

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: P672002

Luminaire Tested: **CCP-SA-1D-827-U-AFL**

Issue Date: 04/16/2023

**Test Information**

Test Method: LM-79-08  
Report Number: P672002  
Test Lab: INNOVATION CENTER(G2)  
Issue Date: 04/16/2023  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: INVUE  
Catalog Number: CCP-SA-1D-827-U-AFL  
Description: INVUE CLEAR CURVE POLE MOUNT LIGHT SQUARE LUMINAIRE @800mA w/ AFL  
distribution lens  
Light Source: (16) 2700K CCT, 80 CRI LEDS  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 4137.1 lumens  
Efficiency: N/A  
Efficacy: 94.0 lumens/watt  
Luminous Opening: Rectangular (W 1' x L: 0.5' x H: 0')  
IES Classification: Type II - Short  
BUG Rating: B1 - U0 - G1

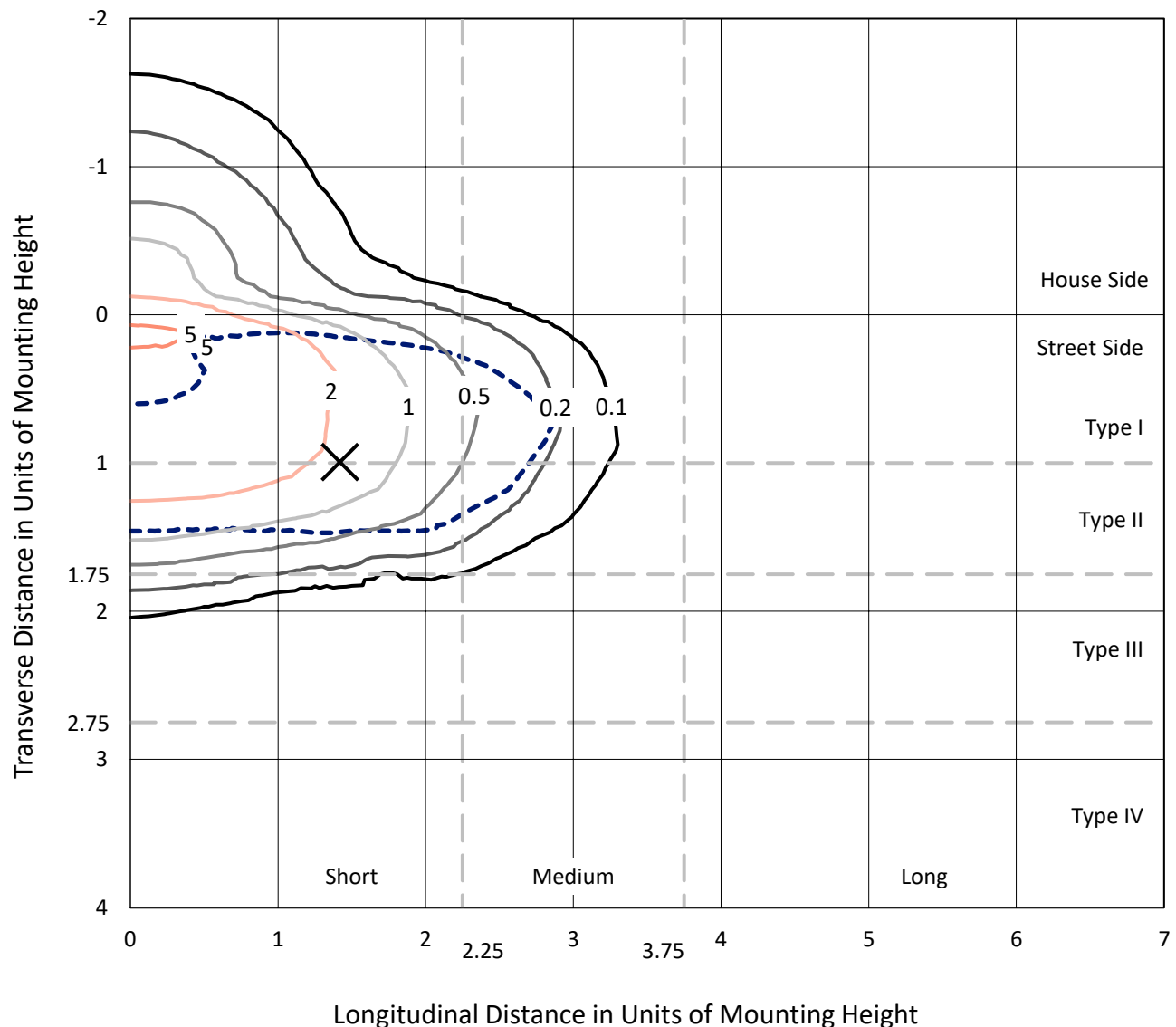
Input Watts (W): 44  
Input Voltage (V): 120  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: NR  
Total Harmonic Distortion (THDi): NR  
Frequency (hertz): 60  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 25 FT

