

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: P386258

Luminaire Tested: **GWC-SA1D-827-U-T3-HSS**

Issue Date: 3/3/2020

**Test Information**

Test Method: LM-79-08  
Report Number: P386258  
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-SA1D-827-U-T3-HSS  
Description: GALLEON WALL LUMINAIRE  
(1) 80 CRI, 2700K, 1200mA 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: 4439 lumens  
Efficiency: N/A  
Efficacy: 67.3 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): 66  
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

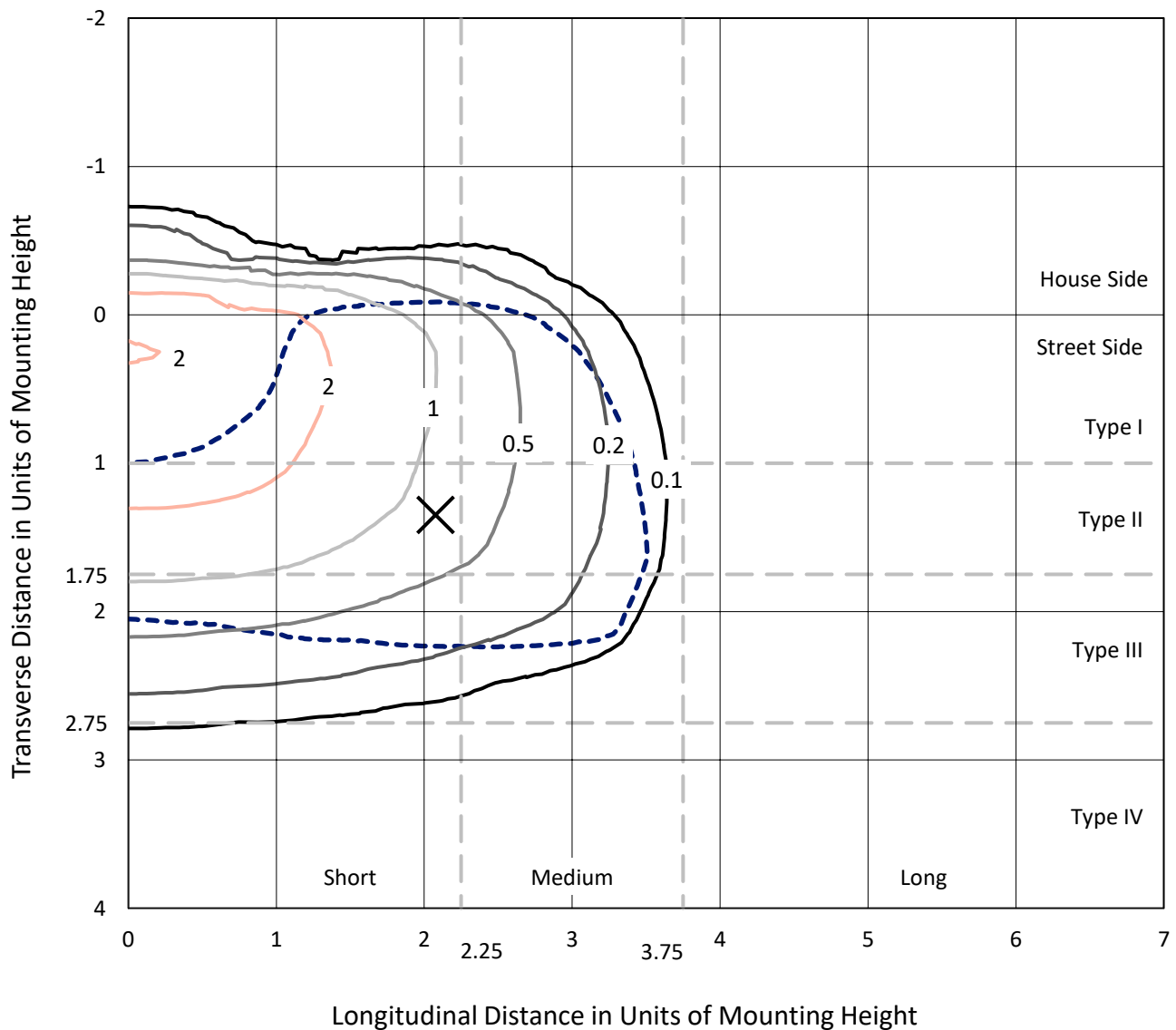


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## Iso-Footcandle Lines of Horizontal Illumination

