

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: P386702

Luminaire Tested: **GWC-SA2B-827-U-T2-HSS**

Issue Date: 3/3/2020

**Test Information**

Test Method: LM-79-08  
Report Number: P386702  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-1903-205-13)  
Test Lab: INNOVATION CENTER  
Issue Date: 3/3/2020  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: McGRAW-EDISON  
Catalog Number: GWC-SA2B-827-U-T2-HSS  
Description: GALLEON WALL LUMINAIRE  
(2) 80 CRI, 2700K, 800mA LIGHTSQUARES WITH 16 LEDS EACH AND TYPE II  
OPTICS WITH HOUSE SIDE SHIELD  
Light Source: -  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 6237 lumens  
Efficiency: N/A  
Efficacy: 73.4 lumens/watt  
Luminous Opening: Rectangular (W 1' x L: 0.5' x H: 0')  
IES Classification: Type II - Medium  
BUG Rating: B1 - U0 - G2

Input Watts (W): 85  
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

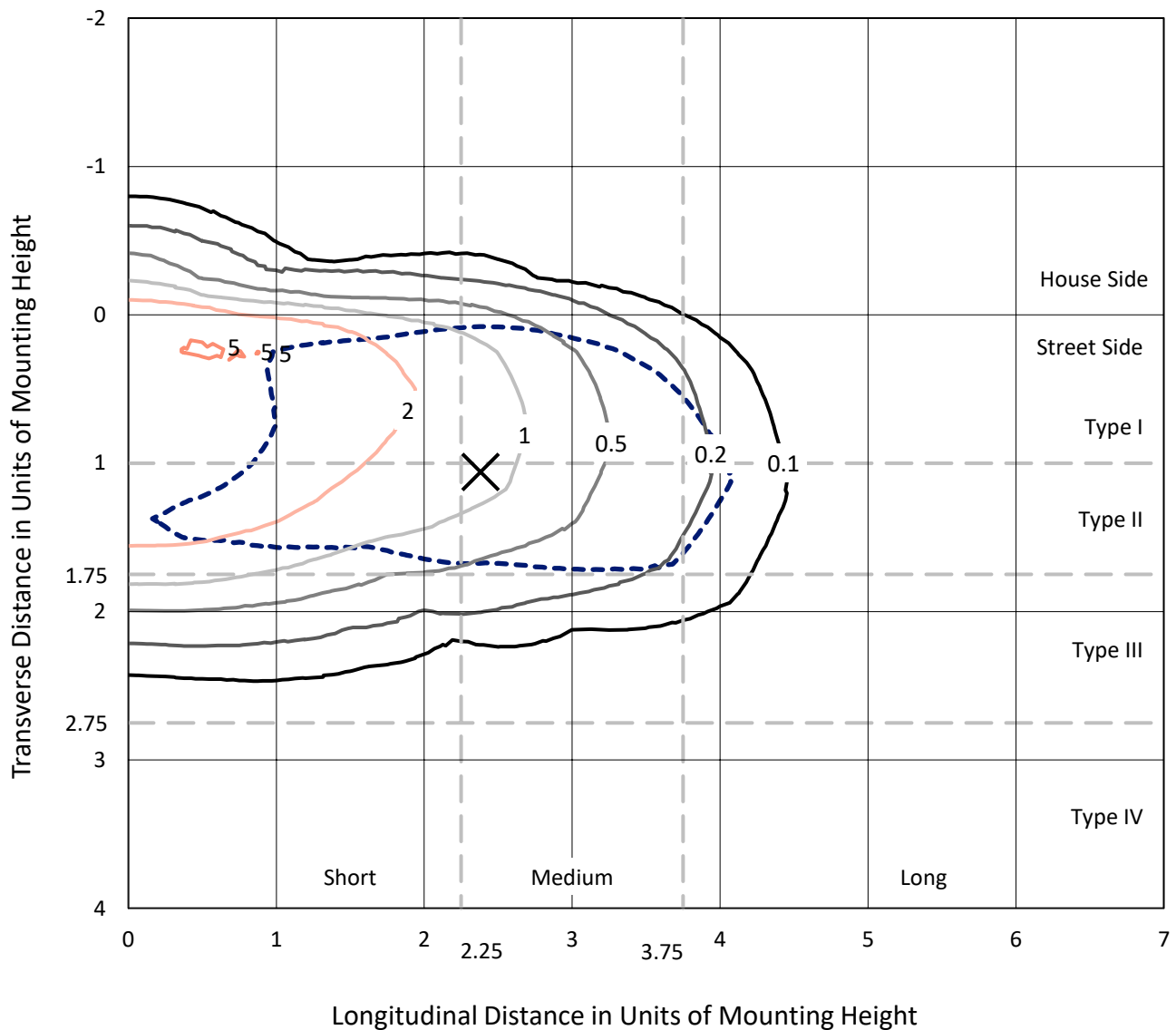


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## Iso-Footcandle Lines of Horizontal Illumination

