

Signify Classified - Internal  
Cooper Lighting Solutions Photometric Lab  
1121 Highway 74 South  
Peachtree City, GA 30269



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: P386870

Luminaire Tested: **GWC-SA2C-750-U-T2-HSS**

Issue Date: 3/3/2020

**Test Information**

Test Method: LM-79-08  
Report Number: P386870  
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-SA2C-750-U-T2-HSS  
Description: GALLEON WALL LUMINAIRE  
(2) 70 CRI, 5000K, 1050mA LIGHTSQUARES WITH 16 LEDS EACH AND TYPE II  
OPTICS WITH HOUSE SIDE SHIELD  
Light Source: -  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 10501 lumens  
Efficiency: N/A  
Efficacy: 92.9 lumens/watt  
Luminous Opening: Rectangular (W 1' x L: 0.5' x H: 0')  
IES Classification: Type II - Medium  
BUG Rating: B1 - U0 - G2

Input Watts (W): 113  
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

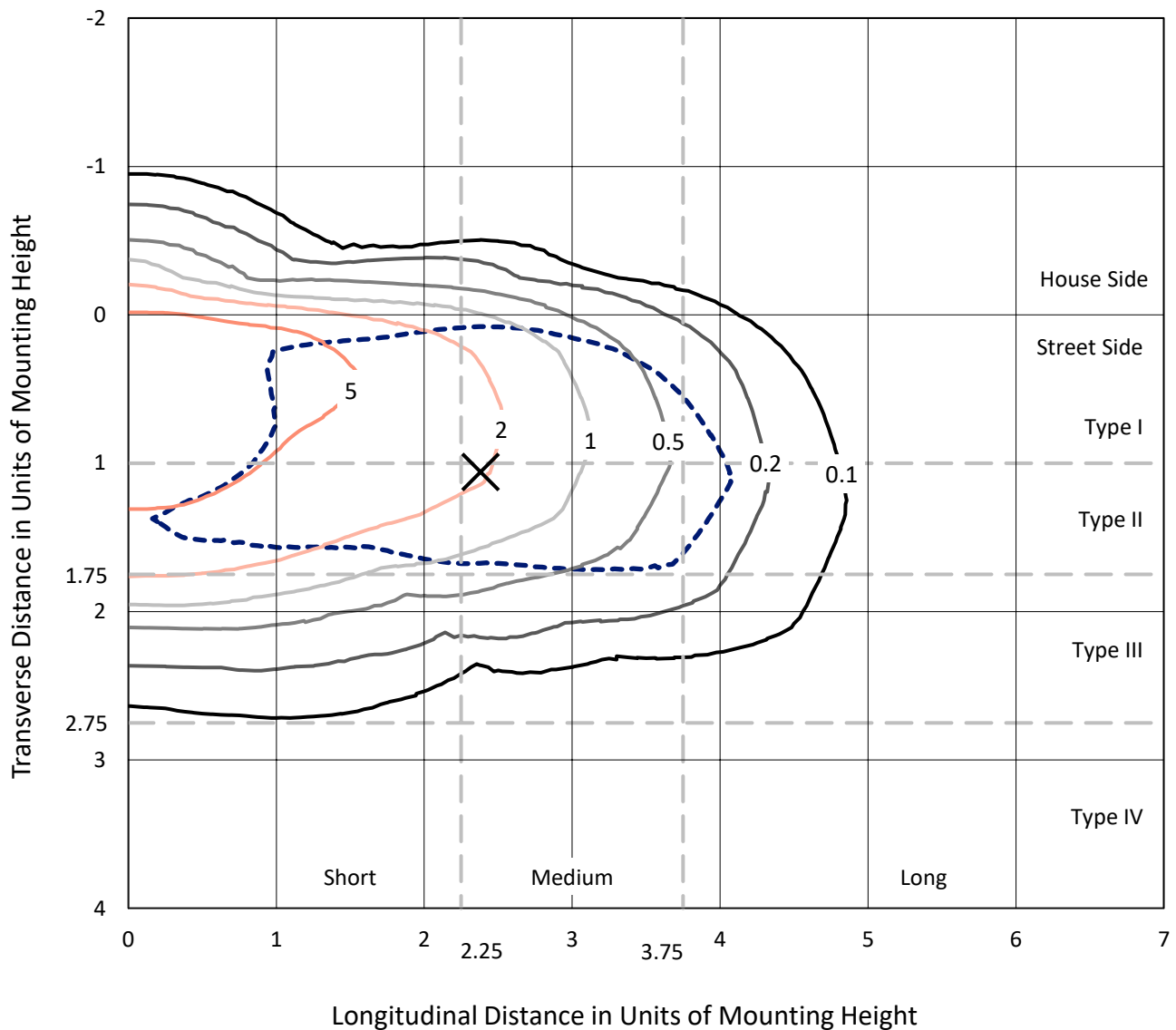


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## Iso-Footcandle Lines of Horizontal Illumination