× Max cd  
 - - - 1/2 Max cd

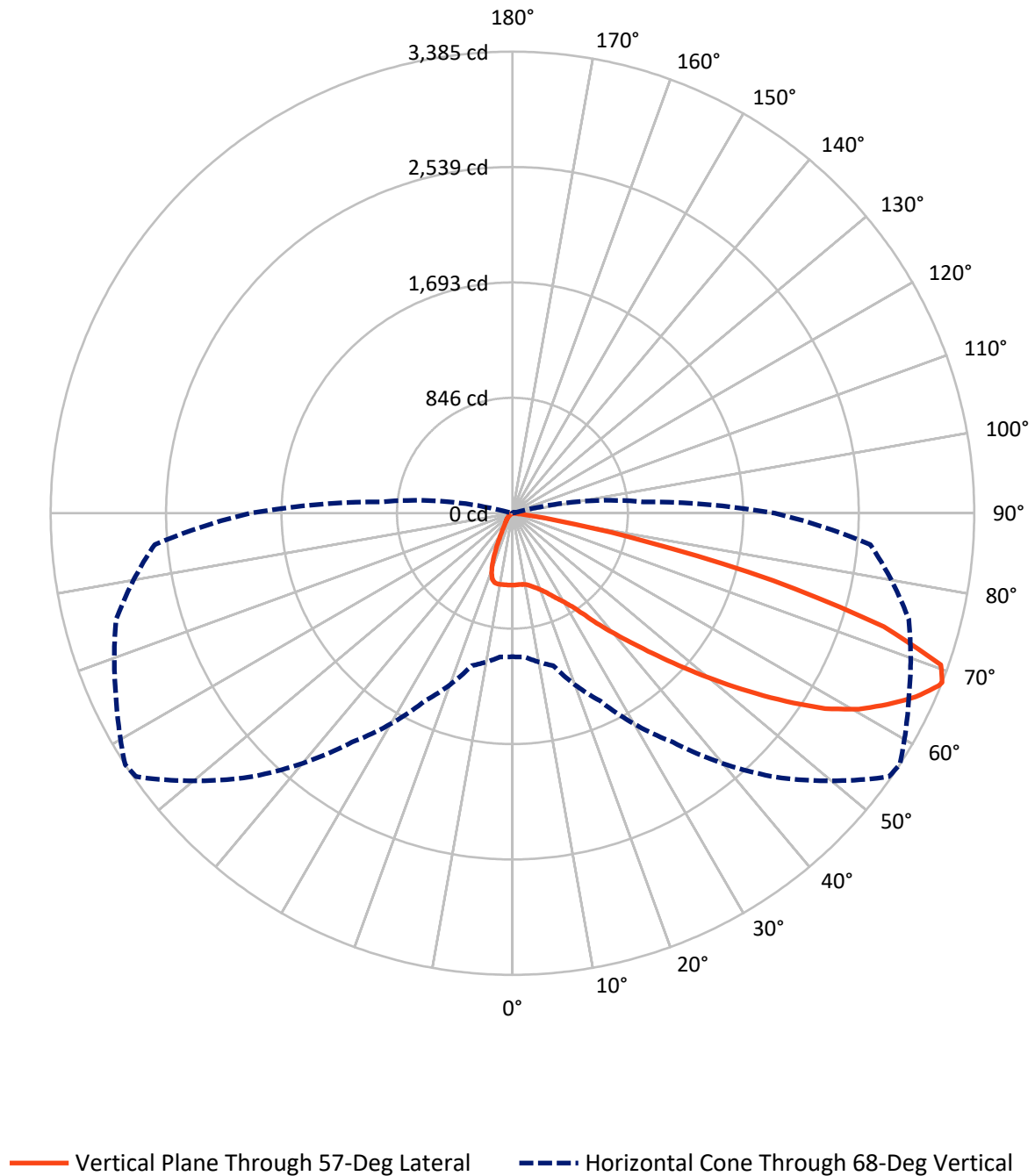


Based on 15 foot mounting height. Maximum calculated value = 3 fc  
 Type III - Short - N/A

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## Luminous Intensity Polar Plot



