

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



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

Test Report Prepared for

Cooper Lighting Solutions

Brand: McGRAW-EDISON

Report Number: P635150

Luminaire Tested: GWS-SA3D-727-U-T4FT-W

Issue Date: 1/10/2023

**Test Information**

Test Method: LM-79-2019  
Report Number: P635150  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-2209-782-54)  
Test Lab: COOPER LIGHTING SOLUTIONS  
Issue Date: 1/10/2023  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: McGRAW-EDISON  
Catalog Number: GWS-SA3D-727-U-T4FT-W  
Description: GALLEON WALL SLIM LUMINAIRE. (3) LIGHTSQUARES WITH 16 LEDS EACH AND TYPE IV FORWARD THROW OPTICS  
Light Source: (48) 2700K CCT, 70 CRI LEDS  
Ballast/Driver: -

**Summary**

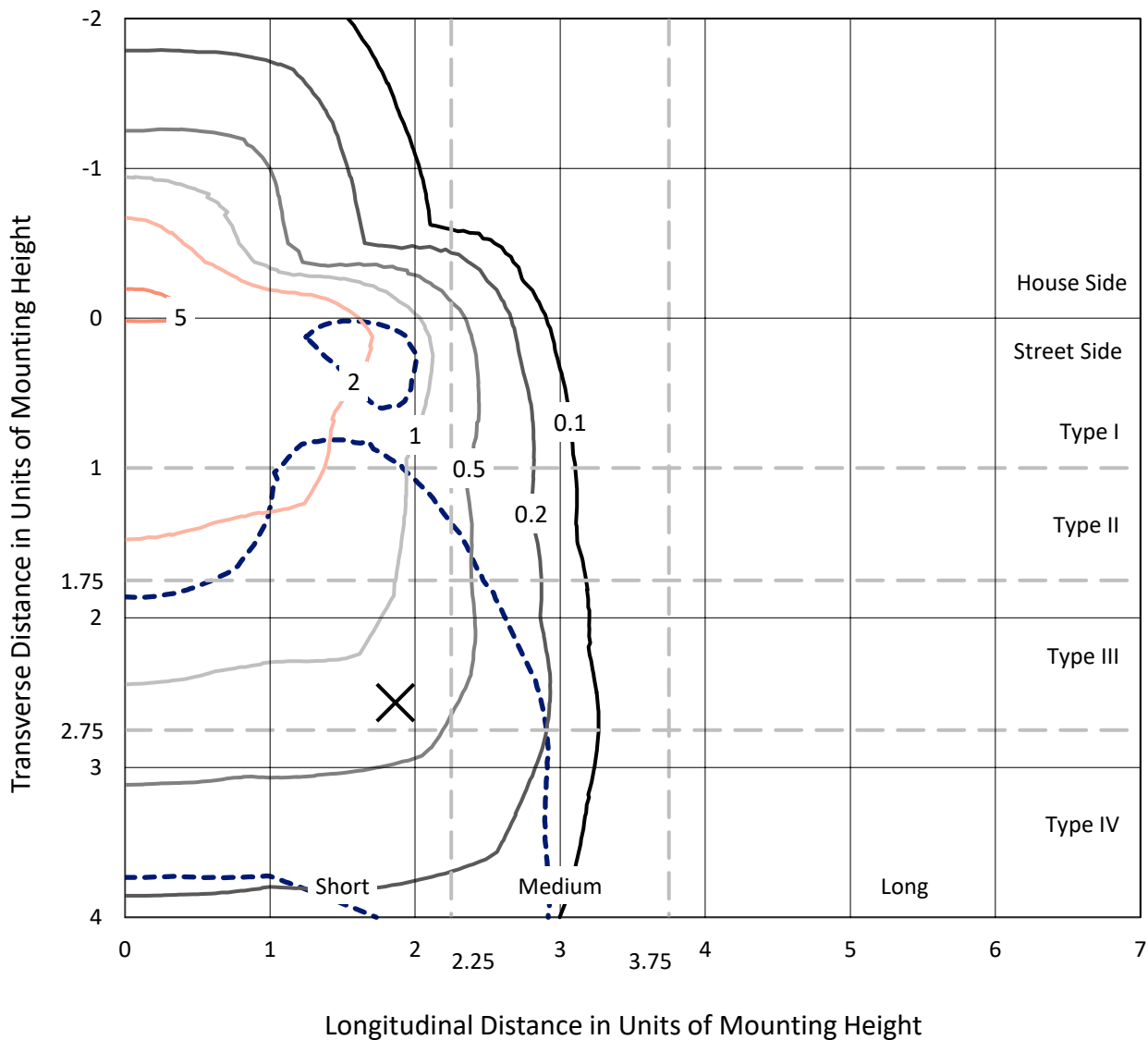
Lumens per Lamp: N/A  
Luminaire Lumens: 14215.6 lumens  
Efficiency: N/A  
Efficacy: 117.7 lumens/watt  
Luminous Opening: Rectangular (W 1.5' x L: 0.5' x H: 0')  
IES Classification: Type IV - Short  
BUG Rating: B2 - U0 - G3  
  
Input Watts (W): 120.8  
Input Voltage (V): 120  
Input Current (Ain): 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



REPORT NUMBER: P635150  
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### Iso-Footcandle Lines of Horizontal Illumination

