

Scaled data based on original data using  
LM-79-2019 Approved Method: Electrical and Photometric Measurements of Solid-  
State Lighting Products

Test Report Prepared for

Cooper Lighting Solutions

Brand: McGRAW-EDISON

Report Number: P631351

Luminaire Tested: GWS-SA1F-740-U-T3R-W-GRSWH

Issue Date: 1/10/2023

**Test Information**

Test Method: LM-79-2019  
Report Number: P631351  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-2209-782-17)  
Test Lab: COOPER LIGHTING SOLUTIONS  
Issue Date: 1/10/2023  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: McGRAW-EDISON  
Catalog Number: GWS-SA1F-740-U-T3R-W-GRSWH  
Description: GALLEON WALL SLIM LUMINAIRE. (1) LIGHTSQUARES WITH 16 LEDS EACH AND  
TYPE III ROADWAY OPTICS W/ FACTORY INSTALLED GLARE SHIELD, WH  
Light Source: (16) 4000K CCT, 70 CRI LEDS  
Ballast/Driver: -

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 7386.4 lumens  
Efficiency: N/A  
Efficacy: 109.9 lumens/watt  
Luminous Opening: Rectangular (W 0.5' x L: 0.5' x H: 0')  
IES Classification: Type II - Short  
BUG Rating: B2 - U0 - G1

Input Watts (W): 67.2  
Input Voltage (V): 120  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: NR  
Total Harmonic Distortion (THDi): NR  
Frequency (hertz): 0  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 28.75 FT

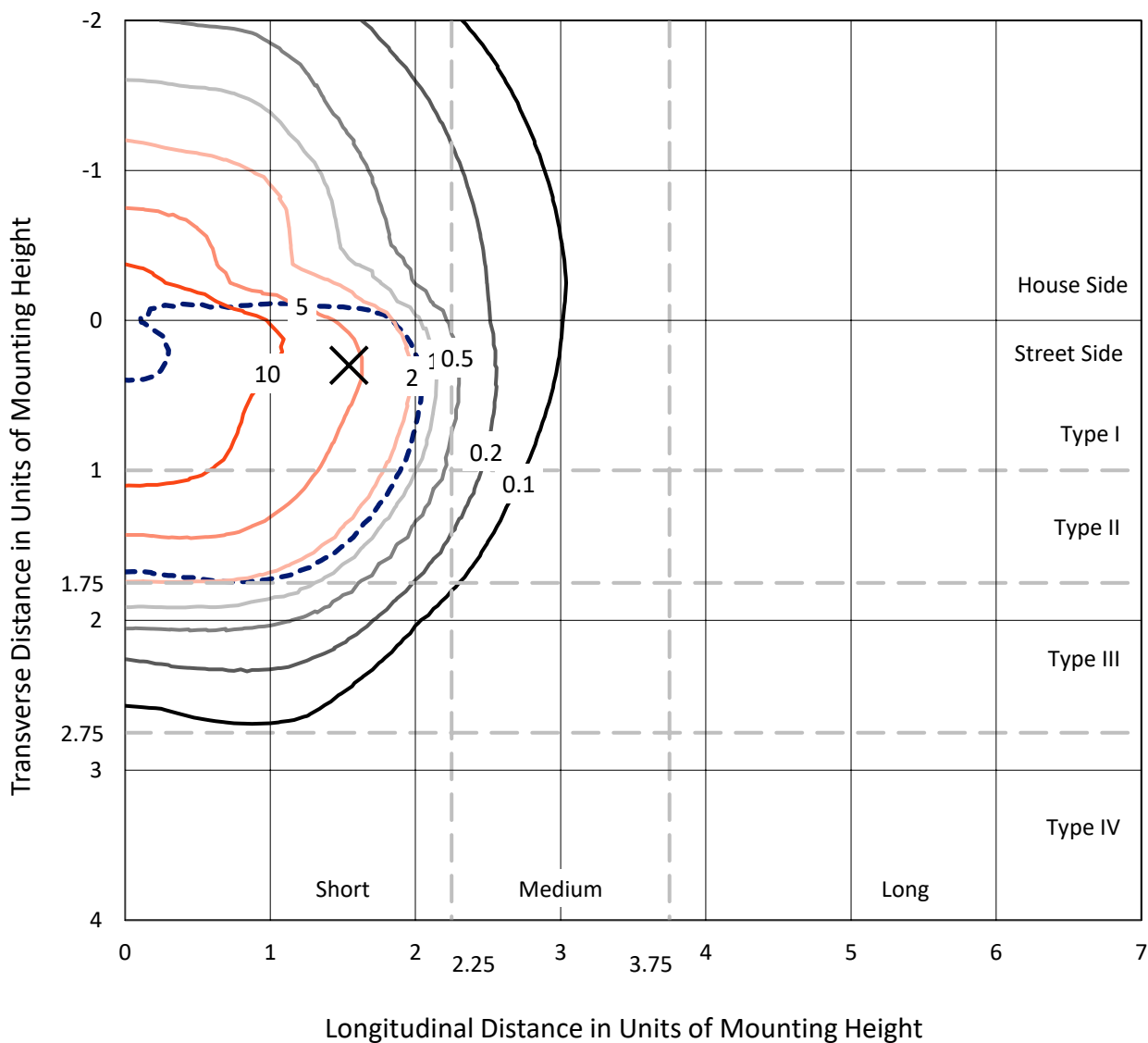


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## Iso-Footcandle Lines of Horizontal Illumination

