

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: INVUE

Report Number: P671043

Luminaire Tested: **CCP-SA2C-850-U-T4FT**

Issue Date: 04/16/2023



**Test Information**

Test Method: LM-79-08  
Report Number: P671043  
Test Lab: INNOVATION CENTER(G1)  
Issue Date: 04/16/2023  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: INVUE  
Catalog Number: CCP-SA2C-850-U-T4FT  
Description: INVUE CLEAR CURVE POLE MOUNT LIGHT SQUARE LUMINAIRE @615mA w/ T4FT  
distribution lens  
Light Source: (32) 5000K CCT, 80 CRI LEDS  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 7884.8 lumens  
Efficiency: N/A  
Efficacy: 127.0 lumens/watt  
Luminous Opening: Rectangular (W 1' x L: 1' x H: 0')  
IES Classification: Type IV - Short  
BUG Rating: B1 - U0 - G3

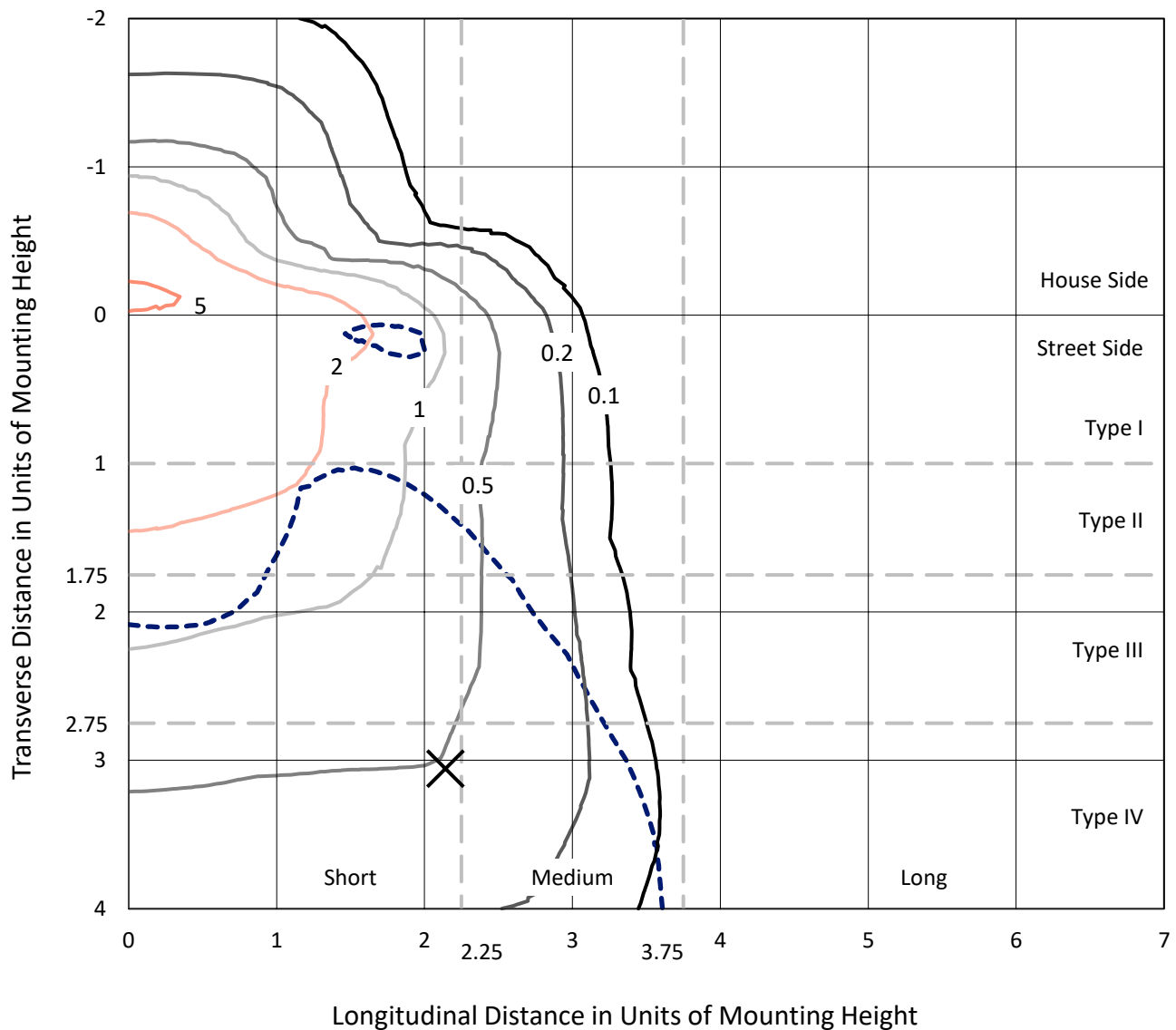
Input Watts (W): 62.1  
Input Voltage (V): 120  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: NR  
Total Harmonic Distortion (THDi): NR  
Frequency (hertz): 60  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 25 FT

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CATALOG NUMBER: CCP-SA2C-850-U-T4FT

## Iso-Footcandle Lines of Horizontal Illumination

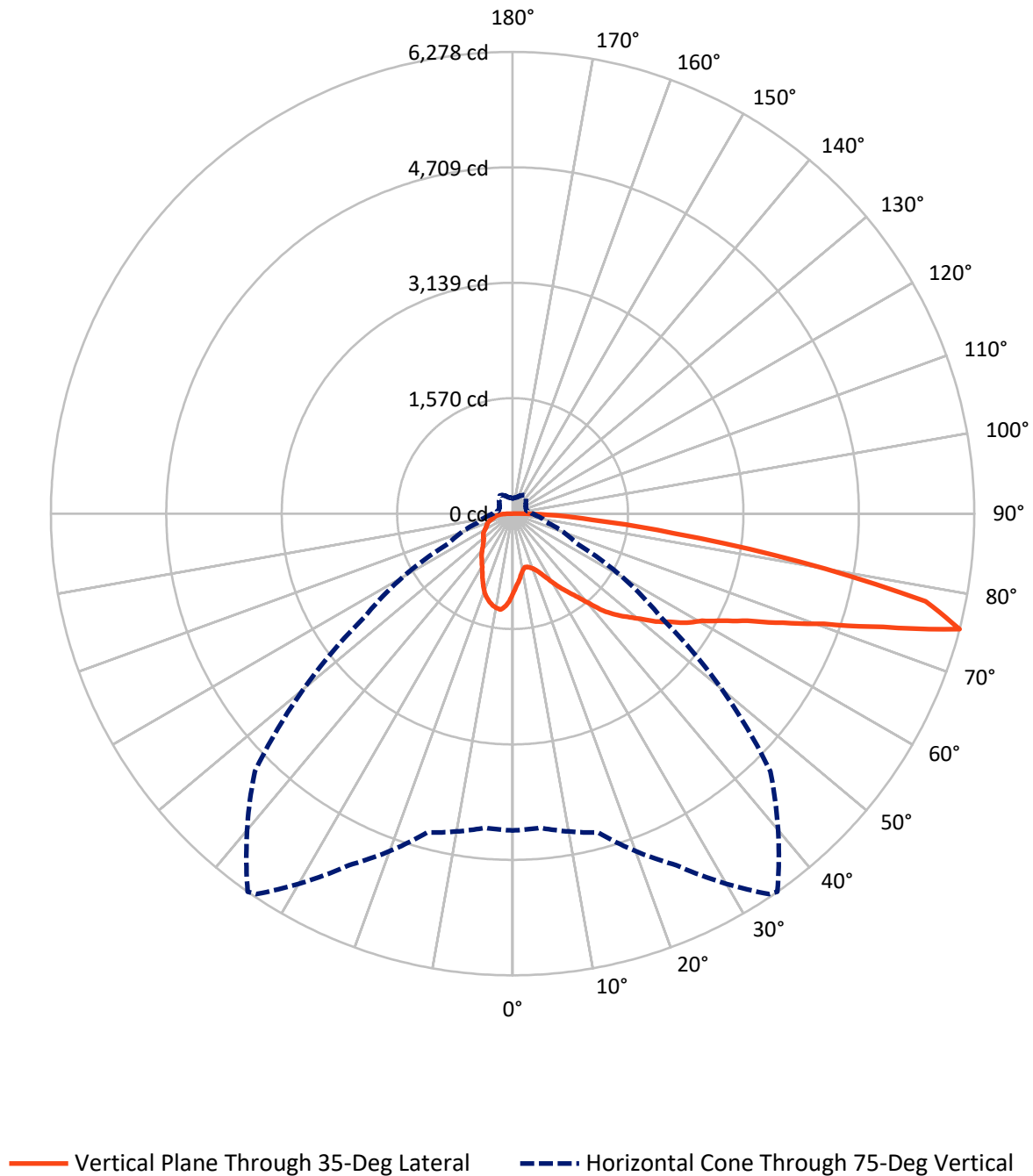
× Max cd  
 - - - 1/2 Max cd



Based on 15 foot mounting height. Maximum calculated value = 5.7 fc  
 Type IV - Short - N/A

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CATALOG NUMBER: CCP-SA2C-850-U-T4FT

## Luminous Intensity Polar Plot



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CATALOG NUMBER: CCP-SA2C-850-U-T4FT

