

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: P386852

Luminaire Tested: **GWC-SA2C-735-U-T4W-HSS**

Issue Date: 3/3/2020

**Test Information**

Test Method: LM-79-08  
Report Number: P386852  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-1903-205-19)  
Test Lab: INNOVATION CENTER  
Issue Date: 3/3/2020  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: McGRAW-EDISON  
Catalog Number: GWC-SA2C-735-U-T4W-HSS  
Description: GALLEON WALL LUMINAIRE  
(2) 70 CRI, 3500K, 1050mA LIGHTSQUARES WITH 16 LEDS EACH AND TYPE IV WIDE OPTICS WITH HOUSE SIDE SHIELD  
Light Source: -  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 10051.5 lumens  
Efficiency: N/A  
Efficacy: 89.0 lumens/watt  
Luminous Opening: Rectangular (W 1' x L: 0.5' x H: 0')  
IES Classification: Type IV - Short  
BUG Rating: B1 - U0 - G2

Input Watts (W): 113  
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

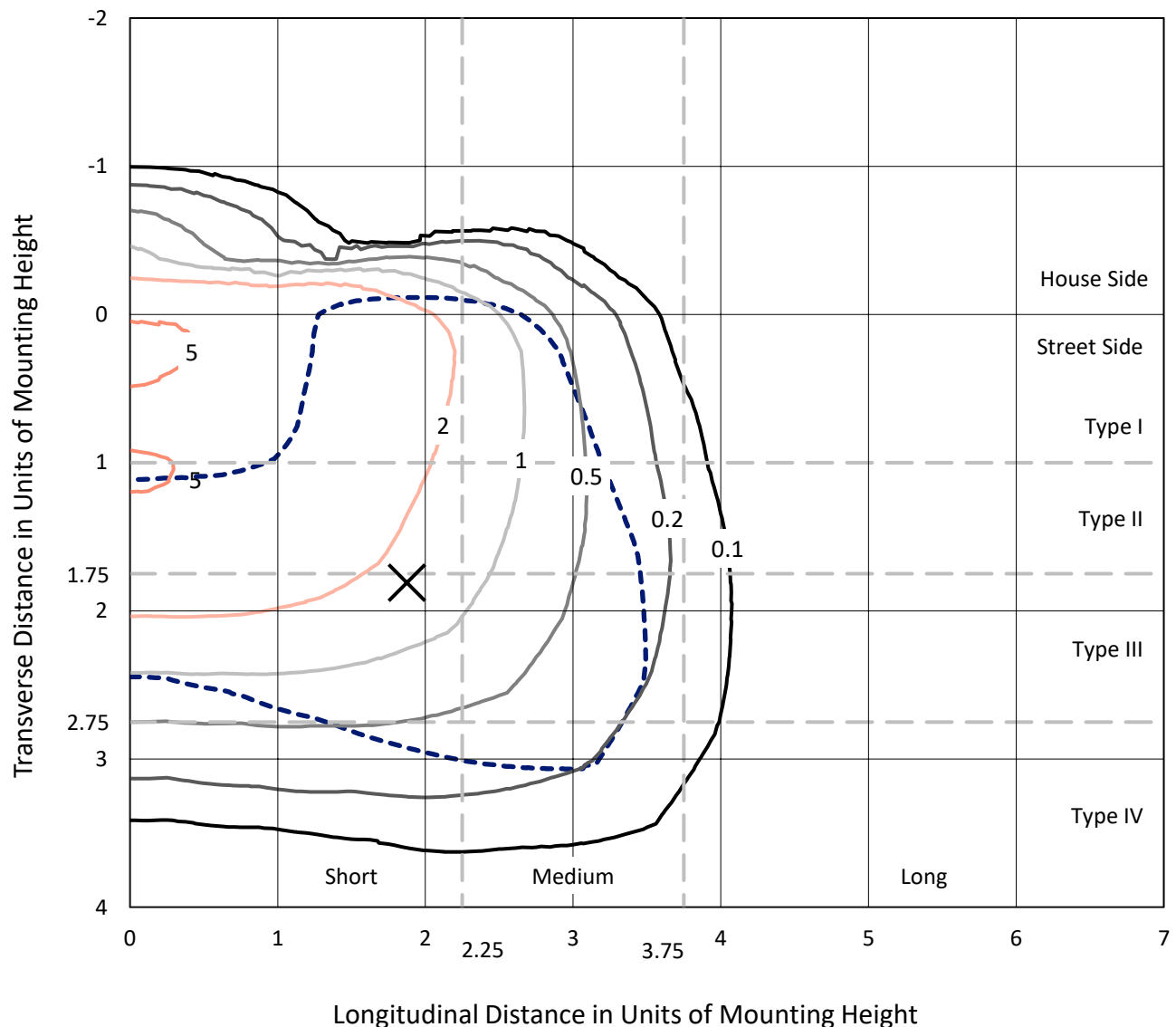


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## Iso-Footcandle Lines of Horizontal Illumination