✕ Max cd  
 - - - 1/2 Max cd

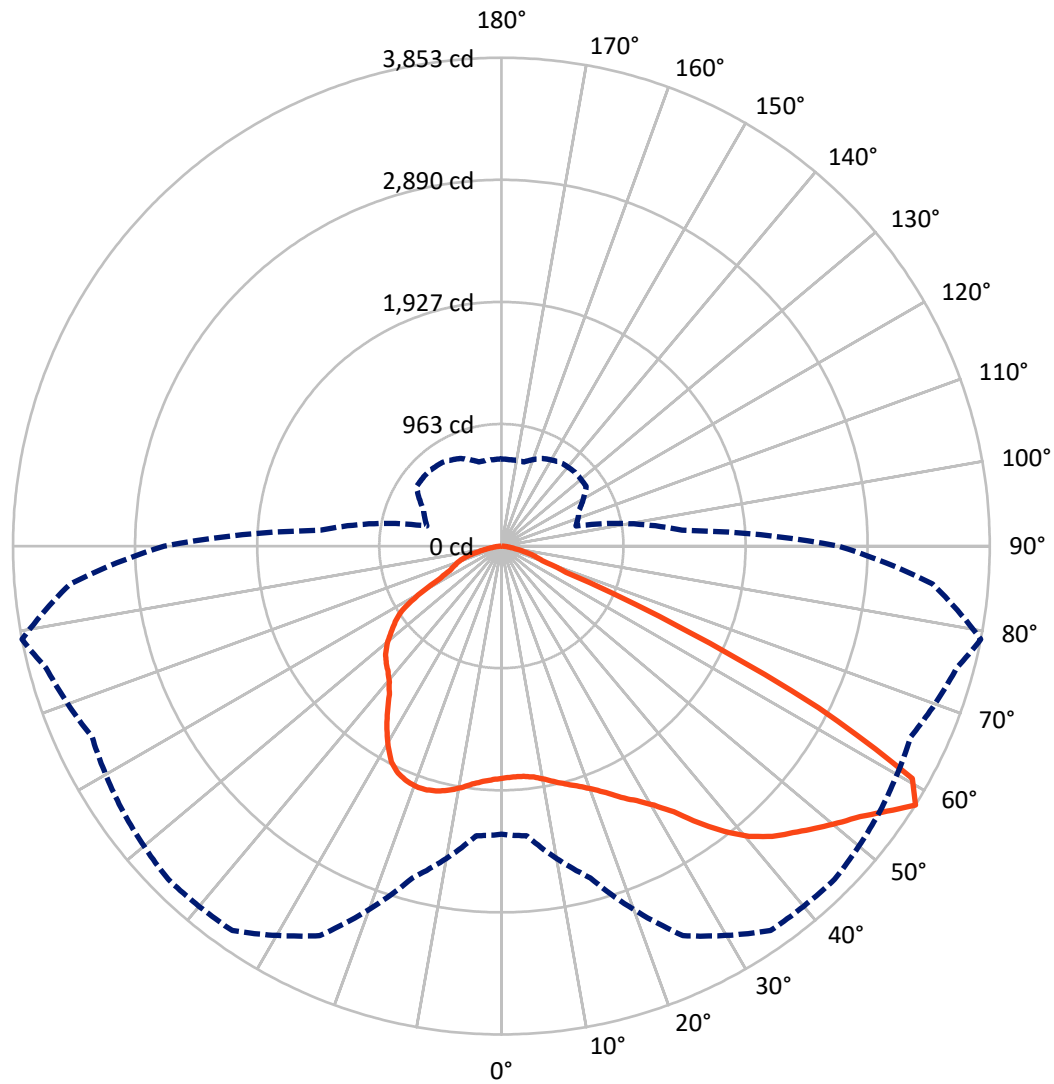


Based on 10 foot mounting height. Maximum calculated value = 18.5 fc  
 Type II - Short - N/A

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## Luminous Intensity Polar Plot



— Vertical Plane Through 79-Deg Lateral    - - - Horizontal Cone Through 57.5-Deg Vertical

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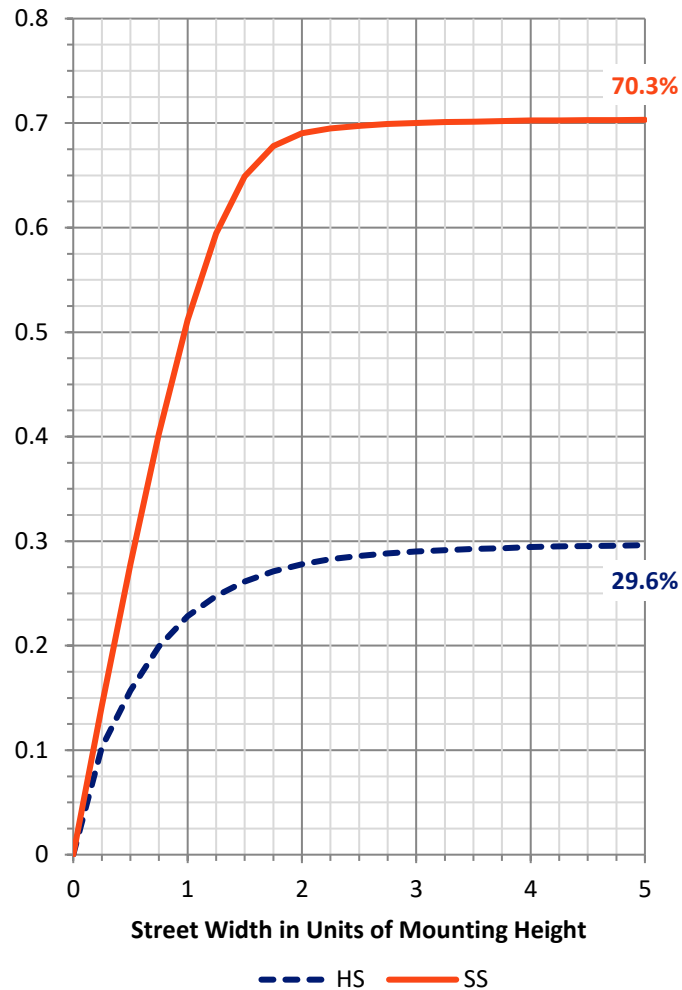
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total  |
|--------------------|-----------|----------|--------|--------|
| <b>House Side</b>  | Lumens    | 2195.6   | 0.0    | 2195.6 |
|                    | % Fixture | 29.7     | 0.0    | 29.7   |
| <b>Street Side</b> | Lumens    | 5190.8   | 0.0    | 5190.8 |
|                    | % Fixture | 70.3     | 0.0    | 70.3   |
| <b>Total</b>       | Lumens    | 7386.4   | 0.0    | 7386.4 |
|                    | % Fixture | 100.0    | 0.0    | 100.0  |

**ZONAL LUMENS:**

| Zone      | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10°    | 169.5  | 2.3       |
| 10°-20°   | 471.1  | 6.4       |
| 20°-30°   | 798.5  | 10.8      |
| 30°-40°   | 1222.3 | 16.5      |
| 40°-50°   | 1629.8 | 22.1      |
| 50°-60°   | 1882.3 | 25.5      |
| 60°-70°   | 978.1  | 13.2      |
| 70°-80°   | 207.9  | 2.8       |
| 80°-90°   | 26.9   | 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°    | 7386.4 | 100.0     |
| 0°-180°   | 7386.4 | 100.0     |

