

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: P386656

Luminaire Tested: **GWC-SA2B-750-U-T4W-HSS**

Issue Date: 3/3/2020

**Test Information**

Test Method: LM-79-08  
Report Number: P386656  
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-SA2B-750-U-T4W-HSS  
Description: GALLEON WALL LUMINAIRE  
(2) 70 CRI, 5000K, 800mA 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: 8643 lumens  
Efficiency: N/A  
Efficacy: 100.5 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): 86  
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

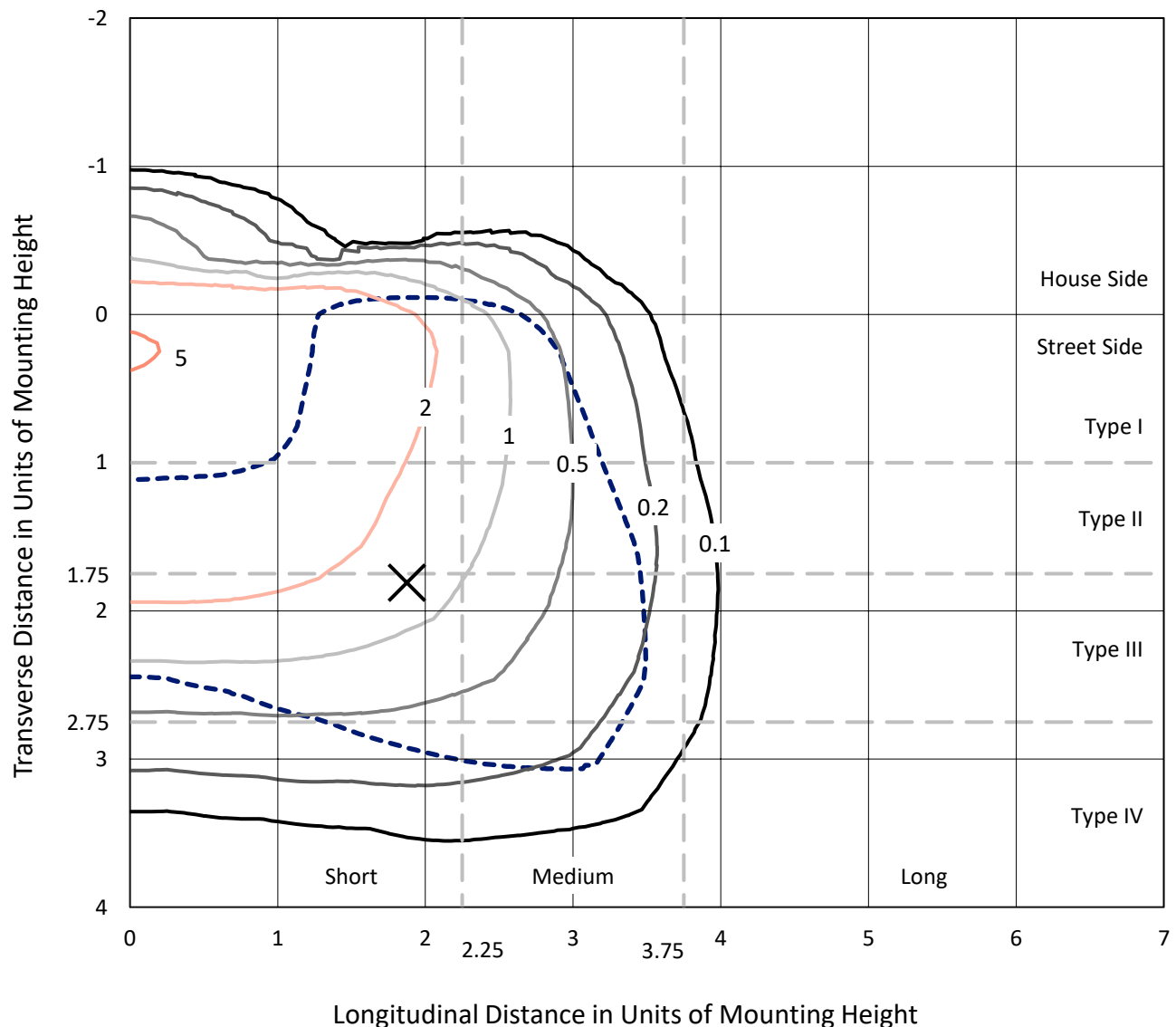


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CATALOG NUMBER: GWC-SA2B-750-U-T4W-HSS