✕ Max cd  
 - - - 1/2 Max cd

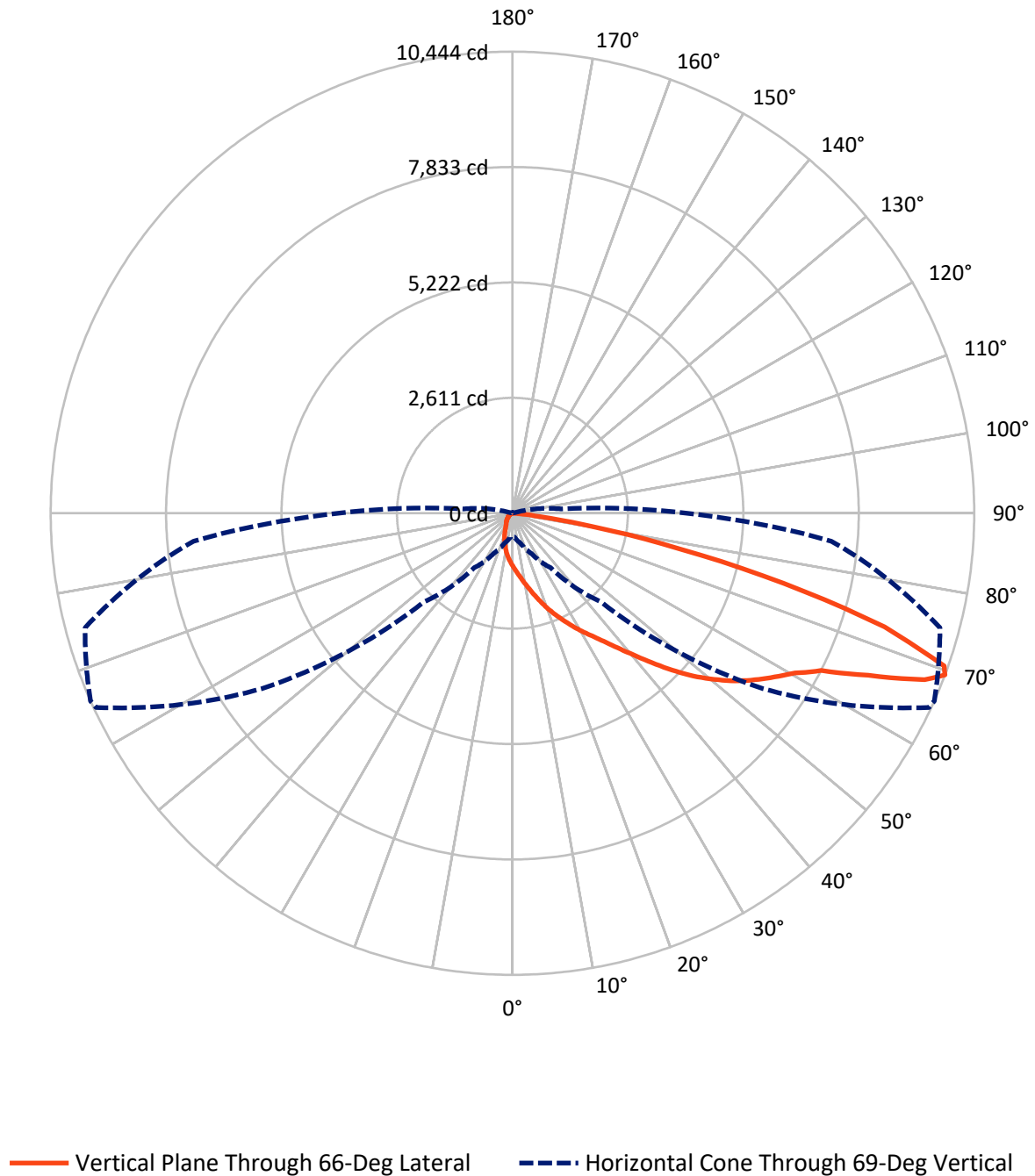


Based on 15 foot mounting height. Maximum calculated value = 8.8 fc  
 Type II - Medium - N/A

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CATALOG NUMBER: GWC-SA2C-750-U-T2-HSS

## Luminous Intensity Polar Plot



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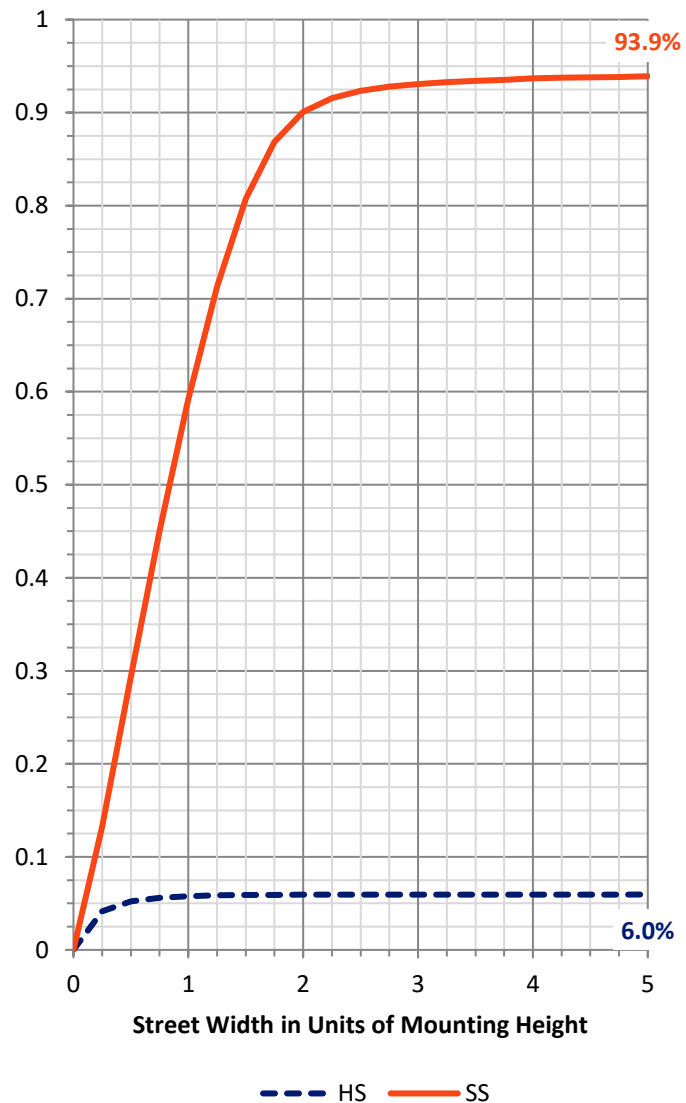
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total   |
|--------------------|-----------|----------|--------|---------|
| <b>House Side</b>  | Lumens    | 629.9    | 0.0    | 629.9   |
|                    | % Fixture | 6.0      | 0.0    | 6.0     |
| <b>Street Side</b> | Lumens    | 9871.1   | 0.0    | 9871.1  |
|                    | % Fixture | 94.0     | 0.0    | 94.0    |
| <b>Total</b>       | Lumens    | 10501.0  | 0.0    | 10501.0 |
|                    | % Fixture | 100.0    | 0.0    | 100.0   |

**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 115.5   | 1.1       |
| 10°-20°   | 343.8   | 3.3       |
| 20°-30°   | 598.7   | 5.7       |
| 30°-40°   | 1050.4  | 10.0      |
| 40°-50°   | 1758.2  | 16.7      |
| 50°-60°   | 2584.4  | 24.6      |
| 60°-70°   | 2653.5  | 25.3      |
| 70°-80°   | 1310.0  | 12.5      |
| 80°-90°   | 86.6    | 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°    | 10501.0 | 100.0     |
| 0°-180°   | 10501.0 | 100.0     |

**Coefficient of Utilization**



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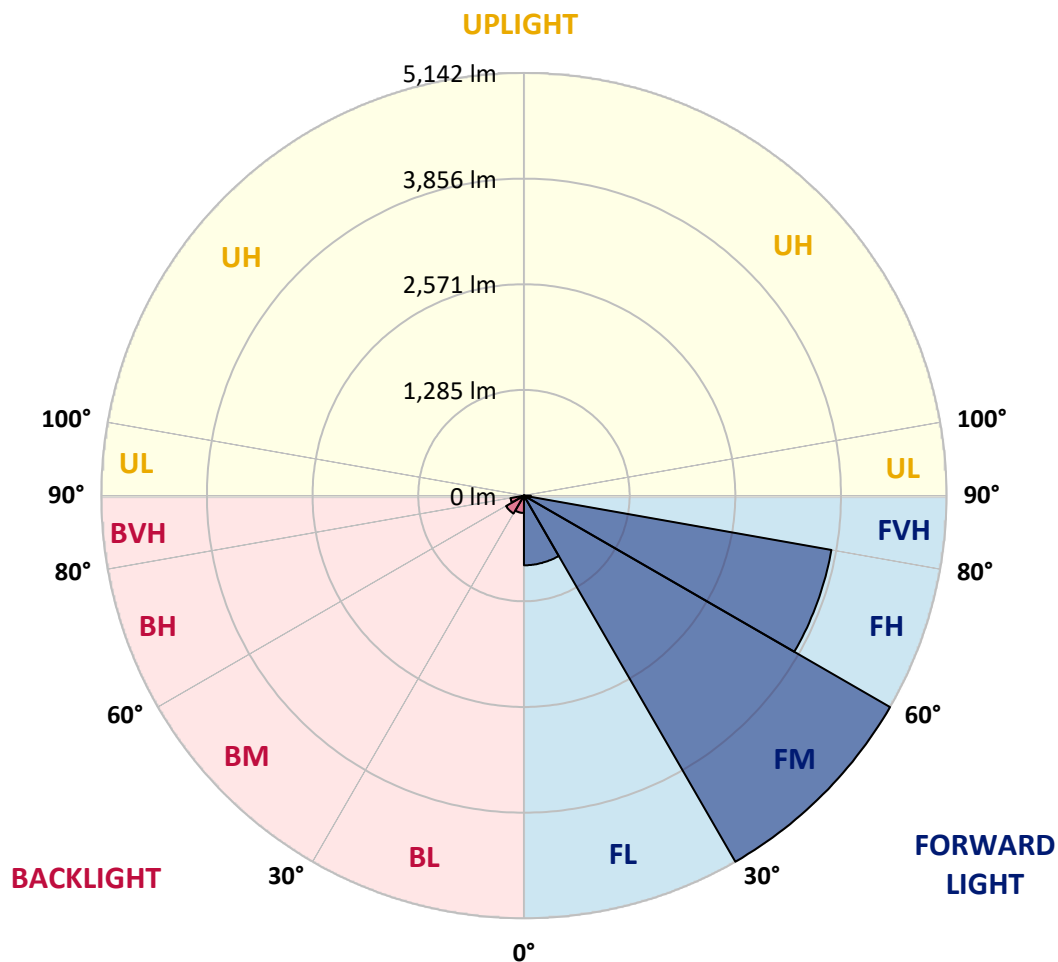
CATALOG NUMBER: GWC-SA2C-750-U-T2-HSS