✕ Max cd  
 - - - 1/2 Max cd

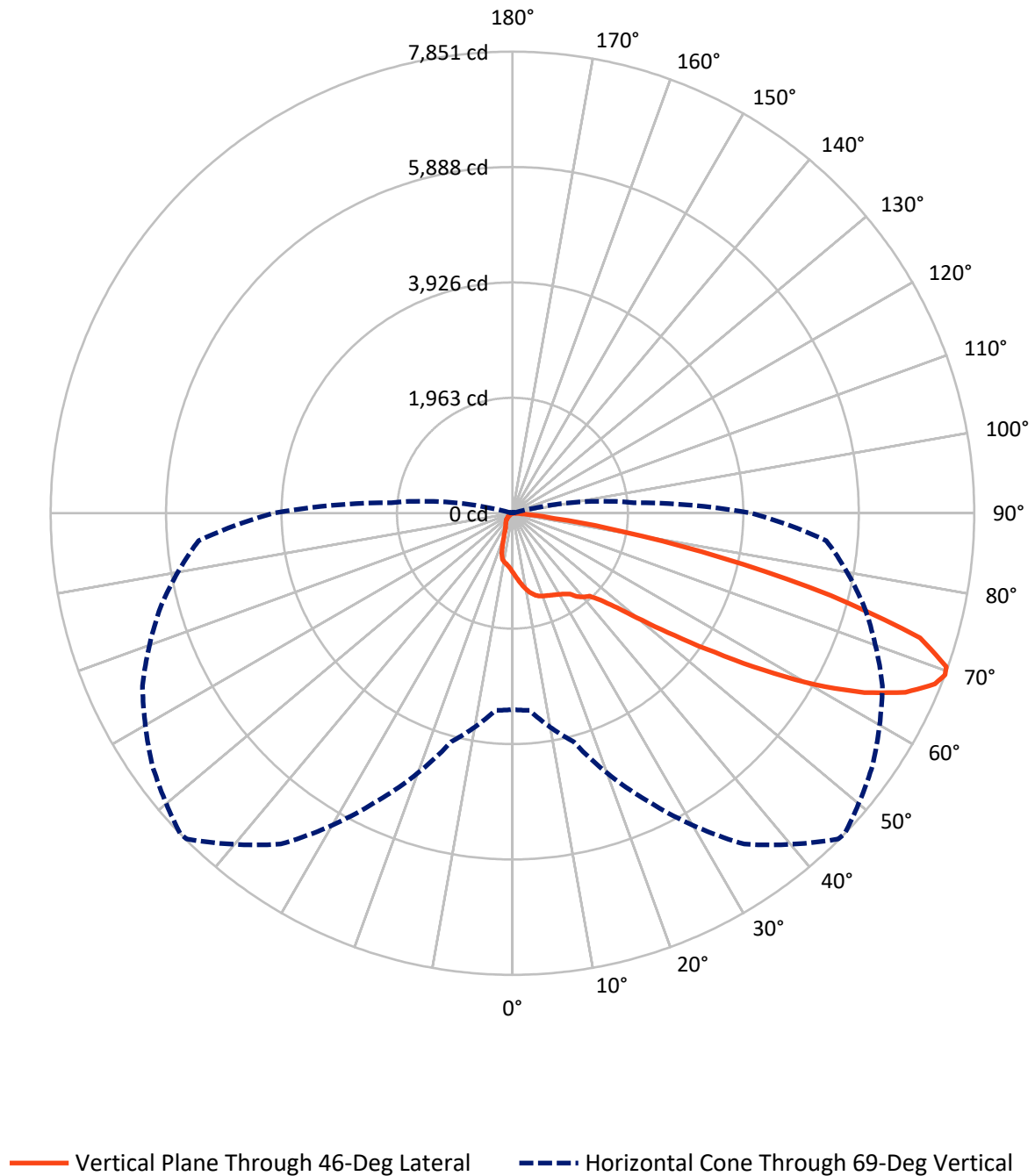


Based on 15 foot mounting height. Maximum calculated value = 6.5 fc  
 Type IV - Short - N/A

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## Luminous Intensity Polar Plot



