

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: P671972

Luminaire Tested: **CCP-SA-2A-740-U-AFL**

Issue Date: 04/16/2023

**Test Information**

Test Method: LM-79-08  
Report Number: P671972  
Test Lab: INNOVATION CENTER(G2)  
Issue Date: 04/16/2023  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: INVUE  
Catalog Number: CCP-SA-2A-740-U-AFL  
Description: INVUE CLEAR CURVE POLE MOUNT LIGHT SQUARE LUMINAIRE @350mA w/ AFL  
distribution lens  
Light Source: (32) 4000K CCT, 70 CRI LEDS  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 5521.7 lumens  
Efficiency: N/A  
Efficacy: 152.5 lumens/watt  
Luminous Opening: Rectangular (W 1' x L: 1' x H: 0')  
IES Classification: Type II - Short  
BUG Rating: B1 - U0 - G1

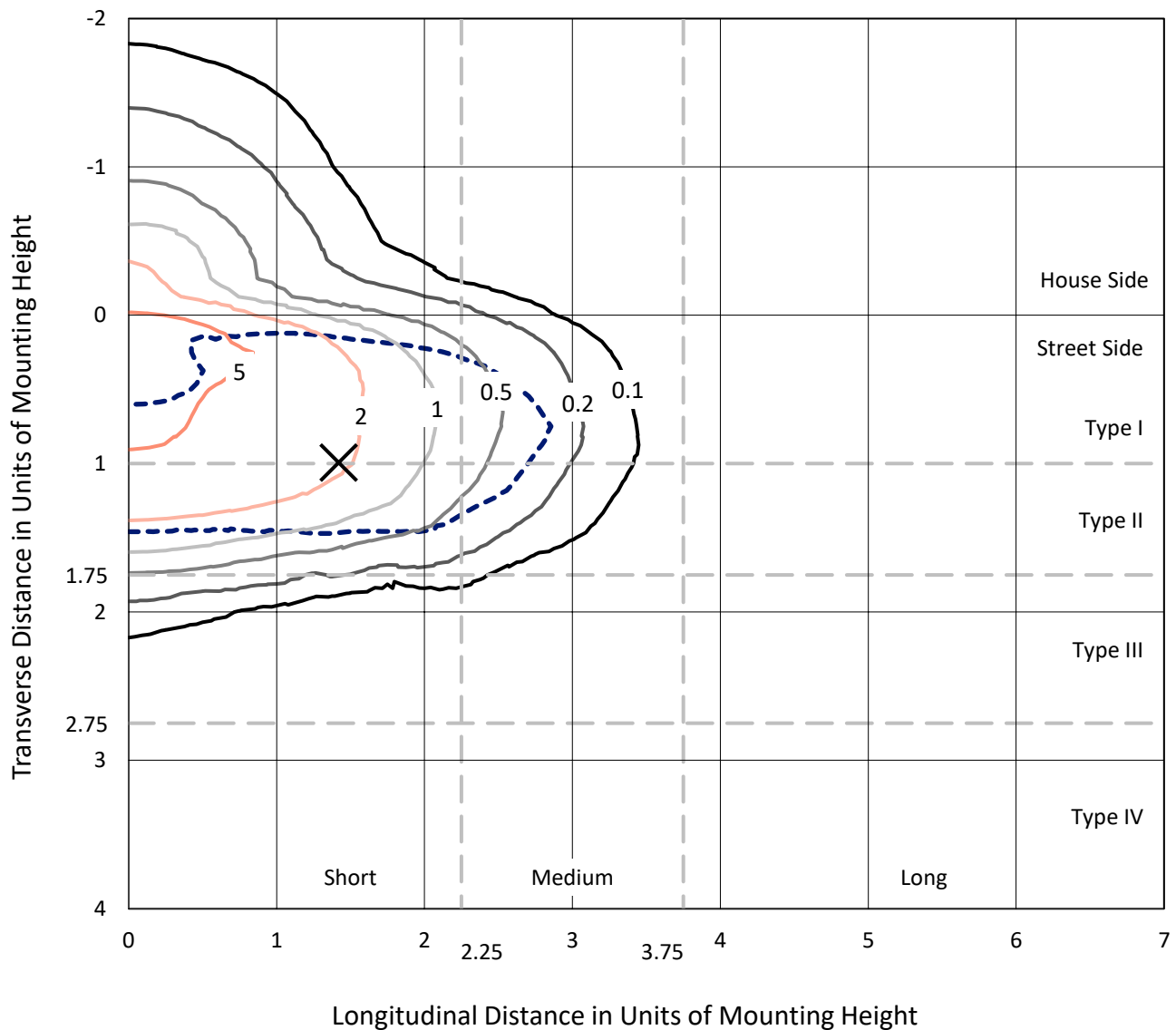
Input Watts (W): 36.2  
Input Voltage (V): 120  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: NR  
Total Harmonic Distortion (THDi): NR  
Frequency (hertz): 60  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 25 FT

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## Iso-Footcandle Lines of Horizontal Illumination

