

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: McGRAW-EDISON

Report Number: P386162

Luminaire Tested: **GWC-SA1D-735-U-SL3-HSS**

Issue Date: 3/3/2020

**Test Information**

Test Method: LM-79-08  
Report Number: P386162  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-1903-205-23)  
Test Lab: INNOVATION CENTER  
Issue Date: 3/3/2020  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: MCGRAW-EDISON  
Catalog Number: GWC-SA1D-735-U-SL3-HSS  
Description: GALLEON WALL LUMINAIRE  
(1) 70 CRI, 3500K, 1200mA LIGHTSQUARE WITH 16 LEDS AND TYPE III SPILL  
LIGHT ELIMINATOR OPTICS WITH HOUSE SIDE SHIELD  
Light Source: -  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 6650.9 lumens  
Efficiency: N/A  
Efficacy: 99.3 lumens/watt  
Luminous Opening: Rectangular (W 0.5' x L: 0.5' x H: 0')  
IES Classification: Type III - Medium  
BUG Rating: B1 - U0 - G2

Input Watts (W): 67  
Input Voltage (V): NR  
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: 28.75 FT

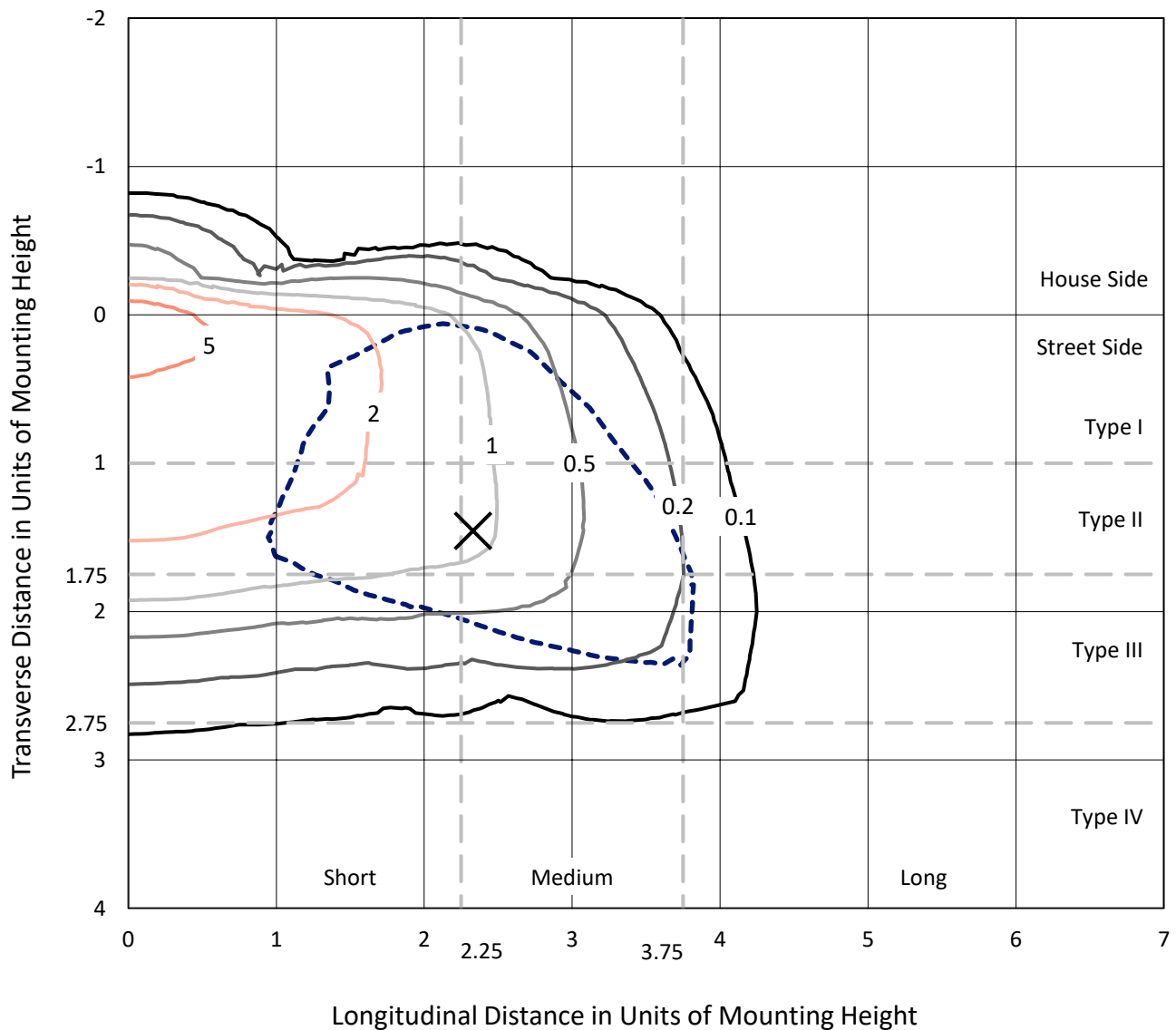


REPORT NUMBER: P386162

CATALOG NUMBER: GWC-SA1D-735-U-SL3-HSS

## Iso-Footcandle Lines of Horizontal Illumination

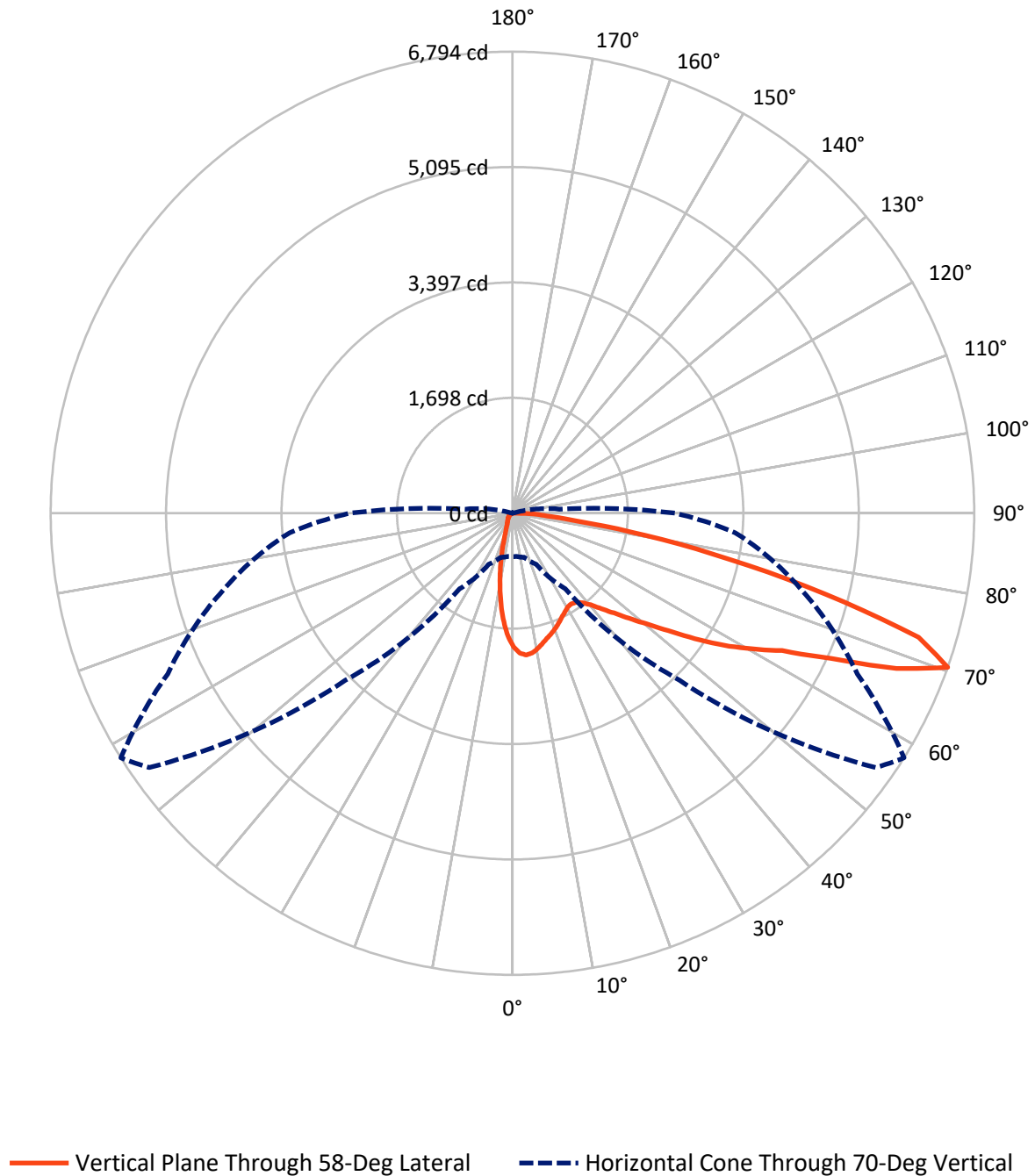
× Max cd  
 - - - 1/2 Max cd



Based on 15 foot mounting height. Maximum calculated value = 8.9 fc  
