

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

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Peachtree City, GA 30269

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: P1461953

Luminaire Tested: USSL-50-722-U-T2RE

Issue Date: 06/10/2026

**Test Information**

Test Method: LM-79-2024  
Report Number: P1461953  
Test Lab: INNOVATION CENTER(G3)  
Issue Date: 6/11/2026  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: STREETWORKS  
Catalog Number: USSL-50-722-U-T2RE  
Description: USSL DISCRETE LED 1 SQUARE 50W 70CRI 2200K FIXTURE w/ TYPE II ROADWAY  
ILLUMINANCE DISTRIBUTION OPTIC  
Light Source: (40) 2200K CCT, 70 CRI LEDS  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 7171.4 lumens  
Efficiency: N/A  
Efficacy: 137.9 lumens/watt  
Luminous Opening: Rectangular (W 0.67' x L: 0.67' x H: 0')  
IES Classification: Type II - Short  
BUG Rating: B1 - U0 - G1

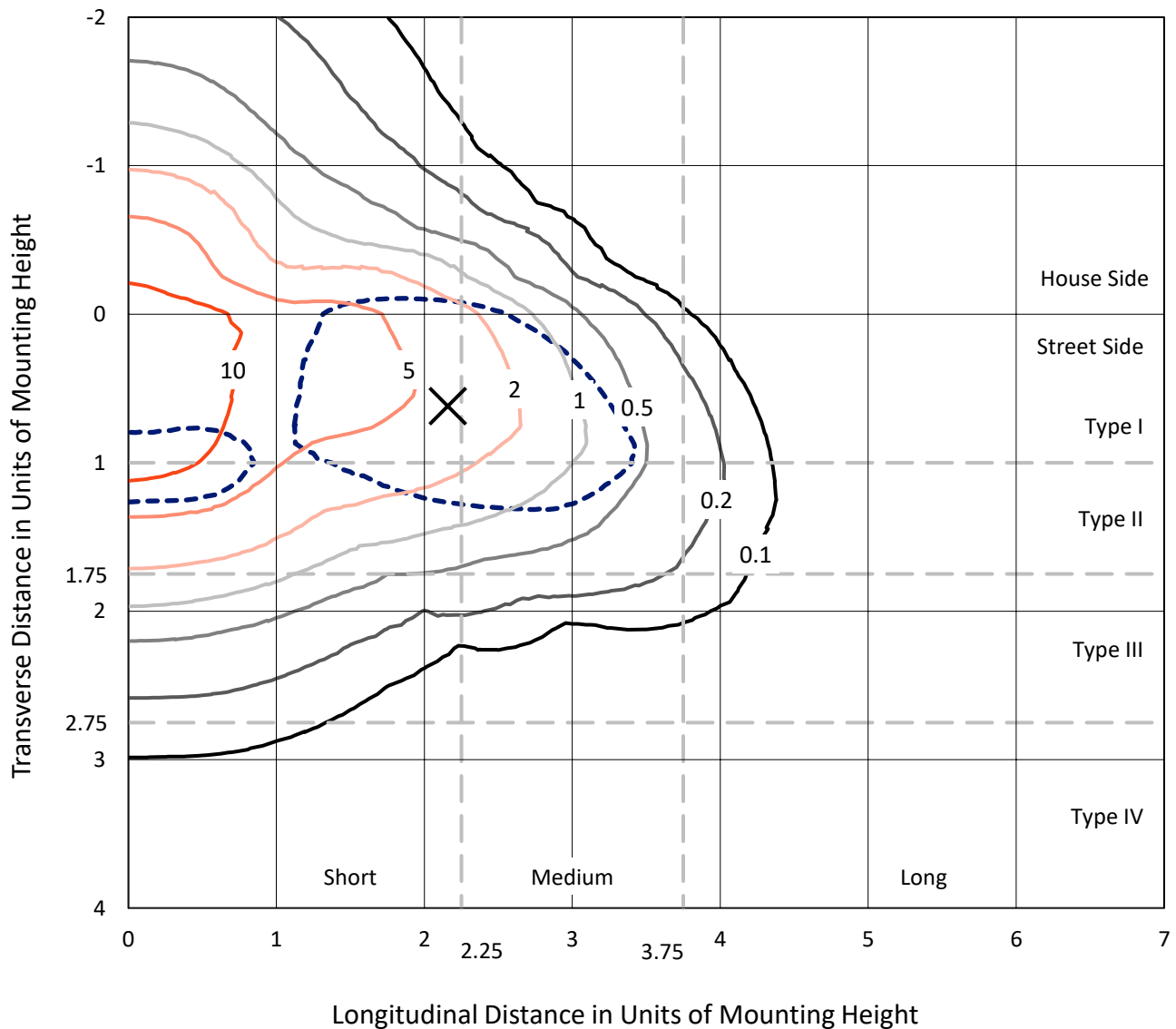
Input Watts (W): 52  
Input Voltage (V): 120  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: 0.98  
Total Harmonic Distortion (THDi): 3.35%  
Frequency (hertz): 60  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 28.75 FT

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## Iso-Footcandle Lines of Horizontal Illumination

× Max cd  
- - - 1/2 Max cd

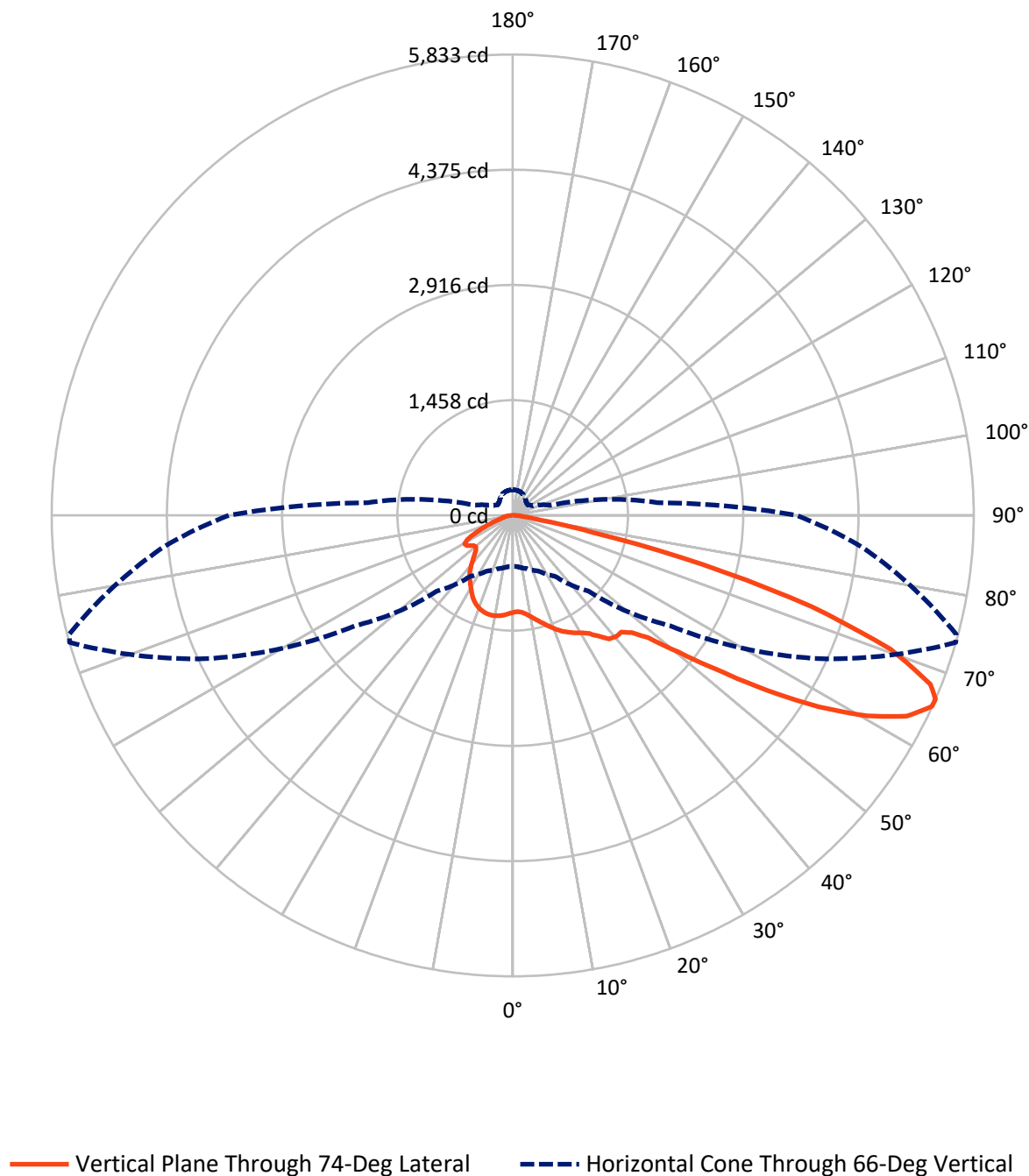


Based on 10 foot mounting height. Maximum calculated value = 14.4 fc  
Type II - Short - N/A

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## Luminous Intensity Polar Plot



