

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: P385554

Luminaire Tested: **GWC-SA1A-760-U-T2-HSS**

Issue Date: 3/3/2020

**Test Information**

Test Method: LM-79-08  
Report Number: P385554  
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-SA1A-760-U-T2-HSS  
Description: GALLEON WALL LUMINAIRE  
(1) 70 CRI, 5700K, 615mA LIGHTSQUARE WITH 16 LEDS AND TYPE II OPTICS WITH  
HOUSE SIDE SHIELD  
Light Source: -  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 3540 lumens  
Efficiency: N/A  
Efficacy: 104.1 lumens/watt  
Luminous Opening: Rectangular (W 0.5' x L: 0.5' x H: 0')  
IES Classification: Type II - Medium  
BUG Rating: B0 - U0 - G1

Input Watts (W): 34  
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

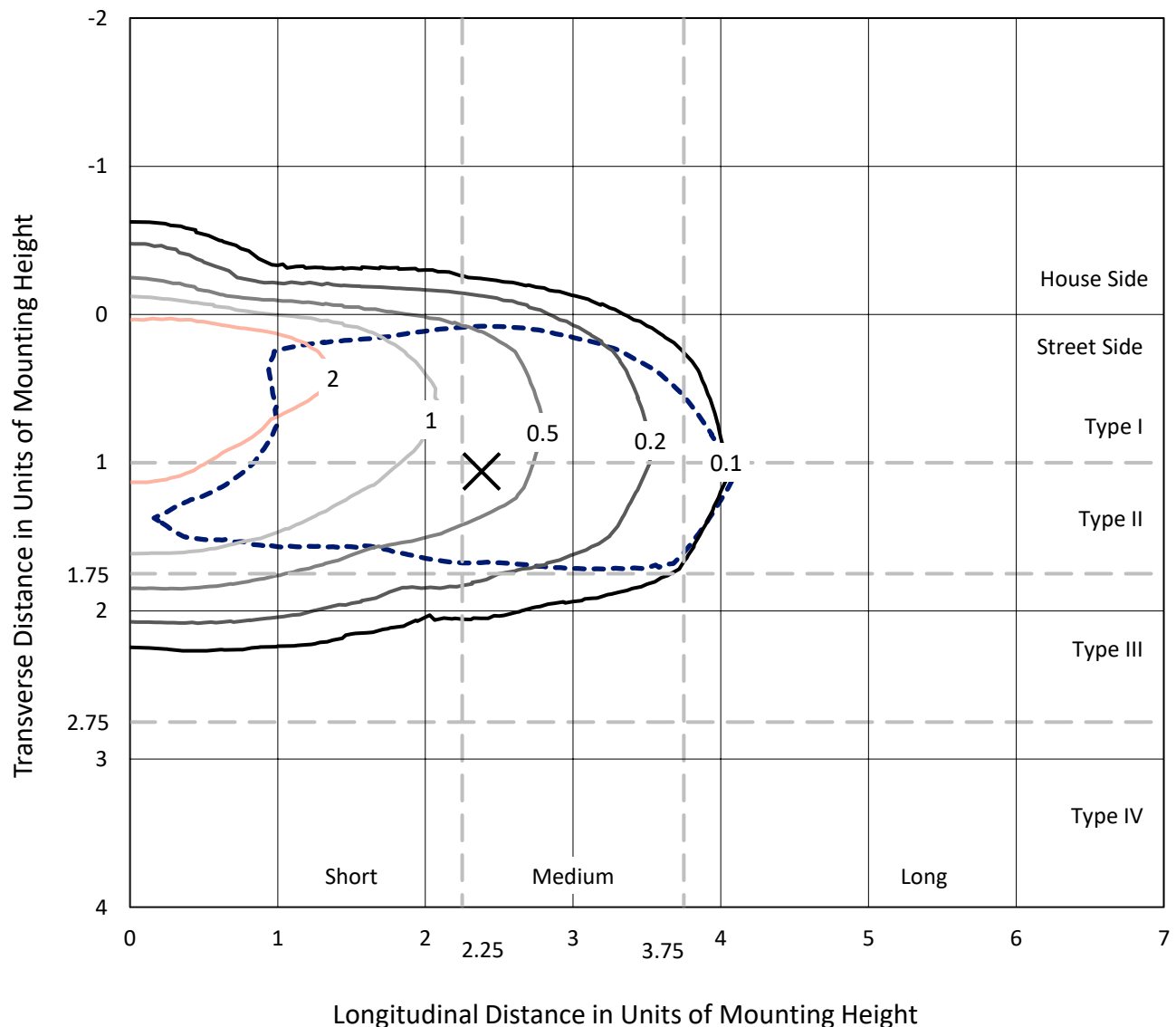


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## Iso-Footcandle Lines of Horizontal Illumination

