

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: P800739

Luminaire Tested: **ARCH-M-PA2-90-727-24VDC-T3**

Issue Date: 5/19/2020

**Test Information**

Test Method: LM-79-08  
Report Number: P800739  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-1910-568-10)  
Test Lab: INNOVATION CENTER  
Issue Date: 5/19/2020  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: STREETWORKS  
Catalog Number: ARCH-M-PA2-90-727-24VDC-T3  
Description: ARCHEON-M ROADWAY AND AREA LUMINAIRE  
(2) 70 CRI, 2700K, 600mA LIGHT ENGINES WITH 16 LEDS AND TYPE III OPTICS  
Light Source: -  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

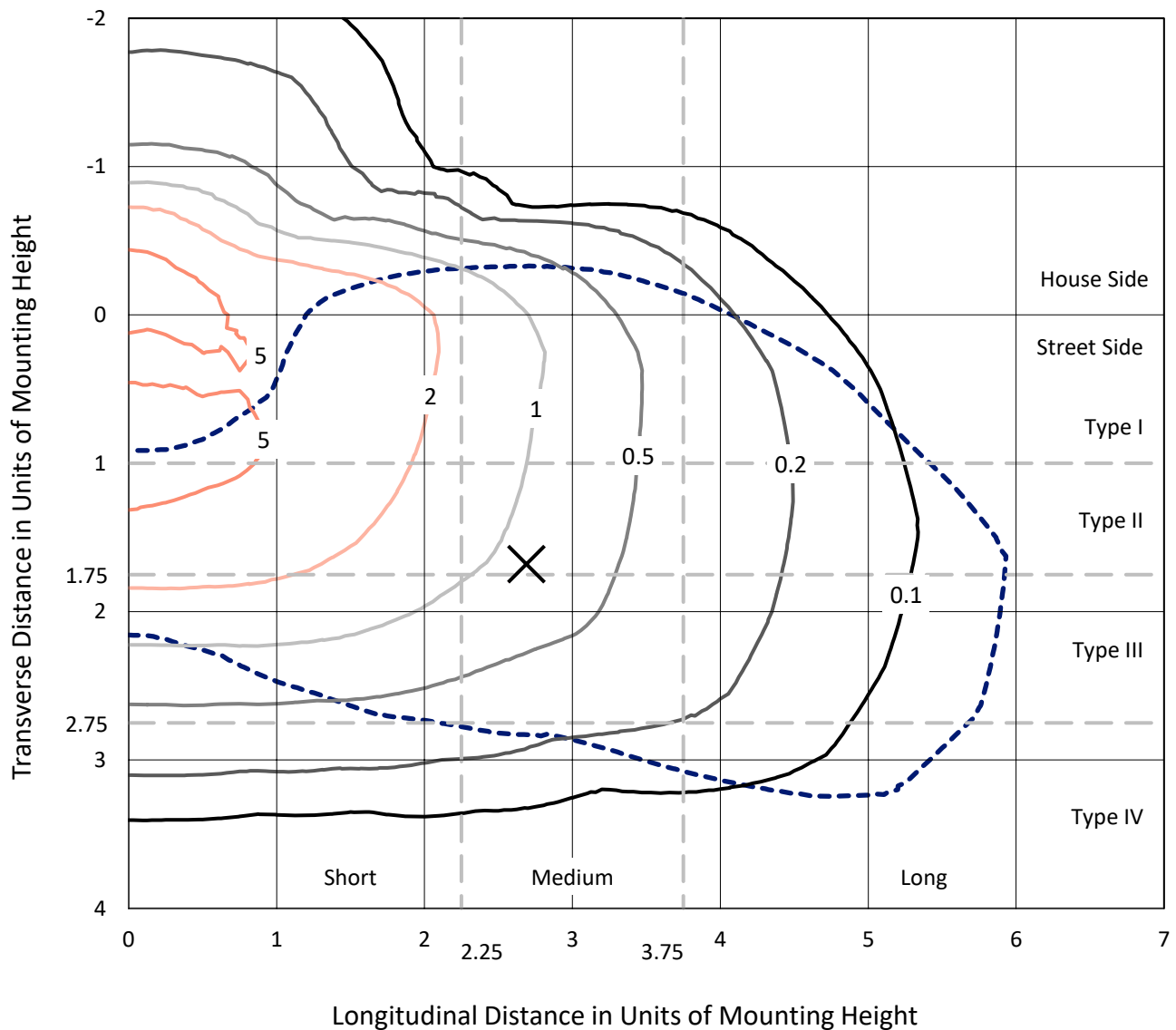
Lumens per Lamp: N/A  
Luminaire Lumens: 12229 lumens  
Efficiency: N/A  
Efficacy: 137.4 lumens/watt  
Luminous Opening: Rectangular (W 0.75' x L: 1' x H: 0')  
IES Classification: Type IV - Medium  
BUG Rating: B2 - U0 - G3

Input Watts (W): 89  
Input Voltage (V): NR  
Input Current (A<sub>in</sub>): 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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CATALOG NUMBER: ARCH-M-PA2-90-727-24VDC-T3

## Iso-Footcandle Lines of Horizontal Illumination

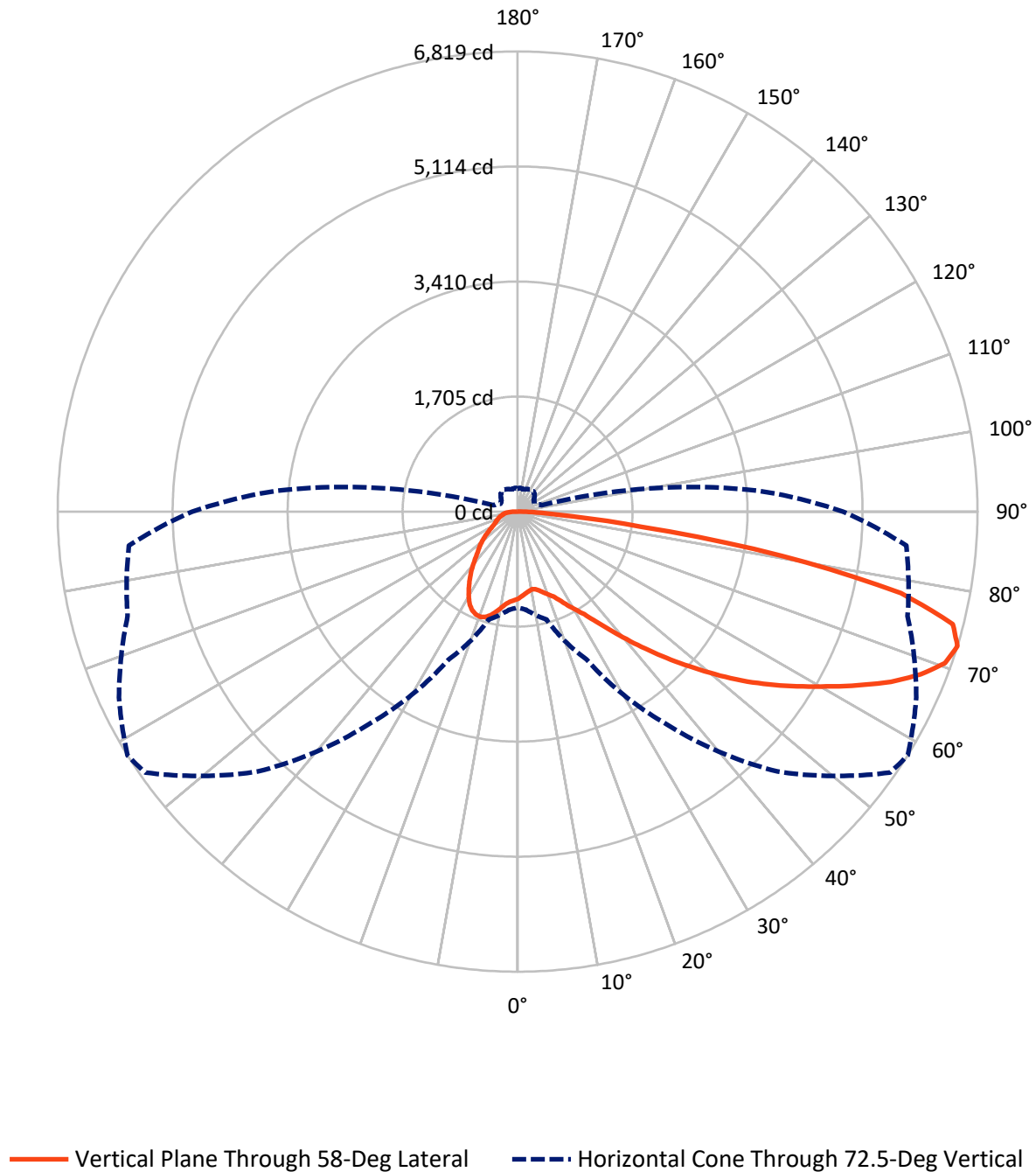
× Max cd  
- - - 1/2 Max cd



Based on 15 foot mounting height. Maximum calculated value = 6.7 fc  
Type IV - Medium - N/A

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## Luminous Intensity Polar Plot