 Type III - Medium - N/A

REPORT NUMBER: P386162  
CATALOG NUMBER: GWC-SA1D-735-U-SL3-HSS

## Luminous Intensity Polar Plot



REPORT NUMBER: P386162

CATALOG NUMBER: GWC-SA1D-735-U-SL3-HSS

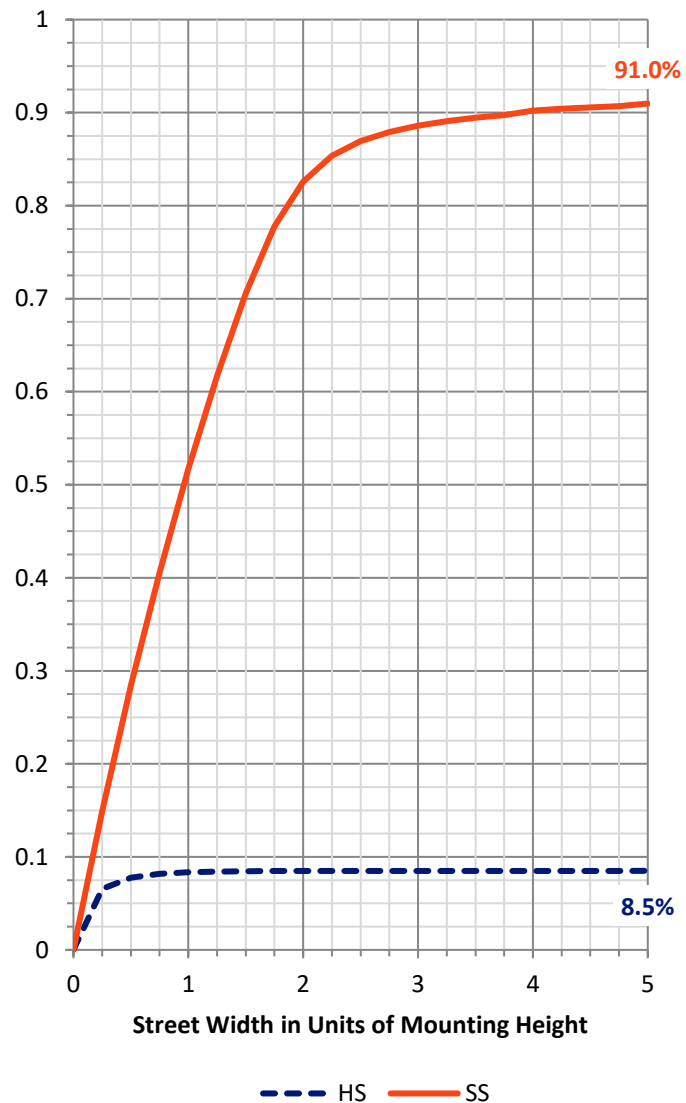
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total  |
|--------------------|-----------|----------|--------|--------|
| <b>House Side</b>  | Lumens    | 569.2    | 0.0    | 569.2  |
|                    | % Fixture | 8.6      | 0.0    | 8.6    |
| <b>Street Side</b> | Lumens    | 6081.7   | 0.0    | 6081.7 |
|                    | % Fixture | 91.4     | 0.0    | 91.4   |
| <b>Total</b>       | Lumens    | 6650.9   | 0.0    | 6650.9 |
|                    | % Fixture | 100.0    | 0.0    | 100.0  |

**ZONAL LUMENS:**

| Zone      | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10°    | 160.7  | 2.4       |
| 10°-20°   | 337.2  | 5.1       |
| 20°-30°   | 443.3  | 6.7       |
| 30°-40°   | 587.1  | 8.8       |
| 40°-50°   | 877.5  | 13.2      |
| 50°-60°   | 1405.7 | 21.1      |
| 60°-70°   | 1771.9 | 26.6      |
| 70°-80°   | 955.8  | 14.4      |
| 80°-90°   | 111.9  | 1.7       |
| 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°    | 6650.9 | 100.0     |
| 0°-180°   | 6650.9 | 100.0     |

