

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: P673863

Luminaire Tested: **CCP-SA1D-760-U-SL3-HSS**

Issue Date: 04/16/2023



**Test Information**

Test Method: LM-79-08  
Report Number: P673863  
Test Lab: INNOVATION CENTER(G1)  
Issue Date: 04/16/2023  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: INVUE  
Catalog Number: CCP-SA1D-760-U-SL3-HSS  
Description: INVUE CLEAR CURVE POLE MOUNT Light Square Luminaire @800mA w/ SL3  
distribution lens and House Side Shield  
Light Source: (16) 5700K CCT, 70 CRI LEDS  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 4714 lumens  
Efficiency: N/A  
Efficacy: 107.1 lumens/watt  
Luminous Opening: Rectangular (W 1' x L: 0.5' x H: 0')  
IES Classification: Type III - Medium  
BUG Rating: B1 - U0 - G1

Input Watts (W): 44  
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

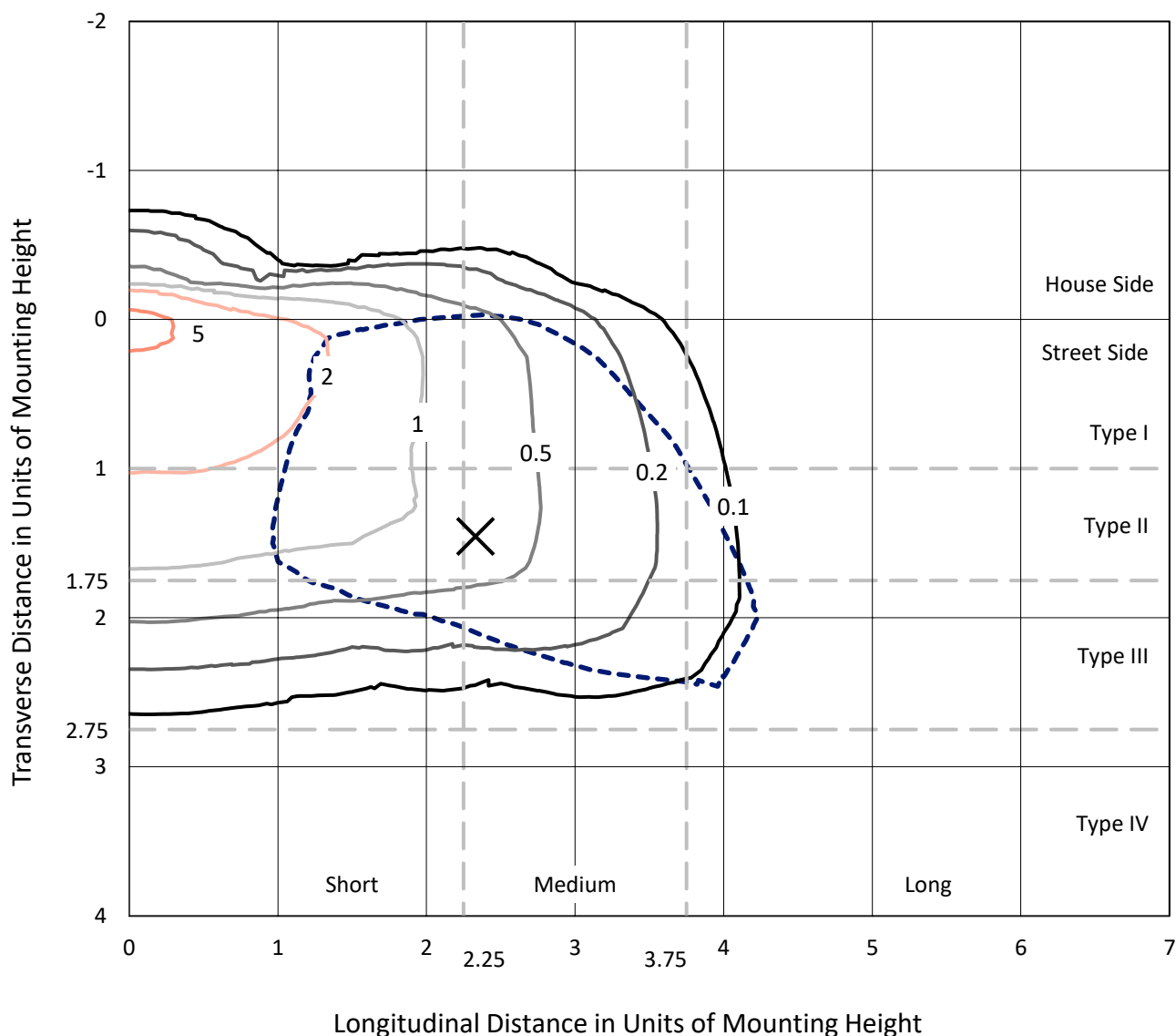
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CATALOG NUMBER: CCP-SA1D-760-U-SL3-HSS

## Iso-Footcandle Lines of Horizontal Illumination

× Max cd

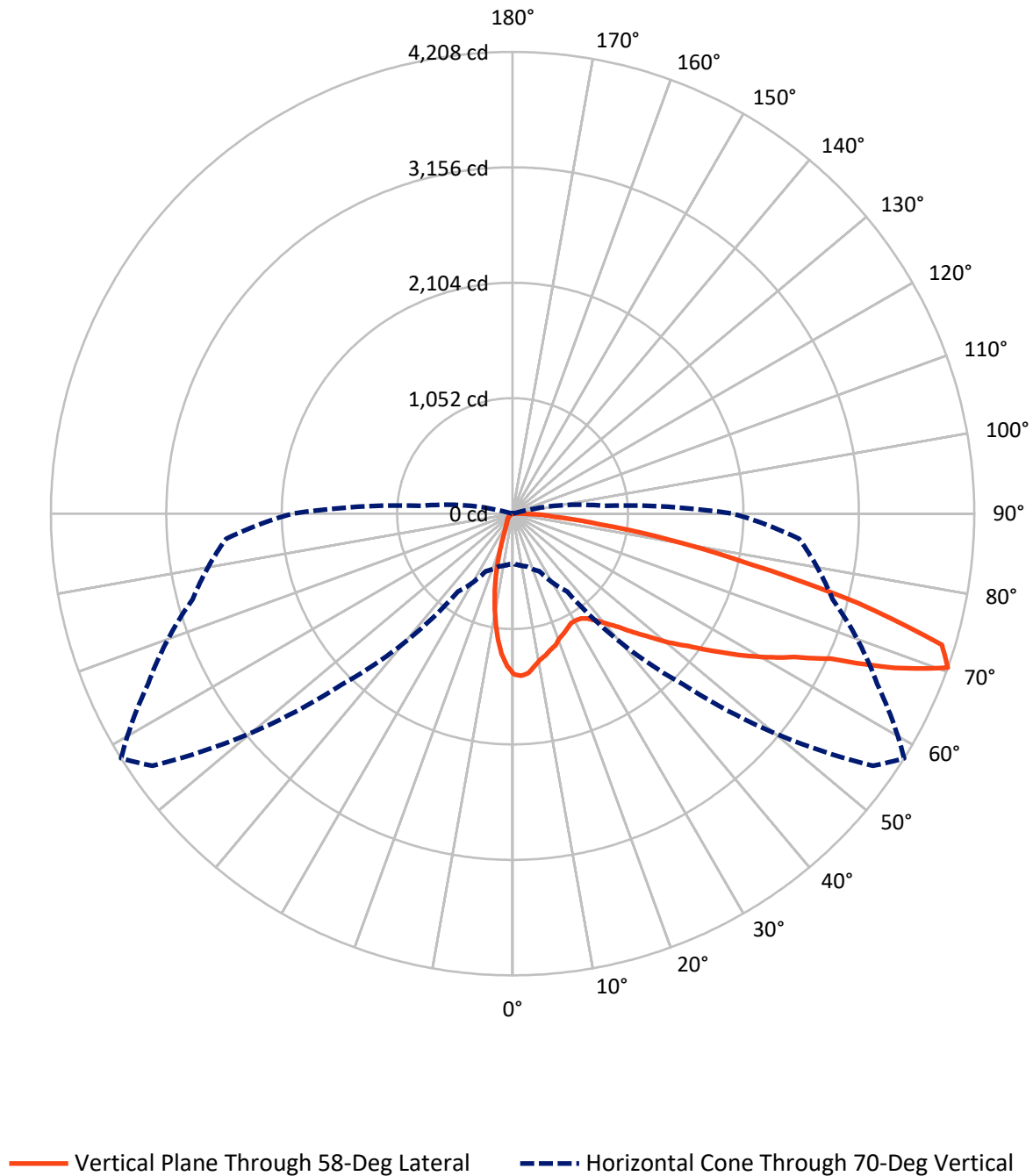
--- 1/2 Max cd



Based on 15 foot mounting height. Maximum calculated value = 6.5 fc  
 Type III - Medium - N/A

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## Luminous Intensity Polar Plot