× Max cd  
 - - - 1/2 Max cd

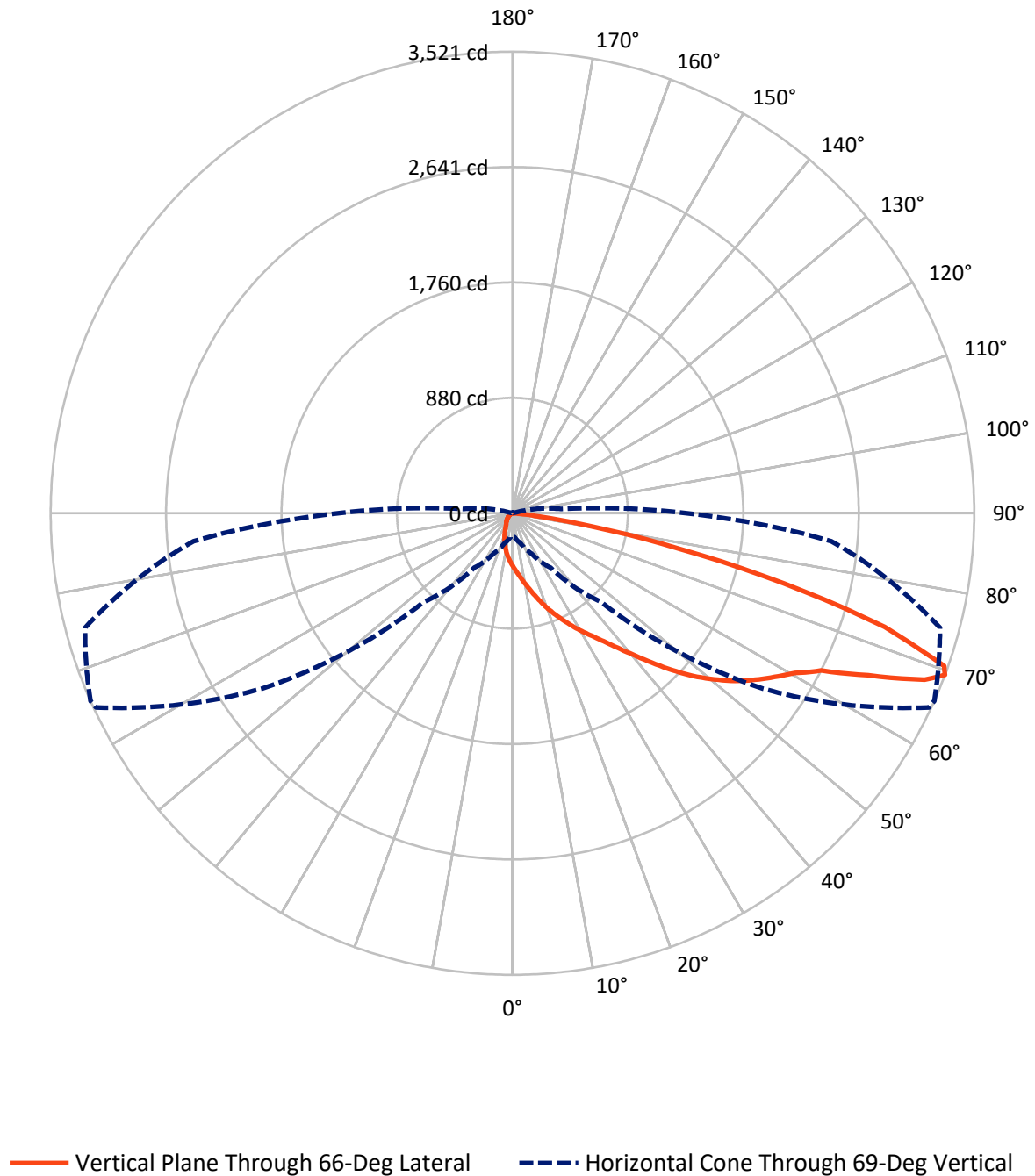


Based on 15 foot mounting height. Maximum calculated value = 3 fc  
 Type II - Medium - N/A

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## Luminous Intensity Polar Plot



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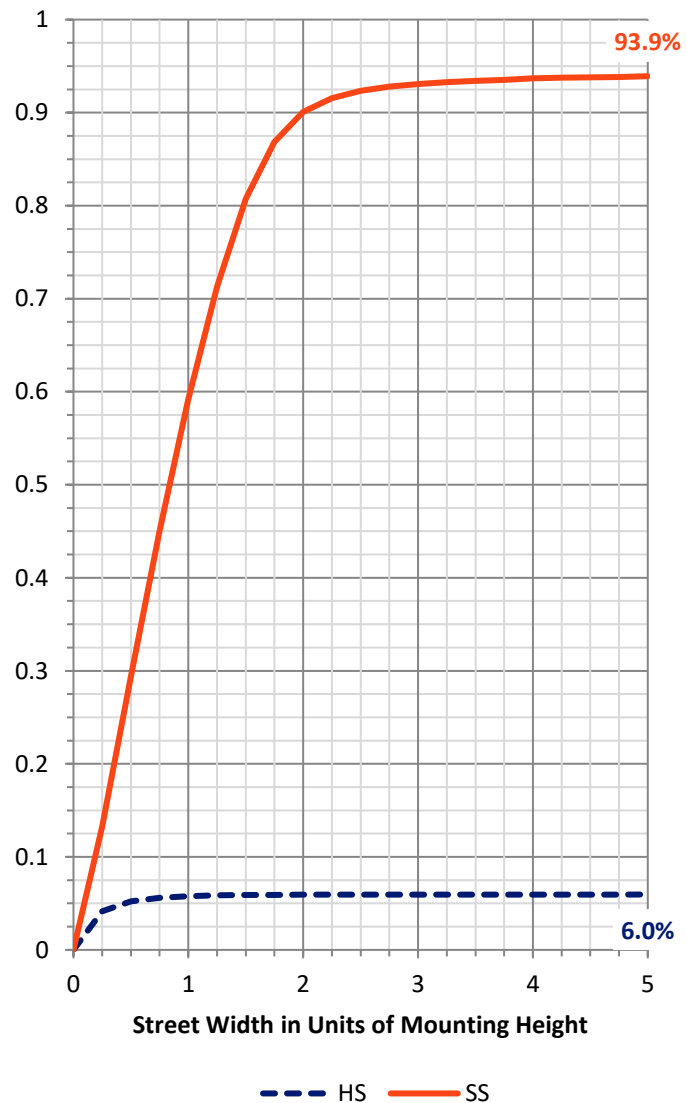
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total  |
|--------------------|-----------|----------|--------|--------|
| <b>House Side</b>  | Lumens    | 212.3    | 0.0    | 212.3  |
|                    | % Fixture | 6.0      | 0.0    | 6.0    |
| <b>Street Side</b> | Lumens    | 3327.6   | 0.0    | 3327.6 |
|                    | % Fixture | 94.0     | 0.0    | 94.0   |
| <b>Total</b>       | Lumens    | 3540.0   | 0.0    | 3540.0 |
|                    | % Fixture | 100.0    | 0.0    | 100.0  |

**ZONAL LUMENS:**

| Zone      | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10°    | 38.9   | 1.1       |
| 10°-20°   | 115.9  | 3.3       |
| 20°-30°   | 201.8  | 5.7       |
| 30°-40°   | 354.1  | 10.0      |
| 40°-50°   | 592.7  | 16.7      |
| 50°-60°   | 871.2  | 24.6      |
| 60°-70°   | 894.5  | 25.3      |
| 70°-80°   | 441.6  | 12.5      |
| 80°-90°   | 29.2   | 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°    | 3540.0 | 100.0     |
| 0°-180°   | 3540.0 | 100.0     |

**Coefficient of Utilization**



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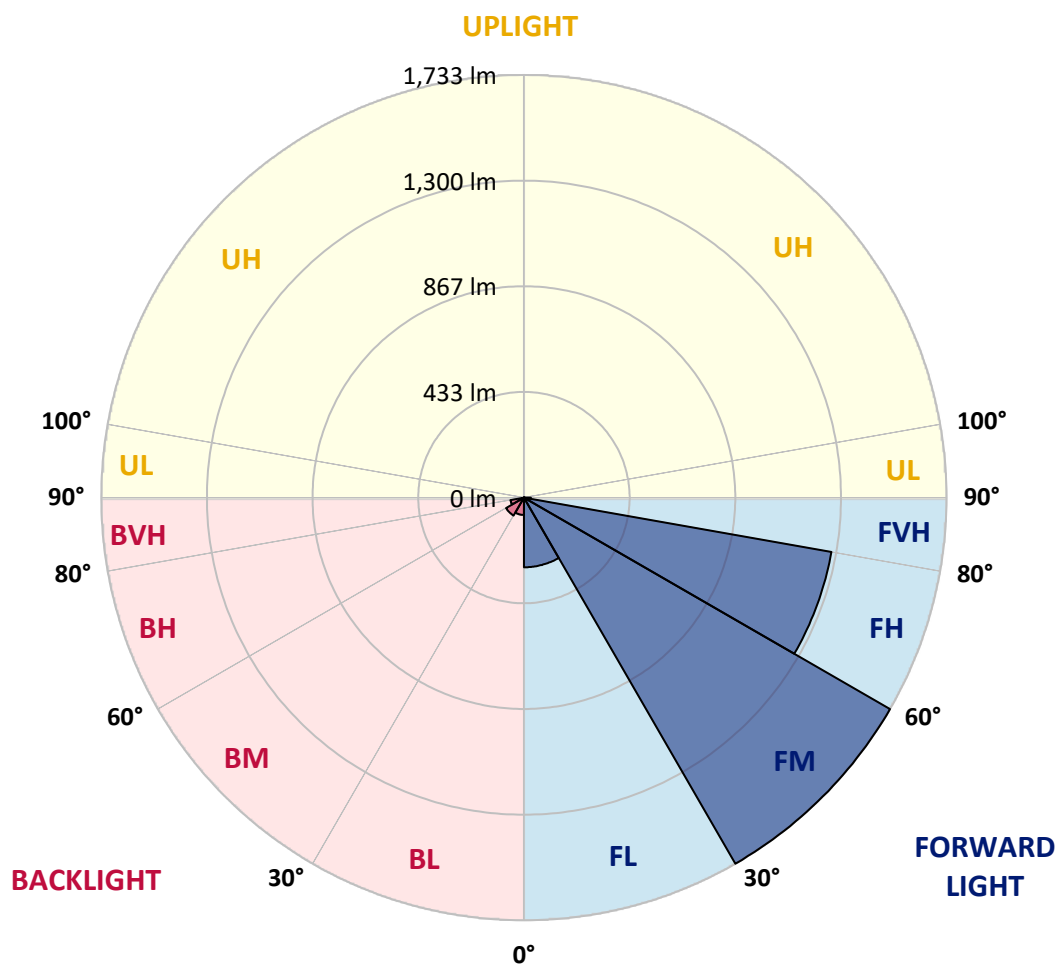
CATALOG NUMBER: GWC-SA1A-760-U-T2-HSS