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

| Zone |             | Lumens | % Fixture | Zone Rating/Lumen Limit |      |         |
|------|-------------|--------|-----------|-------------------------|------|---------|
|      |             |        |           | B                       | U    | G       |
| FL   | (0°-30°)    | 847.3  | 8.1       |                         |      |         |
| FM   | (30°-60°)   | 5141.8 | 49.0      |                         |      |         |
| FH   | (60°-80°)   | 3797.4 | 36.2      |                         |      | G2/5000 |
| FVH  | (80°-90°)   | 84.5   | 0.8       |                         |      | G1/100  |
| BL   | (0°-30°)    | 210.7  | 2.0       | B1/500                  |      |         |
| BM   | (30°-60°)   | 251.1  | 2.4       | B1/1000                 |      |         |
| BH   | (60°-80°)   | 166.0  | 1.6       | B1/500                  |      | G1/500  |
| BVH  | (80°-90°)   | 2.1    | 0.0       |                         |      | G0/10   |
| UL   | (90°-100°)  | 0.0    | 0.0       |                         | U0/0 |         |
| UH   | (100°-180°) | 0.0    | 0.0       |                         | U0/0 |         |

**BUG Rating: B1-U0-G2**

Type II Medium



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**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 5°     | 15°    | 25°    | 35°    | 45°    | 55°    | 65°     | 66°     | 75°     | 85°    |
|-------|--------|--------|--------|--------|--------|--------|--------|---------|---------|---------|--------|
| 0°    | 1195.0 | 1195.0 | 1195.0 | 1195.0 | 1195.0 | 1195.0 | 1195.0 | 1195.0  | 1195.0  | 1195.0  | 1195.0 |
| 2.5°  | 1406.5 | 1400.5 | 1398.0 | 1387.1 | 1368.1 | 1353.7 | 1325.7 | 1293.3  | 1287.3  | 1255.9  | 1217.5 |
| 5°    | 1589.1 | 1584.1 | 1580.6 | 1565.1 | 1545.7 | 1509.3 | 1458.4 | 1398.0  | 1386.6  | 1326.7  | 1249.9 |
| 7.5°  | 1716.3 | 1725.2 | 1725.2 | 1715.3 | 1690.8 | 1663.4 | 1601.0 | 1518.7  | 1504.3  | 1412.5  | 1293.3 |
| 10°   | 1790.6 | 1801.5 | 1810.0 | 1818.5 | 1815.0 | 1804.0 | 1745.2 | 1652.4  | 1635.0  | 1513.3  | 1343.7 |
| 12.5° | 1797.6 | 1808.5 | 1832.5 | 1867.9 | 1902.3 | 1927.2 | 1890.3 | 1800.6  | 1780.6  | 1630.0  | 1403.5 |
| 15°   | 1758.7 | 1770.1 | 1807.0 | 1875.9 | 1959.2 | 2032.0 | 2044.0 | 1964.6  | 1944.2  | 1769.1  | 1478.3 |
| 17.5° | 1690.8 | 1698.3 | 1751.2 | 1846.4 | 1977.1 | 2110.8 | 2183.1 | 2140.7  | 2121.8  | 1928.2  | 1561.6 |
| 20°   | 1640.4 | 1645.9 | 1692.3 | 1794.6 | 1966.1 | 2160.2 | 2314.8 | 2327.7  | 2307.8  | 2098.8  | 1651.9 |
| 22.5° | 1726.7 | 1736.7 | 1738.2 | 1786.6 | 1936.2 | 2184.6 | 2430.5 | 2511.8  | 2496.8  | 2279.9  | 1740.7 |
| 25°   | 1962.7 | 1974.1 | 1936.2 | 1906.3 | 1961.7 | 2195.6 | 2529.7 | 2700.3  | 2688.4  | 2474.9  | 1830.0 |
| 27.5° | 2274.4 | 2286.4 | 2237.5 | 2148.2 | 2094.8 | 2237.0 | 2618.0 | 2891.9  | 2891.4  | 2681.4  | 1926.2 |
| 30°   | 2580.6 | 2592.6 | 2542.7 | 2453.4 | 2330.7 | 2354.2 | 2694.3 | 3092.4  | 3095.4  | 2894.3  | 2028.5 |
| 32.5° | 2901.8 | 2916.8 | 2865.4 | 2750.7 | 2622.5 | 2556.7 | 2801.6 | 3293.9  | 3310.8  | 3141.2  | 2143.7 |
| 35°   | 3266.9 | 3268.9 | 3196.6 | 3076.4 | 2928.8 | 2827.5 | 2973.7 | 3519.8  | 3560.2  | 3447.0  | 2289.8 |
| 37.5° | 3625.0 | 3639.5 | 3580.2 | 3390.6 | 3255.0 | 3140.2 | 3229.5 | 3802.1  | 3859.5  | 3820.6  | 2480.9 |
| 40°   | 3890.4 | 3920.8 | 3912.3 | 3707.8 | 3579.2 | 3497.4 | 3547.2 | 4137.8  | 4210.6  | 4255.5  | 2721.8 |
| 42.5° | 4057.0 | 4079.9 | 4118.8 | 3995.6 | 3878.9 | 3892.4 | 3922.3 | 4528.8  | 4618.6  | 4751.3  | 2998.6 |
| 45°   | 4248.0 | 4259.0 | 4291.4 | 4237.0 | 4158.2 | 4293.9 | 4320.3 | 4969.2  | 5063.5  | 5284.4  | 3305.8 |
| 47.5° | 4481.4 | 4507.4 | 4516.3 | 4466.5 | 4430.6 | 4649.0 | 4703.9 | 5369.7  | 5501.9  | 5855.5  | 3631.0 |
| 50°   | 4778.7 | 4785.7 | 4801.1 | 4768.7 | 4732.8 | 4954.3 | 5048.0 | 5790.2  | 5910.4  | 6428.6  | 3951.7 |
| 52.5° | 5069.5 | 5094.4 | 5148.3 | 5127.8 | 5113.4 | 5214.1 | 5354.8 | 6169.3  | 6303.4  | 6906.4  | 4271.9 |
| 55°   | 5153.3 | 5174.7 | 5360.8 | 5487.9 | 5605.7 | 5534.3 | 5648.0 | 6508.9  | 6654.1  | 7333.4  | 4580.2 |
| 57.5° | 4818.6 | 4862.0 | 5184.2 | 5515.4 | 6003.7 | 6032.1 | 6051.1 | 6857.6  | 6987.7  | 7660.6  | 4900.9 |
| 60°   | 3972.7 | 3981.2 | 4509.9 | 5078.0 | 5937.8 | 6466.5 | 6639.6 | 7232.1  | 7341.4  | 7965.3  | 5284.9 |
| 62.5° | 2526.8 | 2613.0 | 3193.1 | 3995.1 | 5241.6 | 6403.7 | 7351.3 | 7798.7  | 7838.6  | 8330.9  | 5835.6 |
| 65°   | 1203.5 | 1259.4 | 1677.4 | 2468.4 | 3796.6 | 5599.2 | 7842.6 | 8823.7  | 8841.7  | 9055.6  | 6571.3 |
| 67.5° | 666.4  | 693.3  | 892.3  | 1328.7 | 2219.5 | 3959.7 | 7644.1 | 10037.7 | 10054.7 | 9795.8  | 7216.7 |
| 69°   | 521.2  | 544.2  | 700.8  | 1001.5 | 1504.8 | 2846.0 | 6917.4 | 10393.3 | 10443.7 | 10007.8 | 7239.6 |
| 70°   | 442.4  | 464.9  | 603.5  | 845.9  | 1210.0 | 2199.1 | 6157.3 | 10305.0 | 10358.4 | 9987.8  | 7068.5 |
| 72.5° | 270.8  | 283.8  | 402.0  | 595.5  | 811.0  | 1106.3 | 3797.1 | 8715.0  | 8805.2  | 9161.9  | 6075.0 |
| 75°   | 182.5  | 189.5  | 251.4  | 411.0  | 580.1  | 569.6  | 1972.6 | 6142.8  | 6338.3  | 7126.9  | 4486.9 |
| 77.5° | 130.7  | 137.2  | 168.6  | 265.8  | 406.5  | 376.1  | 893.3  | 3817.6  | 3859.5  | 4274.4  | 2447.0 |
| 80°   | 74.3   | 80.3   | 119.2  | 158.1  | 275.8  | 250.9  | 355.1  | 1823.5  | 1844.4  | 1833.0  | 817.0  |
| 82.5° | 38.9   | 43.9   | 65.3   | 104.2  | 177.1  | 164.1  | 147.6  | 610.5   | 613.5   | 510.2   | 179.1  |
| 85°   | 7.5    | 9.0    | 32.4   | 71.3   | 91.3   | 71.3   | 60.4   | 143.1   | 146.1   | 129.2   | 44.4   |
| 87.5° | 0.0    | 0.5    | 13.0   | 16.0   | 18.0   | 18.5   | 19.5   | 27.9    | 29.9    | 40.4    | 12.0   |
| 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-SA2C-750-U-T2-HSS

