

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: P674494

Luminaire Tested: **CCP-SA-1D-850-U-AFL-HSS**

Issue Date: 04/16/2023

**Test Information**

Test Method: LM-79-08  
Report Number: P674494  
Test Lab: INNOVATION CENTER(G2)  
Issue Date: 04/16/2023  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: INVUE  
Catalog Number: CCP-SA-1D-850-U-AFL-HSS  
Description: INVUE CLEAR CURVE POLE MOUNT Light Square Luminaire @800mA w/ AFL  
distribution lens and House Side Shield  
Light Source: (16) 5000K CCT, 80 CRI LEDS  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 4035.5 lumens  
Efficiency: N/A  
Efficacy: 91.7 lumens/watt  
Luminous Opening: Rectangular (W 1' x L: 0.5' x H: 0')  
IES Classification: Type II - Short  
BUG Rating: B0 - U0 - G0

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

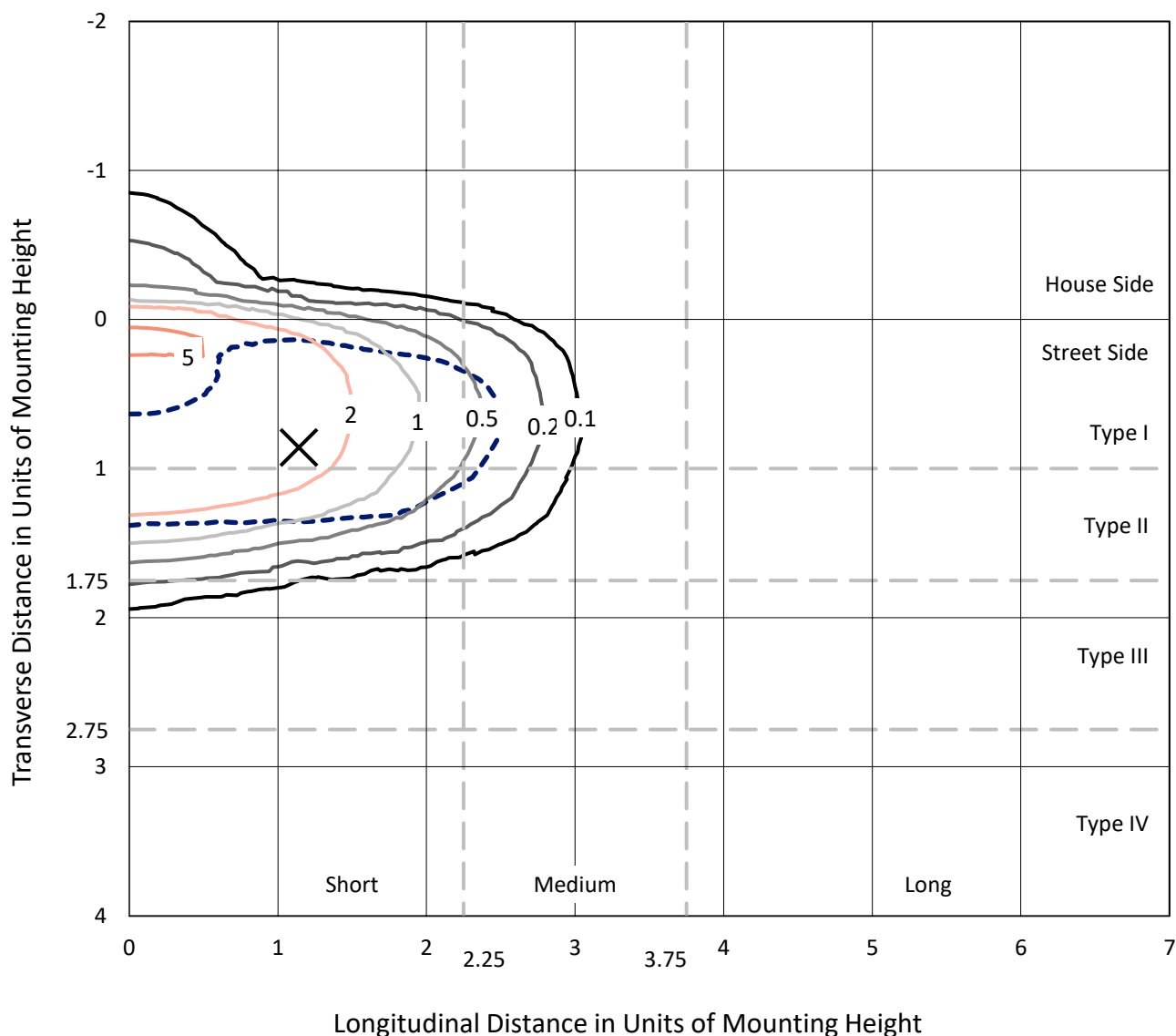
REPORT NUMBER: P674494

CATALOG NUMBER: CCP-SA-1D-850-U-AFL-HSS

## Iso-Footcandle Lines of Horizontal Illumination

× Max cd

--- 1/2 Max cd

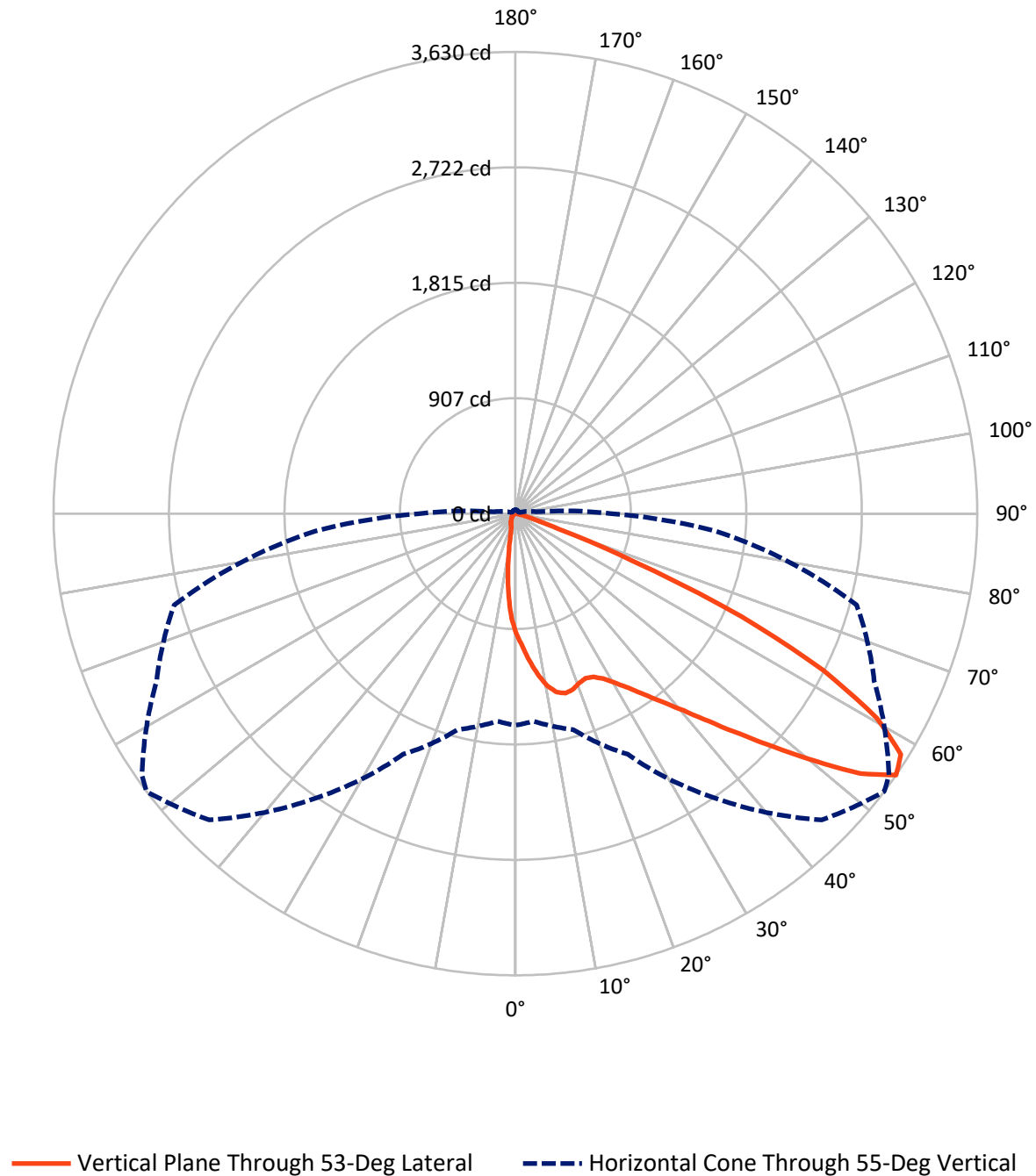


Based on 15 foot mounting height. Maximum calculated value = 6.1 fc

Type II - Short - N/A

REPORT NUMBER: P674494  
CATALOG NUMBER: CCP-SA-1D-850-U-AFL-HSS

## Luminous Intensity Polar Plot



REPORT NUMBER: P674494

CATALOG NUMBER: CCP-SA-1D-850-U-AFL-HSS