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

| Zone |             | Lumens | % Fixture | Zone Rating/Lumen Limit |      |         |
|------|-------------|--------|-----------|-------------------------|------|---------|
|      |             |        |           | B                       | U    | G       |
| FL   | (0°-30°)    | 285.6  | 8.1       |                         |      |         |
| FM   | (30°-60°)   | 1733.4 | 49.0      |                         |      |         |
| FH   | (60°-80°)   | 1280.2 | 36.2      |                         |      | G1/1800 |
| FVH  | (80°-90°)   | 28.5   | 0.8       |                         |      | G1/100  |
| BL   | (0°-30°)    | 71.0   | 2.0       | B0/110                  |      |         |
| BM   | (30°-60°)   | 84.7   | 2.4       | B0/220                  |      |         |
| BH   | (60°-80°)   | 56.0   | 1.6       | B0/110                  |      | G0/110  |
| BVH  | (80°-90°)   | 0.7    | 0.0       |                         |      | G0/10   |
| UL   | (90°-100°)  | 0.0    | 0.0       |                         | U0/0 |         |
| UH   | (100°-180°) | 0.0    | 0.0       |                         | U0/0 |         |

**BUG Rating: B0-U0-G1**

Type II Medium



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**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 5°     | 15°    | 25°    | 35°    | 45°    | 55°    | 65°    | 66°    | 75°    | 85°    |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 402.9  | 402.9  | 402.9  | 402.9  | 402.9  | 402.9  | 402.9  | 402.9  | 402.9  | 402.9  | 402.9  |
| 2.5°  | 474.2  | 472.1  | 471.3  | 467.6  | 461.2  | 456.3  | 446.9  | 436.0  | 434.0  | 423.4  | 410.4  |
| 5°    | 535.7  | 534.0  | 532.8  | 527.6  | 521.1  | 508.8  | 491.6  | 471.3  | 467.4  | 447.3  | 421.4  |
| 7.5°  | 578.6  | 581.6  | 581.6  | 578.2  | 570.0  | 560.7  | 539.7  | 512.0  | 507.1  | 476.2  | 436.0  |
| 10°   | 603.6  | 607.3  | 610.2  | 613.0  | 611.9  | 608.2  | 588.3  | 557.0  | 551.2  | 510.1  | 453.0  |
| 12.5° | 606.0  | 609.7  | 617.7  | 629.7  | 641.3  | 649.7  | 637.3  | 607.0  | 600.3  | 549.5  | 473.1  |
| 15°   | 592.9  | 596.7  | 609.2  | 632.4  | 660.5  | 685.0  | 689.0  | 662.3  | 655.4  | 596.4  | 498.4  |
| 17.5° | 570.0  | 572.5  | 590.3  | 622.5  | 666.5  | 711.6  | 735.9  | 721.7  | 715.3  | 650.0  | 526.4  |
| 20°   | 553.0  | 554.9  | 570.5  | 605.0  | 662.8  | 728.2  | 780.3  | 784.7  | 778.0  | 707.5  | 556.9  |
| 22.5° | 582.1  | 585.5  | 586.0  | 602.3  | 652.7  | 736.5  | 819.3  | 846.8  | 841.7  | 768.6  | 586.8  |
| 25°   | 661.6  | 665.5  | 652.7  | 642.6  | 661.3  | 740.2  | 852.8  | 910.3  | 906.3  | 834.3  | 616.9  |
| 27.5° | 766.7  | 770.8  | 754.3  | 724.2  | 706.2  | 754.1  | 882.6  | 974.9  | 974.7  | 903.9  | 649.4  |
| 30°   | 870.0  | 874.0  | 857.2  | 827.1  | 785.7  | 793.6  | 908.3  | 1042.5 | 1043.5 | 975.7  | 683.8  |
| 32.5° | 978.2  | 983.3  | 966.0  | 927.3  | 884.1  | 861.9  | 944.4  | 1110.4 | 1116.1 | 1058.9 | 722.7  |
| 35°   | 1101.3 | 1102.0 | 1077.6 | 1037.1 | 987.3  | 953.2  | 1002.5 | 1186.6 | 1200.2 | 1162.0 | 771.9  |
| 37.5° | 1222.0 | 1226.9 | 1206.9 | 1143.0 | 1097.3 | 1058.6 | 1088.7 | 1281.7 | 1301.1 | 1288.0 | 836.3  |
| 40°   | 1311.5 | 1321.7 | 1318.9 | 1250.0 | 1206.6 | 1179.0 | 1195.8 | 1394.9 | 1419.4 | 1434.6 | 917.5  |
| 42.5° | 1367.7 | 1375.4 | 1388.5 | 1347.0 | 1307.6 | 1312.2 | 1322.3 | 1526.7 | 1557.0 | 1601.7 | 1010.9 |
| 45°   | 1432.0 | 1435.7 | 1446.7 | 1428.3 | 1401.8 | 1447.5 | 1456.4 | 1675.2 | 1707.0 | 1781.4 | 1114.4 |
| 47.5° | 1510.7 | 1519.5 | 1522.5 | 1505.7 | 1493.6 | 1567.2 | 1585.7 | 1810.2 | 1854.8 | 1974.0 | 1224.1 |
| 50°   | 1610.9 | 1613.3 | 1618.5 | 1607.6 | 1595.5 | 1670.1 | 1701.7 | 1951.9 | 1992.5 | 2167.2 | 1332.2 |
| 52.5° | 1709.0 | 1717.4 | 1735.5 | 1728.6 | 1723.8 | 1757.7 | 1805.2 | 2079.7 | 2125.0 | 2328.2 | 1440.1 |
| 55°   | 1737.2 | 1744.5 | 1807.2 | 1850.0 | 1889.7 | 1865.7 | 1904.0 | 2194.2 | 2243.2 | 2472.2 | 1544.0 |
| 57.5° | 1624.4 | 1639.0 | 1747.6 | 1859.3 | 2023.9 | 2033.5 | 2039.9 | 2311.8 | 2355.6 | 2582.5 | 1652.1 |
| 60°   | 1339.2 | 1342.1 | 1520.3 | 1711.8 | 2001.7 | 2179.9 | 2238.3 | 2438.0 | 2474.9 | 2685.2 | 1781.6 |
| 62.5° | 851.8  | 880.9  | 1076.4 | 1346.8 | 1767.0 | 2158.7 | 2478.2 | 2629.0 | 2642.5 | 2808.4 | 1967.2 |
| 65°   | 405.7  | 424.6  | 565.5  | 832.1  | 1279.9 | 1887.5 | 2643.8 | 2974.6 | 2980.6 | 3052.7 | 2215.2 |
| 67.5° | 224.6  | 233.7  | 300.8  | 447.9  | 748.2  | 1334.9 | 2576.9 | 3383.8 | 3389.5 | 3302.3 | 2432.8 |
| 69°   | 175.7  | 183.4  | 236.2  | 337.6  | 507.3  | 959.4  | 2331.9 | 3503.7 | 3520.7 | 3373.7 | 2440.6 |
| 70°   | 149.1  | 156.7  | 203.4  | 285.2  | 407.9  | 741.3  | 2075.7 | 3473.9 | 3491.9 | 3367.0 | 2382.9 |
| 72.5° | 91.3   | 95.7   | 135.5  | 200.8  | 273.4  | 372.9  | 1280.0 | 2937.9 | 2968.3 | 3088.6 | 2047.9 |
| 75°   | 61.5   | 63.9   | 84.7   | 138.5  | 195.5  | 192.0  | 665.0  | 2070.8 | 2136.7 | 2402.6 | 1512.6 |
| 77.5° | 44.1   | 46.2   | 56.8   | 89.6   | 137.0  | 126.8  | 301.1  | 1286.9 | 1301.1 | 1441.0 | 824.9  |
| 80°   | 25.1   | 27.1   | 40.2   | 53.3   | 93.0   | 84.6   | 119.7  | 614.7  | 621.8  | 617.9  | 275.4  |
| 82.5° | 13.1   | 14.8   | 22.0   | 35.1   | 59.7   | 55.3   | 49.8   | 205.8  | 206.8  | 172.0  | 60.4   |
| 85°   | 2.5    | 3.0    | 10.9   | 24.0   | 30.8   | 24.0   | 20.3   | 48.3   | 49.3   | 43.5   | 15.0   |
| 87.5° | 0.0    | 0.2    | 4.4    | 5.4    | 6.1    | 6.2    | 6.6    | 9.4    | 10.1   | 13.6   | 4.0    |
| 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-SA1A-760-U-T2-HSS