REPORT NUMBER: P672002

CATALOG NUMBER: CCP-SA-1D-827-U-AFL

## Iso-Footcandle Lines of Horizontal Illumination

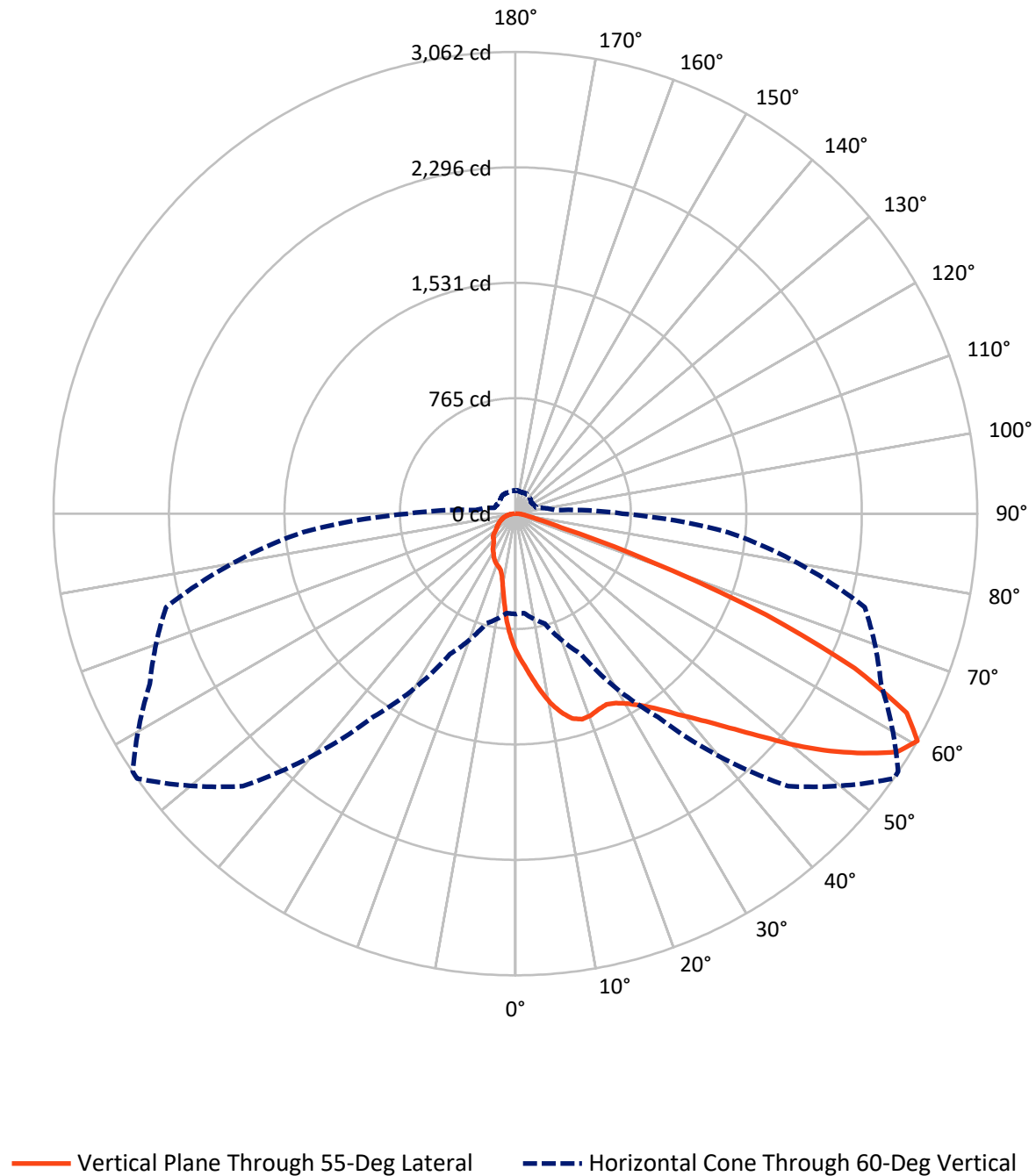
× Max cd  
 - - - 1/2 Max cd



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

REPORT NUMBER: P672002  
CATALOG NUMBER: CCP-SA-1D-827-U-AFL

## Luminous Intensity Polar Plot



REPORT NUMBER: P672002

CATALOG NUMBER: CCP-SA-1D-827-U-AFL

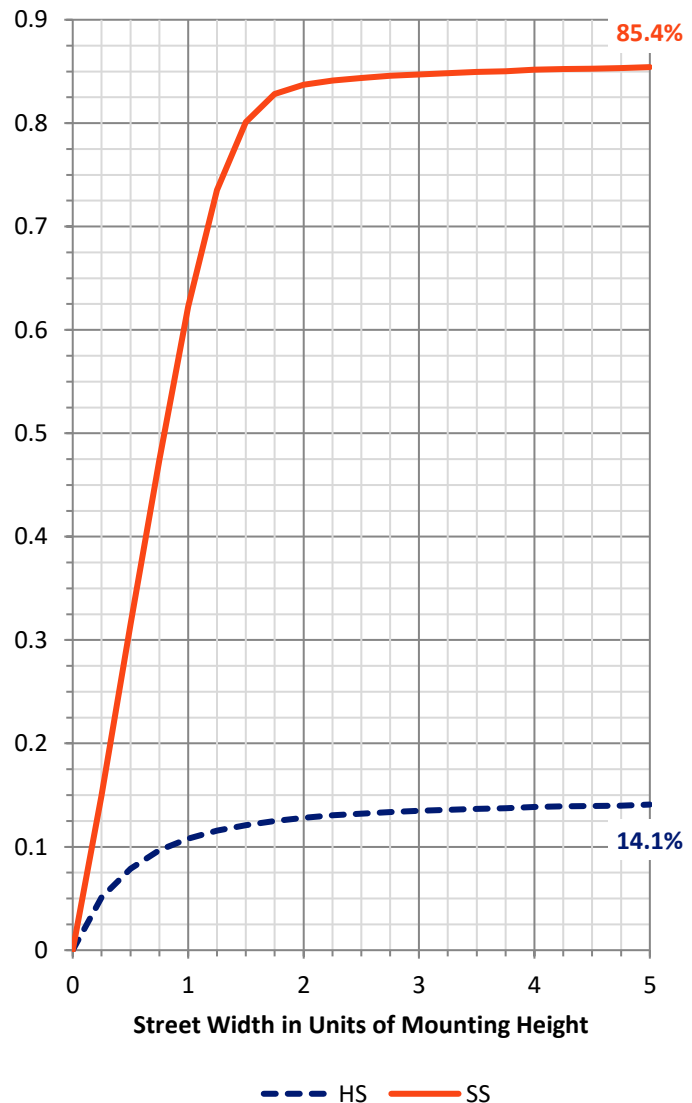
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total  |
|--------------------|-----------|----------|--------|--------|
| <b>House Side</b>  | Lumens    | 594.7    | 0.0    | 594.7  |
|                    | % Fixture | 14.4     | 0.0    | 14.4   |
| <b>Street Side</b> | Lumens    | 3542.4   | 0.0    | 3542.4 |
|                    | % Fixture | 85.6     | 0.0    | 85.6   |
| <b>Total</b>       | Lumens    | 4137.1   | 0.0    | 4137.1 |
|                    | % Fixture | 100.0    | 0.0    | 100.0  |

**Coefficient of Utilization**

**ZONAL LUMENS:**

| Zone      | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10°    | 85.9   | 2.1       |
| 10°-20°   | 243.3  | 5.9       |
| 20°-30°   | 396.1  | 9.6       |
| 30°-40°   | 592.0  | 14.3      |
| 40°-50°   | 870.1  | 21.0      |
| 50°-60°   | 1019.8 | 24.6      |
| 60°-70°   | 672.4  | 16.3      |
| 70°-80°   | 214.1  | 5.2       |
| 80°-90°   | 43.6   | 1.1       |
| 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°    | 4137.1 | 100.0     |
| 0°-180°   | 4137.1 | 100.0     |