## Iso-Footcandle Lines of Horizontal Illumination

✕ Max cd  
 - - - 1/2 Max cd

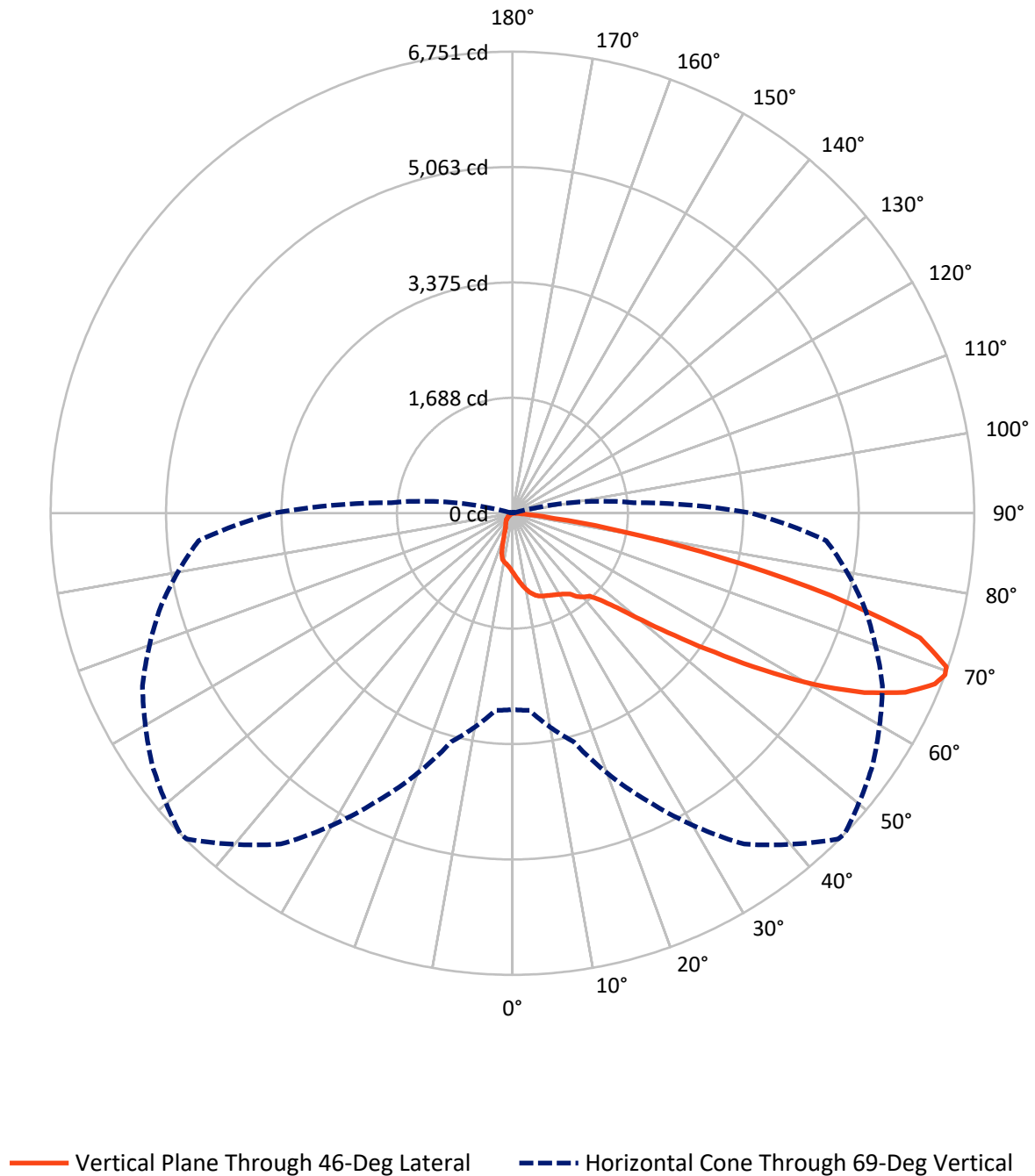


Based on 15 foot mounting height. Maximum calculated value = 5.6 fc  
 Type IV - Short - N/A

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CATALOG NUMBER: GWC-SA2B-750-U-T4W-HSS

## Luminous Intensity Polar Plot



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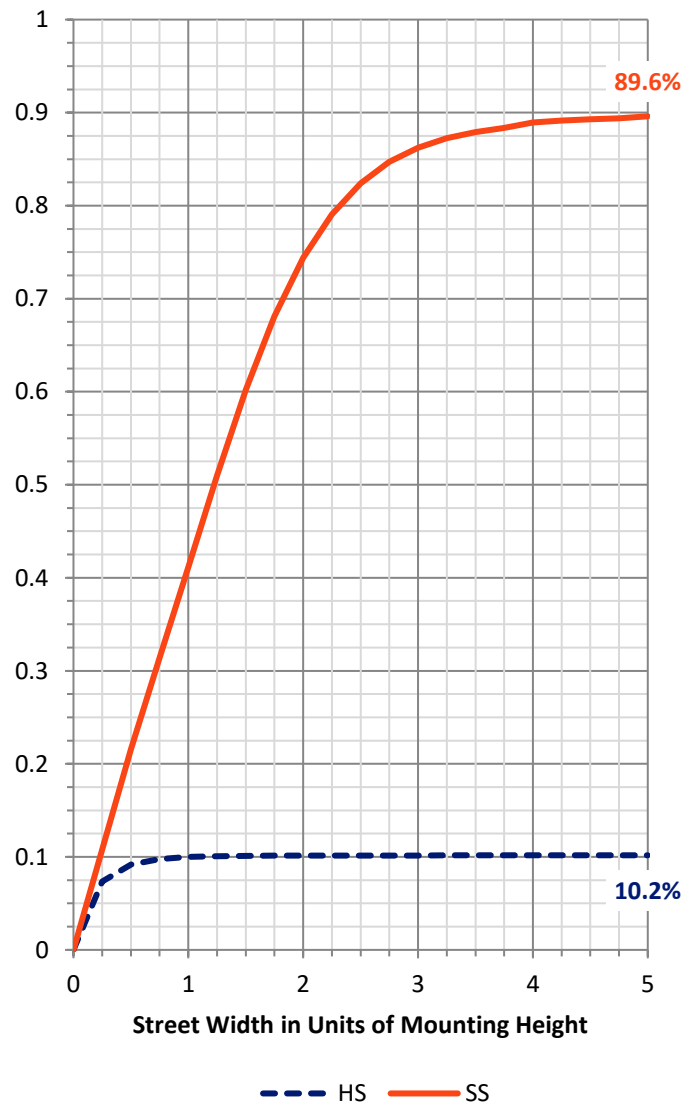
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total  |
|--------------------|-----------|----------|--------|--------|
| <b>House Side</b>  | Lumens    | 887.0    | 0.0    | 887.0  |
|                    | % Fixture | 10.3     | 0.0    | 10.3   |
| <b>Street Side</b> | Lumens    | 7756.0   | 0.0    | 7756.0 |
|                    | % Fixture | 89.7     | 0.0    | 89.7   |
| <b>Total</b>       | Lumens    | 8643.0   | 0.0    | 8643.0 |
|                    | % Fixture | 100.0    | 0.0    | 100.0  |

**ZONAL LUMENS:**

| Zone      | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10°    | 86.2   | 1.0       |
| 10°-20°   | 261.5  | 3.0       |
| 20°-30°   | 411.2  | 4.8       |
| 30°-40°   | 589.7  | 6.8       |
| 40°-50°   | 1019.3 | 11.8      |
| 50°-60°   | 2013.7 | 23.3      |
| 60°-70°   | 2814.3 | 32.6      |
| 70°-80°   | 1359.6 | 15.7      |
| 80°-90°   | 87.4   | 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°    | 8643.0 | 100.0     |
| 0°-180°   | 8643.0 | 100.0     |

