

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: P385811

Luminaire Tested: **GWC-SA1B-827-U-T3**

Issue Date: 3/3/2020

**Test Information**

Test Method: LM-79-08  
Report Number: P385811  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-1903-205-14)  
Test Lab: INNOVATION CENTER  
Issue Date: 3/3/2020  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: McGRAW-EDISON  
Catalog Number: GWC-SA1B-827-U-T3  
Description: GALLEON WALL LUMINAIRE  
(1) 80 CRI, 2700K, 800mA LIGHTSQUARE WITH 16 LEDS AND TYPE III OPTICS  
Light Source: -  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 4488 lumens  
Efficiency: N/A  
Efficacy: 102.0 lumens/watt  
Luminous Opening: Rectangular (W 0.5' x L: 0.5' x H: 0')  
IES Classification: Type III - Short  
BUG Rating: B1 - U0 - G1

Input Watts (W): 44  
Input Voltage (V): NR  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: NR  
Total Harmonic Distortion (THDi): NR  
Frequency (hertz): 60  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 28.75 FT

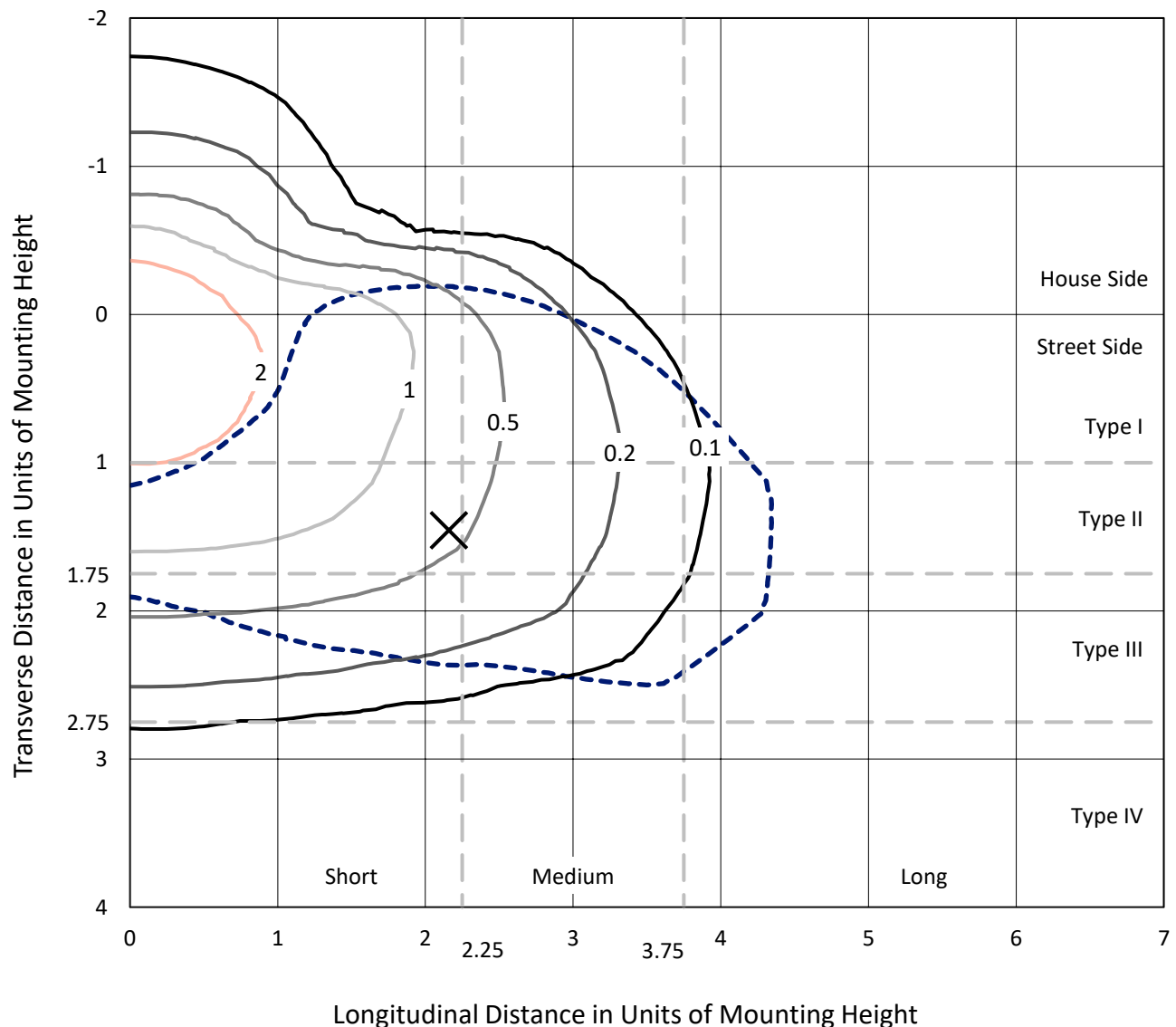


REPORT NUMBER: P385811

CATALOG NUMBER: GWC-SA1B-827-U-T3

## Iso-Footcandle Lines of Horizontal Illumination

× Max cd  
 - - - 1/2 Max cd

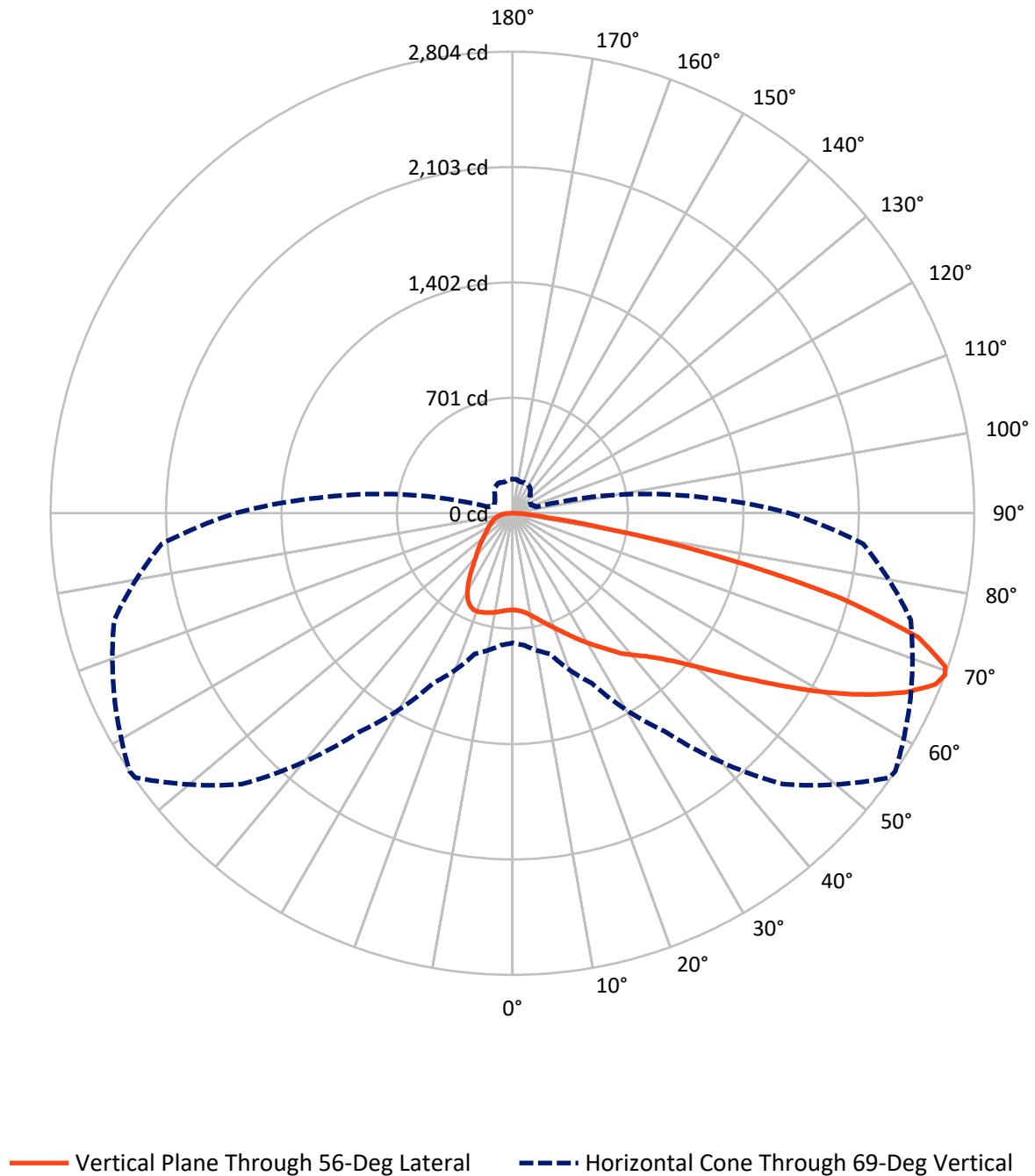


Based on 15 foot mounting height. Maximum calculated value = 2.8 fc  
 Type III - Short - N/A