REPORT NUMBER: P672002

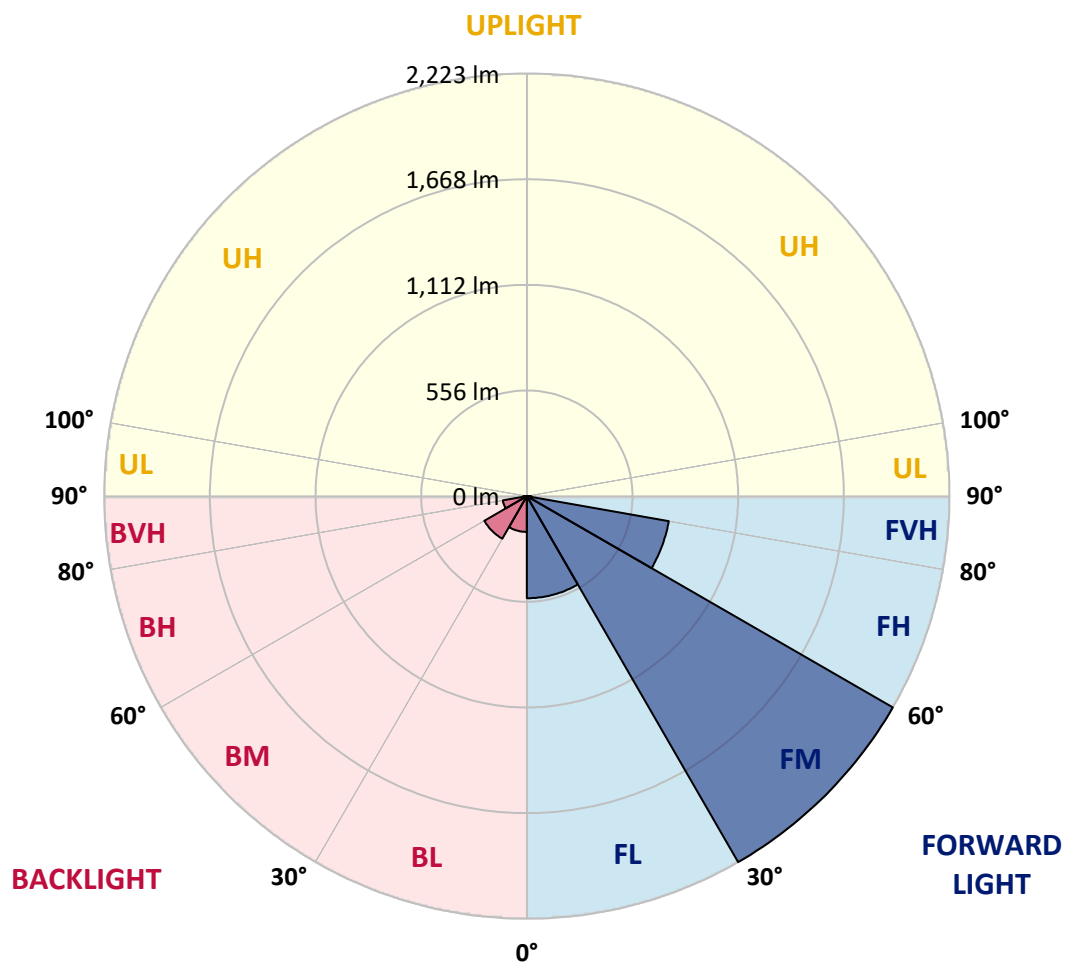
CATALOG NUMBER: CCP-SA-1D-827-U-AFL

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

| Zone |             | Lumens | % Fixture | Zone Rating/Lumen Limit |      |         |
|------|-------------|--------|-----------|-------------------------|------|---------|
|      |             |        |           | B                       | U    | G       |
| FL   | (0°-30°)    | 537.0  | 13.0      |                         |      |         |
| FM   | (30°-60°)   | 2223.4 | 53.7      |                         |      |         |
| FH   | (60°-80°)   | 758.2  | 18.3      |                         |      | G1/1800 |
| FVH  | (80°-90°)   | 23.9   | 0.6       |                         |      | G1/100  |
| BL   | (0°-30°)    | 188.3  | 4.6       | B1/500                  |      |         |
| BM   | (30°-60°)   | 258.5  | 6.2       | B1/1000                 |      |         |
| BH   | (60°-80°)   | 128.3  | 3.1       | B1/500                  |      | G1/500  |
| BVH  | (80°-90°)   | 19.7   | 0.5       |                         |      | G1/100  |
| UL   | (90°-100°)  | 0.0    | 0.0       |                         | U0/0 |         |
| UH   | (100°-180°) | 0.0    | 0.0       |                         | U0/0 |         |

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

Type II Short





REPORT NUMBER: P672002

CATALOG NUMBER: CCP-SA-1D-827-U-AFL

**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 5°     | 15°    | 25°    | 35°    | 45°    | 55°    | 56°    | 65°    | 75°    | 85°    |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 917.5  | 917.5  | 917.5  | 917.5  | 917.5  | 917.5  | 917.5  | 917.5  | 917.5  | 917.5  | 917.5  |
| 2.5°  | 1067.7 | 1063.8 | 1063.8 | 1053.9 | 1039.2 | 1018.9 | 994.6  | 988.6  | 979.3  | 955.6  | 925.0  |
| 5°    | 1230.5 | 1226.3 | 1220.7 | 1203.3 | 1176.0 | 1135.2 | 1083.9 | 1074.6 | 1041.3 | 992.5  | 937.3  |
| 7.5°  | 1338.2 | 1335.8 | 1334.0 | 1319.0 | 1292.0 | 1251.8 | 1183.2 | 1172.7 | 1116.3 | 1035.4 | 949.0  |
| 10°   | 1327.1 | 1334.3 | 1346.9 | 1357.4 | 1362.8 | 1342.1 | 1277.6 | 1265.3 | 1195.5 | 1085.1 | 966.4  |
| 12.5° | 1223.1 | 1233.2 | 1256.6 | 1299.5 | 1349.0 | 1388.9 | 1352.3 | 1345.4 | 1280.0 | 1137.9 | 988.3  |
| 15°   | 1145.7 | 1149.9 | 1161.3 | 1193.1 | 1266.8 | 1373.3 | 1410.2 | 1403.9 | 1358.9 | 1205.7 | 1013.5 |
| 17.5° | 1121.7 | 1123.5 | 1126.2 | 1136.7 | 1187.1 | 1312.4 | 1433.8 | 1439.8 | 1435.3 | 1276.1 | 1041.9 |
| 20°   | 1133.7 | 1134.9 | 1135.2 | 1137.0 | 1161.0 | 1261.4 | 1427.5 | 1437.7 | 1502.5 | 1346.6 | 1070.1 |
| 22.5° | 1179.9 | 1178.4 | 1176.3 | 1169.4 | 1182.9 | 1252.4 | 1410.8 | 1426.9 | 1554.4 | 1410.8 | 1096.2 |
| 25°   | 1260.5 | 1258.4 | 1243.7 | 1229.3 | 1235.0 | 1284.8 | 1401.8 | 1419.1 | 1594.9 | 1471.3 | 1115.4 |
| 27.5° | 1356.5 | 1354.4 | 1339.4 | 1312.1 | 1306.1 | 1338.8 | 1422.7 | 1433.5 | 1624.5 | 1525.0 | 1123.8 |
| 30°   | 1456.0 | 1456.0 | 1437.4 | 1406.0 | 1386.8 | 1400.6 | 1461.4 | 1470.1 | 1647.0 | 1576.9 | 1129.2 |
| 32.5° | 1564.6 | 1567.6 | 1538.8 | 1502.8 | 1481.5 | 1473.4 | 1515.7 | 1523.2 | 1679.7 | 1638.0 | 1140.6 |
| 35°   | 1704.0 | 1697.4 | 1662.3 | 1614.9 | 1580.8 | 1562.5 | 1582.9 | 1591.6 | 1727.7 | 1714.2 | 1158.9 |
| 37.5° | 1860.8 | 1849.1 | 1805.9 | 1749.3 | 1689.6 | 1659.0 | 1672.5 | 1674.6 | 1798.7 | 1813.4 | 1192.2 |
| 40°   | 1990.3 | 1988.2 | 1951.7 | 1898.0 | 1822.7 | 1781.7 | 1775.1 | 1776.3 | 1897.4 | 1931.0 | 1242.5 |
| 42.5° | 2099.5 | 2091.7 | 2085.1 | 2066.2 | 1986.4 | 1919.0 | 1892.0 | 1892.3 | 2004.4 | 2052.4 | 1293.2 |
| 45°   | 2147.8 | 2146.3 | 2165.8 | 2214.3 | 2157.1 | 2077.6 | 2039.2 | 2044.6 | 2127.1 | 2177.1 | 1342.1 |
| 47.5° | 2127.1 | 2128.3 | 2180.4 | 2307.9 | 2341.8 | 2280.9 | 2212.8 | 2209.5 | 2245.8 | 2272.8 | 1385.3 |
| 50°   | 1942.4 | 1961.9 | 2103.1 | 2316.6 | 2462.9 | 2493.2 | 2416.4 | 2404.1 | 2349.9 | 2349.0 | 1411.7 |
| 52.5° | 1802.9 | 1802.0 | 1888.7 | 2228.1 | 2505.8 | 2684.8 | 2615.8 | 2588.2 | 2435.9 | 2391.8 | 1413.8 |
| 55°   | 1614.6 | 1613.4 | 1677.9 | 1969.4 | 2420.6 | 2818.5 | 2803.8 | 2769.3 | 2514.8 | 2405.9 | 1399.4 |
| 57.5° | 1222.8 | 1245.5 | 1309.7 | 1576.6 | 2150.8 | 2797.2 | 2983.4 | 2954.6 | 2591.8 | 2399.6 | 1396.7 |
| 60°   | 665.3  | 662.6  | 755.6  | 1027.6 | 1646.7 | 2555.5 | 3061.7 | 3060.2 | 2673.7 | 2397.2 | 1413.2 |
| 62.5° | 306.7  | 303.7  | 322.3  | 457.6  | 944.2  | 2047.3 | 2910.6 | 2932.1 | 2749.5 | 2375.3 | 1411.7 |
| 65°   | 229.4  | 221.6  | 196.4  | 212.9  | 361.3  | 1222.2 | 2472.2 | 2529.8 | 2632.6 | 2285.4 | 1346.3 |
| 67.5° | 204.5  | 197.0  | 167.6  | 157.1  | 181.4  | 431.2  | 1793.3 | 1846.4 | 2201.4 | 2116.9 | 1240.4 |
| 70°   | 187.4  | 180.8  | 151.4  | 134.9  | 136.1  | 191.0  | 938.8  | 1043.1 | 1613.4 | 1766.7 | 1057.2 |
| 72.5° | 170.9  | 165.2  | 138.5  | 118.7  | 114.5  | 126.2  | 319.9  | 385.9  | 1003.6 | 1287.5 | 788.3  |
| 75°   | 153.5  | 148.1  | 124.7  | 106.4  | 98.3   | 93.6   | 152.3  | 164.0  | 530.7  | 710.9  | 423.1  |
| 77.5° | 133.4  | 130.4  | 111.2  | 93.9   | 87.0   | 70.8   | 101.3  | 106.4  | 227.3  | 279.2  | 201.5  |
| 80°   | 116.0  | 113.6  | 99.2   | 85.2   | 78.0   | 54.6   | 69.9   | 73.5   | 112.1  | 139.4  | 112.7  |
| 82.5° | 75.6   | 81.6   | 82.2   | 73.2   | 68.7   | 43.8   | 46.2   | 48.9   | 74.4   | 82.2   | 49.2   |
| 85°   | 31.2   | 37.8   | 56.7   | 50.4   | 47.7   | 37.2   | 30.6   | 31.2   | 45.6   | 48.0   | 17.7   |
| 87.5° | 14.1   | 15.6   | 27.9   | 28.2   | 24.6   | 14.1   | 15.3   | 16.8   | 23.4   | 23.1   | 7.8    |
| 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: P672002

