

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: P671936

Luminaire Tested: **CCP-SA-1D-727-U-AFL**

Issue Date: 04/16/2023



**Test Information**

Test Method: LM-79-08  
Report Number: P671936  
Test Lab: INNOVATION CENTER(G2)  
Issue Date: 04/16/2023  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: INVUE  
Catalog Number: CCP-SA-1D-727-U-AFL  
Description: INVUE CLEAR CURVE POLE MOUNT LIGHT SQUARE LUMINAIRE @800mA w/ AFL  
distribution lens  
Light Source: (16) 2700K CCT, 70 CRI LEDS  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 4706.7 lumens  
Efficiency: N/A  
Efficacy: 107.0 lumens/watt  
Luminous Opening: Rectangular (W 1' x L: 0.5' x H: 0')  
IES Classification: Type II - Short  
BUG Rating: B1 - U0 - G1

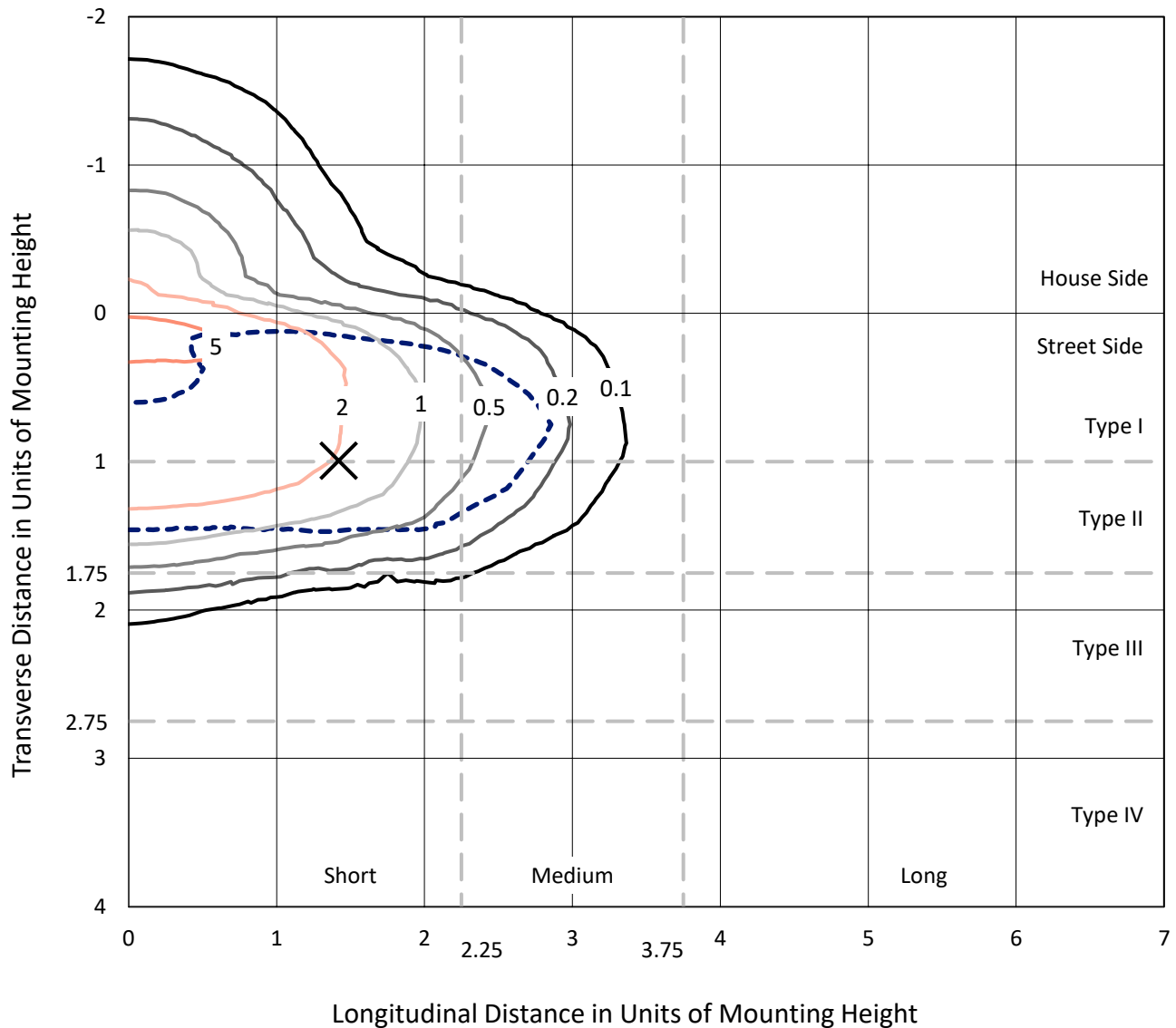
Input Watts (W): 44  
Input Voltage (V): 120  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: NR  
Total Harmonic Distortion (THDi): NR  
Frequency (hertz): 60  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 25 FT

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## Iso-Footcandle Lines of Horizontal Illumination