**CANDELA DISTRIBUTION (continued):**

|       | 90°    | 95°   | 105°  | 115°  | 125°  | 135°  | 145°  | 155°  | 165°  | 175°  | 180°  |
|-------|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 0°    | 402.9  | 402.9 | 402.9 | 402.9 | 402.9 | 402.9 | 402.9 | 402.9 | 402.9 | 402.9 | 402.9 |
| 2.5°  | 404.7  | 398.7 | 387.1 | 373.6 | 363.2 | 352.9 | 344.9 | 336.4 | 333.4 | 331.9 | 331.7 |
| 5°    | 408.7  | 396.0 | 371.4 | 346.2 | 325.5 | 306.0 | 292.1 | 278.8 | 272.6 | 269.7 | 268.5 |
| 7.5°  | 415.5  | 395.0 | 355.4 | 316.9 | 287.2 | 262.8 | 243.5 | 229.0 | 221.8 | 218.8 | 217.6 |
| 10°   | 423.4  | 393.6 | 336.8 | 286.0 | 248.0 | 222.8 | 203.6 | 189.3 | 181.4 | 178.1 | 176.4 |
| 12.5° | 432.6  | 391.3 | 315.3 | 254.7 | 214.5 | 189.3 | 166.1 | 148.5 | 139.4 | 135.5 | 133.7 |
| 15°   | 444.1  | 388.9 | 292.7 | 225.3 | 185.1 | 154.4 | 129.0 | 117.0 | 115.2 | 114.5 | 114.7 |
| 17.5° | 455.3  | 385.2 | 268.2 | 196.2 | 154.2 | 120.6 | 107.6 | 106.9 | 107.3 | 107.3 | 107.3 |
| 20°   | 465.4  | 376.8 | 241.4 | 171.3 | 124.8 | 101.7 | 99.0  | 97.9  | 97.0  | 96.3  | 95.5  |
| 22.5° | 473.3  | 365.5 | 215.7 | 146.6 | 101.9 | 93.1  | 88.9  | 85.2  | 82.2  | 80.2  | 79.2  |
| 25°   | 478.7  | 350.6 | 192.2 | 122.9 | 91.6  | 84.7  | 77.2  | 71.0  | 66.2  | 63.4  | 62.2  |
| 27.5° | 482.7  | 334.4 | 171.2 | 102.9 | 84.6  | 75.0  | 65.1  | 57.7  | 52.8  | 50.3  | 49.3  |
| 30°   | 485.6  | 316.1 | 152.7 | 90.5  | 76.7  | 64.7  | 54.1  | 46.9  | 43.4  | 42.0  | 41.4  |
| 32.5° | 488.3  | 295.8 | 135.2 | 84.6  | 69.3  | 55.3  | 45.4  | 39.8  | 37.7  | 36.0  | 35.5  |
| 35°   | 495.0  | 276.9 | 118.5 | 78.4  | 61.7  | 47.2  | 39.0  | 35.0  | 32.8  | 31.8  | 31.4  |
| 37.5° | 511.0  | 263.0 | 102.6 | 72.0  | 54.1  | 40.9  | 34.1  | 31.3  | 29.3  | 28.2  | 27.9  |
| 40°   | 536.7  | 255.9 | 89.1  | 65.1  | 46.7  | 36.0  | 30.9  | 28.2  | 26.1  | 24.5  | 24.2  |
| 42.5° | 574.5  | 256.9 | 79.7  | 58.2  | 40.9  | 32.1  | 27.9  | 24.7  | 22.4  | 21.0  | 20.7  |
| 45°   | 620.4  | 264.3 | 73.1  | 51.5  | 36.0  | 29.1  | 24.5  | 21.2  | 19.0  | 17.8  | 17.5  |
| 47.5° | 670.2  | 276.3 | 67.8  | 45.4  | 32.1  | 26.2  | 21.2  | 17.7  | 15.8  | 14.8  | 14.6  |
| 50°   | 722.7  | 287.9 | 62.2  | 39.5  | 28.8  | 23.4  | 17.8  | 14.6  | 13.1  | 12.3  | 11.9  |
| 52.5° | 775.8  | 301.3 | 57.2  | 34.1  | 25.9  | 20.0  | 14.8  | 11.9  | 10.8  | 10.1  | 9.8   |
| 55°   | 833.0  | 311.4 | 52.3  | 29.9  | 23.0  | 17.0  | 12.3  | 9.9   | 8.9   | 8.1   | 7.9   |
| 57.5° | 900.2  | 327.0 | 47.2  | 25.9  | 19.7  | 14.1  | 10.1  | 7.9   | 7.1   | 6.2   | 6.1   |
| 60°   | 991.0  | 345.4 | 41.9  | 22.9  | 16.1  | 11.6  | 8.2   | 6.4   | 5.4   | 4.7   | 4.5   |
| 62.5° | 1110.7 | 365.7 | 35.1  | 20.0  | 13.1  | 9.4   | 6.6   | 5.0   | 3.9   | 3.0   | 3.0   |
| 65°   | 1262.6 | 398.8 | 28.8  | 16.8  | 10.8  | 7.7   | 5.0   | 3.7   | 2.2   | 1.3   | 1.3   |
| 67.5° | 1351.2 | 404.5 | 23.2  | 13.8  | 8.7   | 6.6   | 4.2   | 2.5   | 0.7   | 0.2   | 0.0   |
| 69°   | 1322.8 | 371.4 | 19.7  | 11.8  | 7.6   | 6.2   | 3.9   | 1.8   | 0.3   | 0.0   | 0.0   |
| 70°   | 1269.3 | 339.6 | 17.3  | 10.4  | 6.9   | 5.9   | 3.7   | 1.3   | 0.3   | 0.0   | 0.0   |
| 72.5° | 1048.9 | 241.8 | 13.1  | 7.7   | 5.0   | 5.2   | 3.4   | 0.8   | 0.3   | 0.0   | 0.0   |
| 75°   | 764.0  | 147.0 | 9.4   | 5.4   | 3.2   | 3.9   | 2.4   | 0.3   | 0.2   | 0.0   | 0.0   |
| 77.5° | 425.1  | 69.3  | 5.9   | 3.0   | 2.0   | 2.4   | 1.2   | 0.0   | 0.0   | 0.0   | 0.0   |
| 80°   | 138.0  | 18.8  | 2.7   | 1.7   | 1.2   | 1.3   | 0.5   | 0.0   | 0.0   | 0.0   | 0.0   |
| 82.5° | 25.6   | 5.4   | 1.5   | 0.8   | 0.3   | 0.3   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 85°   | 5.5    | 2.2   | 0.8   | 0.3   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 87.5° | 1.8    | 0.7   | 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: SP1-2012-088-5-R3