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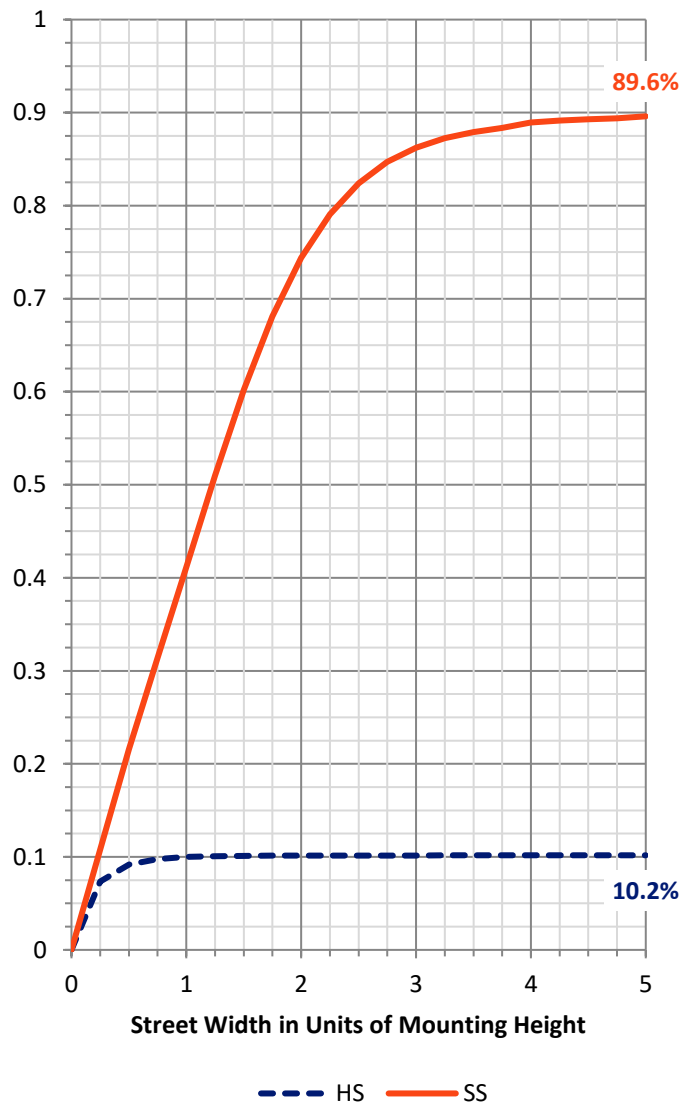
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total   |
|--------------------|-----------|----------|--------|---------|
| <b>House Side</b>  | Lumens    | 1031.5   | 0.0    | 1031.5  |
|                    | % Fixture | 10.3     | 0.0    | 10.3    |
| <b>Street Side</b> | Lumens    | 9020.0   | 0.0    | 9020.0  |
|                    | % Fixture | 89.7     | 0.0    | 89.7    |
| <b>Total</b>       | Lumens    | 10051.5  | 0.0    | 10051.5 |
|                    | % Fixture | 100.0    | 0.0    | 100.0   |

**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 100.2   | 1.0       |
| 10°-20°   | 304.1   | 3.0       |
| 20°-30°   | 478.3   | 4.8       |
| 30°-40°   | 685.8   | 6.8       |
| 40°-50°   | 1185.4  | 11.8      |
| 50°-60°   | 2341.9  | 23.3      |
| 60°-70°   | 3273.0  | 32.6      |
| 70°-80°   | 1581.2  | 15.7      |
| 80°-90°   | 101.6   | 1.0       |
| 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°    | 10051.5 | 100.0     |
| 0°-180°   | 10051.5 | 100.0     |

