

Signify Classified - Internal  
Cooper Lighting Solutions Photometric Lab  
1121 Highway 74 South  
Peachtree City, GA 30269



Scaled data based on original data using  
LM-79-08 Approved Method: Electrical and Photometric Measurements of Solid-  
State Lighting Products

Test Report Prepared for  
Cooper Lighting Solutions  
(formerly Eaton)

Brand: STREETWORKS

Report Number: P348565

Luminaire Tested: **ARCH-N-PA1-40-827-24VDC-T2R**

Issue Date: 3/3/2020

**Test Information**

Test Method: LM-79-08  
Report Number: P348565  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-1903-205-8)  
Test Lab: INNOVATION CENTER  
Issue Date: 3/3/2020  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: STREETWORKS  
Catalog Number: ARCH-N-PA1-40-827-24VDC-T2R  
Description: ARCHEON ROADWAY AND AREA LUMINAIRE  
(1) 80 CRI, 2700K, 740mA LIGHT ENGINE WITH 16 LEDS AND  
Light Source: -  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 4113 lumens  
Efficiency: N/A  
Efficacy: 108.2 lumens/watt  
Luminous Opening: Rectangular (W 0.5' x L: 0.75' x H: 0')  
IES Classification: Type II - Short  
BUG Rating: B1 - U0 - G1

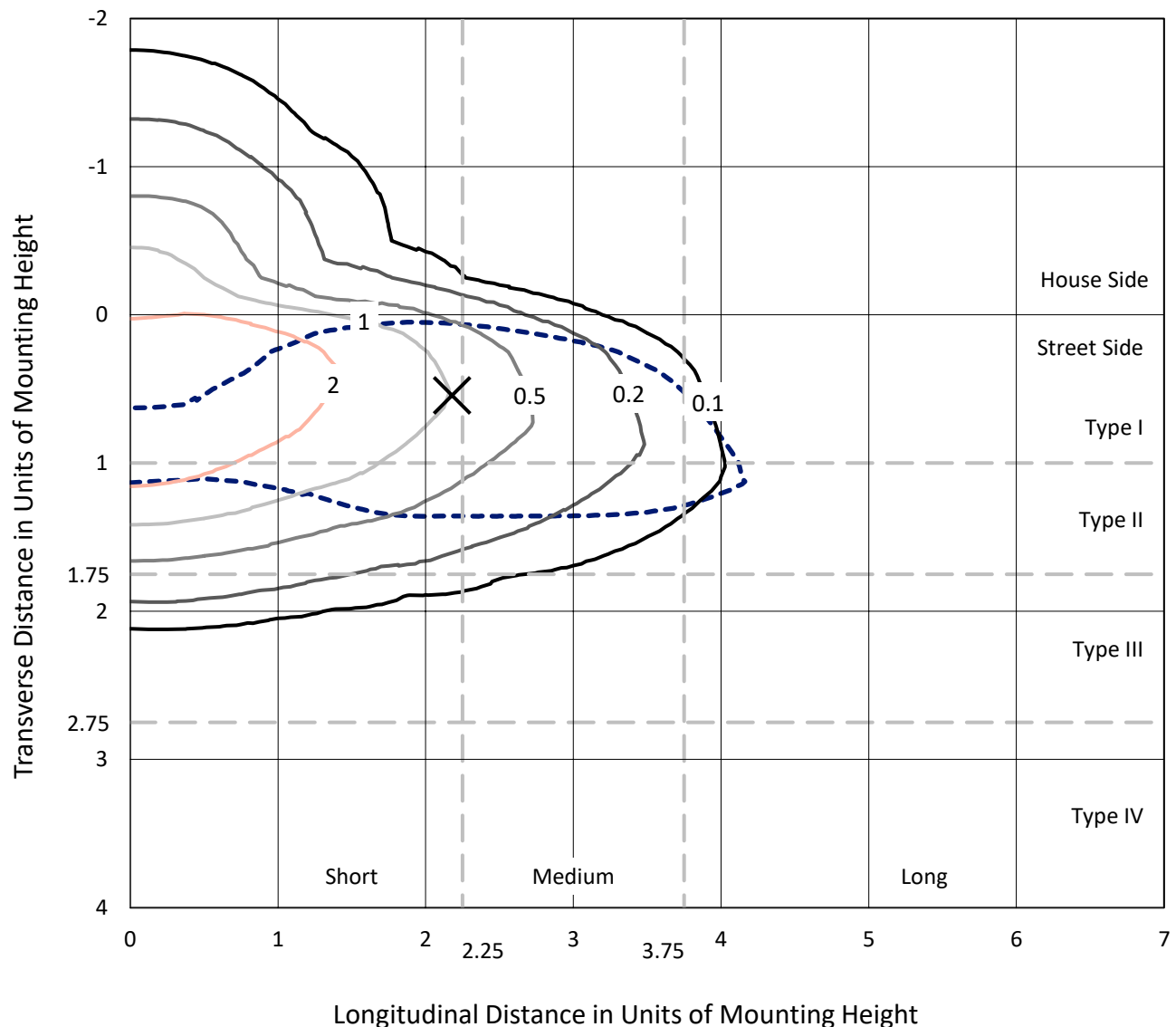
Input Watts (W): 38  
Input Voltage (V): NR  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: NR  
Total Harmonic Distortion (THDi): NR  
Frequency (hertz): 60  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 25 FT

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## Iso-Footcandle Lines of Horizontal Illumination

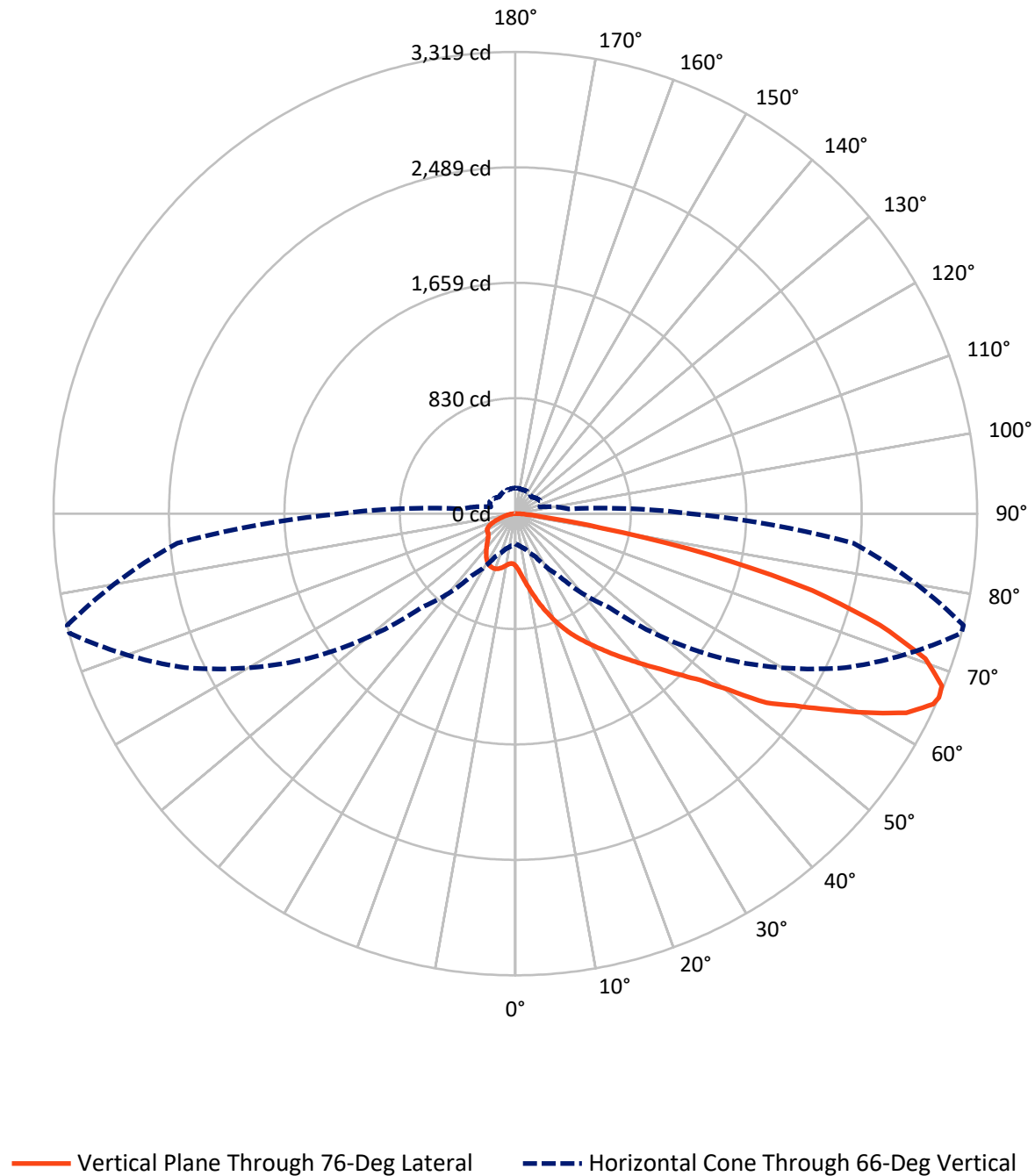
✕ Max cd  
 - - - 1/2 Max cd



Based on 15 foot mounting height. Maximum calculated value = 4.4 fc  
 Type II - Short - N/A

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## Luminous Intensity Polar Plot