REPORT NUMBER: P385811

CATALOG NUMBER: GWC-SA1B-827-U-T3

## Luminous Intensity Polar Plot



REPORT NUMBER: P385811

CATALOG NUMBER: GWC-SA1B-827-U-T3

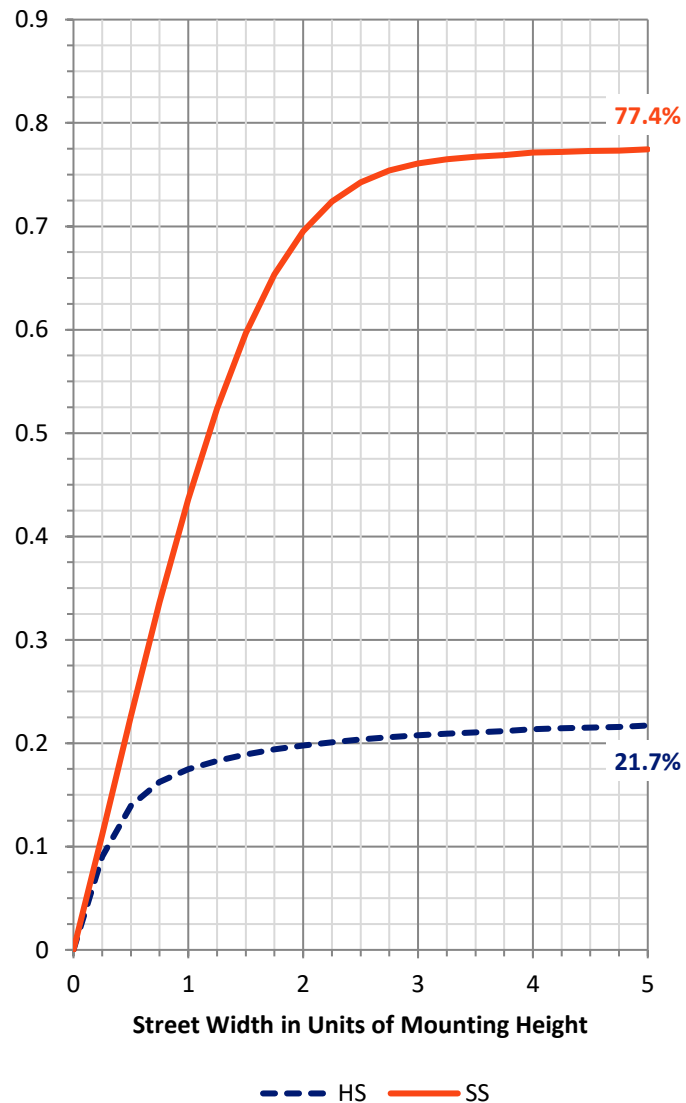
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total  |
|--------------------|-----------|----------|--------|--------|
| <b>House Side</b>  | Lumens    | 999.5    | 0.0    | 999.5  |
|                    | % Fixture | 22.3     | 0.0    | 22.3   |
| <b>Street Side</b> | Lumens    | 3488.5   | 0.0    | 3488.5 |
|                    | % Fixture | 77.7     | 0.0    | 77.7   |
| <b>Total</b>       | Lumens    | 4488.0   | 0.0    | 4488.0 |
|                    | % Fixture | 100.0    | 0.0    | 100.0  |

**ZONAL LUMENS:**

| Zone      | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10°    | 57.6   | 1.3       |
| 10°-20°   | 185.3  | 4.1       |
| 20°-30°   | 323.5  | 7.2       |
| 30°-40°   | 464.7  | 10.4      |
| 40°-50°   | 643.1  | 14.3      |
| 50°-60°   | 942.2  | 21.0      |
| 60°-70°   | 1148.7 | 25.6      |
| 70°-80°   | 635.1  | 14.2      |
| 80°-90°   | 88.0   | 2.0       |
| 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°    | 4488.0 | 100.0     |
| 0°-180°   | 4488.0 | 100.0     |