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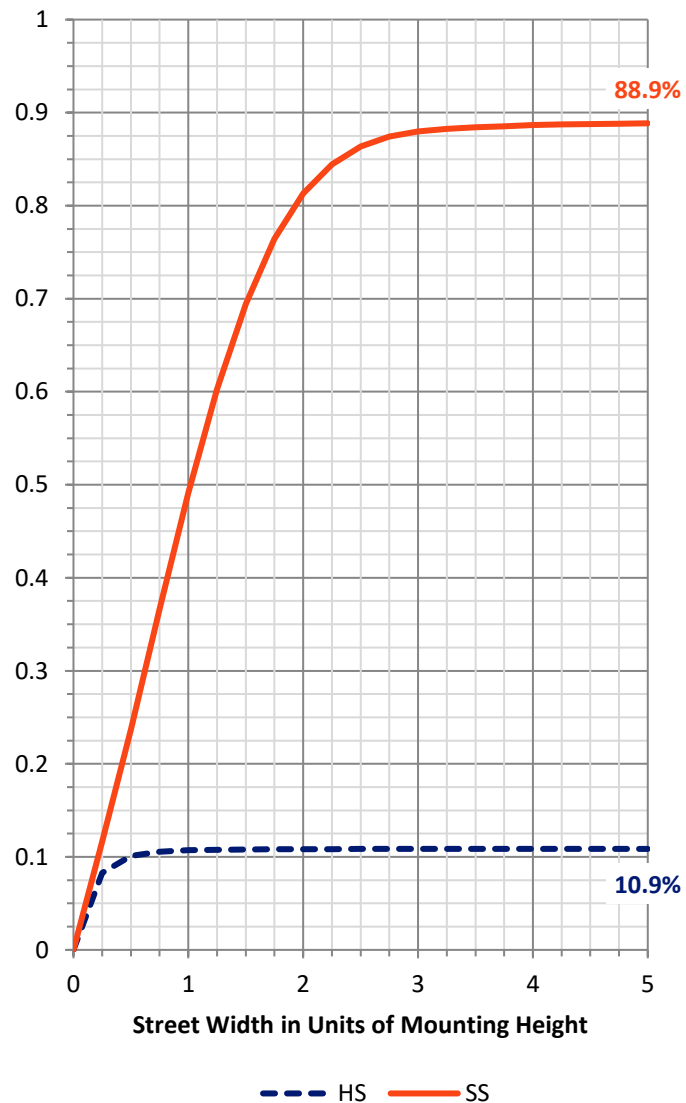
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total  |
|--------------------|-----------|----------|--------|--------|
| <b>House Side</b>  | Lumens    | 486.8    | 0.0    | 486.8  |
|                    | % Fixture | 11.0     | 0.0    | 11.0   |
| <b>Street Side</b> | Lumens    | 3952.2   | 0.0    | 3952.2 |
|                    | % Fixture | 89.0     | 0.0    | 89.0   |
| <b>Total</b>       | Lumens    | 4439.0   | 0.0    | 4439.0 |
|                    | % Fixture | 100.0    | 0.0    | 100.0  |

**ZONAL LUMENS:**

| Zone      | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10°    | 49.4   | 1.1       |
| 10°-20°   | 136.8  | 3.1       |
| 20°-30°   | 236.0  | 5.3       |
| 30°-40°   | 407.3  | 9.2       |
| 40°-50°   | 696.7  | 15.7      |
| 50°-60°   | 1114.6 | 25.1      |
| 60°-70°   | 1287.8 | 29.0      |
| 70°-80°   | 492.1  | 11.1      |
| 80°-90°   | 18.4   | 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°    | 4439.0 | 100.0     |
| 0°-180°   | 4439.0 | 100.0     |