✕ Max cd  
 - - - 1/2 Max cd

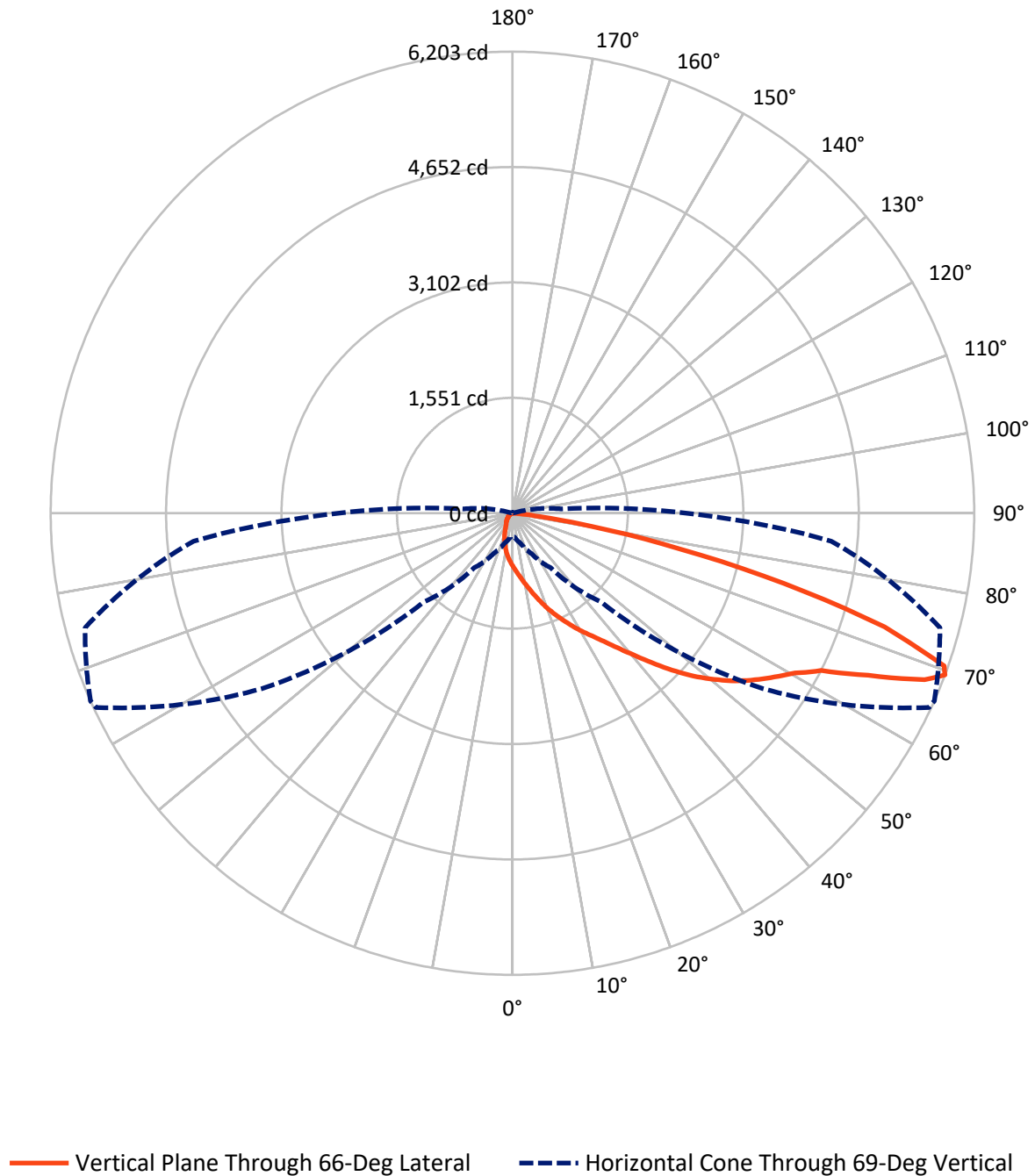


Based on 15 foot mounting height. Maximum calculated value = 5.2 fc  
 Type II - Medium - N/A

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## Luminous Intensity Polar Plot