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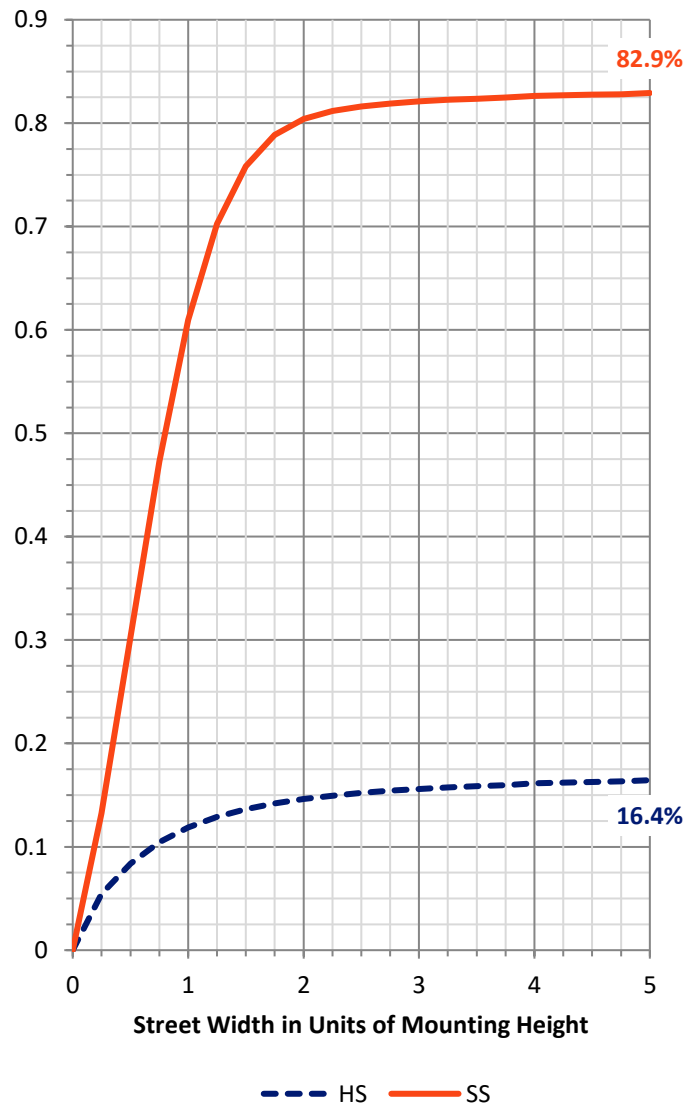
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total  |
|--------------------|-----------|----------|--------|--------|
| <b>House Side</b>  | Lumens    | 692.1    | 0.0    | 692.1  |
|                    | % Fixture | 16.8     | 0.0    | 16.8   |
| <b>Street Side</b> | Lumens    | 3420.9   | 0.0    | 3420.9 |
|                    | % Fixture | 83.2     | 0.0    | 83.2   |
| <b>Total</b>       | Lumens    | 4113.0   | 0.0    | 4113.0 |
|                    | % Fixture | 100.0    | 0.0    | 100.0  |

**ZONAL LUMENS:**

| Zone      | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10°    | 45.4   | 1.1       |
| 10°-20°   | 179.4  | 4.4       |
| 20°-30°   | 348.6  | 8.5       |
| 30°-40°   | 568.9  | 13.8      |
| 40°-50°   | 777.3  | 18.9      |
| 50°-60°   | 905.4  | 22.0      |
| 60°-70°   | 811.7  | 19.7      |
| 70°-80°   | 410.2  | 10.0      |
| 80°-90°   | 66.2   | 1.6       |
| 90°-100°  | 0.0    | 0.0       |
| 100°-110° | 0.0    | 0.0       |
| 110°-120° | 0.0    | 0.0       |
| 120°-130° | 0.0    | 0.0       |
| 130°-140° | 0.0    | 0.0       |
| 140°-150° | 0.0    | 0.0       |
| 150°-160° | 0.0    | 0.0       |
| 160°-170° | 0.0    | 0.0       |
| 170°-180° | 0.0    | 0.0       |
| 0°-90°    | 4113.0 | 100.0     |
| 0°-180°   | 4113.0 | 100.0     |

**Coefficient of Utilization**



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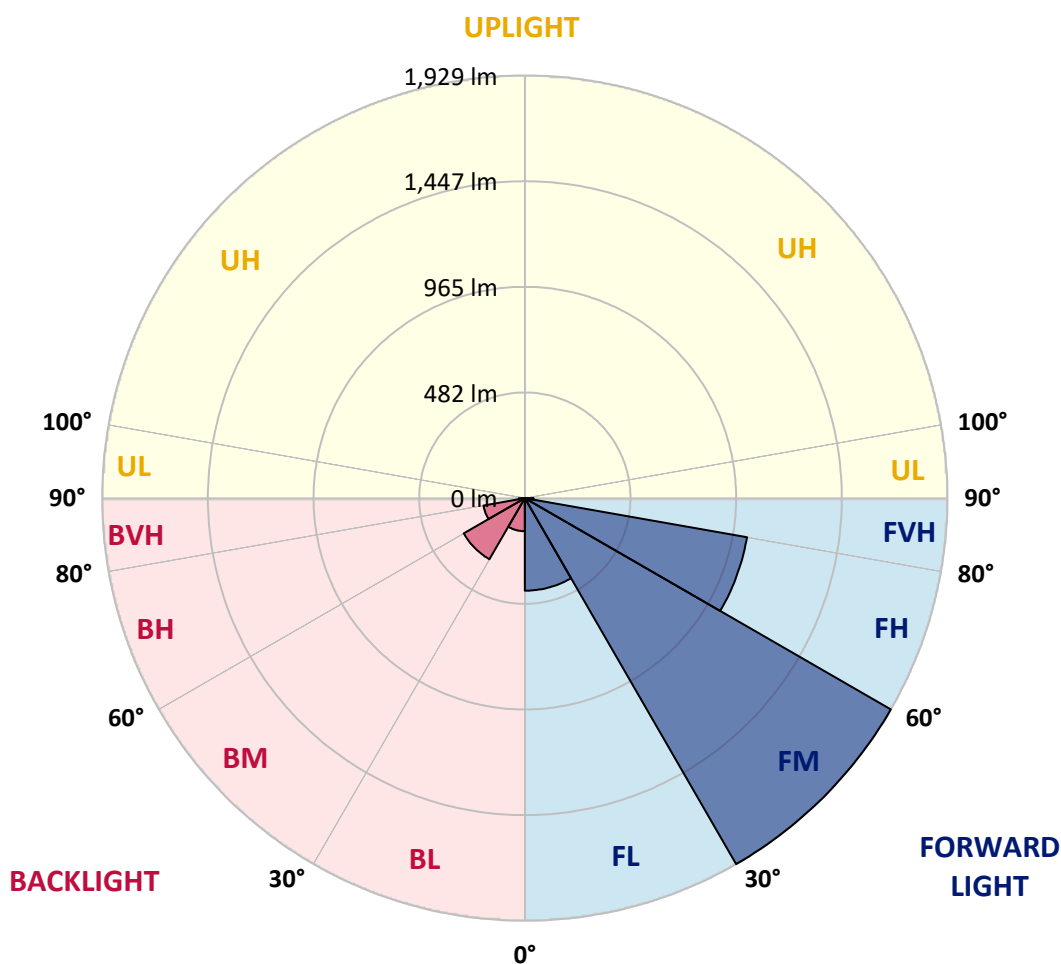
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**LUMINAIRE CLASSIFICATION SYSTEM LUMEN TABLE AND BUG RATING:**