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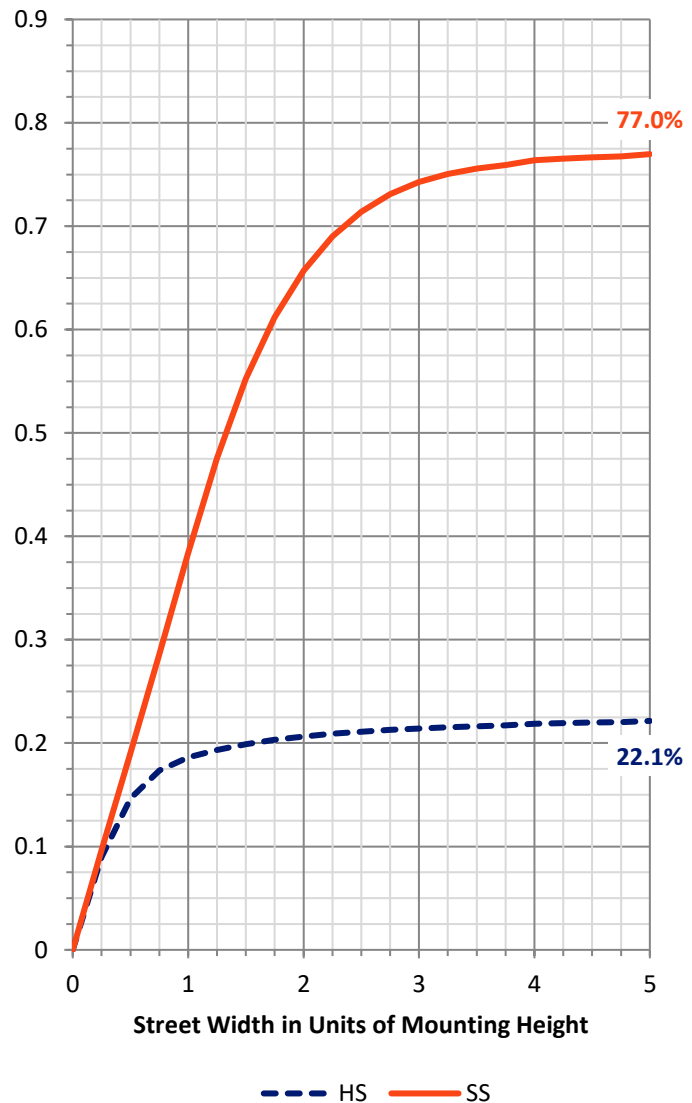
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total   |
|--------------------|-----------|----------|--------|---------|
| <b>House Side</b>  | Lumens    | 2773.4   | 0.0    | 2773.4  |
|                    | % Fixture | 22.7     | 0.0    | 22.7    |
| <b>Street Side</b> | Lumens    | 9455.6   | 0.0    | 9455.6  |
|                    | % Fixture | 77.3     | 0.0    | 77.3    |
| <b>Total</b>       | Lumens    | 12229.0  | 0.0    | 12229.0 |
|                    | % Fixture | 100.0    | 0.0    | 100.0   |

**Coefficient of Utilization**

**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 124.3   | 1.0       |
| 10°-20°   | 394.6   | 3.2       |
| 20°-30°   | 706.9   | 5.8       |
| 30°-40°   | 1063.3  | 8.7       |
| 40°-50°   | 1721.9  | 14.1      |
| 50°-60°   | 2592.1  | 21.2      |
| 60°-70°   | 3050.6  | 24.9      |
| 70°-80°   | 2163.1  | 17.7      |
| 80°-90°   | 412.2   | 3.4       |
| 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°    | 12229.0 | 100.0     |
| 0°-180°   | 12229.0 | 100.0     |



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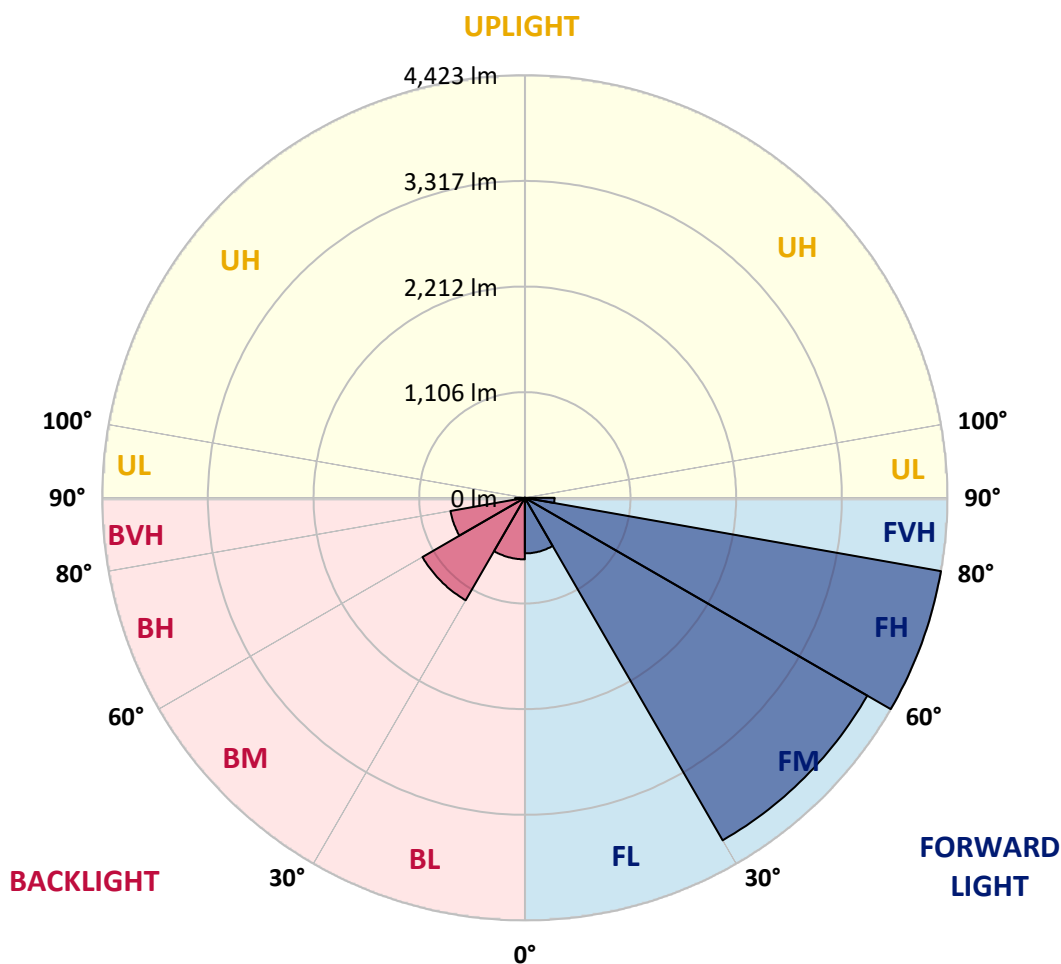
CATALOG NUMBER: ARCH-M-PA2-90-727-24VDC-T3

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

| Zone |             | Lumens | % Fixture | Zone Rating/Lumen Limit |      |         |
|------|-------------|--------|-----------|-------------------------|------|---------|
|      |             |        |           | B                       | U    | G       |
| FL   | (0°-30°)    | 581.5  | 4.8       |                         |      |         |
| FM   | (30°-60°)   | 4139.9 | 33.9      |                         |      |         |
| FH   | (60°-80°)   | 4423.3 | 36.2      |                         |      | G2/5000 |
| FVH  | (80°-90°)   | 310.9  | 2.5       |                         |      | G3/500  |
| BL   | (0°-30°)    | 644.2  | 5.3       | B2/1000                 |      |         |
| BM   | (30°-60°)   | 1237.5 | 10.1      | B2/2500                 |      |         |
| BH   | (60°-80°)   | 790.4  | 6.5       | B2/1000                 |      | G2/1000 |
| BVH  | (80°-90°)   | 101.3  | 0.8       |                         |      | G2/225  |
| UL   | (90°-100°)  | 0.0    | 0.0       |                         | U0/0 |         |
| UH   | (100°-180°) | 0.0    | 0.0       |                         | U0/0 |         |

**BUG Rating: B2-U0-G3**

Type IV Medium



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CATALOG NUMBER: ARCH-M-PA2-90-727-24VDC-T3

