

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: P385810

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

Issue Date: 3/3/2020

**Test Information**

Test Method: LM-79-08  
Report Number: P385810  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-1903-205-15)  
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-HSS  
Description: GALLEON WALL LUMINAIRE  
(1) 80 CRI, 2700K, 800mA LIGHTSQUARE WITH 16 LEDS AND TYPE III OPTICS  
WITH HOUSE SIDE SHIELD  
Light Source: -  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 3270 lumens  
Efficiency: N/A  
Efficacy: 74.3 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



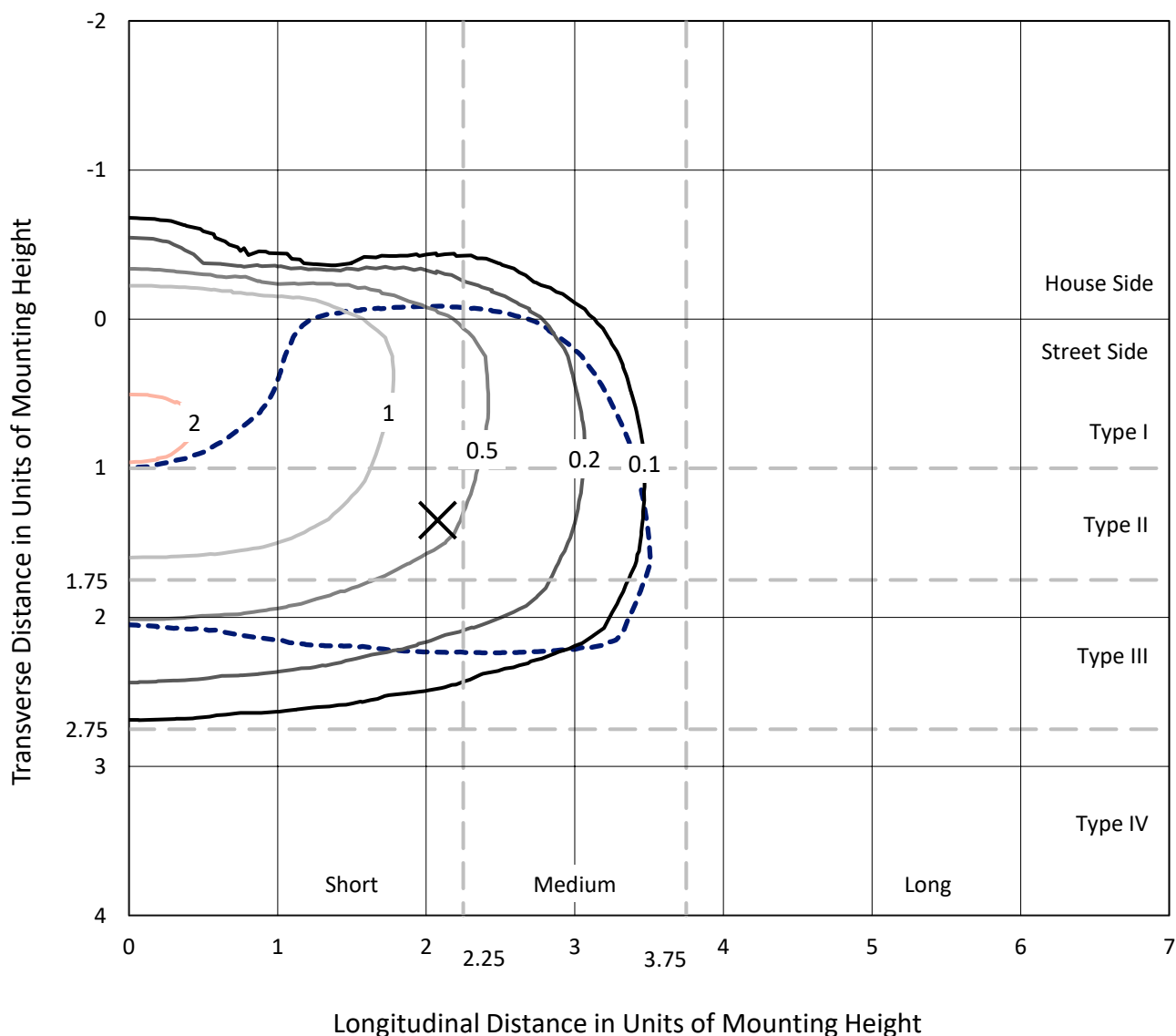
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## Iso-Footcandle Lines of Horizontal Illumination