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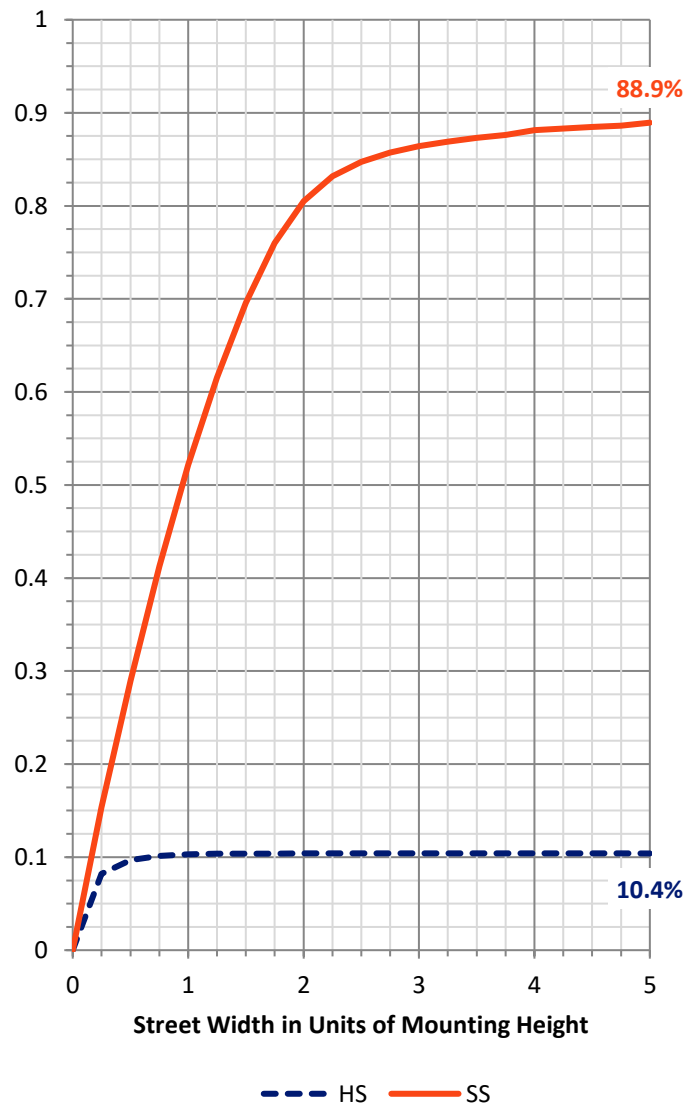
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total  |
|--------------------|-----------|----------|--------|--------|
| <b>House Side</b>  | Lumens    | 493.6    | 0.0    | 493.6  |
|                    | % Fixture | 10.5     | 0.0    | 10.5   |
| <b>Street Side</b> | Lumens    | 4220.4   | 0.0    | 4220.4 |
|                    | % Fixture | 89.5     | 0.0    | 89.5   |
| <b>Total</b>       | Lumens    | 4714.0   | 0.0    | 4714.0 |
|                    | % Fixture | 100.0    | 0.0    | 100.0  |

**ZONAL LUMENS:**

| Zone      | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10°    | 119.4  | 2.5       |
| 10°-20°   | 248.6  | 5.3       |
| 20°-30°   | 332.8  | 7.1       |
| 30°-40°   | 449.9  | 9.5       |
| 40°-50°   | 645.7  | 13.7      |
| 50°-60°   | 951.6  | 20.2      |
| 60°-70°   | 1160.7 | 24.6      |
| 70°-80°   | 708.8  | 15.0      |
| 80°-90°   | 96.3   | 2.0       |
| 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°    | 4714.0 | 100.0     |
| 0°-180°   | 4714.0 | 100.0     |

**Coefficient of Utilization**



REPORT NUMBER: P673863

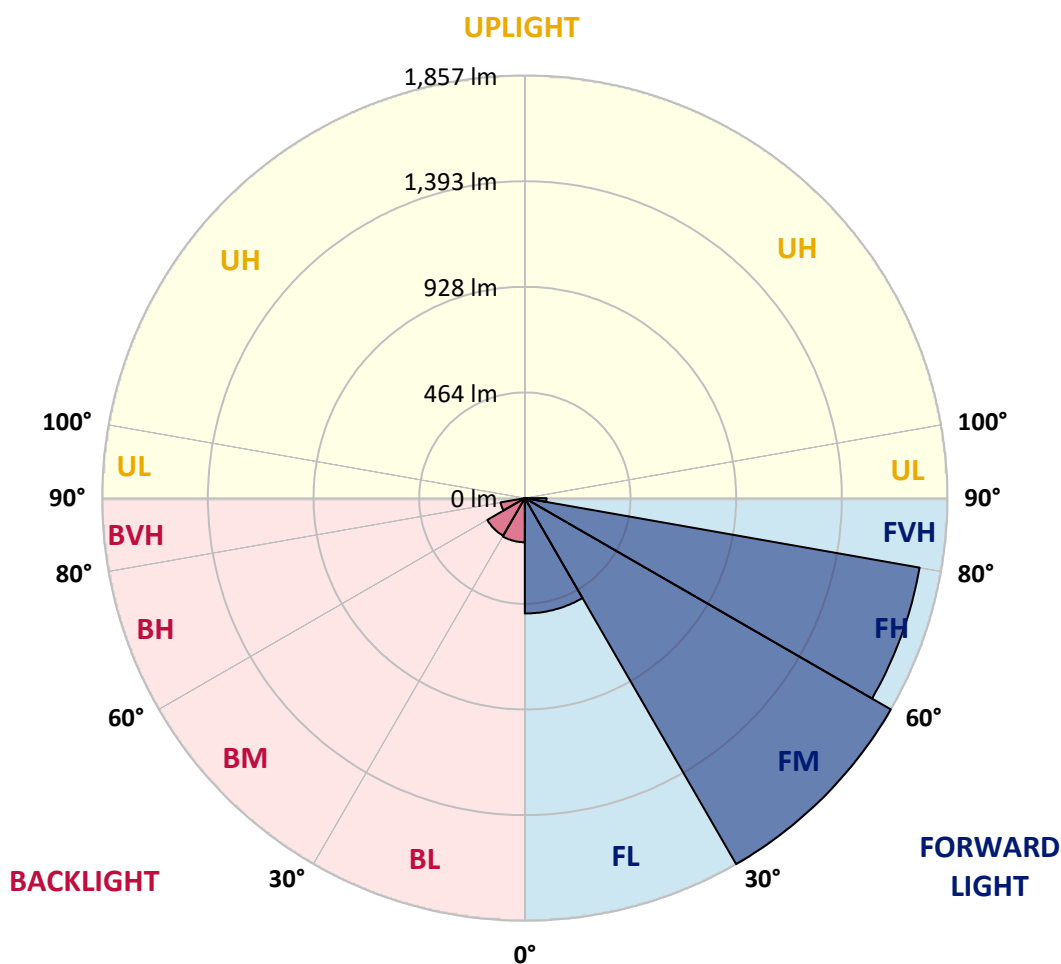
CATALOG NUMBER: CCP-SA1D-760-U-SL3-HSS

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

| Zone |             | Lumens | % Fixture | Zone Rating/Lumen Limit |      |         |
|------|-------------|--------|-----------|-------------------------|------|---------|
|      |             |        |           | B                       | U    | G       |
| FL   | (0°-30°)    | 506.8  | 10.8      |                         |      |         |
| FM   | (30°-60°)   | 1856.8 | 39.4      |                         |      |         |
| FH   | (60°-80°)   | 1761.4 | 37.4      |                         |      | G1/1800 |
| FVH  | (80°-90°)   | 95.4   | 2.0       |                         |      | G1/100  |
| BL   | (0°-30°)    | 194.0  | 4.1       | B1/500                  |      |         |
| BM   | (30°-60°)   | 190.5  | 4.0       | B0/220                  |      |         |
| BH   | (60°-80°)   | 108.2  | 2.3       | B0/110                  |      | G0/110  |
| BVH  | (80°-90°)   | 0.9    | 0.0       |                         |      | G0/10   |
| UL   | (90°-100°)  | 0.0    | 0.0       |                         | U0/0 |         |
| UH   | (100°-180°) | 0.0    | 0.0       |                         | U0/0 |         |