**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 5°     | 15°    | 25°    | 35°    | 45°    | 55°    | 58°    | 65°    | 75°    | 85°    |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 1289.9 | 1289.9 | 1289.9 | 1289.9 | 1289.9 | 1289.9 | 1289.9 | 1289.9 | 1289.9 | 1289.9 | 1289.9 |
| 2.5°  | 1241.5 | 1235.0 | 1236.6 | 1236.6 | 1243.1 | 1246.3 | 1247.9 | 1252.8 | 1256.0 | 1264.1 | 1275.4 |
| 5°    | 1183.3 | 1178.5 | 1180.1 | 1181.7 | 1193.0 | 1204.3 | 1214.0 | 1220.5 | 1230.2 | 1243.1 | 1259.2 |
| 7.5°  | 1141.4 | 1138.1 | 1139.8 | 1143.0 | 1152.7 | 1165.6 | 1181.7 | 1191.4 | 1206.0 | 1230.2 | 1257.6 |
| 10°   | 1110.7 | 1110.7 | 1112.3 | 1118.8 | 1128.5 | 1144.6 | 1157.5 | 1168.8 | 1197.9 | 1241.5 | 1283.4 |
| 12.5° | 1086.5 | 1086.5 | 1091.3 | 1104.2 | 1120.4 | 1136.5 | 1167.2 | 1180.1 | 1218.9 | 1278.6 | 1328.6 |
| 15°   | 1084.9 | 1086.5 | 1088.1 | 1099.4 | 1117.2 | 1152.7 | 1197.9 | 1217.3 | 1264.1 | 1335.1 | 1393.2 |
| 17.5° | 1110.7 | 1112.3 | 1105.9 | 1109.1 | 1130.1 | 1180.1 | 1239.9 | 1262.5 | 1322.2 | 1399.7 | 1459.4 |
| 20°   | 1189.8 | 1189.8 | 1170.4 | 1152.7 | 1167.2 | 1222.1 | 1289.9 | 1312.5 | 1378.7 | 1464.3 | 1524.0 |
| 22.5° | 1351.2 | 1359.3 | 1314.1 | 1275.4 | 1252.8 | 1283.4 | 1344.8 | 1369.0 | 1443.3 | 1535.3 | 1595.0 |
| 25°   | 1546.6 | 1554.7 | 1493.3 | 1438.4 | 1396.4 | 1391.6 | 1432.0 | 1457.8 | 1519.1 | 1614.4 | 1664.4 |
| 27.5° | 1735.5 | 1720.9 | 1664.4 | 1612.8 | 1559.5 | 1515.9 | 1546.6 | 1569.2 | 1640.2 | 1712.9 | 1743.5 |
| 30°   | 1884.0 | 1872.7 | 1817.8 | 1780.7 | 1730.6 | 1674.1 | 1656.4 | 1680.6 | 1738.7 | 1806.5 | 1822.6 |
| 32.5° | 2048.7 | 2040.6 | 1985.7 | 1937.3 | 1895.3 | 1842.0 | 1803.3 | 1814.6 | 1846.9 | 1895.3 | 1905.0 |
| 35°   | 2258.5 | 2276.3 | 2218.2 | 2119.7 | 2072.9 | 2021.2 | 1993.8 | 1997.0 | 2021.2 | 2051.9 | 2035.7 |
| 37.5° | 2479.7 | 2500.7 | 2503.9 | 2348.9 | 2286.0 | 2239.2 | 2210.1 | 2221.4 | 2250.5 | 2271.5 | 2221.4 |
| 40°   | 2889.8 | 2868.8 | 2784.8 | 2670.2 | 2573.3 | 2528.1 | 2487.8 | 2486.2 | 2507.2 | 2544.3 | 2453.9 |
| 42.5° | 3433.8 | 3414.4 | 3244.9 | 3096.4 | 2943.0 | 2891.4 | 2812.3 | 2778.4 | 2788.1 | 2834.9 | 2709.0 |
| 45°   | 3955.3 | 3947.2 | 3811.6 | 3638.8 | 3454.8 | 3354.7 | 3173.9 | 3091.6 | 3083.5 | 3120.6 | 2970.5 |
| 47.5° | 4418.6 | 4383.1 | 4284.6 | 4150.6 | 4131.2 | 3869.7 | 3537.1 | 3425.7 | 3387.0 | 3408.0 | 3240.1 |
| 50°   | 4914.2 | 4793.1 | 4657.5 | 4575.2 | 4715.6 | 4471.9 | 3903.6 | 3787.4 | 3692.1 | 3706.6 | 3532.3 |
| 52.5° | 5177.4 | 4973.9 | 4885.2 | 4909.4 | 5098.3 | 5004.6 | 4302.4 | 4160.3 | 4006.9 | 4027.9 | 3822.9 |
| 55°   | 4951.3 | 4949.7 | 4988.5 | 5138.6 | 5401.8 | 5293.6 | 4681.7 | 4521.9 | 4354.0 | 4358.9 | 4157.1 |
| 57.5° | 4641.4 | 4704.3 | 4904.5 | 5235.5 | 5777.9 | 5597.1 | 5054.7 | 4885.2 | 4731.8 | 4707.6 | 4536.4 |
| 60°   | 4358.9 | 4428.3 | 4718.9 | 5219.3 | 5908.7 | 5874.8 | 5409.8 | 5261.3 | 5137.0 | 5066.0 | 4935.2 |
| 62.5° | 3929.4 | 3981.1 | 4392.8 | 5116.0 | 5798.9 | 6075.0 | 5769.8 | 5668.1 | 5574.5 | 5427.6 | 5364.6 |
| 65°   | 3424.1 | 3441.9 | 3876.2 | 4775.4 | 5661.7 | 6152.4 | 6128.2 | 6083.0 | 5992.6 | 5776.3 | 5789.2 |
| 67.5° | 2876.8 | 2912.4 | 3293.4 | 4231.3 | 5361.4 | 6116.9 | 6405.9 | 6443.0 | 6336.5 | 6012.0 | 6060.4 |
| 70°   | 2294.1 | 2337.6 | 2626.6 | 3479.0 | 4851.2 | 5963.6 | 6662.6 | 6722.3 | 6517.3 | 6089.5 | 6110.5 |
| 72.5° | 1419.1 | 1461.0 | 1654.8 | 2416.7 | 3845.5 | 5448.6 | 6741.7 | 6819.2 | 6522.1 | 5986.2 | 5784.4 |
| 75°   | 490.8  | 495.6  | 647.4  | 1159.1 | 2282.8 | 4113.5 | 6483.4 | 6665.8 | 6317.1 | 5610.0 | 5033.7 |
| 77.5° | 224.4  | 232.5  | 287.4  | 477.9  | 1012.2 | 2219.8 | 5353.3 | 5810.2 | 5694.0 | 5022.4 | 3874.5 |
| 80°   | 155.0  | 158.2  | 198.6  | 285.7  | 584.4  | 781.4  | 3378.9 | 3974.6 | 4178.0 | 3889.1 | 2482.9 |
| 82.5° | 116.2  | 119.5  | 153.4  | 193.7  | 421.4  | 379.4  | 1286.7 | 1846.9 | 2295.7 | 2253.7 | 1038.1 |
| 85°   | 111.4  | 109.8  | 119.5  | 129.2  | 280.9  | 226.0  | 416.5  | 571.5  | 896.0  | 766.8  | 261.5  |
| 87.5° | 48.4   | 53.3   | 122.7  | 72.6   | 146.9  | 104.9  | 180.8  | 211.5  | 272.8  | 237.3  | 93.6   |
| 90°   | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |



REPORT NUMBER: P800739

CATALOG NUMBER: ARCH-M-PA2-90-727-24VDC-T3

**CANDELA DISTRIBUTION (continued):**

|       | 90°    | 95°    | 105°   | 115°   | 125°   | 135°   | 145°   | 155°   | 165°   | 175°   | 180°   |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 1289.9 | 1289.9 | 1289.9 | 1289.9 | 1289.9 | 1289.9 | 1289.9 | 1289.9 | 1289.9 | 1289.9 | 1289.9 |
| 2.5°  | 1280.2 | 1283.4 | 1293.1 | 1307.7 | 1315.7 | 1331.9 | 1343.2 | 1349.6 | 1354.5 | 1356.1 | 1356.1 |
| 5°    | 1268.9 | 1275.4 | 1296.4 | 1320.6 | 1343.2 | 1377.1 | 1407.8 | 1425.5 | 1438.4 | 1443.3 | 1444.9 |
| 7.5°  | 1272.1 | 1288.3 | 1319.0 | 1354.5 | 1383.5 | 1427.1 | 1464.3 | 1499.8 | 1528.8 | 1540.1 | 1540.1 |
| 10°   | 1302.8 | 1325.4 | 1367.4 | 1414.2 | 1451.3 | 1496.5 | 1535.3 | 1566.0 | 1599.9 | 1619.2 | 1622.5 |
| 12.5° | 1349.6 | 1377.1 | 1432.0 | 1483.6 | 1525.6 | 1561.1 | 1596.6 | 1619.2 | 1635.4 | 1649.9 | 1653.1 |
| 15°   | 1415.8 | 1449.7 | 1504.6 | 1557.9 | 1595.0 | 1617.6 | 1627.3 | 1627.3 | 1625.7 | 1627.3 | 1630.5 |
| 17.5° | 1482.0 | 1514.3 | 1569.2 | 1622.5 | 1640.2 | 1627.3 | 1616.0 | 1612.8 | 1611.2 | 1607.9 | 1609.5 |
| 20°   | 1546.6 | 1577.3 | 1624.1 | 1664.4 | 1649.9 | 1604.7 | 1590.2 | 1588.6 | 1583.7 | 1580.5 | 1577.3 |
| 22.5° | 1611.2 | 1633.8 | 1672.5 | 1687.0 | 1628.9 | 1564.3 | 1546.6 | 1536.9 | 1530.4 | 1522.4 | 1514.3 |
| 25°   | 1685.4 | 1691.9 | 1720.9 | 1698.3 | 1577.3 | 1490.1 | 1464.3 | 1449.7 | 1443.3 | 1435.2 | 1428.7 |
| 27.5° | 1754.8 | 1754.8 | 1759.7 | 1680.6 | 1501.4 | 1391.6 | 1352.9 | 1327.0 | 1325.4 | 1323.8 | 1322.2 |
| 30°   | 1817.8 | 1809.7 | 1793.6 | 1627.3 | 1402.9 | 1270.5 | 1212.4 | 1186.6 | 1196.3 | 1204.3 | 1206.0 |
| 32.5° | 1892.1 | 1875.9 | 1830.7 | 1554.7 | 1285.1 | 1134.9 | 1063.9 | 1052.6 | 1063.9 | 1073.6 | 1067.1 |
| 35°   | 2008.3 | 1979.2 | 1869.5 | 1470.7 | 1172.0 | 1010.6 | 942.8  | 926.7  | 923.4  | 921.8  | 908.9  |
| 37.5° | 2174.6 | 2124.5 | 1900.1 | 1380.3 | 1060.7 | 900.8  | 850.8  | 816.9  | 786.2  | 753.9  | 749.1  |
| 40°   | 2378.0 | 2292.4 | 1921.1 | 1277.0 | 942.8  | 808.8  | 755.5  | 711.9  | 660.3  | 603.8  | 597.3  |
| 42.5° | 2600.8 | 2473.2 | 1930.8 | 1162.4 | 839.5  | 732.9  | 666.7  | 611.9  | 553.7  | 510.1  | 502.1  |
| 45°   | 2841.3 | 2668.6 | 1922.7 | 1052.6 | 755.5  | 668.4  | 594.1  | 534.4  | 487.5  | 456.9  | 450.4  |
| 47.5° | 3075.4 | 2893.0 | 1900.1 | 965.4  | 691.0  | 613.5  | 537.6  | 482.7  | 447.2  | 413.3  | 405.2  |
| 50°   | 3375.7 | 3107.7 | 1872.7 | 897.6  | 619.9  | 558.6  | 502.1  | 444.0  | 403.6  | 387.5  | 384.2  |
| 52.5° | 3708.3 | 3322.4 | 1840.4 | 812.0  | 550.5  | 515.0  | 479.5  | 427.8  | 414.9  | 384.2  | 379.4  |
| 55°   | 4068.3 | 3577.5 | 1833.9 | 703.9  | 489.2  | 484.3  | 456.9  | 442.3  | 445.6  | 384.2  | 376.2  |
| 57.5° | 4447.7 | 3850.3 | 1848.5 | 595.7  | 439.1  | 456.9  | 466.6  | 455.3  | 450.4  | 392.3  | 376.2  |
| 60°   | 4843.2 | 4113.5 | 1804.9 | 495.6  | 400.4  | 434.3  | 477.9  | 448.8  | 413.3  | 389.1  | 377.8  |
| 62.5° | 5227.4 | 4334.6 | 1616.0 | 424.6  | 371.3  | 427.8  | 471.4  | 424.6  | 384.2  | 384.2  | 379.4  |
| 65°   | 5506.7 | 4433.1 | 1264.1 | 372.9  | 351.9  | 419.7  | 460.1  | 408.4  | 376.2  | 387.5  | 381.0  |
| 67.5° | 5539.0 | 4331.4 | 849.2  | 332.6  | 335.8  | 405.2  | 434.3  | 393.9  | 368.1  | 397.1  | 387.5  |
| 70°   | 5340.4 | 4066.7 | 519.8  | 301.9  | 314.8  | 379.4  | 411.7  | 379.4  | 356.8  | 389.1  | 374.5  |
| 72.5° | 4825.4 | 3572.7 | 366.5  | 276.1  | 292.2  | 355.2  | 390.7  | 366.5  | 340.6  | 351.9  | 337.4  |
| 75°   | 3958.5 | 2768.7 | 290.6  | 251.8  | 269.6  | 332.6  | 372.9  | 347.1  | 321.3  | 316.4  | 306.7  |
| 77.5° | 2804.2 | 1774.2 | 234.1  | 232.5  | 245.4  | 305.1  | 348.7  | 324.5  | 298.7  | 289.0  | 282.5  |
| 80°   | 1612.8 | 870.2  | 201.8  | 209.9  | 222.8  | 277.7  | 319.6  | 298.7  | 274.4  | 259.9  | 250.2  |
| 82.5° | 616.7  | 303.5  | 177.6  | 182.4  | 197.0  | 248.6  | 290.6  | 272.8  | 248.6  | 261.5  | 219.6  |
| 85°   | 200.2  | 166.3  | 145.3  | 150.1  | 164.7  | 206.6  | 256.7  | 242.2  | 214.7  | 190.5  | 176.0  |
| 87.5° | 88.8   | 90.4   | 77.5   | 85.6   | 103.3  | 137.2  | 187.3  | 177.6  | 156.6  | 130.8  | 125.9  |
| 90°   | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |



Report Prepared for

Cooper Lighting Solutions

(formerly Eaton)

STREETWORKS

Report Number: SP1-2101-121-5

Luminaire Tested: IFLD-S-SA2E-727-U-T2

Test Date: 03/04/2021

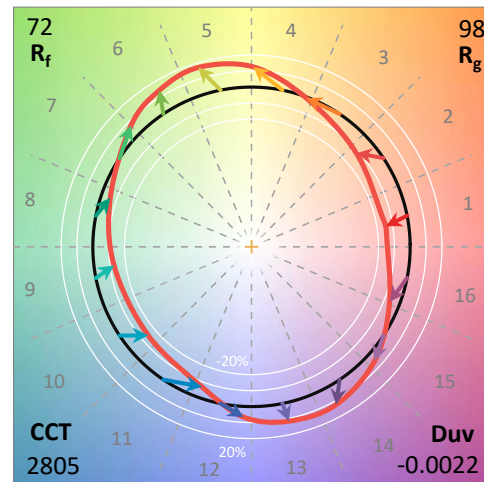
### Test Information

Test Method: LM-79-08  
 Report Number: SP1-2101-121-5  
 Test Lab: COOPER LIGHTING SOLUTIONS  
 Photometer: SP1  
 Measurement Geometry:  $4\pi$   
 Issue Date: 03/04/2021  
 Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
 Product Line: STREETWORKS  
 Catalog Number: **IFLD-S-SA2E-727-U-T2**  
 Description: STREETWORKS INF FLOOD

PROGRAMMED @ 1500mA.

### Spectral Parameters

|                           |         |           |      |      |       |
|---------------------------|---------|-----------|------|------|-------|
| CCT (K):                  | 2805    | CRI (Ra): | 72.4 |      |       |
| CIE u':                   | 0.2586  | R1:       | 69.8 | R9:  | -15.0 |
| CIE v':                   | 0.5221  | R2:       | 81.3 | R10: | 55.6  |
| Duv:                      | -0.0022 | R3:       | 90.2 | R11: | 61.7  |
| CIE x:                    | 0.4477  | R4:       | 68.5 | R12: | 47.2  |
| CIE y:                    | 0.4017  | R5:       | 67.5 | R13: | 71.4  |
| CIE z:                    | 0.1506  | R6:       | 72.4 | R14: | 93.9  |
| Peak Wavelength (nm):     | 599     | R7:       | 79.4 |      |       |
| Dominant Wavelength (nm): | 584     | R8:       | 49.9 |      |       |
| Purity:                   | 55.3    |           |      |      |       |
| Rf:                       | 71.9    |           |      |      |       |
| Rg:                       | 97.9    |           |      |      |       |



### Test Conditions

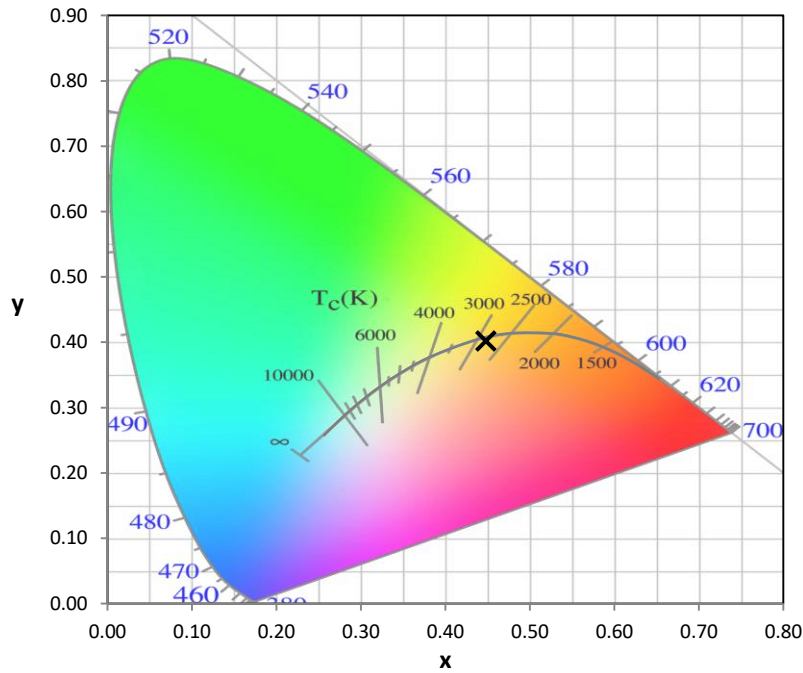
Stabilization Time: 60M  
 Operation Time: 12H  
 Room Temperature (°C) / RH%: 25.3/31%  
 Sphere Temperature (°C): 24.8

REPORT NUMBER: SP1-2101-121-5

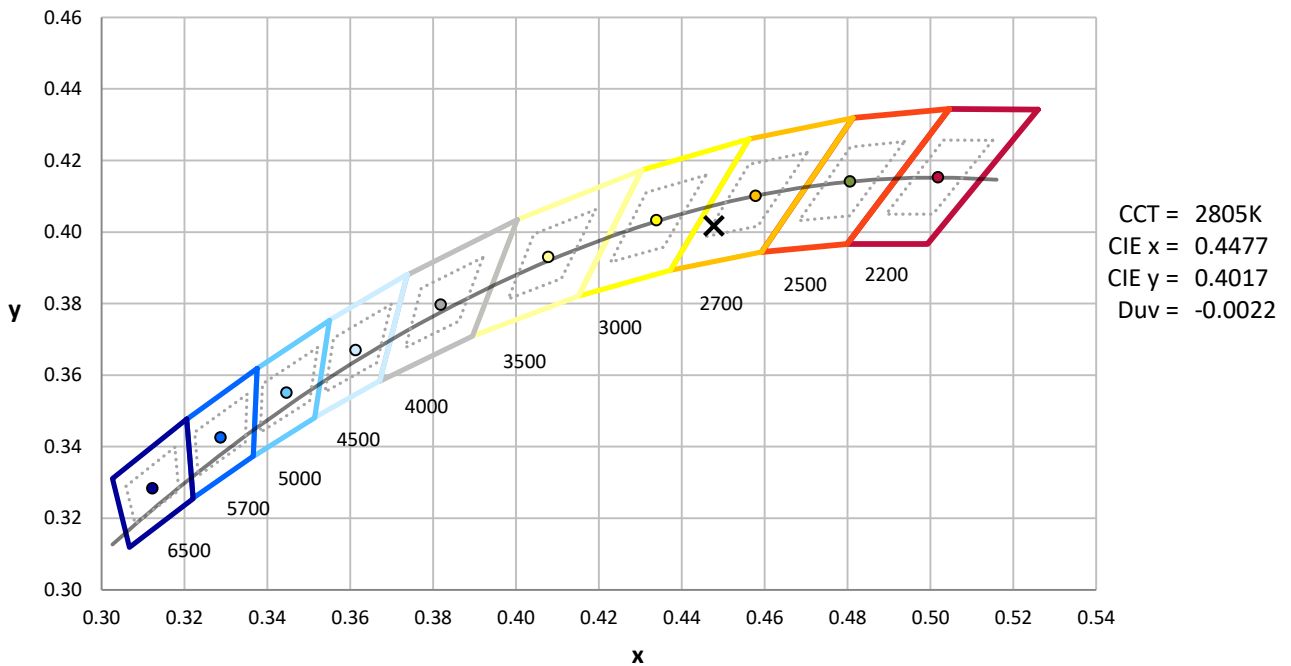
| Measurement and Test Equipment |                       |                  |                      |
|--------------------------------|-----------------------|------------------|----------------------|
| Instrument                     | Identification Number | Calibration Date | Calibration Due Date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