**Coefficient of Utilization**



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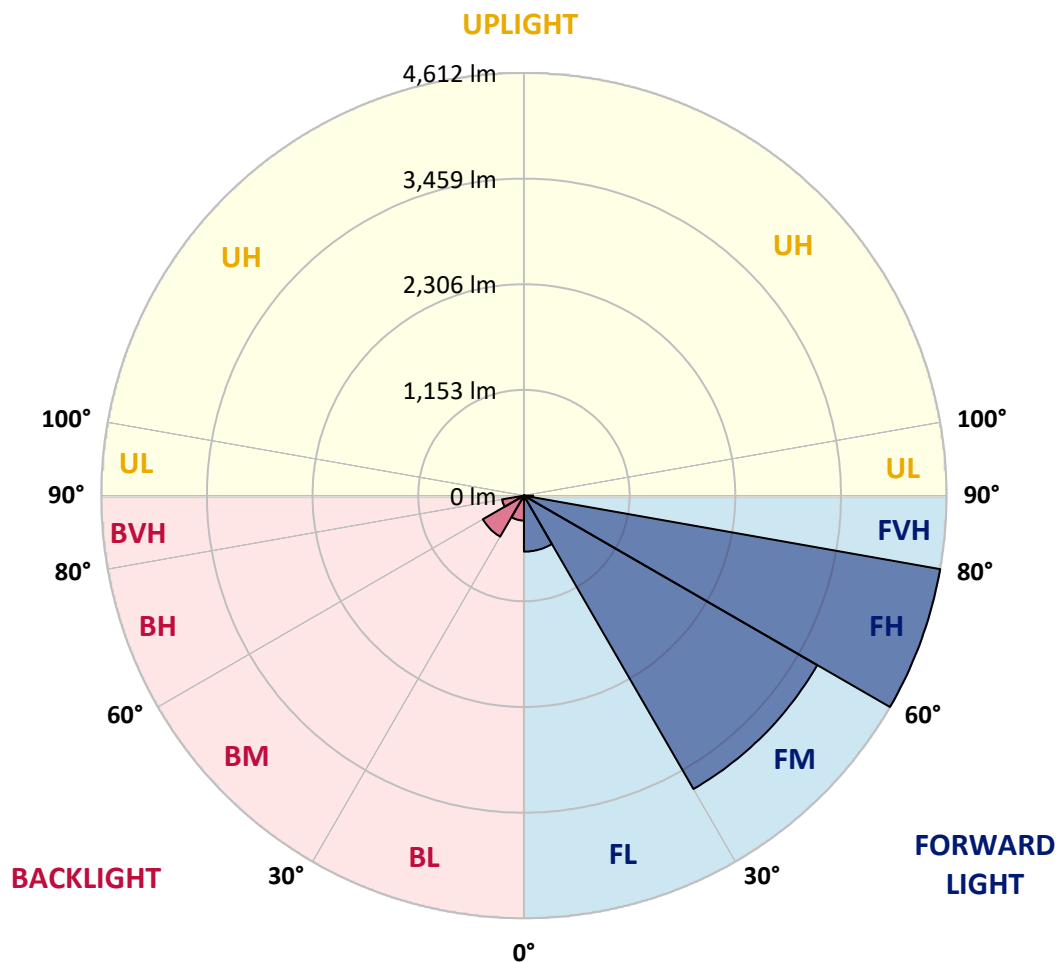
CATALOG NUMBER: GWC-SA2C-735-U-T4W-HSS

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

| Zone |             | Lumens | % Fixture | Zone Rating/Lumen Limit |      |         |
|------|-------------|--------|-----------|-------------------------|------|---------|
|      |             |        |           | B                       | U    | G       |
| FL   | (0°-30°)    | 610.7  | 6.1       |                         |      |         |
| FM   | (30°-60°)   | 3696.2 | 36.8      |                         |      |         |
| FH   | (60°-80°)   | 4612.3 | 45.9      |                         |      | G2/5000 |
| FVH  | (80°-90°)   | 100.8  | 1.0       |                         |      | G2/225  |
| BL   | (0°-30°)    | 271.9  | 2.7       | B1/500                  |      |         |
| BM   | (30°-60°)   | 516.9  | 5.1       | B1/1000                 |      |         |
| BH   | (60°-80°)   | 241.9  | 2.4       | B1/500                  |      | G1/500  |
| BVH  | (80°-90°)   | 0.9    | 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 IV Short