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

Type III Medium



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**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 5°     | 15°    | 25°    | 35°    | 45°    | 55°    | 58°    | 65°    | 75°    | 85°    |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 1463.4 | 1463.4 | 1463.4 | 1463.4 | 1463.4 | 1463.4 | 1463.4 | 1463.4 | 1463.4 | 1463.4 | 1463.4 |
| 2.5°  | 1489.9 | 1495.4 | 1482.1 | 1497.6 | 1483.3 | 1489.9 | 1482.1 | 1479.9 | 1481.0 | 1482.1 | 1473.3 |
| 5°    | 1420.3 | 1433.5 | 1439.0 | 1430.2 | 1451.2 | 1447.9 | 1461.1 | 1462.3 | 1456.7 | 1451.2 | 1452.3 |
| 7.5°  | 1328.5 | 1341.8 | 1347.3 | 1352.8 | 1373.8 | 1401.5 | 1419.2 | 1408.1 | 1416.9 | 1436.8 | 1407.0 |
| 10°   | 1262.2 | 1258.9 | 1257.8 | 1268.8 | 1308.6 | 1331.8 | 1361.7 | 1358.4 | 1380.5 | 1399.3 | 1374.9 |
| 12.5° | 1180.4 | 1173.8 | 1193.7 | 1202.5 | 1237.9 | 1278.8 | 1302.0 | 1326.3 | 1348.4 | 1368.3 | 1340.7 |
| 15°   | 1119.6 | 1125.2 | 1132.9 | 1151.7 | 1177.1 | 1231.3 | 1265.5 | 1288.7 | 1328.5 | 1338.5 | 1327.4 |
| 17.5° | 1071.0 | 1075.4 | 1086.5 | 1096.4 | 1128.5 | 1180.4 | 1234.6 | 1262.2 | 1304.2 | 1330.7 | 1296.5 |
| 20°   | 1072.1 | 1058.8 | 1058.8 | 1068.8 | 1086.5 | 1148.4 | 1205.8 | 1214.7 | 1272.2 | 1317.5 | 1294.3 |
| 22.5° | 1073.2 | 1068.8 | 1058.8 | 1057.7 | 1065.5 | 1109.7 | 1168.3 | 1188.2 | 1250.0 | 1303.1 | 1275.5 |
| 25°   | 1088.7 | 1072.1 | 1073.2 | 1057.7 | 1061.0 | 1083.2 | 1129.6 | 1159.4 | 1230.2 | 1310.8 | 1265.5 |
| 27.5° | 1101.9 | 1109.7 | 1094.2 | 1087.6 | 1068.8 | 1067.7 | 1106.4 | 1131.8 | 1220.2 | 1328.5 | 1272.2 |
| 30°   | 1131.8 | 1137.3 | 1137.3 | 1132.9 | 1115.2 | 1089.8 | 1098.6 | 1130.7 | 1200.3 | 1325.2 | 1261.1 |
| 32.5° | 1181.5 | 1171.6 | 1184.8 | 1178.2 | 1155.0 | 1115.2 | 1122.9 | 1139.5 | 1212.5 | 1367.2 | 1278.8 |
| 35°   | 1198.1 | 1205.8 | 1223.5 | 1209.2 | 1201.4 | 1178.2 | 1162.7 | 1174.9 | 1230.2 | 1409.2 | 1305.3 |
| 37.5° | 1248.9 | 1237.9 | 1250.0 | 1282.1 | 1289.8 | 1247.8 | 1218.0 | 1235.7 | 1296.5 | 1458.9 | 1329.6 |
| 40°   | 1253.4 | 1262.2 | 1284.3 | 1347.3 | 1355.0 | 1337.4 | 1313.0 | 1317.5 | 1362.8 | 1523.0 | 1390.4 |
| 42.5° | 1275.5 | 1285.4 | 1330.7 | 1383.8 | 1425.8 | 1429.1 | 1411.4 | 1411.4 | 1450.1 | 1625.8 | 1457.8 |
| 45°   | 1318.6 | 1302.0 | 1360.6 | 1450.1 | 1510.9 | 1523.0 | 1546.3 | 1540.7 | 1571.7 | 1734.1 | 1583.8 |
| 47.5° | 1335.2 | 1340.7 | 1404.8 | 1513.1 | 1582.7 | 1639.1 | 1677.8 | 1678.9 | 1694.4 | 1872.3 | 1747.4 |
| 50°   | 1389.3 | 1388.2 | 1465.6 | 1566.1 | 1668.9 | 1771.7 | 1846.9 | 1846.9 | 1845.8 | 2007.1 | 1887.8 |
| 52.5° | 1461.1 | 1458.9 | 1518.6 | 1638.0 | 1771.7 | 1901.0 | 2000.5 | 2003.8 | 2029.3 | 2172.9 | 2049.1 |
| 55°   | 1578.3 | 1568.4 | 1625.8 | 1714.3 | 1874.5 | 2031.5 | 2203.9 | 2205.0 | 2185.1 | 2291.2 | 2165.2 |
| 57.5° | 1676.7 | 1675.6 | 1723.1 | 1808.2 | 1989.5 | 2199.5 | 2399.5 | 2429.4 | 2366.4 | 2412.8 | 2258.0 |
| 60°   | 1651.3 | 1665.6 | 1764.0 | 1890.0 | 2111.0 | 2409.5 | 2610.6 | 2657.0 | 2556.5 | 2495.7 | 2327.7 |
| 62.5° | 1493.2 | 1526.4 | 1633.6 | 1834.7 | 2213.8 | 2714.5 | 2901.3 | 2880.3 | 2655.9 | 2566.4 | 2412.8 |
| 65°   | 1074.3 | 1107.5 | 1240.1 | 1541.8 | 2094.5 | 2930.0 | 3283.7 | 3188.7 | 2832.8 | 2671.4 | 2526.6 |
| 67.5° | 632.2  | 645.5  | 728.4  | 983.7  | 1566.1 | 2812.9 | 3747.9 | 3755.7 | 3180.9 | 2832.8 | 2723.4 |
| 70°   | 456.5  | 466.4  | 498.5  | 580.3  | 867.6  | 2205.0 | 4006.6 | 4207.7 | 3663.9 | 3018.5 | 2619.5 |
| 72.5° | 350.4  | 350.4  | 404.5  | 483.0  | 552.6  | 1320.8 | 3687.1 | 4090.6 | 3768.9 | 2840.5 | 2111.0 |
| 75°   | 252.0  | 258.6  | 317.2  | 415.6  | 509.5  | 663.2  | 2716.7 | 3246.1 | 3194.2 | 2302.3 | 1474.4 |
| 77.5° | 144.8  | 148.1  | 223.3  | 348.2  | 478.6  | 455.4  | 1678.9 | 2200.6 | 2262.5 | 1441.3 | 638.8  |
| 80°   | 74.1   | 76.3   | 124.9  | 275.2  | 433.3  | 396.8  | 1001.4 | 1449.0 | 1229.0 | 418.9  | 148.1  |
| 82.5° | 36.5   | 36.5   | 56.4   | 175.7  | 368.1  | 351.5  | 589.1  | 800.2  | 435.5  | 96.2   | 61.9   |
| 85°   | 12.2   | 13.3   | 25.4   | 99.5   | 266.4  | 212.2  | 360.3  | 380.2  | 145.9  | 36.5   | 34.3   |
| 87.5° | 3.3    | 4.4    | 6.6    | 36.5   | 116.1  | 139.3  | 214.4  | 243.2  | 59.7   | 14.4   | 16.6   |
| 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: P673863

CATALOG NUMBER: CCP-SA1D-760-U-SL3-HSS

**CANDELA DISTRIBUTION (continued):**

|       | 90°    | 95°    | 105°   | 115°   | 125°   | 135°   | 145°   | 155°   | 165°   | 175°   | 180°   |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 1463.4 | 1463.4 | 1463.4 | 1463.4 | 1463.4 | 1463.4 | 1463.4 | 1463.4 | 1463.4 | 1463.4 | 1463.4 |
| 2.5°  | 1440.1 | 1432.4 | 1423.6 | 1401.5 | 1383.8 | 1360.6 | 1345.1 | 1332.9 | 1309.7 | 1314.2 | 1304.2 |
| 5°    | 1425.8 | 1411.4 | 1360.6 | 1311.9 | 1267.7 | 1200.3 | 1153.9 | 1124.0 | 1099.7 | 1075.4 | 1093.1 |
| 7.5°  | 1400.4 | 1366.1 | 1286.5 | 1195.9 | 1101.9 | 1013.5 | 925.1  | 872.0  | 833.4  | 798.0  | 796.9  |
| 10°   | 1357.3 | 1302.0 | 1177.1 | 1058.8 | 914.0  | 798.0  | 685.3  | 596.8  | 539.4  | 497.4  | 496.3  |
| 12.5° | 1308.6 | 1251.2 | 1094.2 | 901.9  | 735.0  | 571.4  | 436.6  | 342.6  | 288.5  | 255.3  | 250.9  |
| 15°   | 1277.7 | 1193.7 | 990.3  | 762.6  | 555.9  | 372.5  | 242.1  | 183.5  | 162.5  | 154.7  | 154.7  |
| 17.5° | 1237.9 | 1141.7 | 887.5  | 617.8  | 385.7  | 215.5  | 156.9  | 141.5  | 140.4  | 138.2  | 135.9  |
| 20°   | 1221.3 | 1101.9 | 795.8  | 492.9  | 244.3  | 152.5  | 134.8  | 131.5  | 131.5  | 129.3  | 127.1  |
| 22.5° | 1177.1 | 1044.5 | 698.5  | 361.4  | 162.5  | 133.7  | 127.1  | 122.7  | 120.5  | 118.3  | 120.5  |
| 25°   | 1157.2 | 1003.6 | 606.8  | 249.8  | 132.6  | 119.4  | 116.1  | 111.6  | 108.3  | 107.2  | 107.2  |
| 27.5° | 1143.9 | 962.7  | 517.3  | 173.5  | 117.2  | 109.4  | 102.8  | 99.5   | 95.1   | 90.6   | 90.6   |
| 30°   | 1134.0 | 930.6  | 431.1  | 128.2  | 105.0  | 97.3   | 91.7   | 84.0   | 78.5   | 74.1   | 74.1   |
| 32.5° | 1120.7 | 893.0  | 344.8  | 109.4  | 95.1   | 87.3   | 77.4   | 70.7   | 63.0   | 59.7   | 59.7   |
| 35°   | 1125.2 | 867.6  | 270.8  | 97.3   | 85.1   | 75.2   | 66.3   | 57.5   | 49.7   | 46.4   | 45.3   |
| 37.5° | 1134.0 | 848.8  | 205.6  | 87.3   | 76.3   | 65.2   | 55.3   | 45.3   | 40.9   | 36.5   | 36.5   |
| 40°   | 1171.6 | 843.3  | 151.4  | 80.7   | 69.6   | 57.5   | 46.4   | 37.6   | 33.2   | 29.8   | 28.7   |
| 42.5° | 1234.6 | 851.0  | 117.2  | 72.9   | 63.0   | 48.6   | 38.7   | 30.9   | 26.5   | 23.2   | 22.1   |
| 45°   | 1315.3 | 880.9  | 96.2   | 68.5   | 55.3   | 40.9   | 30.9   | 25.4   | 19.9   | 17.7   | 17.7   |
| 47.5° | 1432.4 | 927.3  | 84.0   | 63.0   | 48.6   | 34.3   | 26.5   | 19.9   | 15.5   | 13.3   | 13.3   |
| 50°   | 1565.0 | 980.4  | 74.1   | 56.4   | 42.0   | 28.7   | 21.0   | 15.5   | 11.1   | 9.9    | 9.9    |
| 52.5° | 1697.7 | 1047.8 | 68.5   | 51.9   | 36.5   | 23.2   | 16.6   | 11.1   | 7.7    | 6.6    | 6.6    |
| 55°   | 1836.9 | 1107.5 | 61.9   | 48.6   | 29.8   | 18.8   | 12.2   | 6.6    | 4.4    | 3.3    | 3.3    |
| 57.5° | 1934.2 | 1130.7 | 54.2   | 42.0   | 23.2   | 14.4   | 8.8    | 4.4    | 2.2    | 1.1    | 1.1    |
| 60°   | 2003.8 | 1134.0 | 46.4   | 34.3   | 17.7   | 11.1   | 5.5    | 2.2    | 1.1    | 0.0    | 0.0    |
| 62.5° | 2062.4 | 1140.6 | 39.8   | 26.5   | 13.3   | 7.7    | 3.3    | 1.1    | 0.0    | 0.0    | 0.0    |
| 65°   | 2178.5 | 1135.1 | 32.1   | 21.0   | 8.8    | 4.4    | 2.2    | 0.0    | 0.0    | 0.0    | 0.0    |
| 67.5° | 2270.2 | 1079.8 | 25.4   | 14.4   | 5.5    | 2.2    | 1.1    | 0.0    | 0.0    | 0.0    | 0.0    |
| 70°   | 2008.3 | 823.4  | 19.9   | 9.9    | 3.3    | 1.1    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |
| 72.5° | 1577.2 | 549.3  | 13.3   | 5.5    | 2.2    | 1.1    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |
| 75°   | 1034.5 | 273.0  | 9.9    | 3.3    | 1.1    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |
| 77.5° | 402.3  | 71.8   | 6.6    | 2.2    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |
| 80°   | 97.3   | 24.3   | 3.3    | 1.1    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |
| 82.5° | 42.0   | 8.8    | 2.2    | 1.1    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |
| 85°   | 25.4   | 4.4    | 1.1    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |
| 87.5° | 13.3   | 2.2    | 1.1    | 1.1    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |
| 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: SP1-2012-088-5-R3