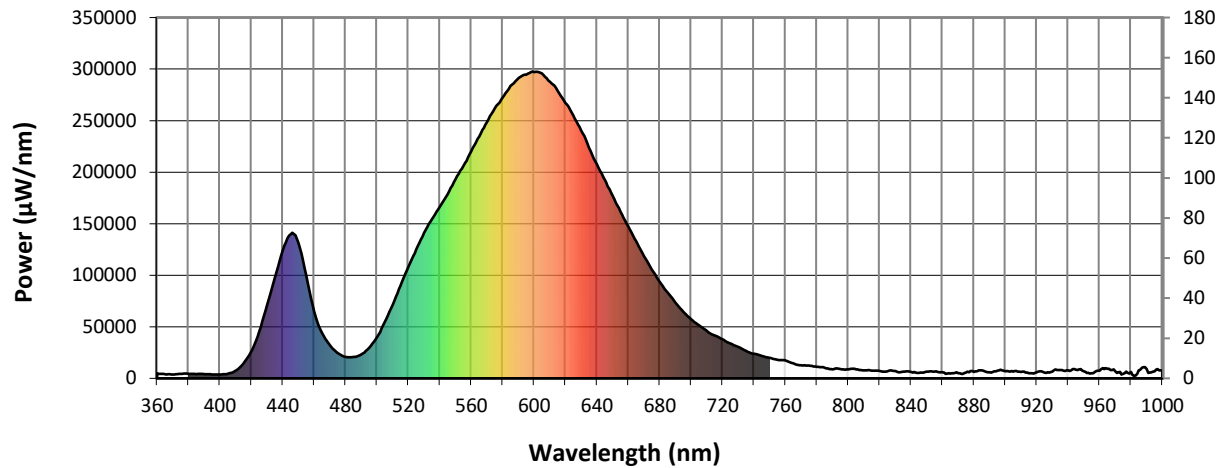
**CIE 1931 Chromaticity Diagram with 2017 ANSI 7-Step and 4-Step Quadrangles**



Point lies inside the ANSI 2700K 4-step quadrangle

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### Photopic Flux vs. Wavelength

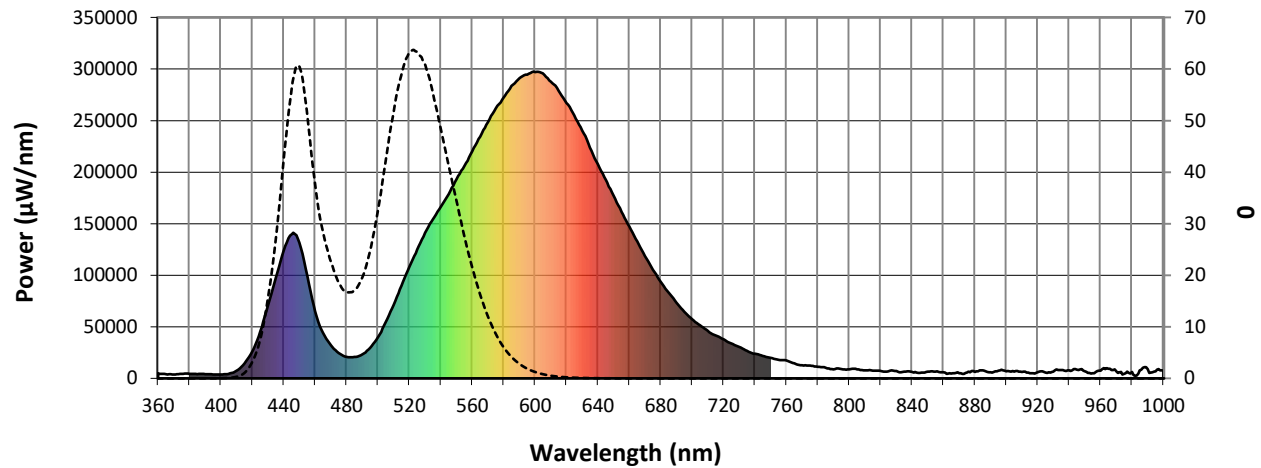


#####

| 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       | 4854             | 0.0              | 490       | 23280            | 3.3              | 620       | 266893           | 69.5             | 750       | 19996            | 0.0              | 880       | 6314             | 0.0              |
| 365       | 4049             | 0.0              | 495       | 29582            | 5.4              | 625       | 255096           | 56.3             | 755       | 17900            | 0.0              | 885       | 7853             | 0.0              |
| 370       | 3795             | 0.0              | 500       | 39981            | 8.8              | 630       | 240244           | 43.5             | 760       | 17272            | 0.0              | 890       | 5823             | 0.0              |
| 375       | 4296             | 0.0              | 505       | 54556            | 15.3             | 635       | 223787           | 33.6             | 765       | 14514            | 0.0              | 895       | 7346             | 0.0              |
| 380       | 4496             | 0.0              | 510       | 71364            | 24.5             | 640       | 207566           | 24.8             | 770       | 12643            | 0.0              | 900       | 6920             | 0.0              |
| 385       | 4186             | 0.0              | 515       | 89828            | 37.2             | 645       | 192517           | 18.5             | 775       | 12475            | 0.0              | 905       | 6608             | 0.0              |
| 390       | 3945             | 0.0              | 520       | 108414           | 52.6             | 650       | 177187           | 12.9             | 780       | 11188            | 0.0              | 910       | 6279             | 0.0              |
| 395       | 3780             | 0.0              | 525       | 124929           | 67.1             | 655       | 161553           | 9.3              | 785       | 10229            | 0.0              | 915       | 5131             | 0.0              |
| 400       | 3679             | 0.0              | 530       | 141352           | 83.2             | 660       | 147361           | 6.1              | 790       | 8578             | 0.0              | 920       | 5855             | 0.0              |
| 405       | 4475             | 0.0              | 535       | 154552           | 95.8             | 665       | 132756           | 4.2              | 795       | 9114             | 0.0              | 925       | 5678             | 0.0              |
| 410       | 7499             | 0.0              | 540       | 166297           | 108.4            | 670       | 118534           | 2.6              | 800       | 8597             | 0.0              | 930       | 6661             | 0.0              |
| 415       | 14449            | 0.0              | 545       | 178874           | 119.1            | 675       | 105260           | 1.8              | 805       | 8790             | 0.0              | 935       | 8074             | 0.0              |
| 420       | 26000            | 0.1              | 550       | 193176           | 131.3            | 680       | 93637            | 1.1              | 810       | 7814             | 0.0              | 940       | 7823             | 0.0              |
| 425       | 45491            | 0.2              | 555       | 206008           | 140.7            | 685       | 83217            | 0.7              | 815       | 7533             | 0.0              | 945       | 8364             | 0.0              |
| 430       | 70707            | 0.6              | 560       | 220126           | 149.6            | 690       | 73671            | 0.4              | 820       | 7303             | 0.0              | 950       | 6763             | 0.0              |
| 435       | 98169            | 1.2              | 565       | 234383           | 155.8            | 695       | 64520            | 0.3              | 825       | 6745             | 0.0              | 955       | 4883             | 0.0              |
| 440       | 123846           | 1.9              | 570       | 248161           | 161.4            | 700       | 57442            | 0.2              | 830       | 7209             | 0.0              | 960       | 7488             | 0.0              |
| 445       | 139822           | 2.9              | 575       | 261970           | 163.0            | 705       | 51479            | 0.1              | 835       | 6674             | 0.0              | 965       | 9316             | 0.0              |
| 450       | 131679           | 3.4              | 580       | 272271           | 161.8            | 710       | 45940            | 0.1              | 840       | 6151             | 0.0              | 970       | 6857             | 0.0              |
| 455       | 99242            | 3.3              | 585       | 283822           | 157.7            | 715       | 41575            | 0.0              | 845       | 5371             | 0.0              | 975       | 4388             | 0.0              |
| 460       | 65216            | 2.7              | 590       | 291192           | 150.6            | 720       | 37753            | 0.0              | 850       | 6484             | 0.0              | 980       | 6095             | 0.0              |
| 465       | 44137            | 2.3              | 595       | 294651           | 139.7            | 725       | 33818            | 0.0              | 855       | 6614             | 0.0              | 985       | 7701             | 0.0              |
| 470       | 32002            | 2.0              | 600       | 297168           | 128.1            | 730       | 30414            | 0.0              | 860       | 5959             | 0.0              | 990       | 9045             | 0.0              |
| 475       | 24549            | 1.9              | 605       | 295658           | 114.5            | 735       | 26662            | 0.0              | 865       | 4768             | 0.0              | 995       | 6989             | 0.0              |
| 480       | 20801            | 2.0              | 610       | 287633           | 98.8             | 740       | 23848            | 0.0              | 870       | 5098             | 0.0              | 1000      | 7341             | 0.0              |
| 485       | 20656            | 2.4              | 615       | 279152           | 84.3             | 745       | 21851            | 0.0              | 875       | 5516             | 0.0              |           |                  |                  |

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### Scotopic Flux vs. Wavelength