**CANDELA DISTRIBUTION (continued):**

|       | 90°    | 95°    | 105°   | 115°   | 125°   | 135°   | 145°   | 155°   | 165°   | 175°   | 180°   |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 1195.0 | 1195.0 | 1195.0 | 1195.0 | 1195.0 | 1195.0 | 1195.0 | 1195.0 | 1195.0 | 1195.0 | 1195.0 |
| 2.5°  | 1200.5 | 1182.6 | 1148.2 | 1108.3 | 1077.3 | 1046.9 | 1023.0 | 998.0  | 989.1  | 984.6  | 984.1  |
| 5°    | 1212.5 | 1174.6 | 1101.8 | 1027.0 | 965.6  | 907.8  | 866.4  | 827.0  | 808.5  | 800.0  | 796.5  |
| 7.5°  | 1232.5 | 1171.6 | 1054.4 | 940.2  | 851.9  | 779.6  | 722.2  | 679.3  | 657.9  | 648.9  | 645.4  |
| 10°   | 1255.9 | 1167.6 | 999.0  | 848.4  | 735.7  | 660.9  | 604.0  | 561.6  | 538.2  | 528.2  | 523.2  |
| 12.5° | 1283.3 | 1160.6 | 935.2  | 755.6  | 636.4  | 561.6  | 492.8  | 440.4  | 413.5  | 402.0  | 396.5  |
| 15°   | 1317.2 | 1153.6 | 868.4  | 668.3  | 549.1  | 457.9  | 382.6  | 347.1  | 341.7  | 339.7  | 340.2  |
| 17.5° | 1350.7 | 1142.7 | 795.5  | 582.1  | 457.4  | 357.6  | 319.2  | 317.2  | 318.2  | 318.2  | 318.2  |
| 20°   | 1380.6 | 1117.7 | 716.2  | 508.2  | 370.1  | 301.8  | 293.8  | 290.3  | 287.8  | 285.8  | 283.3  |
| 22.5° | 1404.0 | 1084.3 | 639.9  | 434.9  | 302.3  | 276.3  | 263.8  | 252.9  | 243.9  | 237.9  | 234.9  |
| 25°   | 1420.0 | 1039.9 | 570.1  | 364.6  | 271.8  | 251.4  | 228.9  | 210.5  | 196.5  | 188.0  | 184.5  |
| 27.5° | 1432.0 | 992.0  | 507.7  | 305.2  | 250.9  | 222.5  | 193.0  | 171.1  | 156.6  | 149.1  | 146.1  |
| 30°   | 1440.4 | 937.7  | 452.9  | 268.3  | 227.4  | 192.0  | 160.6  | 139.2  | 128.7  | 124.7  | 122.7  |
| 32.5° | 1448.4 | 877.3  | 401.0  | 250.9  | 205.5  | 164.1  | 134.7  | 118.2  | 111.7  | 106.7  | 105.2  |
| 35°   | 1468.4 | 821.5  | 351.6  | 232.4  | 183.0  | 140.2  | 115.7  | 103.7  | 97.3   | 94.3   | 93.3   |
| 37.5° | 1515.8 | 780.1  | 304.2  | 213.5  | 160.6  | 121.2  | 101.2  | 92.8   | 86.8   | 83.8   | 82.8   |
| 40°   | 1592.1 | 759.1  | 264.3  | 193.0  | 138.7  | 106.7  | 91.8   | 83.8   | 77.3   | 72.8   | 71.8   |
| 42.5° | 1704.3 | 762.1  | 236.4  | 172.6  | 121.2  | 95.3   | 82.8   | 73.3   | 66.3   | 62.3   | 61.3   |
| 45°   | 1840.5 | 784.1  | 217.0  | 152.6  | 106.7  | 86.3   | 72.8   | 62.8   | 56.4   | 52.9   | 51.9   |
| 47.5° | 1988.1 | 819.5  | 201.0  | 134.7  | 95.3   | 77.8   | 62.8   | 52.4   | 46.9   | 43.9   | 43.4   |
| 50°   | 2143.7 | 853.9  | 184.5  | 117.2  | 85.3   | 69.3   | 52.9   | 43.4   | 38.9   | 36.4   | 35.4   |
| 52.5° | 2301.3 | 893.8  | 169.6  | 101.2  | 76.8   | 59.4   | 43.9   | 35.4   | 31.9   | 29.9   | 28.9   |
| 55°   | 2470.9 | 923.7  | 155.1  | 88.8   | 68.3   | 50.4   | 36.4   | 29.4   | 26.4   | 23.9   | 23.4   |
| 57.5° | 2670.4 | 970.1  | 140.2  | 76.8   | 58.4   | 41.9   | 29.9   | 23.4   | 20.9   | 18.5   | 18.0   |
| 60°   | 2939.7 | 1024.5 | 124.2  | 67.8   | 47.9   | 34.4   | 24.4   | 19.0   | 16.0   | 14.0   | 13.5   |
| 62.5° | 3294.9 | 1084.8 | 104.2  | 59.4   | 38.9   | 27.9   | 19.5   | 15.0   | 11.5   | 9.0    | 9.0    |
| 65°   | 3745.2 | 1183.1 | 85.3   | 49.9   | 31.9   | 22.9   | 15.0   | 11.0   | 6.5    | 4.0    | 4.0    |
| 67.5° | 4008.1 | 1200.0 | 68.8   | 40.9   | 25.9   | 19.5   | 12.5   | 7.5    | 2.0    | 0.5    | 0.0    |
| 69°   | 3923.8 | 1101.8 | 58.4   | 34.9   | 22.4   | 18.5   | 11.5   | 5.5    | 1.0    | 0.0    | 0.0    |
| 70°   | 3765.2 | 1007.5 | 51.4   | 30.9   | 20.4   | 17.5   | 11.0   | 4.0    | 1.0    | 0.0    | 0.0    |
| 72.5° | 3111.3 | 717.2  | 38.9   | 22.9   | 15.0   | 15.5   | 10.0   | 2.5    | 1.0    | 0.0    | 0.0    |
| 75°   | 2266.4 | 435.9  | 27.9   | 16.0   | 9.5    | 11.5   | 7.0    | 1.0    | 0.5    | 0.0    | 0.0    |
| 77.5° | 1260.9 | 205.5  | 17.5   | 9.0    | 6.0    | 7.0    | 3.5    | 0.0    | 0.0    | 0.0    | 0.0    |
| 80°   | 409.5  | 55.9   | 8.0    | 5.0    | 3.5    | 4.0    | 1.5    | 0.0    | 0.0    | 0.0    | 0.0    |
| 82.5° | 75.8   | 16.0   | 4.5    | 2.5    | 1.0    | 1.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |
| 85°   | 16.5   | 6.5    | 2.5    | 1.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |
| 87.5° | 5.5    | 2.0    | 0.5    | 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    |