Luminaire Tested: CCW-SA1A-760-U-SL2-HSS

Test Date: 01/19/2021

### Test Information

Test Method: LM-79-08  
 Report Number: SP1-2012-088-5-R3  
 Test Lab: COOPER LIGHTING SOLUTIONS  
 Photometer: SP1  
 Measurement Geometry:  $4\pi$   
 Issue Date: 01/19/2021  
 Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
 Product Line: INVUE  
 Catalog Number: **CCW-SA1A-760-U-SL2-HSS**  
 Description: INVUE WALL PACK

\*\*\*THIS IS A REVISION OF SP1-2012-088-5-R2. TO UPDATE THE CATALOG  
 INFORMATION.\*\*\*TESTED IN SITU. INVUE WALL PACK LIGHT SQUARE T2 OPTICS 1-SQUARE WITH  
 HOUSE SIDE SHIELD

### Spectral Parameters

|                           |        |           |      |      |       |
|---------------------------|--------|-----------|------|------|-------|
| CCT (K):                  | 5447   | CRI (Ra): | 71.9 |      |       |
| CIE u':                   | 0.2053 | R1:       | 70.7 | R9:  | -27.5 |
| CIE v':                   | 0.4809 | R2:       | 74.8 | R10: | 41.5  |
| Duv:                      | 0.0027 | R3:       | 78.7 | R11: | 74.9  |
| CIE x:                    | 0.3337 | R4:       | 74.0 | R12: | 49.9  |
| CIE y:                    | 0.3473 | R5:       | 72.5 | R13: | 70.2  |
| CIE z:                    | 0.3190 | R6:       | 67.7 | R14: | 88.1  |
| Peak Wavelength (nm):     | 443    | R7:       | 77.7 |      |       |
| Dominant Wavelength (nm): | 556    | R8:       | 58.8 |      |       |
| Purity:                   | 4.5    |           |      |      |       |
| Rf:                       | 72.3   |           |      |      |       |
| Rg:                       | 97.2   |           |      |      |       |



### Test Conditions

Stabilization Time: 75M  
 Operation Time: 12H  
 Room Temperature (°C) / RH%: 25.4/18%  
 Sphere Temperature (°C): 25.3

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| Measurement and Test Equipment |                       |                  |                      |
|--------------------------------|-----------------------|------------------|----------------------|
| Instrument                     | Identification Number | Calibration Date | Calibration Due Date |
| Photometer                     | IN0058                | 7/29/2020        | 1/29/2021            |
| 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 5700K 4-step quadrangle