| Zone |             | Lumens | % Fixture | Zone Rating/Lumen Limit |      |         |
|------|-------------|--------|-----------|-------------------------|------|---------|
|      |             |        |           | B                       | U    | G       |
| FL   | (0°-30°)    | 422.4  | 10.3      |                         |      |         |
| FM   | (30°-60°)   | 1929.3 | 46.9      |                         |      |         |
| FH   | (60°-80°)   | 1030.1 | 25.0      |                         |      | G1/1800 |
| FVH  | (80°-90°)   | 39.1   | 1.0       |                         |      | G1/100  |
| BL   | (0°-30°)    | 150.9  | 3.7       | B1/500                  |      |         |
| BM   | (30°-60°)   | 322.3  | 7.8       | B1/1000                 |      |         |
| BH   | (60°-80°)   | 191.7  | 4.7       | B1/500                  |      | G1/500  |
| BVH  | (80°-90°)   | 27.1   | 0.7       |                         |      | 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°    | 75°    | 76°    | 85°    |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 375.6  | 375.6  | 375.6  | 375.6  | 375.6  | 375.6  | 375.6  | 375.6  | 375.6  | 375.6  | 375.6  |
| 2.5°  | 498.6  | 491.1  | 490.4  | 479.4  | 476.8  | 455.8  | 440.3  | 424.1  | 405.6  | 402.0  | 387.5  |
| 5°    | 640.5  | 639.8  | 630.2  | 612.1  | 598.0  | 562.0  | 526.4  | 488.7  | 447.4  | 440.7  | 408.0  |
| 7.5°  | 768.1  | 767.0  | 759.6  | 740.2  | 719.8  | 675.5  | 624.7  | 566.9  | 499.9  | 490.0  | 435.8  |
| 10°   | 865.0  | 864.6  | 862.1  | 847.8  | 830.5  | 788.1  | 732.0  | 653.1  | 560.9  | 547.4  | 470.6  |
| 12.5° | 939.9  | 940.7  | 942.4  | 937.3  | 929.1  | 892.9  | 835.4  | 744.4  | 626.0  | 612.6  | 509.2  |
| 15°   | 990.5  | 993.1  | 1001.7 | 1008.8 | 1013.2 | 991.0  | 935.3  | 837.8  | 698.9  | 682.8  | 552.1  |
| 17.5° | 1016.1 | 1018.9 | 1033.8 | 1055.3 | 1075.2 | 1072.9 | 1028.7 | 926.9  | 768.8  | 753.3  | 598.2  |
| 20°   | 1038.2 | 1040.3 | 1057.0 | 1082.8 | 1117.9 | 1133.4 | 1108.5 | 1012.6 | 845.5  | 827.0  | 647.1  |
| 22.5° | 1102.1 | 1104.8 | 1109.8 | 1124.5 | 1155.5 | 1183.9 | 1171.9 | 1093.7 | 915.7  | 898.5  | 693.4  |
| 25°   | 1225.5 | 1228.8 | 1217.9 | 1205.4 | 1211.3 | 1231.1 | 1233.4 | 1167.7 | 986.9  | 967.5  | 743.3  |
| 27.5° | 1374.3 | 1378.9 | 1360.3 | 1328.3 | 1300.4 | 1292.7 | 1290.1 | 1228.3 | 1054.9 | 1032.4 | 792.6  |
| 30°   | 1519.9 | 1527.9 | 1503.7 | 1462.2 | 1411.0 | 1375.0 | 1348.3 | 1287.7 | 1121.9 | 1100.4 | 839.0  |
| 32.5° | 1662.2 | 1659.0 | 1623.9 | 1583.4 | 1523.4 | 1478.3 | 1413.8 | 1351.4 | 1197.3 | 1172.6 | 885.3  |
| 35°   | 1759.6 | 1760.8 | 1728.2 | 1680.2 | 1622.9 | 1588.3 | 1501.5 | 1420.1 | 1274.3 | 1251.5 | 937.8  |
| 37.5° | 1842.6 | 1837.4 | 1800.6 | 1755.7 | 1706.4 | 1691.6 | 1604.1 | 1495.7 | 1357.6 | 1332.8 | 993.6  |
| 40°   | 1870.2 | 1864.2 | 1840.1 | 1807.8 | 1768.3 | 1767.0 | 1717.3 | 1581.5 | 1451.9 | 1427.3 | 1056.6 |
| 42.5° | 1853.5 | 1845.8 | 1835.9 | 1827.1 | 1814.9 | 1820.5 | 1823.7 | 1682.0 | 1555.5 | 1528.0 | 1129.5 |
| 45°   | 1791.6 | 1780.0 | 1787.0 | 1806.1 | 1832.5 | 1864.1 | 1919.8 | 1793.3 | 1671.5 | 1648.5 | 1215.1 |
| 47.5° | 1696.5 | 1686.1 | 1707.8 | 1748.7 | 1820.5 | 1900.4 | 2010.7 | 1916.2 | 1810.0 | 1787.1 | 1337.0 |
| 50°   | 1562.8 | 1565.8 | 1597.0 | 1671.4 | 1779.9 | 1917.1 | 2122.7 | 2078.8 | 2011.4 | 1990.0 | 1503.3 |
| 52.5° | 1343.3 | 1343.8 | 1431.5 | 1553.7 | 1707.8 | 1908.5 | 2184.8 | 2286.8 | 2286.3 | 2260.5 | 1661.6 |
| 55°   | 1139.4 | 1151.8 | 1221.2 | 1383.6 | 1591.1 | 1873.9 | 2228.2 | 2387.8 | 2466.9 | 2436.6 | 1809.2 |
| 57.5° | 940.3  | 947.5  | 1013.3 | 1176.4 | 1424.5 | 1781.6 | 2272.8 | 2509.2 | 2674.9 | 2655.8 | 1992.7 |
| 60°   | 713.8  | 725.0  | 793.0  | 943.6  | 1211.4 | 1617.8 | 2277.0 | 2635.8 | 2923.6 | 2904.3 | 2197.5 |
| 62.5° | 463.3  | 482.6  | 546.2  | 687.4  | 953.7  | 1382.2 | 2179.8 | 2718.6 | 3159.3 | 3152.5 | 2379.3 |
| 65°   | 266.3  | 280.8  | 325.1  | 434.0  | 657.9  | 1086.5 | 1948.7 | 2686.8 | 3304.4 | 3300.5 | 2447.3 |
| 66°   | 217.5  | 226.6  | 260.6  | 339.2  | 542.9  | 954.1  | 1814.4 | 2619.6 | 3318.8 | 3318.9 | 2439.5 |
| 67.5° | 174.0  | 178.0  | 193.3  | 242.8  | 400.6  | 756.2  | 1574.3 | 2471.5 | 3300.9 | 3305.8 | 2389.1 |
| 70°   | 144.0  | 146.1  | 150.8  | 162.8  | 218.7  | 456.0  | 1117.5 | 2086.5 | 3121.5 | 3125.2 | 2192.4 |
| 72.5° | 129.2  | 130.4  | 132.2  | 133.9  | 154.3  | 254.8  | 682.5  | 1669.2 | 2736.8 | 2741.7 | 1892.6 |
| 75°   | 117.0  | 117.7  | 117.4  | 117.6  | 129.4  | 162.4  | 352.7  | 1246.2 | 2212.9 | 2203.1 | 1449.8 |
| 77.5° | 102.8  | 103.5  | 102.1  | 102.4  | 114.5  | 124.8  | 175.5  | 872.4  | 1493.4 | 1424.4 | 816.8  |
| 80°   | 86.9   | 87.4   | 86.9   | 87.8   | 99.7   | 94.3   | 102.1  | 490.8  | 660.3  | 624.6  | 290.4  |
| 82.5° | 65.6   | 68.0   | 69.7   | 73.6   | 82.1   | 67.0   | 68.3   | 191.2  | 201.1  | 191.4  | 89.1   |
| 85°   | 28.8   | 35.0   | 52.5   | 56.3   | 61.7   | 40.2   | 44.8   | 77.9   | 81.8   | 79.3   | 32.4   |
| 87.5° | 7.5    | 8.2    | 26.0   | 32.7   | 34.2   | 18.2   | 23.3   | 35.5   | 37.4   | 35.5   | 10.8   |
| 90°   | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |

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CATALOG NUMBER: ARCH-N-PA1-40-827-24VDC-T2R

**CANDELA DISTRIBUTION (continued):**

|       | 90°    | 95°   | 105°  | 115°  | 125°  | 135°  | 145°  | 155°  | 165°  | 175°  | 180°  |
|-------|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 0°    | 375.6  | 375.6 | 375.6 | 375.6 | 375.6 | 375.6 | 375.6 | 375.6 | 375.6 | 375.6 | 375.6 |
| 2.5°  | 379.8  | 373.0 | 360.7 | 349.8 | 341.5 | 336.0 | 330.4 | 327.6 | 325.9 | 324.2 | 324.5 |
| 5°    | 391.9  | 378.1 | 357.0 | 342.1 | 333.7 | 328.4 | 325.6 | 324.5 | 323.8 | 322.1 | 322.1 |
| 7.5°  | 410.2  | 390.7 | 361.6 | 346.3 | 339.7 | 335.7 | 334.0 | 333.4 | 332.6 | 330.6 | 330.9 |
| 10°   | 433.3  | 405.9 | 371.3 | 356.3 | 350.3 | 345.9 | 343.5 | 342.7 | 341.1 | 338.9 | 339.2 |
| 12.5° | 460.4  | 424.8 | 384.0 | 368.3 | 361.1 | 355.1 | 351.2 | 348.8 | 346.1 | 343.2 | 343.4 |
| 15°   | 490.0  | 445.3 | 397.7 | 379.1 | 369.2 | 360.8 | 354.5 | 350.5 | 346.3 | 342.7 | 342.5 |
| 17.5° | 520.0  | 465.1 | 408.1 | 385.0 | 371.6 | 360.5 | 352.0 | 345.7 | 340.6 | 336.1 | 335.7 |
| 20°   | 552.4  | 483.0 | 414.0 | 384.4 | 367.1 | 354.0 | 342.7 | 334.8 | 329.1 | 324.6 | 323.9 |
| 22.5° | 585.3  | 499.7 | 415.0 | 378.7 | 357.2 | 341.1 | 329.3 | 320.6 | 314.7 | 310.1 | 308.4 |
| 25°   | 615.5  | 512.7 | 410.9 | 367.7 | 343.4 | 326.0 | 314.5 | 305.7 | 300.9 | 295.5 | 293.8 |
| 27.5° | 643.0  | 521.8 | 402.8 | 353.5 | 327.9 | 310.8 | 299.9 | 292.4 | 287.2 | 283.0 | 281.6 |
| 30°   | 667.7  | 526.7 | 389.6 | 336.8 | 311.9 | 296.4 | 287.2 | 282.1 | 277.6 | 272.3 | 271.3 |
| 32.5° | 691.2  | 526.7 | 372.5 | 318.5 | 296.2 | 283.7 | 278.3 | 275.1 | 270.0 | 264.9 | 263.5 |
| 35°   | 714.6  | 523.5 | 352.4 | 299.4 | 281.6 | 274.7 | 274.4 | 270.6 | 262.9 | 255.9 | 254.1 |
| 37.5° | 739.4  | 516.9 | 329.8 | 281.5 | 269.8 | 270.6 | 273.0 | 264.6 | 253.7 | 243.8 | 241.1 |
| 40°   | 767.3  | 507.8 | 306.4 | 266.0 | 259.9 | 268.8 | 269.2 | 255.9 | 234.7 | 225.6 | 223.3 |
| 42.5° | 800.1  | 498.8 | 284.6 | 252.3 | 252.0 | 263.3 | 262.1 | 237.2 | 224.5 | 219.9 | 218.7 |
| 45°   | 843.2  | 493.6 | 263.9 | 239.3 | 245.9 | 254.5 | 249.9 | 226.9 | 221.6 | 218.9 | 217.8 |
| 47.5° | 911.2  | 496.3 | 244.9 | 229.0 | 239.7 | 245.8 | 227.3 | 222.7 | 218.9 | 215.7 | 214.6 |
| 50°   | 996.4  | 494.7 | 229.6 | 221.9 | 232.8 | 236.5 | 217.1 | 217.3 | 215.3 | 211.7 | 210.0 |
| 52.5° | 1060.5 | 482.7 | 219.6 | 217.8 | 226.6 | 220.2 | 210.7 | 212.0 | 211.0 | 205.7 | 203.9 |
| 55°   | 1122.4 | 472.4 | 214.6 | 216.3 | 222.2 | 199.8 | 203.2 | 206.2 | 205.3 | 200.1 | 199.3 |
| 57.5° | 1199.3 | 470.4 | 211.5 | 216.7 | 218.4 | 189.6 | 195.9 | 200.0 | 199.3 | 197.0 | 196.6 |
| 60°   | 1293.5 | 471.0 | 208.7 | 217.4 | 214.2 | 182.1 | 189.1 | 194.2 | 194.6 | 194.2 | 193.9 |
| 62.5° | 1345.4 | 455.8 | 201.8 | 215.5 | 206.8 | 175.5 | 181.9 | 189.5 | 189.6 | 190.5 | 190.3 |
| 65°   | 1301.4 | 410.2 | 188.8 | 208.6 | 194.4 | 170.1 | 175.8 | 184.0 | 181.9 | 185.7 | 185.7 |
| 66°   | 1258.6 | 384.0 | 182.4 | 204.1 | 189.1 | 168.0 | 173.8 | 181.2 | 178.6 | 183.8 | 183.8 |
| 67.5° | 1171.4 | 339.7 | 170.8 | 194.6 | 181.5 | 165.0 | 171.6 | 176.6 | 173.0 | 180.7 | 180.1 |
| 70°   | 1011.9 | 262.8 | 147.5 | 173.1 | 169.1 | 160.7 | 168.5 | 167.4 | 162.1 | 173.8 | 171.6 |
| 72.5° | 853.2  | 199.7 | 118.4 | 144.9 | 150.2 | 155.3 | 164.2 | 155.7 | 149.0 | 157.2 | 152.3 |
| 75°   | 662.0  | 150.1 | 93.6  | 112.7 | 126.9 | 146.8 | 159.0 | 142.1 | 132.5 | 131.7 | 129.0 |
| 77.5° | 357.9  | 103.0 | 74.1  | 86.0  | 100.8 | 136.1 | 155.5 | 127.6 | 113.1 | 109.8 | 107.7 |
| 80°   | 141.7  | 67.0  | 53.9  | 65.2  | 70.5  | 120.8 | 147.2 | 110.7 | 93.3  | 89.9  | 86.7  |
| 82.5° | 58.5   | 39.7  | 34.8  | 43.7  | 45.9  | 103.3 | 132.1 | 90.8  | 72.1  | 99.7  | 105.8 |
| 85°   | 25.1   | 21.8  | 20.7  | 22.6  | 26.0  | 72.5  | 105.1 | 69.3  | 77.8  | 69.4  | 55.2  |
| 87.5° | 7.5    | 9.2   | 8.8   | 8.7   | 9.5   | 17.3  | 56.0  | 38.5  | 57.1  | 21.6  | 16.2  |
| 90°   | 0.0    | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |



Report Prepared for

Cooper Lighting Solutions

(formerly Eaton)

STREETWORKS

Report Number: SP1-2101-121-9

Luminaire Tested: IFLD-S-SA2A-827-U-T2

Test Date: 03/05/2021

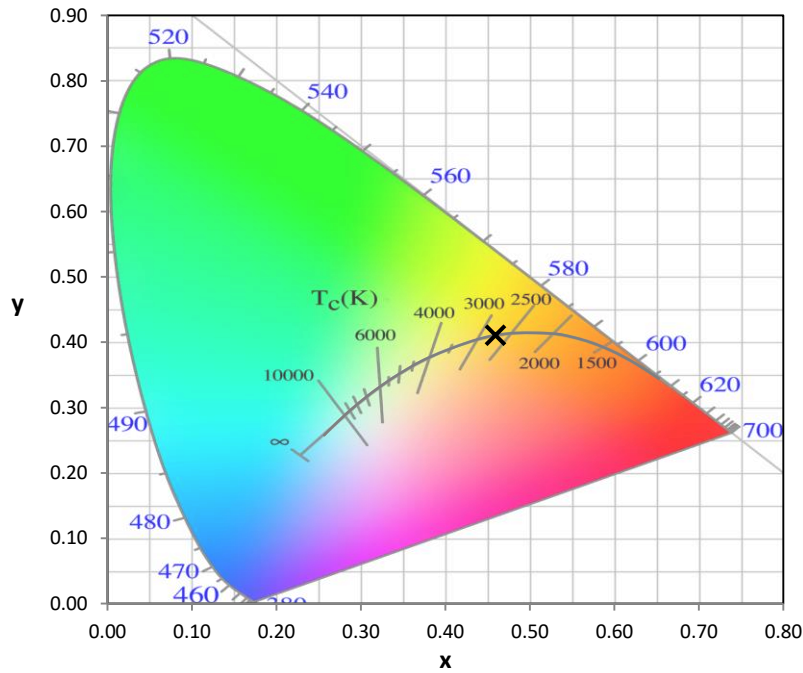


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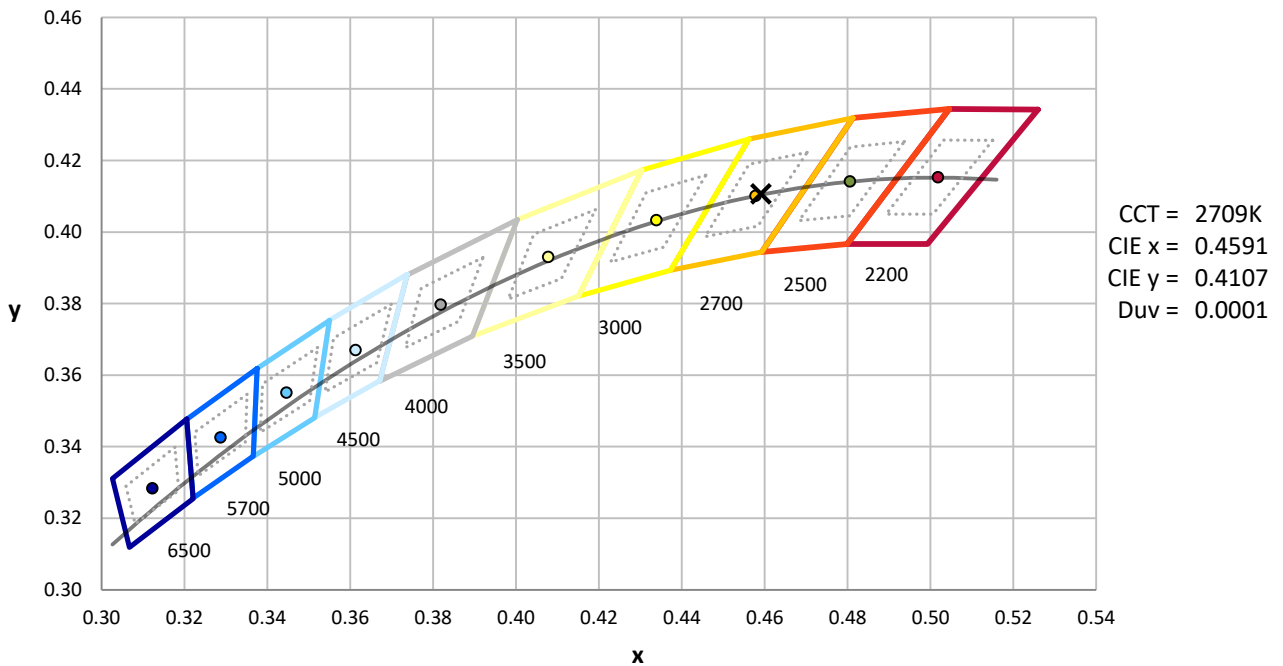
| Measurement and Test Equipment |                       |                  |                      |
|--------------------------------|-----------------------|------------------|----------------------|
| Instrument                     | Identification Number | Calibration Date | Calibration Due Date |
| Photometer                     | IN0058                | 1/31/2021        | 7/31/2021            |
| Power Meter                    | IN0071                | 12/1/2020        | 12/1/2021            |
| AC Power Source                | IN0063                | 12/1/2020        | 12/1/2021            |
| DC Power Source                | IN0208                | 12/1/2020        | 12/1/2021            |
| Sphere Thermometer             | IN0085                | 12/1/2020        | 12/1/2021            |
| Room Thermometer               | IN0046                | 12/1/2020        | 12/1/2021            |

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**CIE 1931 Chromaticity Diagram**



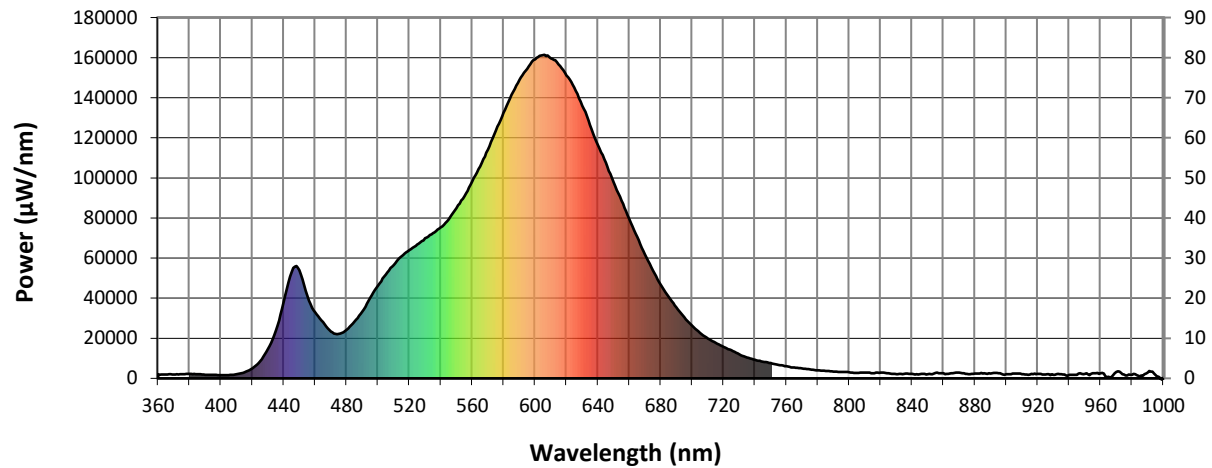
**CIE 1931 Chromaticity Diagram with 2017 ANSI 7-Step and 4-Step Quadrangles**