**Coefficient of Utilization**



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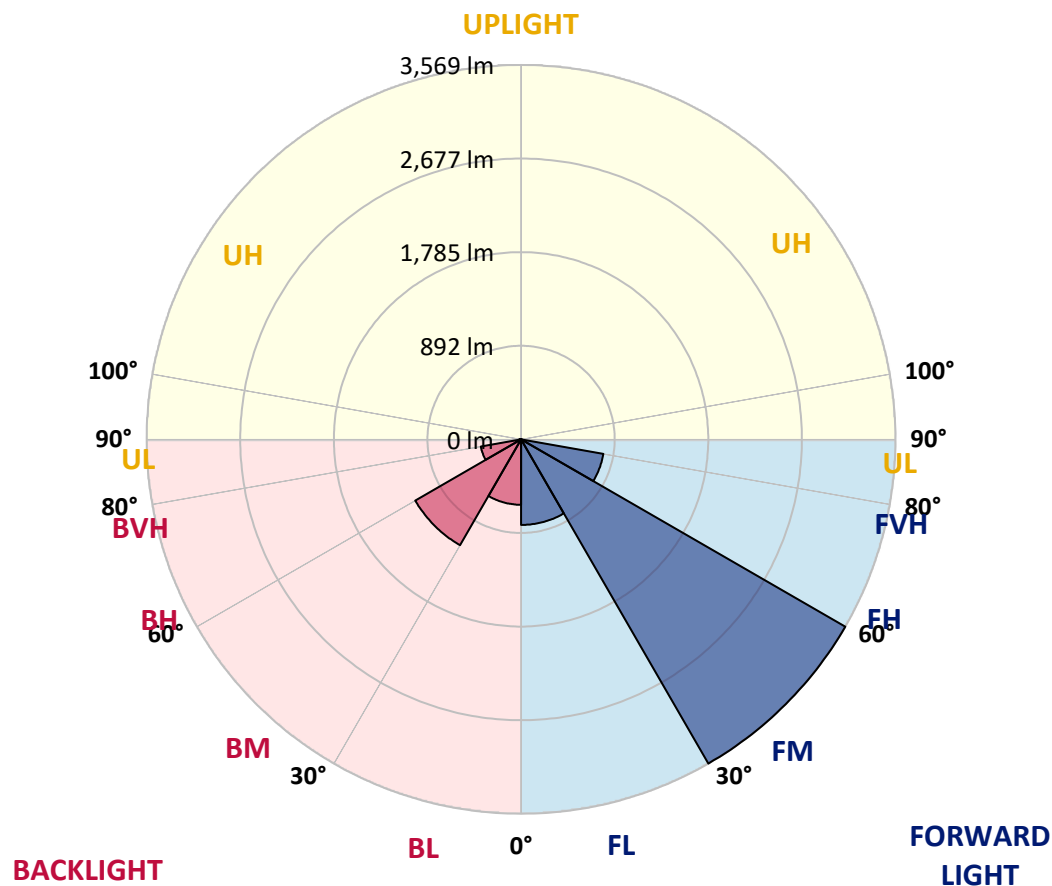
CATALOG NUMBER: GWS-SA1F-740-U-T3R-W-GRSWH

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

| Zone |             | Lumens | % Fixture | Zone Rating/Lumen Limit |      |         |
|------|-------------|--------|-----------|-------------------------|------|---------|
|      |             |        |           | B                       | U    | G       |
| FL   | (0°-30°)    | 815.6  | 11.0      |                         |      |         |
| FM   | (30°-60°)   | 3569.3 | 48.3      |                         |      |         |
| FH   | (60°-80°)   | 796.4  | 10.8      |                         |      | G1/1800 |
| FVH  | (80°-90°)   | 9.4    | 0.1       |                         |      | G0/10   |
| BL   | (0°-30°)    | 623.5  | 8.4       | B2/1000                 |      |         |
| BM   | (30°-60°)   | 1165.0 | 15.8      | B2/2500                 |      |         |
| BH   | (60°-80°)   | 389.6  | 5.3       | B1/500                  |      | G1/500  |
| BVH  | (80°-90°)   | 17.5   | 0.2       |                         |      | G1/100  |
| UL   | (90°-100°)  | 0.0    | 0.0       |                         | U0/0 |         |
| UH   | (100°-180°) | 0.0    | 0.0       |                         | U0/0 |         |

**BUG Rating: B2-U0-G1**

Type II Short





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CATALOG NUMBER: GWS-SA1F-740-U-T3R-W-GRSWH

**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 5°     | 15°    | 25°    | 35°    | 45°    | 55°    | 65°    | 75°    | 79°    | 85°    |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 1830.5 | 1830.5 | 1830.5 | 1830.5 | 1830.5 | 1830.5 | 1830.5 | 1830.5 | 1830.5 | 1830.5 | 1830.5 |
| 2.5°  | 1747.2 | 1743.6 | 1744.8 | 1749.6 | 1767.7 | 1781.0 | 1794.9 | 1807.6 | 1819.6 | 1823.3 | 1826.3 |
| 5°    | 1685.0 | 1678.3 | 1680.1 | 1688.0 | 1709.1 | 1731.5 | 1756.2 | 1786.4 | 1815.4 | 1825.1 | 1837.8 |
| 7.5°  | 1640.9 | 1639.7 | 1642.7 | 1654.8 | 1677.1 | 1698.3 | 1730.3 | 1773.1 | 1823.3 | 1839.6 | 1861.9 |
| 10°   | 1582.3 | 1579.9 | 1592.0 | 1616.7 | 1653.6 | 1687.4 | 1725.4 | 1776.2 | 1846.2 | 1870.4 | 1904.8 |
| 12.5° | 1535.8 | 1534.6 | 1547.3 | 1581.7 | 1628.8 | 1682.6 | 1735.1 | 1791.9 | 1877.0 | 1910.2 | 1952.5 |
| 15°   | 1563.0 | 1557.5 | 1558.1 | 1582.3 | 1624.6 | 1688.0 | 1759.3 | 1820.3 | 1907.8 | 1950.1 | 2004.5 |
| 17.5° | 1642.1 | 1632.4 | 1625.2 | 1629.4 | 1653.6 | 1719.4 | 1796.1 | 1858.3 | 1943.5 | 1993.0 | 2059.4 |
| 20°   | 1751.4 | 1746.0 | 1726.0 | 1712.8 | 1718.2 | 1776.2 | 1854.1 | 1912.1 | 1990.0 | 2045.5 | 2116.8 |
| 22.5° | 1898.2 | 1884.9 | 1857.7 | 1836.6 | 1820.3 | 1865.5 | 1937.4 | 1987.5 | 2054.6 | 2112.6 | 2186.8 |
| 25°   | 2079.9 | 2060.6 | 2017.7 | 1984.5 | 1949.5 | 1996.0 | 2060.0 | 2098.1 | 2143.4 | 2197.1 | 2267.8 |
| 27.5° | 2265.4 | 2249.0 | 2201.3 | 2156.6 | 2113.2 | 2142.2 | 2218.2 | 2240.0 | 2235.2 | 2274.4 | 2334.8 |
| 30°   | 2462.8 | 2442.3 | 2397.0 | 2348.7 | 2292.5 | 2311.3 | 2379.5 | 2390.4 | 2339.0 | 2371.6 | 2412.7 |
| 32.5° | 2671.2 | 2651.3 | 2612.0 | 2555.8 | 2492.4 | 2499.7 | 2518.4 | 2528.7 | 2479.7 | 2498.5 | 2529.9 |
| 35°   | 2883.2 | 2864.5 | 2824.6 | 2769.0 | 2722.5 | 2678.4 | 2631.3 | 2672.4 | 2644.0 | 2680.3 | 2677.8 |
| 37.5° | 3077.0 | 3058.3 | 3033.6 | 2990.7 | 2911.0 | 2824.0 | 2715.3 | 2766.0 | 2810.1 | 2856.0 | 2848.1 |
| 40°   | 3208.1 | 3195.4 | 3201.4 | 3194.8 | 3092.1 | 2920.0 | 2756.3 | 2811.9 | 2932.1 | 3010.6 | 3006.4 |
| 42.5° | 3321.0 | 3308.3 | 3343.4 | 3368.7 | 3248.0 | 3008.8 | 2776.3 | 2829.4 | 3010.0 | 3132.6 | 3126.6 |
| 45°   | 3371.2 | 3367.5 | 3425.5 | 3505.8 | 3390.5 | 3103.0 | 2827.6 | 2865.7 | 3069.2 | 3226.2 | 3203.3 |
| 47.5° | 3311.4 | 3324.0 | 3438.2 | 3574.1 | 3508.9 | 3214.7 | 2932.7 | 2942.4 | 3146.5 | 3327.7 | 3263.0 |
| 50°   | 3192.4 | 3220.2 | 3374.2 | 3575.9 | 3595.2 | 3341.0 | 3078.2 | 3054.1 | 3250.4 | 3435.8 | 3294.5 |
| 52.5° | 3019.1 | 3048.0 | 3299.3 | 3562.0 | 3644.7 | 3487.1 | 3272.1 | 3237.7 | 3381.4 | 3543.9 | 3299.9 |
| 55°   | 2621.1 | 2660.3 | 3127.8 | 3530.6 | 3693.0 | 3620.0 | 3490.7 | 3420.7 | 3550.5 | 3692.4 | 3353.6 |
| 57.5° | 2273.8 | 2294.3 | 2709.8 | 3391.1 | 3702.7 | 3717.8 | 3646.5 | 3563.2 | 3718.4 | 3853.1 | 3414.0 |
| 60°   | 1668.7 | 1673.5 | 2047.3 | 2805.9 | 3406.2 | 3661.0 | 3633.9 | 3510.1 | 3638.7 | 3724.5 | 3137.4 |
| 62.5° | 942.7  | 943.3  | 1241.7 | 1872.8 | 2544.4 | 2984.0 | 3000.9 | 2891.6 | 2783.5 | 2808.9 | 2183.8 |
| 65°   | 353.9  | 387.1  | 567.1  | 920.4  | 1467.0 | 1761.7 | 1831.7 | 1857.1 | 1677.1 | 1565.4 | 1171.0 |
| 67.5° | 236.7  | 244.6  | 331.0  | 473.5  | 652.9  | 753.7  | 843.1  | 845.5  | 618.4  | 551.4  | 461.4  |
| 70°   | 180.6  | 188.4  | 260.3  | 338.8  | 331.0  | 305.6  | 330.4  | 321.3  | 332.2  | 341.2  | 350.9  |
| 72.5° | 134.7  | 142.5  | 201.7  | 239.2  | 198.7  | 195.7  | 221.6  | 246.4  | 269.4  | 279.0  | 294.1  |
| 75°   | 89.4   | 95.4   | 135.9  | 128.0  | 109.9  | 129.8  | 161.9  | 186.6  | 199.9  | 211.4  | 222.9  |
| 77.5° | 56.8   | 61.0   | 72.5   | 58.6   | 61.0   | 76.1   | 94.2   | 116.6  | 129.2  | 140.7  | 146.8  |
| 80°   | 26.0   | 25.4   | 24.8   | 27.8   | 34.4   | 44.7   | 56.8   | 70.1   | 79.7   | 84.6   | 88.2   |
| 82.5° | 10.3   | 11.5   | 12.7   | 15.1   | 18.7   | 24.2   | 32.0   | 41.1   | 48.9   | 50.1   | 53.1   |
| 85°   | 4.2    | 4.8    | 5.4    | 6.6    | 8.5    | 10.9   | 13.3   | 18.7   | 23.6   | 25.4   | 27.2   |
| 87.5° | 0.0    | 0.0    | 0.0    | 0.0    | 0.6    | 1.2    | 1.8    | 3.0    | 5.4    | 6.0    | 6.6    |
| 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: GWS-SA1F-740-U-T3R-W-GRSWH