**Coefficient of Utilization**



REPORT NUMBER: P385811

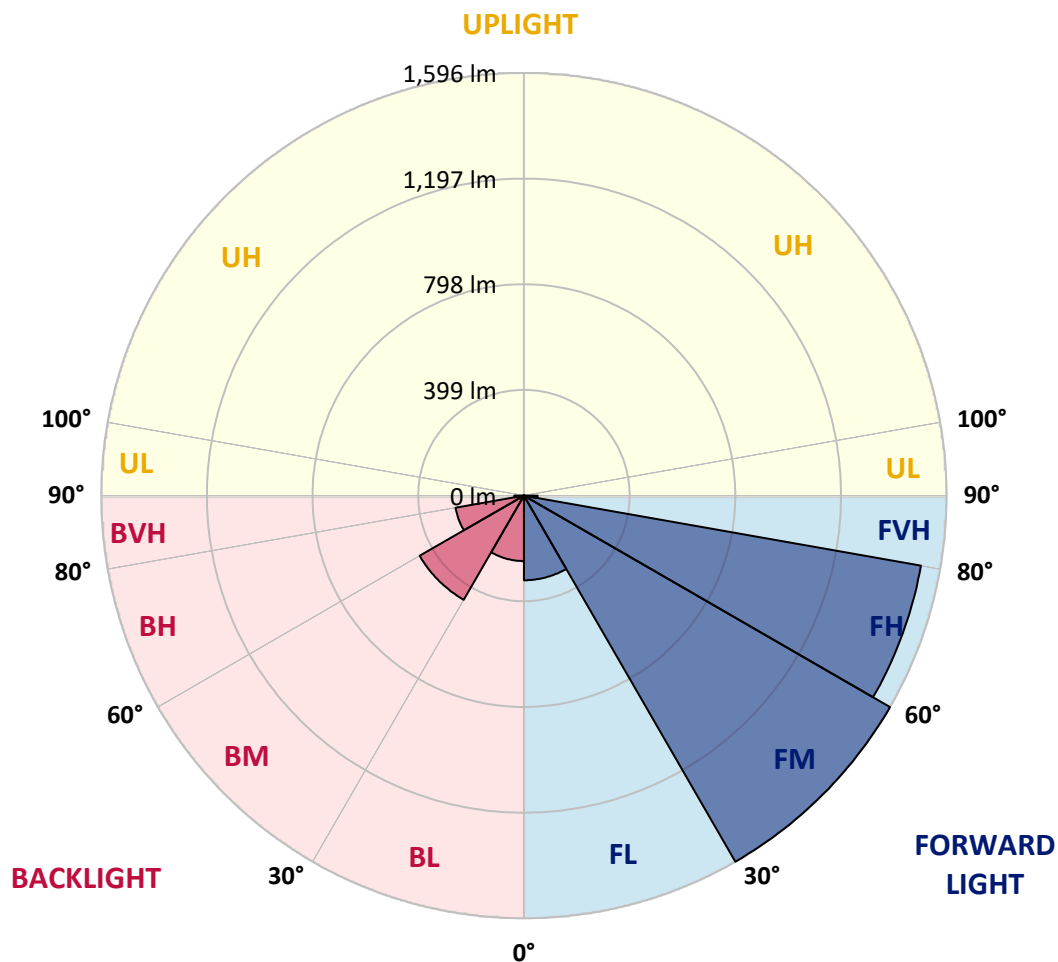
CATALOG NUMBER: GWC-SA1B-827-U-T3

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

| Zone |             | Lumens | % Fixture | Zone Rating/Lumen Limit |      |         |
|------|-------------|--------|-----------|-------------------------|------|---------|
|      |             |        |           | B                       | U    | G       |
| FL   | (0°-30°)    | 319.4  | 7.1       |                         |      |         |
| FM   | (30°-60°)   | 1595.7 | 35.6      |                         |      |         |
| FH   | (60°-80°)   | 1521.7 | 33.9      |                         |      | G1/1800 |
| FVH  | (80°-90°)   | 51.8   | 1.2       |                         |      | G1/100  |
| BL   | (0°-30°)    | 247.0  | 5.5       | B1/500                  |      |         |
| BM   | (30°-60°)   | 454.2  | 10.1      | B1/1000                 |      |         |
| BH   | (60°-80°)   | 262.1  | 5.8       | B1/500                  |      | G1/500  |
| BVH  | (80°-90°)   | 36.1   | 0.8       |                         |      | G1/100  |
| UL   | (90°-100°)  | 0.0    | 0.0       |                         | U0/0 |         |
| UH   | (100°-180°) | 0.0    | 0.0       |                         | U0/0 |         |

**BUG Rating: B1-U0-G1**

Type III Short



REPORT NUMBER: P385811

CATALOG NUMBER: GWC-SA1B-827-U-T3

**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 5°     | 15°    | 25°    | 35°    | 45°    | 55°    | 56°    | 65°    | 75°    | 85°    |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 586.7  | 586.7  | 586.7  | 586.7  | 586.7  | 586.7  | 586.7  | 586.7  | 586.7  | 586.7  | 586.7  |
| 2.5°  | 590.4  | 591.1  | 590.6  | 591.8  | 590.4  | 591.4  | 590.6  | 590.6  | 590.1  | 588.7  | 587.2  |
| 5°    | 599.7  | 601.0  | 600.2  | 601.4  | 599.7  | 600.0  | 598.6  | 598.6  | 597.3  | 594.3  | 591.2  |
| 7.5°  | 614.3  | 615.7  | 615.0  | 616.3  | 613.9  | 613.9  | 612.1  | 611.9  | 609.2  | 604.4  | 600.8  |
| 10°   | 631.6  | 633.4  | 632.8  | 634.7  | 632.8  | 633.4  | 631.6  | 631.6  | 627.9  | 621.1  | 616.6  |
| 12.5° | 656.8  | 659.1  | 657.4  | 657.2  | 656.5  | 657.7  | 656.2  | 655.8  | 652.4  | 643.2  | 637.0  |
| 15°   | 690.5  | 693.0  | 689.4  | 689.1  | 684.8  | 684.3  | 684.3  | 683.8  | 681.7  | 670.5  | 660.3  |
| 17.5° | 729.3  | 730.1  | 727.0  | 722.0  | 716.5  | 712.9  | 712.4  | 713.7  | 713.7  | 700.7  | 684.5  |
| 20°   | 767.3  | 768.7  | 766.2  | 760.7  | 753.6  | 748.3  | 744.6  | 747.1  | 746.9  | 731.5  | 708.4  |
| 22.5° | 808.8  | 812.0  | 808.3  | 801.2  | 792.8  | 787.0  | 780.5  | 782.6  | 782.8  | 763.8  | 731.9  |
| 25°   | 862.4  | 859.5  | 857.1  | 847.1  | 835.2  | 829.2  | 823.1  | 825.3  | 824.7  | 798.6  | 756.2  |
| 27.5° | 909.9  | 910.5  | 907.4  | 896.7  | 883.0  | 869.7  | 869.4  | 870.8  | 868.4  | 834.7  | 779.1  |
| 30°   | 965.1  | 965.4  | 961.0  | 951.5  | 936.5  | 919.3  | 915.3  | 917.6  | 912.7  | 869.1  | 803.2  |
| 32.5° | 1020.0 | 1021.5 | 1016.7 | 1005.1 | 993.0  | 972.2  | 964.1  | 965.7  | 953.3  | 904.1  | 828.1  |
| 35°   | 1068.0 | 1070.2 | 1068.7 | 1060.9 | 1047.8 | 1029.8 | 1020.3 | 1019.3 | 1004.0 | 947.1  | 861.0  |
| 37.5° | 1117.0 | 1119.1 | 1117.4 | 1110.9 | 1105.6 | 1086.6 | 1081.5 | 1081.5 | 1054.9 | 991.0  | 902.9  |
| 40°   | 1167.4 | 1170.5 | 1168.5 | 1159.6 | 1155.1 | 1146.4 | 1134.2 | 1131.3 | 1102.5 | 1043.8 | 971.2  |
| 42.5° | 1214.3 | 1218.3 | 1226.4 | 1221.1 | 1212.0 | 1213.2 | 1188.6 | 1187.1 | 1166.1 | 1121.7 | 1057.1 |
| 45°   | 1280.8 | 1286.7 | 1300.3 | 1296.2 | 1294.4 | 1287.6 | 1258.4 | 1257.0 | 1248.9 | 1226.5 | 1163.6 |
| 47.5° | 1353.3 | 1361.3 | 1385.9 | 1386.7 | 1406.6 | 1393.8 | 1354.1 | 1349.3 | 1351.1 | 1352.0 | 1293.6 |
| 50°   | 1420.1 | 1428.9 | 1469.2 | 1488.3 | 1535.3 | 1538.0 | 1474.5 | 1470.2 | 1477.4 | 1498.8 | 1445.1 |
| 52.5° | 1473.4 | 1484.5 | 1535.0 | 1593.7 | 1674.3 | 1697.1 | 1622.8 | 1619.5 | 1624.9 | 1661.7 | 1616.4 |
| 55°   | 1512.5 | 1524.6 | 1579.5 | 1686.5 | 1815.1 | 1855.5 | 1793.5 | 1790.4 | 1793.8 | 1840.6 | 1802.7 |
| 57.5° | 1521.7 | 1524.6 | 1604.2 | 1748.9 | 1934.0 | 2030.9 | 2002.3 | 1996.1 | 1979.4 | 2020.3 | 2008.4 |
| 60°   | 1478.8 | 1490.6 | 1583.8 | 1770.9 | 2026.0 | 2203.9 | 2220.6 | 2212.9 | 2166.1 | 2199.5 | 2189.9 |
| 62.5° | 1391.9 | 1413.0 | 1507.6 | 1737.5 | 2062.0 | 2345.3 | 2434.8 | 2425.5 | 2344.8 | 2366.4 | 2320.4 |
| 65°   | 1250.0 | 1259.0 | 1358.4 | 1622.3 | 2016.2 | 2435.7 | 2625.7 | 2621.1 | 2519.5 | 2485.6 | 2344.5 |
| 67.5° | 996.1  | 1013.0 | 1097.4 | 1381.6 | 1829.0 | 2425.0 | 2773.4 | 2772.9 | 2633.6 | 2529.9 | 2259.0 |
| 69°   | 787.0  | 804.4  | 884.8  | 1138.1 | 1618.4 | 2327.5 | 2798.1 | 2803.5 | 2665.8 | 2503.0 | 2136.8 |
| 70°   | 627.4  | 647.7  | 702.8  | 958.6  | 1431.5 | 2198.8 | 2777.5 | 2787.3 | 2659.6 | 2458.6 | 2024.1 |
| 72.5° | 267.0  | 283.4  | 322.7  | 494.1  | 872.5  | 1641.9 | 2539.6 | 2576.4 | 2516.2 | 2250.2 | 1672.9 |
| 75°   | 116.6  | 121.7  | 139.5  | 201.5  | 387.3  | 893.6  | 1989.5 | 2057.5 | 2151.5 | 1902.0 | 1246.1 |
| 77.5° | 85.3   | 87.5   | 97.2   | 118.3  | 173.8  | 337.5  | 1279.4 | 1319.0 | 1551.6 | 1384.1 | 764.4  |
| 80°   | 66.0   | 67.6   | 75.1   | 86.9   | 113.5  | 136.5  | 583.5  | 617.5  | 872.5  | 710.9  | 318.3  |
| 82.5° | 52.6   | 53.6   | 58.9   | 64.0   | 78.4   | 82.7   | 193.7  | 214.9  | 322.0  | 196.4  | 84.3   |
| 85°   | 48.9   | 50.1   | 51.9   | 46.7   | 50.2   | 48.5   | 83.8   | 87.7   | 97.2   | 77.1   | 35.3   |
| 87.5° | 22.1   | 26.1   | 51.5   | 36.3   | 26.7   | 21.3   | 34.3   | 35.9   | 40.4   | 40.5   | 15.6   |
| 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: P385811