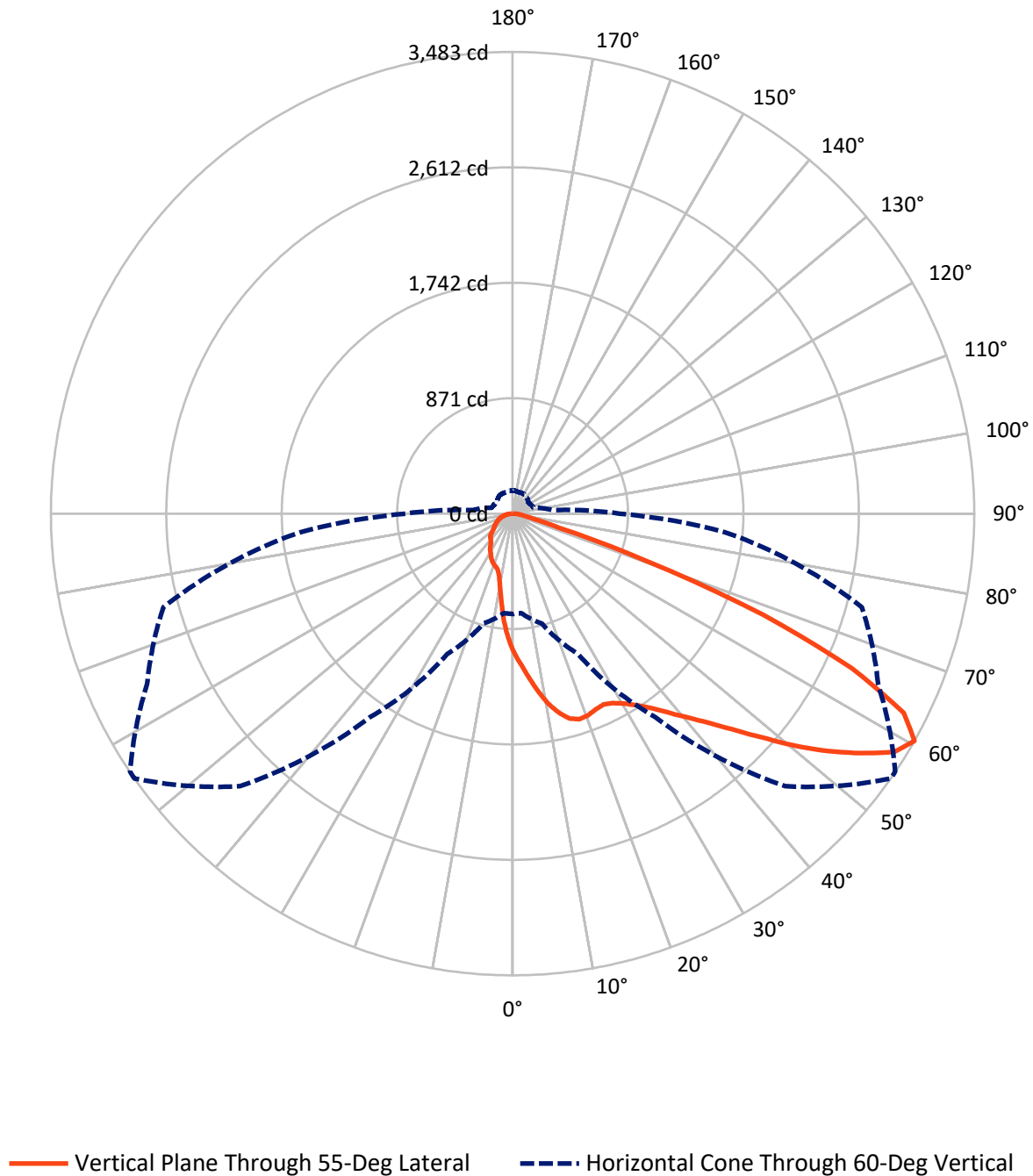
× Max cd  
 - - - 1/2 Max cd



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

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## Luminous Intensity Polar Plot



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CATALOG NUMBER: CCP-SA-1D-727-U-AFL

**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total  |
|--------------------|-----------|----------|--------|--------|
| <b>House Side</b>  | Lumens    | 676.6    | 0.0    | 676.6  |
|                    | % Fixture | 14.4     | 0.0    | 14.4   |
| <b>Street Side</b> | Lumens    | 4030.1   | 0.0    | 4030.1 |
|                    | % Fixture | 85.6     | 0.0    | 85.6   |
| <b>Total</b>       | Lumens    | 4706.7   | 0.0    | 4706.7 |
|                    | % Fixture | 100.0    | 0.0    | 100.0  |

**Coefficient of Utilization**

**ZONAL LUMENS:**

| Zone      | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10°    | 97.7   | 2.1       |
| 10°-20°   | 276.7  | 5.9       |
| 20°-30°   | 450.6  | 9.6       |
| 30°-40°   | 673.5  | 14.3      |
| 40°-50°   | 989.9  | 21.0      |
| 50°-60°   | 1160.2 | 24.6      |
| 60°-70°   | 765.0  | 16.3      |
| 70°-80°   | 243.6  | 5.2       |
| 80°-90°   | 49.5   | 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°    | 4706.7 | 100.0     |
| 0°-180°   | 4706.7 | 100.0     |



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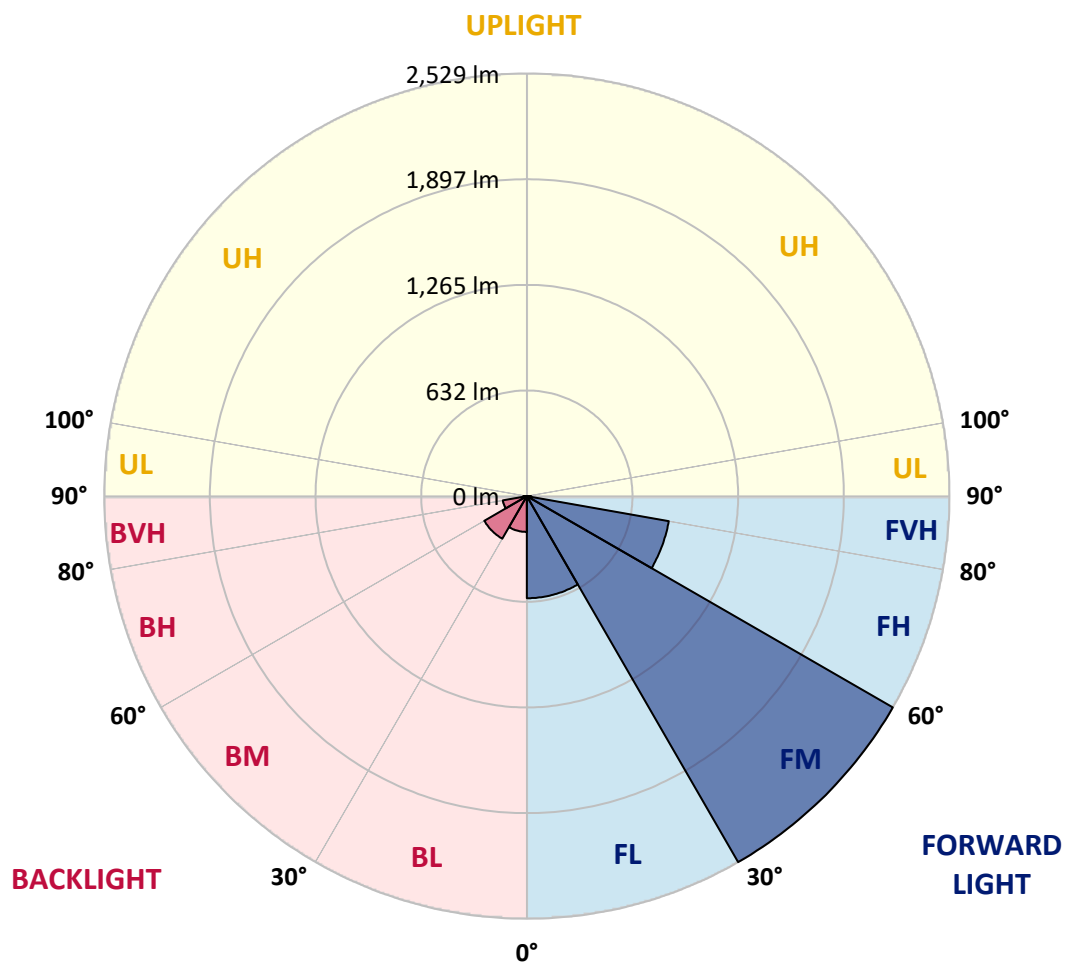
CATALOG NUMBER: CCP-SA-1D-727-U-AFL