**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total  |
|--------------------|-----------|----------|--------|--------|
| <b>House Side</b>  | Lumens    | 218.1    | 0.0    | 218.1  |
|                    | % Fixture | 5.4      | 0.0    | 5.4    |
| <b>Street Side</b> | Lumens    | 3817.4   | 0.0    | 3817.4 |
|                    | % Fixture | 94.6     | 0.0    | 94.6   |
| <b>Total</b>       | Lumens    | 4035.5   | 0.0    | 4035.5 |
|                    | % Fixture | 100.0    | 0.0    | 100.0  |

**ZONAL LUMENS:**

| Zone      | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10°    | 84.4   | 2.1       |
| 10°-20°   | 220.6  | 5.5       |
| 20°-30°   | 369.3  | 9.2       |
| 30°-40°   | 604.1  | 15.0      |
| 40°-50°   | 971.1  | 24.1      |
| 50°-60°   | 1096.4 | 27.2      |
| 60°-70°   | 584.8  | 14.5      |
| 70°-80°   | 96.1   | 2.4       |
| 80°-90°   | 8.6    | 0.2       |
| 90°-100°  | 0.0    | 0.0       |
| 100°-110° | 0.0    | 0.0       |
| 110°-120° | 0.0    | 0.0       |
| 120°-130° | 0.0    | 0.0       |
| 130°-140° | 0.0    | 0.0       |
| 140°-150° | 0.0    | 0.0       |
| 150°-160° | 0.0    | 0.0       |
| 160°-170° | 0.0    | 0.0       |
| 170°-180° | 0.0    | 0.0       |
| 0°-90°    | 4035.5 | 100.0     |
| 0°-180°   | 4035.5 | 100.0     |