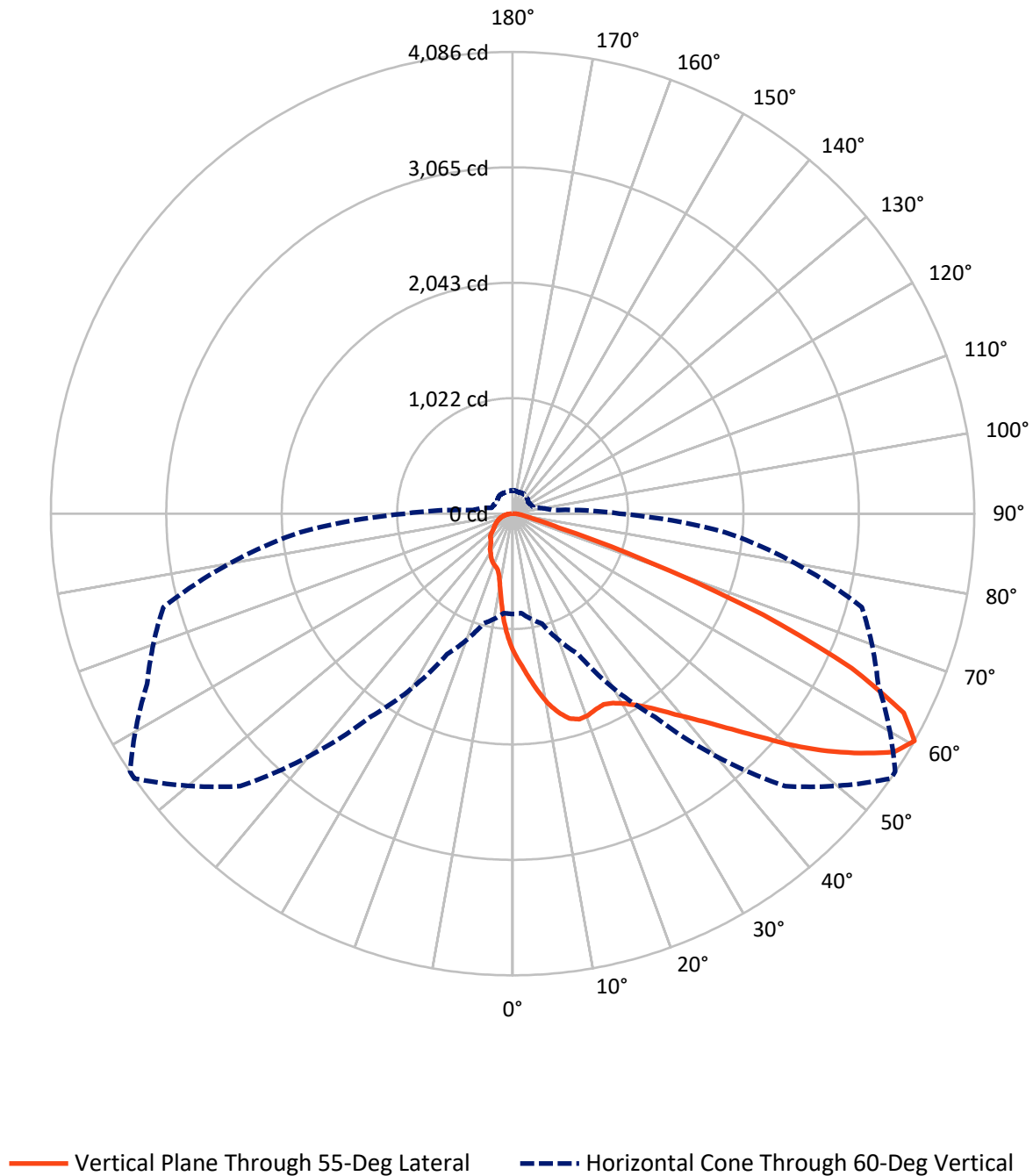
× Max cd  
 - - - 1/2 Max cd



Based on 15 foot mounting height. Maximum calculated value = 7.7 fc  
 Type II - Short - N/A

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CATALOG NUMBER: CCP-SA-2A-740-U-AFL

## Luminous Intensity Polar Plot



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CATALOG NUMBER: CCP-SA-2A-740-U-AFL

**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total  |
|--------------------|-----------|----------|--------|--------|
| <b>House Side</b>  | Lumens    | 793.8    | 0.0    | 793.8  |
|                    | % Fixture | 14.4     | 0.0    | 14.4   |
| <b>Street Side</b> | Lumens    | 4727.9   | 0.0    | 4727.9 |
|                    | % Fixture | 85.6     | 0.0    | 85.6   |
| <b>Total</b>       | Lumens    | 5521.7   | 0.0    | 5521.7 |
|                    | % Fixture | 100.0    | 0.0    | 100.0  |

**Coefficient of Utilization**

**ZONAL LUMENS:**

| Zone      | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10°    | 114.6  | 2.1       |
| 10°-20°   | 324.7  | 5.9       |
| 20°-30°   | 528.6  | 9.6       |
| 30°-40°   | 790.1  | 14.3      |
| 40°-50°   | 1161.3 | 21.0      |
| 50°-60°   | 1361.1 | 24.6      |
| 60°-70°   | 897.4  | 16.3      |
| 70°-80°   | 285.8  | 5.2       |
| 80°-90°   | 58.1   | 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°    | 5521.7 | 100.0     |
| 0°-180°   | 5521.7 | 100.0     |



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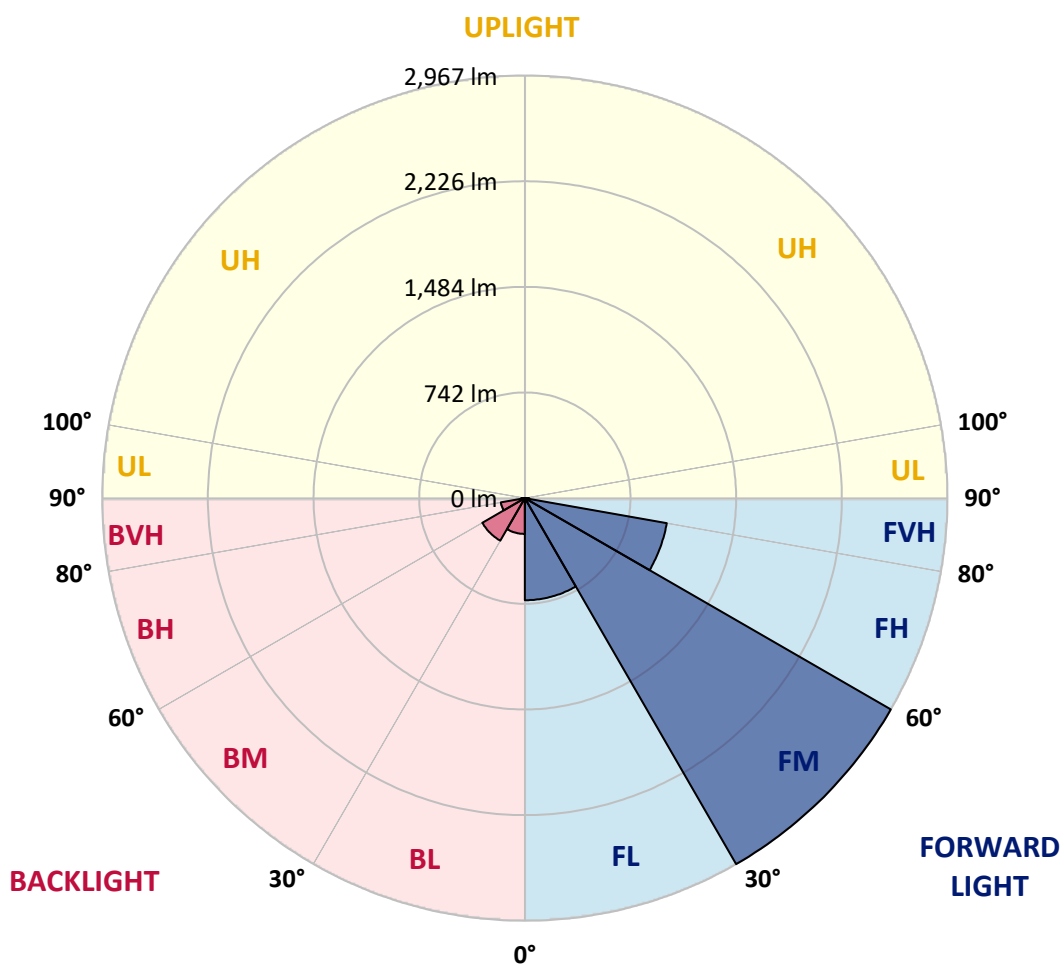
CATALOG NUMBER: CCP-SA-2A-740-U-AFL