**Coefficient of Utilization**



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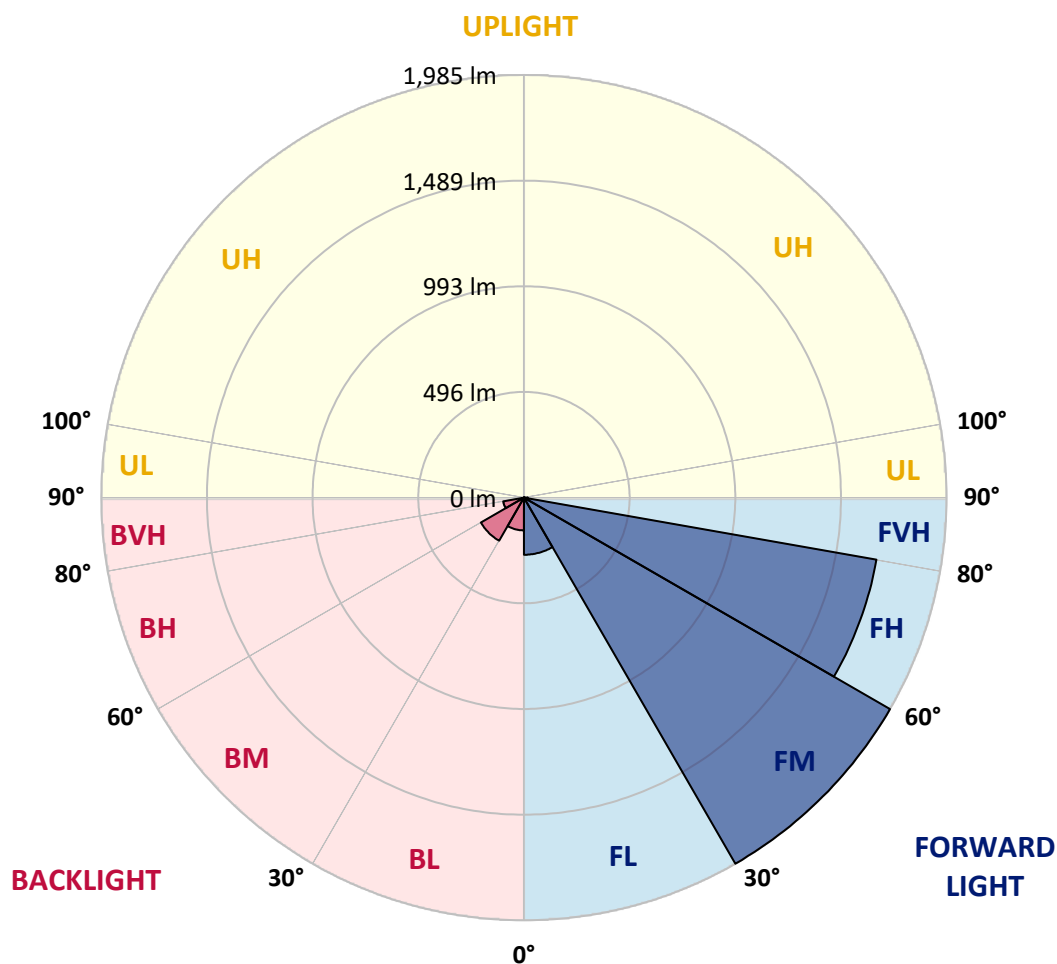
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**LUMINAIRE CLASSIFICATION SYSTEM LUMEN TABLE AND BUG RATING:**