CATALOG NUMBER: GWC-SA1B-827-U-T3

**CANDELA DISTRIBUTION (continued):**

|       | 90°    | 95°    | 105°  | 115°  | 125°  | 135°  | 145°  | 155°  | 165°  | 175°  | 180°  |
|-------|--------|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 0°    | 586.7  | 586.7  | 586.7 | 586.7 | 586.7 | 586.7 | 586.7 | 586.7 | 586.7 | 586.7 | 586.7 |
| 2.5°  | 588.1  | 587.7  | 588.4 | 586.6 | 588.9 | 588.7 | 588.0 | 588.3 | 589.8 | 589.7 | 589.8 |
| 5°    | 591.7  | 591.4  | 592.3 | 590.9 | 593.7 | 594.6 | 594.8 | 596.2 | 597.9 | 598.3 | 598.3 |
| 7.5°  | 600.7  | 600.7  | 601.1 | 599.3 | 601.1 | 601.0 | 600.2 | 601.6 | 603.3 | 603.4 | 603.3 |
| 10°   | 616.1  | 616.3  | 615.5 | 610.7 | 609.2 | 605.0 | 601.1 | 601.3 | 603.4 | 605.1 | 605.6 |
| 12.5° | 635.6  | 635.0  | 631.6 | 622.8 | 616.3 | 607.8 | 603.7 | 603.6 | 605.8 | 607.1 | 607.6 |
| 15°   | 657.9  | 656.2  | 647.3 | 633.0 | 621.5 | 613.2 | 606.7 | 605.1 | 603.9 | 602.4 | 602.5 |
| 17.5° | 678.9  | 675.0  | 660.3 | 640.4 | 628.3 | 617.2 | 604.7 | 594.6 | 587.7 | 583.6 | 582.4 |
| 20°   | 700.2  | 692.6  | 671.5 | 647.3 | 632.0 | 611.8 | 587.7 | 567.3 | 554.6 | 548.7 | 547.6 |
| 22.5° | 719.7  | 707.5  | 681.8 | 654.6 | 629.1 | 593.5 | 555.7 | 526.0 | 508.4 | 500.5 | 501.1 |
| 25°   | 738.7  | 721.7  | 692.6 | 659.7 | 614.3 | 561.4 | 511.1 | 474.6 | 454.2 | 445.4 | 445.1 |
| 27.5° | 755.4  | 736.1  | 704.4 | 655.5 | 586.6 | 515.6 | 458.4 | 422.9 | 405.8 | 398.3 | 397.0 |
| 30°   | 774.6  | 754.2  | 720.0 | 639.6 | 546.1 | 462.7 | 406.9 | 381.9 | 369.8 | 362.2 | 360.9 |
| 32.5° | 797.9  | 778.8  | 732.8 | 610.7 | 494.3 | 407.5 | 366.7 | 349.3 | 338.3 | 329.8 | 328.2 |
| 35°   | 831.9  | 811.2  | 736.1 | 569.3 | 437.4 | 363.9 | 337.2 | 319.3 | 304.4 | 293.4 | 292.4 |
| 37.5° | 874.6  | 851.9  | 728.7 | 515.6 | 382.2 | 335.7 | 312.6 | 290.5 | 271.2 | 255.7 | 253.2 |
| 40°   | 936.2  | 901.8  | 708.1 | 453.8 | 341.5 | 313.9 | 288.7 | 263.5 | 239.5 | 221.4 | 217.8 |
| 42.5° | 1010.1 | 960.4  | 676.6 | 392.2 | 311.7 | 291.7 | 264.8 | 233.6 | 210.7 | 197.9 | 196.0 |
| 45°   | 1104.1 | 1021.3 | 632.8 | 338.4 | 282.3 | 269.6 | 239.2 | 210.4 | 196.2 | 186.8 | 185.2 |
| 47.5° | 1211.4 | 1089.7 | 586.9 | 294.7 | 257.4 | 248.9 | 218.6 | 200.1 | 188.8 | 181.4 | 180.0 |
| 50°   | 1343.2 | 1166.8 | 538.2 | 258.8 | 232.4 | 224.0 | 208.9 | 194.3 | 185.4 | 179.7 | 178.3 |
| 52.5° | 1492.0 | 1253.9 | 503.1 | 230.5 | 211.7 | 205.6 | 203.8 | 191.3 | 184.0 | 179.7 | 178.3 |
| 55°   | 1652.1 | 1342.5 | 465.2 | 206.7 | 193.7 | 195.4 | 200.4 | 191.6 | 186.6 | 181.4 | 179.3 |
| 57.5° | 1812.5 | 1434.0 | 423.0 | 186.6 | 179.5 | 187.8 | 198.1 | 192.2 | 188.0 | 182.9 | 181.0 |
| 60°   | 1939.3 | 1492.0 | 357.6 | 169.8 | 168.2 | 179.5 | 192.5 | 187.5 | 182.1 | 182.3 | 182.0 |
| 62.5° | 1998.5 | 1488.9 | 285.4 | 154.8 | 156.9 | 168.2 | 183.5 | 180.3 | 175.8 | 181.8 | 182.3 |
| 65°   | 1965.2 | 1414.7 | 222.2 | 141.2 | 144.9 | 156.5 | 174.2 | 176.7 | 178.3 | 189.9 | 191.4 |
| 67.5° | 1825.8 | 1270.3 | 172.1 | 129.3 | 133.9 | 148.4 | 175.2 | 192.5 | 194.5 | 206.7 | 206.6 |
| 69°   | 1681.5 | 1134.8 | 149.5 | 123.1 | 128.5 | 150.4 | 187.2 | 202.5 | 195.0 | 207.9 | 206.1 |
| 70°   | 1560.6 | 1027.7 | 137.4 | 118.9 | 126.0 | 154.0 | 195.3 | 202.4 | 192.6 | 203.8 | 200.7 |
| 72.5° | 1201.9 | 739.3  | 116.6 | 111.2 | 117.7 | 147.3 | 197.6 | 197.9 | 187.2 | 189.4 | 184.1 |
| 75°   | 824.4  | 467.2  | 101.7 | 100.6 | 105.0 | 132.8 | 190.2 | 189.1 | 173.2 | 170.1 | 165.7 |
| 77.5° | 454.5  | 237.3  | 86.4  | 90.6  | 93.5  | 117.7 | 172.9 | 171.3 | 158.2 | 151.7 | 150.1 |
| 80°   | 175.3  | 103.9  | 73.0  | 80.6  | 82.4  | 101.9 | 151.5 | 150.1 | 139.1 | 130.8 | 128.5 |
| 82.5° | 66.2   | 54.4   | 60.3  | 69.7  | 69.1  | 84.1  | 128.3 | 127.6 | 116.9 | 104.7 | 101.0 |
| 85°   | 30.6   | 32.6   | 47.8  | 57.5  | 53.0  | 62.3  | 102.7 | 104.1 | 91.1  | 76.5  | 76.5  |
| 87.5° | 13.0   | 18.2   | 33.9  | 43.4  | 35.7  | 42.1  | 75.3  | 71.9  | 66.0  | 45.8  | 43.0  |
| 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: SP1-2104-224-5