Point lies inside the ANSI 2700K 4-step quadrangle

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### Photopic Flux vs. Wavelength

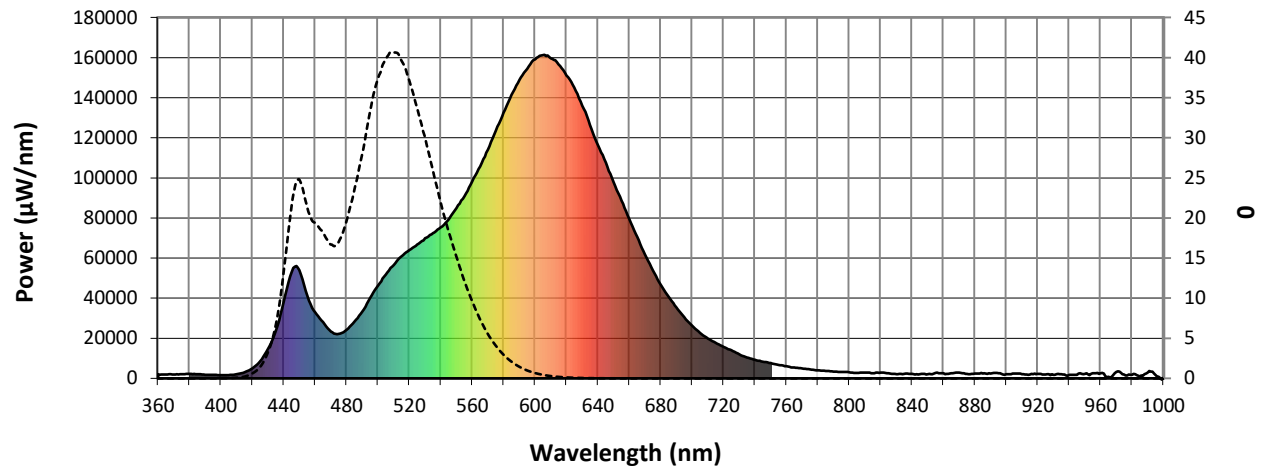


#####

| λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) |
|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|
| 360       | 2013             | 0.0              | 490       | 33356            | 4.7              | 620       | 150993           | 39.3             | 750       | 7593             | 0.0              | 880       | 2373             | 0.0              |
| 365       | 1908             | 0.0              | 495       | 40031            | 7.3              | 625       | 145077           | 32.0             | 755       | 6765             | 0.0              | 885       | 2481             | 0.0              |
| 370       | 1889             | 0.0              | 500       | 46287            | 10.2             | 630       | 136072           | 24.6             | 760       | 6000             | 0.0              | 890       | 2394             | 0.0              |
| 375       | 2095             | 0.0              | 505       | 51783            | 14.5             | 635       | 126417           | 19.0             | 765       | 5393             | 0.0              | 895       | 2574             | 0.0              |
| 380       | 2228             | 0.0              | 510       | 56588            | 19.4             | 640       | 116412           | 13.9             | 770       | 5030             | 0.0              | 900       | 2048             | 0.0              |
| 385       | 2074             | 0.0              | 515       | 60751            | 25.2             | 645       | 107525           | 10.4             | 775       | 4491             | 0.0              | 905       | 2381             | 0.0              |
| 390       | 1820             | 0.0              | 520       | 63966            | 31.0             | 650       | 97857            | 7.2              | 780       | 3943             | 0.0              | 910       | 2017             | 0.0              |
| 395       | 1728             | 0.0              | 525       | 66683            | 35.8             | 655       | 88582            | 5.1              | 785       | 3682             | 0.0              | 915       | 1904             | 0.0              |
| 400       | 1557             | 0.0              | 530       | 69869            | 41.1             | 660       | 79462            | 3.3              | 790       | 3402             | 0.0              | 920       | 2254             | 0.0              |
| 405       | 1644             | 0.0              | 535       | 72510            | 45.0             | 665       | 70606            | 2.2              | 795       | 3156             | 0.0              | 925       | 1998             | 0.0              |
| 410       | 2044             | 0.0              | 540       | 75299            | 49.1             | 670       | 61774            | 1.4              | 800       | 3062             | 0.0              | 930       | 1776             | 0.0              |
| 415       | 3009             | 0.0              | 545       | 79297            | 52.8             | 675       | 53771            | 0.9              | 805       | 2712             | 0.0              | 935       | 2086             | 0.0              |
| 420       | 4992             | 0.0              | 550       | 84946            | 57.7             | 680       | 46786            | 0.5              | 810       | 2896             | 0.0              | 940       | 1766             | 0.0              |
| 425       | 8631             | 0.0              | 555       | 90790            | 62.0             | 685       | 40747            | 0.4              | 815       | 2605             | 0.0              | 945       | 1738             | 0.0              |
| 430       | 14680            | 0.1              | 560       | 98231            | 66.8             | 690       | 35400            | 0.2              | 820       | 2901             | 0.0              | 950       | 2303             | 0.0              |
| 435       | 23899            | 0.3              | 565       | 105738           | 70.3             | 695       | 30445            | 0.1              | 825       | 2541             | 0.0              | 955       | 2567             | 0.0              |
| 440       | 38159            | 0.6              | 570       | 114034           | 74.1             | 700       | 26278            | 0.1              | 830       | 2014             | 0.0              | 960       | 2492             | 0.0              |
| 445       | 53061            | 1.1              | 575       | 123632           | 76.9             | 705       | 22703            | 0.0              | 835       | 2258             | 0.0              | 965       | 810              | 0.0              |
| 450       | 53893            | 1.4              | 580       | 132443           | 78.7             | 710       | 19853            | 0.0              | 840       | 2203             | 0.0              | 970       | 3201             | 0.0              |
| 455       | 41221            | 1.4              | 585       | 141502           | 78.6             | 715       | 17730            | 0.0              | 845       | 2073             | 0.0              | 975       | 1858             | 0.0              |
| 460       | 32969            | 1.4              | 590       | 148917           | 77.0             | 720       | 15616            | 0.0              | 850       | 2096             | 0.0              | 980       | 1769             | 0.0              |
| 465       | 28048            | 1.4              | 595       | 154326           | 73.2             | 725       | 13986            | 0.0              | 855       | 2751             | 0.0              | 985       | 1043             | 0.0              |
| 470       | 23347            | 1.5              | 600       | 159208           | 68.6             | 730       | 12029            | 0.0              | 860       | 2501             | 0.0              | 990       | 2950             | 0.0              |
| 475       | 22136            | 1.7              | 605       | 161290           | 62.5             | 735       | 10461            | 0.0              | 865       | 2512             | 0.0              | 995       | 1643             | 0.0              |
| 480       | 24192            | 2.3              | 610       | 159549           | 54.8             | 740       | 9230             | 0.0              | 870       | 2913             | 0.0              | 1000      | 292              | 0.0              |
| 485       | 28231            | 3.3              | 615       | 156663           | 47.3             | 745       | 8376             | 0.0              | 875       | 2299             | 0.0              |           |                  |                  |

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### Scotopic Flux vs. Wavelength