| Zone |             | Lumens | % Fixture | Zone Rating/Lumen Limit |      |         |
|------|-------------|--------|-----------|-------------------------|------|---------|
|      |             |        |           | B                       | U    | G       |
| FL   | (0°-30°)    | 268.3  | 6.0       |                         |      |         |
| FM   | (30°-60°)   | 1985.1 | 44.7      |                         |      |         |
| FH   | (60°-80°)   | 1680.8 | 37.9      |                         |      | G1/1800 |
| FVH  | (80°-90°)   | 18.1   | 0.4       |                         |      | G1/100  |
| BL   | (0°-30°)    | 153.8  | 3.5       | B1/500                  |      |         |
| BM   | (30°-60°)   | 233.5  | 5.3       | B1/1000                 |      |         |
| BH   | (60°-80°)   | 99.1   | 2.2       | B0/110                  |      | G0/110  |
| BVH  | (80°-90°)   | 0.3    | 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°    | 527.5  | 527.5  | 527.5  | 527.5  | 527.5  | 527.5  | 527.5  | 527.5  | 527.5  | 527.5  | 527.5  |
| 2.5°  | 515.1  | 517.4  | 519.1  | 520.1  | 521.4  | 524.1  | 525.0  | 526.2  | 526.8  | 526.8  | 528.3  |
| 5°    | 494.7  | 497.2  | 500.8  | 503.8  | 509.6  | 517.2  | 522.6  | 524.7  | 528.5  | 531.9  | 533.8  |
| 7.5°  | 475.8  | 478.8  | 483.0  | 489.9  | 500.0  | 512.1  | 523.5  | 526.4  | 533.8  | 540.9  | 544.5  |
| 10°   | 463.7  | 466.0  | 471.4  | 481.3  | 494.5  | 511.5  | 527.5  | 531.0  | 543.6  | 555.6  | 562.3  |
| 12.5° | 459.5  | 461.6  | 467.2  | 478.4  | 494.7  | 514.7  | 536.7  | 542.0  | 560.4  | 577.8  | 587.3  |
| 15°   | 465.6  | 466.0  | 472.1  | 482.6  | 498.7  | 522.4  | 552.0  | 558.3  | 581.6  | 604.3  | 616.0  |
| 17.5° | 489.1  | 487.2  | 490.3  | 494.9  | 507.7  | 532.7  | 568.2  | 577.6  | 608.7  | 635.4  | 646.5  |
| 20°   | 547.8  | 547.8  | 540.7  | 528.1  | 528.3  | 548.7  | 590.0  | 600.7  | 638.7  | 669.6  | 679.6  |
| 22.5° | 648.4  | 646.5  | 632.2  | 601.4  | 573.0  | 576.2  | 616.7  | 630.5  | 674.8  | 707.8  | 711.1  |
| 25°   | 769.3  | 767.0  | 744.9  | 701.5  | 652.4  | 620.7  | 652.8  | 668.7  | 717.8  | 747.0  | 740.1  |
| 27.5° | 897.3  | 895.4  | 873.6  | 819.6  | 749.8  | 691.6  | 695.8  | 710.9  | 761.7  | 790.5  | 768.4  |
| 30°   | 1021.4 | 1022.0 | 1000.4 | 945.0  | 865.8  | 782.1  | 750.4  | 759.2  | 804.3  | 833.5  | 802.0  |
| 32.5° | 1139.3 | 1140.2 | 1121.5 | 1059.6 | 985.7  | 887.2  | 825.9  | 823.6  | 853.9  | 882.6  | 846.5  |