Luminaire Tested: CCW-SA-2A-827-U-SL4

Test Date: 04/27/2021

### Test Information

Test Method: LM-79-08  
 Report Number: SP1-2104-224-5  
 Test Lab: COOPER LIGHTING SOLUTIONS  
 Photometer: SP1  
 Measurement Geometry:  $4\pi$   
 Issue Date: 04/27/2021  
 Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
 Product Line: INVUE  
 Catalog Number: **CCW-SA-2A-827-U-SL4**  
 Description: INVUE WALL PACK ClearCurve Light Square

### Spectral Parameters

|                           |        |           |      |      |      |
|---------------------------|--------|-----------|------|------|------|
| CCT (K):                  | 2661   | CRI (Ra): | 82.2 |      |      |
| CIE u':                   | 0.2642 | R1:       | 80.7 | R9:  | 5.2  |
| CIE v':                   | 0.5282 | R2:       | 91.5 | R10: | 82.2 |
| Duv:                      | 0.0001 | R3:       | 94.9 | R11: | 81.4 |
| CIE x:                    | 0.4631 | R4:       | 80.7 | R12: | 80.4 |
| CIE y:                    | 0.4115 | R5:       | 81.5 | R13: | 83.2 |
| CIE z:                    | 0.1254 | R6:       | 91.6 | R14: | 97.8 |
| Peak Wavelength (nm):     | 606    | R7:       | 81.0 |      |      |
| Dominant Wavelength (nm): | 584    | R8:       | 56.0 |      |      |
| Purity:                   | 62.8   |           |      |      |      |
| Rf:                       | 85.3   |           |      |      |      |
| Rg:                       | 96.5   |           |      |      |      |



### Test Conditions

Stabilization Time: 163M  
 Operation Time: 12H  
 Room Temperature (°C) / RH%: 25.0/47%  
 Sphere Temperature (°C): 24.1

REPORT NUMBER: SP1-2104-224-5

| 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: SP1-2104-224-5

**CIE 1931 Chromaticity Diagram**



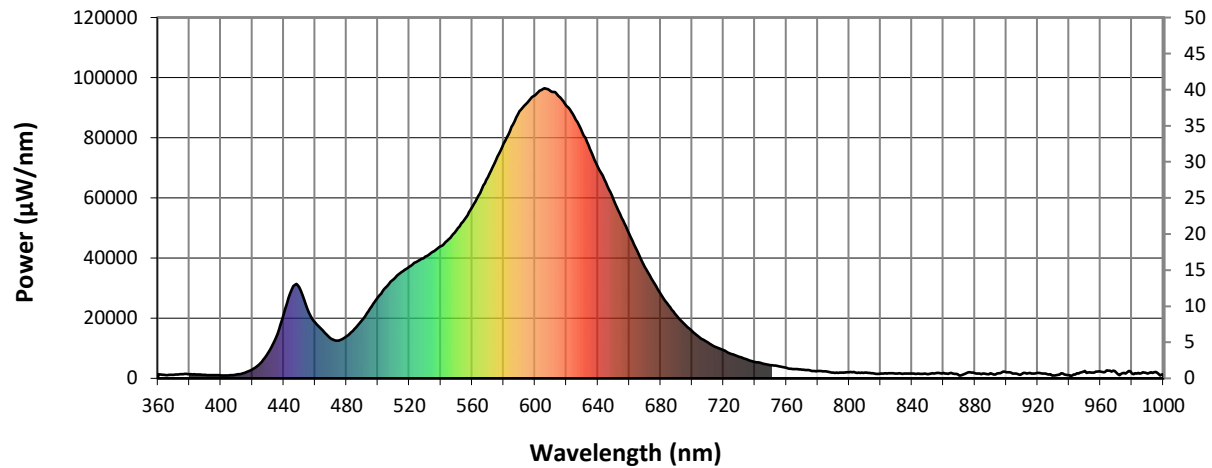
**CIE 1931 Chromaticity Diagram with 2017 ANSI 7-Step and 4-Step Quadrangles**



Point lies inside the ANSI 2700K 4-step quadrangle

REPORT NUMBER: SP1-2104-224-5

### 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       | 1379             | 0.0              | 490       | 19477            | 2.8              | 620       | 90616            | 23.6             | 750       | 4384             | 0.0              | 880       | 1655             | 0.0              |
| 365       | 1114             | 0.0              | 495       | 23200            | 4.2              | 625       | 87050            | 19.2             | 755       | 4013             | 0.0              | 885       | 1597             | 0.0              |
| 370       | 1169             | 0.0              | 500       | 26999            | 6.0              | 630       | 81805            | 14.8             | 760       | 3486             | 0.0              | 890       | 1696             | 0.0              |
| 375       | 1418             | 0.0              | 505       | 30185            | 8.4              | 635       | 76273            | 11.5             | 765       | 3111             | 0.0              | 895       | 1694             | 0.0              |
| 380       | 1358             | 0.0              | 510       | 33025            | 11.3             | 640       | 70276            | 8.4              | 770       | 2922             | 0.0              | 900       | 2016             | 0.0              |
| 385       | 1234             | 0.0              | 515       | 35307            | 14.6             | 645       | 65174            | 6.3              | 775       | 2649             | 0.0              | 905       | 1631             | 0.0              |
| 390       | 1133             | 0.0              | 520       | 37140            | 18.0             | 650       | 59417            | 4.3              | 780       | 2399             | 0.0              | 910       | 1506             | 0.0              |
| 395       | 1066             | 0.0              | 525       | 38834            | 20.8             | 655       | 53417            | 3.1              | 785       | 2386             | 0.0              | 915       | 1763             | 0.0              |
| 400       | 982              | 0.0              | 530       | 40401            | 23.8             | 660       | 48038            | 2.0              | 790       | 1912             | 0.0              | 920       | 1860             | 0.0              |
| 405       | 996              | 0.0              | 535       | 42121            | 26.1             | 665       | 42350            | 1.3              | 795       | 1902             | 0.0              | 925       | 1612             | 0.0              |
| 410       | 1276             | 0.0              | 540       | 43918            | 28.6             | 670       | 36925            | 0.8              | 800       | 2023             | 0.0              | 930       | 976              | 0.0              |
| 415       | 1798             | 0.0              | 545       | 46244            | 30.8             | 675       | 32385            | 0.5              | 805       | 1813             | 0.0              | 935       | 1702             | 0.0              |
| 420       | 2943             | 0.0              | 550       | 49225            | 33.5             | 680       | 28089            | 0.3              | 810       | 1888             | 0.0              | 940       | 1083             | 0.0              |
| 425       | 4989             | 0.0              | 555       | 52758            | 36.0             | 685       | 24306            | 0.2              | 815       | 1669             | 0.0              | 945       | 1672             | 0.0              |
| 430       | 8360             | 0.1              | 560       | 56904            | 38.7             | 690       | 20941            | 0.1              | 820       | 1558             | 0.0              | 950       | 2462             | 0.0              |
| 435       | 13537            | 0.2              | 565       | 61643            | 41.0             | 695       | 18065            | 0.1              | 825       | 1689             | 0.0              | 955       | 1958             | 0.0              |
| 440       | 21265            | 0.3              | 570       | 66872            | 43.5             | 700       | 15715            | 0.0              | 830       | 1632             | 0.0              | 960       | 2236             | 0.0              |
| 445       | 29496            | 0.6              | 575       | 72519            | 45.1             | 705       | 13502            | 0.0              | 835       | 1615             | 0.0              | 965       | 2541             | 0.0              |
| 450       | 30225            | 0.8              | 580       | 78030            | 46.4             | 710       | 11899            | 0.0              | 840       | 1583             | 0.0              | 970       | 1960             | 0.0              |
| 455       | 23120            | 0.8              | 585       | 83595            | 46.4             | 715       | 10427            | 0.0              | 845       | 1541             | 0.0              | 975       | 1763             | 0.0              |
| 460       | 18596            | 0.8              | 590       | 88814            | 45.9             | 720       | 9351             | 0.0              | 850       | 1350             | 0.0              | 980       | 1627             | 0.0              |
| 465       | 15865            | 0.8              | 595       | 91588            | 43.4             | 725       | 8139             | 0.0              | 855       | 1689             | 0.0              | 985       | 1556             | 0.0              |
| 470       | 13251            | 0.8              | 600       | 94210            | 40.6             | 730       | 7143             | 0.0              | 860       | 1763             | 0.0              | 990       | 1638             | 0.0              |
| 475       | 12609            | 1.0              | 605       | 96240            | 37.3             | 735       | 6273             | 0.0              | 865       | 1765             | 0.0              | 995       | 2124             | 0.0              |
| 480       | 14016            | 1.3              | 610       | 95474            | 32.8             | 740       | 5462             | 0.0              | 870       | 942              | 0.0              | 1000      | 1228             | 0.0              |
| 485       | 16368            | 1.9              | 615       | 93812            | 28.3             | 745       | 4946             | 0.0              | 875       | 1844             | 0.0              |           |                  |                  |

