

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: McGRAW-EDISON

Report Number: P386499

Luminaire Tested: **GWC-SA2A-830-U-SL3**

Issue Date: 3/3/2020

### Test Information

Test Method: LM-79-08  
Report Number: P386499  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-1903-205-22)  
Test Lab: INNOVATION CENTER  
Issue Date: 3/3/2020  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: MCGRAW-EDISON  
Catalog Number: GWC-SA2A-830-U-SL3  
Description: GALLEON WALL LUMINAIRE  
(2) 80 CRI, 3000K, 615mA LIGHTSQUARES WITH 16 LEDS EACH AND TYPE III  
SPILL LIGHT ELIMINATOR OPTICS  
Light Source: -  
Ballast/Driver: ELECTRONIC DRIVER

### Summary

Lumens per Lamp: N/A  
Luminaire Lumens: 7729 lumens  
Efficiency: N/A  
Efficacy: 117.1 lumens/watt  
Luminous Opening: Rectangular (W 1' x L: 0.5' x H: 0')  
IES Classification: Type III - Medium  
BUG Rating: B1 - U0 - G2

Input Watts (W): 66  
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

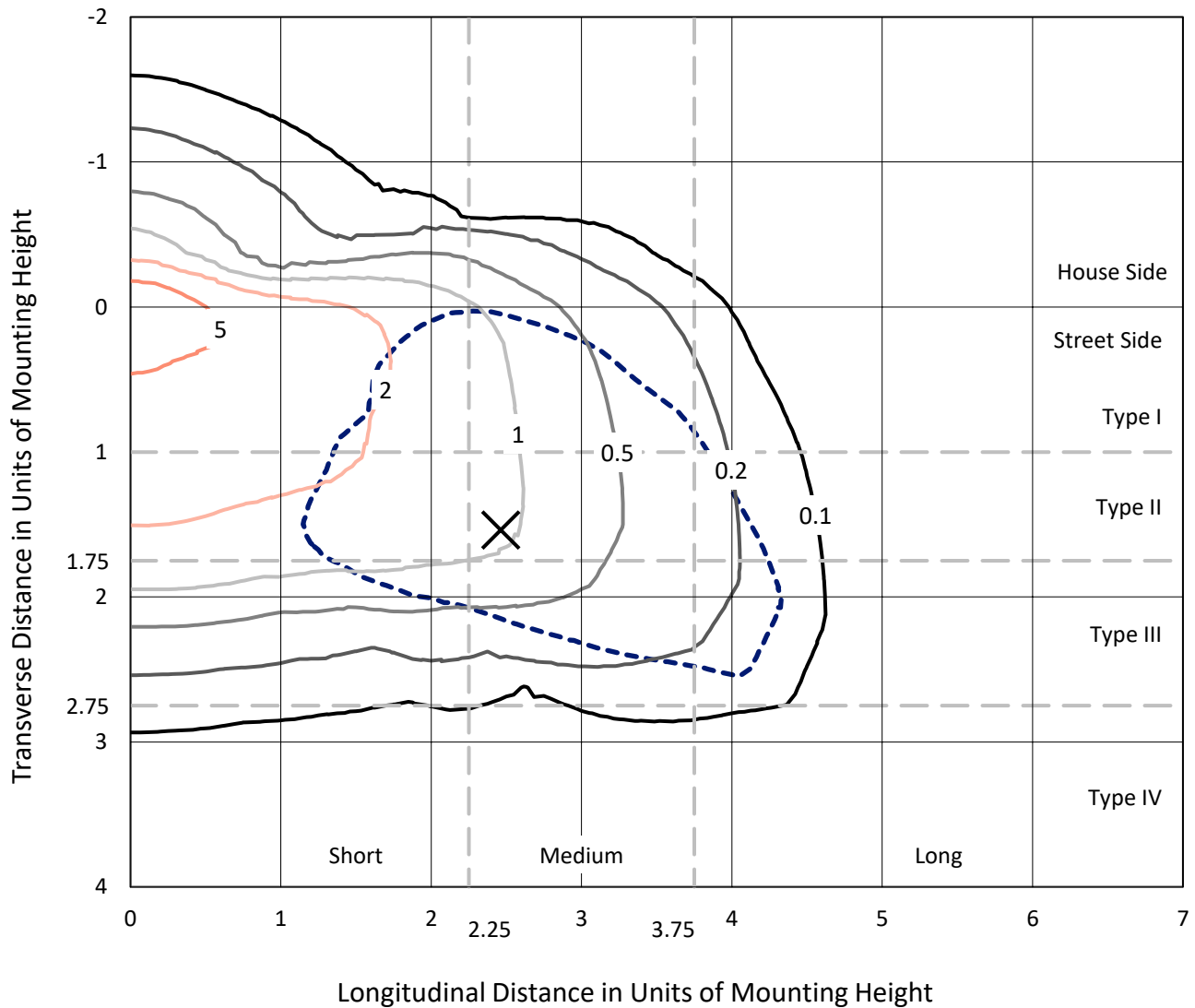


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## Iso-Footcandle Lines of Horizontal Illumination