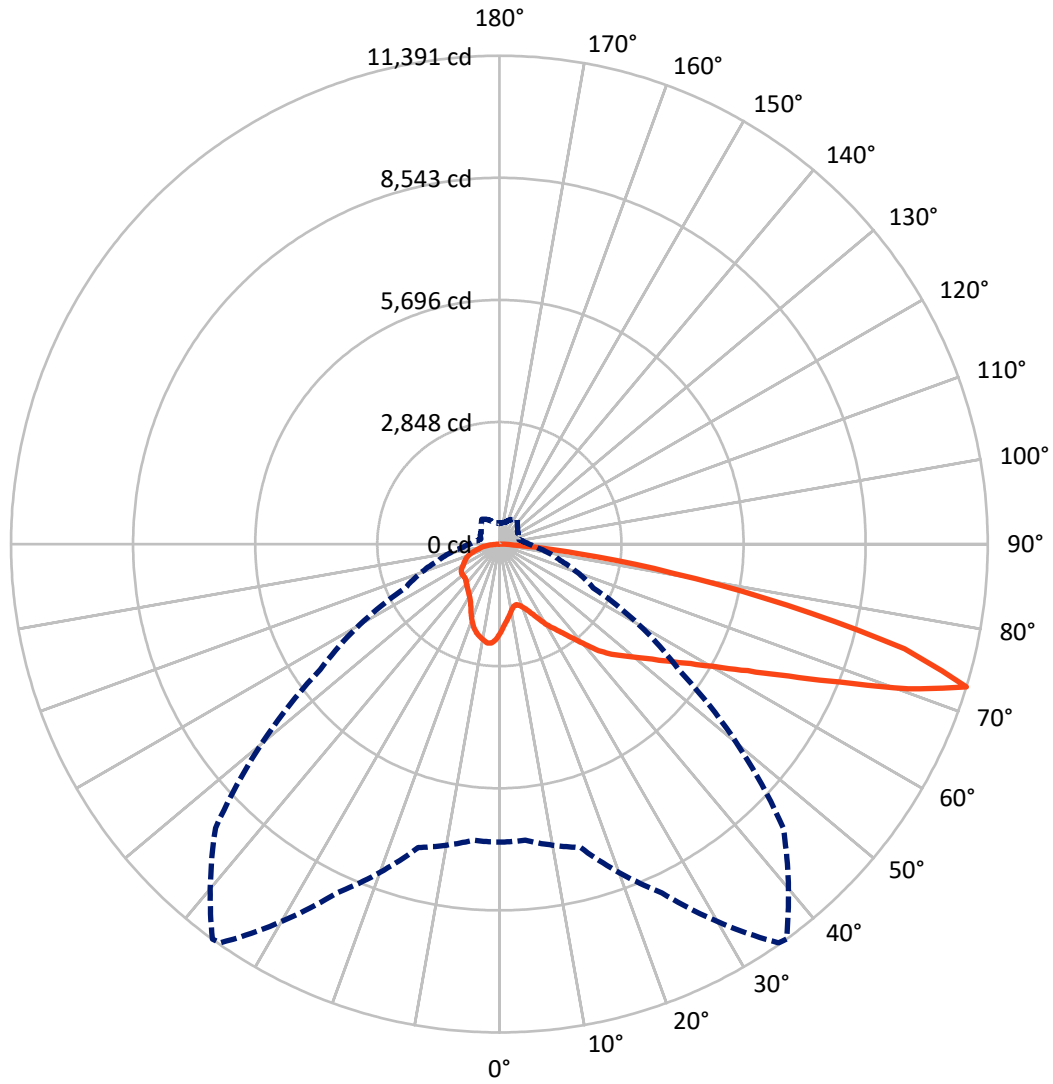
✕ Max cd  
 - - - 1/2 Max cd



Based on 20 foot mounting height. Maximum calculated value = 5.5 fc  
 Type IV - Short - N/A

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### Luminous Intensity Polar Plot



— Vertical Plane Through 36-Deg Lateral    - - - Horizontal Cone Through 72.5-Deg Vertical

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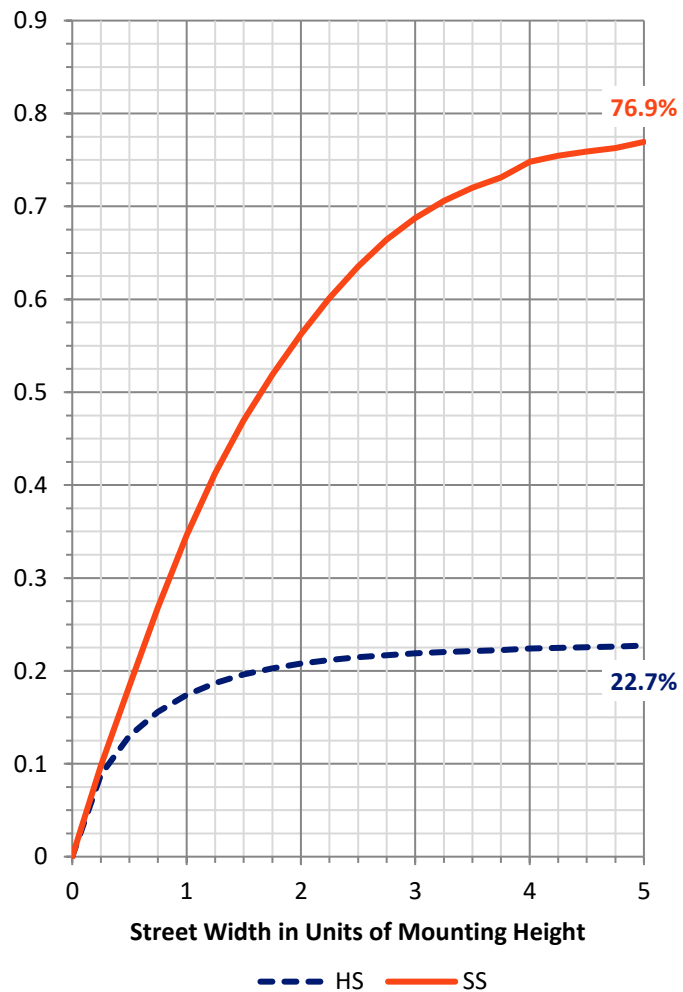
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total   |
|--------------------|-----------|----------|--------|---------|
| <b>House Side</b>  | Lumens    | 3277.3   | 0.0    | 3277.3  |
|                    | % Fixture | 23.1     | 0.0    | 23.1    |
| <b>Street Side</b> | Lumens    | 10938.3  | 0.0    | 10938.3 |
|                    | % Fixture | 76.9     | 0.0    | 76.9    |
| <b>Total</b>       | Lumens    | 14215.6  | 0.0    | 14215.6 |
|                    | % Fixture | 100.0    | 0.0    | 100.0   |

**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 194.5   | 1.4       |
| 10°-20°   | 548.7   | 3.9       |
| 20°-30°   | 908.7   | 6.4       |
| 30°-40°   | 1360.8  | 9.6       |
| 40°-50°   | 1985.3  | 14.0      |
| 50°-60°   | 2825.7  | 19.9      |
| 60°-70°   | 3570.1  | 25.1      |
| 70°-80°   | 2544.0  | 17.9      |
| 80°-90°   | 277.7   | 2.0       |
| 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°    | 14215.6 | 100.0     |
| 0°-180°   | 14215.6 | 100.0     |