× Max cd

--- 1/2 Max cd

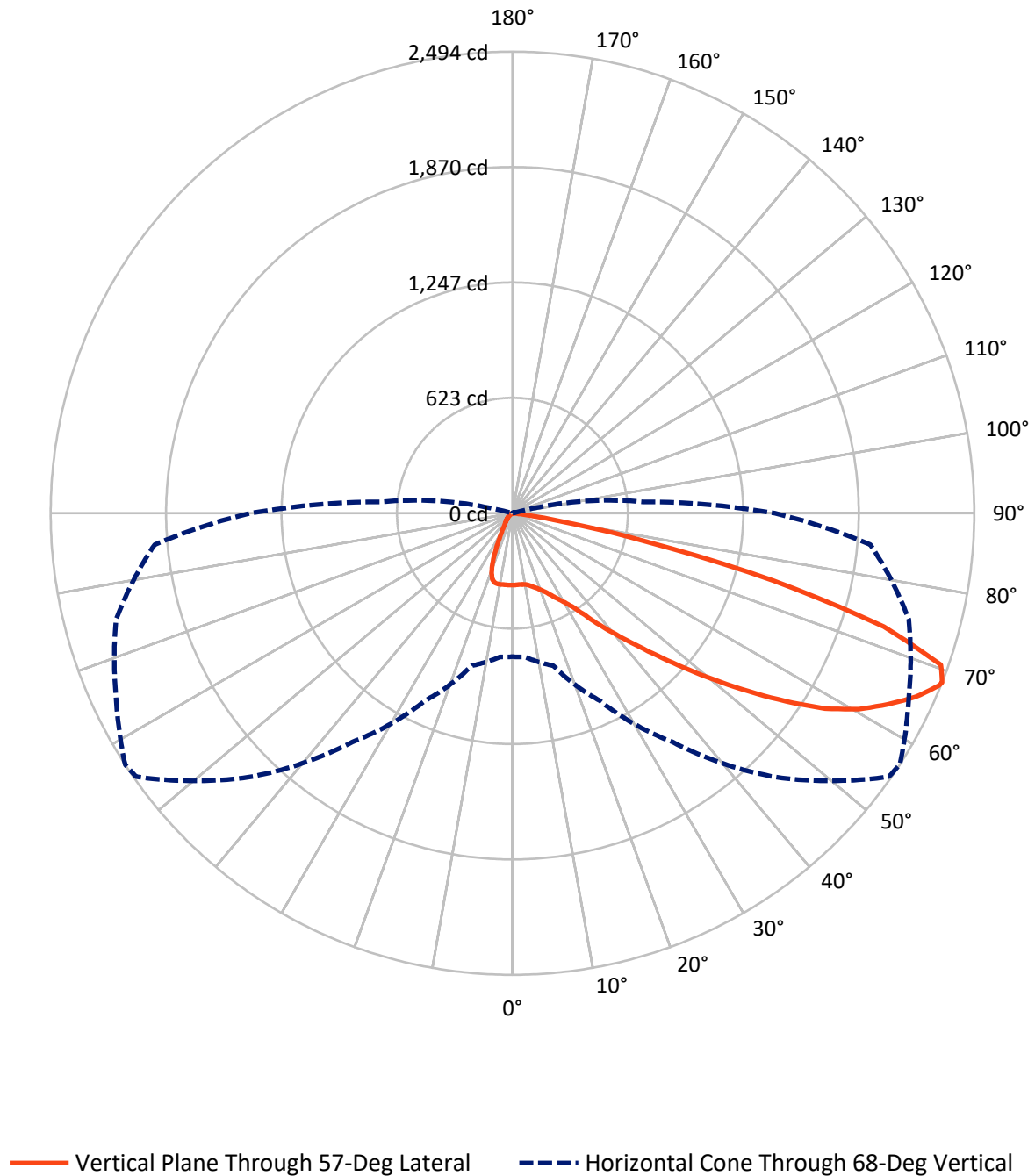


Based on 15 foot mounting height. Maximum calculated value = 2.2 fc  
 Type III - Short - N/A

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## Luminous Intensity Polar Plot