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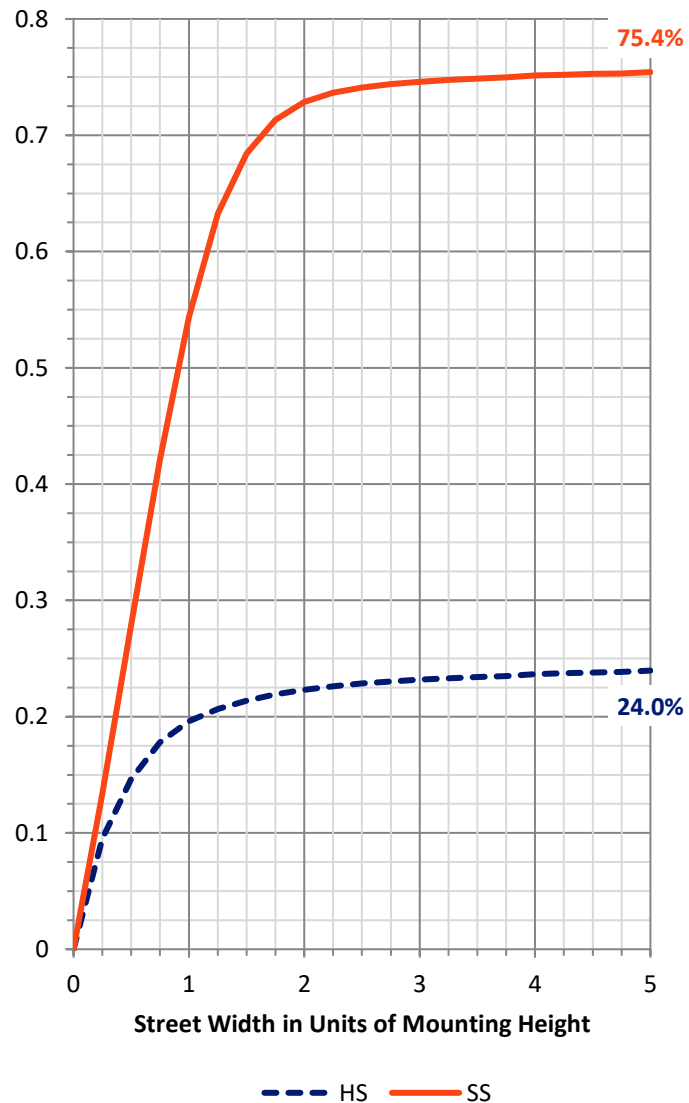
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total  |
|--------------------|-----------|----------|--------|--------|
| <b>House Side</b>  | Lumens    | 1745.5   | 0.0    | 1745.5 |
|                    | % Fixture | 24.3     | 0.0    | 24.3   |
| <b>Street Side</b> | Lumens    | 5425.8   | 0.0    | 5425.8 |
|                    | % Fixture | 75.7     | 0.0    | 75.7   |
| <b>Total</b>       | Lumens    | 7171.4   | 0.0    | 7171.4 |
|                    | % Fixture | 100.0    | 0.0    | 100.0  |

**ZONAL LUMENS:**

| Zone      | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10°    | 115.4  | 1.6       |
| 10°-20°   | 356.5  | 5.0       |
| 20°-30°   | 664.3  | 9.3       |
| 30°-40°   | 996.6  | 13.9      |
| 40°-50°   | 1313.4 | 18.3      |
| 50°-60°   | 1600.9 | 22.3      |
| 60°-70°   | 1463.2 | 20.4      |
| 70°-80°   | 571.9  | 8.0       |
| 80°-90°   | 89.0   | 1.2       |
| 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°    | 7171.4 | 100.0     |
| 0°-180°   | 7171.4 | 100.0     |

**Coefficient of Utilization**



REPORT NUMBER: P1461953

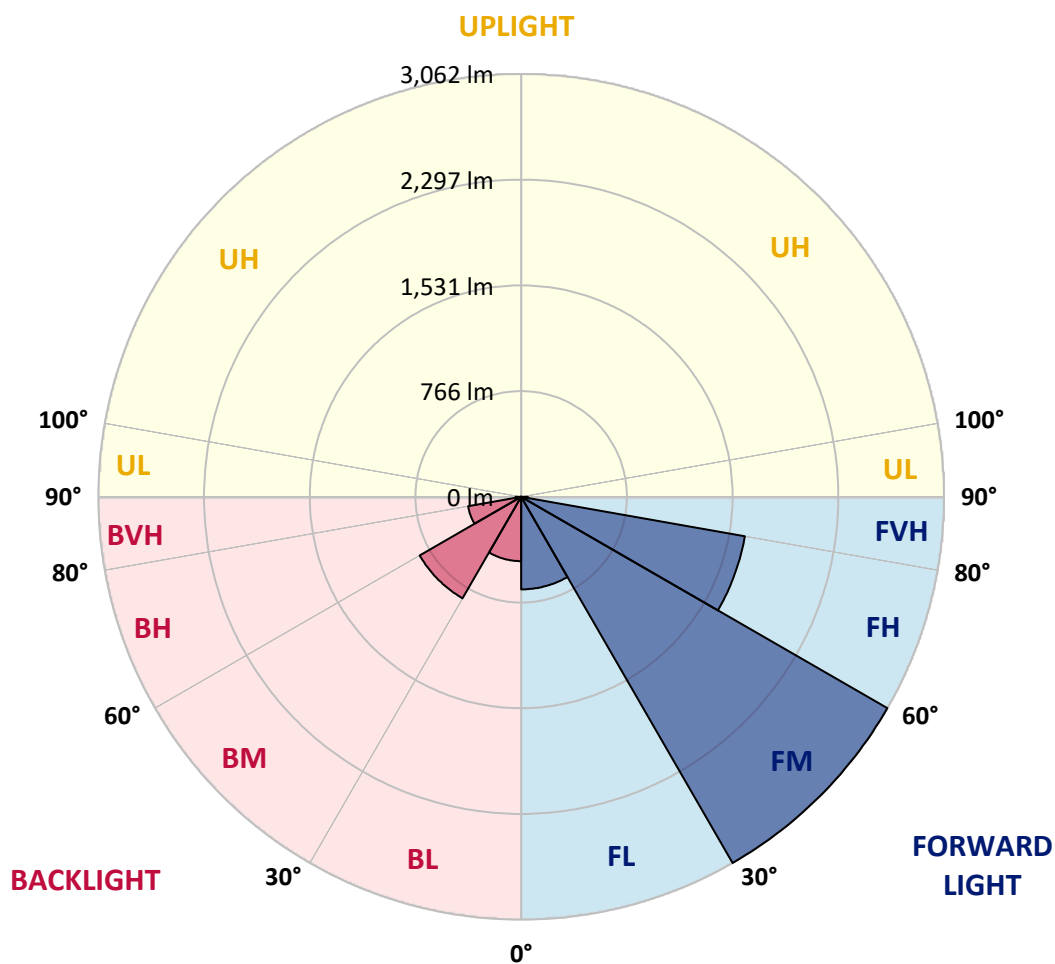
CATALOG NUMBER: USSL-50-722-U-T2RE

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

| Zone |             | Lumens | % Fixture | Zone Rating/Lumen Limit |      |         |
|------|-------------|--------|-----------|-------------------------|------|---------|
|      |             |        |           | B                       | U    | G       |
| FL   | (0°-30°)    | 670.4  | 9.3       |                         |      |         |
| FM   | (30°-60°)   | 3062.3 | 42.7      |                         |      |         |
| FH   | (60°-80°)   | 1645.0 | 22.9      |                         |      | G1/1800 |
| FVH  | (80°-90°)   | 48.2   | 0.7       |                         |      | G1/100  |
| BL   | (0°-30°)    | 465.9  | 6.5       | B1/500                  |      |         |
| BM   | (30°-60°)   | 848.6  | 11.8      | B1/1000                 |      |         |
| BH   | (60°-80°)   | 390.2  | 5.4       | B1/500                  |      | G1/500  |
| BVH  | (80°-90°)   | 40.9   | 0.6       |                         |      | G1/100  |
| UL   | (90°-100°)  | 0.0    | 0.0       |                         | U0/0 |         |
| UH   | (100°-180°) | 0.0    | 0.0       |                         | U0/0 |         |