✕ Max cd  
 - - - 1/2 Max cd

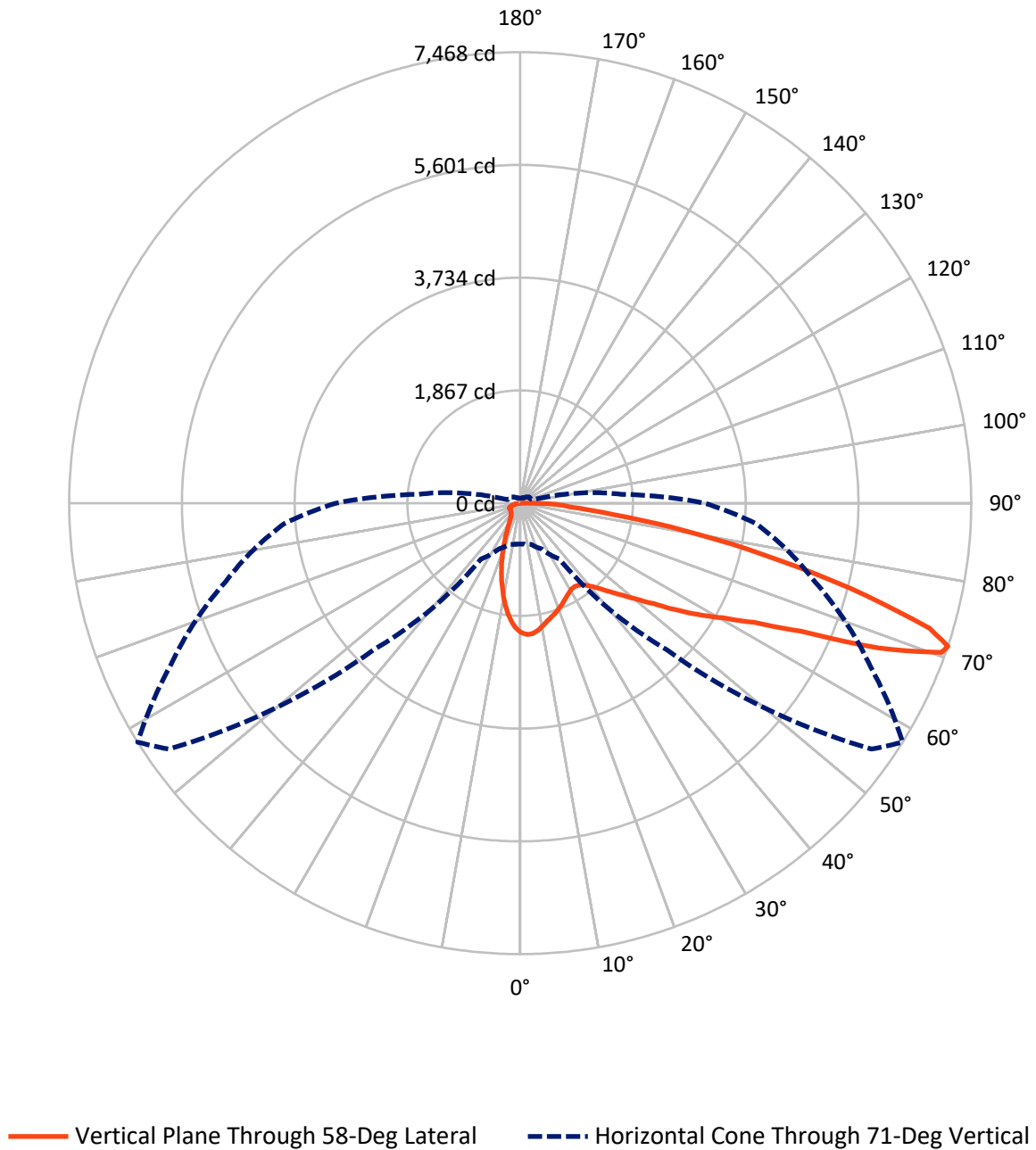


Based on 15 foot mounting height. Maximum calculated value = 9.5 fc  
 Type III - Medium - N/A

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## Luminous Intensity Polar Plot



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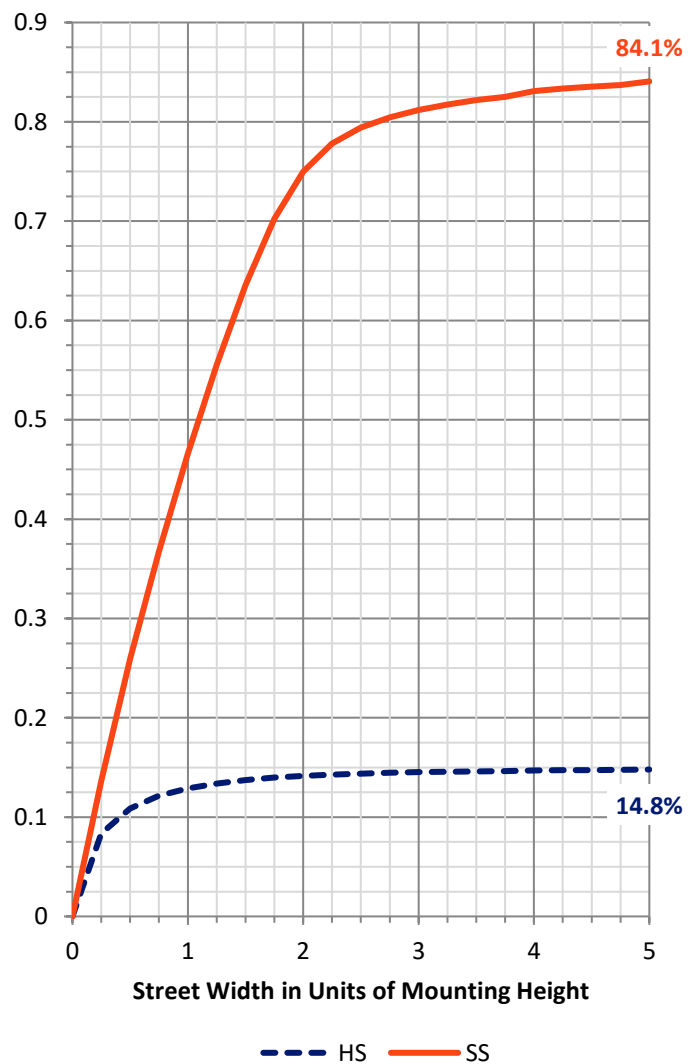
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total  |
|--------------------|-----------|----------|--------|--------|
| <b>House Side</b>  | Lumens    | 1155.5   | 0.0    | 1155.5 |
|                    | % Fixture | 15.0     | 0.0    | 15.0   |
| <b>Street Side</b> | Lumens    | 6573.5   | 0.0    | 6573.5 |
|                    | % Fixture | 85.0     | 0.0    | 85.0   |
| <b>Total</b>       | Lumens    | 7729.0   | 0.0    | 7729.0 |
|                    | % Fixture | 100.0    | 0.0    | 100.0  |

**ZONAL LUMENS:**

| Zone      | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10°    | 184.7  | 2.4       |
| 10°-20°   | 410.8  | 5.3       |
| 20°-30°   | 522.1  | 6.8       |
| 30°-40°   | 665.0  | 8.6       |
| 40°-50°   | 943.0  | 12.2      |
| 50°-60°   | 1459.4 | 18.9      |
| 60°-70°   | 1986.8 | 25.7      |
| 70°-80°   | 1325.4 | 17.1      |
| 80°-90°   | 231.7  | 3.0       |
| 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°    | 7729.0 | 100.0     |
| 0°-180°   | 7729.0 | 100.0     |