**Coefficient of Utilization**

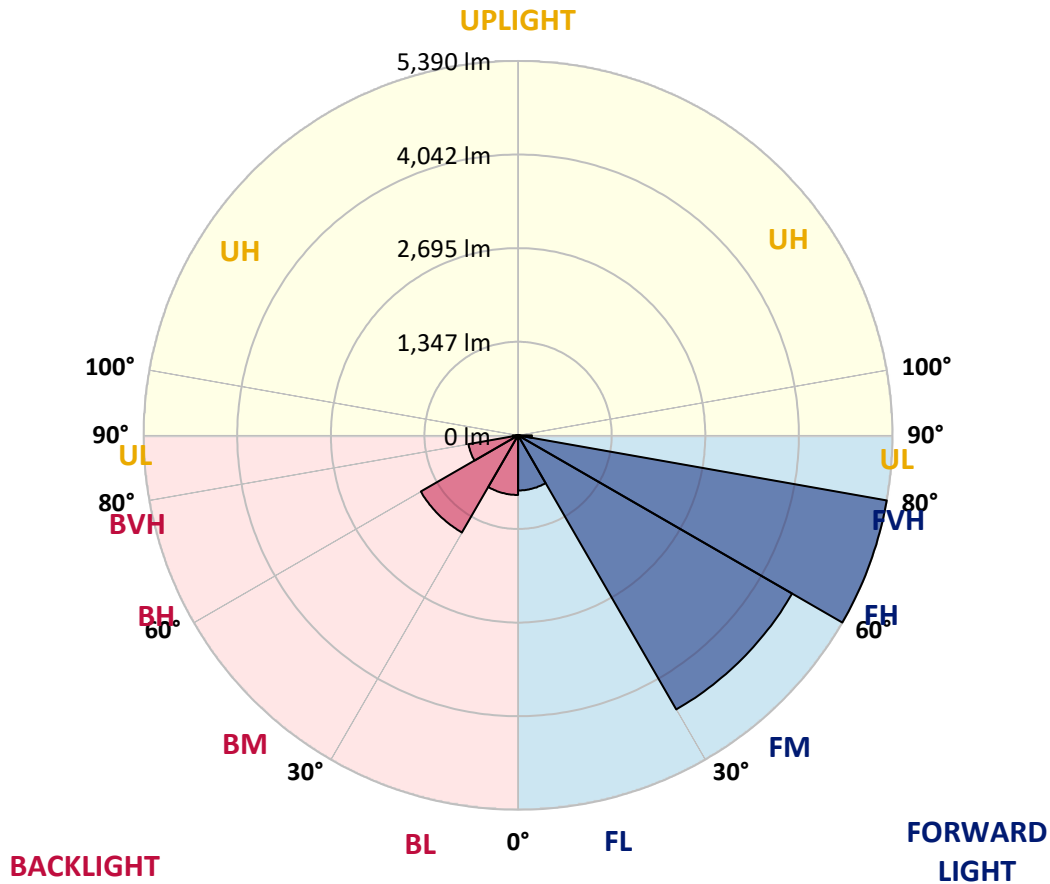


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**LUMINAIRE CLASSIFICATION SYSTEM LUMEN TABLE AND BUG RATING:**

| Zone           | Lumens | % Fixture | Zone Rating/Lumen Limit |      |         |
|----------------|--------|-----------|-------------------------|------|---------|
|                |        |           | B                       | U    | G       |
| FL (0°-30°)    | 793.6  | 5.6       |                         |      |         |
| FM (30°-60°)   | 4555.7 | 32.0      |                         |      |         |
| FH (60°-80°)   | 5389.6 | 37.9      |                         |      | G3/7500 |
| FVH (80°-90°)  | 199.3  | 1.4       |                         |      | G2/225  |
| BL (0°-30°)    | 858.2  | 6.0       | B2/1000                 |      |         |
| BM (30°-60°)   | 1616.2 | 11.4      | B2/2500                 |      |         |
| BH (60°-80°)   | 724.5  | 5.1       | B2/1000                 |      | G2/1000 |
| BVH (80°-90°)  | 78.4   | 0.6       |                         |      | G1/100  |
| UL (90°-100°)  | 0.0    | 0.0       |                         | U0/0 |         |
| UH (100°-180°) | 0.0    | 0.0       |                         | U0/0 |         |