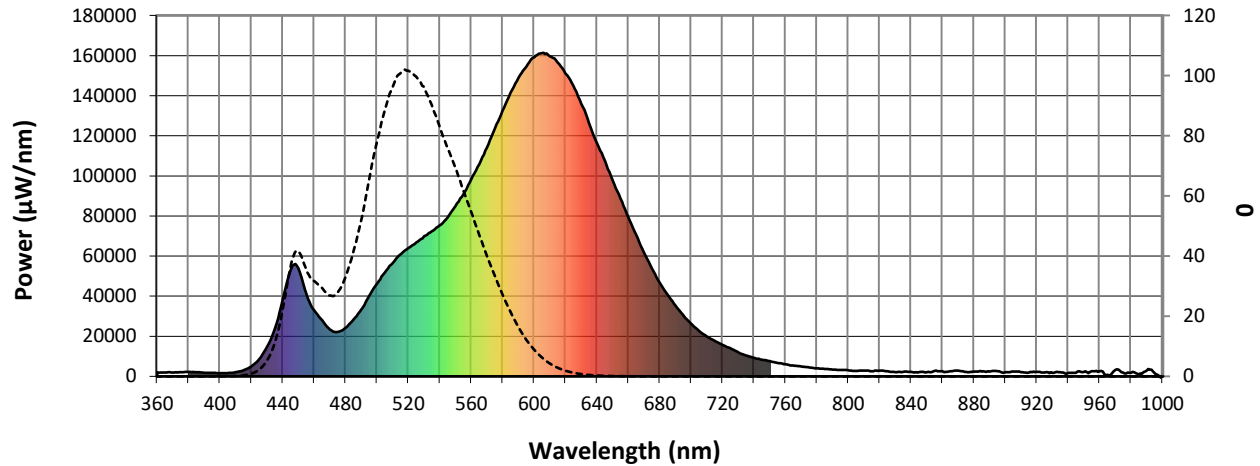
Scotopic Lumens: 8911.3

S/P: 1.22

| λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) |
|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|
| 360       | 2013             | 0.0              | 490       | 33356            | 51.4             | 620       | 150993           | 1.9              | 750       | 7593             | 0.0              | 880       | 2373             | 0.0              |
| 365       | 1908             | 0.0              | 495       | 40031            | 64.7             | 625       | 145077           | 1.2              | 755       | 6765             | 0.0              | 885       | 2481             | 0.0              |
| 370       | 1889             | 0.0              | 500       | 46287            | 77.4             | 630       | 136072           | 0.8              | 760       | 6000             | 0.0              | 890       | 2394             | 0.0              |
| 375       | 2095             | 0.0              | 505       | 51783            | 88.0             | 635       | 126417           | 0.5              | 765       | 5393             | 0.0              | 895       | 2574             | 0.0              |
| 380       | 2228             | 0.0              | 510       | 56588            | 95.9             | 640       | 116412           | 0.3              | 770       | 5030             | 0.0              | 900       | 2048             | 0.0              |
| 385       | 2074             | 0.0              | 515       | 60751            | 100.7            | 645       | 107525           | 0.2              | 775       | 4491             | 0.0              | 905       | 2381             | 0.0              |
| 390       | 1820             | 0.0              | 520       | 63966            | 101.7            | 650       | 97857            | 0.1              | 780       | 3943             | 0.0              | 910       | 2017             | 0.0              |
| 395       | 1728             | 0.0              | 525       | 66683            | 99.8             | 655       | 88582            | 0.1              | 785       | 3682             | 0.0              | 915       | 1904             | 0.0              |
| 400       | 1557             | 0.0              | 530       | 69869            | 96.3             | 660       | 79462            | 0.0              | 790       | 3402             | 0.0              | 920       | 2254             | 0.0              |
| 405       | 1644             | 0.1              | 535       | 72510            | 90.4             | 665       | 70606            | 0.0              | 795       | 3156             | 0.0              | 925       | 1998             | 0.0              |
| 410       | 2044             | 0.1              | 540       | 75299            | 83.2             | 670       | 61774            | 0.0              | 800       | 3062             | 0.0              | 930       | 1776             | 0.0              |
| 415       | 3009             | 0.3              | 545       | 79297            | 76.0             | 675       | 53771            | 0.0              | 805       | 2712             | 0.0              | 935       | 2086             | 0.0              |
| 420       | 4992             | 0.8              | 550       | 84946            | 69.5             | 680       | 46786            | 0.0              | 810       | 2896             | 0.0              | 940       | 1766             | 0.0              |
| 425       | 8631             | 2.1              | 555       | 90790            | 62.0             | 685       | 40747            | 0.0              | 815       | 2605             | 0.0              | 945       | 1738             | 0.0              |
| 430       | 14680            | 5.0              | 560       | 98231            | 54.9             | 690       | 35400            | 0.0              | 820       | 2901             | 0.0              | 950       | 2303             | 0.0              |
| 435       | 23899            | 10.7             | 565       | 105738           | 47.4             | 695       | 30445            | 0.0              | 825       | 2541             | 0.0              | 955       | 2567             | 0.0              |
| 440       | 38159            | 21.3             | 570       | 114034           | 40.2             | 700       | 26278            | 0.0              | 830       | 2014             | 0.0              | 960       | 2492             | 0.0              |
| 445       | 53061            | 35.5             | 575       | 123632           | 33.7             | 705       | 22703            | 0.0              | 835       | 2258             | 0.0              | 965       | 810              | 0.0              |
| 450       | 53893            | 41.8             | 580       | 132443           | 27.3             | 710       | 19853            | 0.0              | 840       | 2203             | 0.0              | 970       | 3201             | 0.0              |
| 455       | 41221            | 36.0             | 585       | 141502           | 21.6             | 715       | 17730            | 0.0              | 845       | 2073             | 0.0              | 975       | 1858             | 0.0              |
| 460       | 32969            | 31.8             | 590       | 148917           | 16.6             | 720       | 15616            | 0.0              | 850       | 2096             | 0.0              | 980       | 1769             | 0.0              |
| 465       | 28048            | 29.6             | 595       | 154326           | 12.3             | 725       | 13986            | 0.0              | 855       | 2751             | 0.0              | 985       | 1043             | 0.0              |
| 470       | 23347            | 26.9             | 600       | 159208           | 9.0              | 730       | 12029            | 0.0              | 860       | 2501             | 0.0              | 990       | 2950             | 0.0              |
| 475       | 22136            | 27.7             | 605       | 161290           | 6.3              | 735       | 10461            | 0.0              | 865       | 2512             | 0.0              | 995       | 1643             | 0.0              |
| 480       | 24192            | 32.7             | 610       | 159549           | 4.3              | 740       | 9230             | 0.0              | 870       | 2913             | 0.0              | 1000      | 292              | 0.0              |
| 485       | 28231            | 40.9             | 615       | 156663           | 2.9              | 745       | 8376             | 0.0              | 875       | 2299             | 0.0              |           |                  |                  |

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### Melanopic Flux vs. Wavelength



Melanopic Lumens: 3277.6

M/P: 0.45

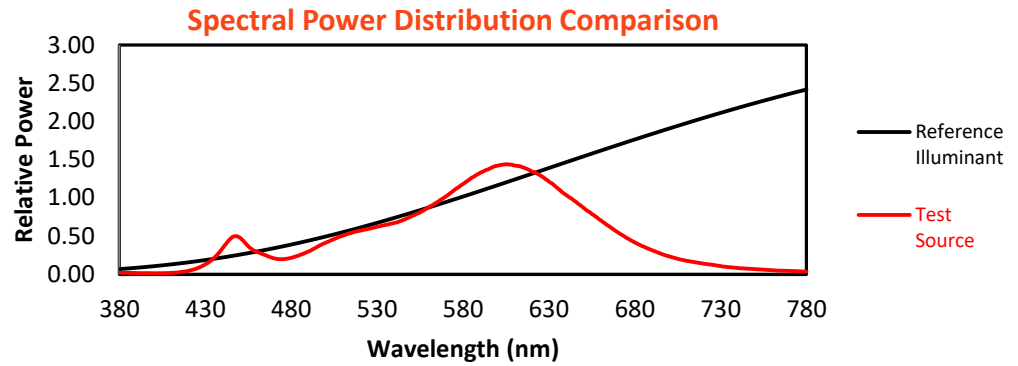
| λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) |
|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|
| 360       | 2013             | 0.0              | 490       | 33356            | 27.8             | 620       | 150993           | 0.1              | 750       | 7593             | 0.0              | 880       | 2373             | 0.0              |
| 365       | 1908             | 0.0              | 495       | 40031            | 33.0             | 625       | 145077           | 0.1              | 755       | 6765             | 0.0              | 885       | 2481             | 0.0              |
| 370       | 1889             | 0.0              | 500       | 46287            | 37.2             | 630       | 136072           | 0.0              | 760       | 6000             | 0.0              | 890       | 2394             | 0.0              |
| 375       | 2095             | 0.0              | 505       | 51783            | 39.7             | 635       | 126417           | 0.0              | 765       | 5393             | 0.0              | 895       | 2574             | 0.0              |
| 380       | 2228             | 0.0              | 510       | 56588            | 40.6             | 640       | 116412           | 0.0              | 770       | 5030             | 0.0              | 900       | 2048             | 0.0              |
| 385       | 2074             | 0.0              | 515       | 60751            | 39.7             | 645       | 107525           | 0.0              | 775       | 4491             | 0.0              | 905       | 2381             | 0.0              |
| 390       | 1820             | 0.0              | 520       | 63966            | 37.2             | 650       | 97857            | 0.0              | 780       | 3943             | 0.0              | 910       | 2017             | 0.0              |
| 395       | 1728             | 0.0              | 525       | 66683            | 33.8             | 655       | 88582            | 0.0              | 785       | 3682             | 0.0              | 915       | 1904             | 0.0              |
| 400       | 1557             | 0.0              | 530       | 69869            | 30.2             | 660       | 79462            | 0.0              | 790       | 3402             | 0.0              | 920       | 2254             | 0.0              |
| 405       | 1644             | 0.0              | 535       | 72510            | 26.1             | 665       | 70606            | 0.0              | 795       | 3156             | 0.0              | 925       | 1998             | 0.0              |
| 410       | 2044             | 0.1              | 540       | 75299            | 22.0             | 670       | 61774            | 0.0              | 800       | 3062             | 0.0              | 930       | 1776             | 0.0              |
| 415       | 3009             | 0.2              | 545       | 79297            | 18.4             | 675       | 53771            | 0.0              | 805       | 2712             | 0.0              | 935       | 2086             | 0.0              |
| 420       | 4992             | 0.6              | 550       | 84946            | 15.2             | 680       | 46786            | 0.0              | 810       | 2896             | 0.0              | 940       | 1766             | 0.0              |
| 425       | 8631             | 1.3              | 555       | 90790            | 12.2             | 685       | 40747            | 0.0              | 815       | 2605             | 0.0              | 945       | 1738             | 0.0              |
| 430       | 14680            | 3.1              | 560       | 98231            | 9.7              | 690       | 35400            | 0.0              | 820       | 2901             | 0.0              | 950       | 2303             | 0.0              |
| 435       | 23899            | 6.4              | 565       | 105738           | 7.4              | 695       | 30445            | 0.0              | 825       | 2541             | 0.0              | 955       | 2567             | 0.0              |
| 440       | 38159            | 12.8             | 570       | 114034           | 5.6              | 700       | 26278            | 0.0              | 830       | 2014             | 0.0              | 960       | 2492             | 0.0              |
| 445       | 53061            | 20.9             | 575       | 123632           | 4.1              | 705       | 22703            | 0.0              | 835       | 2258             | 0.0              | 965       | 810              | 0.0              |
| 450       | 53893            | 24.8             | 580       | 132443           | 3.0              | 710       | 19853            | 0.0              | 840       | 2203             | 0.0              | 970       | 3201             | 0.0              |
| 455       | 41221            | 21.6             | 585       | 141502           | 2.1              | 715       | 17730            | 0.0              | 845       | 2073             | 0.0              | 975       | 1858             | 0.0              |
| 460       | 32969            | 19.4             | 590       | 148917           | 1.5              | 720       | 15616            | 0.0              | 850       | 2096             | 0.0              | 980       | 1769             | 0.0              |
| 465       | 28048            | 18.3             | 595       | 154326           | 1.0              | 725       | 13986            | 0.0              | 855       | 2751             | 0.0              | 985       | 1043             | 0.0              |
| 470       | 23347            | 16.7             | 600       | 159208           | 0.7              | 730       | 12029            | 0.0              | 860       | 2501             | 0.0              | 990       | 2950             | 0.0              |
| 475       | 22136            | 16.9             | 605       | 161290           | 0.4              | 735       | 10461            | 0.0              | 865       | 2512             | 0.0              | 995       | 1643             | 0.0              |
| 480       | 24192            | 19.4             | 610       | 159549           | 0.3              | 740       | 9230             | 0.0              | 870       | 2913             | 0.0              | 1000      | 292              | 0.0              |
| 485       | 28231            | 23.3             | 615       | 156663           | 0.2              | 745       | 8376             | 0.0              | 875       | 2299             | 0.0              |           |                  |                  |