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

| Zone |             | Lumens | % Fixture | Zone Rating/Lumen Limit |      |         |
|------|-------------|--------|-----------|-------------------------|------|---------|
|      |             |        |           | B                       | U    | G       |
| FL   | (0°-30°)    | 716.7  | 13.0      |                         |      |         |
| FM   | (30°-60°)   | 2967.5 | 53.7      |                         |      |         |
| FH   | (60°-80°)   | 1011.9 | 18.3      |                         |      | G1/1800 |
| FVH  | (80°-90°)   | 31.9   | 0.6       |                         |      | G1/100  |
| BL   | (0°-30°)    | 251.3  | 4.6       | B1/500                  |      |         |
| BM   | (30°-60°)   | 345.0  | 6.2       | B1/1000                 |      |         |
| BH   | (60°-80°)   | 171.3  | 3.1       | B1/500                  |      | G1/500  |
| BVH  | (80°-90°)   | 26.2   | 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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**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 5°     | 15°    | 25°    | 35°    | 45°    | 55°    | 56°    | 65°    | 75°    | 85°    |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 1224.6 | 1224.6 | 1224.6 | 1224.6 | 1224.6 | 1224.6 | 1224.6 | 1224.6 | 1224.6 | 1224.6 | 1224.6 |
| 2.5°  | 1425.1 | 1419.9 | 1419.9 | 1406.7 | 1387.1 | 1359.9 | 1327.4 | 1319.4 | 1307.0 | 1275.4 | 1234.6 |
| 5°    | 1642.4 | 1636.8 | 1629.2 | 1606.0 | 1569.6 | 1515.1 | 1446.7 | 1434.3 | 1389.9 | 1324.6 | 1251.0 |
| 7.5°  | 1786.1 | 1782.9 | 1780.5 | 1760.4 | 1724.4 | 1670.8 | 1579.2 | 1565.2 | 1489.9 | 1381.9 | 1266.6 |
| 10°   | 1771.3 | 1780.9 | 1797.7 | 1811.7 | 1818.9 | 1791.3 | 1705.2 | 1688.8 | 1595.6 | 1448.3 | 1289.8 |
| 12.5° | 1632.4 | 1646.0 | 1677.2 | 1734.4 | 1800.5 | 1853.7 | 1804.9 | 1795.7 | 1708.4 | 1518.7 | 1319.0 |
| 15°   | 1529.1 | 1534.7 | 1549.9 | 1592.4 | 1690.8 | 1832.9 | 1882.1 | 1873.7 | 1813.7 | 1609.2 | 1352.7 |
| 17.5° | 1497.1 | 1499.5 | 1503.1 | 1517.1 | 1584.4 | 1751.6 | 1913.7 | 1921.7 | 1915.7 | 1703.2 | 1390.7 |
| 20°   | 1513.1 | 1514.7 | 1515.1 | 1517.5 | 1549.5 | 1683.6 | 1905.3 | 1918.9 | 2005.4 | 1797.3 | 1428.3 |
| 22.5° | 1574.8 | 1572.8 | 1570.0 | 1560.8 | 1578.8 | 1671.6 | 1882.9 | 1904.5 | 2074.6 | 1882.9 | 1463.1 |
| 25°   | 1682.4 | 1679.6 | 1660.0 | 1640.8 | 1648.4 | 1714.8 | 1870.9 | 1894.1 | 2128.6 | 1963.7 | 1488.7 |
| 27.5° | 1810.5 | 1807.7 | 1787.7 | 1751.2 | 1743.2 | 1786.9 | 1898.9 | 1913.3 | 2168.2 | 2035.4 | 1499.9 |
| 30°   | 1943.3 | 1943.3 | 1918.5 | 1876.5 | 1850.9 | 1869.3 | 1950.5 | 1962.1 | 2198.3 | 2104.6 | 1507.1 |
| 32.5° | 2088.2 | 2092.2 | 2053.8 | 2005.8 | 1977.4 | 1966.5 | 2023.0 | 2033.0 | 2241.9 | 2186.3 | 1522.3 |
| 35°   | 2274.3 | 2265.5 | 2218.7 | 2155.4 | 2109.8 | 2085.4 | 2112.6 | 2124.2 | 2305.9 | 2287.9 | 1546.7 |
| 37.5° | 2483.6 | 2468.0 | 2410.4 | 2334.7 | 2255.1 | 2214.3 | 2232.3 | 2235.1 | 2400.8 | 2420.4 | 1591.2 |
| 40°   | 2656.5 | 2653.7 | 2604.9 | 2533.2 | 2432.8 | 2377.9 | 2369.1 | 2370.7 | 2532.4 | 2577.2 | 1658.4 |
| 42.5° | 2802.1 | 2791.7 | 2782.9 | 2757.7 | 2651.3 | 2561.2 | 2525.2 | 2525.6 | 2675.3 | 2739.3 | 1726.0 |
| 45°   | 2866.6 | 2864.6 | 2890.6 | 2955.4 | 2879.0 | 2772.9 | 2721.7 | 2728.9 | 2839.0 | 2905.8 | 1791.3 |
| 47.5° | 2839.0 | 2840.6 | 2910.2 | 3080.3 | 3125.5 | 3044.3 | 2953.4 | 2949.0 | 2997.4 | 3033.5 | 1848.9 |
| 50°   | 2592.4 | 2618.5 | 2807.0 | 3091.9 | 3287.2 | 3327.6 | 3225.2 | 3208.7 | 3136.3 | 3135.1 | 1884.1 |
| 52.5° | 2406.4 | 2405.2 | 2520.8 | 2973.8 | 3344.4 | 3583.3 | 3491.3 | 3454.5 | 3251.2 | 3192.3 | 1886.9 |
| 55°   | 2155.0 | 2153.4 | 2239.5 | 2628.5 | 3230.8 | 3761.8 | 3742.2 | 3696.2 | 3356.4 | 3211.1 | 1867.7 |
| 57.5° | 1632.0 | 1662.4 | 1748.0 | 2104.2 | 2870.6 | 3733.4 | 3981.9 | 3943.5 | 3459.3 | 3202.7 | 1864.1 |
| 60°   | 888.0  | 884.4  | 1008.5 | 1371.5 | 2197.9 | 3410.8 | 4086.4 | 4084.4 | 3568.5 | 3199.5 | 1886.1 |
| 62.5° | 409.4  | 405.4  | 430.2  | 610.7  | 1260.2 | 2732.5 | 3884.7 | 3913.5 | 3669.8 | 3170.3 | 1884.1 |
| 65°   | 306.1  | 295.7  | 262.1  | 284.1  | 482.2  | 1631.2 | 3299.6 | 3376.4 | 3513.7 | 3050.3 | 1796.9 |
| 67.5° | 272.9  | 262.9  | 223.7  | 209.7  | 242.1  | 575.5  | 2393.6 | 2464.4 | 2938.2 | 2825.4 | 1655.6 |
| 70°   | 250.1  | 241.3  | 202.1  | 180.1  | 181.7  | 254.9  | 1253.0 | 1392.3 | 2153.4 | 2357.9 | 1411.1 |
| 72.5° | 228.1  | 220.5  | 184.9  | 158.5  | 152.9  | 168.5  | 427.0  | 515.0  | 1339.4 | 1718.4 | 1052.1 |
| 75°   | 204.9  | 197.7  | 166.5  | 142.1  | 131.3  | 124.9  | 203.3  | 218.9  | 708.3  | 948.9  | 564.7  |