**Coefficient of Utilization**



REPORT NUMBER: P386162

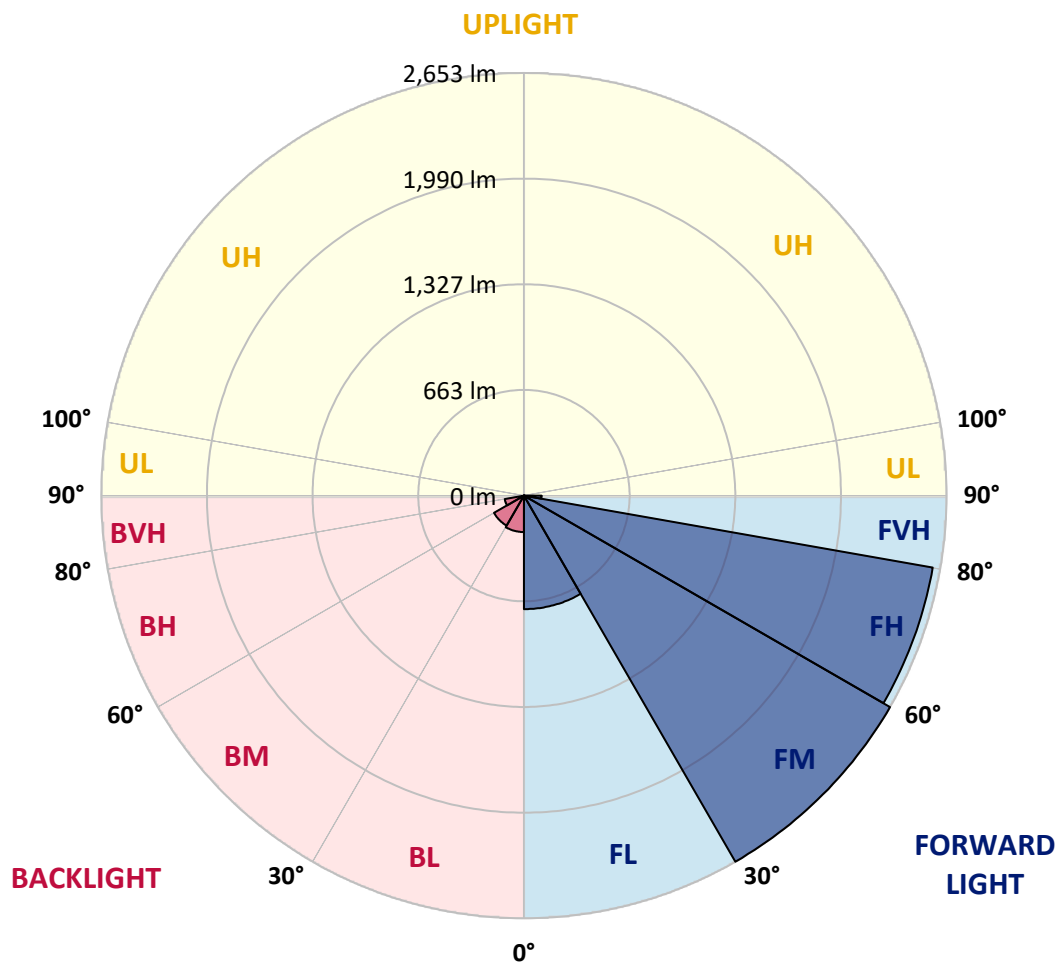
CATALOG NUMBER: GWC-SA1D-735-U-SL3-HSS

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

| Zone |             | Lumens | % Fixture | Zone Rating/Lumen Limit |      |         |
|------|-------------|--------|-----------|-------------------------|------|---------|
|      |             |        |           | B                       | U    | G       |
| FL   | (0°-30°)    | 712.5  | 10.7      |                         |      |         |
| FM   | (30°-60°)   | 2653.2 | 39.9      |                         |      |         |
| FH   | (60°-80°)   | 2605.2 | 39.2      |                         |      | G2/5000 |
| FVH  | (80°-90°)   | 110.9  | 1.7       |                         |      | G2/225  |
| BL   | (0°-30°)    | 228.7  | 3.4       | B1/500                  |      |         |
| BM   | (30°-60°)   | 217.1  | 3.3       | B0/220                  |      |         |
| BH   | (60°-80°)   | 122.4  | 1.8       | B1/500                  |      | G1/500  |
| BVH  | (80°-90°)   | 1.0    | 0.0       |                         |      | G0/10   |
| UL   | (90°-100°)  | 0.0    | 0.0       |                         | U0/0 |         |
| UH   | (100°-180°) | 0.0    | 0.0       |                         | U0/0 |         |