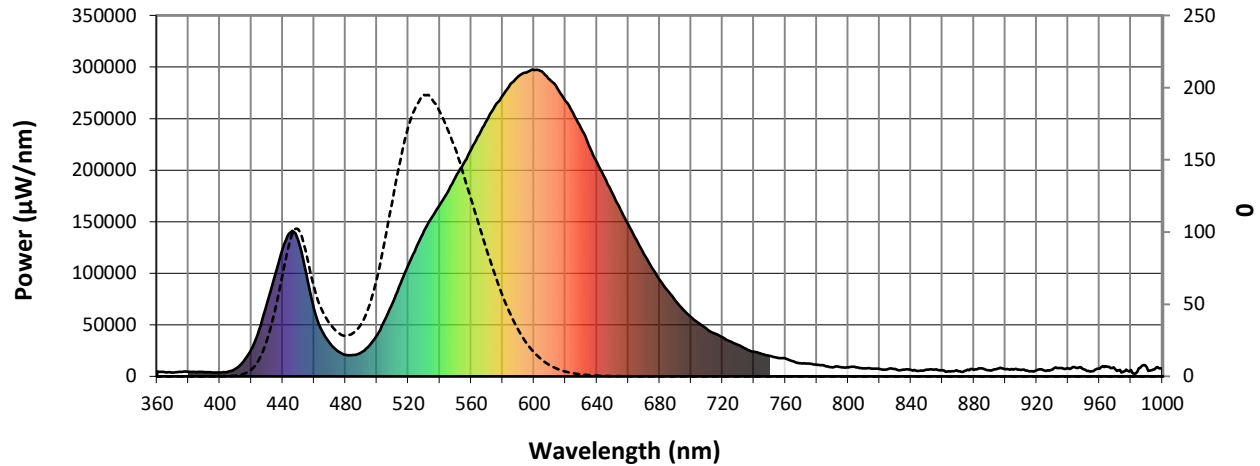
Scotopic Lumens: 15895.6

S/P: 1.11

| 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       | 4854             | 0.0              | 490       | 23280            | 35.8             | 620       | 266893           | 3.3              | 750       | 19996            | 0.0              | 880       | 6314             | 0.0              |
| 365       | 4049             | 0.0              | 495       | 29582            | 47.8             | 625       | 255096           | 2.2              | 755       | 17900            | 0.0              | 885       | 7853             | 0.0              |
| 370       | 3795             | 0.0              | 500       | 39981            | 66.9             | 630       | 240244           | 1.4              | 760       | 17272            | 0.0              | 890       | 5823             | 0.0              |
| 375       | 4296             | 0.0              | 505       | 54556            | 92.7             | 635       | 223787           | 0.9              | 765       | 14514            | 0.0              | 895       | 7346             | 0.0              |
| 380       | 4496             | 0.0              | 510       | 71364            | 121.0            | 640       | 207566           | 0.5              | 770       | 12643            | 0.0              | 900       | 6920             | 0.0              |
| 385       | 4186             | 0.0              | 515       | 89828            | 148.9            | 645       | 192517           | 0.3              | 775       | 12475            | 0.0              | 905       | 6608             | 0.0              |
| 390       | 3945             | 0.0              | 520       | 108414           | 172.3            | 650       | 177187           | 0.2              | 780       | 11188            | 0.0              | 910       | 6279             | 0.0              |
| 395       | 3780             | 0.0              | 525       | 124929           | 186.9            | 655       | 161553           | 0.1              | 785       | 10229            | 0.0              | 915       | 5131             | 0.0              |
| 400       | 3679             | 0.1              | 530       | 141352           | 194.9            | 660       | 147361           | 0.1              | 790       | 8578             | 0.0              | 920       | 5855             | 0.0              |
| 405       | 4475             | 0.1              | 535       | 154552           | 192.6            | 665       | 132756           | 0.0              | 795       | 9114             | 0.0              | 925       | 5678             | 0.0              |
| 410       | 7499             | 0.4              | 540       | 166297           | 183.8            | 670       | 118534           | 0.0              | 800       | 8597             | 0.0              | 930       | 6661             | 0.0              |
| 415       | 14449            | 1.5              | 545       | 178874           | 171.5            | 675       | 105260           | 0.0              | 805       | 8790             | 0.0              | 935       | 8074             | 0.0              |
| 420       | 26000            | 4.3              | 550       | 193176           | 158.0            | 680       | 93637            | 0.0              | 810       | 7814             | 0.0              | 940       | 7823             | 0.0              |
| 425       | 45491            | 11.1             | 555       | 206008           | 140.8            | 685       | 83217            | 0.0              | 815       | 7533             | 0.0              | 945       | 8364             | 0.0              |
| 430       | 70707            | 24.1             | 560       | 220126           | 123.0            | 690       | 73671            | 0.0              | 820       | 7303             | 0.0              | 950       | 6763             | 0.0              |
| 435       | 98169            | 43.9             | 565       | 234383           | 105.2            | 695       | 64520            | 0.0              | 825       | 6745             | 0.0              | 955       | 4883             | 0.0              |
| 440       | 123846           | 69.2             | 570       | 248161           | 87.6             | 700       | 57442            | 0.0              | 830       | 7209             | 0.0              | 960       | 7488             | 0.0              |
| 445       | 139822           | 93.6             | 575       | 261970           | 71.3             | 705       | 51479            | 0.0              | 835       | 6674             | 0.0              | 965       | 9316             | 0.0              |
| 450       | 131679           | 102.1            | 580       | 272271           | 56.1             | 710       | 45940            | 0.0              | 840       | 6151             | 0.0              | 970       | 6857             | 0.0              |
| 455       | 99242            | 86.7             | 585       | 283822           | 43.4             | 715       | 41575            | 0.0              | 845       | 5371             | 0.0              | 975       | 4388             | 0.0              |
| 460       | 65216            | 63.0             | 590       | 291192           | 32.4             | 720       | 37753            | 0.0              | 850       | 6484             | 0.0              | 980       | 6095             | 0.0              |
| 465       | 44137            | 46.6             | 595       | 294651           | 23.5             | 725       | 33818            | 0.0              | 855       | 6614             | 0.0              | 985       | 7701             | 0.0              |
| 470       | 32002            | 36.9             | 600       | 297168           | 16.7             | 730       | 30414            | 0.0              | 860       | 5959             | 0.0              | 990       | 9045             | 0.0              |
| 475       | 24549            | 30.7             | 605       | 295658           | 11.6             | 735       | 26662            | 0.0              | 865       | 4768             | 0.0              | 995       | 6989             | 0.0              |
| 480       | 20801            | 28.1             | 610       | 287633           | 7.8              | 740       | 23848            | 0.0              | 870       | 5098             | 0.0              | 1000      | 7341             | 0.0              |
| 485       | 20656            | 29.9             | 615       | 279152           | 5.2              | 745       | 21851            | 0.0              | 875       | 5516             | 0.0              |           |                  |                  |

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### Melanopic Flux vs. Wavelength


**Melanopic Lumens: 5527.7**
**M/P: 0.39**

| 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       | 4854             | 0.0              | 490       | 23280            | 19.4             | 620       | 266893           | 0.2              | 750       | 19996            | 0.0              | 880       | 6314             | 0.0              |
| 365       | 4049             | 0.0              | 495       | 29582            | 24.4             | 625       | 255096           | 0.1              | 755       | 17900            | 0.0              | 885       | 7853             | 0.0              |
| 370       | 3795             | 0.0              | 500       | 39981            | 32.1             | 630       | 240244           | 0.1              | 760       | 17272            | 0.0              | 890       | 5823             | 0.0              |
| 375       | 4296             | 0.0              | 505       | 54556            | 41.9             | 635       | 223787           | 0.1              | 765       | 14514            | 0.0              | 895       | 7346             | 0.0              |
| 380       | 4496             | 0.0              | 510       | 71364            | 51.2             | 640       | 207566           | 0.0              | 770       | 12643            | 0.0              | 900       | 6920             | 0.0              |
| 385       | 4186             | 0.0              | 515       | 89828            | 58.7             | 645       | 192517           | 0.0              | 775       | 12475            | 0.0              | 905       | 6608             | 0.0              |
| 390       | 3945             | 0.0              | 520       | 108414           | 63.1             | 650       | 177187           | 0.0              | 780       | 11188            | 0.0              | 910       | 6279             | 0.0              |
| 395       | 3780             | 0.0              | 525       | 124929           | 63.4             | 655       | 161553           | 0.0              | 785       | 10229            | 0.0              | 915       | 5131             | 0.0              |
| 400       | 3679             | 0.0              | 530       | 141352           | 61.1             | 660       | 147361           | 0.0              | 790       | 8578             | 0.0              | 920       | 5855             | 0.0              |
| 405       | 4475             | 0.1              | 535       | 154552           | 55.6             | 665       | 132756           | 0.0              | 795       | 9114             | 0.0              | 925       | 5678             | 0.0              |
| 410       | 7499             | 0.3              | 540       | 166297           | 48.7             | 670       | 118534           | 0.0              | 800       | 8597             | 0.0              | 930       | 6661             | 0.0              |
| 415       | 14449            | 1.0              | 545       | 178874           | 41.5             | 675       | 105260           | 0.0              | 805       | 8790             | 0.0              | 935       | 8074             | 0.0              |
| 420       | 26000            | 3.0              | 550       | 193176           | 34.7             | 680       | 93637            | 0.0              | 810       | 7814             | 0.0              | 940       | 7823             | 0.0              |
| 425       | 45491            | 7.1              | 555       | 206008           | 27.8             | 685       | 83217            | 0.0              | 815       | 7533             | 0.0              | 945       | 8364             | 0.0              |
| 430       | 70707            | 14.9             | 560       | 220126           | 21.7             | 690       | 73671            | 0.0              | 820       | 7303             | 0.0              | 950       | 6763             | 0.0              |
| 435       | 98169            | 26.2             | 565       | 234383           | 16.5             | 695       | 64520            | 0.0              | 825       | 6745             | 0.0              | 955       | 4883             | 0.0              |
| 440       | 123846           | 41.4             | 570       | 248161           | 12.1             | 700       | 57442            | 0.0              | 830       | 7209             | 0.0              | 960       | 7488             | 0.0              |
| 445       | 139822           | 55.1             | 575       | 261970           | 8.7              | 705       | 51479            | 0.0              | 835       | 6674             | 0.0              | 965       | 9316             | 0.0              |
| 450       | 131679           | 60.7             | 580       | 272271           | 6.1              | 710       | 45940            | 0.0              | 840       | 6151             | 0.0              | 970       | 6857             | 0.0              |
| 455       | 99242            | 52.0             | 585       | 283822           | 4.2              | 715       | 41575            | 0.0              | 845       | 5371             | 0.0              | 975       | 4388             | 0.0              |
| 460       | 65216            | 38.4             | 590       | 291192           | 2.9              | 720       | 37753            | 0.0              | 850       | 6484             | 0.0              | 980       | 6095             | 0.0              |
| 465       | 44137            | 28.8             | 595       | 294651           | 1.9              | 725       | 33818            | 0.0              | 855       | 6614             | 0.0              | 985       | 7701             | 0.0              |
| 470       | 32002            | 22.9             | 600       | 297168           | 1.3              | 730       | 30414            | 0.0              | 860       | 5959             | 0.0              | 990       | 9045             | 0.0              |
| 475       | 24549            | 18.7             | 605       | 295658           | 0.8              | 735       | 26662            | 0.0              | 865       | 4768             | 0.0              | 995       | 6989             | 0.0              |
| 480       | 20801            | 16.7             | 610       | 287633           | 0.5              | 740       | 23848            | 0.0              | 870       | 5098             | 0.0              | 1000      | 7341             | 0.0              |
| 485       | 20656            | 17.0             | 615       | 279152           | 0.3              | 745       | 21851            | 0.0              | 875       | 5516             | 0.0              |           |                  |                  |