| 35°   | 1244.5 | 1246.6 | 1233.8 | 1185.7 | 1107.4 | 1004.4 | 924.0  | 918.5  | 924.2  | 956.7  | 914.7  |
| 37.5° | 1345.9 | 1347.1 | 1337.5 | 1297.0 | 1231.5 | 1133.0 | 1047.8 | 1040.0 | 1027.9 | 1052.8 | 1004.8 |
| 40°   | 1456.9 | 1453.7 | 1442.6 | 1405.9 | 1349.6 | 1275.1 | 1180.9 | 1167.4 | 1146.2 | 1168.5 | 1123.2 |
| 42.5° | 1560.2 | 1556.6 | 1558.5 | 1516.9 | 1469.5 | 1421.2 | 1336.0 | 1312.9 | 1300.5 | 1326.1 | 1268.4 |
| 45°   | 1689.2 | 1687.4 | 1693.7 | 1657.6 | 1619.1 | 1584.1 | 1513.8 | 1488.6 | 1483.1 | 1513.1 | 1444.1 |
| 47.5° | 1816.7 | 1821.3 | 1840.8 | 1825.5 | 1809.9 | 1779.1 | 1702.1 | 1690.7 | 1694.1 | 1730.4 | 1629.4 |
| 50°   | 1922.9 | 1928.3 | 1981.8 | 1999.5 | 2021.9 | 2003.9 | 1926.6 | 1919.7 | 1932.9 | 1965.7 | 1828.8 |
| 52.5° | 1999.7 | 2010.8 | 2077.3 | 2158.6 | 2240.4 | 2252.6 | 2175.6 | 2169.3 | 2187.1 | 2192.2 | 1982.9 |
| 55°   | 2053.0 | 2062.9 | 2138.2 | 2286.8 | 2453.5 | 2506.0 | 2458.1 | 2433.8 | 2430.4 | 2380.6 | 2144.9 |
| 57.5° | 2062.4 | 2061.4 | 2169.7 | 2369.7 | 2620.6 | 2755.9 | 2725.7 | 2701.8 | 2632.9 | 2554.9 | 2330.7 |
| 60°   | 2009.1 | 2015.2 | 2140.9 | 2398.5 | 2725.5 | 2945.1 | 2947.4 | 2916.3 | 2809.0 | 2724.2 | 2510.8 |
| 62.5° | 1845.0 | 1869.8 | 1996.7 | 2323.1 | 2724.2 | 3021.3 | 3109.8 | 3086.1 | 2957.9 | 2863.0 | 2693.4 |
| 65°   | 1578.8 | 1587.7 | 1708.8 | 2065.0 | 2540.2 | 2989.3 | 3256.1 | 3247.3 | 3092.0 | 2997.7 | 2787.2 |
| 67.5° | 1153.0 | 1133.9 | 1261.1 | 1626.1 | 2150.6 | 2803.4 | 3361.1 | 3372.2 | 3195.5 | 3025.5 | 2687.3 |
| 68°   | 1052.2 | 1057.9 | 1157.0 | 1517.6 | 2048.6 | 2737.7 | 3368.0 | 3385.0 | 3205.8 | 3007.4 | 2632.7 |
| 70°   | 627.2  | 638.1  | 726.5  | 1044.9 | 1558.5 | 2366.0 | 3293.3 | 3332.1 | 3144.5 | 2821.2 | 2277.2 |
| 72.5° | 160.2  | 173.2  | 256.7  | 467.6  | 890.2  | 1667.0 | 2780.1 | 2845.8 | 2730.1 | 2288.7 | 1537.3 |
| 75°   | 65.9   | 69.3   | 91.7   | 154.1  | 331.6  | 751.0  | 1832.4 | 1973.0 | 1892.6 | 1370.2 | 694.8  |
| 77.5° | 45.5   | 47.9   | 59.0   | 85.4   | 143.6  | 254.6  | 898.4  | 999.9  | 900.9  | 467.6  | 151.5  |
| 80°   | 32.7   | 34.6   | 42.2   | 56.9   | 82.5   | 90.9   | 292.8  | 338.6  | 268.9  | 102.6  | 37.6   |
| 82.5° | 19.5   | 21.0   | 31.5   | 40.5   | 50.2   | 43.4   | 72.8   | 82.7   | 77.9   | 51.0   | 16.8   |
| 85°   | 9.7    | 11.3   | 21.2   | 29.0   | 27.1   | 18.3   | 22.2   | 24.8   | 30.6   | 31.1   | 9.0    |
| 87.5° | 0.6    | 1.3    | 12.4   | 17.4   | 7.6    | 4.2    | 6.5    | 8.0    | 10.9   | 15.3   | 3.8    |
| 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-SA1D-827-U-T3-HSS