**Coefficient of Utilization**



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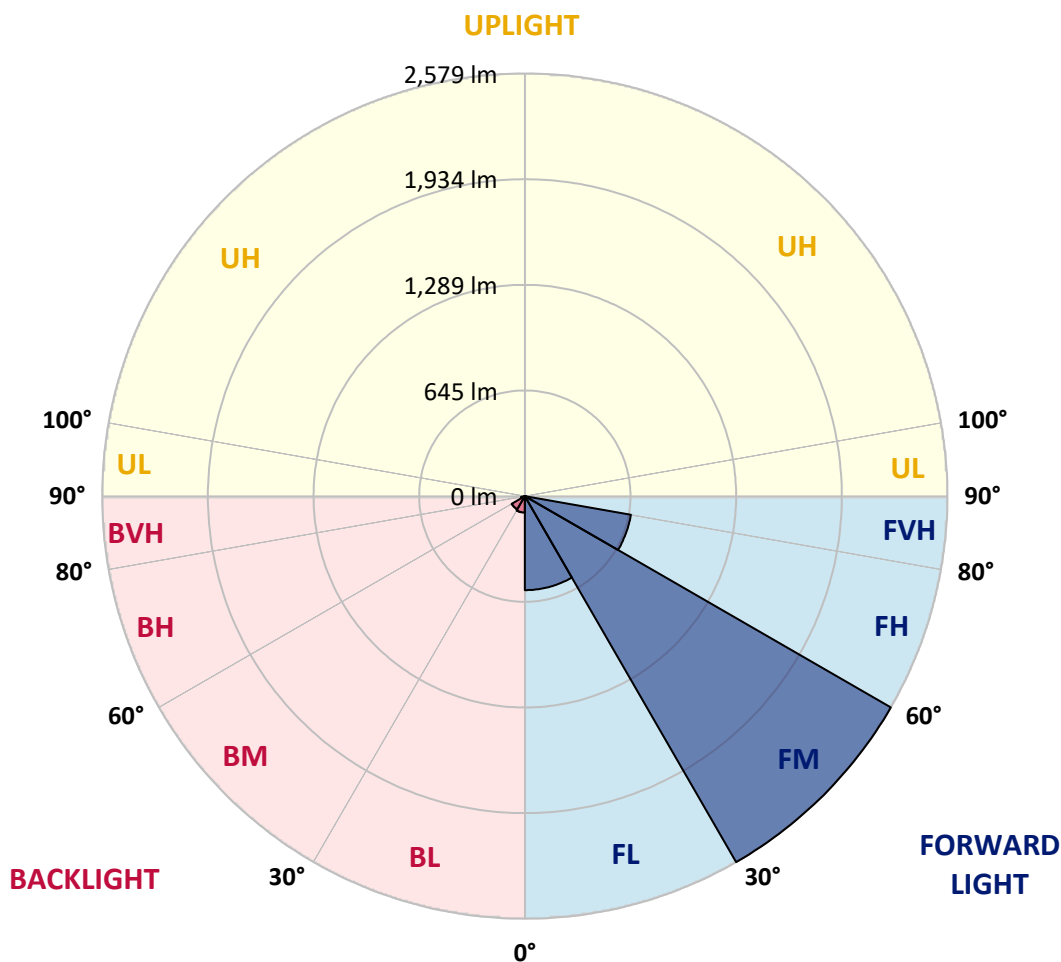
CATALOG NUMBER: CCP-SA-1D-850-U-AFL-HSS

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

| Zone |             | Lumens | % Fixture | Zone Rating/Lumen Limit |      |        |
|------|-------------|--------|-----------|-------------------------|------|--------|
|      |             |        |           | B                       | U    | G      |
| FL   | (0°-30°)    | 573.7  | 14.2      |                         |      |        |
| FM   | (30°-60°)   | 2578.7 | 63.9      |                         |      |        |
| FH   | (60°-80°)   | 657.1  | 16.3      |                         |      | G0/660 |
| FVH  | (80°-90°)   | 7.9    | 0.2       |                         |      | G0/10  |
| BL   | (0°-30°)    | 100.7  | 2.5       | B0/110                  |      |        |
| BM   | (30°-60°)   | 92.9   | 2.3       | B0/220                  |      |        |
| BH   | (60°-80°)   | 23.8   | 0.6       | B0/110                  |      | G0/110 |
| BVH  | (80°-90°)   | 0.7    | 0.0       |                         |      | G0/10  |
| UL   | (90°-100°)  | 0.0    | 0.0       |                         | U0/0 |        |
| UH   | (100°-180°) | 0.0    | 0.0       |                         | U0/0 |        |