**Coefficient of Utilization**



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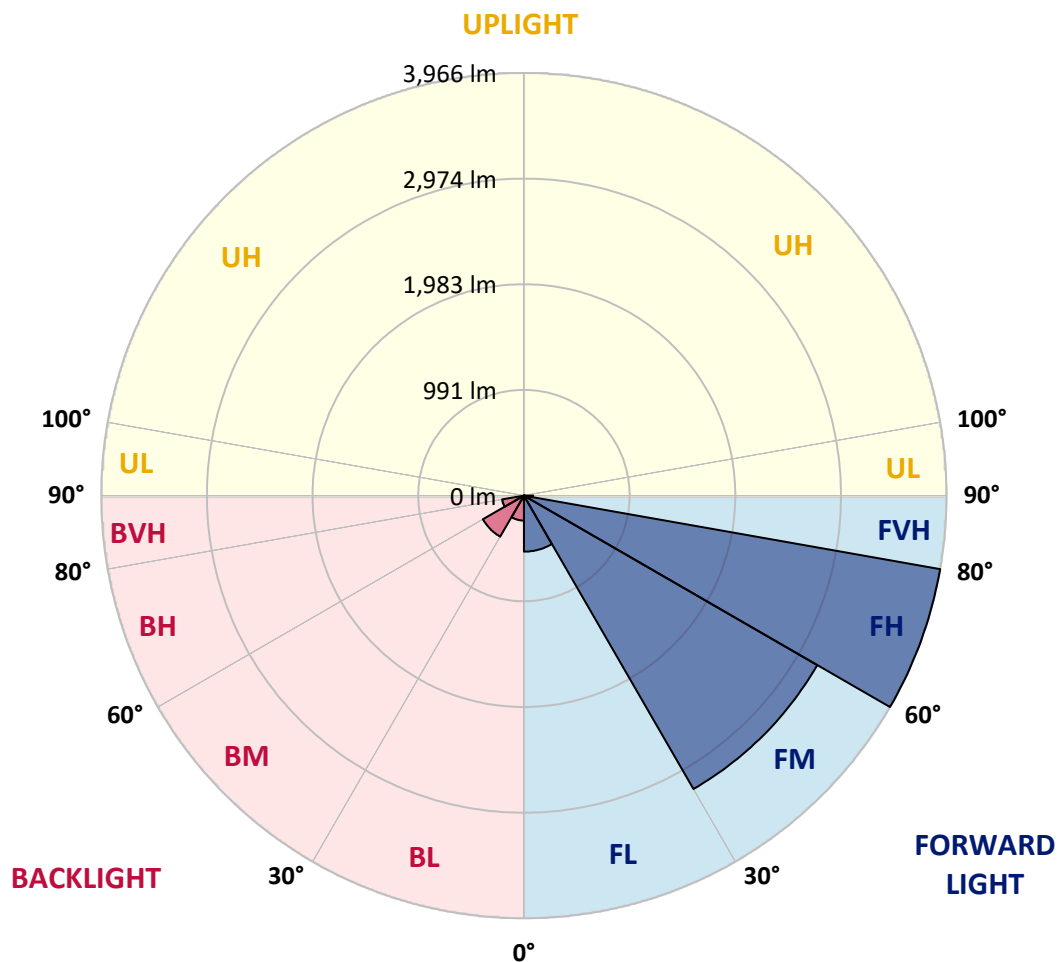
CATALOG NUMBER: GWC-SA2B-750-U-T4W-HSS

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

| Zone |             | Lumens | % Fixture | Zone Rating/Lumen Limit |      |         |
|------|-------------|--------|-----------|-------------------------|------|---------|
|      |             |        |           | B                       | U    | G       |
| FL   | (0°-30°)    | 525.2  | 6.1       |                         |      |         |
| FM   | (30°-60°)   | 3178.2 | 36.8      |                         |      |         |
| FH   | (60°-80°)   | 3966.0 | 45.9      |                         |      | G2/5000 |
| FVH  | (80°-90°)   | 86.7   | 1.0       |                         |      | G1/100  |
| BL   | (0°-30°)    | 233.8  | 2.7       | B1/500                  |      |         |
| BM   | (30°-60°)   | 444.5  | 5.1       | B1/1000                 |      |         |
| BH   | (60°-80°)   | 208.0  | 2.4       | B1/500                  |      | G1/500  |
| BVH  | (80°-90°)   | 0.7    | 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°    | 866.0  | 866.0  | 866.0  | 866.0  | 866.0  | 866.0  | 866.0  | 866.0  | 866.0  | 866.0  | 866.0  |
| 2.5°  | 962.0  | 960.8  | 955.1  | 952.7  | 938.9  | 930.8  | 927.6  | 917.5  | 902.9  | 888.3  | 872.1  |
| 5°    | 1071.5 | 1071.0 | 1060.5 | 1050.4 | 1024.4 | 1000.1 | 995.7  | 972.2  | 939.3  | 908.5  | 877.7  |
| 7.5°  | 1183.3 | 1178.0 | 1167.5 | 1148.0 | 1110.4 | 1071.5 | 1067.8 | 1034.6 | 988.0  | 943.4  | 899.2  |
| 10°   | 1278.1 | 1274.9 | 1261.1 | 1231.5 | 1187.4 | 1143.2 | 1138.7 | 1097.8 | 1045.1 | 990.4  | 934.1  |
| 12.5° | 1351.9 | 1349.4 | 1331.2 | 1294.3 | 1247.3 | 1201.5 | 1195.5 | 1159.0 | 1102.7 | 1041.5 | 975.0  |
| 15°   | 1396.9 | 1395.6 | 1373.4 | 1334.0 | 1287.9 | 1248.1 | 1242.9 | 1210.9 | 1158.6 | 1094.6 | 1019.6 |
| 17.5° | 1407.4 | 1407.8 | 1384.7 | 1345.0 | 1306.9 | 1278.5 | 1274.5 | 1250.2 | 1206.4 | 1142.8 | 1064.2 |
| 20°   | 1383.9 | 1388.8 | 1368.1 | 1333.6 | 1310.1 | 1295.1 | 1291.9 | 1277.3 | 1240.4 | 1180.5 | 1099.8 |
| 22.5° | 1350.7 | 1353.1 | 1338.9 | 1315.8 | 1306.1 | 1308.9 | 1307.3 | 1299.2 | 1268.0 | 1212.9 | 1135.1 |
| 25°   | 1330.4 | 1330.4 | 1321.9 | 1302.4 | 1308.9 | 1326.3 | 1326.8 | 1325.1 | 1300.4 | 1252.6 | 1178.0 |
| 27.5° | 1329.6 | 1327.2 | 1317.4 | 1302.8 | 1320.7 | 1347.4 | 1349.0 | 1360.0 | 1344.6 | 1300.8 | 1231.5 |
| 30°   | 1362.0 | 1359.2 | 1338.5 | 1319.5 | 1342.2 | 1370.9 | 1375.0 | 1398.9 | 1391.2 | 1353.1 | 1291.1 |
| 32.5° | 1437.8 | 1427.7 | 1381.9 | 1350.7 | 1367.7 | 1402.1 | 1407.4 | 1445.5 | 1457.6 | 1417.5 | 1348.6 |
| 35°   | 1541.5 | 1509.5 | 1443.5 | 1409.8 | 1411.4 | 1447.5 | 1452.4 | 1508.3 | 1544.4 | 1476.7 | 1393.2 |
| 37.5° | 1684.6 | 1668.8 | 1561.4 | 1471.4 | 1478.7 | 1533.4 | 1547.6 | 1608.4 | 1598.3 | 1509.1 | 1443.9 |
| 40°   | 1998.2 | 1973.5 | 1859.2 | 1644.1 | 1543.2 | 1603.1 | 1607.6 | 1640.0 | 1640.8 | 1582.5 | 1549.2 |
| 42.5° | 2425.4 | 2415.2 | 2294.9 | 1957.3 | 1670.0 | 1649.7 | 1657.8 | 1712.5 | 1773.7 | 1737.3 | 1735.6 |
| 45°   | 2898.3 | 2893.0 | 2765.4 | 2373.1 | 1926.5 | 1802.5 | 1812.6 | 1886.0 | 2003.1 | 2011.2 | 2062.7 |
| 47.5° | 3278.8 | 3276.4 | 3203.0 | 2837.1 | 2319.2 | 2061.5 | 2064.7 | 2142.5 | 2348.4 | 2450.1 | 2532.3 |
| 50°   | 3625.7 | 3637.4 | 3579.5 | 3339.2 | 2854.1 | 2467.1 | 2459.4 | 2511.3 | 2841.9 | 3008.5 | 3110.6 |
| 52.5° | 4107.9 | 4124.5 | 3962.0 | 3807.6 | 3415.4 | 2970.4 | 2964.3 | 3018.6 | 3435.2 | 3560.0 | 3578.3 |
| 55°   | 4533.8 | 4505.5 | 4377.0 | 4332.4 | 4099.8 | 3592.0 | 3590.4 | 3638.2 | 4009.0 | 4062.1 | 4095.8 |
| 57.5° | 4721.8 | 4710.9 | 4772.9 | 4875.0 | 4816.7 | 4326.7 | 4323.1 | 4286.6 | 4522.5 | 4528.1 | 4631.5 |
| 60°   | 4840.6 | 4854.0 | 5044.0 | 5358.9 | 5504.4 | 5117.4 | 5093.9 | 4871.4 | 5012.8 | 5000.2 | 5110.9 |
| 62.5° | 4751.4 | 4777.8 | 5119.8 | 5644.6 | 6019.0 | 5807.5 | 5774.3 | 5407.1 | 5431.8 | 5388.5 | 5491.4 |
| 65°   | 4278.1 | 4319.0 | 4879.5 | 5590.7 | 6274.3 | 6346.9 | 6313.2 | 5880.0 | 5764.5 | 5693.2 | 5636.1 |
| 67.5° | 3473.7 | 3498.0 | 4083.2 | 5121.8 | 6159.2 | 6668.6 | 6661.7 | 6294.6 | 6015.8 | 5641.7 | 5198.4 |
| 69°   | 2870.7 | 2894.6 | 3457.9 | 4628.2 | 5906.0 | 6737.5 | 6750.9 | 6427.5 | 5968.0 | 5328.9 | 4605.9 |
| 70°   | 2431.4 | 2457.0 | 2981.8 | 4205.2 | 5612.2 | 6705.5 | 6729.4 | 6414.9 | 5831.0 | 4966.6 | 4086.0 |
| 72.5° | 1275.3 | 1297.2 | 1835.7 | 2897.1 | 4575.2 | 6157.2 | 6229.7 | 5872.7 | 4942.7 | 3607.0 | 2416.0 |
| 75°   | 400.8  | 413.3  | 716.9  | 1514.4 | 3132.5 | 4787.5 | 4804.1 | 4606.8 | 3509.8 | 1984.1 | 1006.2 |
| 77.5° | 152.8  | 149.1  | 238.7  | 558.0  | 1583.7 | 3014.6 | 3116.3 | 2878.8 | 1841.8 | 701.5  | 232.2  |
| 80°   | 82.3   | 82.7   | 124.0  | 231.0  | 677.6  | 1549.2 | 1635.1 | 1395.2 | 654.5  | 218.8  | 53.5   |
| 82.5° | 35.7   | 37.3   | 69.7   | 122.4  | 311.2  | 571.4  | 614.3  | 511.4  | 250.0  | 147.1  | 19.9   |
| 85°   | 7.7    | 8.5    | 33.6   | 66.5   | 126.8  | 160.5  | 168.2  | 165.7  | 159.3  | 114.3  | 7.7    |
| 87.5° | 0.0    | 0.0    | 15.0   | 23.9   | 32.0   | 36.5   | 32.0   | 41.7   | 87.9   | 77.0   | 4.1    |
| 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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CATALOG NUMBER: GWC-SA2B-750-U-T4W-HSS