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

| Zone |             | Lumens | % Fixture | Zone Rating/Lumen Limit |      |         |
|------|-------------|--------|-----------|-------------------------|------|---------|
|      |             |        |           | B                       | U    | G       |
| FL   | (0°-30°)    | 610.9  | 13.0      |                         |      |         |
| FM   | (30°-60°)   | 2529.5 | 53.7      |                         |      |         |
| FH   | (60°-80°)   | 862.5  | 18.3      |                         |      | G1/1800 |
| FVH  | (80°-90°)   | 27.2   | 0.6       |                         |      | G1/100  |
| BL   | (0°-30°)    | 214.2  | 4.6       | B1/500                  |      |         |
| BM   | (30°-60°)   | 294.1  | 6.2       | B1/1000                 |      |         |
| BH   | (60°-80°)   | 146.0  | 3.1       | B1/500                  |      | G1/500  |
| BVH  | (80°-90°)   | 22.4   | 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



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CATALOG NUMBER: CCP-SA-1D-727-U-AFL

**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 5°     | 15°    | 25°    | 35°    | 45°    | 55°    | 56°    | 65°    | 75°    | 85°    |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 1043.8 | 1043.8 | 1043.8 | 1043.8 | 1043.8 | 1043.8 | 1043.8 | 1043.8 | 1043.8 | 1043.8 | 1043.8 |
| 2.5°  | 1214.7 | 1210.3 | 1210.3 | 1199.0 | 1182.3 | 1159.1 | 1131.5 | 1124.7 | 1114.1 | 1087.1 | 1052.4 |
| 5°    | 1400.0 | 1395.2 | 1388.7 | 1368.9 | 1337.9 | 1291.5 | 1233.1 | 1222.6 | 1184.7 | 1129.1 | 1066.3 |
| 7.5°  | 1522.4 | 1519.7 | 1517.6 | 1500.6 | 1469.9 | 1424.2 | 1346.1 | 1334.1 | 1270.0 | 1177.9 | 1079.6 |
| 10°   | 1509.8 | 1518.0 | 1532.3 | 1544.2 | 1550.4 | 1526.9 | 1453.5 | 1439.5 | 1360.0 | 1234.5 | 1099.4 |
| 12.5° | 1391.4 | 1403.0 | 1429.6 | 1478.4 | 1534.7 | 1580.1 | 1538.4 | 1530.6 | 1456.2 | 1294.5 | 1124.3 |
| 15°   | 1303.4 | 1308.2 | 1321.2 | 1357.3 | 1441.2 | 1562.3 | 1604.3 | 1597.1 | 1546.0 | 1371.6 | 1153.0 |
| 17.5° | 1276.1 | 1278.2 | 1281.2 | 1293.2 | 1350.5 | 1493.1 | 1631.2 | 1638.1 | 1632.9 | 1451.8 | 1185.4 |
| 20°   | 1289.8 | 1291.1 | 1291.5 | 1293.5 | 1320.8 | 1435.1 | 1624.1 | 1635.7 | 1709.4 | 1532.0 | 1217.5 |
| 22.5° | 1342.3 | 1340.6 | 1338.2 | 1330.4 | 1345.7 | 1424.9 | 1605.0 | 1623.4 | 1768.4 | 1605.0 | 1247.1 |
| 25°   | 1434.1 | 1431.7 | 1415.0 | 1398.6 | 1405.1 | 1461.7 | 1594.7 | 1614.5 | 1814.4 | 1673.9 | 1269.0 |
| 27.5° | 1543.2 | 1540.8 | 1523.8 | 1492.7 | 1485.9 | 1523.1 | 1618.6 | 1630.9 | 1848.2 | 1734.9 | 1278.5 |
| 30°   | 1656.5 | 1656.5 | 1635.3 | 1599.5 | 1577.7 | 1593.4 | 1662.6 | 1672.5 | 1873.8 | 1793.9 | 1284.7 |
| 32.5° | 1780.0 | 1783.4 | 1750.6 | 1709.7 | 1685.5 | 1676.3 | 1724.4 | 1732.9 | 1911.0 | 1863.5 | 1297.6 |
| 35°   | 1938.6 | 1931.1 | 1891.2 | 1837.3 | 1798.4 | 1777.6 | 1800.8 | 1810.7 | 1965.5 | 1950.2 | 1318.4 |
| 37.5° | 2117.0 | 2103.7 | 2054.6 | 1990.1 | 1922.2 | 1887.4 | 1902.8 | 1905.2 | 2046.4 | 2063.1 | 1356.3 |
| 40°   | 2264.4 | 2262.0 | 2220.3 | 2159.3 | 2073.7 | 2026.9 | 2019.4 | 2020.8 | 2158.6 | 2196.8 | 1413.6 |
| 42.5° | 2388.5 | 2379.7 | 2372.1 | 2350.7 | 2259.9 | 2183.2 | 2152.5 | 2152.8 | 2280.4 | 2335.0 | 1471.2 |
| 45°   | 2443.4 | 2441.7 | 2463.9 | 2519.2 | 2454.0 | 2363.6 | 2320.0 | 2326.1 | 2419.9 | 2476.9 | 1526.9 |
| 47.5° | 2419.9 | 2421.3 | 2480.6 | 2625.6 | 2664.1 | 2594.9 | 2517.5 | 2513.7 | 2555.0 | 2585.7 | 1576.0 |
| 50°   | 2209.8 | 2231.9 | 2392.6 | 2635.5 | 2802.0 | 2836.4 | 2749.1 | 2735.1 | 2673.4 | 2672.3 | 1606.0 |
| 52.5° | 2051.2 | 2050.1 | 2148.7 | 2534.9 | 2850.7 | 3054.4 | 2975.9 | 2944.5 | 2771.3 | 2721.1 | 1608.4 |
| 55°   | 1836.9 | 1835.6 | 1908.9 | 2240.5 | 2753.9 | 3206.5 | 3189.8 | 3150.6 | 2861.0 | 2737.1 | 1592.0 |
| 57.5° | 1391.1 | 1417.0 | 1490.0 | 1793.6 | 2446.9 | 3182.3 | 3394.1 | 3361.4 | 2948.6 | 2730.0 | 1588.9 |
| 60°   | 756.9  | 753.9  | 859.6  | 1169.0 | 1873.4 | 2907.4 | 3483.2 | 3481.5 | 3041.8 | 2727.3 | 1607.7 |
| 62.5° | 349.0  | 345.6  | 366.7  | 520.5  | 1074.2 | 2329.2 | 3311.2 | 3335.8 | 3128.1 | 2702.4 | 1606.0 |
| 65°   | 261.0  | 252.1  | 223.4  | 242.2  | 411.0  | 1390.4 | 2812.5 | 2878.0 | 2995.0 | 2600.0 | 1531.6 |
| 67.5° | 232.6  | 224.1  | 190.7  | 178.7  | 206.4  | 490.5  | 2040.2 | 2100.6 | 2504.5 | 2408.3 | 1411.2 |
| 70°   | 213.2  | 205.7  | 172.3  | 153.5  | 154.9  | 217.3  | 1068.0 | 1186.8 | 1835.6 | 2009.9 | 1202.8 |
| 72.5° | 194.4  | 188.0  | 157.6  | 135.1  | 130.3  | 143.6  | 364.0  | 439.0  | 1141.7 | 1464.8 | 896.8  |
| 75°   | 174.7  | 168.5  | 141.9  | 121.1  | 111.9  | 106.4  | 173.3  | 186.6  | 603.8  | 808.8  | 481.3  |
| 77.5° | 151.8  | 148.4  | 126.6  | 106.8  | 98.9   | 80.5   | 115.3  | 121.1  | 258.6  | 317.6  | 229.2  |
| 80°   | 132.0  | 129.3  | 112.9  | 96.9   | 88.7   | 62.1   | 79.5   | 83.6   | 127.6  | 158.6  | 128.3  |
| 82.5° | 86.0   | 92.8   | 93.5   | 83.2   | 78.1   | 49.8   | 52.5   | 55.6   | 84.6   | 93.5   | 55.9   |
| 85°   | 35.5   | 43.0   | 64.5   | 57.3   | 54.2   | 42.3   | 34.8   | 35.5   | 51.9   | 54.6   | 20.1   |
| 87.5° | 16.0   | 17.7   | 31.7   | 32.1   | 28.0   | 16.0   | 17.4   | 19.1   | 26.6   | 26.3   | 8.9    |
| 90°   | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |

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**CANDELA DISTRIBUTION (continued):**

|       | 90°    | 95°    | 105°   | 115°   | 125°   | 135°   | 145°   | 155°   | 165°   | 175°   | 180°   |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 1043.8 | 1043.8 | 1043.8 | 1043.8 | 1043.8 | 1043.8 | 1043.8 | 1043.8 | 1043.8 | 1043.8 | 1043.8 |
| 2.5°  | 1042.8 | 1027.1 | 999.1  | 963.3  | 937.7  | 919.0  | 898.5  | 883.5  | 866.8  | 852.1  | 854.5  |
| 5°    | 1040.4 | 1010.1 | 947.3  | 880.8  | 816.0  | 762.7  | 718.4  | 685.7  | 651.9  | 638.6  | 636.9  |
| 7.5°  | 1042.5 | 991.0  | 887.9  | 779.1  | 680.5  | 612.7  | 561.1  | 530.1  | 510.7  | 499.4  | 500.1  |
| 10°   | 1041.8 | 972.9  | 823.8  | 673.7  | 565.9  | 503.8  | 472.5  | 462.2  | 460.5  | 461.9  | 463.9  |
| 12.5° | 1042.8 | 948.3  | 751.8  | 578.9  | 483.7  | 452.0  | 453.3  | 462.6  | 468.4  | 472.1  | 474.5  |
| 15°   | 1047.2 | 928.2  | 678.1  | 504.2  | 440.7  | 441.7  | 456.4  | 470.7  | 479.3  | 483.4  | 485.4  |
| 17.5° | 1053.7 | 902.9  | 612.7  | 447.5  | 422.6  | 438.3  | 457.4  | 472.8  | 479.3  | 481.7  | 483.4  |
| 20°   | 1054.4 | 873.9  | 546.5  | 408.7  | 410.7  | 431.2  | 447.9  | 460.2  | 468.4  | 471.1  | 472.5  |
| 22.5° | 1051.3 | 834.7  | 478.6  | 380.3  | 397.1  | 417.5  | 431.9  | 445.8  | 434.9  | 426.1  | 423.7  |
| 25°   | 1038.4 | 785.3  | 420.6  | 357.2  | 380.0  | 399.1  | 415.5  | 400.1  | 395.0  | 388.2  | 388.9  |
| 27.5° | 1010.4 | 723.5  | 366.0  | 335.3  | 359.9  | 387.2  | 375.2  | 373.2  | 366.7  | 359.9  | 359.9  |
| 30°   | 973.6  | 658.4  | 320.3  | 312.5  | 335.7  | 349.3  | 352.0  | 349.0  | 345.2  | 336.3  | 337.0  |
| 32.5° | 940.5  | 589.5  | 287.9  | 293.4  | 320.3  | 320.3  | 332.3  | 332.3  | 318.6  | 293.7  | 293.7  |
| 35°   | 907.7  | 524.6  | 264.0  | 277.3  | 295.1  | 300.9  | 317.2  | 295.8  | 276.3  | 265.0  | 264.4  |
| 37.5° | 882.1  | 469.4  | 248.3  | 263.7  | 270.5  | 285.2  | 285.5  | 269.8  | 263.3  | 253.1  | 252.1  |
| 40°   | 867.1  | 423.0  | 238.8  | 256.9  | 257.5  | 271.2  | 248.7  | 253.1  | 251.7  | 243.9  | 242.9  |
| 42.5° | 858.9  | 387.2  | 231.6  | 251.1  | 247.7  | 234.3  | 230.3  | 237.8  | 240.1  | 236.1  | 234.3  |
| 45°   | 852.5  | 359.2  | 225.8  | 230.9  | 239.8  | 215.6  | 213.9  | 219.7  | 224.8  | 224.5  | 223.1  |
| 47.5° | 849.0  | 339.8  | 220.7  | 218.3  | 220.0  | 204.3  | 200.9  | 203.6  | 210.1  | 214.2  | 213.9  |
| 50°   | 835.7  | 324.7  | 213.2  | 205.4  | 194.4  | 194.4  | 192.7  | 192.7  | 200.6  | 208.8  | 209.4  |
| 52.5° | 812.2  | 307.0  | 202.3  | 193.1  | 180.5  | 185.9  | 186.6  | 185.2  | 193.4  | 202.3  | 203.0  |
| 55°   | 786.3  | 293.7  | 187.6  | 181.8  | 168.9  | 178.1  | 181.1  | 179.8  | 185.2  | 191.4  | 191.0  |
| 57.5° | 786.6  | 293.4  | 175.0  | 170.6  | 157.9  | 168.2  | 175.7  | 176.0  | 175.7  | 180.1  | 180.1  |
| 60°   | 806.4  | 300.2  | 165.1  | 155.6  | 145.3  | 157.6  | 169.9  | 169.9  | 167.5  | 174.0  | 174.7  |
| 62.5° | 812.2  | 299.5  | 159.0  | 141.2  | 134.1  | 148.0  | 161.3  | 163.4  | 161.7  | 170.9  | 171.9  |