**BUG Rating: B2-U0-G3**  
 Type IV Short





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**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 5°     | 15°    | 25°    | 35°     | 36°     | 45°    | 55°    | 65°    | 75°    | 85°    |
|-------|--------|--------|--------|--------|---------|---------|--------|--------|--------|--------|--------|
| 0°    | 2080.5 | 2080.5 | 2080.5 | 2080.5 | 2080.5  | 2080.5  | 2080.5 | 2080.5 | 2080.5 | 2080.5 | 2080.5 |
| 2.5°  | 1898.0 | 1894.8 | 1888.5 | 1907.5 | 1926.5  | 1924.4  | 1950.7 | 1976.1 | 2003.5 | 2032.0 | 2070.0 |
| 5°    | 1746.1 | 1744.0 | 1738.7 | 1767.2 | 1795.7  | 1794.6  | 1837.9 | 1879.0 | 1934.9 | 1996.1 | 2072.1 |
| 7.5°  | 1594.1 | 1588.9 | 1596.3 | 1632.1 | 1672.2  | 1676.4  | 1735.5 | 1803.0 | 1884.3 | 1976.1 | 2083.7 |
| 10°   | 1460.2 | 1459.1 | 1462.3 | 1502.4 | 1562.5  | 1566.7  | 1642.7 | 1736.6 | 1844.2 | 1966.6 | 2110.1 |
| 12.5° | 1425.3 | 1423.2 | 1414.8 | 1434.8 | 1480.2  | 1486.5  | 1569.9 | 1684.9 | 1816.8 | 1971.8 | 2145.9 |
| 15°   | 1482.3 | 1477.0 | 1447.5 | 1438.0 | 1460.2  | 1465.4  | 1536.1 | 1654.3 | 1800.9 | 1981.3 | 2191.3 |
| 17.5° | 1580.4 | 1577.3 | 1521.4 | 1482.3 | 1497.1  | 1501.3  | 1554.1 | 1649.0 | 1796.7 | 2000.3 | 2247.2 |
| 20°   | 1723.9 | 1710.2 | 1622.6 | 1563.6 | 1563.6  | 1569.9  | 1601.5 | 1672.2 | 1802.0 | 2023.5 | 2310.5 |
| 22.5° | 1913.8 | 1886.4 | 1763.0 | 1682.8 | 1661.7  | 1670.1  | 1683.8 | 1730.2 | 1824.1 | 2062.6 | 2389.6 |
| 25°   | 2126.9 | 2101.6 | 1955.0 | 1842.1 | 1812.5  | 1815.7  | 1804.1 | 1812.5 | 1872.7 | 2116.4 | 2487.8 |
| 27.5° | 2353.8 | 2336.9 | 2180.7 | 2037.3 | 1990.8  | 1990.8  | 1949.7 | 1929.6 | 1940.2 | 2177.6 | 2597.5 |
| 30°   | 2556.3 | 2533.1 | 2401.2 | 2244.0 | 2182.9  | 2182.9  | 2104.8 | 2061.5 | 2036.2 | 2252.5 | 2744.1 |
| 32.5° | 2662.9 | 2649.2 | 2561.6 | 2441.3 | 2366.4  | 2354.8  | 2287.3 | 2236.7 | 2177.6 | 2363.3 | 2942.5 |
| 35°   | 2802.2 | 2799.0 | 2746.2 | 2652.3 | 2557.4  | 2540.5  | 2494.1 | 2454.0 | 2351.7 | 2501.5 | 3206.2 |
| 37.5° | 2977.3 | 2972.0 | 2963.6 | 2907.7 | 2793.7  | 2790.6  | 2749.4 | 2700.9 | 2567.9 | 2700.9 | 3525.9 |
| 40°   | 3173.5 | 3164.0 | 3153.5 | 3152.4 | 3083.8  | 3072.2  | 3069.1 | 3014.2 | 2828.5 | 2941.4 | 3859.3 |
| 42.5° | 3443.6 | 3410.9 | 3311.7 | 3356.0 | 3406.7  | 3396.1  | 3436.2 | 3353.9 | 3153.5 | 3227.3 | 4174.7 |
| 45°   | 3775.9 | 3695.8 | 3499.5 | 3512.2 | 3639.8  | 3660.9  | 3800.2 | 3780.2 | 3511.1 | 3557.6 | 4507.1 |
| 47.5° | 3975.3 | 3905.7 | 3723.2 | 3712.6 | 3872.0  | 3898.3  | 4201.1 | 4239.1 | 3896.2 | 3955.3 | 4917.5 |
| 50°   | 4138.9 | 4090.3 | 3940.5 | 3955.3 | 4124.1  | 4150.5  | 4598.9 | 4680.1 | 4259.2 | 4362.5 | 5394.4 |
| 52.5° | 4336.2 | 4266.5 | 4150.5 | 4220.1 | 4426.9  | 4458.6  | 5040.9 | 5128.5 | 4586.2 | 4809.9 | 5888.1 |
| 55°   | 4446.9 | 4418.5 | 4420.6 | 4527.1 | 4786.7  | 4829.9  | 5504.1 | 5489.3 | 4885.8 | 5192.9 | 6259.5 |
| 57.5° | 4702.3 | 4691.7 | 4788.8 | 4828.9 | 5206.6  | 5262.5  | 5967.2 | 5840.6 | 5158.0 | 5489.3 | 6437.8 |
| 60°   | 5152.8 | 5126.4 | 5210.8 | 5272.0 | 5725.6  | 5804.8  | 6484.2 | 6184.6 | 5342.7 | 5709.8 | 6377.6 |
| 62.5° | 5785.8 | 5753.1 | 5756.2 | 5853.3 | 6420.9  | 6504.3  | 7059.2 | 6471.5 | 5399.6 | 5743.6 | 5996.8 |
| 65°   | 6572.8 | 6525.4 | 6471.5 | 6603.4 | 7344.1  | 7413.7  | 7684.8 | 6680.4 | 5263.5 | 5418.6 | 5201.3 |
| 67.5° | 7403.1 | 7364.1 | 7300.8 | 7577.2 | 8539.4  | 8581.6  | 8386.4 | 6662.5 | 4832.0 | 4549.3 | 3648.3 |
| 70°   | 7451.7 | 7461.2 | 7760.8 | 8761.0 | 10099.8 | 10110.3 | 9050.0 | 6301.7 | 3913.1 | 2948.8 | 1817.8 |
| 72.5° | 6951.6 | 6935.8 | 7326.1 | 8977.2 | 11355.3 | 11391.1 | 9363.4 | 5105.3 | 2418.1 | 1470.7 | 852.5  |
| 75°   | 5646.5 | 5673.9 | 6084.4 | 7854.7 | 9732.6  | 9764.3  | 7633.1 | 3010.0 | 1148.9 | 719.5  | 545.4  |
| 77.5° | 2430.8 | 2583.8 | 3393.0 | 5533.6 | 6970.6  | 6872.5  | 3934.2 | 1219.6 | 613.0  | 512.7  | 417.8  |
| 80°   | 701.6  | 761.7  | 1209.1 | 2631.2 | 4176.9  | 4103.0  | 1557.2 | 456.8  | 427.3  | 385.1  | 299.6  |
| 82.5° | 226.8  | 251.1  | 443.1  | 1047.6 | 1871.6  | 1869.5  | 590.8  | 270.1  | 279.6  | 261.6  | 193.1  |
| 85°   | 63.3   | 72.8   | 136.1  | 317.6  | 579.2   | 567.6   | 170.9  | 127.7  | 148.8  | 150.9  | 96.0   |
| 87.5° | 0.0    | 0.0    | 1.1    | 2.1    | 2.1     | 2.1     | 4.2    | 19.0   | 43.3   | 54.9   | 39.0   |
| 90°   | 0.0    | 0.0    | 0.0    | 0.0    | 0.0     | 0.0     | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |



REPORT NUMBER: P635150

CATALOG NUMBER: GWS-SA3D-727-U-T4FT-W

**CANDELA DISTRIBUTION (continued):**

|       | 90°    | 95°    | 105°   | 115°   | 125°   | 135°   | 145°   | 155°   | 165°   | 175°   | 180°   |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 2080.5 | 2080.5 | 2080.5 | 2080.5 | 2080.5 | 2080.5 | 2080.5 | 2080.5 | 2080.5 | 2080.5 | 2080.5 |
| 2.5°  | 2093.2 | 2090.0 | 2133.3 | 2167.0 | 2198.7 | 2219.8 | 2226.1 | 2230.3 | 2238.8 | 2243.0 | 2238.8 |
| 5°    | 2107.9 | 2123.8 | 2195.5 | 2248.3 | 2290.5 | 2315.8 | 2316.8 | 2314.7 | 2321.1 | 2315.8 | 2312.6 |
| 7.5°  | 2139.6 | 2170.2 | 2260.9 | 2316.8 | 2344.3 | 2345.3 | 2320.0 | 2290.5 | 2275.7 | 2263.0 | 2258.8 |
| 10°   | 2181.8 | 2227.2 | 2326.3 | 2363.3 | 2354.8 | 2315.8 | 2259.9 | 2213.5 | 2187.1 | 2168.1 | 2163.9 |
| 12.5° | 2239.8 | 2290.5 | 2384.4 | 2383.3 | 2330.6 | 2260.9 | 2195.5 | 2139.6 | 2101.6 | 2079.5 | 2072.1 |
| 15°   | 2294.7 | 2359.0 | 2426.6 | 2377.0 | 2293.6 | 2209.2 | 2124.8 | 2049.9 | 1999.3 | 1964.5 | 1958.1 |
| 17.5° | 2362.2 | 2430.8 | 2457.2 | 2356.9 | 2247.2 | 2138.5 | 2025.7 | 1927.5 | 1859.0 | 1817.8 | 1814.6 |
| 20°   | 2440.3 | 2501.5 | 2471.9 | 2322.1 | 2187.1 | 2044.6 | 1891.7 | 1781.9 | 1708.1 | 1668.0 | 1671.2 |
| 22.5° | 2531.0 | 2575.3 | 2476.2 | 2274.6 | 2103.7 | 1911.7 | 1740.8 | 1635.3 | 1585.7 | 1564.6 | 1565.7 |
| 25°   | 2628.1 | 2656.6 | 2468.8 | 2210.3 | 1976.1 | 1749.2 | 1585.7 | 1537.2 | 1533.0 | 1527.7 | 1529.8 |
| 27.5° | 2743.1 | 2736.7 | 2446.6 | 2119.6 | 1804.1 | 1560.4 | 1477.0 | 1489.7 | 1506.6 | 1504.5 | 1506.6 |
| 30°   | 2897.1 | 2837.0 | 2418.1 | 1994.0 | 1599.4 | 1402.1 | 1412.7 | 1448.6 | 1470.7 | 1472.8 | 1479.2 |
| 32.5° | 3073.3 | 2947.8 | 2372.8 | 1823.1 | 1404.2 | 1313.5 | 1352.5 | 1395.8 | 1422.2 | 1427.5 | 1435.9 |
| 35°   | 3283.2 | 3074.4 | 2292.6 | 1610.0 | 1263.9 | 1260.8 | 1296.6 | 1326.2 | 1354.7 | 1356.8 | 1356.8 |
| 37.5° | 3524.9 | 3201.0 | 2164.9 | 1374.7 | 1177.4 | 1215.4 | 1249.2 | 1255.5 | 1262.9 | 1256.5 | 1259.7 |
| 40°   | 3746.4 | 3323.3 | 1983.5 | 1160.5 | 1106.7 | 1175.3 | 1203.8 | 1182.7 | 1159.5 | 1143.7 | 1146.8 |
| 42.5° | 3932.1 | 3406.7 | 1742.9 | 1010.7 | 1035.0 | 1139.4 | 1161.6 | 1118.3 | 1073.0 | 1043.4 | 1047.6 |
| 45°   | 4141.0 | 3483.7 | 1460.2 | 909.4  | 973.8  | 1114.1 | 1128.9 | 1073.0 | 1014.9 | 970.6  | 964.3  |
| 47.5° | 4429.0 | 3640.9 | 1209.1 | 838.7  | 930.5  | 1100.4 | 1124.7 | 1048.7 | 972.7  | 906.3  | 898.9  |
| 50°   | 4784.6 | 3863.5 | 999.1  | 792.3  | 910.5  | 1093.0 | 1123.6 | 1022.3 | 931.6  | 853.5  | 848.2  |
| 52.5° | 5172.8 | 4080.9 | 844.0  | 756.5  | 890.4  | 1070.9 | 1118.3 | 992.8  | 888.3  | 803.9  | 797.6  |
| 55°   | 5431.3 | 4166.3 | 739.6  | 722.7  | 857.7  | 1036.0 | 1097.2 | 964.3  | 822.9  | 745.9  | 736.4  |
| 57.5° | 5507.3 | 4056.6 | 666.8  | 692.1  | 815.5  | 987.5  | 1057.1 | 904.2  | 782.8  | 721.6  | 714.3  |
| 60°   | 5376.4 | 3780.2 | 621.4  | 666.8  | 769.1  | 925.3  | 987.5  | 869.3  | 751.2  | 696.3  | 691.0  |
| 62.5° | 5007.2 | 3353.9 | 586.6  | 640.4  | 721.6  | 859.8  | 943.2  | 827.1  | 716.4  | 673.1  | 665.7  |
| 65°   | 4264.4 | 2750.5 | 558.1  | 613.0  | 676.3  | 797.6  | 894.7  | 784.9  | 678.4  | 645.7  | 637.2  |
| 67.5° | 2982.6 | 1931.8 | 527.5  | 580.3  | 630.9  | 737.5  | 844.0  | 745.9  | 639.3  | 615.1  | 606.6  |
| 70°   | 1458.0 | 1024.4 | 490.6  | 542.3  | 582.4  | 676.3  | 793.4  | 698.4  | 587.7  | 573.9  | 562.3  |
| 72.5° | 694.2  | 572.9  | 447.3  | 490.6  | 515.9  | 595.0  | 709.0  | 629.9  | 526.5  | 496.9  | 476.9  |
| 75°   | 465.3  | 407.2  | 390.4  | 429.4  | 435.7  | 499.0  | 607.7  | 543.3  | 464.2  | 430.5  | 413.6  |
| 77.5° | 352.4  | 311.2  | 328.1  | 362.9  | 350.3  | 410.4  | 500.1  | 484.3  | 418.8  | 388.3  | 379.8  |
| 80°   | 247.9  | 226.8  | 260.6  | 281.7  | 272.2  | 349.2  | 450.5  | 414.6  | 345.0  | 311.2  | 304.9  |
| 82.5° | 156.1  | 151.9  | 192.0  | 195.2  | 198.3  | 276.4  | 370.3  | 326.0  | 268.0  | 220.5  | 204.7  |
| 85°   | 78.1   | 86.5   | 115.0  | 115.0  | 113.9  | 142.4  | 211.0  | 183.6  | 144.5  | 115.0  | 111.8  |
| 87.5° | 26.4   | 36.9   | 49.6   | 40.1   | 30.6   | 24.3   | 27.4   | 33.8   | 35.9   | 34.8   | 34.8   |
| 90°   | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |



Signify Classified - Internal  
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LM-79-2008: Approved Method: Electrical and Photometric Measurements of Solid-  
State Lighting Products

Report Prepared for

Cooper Lighting Solutions

McGRAW-EDISON

Report Number: SP1-1908-441-1-R4

Test Date: 08/20/2019

Luminaire Tested: SA1C-727-U-5WQ

**Test Information**

Test Method: LM-79-2008  
 Report Number: SP1-1908-441-1-R4  
 Test Lab: COOPER LIGHTING SOLUTIONS  
 Photometer: SP1 - 76IN SPHERE  
 Measurement Geometry: 4π  
 Issue Date: 10/28/2024  
 Manufacturer: COOPER LIGHTING SOLUTIONS  
 Product Line: McGRAW-EDISON  
 Catalog Number: **SA1C-727-U-5WQ**  
 Description: McGRAW EDISON ROADWAY AND AREA LUMINAIRE

\*\*\*THIS IS A REVISION OF SP1-1908-441-1-R3. TO UPDATE THE CATALOG NUMBER.\*\*\*TESTED IN  
 SITU. (1) 70 CRI, 2700K, 1050MA LIGHTSQUARE WITH 16 LEDS AND TYPE V WIDE OPTICS.