**CANDELA DISTRIBUTION (continued):**

|       | 90°    | 95°    | 105°  | 115°  | 125°  | 135°  | 145°  | 155°  | 165°  | 175°  | 180°  |
|-------|--------|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 0°    | 527.5  | 527.5  | 527.5 | 527.5 | 527.5 | 527.5 | 527.5 | 527.5 | 527.5 | 527.5 | 527.5 |
| 2.5°  | 528.9  | 529.1  | 527.7 | 527.1 | 527.5 | 525.0 | 523.9 | 524.3 | 524.3 | 525.0 | 523.9 |
| 5°    | 534.2  | 534.2  | 531.7 | 528.3 | 526.4 | 521.6 | 518.4 | 517.6 | 517.0 | 516.6 | 515.7 |
| 7.5°  | 545.5  | 544.3  | 539.9 | 532.5 | 526.2 | 515.7 | 507.7 | 503.5 | 501.4 | 500.6 | 500.0 |
| 10°   | 563.8  | 561.5  | 554.1 | 540.5 | 526.0 | 507.3 | 489.9 | 477.5 | 467.2 | 463.0 | 460.5 |
| 12.5° | 588.3  | 585.0  | 572.6 | 549.9 | 524.5 | 490.1 | 452.3 | 416.0 | 382.2 | 368.4 | 361.4 |
| 15°   | 616.7  | 611.8  | 592.3 | 557.9 | 515.9 | 451.3 | 369.2 | 305.6 | 258.8 | 241.2 | 233.6 |
| 17.5° | 645.4  | 639.1  | 609.5 | 562.9 | 490.1 | 370.9 | 259.0 | 195.6 | 164.3 | 156.0 | 153.0 |
| 20°   | 674.4  | 665.2  | 624.4 | 559.2 | 431.8 | 267.4 | 170.9 | 142.9 | 133.9 | 131.4 | 130.6 |
| 22.5° | 701.9  | 687.6  | 637.9 | 544.5 | 341.9 | 179.5 | 135.2 | 126.4 | 123.4 | 121.9 | 121.5 |
| 25°   | 725.8  | 705.9  | 649.6 | 499.1 | 242.0 | 135.6 | 121.7 | 118.8 | 115.0 | 112.3 | 112.5 |
| 27.5° | 748.3  | 724.1  | 656.8 | 424.4 | 161.4 | 115.9 | 112.7 | 108.7 | 101.8 | 97.8  | 97.8  |
| 30°   | 775.4  | 748.5  | 662.0 | 326.6 | 118.8 | 102.4 | 99.9  | 93.8  | 84.4  | 79.1  | 79.1  |
| 32.5° | 816.1  | 785.4  | 658.7 | 229.2 | 98.4  | 90.0  | 84.2  | 75.8  | 65.5  | 60.5  | 60.2  |
| 35°   | 878.4  | 842.5  | 634.7 | 150.3 | 86.9  | 78.3  | 68.8  | 58.6  | 49.5  | 45.3  | 45.1  |
| 37.5° | 962.4  | 918.9  | 581.0 | 107.5 | 77.9  | 67.4  | 56.0  | 44.7  | 38.0  | 35.3  | 35.1  |
| 40°   | 1071.3 | 1007.7 | 504.2 | 87.1  | 69.5  | 56.9  | 43.2  | 34.6  | 30.0  | 27.9  | 28.1  |
| 42.5° | 1202.1 | 1102.8 | 412.0 | 75.1  | 61.3  | 46.8  | 33.8  | 27.3  | 24.3  | 22.9  | 22.5  |
| 45°   | 1347.3 | 1196.6 | 315.5 | 67.0  | 53.1  | 37.8  | 26.4  | 21.6  | 19.3  | 18.5  | 18.5  |
| 47.5° | 1507.1 | 1287.9 | 230.9 | 59.8  | 44.3  | 29.2  | 21.2  | 17.6  | 15.7  | 15.1  | 14.9  |
| 50°   | 1652.1 | 1351.3 | 166.4 | 52.3  | 36.3  | 23.1  | 17.2  | 14.7  | 13.4  | 12.6  | 12.6  |
| 52.5° | 1773.0 | 1371.3 | 122.6 | 44.1  | 29.4  | 18.5  | 14.3  | 12.6  | 11.3  | 10.7  | 10.7  |
| 55°   | 1879.4 | 1363.1 | 91.1  | 36.3  | 23.7  | 15.1  | 12.2  | 10.7  | 9.7   | 9.0   | 9.0   |
| 57.5° | 1981.4 | 1336.6 | 68.0  | 29.6  | 19.1  | 12.2  | 10.3  | 9.0   | 8.0   | 7.6   | 7.6   |
| 60°   | 2064.8 | 1292.5 | 50.6  | 23.9  | 15.3  | 9.9   | 8.6   | 7.3   | 6.5   | 5.9   | 5.9   |
| 62.5° | 2132.3 | 1243.8 | 37.2  | 19.7  | 12.2  | 7.8   | 6.7   | 6.1   | 4.8   | 4.2   | 4.2   |
| 65°   | 2132.8 | 1163.0 | 27.9  | 16.4  | 9.4   | 6.1   | 5.0   | 4.8   | 3.1   | 2.5   | 2.3   |
| 67.5° | 1978.5 | 1002.7 | 21.4  | 14.1  | 7.3   | 4.6   | 3.8   | 4.0   | 1.7   | 1.0   | 0.8   |
| 68°   | 1922.4 | 962.0  | 20.2  | 13.9  | 6.9   | 4.4   | 3.6   | 4.0   | 1.5   | 0.8   | 0.6   |
| 70°   | 1620.8 | 765.3  | 16.2  | 13.4  | 6.1   | 3.4   | 2.9   | 4.0   | 1.3   | 0.6   | 0.4   |
| 72.5° | 1036.7 | 444.1  | 12.0  | 10.7  | 4.6   | 2.5   | 1.9   | 3.6   | 1.3   | 0.4   | 0.2   |
| 75°   | 441.2  | 137.7  | 8.2   | 7.6   | 2.7   | 1.9   | 1.3   | 2.3   | 0.8   | 0.2   | 0.0   |
| 77.5° | 93.0   | 31.1   | 4.8   | 4.6   | 1.9   | 1.3   | 0.8   | 0.6   | 0.2   | 0.0   | 0.0   |
| 80°   | 23.9   | 9.0    | 2.5   | 2.3   | 1.0   | 0.6   | 0.4   | 0.0   | 0.0   | 0.0   | 0.0   |
| 82.5° | 7.6    | 3.6    | 1.5   | 1.0   | 0.4   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 85°   | 3.8    | 2.1    | 0.8   | 0.4   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 87.5° | 2.1    | 0.6    | 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