**BUG Rating: B1-U0-G1**

Type II Short



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**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 5°     | 15°    | 25°    | 35°    | 45°    | 55°    | 65°    | 74°    | 75°    | 85°    |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 1226.7 | 1226.7 | 1226.7 | 1226.7 | 1226.7 | 1226.7 | 1226.7 | 1226.7 | 1226.7 | 1226.7 | 1226.7 |
| 2.5°  | 1215.0 | 1214.4 | 1211.7 | 1212.7 | 1214.0 | 1214.7 | 1217.4 | 1215.7 | 1218.4 | 1222.0 | 1224.7 |
| 5°    | 1179.8 | 1180.4 | 1184.4 | 1193.1 | 1209.0 | 1223.0 | 1233.3 | 1234.3 | 1232.0 | 1236.3 | 1238.3 |
| 7.5°  | 1126.2 | 1123.6 | 1132.2 | 1147.5 | 1168.1 | 1199.4 | 1238.0 | 1260.6 | 1262.3 | 1266.3 | 1267.9 |
| 10°   | 1145.8 | 1146.5 | 1144.9 | 1140.5 | 1151.2 | 1179.8 | 1230.0 | 1281.6 | 1307.2 | 1311.5 | 1312.5 |
| 12.5° | 1259.9 | 1257.9 | 1245.6 | 1228.0 | 1212.7 | 1202.7 | 1237.0 | 1301.8 | 1357.4 | 1360.7 | 1371.0 |
| 15°   | 1404.0 | 1390.3 | 1382.7 | 1359.4 | 1324.8 | 1286.5 | 1275.2 | 1333.4 | 1412.3 | 1421.9 | 1441.2 |
| 17.5° | 1537.7 | 1529.7 | 1521.7 | 1494.8 | 1448.2 | 1400.0 | 1351.4 | 1375.7 | 1473.5 | 1486.8 | 1515.0 |
| 20°   | 1676.7 | 1674.7 | 1664.1 | 1639.8 | 1591.2 | 1524.7 | 1448.2 | 1433.9 | 1532.7 | 1549.0 | 1595.9 |
| 22.5° | 1819.1 | 1820.1 | 1809.4 | 1778.1 | 1738.6 | 1656.7 | 1556.6 | 1495.1 | 1590.2 | 1611.5 | 1671.0 |
| 25°   | 1950.4 | 1948.1 | 1932.5 | 1920.8 | 1884.6 | 1801.4 | 1681.7 | 1566.3 | 1638.1 | 1661.1 | 1740.2 |
| 27.5° | 2051.2 | 2042.6 | 2059.2 | 2054.2 | 2019.0 | 1936.5 | 1799.8 | 1644.8 | 1683.4 | 1710.3 | 1800.4 |
| 30°   | 2165.0 | 2157.3 | 2175.3 | 2190.6 | 2154.0 | 2071.8 | 1914.8 | 1711.0 | 1722.6 | 1753.5 | 1857.3 |
| 32.5° | 2324.3 | 2321.3 | 2319.6 | 2330.9 | 2303.7 | 2202.9 | 2030.9 | 1804.8 | 1781.8 | 1812.1 | 1914.8 |
| 35°   | 2547.5 | 2537.5 | 2504.9 | 2485.3 | 2456.3 | 2330.6 | 2163.0 | 1932.5 | 1878.9 | 1910.2 | 1980.4 |
| 37.5° | 2789.3 | 2784.6 | 2724.8 | 2652.6 | 2575.7 | 2443.0 | 2286.0 | 2058.5 | 1983.0 | 2010.3 | 2032.3 |
| 40°   | 3057.4 | 3022.1 | 2971.9 | 2861.5 | 2706.5 | 2511.2 | 2305.3 | 2045.6 | 2014.0 | 2048.6 | 2042.2 |
| 42.5° | 3281.9 | 3235.0 | 3178.8 | 3069.0 | 2839.5 | 2591.0 | 2332.6 | 2043.2 | 2018.6 | 2058.2 | 2026.6 |
| 45°   | 3456.5 | 3434.6 | 3346.7 | 3234.3 | 2975.9 | 2664.6 | 2406.4 | 2135.0 | 2115.4 | 2157.3 | 2059.5 |
| 47.5° | 3485.8 | 3462.5 | 3432.9 | 3351.7 | 3068.7 | 2748.0 | 2508.9 | 2310.7 | 2315.6 | 2373.5 | 2192.9 |
| 50°   | 3222.3 | 3216.7 | 3265.6 | 3320.1 | 3116.2 | 2801.3 | 2633.0 | 2573.1 | 2715.8 | 2750.7 | 2529.2 |
| 52.5° | 2713.8 | 2707.1 | 2867.1 | 3063.0 | 2999.5 | 2829.9 | 2783.6 | 2959.6 | 3246.0 | 3304.2 | 2967.9 |
| 55°   | 2152.7 | 2194.6 | 2343.9 | 2658.9 | 2685.2 | 2714.1 | 2940.3 | 3406.3 | 3905.2 | 3934.1 | 3443.9 |
| 57.5° | 1815.7 | 1802.8 | 1913.9 | 2205.2 | 2292.4 | 2468.6 | 3004.8 | 3895.6 | 4569.4 | 4544.8 | 3906.9 |
| 60°   | 1529.0 | 1534.0 | 1593.2 | 1810.7 | 1924.2 | 2113.8 | 2960.6 | 4336.3 | 5153.8 | 5124.2 | 4298.7 |
| 62.5° | 1157.5 | 1146.2 | 1205.4 | 1384.3 | 1617.2 | 1804.4 | 2807.2 | 4544.1 | 5593.5 | 5562.3 | 4489.6 |
| 65°   | 757.0  | 771.0  | 818.6  | 930.3  | 1147.8 | 1506.7 | 2553.5 | 4422.1 | 5828.7 | 5799.8 | 4477.3 |
| 66°   | 643.9  | 649.6  | 697.8  | 777.3  | 941.6  | 1353.7 | 2433.7 | 4290.4 | 5832.7 | 5808.4 | 4410.4 |
| 67.5° | 493.3  | 501.6  | 542.2  | 591.4  | 691.2  | 1049.1 | 2221.2 | 4020.3 | 5699.3 | 5677.4 | 4220.8 |
| 70°   | 361.9  | 364.5  | 396.8  | 408.1  | 424.7  | 580.1  | 1666.4 | 3467.8 | 5069.0 | 5062.4 | 3488.4 |
| 72.5° | 276.1  | 279.4  | 298.0  | 307.7  | 302.3  | 350.2  | 943.0  | 2825.2 | 3958.1 | 3951.4 | 2404.8 |
| 75°   | 238.2  | 237.2  | 242.8  | 242.1  | 238.8  | 250.5  | 413.8  | 1904.2 | 2479.0 | 2491.9 | 1175.5 |
| 77.5° | 195.6  | 196.6  | 200.6  | 196.9  | 194.2  | 195.9  | 252.1  | 987.9  | 1048.1 | 1020.5 | 355.6  |
| 80°   | 156.7  | 158.0  | 162.0  | 159.7  | 156.0  | 159.7  | 183.6  | 357.6  | 351.6  | 312.7  | 143.4  |
| 82.5° | 123.4  | 119.7  | 123.1  | 124.7  | 121.7  | 126.4  | 137.7  | 163.3  | 152.3  | 148.3  | 100.4  |
| 85°   | 79.8   | 80.5   | 74.5   | 83.2   | 80.5   | 81.8   | 94.5   | 111.4  | 106.8  | 105.8  | 69.2   |
| 87.5° | 26.6   | 28.9   | 31.6   | 32.3   | 33.3   | 34.6   | 40.6   | 49.2   | 61.9   | 64.2   | 28.6   |
| 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: USSL-50-722-U-T2RE

**CANDELA DISTRIBUTION (continued):**

|       | 90°    | 95°    | 105°   | 115°   | 125°   | 135°   | 145°   | 155°   | 165°   | 175°   | 180°   |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 1226.7 | 1226.7 | 1226.7 | 1226.7 | 1226.7 | 1226.7 | 1226.7 | 1226.7 | 1226.7 | 1226.7 | 1226.7 |
| 2.5°  | 1229.7 | 1234.7 | 1241.3 | 1249.3 | 1254.9 | 1258.9 | 1256.6 | 1256.9 | 1255.9 | 1252.6 | 1252.0 |
| 5°    | 1244.0 | 1251.6 | 1262.6 | 1264.9 | 1258.6 | 1246.0 | 1230.7 | 1215.4 | 1207.0 | 1198.1 | 1197.7 |
| 7.5°  | 1274.6 | 1278.2 | 1280.9 | 1262.3 | 1227.7 | 1195.7 | 1162.1 | 1139.2 | 1128.9 | 1122.6 | 1128.2 |
| 10°   | 1315.1 | 1315.5 | 1292.9 | 1238.3 | 1179.8 | 1136.2 | 1108.6 | 1091.0 | 1081.0 | 1077.3 | 1079.0 |
| 12.5° | 1367.7 | 1360.1 | 1300.5 | 1209.4 | 1133.5 | 1091.3 | 1068.4 | 1057.4 | 1049.7 | 1047.1 | 1048.4 |
| 15°   | 1431.2 | 1406.3 | 1298.9 | 1174.1 | 1090.3 | 1057.0 | 1041.1 | 1032.8 | 1027.4 | 1025.4 | 1027.8 |
| 17.5° | 1494.1 | 1445.9 | 1288.2 | 1135.2 | 1057.7 | 1034.4 | 1023.8 | 1014.5 | 1012.1 | 1010.8 | 1012.8 |
| 20°   | 1556.0 | 1480.5 | 1269.9 | 1093.3 | 1033.8 | 1022.1 | 1010.5 | 1004.8 | 1007.5 | 1008.8 | 1012.5 |
| 22.5° | 1612.5 | 1501.4 | 1240.6 | 1050.1 | 1014.5 | 1007.8 | 1003.8 | 1002.5 | 1007.1 | 1009.8 | 1013.1 |
| 25°   | 1654.1 | 1507.4 | 1201.4 | 1012.5 | 991.5  | 994.2  | 998.5  | 996.5  | 997.8  | 998.2  | 1000.5 |
| 27.5° | 1686.7 | 1505.4 | 1145.2 | 976.2  | 963.6  | 975.6  | 985.5  | 977.2  | 973.6  | 970.2  | 972.2  |
| 30°   | 1715.3 | 1500.7 | 1084.0 | 933.3  | 924.3  | 944.6  | 955.9  | 940.3  | 930.3  | 924.0  | 930.0  |
| 32.5° | 1739.6 | 1500.1 | 1027.1 | 877.8  | 878.8  | 900.4  | 912.0  | 894.1  | 879.1  | 873.1  | 872.1  |
| 35°   | 1764.8 | 1502.1 | 974.2  | 821.2  | 815.2  | 844.2  | 850.2  | 833.5  | 814.6  | 807.9  | 808.6  |
| 37.5° | 1780.5 | 1503.7 | 919.3  | 749.4  | 746.0  | 773.7  | 779.3  | 767.0  | 753.4  | 745.7  | 743.4  |
| 40°   | 1767.5 | 1483.8 | 843.8  | 676.2  | 664.9  | 688.5  | 703.5  | 701.1  | 681.2  | 658.2  | 657.2  |
| 42.5° | 1759.9 | 1464.5 | 764.0  | 605.4  | 595.0  | 607.7  | 634.3  | 620.3  | 582.7  | 578.4  | 575.4  |
| 45°   | 1820.7 | 1476.1 | 697.5  | 546.1  | 523.2  | 543.5  | 568.4  | 535.2  | 519.2  | 513.6  | 518.2  |
| 47.5° | 1992.3 | 1542.0 | 648.6  | 503.9  | 472.6  | 491.6  | 500.9  | 489.3  | 475.6  | 473.6  | 475.6  |
| 50°   | 2367.2 | 1715.3 | 626.6  | 480.6  | 438.1  | 449.4  | 445.7  | 451.4  | 441.0  | 443.0  | 445.0  |
| 52.5° | 2842.8 | 2026.3 | 638.0  | 477.6  | 414.1  | 405.1  | 402.5  | 414.8  | 416.8  | 426.1  | 429.4  |
| 55°   | 3339.4 | 2300.3 | 677.2  | 488.3  | 387.5  | 355.9  | 360.2  | 381.8  | 401.5  | 414.1  | 417.1  |
| 57.5° | 3760.2 | 2433.7 | 720.8  | 488.3  | 351.9  | 317.0  | 327.0  | 358.6  | 389.8  | 400.5  | 401.8  |
| 60°   | 3936.1 | 2412.8 | 734.4  | 455.3  | 315.0  | 285.4  | 302.3  | 344.6  | 373.9  | 379.8  | 383.2  |
| 62.5° | 3912.2 | 2291.0 | 677.2  | 388.5  | 276.4  | 261.8  | 288.4  | 329.6  | 350.2  | 357.2  | 358.9  |
| 65°   | 3731.2 | 2016.3 | 555.8  | 310.3  | 243.8  | 244.8  | 276.7  | 310.7  | 327.3  | 335.6  | 338.9  |
| 66°   | 3591.5 | 1841.3 | 495.9  | 287.0  | 232.2  | 239.5  | 272.1  | 301.0  | 317.0  | 323.3  | 326.3  |
| 67.5° | 3292.5 | 1529.4 | 423.4  | 249.8  | 219.2  | 232.2  | 262.1  | 286.4  | 299.0  | 306.3  | 308.7  |
| 70°   | 2400.5 | 932.3  | 304.3  | 199.6  | 200.2  | 217.9  | 237.2  | 254.1  | 278.1  | 288.4  | 291.7  |
| 72.5° | 1420.6 | 466.0  | 221.5  | 169.0  | 184.9  | 202.9  | 212.2  | 231.5  | 262.4  | 280.4  | 285.0  |
| 75°   | 648.9  | 228.5  | 161.6  | 149.7  | 165.6  | 176.3  | 186.9  | 213.5  | 251.5  | 278.7  | 283.4  |
| 77.5° | 220.2  | 147.3  | 131.4  | 134.4  | 138.4  | 145.7  | 161.6  | 195.6  | 239.1  | 269.4  | 277.1  |
| 80°   | 119.1  | 116.7  | 108.8  | 113.8  | 114.8  | 121.4  | 138.7  | 173.0  | 217.2  | 243.5  | 245.1  |
| 82.5° | 95.5   | 90.5   | 86.5   | 88.5   | 90.5   | 99.1   | 111.4  | 143.0  | 184.3  | 150.3  | 152.0  |
| 85°   | 61.5   | 54.2   | 56.2   | 59.2   | 61.2   | 68.9   | 76.8   | 106.1  | 132.7  | 70.2   | 66.9   |
| 87.5° | 18.3   | 16.6   | 20.0   | 22.3   | 22.0   | 22.3   | 29.6   | 55.5   | 78.2   | 32.9   | 22.6   |
| 90°   | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |

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

Report Prepared for

Cooper Lighting Solutions

McGraw-Edison

Report Number: SP2-2501-321-2

Test Date: 04/09/2025

Luminaire Tested: GKO-PB1E-722-U-T4W

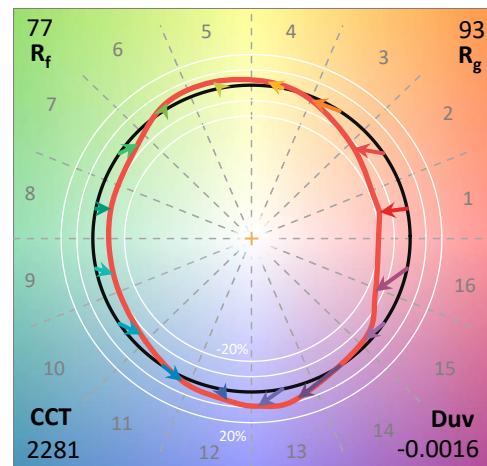
Data in this report applies to families of products including GKO-PB1E-722-U-T4W

### Test Information

Test Method: LM-79-2019  
 Report Number: SP2-2501-321-2  
 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-722-U-T4W**  
 Description: Gekko Wedge Wall Pack Fixture 1 SQ w/ T4W distribution

### Spectral Parameters

|                           |          |           |      |      |       |
|---------------------------|----------|-----------|------|------|-------|
| CCT (K):                  | 2281     | CRI (Ra): | 70.6 |      |       |
| CIE u':                   | 0.2851   | R1:       | 68.4 | R9:  | -35.1 |
| CIE v':                   | 0.5324   | R2:       | 88.7 | R10: | 78.0  |
| Duv:                      | -0.0016  | R3:       | 85.7 | R11: | 60.2  |
| CIE x:                    | 0.4942   | R4:       | 63.2 | R12: | 73.8  |
| CIE y:                    | 0.4102   | R5:       | 69.0 | R13: | 72.8  |
| CIE z:                    | 0.0956   | R6:       | 88.6 | R14: | 92.4  |
| Peak Wavelength (nm):     | 602      | R7:       | 68.8 | R15: | 58.4  |
| Dominant Wavelength (nm): | 587      | R8:       | 32.6 |      |       |
| Purity:                   | 71.48321 |           |      |      |       |
| Rf:                       | 76.9     |           |      |      |       |
| Rg:                       | 92.6     |           |      |      |       |



### Test Conditions

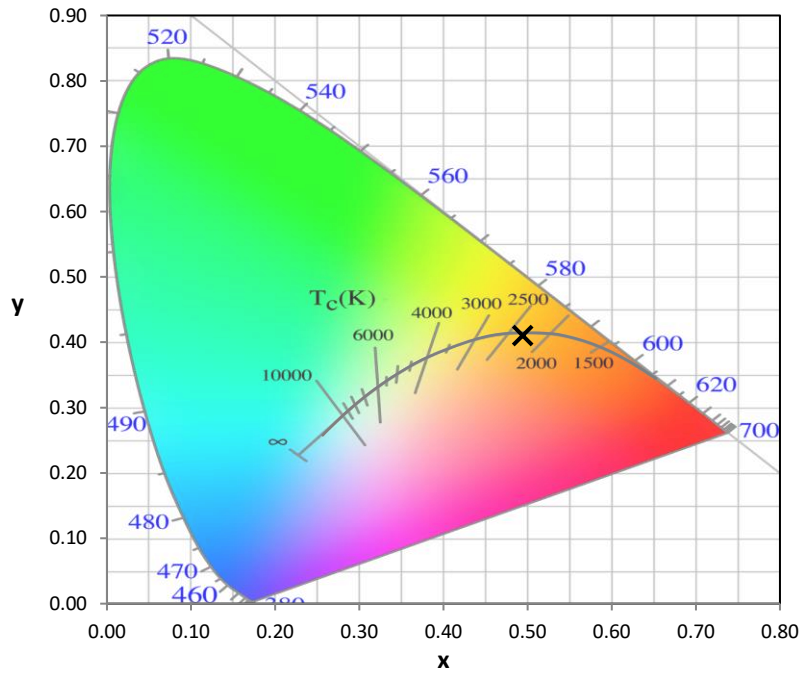
Stabilization Time: 40M  
 Operation Time: 1H 40M  
 Sphere Temperature (°C): 25.0

REPORT NUMBER: SP2-2501-321-2

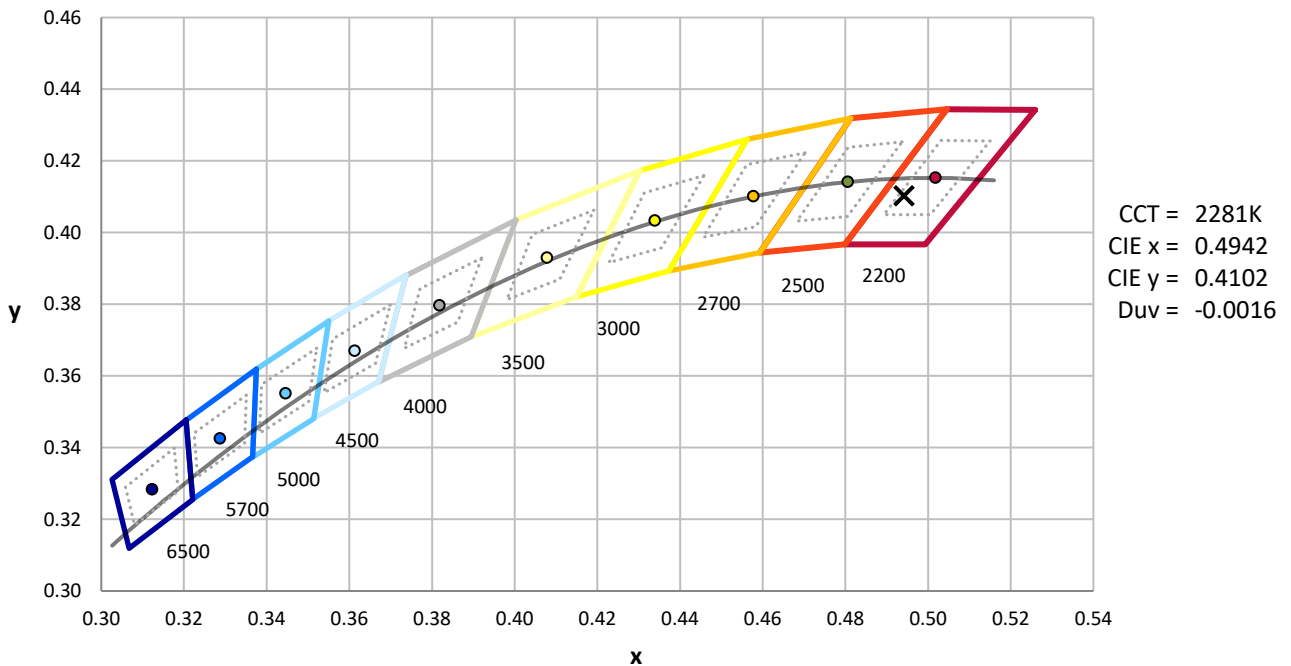
| Measurement and Test Equipment |                       |                  |                      |
|--------------------------------|-----------------------|------------------|----------------------|
| Instrument                     | Identification Number | Calibration Date | Calibration Due Date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