**CANDELA DISTRIBUTION (continued):**

|       | 90°    | 95°    | 105°  | 115°  | 125°  | 135°  | 145°  | 155°  | 165°  | 175°  | 180°  |
|-------|--------|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 0°    | 866.0  | 866.0  | 866.0 | 866.0 | 866.0 | 866.0 | 866.0 | 866.0 | 866.0 | 866.0 | 866.0 |
| 2.5°  | 866.8  | 859.5  | 847.0 | 833.2 | 823.4 | 813.3 | 805.2 | 801.6 | 797.5 | 794.7 | 798.3 |
| 5°    | 865.2  | 851.0  | 826.7 | 803.2 | 786.2 | 772.4 | 761.0 | 756.6 | 752.1 | 748.9 | 748.5 |
| 7.5°  | 879.4  | 859.5  | 822.2 | 787.8 | 761.4 | 742.8 | 727.4 | 720.9 | 715.7 | 713.2 | 711.2 |
| 10°   | 906.5  | 881.0  | 831.1 | 786.2 | 752.1 | 720.5 | 687.3 | 661.8 | 645.1 | 637.4 | 634.6 |
| 12.5° | 941.8  | 909.8  | 848.2 | 794.7 | 745.2 | 684.4 | 613.9 | 553.2 | 513.8 | 500.9 | 493.2 |
| 15°   | 983.1  | 943.4  | 870.5 | 805.6 | 720.1 | 609.1 | 489.5 | 410.1 | 373.6 | 366.3 | 358.2 |
| 17.5° | 1022.8 | 979.1  | 897.2 | 807.6 | 665.0 | 486.7 | 358.6 | 304.7 | 290.6 | 295.4 | 296.6 |
| 20°   | 1057.7 | 1014.3 | 923.5 | 789.8 | 564.9 | 365.1 | 277.6 | 264.2 | 269.5 | 278.8 | 280.4 |
| 22.5° | 1092.9 | 1048.4 | 947.9 | 742.8 | 436.8 | 277.2 | 250.0 | 253.3 | 258.5 | 267.9 | 269.5 |
| 25°   | 1135.9 | 1089.7 | 970.5 | 656.5 | 327.8 | 235.8 | 237.5 | 242.3 | 247.6 | 256.1 | 256.9 |
| 27.5° | 1185.3 | 1142.0 | 985.5 | 544.2 | 243.1 | 216.8 | 222.1 | 229.4 | 234.6 | 242.7 | 244.4 |
| 30°   | 1251.0 | 1210.9 | 990.4 | 427.9 | 203.8 | 199.8 | 202.2 | 211.1 | 218.8 | 226.1 | 227.3 |
| 32.5° | 1312.6 | 1278.9 | 974.2 | 323.0 | 188.8 | 184.0 | 184.0 | 189.2 | 198.2 | 205.1 | 206.7 |
| 35°   | 1369.3 | 1347.4 | 922.3 | 236.3 | 177.5 | 169.4 | 165.3 | 165.3 | 171.0 | 176.7 | 178.3 |
| 37.5° | 1444.3 | 1443.5 | 838.4 | 188.4 | 166.6 | 157.2 | 148.7 | 142.2 | 140.2 | 141.4 | 142.2 |
| 40°   | 1572.7 | 1573.9 | 729.0 | 169.0 | 157.2 | 144.7 | 131.7 | 120.0 | 109.0 | 105.4 | 105.0 |
| 42.5° | 1773.3 | 1755.1 | 614.3 | 159.7 | 149.1 | 131.7 | 112.3 | 96.4  | 79.4  | 74.2  | 73.8  |
| 45°   | 2091.8 | 1983.6 | 492.8 | 151.2 | 140.6 | 117.1 | 92.8  | 71.3  | 57.5  | 53.5  | 53.5  |
| 47.5° | 2555.8 | 2283.9 | 381.7 | 141.8 | 129.3 | 100.5 | 70.1  | 51.5  | 42.1  | 40.1  | 40.5  |
| 50°   | 3035.6 | 2578.1 | 292.6 | 130.1 | 115.5 | 83.1  | 51.9  | 37.3  | 32.0  | 32.0  | 32.4  |
| 52.5° | 3461.1 | 2793.7 | 228.1 | 117.5 | 98.5  | 65.2  | 39.3  | 29.2  | 26.7  | 26.3  | 26.7  |
| 55°   | 3859.5 | 2932.7 | 174.7 | 102.9 | 78.2  | 48.6  | 30.0  | 23.9  | 22.3  | 21.5  | 21.1  |
| 57.5° | 4243.7 | 3001.6 | 130.9 | 83.1  | 56.7  | 35.3  | 23.9  | 20.3  | 18.6  | 17.4  | 17.0  |
| 60°   | 4499.4 | 2945.7 | 90.0  | 61.2  | 39.3  | 25.5  | 19.9  | 17.4  | 15.4  | 14.2  | 13.8  |
| 62.5° | 4643.6 | 2792.9 | 57.9  | 44.2  | 28.0  | 19.0  | 15.8  | 14.6  | 11.8  | 10.5  | 10.5  |
| 65°   | 4585.3 | 2540.9 | 40.5  | 31.6  | 20.3  | 14.2  | 11.8  | 11.8  | 8.5   | 6.9   | 6.5   |
| 67.5° | 4063.3 | 2146.6 | 30.8  | 23.5  | 14.6  | 10.5  | 8.9   | 10.1  | 5.3   | 3.2   | 3.2   |
| 69°   | 3496.0 | 1779.0 | 26.3  | 19.5  | 12.2  | 8.5   | 7.7   | 9.3   | 3.6   | 2.4   | 2.0   |
| 70°   | 3038.5 | 1534.6 | 23.9  | 17.0  | 10.1  | 7.3   | 6.9   | 8.9   | 3.6   | 2.0   | 1.6   |
| 72.5° | 1817.9 | 855.9  | 18.2  | 12.2  | 6.5   | 5.7   | 5.7   | 10.1  | 3.6   | 2.0   | 1.6   |
| 75°   | 734.7  | 301.5  | 13.4  | 8.5   | 4.9   | 4.9   | 6.9   | 13.0  | 3.2   | 1.6   | 1.2   |
| 77.5° | 166.6  | 66.1   | 7.7   | 5.3   | 3.2   | 4.9   | 8.1   | 10.1  | 2.0   | 0.8   | 0.0   |
| 80°   | 40.5   | 16.2   | 4.9   | 3.2   | 2.0   | 3.6   | 6.1   | 5.7   | 0.4   | 0.0   | 0.0   |
| 82.5° | 13.4   | 5.7    | 2.0   | 1.6   | 0.4   | 1.2   | 2.8   | 1.6   | 0.0   | 0.0   | 0.0   |
| 85°   | 5.7    | 3.2    | 0.8   | 0.4   | 0.0   | 0.0   | 0.4   | 0.0   | 0.0   | 0.0   | 0.0   |
| 87.5° | 3.6    | 1.2    | 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   |