Luminaire Tested: CCW-SA1A-760-U-SL2-HSS

Test Date: 01/19/2021

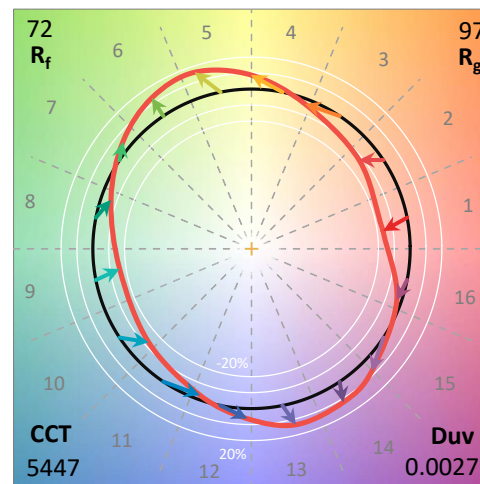
### Test Information

Test Method: LM-79-08  
 Report Number: SP1-2012-088-5-R3  
 Test Lab: COOPER LIGHTING SOLUTIONS  
 Photometer: SP1  
 Measurement Geometry:  $4\pi$   
 Issue Date: 01/19/2021  
 Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
 Product Line: INVUE  
 Catalog Number: **CCW-SA1A-760-U-SL2-HSS**  
 Description: INVUE WALL PACK

\*\*\*THIS IS A REVISION OF SP1-2012-088-5-R2. TO UPDATE THE CATALOG  
 INFORMATION.\*\*\*TESTED IN SITU. INVUE WALL PACK LIGHT SQUARE T2 OPTICS 1-SQUARE WITH  
 HOUSE SIDE SHIELD

### Spectral Parameters

|                           |        |           |      |      |       |
|---------------------------|--------|-----------|------|------|-------|
| CCT (K):                  | 5447   | CRI (Ra): | 71.9 |      |       |
| CIE u':                   | 0.2053 | R1:       | 70.7 | R9:  | -27.5 |
| CIE v':                   | 0.4809 | R2:       | 74.8 | R10: | 41.5  |
| Duv:                      | 0.0027 | R3:       | 78.7 | R11: | 74.9  |
| CIE x:                    | 0.3337 | R4:       | 74.0 | R12: | 49.9  |
| CIE y:                    | 0.3473 | R5:       | 72.5 | R13: | 70.2  |
| CIE z:                    | 0.3190 | R6:       | 67.7 | R14: | 88.1  |
| Peak Wavelength (nm):     | 443    | R7:       | 77.7 |      |       |
| Dominant Wavelength (nm): | 556    | R8:       | 58.8 |      |       |
| Purity:                   | 4.5    |           |      |      |       |
| Rf:                       | 72.3   |           |      |      |       |
| Rg:                       | 97.2   |           |      |      |       |



### Test Conditions

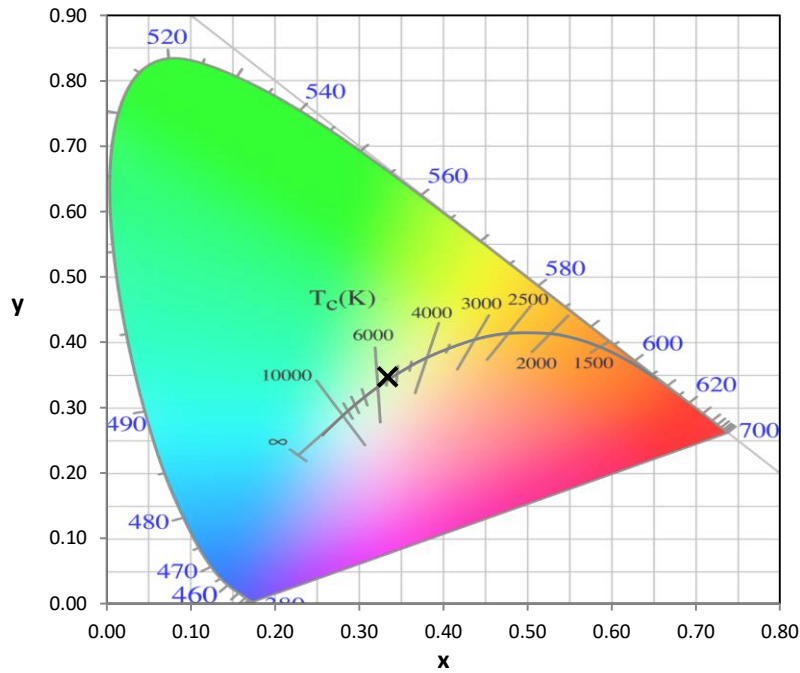
Stabilization Time: 75M  
 Operation Time: 12H  
 Room Temperature (°C) / RH%: 25.4/18%  
 Sphere Temperature (°C): 25.3

REPORT NUMBER: SP1-2012-088-5-R3

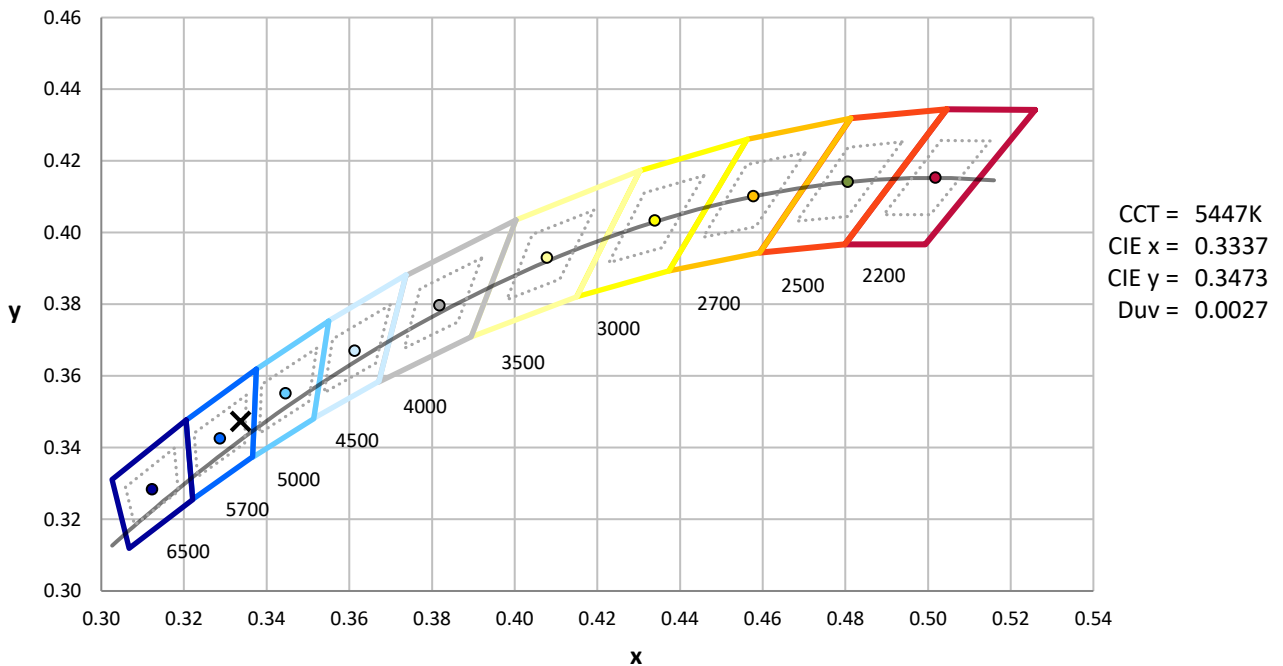
| Measurement and Test Equipment |                       |                  |                      |
|--------------------------------|-----------------------|------------------|----------------------|
| Instrument                     | Identification Number | Calibration Date | Calibration Due Date |
| Photometer                     | IN0058                | 7/29/2020        | 1/29/2021            |
| 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**