**Spectral Parameters**

CCT (K): 2741  
 CIE u': 0.2605  
 CIE v': 0.5272  
 Duv: 0.0005  
 CIE x: 0.4573  
 CIE y: 0.4113  
 CIE z: 0.1313  
 Peak Wavelength (nm): 602  
 Dominant Wavelength (nm): 583  
 Purity: 61.2

|           |      |      |       |
|-----------|------|------|-------|
| CRI (Ra): | 71.5 |      |       |
| R1:       | 69.2 | R9:  | -16.1 |
| R2:       | 79.4 | R10: | 51.4  |
| R3:       | 87.8 | R11: | 63.1  |
| R4:       | 69.4 | R12: | 42.0  |
| R5:       | 66.4 | R13: | 70.2  |
| R6:       | 69.8 | R14: | 92.4  |
| R7:       | 79.8 |      |       |
| R8:       | 50.1 |      |       |

Rf: 69.9  
 Rg: 98.3



**Test Conditions**

Stabilization Time: 56M  
 Operation Time: 12H  
 Room Temperature (°C) / RH%: 25.3./42%  
 Sphere Temperature (°C): 25.7

REPORT NUMBER: SP1-1908-441-1-R4

| Measurement and Test Equipment |                       |                  |                      |
|--------------------------------|-----------------------|------------------|----------------------|
| Instrument                     | Identification Number | Calibration Date | Calibration Due Date |
| Photometer                     | IN0058                | 6/28/2019        | 12/28/2019           |
| Power Meter                    | IN0071                | 12/5/2018        | 12/5/2019            |
| AC Power Source                | IN0063                | 12/5/2018        | 12/5/2019            |
| DC Power Source                | IN0208                | 12/5/2018        | 12/5/2019            |
| Sphere Thermometer             | IN0085                | 12/5/2018        | 12/5/2019            |
| Room Thermometer               | IN0046                | 12/5/2018        | 12/5/2019            |

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CIE 1931 Chromaticity Diagram



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



Point lies inside the ANSI 2700K 4-step quadrangle

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**Photopic Flux vs. Wavelength**



**Photopic Lumens: 6211.7**

| $\lambda$<br>(nm) | Power<br>( $\mu\text{W}/\text{nm}$ ) | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>( $\mu\text{W}/\text{nm}$ ) | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>( $\mu\text{W}/\text{nm}$ ) | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>( $\mu\text{W}/\text{nm}$ ) | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>( $\mu\text{W}/\text{nm}$ ) | Lumens<br>( $\phi/\text{nm}$ ) |
|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|
| 360               | 2044                                 | 0.0                            | 490               | 7179                                 | 1.0                            | 620               | 118034                               | 30.7                           | 750               | 8362                                 | 0.0                            | 880               | 3128                                 | 0.0                            |
| 365               | 2016                                 | 0.0                            | 495               | 10476                                | 1.9                            | 625               | 111884                               | 24.7                           | 755               | 7635                                 | 0.0                            | 885               | 3110                                 | 0.0                            |
| 370               | 2020                                 | 0.0                            | 500               | 15549                                | 3.4                            | 630               | 106119                               | 19.2                           | 760               | 6582                                 | 0.0                            | 890               | 2632                                 | 0.0                            |
| 375               | 2137                                 | 0.0                            | 505               | 22477                                | 6.3                            | 635               | 99706                                | 15.0                           | 765               | 5777                                 | 0.0                            | 895               | 2709                                 | 0.0                            |
| 380               | 2046                                 | 0.0                            | 510               | 30417                                | 10.4                           | 640               | 92142                                | 11.0                           | 770               | 5474                                 | 0.0                            | 900               | 2016                                 | 0.0                            |
| 385               | 1925                                 | 0.0                            | 515               | 39274                                | 16.3                           | 645               | 84987                                | 8.2                            | 775               | 4977                                 | 0.0                            | 905               | 1748                                 | 0.0                            |
| 390               | 1893                                 | 0.0                            | 520               | 47282                                | 22.9                           | 650               | 78016                                | 5.7                            | 780               | 4723                                 | 0.0                            | 910               | 2046                                 | 0.0                            |
| 395               | 1695                                 | 0.0                            | 525               | 55413                                | 29.7                           | 655               | 71541                                | 4.1                            | 785               | 4219                                 | 0.0                            | 915               | 1844                                 | 0.0                            |
| 400               | 1633                                 | 0.0                            | 530               | 62377                                | 36.7                           | 660               | 64863                                | 2.7                            | 790               | 3969                                 | 0.0                            | 920               | 2734                                 | 0.0                            |
| 405               | 2065                                 | 0.0                            | 535               | 68520                                | 42.5                           | 665               | 58485                                | 1.9                            | 795               | 4122                                 | 0.0                            | 925               | 2307                                 | 0.0                            |
| 410               | 3449                                 | 0.0                            | 540               | 73435                                | 47.8                           | 670               | 51641                                | 1.1                            | 800               | 2864                                 | 0.0                            | 930               | 2039                                 | 0.0                            |
| 415               | 7117                                 | 0.0                            | 545               | 78677                                | 52.4                           | 675               | 46030                                | 0.8                            | 805               | 3151                                 | 0.0                            | 935               | 1784                                 | 0.0                            |
| 420               | 13992                                | 0.0                            | 550               | 83331                                | 56.6                           | 680               | 40590                                | 0.5                            | 810               | 3022                                 | 0.0                            | 940               | 2464                                 | 0.0                            |
| 425               | 25176                                | 0.1                            | 555               | 89120                                | 60.9                           | 685               | 35691                                | 0.3                            | 815               | 3471                                 | 0.0                            | 945               | 2794                                 | 0.0                            |
| 430               | 38151                                | 0.3                            | 560               | 94613                                | 64.3                           | 690               | 31631                                | 0.2                            | 820               | 2749                                 | 0.0                            | 950               | 3090                                 | 0.0                            |
| 435               | 49673                                | 0.6                            | 565               | 99818                                | 66.4                           | 695               | 27437                                | 0.1                            | 825               | 2729                                 | 0.0                            | 955               | 1866                                 | 0.0                            |
| 440               | 57273                                | 0.9                            | 570               | 106526                               | 69.3                           | 700               | 24589                                | 0.1                            | 830               | 2282                                 | 0.0                            | 960               | 3110                                 | 0.0                            |
| 445               | 54802                                | 1.1                            | 575               | 111610                               | 69.4                           | 705               | 21832                                | 0.0                            | 835               | 3140                                 | 0.0                            | 965               | 3880                                 | 0.0                            |
| 450               | 39184                                | 1.0                            | 580               | 117163                               | 69.6                           | 710               | 19500                                | 0.0                            | 840               | 2365                                 | 0.0                            | 970               | 3243                                 | 0.0                            |
| 455               | 22506                                | 0.8                            | 585               | 122201                               | 67.9                           | 715               | 17870                                | 0.0                            | 845               | 3024                                 | 0.0                            | 975               | 2014                                 | 0.0                            |
| 460               | 13692                                | 0.6                            | 590               | 125662                               | 65.0                           | 720               | 15924                                | 0.0                            | 850               | 2510                                 | 0.0                            | 980               | 1688                                 | 0.0                            |
| 465               | 9446                                 | 0.5                            | 595               | 127415                               | 60.4                           | 725               | 14268                                | 0.0                            | 855               | 2739                                 | 0.0                            | 985               | 2827                                 | 0.0                            |
| 470               | 6698                                 | 0.4                            | 600               | 129155                               | 55.7                           | 730               | 12438                                | 0.0                            | 860               | 3515                                 | 0.0                            | 990               | 4172                                 | 0.0                            |
| 475               | 5328                                 | 0.4                            | 605               | 128057                               | 49.6                           | 735               | 11255                                | 0.0                            | 865               | 3600                                 | 0.0                            | 995               | 3177                                 | 0.0                            |
| 480               | 5081                                 | 0.5                            | 610               | 126031                               | 43.3                           | 740               | 9951                                 | 0.0                            | 870               | 3609                                 | 0.0                            | 1000              | 3241                                 | 0.0                            |
| 485               | 5579                                 | 0.7                            | 615               | 123059                               | 37.1                           | 745               | 8870                                 | 0.0                            | 875               | 3208                                 | 0.0                            |                   |                                      |                                |