CATALOG NUMBER: CCP-SA-1D-827-U-AFL

**CANDELA DISTRIBUTION (continued):**

|       | 90°   | 95°   | 105°  | 115°  | 125°  | 135°  | 145°  | 155°  | 165°  | 175°  | 180°  |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 0°    | 917.5 | 917.5 | 917.5 | 917.5 | 917.5 | 917.5 | 917.5 | 917.5 | 917.5 | 917.5 | 917.5 |
| 2.5°  | 916.6 | 902.8 | 878.2 | 846.8 | 824.3 | 807.8 | 789.8 | 776.6 | 761.9 | 749.0 | 751.1 |
| 5°    | 914.5 | 887.8 | 832.7 | 774.2 | 717.2 | 670.4 | 631.5 | 602.7 | 573.0 | 561.3 | 559.8 |
| 7.5°  | 916.3 | 871.0 | 780.5 | 684.8 | 598.2 | 538.5 | 493.2 | 466.0 | 448.9 | 439.0 | 439.6 |
| 10°   | 915.7 | 855.1 | 724.1 | 592.2 | 497.4 | 442.9 | 415.3 | 406.3 | 404.8 | 406.0 | 407.8 |
| 12.5° | 916.6 | 833.6 | 660.8 | 508.8 | 425.2 | 397.3 | 398.5 | 406.6 | 411.7 | 415.0 | 417.1 |
| 15°   | 920.5 | 815.9 | 596.1 | 443.2 | 387.4 | 388.3 | 401.2 | 413.8 | 421.3 | 424.9 | 426.7 |
| 17.5° | 926.2 | 793.7 | 538.5 | 393.4 | 371.5 | 385.3 | 402.1 | 415.6 | 421.3 | 423.4 | 424.9 |
| 20°   | 926.8 | 768.2 | 480.3 | 359.2 | 361.0 | 379.0 | 393.7 | 404.5 | 411.7 | 414.1 | 415.3 |
| 22.5° | 924.1 | 733.7 | 420.7 | 334.3 | 349.0 | 367.0 | 379.6 | 391.9 | 382.3 | 374.5 | 372.4 |
| 25°   | 912.7 | 690.2 | 369.7 | 313.9 | 334.0 | 350.8 | 365.2 | 351.7 | 347.2 | 341.2 | 341.8 |
| 27.5° | 888.1 | 636.0 | 321.7 | 294.7 | 316.3 | 340.3 | 329.8 | 328.0 | 322.3 | 316.3 | 316.3 |
| 30°   | 855.7 | 578.7 | 281.6 | 274.7 | 295.0 | 307.0 | 309.4 | 306.7 | 303.4 | 295.6 | 296.2 |
| 32.5° | 826.7 | 518.1 | 253.1 | 257.9 | 281.6 | 281.6 | 292.0 | 292.0 | 280.1 | 258.2 | 258.2 |
| 35°   | 797.9 | 461.2 | 232.1 | 243.8 | 259.4 | 264.5 | 278.9 | 260.0 | 242.9 | 233.0 | 232.4 |
| 37.5° | 775.4 | 412.6 | 218.3 | 231.8 | 237.8 | 250.7 | 251.0 | 237.2 | 231.5 | 222.5 | 221.6 |
| 40°   | 762.2 | 371.8 | 209.9 | 225.8 | 226.4 | 238.4 | 218.6 | 222.5 | 221.3 | 214.4 | 213.5 |
| 42.5° | 755.0 | 340.3 | 203.6 | 220.7 | 217.7 | 206.0 | 202.4 | 209.0 | 211.1 | 207.5 | 206.0 |
| 45°   | 749.3 | 315.7 | 198.5 | 203.0 | 210.8 | 189.5 | 188.0 | 193.1 | 197.6 | 197.3 | 196.1 |
| 47.5° | 746.3 | 298.6 | 194.0 | 191.9 | 193.4 | 179.6 | 176.6 | 179.0 | 184.7 | 188.3 | 188.0 |
| 50°   | 734.6 | 285.4 | 187.4 | 180.5 | 170.9 | 170.9 | 169.4 | 169.4 | 176.3 | 183.5 | 184.1 |
| 52.5° | 713.9 | 269.9 | 177.8 | 169.7 | 158.6 | 163.4 | 164.0 | 162.8 | 170.0 | 177.8 | 178.4 |
| 55°   | 691.1 | 258.2 | 164.9 | 159.8 | 148.4 | 156.5 | 159.2 | 158.0 | 162.8 | 168.2 | 167.9 |
| 57.5° | 691.4 | 257.9 | 153.8 | 149.9 | 138.8 | 147.8 | 154.4 | 154.7 | 154.4 | 158.3 | 158.3 |
| 60°   | 708.8 | 263.9 | 145.1 | 136.7 | 127.7 | 138.5 | 149.3 | 149.3 | 147.2 | 152.9 | 153.5 |
| 62.5° | 713.9 | 263.3 | 139.7 | 124.1 | 117.8 | 130.1 | 141.8 | 143.6 | 142.1 | 150.2 | 151.1 |
| 65°   | 668.9 | 249.2 | 134.3 | 112.7 | 108.8 | 120.8 | 132.5 | 137.6 | 136.1 | 146.6 | 147.8 |
| 67.5° | 606.6 | 230.9 | 125.9 | 102.5 | 99.5  | 111.8 | 122.9 | 128.3 | 128.0 | 141.8 | 142.4 |
| 70°   | 522.9 | 208.4 | 115.4 | 92.1  | 90.6  | 101.3 | 111.2 | 116.9 | 119.6 | 135.5 | 135.2 |
| 72.5° | 405.1 | 178.7 | 99.5  | 81.0  | 80.7  | 90.6  | 99.2  | 105.5 | 110.6 | 125.9 | 125.9 |
| 75°   | 261.2 | 140.6 | 81.3  | 70.2  | 69.0  | 78.3  | 87.3  | 94.4  | 110.0 | 134.3 | 134.0 |
| 77.5° | 159.5 | 107.3 | 65.4  | 58.5  | 58.2  | 66.6  | 75.6  | 87.9  | 120.2 | 119.6 | 116.3 |
| 80°   | 95.6  | 77.1  | 52.2  | 46.8  | 46.8  | 54.6  | 64.5  | 94.2  | 99.8  | 113.9 | 107.6 |
| 82.5° | 49.8  | 47.4  | 39.0  | 34.5  | 36.0  | 42.9  | 58.8  | 75.3  | 81.6  | 69.3  | 63.6  |
| 85°   | 20.4  | 25.2  | 24.0  | 21.9  | 22.8  | 29.7  | 56.7  | 60.3  | 48.3  | 50.7  | 51.0  |
| 87.5° | 6.9   | 11.1  | 11.1  | 8.7   | 9.6   | 21.0  | 33.6  | 20.1  | 24.3  | 14.4  | 10.8  |
| 90°   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |

Report Prepared for

Cooper Lighting Solutions

(formerly Eaton)

INVUE

Report Number: SP1-2104-224-5

Luminaire Tested: CCW-SA-2A-827-U-SL4

Test Date: 04/27/2021

### Test Information

Test Method: LM-79-08  
 Report Number: SP1-2104-224-5  
 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-827-U-SL4**  
 Description: INVUE WALL PACK ClearCurve Light Square

### Spectral Parameters

|                           |        |           |      |      |      |
|---------------------------|--------|-----------|------|------|------|
| CCT (K):                  | 2661   | CRI (Ra): | 82.2 |      |      |
| CIE u':                   | 0.2642 | R1:       | 80.7 | R9:  | 5.2  |
| CIE v':                   | 0.5282 | R2:       | 91.5 | R10: | 82.2 |
| Duv:                      | 0.0001 | R3:       | 94.9 | R11: | 81.4 |
| CIE x:                    | 0.4631 | R4:       | 80.7 | R12: | 80.4 |
| CIE y:                    | 0.4115 | R5:       | 81.5 | R13: | 83.2 |
| CIE z:                    | 0.1254 | R6:       | 91.6 | R14: | 97.8 |
| Peak Wavelength (nm):     | 606    | R7:       | 81.0 |      |      |
| Dominant Wavelength (nm): | 584    | R8:       | 56.0 |      |      |
| Purity:                   | 62.8   |           |      |      |      |
| Rf:                       | 85.3   |           |      |      |      |
| Rg:                       | 96.5   |           |      |      |      |



### Test Conditions

Stabilization Time: 163M  
 Operation Time: 12H  
 Room Temperature (°C) / RH%: 25.0/47%  
 Sphere Temperature (°C): 24.1