LM-79-08: Approved Method: Electrical and Photometric Measurements of Solid-  
State Lighting Products

Report Prepared for

Cooper Lighting Solutions

(formerly Eaton)

INVUE

Report Number: SP1-2104-224-4

Luminaire Tested: CCW-SA-2A-750-U-SL4

Test Date: 05/04/2021

### Test Information

Test Method: LM-79-08  
 Report Number: SP1-2104-224-4  
 Test Lab: COOPER LIGHTING SOLUTIONS  
 Photometer: SP1  
 Measurement Geometry:  $4\pi$   
 Issue Date: 05/04/2021  
 Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
 Product Line: INVUE  
 Catalog Number: **CCW-SA-2A-750-U-SL4**  
 Description: INVUE WALL PACK ClearCurve Light Square

### Spectral Parameters

|                           |        |           |      |      |       |
|---------------------------|--------|-----------|------|------|-------|
| CCT (K):                  | 4797   | CRI (Ra): | 71.8 |      |       |
| CIE u':                   | 0.2115 | R1:       | 69.5 | R9:  | -28.1 |
| CIE v':                   | 0.4912 | R2:       | 75.8 | R10: | 43.3  |
| Duv:                      | 0.0031 | R3:       | 81.2 | R11: | 71.1  |
| CIE x:                    | 0.3518 | R4:       | 73.2 | R12: | 43.8  |
| CIE y:                    | 0.3631 | R5:       | 70.2 | R13: | 69.8  |
| CIE z:                    | 0.2851 | R6:       | 67.5 | R14: | 89.4  |
| Peak Wavelength (nm):     | 445    | R7:       | 80.3 |      |       |
| Dominant Wavelength (nm): | 572    | R8:       | 57.0 |      |       |
| Purity:                   | 14.6   |           |      |      |       |
| Rf:                       | 72.7   |           |      |      |       |
| Rg:                       | 96.4   |           |      |      |       |



### Test Conditions

Stabilization Time: 91M  
 Operation Time: 12H  
 Room Temperature (°C) / RH%: 24.8/44%  
 Sphere Temperature (°C): 24.5

REPORT NUMBER: SP1-2104-224-4

| 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**



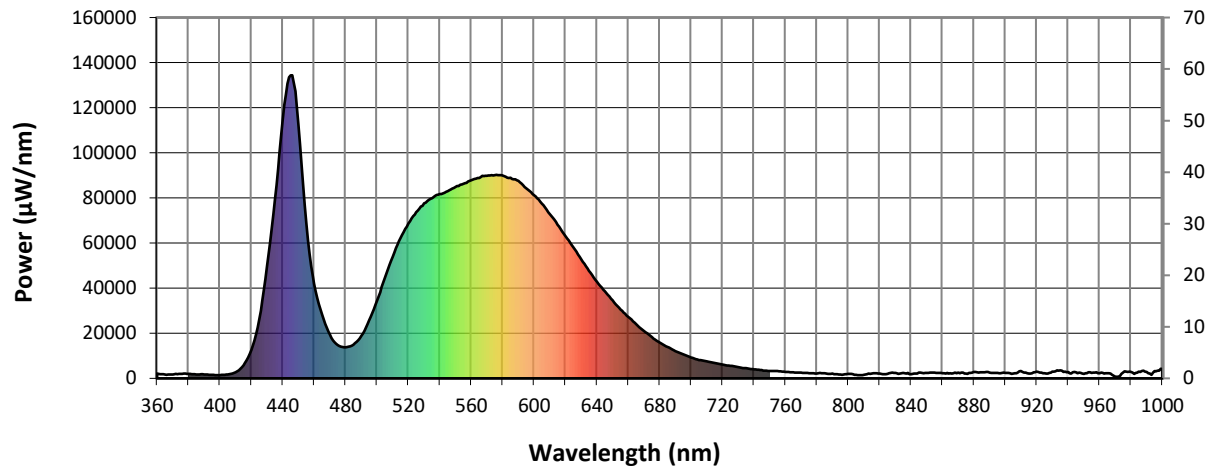
**CIE 1931 Chromaticity Diagram with 2017 ANSI 7-Step and 4-Step Quadrangles**



Point lies inside the ANSI 5000K 7-step quadrangle

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### Photopic Flux vs. Wavelength