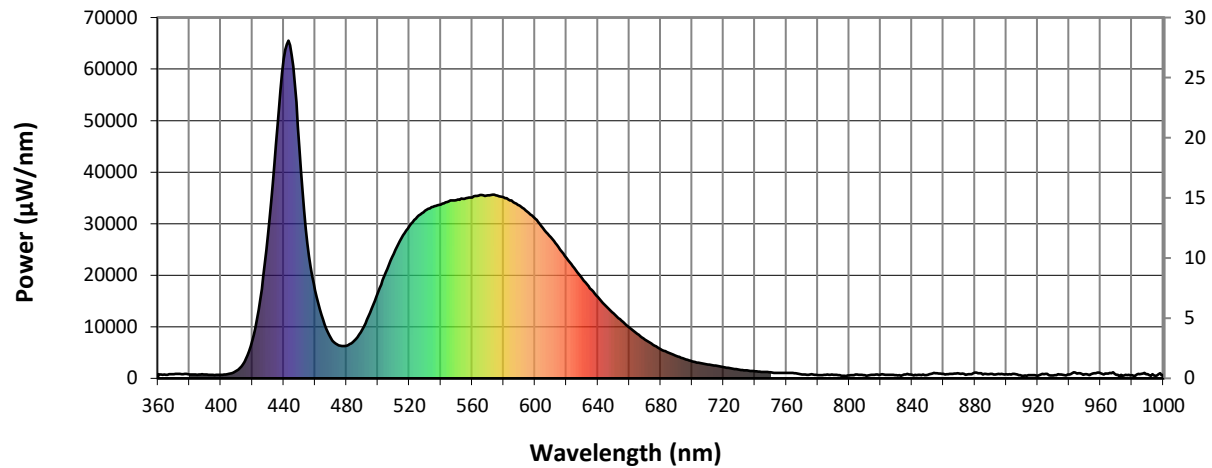
**CIE 1931 Chromaticity Diagram with 2017 ANSI 7-Step and 4-Step Quadrangles**



Point lies inside the ANSI 5700K 4-step quadrangle

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### Photopic Flux vs. Wavelength

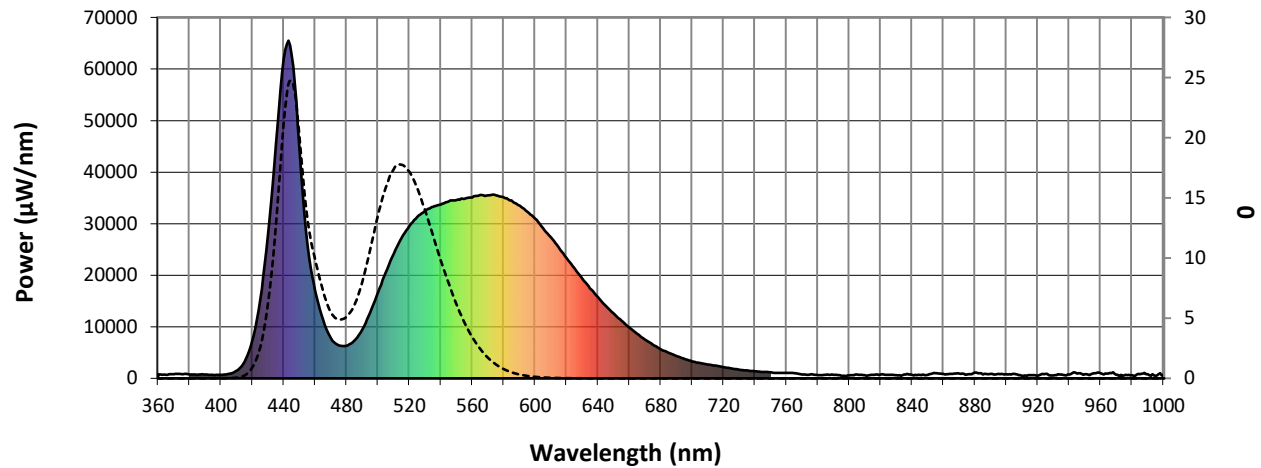


#####

| 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       | 828              | 0.0              | 490       | 9471             | 1.3              | 620       | 23317            | 6.1              | 750       | 1157             | 0.0              | 880       | 1136             | 0.0              |
| 365       | 696              | 0.0              | 495       | 12752            | 2.3              | 625       | 21413            | 4.7              | 755       | 1067             | 0.0              | 885       | 773              | 0.0              |
| 370       | 807              | 0.0              | 500       | 16685            | 3.7              | 630       | 19344            | 3.5              | 760       | 1059             | 0.0              | 890       | 872              | 0.0              |
| 375       | 837              | 0.0              | 505       | 20565            | 5.8              | 635       | 17464            | 2.6              | 765       | 1009             | 0.0              | 895       | 891              | 0.0              |
| 380       | 757              | 0.0              | 510       | 24119            | 8.3              | 640       | 15745            | 1.9              | 770       | 774              | 0.0              | 900       | 807              | 0.0              |
| 385       | 706              | 0.0              | 515       | 27181            | 11.3             | 645       | 14060            | 1.4              | 775       | 761              | 0.0              | 905       | 899              | 0.0              |
| 390       | 746              | 0.0              | 520       | 29555            | 14.3             | 650       | 12579            | 0.9              | 780       | 653              | 0.0              | 910       | 506              | 0.0              |
| 395       | 660              | 0.0              | 525       | 31307            | 16.8             | 655       | 11181            | 0.6              | 785       | 704              | 0.0              | 915       | 598              | 0.0              |
| 400       | 671              | 0.0              | 530       | 32558            | 19.2             | 660       | 9847             | 0.4              | 790       | 663              | 0.0              | 920       | 510              | 0.0              |
| 405       | 848              | 0.0              | 535       | 33301            | 20.7             | 665       | 8641             | 0.3              | 795       | 493              | 0.0              | 925       | 874              | 0.0              |
| 410       | 1490             | 0.0              | 540       | 33727            | 22.0             | 670       | 7535             | 0.2              | 800       | 584              | 0.0              | 930       | 549              | 0.0              |
| 415       | 3203             | 0.0              | 545       | 34356            | 22.9             | 675       | 6542             | 0.1              | 805       | 739              | 0.0              | 935       | 720              | 0.0              |
| 420       | 7298             | 0.0              | 550       | 34589            | 23.5             | 680       | 5664             | 0.1              | 810       | 601              | 0.0              | 940       | 754              | 0.0              |
| 425       | 15315            | 0.1              | 555       | 34855            | 23.8             | 685       | 4962             | 0.0              | 815       | 677              | 0.0              | 945       | 931              | 0.0              |
| 430       | 27886            | 0.2              | 560       | 35083            | 23.8             | 690       | 4369             | 0.0              | 820       | 726              | 0.0              | 950       | 811              | 0.0              |
| 435       | 45485            | 0.5              | 565       | 35553            | 23.6             | 695       | 3785             | 0.0              | 825       | 693              | 0.0              | 955       | 955              | 0.0              |
| 440       | 61965            | 1.0              | 570       | 35511            | 23.1             | 700       | 3318             | 0.0              | 830       | 619              | 0.0              | 960       | 1025             | 0.0              |
| 445       | 62721            | 1.3              | 575       | 35515            | 22.1             | 705       | 2962             | 0.0              | 835       | 738              | 0.0              | 965       | 916              | 0.0              |
| 450       | 44754            | 1.2              | 580       | 35114            | 20.9             | 710       | 2689             | 0.0              | 840       | 681              | 0.0              | 970       | 695              | 0.0              |
| 455       | 26152            | 0.9              | 585       | 34546            | 19.2             | 715       | 2476             | 0.0              | 845       | 691              | 0.0              | 975       | 568              | 0.0              |
| 460       | 17101            | 0.7              | 590       | 33522            | 17.3             | 720       | 2192             | 0.0              | 850       | 710              | 0.0              | 980       | 643              | 0.0              |
| 465       | 11400            | 0.6              | 595       | 32326            | 15.3             | 725       | 1939             | 0.0              | 855       | 1025             | 0.0              | 985       | 804              | 0.0              |
| 470       | 7763             | 0.5              | 600       | 30973            | 13.3             | 730       | 1698             | 0.0              | 860       | 889              | 0.0              | 990       | 812              | 0.0              |
| 475       | 6419             | 0.5              | 605       | 29160            | 11.3             | 735       | 1533             | 0.0              | 865       | 885              | 0.0              | 995       | 496              | 0.0              |
| 480       | 6330             | 0.6              | 610       | 27373            | 9.4              | 740       | 1375             | 0.0              | 870       | 905              | 0.0              | 1000      | 659              | 0.0              |
| 485       | 7299             | 0.9              | 615       | 25423            | 7.7              | 745       | 1254             | 0.0              | 875       | 739              | 0.0              |           |                  |                  |

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### Scotopic Flux vs. Wavelength