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**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 5°     | 15°    | 25°    | 35°    | 45°    | 46°    | 55°    | 65°    | 75°    | 85°    |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 1007.1 | 1007.1 | 1007.1 | 1007.1 | 1007.1 | 1007.1 | 1007.1 | 1007.1 | 1007.1 | 1007.1 | 1007.1 |
| 2.5°  | 1118.8 | 1117.4 | 1110.8 | 1108.0 | 1092.0 | 1082.6 | 1078.8 | 1067.0 | 1050.1 | 1033.1 | 1014.2 |
| 5°    | 1246.1 | 1245.6 | 1233.3 | 1221.6 | 1191.4 | 1163.2 | 1157.9 | 1130.6 | 1092.4 | 1056.6 | 1020.7 |
| 7.5°  | 1376.1 | 1370.0 | 1357.8 | 1335.2 | 1291.3 | 1246.1 | 1241.8 | 1203.2 | 1149.0 | 1097.1 | 1045.7 |
| 10°   | 1486.4 | 1482.6 | 1466.6 | 1432.2 | 1380.8 | 1329.5 | 1324.3 | 1276.7 | 1215.4 | 1151.8 | 1086.3 |
| 12.5° | 1572.2 | 1569.4 | 1548.1 | 1505.3 | 1450.6 | 1397.3 | 1390.3 | 1347.8 | 1282.4 | 1211.2 | 1133.9 |
| 15°   | 1624.5 | 1623.1 | 1597.2 | 1551.4 | 1497.8 | 1451.6 | 1445.4 | 1408.2 | 1347.4 | 1273.0 | 1185.7 |
| 17.5° | 1636.8 | 1637.3 | 1610.4 | 1564.2 | 1519.8 | 1486.9 | 1482.2 | 1453.9 | 1403.0 | 1329.1 | 1237.6 |
| 20°   | 1609.5 | 1615.1 | 1591.1 | 1550.9 | 1523.6 | 1506.2 | 1502.5 | 1485.5 | 1442.6 | 1372.8 | 1279.1 |
| 22.5° | 1570.8 | 1573.6 | 1557.1 | 1530.3 | 1518.9 | 1522.2 | 1520.3 | 1510.9 | 1474.7 | 1410.5 | 1320.0 |
| 25°   | 1547.2 | 1547.2 | 1537.3 | 1514.7 | 1522.2 | 1542.5 | 1543.0 | 1541.1 | 1512.3 | 1456.7 | 1370.0 |
| 27.5° | 1546.2 | 1543.4 | 1532.2 | 1515.1 | 1535.9 | 1567.0 | 1568.9 | 1581.7 | 1563.7 | 1512.8 | 1432.2 |
| 30°   | 1584.0 | 1580.7 | 1556.7 | 1534.5 | 1560.9 | 1594.3 | 1599.0 | 1626.8 | 1617.9 | 1573.6 | 1501.5 |
| 32.5° | 1672.1 | 1660.3 | 1607.0 | 1570.8 | 1590.6 | 1630.6 | 1636.8 | 1681.0 | 1695.2 | 1648.5 | 1568.4 |
| 35°   | 1792.7 | 1755.5 | 1678.7 | 1639.6 | 1641.5 | 1683.4 | 1689.0 | 1754.1 | 1796.0 | 1717.3 | 1620.3 |
| 37.5° | 1959.1 | 1940.7 | 1815.8 | 1711.2 | 1719.7 | 1783.3 | 1799.8 | 1870.5 | 1858.7 | 1755.1 | 1679.2 |
| 40°   | 2323.9 | 2295.1 | 2162.2 | 1911.9 | 1794.6 | 1864.4 | 1869.6 | 1907.3 | 1908.2 | 1840.4 | 1801.7 |
| 42.5° | 2820.6 | 2808.8 | 2668.8 | 2276.2 | 1942.1 | 1918.6 | 1928.0 | 1991.6 | 2062.8 | 2020.4 | 2018.5 |
| 45°   | 3370.5 | 3364.4 | 3216.0 | 2759.8 | 2240.5 | 2096.3 | 2108.0 | 2193.3 | 2329.5 | 2339.0 | 2398.8 |
| 47.5° | 3813.1 | 3810.3 | 3725.0 | 3299.4 | 2697.1 | 2397.4 | 2401.2 | 2491.6 | 2731.1 | 2849.4 | 2945.0 |
| 50°   | 4216.6 | 4230.2 | 4162.8 | 3883.4 | 3319.3 | 2869.2 | 2860.2 | 2920.5 | 3305.1 | 3498.8 | 3617.5 |
| 52.5° | 4777.4 | 4796.6 | 4607.7 | 4428.1 | 3971.9 | 3454.4 | 3447.4 | 3510.5 | 3995.1 | 4140.2 | 4161.4 |
| 55°   | 5272.6 | 5239.7 | 5090.3 | 5038.4 | 4767.9 | 4177.4 | 4175.5 | 4231.1 | 4662.4 | 4724.1 | 4763.2 |
| 57.5° | 5491.3 | 5478.6 | 5550.7 | 5669.5 | 5601.6 | 5031.9 | 5027.6 | 4985.2 | 5259.5 | 5266.1 | 5386.3 |
| 60°   | 5629.4 | 5645.0 | 5866.0 | 6232.2 | 6401.4 | 5951.3 | 5924.0 | 5665.3 | 5829.7 | 5815.1 | 5943.7 |
| 62.5° | 5525.8 | 5556.4 | 5954.2 | 6564.5 | 6999.9 | 6753.9 | 6715.3 | 6288.3 | 6317.0 | 6266.6 | 6386.3 |
| 65°   | 4975.3 | 5022.9 | 5674.7 | 6501.7 | 7296.8 | 7381.2 | 7342.0 | 6838.2 | 6704.0 | 6621.0 | 6554.5 |
| 67.5° | 4039.8 | 4068.0 | 4748.6 | 5956.5 | 7163.0 | 7755.4 | 7747.4 | 7320.4 | 6996.1 | 6561.2 | 6045.6 |
| 69°   | 3338.5 | 3366.3 | 4021.5 | 5382.4 | 6868.5 | 7835.5 | 7851.1 | 7474.9 | 6940.5 | 6197.4 | 5356.5 |
| 70°   | 2827.7 | 2857.4 | 3467.7 | 4890.5 | 6526.7 | 7798.3 | 7826.1 | 7460.4 | 6781.2 | 5776.0 | 4751.9 |
| 72.5° | 1483.1 | 1508.6 | 2134.9 | 3369.1 | 5320.7 | 7160.6 | 7245.0 | 6829.8 | 5748.2 | 4194.9 | 2809.7 |
| 75°   | 466.1  | 480.7  | 833.7  | 1761.2 | 3643.0 | 5567.7 | 5587.0 | 5357.6 | 4081.8 | 2307.3 | 1170.2 |
| 77.5° | 177.6  | 173.4  | 277.6  | 648.9  | 1841.8 | 3505.8 | 3624.2 | 3348.0 | 2142.0 | 815.8  | 270.1  |
| 80°   | 95.6   | 96.1   | 144.2  | 268.7  | 788.0  | 1801.7 | 1901.6 | 1622.6 | 761.1  | 254.5  | 62.2   |
| 82.5° | 41.4   | 43.4   | 81.1   | 142.3  | 361.9  | 664.5  | 714.5  | 594.7  | 290.7  | 171.1  | 23.1   |
| 85°   | 8.9    | 9.9    | 39.1   | 77.3   | 147.5  | 186.7  | 195.6  | 192.8  | 185.2  | 132.9  | 8.9    |
| 87.5° | 0.0    | 0.0    | 17.5   | 27.8   | 37.2   | 42.5   | 37.2   | 48.6   | 102.3  | 89.5   | 4.7    |
| 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: P386852