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**CIE 1931 Chromaticity Diagram**



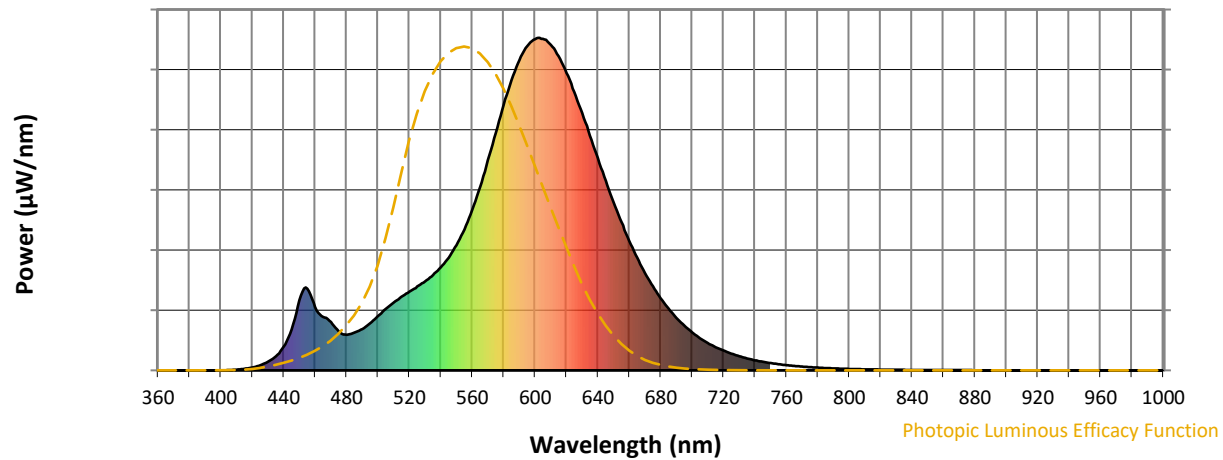
**CIE 1931 Chromaticity Diagram with 2017 ANSI 7-Step and 4-Step Quadrangles**



Point lies inside the ANSI 2200K 4-step quadrangle

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### Photopic Flux vs. Wavelength

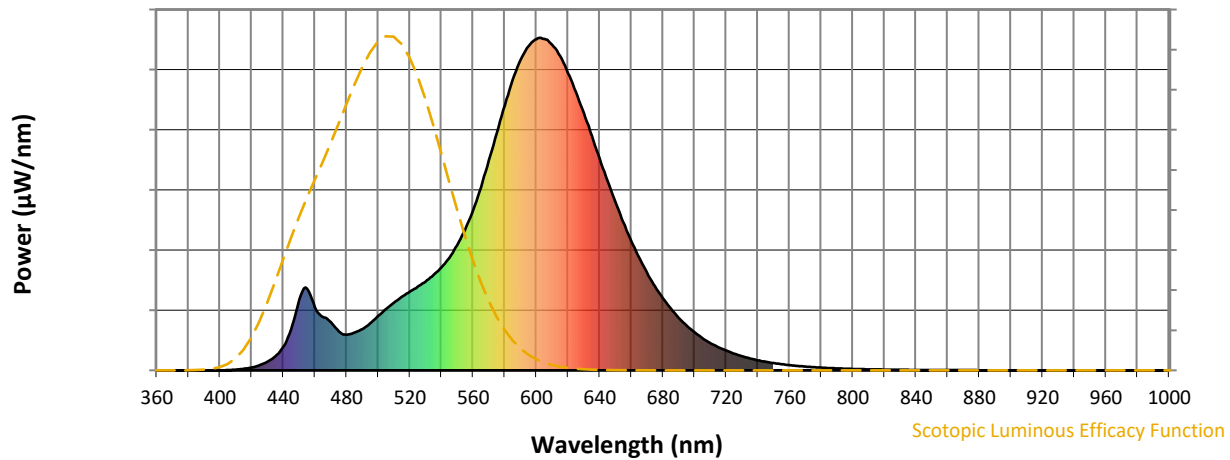


### Photopic Lumens: NR

| λ<br>(nm) | Power<br>W <sup>λ</sup> /nm | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>W <sup>λ</sup> /nm | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>W <sup>λ</sup> /nm | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>W <sup>λ</sup> /nm | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>W <sup>λ</sup> /nm | Lumens<br>(φ/nm) |
|-----------|-----------------------------|------------------|-----------|-----------------------------|------------------|-----------|-----------------------------|------------------|-----------|-----------------------------|------------------|-----------|-----------------------------|------------------|
| 360       | 0                           | NR               | 490       | 124                         | NR               | 620       | 894                         | NR               | 750       | 22                          | NR               | 880       | 0                           | NR               |
| 365       | 0                           | NR               | 495       | 141                         | NR               | 625       | 837                         | NR               | 755       | 19                          | NR               | 885       | 0                           | NR               |
| 370       | 0                           | NR               | 500       | 163                         | NR               | 630       | 774                         | NR               | 760       | 16                          | NR               | 890       | 0                           | NR               |
| 375       | 0                           | NR               | 505       | 184                         | NR               | 635       | 706                         | NR               | 765       | 13                          | NR               | 895       | 0                           | NR               |
| 380       | 0                           | NR               | 510       | 204                         | NR               | 640       | 638                         | NR               | 770       | 11                          | NR               | 900       | 0                           | NR               |
| 385       | 0                           | NR               | 515       | 221                         | NR               | 645       | 570                         | NR               | 775       | 10                          | NR               | 905       | 0                           | NR               |
| 390       | 0                           | NR               | 520       | 237                         | NR               | 650       | 505                         | NR               | 780       | 8                           | NR               | 910       | 0                           | NR               |
| 395       | 0                           | NR               | 525       | 252                         | NR               | 655       | 446                         | NR               | 785       | 7                           | NR               | 915       | 0                           | NR               |
| 400       | 0                           | NR               | 530       | 268                         | NR               | 660       | 389                         | NR               | 790       | 6                           | NR               | 920       | 0                           | NR               |
| 405       | 1                           | NR               | 535       | 287                         | NR               | 665       | 339                         | NR               | 795       | 5                           | NR               | 925       | 0                           | NR               |
| 410       | 2                           | NR               | 540       | 310                         | NR               | 670       | 292                         | NR               | 800       | 4                           | NR               | 930       | 0                           | NR               |
| 415       | 5                           | NR               | 545       | 339                         | NR               | 675       | 253                         | NR               | 805       | 4                           | NR               | 935       | 0                           | NR               |
| 420       | 9                           | NR               | 550       | 377                         | NR               | 680       | 217                         | NR               | 810       | 3                           | NR               | 940       | 0                           | NR               |
| 425       | 15                          | NR               | 555       | 424                         | NR               | 685       | 186                         | NR               | 815       | 3                           | NR               | 945       | 0                           | NR               |
| 430       | 26                          | NR               | 560       | 482                         | NR               | 690       | 158                         | NR               | 820       | 2                           | NR               | 950       | 0                           | NR               |
| 435       | 43                          | NR               | 565       | 551                         | NR               | 695       | 135                         | NR               | 825       | 2                           | NR               | 955       | 0                           | NR               |
| 440       | 71                          | NR               | 570       | 632                         | NR               | 700       | 114                         | NR               | 830       | 2                           | NR               | 960       | 0                           | NR               |
| 445       | 123                         | NR               | 575       | 714                         | NR               | 705       | 97                          | NR               | 835       | 2                           | NR               | 965       | 0                           | NR               |
| 450       | 210                         | NR               | 580       | 797                         | NR               | 710       | 82                          | NR               | 840       | 1                           | NR               | 970       | 0                           | NR               |
| 455       | 245                         | NR               | 585       | 873                         | NR               | 715       | 70                          | NR               | 845       | 1                           | NR               | 975       | 0                           | NR               |
| 460       | 190                         | NR               | 590       | 934                         | NR               | 720       | 59                          | NR               | 850       | 1                           | NR               | 980       | 0                           | NR               |
| 465       | 161                         | NR               | 595       | 975                         | NR               | 725       | 50                          | NR               | 855       | 1                           | NR               | 985       | 0                           | NR               |
| 470       | 145                         | NR               | 600       | 996                         | NR               | 730       | 43                          | NR               | 860       | 1                           | NR               | 990       | 0                           | NR               |
| 475       | 117                         | NR               | 605       | 997                         | NR               | 735       | 36                          | NR               | 865       | 1                           | NR               | 995       | 0                           | NR               |
| 480       | 107                         | NR               | 610       | 978                         | NR               | 740       | 30                          | NR               | 870       | 1                           | NR               | 1000      | 0                           | NR               |
| 485       | 113                         | NR               | 615       | 945                         | NR               | 745       | 26                          | NR               | 875       | 1                           | NR               |           |                             |                  |

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### Scotopic Flux vs. Wavelength