**BUG Rating: B0-U0-G0**

Type II Short





REPORT NUMBER: P674494

CATALOG NUMBER: CCP-SA-1D-850-U-AFL-HSS

**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 5°     | 15°    | 25°    | 35°    | 45°    | 53°    | 55°    | 65°    | 75°    | 85°    |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 944.4  | 944.4  | 944.4  | 944.4  | 944.4  | 944.4  | 944.4  | 944.4  | 944.4  | 944.4  | 944.4  |
| 2.5°  | 1132.5 | 1125.8 | 1129.7 | 1119.4 | 1100.7 | 1077.3 | 1042.3 | 1044.1 | 1016.5 | 992.5  | 959.3  |
| 5°    | 1319.5 | 1312.5 | 1310.4 | 1284.2 | 1258.0 | 1215.9 | 1164.0 | 1155.5 | 1104.9 | 1043.8 | 974.1  |
| 7.5°  | 1418.2 | 1412.2 | 1416.8 | 1407.2 | 1381.4 | 1343.2 | 1277.5 | 1271.1 | 1193.0 | 1100.3 | 997.8  |
| 10°   | 1372.9 | 1370.8 | 1390.3 | 1412.9 | 1433.7 | 1429.2 | 1376.5 | 1366.6 | 1278.9 | 1162.6 | 1022.2 |
| 12.5° | 1251.3 | 1258.0 | 1282.8 | 1324.5 | 1388.8 | 1449.3 | 1440.8 | 1442.6 | 1366.6 | 1230.1 | 1049.1 |
| 15°   | 1179.9 | 1188.0 | 1202.2 | 1223.7 | 1302.9 | 1410.4 | 1465.2 | 1482.9 | 1450.7 | 1305.4 | 1080.9 |
| 17.5° | 1173.9 | 1180.6 | 1182.7 | 1190.8 | 1237.2 | 1347.8 | 1455.3 | 1488.9 | 1525.7 | 1376.5 | 1116.6 |
| 20°   | 1220.2 | 1223.0 | 1221.2 | 1215.2 | 1231.9 | 1313.9 | 1424.2 | 1472.3 | 1587.6 | 1452.1 | 1148.1 |
| 22.5° | 1307.5 | 1303.3 | 1298.0 | 1275.7 | 1274.6 | 1323.4 | 1407.2 | 1457.4 | 1624.3 | 1514.7 | 1168.9 |
| 25°   | 1415.7 | 1406.9 | 1399.5 | 1368.0 | 1353.1 | 1373.3 | 1422.4 | 1462.7 | 1657.6 | 1575.5 | 1183.8 |
| 27.5° | 1533.8 | 1536.6 | 1518.3 | 1475.8 | 1452.5 | 1448.2 | 1469.5 | 1499.5 | 1689.7 | 1630.0 | 1191.9 |
| 30°   | 1660.0 | 1661.5 | 1637.4 | 1593.6 | 1572.4 | 1545.1 | 1543.7 | 1561.7 | 1724.4 | 1692.6 | 1199.7 |
| 32.5° | 1803.9 | 1807.8 | 1768.6 | 1723.0 | 1685.8 | 1650.5 | 1633.2 | 1648.4 | 1786.6 | 1774.2 | 1215.6 |
| 35°   | 2011.8 | 1994.9 | 1941.8 | 1872.9 | 1820.2 | 1773.9 | 1747.4 | 1757.3 | 1869.4 | 1872.2 | 1247.4 |
| 37.5° | 2226.1 | 2224.3 | 2165.7 | 2066.3 | 1980.0 | 1922.4 | 1877.1 | 1893.4 | 1985.7 | 2003.4 | 1298.3 |
| 40°   | 2425.9 | 2430.5 | 2379.6 | 2292.9 | 2181.9 | 2082.9 | 2034.5 | 2045.4 | 2140.2 | 2162.5 | 1360.2 |
| 42.5° | 2556.4 | 2553.9 | 2557.8 | 2533.0 | 2421.6 | 2305.0 | 2232.1 | 2238.1 | 2319.8 | 2331.5 | 1437.6 |
| 45°   | 2616.5 | 2606.9 | 2640.1 | 2718.6 | 2674.4 | 2551.8 | 2468.7 | 2461.2 | 2506.1 | 2503.0 | 1508.0 |
| 47.5° | 2564.5 | 2546.8 | 2623.2 | 2812.3 | 2897.9 | 2860.8 | 2742.0 | 2728.5 | 2690.4 | 2664.9 | 1581.2 |
| 50°   | 2306.0 | 2298.2 | 2461.6 | 2767.8 | 3038.3 | 3146.5 | 3059.1 | 3009.3 | 2854.8 | 2784.4 | 1619.7 |
| 52.5° | 2060.3 | 2038.7 | 2149.0 | 2540.4 | 2975.7 | 3376.3 | 3394.3 | 3305.6 | 2991.2 | 2818.7 | 1606.6 |
| 55°   | 1664.3 | 1637.8 | 1758.0 | 2087.2 | 2727.8 | 3405.6 | 3629.8 | 3583.5 | 3110.8 | 2776.3 | 1580.1 |
| 57.5° | 1010.9 | 984.7  | 1161.5 | 1494.9 | 2181.6 | 3161.7 | 3571.8 | 3618.8 | 3202.7 | 2729.6 | 1562.8 |
| 60°   | 425.0  | 408.4  | 477.7  | 713.5  | 1393.1 | 2598.4 | 3264.2 | 3381.6 | 3220.0 | 2665.6 | 1569.9 |
| 62.5° | 221.0  | 213.6  | 217.4  | 285.7  | 563.2  | 1711.0 | 2716.9 | 2921.2 | 3045.3 | 2637.3 | 1576.9 |
| 65°   | 165.8  | 160.2  | 147.8  | 157.0  | 218.9  | 739.7  | 1952.4 | 2226.1 | 2666.7 | 2565.5 | 1529.2 |
| 67.5° | 136.1  | 130.8  | 122.0  | 119.2  | 129.1  | 256.7  | 996.7  | 1352.4 | 2089.6 | 2259.7 | 1358.1 |
| 70°   | 108.5  | 106.8  | 104.0  | 98.6   | 96.9   | 124.5  | 357.5  | 551.2  | 1381.8 | 1593.6 | 984.4  |
| 72.5° | 90.5   | 90.9   | 87.7   | 83.1   | 76.7   | 80.3   | 142.5  | 188.5  | 668.6  | 764.1  | 412.3  |
| 75°   | 75.7   | 75.7   | 76.7   | 70.4   | 64.0   | 55.2   | 79.2   | 91.9   | 214.6  | 176.4  | 88.0   |
| 77.5° | 59.4   | 60.1   | 64.7   | 59.4   | 51.3   | 34.7   | 43.1   | 49.1   | 63.6   | 50.9   | 32.2   |
| 80°   | 47.4   | 46.7   | 44.9   | 53.4   | 46.0   | 24.4   | 20.5   | 22.6   | 29.7   | 24.4   | 15.9   |
| 82.5° | 33.2   | 32.9   | 31.5   | 36.1   | 35.7   | 18.0   | 13.4   | 13.8   | 18.0   | 15.6   | 9.9    |
| 85°   | 8.1    | 9.5    | 20.2   | 17.0   | 14.9   | 10.6   | 8.1    | 8.8    | 11.7   | 10.3   | 5.3    |
| 87.5° | 3.5    | 3.5    | 9.2    | 11.0   | 7.1    | 4.6    | 3.5    | 3.9    | 6.0    | 6.0    | 3.2    |
| 90°   | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |

REPORT NUMBER: P674494

CATALOG NUMBER: CCP-SA-1D-850-U-AFL-HSS

**CANDELA DISTRIBUTION (continued):**

|       | 90°   | 95°   | 105°  | 115°  | 125°  | 135°  | 145°  | 155°  | 165°  | 175°  | 180°  |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 0°    | 944.4 | 944.4 | 944.4 | 944.4 | 944.4 | 944.4 | 944.4 | 944.4 | 944.4 | 944.4 | 944.4 |
| 2.5°  | 947.6 | 924.6 | 895.6 | 864.8 | 833.4 | 795.5 | 771.5 | 751.7 | 736.1 | 724.1 | 719.9 |
| 5°    | 951.1 | 906.9 | 841.2 | 759.5 | 676.4 | 598.6 | 538.5 | 493.9 | 457.2 | 437.0 | 428.2 |
| 7.5°  | 950.8 | 892.1 | 773.3 | 636.4 | 501.4 | 389.3 | 309.7 | 260.6 | 227.7 | 214.3 | 206.1 |
| 10°   | 950.4 | 872.6 | 695.8 | 500.0 | 335.2 | 225.6 | 166.2 | 138.6 | 126.6 | 122.0 | 121.3 |
| 12.5° | 960.7 | 850.3 | 609.2 | 368.1 | 210.4 | 140.4 | 115.6 | 109.3 | 106.4 | 105.0 | 104.7 |
| 15°   | 966.3 | 829.8 | 518.0 | 259.9 | 141.8 | 111.0 | 103.2 | 100.4 | 99.4  | 98.6  | 98.3  |
| 17.5° | 972.3 | 798.0 | 431.4 | 188.1 | 113.5 | 100.8 | 96.2  | 94.4  | 93.7  | 93.7  | 93.7  |
| 20°   | 973.4 | 763.7 | 345.4 | 138.6 | 100.8 | 94.1  | 89.5  | 87.7  | 86.6  | 85.9  | 85.9  |
| 22.5° | 965.6 | 723.1 | 271.5 | 112.4 | 93.3  | 87.7  | 82.7  | 79.9  | 78.1  | 77.8  | 77.8  |
| 25°   | 946.2 | 665.4 | 208.3 | 98.6  | 87.3  | 81.3  | 75.3  | 72.1  | 70.7  | 70.7  | 70.7  |
| 27.5° | 918.2 | 597.5 | 160.9 | 87.7  | 79.6  | 73.5  | 68.2  | 65.4  | 65.1  | 64.7  | 65.1  |
| 30°   | 886.4 | 532.1 | 123.0 | 77.8  | 70.4  | 65.4  | 61.2  | 59.8  | 60.5  | 60.5  | 60.8  |
| 32.5° | 854.6 | 466.7 | 96.2  | 70.0  | 62.2  | 58.0  | 55.9  | 55.9  | 56.9  | 56.9  | 56.9  |
| 35°   | 827.4 | 402.7 | 80.6  | 63.6  | 56.6  | 53.0  | 52.0  | 53.0  | 53.7  | 54.1  | 54.1  |
| 37.5° | 812.2 | 347.6 | 71.1  | 58.0  | 52.0  | 49.1  | 48.8  | 49.9  | 51.3  | 52.3  | 52.7  |
| 40°   | 806.5 | 305.1 | 65.4  | 53.7  | 47.7  | 46.0  | 45.6  | 47.0  | 49.5  | 51.3  | 51.6  |
| 42.5° | 806.9 | 267.7 | 60.5  | 49.5  | 44.9  | 42.4  | 42.4  | 44.6  | 47.0  | 48.8  | 48.8  |
| 45°   | 809.3 | 235.5 | 55.5  | 45.3  | 42.4  | 38.2  | 38.5  | 41.4  | 43.1  | 44.9  | 44.9  |
| 47.5° | 811.5 | 209.7 | 50.2  | 40.7  | 36.8  | 34.7  | 35.4  | 37.5  | 40.0  | 42.8  | 42.8  |
| 50°   | 799.1 | 191.3 | 44.9  | 35.7  | 32.2  | 31.5  | 32.9  | 34.7  | 38.2  | 41.0  | 41.4  |
| 52.5° | 769.4 | 174.7 | 40.3  | 31.8  | 29.0  | 29.3  | 31.1  | 32.2  | 35.0  | 35.4  | 35.7  |
| 55°   | 756.3 | 166.2 | 36.8  | 29.0  | 26.5  | 27.6  | 28.6  | 29.0  | 28.3  | 26.5  | 26.5  |
| 57.5° | 753.5 | 160.5 | 33.2  | 26.2  | 24.4  | 25.8  | 25.5  | 23.3  | 21.2  | 19.1  | 18.7  |
| 60°   | 756.3 | 152.7 | 30.4  | 22.6  | 22.3  | 22.6  | 21.6  | 17.7  | 14.9  | 13.4  | 12.7  |
| 62.5° | 740.0 | 141.4 | 27.9  | 19.4  | 19.4  | 19.1  | 16.3  | 12.0  | 9.5   | 8.5   | 8.1   |
| 65°   | 686.3 | 119.2 | 25.5  | 16.3  | 15.9  | 15.2  | 11.0  | 8.1   | 6.4   | 5.3   | 5.0   |
| 67.5° | 580.6 | 92.3  | 23.0  | 13.4  | 12.7  | 10.6  | 7.1   | 5.3   | 3.5   | 3.2   | 2.8   |
| 70°   | 396.0 | 57.3  | 19.4  | 10.6  | 9.5   | 6.7   | 4.2   | 3.2   | 2.1   | 1.8   | 1.4   |
| 72.5° | 143.6 | 33.2  | 16.3  | 8.1   | 6.4   | 4.2   | 2.5   | 1.4   | 1.1   | 1.1   | 0.7   |
| 75°   | 33.9  | 23.3  | 12.4  | 6.0   | 4.2   | 2.5   | 1.4   | 1.1   | 0.7   | 0.7   | 0.4   |
| 77.5° | 15.6  | 18.0  | 8.1   | 3.5   | 2.8   | 1.8   | 1.1   | 0.7   | 0.4   | 0.4   | 0.0   |
| 80°   | 8.8   | 12.7  | 3.9   | 2.5   | 2.1   | 1.4   | 0.7   | 0.4   | 0.4   | 0.0   | 0.0   |
| 82.5° | 4.6   | 7.1   | 2.8   | 2.1   | 1.8   | 1.1   | 0.7   | 0.0   | 0.0   | 0.0   | 0.0   |
| 85°   | 3.2   | 3.5   | 2.1   | 1.8   | 1.4   | 1.1   | 0.7   | 0.0   | 0.0   | 0.0   | 0.0   |
| 87.5° | 2.5   | 2.5   | 2.1   | 1.8   | 1.4   | 1.1   | 0.4   | 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: SP1-2104-224-9