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Scotopic Flux vs. Wavelength



Scotopic Lumens: 6474.3

S/P: 1.04

| λ (nm) | Power (µW/nm) | Lumens (φ/nm) | λ (nm) | Power (µW/nm) | Lumens (φ/nm) | λ (nm) | Power (µW/nm) | Lumens (φ/nm) | λ (nm) | Power (µW/nm) | Lumens (φ/nm) | λ (nm) | Power (µW/nm) | Lumens (φ/nm) |
|--------|---------------|---------------|--------|---------------|---------------|--------|---------------|---------------|--------|---------------|---------------|--------|---------------|---------------|
| 360    | 2044          | 0.0           | 490    | 7179          | 6.0           | 620    | 118034        | 0.1           | 750    | 8362          | 0.0           | 880    | 3128          | 0.0           |
| 365    | 2016          | 0.0           | 495    | 10476         | 8.6           | 625    | 111884        | 0.1           | 755    | 7635          | 0.0           | 885    | 3110          | 0.0           |
| 370    | 2020          | 0.0           | 500    | 15549         | 12.5          | 630    | 106119        | 0.0           | 760    | 6582          | 0.0           | 890    | 2632          | 0.0           |
| 375    | 2137          | 0.0           | 505    | 22477         | 17.3          | 635    | 99706         | 0.0           | 765    | 5777          | 0.0           | 895    | 2709          | 0.0           |
| 380    | 2046          | 0.0           | 510    | 30417         | 21.8          | 640    | 92142         | 0.0           | 770    | 5474          | 0.0           | 900    | 2016          | 0.0           |
| 385    | 1925          | 0.0           | 515    | 39274         | 25.7          | 645    | 84987         | 0.0           | 775    | 4977          | 0.0           | 905    | 1748          | 0.0           |
| 390    | 1893          | 0.0           | 520    | 47282         | 27.5          | 650    | 78016         | 0.0           | 780    | 4723          | 0.0           | 910    | 2046          | 0.0           |
| 395    | 1695          | 0.0           | 525    | 55413         | 28.1          | 655    | 71541         | 0.0           | 785    | 4219          | 0.0           | 915    | 1844          | 0.0           |
| 400    | 1633          | 0.0           | 530    | 62377         | 27.0          | 660    | 64863         | 0.0           | 790    | 3969          | 0.0           | 920    | 2734          | 0.0           |
| 405    | 2065          | 0.0           | 535    | 68520         | 24.7          | 665    | 58485         | 0.0           | 795    | 4122          | 0.0           | 925    | 2307          | 0.0           |
| 410    | 3449          | 0.1           | 540    | 73435         | 21.5          | 670    | 51641         | 0.0           | 800    | 2864          | 0.0           | 930    | 2039          | 0.0           |
| 415    | 7117          | 0.5           | 545    | 78677         | 18.3          | 675    | 46030         | 0.0           | 805    | 3151          | 0.0           | 935    | 1784          | 0.0           |
| 420    | 13992         | 1.6           | 550    | 83331         | 15.0          | 680    | 40590         | 0.0           | 810    | 3022          | 0.0           | 940    | 2464          | 0.0           |
| 425    | 25176         | 3.9           | 555    | 89120         | 12.0          | 685    | 35691         | 0.0           | 815    | 3471          | 0.0           | 945    | 2794          | 0.0           |
| 430    | 38151         | 8.1           | 560    | 94613         | 9.3           | 690    | 31631         | 0.0           | 820    | 2749          | 0.0           | 950    | 3090          | 0.0           |
| 435    | 49673         | 13.3          | 565    | 99818         | 7.0           | 695    | 27437         | 0.0           | 825    | 2729          | 0.0           | 955    | 1866          | 0.0           |
| 440    | 57273         | 19.1          | 570    | 106526        | 5.2           | 700    | 24589         | 0.0           | 830    | 2282          | 0.0           | 960    | 3110          | 0.0           |
| 445    | 54802         | 21.6          | 575    | 111610        | 3.7           | 705    | 21832         | 0.0           | 835    | 3140          | 0.0           | 965    | 3880          | 0.0           |
| 450    | 39184         | 18.1          | 580    | 117163        | 2.6           | 710    | 19500         | 0.0           | 840    | 2365          | 0.0           | 970    | 3243          | 0.0           |
| 455    | 22506         | 11.8          | 585    | 122201        | 1.8           | 715    | 17870         | 0.0           | 845    | 3024          | 0.0           | 975    | 2014          | 0.0           |
| 460    | 13692         | 8.1           | 590    | 125662        | 1.2           | 720    | 15924         | 0.0           | 850    | 2510          | 0.0           | 980    | 1688          | 0.0           |
| 465    | 9446          | 6.2           | 595    | 127415        | 0.8           | 725    | 14268         | 0.0           | 855    | 2739          | 0.0           | 985    | 2827          | 0.0           |
| 470    | 6698          | 4.8           | 600    | 129155        | 0.5           | 730    | 12438         | 0.0           | 860    | 3515          | 0.0           | 990    | 4172          | 0.0           |
| 475    | 5328          | 4.1           | 605    | 128057        | 0.4           | 735    | 11255         | 0.0           | 865    | 3600          | 0.0           | 995    | 3177          | 0.0           |
| 480    | 5081          | 4.1           | 610    | 126031        | 0.2           | 740    | 9951          | 0.0           | 870    | 3609          | 0.0           | 1000   | 3241          | 0.0           |
| 485    | 5579          | 4.6           | 615    | 123059        | 0.1           | 745    | 8870          | 0.0           | 875    | 3208          | 0.0           |        |               |               |