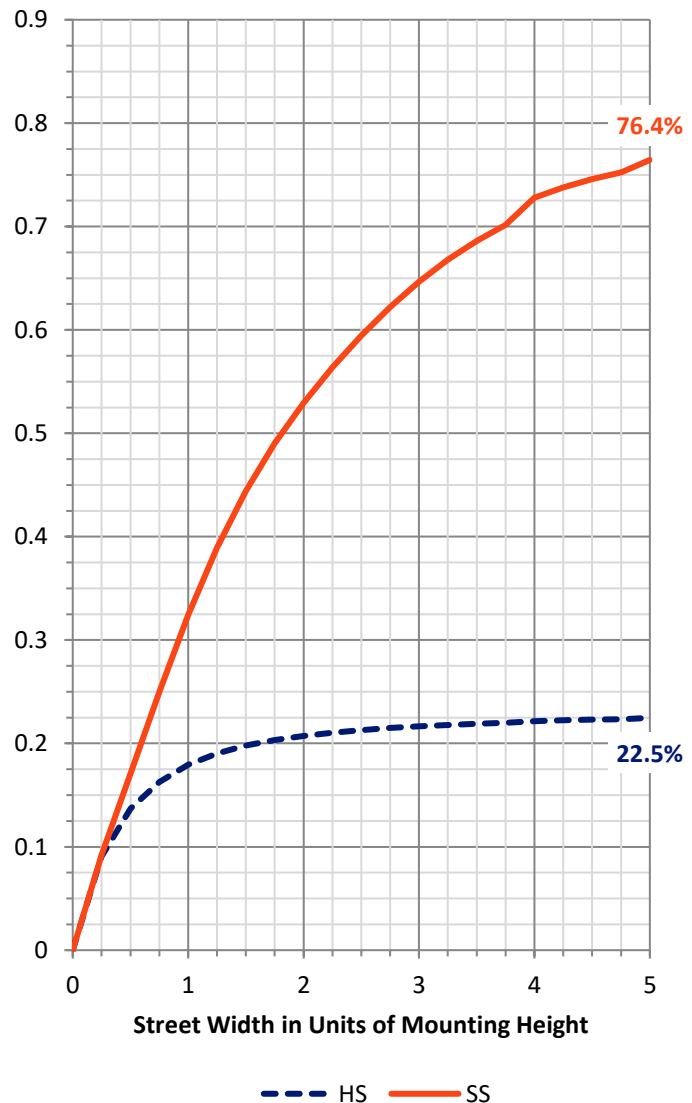
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total  |
|--------------------|-----------|----------|--------|--------|
| <b>House Side</b>  | Lumens    | 1812.1   | 0.0    | 1812.1 |
|                    | % Fixture | 23.0     | 0.0    | 23.0   |
| <b>Street Side</b> | Lumens    | 6072.6   | 0.0    | 6072.6 |
|                    | % Fixture | 77.0     | 0.0    | 77.0   |
| <b>Total</b>       | Lumens    | 7884.8   | 0.0    | 7884.8 |
|                    | % Fixture | 100.0    | 0.0    | 100.0  |

**ZONAL LUMENS:**

| Zone      | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10°    | 102.9  | 1.3       |
| 10°-20°   | 298.7  | 3.8       |
| 20°-30°   | 495.7  | 6.3       |
| 30°-40°   | 734.8  | 9.3       |
| 40°-50°   | 1059.5 | 13.4      |
| 50°-60°   | 1457.0 | 18.5      |
| 60°-70°   | 1799.7 | 22.8      |
| 70°-80°   | 1646.5 | 20.9      |
| 80°-90°   | 289.9  | 3.7       |
| 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°    | 7884.8 | 100.0     |
| 0°-180°   | 7884.8 | 100.0     |

**Coefficient of Utilization**



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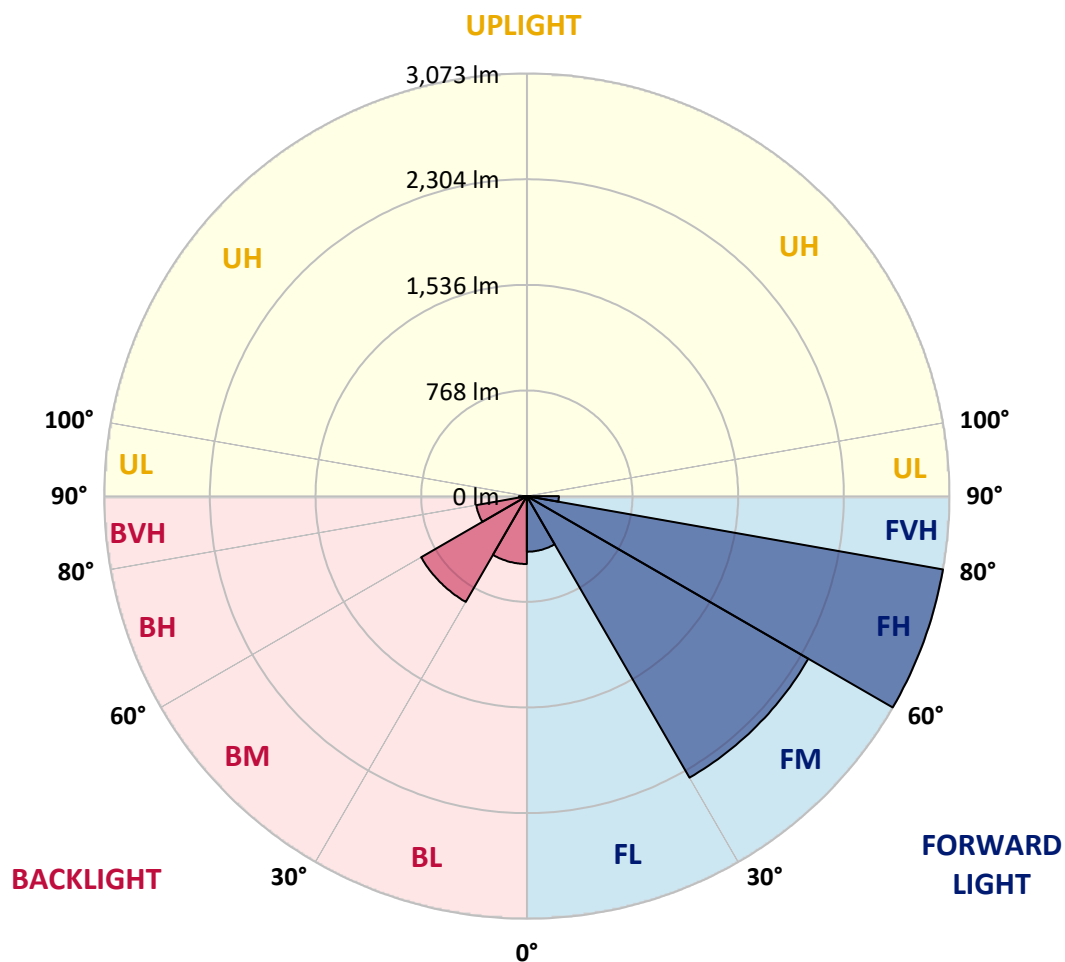
CATALOG NUMBER: CCP-SA2C-850-U-T4FT

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

| Zone |             | Lumens | % Fixture | Zone Rating/Lumen Limit |      |         |
|------|-------------|--------|-----------|-------------------------|------|---------|
|      |             |        |           | B                       | U    | G       |
| FL   | (0°-30°)    | 404.1  | 5.1       |                         |      |         |
| FM   | (30°-60°)   | 2363.4 | 30.0      |                         |      |         |
| FH   | (60°-80°)   | 3072.5 | 39.0      |                         |      | G2/5000 |
| FVH  | (80°-90°)   | 232.6  | 3.0       |                         |      | G3/500  |
| BL   | (0°-30°)    | 493.2  | 6.3       | B1/500                  |      |         |
| BM   | (30°-60°)   | 888.0  | 11.3      | B1/1000                 |      |         |
| BH   | (60°-80°)   | 373.7  | 4.7       | B1/500                  |      | G1/500  |
| BVH  | (80°-90°)   | 57.2   | 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-G3**

Type IV Short



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CATALOG NUMBER: CCP-SA2C-850-U-T4FT