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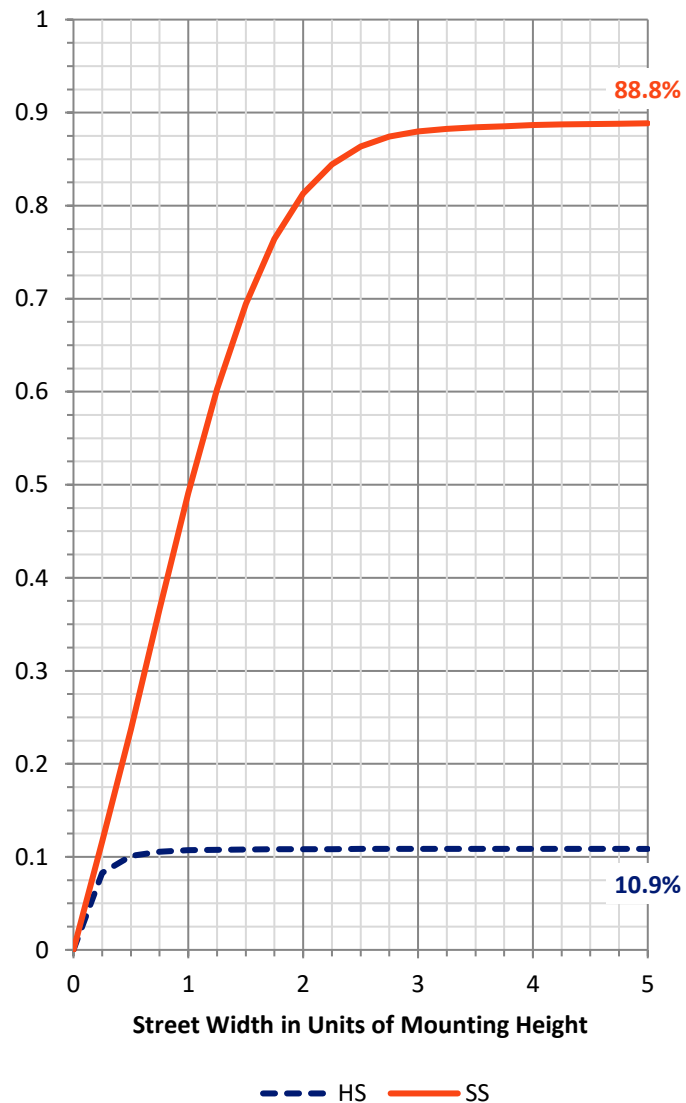
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total  |
|--------------------|-----------|----------|--------|--------|
| <b>House Side</b>  | Lumens    | 358.6    | 0.0    | 358.6  |
|                    | % Fixture | 11.0     | 0.0    | 11.0   |
| <b>Street Side</b> | Lumens    | 2911.4   | 0.0    | 2911.4 |
|                    | % Fixture | 89.0     | 0.0    | 89.0   |
| <b>Total</b>       | Lumens    | 3270.0   | 0.0    | 3270.0 |
|                    | % Fixture | 100.0    | 0.0    | 100.0  |

**ZONAL LUMENS:**

| Zone      | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10°    | 36.4   | 1.1       |
| 10°-20°   | 100.8  | 3.1       |
| 20°-30°   | 173.8  | 5.3       |
| 30°-40°   | 300.0  | 9.2       |
| 40°-50°   | 513.2  | 15.7      |
| 50°-60°   | 821.1  | 25.1      |
| 60°-70°   | 948.7  | 29.0      |
| 70°-80°   | 362.5  | 11.1      |
| 80°-90°   | 13.6   | 0.4       |
| 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°    | 3270.0 | 100.0     |
| 0°-180°   | 3270.0 | 100.0     |