| 65°   | 761.0  | 283.5  | 152.8  | 128.3  | 123.8  | 137.5  | 150.8  | 156.6  | 154.9  | 166.8  | 168.2  |
| 67.5° | 690.1  | 262.7  | 143.3  | 116.7  | 113.3  | 127.2  | 139.9  | 146.0  | 145.7  | 161.3  | 162.0  |
| 70°   | 594.9  | 237.1  | 131.3  | 104.7  | 103.0  | 115.3  | 126.6  | 133.0  | 136.1  | 154.2  | 153.8  |
| 72.5° | 460.9  | 203.3  | 113.3  | 92.1   | 91.8   | 103.0  | 112.9  | 120.1  | 125.9  | 143.3  | 143.3  |
| 75°   | 297.1  | 160.0  | 92.4   | 79.8   | 78.5   | 89.0   | 99.3   | 107.5  | 125.2  | 152.8  | 152.5  |
| 77.5° | 181.5  | 122.1  | 74.4   | 66.5   | 66.2   | 75.7   | 86.0   | 99.9   | 136.8  | 136.1  | 132.4  |
| 80°   | 108.8  | 87.7   | 59.4   | 53.2   | 53.2   | 62.1   | 73.3   | 107.1  | 113.6  | 129.6  | 122.5  |
| 82.5° | 56.6   | 53.9   | 44.3   | 39.2   | 40.9   | 48.8   | 66.9   | 85.6   | 92.8   | 78.8   | 72.3   |
| 85°   | 23.2   | 28.7   | 27.3   | 24.9   | 25.9   | 33.8   | 64.5   | 68.6   | 54.9   | 57.6   | 58.0   |
| 87.5° | 7.8    | 12.6   | 12.6   | 9.9    | 10.9   | 23.9   | 38.2   | 22.9   | 27.6   | 16.4   | 12.3   |
| 90°   | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |

LM-79-08: Approved Method: Electrical and Photometric Measurements of Solid-State Lighting Products

Report Prepared for

Cooper Lighting Solutions

(formerly Eaton)

INVUE

Report Number: SP1-2012-088-8-R2

Luminaire Tested: CCW-SA1B-727-U-SL4

Test Date: 01/20/2021

### Test Information

Test Method: LM-79-08  
 Report Number: SP1-2012-088-8-R2  
 Test Lab: COOPER LIGHTING SOLUTIONS  
 Photometer: SP1  
 Measurement Geometry:  $4\pi$   
 Issue Date: 01/20/2021  
 Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
 Product Line: INVUE  
 Catalog Number: **CCW-SA1B-727-U-SL4**  
 Description: INVUE WALL PACK

\*\*\*THIS IS A REVISION OF SP1-2012-088-8. TO UPDATE THE CATALOG INFORMATION.\*\*\*TESTED IN SITU. INVUE WALL PACK LIGHT SQUARE SL4 OPTICS 1-SQUARE

### Spectral Parameters

|                           |         |           |      |      |      |
|---------------------------|---------|-----------|------|------|------|
| CCT (K):                  | 2705    | CRI (Ra): | 73.8 |      |      |
| CIE u':                   | 0.2629  | R1:       | 72.2 | R9:  | -7.6 |
| CIE v':                   | 0.5237  | R2:       | 81.9 | R10: | 56.9 |
| Duv:                      | -0.0024 | R3:       | 89.3 | R11: | 66.0 |
| CIE x:                    | 0.4552  | R4:       | 71.3 | R12: | 47.9 |
| CIE y:                    | 0.4030  | R5:       | 69.5 | R13: | 73.4 |
| CIE z:                    | 0.1418  | R6:       | 73.6 | R14: | 93.2 |
| Peak Wavelength (nm):     | 603     | R7:       | 80.1 |      |      |
| Dominant Wavelength (nm): | 585     | R8:       | 52.8 |      |      |
| Purity:                   | 57.7    |           |      |      |      |
| Rf:                       | 71.2    |           |      |      |      |
| Rg:                       | 100.1   |           |      |      |      |



### Test Conditions

Stabilization Time: 177M  
 Operation Time: 12H  
 Room Temperature (°C) / RH%: 24.8/34%  
 Sphere Temperature (°C): 24.7