| 77.5° | 178.1  | 174.1  | 148.5  | 125.3  | 116.1  | 94.4   | 135.3  | 142.1  | 303.3  | 372.6  | 268.9  |
| 80°   | 154.9  | 151.7  | 132.5  | 113.7  | 104.1  | 72.8   | 93.2   | 98.0   | 149.7  | 186.1  | 150.5  |
| 82.5° | 100.8  | 108.9  | 109.7  | 97.6   | 91.6   | 58.4   | 61.6   | 65.2   | 99.2   | 109.7  | 65.6   |
| 85°   | 41.6   | 50.4   | 75.6   | 67.2   | 63.6   | 49.6   | 40.8   | 41.6   | 60.8   | 64.0   | 23.6   |
| 87.5° | 18.8   | 20.8   | 37.2   | 37.6   | 32.8   | 18.8   | 20.4   | 22.4   | 31.2   | 30.8   | 10.4   |
| 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°    | 1224.6 | 1224.6 | 1224.6 | 1224.6 | 1224.6 | 1224.6 | 1224.6 | 1224.6 | 1224.6 | 1224.6 | 1224.6 |
| 2.5°  | 1223.4 | 1205.0 | 1172.2 | 1130.1 | 1100.1 | 1078.1 | 1054.1 | 1036.5 | 1016.9 | 999.7  | 1002.5 |
| 5°    | 1220.6 | 1185.0 | 1111.3 | 1033.3 | 957.3  | 894.8  | 842.8  | 804.4  | 764.8  | 749.2  | 747.2  |
| 7.5°  | 1223.0 | 1162.6 | 1041.7 | 914.0  | 798.4  | 718.7  | 658.3  | 621.9  | 599.1  | 585.9  | 586.7  |
| 10°   | 1222.2 | 1141.3 | 966.5  | 790.4  | 663.9  | 591.1  | 554.3  | 542.3  | 540.3  | 541.9  | 544.3  |
| 12.5° | 1223.4 | 1112.5 | 882.0  | 679.1  | 567.5  | 530.3  | 531.9  | 542.7  | 549.5  | 553.9  | 556.7  |
| 15°   | 1228.6 | 1088.9 | 795.6  | 591.5  | 517.0  | 518.2  | 535.5  | 552.3  | 562.3  | 567.1  | 569.5  |
| 17.5° | 1236.2 | 1059.3 | 718.7  | 525.1  | 495.8  | 514.2  | 536.7  | 554.7  | 562.3  | 565.1  | 567.1  |
| 20°   | 1237.0 | 1025.3 | 641.1  | 479.4  | 481.8  | 505.8  | 525.5  | 539.9  | 549.5  | 552.7  | 554.3  |
| 22.5° | 1233.4 | 979.3  | 561.5  | 446.2  | 465.8  | 489.8  | 506.6  | 523.1  | 510.2  | 499.8  | 497.0  |
| 25°   | 1218.2 | 921.2  | 493.4  | 419.0  | 445.8  | 468.2  | 487.4  | 469.4  | 463.4  | 455.4  | 456.2  |
| 27.5° | 1185.4 | 848.8  | 429.4  | 393.4  | 422.2  | 454.2  | 440.2  | 437.8  | 430.2  | 422.2  | 422.2  |
| 30°   | 1142.1 | 772.4  | 375.8  | 366.6  | 393.8  | 409.8  | 413.0  | 409.4  | 405.0  | 394.6  | 395.4  |
| 32.5° | 1103.3 | 691.5  | 337.8  | 344.2  | 375.8  | 375.8  | 389.8  | 389.8  | 373.8  | 344.6  | 344.6  |
| 35°   | 1064.9 | 615.5  | 309.7  | 325.4  | 346.2  | 353.0  | 372.2  | 347.0  | 324.2  | 310.9  | 310.1  |
| 37.5° | 1034.9 | 550.7  | 291.3  | 309.3  | 317.4  | 334.6  | 335.0  | 316.6  | 308.9  | 296.9  | 295.7  |
| 40°   | 1017.3 | 496.2  | 280.1  | 301.3  | 302.1  | 318.2  | 291.7  | 296.9  | 295.3  | 286.1  | 284.9  |
| 42.5° | 1007.7 | 454.2  | 271.7  | 294.5  | 290.5  | 274.9  | 270.1  | 278.9  | 281.7  | 276.9  | 274.9  |
| 45°   | 1000.1 | 421.4  | 264.9  | 270.9  | 281.3  | 252.9  | 250.9  | 257.7  | 263.7  | 263.3  | 261.7  |
| 47.5° | 996.1  | 398.6  | 258.9  | 256.1  | 258.1  | 239.7  | 235.7  | 238.9  | 246.5  | 251.3  | 250.9  |
| 50°   | 980.5  | 381.0  | 250.1  | 240.9  | 228.1  | 228.1  | 226.1  | 226.1  | 235.3  | 244.9  | 245.7  |
| 52.5° | 952.9  | 360.2  | 237.3  | 226.5  | 211.7  | 218.1  | 218.9  | 217.3  | 226.9  | 237.3  | 238.1  |
| 55°   | 922.4  | 344.6  | 220.1  | 213.3  | 198.1  | 208.9  | 212.5  | 210.9  | 217.3  | 224.5  | 224.1  |
| 57.5° | 922.8  | 344.2  | 205.3  | 200.1  | 185.3  | 197.3  | 206.1  | 206.5  | 206.1  | 211.3  | 211.3  |
| 60°   | 946.1  | 352.2  | 193.7  | 182.5  | 170.5  | 184.9  | 199.3  | 199.3  | 196.5  | 204.1  | 204.9  |
| 62.5° | 952.9  | 351.4  | 186.5  | 165.7  | 157.3  | 173.7  | 189.3  | 191.7  | 189.7  | 200.5  | 201.7  |
| 65°   | 892.8  | 332.6  | 179.3  | 150.5  | 145.3  | 161.3  | 176.9  | 183.7  | 181.7  | 195.7  | 197.3  |
| 67.5° | 809.6  | 308.1  | 168.1  | 136.9  | 132.9  | 149.3  | 164.1  | 171.3  | 170.9  | 189.3  | 190.1  |
| 70°   | 697.9  | 278.1  | 154.1  | 122.9  | 120.9  | 135.3  | 148.5  | 156.1  | 159.7  | 180.9  | 180.5  |
| 72.5° | 540.7  | 238.5  | 132.9  | 108.1  | 107.7  | 120.9  | 132.5  | 140.9  | 147.7  | 168.1  | 168.1  |
| 75°   | 348.6  | 187.7  | 108.5  | 93.6   | 92.0   | 104.5  | 116.5  | 126.1  | 146.9  | 179.3  | 178.9  |
| 77.5° | 212.9  | 143.3  | 87.2   | 78.0   | 77.6   | 88.8   | 100.8  | 117.3  | 160.5  | 159.7  | 155.3  |
| 80°   | 127.7  | 102.8  | 69.6   | 62.4   | 62.4   | 72.8   | 86.0   | 125.7  | 133.3  | 152.1  | 143.7  |
| 82.5° | 66.4   | 63.2   | 52.0   | 46.0   | 48.0   | 57.2   | 78.4   | 100.4  | 108.9  | 92.4   | 84.8   |
| 85°   | 27.2   | 33.6   | 32.0   | 29.2   | 30.4   | 39.6   | 75.6   | 80.4   | 64.4   | 67.6   | 68.0   |
| 87.5° | 9.2    | 14.8   | 14.8   | 11.6   | 12.8   | 28.0   | 44.8   | 26.8   | 32.4   | 19.2   | 14.4   |
| 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: SP1-2104-224-3