REPORT NUMBER: SP1-2104-224-5

### Scotopic Flux vs. Wavelength



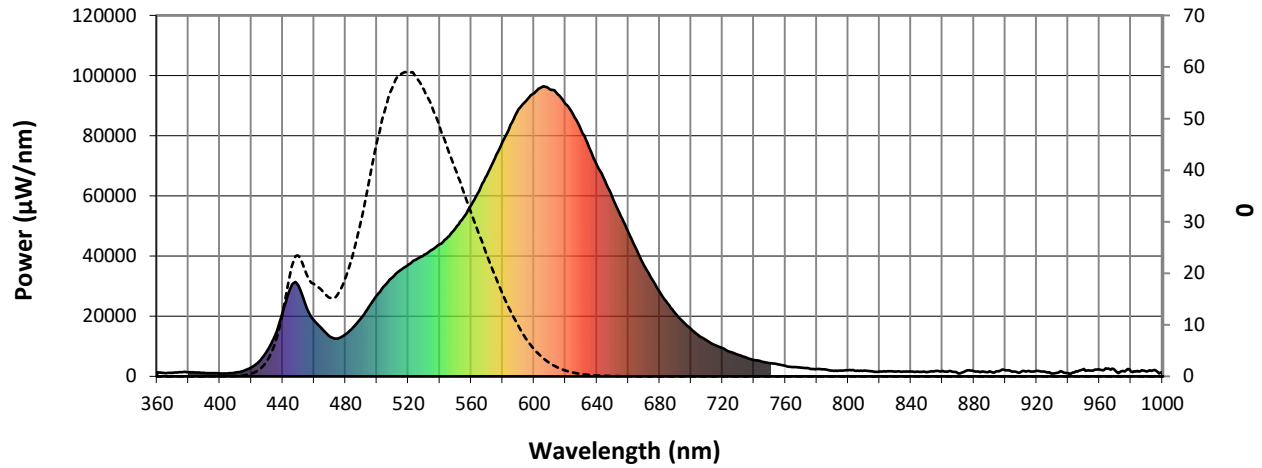
Scotopic Lumens: 5165.4

S/P: 1.2

| 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       | 1379             | 0.0              | 490       | 19477            | 30.0             | 620       | 90616            | 1.1              | 750       | 4384             | 0.0              | 880       | 1655             | 0.0              |
| 365       | 1114             | 0.0              | 495       | 23200            | 37.5             | 625       | 87050            | 0.7              | 755       | 4013             | 0.0              | 885       | 1597             | 0.0              |
| 370       | 1169             | 0.0              | 500       | 26999            | 45.2             | 630       | 81805            | 0.5              | 760       | 3486             | 0.0              | 890       | 1696             | 0.0              |
| 375       | 1418             | 0.0              | 505       | 30185            | 51.3             | 635       | 76273            | 0.3              | 765       | 3111             | 0.0              | 895       | 1694             | 0.0              |
| 380       | 1358             | 0.0              | 510       | 33025            | 56.0             | 640       | 70276            | 0.2              | 770       | 2922             | 0.0              | 900       | 2016             | 0.0              |
| 385       | 1234             | 0.0              | 515       | 35307            | 58.5             | 645       | 65174            | 0.1              | 775       | 2649             | 0.0              | 905       | 1631             | 0.0              |
| 390       | 1133             | 0.0              | 520       | 37140            | 59.0             | 650       | 59417            | 0.1              | 780       | 2399             | 0.0              | 910       | 1506             | 0.0              |
| 395       | 1066             | 0.0              | 525       | 38834            | 58.1             | 655       | 53417            | 0.0              | 785       | 2386             | 0.0              | 915       | 1763             | 0.0              |
| 400       | 982              | 0.0              | 530       | 40401            | 55.7             | 660       | 48038            | 0.0              | 790       | 1912             | 0.0              | 920       | 1860             | 0.0              |
| 405       | 996              | 0.0              | 535       | 42121            | 52.5             | 665       | 42350            | 0.0              | 795       | 1902             | 0.0              | 925       | 1612             | 0.0              |
| 410       | 1276             | 0.1              | 540       | 43918            | 48.5             | 670       | 36925            | 0.0              | 800       | 2023             | 0.0              | 930       | 976              | 0.0              |
| 415       | 1798             | 0.2              | 545       | 46244            | 44.3             | 675       | 32385            | 0.0              | 805       | 1813             | 0.0              | 935       | 1702             | 0.0              |
| 420       | 2943             | 0.5              | 550       | 49225            | 40.3             | 680       | 28089            | 0.0              | 810       | 1888             | 0.0              | 940       | 1083             | 0.0              |
| 425       | 4989             | 1.2              | 555       | 52758            | 36.1             | 685       | 24306            | 0.0              | 815       | 1669             | 0.0              | 945       | 1672             | 0.0              |
| 430       | 8360             | 2.8              | 560       | 56904            | 31.8             | 690       | 20941            | 0.0              | 820       | 1558             | 0.0              | 950       | 2462             | 0.0              |
| 435       | 13537            | 6.1              | 565       | 61643            | 27.7             | 695       | 18065            | 0.0              | 825       | 1689             | 0.0              | 955       | 1958             | 0.0              |
| 440       | 21265            | 11.9             | 570       | 66872            | 23.6             | 700       | 15715            | 0.0              | 830       | 1632             | 0.0              | 960       | 2236             | 0.0              |
| 445       | 29496            | 19.8             | 575       | 72519            | 19.7             | 705       | 13502            | 0.0              | 835       | 1615             | 0.0              | 965       | 2541             | 0.0              |
| 450       | 30225            | 23.4             | 580       | 78030            | 16.1             | 710       | 11899            | 0.0              | 840       | 1583             | 0.0              | 970       | 1960             | 0.0              |
| 455       | 23120            | 20.2             | 585       | 83595            | 12.8             | 715       | 10427            | 0.0              | 845       | 1541             | 0.0              | 975       | 1763             | 0.0              |
| 460       | 18596            | 18.0             | 590       | 88814            | 9.9              | 720       | 9351             | 0.0              | 850       | 1350             | 0.0              | 980       | 1627             | 0.0              |
| 465       | 15865            | 16.8             | 595       | 91588            | 7.3              | 725       | 8139             | 0.0              | 855       | 1689             | 0.0              | 985       | 1556             | 0.0              |
| 470       | 13251            | 15.3             | 600       | 94210            | 5.3              | 730       | 7143             | 0.0              | 860       | 1763             | 0.0              | 990       | 1638             | 0.0              |
| 475       | 12609            | 15.8             | 605       | 96240            | 3.8              | 735       | 6273             | 0.0              | 865       | 1765             | 0.0              | 995       | 2124             | 0.0              |
| 480       | 14016            | 18.9             | 610       | 95474            | 2.6              | 740       | 5462             | 0.0              | 870       | 942              | 0.0              | 1000      | 1228             | 0.0              |
| 485       | 16368            | 23.7             | 615       | 93812            | 1.7              | 745       | 4946             | 0.0              | 875       | 1844             | 0.0              |           |                  |                  |