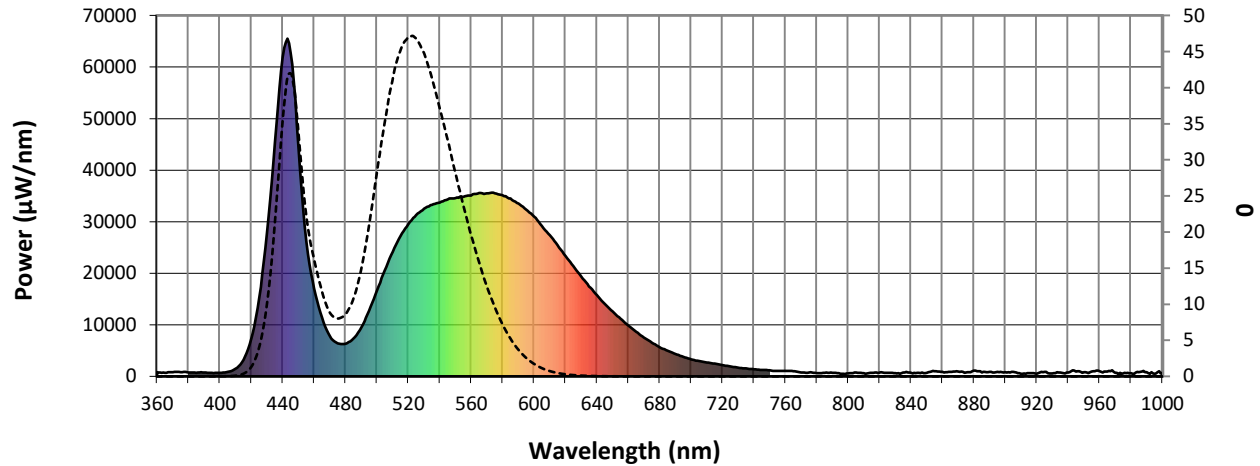
Scotopic Lumens: 1610.2

S/P: 0.74

| 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       | 828              | 0.0              | 490       | 9471             | 14.6             | 620       | 23317            | 0.3              | 750       | 1157             | 0.0              | 880       | 1136             | 0.0              |
| 365       | 696              | 0.0              | 495       | 12752            | 20.6             | 625       | 21413            | 0.2              | 755       | 1067             | 0.0              | 885       | 773              | 0.0              |
| 370       | 807              | 0.0              | 500       | 16685            | 27.9             | 630       | 19344            | 0.1              | 760       | 1059             | 0.0              | 890       | 872              | 0.0              |
| 375       | 837              | 0.0              | 505       | 20565            | 35.0             | 635       | 17464            | 0.1              | 765       | 1009             | 0.0              | 895       | 891              | 0.0              |
| 380       | 757              | 0.0              | 510       | 24119            | 40.9             | 640       | 15745            | 0.0              | 770       | 774              | 0.0              | 900       | 807              | 0.0              |
| 385       | 706              | 0.0              | 515       | 27181            | 45.1             | 645       | 14060            | 0.0              | 775       | 761              | 0.0              | 905       | 899              | 0.0              |
| 390       | 746              | 0.0              | 520       | 29555            | 47.0             | 650       | 12579            | 0.0              | 780       | 653              | 0.0              | 910       | 506              | 0.0              |
| 395       | 660              | 0.0              | 525       | 31307            | 46.8             | 655       | 11181            | 0.0              | 785       | 704              | 0.0              | 915       | 598              | 0.0              |
| 400       | 671              | 0.0              | 530       | 32558            | 44.9             | 660       | 9847             | 0.0              | 790       | 663              | 0.0              | 920       | 510              | 0.0              |
| 405       | 848              | 0.0              | 535       | 33301            | 41.5             | 665       | 8641             | 0.0              | 795       | 493              | 0.0              | 925       | 874              | 0.0              |
| 410       | 1490             | 0.1              | 540       | 33727            | 37.3             | 670       | 7535             | 0.0              | 800       | 584              | 0.0              | 930       | 549              | 0.0              |
| 415       | 3203             | 0.3              | 545       | 34356            | 32.9             | 675       | 6542             | 0.0              | 805       | 739              | 0.0              | 935       | 720              | 0.0              |
| 420       | 7298             | 1.2              | 550       | 34589            | 28.3             | 680       | 5664             | 0.0              | 810       | 601              | 0.0              | 940       | 754              | 0.0              |
| 425       | 15315            | 3.7              | 555       | 34855            | 23.8             | 685       | 4962             | 0.0              | 815       | 677              | 0.0              | 945       | 931              | 0.0              |
| 430       | 27886            | 9.5              | 560       | 35083            | 19.6             | 690       | 4369             | 0.0              | 820       | 726              | 0.0              | 950       | 811              | 0.0              |
| 435       | 45485            | 20.3             | 565       | 35553            | 16.0             | 695       | 3785             | 0.0              | 825       | 693              | 0.0              | 955       | 955              | 0.0              |
| 440       | 61965            | 34.6             | 570       | 35511            | 12.5             | 700       | 3318             | 0.0              | 830       | 619              | 0.0              | 960       | 1025             | 0.0              |
| 445       | 62721            | 42.0             | 575       | 35515            | 9.7              | 705       | 2962             | 0.0              | 835       | 738              | 0.0              | 965       | 916              | 0.0              |
| 450       | 44754            | 34.7             | 580       | 35114            | 7.2              | 710       | 2689             | 0.0              | 840       | 681              | 0.0              | 970       | 695              | 0.0              |
| 455       | 26152            | 22.9             | 585       | 34546            | 5.3              | 715       | 2476             | 0.0              | 845       | 691              | 0.0              | 975       | 568              | 0.0              |
| 460       | 17101            | 16.5             | 590       | 33522            | 3.7              | 720       | 2192             | 0.0              | 850       | 710              | 0.0              | 980       | 643              | 0.0              |
| 465       | 11400            | 12.0             | 595       | 32326            | 2.6              | 725       | 1939             | 0.0              | 855       | 1025             | 0.0              | 985       | 804              | 0.0              |
| 470       | 7763             | 8.9              | 600       | 30973            | 1.7              | 730       | 1698             | 0.0              | 860       | 889              | 0.0              | 990       | 812              | 0.0              |
| 475       | 6419             | 8.0              | 605       | 29160            | 1.1              | 735       | 1533             | 0.0              | 865       | 885              | 0.0              | 995       | 496              | 0.0              |
| 480       | 6330             | 8.5              | 610       | 27373            | 0.7              | 740       | 1375             | 0.0              | 870       | 905              | 0.0              | 1000      | 659              | 0.0              |
| 485       | 7299             | 10.6             | 615       | 25423            | 0.5              | 745       | 1254             | 0.0              | 875       | 739              | 0.0              |           |                  |                  |

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### Melanopic Flux vs. Wavelength



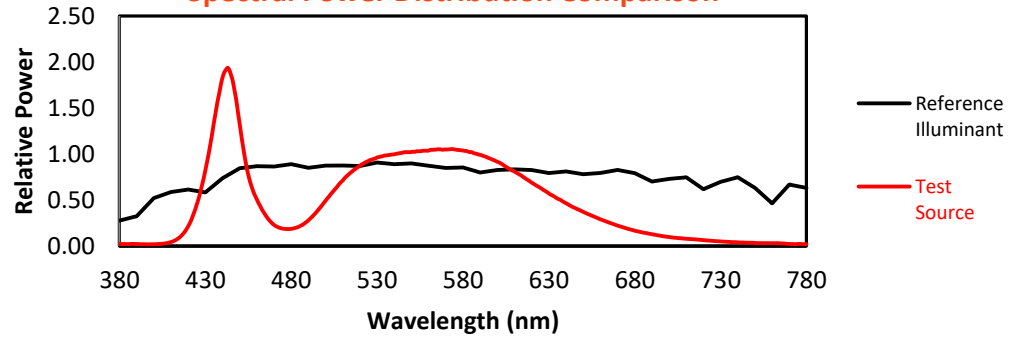
**Melanopic Lumens: 4010.3**      **S/P: 1.85**

| 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       | 828              | 0.0              | 490       | 9471             | 7.9              | 620       | 23317            | 0.0              | 750       | 1157             | 0.0              | 880       | 1136             | 0.0              |
| 365       | 696              | 0.0              | 495       | 12752            | 10.5             | 625       | 21413            | 0.0              | 755       | 1067             | 0.0              | 885       | 773              | 0.0              |
| 370       | 807              | 0.0              | 500       | 16685            | 13.4             | 630       | 19344            | 0.0              | 760       | 1059             | 0.0              | 890       | 872              | 0.0              |
| 375       | 837              | 0.0              | 505       | 20565            | 15.8             | 635       | 17464            | 0.0              | 765       | 1009             | 0.0              | 895       | 891              | 0.0              |
| 380       | 757              | 0.0              | 510       | 24119            | 17.3             | 640       | 15745            | 0.0              | 770       | 774              | 0.0              | 900       | 807              | 0.0              |
| 385       | 706              | 0.0              | 515       | 27181            | 17.8             | 645       | 14060            | 0.0              | 775       | 761              | 0.0              | 905       | 899              | 0.0              |
| 390       | 746              | 0.0              | 520       | 29555            | 17.2             | 650       | 12579            | 0.0              | 780       | 653              | 0.0              | 910       | 506              | 0.0              |
| 395       | 660              | 0.0              | 525       | 31307            | 15.9             | 655       | 11181            | 0.0              | 785       | 704              | 0.0              | 915       | 598              | 0.0              |
| 400       | 671              | 0.0              | 530       | 32558            | 14.1             | 660       | 9847             | 0.0              | 790       | 663              | 0.0              | 920       | 510              | 0.0              |
| 405       | 848              | 0.0              | 535       | 33301            | 12.0             | 665       | 8641             | 0.0              | 795       | 493              | 0.0              | 925       | 874              | 0.0              |
| 410       | 1490             | 0.1              | 540       | 33727            | 9.9              | 670       | 7535             | 0.0              | 800       | 584              | 0.0              | 930       | 549              | 0.0              |
| 415       | 3203             | 0.2              | 545       | 34356            | 8.0              | 675       | 6542             | 0.0              | 805       | 739              | 0.0              | 935       | 720              | 0.0              |
| 420       | 7298             | 0.8              | 550       | 34589            | 6.2              | 680       | 5664             | 0.0              | 810       | 601              | 0.0              | 940       | 754              | 0.0              |
| 425       | 15315            | 2.4              | 555       | 34855            | 4.7              | 685       | 4962             | 0.0              | 815       | 677              | 0.0              | 945       | 931              | 0.0              |
| 430       | 27886            | 5.9              | 560       | 35083            | 3.5              | 690       | 4369             | 0.0              | 820       | 726              | 0.0              | 950       | 811              | 0.0              |
| 435       | 45485            | 12.1             | 565       | 35553            | 2.5              | 695       | 3785             | 0.0              | 825       | 693              | 0.0              | 955       | 955              | 0.0              |
| 440       | 61965            | 20.7             | 570       | 35511            | 1.7              | 700       | 3318             | 0.0              | 830       | 619              | 0.0              | 960       | 1025             | 0.0              |
| 445       | 62721            | 24.7             | 575       | 35515            | 1.2              | 705       | 2962             | 0.0              | 835       | 738              | 0.0              | 965       | 916              | 0.0              |
| 450       | 44754            | 20.6             | 580       | 35114            | 0.8              | 710       | 2689             | 0.0              | 840       | 681              | 0.0              | 970       | 695              | 0.0              |
| 455       | 26152            | 13.7             | 585       | 34546            | 0.5              | 715       | 2476             | 0.0              | 845       | 691              | 0.0              | 975       | 568              | 0.0              |
| 460       | 17101            | 10.1             | 590       | 33522            | 0.3              | 720       | 2192             | 0.0              | 850       | 710              | 0.0              | 980       | 643              | 0.0              |
| 465       | 11400            | 7.4              | 595       | 32326            | 0.2              | 725       | 1939             | 0.0              | 855       | 1025             | 0.0              | 985       | 804              | 0.0              |
| 470       | 7763             | 5.6              | 600       | 30973            | 0.1              | 730       | 1698             | 0.0              | 860       | 889              | 0.0              | 990       | 812              | 0.0              |
| 475       | 6419             | 4.9              | 605       | 29160            | 0.1              | 735       | 1533             | 0.0              | 865       | 885              | 0.0              | 995       | 496              | 0.0              |
| 480       | 6330             | 5.1              | 610       | 27373            | 0.0              | 740       | 1375             | 0.0              | 870       | 905              | 0.0              | 1000      | 659              | 0.0              |
| 485       | 7299             | 6.0              | 615       | 25423            | 0.0              | 745       | 1254             | 0.0              | 875       | 739              | 0.0              |           |                  |                  |