Luminaire Tested: CCW-SA-2A-740-U-SL4

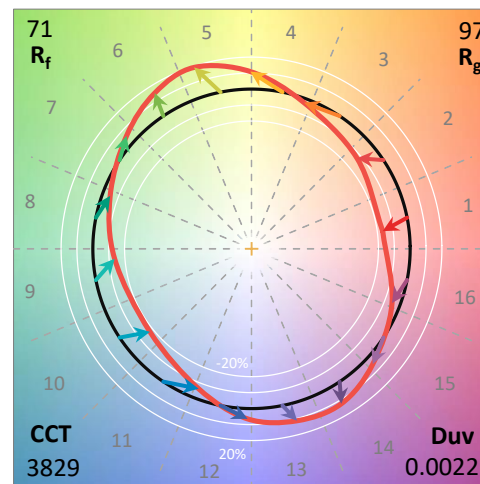
Test Date: 04/26/2021

### Test Information

Test Method: LM-79-08  
 Report Number: SP1-2104-224-3  
 Test Lab: COOPER LIGHTING SOLUTIONS  
 Photometer: SP1  
 Measurement Geometry:  $4\pi$   
 Issue Date: 04/26/2021  
 Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
 Product Line: INVUE  
 Catalog Number: **CCW-SA-2A-740-U-SL4**  
 Description: INVUE WALL PACK ClearCurve Light Square

### Spectral Parameters

|                           |        |           |      |      |       |
|---------------------------|--------|-----------|------|------|-------|
| CCT (K):                  | 3829   | CRI (Ra): | 69.8 |      |       |
| CIE u':                   | 0.2271 | R1:       | 67.2 | R9:  | -35.1 |
| CIE v':                   | 0.5076 | R2:       | 75.2 | R10: | 43.1  |
| Duv:                      | 0.0022 | R3:       | 83.2 | R11: | 69.0  |
| CIE x:                    | 0.3900 | R4:       | 71.0 | R12: | 44.3  |
| CIE y:                    | 0.3873 | R5:       | 67.4 | R13: | 67.6  |
| CIE z:                    | 0.2227 | R6:       | 66.8 | R14: | 90.3  |
| Peak Wavelength (nm):     | 440    | R7:       | 77.6 |      |       |
| Dominant Wavelength (nm): | 578    | R8:       | 50.3 |      |       |
| Purity:                   | 33.4   |           |      |      |       |
| Rf:                       | 70.6   |           |      |      |       |
| Rg:                       | 96.7   |           |      |      |       |



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| 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 4000K 7-step quadrangle

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### Photopic Flux vs. Wavelength

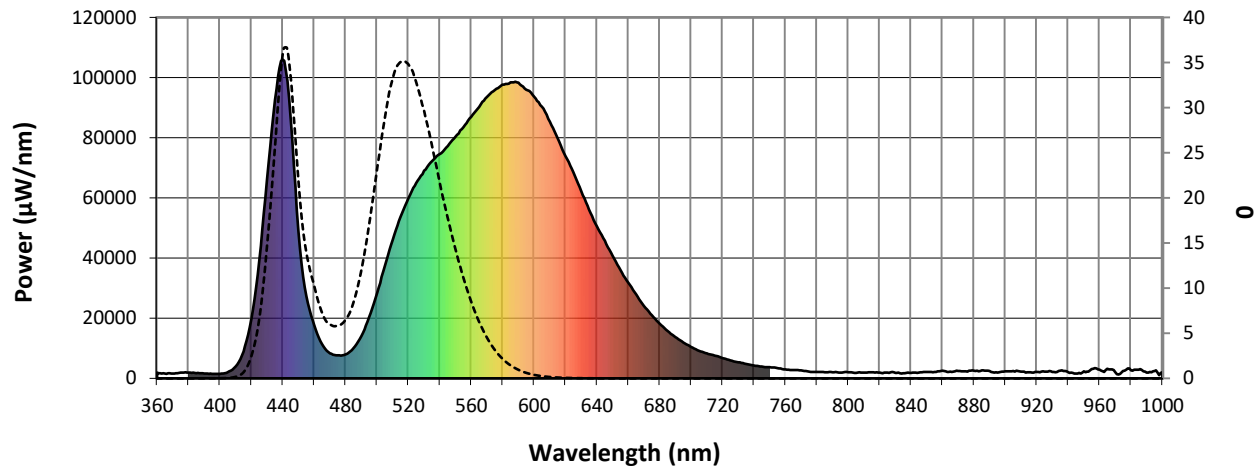


#####

| λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) |
|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|
| 360       | 1901             | 0.0              | 490       | 14057            | 2.0              | 620       | 73853            | 19.2             | 750       | 3678             | 0.0              | 880       | 2528             | 0.0              |
| 365       | 1585             | 0.0              | 495       | 20304            | 3.7              | 625       | 68653            | 15.1             | 755       | 3385             | 0.0              | 885       | 2638             | 0.0              |
| 370       | 1604             | 0.0              | 500       | 28346            | 6.3              | 630       | 62254            | 11.3             | 760       | 2963             | 0.0              | 890       | 2417             | 0.0              |
| 375       | 1905             | 0.0              | 505       | 37228            | 10.4             | 635       | 56177            | 8.4              | 765       | 2782             | 0.0              | 895       | 1902             | 0.0              |
| 380       | 1882             | 0.0              | 510       | 46037            | 15.8             | 640       | 50521            | 6.0              | 770       | 2657             | 0.0              | 900       | 2330             | 0.0              |
| 385       | 1693             | 0.0              | 515       | 53619            | 22.2             | 645       | 45727            | 4.4              | 775       | 2259             | 0.0              | 905       | 2456             | 0.0              |
| 390       | 1640             | 0.0              | 520       | 59890            | 29.0             | 650       | 40814            | 3.0              | 780       | 2169             | 0.0              | 910       | 2205             | 0.0              |
| 395       | 1513             | 0.0              | 525       | 64946            | 34.9             | 655       | 35925            | 2.1              | 785       | 2065             | 0.0              | 915       | 2002             | 0.0              |
| 400       | 1481             | 0.0              | 530       | 69048            | 40.7             | 660       | 31824            | 1.3              | 790       | 2054             | 0.0              | 920       | 2125             | 0.0              |
| 405       | 2044             | 0.0              | 535       | 72246            | 44.8             | 665       | 27860            | 0.9              | 795       | 1908             | 0.0              | 925       | 2266             | 0.0              |
| 410       | 3966             | 0.0              | 540       | 74621            | 48.6             | 670       | 24069            | 0.5              | 800       | 2026             | 0.0              | 930       | 2159             | 0.0              |
| 415       | 8943             | 0.0              | 545       | 77288            | 51.4             | 675       | 20926            | 0.4              | 805       | 1766             | 0.0              | 935       | 2581             | 0.0              |
| 420       | 19566            | 0.1              | 550       | 80334            | 54.6             | 680       | 18170            | 0.2              | 810       | 1913             | 0.0              | 940       | 2052             | 0.0              |
| 425       | 39243            | 0.2              | 555       | 83561            | 57.1             | 685       | 15785            | 0.1              | 815       | 2019             | 0.0              | 945       | 1631             | 0.0              |
| 430       | 66113            | 0.5              | 560       | 86964            | 59.1             | 690       | 13770            | 0.1              | 820       | 1876             | 0.0              | 950       | 2301             | 0.0              |
| 435       | 92550            | 1.1              | 565       | 90264            | 60.0             | 695       | 11953            | 0.1              | 825       | 1869             | 0.0              | 955       | 3077             | 0.0              |
| 440       | 106034           | 1.7              | 570       | 93519            | 60.8             | 700       | 10452            | 0.0              | 830       | 1862             | 0.0              | 960       | 2911             | 0.0              |
| 445       | 86383            | 1.8              | 575       | 95920            | 59.7             | 705       | 9162             | 0.0              | 835       | 1663             | 0.0              | 965       | 3163             | 0.0              |
| 450       | 49216            | 1.3              | 580       | 97650            | 58.0             | 710       | 8266             | 0.0              | 840       | 1843             | 0.0              | 970       | 1995             | 0.0              |
| 455       | 27376            | 0.9              | 585       | 98486            | 54.7             | 715       | 7583             | 0.0              | 845       | 1921             | 0.0              | 975       | 2418             | 0.0              |
| 460       | 17830            | 0.7              | 590       | 98332            | 50.8             | 720       | 6750             | 0.0              | 850       | 2105             | 0.0              | 980       | 2674             | 0.0              |
| 465       | 11374            | 0.6              | 595       | 96023            | 45.5             | 725       | 5965             | 0.0              | 855       | 2096             | 0.0              | 985       | 2850             | 0.0              |
| 470       | 8344             | 0.5              | 600       | 93650            | 40.4             | 730       | 5310             | 0.0              | 860       | 2601             | 0.0              | 990       | 1972             | 0.0              |
| 475       | 7639             | 0.6              | 605       | 90313            | 35.0             | 735       | 4838             | 0.0              | 865       | 2199             | 0.0              | 995       | 2443             | 0.0              |
| 480       | 7991             | 0.8              | 610       | 85305            | 29.3             | 740       | 4280             | 0.0              | 870       | 2491             | 0.0              | 1000      | 1979             | 0.0              |
| 485       | 9994             | 1.2              | 615       | 79870            | 24.1             | 745       | 3928             | 0.0              | 875       | 2370             | 0.0              |           |                  |                  |