REPORT NUMBER: SP1-2104-224-5

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

REPORT NUMBER: SP1-2104-224-5

**CIE 1931 Chromaticity Diagram**



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



Point lies inside the ANSI 2700K 4-step quadrangle

REPORT NUMBER: SP1-2104-224-5

### 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       | 1379             | 0.0              | 490       | 19477            | 2.8              | 620       | 90616            | 23.6             | 750       | 4384             | 0.0              | 880       | 1655             | 0.0              |
| 365       | 1114             | 0.0              | 495       | 23200            | 4.2              | 625       | 87050            | 19.2             | 755       | 4013             | 0.0              | 885       | 1597             | 0.0              |
| 370       | 1169             | 0.0              | 500       | 26999            | 6.0              | 630       | 81805            | 14.8             | 760       | 3486             | 0.0              | 890       | 1696             | 0.0              |
| 375       | 1418             | 0.0              | 505       | 30185            | 8.4              | 635       | 76273            | 11.5             | 765       | 3111             | 0.0              | 895       | 1694             | 0.0              |
| 380       | 1358             | 0.0              | 510       | 33025            | 11.3             | 640       | 70276            | 8.4              | 770       | 2922             | 0.0              | 900       | 2016             | 0.0              |
| 385       | 1234             | 0.0              | 515       | 35307            | 14.6             | 645       | 65174            | 6.3              | 775       | 2649             | 0.0              | 905       | 1631             | 0.0              |
| 390       | 1133             | 0.0              | 520       | 37140            | 18.0             | 650       | 59417            | 4.3              | 780       | 2399             | 0.0              | 910       | 1506             | 0.0              |
| 395       | 1066             | 0.0              | 525       | 38834            | 20.8             | 655       | 53417            | 3.1              | 785       | 2386             | 0.0              | 915       | 1763             | 0.0              |
| 400       | 982              | 0.0              | 530       | 40401            | 23.8             | 660       | 48038            | 2.0              | 790       | 1912             | 0.0              | 920       | 1860             | 0.0              |
| 405       | 996              | 0.0              | 535       | 42121            | 26.1             | 665       | 42350            | 1.3              | 795       | 1902             | 0.0              | 925       | 1612             | 0.0              |
| 410       | 1276             | 0.0              | 540       | 43918            | 28.6             | 670       | 36925            | 0.8              | 800       | 2023             | 0.0              | 930       | 976              | 0.0              |
| 415       | 1798             | 0.0              | 545       | 46244            | 30.8             | 675       | 32385            | 0.5              | 805       | 1813             | 0.0              | 935       | 1702             | 0.0              |
| 420       | 2943             | 0.0              | 550       | 49225            | 33.5             | 680       | 28089            | 0.3              | 810       | 1888             | 0.0              | 940       | 1083             | 0.0              |
| 425       | 4989             | 0.0              | 555       | 52758            | 36.0             | 685       | 24306            | 0.2              | 815       | 1669             | 0.0              | 945       | 1672             | 0.0              |
| 430       | 8360             | 0.1              | 560       | 56904            | 38.7             | 690       | 20941            | 0.1              | 820       | 1558             | 0.0              | 950       | 2462             | 0.0              |
| 435       | 13537            | 0.2              | 565       | 61643            | 41.0             | 695       | 18065            | 0.1              | 825       | 1689             | 0.0              | 955       | 1958             | 0.0              |
| 440       | 21265            | 0.3              | 570       | 66872            | 43.5             | 700       | 15715            | 0.0              | 830       | 1632             | 0.0              | 960       | 2236             | 0.0              |
| 445       | 29496            | 0.6              | 575       | 72519            | 45.1             | 705       | 13502            | 0.0              | 835       | 1615             | 0.0              | 965       | 2541             | 0.0              |
| 450       | 30225            | 0.8              | 580       | 78030            | 46.4             | 710       | 11899            | 0.0              | 840       | 1583             | 0.0              | 970       | 1960             | 0.0              |
| 455       | 23120            | 0.8              | 585       | 83595            | 46.4             | 715       | 10427            | 0.0              | 845       | 1541             | 0.0              | 975       | 1763             | 0.0              |
| 460       | 18596            | 0.8              | 590       | 88814            | 45.9             | 720       | 9351             | 0.0              | 850       | 1350             | 0.0              | 980       | 1627             | 0.0              |
| 465       | 15865            | 0.8              | 595       | 91588            | 43.4             | 725       | 8139             | 0.0              | 855       | 1689             | 0.0              | 985       | 1556             | 0.0              |
| 470       | 13251            | 0.8              | 600       | 94210            | 40.6             | 730       | 7143             | 0.0              | 860       | 1763             | 0.0              | 990       | 1638             | 0.0              |
| 475       | 12609            | 1.0              | 605       | 96240            | 37.3             | 735       | 6273             | 0.0              | 865       | 1765             | 0.0              | 995       | 2124             | 0.0              |
| 480       | 14016            | 1.3              | 610       | 95474            | 32.8             | 740       | 5462             | 0.0              | 870       | 942              | 0.0              | 1000      | 1228             | 0.0              |
| 485       | 16368            | 1.9              | 615       | 93812            | 28.3             | 745       | 4946             | 0.0              | 875       | 1844             | 0.0              |           |                  |                  |