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: SP1-2104-224-4

Luminaire Tested: CCW-SA-2A-750-U-SL4

Test Date: 05/04/2021

### Test Information

Test Method: LM-79-08  
 Report Number: SP1-2104-224-4  
 Test Lab: COOPER LIGHTING SOLUTIONS  
 Photometer: SP1  
 Measurement Geometry:  $4\pi$   
 Issue Date: 05/04/2021  
 Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
 Product Line: INVUE  
 Catalog Number: **CCW-SA-2A-750-U-SL4**  
 Description: INVUE WALL PACK ClearCurve Light Square

### Spectral Parameters

|                           |        |           |      |      |       |
|---------------------------|--------|-----------|------|------|-------|
| CCT (K):                  | 4797   | CRI (Ra): | 71.8 |      |       |
| CIE u':                   | 0.2115 | R1:       | 69.5 | R9:  | -28.1 |
| CIE v':                   | 0.4912 | R2:       | 75.8 | R10: | 43.3  |
| Duv:                      | 0.0031 | R3:       | 81.2 | R11: | 71.1  |
| CIE x:                    | 0.3518 | R4:       | 73.2 | R12: | 43.8  |
| CIE y:                    | 0.3631 | R5:       | 70.2 | R13: | 69.8  |
| CIE z:                    | 0.2851 | R6:       | 67.5 | R14: | 89.4  |
| Peak Wavelength (nm):     | 445    | R7:       | 80.3 |      |       |
| Dominant Wavelength (nm): | 572    | R8:       | 57.0 |      |       |
| Purity:                   | 14.6   |           |      |      |       |
| Rf:                       | 72.7   |           |      |      |       |
| Rg:                       | 96.4   |           |      |      |       |



### Test Conditions

Stabilization Time: 91M  
 Operation Time: 12H  
 Room Temperature (°C) / RH%: 24.8/44%  
 Sphere Temperature (°C): 24.5

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| Measurement and Test Equipment |                       |                  |                      |
|--------------------------------|-----------------------|------------------|----------------------|
| Instrument                     | Identification Number | Calibration Date | Calibration Due Date |
| Photometer                     | IN0058                | 1/31/2021        | 7/31/2021            |
| Power Meter                    | IN0071                | 12/1/2020        | 12/1/2021            |
| AC Power Source                | IN0063                | 12/1/2020        | 12/1/2021            |
| DC Power Source                | IN0208                | 12/1/2020        | 12/1/2021            |
| Sphere Thermometer             | IN0085                | 12/1/2020        | 12/1/2021            |
| Room Thermometer               | IN0046                | 12/1/2020        | 12/1/2021            |

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**CIE 1931 Chromaticity Diagram**



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



Point lies inside the ANSI 5000K 7-step quadrangle

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### Photopic Flux vs. Wavelength