**Coefficient of Utilization**



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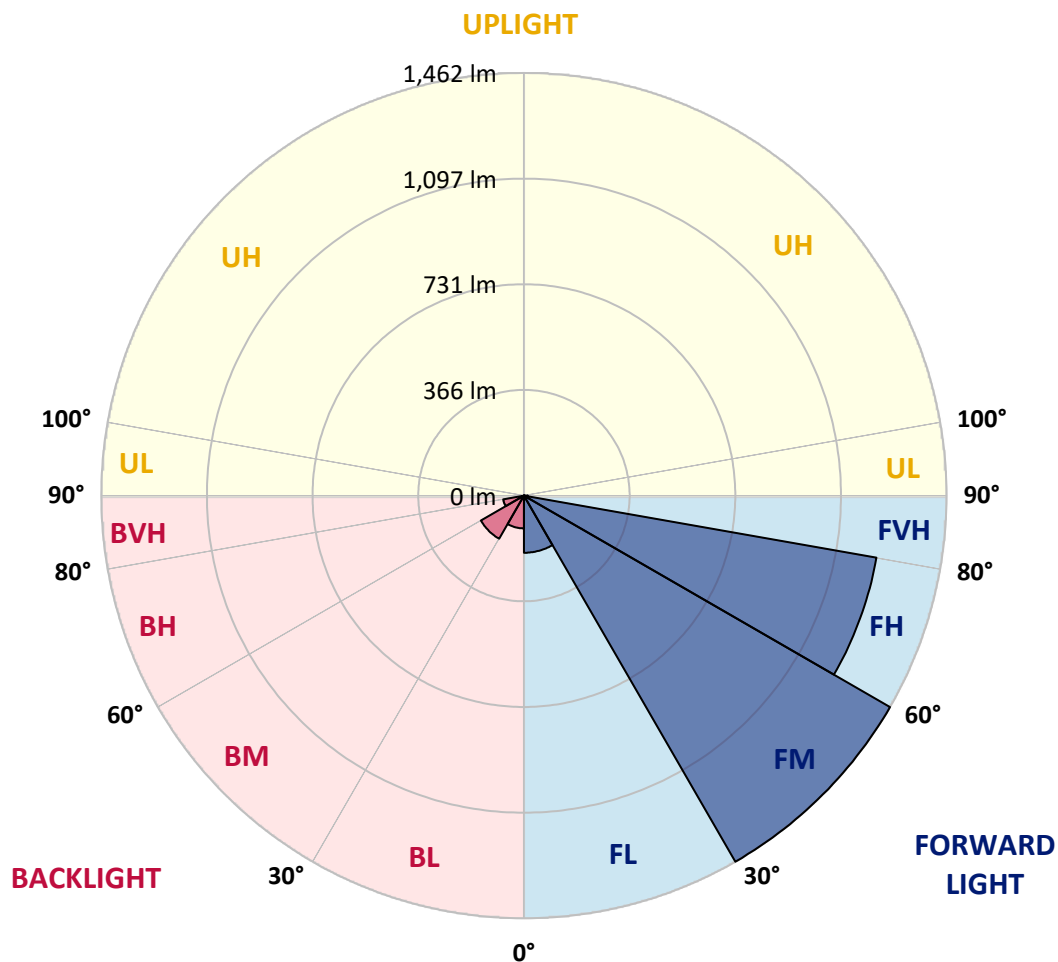
CATALOG NUMBER: GWC-SA1B-827-U-T3-HSS

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

| Zone |             | Lumens | % Fixture | Zone Rating/Lumen Limit |      |         |
|------|-------------|--------|-----------|-------------------------|------|---------|
|      |             |        |           | B                       | U    | G       |
| FL   | (0°-30°)    | 197.6  | 6.0       |                         |      |         |
| FM   | (30°-60°)   | 1462.3 | 44.7      |                         |      |         |
| FH   | (60°-80°)   | 1238.1 | 37.9      |                         |      | G1/1800 |
| FVH  | (80°-90°)   | 13.3   | 0.4       |                         |      | G1/100  |
| BL   | (0°-30°)    | 113.3  | 3.5       | B1/500                  |      |         |
| BM   | (30°-60°)   | 172.0  | 5.3       | B0/220                  |      |         |
| BH   | (60°-80°)   | 73.0   | 2.2       | B0/110                  |      | G0/110  |
| BVH  | (80°-90°)   | 0.2    | 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-G1**