**CANDELA DISTRIBUTION (continued):**

|       | 90°    | 95°    | 105°   | 115°   | 125°   | 135°   | 145°   | 155°   | 165°   | 175°   | 180°   |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 1830.5 | 1830.5 | 1830.5 | 1830.5 | 1830.5 | 1830.5 | 1830.5 | 1830.5 | 1830.5 | 1830.5 | 1830.5 |
| 2.5°  | 1842.6 | 1834.7 | 1848.0 | 1857.1 | 1865.5 | 1856.5 | 1853.5 | 1845.6 | 1844.4 | 1844.4 | 1848.6 |
| 5°    | 1859.5 | 1854.1 | 1868.0 | 1873.4 | 1872.8 | 1852.9 | 1840.8 | 1825.1 | 1817.2 | 1817.2 | 1818.4 |
| 7.5°  | 1889.7 | 1886.7 | 1894.5 | 1886.1 | 1866.8 | 1826.3 | 1786.4 | 1753.2 | 1730.9 | 1719.4 | 1723.0 |
| 10°   | 1939.8 | 1936.2 | 1929.6 | 1898.2 | 1842.6 | 1758.7 | 1677.1 | 1616.7 | 1580.5 | 1560.0 | 1561.2 |
| 12.5° | 1988.8 | 1982.7 | 1959.2 | 1889.7 | 1775.6 | 1642.1 | 1535.2 | 1467.6 | 1427.7 | 1403.5 | 1398.1 |
| 15°   | 2042.5 | 2026.8 | 1976.1 | 1846.2 | 1666.3 | 1499.6 | 1387.8 | 1314.8 | 1271.9 | 1257.4 | 1256.8 |
| 17.5° | 2093.8 | 2066.1 | 1974.3 | 1768.9 | 1535.2 | 1350.4 | 1238.1 | 1192.8 | 1185.5 | 1192.2 | 1194.0 |
| 20°   | 2145.8 | 2101.1 | 1954.3 | 1662.0 | 1379.4 | 1201.8 | 1143.8 | 1162.6 | 1189.7 | 1207.9 | 1212.1 |
| 22.5° | 2199.5 | 2130.1 | 1909.0 | 1524.3 | 1215.1 | 1101.6 | 1125.7 | 1166.8 | 1200.6 | 1224.8 | 1227.2 |
| 25°   | 2259.9 | 2157.2 | 1841.4 | 1355.8 | 1083.5 | 1073.8 | 1121.5 | 1165.0 | 1201.2 | 1229.0 | 1233.8 |
| 27.5° | 2294.3 | 2157.9 | 1746.6 | 1182.5 | 1023.1 | 1062.9 | 1111.2 | 1152.3 | 1188.5 | 1218.7 | 1224.2 |
| 30°   | 2328.2 | 2141.5 | 1596.2 | 1041.8 | 1005.5 | 1050.2 | 1093.7 | 1131.8 | 1166.2 | 1195.8 | 1202.4 |
| 32.5° | 2375.9 | 2126.4 | 1422.9 | 960.9  | 995.3  | 1038.2 | 1073.8 | 1107.6 | 1134.2 | 1147.5 | 1151.1 |
| 35°   | 2435.1 | 2107.1 | 1238.7 | 925.8  | 988.6  | 1028.5 | 1059.9 | 1078.0 | 1043.6 | 1036.3 | 1044.2 |
| 37.5° | 2517.8 | 2089.0 | 1055.1 | 910.7  | 984.4  | 1024.9 | 1052.7 | 1006.2 | 963.9  | 947.0  | 953.0  |
| 40°   | 2607.2 | 2078.7 | 930.7  | 898.7  | 986.2  | 1028.5 | 1022.5 | 953.6  | 892.6  | 857.0  | 855.8  |
| 42.5° | 2683.3 | 2063.0 | 850.9  | 890.8  | 991.1  | 1042.4 | 981.4  | 907.1  | 816.5  | 795.4  | 796.0  |
| 45°   | 2734.6 | 2023.2 | 808.7  | 882.3  | 995.3  | 1045.4 | 962.1  | 843.1  | 778.5  | 765.2  | 764.6  |
| 47.5° | 2755.7 | 1950.7 | 781.5  | 869.1  | 994.7  | 1020.6 | 922.8  | 816.5  | 751.9  | 748.3  | 750.7  |
| 50°   | 2741.9 | 1831.7 | 753.7  | 843.1  | 980.2  | 994.7  | 877.5  | 793.0  | 733.8  | 753.7  | 768.2  |
| 52.5° | 2690.5 | 1677.7 | 720.5  | 807.5  | 954.2  | 965.1  | 854.6  | 778.5  | 720.5  | 747.1  | 758.5  |
| 55°   | 2677.2 | 1552.7 | 678.2  | 761.0  | 915.6  | 912.5  | 830.4  | 771.2  | 711.4  | 701.2  | 703.0  |
| 57.5° | 2659.7 | 1430.7 | 608.2  | 677.6  | 817.7  | 822.6  | 807.5  | 762.8  | 687.9  | 684.9  | 687.9  |
| 60°   | 2310.6 | 1096.7 | 542.3  | 584.6  | 671.6  | 697.5  | 781.5  | 747.1  | 649.8  | 637.1  | 636.5  |
| 62.5° | 1509.2 | 664.3  | 482.5  | 509.7  | 547.2  | 577.4  | 712.6  | 701.8  | 608.2  | 600.3  | 605.7  |
| 65°   | 811.7  | 473.5  | 439.1  | 455.4  | 475.9  | 498.8  | 590.6  | 625.1  | 549.6  | 521.8  | 522.4  |
| 67.5° | 414.9  | 402.8  | 406.4  | 417.9  | 433.6  | 445.1  | 476.5  | 506.7  | 468.7  | 445.1  | 444.5  |
| 70°   | 355.1  | 364.8  | 370.2  | 376.9  | 387.1  | 385.3  | 388.3  | 393.8  | 390.7  | 379.3  | 378.7  |
| 72.5° | 302.6  | 317.7  | 318.9  | 320.1  | 323.7  | 315.3  | 309.8  | 300.8  | 301.4  | 303.2  | 303.8  |
| 75°   | 230.1  | 244.6  | 248.2  | 246.4  | 250.0  | 239.2  | 231.9  | 222.9  | 212.0  | 210.2  | 211.4  |
| 77.5° | 149.8  | 161.3  | 166.7  | 165.5  | 167.3  | 158.8  | 155.2  | 145.5  | 132.9  | 128.0  | 128.0  |
| 80°   | 90.6   | 97.2   | 101.5  | 102.7  | 104.5  | 98.4   | 92.4   | 83.9   | 78.5   | 73.1   | 73.1   |
| 82.5° | 55.0   | 59.2   | 62.2   | 62.2   | 64.0   | 57.4   | 52.5   | 46.5   | 44.1   | 39.3   | 39.3   |
| 85°   | 27.8   | 30.8   | 32.0   | 31.4   | 30.2   | 24.8   | 22.9   | 19.9   | 18.7   | 16.3   | 16.3   |
| 87.5° | 6.6    | 8.5    | 8.5    | 6.0    | 6.0    | 3.0    | 1.8    | 0.6    | 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