**BUG Rating: B1-U0-G2**

Type III Medium



REPORT NUMBER: P386162

CATALOG NUMBER: GWC-SA1D-735-U-SL3-HSS

**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 5°     | 15°    | 25°    | 35°    | 45°    | 55°    | 58°    | 65°    | 75°    | 85°    |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 1964.6 | 1964.6 | 1964.6 | 1964.6 | 1964.6 | 1964.6 | 1964.6 | 1964.6 | 1964.6 | 1964.6 | 1964.6 |
| 2.5°  | 2127.5 | 2122.3 | 2120.3 | 2117.0 | 2104.3 | 2091.8 | 2067.2 | 2060.4 | 2044.9 | 2008.0 | 1969.1 |
| 5°    | 2129.2 | 2128.9 | 2134.8 | 2133.4 | 2128.9 | 2123.1 | 2105.4 | 2096.3 | 2070.0 | 2017.4 | 1946.1 |
| 7.5°  | 2026.6 | 2031.8 | 2044.9 | 2055.4 | 2067.5 | 2083.3 | 2085.5 | 2076.6 | 2055.1 | 1998.4 | 1903.8 |
| 10°   | 1888.8 | 1897.2 | 1915.4 | 1936.2 | 1967.9 | 1999.5 | 2027.7 | 2026.6 | 2019.1 | 1963.2 | 1853.0 |
| 12.5° | 1750.8 | 1760.5 | 1781.6 | 1812.3 | 1857.4 | 1908.8 | 1959.1 | 1966.1 | 1978.5 | 1931.8 | 1805.9 |
| 15°   | 1630.0 | 1638.3 | 1659.1 | 1696.6 | 1752.5 | 1821.7 | 1895.5 | 1908.2 | 1940.3 | 1907.2 | 1766.6 |
| 17.5° | 1527.5 | 1532.6 | 1547.8 | 1589.6 | 1654.4 | 1738.2 | 1834.1 | 1859.0 | 1906.9 | 1887.8 | 1732.6 |
| 20°   | 1455.8 | 1456.6 | 1466.6 | 1495.9 | 1560.6 | 1654.4 | 1770.5 | 1806.2 | 1871.5 | 1871.2 | 1697.5 |
| 22.5° | 1420.4 | 1417.6 | 1419.5 | 1436.4 | 1484.0 | 1574.4 | 1706.9 | 1749.2 | 1839.6 | 1857.1 | 1661.8 |
| 25°   | 1413.8 | 1411.5 | 1406.0 | 1408.2 | 1437.0 | 1504.4 | 1642.7 | 1691.7 | 1811.7 | 1848.5 | 1630.9 |
| 27.5° | 1434.5 | 1436.7 | 1427.3 | 1417.4 | 1419.5 | 1459.1 | 1585.8 | 1642.4 | 1789.1 | 1848.5 | 1609.0 |
| 30°   | 1476.3 | 1477.4 | 1470.4 | 1457.5 | 1440.0 | 1446.4 | 1546.2 | 1602.9 | 1777.7 | 1861.2 | 1595.2 |
| 32.5° | 1522.5 | 1528.5 | 1527.7 | 1517.2 | 1492.3 | 1466.6 | 1536.8 | 1588.5 | 1776.9 | 1889.4 | 1593.8 |
| 35°   | 1579.7 | 1586.6 | 1598.2 | 1596.0 | 1570.0 | 1527.7 | 1568.9 | 1609.6 | 1793.2 | 1935.9 | 1608.7 |
| 37.5° | 1640.6 | 1651.1 | 1675.9 | 1687.8 | 1670.9 | 1623.1 | 1640.8 | 1669.9 | 1836.9 | 2011.1 | 1646.6 |
| 40°   | 1699.5 | 1711.3 | 1756.7 | 1803.4 | 1790.7 | 1741.4 | 1749.8 | 1773.0 | 1914.6 | 2119.3 | 1718.5 |
| 42.5° | 1757.2 | 1774.9 | 1841.6 | 1918.4 | 1933.6 | 1894.4 | 1898.8 | 1917.4 | 2029.9 | 2268.1 | 1836.0 |
| 45°   | 1826.4 | 1846.3 | 1945.0 | 2039.9 | 2080.6 | 2063.4 | 2082.2 | 2094.4 | 2180.6 | 2464.7 | 1994.5 |
| 47.5° | 1927.8 | 1950.8 | 2071.9 | 2180.1 | 2251.4 | 2262.5 | 2300.4 | 2308.4 | 2371.2 | 2693.6 | 2201.1 |
| 50°   | 2125.8 | 2132.2 | 2241.8 | 2339.9 | 2442.8 | 2509.2 | 2552.3 | 2558.4 | 2601.8 | 2944.0 | 2459.1 |
| 52.5° | 2375.1 | 2379.2 | 2441.1 | 2507.0 | 2623.9 | 2759.5 | 2860.5 | 2869.0 | 2878.1 | 3187.8 | 2713.8 |
| 55°   | 2622.6 | 2622.0 | 2663.0 | 2701.7 | 2835.6 | 3032.5 | 3251.4 | 3256.7 | 3191.2 | 3419.3 | 2908.6 |
| 57.5° | 2777.1 | 2792.1 | 2854.3 | 2904.1 | 3091.1 | 3343.6 | 3647.5 | 3666.8 | 3520.0 | 3590.8 | 3101.0 |
| 60°   | 2727.9 | 2735.1 | 2873.1 | 3057.4 | 3409.3 | 3785.8 | 4048.2 | 4053.2 | 3767.3 | 3762.0 | 3344.3 |
| 62.5° | 2324.2 | 2328.0 | 2544.8 | 2924.6 | 3570.6 | 4359.4 | 4531.6 | 4450.6 | 4051.5 | 3999.6 | 3635.5 |
| 65°   | 1592.9 | 1618.1 | 1799.2 | 2268.5 | 3274.4 | 4719.1 | 5280.0 | 5145.9 | 4484.9 | 4341.9 | 3898.9 |
| 67.5° | 938.1  | 932.8  | 1022.4 | 1368.1 | 2404.9 | 4480.2 | 6226.7 | 6093.4 | 5075.9 | 4571.2 | 3821.7 |
| 70°   | 640.8  | 637.2  | 671.5  | 828.3  | 1357.6 | 3475.5 | 6524.5 | 6793.6 | 5597.8 | 4416.8 | 3289.1 |
| 72.5° | 457.4  | 459.4  | 510.0  | 643.6  | 852.3  | 2025.0 | 5610.7 | 6247.6 | 5434.3 | 3850.5 | 2500.1 |
| 75°   | 310.6  | 315.8  | 388.3  | 527.9  | 747.3  | 1030.1 | 3981.5 | 4749.3 | 4425.2 | 2798.5 | 1437.0 |
| 77.5° | 167.0  | 172.8  | 258.3  | 425.4  | 675.6  | 715.7  | 2561.2 | 3268.6 | 2779.7 | 1258.0 | 416.5  |
| 80°   | 69.7   | 73.0   | 120.9  | 309.2  | 583.8  | 628.6  | 1507.0 | 1982.0 | 1184.5 | 248.1  | 92.9   |
| 82.5° | 30.2   | 31.8   | 50.4   | 184.5  | 436.4  | 530.7  | 797.8  | 953.6  | 358.9  | 54.5   | 46.8   |
| 85°   | 5.8    | 6.1    | 20.8   | 97.6   | 278.5  | 299.5  | 517.1  | 506.9  | 161.2  | 23.5   | 34.0   |
| 87.5° | 0.0    | 0.0    | 5.0    | 30.7   | 81.8   | 163.2  | 315.5  | 311.7  | 54.8   | 11.4   | 12.7   |
| 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: P386162