CATALOG NUMBER: GWC-SA2C-735-U-T4W-HSS

**CANDELA DISTRIBUTION (continued):**

|       | 90°    | 95°    | 105°   | 115°   | 125°   | 135°   | 145°   | 155°   | 165°   | 175°   | 180°   |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 1007.1 | 1007.1 | 1007.1 | 1007.1 | 1007.1 | 1007.1 | 1007.1 | 1007.1 | 1007.1 | 1007.1 | 1007.1 |
| 2.5°  | 1008.1 | 999.6  | 985.0  | 969.0  | 957.6  | 945.9  | 936.4  | 932.2  | 927.5  | 924.2  | 928.4  |
| 5°    | 1006.2 | 989.7  | 961.4  | 934.0  | 914.3  | 898.2  | 885.1  | 879.8  | 874.7  | 870.9  | 870.4  |
| 7.5°  | 1022.7 | 999.6  | 956.2  | 916.2  | 885.6  | 863.9  | 845.9  | 838.4  | 832.3  | 829.5  | 827.1  |
| 10°   | 1054.3 | 1024.6 | 966.6  | 914.3  | 874.7  | 837.9  | 799.3  | 769.6  | 750.3  | 741.3  | 738.0  |
| 12.5° | 1095.2 | 1058.0 | 986.4  | 924.2  | 866.7  | 795.9  | 714.0  | 643.3  | 597.5  | 582.5  | 573.6  |
| 15°   | 1143.3 | 1097.1 | 1012.3 | 936.9  | 837.5  | 708.3  | 569.3  | 476.9  | 434.6  | 426.0  | 416.6  |
| 17.5° | 1189.6 | 1138.6 | 1043.4 | 939.3  | 773.4  | 566.0  | 417.1  | 354.4  | 337.9  | 343.5  | 344.9  |
| 20°   | 1230.0 | 1179.6 | 1074.0 | 918.5  | 656.9  | 424.6  | 322.9  | 307.3  | 313.4  | 324.3  | 326.2  |
| 22.5° | 1271.0 | 1219.2 | 1102.3 | 863.9  | 508.0  | 322.4  | 290.7  | 294.6  | 300.7  | 311.5  | 313.4  |
| 25°   | 1321.0 | 1267.2 | 1128.7 | 763.4  | 381.3  | 274.3  | 276.2  | 281.8  | 287.9  | 297.9  | 298.8  |
| 27.5° | 1378.5 | 1328.0 | 1146.2 | 633.0  | 282.8  | 252.1  | 258.2  | 266.8  | 272.9  | 282.3  | 284.2  |
| 30°   | 1454.8 | 1408.2 | 1151.8 | 497.7  | 237.0  | 232.3  | 235.1  | 245.6  | 254.5  | 262.9  | 264.3  |
| 32.5° | 1526.5 | 1487.3 | 1132.9 | 375.6  | 219.6  | 214.0  | 214.0  | 220.1  | 230.4  | 238.5  | 240.4  |
| 35°   | 1592.5 | 1567.0 | 1072.6 | 274.8  | 206.4  | 197.0  | 192.3  | 192.3  | 198.9  | 205.4  | 207.3  |
| 37.5° | 1679.6 | 1678.7 | 975.1  | 219.2  | 193.7  | 182.9  | 172.9  | 165.4  | 163.1  | 164.5  | 165.4  |
| 40°   | 1829.0 | 1830.4 | 847.8  | 196.5  | 182.9  | 168.2  | 153.1  | 139.5  | 126.8  | 122.5  | 122.0  |
| 42.5° | 2062.3 | 2041.1 | 714.5  | 185.7  | 173.4  | 153.1  | 130.6  | 112.2  | 92.3   | 86.2   | 85.8   |
| 45°   | 2432.7 | 2306.9 | 573.0  | 175.8  | 163.5  | 136.2  | 107.9  | 82.9   | 66.9   | 62.2   | 62.2   |
| 47.5° | 2972.3 | 2656.1 | 444.0  | 165.0  | 150.3  | 116.9  | 81.5   | 59.8   | 49.0   | 46.7   | 47.2   |
| 50°   | 3530.3 | 2998.3 | 340.2  | 151.2  | 134.3  | 96.6   | 60.3   | 43.4   | 37.2   | 37.2   | 37.7   |
| 52.5° | 4025.2 | 3249.0 | 265.3  | 136.7  | 114.5  | 75.9   | 45.7   | 33.9   | 31.1   | 30.6   | 31.1   |
| 55°   | 4488.4 | 3410.7 | 203.1  | 119.7  | 90.9   | 56.6   | 34.9   | 27.8   | 25.9   | 25.0   | 24.5   |
| 57.5° | 4935.2 | 3490.8 | 152.2  | 96.6   | 65.9   | 41.0   | 27.8   | 23.6   | 21.7   | 20.3   | 19.8   |
| 60°   | 5232.6 | 3425.7 | 104.6  | 71.2   | 45.7   | 29.7   | 23.1   | 20.3   | 17.9   | 16.5   | 16.1   |
| 62.5° | 5400.4 | 3248.0 | 67.4   | 51.4   | 32.5   | 22.2   | 18.4   | 17.0   | 13.6   | 12.2   | 12.2   |
| 65°   | 5332.6 | 2955.0 | 47.2   | 36.7   | 23.6   | 16.5   | 13.6   | 13.6   | 9.9    | 8.0    | 7.5    |
| 67.5° | 4725.5 | 2496.3 | 35.8   | 27.3   | 17.0   | 12.2   | 10.3   | 11.7   | 6.1    | 3.8    | 3.8    |
| 69°   | 4065.7 | 2068.9 | 30.6   | 22.6   | 14.2   | 9.9    | 8.9    | 10.8   | 4.2    | 2.8    | 2.3    |
| 70°   | 3533.6 | 1784.8 | 27.8   | 19.8   | 11.7   | 8.5    | 8.0    | 10.3   | 4.2    | 2.3    | 1.9    |
| 72.5° | 2114.2 | 995.4  | 21.2   | 14.2   | 7.5    | 6.6    | 6.6    | 11.7   | 4.2    | 2.3    | 1.9    |
| 75°   | 854.5  | 350.7  | 15.6   | 9.9    | 5.6    | 5.6    | 8.0    | 15.1   | 3.8    | 1.9    | 1.4    |
| 77.5° | 193.7  | 76.8   | 8.9    | 6.1    | 3.8    | 5.6    | 9.4    | 11.7   | 2.3    | 0.9    | 0.0    |
| 80°   | 47.2   | 18.9   | 5.6    | 3.8    | 2.3    | 4.2    | 7.0    | 6.6    | 0.5    | 0.0    | 0.0    |
| 82.5° | 15.6   | 6.6    | 2.3    | 1.9    | 0.5    | 1.4    | 3.3    | 1.9    | 0.0    | 0.0    | 0.0    |
| 85°   | 6.6    | 3.8    | 0.9    | 0.5    | 0.0    | 0.0    | 0.5    | 0.0    | 0.0    | 0.0    | 0.0    |
| 87.5° | 4.2    | 1.4    | 0.0    | 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