MCGRAW, INVUE, LUMARK AND STREETWORKS

DATA VALID FOR LUMINAIRES UTILIZING SA LIGHT ENGINES

Report Number: SP1-2101-121-2

Luminaire Tested: IFLD-S-SA2A-740-U-T3R-HSS

Test Date: 03/05/2021

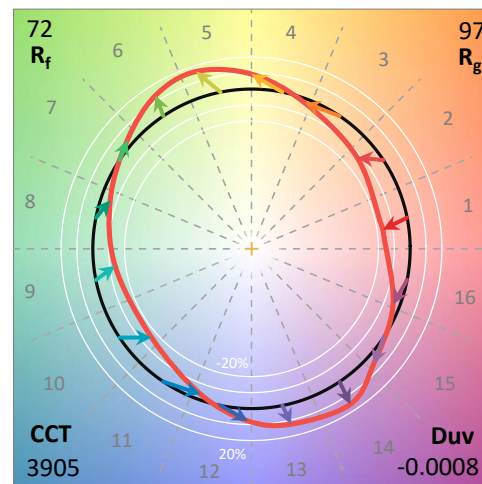
### Test Information

Test Method: LM-79-08  
 Report Number: SP1-2101-121-2  
 Test Lab: COOPER LIGHTING SOLUTIONS  
 Photometer: SP1  
 Measurement Geometry:  $4\pi$   
 Issue Date: 03/05/2021  
 Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
 Product Line: STREETWORKS  
 Catalog Number: **IFLD-S-SA2A-740-U-T3R-HSS**  
 Description: STREETWORKS INF FLOOD

SHIELD, DRIVER PROGRAMMED @ 615mA.

### Spectral Parameters

|                           |         |           |      |      |       |
|---------------------------|---------|-----------|------|------|-------|
| CCT (K):                  | 3905    | CRI (Ra): | 71.2 |      |       |
| CIE u':                   | 0.2273  | R1:       | 68.9 | R9:  | -29.7 |
| CIE v':                   | 0.5024  | R2:       | 77.0 | R10: | 46.2  |
| Duv:                      | -0.0008 | R3:       | 84.0 | R11: | 68.8  |
| CIE x:                    | 0.3841  | R4:       | 71.6 | R12: | 45.6  |
| CIE y:                    | 0.3774  | R5:       | 68.9 | R13: | 69.5  |
| CIE z:                    | 0.2385  | R6:       | 68.3 | R14: | 90.7  |
| Peak Wavelength (nm):     | 443     | R7:       | 78.7 |      |       |
| Dominant Wavelength (nm): | 579     | R8:       | 52.2 |      |       |
| Purity:                   | 28.7    |           |      |      |       |
| Rf:                       | 71.7    |           |      |      |       |
| Rg:                       | 96.9    |           |      |      |       |



### Test Conditions

Stabilization Time: 211M  
 Operation Time: 12H  
 Room Temperature (°C) / RH%: 24.8/312%  
 Sphere Temperature (°C): 24.1

REPORT NUMBER: SP1-2101-121-2

| 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 4000K 4-step quadrangle

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### Photopic Flux vs. Wavelength