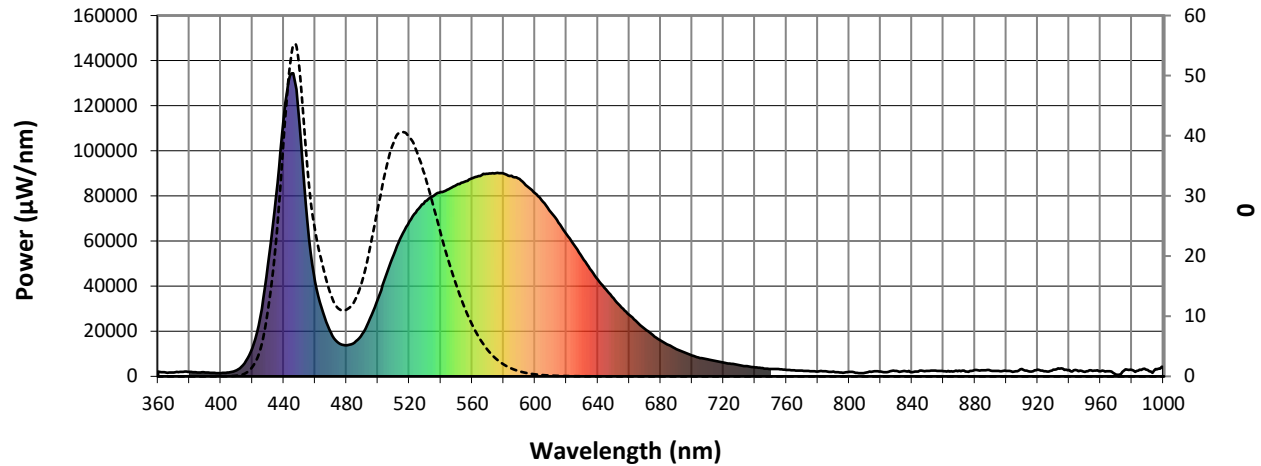


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| λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) |
|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|
| 360       | 2166             | 0.0              | 490       | 18819            | 2.7              | 620       | 63002            | 16.4             | 750       | 3328             | 0.0              | 880       | 2830             | 0.0              |
| 365       | 1672             | 0.0              | 495       | 25621            | 4.6              | 625       | 58119            | 12.8             | 755       | 3244             | 0.0              | 885       | 2751             | 0.0              |
| 370       | 1688             | 0.0              | 500       | 34501            | 7.6              | 630       | 52745            | 9.5              | 760       | 2856             | 0.0              | 890       | 2579             | 0.0              |
| 375       | 2041             | 0.0              | 505       | 44365            | 12.4             | 635       | 47707            | 7.2              | 765       | 2696             | 0.0              | 895       | 2461             | 0.0              |
| 380       | 1996             | 0.0              | 510       | 53923            | 18.5             | 640       | 42815            | 5.1              | 770       | 2495             | 0.0              | 900       | 2372             | 0.0              |
| 385       | 1720             | 0.0              | 515       | 62101            | 25.7             | 645       | 38643            | 3.7              | 775       | 2247             | 0.0              | 905       | 2190             | 0.0              |
| 390       | 1706             | 0.0              | 520       | 68661            | 33.3             | 650       | 34557            | 2.5              | 780       | 2133             | 0.0              | 910       | 3204             | 0.0              |
| 395       | 1550             | 0.0              | 525       | 73606            | 39.5             | 655       | 30447            | 1.7              | 785       | 2276             | 0.0              | 915       | 2069             | 0.0              |
| 400       | 1444             | 0.0              | 530       | 77628            | 45.7             | 660       | 27287            | 1.1              | 790       | 2093             | 0.0              | 920       | 2977             | 0.0              |
| 405       | 1761             | 0.0              | 535       | 79955            | 49.6             | 665       | 24046            | 0.8              | 795       | 1681             | 0.0              | 925       | 2332             | 0.0              |
| 410       | 2694             | 0.0              | 540       | 81715            | 53.2             | 670       | 20995            | 0.5              | 800       | 2044             | 0.0              | 930       | 2929             | 0.0              |
| 415       | 5767             | 0.0              | 545       | 83067            | 55.3             | 675       | 18242            | 0.3              | 805       | 1519             | 0.0              | 935       | 3495             | 0.0              |
| 420       | 12476            | 0.0              | 550       | 84799            | 57.6             | 680       | 15871            | 0.2              | 810       | 1549             | 0.0              | 940       | 2810             | 0.0              |
| 425       | 26189            | 0.1              | 555       | 86279            | 58.9             | 685       | 13910            | 0.1              | 815       | 2097             | 0.0              | 945       | 2657             | 0.0              |
| 430       | 49608            | 0.4              | 560       | 87792            | 59.7             | 690       | 12111            | 0.1              | 820       | 2098             | 0.0              | 950       | 1935             | 0.0              |
| 435       | 79442            | 0.9              | 565       | 88893            | 59.1             | 695       | 10644            | 0.0              | 825       | 2049             | 0.0              | 955       | 2408             | 0.0              |
| 440       | 114477           | 1.8              | 570       | 89760            | 58.4             | 700       | 9267             | 0.0              | 830       | 2352             | 0.0              | 960       | 2331             | 0.0              |
| 445       | 134358           | 2.8              | 575       | 90097            | 56.1             | 705       | 8161             | 0.0              | 835       | 2358             | 0.0              | 965       | 2231             | 0.0              |
| 450       | 112862           | 2.9              | 580       | 90008            | 53.5             | 710       | 7567             | 0.0              | 840       | 1853             | 0.0              | 970       | 688              | 0.0              |
| 455       | 68630            | 2.3              | 585       | 88925            | 49.4             | 715       | 6794             | 0.0              | 845       | 2553             | 0.0              | 975       | 2537             | 0.0              |
| 460       | 41987            | 1.7              | 590       | 87580            | 45.3             | 720       | 6069             | 0.0              | 850       | 2413             | 0.0              | 980       | 2826             | 0.0              |
| 465       | 28353            | 1.5              | 595       | 84246            | 39.9             | 725       | 5588             | 0.0              | 855       | 2597             | 0.0              | 985       | 3000             | 0.0              |
| 470       | 19290            | 1.2              | 600       | 81176            | 35.0             | 730       | 4999             | 0.0              | 860       | 2269             | 0.0              | 990       | 2880             | 0.0              |
| 475       | 14790            | 1.2              | 605       | 77529            | 30.0             | 735       | 4495             | 0.0              | 865       | 2210             | 0.0              | 995       | 3332             | 0.0              |
| 480       | 13767            | 1.3              | 610       | 72750            | 25.0             | 740       | 4033             | 0.0              | 870       | 2564             | 0.0              | 1000      | 4187             | 0.0              |
| 485       | 14964            | 1.8              | 615       | 68174            | 20.6             | 745       | 3625             | 0.0              | 875       | 2169             | 0.0              |           |                  |                  |