Type III Short



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**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 5°     | 15°    | 25°    | 35°    | 45°    | 55°    | 57°    | 65°    | 75°    | 85°    |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 388.6  | 388.6  | 388.6  | 388.6  | 388.6  | 388.6  | 388.6  | 388.6  | 388.6  | 388.6  | 388.6  |
| 2.5°  | 379.4  | 381.1  | 382.4  | 383.2  | 384.1  | 386.1  | 386.7  | 387.6  | 388.1  | 388.1  | 389.2  |
| 5°    | 364.4  | 366.3  | 368.9  | 371.1  | 375.4  | 381.0  | 385.0  | 386.6  | 389.3  | 391.8  | 393.2  |
| 7.5°  | 350.5  | 352.7  | 355.8  | 360.9  | 368.3  | 377.3  | 385.6  | 387.8  | 393.2  | 398.5  | 401.1  |
| 10°   | 341.6  | 343.3  | 347.3  | 354.5  | 364.3  | 376.8  | 388.6  | 391.2  | 400.5  | 409.3  | 414.2  |
| 12.5° | 338.5  | 340.0  | 344.2  | 352.4  | 364.4  | 379.1  | 395.4  | 399.2  | 412.8  | 425.7  | 432.6  |
| 15°   | 342.9  | 343.3  | 347.7  | 355.5  | 367.4  | 384.9  | 406.7  | 411.3  | 428.5  | 445.2  | 453.8  |
| 17.5° | 360.3  | 358.9  | 361.2  | 364.6  | 374.0  | 392.4  | 418.6  | 425.5  | 448.4  | 468.0  | 476.2  |
| 20°   | 403.6  | 403.6  | 398.3  | 389.0  | 389.2  | 404.2  | 434.6  | 442.5  | 470.5  | 493.2  | 500.7  |
| 22.5° | 477.6  | 476.2  | 465.7  | 443.0  | 422.1  | 424.4  | 454.3  | 464.5  | 497.1  | 521.4  | 523.9  |
| 25°   | 566.7  | 565.0  | 548.7  | 516.7  | 480.6  | 457.2  | 480.9  | 492.6  | 528.8  | 550.3  | 545.2  |
| 27.5° | 661.0  | 659.6  | 643.5  | 603.8  | 552.3  | 509.5  | 512.6  | 523.7  | 561.1  | 582.3  | 566.1  |
| 30°   | 752.4  | 752.8  | 736.9  | 696.1  | 637.8  | 576.1  | 552.8  | 559.3  | 592.5  | 614.0  | 590.8  |
| 32.5° | 839.3  | 839.9  | 826.1  | 780.5  | 726.1  | 653.6  | 608.4  | 606.7  | 629.0  | 650.2  | 623.6  |
| 35°   | 916.7  | 918.3  | 908.9  | 873.5  | 815.8  | 739.9  | 680.6  | 676.6  | 680.8  | 704.8  | 673.8  |
| 37.5° | 991.4  | 992.4  | 985.2  | 955.4  | 907.2  | 834.6  | 771.9  | 766.1  | 757.2  | 775.6  | 740.2  |
| 40°   | 1073.2 | 1070.9 | 1062.7 | 1035.7 | 994.2  | 939.3  | 869.9  | 860.0  | 844.4  | 860.8  | 827.4  |
| 42.5° | 1149.3 | 1146.7 | 1148.1 | 1117.4 | 1082.5 | 1046.9 | 984.2  | 967.2  | 958.0  | 976.9  | 934.4  |
| 45°   | 1244.4 | 1243.0 | 1247.6 | 1221.0 | 1192.7 | 1166.9 | 1115.1 | 1096.6 | 1092.6 | 1114.7 | 1063.8 |
| 47.5° | 1338.2 | 1341.6 | 1356.0 | 1344.7 | 1333.3 | 1310.6 | 1253.8 | 1245.5 | 1247.9 | 1274.7 | 1200.3 |
| 50°   | 1416.5 | 1420.5 | 1459.9 | 1472.9 | 1489.5 | 1476.2 | 1419.3 | 1414.2 | 1423.9 | 1448.0 | 1347.2 |
| 52.5° | 1473.1 | 1481.3 | 1530.3 | 1590.1 | 1650.4 | 1659.4 | 1602.6 | 1598.0 | 1611.1 | 1614.9 | 1460.7 |
| 55°   | 1512.3 | 1519.6 | 1575.1 | 1684.6 | 1807.4 | 1846.0 | 1810.8 | 1792.8 | 1790.4 | 1753.7 | 1580.1 |
| 57.5° | 1519.3 | 1518.5 | 1598.3 | 1745.7 | 1930.4 | 2030.2 | 2007.9 | 1990.3 | 1939.6 | 1882.0 | 1716.9 |
| 60°   | 1480.0 | 1484.5 | 1577.1 | 1766.9 | 2007.8 | 2169.5 | 2171.2 | 2148.3 | 2069.3 | 2006.8 | 1849.6 |
| 62.5° | 1359.1 | 1377.4 | 1470.9 | 1711.3 | 2006.8 | 2225.6 | 2290.9 | 2273.4 | 2178.9 | 2109.0 | 1984.1 |
| 65°   | 1163.1 | 1169.6 | 1258.8 | 1521.2 | 1871.2 | 2202.1 | 2398.6 | 2392.1 | 2277.7 | 2208.3 | 2053.2 |
| 67.5° | 849.3  | 835.3  | 929.0  | 1197.8 | 1584.2 | 2065.1 | 2475.9 | 2484.1 | 2353.9 | 2228.7 | 1979.6 |
| 68°   | 775.1  | 779.3  | 852.3  | 1117.9 | 1509.1 | 2016.7 | 2481.0 | 2493.6 | 2361.5 | 2215.4 | 1939.4 |
| 70°   | 462.0  | 470.0  | 535.1  | 769.7  | 1148.1 | 1742.9 | 2426.0 | 2454.6 | 2316.4 | 2078.3 | 1677.5 |
| 72.5° | 118.0  | 127.6  | 189.1  | 344.5  | 655.7  | 1228.0 | 2048.0 | 2096.3 | 2011.2 | 1686.0 | 1132.4 |
| 75°   | 48.6   | 51.0   | 67.6   | 113.5  | 244.3  | 553.2  | 1349.8 | 1453.4 | 1394.2 | 1009.4 | 511.8  |
| 77.5° | 33.6   | 35.3   | 43.4   | 62.9   | 105.8  | 187.6  | 661.8  | 736.6  | 663.6  | 344.5  | 111.6  |
| 80°   | 24.1   | 25.5   | 31.1   | 41.9   | 60.8   | 67.0   | 215.7  | 249.4  | 198.1  | 75.6   | 27.7   |
| 82.5° | 14.4   | 15.5   | 23.2   | 29.8   | 37.0   | 32.0   | 53.7   | 60.9   | 57.4   | 37.6   | 12.4   |
| 85°   | 7.1    | 8.3    | 15.6   | 21.3   | 19.9   | 13.5   | 16.4   | 18.2   | 22.6   | 22.9   | 6.6    |
| 87.5° | 0.5    | 0.9    | 9.1    | 12.8   | 5.6    | 3.1    | 4.8    | 5.9    | 8.0    | 11.3   | 2.8    |
| 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-SA1B-827-U-T3-HSS