CATALOG NUMBER: GWC-SA1D-735-U-SL3-HSS

**CANDELA DISTRIBUTION (continued):**

|       | 90°    | 95°    | 105°   | 115°   | 125°   | 135°   | 145°   | 155°   | 165°   | 175°   | 180°   |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 1964.6 | 1964.6 | 1964.6 | 1964.6 | 1964.6 | 1964.6 | 1964.6 | 1964.6 | 1964.6 | 1964.6 | 1964.6 |
| 2.5°  | 1949.1 | 1930.1 | 1890.0 | 1840.5 | 1802.6 | 1760.8 | 1727.6 | 1685.6 | 1667.3 | 1668.2 | 1658.2 |
| 5°    | 1905.5 | 1866.2 | 1777.4 | 1665.5 | 1579.1 | 1490.1 | 1413.5 | 1337.1 | 1292.0 | 1277.4 | 1263.6 |
| 7.5°  | 1843.0 | 1780.7 | 1639.1 | 1466.6 | 1320.5 | 1177.8 | 1053.7 | 944.5  | 875.3  | 841.6  | 829.1  |
| 10°   | 1772.4 | 1685.1 | 1480.1 | 1252.8 | 1044.2 | 851.3  | 690.3  | 550.4  | 494.5  | 456.5  | 446.9  |
| 12.5° | 1710.4 | 1592.1 | 1324.7 | 1033.5 | 786.0  | 553.1  | 399.6  | 312.5  | 274.6  | 259.6  | 257.2  |
| 15°   | 1652.1 | 1505.3 | 1175.1 | 834.9  | 544.3  | 340.4  | 254.2  | 224.6  | 215.7  | 213.2  | 213.2  |
| 17.5° | 1597.1 | 1422.6 | 1028.8 | 639.4  | 360.1  | 238.7  | 210.4  | 203.8  | 201.0  | 200.7  | 201.0  |
| 20°   | 1539.6 | 1340.0 | 885.0  | 468.5  | 251.4  | 202.2  | 194.5  | 190.8  | 190.0  | 190.0  | 190.0  |
| 22.5° | 1484.5 | 1257.2 | 745.0  | 334.6  | 201.6  | 184.5  | 180.6  | 178.1  | 177.3  | 177.0  | 176.4  |
| 25°   | 1431.7 | 1178.7 | 608.4  | 236.4  | 177.0  | 169.0  | 165.6  | 162.3  | 159.9  | 158.5  | 157.6  |
| 27.5° | 1388.3 | 1108.7 | 481.3  | 189.8  | 159.9  | 152.9  | 148.8  | 143.8  | 137.7  | 135.0  | 133.9  |
| 30°   | 1353.8 | 1044.8 | 370.9  | 160.2  | 143.8  | 136.9  | 130.6  | 121.9  | 113.1  | 108.4  | 108.1  |
| 32.5° | 1326.6 | 982.0  | 281.5  | 141.6  | 129.4  | 120.9  | 111.7  | 101.0  | 90.7   | 85.5   | 85.2   |
| 35°   | 1313.4 | 926.7  | 215.1  | 128.0  | 116.7  | 106.0  | 94.6   | 82.7   | 72.7   | 67.7   | 67.2   |
| 37.5° | 1322.2 | 880.0  | 167.9  | 116.7  | 106.0  | 93.5   | 80.2   | 67.7   | 58.9   | 54.5   | 54.2   |
| 40°   | 1354.6 | 850.2  | 136.3  | 107.0  | 96.8   | 81.5   | 67.2   | 55.6   | 48.1   | 44.5   | 44.2   |
| 42.5° | 1423.5 | 839.1  | 116.4  | 99.0   | 87.9   | 70.5   | 55.9   | 45.9   | 39.0   | 36.5   | 36.0   |
| 45°   | 1538.4 | 855.4  | 102.9  | 91.3   | 78.8   | 60.0   | 46.2   | 37.6   | 31.6   | 29.6   | 29.3   |
| 47.5° | 1691.7 | 898.2  | 93.2   | 83.8   | 70.5   | 50.6   | 38.4   | 30.4   | 25.7   | 23.8   | 23.5   |
| 50°   | 1889.1 | 966.3  | 85.2   | 76.4   | 62.8   | 42.8   | 31.8   | 24.0   | 19.9   | 18.5   | 18.5   |
| 52.5° | 2104.1 | 1047.3 | 78.0   | 69.4   | 55.0   | 35.7   | 25.7   | 18.5   | 15.8   | 14.1   | 14.1   |
| 55°   | 2281.6 | 1118.1 | 70.3   | 64.2   | 45.7   | 29.6   | 19.6   | 14.1   | 11.6   | 10.8   | 10.8   |
| 57.5° | 2458.9 | 1193.6 | 61.4   | 55.0   | 36.5   | 24.0   | 14.9   | 10.5   | 8.5    | 8.0    | 8.0    |
| 60°   | 2688.6 | 1285.9 | 52.8   | 44.8   | 28.7   | 18.2   | 11.1   | 7.4    | 6.4    | 6.1    | 6.1    |
| 62.5° | 2941.4 | 1340.1 | 45.1   | 36.0   | 22.4   | 13.5   | 8.0    | 5.0    | 4.7    | 4.7    | 4.4    |
| 65°   | 3096.1 | 1263.6 | 37.9   | 28.7   | 17.4   | 10.2   | 5.3    | 3.6    | 4.1    | 3.9    | 3.3    |
| 67.5° | 2898.9 | 989.3  | 31.0   | 22.4   | 13.5   | 7.7    | 3.3    | 2.4    | 4.4    | 3.6    | 2.7    |
| 70°   | 2400.2 | 692.5  | 24.0   | 15.8   | 10.8   | 6.7    | 2.3    | 1.7    | 4.7    | 3.6    | 2.3    |
| 72.5° | 1796.2 | 463.5  | 19.1   | 10.5   | 8.0    | 5.8    | 2.0    | 0.8    | 4.1    | 3.0    | 2.0    |
| 75°   | 981.5  | 186.7  | 15.2   | 6.7    | 5.0    | 4.1    | 1.4    | 0.6    | 2.7    | 2.3    | 1.4    |
| 77.5° | 258.3  | 49.2   | 11.1   | 4.4    | 2.7    | 1.7    | 0.8    | 0.3    | 1.4    | 1.1    | 0.6    |
| 80°   | 65.9   | 19.1   | 7.2    | 3.0    | 2.0    | 0.8    | 0.0    | 0.0    | 0.3    | 0.0    | 0.0    |
| 82.5° | 35.1   | 8.0    | 4.4    | 2.3    | 1.1    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |
| 85°   | 26.6   | 5.3    | 2.4    | 1.4    | 0.3    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |
| 87.5° | 10.2   | 1.7    | 0.8    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |
| 90°   | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |



Report Prepared for

Cooper Lighting Solutions

(formerly Eaton)

INVUE

Report Number: SP1-2104-224-2

Luminaire Tested: CCW-SA-2A-735-U-SL4

Test Date: 04/26/2021

### Test Information

Test Method: LM-79-08  
 Report Number: SP1-2104-224-2  
 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-735-U-SL4**  
 Description: INVUE WALL PACK ClearCurve Light Square

### Spectral Parameters

|                           |        |           |      |      |       |
|---------------------------|--------|-----------|------|------|-------|
| CCT (K):                  | 3367   | CRI (Ra): | 73.3 |      |       |
| CIE u':                   | 0.2376 | R1:       | 69.1 | R9:  | -34.3 |
| CIE v':                   | 0.5184 | R2:       | 81.3 | R10: | 58.3  |
| Duv:                      | 0.0034 | R3:       | 93.4 | R11: | 69.1  |
| CIE x:                    | 0.4168 | R4:       | 71.8 | R12: | 54.2  |
| CIE y:                    | 0.4041 | R5:       | 69.6 | R13: | 71.1  |
| CIE z:                    | 0.1791 | R6:       | 75.4 | R14: | 96.4  |
| Peak Wavelength (nm):     | 590    | R7:       | 79.5 |      |       |
| Dominant Wavelength (nm): | 580    | R8:       | 46.4 |      |       |
| Purity:                   | 46.5   |           |      |      |       |
| Rf:                       | 77.2   |           |      |      |       |
| Rg:                       | 94.4   |           |      |      |       |