REPORT NUMBER: SP1-2104-224-4

### Scotopic Flux vs. Wavelength



Scotopic Lumens: 9214.6

S/P: 1.71

| 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       | 2166             | 0.0              | 490       | 18819            | 29.0             | 620       | 63002            | 0.8              | 750       | 3328             | 0.0              | 880       | 2830             | 0.0              |
| 365       | 1672             | 0.0              | 495       | 25621            | 41.4             | 625       | 58119            | 0.5              | 755       | 3244             | 0.0              | 885       | 2751             | 0.0              |
| 370       | 1688             | 0.0              | 500       | 34501            | 57.7             | 630       | 52745            | 0.3              | 760       | 2856             | 0.0              | 890       | 2579             | 0.0              |
| 375       | 2041             | 0.0              | 505       | 44365            | 75.4             | 635       | 47707            | 0.2              | 765       | 2696             | 0.0              | 895       | 2461             | 0.0              |
| 380       | 1996             | 0.0              | 510       | 53923            | 91.4             | 640       | 42815            | 0.1              | 770       | 2495             | 0.0              | 900       | 2372             | 0.0              |
| 385       | 1720             | 0.0              | 515       | 62101            | 102.9            | 645       | 38643            | 0.1              | 775       | 2247             | 0.0              | 905       | 2190             | 0.0              |
| 390       | 1706             | 0.0              | 520       | 68661            | 109.1            | 650       | 34557            | 0.0              | 780       | 2133             | 0.0              | 910       | 3204             | 0.0              |
| 395       | 1550             | 0.0              | 525       | 73606            | 110.1            | 655       | 30447            | 0.0              | 785       | 2276             | 0.0              | 915       | 2069             | 0.0              |
| 400       | 1444             | 0.0              | 530       | 77628            | 107.0            | 660       | 27287            | 0.0              | 790       | 2093             | 0.0              | 920       | 2977             | 0.0              |
| 405       | 1761             | 0.1              | 535       | 79955            | 99.6             | 665       | 24046            | 0.0              | 795       | 1681             | 0.0              | 925       | 2332             | 0.0              |
| 410       | 2694             | 0.2              | 540       | 81715            | 90.3             | 670       | 20995            | 0.0              | 800       | 2044             | 0.0              | 930       | 2929             | 0.0              |
| 415       | 5767             | 0.6              | 545       | 83067            | 79.6             | 675       | 18242            | 0.0              | 805       | 1519             | 0.0              | 935       | 3495             | 0.0              |
| 420       | 12476            | 2.1              | 550       | 84799            | 69.3             | 680       | 15871            | 0.0              | 810       | 1549             | 0.0              | 940       | 2810             | 0.0              |
| 425       | 26189            | 6.4              | 555       | 86279            | 59.0             | 685       | 13910            | 0.0              | 815       | 2097             | 0.0              | 945       | 2657             | 0.0              |
| 430       | 49608            | 16.9             | 560       | 87792            | 49.1             | 690       | 12111            | 0.0              | 820       | 2098             | 0.0              | 950       | 1935             | 0.0              |
| 435       | 79442            | 35.5             | 565       | 88893            | 39.9             | 695       | 10644            | 0.0              | 825       | 2049             | 0.0              | 955       | 2408             | 0.0              |
| 440       | 114477           | 64.0             | 570       | 89760            | 31.7             | 700       | 9267             | 0.0              | 830       | 2352             | 0.0              | 960       | 2331             | 0.0              |
| 445       | 134358           | 90.0             | 575       | 90097            | 24.5             | 705       | 8161             | 0.0              | 835       | 2358             | 0.0              | 965       | 2231             | 0.0              |
| 450       | 112862           | 87.5             | 580       | 90008            | 18.5             | 710       | 7567             | 0.0              | 840       | 1853             | 0.0              | 970       | 688              | 0.0              |
| 455       | 68630            | 60.0             | 585       | 88925            | 13.6             | 715       | 6794             | 0.0              | 845       | 2553             | 0.0              | 975       | 2537             | 0.0              |
| 460       | 41987            | 40.6             | 590       | 87580            | 9.8              | 720       | 6069             | 0.0              | 850       | 2413             | 0.0              | 980       | 2826             | 0.0              |
| 465       | 28353            | 29.9             | 595       | 84246            | 6.7              | 725       | 5588             | 0.0              | 855       | 2597             | 0.0              | 985       | 3000             | 0.0              |
| 470       | 19290            | 22.2             | 600       | 81176            | 4.6              | 730       | 4999             | 0.0              | 860       | 2269             | 0.0              | 990       | 2880             | 0.0              |
| 475       | 14790            | 18.5             | 605       | 77529            | 3.0              | 735       | 4495             | 0.0              | 865       | 2210             | 0.0              | 995       | 3332             | 0.0              |
| 480       | 13767            | 18.6             | 610       | 72750            | 2.0              | 740       | 4033             | 0.0              | 870       | 2564             | 0.0              | 1000      | 4187             | 0.0              |
| 485       | 14964            | 21.7             | 615       | 68174            | 1.3              | 745       | 3625             | 0.0              | 875       | 2169             | 0.0              |           |                  |                  |

REPORT NUMBER: SP1-2104-224-4

### Melanopic Flux vs. Wavelength


**Melanopic Lumens: 3619.9**
**M/P: 0.67**

| 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       | 2166             | 0.0              | 490       | 18819            | 15.7             | 620       | 63002            | 0.0              | 750       | 3328             | 0.0              | 880       | 2830             | 0.0              |
| 365       | 1672             | 0.0              | 495       | 25621            | 21.2             | 625       | 58119            | 0.0              | 755       | 3244             | 0.0              | 885       | 2751             | 0.0              |
| 370       | 1688             | 0.0              | 500       | 34501            | 27.7             | 630       | 52745            | 0.0              | 760       | 2856             | 0.0              | 890       | 2579             | 0.0              |
| 375       | 2041             | 0.0              | 505       | 44365            | 34.0             | 635       | 47707            | 0.0              | 765       | 2696             | 0.0              | 895       | 2461             | 0.0              |
| 380       | 1996             | 0.0              | 510       | 53923            | 38.7             | 640       | 42815            | 0.0              | 770       | 2495             | 0.0              | 900       | 2372             | 0.0              |
| 385       | 1720             | 0.0              | 515       | 62101            | 40.6             | 645       | 38643            | 0.0              | 775       | 2247             | 0.0              | 905       | 2190             | 0.0              |
| 390       | 1706             | 0.0              | 520       | 68661            | 40.0             | 650       | 34557            | 0.0              | 780       | 2133             | 0.0              | 910       | 3204             | 0.0              |
| 395       | 1550             | 0.0              | 525       | 73606            | 37.3             | 655       | 30447            | 0.0              | 785       | 2276             | 0.0              | 915       | 2069             | 0.0              |
| 400       | 1444             | 0.0              | 530       | 77628            | 33.5             | 660       | 27287            | 0.0              | 790       | 2093             | 0.0              | 920       | 2977             | 0.0              |
| 405       | 1761             | 0.0              | 535       | 79955            | 28.8             | 665       | 24046            | 0.0              | 795       | 1681             | 0.0              | 925       | 2332             | 0.0              |
| 410       | 2694             | 0.1              | 540       | 81715            | 23.9             | 670       | 20995            | 0.0              | 800       | 2044             | 0.0              | 930       | 2929             | 0.0              |
| 415       | 5767             | 0.4              | 545       | 83067            | 19.3             | 675       | 18242            | 0.0              | 805       | 1519             | 0.0              | 935       | 3495             | 0.0              |
| 420       | 12476            | 1.4              | 550       | 84799            | 15.2             | 680       | 15871            | 0.0              | 810       | 1549             | 0.0              | 940       | 2810             | 0.0              |
| 425       | 26189            | 4.1              | 555       | 86279            | 11.6             | 685       | 13910            | 0.0              | 815       | 2097             | 0.0              | 945       | 2657             | 0.0              |
| 430       | 49608            | 10.5             | 560       | 87792            | 8.7              | 690       | 12111            | 0.0              | 820       | 2098             | 0.0              | 950       | 1935             | 0.0              |
| 435       | 79442            | 21.2             | 565       | 88893            | 6.2              | 695       | 10644            | 0.0              | 825       | 2049             | 0.0              | 955       | 2408             | 0.0              |
| 440       | 114477           | 38.3             | 570       | 89760            | 4.4              | 700       | 9267             | 0.0              | 830       | 2352             | 0.0              | 960       | 2331             | 0.0              |
| 445       | 134358           | 53.0             | 575       | 90097            | 3.0              | 705       | 8161             | 0.0              | 835       | 2358             | 0.0              | 965       | 2231             | 0.0              |
| 450       | 112862           | 52.0             | 580       | 90008            | 2.0              | 710       | 7567             | 0.0              | 840       | 1853             | 0.0              | 970       | 688              | 0.0              |
| 455       | 68630            | 36.0             | 585       | 88925            | 1.3              | 715       | 6794             | 0.0              | 845       | 2553             | 0.0              | 975       | 2537             | 0.0              |
| 460       | 41987            | 24.7             | 590       | 87580            | 0.9              | 720       | 6069             | 0.0              | 850       | 2413             | 0.0              | 980       | 2826             | 0.0              |
| 465       | 28353            | 18.5             | 595       | 84246            | 0.5              | 725       | 5588             | 0.0              | 855       | 2597             | 0.0              | 985       | 3000             | 0.0              |
| 470       | 19290            | 13.8             | 600       | 81176            | 0.3              | 730       | 4999             | 0.0              | 860       | 2269             | 0.0              | 990       | 2880             | 0.0              |
| 475       | 14790            | 11.3             | 605       | 77529            | 0.2              | 735       | 4495             | 0.0              | 865       | 2210             | 0.0              | 995       | 3332             | 0.0              |
| 480       | 13767            | 11.1             | 610       | 72750            | 0.1              | 740       | 4033             | 0.0              | 870       | 2564             | 0.0              | 1000      | 4187             | 0.0              |
| 485       | 14964            | 12.3             | 615       | 68174            | 0.1              | 745       | 3625             | 0.0              | 875       | 2169             | 0.0              |           |                  |                  |