**Coefficient of Utilization**



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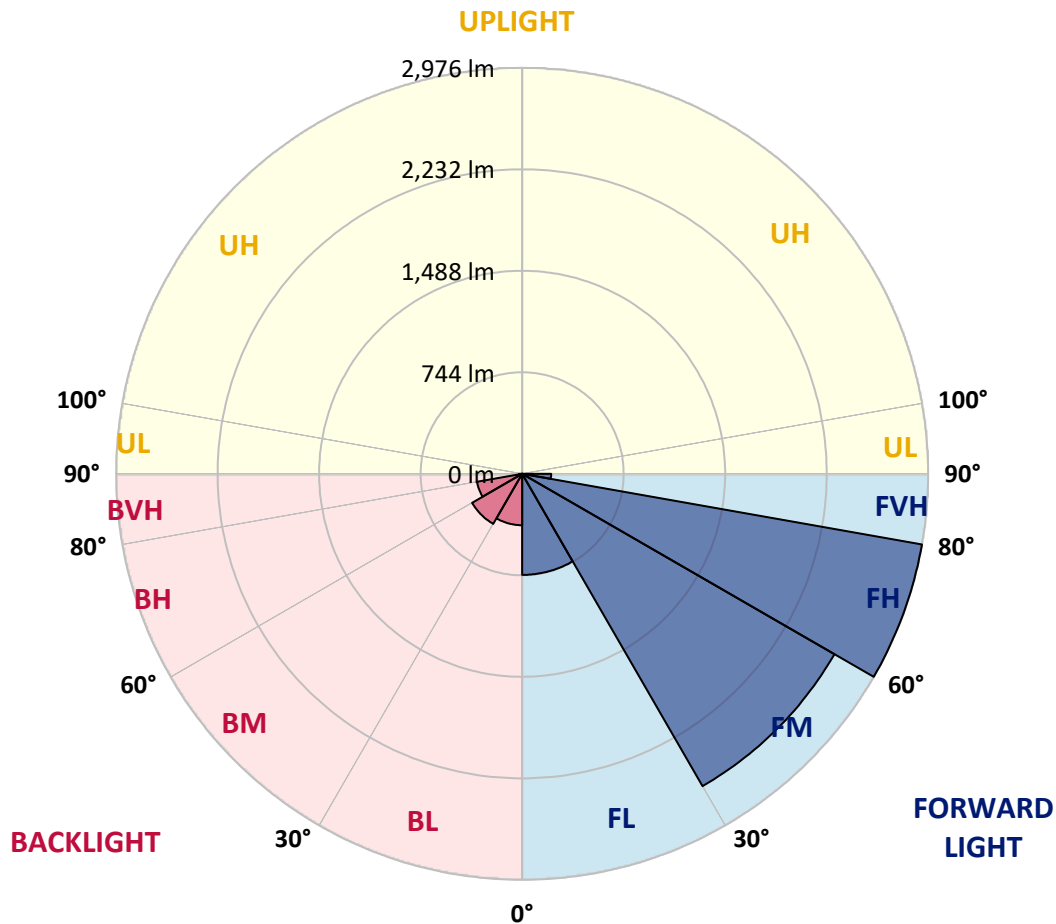
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**LUMINAIRE CLASSIFICATION SYSTEM LUMEN TABLE AND BUG RATING:**

| Zone |             | Lumens | % Fixture | Zone Rating/Lumen Limit |      |         |
|------|-------------|--------|-----------|-------------------------|------|---------|
|      |             |        |           | B                       | U    | G       |
| FL   | (0°-30°)    | 741.0  | 9.6       |                         |      |         |
| FM   | (30°-60°)   | 2643.7 | 34.2      |                         |      |         |
| FH   | (60°-80°)   | 2976.3 | 38.5      |                         |      | G2/5000 |
| FVH  | (80°-90°)   | 212.5  | 2.7       |                         |      | G2/225  |
| BL   | (0°-30°)    | 376.7  | 4.9       | B1/500                  |      |         |
| BM   | (30°-60°)   | 423.8  | 5.5       | B1/1000                 |      |         |
| BH   | (60°-80°)   | 335.8  | 4.3       | B1/500                  |      | G1/500  |
| BVH  | (80°-90°)   | 19.3   | 0.2       |                         |      | G1/100  |
| 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