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| 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 2700K 4-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       | 926              | 0.0              | 490       | 3601             | 0.5              | 620       | 58340            | 15.2             | 750       | 3861             | 0.0              | 880       | 1742             | 0.0              |
| 365       | 867              | 0.0              | 495       | 5135             | 0.9              | 625       | 56180            | 12.4             | 755       | 3520             | 0.0              | 885       | 1920             | 0.0              |
| 370       | 1032             | 0.0              | 500       | 7689             | 1.7              | 630       | 53018            | 9.6              | 760       | 3223             | 0.0              | 890       | 1286             | 0.0              |
| 375       | 1034             | 0.0              | 505       | 11015            | 3.1              | 635       | 49683            | 7.5              | 765       | 2910             | 0.0              | 895       | 1660             | 0.0              |
| 380       | 979              | 0.0              | 510       | 14817            | 5.1              | 640       | 46308            | 5.5              | 770       | 2560             | 0.0              | 900       | 1274             | 0.0              |
| 385       | 938              | 0.0              | 515       | 18962            | 7.9              | 645       | 42927            | 4.1              | 775       | 2242             | 0.0              | 905       | 1020             | 0.0              |
| 390       | 893              | 0.0              | 520       | 22933            | 11.1             | 650       | 39728            | 2.9              | 780       | 2156             | 0.0              | 910       | 1258             | 0.0              |
| 395       | 757              | 0.0              | 525       | 26438            | 14.2             | 655       | 36260            | 2.1              | 785       | 1926             | 0.0              | 915       | 1481             | 0.0              |
| 400       | 728              | 0.0              | 530       | 29492            | 17.4             | 660       | 32543            | 1.4              | 790       | 1871             | 0.0              | 920       | 923              | 0.0              |
| 405       | 812              | 0.0              | 535       | 32054            | 19.9             | 665       | 29105            | 0.9              | 795       | 1697             | 0.0              | 925       | 1444             | 0.0              |
| 410       | 1197             | 0.0              | 540       | 34386            | 22.4             | 670       | 25817            | 0.6              | 800       | 1691             | 0.0              | 930       | 1315             | 0.0              |
| 415       | 2254             | 0.0              | 545       | 36784            | 24.5             | 675       | 22832            | 0.4              | 805       | 1967             | 0.0              | 935       | 1037             | 0.0              |
| 420       | 4742             | 0.0              | 550       | 39017            | 26.5             | 680       | 20201            | 0.2              | 810       | 1719             | 0.0              | 940       | 1195             | 0.0              |
| 425       | 8975             | 0.0              | 555       | 41253            | 28.2             | 685       | 17863            | 0.2              | 815       | 1436             | 0.0              | 945       | 914              | 0.0              |
| 430       | 14905            | 0.1              | 560       | 43733            | 29.7             | 690       | 15761            | 0.1              | 820       | 1465             | 0.0              | 950       | 1373             | 0.0              |
| 435       | 22096            | 0.3              | 565       | 46694            | 31.0             | 695       | 13762            | 0.1              | 825       | 1365             | 0.0              | 955       | 692              | 0.0              |
| 440       | 28868            | 0.5              | 570       | 49493            | 32.2             | 700       | 12064            | 0.0              | 830       | 1404             | 0.0              | 960       | 844              | 0.0              |
| 445       | 31683            | 0.7              | 575       | 52587            | 32.7             | 705       | 10683            | 0.0              | 835       | 1222             | 0.0              | 965       | 1427             | 0.0              |
| 450       | 25690            | 0.7              | 580       | 55129            | 32.8             | 710       | 9480             | 0.0              | 840       | 1144             | 0.0              | 970       | 654              | 0.0              |
| 455       | 14802            | 0.5              | 585       | 57737            | 32.1             | 715       | 8582             | 0.0              | 845       | 1078             | 0.0              | 975       | 1127             | 0.0              |
| 460       | 8755             | 0.4              | 590       | 59688            | 30.9             | 720       | 7530             | 0.0              | 850       | 1254             | 0.0              | 980       | 1935             | 0.0              |
| 465       | 5978             | 0.3              | 595       | 61458            | 29.1             | 725       | 6824             | 0.0              | 855       | 1203             | 0.0              | 985       | 1754             | 0.0              |
| 470       | 4047             | 0.3              | 600       | 62443            | 26.9             | 730       | 5968             | 0.0              | 860       | 1183             | 0.0              | 990       | 1822             | 0.0              |
| 475       | 3070             | 0.2              | 605       | 62403            | 24.2             | 735       | 5266             | 0.0              | 865       | 1505             | 0.0              | 995       | 1176             | 0.0              |
| 480       | 2814             | 0.3              | 610       | 61581            | 21.2             | 740       | 4712             | 0.0              | 870       | 1624             | 0.0              | 1000      | 2143             | 0.0              |
| 485       | 2926             | 0.3              | 615       | 60386            | 18.2             | 745       | 4264             | 0.0              | 875       | 1559             | 0.0              |           |                  |                  |

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### Scotopic Flux vs. Wavelength