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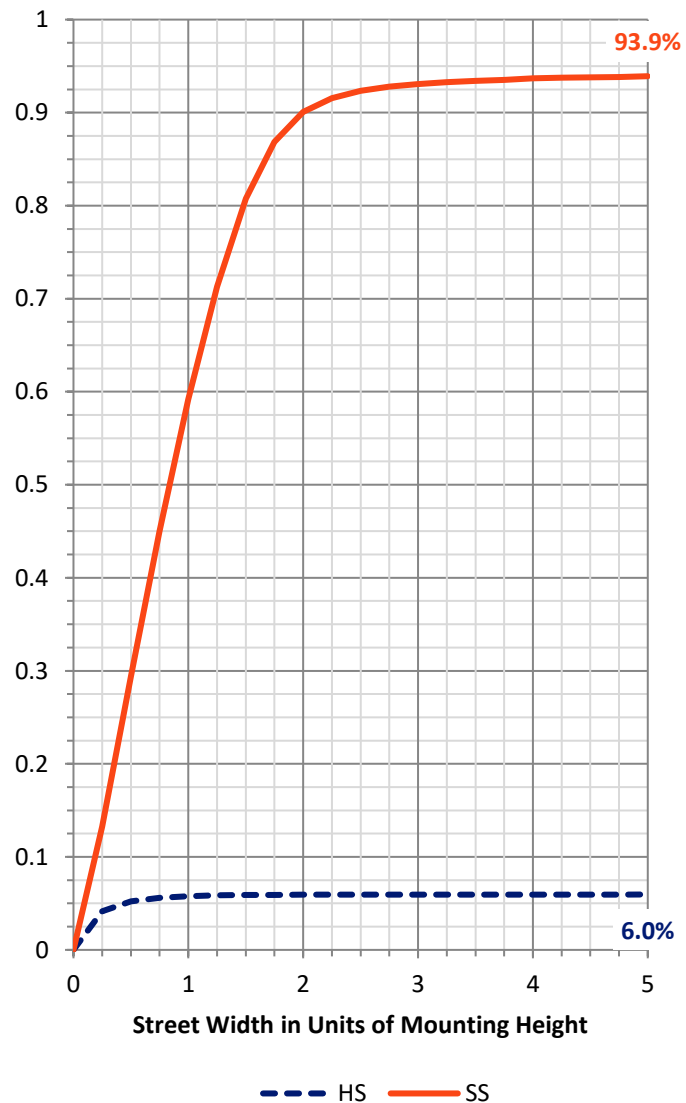
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total  |
|--------------------|-----------|----------|--------|--------|
| <b>House Side</b>  | Lumens    | 374.1    | 0.0    | 374.1  |
|                    | % Fixture | 6.0      | 0.0    | 6.0    |
| <b>Street Side</b> | Lumens    | 5862.9   | 0.0    | 5862.9 |
|                    | % Fixture | 94.0     | 0.0    | 94.0   |
| <b>Total</b>       | Lumens    | 6237.0   | 0.0    | 6237.0 |
|                    | % Fixture | 100.0    | 0.0    | 100.0  |

**ZONAL LUMENS:**

| Zone      | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10°    | 68.6   | 1.1       |
| 10°-20°   | 204.2  | 3.3       |
| 20°-30°   | 355.6  | 5.7       |
| 30°-40°   | 623.9  | 10.0      |
| 40°-50°   | 1044.3 | 16.7      |
| 50°-60°   | 1535.0 | 24.6      |
| 60°-70°   | 1576.0 | 25.3      |
| 70°-80°   | 778.0  | 12.5      |
| 80°-90°   | 51.5   | 0.8       |
| 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°    | 6237.0 | 100.0     |
| 0°-180°   | 6237.0 | 100.0     |