REPORT NUMBER: SP1-2012-088-5-R3

### Photopic Flux vs. Wavelength

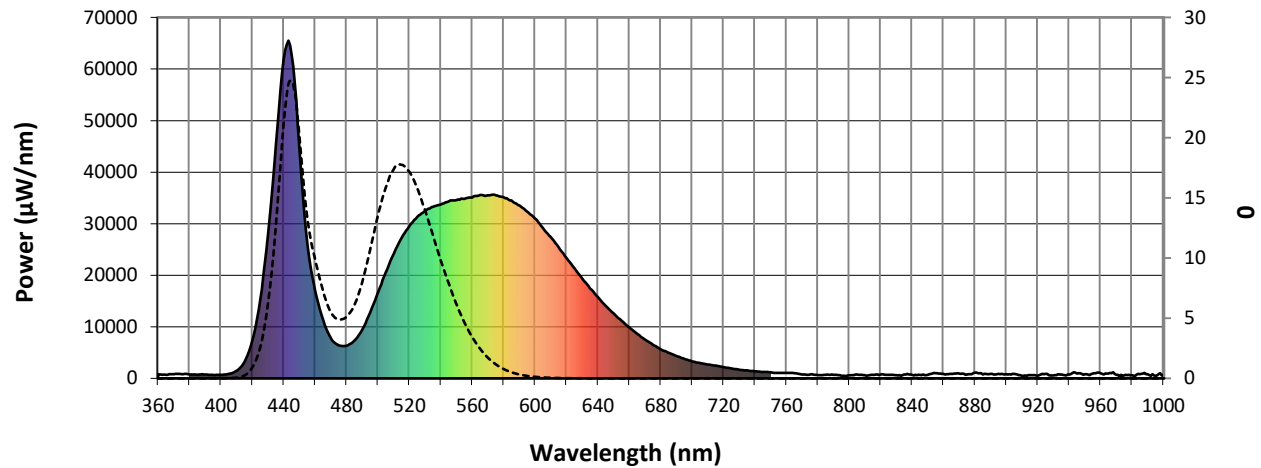


#####

| 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       | 828              | 0.0              | 490       | 9471             | 1.3              | 620       | 23317            | 6.1              | 750       | 1157             | 0.0              | 880       | 1136             | 0.0              |
| 365       | 696              | 0.0              | 495       | 12752            | 2.3              | 625       | 21413            | 4.7              | 755       | 1067             | 0.0              | 885       | 773              | 0.0              |
| 370       | 807              | 0.0              | 500       | 16685            | 3.7              | 630       | 19344            | 3.5              | 760       | 1059             | 0.0              | 890       | 872              | 0.0              |
| 375       | 837              | 0.0              | 505       | 20565            | 5.8              | 635       | 17464            | 2.6              | 765       | 1009             | 0.0              | 895       | 891              | 0.0              |
| 380       | 757              | 0.0              | 510       | 24119            | 8.3              | 640       | 15745            | 1.9              | 770       | 774              | 0.0              | 900       | 807              | 0.0              |
| 385       | 706              | 0.0              | 515       | 27181            | 11.3             | 645       | 14060            | 1.4              | 775       | 761              | 0.0              | 905       | 899              | 0.0              |
| 390       | 746              | 0.0              | 520       | 29555            | 14.3             | 650       | 12579            | 0.9              | 780       | 653              | 0.0              | 910       | 506              | 0.0              |
| 395       | 660              | 0.0              | 525       | 31307            | 16.8             | 655       | 11181            | 0.6              | 785       | 704              | 0.0              | 915       | 598              | 0.0              |
| 400       | 671              | 0.0              | 530       | 32558            | 19.2             | 660       | 9847             | 0.4              | 790       | 663              | 0.0              | 920       | 510              | 0.0              |
| 405       | 848              | 0.0              | 535       | 33301            | 20.7             | 665       | 8641             | 0.3              | 795       | 493              | 0.0              | 925       | 874              | 0.0              |
| 410       | 1490             | 0.0              | 540       | 33727            | 22.0             | 670       | 7535             | 0.2              | 800       | 584              | 0.0              | 930       | 549              | 0.0              |
| 415       | 3203             | 0.0              | 545       | 34356            | 22.9             | 675       | 6542             | 0.1              | 805       | 739              | 0.0              | 935       | 720              | 0.0              |
| 420       | 7298             | 0.0              | 550       | 34589            | 23.5             | 680       | 5664             | 0.1              | 810       | 601              | 0.0              | 940       | 754              | 0.0              |
| 425       | 15315            | 0.1              | 555       | 34855            | 23.8             | 685       | 4962             | 0.0              | 815       | 677              | 0.0              | 945       | 931              | 0.0              |
| 430       | 27886            | 0.2              | 560       | 35083            | 23.8             | 690       | 4369             | 0.0              | 820       | 726              | 0.0              | 950       | 811              | 0.0              |
| 435       | 45485            | 0.5              | 565       | 35553            | 23.6             | 695       | 3785             | 0.0              | 825       | 693              | 0.0              | 955       | 955              | 0.0              |
| 440       | 61965            | 1.0              | 570       | 35511            | 23.1             | 700       | 3318             | 0.0              | 830       | 619              | 0.0              | 960       | 1025             | 0.0              |
| 445       | 62721            | 1.3              | 575       | 35515            | 22.1             | 705       | 2962             | 0.0              | 835       | 738              | 0.0              | 965       | 916              | 0.0              |
| 450       | 44754            | 1.2              | 580       | 35114            | 20.9             | 710       | 2689             | 0.0              | 840       | 681              | 0.0              | 970       | 695              | 0.0              |
| 455       | 26152            | 0.9              | 585       | 34546            | 19.2             | 715       | 2476             | 0.0              | 845       | 691              | 0.0              | 975       | 568              | 0.0              |
| 460       | 17101            | 0.7              | 590       | 33522            | 17.3             | 720       | 2192             | 0.0              | 850       | 710              | 0.0              | 980       | 643              | 0.0              |
| 465       | 11400            | 0.6              | 595       | 32326            | 15.3             | 725       | 1939             | 0.0              | 855       | 1025             | 0.0              | 985       | 804              | 0.0              |
| 470       | 7763             | 0.5              | 600       | 30973            | 13.3             | 730       | 1698             | 0.0              | 860       | 889              | 0.0              | 990       | 812              | 0.0              |
| 475       | 6419             | 0.5              | 605       | 29160            | 11.3             | 735       | 1533             | 0.0              | 865       | 885              | 0.0              | 995       | 496              | 0.0              |
| 480       | 6330             | 0.6              | 610       | 27373            | 9.4              | 740       | 1375             | 0.0              | 870       | 905              | 0.0              | 1000      | 659              | 0.0              |
| 485       | 7299             | 0.9              | 615       | 25423            | 7.7              | 745       | 1254             | 0.0              | 875       | 739              | 0.0              |           |                  |                  |

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### Scotopic Flux vs. Wavelength



Scotopic Lumens: 1610.2

S/P: 0.74

| 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       | 828              | 0.0              | 490       | 9471             | 14.6             | 620       | 23317            | 0.3              | 750       | 1157             | 0.0              | 880       | 1136             | 0.0              |
| 365       | 696              | 0.0              | 495       | 12752            | 20.6             | 625       | 21413            | 0.2              | 755       | 1067             | 0.0              | 885       | 773              | 0.0              |
| 370       | 807              | 0.0              | 500       | 16685            | 27.9             | 630       | 19344            | 0.1              | 760       | 1059             | 0.0              | 890       | 872              | 0.0              |
| 375       | 837              | 0.0              | 505       | 20565            | 35.0             | 635       | 17464            | 0.1              | 765       | 1009             | 0.0              | 895       | 891              | 0.0              |
| 380       | 757              | 0.0              | 510       | 24119            | 40.9             | 640       | 15745            | 0.0              | 770       | 774              | 0.0              | 900       | 807              | 0.0              |
| 385       | 706              | 0.0              | 515       | 27181            | 45.1             | 645       | 14060            | 0.0              | 775       | 761              | 0.0              | 905       | 899              | 0.0              |
| 390       | 746              | 0.0              | 520       | 29555            | 47.0             | 650       | 12579            | 0.0              | 780       | 653              | 0.0              | 910       | 506              | 0.0              |
| 395       | 660              | 0.0              | 525       | 31307            | 46.8             | 655       | 11181            | 0.0              | 785       | 704              | 0.0              | 915       | 598              | 0.0              |
| 400       | 671              | 0.0              | 530       | 32558            | 44.9             | 660       | 9847             | 0.0              | 790       | 663              | 0.0              | 920       | 510              | 0.0              |
| 405       | 848              | 0.0              | 535       | 33301            | 41.5             | 665       | 8641             | 0.0              | 795       | 493              | 0.0              | 925       | 874              | 0.0              |
| 410       | 1490             | 0.1              | 540       | 33727            | 37.3             | 670       | 7535             | 0.0              | 800       | 584              | 0.0              | 930       | 549              | 0.0              |
| 415       | 3203             | 0.3              | 545       | 34356            | 32.9             | 675       | 6542             | 0.0              | 805       | 739              | 0.0              | 935       | 720              | 0.0              |
| 420       | 7298             | 1.2              | 550       | 34589            | 28.3             | 680       | 5664             | 0.0              | 810       | 601              | 0.0              | 940       | 754              | 0.0              |
| 425       | 15315            | 3.7              | 555       | 34855            | 23.8             | 685       | 4962             | 0.0              | 815       | 677              | 0.0              | 945       | 931              | 0.0              |
| 430       | 27886            | 9.5              | 560       | 35083            | 19.6             | 690       | 4369             | 0.0              | 820       | 726              | 0.0              | 950       | 811              | 0.0              |
| 435       | 45485            | 20.3             | 565       | 35553            | 16.0             | 695       | 3785             | 0.0              | 825       | 693              | 0.0              | 955       | 955              | 0.0              |
| 440       | 61965            | 34.6             | 570       | 35511            | 12.5             | 700       | 3318             | 0.0              | 830       | 619              | 0.0              | 960       | 1025             | 0.0              |
| 445       | 62721            | 42.0             | 575       | 35515            | 9.7              | 705       | 2962             | 0.0              | 835       | 738              | 0.0              | 965       | 916              | 0.0              |
| 450       | 44754            | 34.7             | 580       | 35114            | 7.2              | 710       | 2689             | 0.0              | 840       | 681              | 0.0              | 970       | 695              | 0.0              |
| 455       | 26152            | 22.9             | 585       | 34546            | 5.3              | 715       | 2476             | 0.0              | 845       | 691              | 0.0              | 975       | 568              | 0.0              |
| 460       | 17101            | 16.5             | 590       | 33522            | 3.7              | 720       | 2192             | 0.0              | 850       | 710              | 0.0              | 980       | 643              | 0.0              |
| 465       | 11400            | 12.0             | 595       | 32326            | 2.6              | 725       | 1939             | 0.0              | 855       | 1025             | 0.0              | 985       | 804              | 0.0              |
| 470       | 7763             | 8.9              | 600       | 30973            | 1.7              | 730       | 1698             | 0.0              | 860       | 889              | 0.0              | 990       | 812              | 0.0              |
| 475       | 6419             | 8.0              | 605       | 29160            | 1.1              | 735       | 1533             | 0.0              | 865       | 885              | 0.0              | 995       | 496              | 0.0              |
| 480       | 6330             | 8.5              | 610       | 27373            | 0.7              | 740       | 1375             | 0.0              | 870       | 905              | 0.0              | 1000      | 659              | 0.0              |
| 485       | 7299             | 10.6             | 615       | 25423            | 0.5              | 745       | 1254             | 0.0              | 875       | 739              | 0.0              |           |                  |                  |