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### Scotopic Flux vs. Wavelength



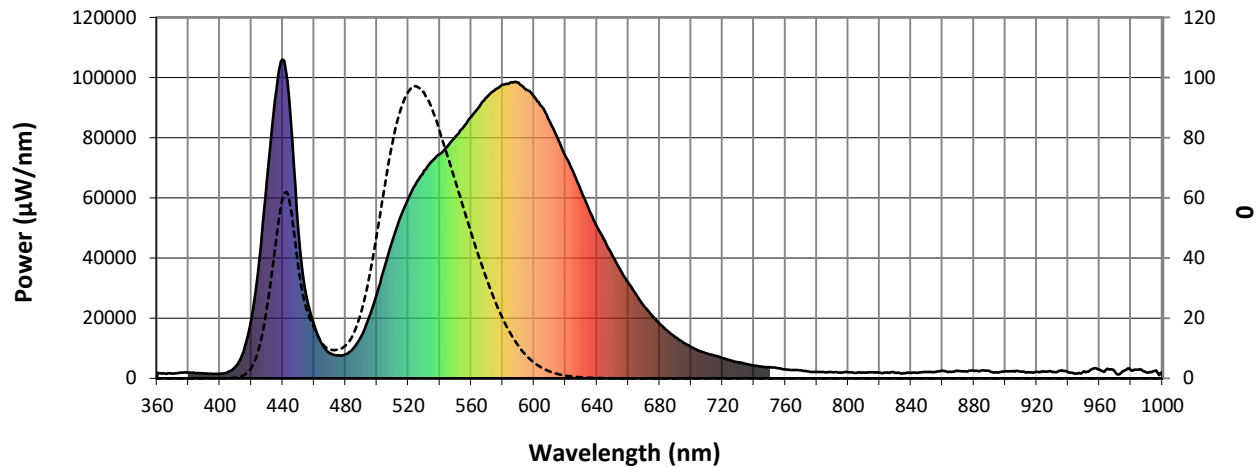
Scotopic Lumens: 7682.8

S/P: 1.42

| 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       | 1901             | 0.0              | 490       | 14057            | 21.6             | 620       | 73853            | 0.9              | 750       | 3678             | 0.0              | 880       | 2528             | 0.0              |
| 365       | 1585             | 0.0              | 495       | 20304            | 32.8             | 625       | 68653            | 0.6              | 755       | 3385             | 0.0              | 885       | 2638             | 0.0              |
| 370       | 1604             | 0.0              | 500       | 28346            | 47.4             | 630       | 62254            | 0.4              | 760       | 2963             | 0.0              | 890       | 2417             | 0.0              |
| 375       | 1905             | 0.0              | 505       | 37228            | 63.3             | 635       | 56177            | 0.2              | 765       | 2782             | 0.0              | 895       | 1902             | 0.0              |
| 380       | 1882             | 0.0              | 510       | 46037            | 78.0             | 640       | 50521            | 0.1              | 770       | 2657             | 0.0              | 900       | 2330             | 0.0              |
| 385       | 1693             | 0.0              | 515       | 53619            | 88.9             | 645       | 45727            | 0.1              | 775       | 2259             | 0.0              | 905       | 2456             | 0.0              |
| 390       | 1640             | 0.0              | 520       | 59890            | 95.2             | 650       | 40814            | 0.0              | 780       | 2169             | 0.0              | 910       | 2205             | 0.0              |
| 395       | 1513             | 0.0              | 525       | 64946            | 97.2             | 655       | 35925            | 0.0              | 785       | 2065             | 0.0              | 915       | 2002             | 0.0              |
| 400       | 1481             | 0.0              | 530       | 69048            | 95.2             | 660       | 31824            | 0.0              | 790       | 2054             | 0.0              | 920       | 2125             | 0.0              |
| 405       | 2044             | 0.1              | 535       | 72246            | 90.0             | 665       | 27860            | 0.0              | 795       | 1908             | 0.0              | 925       | 2266             | 0.0              |
| 410       | 3966             | 0.2              | 540       | 74621            | 82.5             | 670       | 24069            | 0.0              | 800       | 2026             | 0.0              | 930       | 2159             | 0.0              |
| 415       | 8943             | 0.9              | 545       | 77288            | 74.1             | 675       | 20926            | 0.0              | 805       | 1766             | 0.0              | 935       | 2581             | 0.0              |
| 420       | 19566            | 3.2              | 550       | 80334            | 65.7             | 680       | 18170            | 0.0              | 810       | 1913             | 0.0              | 940       | 2052             | 0.0              |
| 425       | 39243            | 9.6              | 555       | 83561            | 57.1             | 685       | 15785            | 0.0              | 815       | 2019             | 0.0              | 945       | 1631             | 0.0              |
| 430       | 66113            | 22.5             | 560       | 86964            | 48.6             | 690       | 13770            | 0.0              | 820       | 1876             | 0.0              | 950       | 2301             | 0.0              |
| 435       | 92550            | 41.4             | 565       | 90264            | 40.5             | 695       | 11953            | 0.0              | 825       | 1869             | 0.0              | 955       | 3077             | 0.0              |
| 440       | 106034           | 59.3             | 570       | 93519            | 33.0             | 700       | 10452            | 0.0              | 830       | 1862             | 0.0              | 960       | 2911             | 0.0              |
| 445       | 86383            | 57.8             | 575       | 95920            | 26.1             | 705       | 9162             | 0.0              | 835       | 1663             | 0.0              | 965       | 3163             | 0.0              |
| 450       | 49216            | 38.1             | 580       | 97650            | 20.1             | 710       | 8266             | 0.0              | 840       | 1843             | 0.0              | 970       | 1995             | 0.0              |
| 455       | 27376            | 23.9             | 585       | 98486            | 15.1             | 715       | 7583             | 0.0              | 845       | 1921             | 0.0              | 975       | 2418             | 0.0              |
| 460       | 17830            | 17.2             | 590       | 98332            | 10.9             | 720       | 6750             | 0.0              | 850       | 2105             | 0.0              | 980       | 2674             | 0.0              |
| 465       | 11374            | 12.0             | 595       | 96023            | 7.7              | 725       | 5965             | 0.0              | 855       | 2096             | 0.0              | 985       | 2850             | 0.0              |
| 470       | 8344             | 9.6              | 600       | 93650            | 5.3              | 730       | 5310             | 0.0              | 860       | 2601             | 0.0              | 990       | 1972             | 0.0              |
| 475       | 7639             | 9.6              | 605       | 90313            | 3.5              | 735       | 4838             | 0.0              | 865       | 2199             | 0.0              | 995       | 2443             | 0.0              |
| 480       | 7991             | 10.8             | 610       | 85305            | 2.3              | 740       | 4280             | 0.0              | 870       | 2491             | 0.0              | 1000      | 1979             | 0.0              |
| 485       | 9994             | 14.5             | 615       | 79870            | 1.5              | 745       | 3928             | 0.0              | 875       | 2370             | 0.0              |           |                  |                  |