**Coefficient of Utilization**



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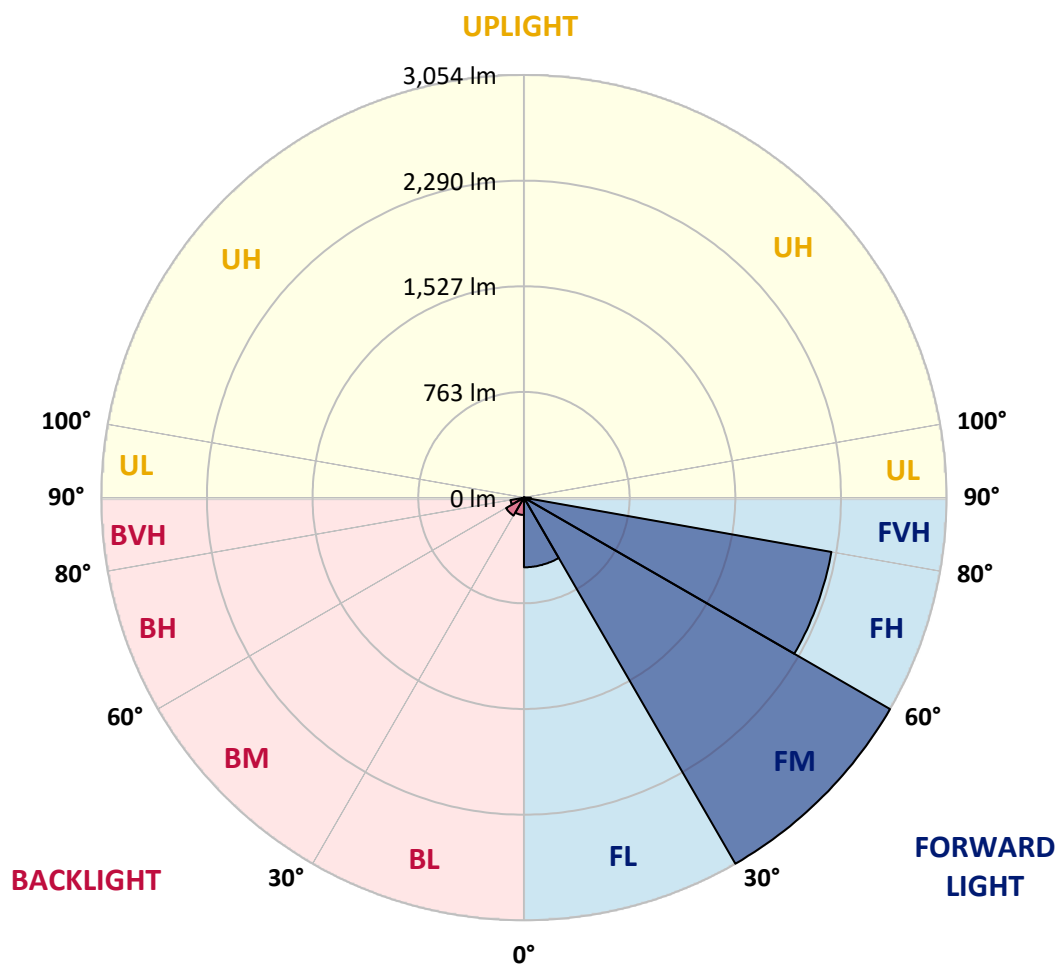
CATALOG NUMBER: GWC-SA2B-827-U-T2-HSS

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

| Zone |             | Lumens | % Fixture | Zone Rating/Lumen Limit |      |         |
|------|-------------|--------|-----------|-------------------------|------|---------|
|      |             |        |           | B                       | U    | G       |
| FL   | (0°-30°)    | 503.3  | 8.1       |                         |      |         |
| FM   | (30°-60°)   | 3053.9 | 49.0      |                         |      |         |
| FH   | (60°-80°)   | 2255.5 | 36.2      |                         |      | G2/5000 |
| FVH  | (80°-90°)   | 50.2   | 0.8       |                         |      | G1/100  |
| BL   | (0°-30°)    | 125.1  | 2.0       | B1/500                  |      |         |
| BM   | (30°-60°)   | 149.2  | 2.4       | B0/220                  |      |         |
| BH   | (60°-80°)   | 98.6   | 1.6       | B0/110                  |      | G0/110  |
| BVH  | (80°-90°)   | 1.2    | 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 II Medium