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### Melanopic Flux vs. Wavelength



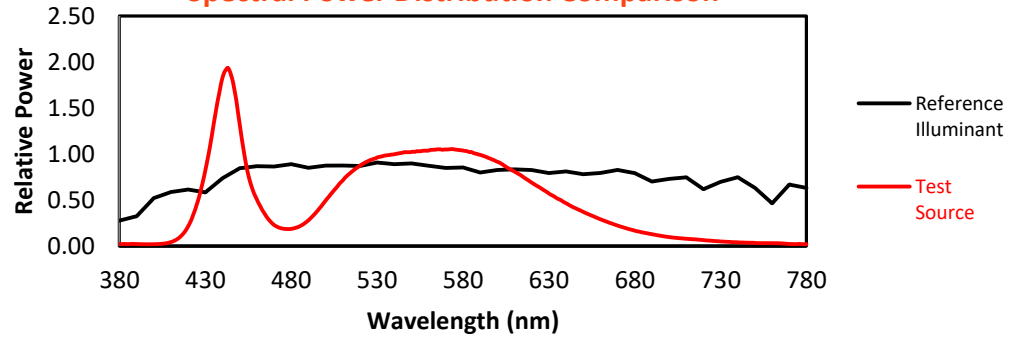
**Melanopic Lumens: 4010.3**      **S/P: 1.85**

| 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       | 828              | 0.0              | 490       | 9471             | 7.9              | 620       | 23317            | 0.0              | 750       | 1157             | 0.0              | 880       | 1136             | 0.0              |
| 365       | 696              | 0.0              | 495       | 12752            | 10.5             | 625       | 21413            | 0.0              | 755       | 1067             | 0.0              | 885       | 773              | 0.0              |
| 370       | 807              | 0.0              | 500       | 16685            | 13.4             | 630       | 19344            | 0.0              | 760       | 1059             | 0.0              | 890       | 872              | 0.0              |
| 375       | 837              | 0.0              | 505       | 20565            | 15.8             | 635       | 17464            | 0.0              | 765       | 1009             | 0.0              | 895       | 891              | 0.0              |
| 380       | 757              | 0.0              | 510       | 24119            | 17.3             | 640       | 15745            | 0.0              | 770       | 774              | 0.0              | 900       | 807              | 0.0              |
| 385       | 706              | 0.0              | 515       | 27181            | 17.8             | 645       | 14060            | 0.0              | 775       | 761              | 0.0              | 905       | 899              | 0.0              |
| 390       | 746              | 0.0              | 520       | 29555            | 17.2             | 650       | 12579            | 0.0              | 780       | 653              | 0.0              | 910       | 506              | 0.0              |
| 395       | 660              | 0.0              | 525       | 31307            | 15.9             | 655       | 11181            | 0.0              | 785       | 704              | 0.0              | 915       | 598              | 0.0              |
| 400       | 671              | 0.0              | 530       | 32558            | 14.1             | 660       | 9847             | 0.0              | 790       | 663              | 0.0              | 920       | 510              | 0.0              |
| 405       | 848              | 0.0              | 535       | 33301            | 12.0             | 665       | 8641             | 0.0              | 795       | 493              | 0.0              | 925       | 874              | 0.0              |
| 410       | 1490             | 0.1              | 540       | 33727            | 9.9              | 670       | 7535             | 0.0              | 800       | 584              | 0.0              | 930       | 549              | 0.0              |
| 415       | 3203             | 0.2              | 545       | 34356            | 8.0              | 675       | 6542             | 0.0              | 805       | 739              | 0.0              | 935       | 720              | 0.0              |
| 420       | 7298             | 0.8              | 550       | 34589            | 6.2              | 680       | 5664             | 0.0              | 810       | 601              | 0.0              | 940       | 754              | 0.0              |
| 425       | 15315            | 2.4              | 555       | 34855            | 4.7              | 685       | 4962             | 0.0              | 815       | 677              | 0.0              | 945       | 931              | 0.0              |
| 430       | 27886            | 5.9              | 560       | 35083            | 3.5              | 690       | 4369             | 0.0              | 820       | 726              | 0.0              | 950       | 811              | 0.0              |
| 435       | 45485            | 12.1             | 565       | 35553            | 2.5              | 695       | 3785             | 0.0              | 825       | 693              | 0.0              | 955       | 955              | 0.0              |
| 440       | 61965            | 20.7             | 570       | 35511            | 1.7              | 700       | 3318             | 0.0              | 830       | 619              | 0.0              | 960       | 1025             | 0.0              |
| 445       | 62721            | 24.7             | 575       | 35515            | 1.2              | 705       | 2962             | 0.0              | 835       | 738              | 0.0              | 965       | 916              | 0.0              |
| 450       | 44754            | 20.6             | 580       | 35114            | 0.8              | 710       | 2689             | 0.0              | 840       | 681              | 0.0              | 970       | 695              | 0.0              |
| 455       | 26152            | 13.7             | 585       | 34546            | 0.5              | 715       | 2476             | 0.0              | 845       | 691              | 0.0              | 975       | 568              | 0.0              |
| 460       | 17101            | 10.1             | 590       | 33522            | 0.3              | 720       | 2192             | 0.0              | 850       | 710              | 0.0              | 980       | 643              | 0.0              |
| 465       | 11400            | 7.4              | 595       | 32326            | 0.2              | 725       | 1939             | 0.0              | 855       | 1025             | 0.0              | 985       | 804              | 0.0              |
| 470       | 7763             | 5.6              | 600       | 30973            | 0.1              | 730       | 1698             | 0.0              | 860       | 889              | 0.0              | 990       | 812              | 0.0              |
| 475       | 6419             | 4.9              | 605       | 29160            | 0.1              | 735       | 1533             | 0.0              | 865       | 885              | 0.0              | 995       | 496              | 0.0              |
| 480       | 6330             | 5.1              | 610       | 27373            | 0.0              | 740       | 1375             | 0.0              | 870       | 905              | 0.0              | 1000      | 659              | 0.0              |
| 485       | 7299             | 6.0              | 615       | 25423            | 0.0              | 745       | 1254             | 0.0              | 875       | 739              | 0.0              |           |                  |                  |