### Test Conditions

Stabilization Time: 71M  
 Operation Time: 12H  
 Room Temperature (°C) / RH%: 24.9/38%  
 Sphere Temperature (°C): 24.2

REPORT NUMBER: SP1-2104-224-2

| 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: SP1-2104-224-2

**CIE 1931 Chromaticity Diagram**



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



Point lies inside the ANSI 3500K 4-step quadrangle

REPORT NUMBER: SP1-2104-224-2

### 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       | 1840             | 0.0              | 490       | 20271            | 2.9              | 620       | 80709            | 21.0             | 750       | 3465             | 0.0              | 880       | 2800             | 0.0              |
| 365       | 1514             | 0.0              | 495       | 25910            | 4.7              | 625       | 74695            | 16.5             | 755       | 3075             | 0.0              | 885       | 2582             | 0.0              |
| 370       | 1514             | 0.0              | 500       | 32216            | 7.1              | 630       | 67709            | 12.3             | 760       | 2794             | 0.0              | 890       | 2353             | 0.0              |
| 375       | 1843             | 0.0              | 505       | 38336            | 10.7             | 635       | 61156            | 9.2              | 765       | 2593             | 0.0              | 895       | 1819             | 0.0              |
| 380       | 1796             | 0.0              | 510       | 43738            | 15.0             | 640       | 54795            | 6.5              | 770       | 2401             | 0.0              | 900       | 2024             | 0.0              |
| 385       | 1575             | 0.0              | 515       | 47977            | 19.9             | 645       | 49111            | 4.7              | 775       | 2233             | 0.0              | 905       | 1851             | 0.0              |
| 390       | 1527             | 0.0              | 520       | 51818            | 25.1             | 650       | 43533            | 3.2              | 780       | 2166             | 0.0              | 910       | 1602             | 0.0              |
| 395       | 1326             | 0.0              | 525       | 54890            | 29.5             | 655       | 38234            | 2.2              | 785       | 2051             | 0.0              | 915       | 2200             | 0.0              |
| 400       | 1233             | 0.0              | 530       | 57872            | 34.1             | 660       | 33754            | 1.4              | 790       | 1765             | 0.0              | 920       | 2530             | 0.0              |
| 405       | 1329             | 0.0              | 535       | 60410            | 37.5             | 665       | 29162            | 0.9              | 795       | 1903             | 0.0              | 925       | 2487             | 0.0              |
| 410       | 1902             | 0.0              | 540       | 62857            | 41.0             | 670       | 25117            | 0.5              | 800       | 2127             | 0.0              | 930       | 2089             | 0.0              |
| 415       | 3436             | 0.0              | 545       | 66165            | 44.0             | 675       | 21511            | 0.4              | 805       | 1867             | 0.0              | 935       | 2293             | 0.0              |
| 420       | 6571             | 0.0              | 550       | 70124            | 47.7             | 680       | 18435            | 0.2              | 810       | 1775             | 0.0              | 940       | 2315             | 0.0              |
| 425       | 12957            | 0.1              | 555       | 74973            | 51.2             | 685       | 16004            | 0.1              | 815       | 1812             | 0.0              | 945       | 2481             | 0.0              |
| 430       | 23376            | 0.2              | 560       | 80227            | 54.5             | 690       | 13701            | 0.1              | 820       | 1973             | 0.0              | 950       | 2701             | 0.0              |
| 435       | 38205            | 0.5              | 565       | 85358            | 56.8             | 695       | 11765            | 0.0              | 825       | 1773             | 0.0              | 955       | 2892             | 0.0              |
| 440       | 56691            | 0.9              | 570       | 90422            | 58.8             | 700       | 10145            | 0.0              | 830       | 1925             | 0.0              | 960       | 2609             | 0.0              |
| 445       | 67585            | 1.4              | 575       | 95259            | 59.3             | 705       | 8865             | 0.0              | 835       | 2001             | 0.0              | 965       | 3066             | 0.0              |
| 450       | 55963            | 1.5              | 580       | 99033            | 58.8             | 710       | 7954             | 0.0              | 840       | 2142             | 0.0              | 970       | 2566             | 0.0              |
| 455       | 35549            | 1.2              | 585       | 101572           | 56.4             | 715       | 7285             | 0.0              | 845       | 2101             | 0.0              | 975       | 2375             | 0.0              |
| 460       | 25268            | 1.0              | 590       | 103264           | 53.4             | 720       | 6412             | 0.0              | 850       | 2097             | 0.0              | 980       | 3526             | 0.0              |
| 465       | 18712            | 1.0              | 595       | 102194           | 48.4             | 725       | 5721             | 0.0              | 855       | 2090             | 0.0              | 985       | 2982             | 0.0              |
| 470       | 13835            | 0.9              | 600       | 100645           | 43.4             | 730       | 5017             | 0.0              | 860       | 2535             | 0.0              | 990       | 2305             | 0.0              |
| 475       | 12398            | 1.0              | 605       | 97644            | 37.8             | 735       | 4459             | 0.0              | 865       | 2101             | 0.0              | 995       | 3671             | 0.0              |
| 480       | 13406            | 1.3              | 610       | 92487            | 31.8             | 740       | 4062             | 0.0              | 870       | 1798             | 0.0              | 1000      | 2560             | 0.0              |
| 485       | 15865            | 1.9              | 615       | 87436            | 26.4             | 745       | 3636             | 0.0              | 875       | 2857             | 0.0              |           |                  |                  |