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**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 5°     | 15°    | 25°    | 35°    | 45°    | 55°    | 65°    | 66°    | 75°    | 85°    |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 709.8  | 709.8  | 709.8  | 709.8  | 709.8  | 709.8  | 709.8  | 709.8  | 709.8  | 709.8  | 709.8  |
| 2.5°  | 835.4  | 831.8  | 830.4  | 823.8  | 812.6  | 804.0  | 787.4  | 768.1  | 764.6  | 745.9  | 723.1  |
| 5°    | 943.8  | 940.9  | 938.8  | 929.6  | 918.0  | 896.4  | 866.2  | 830.4  | 823.5  | 788.0  | 742.4  |
| 7.5°  | 1019.4 | 1024.7 | 1024.7 | 1018.8 | 1004.3 | 988.0  | 950.9  | 902.1  | 893.5  | 839.0  | 768.1  |
| 10°   | 1063.5 | 1070.0 | 1075.1 | 1080.1 | 1078.0 | 1071.5 | 1036.5 | 981.4  | 971.1  | 898.8  | 798.1  |
| 12.5° | 1067.6 | 1074.2 | 1088.4 | 1109.4 | 1129.9 | 1144.7 | 1122.7 | 1069.4 | 1057.6 | 968.1  | 833.6  |
| 15°   | 1044.5 | 1051.4 | 1073.3 | 1114.2 | 1163.6 | 1206.9 | 1214.0 | 1166.9 | 1154.7 | 1050.8 | 878.1  |
| 17.5° | 1004.3 | 1008.7 | 1040.1 | 1096.7 | 1174.3 | 1253.7 | 1296.6 | 1271.5 | 1260.2 | 1145.3 | 927.5  |
| 20°   | 974.3  | 977.6  | 1005.1 | 1065.9 | 1167.8 | 1283.0 | 1374.8 | 1382.6 | 1370.7 | 1246.6 | 981.1  |
| 22.5° | 1025.6 | 1031.5 | 1032.4 | 1061.1 | 1150.0 | 1297.5 | 1443.6 | 1491.9 | 1483.0 | 1354.1 | 1033.9 |
| 25°   | 1165.7 | 1172.5 | 1150.0 | 1132.2 | 1165.1 | 1304.0 | 1502.5 | 1603.8 | 1596.7 | 1469.9 | 1086.9 |
| 27.5° | 1350.9 | 1358.0 | 1328.9 | 1275.9 | 1244.2 | 1328.6 | 1555.0 | 1717.6 | 1717.3 | 1592.6 | 1144.1 |
| 30°   | 1532.7 | 1539.9 | 1510.2 | 1457.2 | 1384.3 | 1398.3 | 1600.3 | 1836.7 | 1838.5 | 1719.1 | 1204.8 |
| 32.5° | 1723.5 | 1732.4 | 1701.9 | 1633.8 | 1557.6 | 1518.5 | 1664.0 | 1956.4 | 1966.4 | 1865.7 | 1273.2 |
| 35°   | 1940.4 | 1941.6 | 1898.6 | 1827.2 | 1739.5 | 1679.4 | 1766.2 | 2090.6 | 2114.6 | 2047.3 | 1360.0 |
| 37.5° | 2153.1 | 2161.7 | 2126.4 | 2013.8 | 1933.3 | 1865.1 | 1918.2 | 2258.2 | 2292.3 | 2269.2 | 1473.5 |
| 40°   | 2310.7 | 2328.7 | 2323.7 | 2202.2 | 2125.8 | 2077.2 | 2106.9 | 2457.6 | 2500.9 | 2527.5 | 1616.6 |
| 42.5° | 2409.6 | 2423.2 | 2446.3 | 2373.2 | 2303.9 | 2311.9 | 2329.6 | 2689.9 | 2743.2 | 2822.0 | 1781.0 |