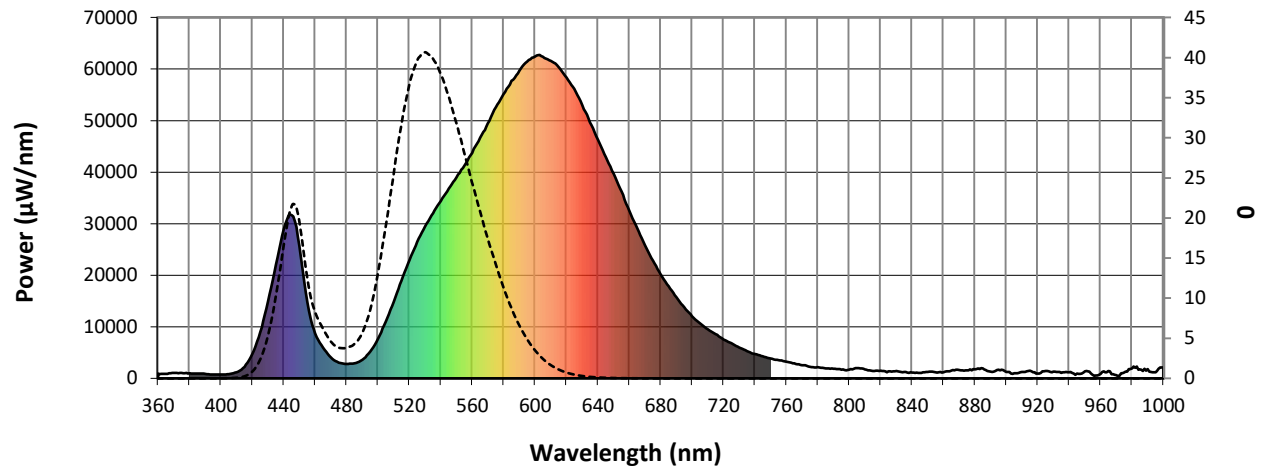
Scotopic Lumens: 1073.3

S/P: 0.36

| 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       | 926              | 0.0              | 490       | 3601             | 5.5              | 620       | 58340            | 0.7              | 750       | 3861             | 0.0              | 880       | 1742             | 0.0              |
| 365       | 867              | 0.0              | 495       | 5135             | 8.3              | 625       | 56180            | 0.5              | 755       | 3520             | 0.0              | 885       | 1920             | 0.0              |
| 370       | 1032             | 0.0              | 500       | 7689             | 12.9             | 630       | 53018            | 0.3              | 760       | 3223             | 0.0              | 890       | 1286             | 0.0              |
| 375       | 1034             | 0.0              | 505       | 11015            | 18.7             | 635       | 49683            | 0.2              | 765       | 2910             | 0.0              | 895       | 1660             | 0.0              |
| 380       | 979              | 0.0              | 510       | 14817            | 25.1             | 640       | 46308            | 0.1              | 770       | 2560             | 0.0              | 900       | 1274             | 0.0              |
| 385       | 938              | 0.0              | 515       | 18962            | 31.4             | 645       | 42927            | 0.1              | 775       | 2242             | 0.0              | 905       | 1020             | 0.0              |
| 390       | 893              | 0.0              | 520       | 22933            | 36.5             | 650       | 39728            | 0.0              | 780       | 2156             | 0.0              | 910       | 1258             | 0.0              |
| 395       | 757              | 0.0              | 525       | 26438            | 39.6             | 655       | 36260            | 0.0              | 785       | 1926             | 0.0              | 915       | 1481             | 0.0              |
| 400       | 728              | 0.0              | 530       | 29492            | 40.7             | 660       | 32543            | 0.0              | 790       | 1871             | 0.0              | 920       | 923              | 0.0              |
| 405       | 812              | 0.0              | 535       | 32054            | 39.9             | 665       | 29105            | 0.0              | 795       | 1697             | 0.0              | 925       | 1444             | 0.0              |
| 410       | 1197             | 0.1              | 540       | 34386            | 38.0             | 670       | 25817            | 0.0              | 800       | 1691             | 0.0              | 930       | 1315             | 0.0              |
| 415       | 2254             | 0.2              | 545       | 36784            | 35.3             | 675       | 22832            | 0.0              | 805       | 1967             | 0.0              | 935       | 1037             | 0.0              |
| 420       | 4742             | 0.8              | 550       | 39017            | 31.9             | 680       | 20201            | 0.0              | 810       | 1719             | 0.0              | 940       | 1195             | 0.0              |
| 425       | 8975             | 2.2              | 555       | 41253            | 28.2             | 685       | 17863            | 0.0              | 815       | 1436             | 0.0              | 945       | 914              | 0.0              |
| 430       | 14905            | 5.1              | 560       | 43733            | 24.4             | 690       | 15761            | 0.0              | 820       | 1465             | 0.0              | 950       | 1373             | 0.0              |
| 435       | 22096            | 9.9              | 565       | 46694            | 20.9             | 695       | 13762            | 0.0              | 825       | 1365             | 0.0              | 955       | 692              | 0.0              |
| 440       | 28868            | 16.1             | 570       | 49493            | 17.5             | 700       | 12064            | 0.0              | 830       | 1404             | 0.0              | 960       | 844              | 0.0              |
| 445       | 31683            | 21.2             | 575       | 52587            | 14.3             | 705       | 10683            | 0.0              | 835       | 1222             | 0.0              | 965       | 1427             | 0.0              |
| 450       | 25690            | 19.9             | 580       | 55129            | 11.4             | 710       | 9480             | 0.0              | 840       | 1144             | 0.0              | 970       | 654              | 0.0              |
| 455       | 14802            | 12.9             | 585       | 57737            | 8.8              | 715       | 8582             | 0.0              | 845       | 1078             | 0.0              | 975       | 1127             | 0.0              |
| 460       | 8755             | 8.5              | 590       | 59688            | 6.6              | 720       | 7530             | 0.0              | 850       | 1254             | 0.0              | 980       | 1935             | 0.0              |
| 465       | 5978             | 6.3              | 595       | 61458            | 4.9              | 725       | 6824             | 0.0              | 855       | 1203             | 0.0              | 985       | 1754             | 0.0              |
| 470       | 4047             | 4.7              | 600       | 62443            | 3.5              | 730       | 5968             | 0.0              | 860       | 1183             | 0.0              | 990       | 1822             | 0.0              |
| 475       | 3070             | 3.8              | 605       | 62403            | 2.5              | 735       | 5266             | 0.0              | 865       | 1505             | 0.0              | 995       | 1176             | 0.0              |
| 480       | 2814             | 3.8              | 610       | 61581            | 1.7              | 740       | 4712             | 0.0              | 870       | 1624             | 0.0              | 1000      | 2143             | 0.0              |
| 485       | 2926             | 4.2              | 615       | 60386            | 1.1              | 745       | 4264             | 0.0              | 875       | 1559             | 0.0              |           |                  |                  |

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### Melanopic Flux vs. Wavelength