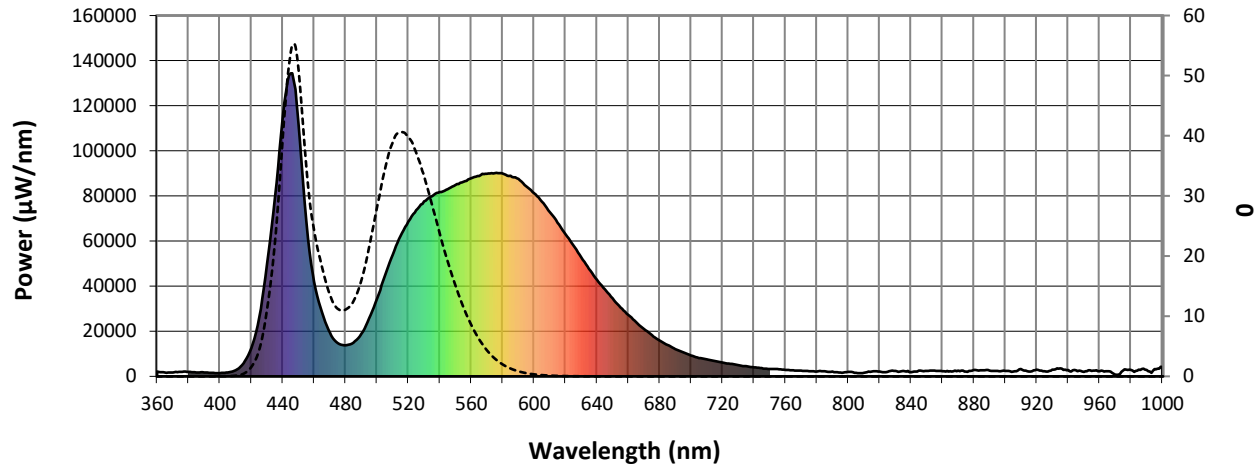


#####

| 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       | 2166             | 0.0              | 490       | 18819            | 2.7              | 620       | 63002            | 16.4             | 750       | 3328             | 0.0              | 880       | 2830             | 0.0              |
| 365       | 1672             | 0.0              | 495       | 25621            | 4.6              | 625       | 58119            | 12.8             | 755       | 3244             | 0.0              | 885       | 2751             | 0.0              |
| 370       | 1688             | 0.0              | 500       | 34501            | 7.6              | 630       | 52745            | 9.5              | 760       | 2856             | 0.0              | 890       | 2579             | 0.0              |
| 375       | 2041             | 0.0              | 505       | 44365            | 12.4             | 635       | 47707            | 7.2              | 765       | 2696             | 0.0              | 895       | 2461             | 0.0              |
| 380       | 1996             | 0.0              | 510       | 53923            | 18.5             | 640       | 42815            | 5.1              | 770       | 2495             | 0.0              | 900       | 2372             | 0.0              |
| 385       | 1720             | 0.0              | 515       | 62101            | 25.7             | 645       | 38643            | 3.7              | 775       | 2247             | 0.0              | 905       | 2190             | 0.0              |
| 390       | 1706             | 0.0              | 520       | 68661            | 33.3             | 650       | 34557            | 2.5              | 780       | 2133             | 0.0              | 910       | 3204             | 0.0              |
| 395       | 1550             | 0.0              | 525       | 73606            | 39.5             | 655       | 30447            | 1.7              | 785       | 2276             | 0.0              | 915       | 2069             | 0.0              |
| 400       | 1444             | 0.0              | 530       | 77628            | 45.7             | 660       | 27287            | 1.1              | 790       | 2093             | 0.0              | 920       | 2977             | 0.0              |
| 405       | 1761             | 0.0              | 535       | 79955            | 49.6             | 665       | 24046            | 0.8              | 795       | 1681             | 0.0              | 925       | 2332             | 0.0              |
| 410       | 2694             | 0.0              | 540       | 81715            | 53.2             | 670       | 20995            | 0.5              | 800       | 2044             | 0.0              | 930       | 2929             | 0.0              |
| 415       | 5767             | 0.0              | 545       | 83067            | 55.3             | 675       | 18242            | 0.3              | 805       | 1519             | 0.0              | 935       | 3495             | 0.0              |
| 420       | 12476            | 0.0              | 550       | 84799            | 57.6             | 680       | 15871            | 0.2              | 810       | 1549             | 0.0              | 940       | 2810             | 0.0              |
| 425       | 26189            | 0.1              | 555       | 86279            | 58.9             | 685       | 13910            | 0.1              | 815       | 2097             | 0.0              | 945       | 2657             | 0.0              |
| 430       | 49608            | 0.4              | 560       | 87792            | 59.7             | 690       | 12111            | 0.1              | 820       | 2098             | 0.0              | 950       | 1935             | 0.0              |
| 435       | 79442            | 0.9              | 565       | 88893            | 59.1             | 695       | 10644            | 0.0              | 825       | 2049             | 0.0              | 955       | 2408             | 0.0              |
| 440       | 114477           | 1.8              | 570       | 89760            | 58.4             | 700       | 9267             | 0.0              | 830       | 2352             | 0.0              | 960       | 2331             | 0.0              |
| 445       | 134358           | 2.8              | 575       | 90097            | 56.1             | 705       | 8161             | 0.0              | 835       | 2358             | 0.0              | 965       | 2231             | 0.0              |
| 450       | 112862           | 2.9              | 580       | 90008            | 53.5             | 710       | 7567             | 0.0              | 840       | 1853             | 0.0              | 970       | 688              | 0.0              |
| 455       | 68630            | 2.3              | 585       | 88925            | 49.4             | 715       | 6794             | 0.0              | 845       | 2553             | 0.0              | 975       | 2537             | 0.0              |
| 460       | 41987            | 1.7              | 590       | 87580            | 45.3             | 720       | 6069             | 0.0              | 850       | 2413             | 0.0              | 980       | 2826             | 0.0              |
| 465       | 28353            | 1.5              | 595       | 84246            | 39.9             | 725       | 5588             | 0.0              | 855       | 2597             | 0.0              | 985       | 3000             | 0.0              |
| 470       | 19290            | 1.2              | 600       | 81176            | 35.0             | 730       | 4999             | 0.0              | 860       | 2269             | 0.0              | 990       | 2880             | 0.0              |
| 475       | 14790            | 1.2              | 605       | 77529            | 30.0             | 735       | 4495             | 0.0              | 865       | 2210             | 0.0              | 995       | 3332             | 0.0              |
| 480       | 13767            | 1.3              | 610       | 72750            | 25.0             | 740       | 4033             | 0.0              | 870       | 2564             | 0.0              | 1000      | 4187             | 0.0              |
| 485       | 14964            | 1.8              | 615       | 68174            | 20.6             | 745       | 3625             | 0.0              | 875       | 2169             | 0.0              |           |                  |                  |

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### Scotopic Flux vs. Wavelength