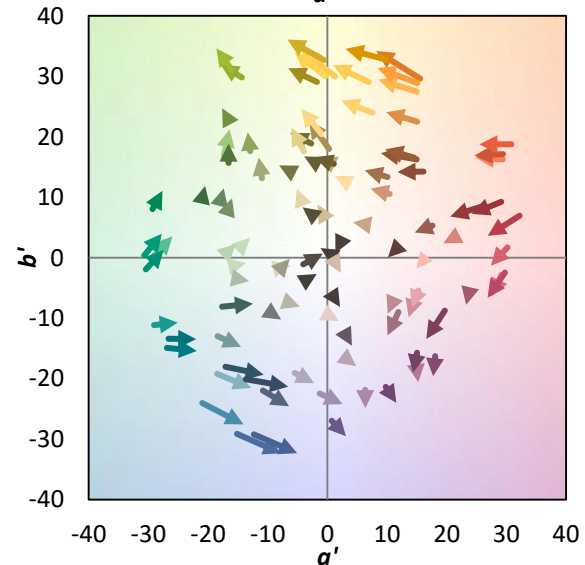
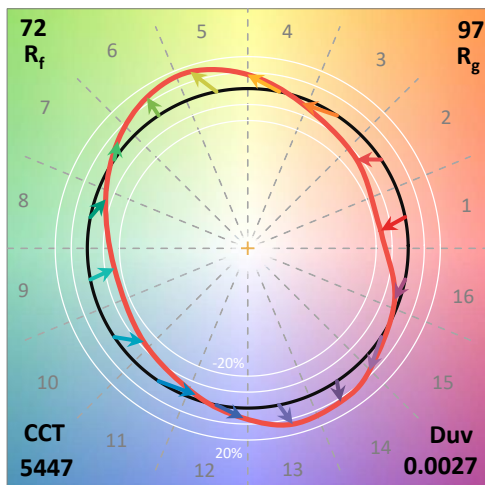
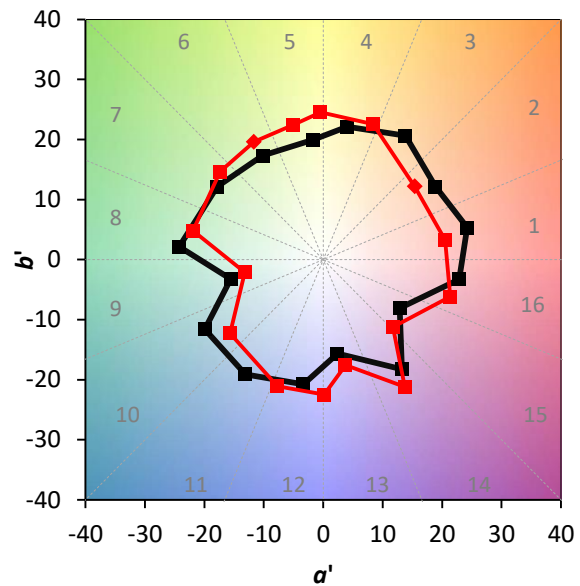
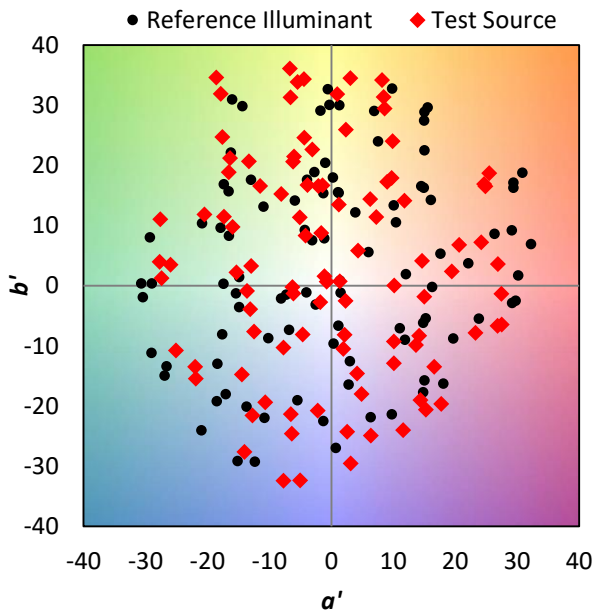
### Summary