**Melanopic Lumens: 3157.6**
**S/P: 1.07**

| 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       | 926              | 0.0              | 490       | 3601             | 3.0              | 620       | 58340            | 0.0              | 750       | 3861             | 0.0              | 880       | 1742             | 0.0              |
| 365       | 867              | 0.0              | 495       | 5135             | 4.2              | 625       | 56180            | 0.0              | 755       | 3520             | 0.0              | 885       | 1920             | 0.0              |
| 370       | 1032             | 0.0              | 500       | 7689             | 6.2              | 630       | 53018            | 0.0              | 760       | 3223             | 0.0              | 890       | 1286             | 0.0              |
| 375       | 1034             | 0.0              | 505       | 11015            | 8.5              | 635       | 49683            | 0.0              | 765       | 2910             | 0.0              | 895       | 1660             | 0.0              |
| 380       | 979              | 0.0              | 510       | 14817            | 10.6             | 640       | 46308            | 0.0              | 770       | 2560             | 0.0              | 900       | 1274             | 0.0              |
| 385       | 938              | 0.0              | 515       | 18962            | 12.4             | 645       | 42927            | 0.0              | 775       | 2242             | 0.0              | 905       | 1020             | 0.0              |
| 390       | 893              | 0.0              | 520       | 22933            | 13.4             | 650       | 39728            | 0.0              | 780       | 2156             | 0.0              | 910       | 1258             | 0.0              |
| 395       | 757              | 0.0              | 525       | 26438            | 13.4             | 655       | 36260            | 0.0              | 785       | 1926             | 0.0              | 915       | 1481             | 0.0              |
| 400       | 728              | 0.0              | 530       | 29492            | 12.7             | 660       | 32543            | 0.0              | 790       | 1871             | 0.0              | 920       | 923              | 0.0              |
| 405       | 812              | 0.0              | 535       | 32054            | 11.5             | 665       | 29105            | 0.0              | 795       | 1697             | 0.0              | 925       | 1444             | 0.0              |
| 410       | 1197             | 0.0              | 540       | 34386            | 10.1             | 670       | 25817            | 0.0              | 800       | 1691             | 0.0              | 930       | 1315             | 0.0              |
| 415       | 2254             | 0.1              | 545       | 36784            | 8.5              | 675       | 22832            | 0.0              | 805       | 1967             | 0.0              | 935       | 1037             | 0.0              |
| 420       | 4742             | 0.5              | 550       | 39017            | 7.0              | 680       | 20201            | 0.0              | 810       | 1719             | 0.0              | 940       | 1195             | 0.0              |
| 425       | 8975             | 1.4              | 555       | 41253            | 5.6              | 685       | 17863            | 0.0              | 815       | 1436             | 0.0              | 945       | 914              | 0.0              |
| 430       | 14905            | 3.1              | 560       | 43733            | 4.3              | 690       | 15761            | 0.0              | 820       | 1465             | 0.0              | 950       | 1373             | 0.0              |
| 435       | 22096            | 5.9              | 565       | 46694            | 3.3              | 695       | 13762            | 0.0              | 825       | 1365             | 0.0              | 955       | 692              | 0.0              |
| 440       | 28868            | 9.6              | 570       | 49493            | 2.4              | 700       | 12064            | 0.0              | 830       | 1404             | 0.0              | 960       | 844              | 0.0              |
| 445       | 31683            | 12.5             | 575       | 52587            | 1.8              | 705       | 10683            | 0.0              | 835       | 1222             | 0.0              | 965       | 1427             | 0.0              |
| 450       | 25690            | 11.8             | 580       | 55129            | 1.2              | 710       | 9480             | 0.0              | 840       | 1144             | 0.0              | 970       | 654              | 0.0              |
| 455       | 14802            | 7.8              | 585       | 57737            | 0.9              | 715       | 8582             | 0.0              | 845       | 1078             | 0.0              | 975       | 1127             | 0.0              |
| 460       | 8755             | 5.2              | 590       | 59688            | 0.6              | 720       | 7530             | 0.0              | 850       | 1254             | 0.0              | 980       | 1935             | 0.0              |
| 465       | 5978             | 3.9              | 595       | 61458            | 0.4              | 725       | 6824             | 0.0              | 855       | 1203             | 0.0              | 985       | 1754             | 0.0              |
| 470       | 4047             | 2.9              | 600       | 62443            | 0.3              | 730       | 5968             | 0.0              | 860       | 1183             | 0.0              | 990       | 1822             | 0.0              |
| 475       | 3070             | 2.3              | 605       | 62403            | 0.2              | 735       | 5266             | 0.0              | 865       | 1505             | 0.0              | 995       | 1176             | 0.0              |
| 480       | 2814             | 2.3              | 610       | 61581            | 0.1              | 740       | 4712             | 0.0              | 870       | 1624             | 0.0              | 1000      | 2143             | 0.0              |
| 485       | 2926             | 2.4              | 615       | 60386            | 0.1              | 745       | 4264             | 0.0              | 875       | 1559             | 0.0              |           |                  |                  |

### Summary

$R_f = 71.2$   
 $R_g = 100.1$   
 CIE  $R_a = 73.8$   
 $R_g = -7.6$

### Spectral Power Distribution Comparison



### Color Vector Graphics



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

|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 86 | CES26 = 55 | CES51 = 78 | CES76 = 50 |
| CES02 = 63 | CES27 = 77 | CES52 = 80 | CES77 = 75 |
| CES03 = 31 | CES28 = 80 | CES53 = 68 | CES78 = 56 |
| CES04 = 71 | CES29 = 46 | CES54 = 80 | CES79 = 81 |
| CES05 = 50 | CES30 = 51 | CES55 = 78 | CES80 = 80 |
| CES06 = 52 | CES31 = 51 | CES56 = 67 | CES81 = 73 |
| CES07 = 43 | CES32 = 49 | CES57 = 64 | CES82 = 91 |
| CES08 = 41 | CES33 = 55 | CES58 = 67 | CES83 = 84 |
| CES09 = 29 | CES34 = 65 | CES59 = 86 | CES84 = 89 |
| CES10 = 77 | CES35 = 82 | CES60 = 91 | CES85 = 84 |
| CES11 = 60 | CES36 = 84 | CES61 = 85 | CES86 = 66 |
| CES12 = 66 | CES37 = 75 | CES62 = 75 | CES87 = 78 |
| CES13 = 44 | CES38 = 59 | CES63 = 70 | CES88 = 75 |
| CES14 = 74 | CES39 = 91 | CES64 = 70 | CES89 = 68 |
| CES15 = 72 | CES40 = 85 | CES65 = 67 | CES90 = 71 |
| CES16 = 48 | CES41 = 78 | CES66 = 64 | CES91 = 97 |
| CES17 = 51 | CES42 = 74 | CES67 = 62 | CES92 = 71 |
| CES18 = 57 | CES43 = 63 | CES68 = 68 | CES93 = 82 |
| CES19 = 73 | CES44 = 98 | CES69 = 77 | CES94 = 58 |
| CES20 = 67 | CES45 = 75 | CES70 = 60 | CES95 = 77 |
| CES21 = 88 | CES46 = 70 | CES71 = 59 | CES96 = 80 |
| CES22 = 80 | CES47 = 65 | CES72 = 86 | CES97 = 80 |
| CES23 = 92 | CES48 = 56 | CES73 = 52 | CES98 = 74 |
| CES24 = 91 | CES49 = 68 | CES74 = 93 | CES99 = 68 |
| CES25 = 73 | CES50 = 78 | CES75 = 59 |            |



### Color Rendition by Hue-Angle Bin



**Measure Comparisons**


(END OF REPORT)