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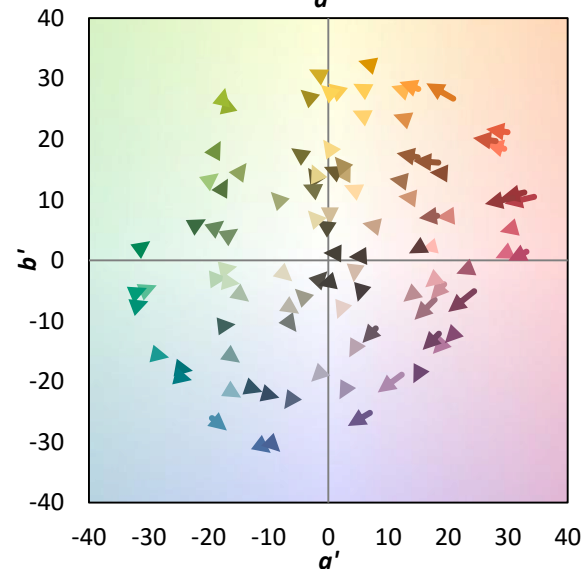
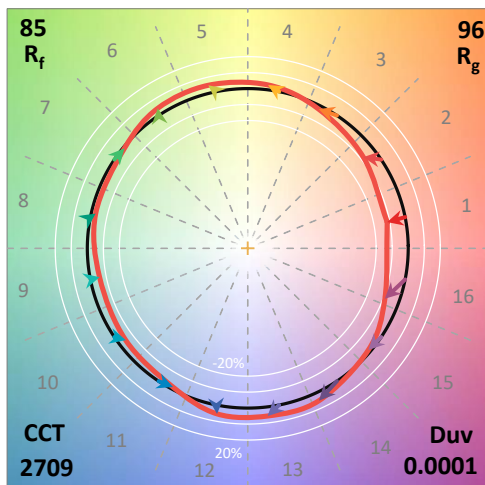
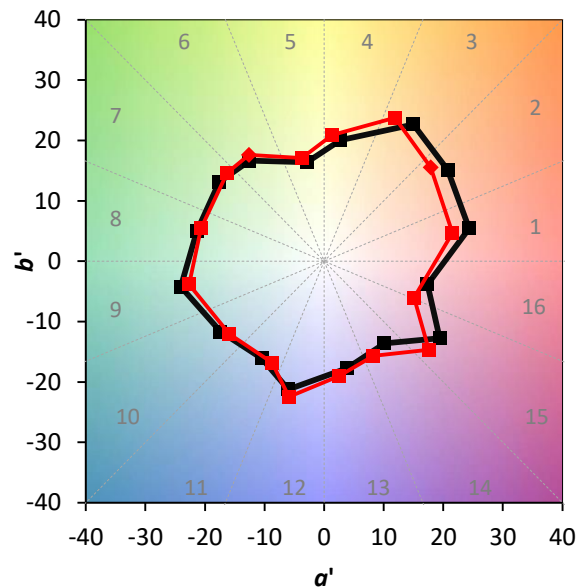
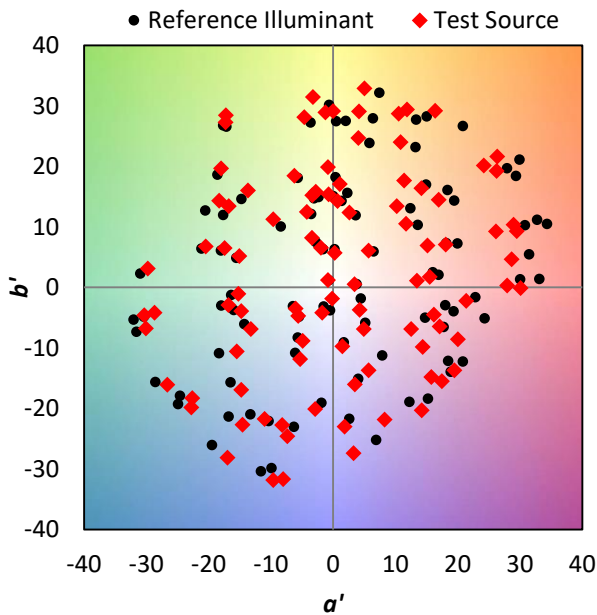
TM-30-18