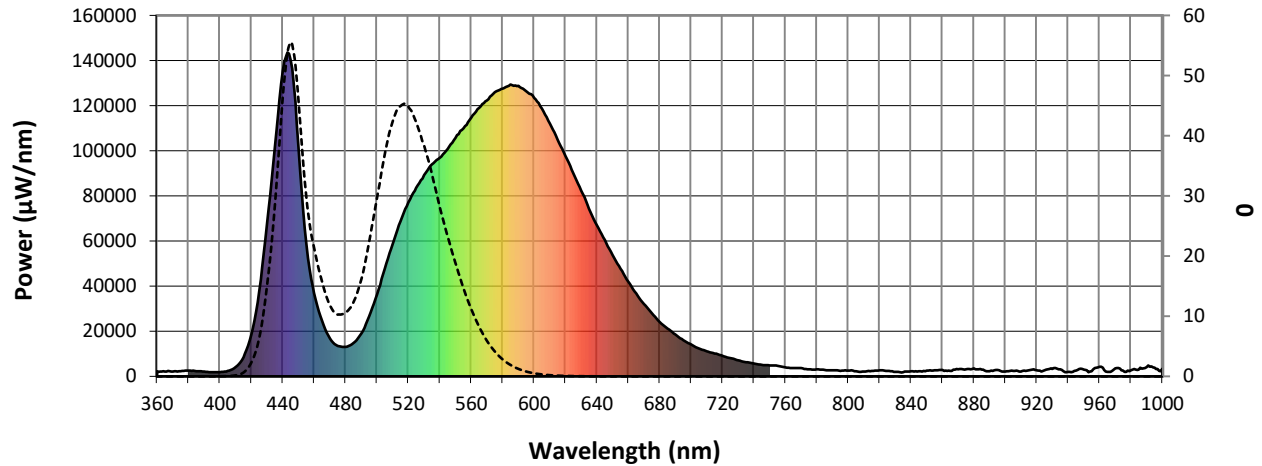


#####

| λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) |
|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|
| 360       | 2304             | 0.0              | 490       | 19043            | 2.7              | 620       | 97577            | 25.4             | 750       | 4830             | 0.0              | 880       | 3505             | 0.0              |
| 365       | 2150             | 0.0              | 495       | 26606            | 4.8              | 625       | 90158            | 19.9             | 755       | 4664             | 0.0              | 885       | 2991             | 0.0              |
| 370       | 2146             | 0.0              | 500       | 36376            | 8.0              | 630       | 82240            | 14.9             | 760       | 4006             | 0.0              | 890       | 2327             | 0.0              |
| 375       | 2332             | 0.0              | 505       | 47714            | 13.3             | 635       | 74361            | 11.2             | 765       | 3715             | 0.0              | 895       | 2775             | 0.0              |
| 380       | 2527             | 0.0              | 510       | 58741            | 20.2             | 640       | 66994            | 8.0              | 770       | 3696             | 0.0              | 900       | 2141             | 0.0              |
| 385       | 2304             | 0.0              | 515       | 68716            | 28.5             | 645       | 60405            | 5.8              | 775       | 3117             | 0.0              | 905       | 2421             | 0.0              |
| 390       | 2064             | 0.0              | 520       | 77136            | 37.4             | 650       | 53806            | 3.9              | 780       | 3062             | 0.0              | 910       | 2200             | 0.0              |
| 395       | 1856             | 0.0              | 525       | 83567            | 44.9             | 655       | 47610            | 2.7              | 785       | 2907             | 0.0              | 915       | 2716             | 0.0              |
| 400       | 1856             | 0.0              | 530       | 89283            | 52.6             | 660       | 42018            | 1.8              | 790       | 2655             | 0.0              | 920       | 2656             | 0.0              |
| 405       | 2374             | 0.0              | 535       | 94097            | 58.4             | 665       | 36742            | 1.2              | 795       | 2467             | 0.0              | 925       | 2671             | 0.0              |
| 410       | 4084             | 0.0              | 540       | 96845            | 63.1             | 670       | 32105            | 0.7              | 800       | 2609             | 0.0              | 930       | 3292             | 0.0              |
| 415       | 8543             | 0.0              | 545       | 100829           | 67.1             | 675       | 27946            | 0.5              | 805       | 2293             | 0.0              | 935       | 3188             | 0.0              |
| 420       | 18394            | 0.1              | 550       | 105648           | 71.8             | 680       | 24146            | 0.3              | 810       | 2188             | 0.0              | 940       | 1997             | 0.0              |
| 425       | 37987            | 0.2              | 555       | 110017           | 75.1             | 685       | 21191            | 0.2              | 815       | 2386             | 0.0              | 945       | 2623             | 0.0              |
| 430       | 67605            | 0.5              | 560       | 114586           | 77.9             | 690       | 18544            | 0.1              | 820       | 2712             | 0.0              | 950       | 2969             | 0.0              |
| 435       | 102160           | 1.2              | 565       | 118987           | 79.1             | 695       | 16058            | 0.1              | 825       | 2473             | 0.0              | 955       | 2277             | 0.0              |
| 440       | 135103           | 2.1              | 570       | 122326           | 79.5             | 700       | 14133            | 0.0              | 830       | 1969             | 0.0              | 960       | 4267             | 0.0              |
| 445       | 140126           | 2.9              | 575       | 125968           | 78.4             | 705       | 12309            | 0.0              | 835       | 1917             | 0.0              | 965       | 2034             | 0.0              |
| 450       | 102339           | 2.7              | 580       | 127613           | 75.8             | 710       | 11142            | 0.0              | 840       | 2248             | 0.0              | 970       | 3586             | 0.0              |
| 455       | 58751            | 2.0              | 585       | 129466           | 71.9             | 715       | 10143            | 0.0              | 845       | 2266             | 0.0              | 975       | 2505             | 0.0              |
| 460       | 36892            | 1.5              | 590       | 128813           | 66.6             | 720       | 9072             | 0.0              | 850       | 2558             | 0.0              | 980       | 2666             | 0.0              |
| 465       | 24637            | 1.3              | 595       | 126387           | 59.9             | 725       | 8130             | 0.0              | 855       | 2767             | 0.0              | 985       | 2934             | 0.0              |
| 470       | 16738            | 1.0              | 600       | 123477           | 53.2             | 730       | 7149             | 0.0              | 860       | 2826             | 0.0              | 990       | 4120             | 0.0              |
| 475       | 13456            | 1.1              | 605       | 118718           | 46.0             | 735       | 6311             | 0.0              | 865       | 2385             | 0.0              | 995       | 3858             | 0.0              |
| 480       | 13081            | 1.2              | 610       | 112091           | 38.5             | 740       | 5711             | 0.0              | 870       | 3194             | 0.0              | 1000      | 3405             | 0.0              |
| 485       | 14734            | 1.7              | 615       | 105039           | 31.7             | 745       | 5111             | 0.0              | 875       | 3189             | 0.0              |           |                  |                  |

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### Scotopic Flux vs. Wavelength