**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 5°     | 15°    | 25°    | 34°    | 35°    | 45°    | 55°    | 65°    | 75°    | 85°    |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 1080.3 | 1080.3 | 1080.3 | 1080.3 | 1080.3 | 1080.3 | 1080.3 | 1080.3 | 1080.3 | 1080.3 | 1080.3 |
| 2.5°  | 978.6  | 969.9  | 978.6  | 984.4  | 984.4  | 984.4  | 993.1  | 1019.3 | 1036.7 | 1048.3 | 1068.6 |
| 5°    | 877.0  | 879.9  | 885.7  | 900.2  | 908.9  | 914.7  | 929.3  | 961.2  | 987.3  | 1025.1 | 1068.6 |
| 7.5°  | 787.0  | 792.8  | 801.5  | 816.0  | 836.3  | 833.4  | 865.4  | 908.9  | 958.3  | 1007.7 | 1071.5 |
| 10°   | 740.5  | 752.1  | 755.0  | 757.9  | 778.3  | 778.3  | 821.8  | 871.2  | 932.2  | 996.0  | 1071.5 |
| 12.5° | 749.2  | 749.2  | 740.5  | 737.6  | 749.2  | 746.3  | 784.1  | 842.1  | 908.9  | 998.9  | 1083.2 |
| 15°   | 775.3  | 775.3  | 757.9  | 740.5  | 757.9  | 752.1  | 784.1  | 830.5  | 908.9  | 1001.9 | 1106.4 |
| 17.5° | 810.2  | 813.1  | 792.8  | 763.7  | 769.5  | 772.4  | 795.7  | 839.2  | 908.9  | 1007.7 | 1138.3 |
| 20°   | 879.9  | 865.4  | 833.4  | 787.0  | 807.3  | 798.6  | 833.4  | 871.2  | 926.4  | 1030.9 | 1184.8 |
| 22.5° | 940.9  | 940.9  | 879.9  | 839.2  | 842.1  | 842.1  | 874.1  | 906.0  | 952.5  | 1062.8 | 1219.6 |
| 25°   | 1039.6 | 1033.8 | 958.3  | 897.3  | 903.1  | 906.0  | 923.4  | 961.2  | 996.0  | 1080.3 | 1263.2 |
| 27.5° | 1164.5 | 1150.0 | 1074.5 | 1004.8 | 981.5  | 990.2  | 998.9  | 1028.0 | 1036.7 | 1109.3 | 1315.5 |
| 30°   | 1298.1 | 1277.7 | 1213.8 | 1103.5 | 1091.9 | 1094.8 | 1080.3 | 1097.7 | 1086.1 | 1155.8 | 1367.7 |
| 32.5° | 1382.3 | 1382.3 | 1321.3 | 1240.0 | 1208.0 | 1208.0 | 1158.7 | 1170.3 | 1170.3 | 1199.3 | 1460.7 |
| 35°   | 1454.9 | 1449.1 | 1408.4 | 1347.4 | 1327.1 | 1315.5 | 1266.1 | 1283.5 | 1254.5 | 1283.5 | 1591.3 |
| 37.5° | 1565.2 | 1547.8 | 1530.4 | 1489.7 | 1449.1 | 1440.3 | 1414.2 | 1425.8 | 1385.2 | 1370.7 | 1739.4 |
| 40°   | 1693.0 | 1684.3 | 1666.9 | 1649.4 | 1608.8 | 1605.9 | 1576.8 | 1588.4 | 1544.9 | 1489.7 | 1887.5 |
| 42.5° | 1881.7 | 1855.6 | 1800.4 | 1785.9 | 1794.6 | 1806.2 | 1794.6 | 1774.3 | 1695.9 | 1626.2 | 2047.3 |
| 45°   | 2070.5 | 2029.8 | 1925.3 | 1902.1 | 1968.9 | 1960.1 | 2009.5 | 2000.8 | 1873.0 | 1762.7 | 2215.7 |
| 47.5° | 2192.5 | 2157.6 | 2073.4 | 2058.9 | 2087.9 | 2099.5 | 2247.6 | 2221.5 | 2018.2 | 1887.5 | 2378.3 |
| 50°   | 2279.6 | 2282.5 | 2172.1 | 2209.9 | 2247.6 | 2247.6 | 2433.5 | 2430.6 | 2195.4 | 2041.5 | 2590.3 |
| 52.5° | 2407.4 | 2366.7 | 2320.2 | 2355.1 | 2407.4 | 2436.4 | 2665.8 | 2601.9 | 2305.7 | 2172.1 | 2828.4 |
| 55°   | 2474.1 | 2456.7 | 2416.1 | 2477.0 | 2587.4 | 2601.9 | 2845.8 | 2796.5 | 2430.6 | 2326.0 | 3072.3 |
| 57.5° | 2500.3 | 2514.8 | 2581.6 | 2607.7 | 2761.6 | 2799.4 | 3008.5 | 2938.8 | 2546.7 | 2517.7 | 3261.1 |
| 60°   | 2616.4 | 2596.1 | 2686.1 | 2790.7 | 2938.8 | 2959.1 | 3211.7 | 3060.7 | 2660.0 | 2642.6 | 3322.1 |
| 62.5° | 2851.7 | 2799.4 | 2848.7 | 2973.6 | 3179.8 | 3205.9 | 3426.6 | 3223.4 | 2709.4 | 2726.8 | 3319.2 |
| 65°   | 3194.3 | 3156.6 | 3084.0 | 3182.7 | 3473.1 | 3510.8 | 3679.3 | 3362.7 | 2694.8 | 2697.7 | 3084.0 |
| 67.5° | 3598.0 | 3537.0 | 3461.5 | 3522.5 | 3876.7 | 3963.9 | 3987.1 | 3423.7 | 2593.2 | 2535.1 | 2509.0 |
| 70°   | 3952.2 | 3911.6 | 3862.2 | 3966.8 | 4460.4 | 4492.4 | 4370.4 | 3386.0 | 2311.5 | 2035.6 | 1672.7 |
| 72.5° | 4283.3 | 4263.0 | 4292.0 | 4684.0 | 5250.3 | 5270.6 | 4730.5 | 3147.9 | 1826.6 | 1234.2 | 778.3  |
| 75°   | 4309.4 | 4289.1 | 4489.5 | 5276.4 | 6240.5 | 6278.3 | 4954.1 | 2468.3 | 964.1  | 502.4  | 328.1  |
| 77.5° | 2918.4 | 2979.4 | 3354.0 | 4620.1 | 5732.3 | 5741.1 | 4051.0 | 1147.0 | 397.8  | 296.2  | 229.4  |
| 80°   | 717.3  | 795.7  | 1263.2 | 2389.9 | 3865.1 | 3960.9 | 2218.6 | 386.2  | 261.4  | 226.5  | 171.3  |
| 82.5° | 261.4  | 284.6  | 514.0  | 1080.3 | 2172.1 | 2209.9 | 775.3  | 209.1  | 188.8  | 174.2  | 124.9  |
| 85°   | 124.9  | 127.8  | 243.9  | 531.4  | 1097.7 | 1086.1 | 278.8  | 124.9  | 136.5  | 119.1  | 75.5   |
| 87.5° | 52.3   | 52.3   | 107.4  | 246.8  | 485.0  | 470.4  | 90.0   | 58.1   | 78.4   | 69.7   | 37.8   |
| 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: P671043

CATALOG NUMBER: CCP-SA2C-850-U-T4FT

**CANDELA DISTRIBUTION (continued):**

|       | 90°    | 95°    | 105°   | 115°   | 125°   | 135°   | 145°   | 155°   | 165°   | 175°   | 180°   |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 1080.3 | 1080.3 | 1080.3 | 1080.3 | 1080.3 | 1080.3 | 1080.3 | 1080.3 | 1080.3 | 1080.3 | 1080.3 |
| 2.5°  | 1083.2 | 1089.0 | 1112.2 | 1129.6 | 1147.0 | 1161.6 | 1184.8 | 1184.8 | 1199.3 | 1199.3 | 1199.3 |
| 5°    | 1080.3 | 1112.2 | 1150.0 | 1190.6 | 1216.7 | 1242.9 | 1266.1 | 1269.0 | 1277.7 | 1289.3 | 1292.2 |
| 7.5°  | 1091.9 | 1123.8 | 1184.8 | 1242.9 | 1274.8 | 1286.4 | 1315.5 | 1306.8 | 1306.8 | 1306.8 | 1315.5 |
| 10°   | 1115.1 | 1150.0 | 1234.2 | 1286.4 | 1309.7 | 1312.6 | 1303.9 | 1298.1 | 1280.6 | 1274.8 | 1266.1 |
| 12.5° | 1132.5 | 1193.5 | 1277.7 | 1318.4 | 1309.7 | 1301.0 | 1280.6 | 1251.6 | 1231.3 | 1225.5 | 1225.5 |
| 15°   | 1176.1 | 1237.1 | 1315.5 | 1330.0 | 1315.5 | 1269.0 | 1242.9 | 1210.9 | 1193.5 | 1167.4 | 1179.0 |
| 17.5° | 1213.8 | 1283.5 | 1353.2 | 1335.8 | 1306.8 | 1234.2 | 1196.4 | 1150.0 | 1126.7 | 1097.7 | 1097.7 |
| 20°   | 1263.2 | 1327.1 | 1388.1 | 1341.6 | 1277.7 | 1199.3 | 1138.3 | 1080.3 | 1048.3 | 1019.3 | 1025.1 |
| 22.5° | 1318.4 | 1376.5 | 1408.4 | 1318.4 | 1234.2 | 1144.1 | 1059.9 | 1004.8 | 964.1  | 946.7  | 952.5  |
| 25°   | 1361.9 | 1425.8 | 1420.0 | 1280.6 | 1181.9 | 1074.5 | 981.5  | 929.3  | 920.5  | 903.1  | 903.1  |
| 27.5° | 1417.1 | 1483.9 | 1411.3 | 1234.2 | 1094.8 | 964.1  | 906.0  | 885.7  | 885.7  | 877.0  | 882.8  |
| 30°   | 1489.7 | 1536.2 | 1391.0 | 1167.4 | 984.4  | 865.4  | 836.3  | 847.9  | 868.3  | 859.6  | 862.5  |
| 32.5° | 1608.8 | 1603.0 | 1373.6 | 1091.9 | 868.3  | 769.5  | 789.9  | 813.1  | 830.5  | 839.2  | 845.0  |
| 35°   | 1724.9 | 1687.2 | 1353.2 | 990.2  | 760.8  | 723.1  | 740.5  | 766.6  | 798.6  | 807.3  | 810.2  |
| 37.5° | 1841.1 | 1774.3 | 1318.4 | 865.4  | 694.0  | 682.4  | 699.8  | 714.4  | 740.5  | 746.3  | 752.1  |
| 40°   | 1963.1 | 1832.4 | 1257.4 | 743.4  | 638.9  | 638.9  | 650.5  | 653.4  | 667.9  | 676.6  | 682.4  |
| 42.5° | 2070.5 | 1887.5 | 1147.0 | 630.2  | 580.8  | 601.1  | 604.0  | 598.2  | 586.6  | 592.4  | 595.3  |
| 45°   | 2201.2 | 1948.5 | 1019.3 | 548.8  | 537.2  | 563.4  | 569.2  | 545.9  | 525.6  | 514.0  | 508.2  |
| 47.5° | 2328.9 | 2012.4 | 908.9  | 482.1  | 496.6  | 537.2  | 537.2  | 511.1  | 476.2  | 447.2  | 435.6  |
| 50°   | 2445.1 | 2076.3 | 818.9  | 441.4  | 455.9  | 516.9  | 522.7  | 473.3  | 435.6  | 400.7  | 394.9  |
| 52.5° | 2639.7 | 2183.7 | 726.0  | 409.5  | 432.7  | 502.4  | 499.5  | 455.9  | 406.5  | 368.8  | 365.9  |
| 55°   | 2811.0 | 2291.2 | 604.0  | 377.5  | 409.5  | 482.1  | 490.8  | 438.5  | 371.7  | 336.9  | 331.0  |
| 57.5° | 2935.9 | 2317.3 | 482.1  | 345.6  | 386.2  | 458.8  | 470.4  | 403.6  | 348.5  | 319.4  | 316.5  |
| 60°   | 2959.1 | 2215.7 | 392.0  | 319.4  | 354.3  | 426.9  | 435.6  | 383.3  | 331.0  | 307.8  | 302.0  |
| 62.5° | 2851.7 | 2021.1 | 334.0  | 296.2  | 328.1  | 394.9  | 412.4  | 360.1  | 313.6  | 293.3  | 290.4  |
| 65°   | 2607.7 | 1736.5 | 293.3  | 275.9  | 310.7  | 371.7  | 392.0  | 342.7  | 299.1  | 281.7  | 278.8  |
| 67.5° | 2064.7 | 1332.9 | 261.4  | 261.4  | 287.5  | 348.5  | 377.5  | 331.0  | 284.6  | 273.0  | 270.1  |
| 70°   | 1350.3 | 801.5  | 238.1  | 241.0  | 270.1  | 328.1  | 360.1  | 316.5  | 267.2  | 264.3  | 258.4  |
| 72.5° | 580.8  | 368.8  | 212.0  | 220.7  | 243.9  | 293.3  | 334.0  | 296.2  | 246.8  | 238.1  | 229.4  |
| 75°   | 267.2  | 223.6  | 191.7  | 197.5  | 217.8  | 258.4  | 302.0  | 273.0  | 229.4  | 214.9  | 206.2  |
| 77.5° | 188.8  | 162.6  | 159.7  | 171.3  | 185.9  | 223.6  | 267.2  | 255.5  | 212.0  | 200.4  | 194.6  |
| 80°   | 139.4  | 124.9  | 133.6  | 145.2  | 153.9  | 206.2  | 252.6  | 235.2  | 194.6  | 177.1  | 168.4  |
| 82.5° | 98.7   | 92.9   | 104.5  | 116.2  | 124.9  | 180.0  | 232.3  | 206.2  | 162.6  | 148.1  | 133.6  |
| 85°   | 58.1   | 61.0   | 72.6   | 78.4   | 87.1   | 133.6  | 194.6  | 165.5  | 124.9  | 95.8   | 92.9   |
| 87.5° | 26.1   | 26.1   | 34.8   | 37.8   | 43.6   | 78.4   | 130.7  | 104.5  | 78.4   | 61.0   | 58.1   |
| 90°   | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |



Report Prepared for

Cooper Lighting Solutions

(formerly Eaton)

INVUE

Report Number: SP1-2104-224-9

Luminaire Tested: CCW-SA2A-850-U-SL4

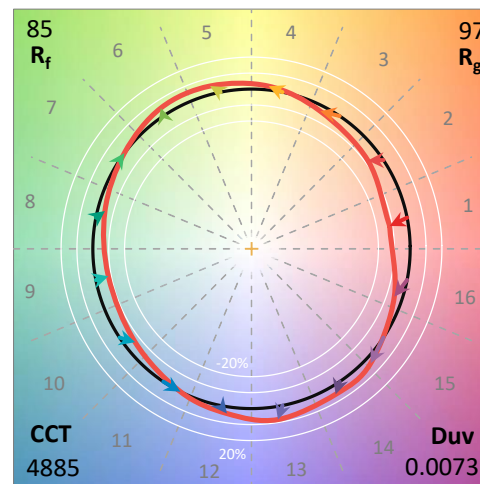
Test Date: 04/27/2021

### Test Information

Test Method: LM-79-08  
 Report Number: SP1-2104-224-9  
 Test Lab: COOPER LIGHTING SOLUTIONS  
 Photometer: SP1  
 Measurement Geometry:  $4\pi$   
 Issue Date: 04/27/2021  
 Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
 Product Line: INVUE  
 Catalog Number: **CCW-SA-2A-850-U-SL4**  
 Description: INVUE WALL PACK ClearCurve Light Square

### Spectral Parameters

|                           |        |           |      |      |      |
|---------------------------|--------|-----------|------|------|------|
| CCT (K):                  | 4885   | CRI (Ra): | 82.2 |      |      |
| CIE u':                   | 0.2076 | R1:       | 79.1 | R9:  | 4.0  |
| CIE v':                   | 0.4943 | R2:       | 85.5 | R10: | 67.5 |
| Duv:                      | 0.0073 | R3:       | 92.5 | R11: | 82.5 |
| CIE x:                    | 0.3501 | R4:       | 82.9 | R12: | 63.4 |
| CIE y:                    | 0.3704 | R5:       | 80.2 | R13: | 80.2 |
| CIE z:                    | 0.2795 | R6:       | 81.6 | R14: | 96.0 |
| Peak Wavelength (nm):     | 446    | R7:       | 88.2 |      |      |
| Dominant Wavelength (nm): | 569    | R8:       | 67.2 |      |      |
| Purity:                   | 16.4   |           |      |      |      |
| Rf:                       | 84.6   |           |      |      |      |
| Rg:                       | 96.9   |           |      |      |      |



### Test Conditions

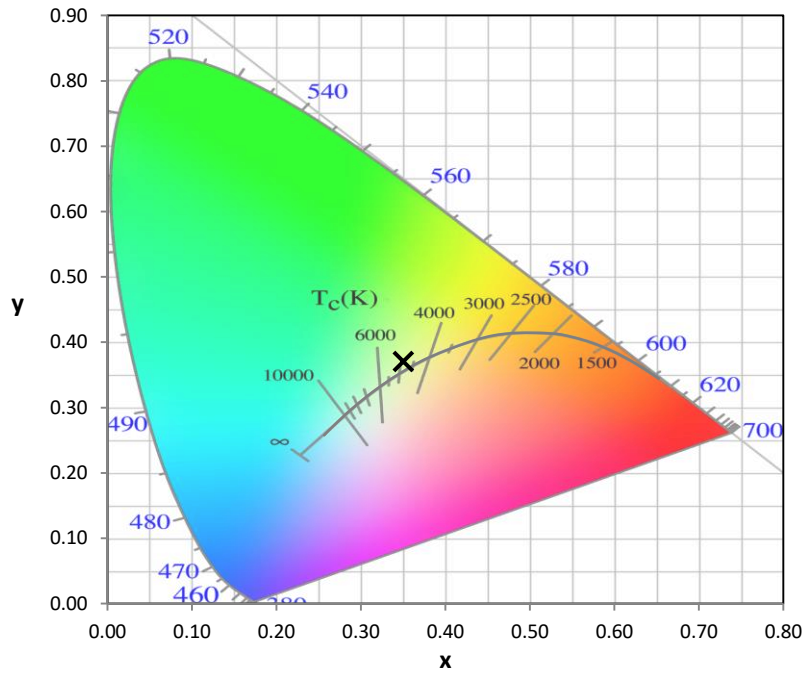
Stabilization Time: 76M  
 Operation Time: 12H  
 Room Temperature (°C) / RH%: 24.9/41%  
 Sphere Temperature (°C): 24.2

REPORT NUMBER: SP1-2104-224-9

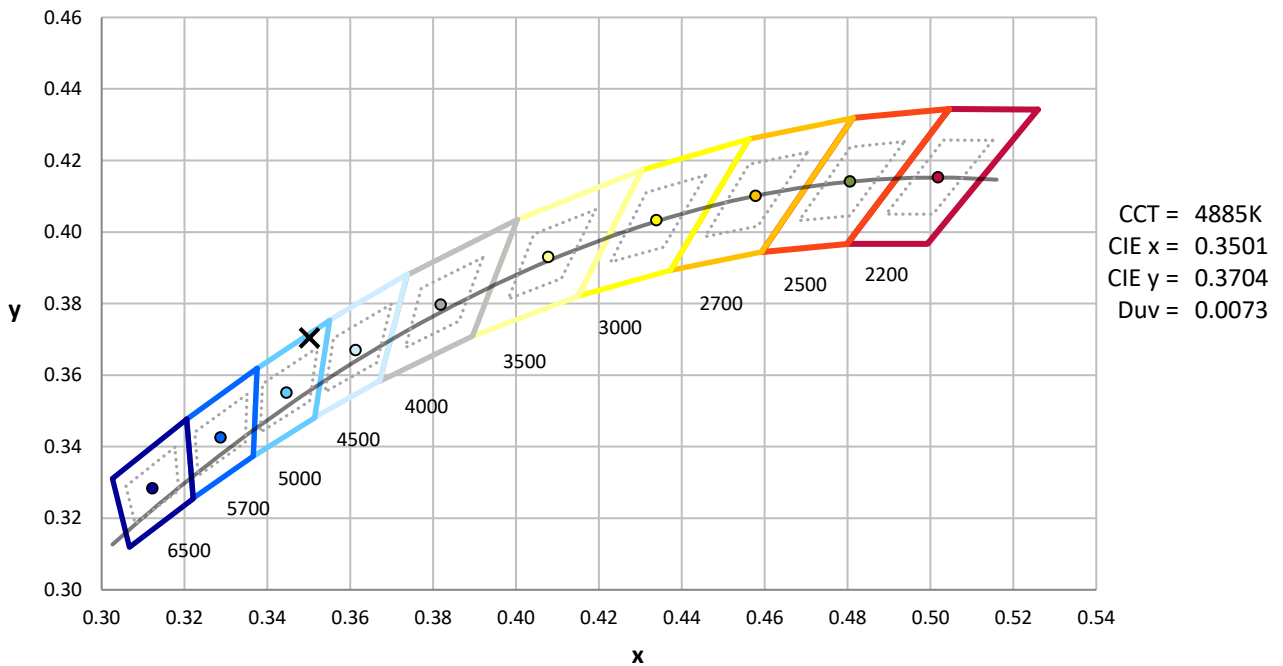
| Measurement and Test Equipment |                       |                  |                      |
|--------------------------------|-----------------------|------------------|----------------------|
| Instrument                     | Identification Number | Calibration Date | Calibration Due Date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