Luminaire Tested: CCW-SA-2A-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**



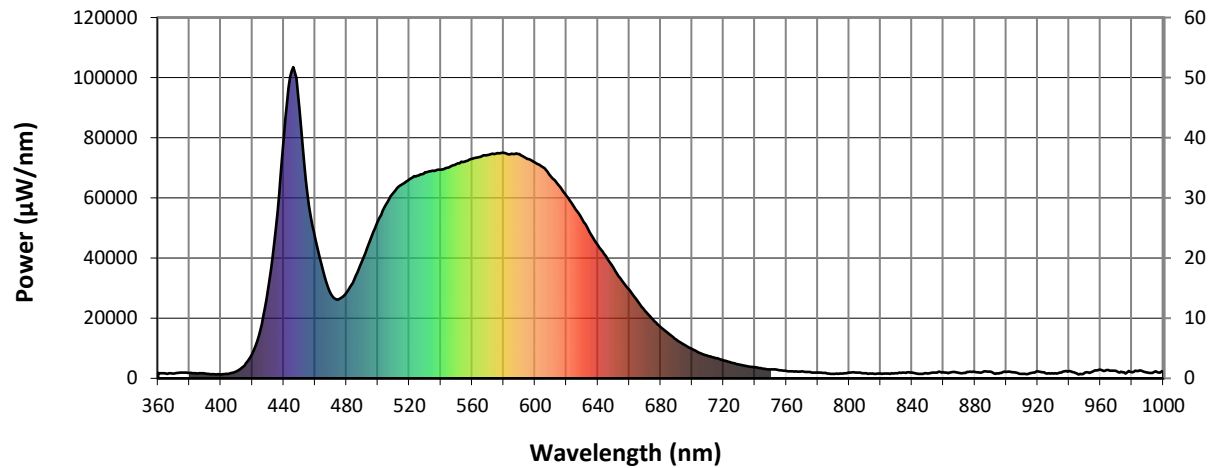
**CIE 1931 Chromaticity Diagram with 2017 ANSI 7-Step and 4-Step Quadrangles**



Point lies inside the ANSI 5000K 7-step quadrangle

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### Photopic Flux vs. Wavelength