REPORT NUMBER: SP1-2104-224-5

### Scotopic Flux vs. Wavelength



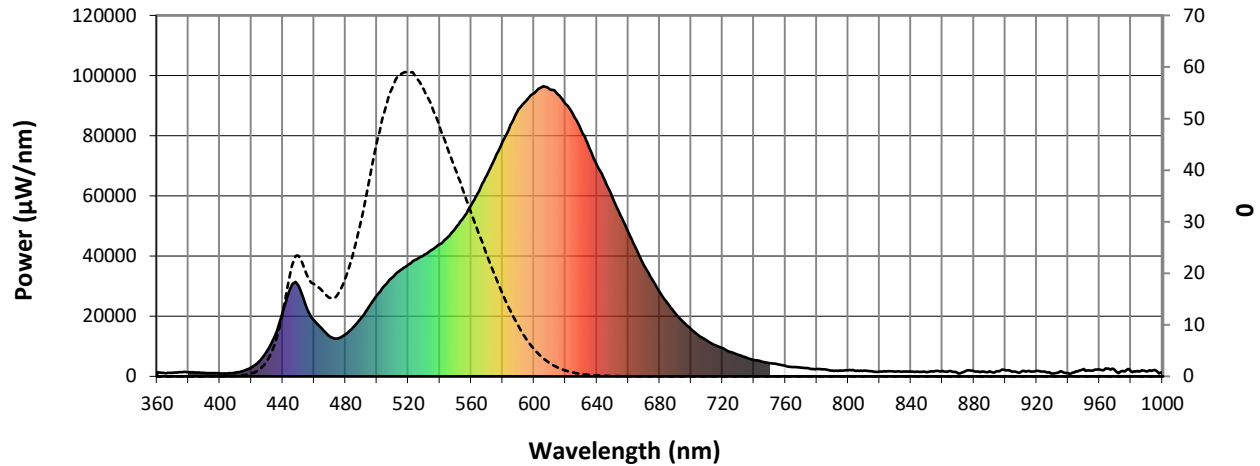
Scotopic Lumens: 5165.4

S/P: 1.2

| $\lambda$<br>(nm) | Power<br>( $\mu\text{W/nm}$ ) | Lumens<br>( $\Phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>( $\mu\text{W/nm}$ ) | Lumens<br>( $\Phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>( $\mu\text{W/nm}$ ) | Lumens<br>( $\Phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>( $\mu\text{W/nm}$ ) | Lumens<br>( $\Phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>( $\mu\text{W/nm}$ ) | Lumens<br>( $\Phi/\text{nm}$ ) |
|-------------------|-------------------------------|--------------------------------|-------------------|-------------------------------|--------------------------------|-------------------|-------------------------------|--------------------------------|-------------------|-------------------------------|--------------------------------|-------------------|-------------------------------|--------------------------------|
| 360               | 1379                          | 0.0                            | 490               | 19477                         | 30.0                           | 620               | 90616                         | 1.1                            | 750               | 4384                          | 0.0                            | 880               | 1655                          | 0.0                            |
| 365               | 1114                          | 0.0                            | 495               | 23200                         | 37.5                           | 625               | 87050                         | 0.7                            | 755               | 4013                          | 0.0                            | 885               | 1597                          | 0.0                            |
| 370               | 1169                          | 0.0                            | 500               | 26999                         | 45.2                           | 630               | 81805                         | 0.5                            | 760               | 3486                          | 0.0                            | 890               | 1696                          | 0.0                            |
| 375               | 1418                          | 0.0                            | 505               | 30185                         | 51.3                           | 635               | 76273                         | 0.3                            | 765               | 3111                          | 0.0                            | 895               | 1694                          | 0.0                            |
| 380               | 1358                          | 0.0                            | 510               | 33025                         | 56.0                           | 640               | 70276                         | 0.2                            | 770               | 2922                          | 0.0                            | 900               | 2016                          | 0.0                            |
| 385               | 1234                          | 0.0                            | 515               | 35307                         | 58.5                           | 645               | 65174                         | 0.1                            | 775               | 2649                          | 0.0                            | 905               | 1631                          | 0.0                            |
| 390               | 1133                          | 0.0                            | 520               | 37140                         | 59.0                           | 650               | 59417                         | 0.1                            | 780               | 2399                          | 0.0                            | 910               | 1506                          | 0.0                            |
| 395               | 1066                          | 0.0                            | 525               | 38834                         | 58.1                           | 655               | 53417                         | 0.0                            | 785               | 2386                          | 0.0                            | 915               | 1763                          | 0.0                            |
| 400               | 982                           | 0.0                            | 530               | 40401                         | 55.7                           | 660               | 48038                         | 0.0                            | 790               | 1912                          | 0.0                            | 920               | 1860                          | 0.0                            |
| 405               | 996                           | 0.0                            | 535               | 42121                         | 52.5                           | 665               | 42350                         | 0.0                            | 795               | 1902                          | 0.0                            | 925               | 1612                          | 0.0                            |
| 410               | 1276                          | 0.1                            | 540               | 43918                         | 48.5                           | 670               | 36925                         | 0.0                            | 800               | 2023                          | 0.0                            | 930               | 976                           | 0.0                            |
| 415               | 1798                          | 0.2                            | 545               | 46244                         | 44.3                           | 675               | 32385                         | 0.0                            | 805               | 1813                          | 0.0                            | 935               | 1702                          | 0.0                            |
| 420               | 2943                          | 0.5                            | 550               | 49225                         | 40.3                           | 680               | 28089                         | 0.0                            | 810               | 1888                          | 0.0                            | 940               | 1083                          | 0.0                            |
| 425               | 4989                          | 1.2                            | 555               | 52758                         | 36.1                           | 685               | 24306                         | 0.0                            | 815               | 1669                          | 0.0                            | 945               | 1672                          | 0.0                            |
| 430               | 8360                          | 2.8                            | 560               | 56904                         | 31.8                           | 690               | 20941                         | 0.0                            | 820               | 1558                          | 0.0                            | 950               | 2462                          | 0.0                            |
| 435               | 13537                         | 6.1                            | 565               | 61643                         | 27.7                           | 695               | 18065                         | 0.0                            | 825               | 1689                          | 0.0                            | 955               | 1958                          | 0.0                            |
| 440               | 21265                         | 11.9                           | 570               | 66872                         | 23.6                           | 700               | 15715                         | 0.0                            | 830               | 1632                          | 0.0                            | 960               | 2236                          | 0.0                            |
| 445               | 29496                         | 19.8                           | 575               | 72519                         | 19.7                           | 705               | 13502                         | 0.0                            | 835               | 1615                          | 0.0                            | 965               | 2541                          | 0.0                            |
| 450               | 30225                         | 23.4                           | 580               | 78030                         | 16.1                           | 710               | 11899                         | 0.0                            | 840               | 1583                          | 0.0                            | 970               | 1960                          | 0.0                            |
| 455               | 23120                         | 20.2                           | 585               | 83595                         | 12.8                           | 715               | 10427                         | 0.0                            | 845               | 1541                          | 0.0                            | 975               | 1763                          | 0.0                            |
| 460               | 18596                         | 18.0                           | 590               | 88814                         | 9.9                            | 720               | 9351                          | 0.0                            | 850               | 1350                          | 0.0                            | 980               | 1627                          | 0.0                            |
| 465               | 15865                         | 16.8                           | 595               | 91588                         | 7.3                            | 725               | 8139                          | 0.0                            | 855               | 1689                          | 0.0                            | 985               | 1556                          | 0.0                            |
| 470               | 13251                         | 15.3                           | 600               | 94210                         | 5.3                            | 730               | 7143                          | 0.0                            | 860               | 1763                          | 0.0                            | 990               | 1638                          | 0.0                            |
| 475               | 12609                         | 15.8                           | 605               | 96240                         | 3.8                            | 735               | 6273                          | 0.0                            | 865               | 1765                          | 0.0                            | 995               | 2124                          | 0.0                            |
| 480               | 14016                         | 18.9                           | 610               | 95474                         | 2.6                            | 740               | 5462                          | 0.0                            | 870               | 942                           | 0.0                            | 1000              | 1228                          | 0.0                            |
| 485               | 16368                         | 23.7                           | 615               | 93812                         | 1.7                            | 745               | 4946                          | 0.0                            | 875               | 1844                          | 0.0                            |                   |                               |                                |

REPORT NUMBER: SP1-2104-224-5

### Melanopic Flux vs. Wavelength


**Melanopic Lumens: 1892.1**
**M/P: 0.44**

| 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       | 1379             | 0.0              | 490       | 19477            | 16.2             | 620       | 90616            | 0.1              | 750       | 4384             | 0.0              | 880       | 1655             | 0.0              |
| 365       | 1114             | 0.0              | 495       | 23200            | 19.2             | 625       | 87050            | 0.0              | 755       | 4013             | 0.0              | 885       | 1597             | 0.0              |
| 370       | 1169             | 0.0              | 500       | 26999            | 21.7             | 630       | 81805            | 0.0              | 760       | 3486             | 0.0              | 890       | 1696             | 0.0              |
| 375       | 1418             | 0.0              | 505       | 30185            | 23.2             | 635       | 76273            | 0.0              | 765       | 3111             | 0.0              | 895       | 1694             | 0.0              |
| 380       | 1358             | 0.0              | 510       | 33025            | 23.7             | 640       | 70276            | 0.0              | 770       | 2922             | 0.0              | 900       | 2016             | 0.0              |
| 385       | 1234             | 0.0              | 515       | 35307            | 23.1             | 645       | 65174            | 0.0              | 775       | 2649             | 0.0              | 905       | 1631             | 0.0              |
| 390       | 1133             | 0.0              | 520       | 37140            | 21.6             | 650       | 59417            | 0.0              | 780       | 2399             | 0.0              | 910       | 1506             | 0.0              |
| 395       | 1066             | 0.0              | 525       | 38834            | 19.7             | 655       | 53417            | 0.0              | 785       | 2386             | 0.0              | 915       | 1763             | 0.0              |
| 400       | 982              | 0.0              | 530       | 40401            | 17.5             | 660       | 48038            | 0.0              | 790       | 1912             | 0.0              | 920       | 1860             | 0.0              |
| 405       | 996              | 0.0              | 535       | 42121            | 15.2             | 665       | 42350            | 0.0              | 795       | 1902             | 0.0              | 925       | 1612             | 0.0              |
| 410       | 1276             | 0.0              | 540       | 43918            | 12.9             | 670       | 36925            | 0.0              | 800       | 2023             | 0.0              | 930       | 976              | 0.0              |
| 415       | 1798             | 0.1              | 545       | 46244            | 10.7             | 675       | 32385            | 0.0              | 805       | 1813             | 0.0              | 935       | 1702             | 0.0              |
| 420       | 2943             | 0.3              | 550       | 49225            | 8.8              | 680       | 28089            | 0.0              | 810       | 1888             | 0.0              | 940       | 1083             | 0.0              |
| 425       | 4989             | 0.8              | 555       | 52758            | 7.1              | 685       | 24306            | 0.0              | 815       | 1669             | 0.0              | 945       | 1672             | 0.0              |
| 430       | 8360             | 1.8              | 560       | 56904            | 5.6              | 690       | 20941            | 0.0              | 820       | 1558             | 0.0              | 950       | 2462             | 0.0              |
| 435       | 13537            | 3.6              | 565       | 61643            | 4.3              | 695       | 18065            | 0.0              | 825       | 1689             | 0.0              | 955       | 1958             | 0.0              |
| 440       | 21265            | 7.1              | 570       | 66872            | 3.3              | 700       | 15715            | 0.0              | 830       | 1632             | 0.0              | 960       | 2236             | 0.0              |
| 445       | 29496            | 11.6             | 575       | 72519            | 2.4              | 705       | 13502            | 0.0              | 835       | 1615             | 0.0              | 965       | 2541             | 0.0              |
| 450       | 30225            | 13.9             | 580       | 78030            | 1.7              | 710       | 11899            | 0.0              | 840       | 1583             | 0.0              | 970       | 1960             | 0.0              |
| 455       | 23120            | 12.1             | 585       | 83595            | 1.2              | 715       | 10427            | 0.0              | 845       | 1541             | 0.0              | 975       | 1763             | 0.0              |
| 460       | 18596            | 11.0             | 590       | 88814            | 0.9              | 720       | 9351             | 0.0              | 850       | 1350             | 0.0              | 980       | 1627             | 0.0              |
| 465       | 15865            | 10.4             | 595       | 91588            | 0.6              | 725       | 8139             | 0.0              | 855       | 1689             | 0.0              | 985       | 1556             | 0.0              |
| 470       | 13251            | 9.5              | 600       | 94210            | 0.4              | 730       | 7143             | 0.0              | 860       | 1763             | 0.0              | 990       | 1638             | 0.0              |
| 475       | 12609            | 9.6              | 605       | 96240            | 0.3              | 735       | 6273             | 0.0              | 865       | 1765             | 0.0              | 995       | 2124             | 0.0              |
| 480       | 14016            | 11.3             | 610       | 95474            | 0.2              | 740       | 5462             | 0.0              | 870       | 942              | 0.0              | 1000      | 1228             | 0.0              |
| 485       | 16368            | 13.5             | 615       | 93812            | 0.1              | 745       | 4946             | 0.0              | 875       | 1844             | 0.0              |           |                  |                  |