| 45°   | 2523.1 | 2529.6 | 2548.8 | 2516.6 | 2469.8 | 2550.3 | 2566.0 | 2951.4 | 3007.4 | 3138.7 | 1963.5 |
| 47.5° | 2661.7 | 2677.1 | 2682.5 | 2652.8 | 2631.5 | 2761.3 | 2793.8 | 3189.3 | 3267.8 | 3477.9 | 2156.6 |
| 50°   | 2838.3 | 2842.4 | 2851.6 | 2832.3 | 2811.0 | 2942.6 | 2998.2 | 3439.0 | 3510.4 | 3818.2 | 2347.1 |
| 52.5° | 3011.0 | 3025.8 | 3057.8 | 3045.6 | 3037.1 | 3096.9 | 3180.4 | 3664.2 | 3743.9 | 4102.0 | 2537.3 |
| 55°   | 3060.7 | 3073.5 | 3184.0 | 3259.5 | 3329.4 | 3287.1 | 3354.6 | 3865.9 | 3952.1 | 4355.6 | 2720.4 |
| 57.5° | 2862.0 | 2887.7 | 3079.1 | 3275.8 | 3565.8 | 3582.7 | 3594.0 | 4073.0 | 4150.3 | 4549.9 | 2910.9 |
| 60°   | 2359.6 | 2364.6 | 2678.6 | 3016.0 | 3526.7 | 3840.7 | 3943.5 | 4295.5 | 4360.4 | 4731.0 | 3139.0 |
| 62.5° | 1500.8 | 1552.0 | 1896.5 | 2372.9 | 3113.2 | 3803.4 | 4366.3 | 4632.0 | 4655.7 | 4948.1 | 3466.0 |
| 65°   | 714.8  | 748.0  | 996.3  | 1466.1 | 2255.0 | 3325.6 | 4658.1 | 5240.8 | 5251.4 | 5378.5 | 3903.0 |
| 67.5° | 395.8  | 411.8  | 530.0  | 789.2  | 1318.3 | 2351.8 | 4540.2 | 5961.8 | 5971.9 | 5818.2 | 4286.3 |
| 69°   | 309.6  | 323.2  | 416.2  | 594.8  | 893.8  | 1690.3 | 4108.6 | 6173.0 | 6203.0 | 5944.1 | 4299.9 |
| 70°   | 262.8  | 276.1  | 358.5  | 502.4  | 718.7  | 1306.1 | 3657.1 | 6120.6 | 6152.3 | 5932.2 | 4198.3 |
| 72.5° | 160.9  | 168.6  | 238.8  | 353.7  | 481.7  | 657.1  | 2255.3 | 5176.2 | 5229.8 | 5441.6 | 3608.2 |
| 75°   | 108.4  | 112.6  | 149.3  | 244.1  | 344.5  | 338.3  | 1171.6 | 3648.5 | 3764.6 | 4233.0 | 2665.0 |
| 77.5° | 77.6   | 81.5   | 100.1  | 157.9  | 241.4  | 223.4  | 530.6  | 2267.4 | 2292.3 | 2538.8 | 1453.4 |
| 80°   | 44.1   | 47.7   | 70.8   | 93.9   | 163.8  | 149.0  | 210.9  | 1083.1 | 1095.5 | 1088.7 | 485.2  |
| 82.5° | 23.1   | 26.1   | 38.8   | 61.9   | 105.2  | 97.5   | 87.7   | 362.6  | 364.4  | 303.1  | 106.4  |
| 85°   | 4.4    | 5.3    | 19.3   | 42.4   | 54.2   | 42.4   | 35.8   | 85.0   | 86.8   | 76.7   | 26.4   |
| 87.5° | 0.0    | 0.3    | 7.7    | 9.5    | 10.7   | 11.0   | 11.6   | 16.6   | 17.8   | 24.0   | 7.1    |
| 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-827-U-T2-HSS