$R_f = 72.3$   
 $R_g = 97.2$   
 CIE  $R_a = 71.9$   
 $R_g = -27.5$

### Spectral Power Distribution Comparison

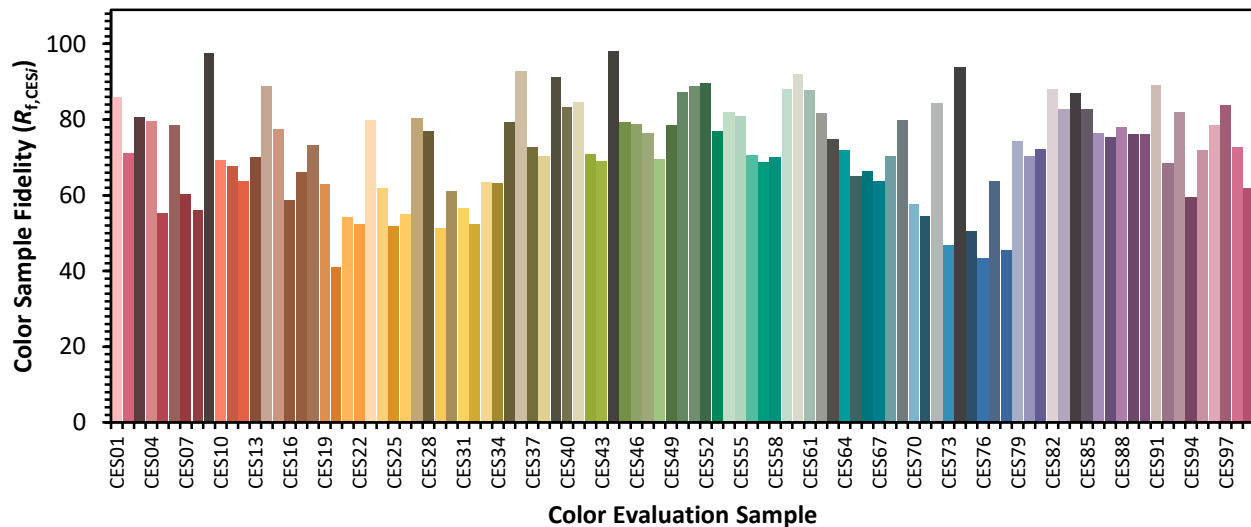


### Color Vector Graphics

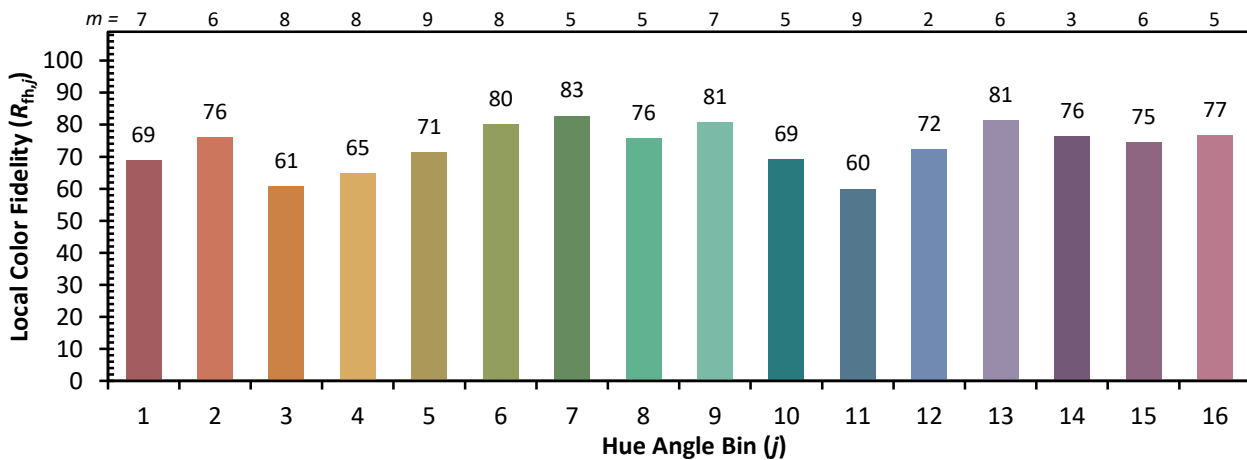
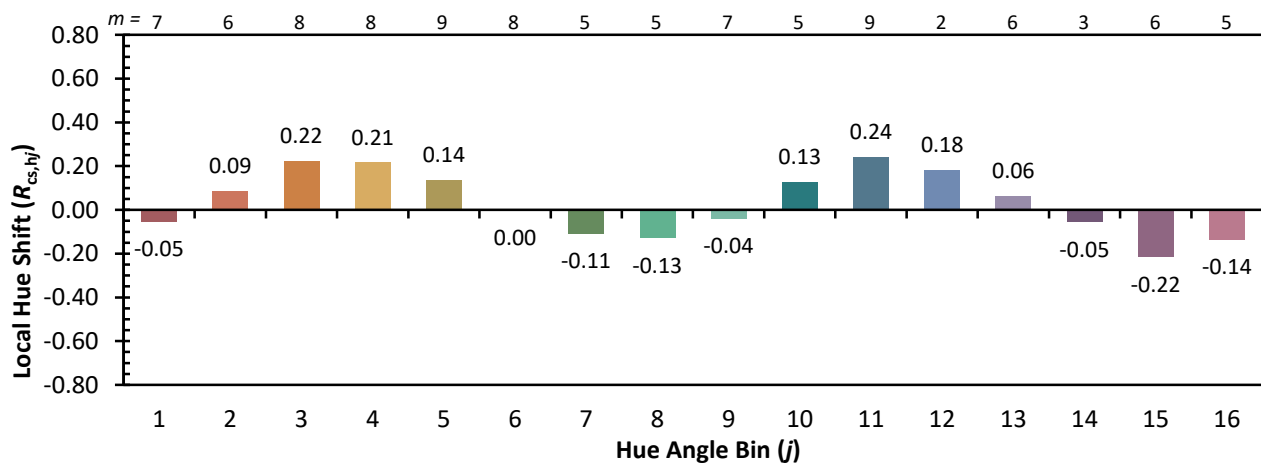
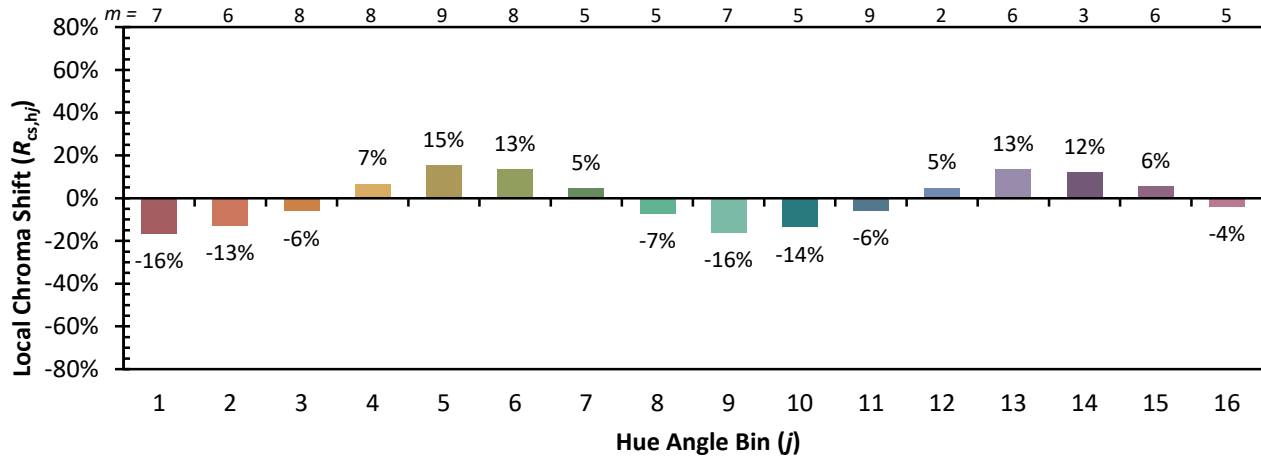


**Individual Sample Fidelity Index ( $R_{f,i}$ )**

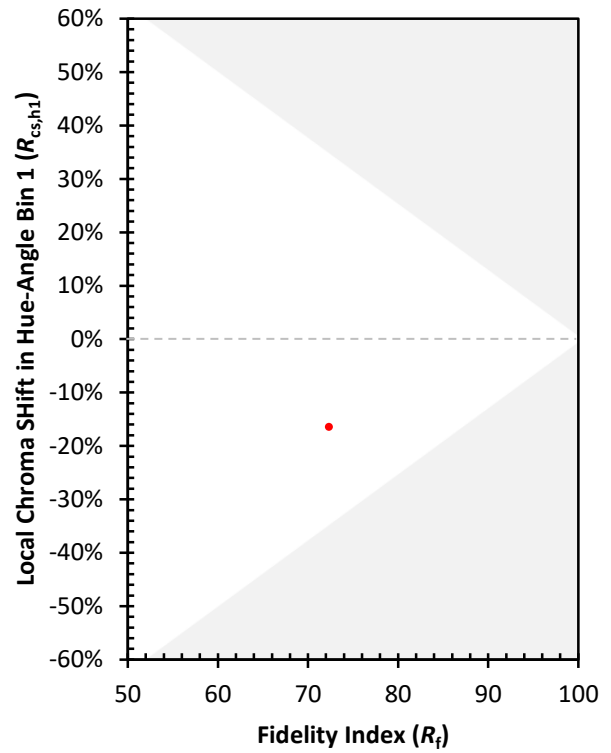
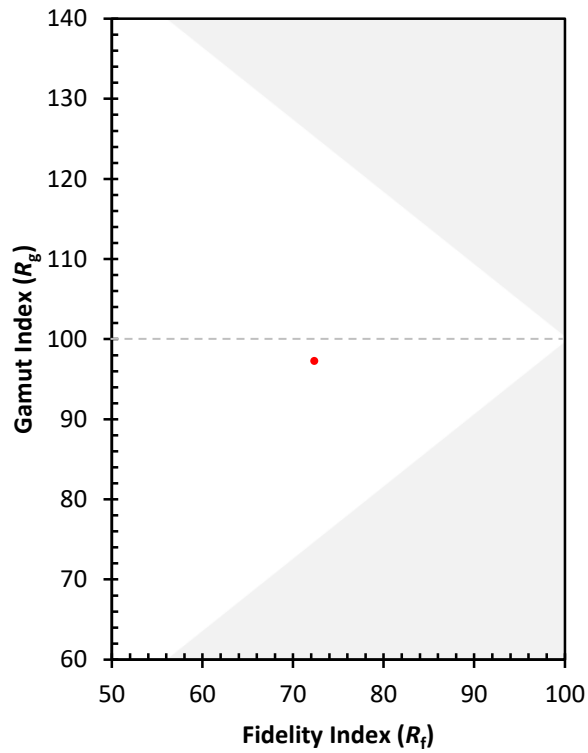
|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 85 | CES26 = 55 | CES51 = 89 | CES76 = 43 |
| CES02 = 59 | CES27 = 80 | CES52 = 90 | CES77 = 64 |
| CES03 = 30 | CES28 = 77 | CES53 = 77 | CES78 = 46 |
| CES04 = 69 | CES29 = 51 | CES54 = 82 | CES79 = 74 |
| CES05 = 46 | CES30 = 61 | CES55 = 81 | CES80 = 70 |
| CES06 = 50 | CES31 = 56 | CES56 = 71 | CES81 = 72 |
| CES07 = 38 | CES32 = 52 | CES57 = 69 | CES82 = 88 |
| CES08 = 38 | CES33 = 63 | CES58 = 70 | CES83 = 83 |
| CES09 = 29 | CES34 = 63 | CES59 = 88 | CES84 = 87 |
| CES10 = 72 | CES35 = 79 | CES60 = 92 | CES85 = 83 |
| CES11 = 55 | CES36 = 93 | CES61 = 88 | CES86 = 76 |
| CES12 = 61 | CES37 = 73 | CES62 = 82 | CES87 = 75 |
| CES13 = 41 | CES38 = 70 | CES63 = 75 | CES88 = 78 |
| CES14 = 74 | CES39 = 91 | CES64 = 72 | CES89 = 76 |
| CES15 = 70 | CES40 = 83 | CES65 = 65 | CES90 = 76 |
| CES16 = 46 | CES41 = 85 | CES66 = 66 | CES91 = 89 |
| CES17 = 48 | CES42 = 71 | CES67 = 64 | CES92 = 69 |
| CES18 = 55 | CES43 = 69 | CES68 = 70 | CES93 = 82 |
| CES19 = 71 | CES44 = 98 | CES69 = 80 | CES94 = 60 |
| CES20 = 64 | CES45 = 79 | CES70 = 58 | CES95 = 72 |
| CES21 = 85 | CES46 = 79 | CES71 = 54 | CES96 = 79 |
| CES22 = 77 | CES47 = 76 | CES72 = 84 | CES97 = 84 |
| CES23 = 91 | CES48 = 69 | CES73 = 47 | CES98 = 73 |
| CES24 = 90 | CES49 = 79 | CES74 = 94 | CES99 = 62 |
| CES25 = 71 | CES50 = 87 | CES75 = 50 |            |



Color Rendition by Hue-Angle Bin



**Measure Comparisons**



(END OF REPORT)