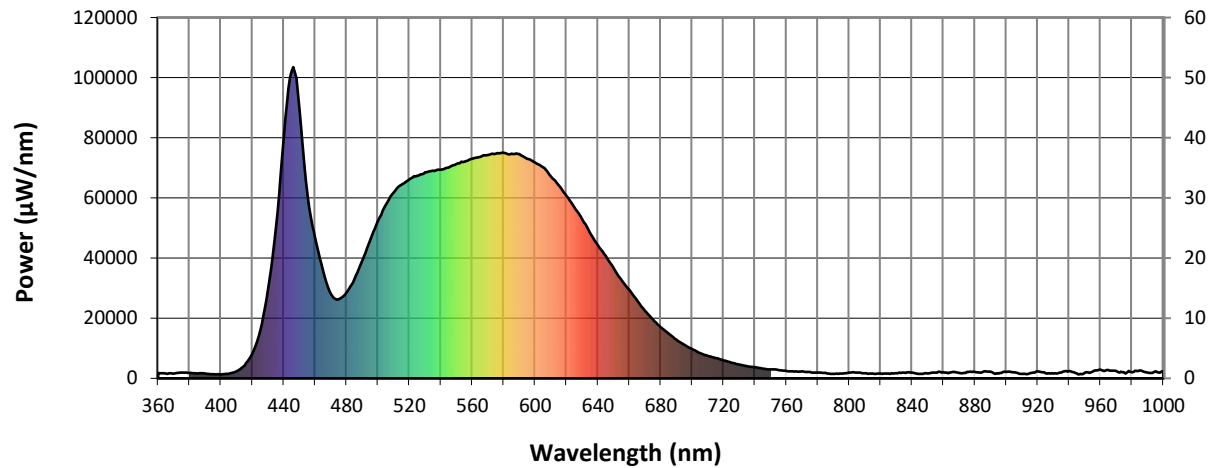
**CIE 1931 Chromaticity Diagram with 2017 ANSI 7-Step and 4-Step Quadrangles**



Point lies inside the ANSI 5000K 7-step quadrangle

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### Photopic Flux vs. Wavelength

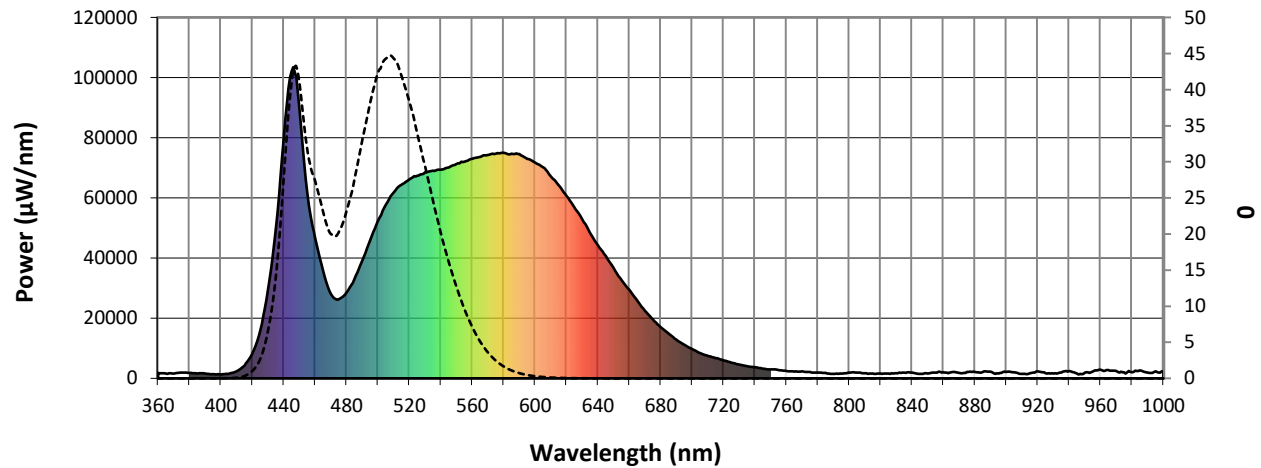


#####

| λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) |
|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|
| 360       | 1830             | 0.0              | 490       | 39290            | 5.6              | 620       | 60661            | 15.8             | 750       | 3022             | 0.0              | 880       | 2170             | 0.0              |
| 365       | 1565             | 0.0              | 495       | 45895            | 8.3              | 625       | 56965            | 12.6             | 755       | 2799             | 0.0              | 885       | 2095             | 0.0              |
| 370       | 1615             | 0.0              | 500       | 52484            | 11.6             | 630       | 52840            | 9.6              | 760       | 2426             | 0.0              | 890       | 2221             | 0.0              |
| 375       | 1925             | 0.0              | 505       | 57658            | 16.1             | 635       | 48454            | 7.3              | 765       | 2265             | 0.0              | 895       | 1631             | 0.0              |
| 380       | 1770             | 0.0              | 510       | 61833            | 21.2             | 640       | 44251            | 5.3              | 770       | 2313             | 0.0              | 900       | 2168             | 0.0              |
| 385       | 1631             | 0.0              | 515       | 64361            | 26.7             | 645       | 40632            | 3.9              | 775       | 2117             | 0.0              | 905       | 1986             | 0.0              |
| 390       | 1587             | 0.0              | 520       | 66173            | 32.1             | 650       | 36678            | 2.7              | 780       | 1949             | 0.0              | 910       | 1497             | 0.0              |
| 395       | 1387             | 0.0              | 525       | 67346            | 36.2             | 655       | 32622            | 1.9              | 785       | 1850             | 0.0              | 915       | 1688             | 0.0              |
| 400       | 1314             | 0.0              | 530       | 68548            | 40.4             | 660       | 29433            | 1.2              | 790       | 1537             | 0.0              | 920       | 2309             | 0.0              |
| 405       | 1545             | 0.0              | 535       | 69083            | 42.8             | 665       | 25904            | 0.8              | 795       | 1606             | 0.0              | 925       | 1676             | 0.0              |
| 410       | 2352             | 0.0              | 540       | 69434            | 45.2             | 670       | 22450            | 0.5              | 800       | 1879             | 0.0              | 930       | 1643             | 0.0              |
| 415       | 4302             | 0.0              | 545       | 70161            | 46.7             | 675       | 19540            | 0.3              | 805       | 1874             | 0.0              | 935       | 1938             | 0.0              |
| 420       | 8202             | 0.0              | 550       | 71259            | 48.4             | 680       | 17063            | 0.2              | 810       | 1689             | 0.0              | 940       | 2503             | 0.0              |
| 425       | 15931            | 0.1              | 555       | 72093            | 49.2             | 685       | 14938            | 0.1              | 815       | 1603             | 0.0              | 945       | 1604             | 0.0              |
| 430       | 29451            | 0.2              | 560       | 73055            | 49.6             | 690       | 12839            | 0.1              | 820       | 1615             | 0.0              | 950       | 1939             | 0.0              |
| 435       | 50263            | 0.6              | 565       | 73632            | 49.0             | 695       | 11135            | 0.0              | 825       | 1580             | 0.0              | 955       | 2280             | 0.0              |
| 440       | 79646            | 1.3              | 570       | 74262            | 48.3             | 700       | 9751             | 0.0              | 830       | 1691             | 0.0              | 960       | 2909             | 0.0              |
| 445       | 102126           | 2.1              | 575       | 74754            | 46.5             | 705       | 8425             | 0.0              | 835       | 1874             | 0.0              | 965       | 2727             | 0.0              |
| 450       | 89946            | 2.3              | 580       | 74999            | 44.6             | 710       | 7445             | 0.0              | 840       | 1897             | 0.0              | 970       | 2407             | 0.0              |
| 455       | 61475            | 2.1              | 585       | 74696            | 41.5             | 715       | 6743             | 0.0              | 845       | 1518             | 0.0              | 975       | 2033             | 0.0              |
| 460       | 46830            | 1.9              | 590       | 74627            | 38.6             | 720       | 5983             | 0.0              | 850       | 1637             | 0.0              | 980       | 1993             | 0.0              |
| 465       | 35832            | 1.8              | 595       | 73026            | 34.6             | 725       | 5259             | 0.0              | 855       | 1867             | 0.0              | 985       | 2615             | 0.0              |
| 470       | 28041            | 1.7              | 600       | 71687            | 30.9             | 730       | 4564             | 0.0              | 860       | 2075             | 0.0              | 990       | 1918             | 0.0              |
| 475       | 26334            | 2.1              | 605       | 70271            | 27.2             | 735       | 4065             | 0.0              | 865       | 2074             | 0.0              | 995       | 2319             | 0.0              |
| 480       | 28580            | 2.7              | 610       | 67123            | 23.1             | 740       | 3702             | 0.0              | 870       | 1793             | 0.0              | 1000      | 2272             | 0.0              |
| 485       | 33016            | 3.9              | 615       | 64247            | 19.4             | 745       | 3231             | 0.0              | 875       | 2156             | 0.0              |           |                  |                  |

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### Scotopic Flux vs. Wavelength