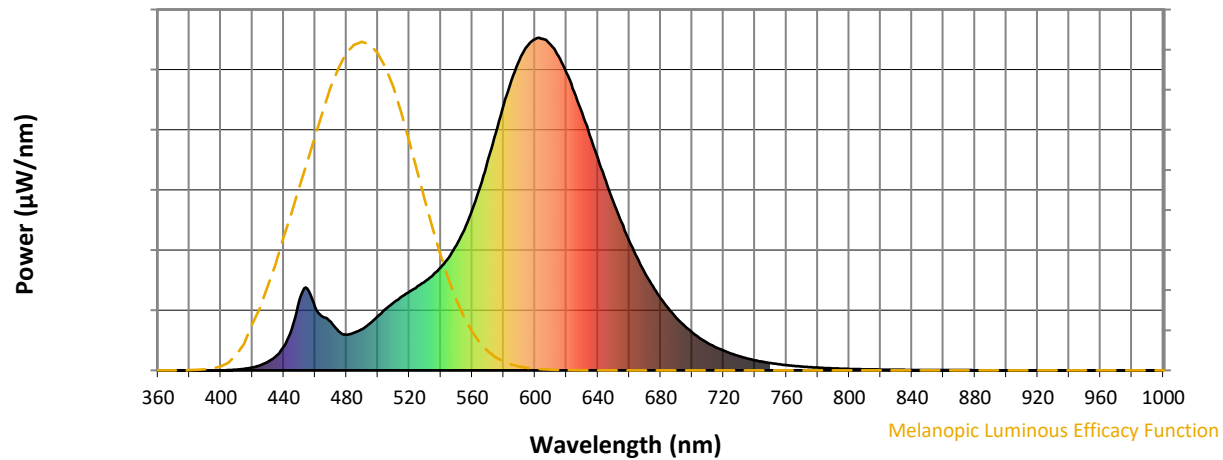
Scotopic Lumens: NR

S/P: 0.98

| 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       | 124                         | NR               | 620       | 894                         | NR               | 750       | 22                          | NR               | 880       | 0                           | NR               |
| 365       | 0                           | NR               | 495       | 141                         | NR               | 625       | 837                         | NR               | 755       | 19                          | NR               | 885       | 0                           | NR               |
| 370       | 0                           | NR               | 500       | 163                         | NR               | 630       | 774                         | NR               | 760       | 16                          | NR               | 890       | 0                           | NR               |
| 375       | 0                           | NR               | 505       | 184                         | NR               | 635       | 706                         | NR               | 765       | 13                          | NR               | 895       | 0                           | NR               |
| 380       | 0                           | NR               | 510       | 204                         | NR               | 640       | 638                         | NR               | 770       | 11                          | NR               | 900       | 0                           | NR               |
| 385       | 0                           | NR               | 515       | 221                         | NR               | 645       | 570                         | NR               | 775       | 10                          | NR               | 905       | 0                           | NR               |
| 390       | 0                           | NR               | 520       | 237                         | NR               | 650       | 505                         | NR               | 780       | 8                           | NR               | 910       | 0                           | NR               |
| 395       | 0                           | NR               | 525       | 252                         | NR               | 655       | 446                         | NR               | 785       | 7                           | NR               | 915       | 0                           | NR               |
| 400       | 0                           | NR               | 530       | 268                         | NR               | 660       | 389                         | NR               | 790       | 6                           | NR               | 920       | 0                           | NR               |
| 405       | 1                           | NR               | 535       | 287                         | NR               | 665       | 339                         | NR               | 795       | 5                           | NR               | 925       | 0                           | NR               |
| 410       | 2                           | NR               | 540       | 310                         | NR               | 670       | 292                         | NR               | 800       | 4                           | NR               | 930       | 0                           | NR               |
| 415       | 5                           | NR               | 545       | 339                         | NR               | 675       | 253                         | NR               | 805       | 4                           | NR               | 935       | 0                           | NR               |
| 420       | 9                           | NR               | 550       | 377                         | NR               | 680       | 217                         | NR               | 810       | 3                           | NR               | 940       | 0                           | NR               |
| 425       | 15                          | NR               | 555       | 424                         | NR               | 685       | 186                         | NR               | 815       | 3                           | NR               | 945       | 0                           | NR               |
| 430       | 26                          | NR               | 560       | 482                         | NR               | 690       | 158                         | NR               | 820       | 2                           | NR               | 950       | 0                           | NR               |
| 435       | 43                          | NR               | 565       | 551                         | NR               | 695       | 135                         | NR               | 825       | 2                           | NR               | 955       | 0                           | NR               |
| 440       | 71                          | NR               | 570       | 632                         | NR               | 700       | 114                         | NR               | 830       | 2                           | NR               | 960       | 0                           | NR               |
| 445       | 123                         | NR               | 575       | 714                         | NR               | 705       | 97                          | NR               | 835       | 2                           | NR               | 965       | 0                           | NR               |
| 450       | 210                         | NR               | 580       | 797                         | NR               | 710       | 82                          | NR               | 840       | 1                           | NR               | 970       | 0                           | NR               |
| 455       | 245                         | NR               | 585       | 873                         | NR               | 715       | 70                          | NR               | 845       | 1                           | NR               | 975       | 0                           | NR               |
| 460       | 190                         | NR               | 590       | 934                         | NR               | 720       | 59                          | NR               | 850       | 1                           | NR               | 980       | 0                           | NR               |
| 465       | 161                         | NR               | 595       | 975                         | NR               | 725       | 50                          | NR               | 855       | 1                           | NR               | 985       | 0                           | NR               |
| 470       | 145                         | NR               | 600       | 996                         | NR               | 730       | 43                          | NR               | 860       | 1                           | NR               | 990       | 0                           | NR               |
| 475       | 117                         | NR               | 605       | 997                         | NR               | 735       | 36                          | NR               | 865       | 1                           | NR               | 995       | 0                           | NR               |
| 480       | 107                         | NR               | 610       | 978                         | NR               | 740       | 30                          | NR               | 870       | 1                           | NR               | 1000      | 0                           | NR               |
| 485       | 113                         | NR               | 615       | 945                         | NR               | 745       | 26                          | NR               | 875       | 1                           | NR               |           |                             |                  |

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### Melanopic Flux vs. Wavelength



Melanopic Lumens: NR

M/P: 1.75

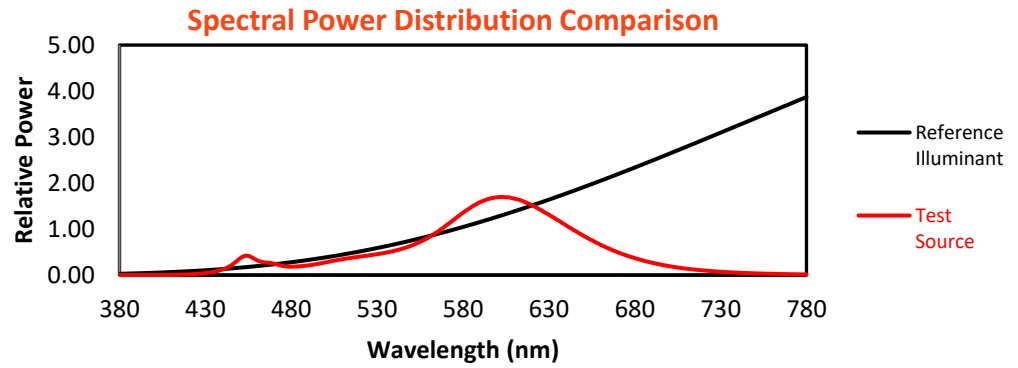
| λ<br>(nm) | Power<br>W <sup>λ</sup> /nm | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>W <sup>λ</sup> /nm | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>W <sup>λ</sup> /nm | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>W <sup>λ</sup> /nm | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>W <sup>λ</sup> /nm | Lumens<br>(φ/nm) |
|-----------|-----------------------------|------------------|-----------|-----------------------------|------------------|-----------|-----------------------------|------------------|-----------|-----------------------------|------------------|-----------|-----------------------------|------------------|
| 360       | 0                           | NR               | 490       | 124                         | NR               | 620       | 894                         | NR               | 750       | 22                          | NR               | 880       | 0                           | NR               |
| 365       | 0                           | NR               | 495       | 141                         | NR               | 625       | 837                         | NR               | 755       | 19                          | NR               | 885       | 0                           | NR               |
| 370       | 0                           | NR               | 500       | 163                         | NR               | 630       | 774                         | NR               | 760       | 16                          | NR               | 890       | 0                           | NR               |
| 375       | 0                           | NR               | 505       | 184                         | NR               | 635       | 706                         | NR               | 765       | 13                          | NR               | 895       | 0                           | NR               |
| 380       | 0                           | NR               | 510       | 204                         | NR               | 640       | 638                         | NR               | 770       | 11                          | NR               | 900       | 0                           | NR               |
| 385       | 0                           | NR               | 515       | 221                         | NR               | 645       | 570                         | NR               | 775       | 10                          | NR               | 905       | 0                           | NR               |
| 390       | 0                           | NR               | 520       | 237                         | NR               | 650       | 505                         | NR               | 780       | 8                           | NR               | 910       | 0                           | NR               |
| 395       | 0                           | NR               | 525       | 252                         | NR               | 655       | 446                         | NR               | 785       | 7                           | NR               | 915       | 0                           | NR               |
| 400       | 0                           | NR               | 530       | 268                         | NR               | 660       | 389                         | NR               | 790       | 6                           | NR               | 920       | 0                           | NR               |
| 405       | 1                           | NR               | 535       | 287                         | NR               | 665       | 339                         | NR               | 795       | 5                           | NR               | 925       | 0                           | NR               |
| 410       | 2                           | NR               | 540       | 310                         | NR               | 670       | 292                         | NR               | 800       | 4                           | NR               | 930       | 0                           | NR               |
| 415       | 5                           | NR               | 545       | 339                         | NR               | 675       | 253                         | NR               | 805       | 4                           | NR               | 935       | 0                           | NR               |
| 420       | 9                           | NR               | 550       | 377                         | NR               | 680       | 217                         | NR               | 810       | 3                           | NR               | 940       | 0                           | NR               |
| 425       | 15                          | NR               | 555       | 424                         | NR               | 685       | 186                         | NR               | 815       | 3                           | NR               | 945       | 0                           | NR               |
| 430       | 26                          | NR               | 560       | 482                         | NR               | 690       | 158                         | NR               | 820       | 2                           | NR               | 950       | 0                           | NR               |
| 435       | 43                          | NR               | 565       | 551                         | NR               | 695       | 135                         | NR               | 825       | 2                           | NR               | 955       | 0                           | NR               |
| 440       | 71                          | NR               | 570       | 632                         | NR               | 700       | 114                         | NR               | 830       | 2                           | NR               | 960       | 0                           | NR               |
| 445       | 123                         | NR               | 575       | 714                         | NR               | 705       | 97                          | NR               | 835       | 2                           | NR               | 965       | 0                           | NR               |
| 450       | 210                         | NR               | 580       | 797                         | NR               | 710       | 82                          | NR               | 840       | 1                           | NR               | 970       | 0                           | NR               |
| 455       | 245                         | NR               | 585       | 873                         | NR               | 715       | 70                          | NR               | 845       | 1                           | NR               | 975       | 0                           | NR               |
| 460       | 190                         | NR               | 590       | 934                         | NR               | 720       | 59                          | NR               | 850       | 1                           | NR               | 980       | 0                           | NR               |
| 465       | 161                         | NR               | 595       | 975                         | NR               | 725       | 50                          | NR               | 855       | 1                           | NR               | 985       | 0                           | NR               |
| 470       | 145                         | NR               | 600       | 996                         | NR               | 730       | 43                          | NR               | 860       | 1                           | NR               | 990       | 0                           | NR               |
| 475       | 117                         | NR               | 605       | 997                         | NR               | 735       | 36                          | NR               | 865       | 1                           | NR               | 995       | 0                           | NR               |
| 480       | 107                         | NR               | 610       | 978                         | NR               | 740       | 30                          | NR               | 870       | 1                           | NR               | 1000      | 0                           | NR               |
| 485       | 113                         | NR               | 615       | 945                         | NR               | 745       | 26                          | NR               | 875       | 1                           | NR               |           |                             |                  |