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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              |           |                  |                  |

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              |           |                  |                  |

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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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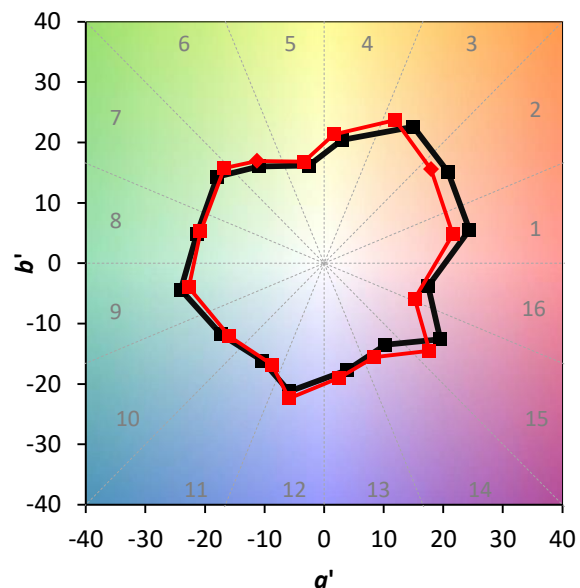
TM-30-18

### Summary

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

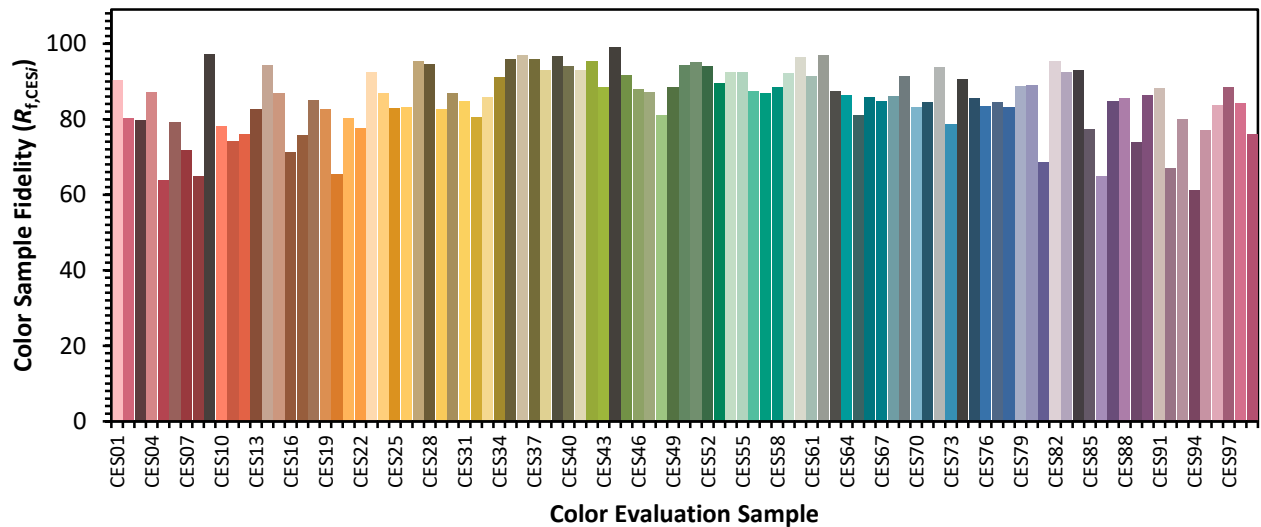


### Color Vector Graphics



**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)