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**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 5°     | 15°    | 25°    | 35°    | 45°    | 55°    | 58°    | 65°    | 75°    | 85°    |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 2141.4 | 2141.4 | 2141.4 | 2141.4 | 2141.4 | 2141.4 | 2141.4 | 2141.4 | 2141.4 | 2141.4 | 2141.4 |
| 2.5°  | 2198.3 | 2195.3 | 2196.4 | 2194.2 | 2189.1 | 2184.0 | 2176.4 | 2177.8 | 2167.3 | 2151.7 | 2132.3 |
| 5°    | 2156.8 | 2155.7 | 2163.8 | 2168.4 | 2172.1 | 2169.2 | 2167.0 | 2169.7 | 2154.4 | 2132.8 | 2099.2 |
| 7.5°  | 2069.8 | 2058.0 | 2068.2 | 2083.6 | 2098.1 | 2109.1 | 2123.7 | 2125.6 | 2115.9 | 2093.3 | 2049.1 |
| 10°   | 1946.3 | 1935.0 | 1950.0 | 1974.0 | 2003.1 | 2029.5 | 2058.8 | 2064.2 | 2066.1 | 2045.6 | 1992.0 |
| 12.5° | 1818.1 | 1809.5 | 1824.6 | 1858.2 | 1906.4 | 1947.1 | 1993.9 | 2002.0 | 2018.7 | 2005.0 | 1939.3 |
| 15°   | 1703.4 | 1700.2 | 1718.5 | 1751.6 | 1807.1 | 1869.3 | 1936.8 | 1951.6 | 1979.9 | 1975.3 | 1898.1 |
| 17.5° | 1604.3 | 1603.5 | 1617.5 | 1652.3 | 1713.6 | 1792.3 | 1880.0 | 1905.1 | 1947.1 | 1952.5 | 1864.1 |
| 20°   | 1530.6 | 1529.0 | 1538.6 | 1564.2 | 1627.5 | 1716.6 | 1818.6 | 1853.1 | 1913.7 | 1932.5 | 1829.1 |
| 22.5° | 1491.0 | 1490.7 | 1491.0 | 1503.1 | 1554.8 | 1637.7 | 1758.9 | 1800.9 | 1881.1 | 1916.6 | 1790.4 |
| 25°   | 1484.3 | 1483.5 | 1477.5 | 1476.2 | 1505.5 | 1571.8 | 1699.6 | 1746.0 | 1850.1 | 1905.6 | 1753.5 |
| 27.5° | 1501.8 | 1502.8 | 1495.0 | 1482.4 | 1488.3 | 1528.4 | 1648.2 | 1697.8 | 1825.4 | 1903.5 | 1727.9 |
| 30°   | 1538.1 | 1537.6 | 1530.8 | 1517.6 | 1506.1 | 1512.3 | 1611.6 | 1661.1 | 1808.7 | 1912.9 | 1710.4 |
| 32.5° | 1578.2 | 1581.2 | 1579.8 | 1572.6 | 1555.3 | 1530.6 | 1600.6 | 1649.0 | 1803.8 | 1935.5 | 1702.9 |
| 35°   | 1626.4 | 1629.6 | 1639.3 | 1645.0 | 1624.8 | 1585.0 | 1624.3 | 1666.3 | 1817.8 | 1978.0 | 1715.0 |
| 37.5° | 1672.2 | 1680.5 | 1707.7 | 1731.7 | 1714.5 | 1670.0 | 1687.3 | 1717.1 | 1861.2 | 2045.1 | 1747.6 |
| 40°   | 1725.0 | 1732.2 | 1776.6 | 1827.5 | 1824.8 | 1778.8 | 1788.8 | 1808.7 | 1937.6 | 2141.2 | 1806.5 |
| 42.5° | 1776.9 | 1791.5 | 1855.8 | 1928.0 | 1948.7 | 1908.0 | 1923.9 | 1934.4 | 2045.3 | 2268.5 | 1909.4 |
| 45°   | 1846.1 | 1861.7 | 1951.1 | 2038.1 | 2086.5 | 2063.6 | 2088.9 | 2093.0 | 2180.8 | 2441.9 | 2058.8 |
| 47.5° | 1950.8 | 1968.6 | 2072.8 | 2164.1 | 2238.1 | 2240.5 | 2282.3 | 2280.6 | 2349.8 | 2640.3 | 2247.0 |
| 50°   | 2114.0 | 2139.6 | 2224.9 | 2310.3 | 2400.2 | 2450.3 | 2506.0 | 2498.2 | 2552.6 | 2851.7 | 2463.7 |
| 52.5° | 2327.8 | 2339.6 | 2402.9 | 2465.9 | 2577.6 | 2689.9 | 2769.8 | 2762.8 | 2782.5 | 3068.9 | 2709.8 |
| 55°   | 2549.3 | 2558.2 | 2584.3 | 2618.8 | 2769.0 | 2952.1 | 3121.2 | 3110.1 | 3060.3 | 3294.6 | 2952.9 |
| 57.5° | 2748.6 | 2766.6 | 2784.6 | 2798.9 | 2961.8 | 3226.2 | 3480.6 | 3481.4 | 3361.9 | 3537.9 | 3204.1 |
| 60°   | 2779.5 | 2795.4 | 2914.7 | 3027.2 | 3291.6 | 3591.8 | 3865.3 | 3857.2 | 3673.9 | 3802.1 | 3484.1 |
| 62.5° | 2457.0 | 2492.8 | 2692.0 | 2991.4 | 3609.3 | 4260.6 | 4356.1 | 4346.2 | 4047.1 | 4127.6 | 3810.1 |
| 65°   | 1760.8 | 1801.4 | 2041.8 | 2491.7 | 3455.3 | 4997.4 | 5241.9 | 5107.8 | 4555.9 | 4527.9 | 4191.9 |
| 67.5° | 1015.8 | 1025.5 | 1129.7 | 1491.0 | 2630.9 | 5035.9 | 6593.2 | 6405.5 | 5346.1 | 4982.1 | 4378.7 |
| 70°   | 751.1  | 750.9  | 775.6  | 917.5  | 1423.7 | 4110.1 | 7235.8 | 7404.1 | 6178.0 | 5131.5 | 4114.6 |
| 71°   | 679.3  | 680.1  | 707.8  | 835.1  | 1127.5 | 3440.2 | 7099.3 | 7467.6 | 6397.2 | 5057.7 | 3923.5 |
| 72.5° | 581.0  | 583.7  | 622.2  | 749.0  | 948.5  | 2372.4 | 6511.3 | 7086.4 | 6501.1 | 4875.7 | 3624.4 |
| 75°   | 440.7  | 446.9  | 500.2  | 631.3  | 866.9  | 1203.2 | 4778.8 | 5658.7 | 5775.2 | 4302.3 | 2693.1 |
| 77.5° | 314.5  | 321.5  | 381.8  | 530.9  | 824.1  | 906.8  | 3200.3 | 4127.6 | 4250.1 | 2757.2 | 1214.8 |
| 80°   | 198.7  | 207.0  | 252.5  | 422.4  | 774.3  | 861.0  | 2011.1 | 2774.4 | 2317.5 | 882.3  | 309.1  |
| 82.5° | 116.6  | 123.0  | 156.7  | 276.0  | 632.4  | 829.2  | 1183.3 | 1537.8 | 901.9  | 266.5  | 140.5  |
| 85°   | 67.6   | 70.5   | 97.7   | 175.8  | 459.3  | 782.6  | 869.3  | 859.6  | 391.5  | 130.3  | 66.5   |
| 87.5° | 31.5   | 35.0   | 57.9   | 91.8   | 255.0  | 567.3  | 687.1  | 593.7  | 243.4  | 61.1   | 31.2   |
| 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°    | 2141.4 | 2141.4 | 2141.4 | 2141.4 | 2141.4 | 2141.4 | 2141.4 | 2141.4 | 2141.4 | 2141.4 | 2141.4 |
| 2.5°  | 2122.9 | 2118.3 | 2099.2 | 2082.2 | 2064.5 | 2041.3 | 2015.7 | 2012.5 | 1996.9 | 1999.8 | 1994.5 |
| 5°    | 2080.9 | 2069.3 | 2023.3 | 1981.5 | 1932.3 | 1888.1 | 1840.2 | 1818.1 | 1786.3 | 1784.2 | 1776.1 |
| 7.5°  | 2020.8 | 1999.3 | 1928.0 | 1848.8 | 1769.6 | 1694.3 | 1619.7 | 1570.7 | 1520.6 | 1499.3 | 1497.5 |
| 10°   | 1953.3 | 1916.6 | 1811.6 | 1694.5 | 1580.4 | 1470.3 | 1363.6 | 1284.8 | 1213.7 | 1180.0 | 1178.7 |
| 12.5° | 1889.2 | 1835.1 | 1691.0 | 1531.6 | 1375.5 | 1232.8 | 1086.6 | 983.0  | 893.8  | 864.0  | 851.3  |
| 15°   | 1834.8 | 1758.6 | 1573.6 | 1369.8 | 1180.3 | 982.1  | 815.8  | 706.7  | 624.3  | 595.8  | 590.4  |
| 17.5° | 1782.0 | 1684.0 | 1453.3 | 1206.4 | 977.3  | 759.5  | 592.8  | 511.8  | 467.9  | 456.3  | 456.1  |
| 20°   | 1729.5 | 1607.3 | 1327.6 | 1039.2 | 781.0  | 568.1  | 455.8  | 419.5  | 404.7  | 403.3  | 401.2  |
| 22.5° | 1670.0 | 1526.0 | 1195.4 | 871.5  | 609.5  | 446.7  | 387.4  | 372.9  | 371.0  | 375.8  | 375.8  |
| 25°   | 1614.3 | 1445.2 | 1061.3 | 707.3  | 474.1  | 372.6  | 346.0  | 343.0  | 348.1  | 356.7  | 357.5  |
| 27.5° | 1562.3 | 1367.4 | 930.5  | 561.3  | 379.9  | 328.2  | 317.2  | 320.7  | 329.8  | 339.8  | 340.0  |
| 30°   | 1519.5 | 1293.9 | 803.4  | 442.3  | 320.9  | 295.1  | 293.2  | 300.2  | 310.2  | 318.0  | 319.8  |
| 32.5° | 1486.4 | 1231.2 | 680.6  | 355.7  | 282.4  | 270.3  | 271.9  | 277.8  | 284.0  | 288.3  | 291.3  |
| 35°   | 1471.1 | 1177.3 | 567.3  | 299.9  | 257.9  | 251.2  | 253.3  | 256.6  | 259.3  | 262.5  | 264.9  |
| 37.5° | 1473.8 | 1135.6 | 466.0  | 265.2  | 241.5  | 238.0  | 238.0  | 238.0  | 238.0  | 239.6  | 239.9  |
| 40°   | 1498.8 | 1111.6 | 383.7  | 243.1  | 230.5  | 226.7  | 223.7  | 221.0  | 218.9  | 220.0  | 219.4  |
| 42.5° | 1562.9 | 1109.5 | 323.3  | 229.1  | 221.6  | 215.4  | 209.5  | 205.7  | 203.0  | 204.1  | 204.6  |
| 45°   | 1671.6 | 1136.4 | 282.7  | 219.2  | 213.2  | 203.8  | 196.3  | 192.2  | 190.3  | 193.8  | 194.4  |
| 47.5° | 1812.5 | 1195.1 | 257.9  | 211.9  | 205.4  | 193.0  | 185.0  | 181.2  | 181.7  | 186.8  | 188.2  |
| 50°   | 1993.9 | 1290.4 | 246.1  | 207.3  | 200.0  | 183.9  | 175.5  | 172.3  | 173.9  | 181.2  | 182.8  |
| 52.5° | 2193.1 | 1427.7 | 247.4  | 206.0  | 196.5  | 177.2  | 168.3  | 164.5  | 167.2  | 173.9  | 175.3  |
| 55°   | 2423.1 | 1592.8 | 269.8  | 207.8  | 191.4  | 172.8  | 162.3  | 155.9  | 158.0  | 164.2  | 165.3  |
| 57.5° | 2678.6 | 1781.8 | 314.7  | 207.3  | 185.0  | 168.8  | 156.2  | 146.5  | 148.1  | 151.8  | 152.9  |
| 60°   | 2944.6 | 2010.1 | 384.5  | 208.9  | 182.0  | 164.0  | 147.8  | 135.7  | 135.2  | 138.4  | 138.9  |
| 62.5° | 3263.9 | 2274.2 | 464.2  | 210.0  | 183.9  | 157.8  | 136.8  | 124.9  | 123.3  | 124.1  | 124.7  |
| 65°   | 3592.9 | 2465.3 | 434.3  | 205.7  | 189.8  | 152.7  | 127.1  | 114.4  | 111.5  | 110.9  | 111.2  |
| 67.5° | 3603.1 | 2260.4 | 304.5  | 197.1  | 192.2  | 150.0  | 119.8  | 105.5  | 100.7  | 98.8   | 98.5   |
| 70°   | 3231.3 | 1836.4 | 237.2  | 187.9  | 182.5  | 145.7  | 113.1  | 98.3   | 91.0   | 88.0   | 87.8   |
| 71°   | 3049.8 | 1690.5 | 224.8  | 183.3  | 175.3  | 141.3  | 110.1  | 95.0   | 87.5   | 84.3   | 83.7   |
| 72.5° | 2765.3 | 1515.5 | 209.7  | 176.1  | 161.3  | 130.3  | 104.5  | 90.5   | 82.7   | 78.9   | 78.1   |
| 75°   | 1984.5 | 991.0  | 180.1  | 157.0  | 133.5  | 103.9  | 91.5   | 81.3   | 74.6   | 70.0   | 69.5   |
| 77.5° | 764.6  | 394.4  | 136.2  | 130.6  | 102.3  | 81.3   | 75.4   | 70.3   | 65.4   | 60.8   | 60.6   |
| 80°   | 236.4  | 176.3  | 99.3   | 98.3   | 74.0   | 60.6   | 58.7   | 57.3   | 55.5   | 50.6   | 49.5   |
| 82.5° | 126.3  | 101.2  | 68.4   | 63.5   | 48.5   | 40.4   | 42.5   | 43.1   | 43.3   | 38.2   | 37.7   |
| 85°   | 60.3   | 53.6   | 38.5   | 36.1   | 28.3   | 22.6   | 26.1   | 28.3   | 28.5   | 23.4   | 21.8   |
| 87.5° | 28.8   | 28.0   | 18.0   | 13.7   | 10.5   | 7.5    | 9.2    | 11.3   | 12.4   | 8.9    | 7.8    |
| 90°   | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |

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: SP1-2012-088-3

Luminaire Tested: WIS-SA-830-2D-U-SL4

Test Date: 01/11/2021

### Test Information

Test Method: LM-79-08  
 Report Number: SP1-2012-088-3  
 Test Lab: COOPER LIGHTING SOLUTIONS  
 Photometer: SP1  
 Measurement Geometry:  $4\pi$   
 Issue Date: 01/11/2021  
 Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
 Product Line: INVUE  
 Catalog Number: **WIS-SA-830-2D-U-SL4**  
 Description: INVUE. WALL PACK LIGHT SQUARE SL4 OPTICS 2-SQUARE.

### Spectral Parameters

|                           |        |           |      |      |      |
|---------------------------|--------|-----------|------|------|------|
| CCT (K):                  | 3049   | CRI (Ra): | 81.7 |      |      |
| CIE u':                   | 0.2482 | R1:       | 79.6 | R9:  | 1.9  |
| CIE v':                   | 0.5224 | R2:       | 90.6 | R10: | 79.3 |
| Duv:                      | 0.0015 | R3:       | 95.7 | R11: | 78.7 |
| CIE x:                    | 0.4354 | R4:       | 79.4 | R12: | 72.2 |
| CIE y:                    | 0.4072 | R5:       | 80.2 | R13: | 82.2 |
| CIE z:                    | 0.1574 | R6:       | 89.0 | R14: | 98.1 |
| Peak Wavelength (nm):     | 601    | R7:       | 82.2 |      |      |
| Dominant Wavelength (nm): | 582    | R8:       | 57.0 |      |      |
| Purity:                   | 53     |           |      |      |      |
| Rf:                       | 85.1   |           |      |      |      |
| Rg:                       | 94.3   |           |      |      |      |



### Test Conditions

Stabilization Time: 83M  
 Operation Time: 12H  
 Room Temperature (°C) / RH%: 25.6/29%  
 Sphere Temperature (°C): 25.6

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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 3000K 4-step quadrangle

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### Photopic Flux vs. Wavelength