REPORT NUMBER: SP1-2104-224-3

### Melanopic Flux vs. Wavelength



**Melanopic Lumens: 2823**

**M/P: 0.52**

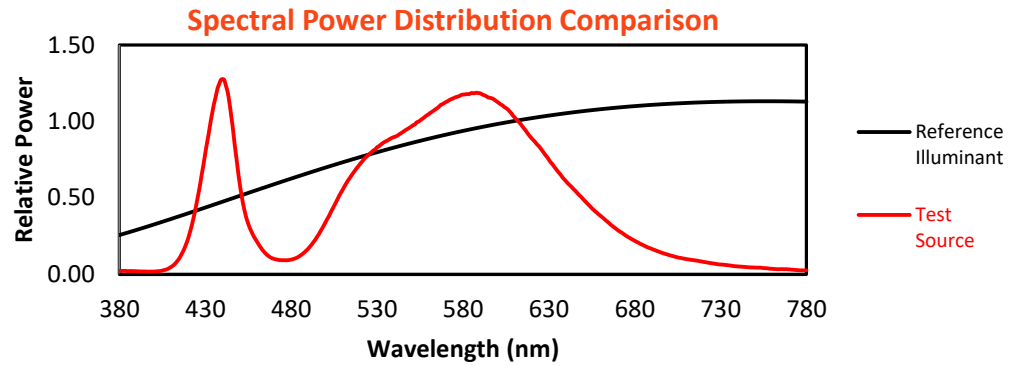
| λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) |
|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|
| 360       | 1901             | 0.0              | 490       | 14057            | 11.7             | 620       | 73853            | 0.1              | 750       | 3678             | 0.0              | 880       | 2528             | 0.0              |
| 365       | 1585             | 0.0              | 495       | 20304            | 16.8             | 625       | 68653            | 0.0              | 755       | 3385             | 0.0              | 885       | 2638             | 0.0              |
| 370       | 1604             | 0.0              | 500       | 28346            | 22.8             | 630       | 62254            | 0.0              | 760       | 2963             | 0.0              | 890       | 2417             | 0.0              |
| 375       | 1905             | 0.0              | 505       | 37228            | 28.6             | 635       | 56177            | 0.0              | 765       | 2782             | 0.0              | 895       | 1902             | 0.0              |
| 380       | 1882             | 0.0              | 510       | 46037            | 33.1             | 640       | 50521            | 0.0              | 770       | 2657             | 0.0              | 900       | 2330             | 0.0              |
| 385       | 1693             | 0.0              | 515       | 53619            | 35.0             | 645       | 45727            | 0.0              | 775       | 2259             | 0.0              | 905       | 2456             | 0.0              |
| 390       | 1640             | 0.0              | 520       | 59890            | 34.9             | 650       | 40814            | 0.0              | 780       | 2169             | 0.0              | 910       | 2205             | 0.0              |
| 395       | 1513             | 0.0              | 525       | 64946            | 32.9             | 655       | 35925            | 0.0              | 785       | 2065             | 0.0              | 915       | 2002             | 0.0              |
| 400       | 1481             | 0.0              | 530       | 69048            | 29.8             | 660       | 31824            | 0.0              | 790       | 2054             | 0.0              | 920       | 2125             | 0.0              |
| 405       | 2044             | 0.0              | 535       | 72246            | 26.0             | 665       | 27860            | 0.0              | 795       | 1908             | 0.0              | 925       | 2266             | 0.0              |
| 410       | 3966             | 0.2              | 540       | 74621            | 21.8             | 670       | 24069            | 0.0              | 800       | 2026             | 0.0              | 930       | 2159             | 0.0              |
| 415       | 8943             | 0.6              | 545       | 77288            | 18.0             | 675       | 20926            | 0.0              | 805       | 1766             | 0.0              | 935       | 2581             | 0.0              |
| 420       | 19566            | 2.2              | 550       | 80334            | 14.4             | 680       | 18170            | 0.0              | 810       | 1913             | 0.0              | 940       | 2052             | 0.0              |
| 425       | 39243            | 6.1              | 555       | 83561            | 11.3             | 685       | 15785            | 0.0              | 815       | 2019             | 0.0              | 945       | 1631             | 0.0              |
| 430       | 66113            | 14.0             | 560       | 86964            | 8.6              | 690       | 13770            | 0.0              | 820       | 1876             | 0.0              | 950       | 2301             | 0.0              |
| 435       | 92550            | 24.7             | 565       | 90264            | 6.3              | 695       | 11953            | 0.0              | 825       | 1869             | 0.0              | 955       | 3077             | 0.0              |
| 440       | 106034           | 35.4             | 570       | 93519            | 4.6              | 700       | 10452            | 0.0              | 830       | 1862             | 0.0              | 960       | 2911             | 0.0              |
| 445       | 86383            | 34.1             | 575       | 95920            | 3.2              | 705       | 9162             | 0.0              | 835       | 1663             | 0.0              | 965       | 3163             | 0.0              |
| 450       | 49216            | 22.7             | 580       | 97650            | 2.2              | 710       | 8266             | 0.0              | 840       | 1843             | 0.0              | 970       | 1995             | 0.0              |
| 455       | 27376            | 14.3             | 585       | 98486            | 1.5              | 715       | 7583             | 0.0              | 845       | 1921             | 0.0              | 975       | 2418             | 0.0              |
| 460       | 17830            | 10.5             | 590       | 98332            | 1.0              | 720       | 6750             | 0.0              | 850       | 2105             | 0.0              | 980       | 2674             | 0.0              |
| 465       | 11374            | 7.4              | 595       | 96023            | 0.6              | 725       | 5965             | 0.0              | 855       | 2096             | 0.0              | 985       | 2850             | 0.0              |
| 470       | 8344             | 6.0              | 600       | 93650            | 0.4              | 730       | 5310             | 0.0              | 860       | 2601             | 0.0              | 990       | 1972             | 0.0              |
| 475       | 7639             | 5.8              | 605       | 90313            | 0.2              | 735       | 4838             | 0.0              | 865       | 2199             | 0.0              | 995       | 2443             | 0.0              |
| 480       | 7991             | 6.4              | 610       | 85305            | 0.2              | 740       | 4280             | 0.0              | 870       | 2491             | 0.0              | 1000      | 1979             | 0.0              |
| 485       | 9994             | 8.2              | 615       | 79870            | 0.1              | 745       | 3928             | 0.0              | 875       | 2370             | 0.0              |           |                  |                  |