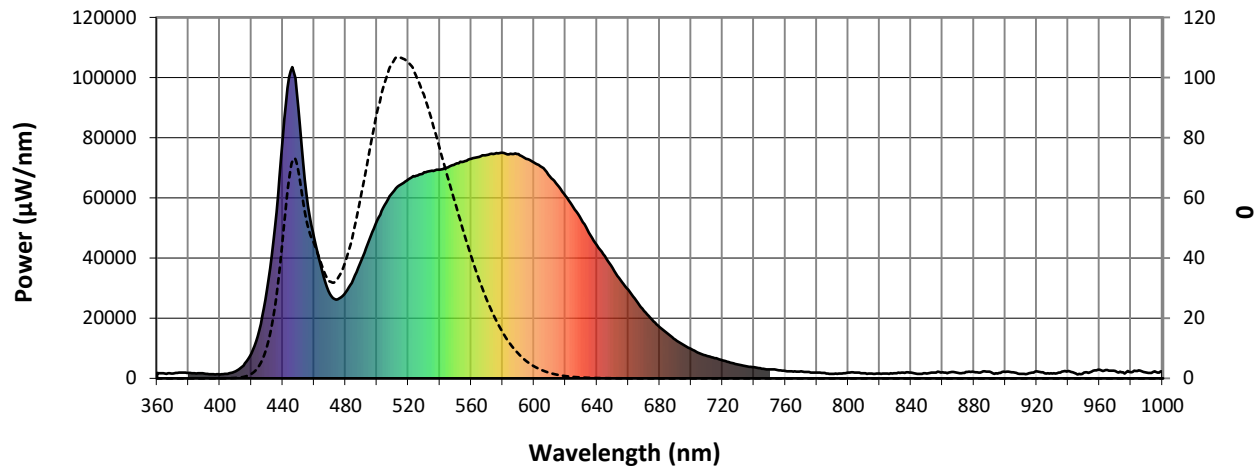
Scotopic Lumens: 9262.6

S/P: 1.91

| 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       | 1830             | 0.0              | 490       | 39290            | 60.5             | 620       | 60661            | 0.8              | 750       | 3022             | 0.0              | 880       | 2170             | 0.0              |
| 365       | 1565             | 0.0              | 495       | 45895            | 74.2             | 625       | 56965            | 0.5              | 755       | 2799             | 0.0              | 885       | 2095             | 0.0              |
| 370       | 1615             | 0.0              | 500       | 52484            | 87.8             | 630       | 52840            | 0.3              | 760       | 2426             | 0.0              | 890       | 2221             | 0.0              |
| 375       | 1925             | 0.0              | 505       | 57658            | 98.0             | 635       | 48454            | 0.2              | 765       | 2265             | 0.0              | 895       | 1631             | 0.0              |
| 380       | 1770             | 0.0              | 510       | 61833            | 104.8            | 640       | 44251            | 0.1              | 770       | 2313             | 0.0              | 900       | 2168             | 0.0              |
| 385       | 1631             | 0.0              | 515       | 64361            | 106.7            | 645       | 40632            | 0.1              | 775       | 2117             | 0.0              | 905       | 1986             | 0.0              |
| 390       | 1587             | 0.0              | 520       | 66173            | 105.2            | 650       | 36678            | 0.0              | 780       | 1949             | 0.0              | 910       | 1497             | 0.0              |
| 395       | 1387             | 0.0              | 525       | 67346            | 100.7            | 655       | 32622            | 0.0              | 785       | 1850             | 0.0              | 915       | 1688             | 0.0              |
| 400       | 1314             | 0.0              | 530       | 68548            | 94.5             | 660       | 29433            | 0.0              | 790       | 1537             | 0.0              | 920       | 2309             | 0.0              |
| 405       | 1545             | 0.0              | 535       | 69083            | 86.1             | 665       | 25904            | 0.0              | 795       | 1606             | 0.0              | 925       | 1676             | 0.0              |
| 410       | 2352             | 0.1              | 540       | 69434            | 76.7             | 670       | 22450            | 0.0              | 800       | 1879             | 0.0              | 930       | 1643             | 0.0              |
| 415       | 4302             | 0.4              | 545       | 70161            | 67.3             | 675       | 19540            | 0.0              | 805       | 1874             | 0.0              | 935       | 1938             | 0.0              |
| 420       | 8202             | 1.3              | 550       | 71259            | 58.3             | 680       | 17063            | 0.0              | 810       | 1689             | 0.0              | 940       | 2503             | 0.0              |
| 425       | 15931            | 3.9              | 555       | 72093            | 49.3             | 685       | 14938            | 0.0              | 815       | 1603             | 0.0              | 945       | 1604             | 0.0              |
| 430       | 29451            | 10.0             | 560       | 73055            | 40.8             | 690       | 12839            | 0.0              | 820       | 1615             | 0.0              | 950       | 1939             | 0.0              |
| 435       | 50263            | 22.5             | 565       | 73632            | 33.0             | 695       | 11135            | 0.0              | 825       | 1580             | 0.0              | 955       | 2280             | 0.0              |
| 440       | 79646            | 44.5             | 570       | 74262            | 26.2             | 700       | 9751             | 0.0              | 830       | 1691             | 0.0              | 960       | 2909             | 0.0              |
| 445       | 102126           | 68.4             | 575       | 74754            | 20.4             | 705       | 8425             | 0.0              | 835       | 1874             | 0.0              | 965       | 2727             | 0.0              |
| 450       | 89946            | 69.7             | 580       | 74999            | 15.5             | 710       | 7445             | 0.0              | 840       | 1897             | 0.0              | 970       | 2407             | 0.0              |
| 455       | 61475            | 53.7             | 585       | 74696            | 11.4             | 715       | 6743             | 0.0              | 845       | 1518             | 0.0              | 975       | 2033             | 0.0              |
| 460       | 46830            | 45.2             | 590       | 74627            | 8.3              | 720       | 5983             | 0.0              | 850       | 1637             | 0.0              | 980       | 1993             | 0.0              |
| 465       | 35832            | 37.8             | 595       | 73026            | 5.8              | 725       | 5259             | 0.0              | 855       | 1867             | 0.0              | 985       | 2615             | 0.0              |
| 470       | 28041            | 32.3             | 600       | 71687            | 4.0              | 730       | 4564             | 0.0              | 860       | 2075             | 0.0              | 990       | 1918             | 0.0              |
| 475       | 26334            | 32.9             | 605       | 70271            | 2.8              | 735       | 4065             | 0.0              | 865       | 2074             | 0.0              | 995       | 2319             | 0.0              |
| 480       | 28580            | 38.6             | 610       | 67123            | 1.8              | 740       | 3702             | 0.0              | 870       | 1793             | 0.0              | 1000      | 2272             | 0.0              |
| 485       | 33016            | 47.9             | 615       | 64247            | 1.2              | 745       | 3231             | 0.0              | 875       | 2156             | 0.0              |           |                  |                  |

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### Melanopic Flux vs. Wavelength



**Melanopic Lumens: 3791.6**

**M/P: 0.78**

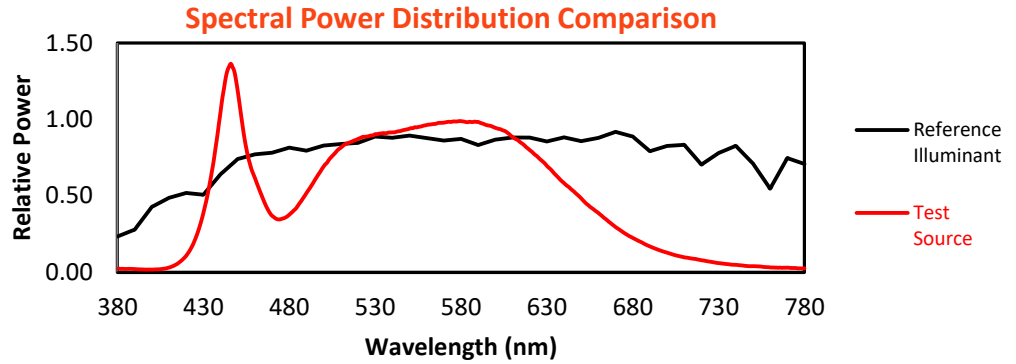
| λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) |
|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|
| 360       | 1830             | 0.0              | 490       | 39290            | 32.7             | 620       | 60661            | 0.0              | 750       | 3022             | 0.0              | 880       | 2170             | 0.0              |
| 365       | 1565             | 0.0              | 495       | 45895            | 37.9             | 625       | 56965            | 0.0              | 755       | 2799             | 0.0              | 885       | 2095             | 0.0              |
| 370       | 1615             | 0.0              | 500       | 52484            | 42.2             | 630       | 52840            | 0.0              | 760       | 2426             | 0.0              | 890       | 2221             | 0.0              |
| 375       | 1925             | 0.0              | 505       | 57658            | 44.3             | 635       | 48454            | 0.0              | 765       | 2265             | 0.0              | 895       | 1631             | 0.0              |
| 380       | 1770             | 0.0              | 510       | 61833            | 44.4             | 640       | 44251            | 0.0              | 770       | 2313             | 0.0              | 900       | 2168             | 0.0              |
| 385       | 1631             | 0.0              | 515       | 64361            | 42.1             | 645       | 40632            | 0.0              | 775       | 2117             | 0.0              | 905       | 1986             | 0.0              |
| 390       | 1587             | 0.0              | 520       | 66173            | 38.5             | 650       | 36678            | 0.0              | 780       | 1949             | 0.0              | 910       | 1497             | 0.0              |
| 395       | 1387             | 0.0              | 525       | 67346            | 34.2             | 655       | 32622            | 0.0              | 785       | 1850             | 0.0              | 915       | 1688             | 0.0              |
| 400       | 1314             | 0.0              | 530       | 68548            | 29.6             | 660       | 29433            | 0.0              | 790       | 1537             | 0.0              | 920       | 2309             | 0.0              |
| 405       | 1545             | 0.0              | 535       | 69083            | 24.9             | 665       | 25904            | 0.0              | 795       | 1606             | 0.0              | 925       | 1676             | 0.0              |
| 410       | 2352             | 0.1              | 540       | 69434            | 20.3             | 670       | 22450            | 0.0              | 800       | 1879             | 0.0              | 930       | 1643             | 0.0              |
| 415       | 4302             | 0.3              | 545       | 70161            | 16.3             | 675       | 19540            | 0.0              | 805       | 1874             | 0.0              | 935       | 1938             | 0.0              |
| 420       | 8202             | 0.9              | 550       | 71259            | 12.8             | 680       | 17063            | 0.0              | 810       | 1689             | 0.0              | 940       | 2503             | 0.0              |
| 425       | 15931            | 2.5              | 555       | 72093            | 9.7              | 685       | 14938            | 0.0              | 815       | 1603             | 0.0              | 945       | 1604             | 0.0              |
| 430       | 29451            | 6.2              | 560       | 73055            | 7.2              | 690       | 12839            | 0.0              | 820       | 1615             | 0.0              | 950       | 1939             | 0.0              |
| 435       | 50263            | 13.4             | 565       | 73632            | 5.2              | 695       | 11135            | 0.0              | 825       | 1580             | 0.0              | 955       | 2280             | 0.0              |
| 440       | 79646            | 26.6             | 570       | 74262            | 3.6              | 700       | 9751             | 0.0              | 830       | 1691             | 0.0              | 960       | 2909             | 0.0              |
| 445       | 102126           | 40.3             | 575       | 74754            | 2.5              | 705       | 8425             | 0.0              | 835       | 1874             | 0.0              | 965       | 2727             | 0.0              |
| 450       | 89946            | 41.4             | 580       | 74999            | 1.7              | 710       | 7445             | 0.0              | 840       | 1897             | 0.0              | 970       | 2407             | 0.0              |
| 455       | 61475            | 32.2             | 585       | 74696            | 1.1              | 715       | 6743             | 0.0              | 845       | 1518             | 0.0              | 975       | 2033             | 0.0              |
| 460       | 46830            | 27.6             | 590       | 74627            | 0.7              | 720       | 5983             | 0.0              | 850       | 1637             | 0.0              | 980       | 1993             | 0.0              |
| 465       | 35832            | 23.4             | 595       | 73026            | 0.5              | 725       | 5259             | 0.0              | 855       | 1867             | 0.0              | 985       | 2615             | 0.0              |
| 470       | 28041            | 20.1             | 600       | 71687            | 0.3              | 730       | 4564             | 0.0              | 860       | 2075             | 0.0              | 990       | 1918             | 0.0              |
| 475       | 26334            | 20.1             | 605       | 70271            | 0.2              | 735       | 4065             | 0.0              | 865       | 2074             | 0.0              | 995       | 2319             | 0.0              |
| 480       | 28580            | 23.0             | 610       | 67123            | 0.1              | 740       | 3702             | 0.0              | 870       | 1793             | 0.0              | 1000      | 2272             | 0.0              |
| 485       | 33016            | 27.2             | 615       | 64247            | 0.1              | 745       | 3231             | 0.0              | 875       | 2156             | 0.0              |           |                  |                  |