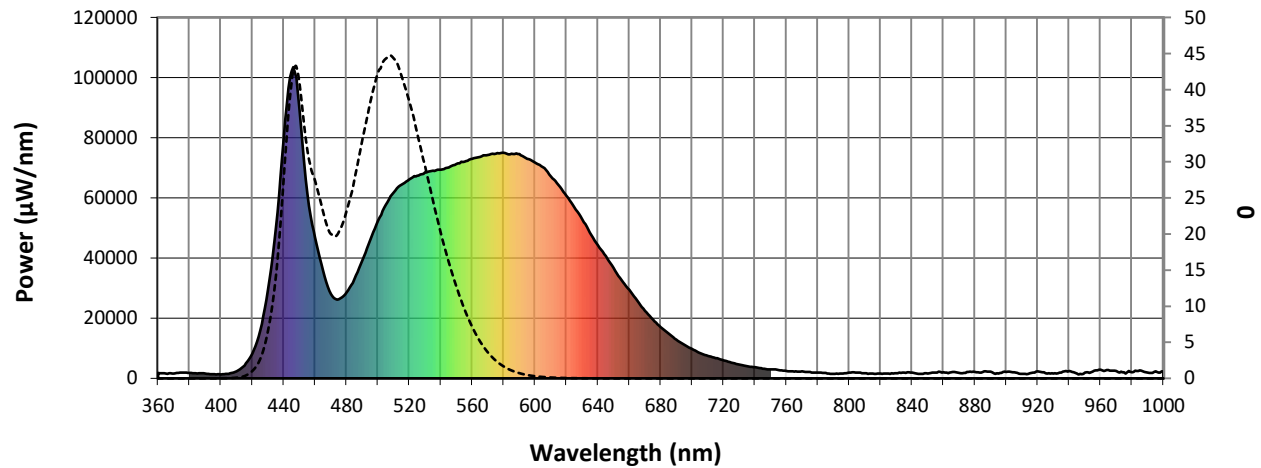


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| λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) |
|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|
| 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              |           |                  |                  |

REPORT NUMBER: SP1-2104-224-9

### Scotopic Flux vs. Wavelength



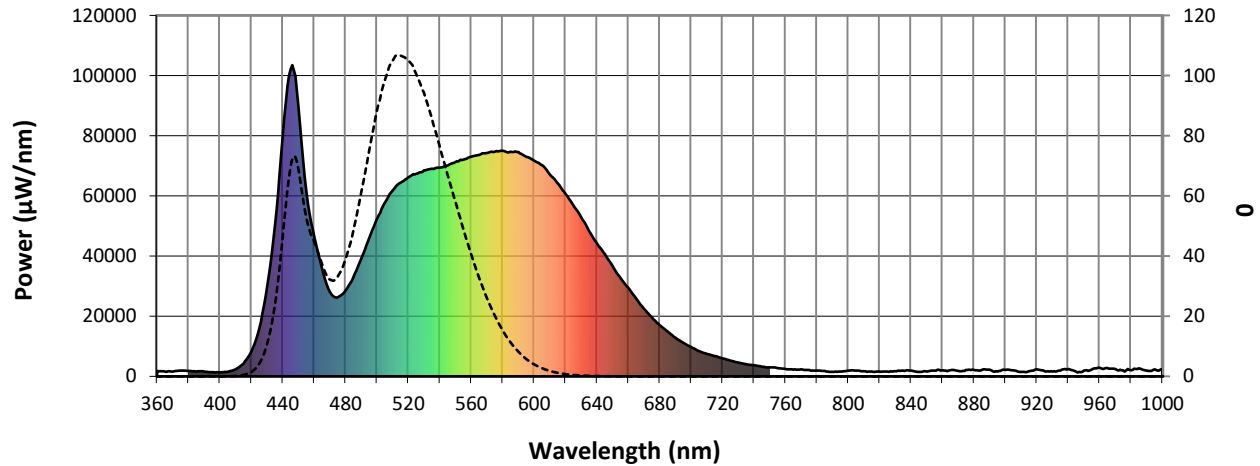
Scotopic Lumens: 9262.6

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              |           |                  |                  |

REPORT NUMBER: SP1-2104-224-9

### 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              |           |                  |                  |