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### Photopic Flux vs. Wavelength

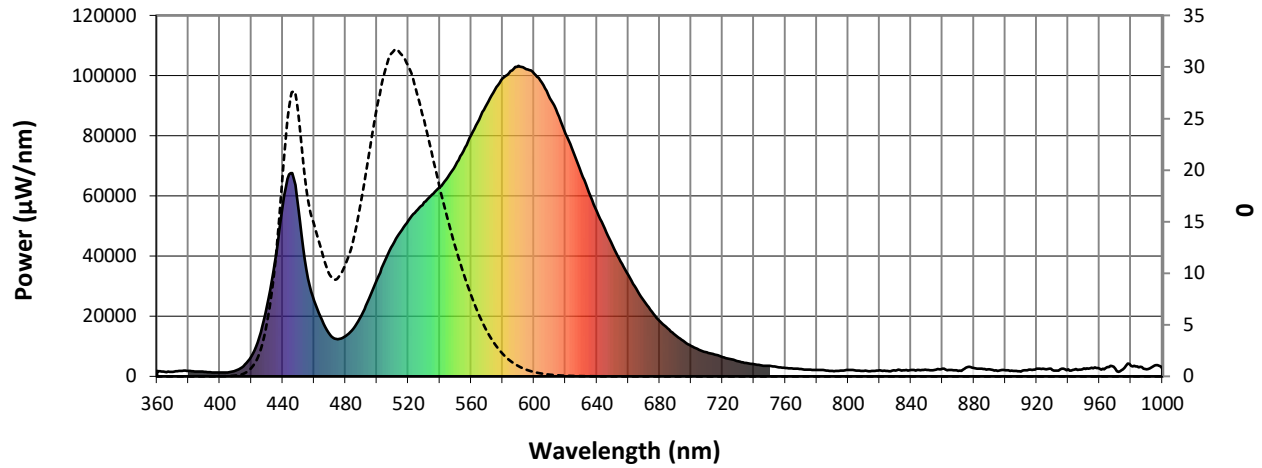


#####

| 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       | 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              |           |                  |                  |