REPORT NUMBER: SP1-2104-224-5

### Melanopic Flux vs. Wavelength


**Melanopic Lumens: 1892.1      M/P: 0.44**

| 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       | 1379             | 0.0              | 490       | 19477            | 16.2             | 620       | 90616            | 0.1              | 750       | 4384             | 0.0              | 880       | 1655             | 0.0              |
| 365       | 1114             | 0.0              | 495       | 23200            | 19.2             | 625       | 87050            | 0.0              | 755       | 4013             | 0.0              | 885       | 1597             | 0.0              |
| 370       | 1169             | 0.0              | 500       | 26999            | 21.7             | 630       | 81805            | 0.0              | 760       | 3486             | 0.0              | 890       | 1696             | 0.0              |
| 375       | 1418             | 0.0              | 505       | 30185            | 23.2             | 635       | 76273            | 0.0              | 765       | 3111             | 0.0              | 895       | 1694             | 0.0              |
| 380       | 1358             | 0.0              | 510       | 33025            | 23.7             | 640       | 70276            | 0.0              | 770       | 2922             | 0.0              | 900       | 2016             | 0.0              |
| 385       | 1234             | 0.0              | 515       | 35307            | 23.1             | 645       | 65174            | 0.0              | 775       | 2649             | 0.0              | 905       | 1631             | 0.0              |
| 390       | 1133             | 0.0              | 520       | 37140            | 21.6             | 650       | 59417            | 0.0              | 780       | 2399             | 0.0              | 910       | 1506             | 0.0              |
| 395       | 1066             | 0.0              | 525       | 38834            | 19.7             | 655       | 53417            | 0.0              | 785       | 2386             | 0.0              | 915       | 1763             | 0.0              |
| 400       | 982              | 0.0              | 530       | 40401            | 17.5             | 660       | 48038            | 0.0              | 790       | 1912             | 0.0              | 920       | 1860             | 0.0              |
| 405       | 996              | 0.0              | 535       | 42121            | 15.2             | 665       | 42350            | 0.0              | 795       | 1902             | 0.0              | 925       | 1612             | 0.0              |
| 410       | 1276             | 0.0              | 540       | 43918            | 12.9             | 670       | 36925            | 0.0              | 800       | 2023             | 0.0              | 930       | 976              | 0.0              |
| 415       | 1798             | 0.1              | 545       | 46244            | 10.7             | 675       | 32385            | 0.0              | 805       | 1813             | 0.0              | 935       | 1702             | 0.0              |
| 420       | 2943             | 0.3              | 550       | 49225            | 8.8              | 680       | 28089            | 0.0              | 810       | 1888             | 0.0              | 940       | 1083             | 0.0              |
| 425       | 4989             | 0.8              | 555       | 52758            | 7.1              | 685       | 24306            | 0.0              | 815       | 1669             | 0.0              | 945       | 1672             | 0.0              |
| 430       | 8360             | 1.8              | 560       | 56904            | 5.6              | 690       | 20941            | 0.0              | 820       | 1558             | 0.0              | 950       | 2462             | 0.0              |
| 435       | 13537            | 3.6              | 565       | 61643            | 4.3              | 695       | 18065            | 0.0              | 825       | 1689             | 0.0              | 955       | 1958             | 0.0              |
| 440       | 21265            | 7.1              | 570       | 66872            | 3.3              | 700       | 15715            | 0.0              | 830       | 1632             | 0.0              | 960       | 2236             | 0.0              |
| 445       | 29496            | 11.6             | 575       | 72519            | 2.4              | 705       | 13502            | 0.0              | 835       | 1615             | 0.0              | 965       | 2541             | 0.0              |
| 450       | 30225            | 13.9             | 580       | 78030            | 1.7              | 710       | 11899            | 0.0              | 840       | 1583             | 0.0              | 970       | 1960             | 0.0              |
| 455       | 23120            | 12.1             | 585       | 83595            | 1.2              | 715       | 10427            | 0.0              | 845       | 1541             | 0.0              | 975       | 1763             | 0.0              |
| 460       | 18596            | 11.0             | 590       | 88814            | 0.9              | 720       | 9351             | 0.0              | 850       | 1350             | 0.0              | 980       | 1627             | 0.0              |
| 465       | 15865            | 10.4             | 595       | 91588            | 0.6              | 725       | 8139             | 0.0              | 855       | 1689             | 0.0              | 985       | 1556             | 0.0              |
| 470       | 13251            | 9.5              | 600       | 94210            | 0.4              | 730       | 7143             | 0.0              | 860       | 1763             | 0.0              | 990       | 1638             | 0.0              |
| 475       | 12609            | 9.6              | 605       | 96240            | 0.3              | 735       | 6273             | 0.0              | 865       | 1765             | 0.0              | 995       | 2124             | 0.0              |
| 480       | 14016            | 11.3             | 610       | 95474            | 0.2              | 740       | 5462             | 0.0              | 870       | 942              | 0.0              | 1000      | 1228             | 0.0              |
| 485       | 16368            | 13.5             | 615       | 93812            | 0.1              | 745       | 4946             | 0.0              | 875       | 1844             | 0.0              |           |                  |                  |