**CANDELA DISTRIBUTION (continued):**

|       | 90°    | 95°    | 105°  | 115°  | 125°  | 135°  | 145°  | 155°  | 165°  | 175°  | 180°  |
|-------|--------|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 0°    | 388.6  | 388.6  | 388.6 | 388.6 | 388.6 | 388.6 | 388.6 | 388.6 | 388.6 | 388.6 | 388.6 |
| 2.5°  | 389.6  | 389.8  | 388.7 | 388.3 | 388.6 | 386.7 | 385.9 | 386.2 | 386.2 | 386.7 | 385.9 |
| 5°    | 393.5  | 393.5  | 391.7 | 389.2 | 387.8 | 384.2 | 381.9 | 381.3 | 380.8 | 380.5 | 379.9 |
| 7.5°  | 401.9  | 400.9  | 397.7 | 392.3 | 387.6 | 379.9 | 374.0 | 370.9 | 369.4 | 368.8 | 368.3 |
| 10°   | 415.3  | 413.6  | 408.2 | 398.1 | 387.5 | 373.7 | 360.9 | 351.8 | 344.2 | 341.1 | 339.2 |
| 12.5° | 433.4  | 430.9  | 421.8 | 405.1 | 386.4 | 361.0 | 333.2 | 306.5 | 281.6 | 271.4 | 266.3 |
| 15°   | 454.3  | 450.7  | 436.3 | 411.0 | 380.1 | 332.4 | 272.0 | 225.1 | 190.6 | 177.7 | 172.1 |
| 17.5° | 475.5  | 470.8  | 449.0 | 414.7 | 361.0 | 273.2 | 190.8 | 144.1 | 121.1 | 114.9 | 112.7 |
| 20°   | 496.8  | 490.0  | 460.0 | 411.9 | 318.1 | 197.0 | 125.9 | 105.3 | 98.6  | 96.8  | 96.2  |
| 22.5° | 517.1  | 506.5  | 469.9 | 401.1 | 251.9 | 132.2 | 99.6  | 93.1  | 90.9  | 89.8  | 89.5  |
| 25°   | 534.7  | 520.0  | 478.6 | 367.7 | 178.3 | 99.9  | 89.7  | 87.5  | 84.7  | 82.7  | 82.9  |
| 27.5° | 551.2  | 533.4  | 483.8 | 312.6 | 118.9 | 85.4  | 83.0  | 80.1  | 75.0  | 72.1  | 72.1  |
| 30°   | 571.2  | 551.4  | 487.7 | 240.6 | 87.5  | 75.5  | 73.6  | 69.1  | 62.2  | 58.3  | 58.3  |
| 32.5° | 601.2  | 578.6  | 485.2 | 168.8 | 72.5  | 66.3  | 62.0  | 55.8  | 48.2  | 44.5  | 44.4  |
| 35°   | 647.1  | 620.6  | 467.6 | 110.7 | 64.0  | 57.7  | 50.7  | 43.1  | 36.5  | 33.4  | 33.2  |
| 37.5° | 708.9  | 676.9  | 428.0 | 79.2  | 57.4  | 49.6  | 41.3  | 32.9  | 28.0  | 26.0  | 25.8  |
| 40°   | 789.2  | 742.3  | 371.4 | 64.2  | 51.2  | 41.9  | 31.9  | 25.5  | 22.1  | 20.6  | 20.7  |
| 42.5° | 885.5  | 812.4  | 303.5 | 55.4  | 45.1  | 34.5  | 24.9  | 20.1  | 17.9  | 16.9  | 16.5  |
| 45°   | 992.5  | 881.5  | 232.4 | 49.3  | 39.1  | 27.8  | 19.5  | 15.9  | 14.2  | 13.6  | 13.6  |
| 47.5° | 1110.2 | 948.8  | 170.1 | 44.1  | 32.6  | 21.5  | 15.6  | 13.0  | 11.6  | 11.1  | 11.0  |
| 50°   | 1217.0 | 995.4  | 122.6 | 38.5  | 26.7  | 17.0  | 12.7  | 10.8  | 9.9   | 9.3   | 9.3   |
| 52.5° | 1306.1 | 1010.1 | 90.3  | 32.5  | 21.6  | 13.6  | 10.5  | 9.3   | 8.3   | 7.9   | 7.9   |
| 55°   | 1384.5 | 1004.1 | 67.1  | 26.7  | 17.5  | 11.1  | 9.0   | 7.9   | 7.1   | 6.6   | 6.6   |
| 57.5° | 1459.6 | 984.6  | 50.1  | 21.8  | 14.1  | 9.0   | 7.6   | 6.6   | 5.9   | 5.6   | 5.6   |
| 60°   | 1521.0 | 952.2  | 37.3  | 17.6  | 11.3  | 7.3   | 6.3   | 5.4   | 4.8   | 4.3   | 4.3   |
| 62.5° | 1570.8 | 916.3  | 27.4  | 14.5  | 9.0   | 5.7   | 4.9   | 4.5   | 3.6   | 3.1   | 3.1   |
| 65°   | 1571.1 | 856.8  | 20.6  | 12.1  | 7.0   | 4.5   | 3.7   | 3.6   | 2.3   | 1.9   | 1.7   |
| 67.5° | 1457.5 | 738.6  | 15.8  | 10.4  | 5.4   | 3.4   | 2.8   | 2.9   | 1.2   | 0.8   | 0.6   |
| 68°   | 1416.2 | 708.6  | 14.8  | 10.2  | 5.1   | 3.2   | 2.6   | 2.9   | 1.1   | 0.6   | 0.5   |
| 70°   | 1194.0 | 563.7  | 11.9  | 9.9   | 4.5   | 2.5   | 2.2   | 2.9   | 0.9   | 0.5   | 0.3   |
| 72.5° | 763.7  | 327.2  | 8.8   | 7.9   | 3.4   | 1.9   | 1.4   | 2.6   | 0.9   | 0.3   | 0.2   |
| 75°   | 325.0  | 101.4  | 6.0   | 5.6   | 2.0   | 1.4   | 0.9   | 1.7   | 0.6   | 0.2   | 0.0   |
| 77.5° | 68.5   | 22.9   | 3.6   | 3.4   | 1.4   | 0.9   | 0.6   | 0.5   | 0.2   | 0.0   | 0.0   |
| 80°   | 17.6   | 6.6    | 1.9   | 1.7   | 0.8   | 0.5   | 0.3   | 0.0   | 0.0   | 0.0   | 0.0   |
| 82.5° | 5.6    | 2.6    | 1.1   | 0.8   | 0.3   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 85°   | 2.8    | 1.5    | 0.6   | 0.3   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 87.5° | 1.5    | 0.5    | 0.2   | 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**