REPORT NUMBER: SP1-2104-224-2

### Scotopic Flux vs. Wavelength



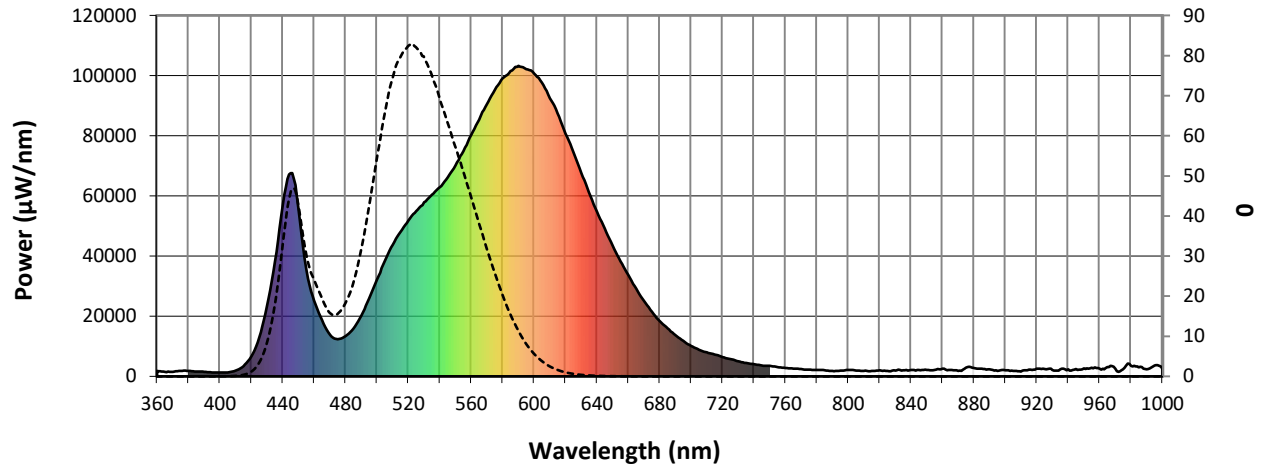
Scotopic Lumens: 7088.7

S/P: 1.35

| 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       | 1840             | 0.0              | 490       | 20271            | 31.2             | 620       | 80709            | 1.0              | 750       | 3465             | 0.0              | 880       | 2800             | 0.0              |
| 365       | 1514             | 0.0              | 495       | 25910            | 41.9             | 625       | 74695            | 0.6              | 755       | 3075             | 0.0              | 885       | 2582             | 0.0              |
| 370       | 1514             | 0.0              | 500       | 32216            | 53.9             | 630       | 67709            | 0.4              | 760       | 2794             | 0.0              | 890       | 2353             | 0.0              |
| 375       | 1843             | 0.0              | 505       | 38336            | 65.2             | 635       | 61156            | 0.2              | 765       | 2593             | 0.0              | 895       | 1819             | 0.0              |
| 380       | 1796             | 0.0              | 510       | 43738            | 74.1             | 640       | 54795            | 0.1              | 770       | 2401             | 0.0              | 900       | 2024             | 0.0              |
| 385       | 1575             | 0.0              | 515       | 47977            | 79.5             | 645       | 49111            | 0.1              | 775       | 2233             | 0.0              | 905       | 1851             | 0.0              |
| 390       | 1527             | 0.0              | 520       | 51818            | 82.4             | 650       | 43533            | 0.1              | 780       | 2166             | 0.0              | 910       | 1602             | 0.0              |
| 395       | 1326             | 0.0              | 525       | 54890            | 82.1             | 655       | 38234            | 0.0              | 785       | 2051             | 0.0              | 915       | 2200             | 0.0              |
| 400       | 1233             | 0.0              | 530       | 57872            | 79.8             | 660       | 33754            | 0.0              | 790       | 1765             | 0.0              | 920       | 2530             | 0.0              |
| 405       | 1329             | 0.0              | 535       | 60410            | 75.3             | 665       | 29162            | 0.0              | 795       | 1903             | 0.0              | 925       | 2487             | 0.0              |
| 410       | 1902             | 0.1              | 540       | 62857            | 69.5             | 670       | 25117            | 0.0              | 800       | 2127             | 0.0              | 930       | 2089             | 0.0              |
| 415       | 3436             | 0.4              | 545       | 66165            | 63.4             | 675       | 21511            | 0.0              | 805       | 1867             | 0.0              | 935       | 2293             | 0.0              |
| 420       | 6571             | 1.1              | 550       | 70124            | 57.3             | 680       | 18435            | 0.0              | 810       | 1775             | 0.0              | 940       | 2315             | 0.0              |
| 425       | 12957            | 3.2              | 555       | 74973            | 51.2             | 685       | 16004            | 0.0              | 815       | 1812             | 0.0              | 945       | 2481             | 0.0              |
| 430       | 23376            | 8.0              | 560       | 80227            | 44.8             | 690       | 13701            | 0.0              | 820       | 1973             | 0.0              | 950       | 2701             | 0.0              |
| 435       | 38205            | 17.1             | 565       | 85358            | 38.3             | 695       | 11765            | 0.0              | 825       | 1773             | 0.0              | 955       | 2892             | 0.0              |
| 440       | 56691            | 31.7             | 570       | 90422            | 31.9             | 700       | 10145            | 0.0              | 830       | 1925             | 0.0              | 960       | 2609             | 0.0              |
| 445       | 67585            | 45.3             | 575       | 95259            | 25.9             | 705       | 8865             | 0.0              | 835       | 2001             | 0.0              | 965       | 3066             | 0.0              |
| 450       | 55963            | 43.4             | 580       | 99033            | 20.4             | 710       | 7954             | 0.0              | 840       | 2142             | 0.0              | 970       | 2566             | 0.0              |
| 455       | 35549            | 31.1             | 585       | 101572           | 15.5             | 715       | 7285             | 0.0              | 845       | 2101             | 0.0              | 975       | 2375             | 0.0              |
| 460       | 25268            | 24.4             | 590       | 103264           | 11.5             | 720       | 6412             | 0.0              | 850       | 2097             | 0.0              | 980       | 3526             | 0.0              |
| 465       | 18712            | 19.8             | 595       | 102194           | 8.1              | 725       | 5721             | 0.0              | 855       | 2090             | 0.0              | 985       | 2982             | 0.0              |
| 470       | 13835            | 15.9             | 600       | 100645           | 5.7              | 730       | 5017             | 0.0              | 860       | 2535             | 0.0              | 990       | 2305             | 0.0              |
| 475       | 12398            | 15.5             | 605       | 97644            | 3.8              | 735       | 4459             | 0.0              | 865       | 2101             | 0.0              | 995       | 3671             | 0.0              |
| 480       | 13406            | 18.1             | 610       | 92487            | 2.5              | 740       | 4062             | 0.0              | 870       | 1798             | 0.0              | 1000      | 2560             | 0.0              |
| 485       | 15865            | 23.0             | 615       | 87436            | 1.6              | 745       | 3636             | 0.0              | 875       | 2857             | 0.0              |           |                  |                  |