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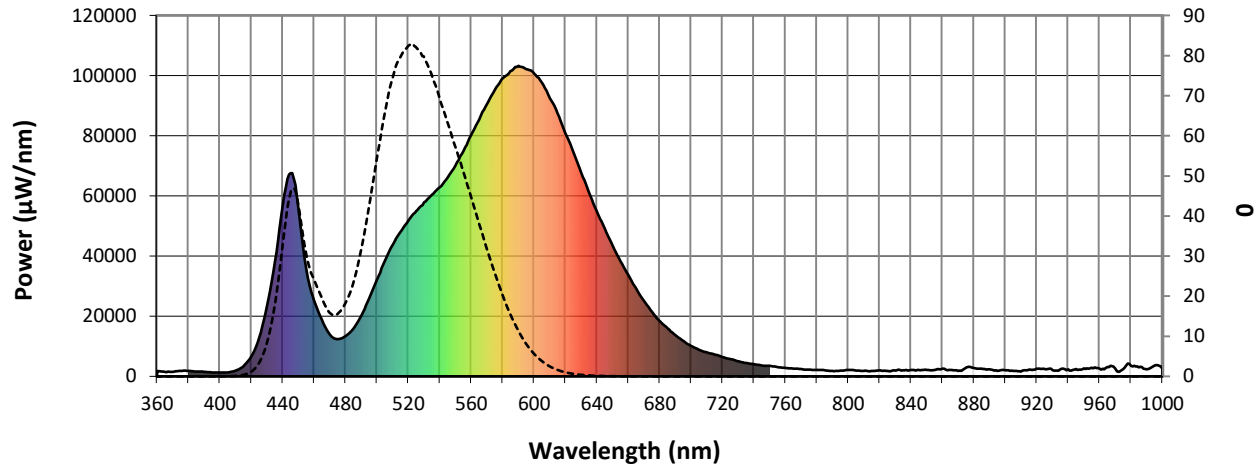
### Scotopic Flux vs. Wavelength


**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              |           |                  |                  |

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### 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              |           |                  |                  |

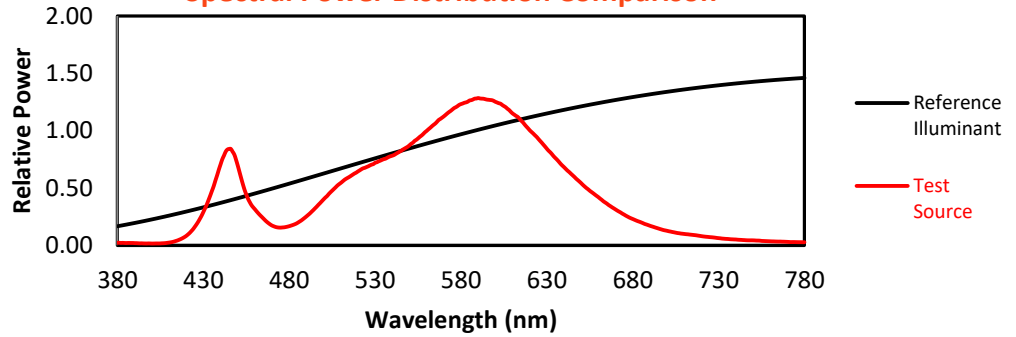
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TM-30-18

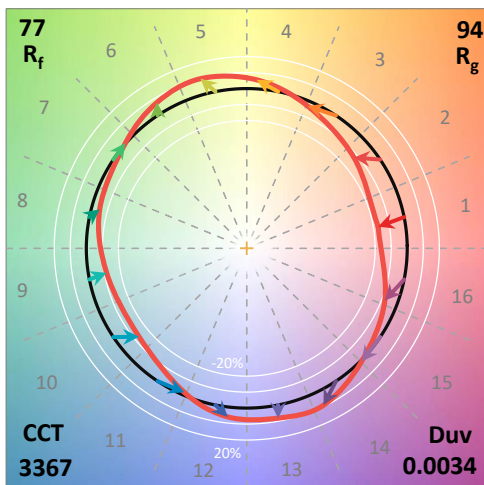
### Summary

$R_f = 77.2$   
 $R_g = 94.4$   
 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)