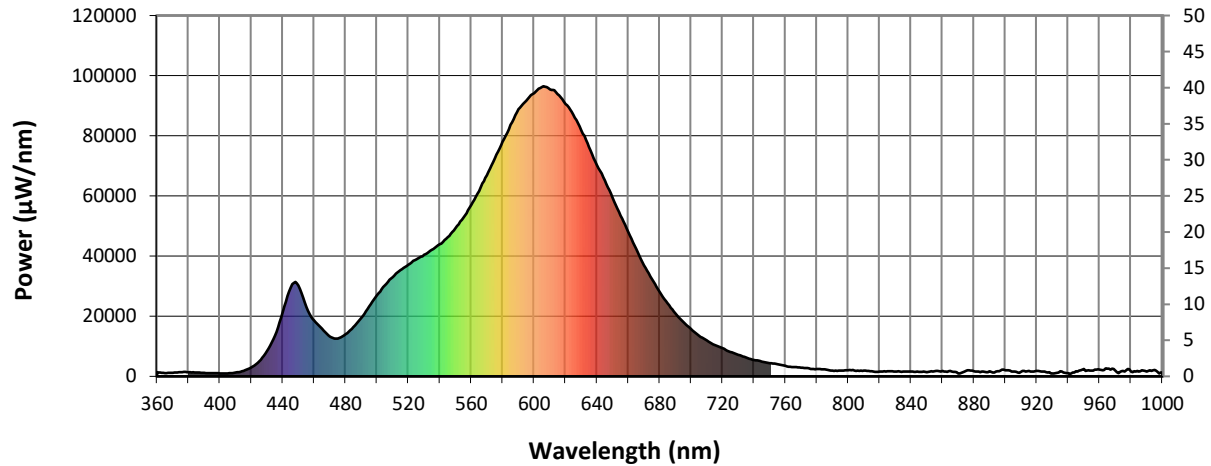
**CIE 1931 Chromaticity Diagram with 2017 ANSI 7-Step and 4-Step Quadrangles**