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TM-30-18

### Summary

$R_f = 72.7$   
 $R_g = 96.4$   
 $CIE R_a = 71.8$   
 $R_g = -28.1$



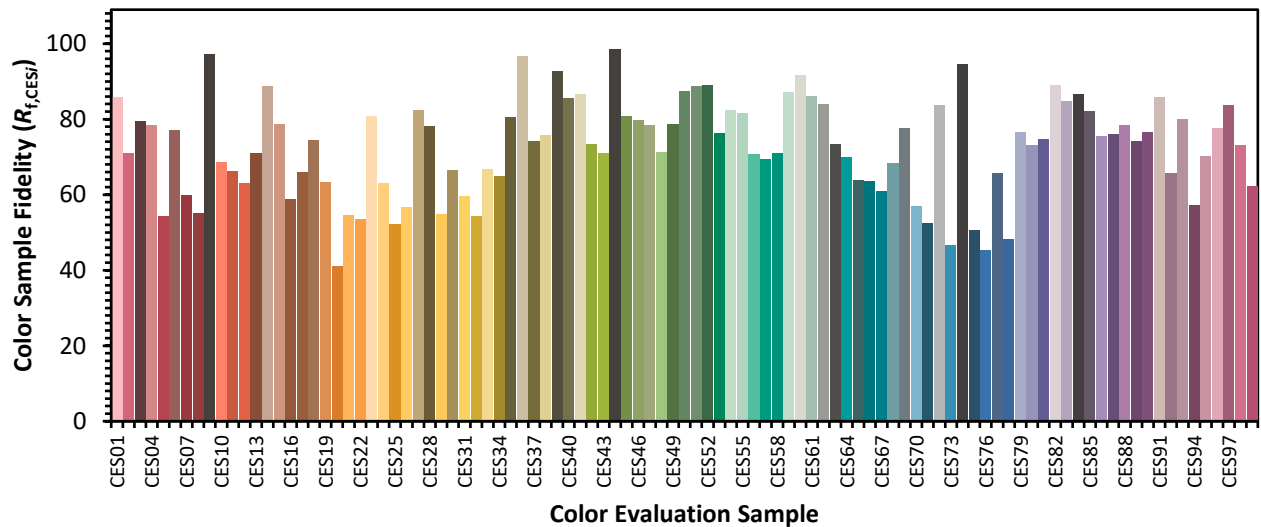
### Color Vector Graphics





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

|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 85 | CES26 = 57 | CES51 = 89 | CES76 = 45 |
| CES02 = 60 | CES27 = 82 | CES52 = 89 | CES77 = 66 |
| CES03 = 30 | CES28 = 78 | CES53 = 76 | CES78 = 48 |
| CES04 = 69 | CES29 = 55 | CES54 = 82 | CES79 = 76 |
| CES05 = 46 | CES30 = 66 | CES55 = 82 | CES80 = 73 |
| CES06 = 50 | CES31 = 60 | CES56 = 71 | CES81 = 75 |
| CES07 = 39 | CES32 = 54 | CES57 = 69 | CES82 = 89 |
| CES08 = 38 | CES33 = 67 | CES58 = 71 | CES83 = 85 |
| CES09 = 29 | CES34 = 65 | CES59 = 87 | CES84 = 87 |
| CES10 = 73 | CES35 = 80 | CES60 = 92 | CES85 = 82 |
| CES11 = 56 | CES36 = 97 | CES61 = 86 | CES86 = 75 |
| CES12 = 62 | CES37 = 74 | CES62 = 84 | CES87 = 76 |
| CES13 = 42 | CES38 = 76 | CES63 = 73 | CES88 = 78 |
| CES14 = 74 | CES39 = 93 | CES64 = 70 | CES89 = 74 |
| CES15 = 70 | CES40 = 86 | CES65 = 64 | CES90 = 76 |
| CES16 = 46 | CES41 = 87 | CES66 = 64 | CES91 = 86 |
| CES17 = 49 | CES42 = 73 | CES67 = 61 | CES92 = 66 |
| CES18 = 55 | CES43 = 71 | CES68 = 68 | CES93 = 80 |
| CES19 = 71 | CES44 = 98 | CES69 = 78 | CES94 = 57 |
| CES20 = 64 | CES45 = 81 | CES70 = 57 | CES95 = 70 |
| CES21 = 85 | CES46 = 80 | CES71 = 53 | CES96 = 78 |
| CES22 = 77 | CES47 = 78 | CES72 = 84 | CES97 = 84 |
| CES23 = 91 | CES48 = 71 | CES73 = 47 | CES98 = 73 |
| CES24 = 90 | CES49 = 79 | CES74 = 95 | CES99 = 62 |
| CES25 = 71 | CES50 = 87 | CES75 = 51 |            |



Color Rendition by Hue-Angle Bin



**Measure Comparisons**


(END OF REPORT)