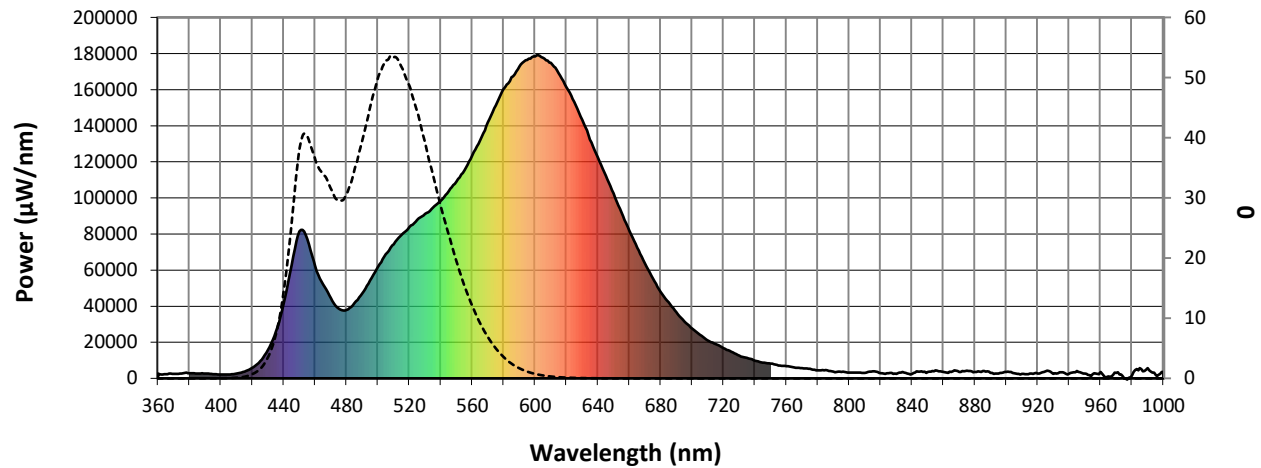


#####

| 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       | 2750             | 0.0              | 490       | 47173            | 6.7              | 620       | 161309           | 42.0             | 750       | 8155             | 0.0              | 880       | 3493             | 0.0              |
| 365       | 2250             | 0.0              | 495       | 54281            | 9.8              | 625       | 153301           | 33.8             | 755       | 7110             | 0.0              | 885       | 4023             | 0.0              |
| 370       | 2449             | 0.0              | 500       | 61837            | 13.6             | 630       | 143292           | 25.9             | 760       | 6829             | 0.0              | 890       | 2983             | 0.0              |
| 375       | 2752             | 0.0              | 505       | 68833            | 19.3             | 635       | 132368           | 19.9             | 765       | 6022             | 0.0              | 895       | 2605             | 0.0              |
| 380       | 2834             | 0.0              | 510       | 74324            | 25.5             | 640       | 122334           | 14.6             | 770       | 5682             | 0.0              | 900       | 3576             | 0.0              |
| 385       | 2613             | 0.0              | 515       | 79410            | 32.9             | 645       | 112200           | 10.8             | 775       | 5247             | 0.0              | 905       | 2786             | 0.0              |
| 390       | 2589             | 0.0              | 520       | 83815            | 40.6             | 650       | 102448           | 7.5              | 780       | 4493             | 0.0              | 910       | 2480             | 0.0              |
| 395       | 2344             | 0.0              | 525       | 87774            | 47.1             | 655       | 91886            | 5.3              | 785       | 4667             | 0.0              | 915       | 2633             | 0.0              |
| 400       | 2067             | 0.0              | 530       | 91247            | 53.7             | 660       | 81865            | 3.4              | 790       | 3736             | 0.0              | 920       | 2726             | 0.0              |
| 405       | 2087             | 0.0              | 535       | 94694            | 58.7             | 665       | 72448            | 2.3              | 795       | 3568             | 0.0              | 925       | 3905             | 0.0              |
| 410       | 2663             | 0.0              | 540       | 98431            | 64.1             | 670       | 63654            | 1.4              | 800       | 3190             | 0.0              | 930       | 2414             | 0.0              |
| 415       | 3760             | 0.0              | 545       | 103765           | 69.1             | 675       | 55284            | 0.9              | 805       | 3215             | 0.0              | 935       | 3414             | 0.0              |
| 420       | 5815             | 0.0              | 550       | 109130           | 74.2             | 680       | 47949            | 0.6              | 810       | 3108             | 0.0              | 940       | 2725             | 0.0              |
| 425       | 9591             | 0.1              | 555       | 115271           | 78.7             | 685       | 42173            | 0.4              | 815       | 3889             | 0.0              | 945       | 4070             | 0.0              |
| 430       | 15806            | 0.1              | 560       | 123390           | 83.9             | 690       | 36755            | 0.2              | 820       | 2869             | 0.0              | 950       | 2640             | 0.0              |
| 435       | 26035            | 0.3              | 565       | 131926           | 87.7             | 695       | 31630            | 0.1              | 825       | 2776             | 0.0              | 955       | 2231             | 0.0              |
| 440       | 41509            | 0.7              | 570       | 141815           | 92.2             | 700       | 27642            | 0.1              | 830       | 2538             | 0.0              | 960       | 3598             | 0.0              |
| 445       | 62857            | 1.3              | 575       | 151359           | 94.2             | 705       | 24213            | 0.1              | 835       | 3283             | 0.0              | 965       | 1098             | 0.0              |
| 450       | 81434            | 2.1              | 580       | 160364           | 95.3             | 710       | 21007            | 0.0              | 840       | 2477             | 0.0              | 970       | 3057             | 0.0              |
| 455       | 77103            | 2.6              | 585       | 166836           | 92.7             | 715       | 18986            | 0.0              | 845       | 3781             | 0.0              | 975       | 152              | 0.0              |
| 460       | 62408            | 2.6              | 590       | 172885           | 89.4             | 720       | 16766            | 0.0              | 850       | 3525             | 0.0              | 980       | 1629             | 0.0              |
| 465       | 52134            | 2.7              | 595       | 176548           | 83.7             | 725       | 14792            | 0.0              | 855       | 4413             | 0.0              | 985       | 5600             | 0.0              |
| 470       | 44297            | 2.8              | 600       | 178427           | 76.9             | 730       | 12553            | 0.0              | 860       | 3598             | 0.0              | 990       | 5671             | 0.0              |
| 475       | 38679            | 3.0              | 605       | 177729           | 68.8             | 735       | 11291            | 0.0              | 865       | 3617             | 0.0              | 995       | 1881             | 0.0              |
| 480       | 38032            | 3.6              | 610       | 174846           | 60.1             | 740       | 9818             | 0.0              | 870       | 3567             | 0.0              | 1000      | 3484             | 0.0              |
| 485       | 41652            | 4.9              | 615       | 169274           | 51.1             | 745       | 8656             | 0.0              | 875       | 4346             | 0.0              |           |                  |                  |