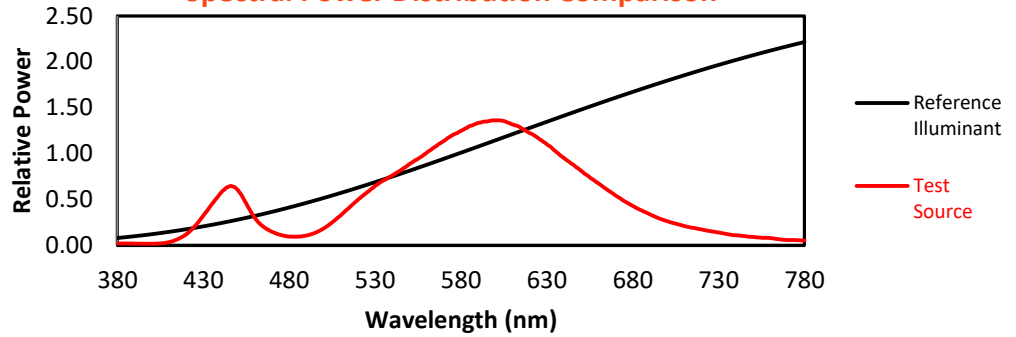
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TM-30-18

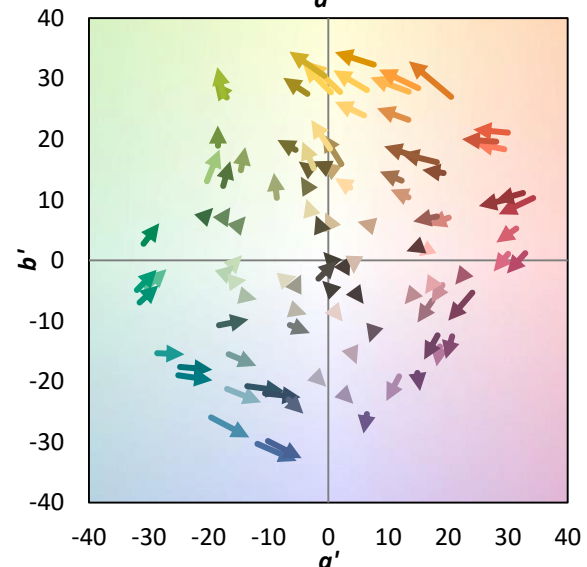
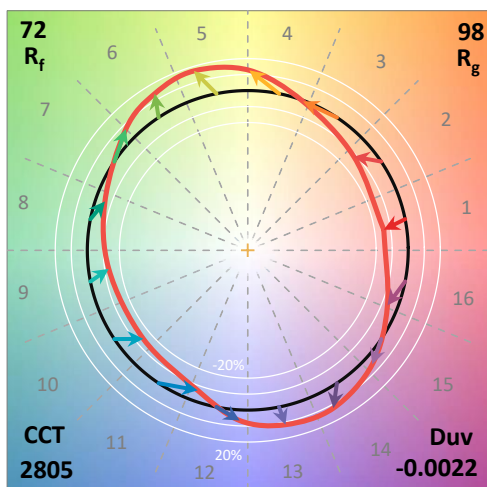
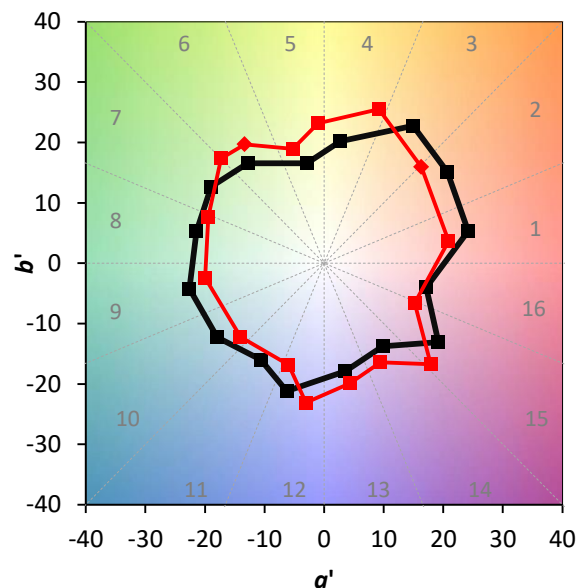
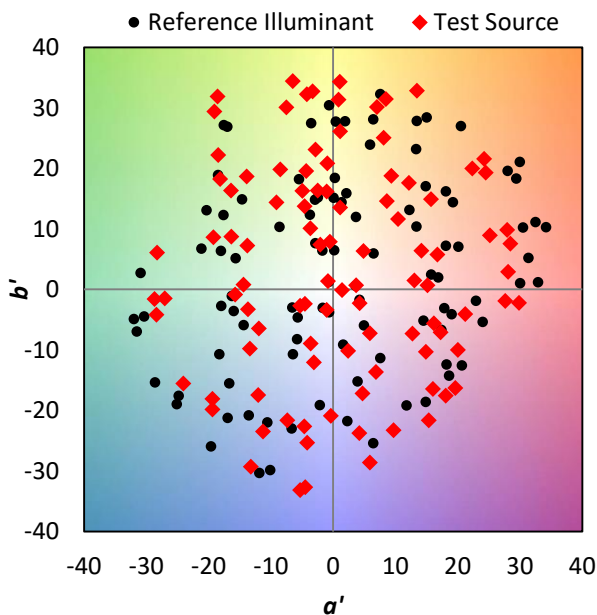
### Summary