Scotopic Lumens: 9214.6

S/P: 1.71

| 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       | 2166             | 0.0              | 490       | 18819            | 29.0             | 620       | 63002            | 0.8              | 750       | 3328             | 0.0              | 880       | 2830             | 0.0              |
| 365       | 1672             | 0.0              | 495       | 25621            | 41.4             | 625       | 58119            | 0.5              | 755       | 3244             | 0.0              | 885       | 2751             | 0.0              |
| 370       | 1688             | 0.0              | 500       | 34501            | 57.7             | 630       | 52745            | 0.3              | 760       | 2856             | 0.0              | 890       | 2579             | 0.0              |
| 375       | 2041             | 0.0              | 505       | 44365            | 75.4             | 635       | 47707            | 0.2              | 765       | 2696             | 0.0              | 895       | 2461             | 0.0              |
| 380       | 1996             | 0.0              | 510       | 53923            | 91.4             | 640       | 42815            | 0.1              | 770       | 2495             | 0.0              | 900       | 2372             | 0.0              |
| 385       | 1720             | 0.0              | 515       | 62101            | 102.9            | 645       | 38643            | 0.1              | 775       | 2247             | 0.0              | 905       | 2190             | 0.0              |
| 390       | 1706             | 0.0              | 520       | 68661            | 109.1            | 650       | 34557            | 0.0              | 780       | 2133             | 0.0              | 910       | 3204             | 0.0              |
| 395       | 1550             | 0.0              | 525       | 73606            | 110.1            | 655       | 30447            | 0.0              | 785       | 2276             | 0.0              | 915       | 2069             | 0.0              |
| 400       | 1444             | 0.0              | 530       | 77628            | 107.0            | 660       | 27287            | 0.0              | 790       | 2093             | 0.0              | 920       | 2977             | 0.0              |
| 405       | 1761             | 0.1              | 535       | 79955            | 99.6             | 665       | 24046            | 0.0              | 795       | 1681             | 0.0              | 925       | 2332             | 0.0              |
| 410       | 2694             | 0.2              | 540       | 81715            | 90.3             | 670       | 20995            | 0.0              | 800       | 2044             | 0.0              | 930       | 2929             | 0.0              |
| 415       | 5767             | 0.6              | 545       | 83067            | 79.6             | 675       | 18242            | 0.0              | 805       | 1519             | 0.0              | 935       | 3495             | 0.0              |
| 420       | 12476            | 2.1              | 550       | 84799            | 69.3             | 680       | 15871            | 0.0              | 810       | 1549             | 0.0              | 940       | 2810             | 0.0              |
| 425       | 26189            | 6.4              | 555       | 86279            | 59.0             | 685       | 13910            | 0.0              | 815       | 2097             | 0.0              | 945       | 2657             | 0.0              |
| 430       | 49608            | 16.9             | 560       | 87792            | 49.1             | 690       | 12111            | 0.0              | 820       | 2098             | 0.0              | 950       | 1935             | 0.0              |
| 435       | 79442            | 35.5             | 565       | 88893            | 39.9             | 695       | 10644            | 0.0              | 825       | 2049             | 0.0              | 955       | 2408             | 0.0              |
| 440       | 114477           | 64.0             | 570       | 89760            | 31.7             | 700       | 9267             | 0.0              | 830       | 2352             | 0.0              | 960       | 2331             | 0.0              |
| 445       | 134358           | 90.0             | 575       | 90097            | 24.5             | 705       | 8161             | 0.0              | 835       | 2358             | 0.0              | 965       | 2231             | 0.0              |
| 450       | 112862           | 87.5             | 580       | 90008            | 18.5             | 710       | 7567             | 0.0              | 840       | 1853             | 0.0              | 970       | 688              | 0.0              |
| 455       | 68630            | 60.0             | 585       | 88925            | 13.6             | 715       | 6794             | 0.0              | 845       | 2553             | 0.0              | 975       | 2537             | 0.0              |
| 460       | 41987            | 40.6             | 590       | 87580            | 9.8              | 720       | 6069             | 0.0              | 850       | 2413             | 0.0              | 980       | 2826             | 0.0              |
| 465       | 28353            | 29.9             | 595       | 84246            | 6.7              | 725       | 5588             | 0.0              | 855       | 2597             | 0.0              | 985       | 3000             | 0.0              |
| 470       | 19290            | 22.2             | 600       | 81176            | 4.6              | 730       | 4999             | 0.0              | 860       | 2269             | 0.0              | 990       | 2880             | 0.0              |
| 475       | 14790            | 18.5             | 605       | 77529            | 3.0              | 735       | 4495             | 0.0              | 865       | 2210             | 0.0              | 995       | 3332             | 0.0              |
| 480       | 13767            | 18.6             | 610       | 72750            | 2.0              | 740       | 4033             | 0.0              | 870       | 2564             | 0.0              | 1000      | 4187             | 0.0              |
| 485       | 14964            | 21.7             | 615       | 68174            | 1.3              | 745       | 3625             | 0.0              | 875       | 2169             | 0.0              |           |                  |                  |

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### Melanopic Flux vs. Wavelength