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### Scotopic Flux vs. Wavelength


**Scotopic Lumens: 4584.8**
**S/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       | 2750             | 0.0              | 490       | 47173            | 72.6             | 620       | 161309           | 2.0              | 750       | 8155             | 0.0              | 880       | 3493             | 0.0              |
| 365       | 2250             | 0.0              | 495       | 54281            | 87.7             | 625       | 153301           | 1.3              | 755       | 7110             | 0.0              | 885       | 4023             | 0.0              |
| 370       | 2449             | 0.0              | 500       | 61837            | 103.4            | 630       | 143292           | 0.8              | 760       | 6829             | 0.0              | 890       | 2983             | 0.0              |
| 375       | 2752             | 0.0              | 505       | 68833            | 117.0            | 635       | 132368           | 0.5              | 765       | 6022             | 0.0              | 895       | 2605             | 0.0              |
| 380       | 2834             | 0.0              | 510       | 74324            | 126.0            | 640       | 122334           | 0.3              | 770       | 5682             | 0.0              | 900       | 3576             | 0.0              |
| 385       | 2613             | 0.0              | 515       | 79410            | 131.6            | 645       | 112200           | 0.2              | 775       | 5247             | 0.0              | 905       | 2786             | 0.0              |
| 390       | 2589             | 0.0              | 520       | 83815            | 133.2            | 650       | 102448           | 0.1              | 780       | 4493             | 0.0              | 910       | 2480             | 0.0              |
| 395       | 2344             | 0.0              | 525       | 87774            | 131.3            | 655       | 91886            | 0.1              | 785       | 4667             | 0.0              | 915       | 2633             | 0.0              |
| 400       | 2067             | 0.0              | 530       | 91247            | 125.8            | 660       | 81865            | 0.0              | 790       | 3736             | 0.0              | 920       | 2726             | 0.0              |
| 405       | 2087             | 0.1              | 535       | 94694            | 118.0            | 665       | 72448            | 0.0              | 795       | 3568             | 0.0              | 925       | 3905             | 0.0              |
| 410       | 2663             | 0.2              | 540       | 98431            | 108.8            | 670       | 63654            | 0.0              | 800       | 3190             | 0.0              | 930       | 2414             | 0.0              |
| 415       | 3760             | 0.4              | 545       | 103765           | 99.5             | 675       | 55284            | 0.0              | 805       | 3215             | 0.0              | 935       | 3414             | 0.0              |
| 420       | 5815             | 1.0              | 550       | 109130           | 89.2             | 680       | 47949            | 0.0              | 810       | 3108             | 0.0              | 940       | 2725             | 0.0              |
| 425       | 9591             | 2.3              | 555       | 115271           | 78.8             | 685       | 42173            | 0.0              | 815       | 3889             | 0.0              | 945       | 4070             | 0.0              |
| 430       | 15806            | 5.4              | 560       | 123390           | 69.0             | 690       | 36755            | 0.0              | 820       | 2869             | 0.0              | 950       | 2640             | 0.0              |
| 435       | 26035            | 11.6             | 565       | 131926           | 59.2             | 695       | 31630            | 0.0              | 825       | 2776             | 0.0              | 955       | 2231             | 0.0              |
| 440       | 41509            | 23.2             | 570       | 141815           | 50.0             | 700       | 27642            | 0.0              | 830       | 2538             | 0.0              | 960       | 3598             | 0.0              |
| 445       | 62857            | 42.1             | 575       | 151359           | 41.2             | 705       | 24213            | 0.0              | 835       | 3283             | 0.0              | 965       | 1098             | 0.0              |
| 450       | 81434            | 63.1             | 580       | 160364           | 33.0             | 710       | 21007            | 0.0              | 840       | 2477             | 0.0              | 970       | 3057             | 0.0              |
| 455       | 77103            | 67.4             | 585       | 166836           | 25.5             | 715       | 18986            | 0.0              | 845       | 3781             | 0.0              | 975       | 152              | 0.0              |
| 460       | 62408            | 60.3             | 590       | 172885           | 19.3             | 720       | 16766            | 0.0              | 850       | 3525             | 0.0              | 980       | 1629             | 0.0              |
| 465       | 52134            | 55.1             | 595       | 176548           | 14.1             | 725       | 14792            | 0.0              | 855       | 4413             | 0.0              | 985       | 5600             | 0.0              |
| 470       | 44297            | 51.0             | 600       | 178427           | 10.1             | 730       | 12553            | 0.0              | 860       | 3598             | 0.0              | 990       | 5671             | 0.0              |
| 475       | 38679            | 48.4             | 605       | 177729           | 7.0              | 735       | 11291            | 0.0              | 865       | 3617             | 0.0              | 995       | 1881             | 0.0              |
| 480       | 38032            | 51.4             | 610       | 174846           | 4.7              | 740       | 9818             | 0.0              | 870       | 3567             | 0.0              | 1000      | 3484             | 0.0              |
| 485       | 41652            | 60.4             | 615       | 169274           | 3.1              | 745       | 8656             | 0.0              | 875       | 4346             | 0.0              |           |                  |                  |

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### Melanopic Flux vs. Wavelength