Scotopic Lumens: 10425.8

S/P: 1.47

| $\lambda$<br>(nm) | Power<br>( $\mu\text{W/nm}$ ) | Lumens<br>( $\Phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>( $\mu\text{W/nm}$ ) | Lumens<br>( $\Phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>( $\mu\text{W/nm}$ ) | Lumens<br>( $\Phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>( $\mu\text{W/nm}$ ) | Lumens<br>( $\Phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>( $\mu\text{W/nm}$ ) | Lumens<br>( $\Phi/\text{nm}$ ) |
|-------------------|-------------------------------|--------------------------------|-------------------|-------------------------------|--------------------------------|-------------------|-------------------------------|--------------------------------|-------------------|-------------------------------|--------------------------------|-------------------|-------------------------------|--------------------------------|
| 360               | 2304                          | 0.0                            | 490               | 19043                         | 29.3                           | 620               | 97577                         | 1.2                            | 750               | 4830                          | 0.0                            | 880               | 3505                          | 0.0                            |
| 365               | 2150                          | 0.0                            | 495               | 26606                         | 43.0                           | 625               | 90158                         | 0.8                            | 755               | 4664                          | 0.0                            | 885               | 2991                          | 0.0                            |
| 370               | 2146                          | 0.0                            | 500               | 36376                         | 60.8                           | 630               | 82240                         | 0.5                            | 760               | 4006                          | 0.0                            | 890               | 2327                          | 0.0                            |
| 375               | 2332                          | 0.0                            | 505               | 47714                         | 81.1                           | 635               | 74361                         | 0.3                            | 765               | 3715                          | 0.0                            | 895               | 2775                          | 0.0                            |
| 380               | 2527                          | 0.0                            | 510               | 58741                         | 99.6                           | 640               | 66994                         | 0.2                            | 770               | 3696                          | 0.0                            | 900               | 2141                          | 0.0                            |
| 385               | 2304                          | 0.0                            | 515               | 68716                         | 113.9                          | 645               | 60405                         | 0.1                            | 775               | 3117                          | 0.0                            | 905               | 2421                          | 0.0                            |
| 390               | 2064                          | 0.0                            | 520               | 77136                         | 122.6                          | 650               | 53806                         | 0.1                            | 780               | 3062                          | 0.0                            | 910               | 2200                          | 0.0                            |
| 395               | 1856                          | 0.0                            | 525               | 83567                         | 125.0                          | 655               | 47610                         | 0.0                            | 785               | 2907                          | 0.0                            | 915               | 2716                          | 0.0                            |
| 400               | 1856                          | 0.0                            | 530               | 89283                         | 123.1                          | 660               | 42018                         | 0.0                            | 790               | 2655                          | 0.0                            | 920               | 2656                          | 0.0                            |
| 405               | 2374                          | 0.1                            | 535               | 94097                         | 117.3                          | 665               | 36742                         | 0.0                            | 795               | 2467                          | 0.0                            | 925               | 2671                          | 0.0                            |
| 410               | 4084                          | 0.2                            | 540               | 96845                         | 107.0                          | 670               | 32105                         | 0.0                            | 800               | 2609                          | 0.0                            | 930               | 3292                          | 0.0                            |
| 415               | 8543                          | 0.9                            | 545               | 100829                        | 96.7                           | 675               | 27946                         | 0.0                            | 805               | 2293                          | 0.0                            | 935               | 3188                          | 0.0                            |
| 420               | 18394                         | 3.0                            | 550               | 105648                        | 86.4                           | 680               | 24146                         | 0.0                            | 810               | 2188                          | 0.0                            | 940               | 1997                          | 0.0                            |
| 425               | 37987                         | 9.3                            | 555               | 110017                        | 75.2                           | 685               | 21191                         | 0.0                            | 815               | 2386                          | 0.0                            | 945               | 2623                          | 0.0                            |
| 430               | 67605                         | 23.0                           | 560               | 114586                        | 64.0                           | 690               | 18544                         | 0.0                            | 820               | 2712                          | 0.0                            | 950               | 2969                          | 0.0                            |
| 435               | 102160                        | 45.7                           | 565               | 118987                        | 53.4                           | 695               | 16058                         | 0.0                            | 825               | 2473                          | 0.0                            | 955               | 2277                          | 0.0                            |
| 440               | 135103                        | 75.5                           | 570               | 122326                        | 43.2                           | 700               | 14133                         | 0.0                            | 830               | 1969                          | 0.0                            | 960               | 4267                          | 0.0                            |
| 445               | 140126                        | 93.8                           | 575               | 125968                        | 34.3                           | 705               | 12309                         | 0.0                            | 835               | 1917                          | 0.0                            | 965               | 2034                          | 0.0                            |
| 450               | 102339                        | 79.3                           | 580               | 127613                        | 26.3                           | 710               | 11142                         | 0.0                            | 840               | 2248                          | 0.0                            | 970               | 3586                          | 0.0                            |
| 455               | 58751                         | 51.3                           | 585               | 129466                        | 19.8                           | 715               | 10143                         | 0.0                            | 845               | 2266                          | 0.0                            | 975               | 2505                          | 0.0                            |
| 460               | 36892                         | 35.6                           | 590               | 128813                        | 14.3                           | 720               | 9072                          | 0.0                            | 850               | 2558                          | 0.0                            | 980               | 2666                          | 0.0                            |
| 465               | 24637                         | 26.0                           | 595               | 126387                        | 10.1                           | 725               | 8130                          | 0.0                            | 855               | 2767                          | 0.0                            | 985               | 2934                          | 0.0                            |
| 470               | 16738                         | 19.3                           | 600               | 123477                        | 7.0                            | 730               | 7149                          | 0.0                            | 860               | 2826                          | 0.0                            | 990               | 4120                          | 0.0                            |
| 475               | 13456                         | 16.8                           | 605               | 118718                        | 4.7                            | 735               | 6311                          | 0.0                            | 865               | 2385                          | 0.0                            | 995               | 3858                          | 0.0                            |
| 480               | 13081                         | 17.7                           | 610               | 112091                        | 3.0                            | 740               | 5711                          | 0.0                            | 870               | 3194                          | 0.0                            | 1000              | 3405                          | 0.0                            |
| 485               | 14734                         | 21.4                           | 615               | 105039                        | 1.9                            | 745               | 5111                          | 0.0                            | 875               | 3189                          | 0.0                            |                   |                               |                                |

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### Melanopic Flux vs. Wavelength