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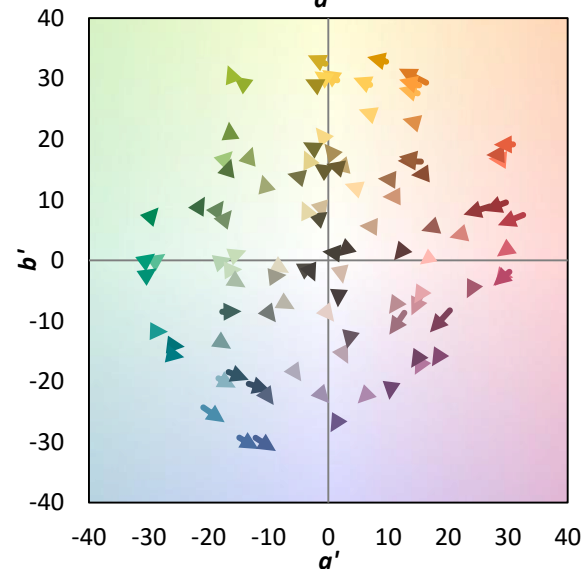
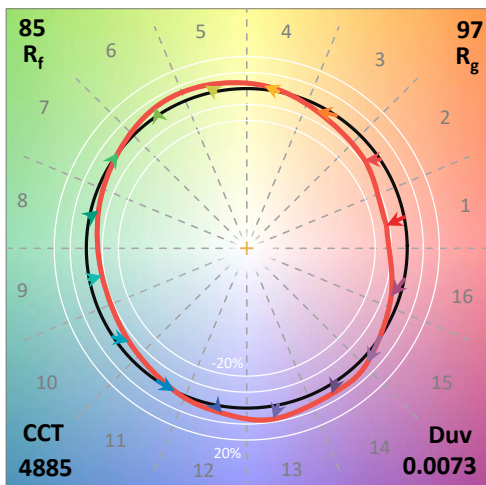
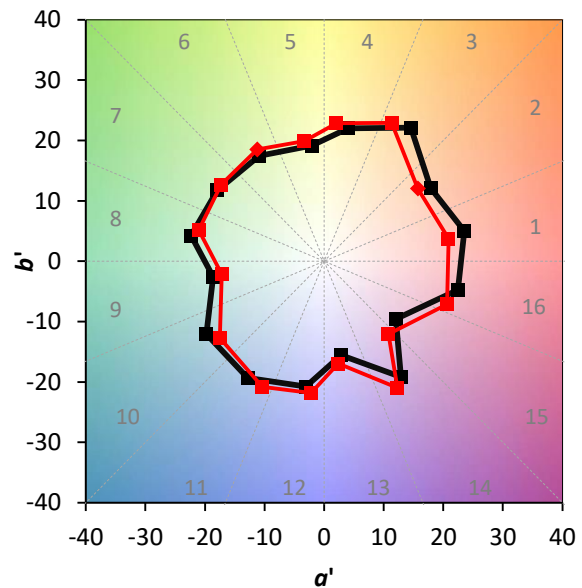
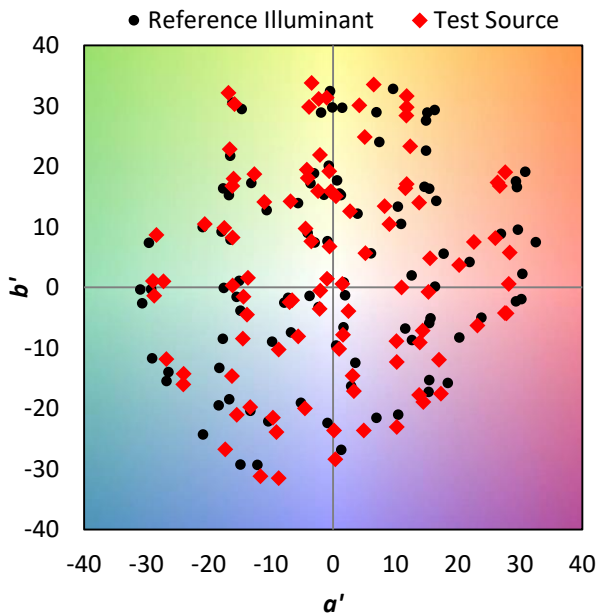
TM-30-18