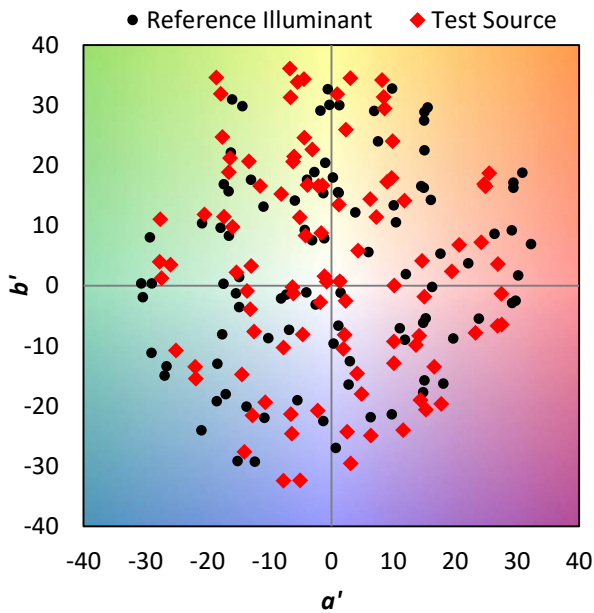
### Summary

$R_f = 72.3$   
 $R_g = 97.2$   
 CIE  $R_a = 71.9$   
 $R_g = -27.5$

### Spectral Power Distribution Comparison



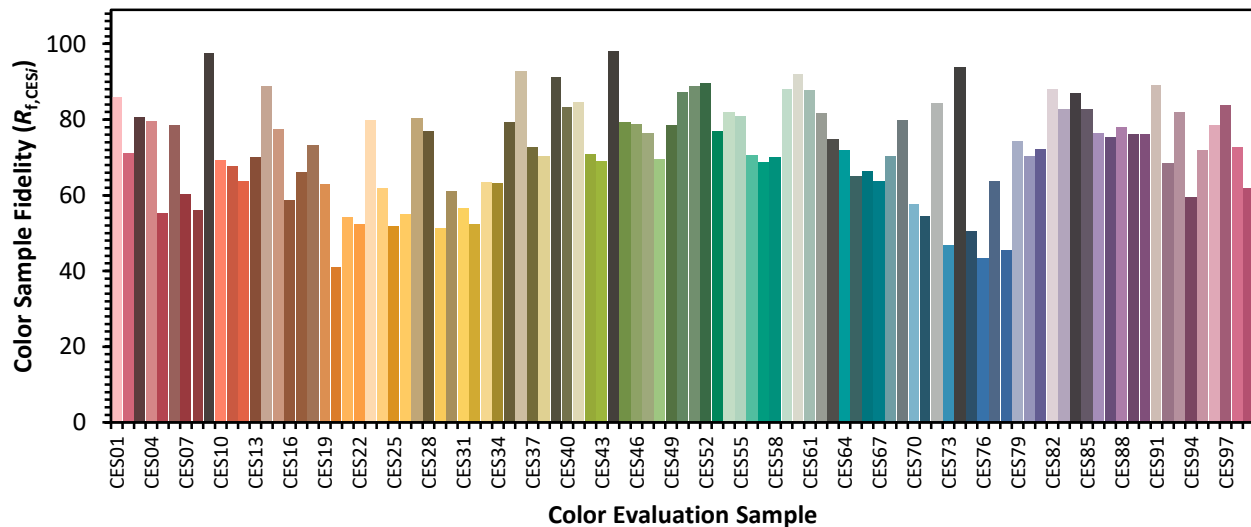
### Color Vector Graphics





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

|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 85 | CES26 = 55 | CES51 = 89 | CES76 = 43 |
| CES02 = 59 | CES27 = 80 | CES52 = 90 | CES77 = 64 |
| CES03 = 30 | CES28 = 77 | CES53 = 77 | CES78 = 46 |
| CES04 = 69 | CES29 = 51 | CES54 = 82 | CES79 = 74 |
| CES05 = 46 | CES30 = 61 | CES55 = 81 | CES80 = 70 |
| CES06 = 50 | CES31 = 56 | CES56 = 71 | CES81 = 72 |
| CES07 = 38 | CES32 = 52 | CES57 = 69 | CES82 = 88 |
| CES08 = 38 | CES33 = 63 | CES58 = 70 | CES83 = 83 |
| CES09 = 29 | CES34 = 63 | CES59 = 88 | CES84 = 87 |
| CES10 = 72 | CES35 = 79 | CES60 = 92 | CES85 = 83 |
| CES11 = 55 | CES36 = 93 | CES61 = 88 | CES86 = 76 |
| CES12 = 61 | CES37 = 73 | CES62 = 82 | CES87 = 75 |
| CES13 = 41 | CES38 = 70 | CES63 = 75 | CES88 = 78 |
| CES14 = 74 | CES39 = 91 | CES64 = 72 | CES89 = 76 |
| CES15 = 70 | CES40 = 83 | CES65 = 65 | CES90 = 76 |
| CES16 = 46 | CES41 = 85 | CES66 = 66 | CES91 = 89 |
| CES17 = 48 | CES42 = 71 | CES67 = 64 | CES92 = 69 |
| CES18 = 55 | CES43 = 69 | CES68 = 70 | CES93 = 82 |
| CES19 = 71 | CES44 = 98 | CES69 = 80 | CES94 = 60 |
| CES20 = 64 | CES45 = 79 | CES70 = 58 | CES95 = 72 |
| CES21 = 85 | CES46 = 79 | CES71 = 54 | CES96 = 79 |
| CES22 = 77 | CES47 = 76 | CES72 = 84 | CES97 = 84 |
| CES23 = 91 | CES48 = 69 | CES73 = 47 | CES98 = 73 |
| CES24 = 90 | CES49 = 79 | CES74 = 94 | CES99 = 62 |
| CES25 = 71 | CES50 = 87 | CES75 = 50 |            |



### Color Rendition by Hue-Angle Bin



**Measure Comparisons**



(END OF REPORT)