REPORT NUMBER: SP1-2104-224-9

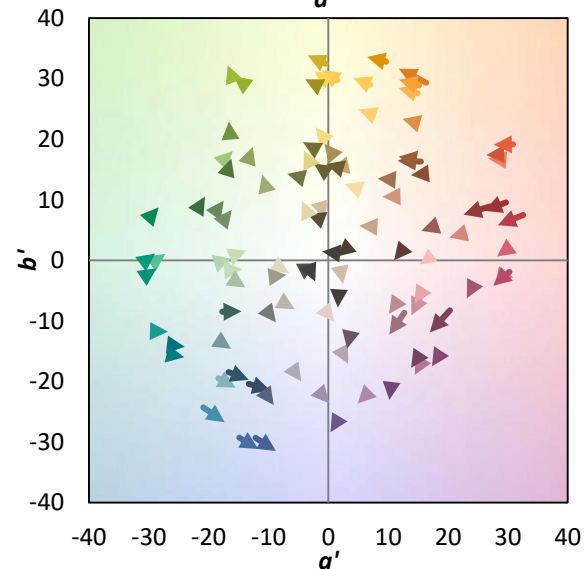
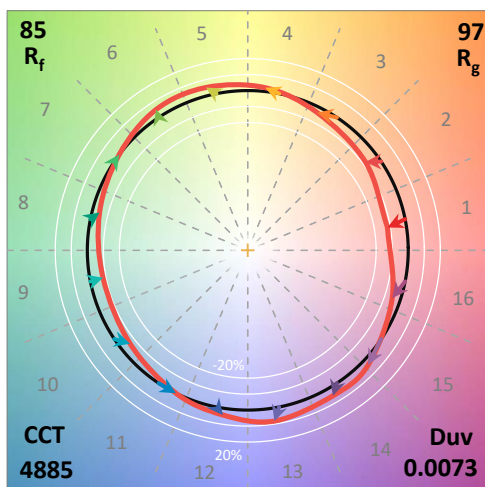
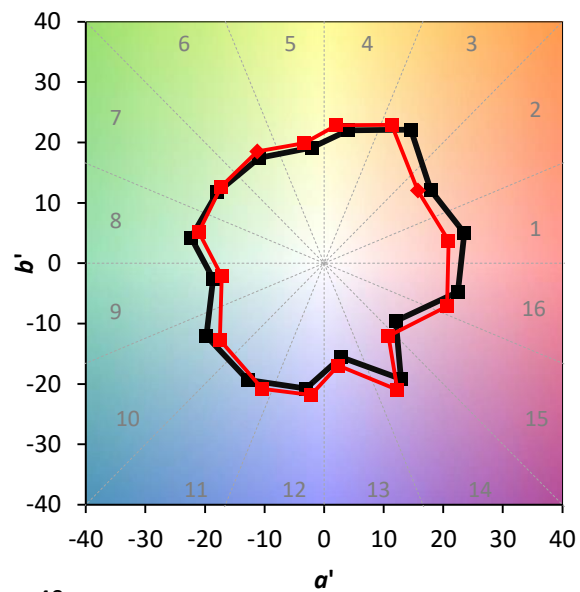
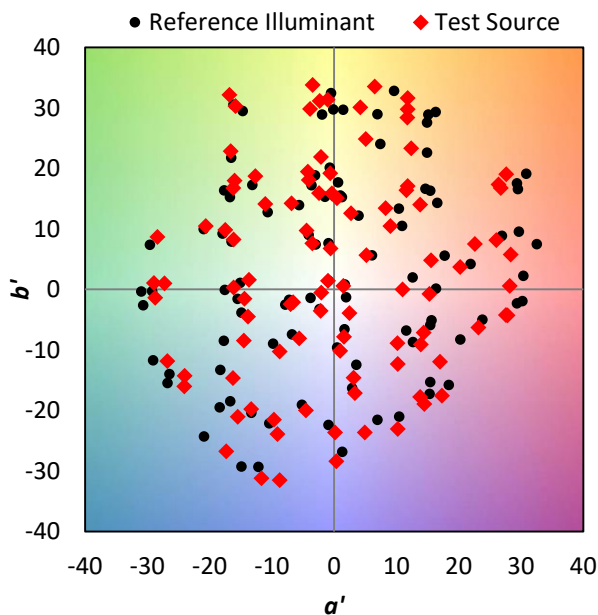
TM-30-18

### Summary

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

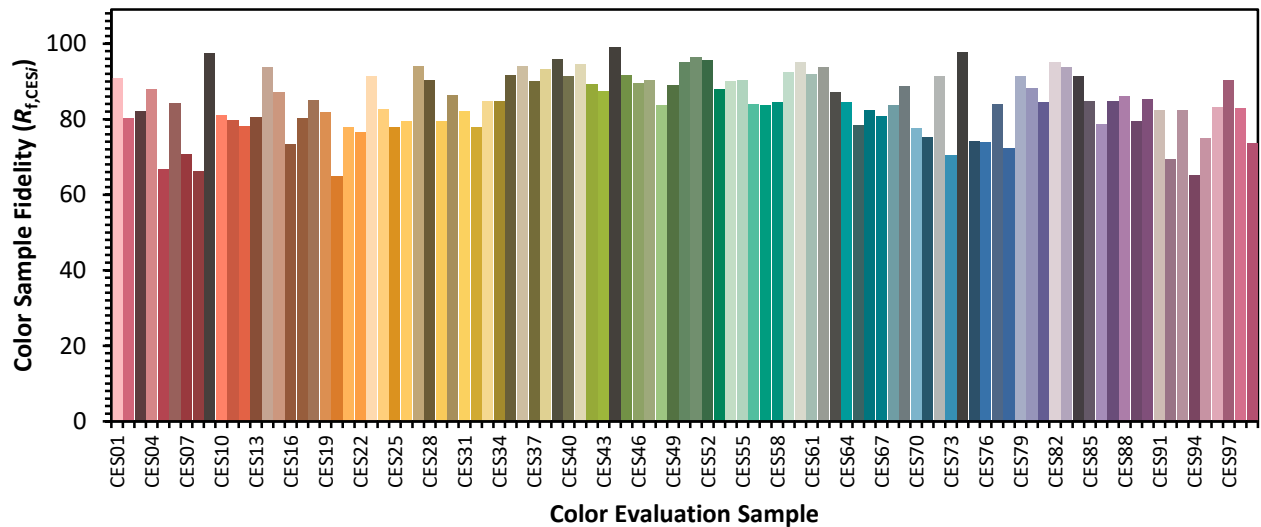


### Color Vector Graphics



**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)