**Melanopic Lumens: 12033.4    S/P: 1.36**

| 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       | 2750             | 0.0              | 490       | 47173            | 39.3             | 620       | 161309           | 0.1              | 750       | 8155             | 0.0              | 880       | 3493             | 0.0              |
| 365       | 2250             | 0.0              | 495       | 54281            | 44.8             | 625       | 153301           | 0.1              | 755       | 7110             | 0.0              | 885       | 4023             | 0.0              |
| 370       | 2449             | 0.0              | 500       | 61837            | 49.7             | 630       | 143292           | 0.0              | 760       | 6829             | 0.0              | 890       | 2983             | 0.0              |
| 375       | 2752             | 0.0              | 505       | 68833            | 52.8             | 635       | 132368           | 0.0              | 765       | 6022             | 0.0              | 895       | 2605             | 0.0              |
| 380       | 2834             | 0.0              | 510       | 74324            | 53.4             | 640       | 122334           | 0.0              | 770       | 5682             | 0.0              | 900       | 3576             | 0.0              |
| 385       | 2613             | 0.0              | 515       | 79410            | 51.9             | 645       | 112200           | 0.0              | 775       | 5247             | 0.0              | 905       | 2786             | 0.0              |
| 390       | 2589             | 0.0              | 520       | 83815            | 48.8             | 650       | 102448           | 0.0              | 780       | 4493             | 0.0              | 910       | 2480             | 0.0              |
| 395       | 2344             | 0.0              | 525       | 87774            | 44.5             | 655       | 91886            | 0.0              | 785       | 4667             | 0.0              | 915       | 2633             | 0.0              |
| 400       | 2067             | 0.0              | 530       | 91247            | 39.4             | 660       | 81865            | 0.0              | 790       | 3736             | 0.0              | 920       | 2726             | 0.0              |
| 405       | 2087             | 0.0              | 535       | 94694            | 34.1             | 665       | 72448            | 0.0              | 795       | 3568             | 0.0              | 925       | 3905             | 0.0              |
| 410       | 2663             | 0.1              | 540       | 98431            | 28.8             | 670       | 63654            | 0.0              | 800       | 3190             | 0.0              | 930       | 2414             | 0.0              |
| 415       | 3760             | 0.2              | 545       | 103765           | 24.1             | 675       | 55284            | 0.0              | 805       | 3215             | 0.0              | 935       | 3414             | 0.0              |
| 420       | 5815             | 0.7              | 550       | 109130           | 19.6             | 680       | 47949            | 0.0              | 810       | 3108             | 0.0              | 940       | 2725             | 0.0              |
| 425       | 9591             | 1.5              | 555       | 115271           | 15.5             | 685       | 42173            | 0.0              | 815       | 3889             | 0.0              | 945       | 4070             | 0.0              |
| 430       | 15806            | 3.3              | 560       | 123390           | 12.2             | 690       | 36755            | 0.0              | 820       | 2869             | 0.0              | 950       | 2640             | 0.0              |
| 435       | 26035            | 6.9              | 565       | 131926           | 9.3              | 695       | 31630            | 0.0              | 825       | 2776             | 0.0              | 955       | 2231             | 0.0              |
| 440       | 41509            | 13.9             | 570       | 141815           | 6.9              | 700       | 27642            | 0.0              | 830       | 2538             | 0.0              | 960       | 3598             | 0.0              |
| 445       | 62857            | 24.8             | 575       | 151359           | 5.0              | 705       | 24213            | 0.0              | 835       | 3283             | 0.0              | 965       | 1098             | 0.0              |
| 450       | 81434            | 37.5             | 580       | 160364           | 3.6              | 710       | 21007            | 0.0              | 840       | 2477             | 0.0              | 970       | 3057             | 0.0              |
| 455       | 77103            | 40.4             | 585       | 166836           | 2.5              | 715       | 18986            | 0.0              | 845       | 3781             | 0.0              | 975       | 152              | 0.0              |
| 460       | 62408            | 36.8             | 590       | 172885           | 1.7              | 720       | 16766            | 0.0              | 850       | 3525             | 0.0              | 980       | 1629             | 0.0              |
| 465       | 52134            | 34.1             | 595       | 176548           | 1.1              | 725       | 14792            | 0.0              | 855       | 4413             | 0.0              | 985       | 5600             | 0.0              |
| 470       | 44297            | 31.7             | 600       | 178427           | 0.8              | 730       | 12553            | 0.0              | 860       | 3598             | 0.0              | 990       | 5671             | 0.0              |
| 475       | 38679            | 29.5             | 605       | 177729           | 0.5              | 735       | 11291            | 0.0              | 865       | 3617             | 0.0              | 995       | 1881             | 0.0              |
| 480       | 38032            | 30.6             | 610       | 174846           | 0.3              | 740       | 9818             | 0.0              | 870       | 3567             | 0.0              | 1000      | 3484             | 0.0              |
| 485       | 41652            | 34.3             | 615       | 169274           | 0.2              | 745       | 8656             | 0.0              | 875       | 4346             | 0.0              |           |                  |                  |

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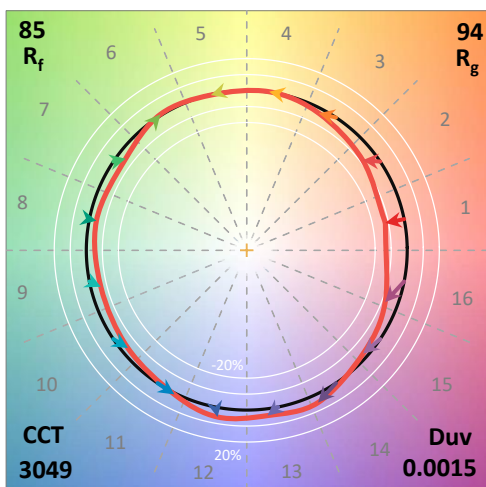
TM-30-18

### Summary

$R_f = 85.1$   
 $R_g = 94.3$   
 CIE  $R_a = 81.7$   
 $R_g = 1.9$



### Color Vector Graphics



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

|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 86 | CES26 = 85 | CES51 = 93 | CES76 = 82 |
| CES02 = 63 | CES27 = 94 | CES52 = 93 | CES77 = 85 |
| CES03 = 31 | CES28 = 95 | CES53 = 89 | CES78 = 82 |
| CES04 = 70 | CES29 = 90 | CES54 = 90 | CES79 = 91 |
| CES05 = 49 | CES30 = 96 | CES55 = 89 | CES80 = 90 |
| CES06 = 51 | CES31 = 91 | CES56 = 86 | CES81 = 72 |
| CES07 = 42 | CES32 = 85 | CES57 = 85 | CES82 = 96 |
| CES08 = 41 | CES33 = 95 | CES58 = 86 | CES83 = 95 |
| CES09 = 29 | CES34 = 92 | CES59 = 91 | CES84 = 92 |
| CES10 = 76 | CES35 = 96 | CES60 = 92 | CES85 = 77 |
| CES11 = 59 | CES36 = 87 | CES61 = 88 | CES86 = 68 |
| CES12 = 65 | CES37 = 96 | CES62 = 90 | CES87 = 84 |
| CES13 = 43 | CES38 = 94 | CES63 = 88 | CES88 = 87 |
| CES14 = 74 | CES39 = 98 | CES64 = 81 | CES89 = 75 |
| CES15 = 71 | CES40 = 96 | CES65 = 79 | CES90 = 88 |
| CES16 = 47 | CES41 = 97 | CES66 = 80 | CES91 = 79 |
| CES17 = 50 | CES42 = 98 | CES67 = 78 | CES92 = 65 |
| CES18 = 56 | CES43 = 92 | CES68 = 82 | CES93 = 78 |
| CES19 = 72 | CES44 = 99 | CES69 = 87 | CES94 = 61 |
| CES20 = 66 | CES45 = 93 | CES70 = 80 | CES95 = 74 |
| CES21 = 87 | CES46 = 90 | CES71 = 77 | CES96 = 83 |
| CES22 = 79 | CES47 = 95 | CES72 = 92 | CES97 = 88 |
| CES23 = 92 | CES48 = 84 | CES73 = 75 | CES98 = 84 |
| CES24 = 91 | CES49 = 91 | CES74 = 92 | CES99 = 75 |
| CES25 = 72 | CES50 = 94 | CES75 = 80 |            |



**Color Rendition by Hue-Angle Bin**


**Measure Comparisons**



(END OF REPORT)