**Melanopic Lumens: 3927.2**
**M/P: 0.55**

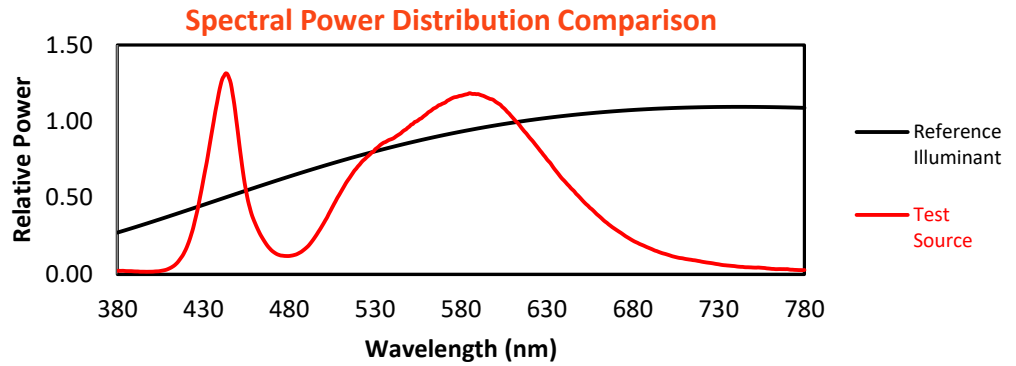
| λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) |
|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|
| 360       | 2304             | 0.0              | 490       | 19043            | 15.8             | 620       | 97577            | 0.1              | 750       | 4830             | 0.0              | 880       | 3505             | 0.0              |
| 365       | 2150             | 0.0              | 495       | 26606            | 22.0             | 625       | 90158            | 0.0              | 755       | 4664             | 0.0              | 885       | 2991             | 0.0              |
| 370       | 2146             | 0.0              | 500       | 36376            | 29.2             | 630       | 82240            | 0.0              | 760       | 4006             | 0.0              | 890       | 2327             | 0.0              |
| 375       | 2332             | 0.0              | 505       | 47714            | 36.6             | 635       | 74361            | 0.0              | 765       | 3715             | 0.0              | 895       | 2775             | 0.0              |
| 380       | 2527             | 0.0              | 510       | 58741            | 42.2             | 640       | 66994            | 0.0              | 770       | 3696             | 0.0              | 900       | 2141             | 0.0              |
| 385       | 2304             | 0.0              | 515       | 68716            | 44.9             | 645       | 60405            | 0.0              | 775       | 3117             | 0.0              | 905       | 2421             | 0.0              |
| 390       | 2064             | 0.0              | 520       | 77136            | 44.9             | 650       | 53806            | 0.0              | 780       | 3062             | 0.0              | 910       | 2200             | 0.0              |
| 395       | 1856             | 0.0              | 525       | 83567            | 42.4             | 655       | 47610            | 0.0              | 785       | 2907             | 0.0              | 915       | 2716             | 0.0              |
| 400       | 1856             | 0.0              | 530       | 89283            | 38.6             | 660       | 42018            | 0.0              | 790       | 2655             | 0.0              | 920       | 2656             | 0.0              |
| 405       | 2374             | 0.0              | 535       | 94097            | 33.9             | 665       | 36742            | 0.0              | 795       | 2467             | 0.0              | 925       | 2671             | 0.0              |
| 410       | 4084             | 0.2              | 540       | 96845            | 28.3             | 670       | 32105            | 0.0              | 800       | 2609             | 0.0              | 930       | 3292             | 0.0              |
| 415       | 8543             | 0.6              | 545       | 100829           | 23.4             | 675       | 27946            | 0.0              | 805       | 2293             | 0.0              | 935       | 3188             | 0.0              |
| 420       | 18394            | 2.1              | 550       | 105648           | 19.0             | 680       | 24146            | 0.0              | 810       | 2188             | 0.0              | 940       | 1997             | 0.0              |
| 425       | 37987            | 5.9              | 555       | 110017           | 14.8             | 685       | 21191            | 0.0              | 815       | 2386             | 0.0              | 945       | 2623             | 0.0              |
| 430       | 67605            | 14.3             | 560       | 114586           | 11.3             | 690       | 18544            | 0.0              | 820       | 2712             | 0.0              | 950       | 2969             | 0.0              |
| 435       | 102160           | 27.3             | 565       | 118987           | 8.4              | 695       | 16058            | 0.0              | 825       | 2473             | 0.0              | 955       | 2277             | 0.0              |
| 440       | 135103           | 45.1             | 570       | 122326           | 6.0              | 700       | 14133            | 0.0              | 830       | 1969             | 0.0              | 960       | 4267             | 0.0              |
| 445       | 140126           | 55.3             | 575       | 125968           | 4.2              | 705       | 12309            | 0.0              | 835       | 1917             | 0.0              | 965       | 2034             | 0.0              |
| 450       | 102339           | 47.2             | 580       | 127613           | 2.9              | 710       | 11142            | 0.0              | 840       | 2248             | 0.0              | 970       | 3586             | 0.0              |
| 455       | 58751            | 30.8             | 585       | 129466           | 1.9              | 715       | 10143            | 0.0              | 845       | 2266             | 0.0              | 975       | 2505             | 0.0              |
| 460       | 36892            | 21.7             | 590       | 128813           | 1.3              | 720       | 9072             | 0.0              | 850       | 2558             | 0.0              | 980       | 2666             | 0.0              |
| 465       | 24637            | 16.1             | 595       | 126387           | 0.8              | 725       | 8130             | 0.0              | 855       | 2767             | 0.0              | 985       | 2934             | 0.0              |
| 470       | 16738            | 12.0             | 600       | 123477           | 0.5              | 730       | 7149             | 0.0              | 860       | 2826             | 0.0              | 990       | 4120             | 0.0              |
| 475       | 13456            | 10.3             | 605       | 118718           | 0.3              | 735       | 6311             | 0.0              | 865       | 2385             | 0.0              | 995       | 3858             | 0.0              |
| 480       | 13081            | 10.5             | 610       | 112091           | 0.2              | 740       | 5711             | 0.0              | 870       | 3194             | 0.0              | 1000      | 3405             | 0.0              |
| 485       | 14734            | 12.1             | 615       | 105039           | 0.1              | 745       | 5111             | 0.0              | 875       | 3189             | 0.0              |           |                  |                  |

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TM-30-18

### Summary

$R_f = 71.7$   
 $R_g = 96.9$   
 CIE  $R_a = 71.2$   
 $R_g = -29.7$



### Color Vector Graphics



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

|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 85 | CES26 = 55 | CES51 = 86 | CES76 = 45 |
| CES02 = 61 | CES27 = 80 | CES52 = 87 | CES77 = 68 |
| CES03 = 30 | CES28 = 79 | CES53 = 74 | CES78 = 49 |
| CES04 = 70 | CES29 = 51 | CES54 = 81 | CES79 = 77 |
| CES05 = 47 | CES30 = 60 | CES55 = 80 | CES80 = 75 |
| CES06 = 50 | CES31 = 56 | CES56 = 69 | CES81 = 75 |
| CES07 = 40 | CES32 = 52 | CES57 = 67 | CES82 = 90 |
| CES08 = 39 | CES33 = 62 | CES58 = 69 | CES83 = 85 |
| CES09 = 29 | CES34 = 65 | CES59 = 86 | CES84 = 87 |
| CES10 = 74 | CES35 = 81 | CES60 = 91 | CES85 = 83 |
| CES11 = 57 | CES36 = 92 | CES61 = 85 | CES86 = 72 |
| CES12 = 63 | CES37 = 74 | CES62 = 81 | CES87 = 77 |
| CES13 = 42 | CES38 = 69 | CES63 = 72 | CES88 = 77 |
| CES14 = 74 | CES39 = 92 | CES64 = 69 | CES89 = 72 |
| CES15 = 71 | CES40 = 86 | CES65 = 64 | CES90 = 75 |
| CES16 = 46 | CES41 = 84 | CES66 = 63 | CES91 = 91 |
| CES17 = 49 | CES42 = 75 | CES67 = 60 | CES92 = 66 |
| CES18 = 56 | CES43 = 70 | CES68 = 67 | CES93 = 80 |
| CES19 = 72 | CES44 = 98 | CES69 = 77 | CES94 = 56 |
| CES20 = 65 | CES45 = 80 | CES70 = 57 | CES95 = 72 |
| CES21 = 86 | CES46 = 77 | CES71 = 53 | CES96 = 78 |
| CES22 = 78 | CES47 = 74 | CES72 = 84 | CES97 = 83 |
| CES23 = 92 | CES48 = 66 | CES73 = 47 | CES98 = 73 |
| CES24 = 91 | CES49 = 76 | CES74 = 96 | CES99 = 63 |
| CES25 = 72 | CES50 = 85 | CES75 = 52 |            |



Color Rendition by Hue-Angle Bin



**Measure Comparisons**



(END OF REPORT)