**CANDELA DISTRIBUTION (continued):**

|       | 90°    | 95°   | 105°  | 115°  | 125°  | 135°  | 145°  | 155°  | 165°  | 175°  | 180°  |
|-------|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 0°    | 709.8  | 709.8 | 709.8 | 709.8 | 709.8 | 709.8 | 709.8 | 709.8 | 709.8 | 709.8 | 709.8 |
| 2.5°  | 713.0  | 702.4 | 681.9 | 658.2 | 639.9 | 621.8 | 607.6 | 592.8 | 587.4 | 584.8 | 584.5 |
| 5°    | 720.2  | 697.6 | 654.4 | 610.0 | 573.5 | 539.2 | 514.6 | 491.2 | 480.2 | 475.2 | 473.1 |
| 7.5°  | 732.0  | 695.9 | 626.3 | 558.4 | 506.0 | 463.0 | 429.0 | 403.5 | 390.7 | 385.4 | 383.3 |
| 10°   | 745.9  | 693.5 | 593.4 | 503.9 | 437.0 | 392.5 | 358.7 | 333.6 | 319.6 | 313.7 | 310.8 |
| 12.5° | 762.2  | 689.4 | 555.4 | 448.8 | 378.0 | 333.6 | 292.7 | 261.6 | 245.6 | 238.8 | 235.5 |
| 15°   | 782.4  | 685.2 | 515.8 | 397.0 | 326.2 | 271.9 | 227.2 | 206.2 | 202.9 | 201.7 | 202.0 |
| 17.5° | 802.2  | 678.7 | 472.5 | 345.7 | 271.7 | 212.4 | 189.6 | 188.4 | 189.0 | 189.0 | 189.0 |
| 20°   | 820.0  | 663.9 | 425.4 | 301.9 | 219.8 | 179.2 | 174.5 | 172.4 | 170.9 | 169.7 | 168.3 |
| 22.5° | 833.9  | 644.0 | 380.1 | 258.3 | 179.5 | 164.1 | 156.7 | 150.2 | 144.9 | 141.3 | 139.5 |
| 25°   | 843.4  | 617.7 | 338.6 | 216.6 | 161.5 | 149.3 | 136.0 | 125.0 | 116.7 | 111.7 | 109.6 |
| 27.5° | 850.5  | 589.2 | 301.6 | 181.3 | 149.0 | 132.1 | 114.6 | 101.6 | 93.0  | 88.6  | 86.8  |
| 30°   | 855.5  | 556.9 | 269.0 | 159.4 | 135.1 | 114.1 | 95.4  | 82.7  | 76.4  | 74.1  | 72.9  |
| 32.5° | 860.3  | 521.1 | 238.2 | 149.0 | 122.1 | 97.5  | 80.0  | 70.2  | 66.4  | 63.4  | 62.5  |
| 35°   | 872.1  | 487.9 | 208.8 | 138.0 | 108.7 | 83.2  | 68.7  | 61.6  | 57.8  | 56.0  | 55.4  |
| 37.5° | 900.3  | 463.3 | 180.7 | 126.8 | 95.4  | 72.0  | 60.1  | 55.1  | 51.5  | 49.8  | 49.2  |
| 40°   | 945.6  | 450.9 | 157.0 | 114.6 | 82.4  | 63.4  | 54.5  | 49.8  | 45.9  | 43.3  | 42.7  |
| 42.5° | 1012.3 | 452.7 | 140.4 | 102.5 | 72.0  | 56.6  | 49.2  | 43.5  | 39.4  | 37.0  | 36.4  |
| 45°   | 1093.1 | 465.7 | 128.9 | 90.6  | 63.4  | 51.2  | 43.3  | 37.3  | 33.5  | 31.4  | 30.8  |
| 47.5° | 1180.8 | 486.7 | 119.4 | 80.0  | 56.6  | 46.2  | 37.3  | 31.1  | 27.8  | 26.1  | 25.8  |
| 50°   | 1273.2 | 507.2 | 109.6 | 69.6  | 50.7  | 41.2  | 31.4  | 25.8  | 23.1  | 21.6  | 21.0  |
| 52.5° | 1366.9 | 530.9 | 100.7 | 60.1  | 45.6  | 35.3  | 26.1  | 21.0  | 19.0  | 17.8  | 17.2  |
| 55°   | 1467.6 | 548.6 | 92.1  | 52.7  | 40.6  | 29.9  | 21.6  | 17.5  | 15.7  | 14.2  | 13.9  |
| 57.5° | 1586.1 | 576.2 | 83.2  | 45.6  | 34.7  | 24.9  | 17.8  | 13.9  | 12.4  | 11.0  | 10.7  |
| 60°   | 1746.0 | 608.5 | 73.8  | 40.3  | 28.4  | 20.4  | 14.5  | 11.3  | 9.5   | 8.3   | 8.0   |
| 62.5° | 1957.0 | 644.3 | 61.9  | 35.3  | 23.1  | 16.6  | 11.6  | 8.9   | 6.8   | 5.3   | 5.3   |
| 65°   | 2224.5 | 702.7 | 50.7  | 29.6  | 19.0  | 13.6  | 8.9   | 6.5   | 3.9   | 2.4   | 2.4   |
| 67.5° | 2380.6 | 712.8 | 40.9  | 24.3  | 15.4  | 11.6  | 7.4   | 4.4   | 1.2   | 0.3   | 0.0   |
| 69°   | 2330.5 | 654.4 | 34.7  | 20.7  | 13.3  | 11.0  | 6.8   | 3.3   | 0.6   | 0.0   | 0.0   |
| 70°   | 2236.3 | 598.4 | 30.5  | 18.4  | 12.1  | 10.4  | 6.5   | 2.4   | 0.6   | 0.0   | 0.0   |
| 72.5° | 1847.9 | 426.0 | 23.1  | 13.6  | 8.9   | 9.2   | 5.9   | 1.5   | 0.6   | 0.0   | 0.0   |
| 75°   | 1346.1 | 258.9 | 16.6  | 9.5   | 5.6   | 6.8   | 4.1   | 0.6   | 0.3   | 0.0   | 0.0   |
| 77.5° | 748.9  | 122.1 | 10.4  | 5.3   | 3.6   | 4.1   | 2.1   | 0.0   | 0.0   | 0.0   | 0.0   |
| 80°   | 243.2  | 33.2  | 4.7   | 3.0   | 2.1   | 2.4   | 0.9   | 0.0   | 0.0   | 0.0   | 0.0   |
| 82.5° | 45.0   | 9.5   | 2.7   | 1.5   | 0.6   | 0.6   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 85°   | 9.8    | 3.9   | 1.5   | 0.6   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 87.5° | 3.3    | 1.2   | 0.3   | 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: SP1-2104-224-5

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

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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**



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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       | 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              |           |                  |                  |

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### Scotopic Flux vs. Wavelength