### Summary

$R_f = 85.2$   
 $R_g = 96.4$   
 CIE  $R_a = 82.1$   
 $R_9 = 4.5$



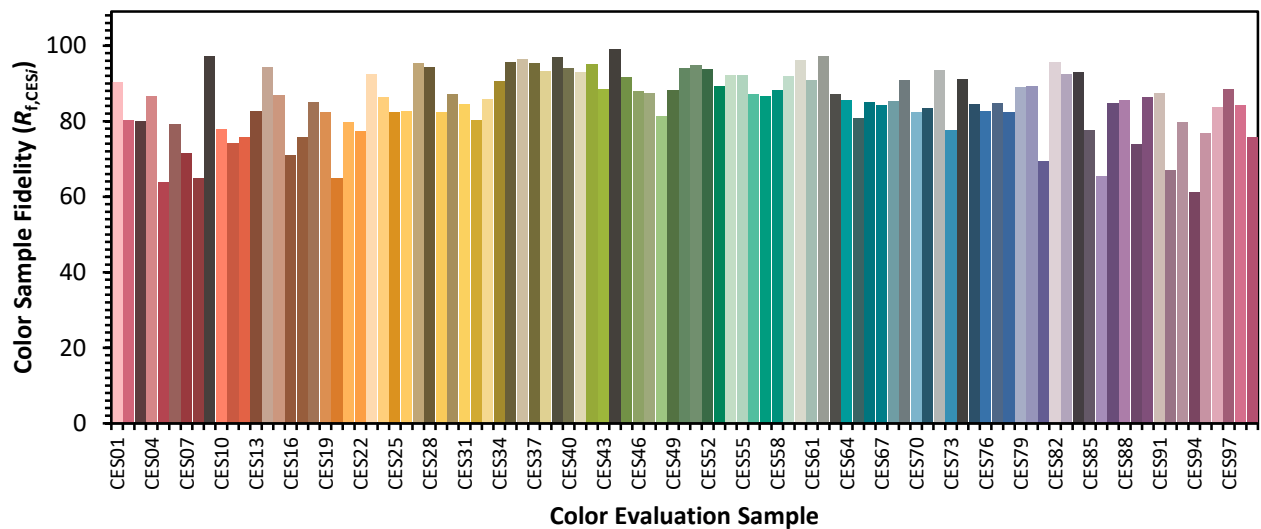
### Color Vector Graphics



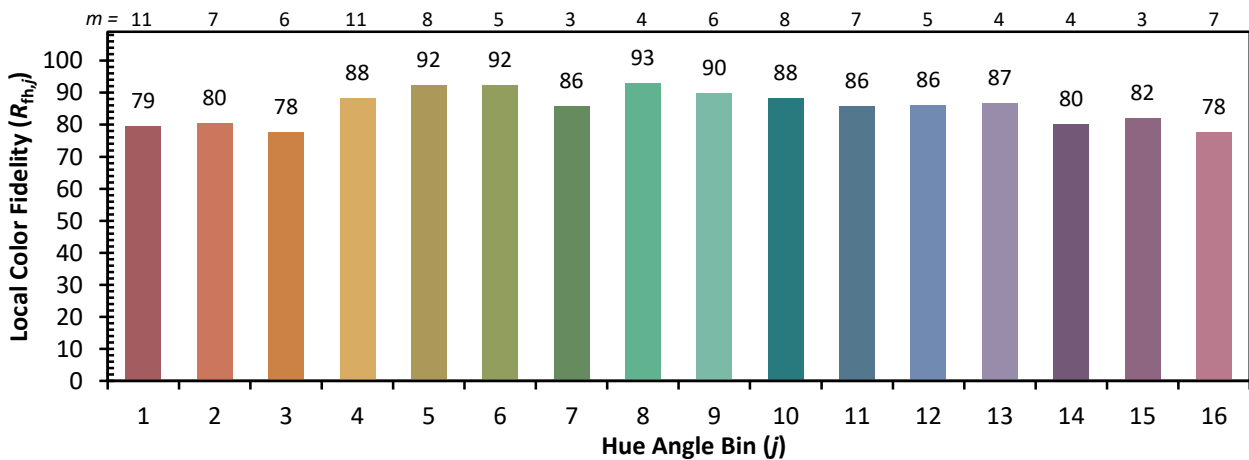
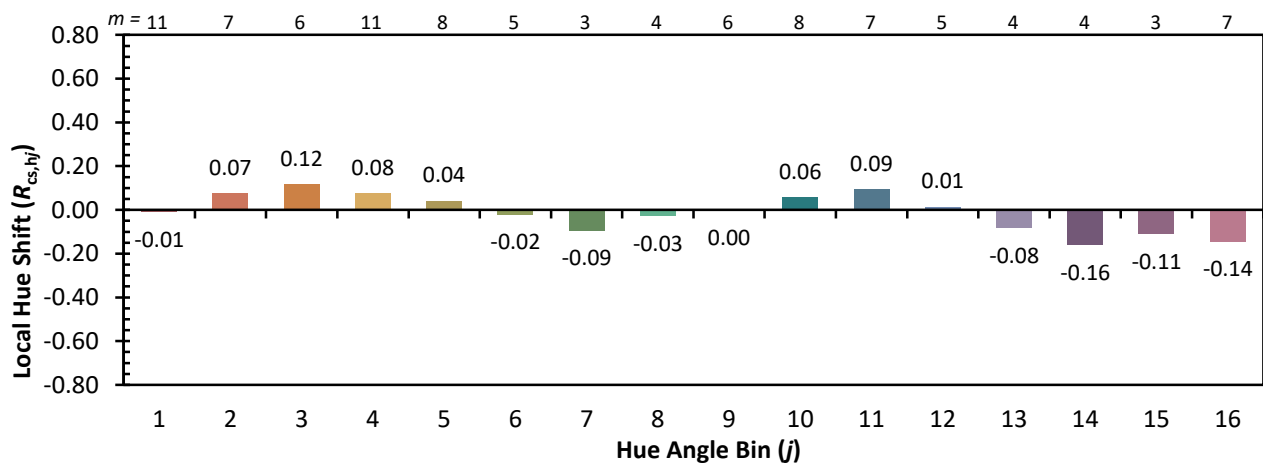
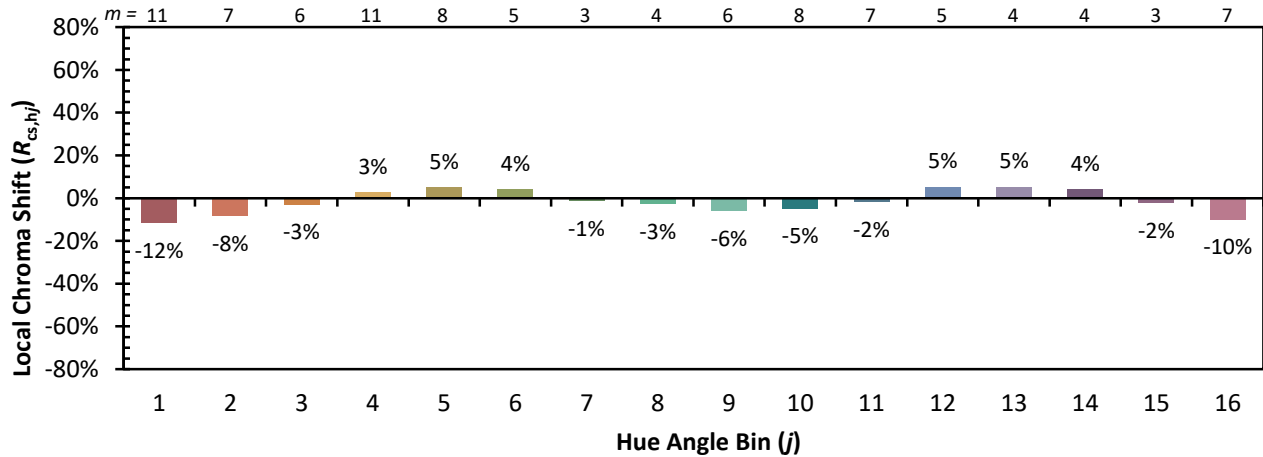


**Individual Sample Fidelity Index ( $R_{f,i}$ )**

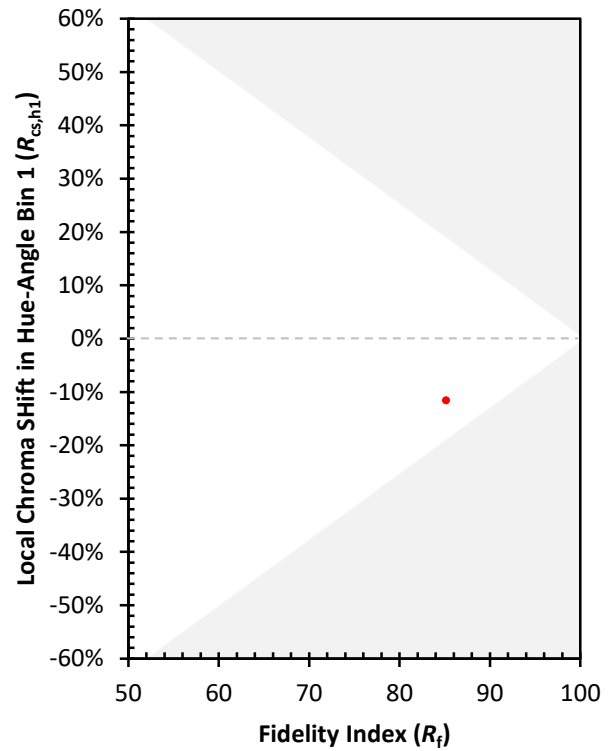
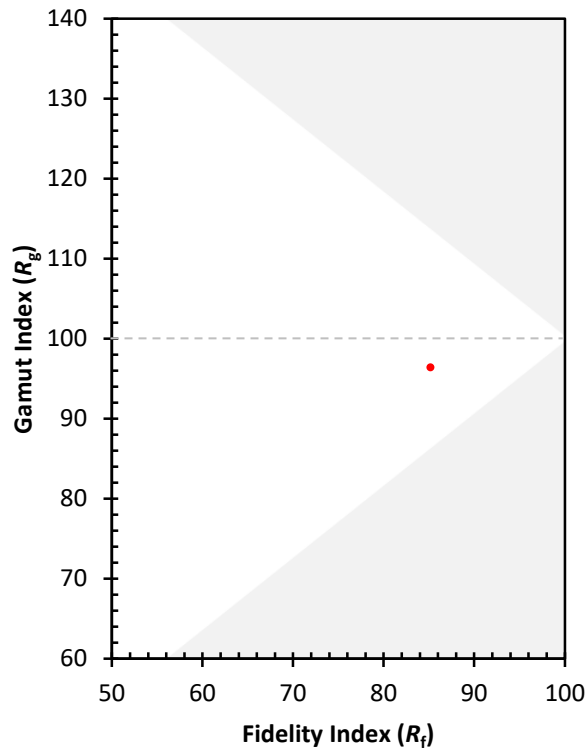
|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 86 | CES26 = 83 | CES51 = 95 | CES76 = 83 |
| CES02 = 64 | CES27 = 95 | CES52 = 94 | CES77 = 85 |
| CES03 = 31 | CES28 = 94 | CES53 = 89 | CES78 = 82 |
| CES04 = 71 | CES29 = 82 | CES54 = 92 | CES79 = 89 |
| CES05 = 50 | CES30 = 87 | CES55 = 92 | CES80 = 89 |
| CES06 = 52 | CES31 = 85 | CES56 = 87 | CES81 = 69 |
| CES07 = 43 | CES32 = 80 | CES57 = 87 | CES82 = 96 |
| CES08 = 42 | CES33 = 86 | CES58 = 88 | CES83 = 93 |
| CES09 = 29 | CES34 = 91 | CES59 = 92 | CES84 = 93 |
| CES10 = 77 | CES35 = 96 | CES60 = 96 | CES85 = 78 |
| CES11 = 60 | CES36 = 96 | CES61 = 91 | CES86 = 65 |
| CES12 = 66 | CES37 = 95 | CES62 = 97 | CES87 = 85 |
| CES13 = 44 | CES38 = 93 | CES63 = 87 | CES88 = 86 |
| CES14 = 74 | CES39 = 97 | CES64 = 86 | CES89 = 74 |
| CES15 = 72 | CES40 = 94 | CES65 = 81 | CES90 = 86 |
| CES16 = 48 | CES41 = 93 | CES66 = 85 | CES91 = 87 |
| CES17 = 50 | CES42 = 95 | CES67 = 84 | CES92 = 67 |
| CES18 = 57 | CES43 = 88 | CES68 = 85 | CES93 = 80 |
| CES19 = 73 | CES44 = 99 | CES69 = 91 | CES94 = 61 |
| CES20 = 67 | CES45 = 92 | CES70 = 82 | CES95 = 77 |
| CES21 = 87 | CES46 = 88 | CES71 = 83 | CES96 = 84 |
| CES22 = 79 | CES47 = 88 | CES72 = 93 | CES97 = 88 |
| CES23 = 92 | CES48 = 81 | CES73 = 78 | CES98 = 84 |
| CES24 = 91 | CES49 = 88 | CES74 = 91 | CES99 = 76 |
| CES25 = 72 | CES50 = 94 | CES75 = 85 |            |



Color Rendition by Hue-Angle Bin



**Measure Comparisons**



(END OF REPORT)