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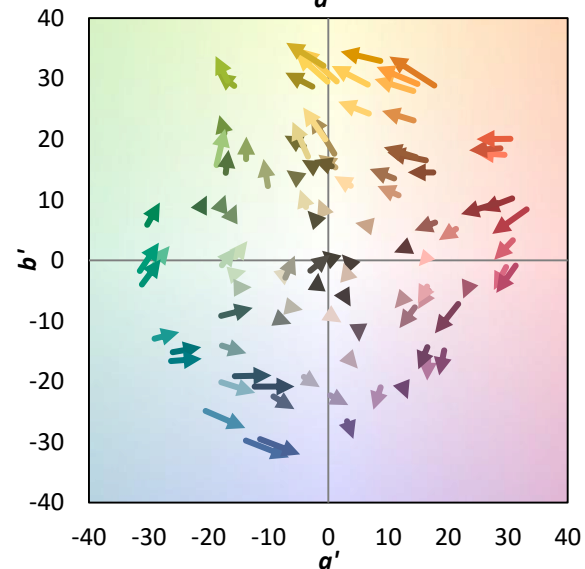
TM-30-18

### Summary

$R_f = 70.6$   
 $R_g = 96.7$   
 CIE  $R_a = 69.8$   
 $R_g = -35.1$

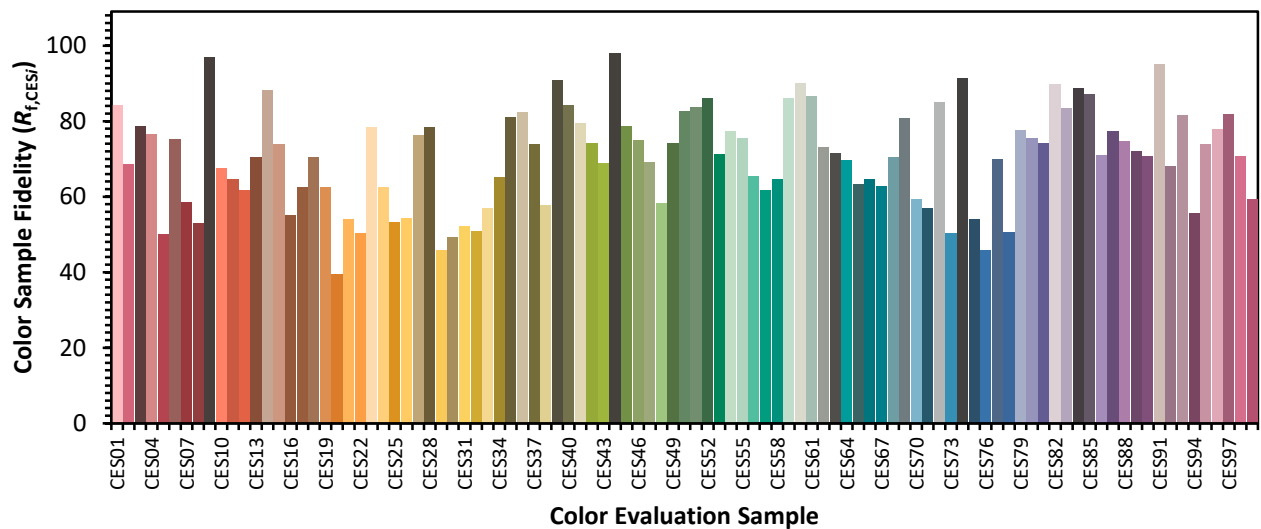


### Color Vector Graphics



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

|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 85 | CES26 = 54 | CES51 = 84 | CES76 = 46 |
| CES02 = 61 | CES27 = 76 | CES52 = 86 | CES77 = 70 |
| CES03 = 30 | CES28 = 78 | CES53 = 71 | CES78 = 50 |
| CES04 = 70 | CES29 = 46 | CES54 = 77 | CES79 = 77 |
| CES05 = 47 | CES30 = 49 | CES55 = 76 | CES80 = 75 |
| CES06 = 50 | CES31 = 52 | CES56 = 65 | CES81 = 74 |
| CES07 = 40 | CES32 = 51 | CES57 = 62 | CES82 = 90 |
| CES08 = 39 | CES33 = 57 | CES58 = 65 | CES83 = 84 |
| CES09 = 29 | CES34 = 65 | CES59 = 86 | CES84 = 89 |
| CES10 = 74 | CES35 = 81 | CES60 = 90 | CES85 = 87 |
| CES11 = 57 | CES36 = 82 | CES61 = 87 | CES86 = 71 |
| CES12 = 63 | CES37 = 74 | CES62 = 73 | CES87 = 77 |
| CES13 = 42 | CES38 = 58 | CES63 = 72 | CES88 = 75 |
| CES14 = 74 | CES39 = 91 | CES64 = 70 | CES89 = 72 |
| CES15 = 71 | CES40 = 84 | CES65 = 63 | CES90 = 71 |
| CES16 = 46 | CES41 = 79 | CES66 = 65 | CES91 = 95 |
| CES17 = 49 | CES42 = 74 | CES67 = 63 | CES92 = 68 |
| CES18 = 56 | CES43 = 69 | CES68 = 70 | CES93 = 82 |
| CES19 = 72 | CES44 = 98 | CES69 = 81 | CES94 = 56 |
| CES20 = 65 | CES45 = 79 | CES70 = 59 | CES95 = 74 |
| CES21 = 86 | CES46 = 75 | CES71 = 57 | CES96 = 78 |
| CES22 = 78 | CES47 = 69 | CES72 = 85 | CES97 = 82 |
| CES23 = 92 | CES48 = 58 | CES73 = 50 | CES98 = 71 |
| CES24 = 91 | CES49 = 74 | CES74 = 91 | CES99 = 59 |
| CES25 = 72 | CES50 = 83 | CES75 = 54 |            |



Color Rendition by Hue-Angle Bin



**Measure Comparisons**



(END OF REPORT)