### Summary

$R_f = 84.6$   
 $R_g = 96.9$   
 CIE  $R_a = 82.2$   
 $R_9 = 4.0$



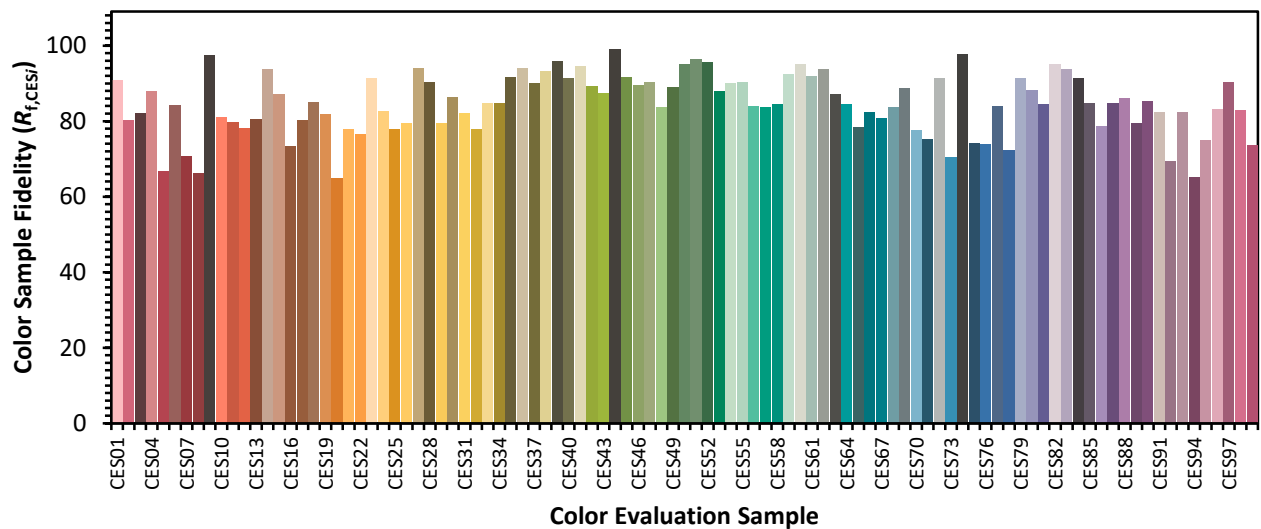
### Color Vector Graphics



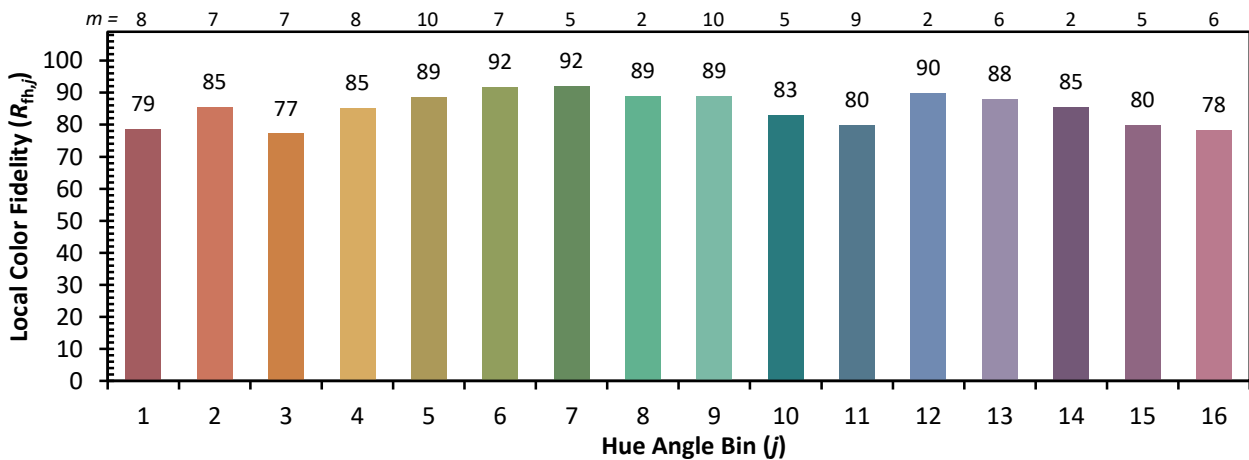
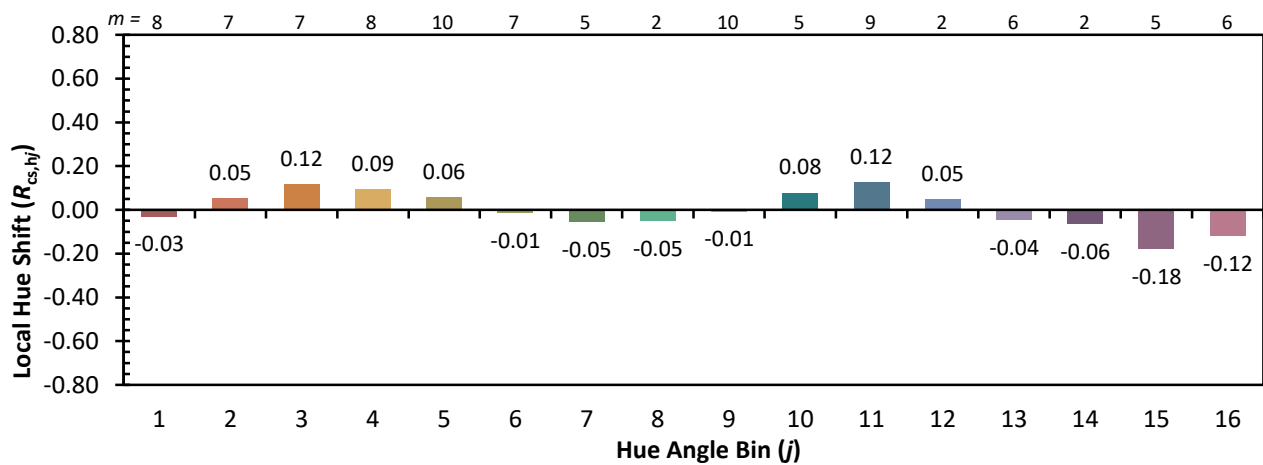
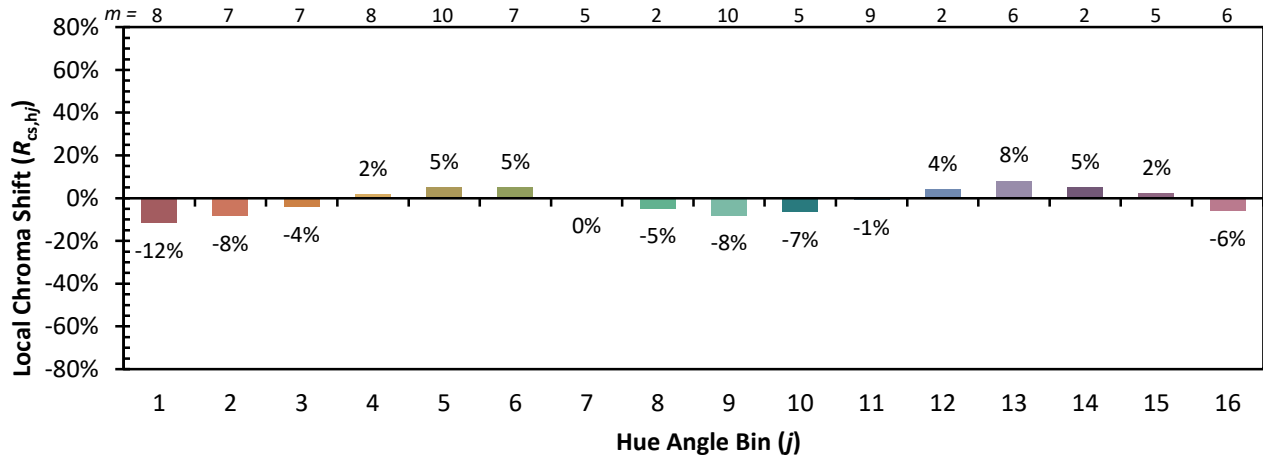


**Individual Sample Fidelity Index ( $R_{f,i}$ )**

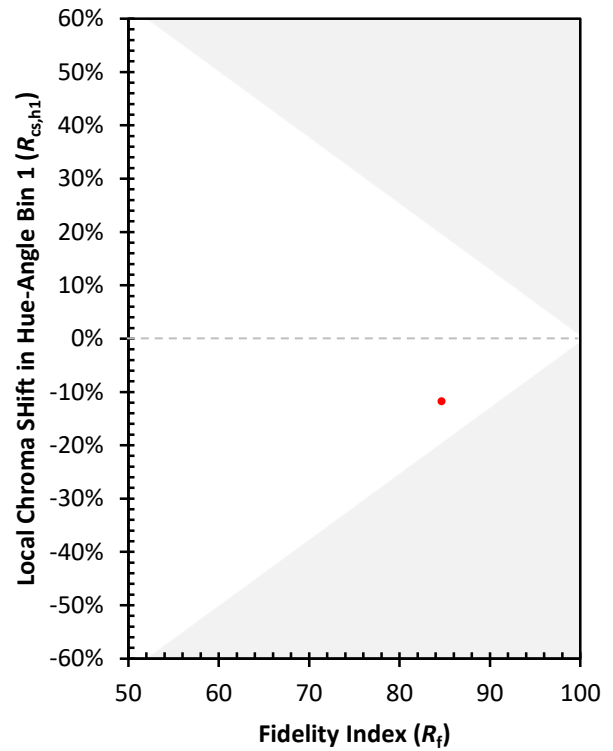
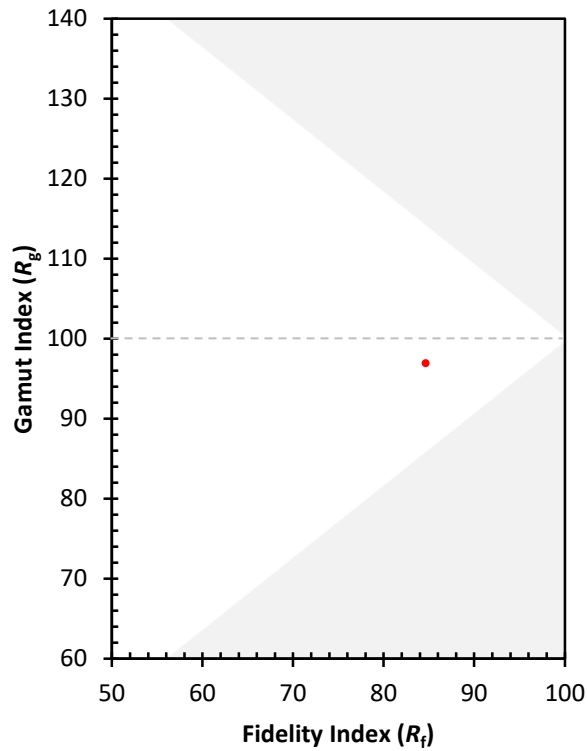
|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 85 | CES26 = 79 | CES51 = 96 | CES76 = 74 |
| CES02 = 60 | CES27 = 94 | CES52 = 96 | CES77 = 84 |
| CES03 = 30 | CES28 = 90 | CES53 = 88 | CES78 = 72 |
| CES04 = 69 | CES29 = 80 | CES54 = 90 | CES79 = 91 |
| CES05 = 47 | CES30 = 86 | CES55 = 90 | CES80 = 88 |
| CES06 = 50 | CES31 = 82 | CES56 = 84 | CES81 = 85 |
| CES07 = 39 | CES32 = 78 | CES57 = 84 | CES82 = 95 |
| CES08 = 39 | CES33 = 85 | CES58 = 84 | CES83 = 94 |
| CES09 = 29 | CES34 = 85 | CES59 = 92 | CES84 = 91 |
| CES10 = 73 | CES35 = 92 | CES60 = 95 | CES85 = 85 |
| CES11 = 56 | CES36 = 94 | CES61 = 92 | CES86 = 79 |
| CES12 = 61 | CES37 = 90 | CES62 = 94 | CES87 = 85 |
| CES13 = 42 | CES38 = 93 | CES63 = 87 | CES88 = 86 |
| CES14 = 74 | CES39 = 96 | CES64 = 84 | CES89 = 79 |
| CES15 = 70 | CES40 = 91 | CES65 = 78 | CES90 = 85 |
| CES16 = 46 | CES41 = 94 | CES66 = 82 | CES91 = 82 |
| CES17 = 48 | CES42 = 89 | CES67 = 81 | CES92 = 69 |
| CES18 = 55 | CES43 = 87 | CES68 = 84 | CES93 = 82 |
| CES19 = 70 | CES44 = 99 | CES69 = 89 | CES94 = 65 |
| CES20 = 64 | CES45 = 92 | CES70 = 78 | CES95 = 75 |
| CES21 = 85 | CES46 = 89 | CES71 = 75 | CES96 = 83 |
| CES22 = 77 | CES47 = 90 | CES72 = 91 | CES97 = 90 |
| CES23 = 91 | CES48 = 84 | CES73 = 71 | CES98 = 83 |
| CES24 = 90 | CES49 = 89 | CES74 = 98 | CES99 = 74 |
| CES25 = 70 | CES50 = 95 | CES75 = 74 |            |



Color Rendition by Hue-Angle Bin



**Measure Comparisons**



(END OF REPORT)