REPORT NUMBER: SP1-2104-224-5

TM-30-18

### Summary

$R_f = 85.3$   
 $R_g = 96.5$   
 CIE  $R_a = 82.2$   
 $R_9 = 5.2$

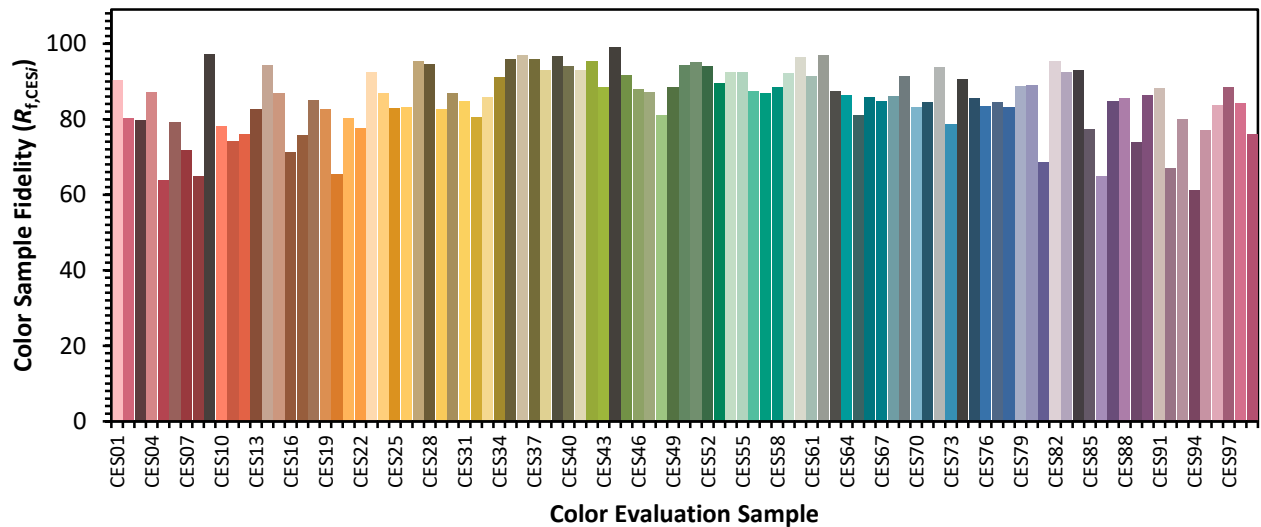


### Color Vector Graphics



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

|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 87 | CES26 = 83 | CES51 = 95 | CES76 = 83 |
| CES02 = 64 | CES27 = 95 | CES52 = 94 | CES77 = 85 |
| CES03 = 32 | CES28 = 95 | CES53 = 89 | CES78 = 83 |
| CES04 = 71 | CES29 = 83 | CES54 = 92 | CES79 = 89 |
| CES05 = 51 | CES30 = 87 | CES55 = 92 | CES80 = 89 |
| CES06 = 52 | CES31 = 85 | CES56 = 87 | CES81 = 69 |
| CES07 = 43 | CES32 = 81 | CES57 = 87 | CES82 = 95 |
| CES08 = 42 | CES33 = 86 | CES58 = 88 | CES83 = 92 |
| CES09 = 29 | CES34 = 91 | CES59 = 92 | CES84 = 93 |
| CES10 = 77 | CES35 = 96 | CES60 = 96 | CES85 = 77 |
| CES11 = 60 | CES36 = 97 | CES61 = 91 | CES86 = 65 |
| CES12 = 66 | CES37 = 96 | CES62 = 97 | CES87 = 85 |
| CES13 = 44 | CES38 = 93 | CES63 = 87 | CES88 = 85 |
| CES14 = 74 | CES39 = 97 | CES64 = 86 | CES89 = 74 |
| CES15 = 72 | CES40 = 94 | CES65 = 81 | CES90 = 86 |
| CES16 = 48 | CES41 = 93 | CES66 = 86 | CES91 = 88 |
| CES17 = 50 | CES42 = 95 | CES67 = 85 | CES92 = 67 |
| CES18 = 57 | CES43 = 88 | CES68 = 86 | CES93 = 80 |
| CES19 = 73 | CES44 = 99 | CES69 = 91 | CES94 = 61 |
| CES20 = 67 | CES45 = 92 | CES70 = 83 | CES95 = 77 |
| CES21 = 87 | CES46 = 88 | CES71 = 85 | CES96 = 84 |
| CES22 = 80 | CES47 = 87 | CES72 = 94 | CES97 = 88 |
| CES23 = 92 | CES48 = 81 | CES73 = 79 | CES98 = 84 |
| CES24 = 91 | CES49 = 88 | CES74 = 90 | CES99 = 76 |
| CES25 = 72 | CES50 = 94 | CES75 = 86 |            |



**Color Rendition by Hue-Angle Bin**


**Measure Comparisons**



(END OF REPORT)