**Melanopic Lumens: 3619.9**

**M/P: 0.67**

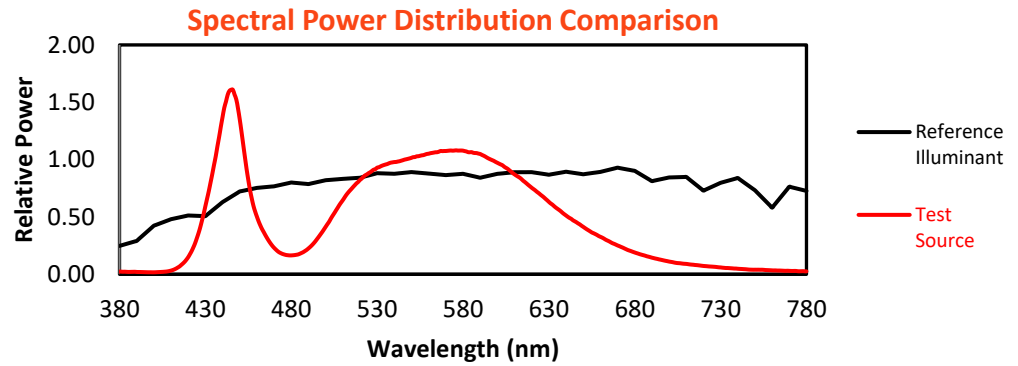
| λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) |
|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|
| 360       | 2166             | 0.0              | 490       | 18819            | 15.7             | 620       | 63002            | 0.0              | 750       | 3328             | 0.0              | 880       | 2830             | 0.0              |
| 365       | 1672             | 0.0              | 495       | 25621            | 21.2             | 625       | 58119            | 0.0              | 755       | 3244             | 0.0              | 885       | 2751             | 0.0              |
| 370       | 1688             | 0.0              | 500       | 34501            | 27.7             | 630       | 52745            | 0.0              | 760       | 2856             | 0.0              | 890       | 2579             | 0.0              |
| 375       | 2041             | 0.0              | 505       | 44365            | 34.0             | 635       | 47707            | 0.0              | 765       | 2696             | 0.0              | 895       | 2461             | 0.0              |
| 380       | 1996             | 0.0              | 510       | 53923            | 38.7             | 640       | 42815            | 0.0              | 770       | 2495             | 0.0              | 900       | 2372             | 0.0              |
| 385       | 1720             | 0.0              | 515       | 62101            | 40.6             | 645       | 38643            | 0.0              | 775       | 2247             | 0.0              | 905       | 2190             | 0.0              |
| 390       | 1706             | 0.0              | 520       | 68661            | 40.0             | 650       | 34557            | 0.0              | 780       | 2133             | 0.0              | 910       | 3204             | 0.0              |
| 395       | 1550             | 0.0              | 525       | 73606            | 37.3             | 655       | 30447            | 0.0              | 785       | 2276             | 0.0              | 915       | 2069             | 0.0              |
| 400       | 1444             | 0.0              | 530       | 77628            | 33.5             | 660       | 27287            | 0.0              | 790       | 2093             | 0.0              | 920       | 2977             | 0.0              |
| 405       | 1761             | 0.0              | 535       | 79955            | 28.8             | 665       | 24046            | 0.0              | 795       | 1681             | 0.0              | 925       | 2332             | 0.0              |
| 410       | 2694             | 0.1              | 540       | 81715            | 23.9             | 670       | 20995            | 0.0              | 800       | 2044             | 0.0              | 930       | 2929             | 0.0              |
| 415       | 5767             | 0.4              | 545       | 83067            | 19.3             | 675       | 18242            | 0.0              | 805       | 1519             | 0.0              | 935       | 3495             | 0.0              |
| 420       | 12476            | 1.4              | 550       | 84799            | 15.2             | 680       | 15871            | 0.0              | 810       | 1549             | 0.0              | 940       | 2810             | 0.0              |
| 425       | 26189            | 4.1              | 555       | 86279            | 11.6             | 685       | 13910            | 0.0              | 815       | 2097             | 0.0              | 945       | 2657             | 0.0              |
| 430       | 49608            | 10.5             | 560       | 87792            | 8.7              | 690       | 12111            | 0.0              | 820       | 2098             | 0.0              | 950       | 1935             | 0.0              |
| 435       | 79442            | 21.2             | 565       | 88893            | 6.2              | 695       | 10644            | 0.0              | 825       | 2049             | 0.0              | 955       | 2408             | 0.0              |
| 440       | 114477           | 38.3             | 570       | 89760            | 4.4              | 700       | 9267             | 0.0              | 830       | 2352             | 0.0              | 960       | 2331             | 0.0              |
| 445       | 134358           | 53.0             | 575       | 90097            | 3.0              | 705       | 8161             | 0.0              | 835       | 2358             | 0.0              | 965       | 2231             | 0.0              |
| 450       | 112862           | 52.0             | 580       | 90008            | 2.0              | 710       | 7567             | 0.0              | 840       | 1853             | 0.0              | 970       | 688              | 0.0              |
| 455       | 68630            | 36.0             | 585       | 88925            | 1.3              | 715       | 6794             | 0.0              | 845       | 2553             | 0.0              | 975       | 2537             | 0.0              |
| 460       | 41987            | 24.7             | 590       | 87580            | 0.9              | 720       | 6069             | 0.0              | 850       | 2413             | 0.0              | 980       | 2826             | 0.0              |
| 465       | 28353            | 18.5             | 595       | 84246            | 0.5              | 725       | 5588             | 0.0              | 855       | 2597             | 0.0              | 985       | 3000             | 0.0              |
| 470       | 19290            | 13.8             | 600       | 81176            | 0.3              | 730       | 4999             | 0.0              | 860       | 2269             | 0.0              | 990       | 2880             | 0.0              |
| 475       | 14790            | 11.3             | 605       | 77529            | 0.2              | 735       | 4495             | 0.0              | 865       | 2210             | 0.0              | 995       | 3332             | 0.0              |
| 480       | 13767            | 11.1             | 610       | 72750            | 0.1              | 740       | 4033             | 0.0              | 870       | 2564             | 0.0              | 1000      | 4187             | 0.0              |
| 485       | 14964            | 12.3             | 615       | 68174            | 0.1              | 745       | 3625             | 0.0              | 875       | 2169             | 0.0              |           |                  |                  |

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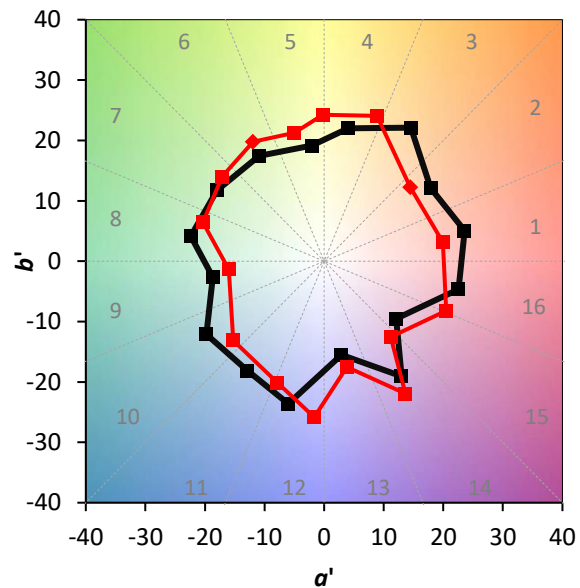
TM-30-18

### Summary

$R_f = 72.7$   
 $R_g = 96.4$   
 $CIE R_a = 71.8$   
 $R_g = -28.1$



### Color Vector Graphics



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

|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 85 | CES26 = 57 | CES51 = 89 | CES76 = 45 |
| CES02 = 60 | CES27 = 82 | CES52 = 89 | CES77 = 66 |
| CES03 = 30 | CES28 = 78 | CES53 = 76 | CES78 = 48 |
| CES04 = 69 | CES29 = 55 | CES54 = 82 | CES79 = 76 |
| CES05 = 46 | CES30 = 66 | CES55 = 82 | CES80 = 73 |
| CES06 = 50 | CES31 = 60 | CES56 = 71 | CES81 = 75 |
| CES07 = 39 | CES32 = 54 | CES57 = 69 | CES82 = 89 |
| CES08 = 38 | CES33 = 67 | CES58 = 71 | CES83 = 85 |
| CES09 = 29 | CES34 = 65 | CES59 = 87 | CES84 = 87 |
| CES10 = 73 | CES35 = 80 | CES60 = 92 | CES85 = 82 |
| CES11 = 56 | CES36 = 97 | CES61 = 86 | CES86 = 75 |
| CES12 = 62 | CES37 = 74 | CES62 = 84 | CES87 = 76 |
| CES13 = 42 | CES38 = 76 | CES63 = 73 | CES88 = 78 |
| CES14 = 74 | CES39 = 93 | CES64 = 70 | CES89 = 74 |
| CES15 = 70 | CES40 = 86 | CES65 = 64 | CES90 = 76 |
| CES16 = 46 | CES41 = 87 | CES66 = 64 | CES91 = 86 |
| CES17 = 49 | CES42 = 73 | CES67 = 61 | CES92 = 66 |
| CES18 = 55 | CES43 = 71 | CES68 = 68 | CES93 = 80 |
| CES19 = 71 | CES44 = 98 | CES69 = 78 | CES94 = 57 |
| CES20 = 64 | CES45 = 81 | CES70 = 57 | CES95 = 70 |
| CES21 = 85 | CES46 = 80 | CES71 = 53 | CES96 = 78 |
| CES22 = 77 | CES47 = 78 | CES72 = 84 | CES97 = 84 |
| CES23 = 91 | CES48 = 71 | CES73 = 47 | CES98 = 73 |
| CES24 = 90 | CES49 = 79 | CES74 = 95 | CES99 = 62 |
| CES25 = 71 | CES50 = 87 | CES75 = 51 |            |



Color Rendition by Hue-Angle Bin



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**TM-30-18**

**Measure Comparisons**



(END OF REPORT)