REPORT NUMBER: SP1-2104-224-2

### Melanopic Flux vs. Wavelength


**Melanopic Lumens: 2621**
**M/P: 0.5**

| 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       | 1840             | 0.0              | 490       | 20271            | 16.9             | 620       | 80709            | 0.1              | 750       | 3465             | 0.0              | 880       | 2800             | 0.0              |
| 365       | 1514             | 0.0              | 495       | 25910            | 21.4             | 625       | 74695            | 0.0              | 755       | 3075             | 0.0              | 885       | 2582             | 0.0              |
| 370       | 1514             | 0.0              | 500       | 32216            | 25.9             | 630       | 67709            | 0.0              | 760       | 2794             | 0.0              | 890       | 2353             | 0.0              |
| 375       | 1843             | 0.0              | 505       | 38336            | 29.4             | 635       | 61156            | 0.0              | 765       | 2593             | 0.0              | 895       | 1819             | 0.0              |
| 380       | 1796             | 0.0              | 510       | 43738            | 31.4             | 640       | 54795            | 0.0              | 770       | 2401             | 0.0              | 900       | 2024             | 0.0              |
| 385       | 1575             | 0.0              | 515       | 47977            | 31.3             | 645       | 49111            | 0.0              | 775       | 2233             | 0.0              | 905       | 1851             | 0.0              |
| 390       | 1527             | 0.0              | 520       | 51818            | 30.2             | 650       | 43533            | 0.0              | 780       | 2166             | 0.0              | 910       | 1602             | 0.0              |
| 395       | 1326             | 0.0              | 525       | 54890            | 27.8             | 655       | 38234            | 0.0              | 785       | 2051             | 0.0              | 915       | 2200             | 0.0              |
| 400       | 1233             | 0.0              | 530       | 57872            | 25.0             | 660       | 33754            | 0.0              | 790       | 1765             | 0.0              | 920       | 2530             | 0.0              |
| 405       | 1329             | 0.0              | 535       | 60410            | 21.7             | 665       | 29162            | 0.0              | 795       | 1903             | 0.0              | 925       | 2487             | 0.0              |
| 410       | 1902             | 0.1              | 540       | 62857            | 18.4             | 670       | 25117            | 0.0              | 800       | 2127             | 0.0              | 930       | 2089             | 0.0              |
| 415       | 3436             | 0.2              | 545       | 66165            | 15.4             | 675       | 21511            | 0.0              | 805       | 1867             | 0.0              | 935       | 2293             | 0.0              |
| 420       | 6571             | 0.8              | 550       | 70124            | 12.6             | 680       | 18435            | 0.0              | 810       | 1775             | 0.0              | 940       | 2315             | 0.0              |
| 425       | 12957            | 2.0              | 555       | 74973            | 10.1             | 685       | 16004            | 0.0              | 815       | 1812             | 0.0              | 945       | 2481             | 0.0              |
| 430       | 23376            | 4.9              | 560       | 80227            | 7.9              | 690       | 13701            | 0.0              | 820       | 1973             | 0.0              | 950       | 2701             | 0.0              |
| 435       | 38205            | 10.2             | 565       | 85358            | 6.0              | 695       | 11765            | 0.0              | 825       | 1773             | 0.0              | 955       | 2892             | 0.0              |
| 440       | 56691            | 18.9             | 570       | 90422            | 4.4              | 700       | 10145            | 0.0              | 830       | 1925             | 0.0              | 960       | 2609             | 0.0              |
| 445       | 67585            | 26.7             | 575       | 95259            | 3.2              | 705       | 8865             | 0.0              | 835       | 2001             | 0.0              | 965       | 3066             | 0.0              |
| 450       | 55963            | 25.8             | 580       | 99033            | 2.2              | 710       | 7954             | 0.0              | 840       | 2142             | 0.0              | 970       | 2566             | 0.0              |
| 455       | 35549            | 18.6             | 585       | 101572           | 1.5              | 715       | 7285             | 0.0              | 845       | 2101             | 0.0              | 975       | 2375             | 0.0              |
| 460       | 25268            | 14.9             | 590       | 103264           | 1.0              | 720       | 6412             | 0.0              | 850       | 2097             | 0.0              | 980       | 3526             | 0.0              |
| 465       | 18712            | 12.2             | 595       | 102194           | 0.7              | 725       | 5721             | 0.0              | 855       | 2090             | 0.0              | 985       | 2982             | 0.0              |
| 470       | 13835            | 9.9              | 600       | 100645           | 0.4              | 730       | 5017             | 0.0              | 860       | 2535             | 0.0              | 990       | 2305             | 0.0              |
| 475       | 12398            | 9.5              | 605       | 97644            | 0.3              | 735       | 4459             | 0.0              | 865       | 2101             | 0.0              | 995       | 3671             | 0.0              |
| 480       | 13406            | 10.8             | 610       | 92487            | 0.2              | 740       | 4062             | 0.0              | 870       | 1798             | 0.0              | 1000      | 2560             | 0.0              |
| 485       | 15865            | 13.1             | 615       | 87436            | 0.1              | 745       | 3636             | 0.0              | 875       | 2857             | 0.0              |           |                  |                  |

REPORT NUMBER: SP1-2104-224-2

TM-30-18

### Summary

$R_f = 77.2$   
 $R_g = 94.4$   
 CIE  $R_a = 73.3$   
 $R_g = -34.3$

### Spectral Power Distribution Comparison



### Color Vector Graphics





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

|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 86 | CES26 = 69 | CES51 = 90 | CES76 = 63 |
| CES02 = 62 | CES27 = 89 | CES52 = 89 | CES77 = 80 |
| CES03 = 31 | CES28 = 87 | CES53 = 80 | CES78 = 65 |
| CES04 = 70 | CES29 = 67 | CES54 = 85 | CES79 = 87 |
| CES05 = 48 | CES30 = 74 | CES55 = 84 | CES80 = 86 |
| CES06 = 51 | CES31 = 71 | CES56 = 76 | CES81 = 75 |
| CES07 = 41 | CES32 = 67 | CES57 = 75 | CES82 = 94 |
| CES08 = 39 | CES33 = 75 | CES58 = 77 | CES83 = 91 |
| CES09 = 29 | CES34 = 79 | CES59 = 87 | CES84 = 89 |
| CES10 = 75 | CES35 = 89 | CES60 = 93 | CES85 = 80 |
| CES11 = 58 | CES36 = 98 | CES61 = 86 | CES86 = 66 |
| CES12 = 64 | CES37 = 86 | CES62 = 90 | CES87 = 79 |
| CES13 = 43 | CES38 = 82 | CES63 = 77 | CES88 = 79 |
| CES14 = 74 | CES39 = 95 | CES64 = 74 | CES89 = 70 |
| CES15 = 71 | CES40 = 91 | CES65 = 69 | CES90 = 77 |
| CES16 = 47 | CES41 = 89 | CES66 = 71 | CES91 = 87 |
| CES17 = 50 | CES42 = 88 | CES67 = 69 | CES92 = 60 |
| CES18 = 56 | CES43 = 82 | CES68 = 74 | CES93 = 76 |
| CES19 = 72 | CES44 = 99 | CES69 = 82 | CES94 = 52 |
| CES20 = 65 | CES45 = 87 | CES70 = 67 | CES95 = 69 |
| CES21 = 86 | CES46 = 82 | CES71 = 66 | CES96 = 78 |
| CES22 = 79 | CES47 = 83 | CES72 = 88 | CES97 = 85 |
| CES23 = 92 | CES48 = 72 | CES73 = 60 | CES98 = 76 |
| CES24 = 91 | CES49 = 82 | CES74 = 97 | CES99 = 63 |
| CES25 = 72 | CES50 = 89 | CES75 = 67 |            |



Color Rendition by Hue-Angle Bin



**Measure Comparisons**



(END OF REPORT)