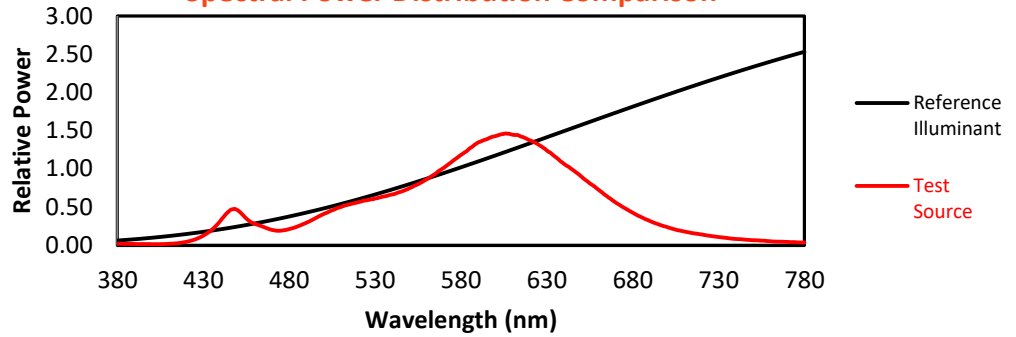
REPORT NUMBER: SP1-2104-224-5

TM-30-18

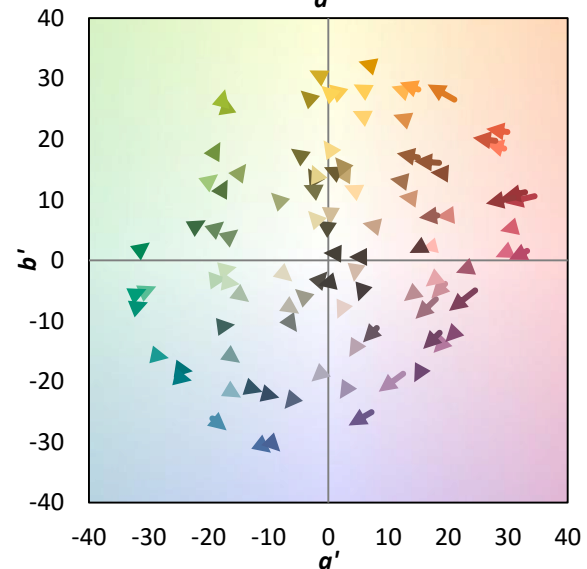
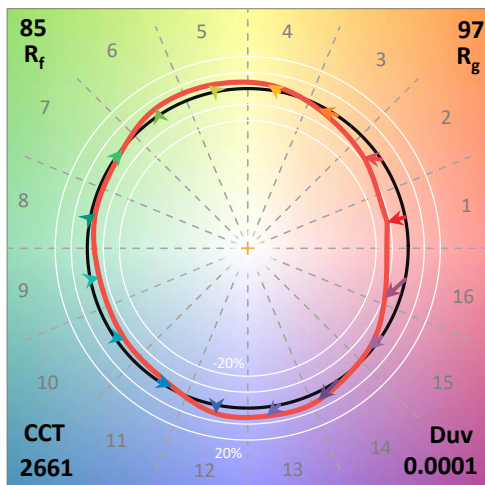
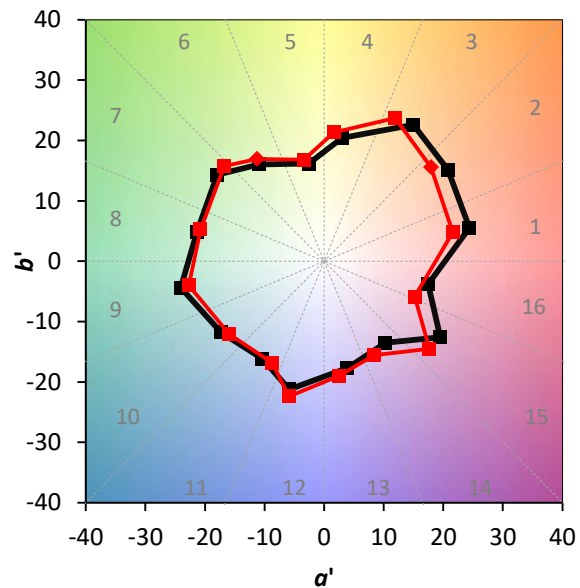
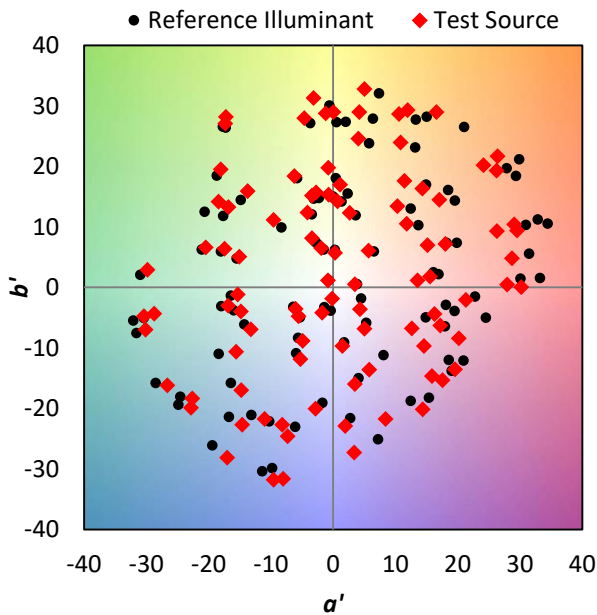
### Summary

$R_f = 85.3$   
 $R_g = 96.5$   
 CIE  $R_a = 82.2$   
 $R_g = 5.2$

### Spectral Power Distribution Comparison



### Color Vector Graphics



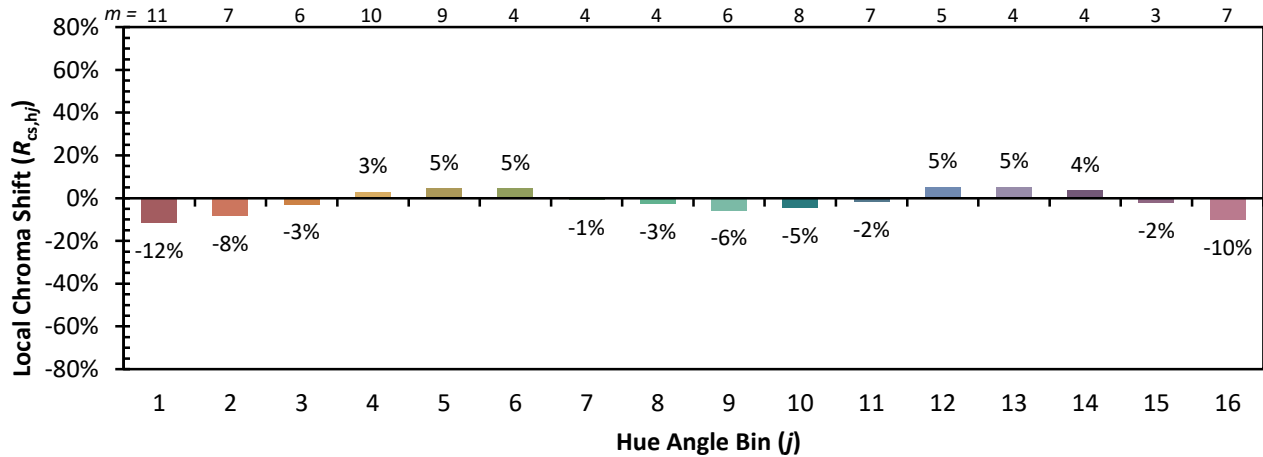


**Individual Sample Fidelity Index ( $R_{f,i}$ )**

|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 87 | CES26 = 83 | CES51 = 95 | CES76 = 83 |
| CES02 = 64 | CES27 = 95 | CES52 = 94 | CES77 = 85 |
| CES03 = 32 | CES28 = 95 | CES53 = 89 | CES78 = 83 |
| CES04 = 71 | CES29 = 83 | CES54 = 92 | CES79 = 89 |
| CES05 = 51 | CES30 = 87 | CES55 = 92 | CES80 = 89 |
| CES06 = 52 | CES31 = 85 | CES56 = 87 | CES81 = 69 |
| CES07 = 43 | CES32 = 81 | CES57 = 87 | CES82 = 95 |
| CES08 = 42 | CES33 = 86 | CES58 = 88 | CES83 = 92 |
| CES09 = 29 | CES34 = 91 | CES59 = 92 | CES84 = 93 |
| CES10 = 77 | CES35 = 96 | CES60 = 96 | CES85 = 77 |
| CES11 = 60 | CES36 = 97 | CES61 = 91 | CES86 = 65 |
| CES12 = 66 | CES37 = 96 | CES62 = 97 | CES87 = 85 |
| CES13 = 44 | CES38 = 93 | CES63 = 87 | CES88 = 85 |
| CES14 = 74 | CES39 = 97 | CES64 = 86 | CES89 = 74 |
| CES15 = 72 | CES40 = 94 | CES65 = 81 | CES90 = 86 |
| CES16 = 48 | CES41 = 93 | CES66 = 86 | CES91 = 88 |
| CES17 = 50 | CES42 = 95 | CES67 = 85 | CES92 = 67 |
| CES18 = 57 | CES43 = 88 | CES68 = 86 | CES93 = 80 |
| CES19 = 73 | CES44 = 99 | CES69 = 91 | CES94 = 61 |
| CES20 = 67 | CES45 = 92 | CES70 = 83 | CES95 = 77 |
| CES21 = 87 | CES46 = 88 | CES71 = 85 | CES96 = 84 |
| CES22 = 80 | CES47 = 87 | CES72 = 94 | CES97 = 88 |
| CES23 = 92 | CES48 = 81 | CES73 = 79 | CES98 = 84 |
| CES24 = 91 | CES49 = 88 | CES74 = 90 | CES99 = 76 |
| CES25 = 72 | CES50 = 94 | CES75 = 86 |            |



### Color Rendition by Hue-Angle Bin



REPORT NUMBER: SP1-2104-224-5

**TM-30-18**

**Measure Comparisons**



(END OF REPORT)