Point lies inside the ANSI 2700K 4-step quadrangle

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### Photopic Flux vs. Wavelength



#####

| λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) |
|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|
| 360       | 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



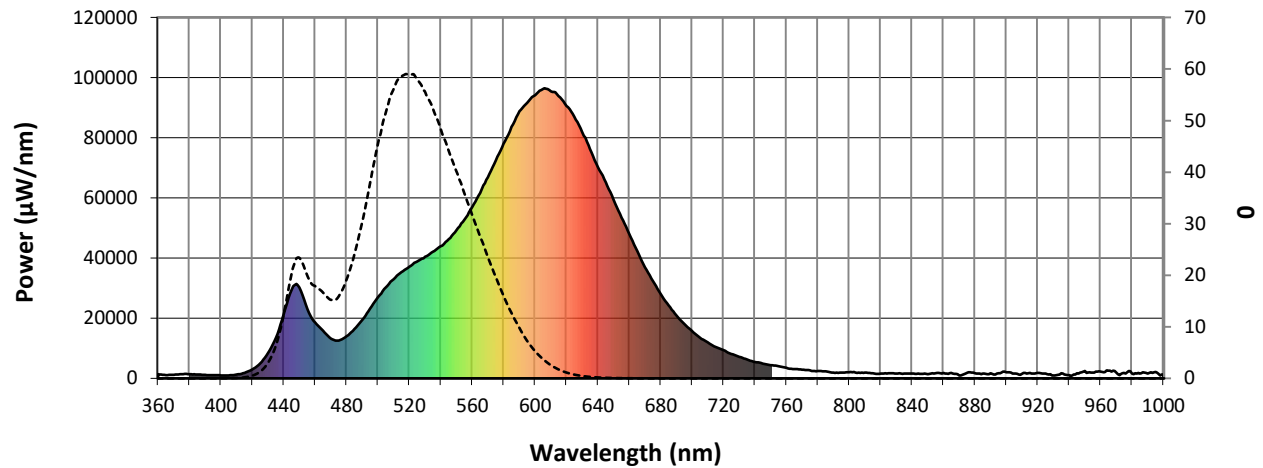
Scotopic Lumens: 5165.4

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



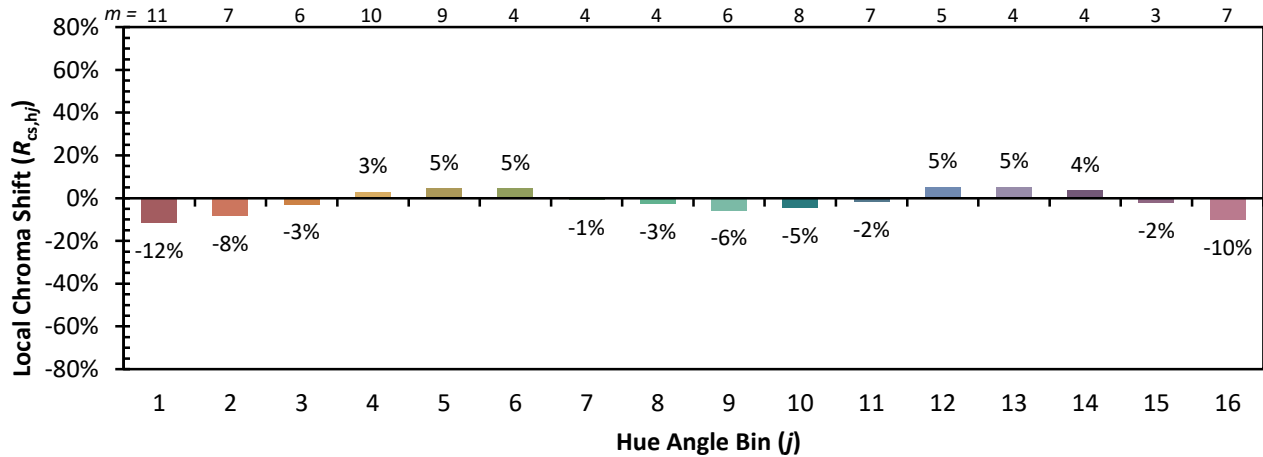


**Individual Sample Fidelity Index ( $R_{f,i}$ )**

|            |            |            |            |
|------------|------------|------------|------------|
| 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)