REPORT NUMBER: SP2-2501-321-2

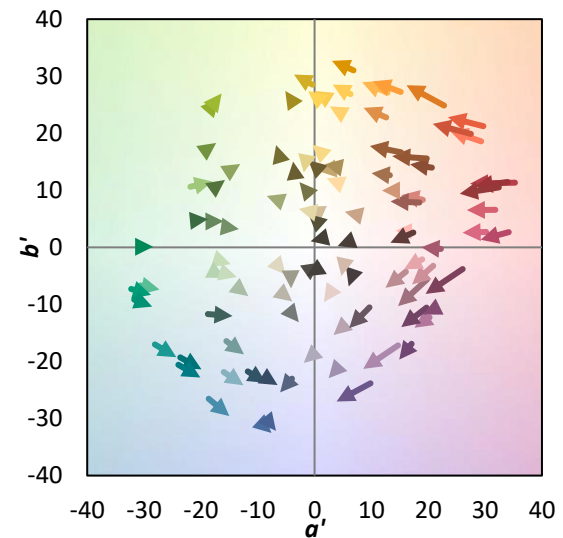
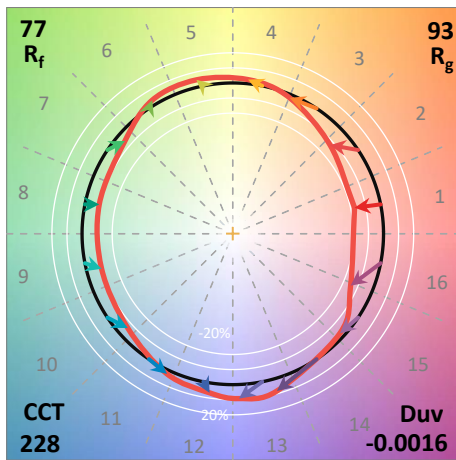
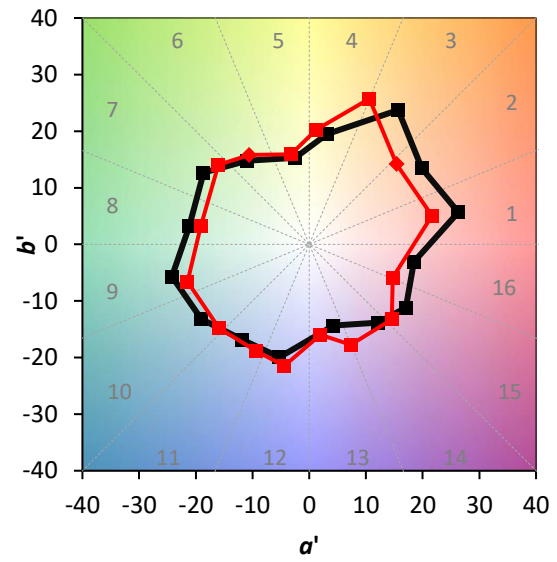
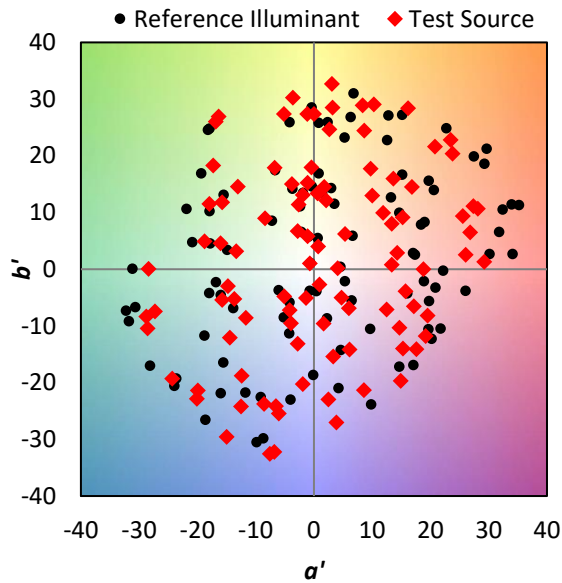
TM-30-18