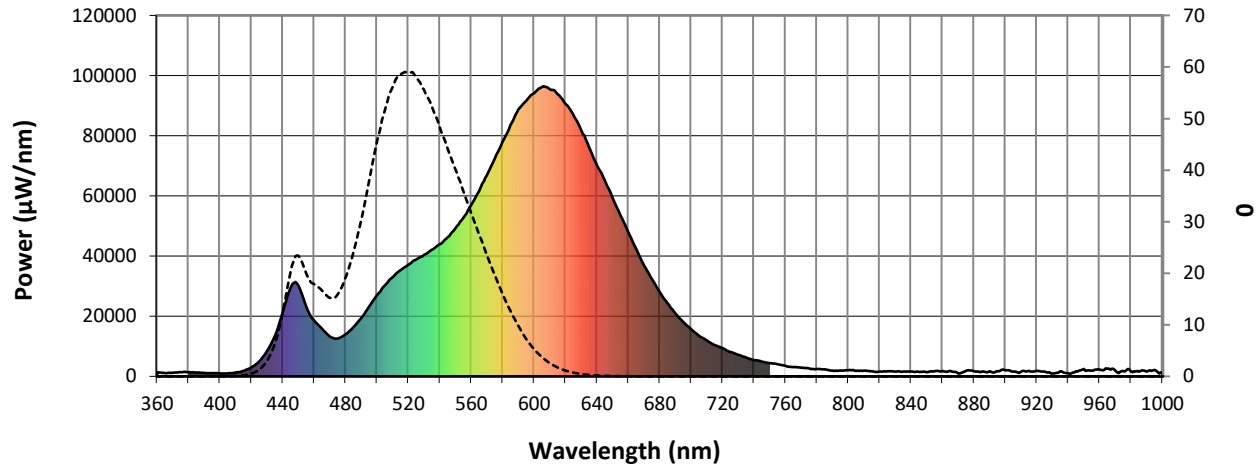
Scotopic Lumens: 5165.4

S/P: 1.2

| $\lambda$<br>(nm) | Power<br>( $\mu\text{W/nm}$ ) | Lumens<br>( $\Phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>( $\mu\text{W/nm}$ ) | Lumens<br>( $\Phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>( $\mu\text{W/nm}$ ) | Lumens<br>( $\Phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>( $\mu\text{W/nm}$ ) | Lumens<br>( $\Phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>( $\mu\text{W/nm}$ ) | Lumens<br>( $\Phi/\text{nm}$ ) |
|-------------------|-------------------------------|--------------------------------|-------------------|-------------------------------|--------------------------------|-------------------|-------------------------------|--------------------------------|-------------------|-------------------------------|--------------------------------|-------------------|-------------------------------|--------------------------------|
| 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                            |                   |                               |                                |

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### 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              |           |                  |                  |

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TM-30-18

### Summary

$R_f = 85.3$   
 $R_g = 96.5$   
 CIE  $R_a = 82.2$   
 $R_9 = 5.2$



### Color Vector Graphics





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

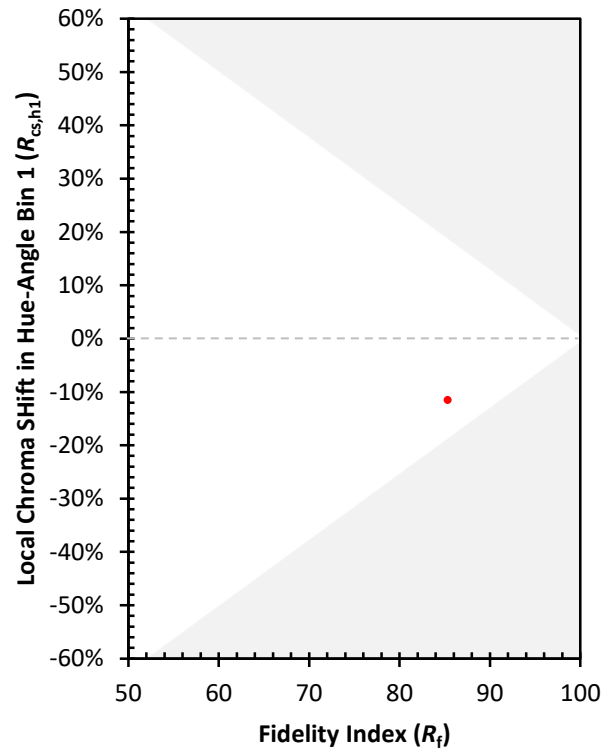
|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 87 | CES26 = 83 | CES51 = 95 | CES76 = 83 |
| CES02 = 64 | CES27 = 95 | CES52 = 94 | CES77 = 85 |
| CES03 = 32 | CES28 = 95 | CES53 = 89 | CES78 = 83 |
| CES04 = 71 | CES29 = 83 | CES54 = 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



**Measure Comparisons**



(END OF REPORT)