$R_f = 71.9$   
 $R_g = 97.9$   
 CIE  $R_a = 72.4$   
 $R_g = -15.0$

### Spectral Power Distribution Comparison



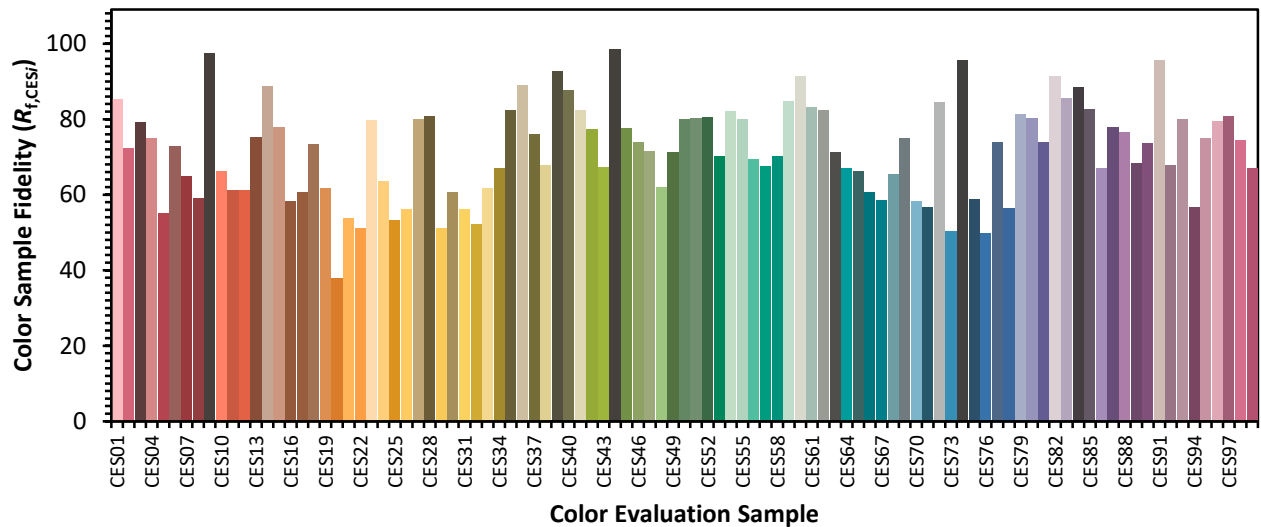
### Color Vector Graphics

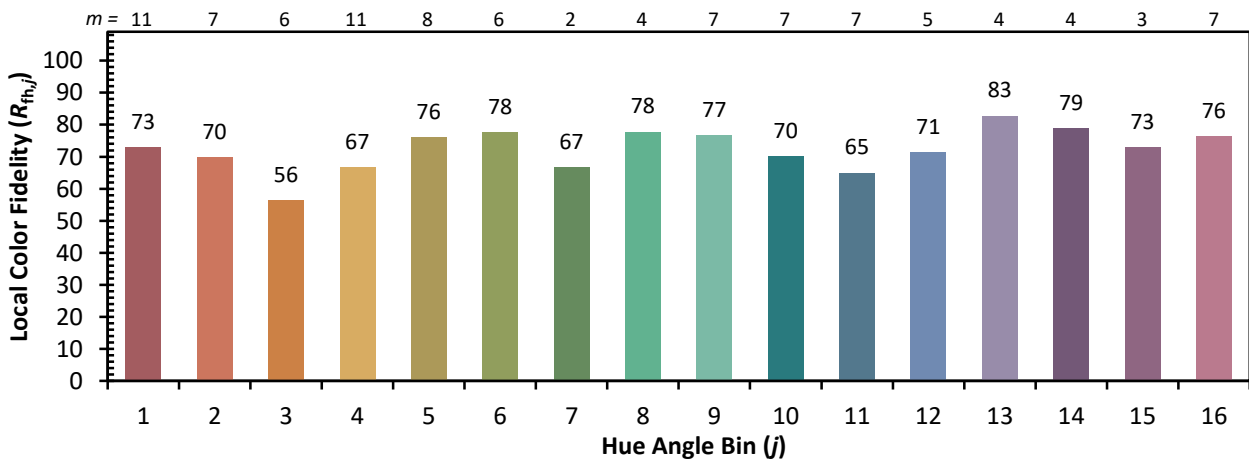
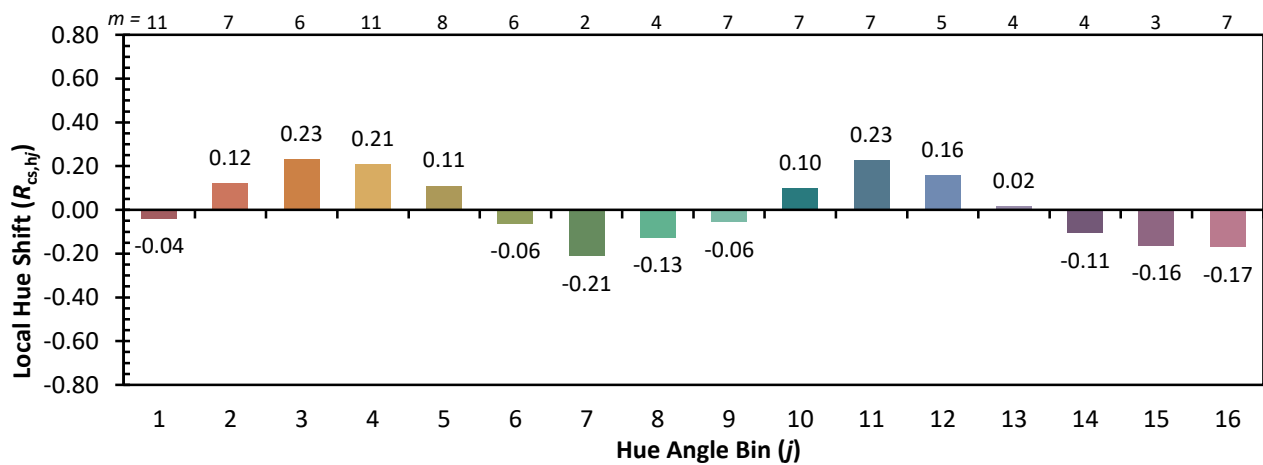
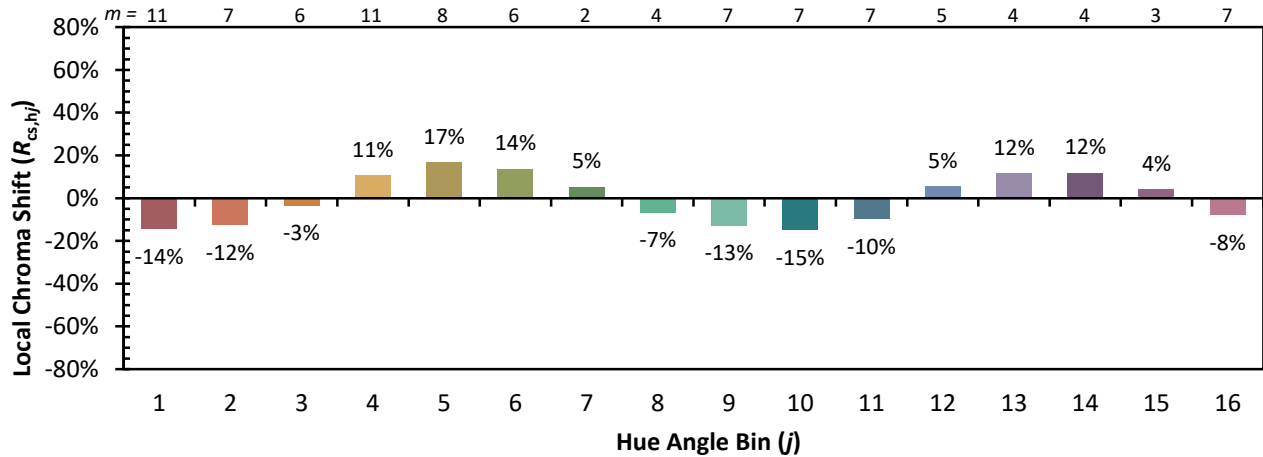




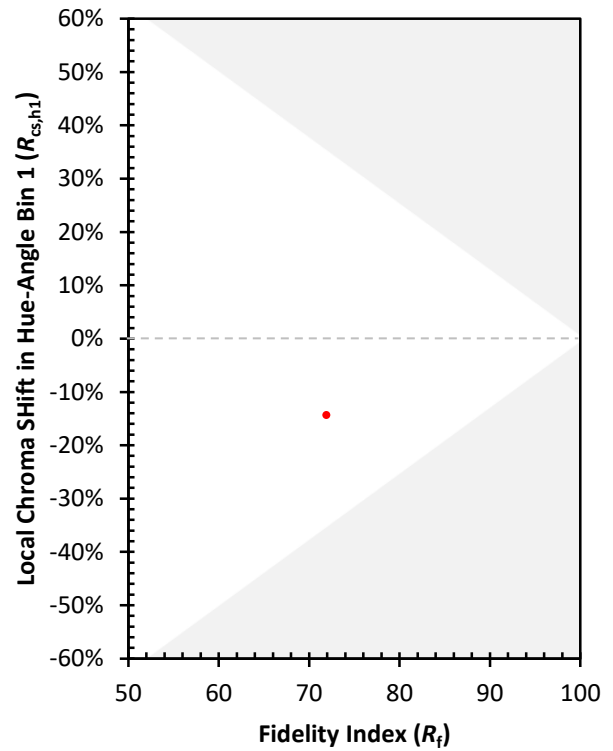
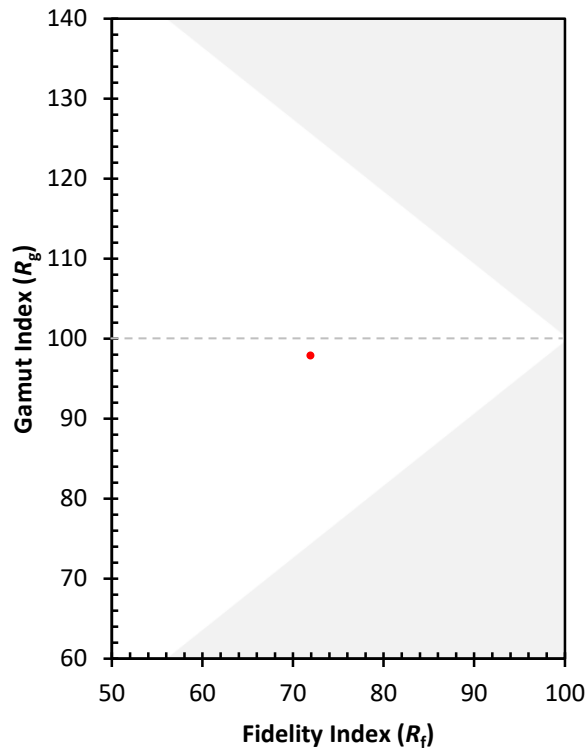
**Individual Sample Fidelity Index ( $R_{f,i}$ )**

|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 86 | CES26 = 56 | CES51 = 80 | CES76 = 50 |
| CES02 = 63 | CES27 = 80 | CES52 = 81 | CES77 = 74 |
| CES03 = 31 | CES28 = 81 | CES53 = 70 | CES78 = 56 |
| CES04 = 71 | CES29 = 51 | CES54 = 82 | CES79 = 81 |
| CES05 = 50 | CES30 = 61 | CES55 = 80 | CES80 = 80 |
| CES06 = 52 | CES31 = 56 | CES56 = 69 | CES81 = 74 |
| CES07 = 42 | CES32 = 52 | CES57 = 67 | CES82 = 91 |
| CES08 = 41 | CES33 = 62 | CES58 = 70 | CES83 = 86 |
| CES09 = 29 | CES34 = 67 | CES59 = 85 | CES84 = 89 |
| CES10 = 76 | CES35 = 83 | CES60 = 91 | CES85 = 83 |
| CES11 = 60 | CES36 = 89 | CES61 = 83 | CES86 = 67 |
| CES12 = 66 | CES37 = 76 | CES62 = 82 | CES87 = 78 |
| CES13 = 43 | CES38 = 68 | CES63 = 71 | CES88 = 76 |
| CES14 = 74 | CES39 = 93 | CES64 = 67 | CES89 = 68 |
| CES15 = 71 | CES40 = 88 | CES65 = 66 | CES90 = 74 |
| CES16 = 48 | CES41 = 82 | CES66 = 61 | CES91 = 96 |
| CES17 = 50 | CES42 = 77 | CES67 = 58 | CES92 = 68 |
| CES18 = 57 | CES43 = 67 | CES68 = 65 | CES93 = 80 |
| CES19 = 73 | CES44 = 99 | CES69 = 75 | CES94 = 57 |
| CES20 = 67 | CES45 = 78 | CES70 = 58 | CES95 = 75 |
| CES21 = 88 | CES46 = 74 | CES71 = 57 | CES96 = 79 |
| CES22 = 80 | CES47 = 71 | CES72 = 85 | CES97 = 81 |
| CES23 = 92 | CES48 = 62 | CES73 = 50 | CES98 = 75 |
| CES24 = 91 | CES49 = 71 | CES74 = 96 | CES99 = 67 |
| CES25 = 73 | CES50 = 80 | CES75 = 59 |            |



**Color Rendition by Hue-Angle Bin**


**Measure Comparisons**



(END OF REPORT)