### Summary

$R_f = 76.9$   
 $R_g = 92.6$   
 $CIE R_a = 70.6$   
 $R_g = -35.1$

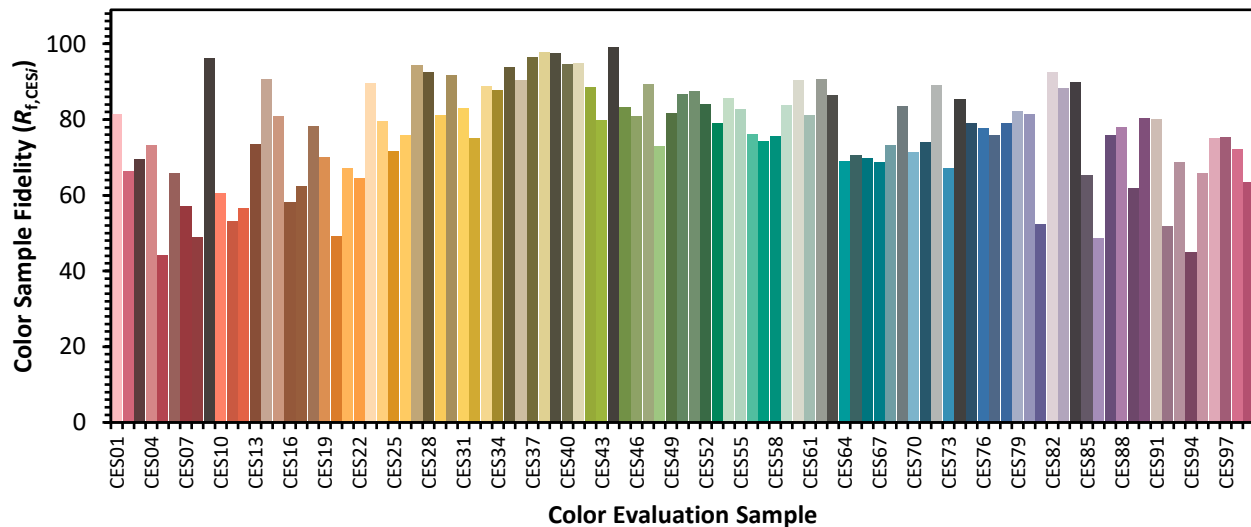


### Color Vector Graphics

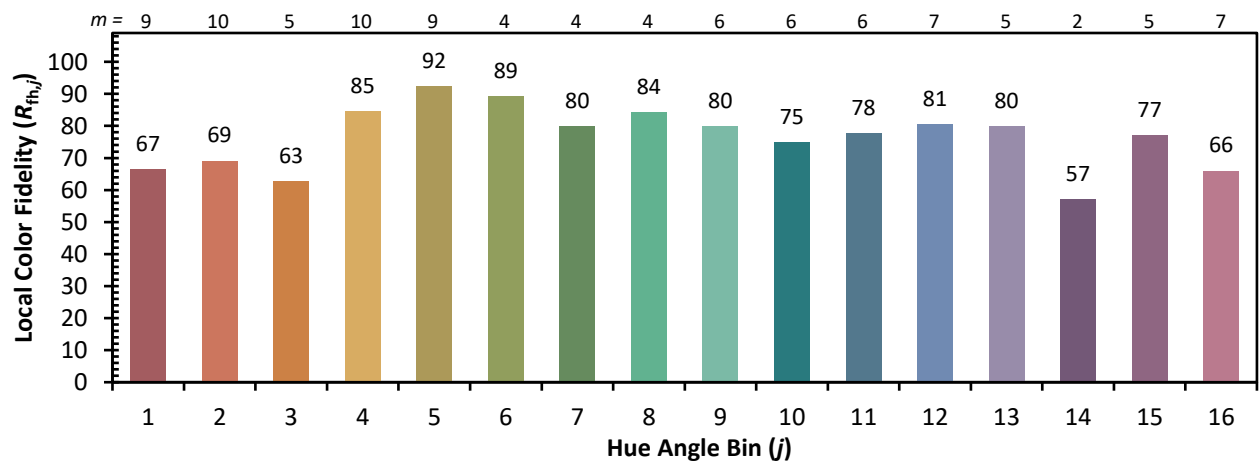
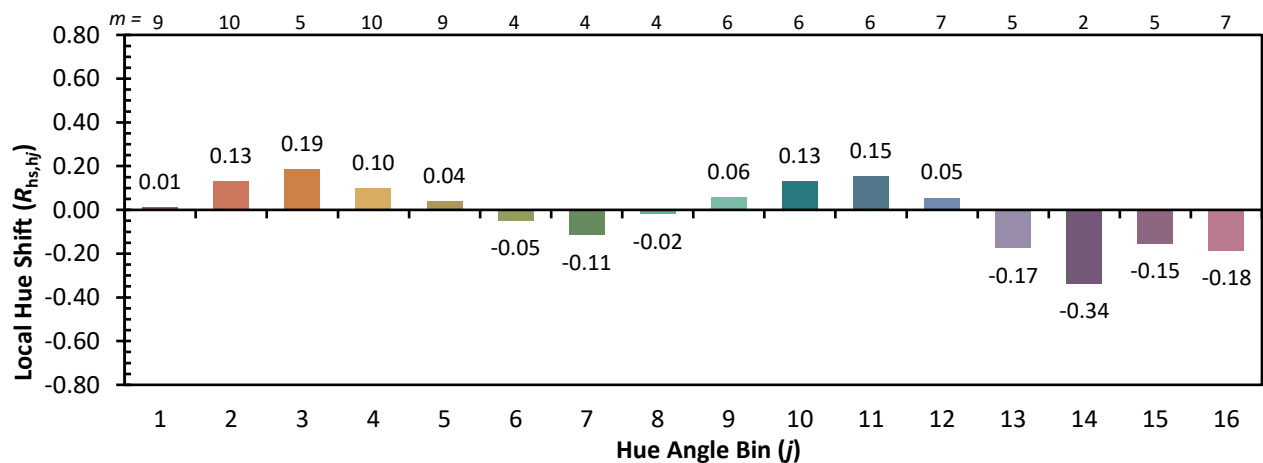
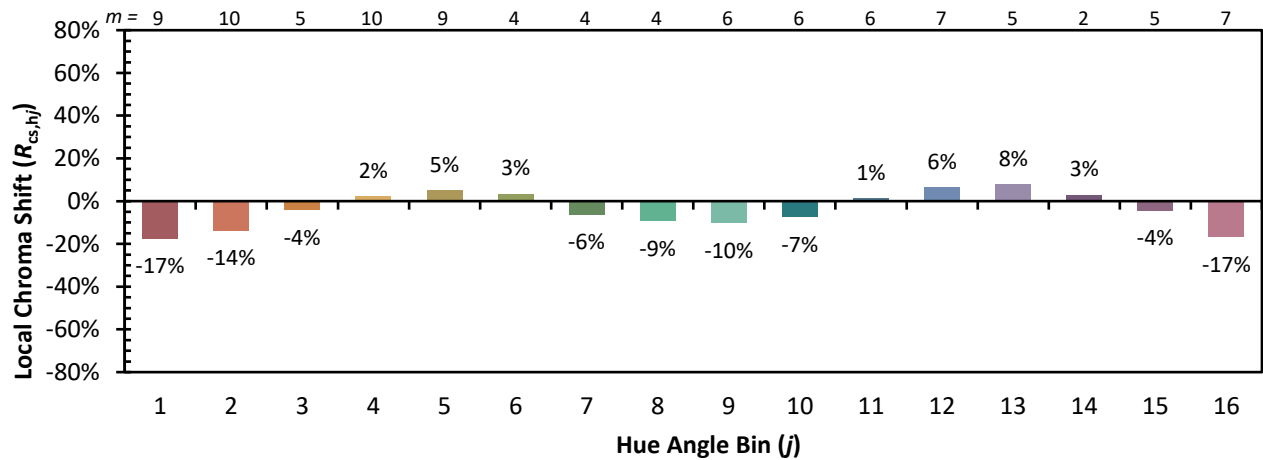


**Individual Sample Fidelity Index ( $R_{f,i}$ )**

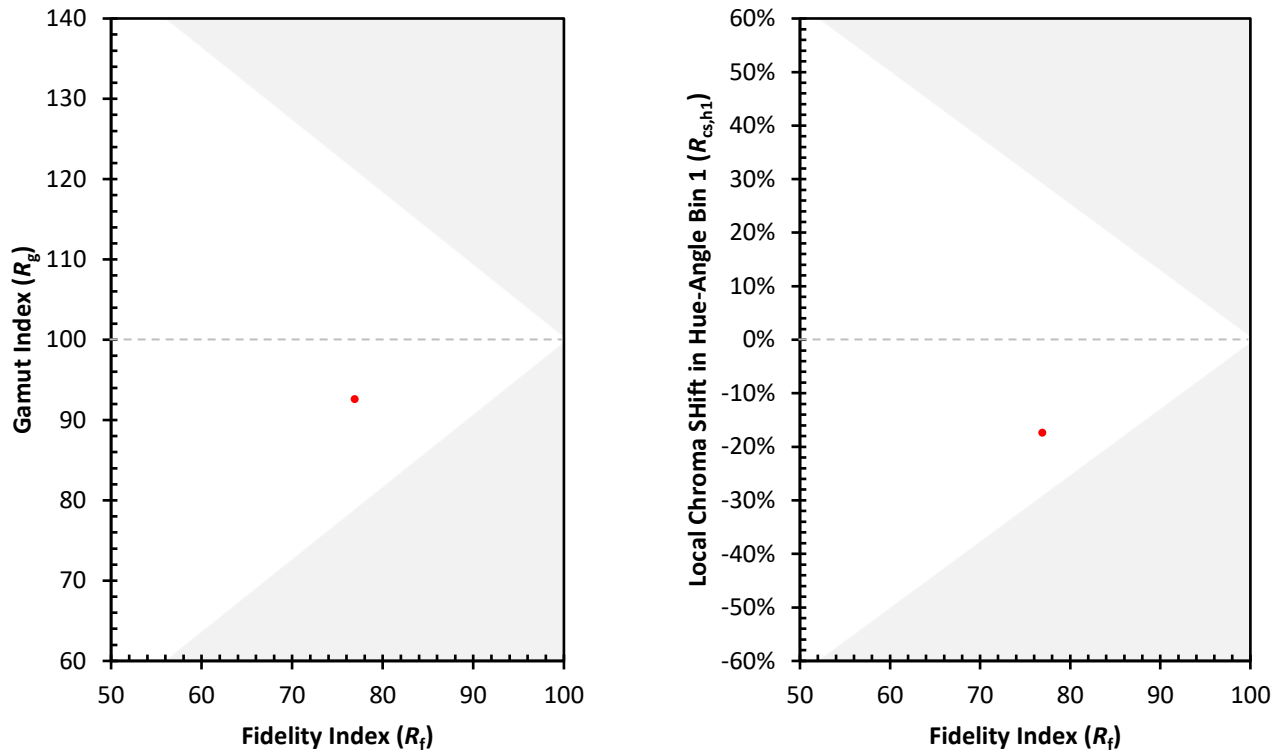
|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 87 | CES26 = 76 | CES51 = 88 | CES76 = 78 |
| CES02 = 65 | CES27 = 94 | CES52 = 84 | CES77 = 76 |
| CES03 = 32 | CES28 = 93 | CES53 = 79 | CES78 = 79 |
| CES04 = 72 | CES29 = 81 | CES54 = 86 | CES79 = 82 |
| CES05 = 51 | CES30 = 92 | CES55 = 83 | CES80 = 81 |
| CES06 = 52 | CES31 = 83 | CES56 = 76 | CES81 = 52 |
| CES07 = 44 | CES32 = 75 | CES57 = 74 | CES82 = 92 |
| CES08 = 42 | CES33 = 89 | CES58 = 76 | CES83 = 88 |
| CES09 = 29 | CES34 = 88 | CES59 = 84 | CES84 = 90 |
| CES10 = 79 | CES35 = 94 | CES60 = 91 | CES85 = 65 |
| CES11 = 62 | CES36 = 90 | CES61 = 81 | CES86 = 49 |
| CES12 = 68 | CES37 = 96 | CES62 = 91 | CES87 = 76 |
| CES13 = 44 | CES38 = 98 | CES63 = 86 | CES88 = 78 |
| CES14 = 75 | CES39 = 98 | CES64 = 69 | CES89 = 62 |
| CES15 = 72 | CES40 = 95 | CES65 = 71 | CES90 = 80 |
| CES16 = 48 | CES41 = 95 | CES66 = 70 | CES91 = 80 |
| CES17 = 51 | CES42 = 89 | CES67 = 69 | CES92 = 52 |
| CES18 = 57 | CES43 = 80 | CES68 = 73 | CES93 = 69 |
| CES19 = 74 | CES44 = 99 | CES69 = 84 | CES94 = 45 |
| CES20 = 68 | CES45 = 83 | CES70 = 71 | CES95 = 66 |
| CES21 = 88 | CES46 = 81 | CES71 = 74 | CES96 = 75 |
| CES22 = 81 | CES47 = 89 | CES72 = 89 | CES97 = 75 |
| CES23 = 92 | CES48 = 73 | CES73 = 67 | CES98 = 72 |
| CES24 = 92 | CES49 = 82 | CES74 = 85 | CES99 = 64 |
| CES25 = 73 | CES50 = 87 | CES75 = 79 |            |



Color Rendition by Hue-Angle Bin



**Measure Comparisons**



(END OF REPORT)