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Melanopic Flux vs. Wavelength



Melanopic Lumens: 2145.7 M/P: 0.35

| $\lambda$ (nm) | Power ( $\mu\text{W}/\text{nm}$ ) | Lumens ( $\phi/\text{nm}$ ) | $\lambda$ (nm) | Power ( $\mu\text{W}/\text{nm}$ ) | Lumens ( $\phi/\text{nm}$ ) | $\lambda$ (nm) | Power ( $\mu\text{W}/\text{nm}$ ) | Lumens ( $\phi/\text{nm}$ ) | $\lambda$ (nm) | Power ( $\mu\text{W}/\text{nm}$ ) | Lumens ( $\phi/\text{nm}$ ) | $\lambda$ (nm) | Power ( $\mu\text{W}/\text{nm}$ ) | Lumens ( $\phi/\text{nm}$ ) |
|----------------|-----------------------------------|-----------------------------|----------------|-----------------------------------|-----------------------------|----------------|-----------------------------------|-----------------------------|----------------|-----------------------------------|-----------------------------|----------------|-----------------------------------|-----------------------------|
| 360            | 2044                              | 0.0                         | 490            | 7179                              | 11.1                        | 620            | 118034                            | 1.5                         | 750            | 8362                              | 0.0                         | 880            | 3128                              | 0.0                         |
| 365            | 2016                              | 0.0                         | 495            | 10476                             | 16.9                        | 625            | 111884                            | 0.9                         | 755            | 7635                              | 0.0                         | 885            | 3110                              | 0.0                         |
| 370            | 2020                              | 0.0                         | 500            | 15549                             | 26.0                        | 630            | 106119                            | 0.6                         | 760            | 6582                              | 0.0                         | 890            | 2632                              | 0.0                         |
| 375            | 2137                              | 0.0                         | 505            | 22477                             | 38.2                        | 635            | 99706                             | 0.4                         | 765            | 5777                              | 0.0                         | 895            | 2709                              | 0.0                         |
| 380            | 2046                              | 0.0                         | 510            | 30417                             | 51.6                        | 640            | 92142                             | 0.2                         | 770            | 5474                              | 0.0                         | 900            | 2016                              | 0.0                         |
| 385            | 1925                              | 0.0                         | 515            | 39274                             | 65.1                        | 645            | 84987                             | 0.1                         | 775            | 4977                              | 0.0                         | 905            | 1748                              | 0.0                         |
| 390            | 1893                              | 0.0                         | 520            | 47282                             | 75.2                        | 650            | 78016                             | 0.1                         | 780            | 4723                              | 0.0                         | 910            | 2046                              | 0.0                         |
| 395            | 1695                              | 0.0                         | 525            | 55413                             | 82.9                        | 655            | 71541                             | 0.1                         | 785            | 4219                              | 0.0                         | 915            | 1844                              | 0.0                         |
| 400            | 1633                              | 0.0                         | 530            | 62377                             | 86.0                        | 660            | 64863                             | 0.0                         | 790            | 3969                              | 0.0                         | 920            | 2734                              | 0.0                         |
| 405            | 2065                              | 0.1                         | 535            | 68520                             | 85.4                        | 665            | 58485                             | 0.0                         | 795            | 4122                              | 0.0                         | 925            | 2307                              | 0.0                         |
| 410            | 3449                              | 0.2                         | 540            | 73435                             | 81.1                        | 670            | 51641                             | 0.0                         | 800            | 2864                              | 0.0                         | 930            | 2039                              | 0.0                         |
| 415            | 7117                              | 0.7                         | 545            | 78677                             | 75.4                        | 675            | 46030                             | 0.0                         | 805            | 3151                              | 0.0                         | 935            | 1784                              | 0.0                         |
| 420            | 13992                             | 2.3                         | 550            | 83331                             | 68.1                        | 680            | 40590                             | 0.0                         | 810            | 3022                              | 0.0                         | 940            | 2464                              | 0.0                         |
| 425            | 25176                             | 6.2                         | 555            | 89120                             | 60.9                        | 685            | 35691                             | 0.0                         | 815            | 3471                              | 0.0                         | 945            | 2794                              | 0.0                         |
| 430            | 38151                             | 13.0                        | 560            | 94613                             | 52.9                        | 690            | 31631                             | 0.0                         | 820            | 2749                              | 0.0                         | 950            | 3090                              | 0.0                         |
| 435            | 49673                             | 22.2                        | 565            | 99818                             | 44.8                        | 695            | 27437                             | 0.0                         | 825            | 2729                              | 0.0                         | 955            | 1866                              | 0.0                         |
| 440            | 57273                             | 32.0                        | 570            | 106526                            | 37.6                        | 700            | 24589                             | 0.0                         | 830            | 2282                              | 0.0                         | 960            | 3110                              | 0.0                         |
| 445            | 54802                             | 36.7                        | 575            | 111610                            | 30.4                        | 705            | 21832                             | 0.0                         | 835            | 3140                              | 0.0                         | 965            | 3880                              | 0.0                         |
| 450            | 39184                             | 30.4                        | 580            | 117163                            | 24.1                        | 710            | 19500                             | 0.0                         | 840            | 2365                              | 0.0                         | 970            | 3243                              | 0.0                         |
| 455            | 22506                             | 19.7                        | 585            | 122201                            | 18.7                        | 715            | 17870                             | 0.0                         | 845            | 3024                              | 0.0                         | 975            | 2014                              | 0.0                         |
| 460            | 13692                             | 13.2                        | 590            | 125662                            | 14.0                        | 720            | 15924                             | 0.0                         | 850            | 2510                              | 0.0                         | 980            | 1688                              | 0.0                         |
| 465            | 9446                              | 10.0                        | 595            | 127415                            | 10.2                        | 725            | 14268                             | 0.0                         | 855            | 2739                              | 0.0                         | 985            | 2827                              | 0.0                         |
| 470            | 6698                              | 7.7                         | 600            | 129155                            | 7.3                         | 730            | 12438                             | 0.0                         | 860            | 3515                              | 0.0                         | 990            | 4172                              | 0.0                         |
| 475            | 5328                              | 6.7                         | 605            | 128057                            | 5.0                         | 735            | 11255                             | 0.0                         | 865            | 3600                              | 0.0                         | 995            | 3177                              | 0.0                         |
| 480            | 5081                              | 6.9                         | 610            | 126031                            | 3.4                         | 740            | 9951                              | 0.0                         | 870            | 3609                              | 0.0                         | 1000           | 3241                              | 0.0                         |
| 485            | 5579                              | 8.1                         | 615            | 123059                            | 2.3                         | 745            | 8870                              | 0.0                         | 875            | 3208                              | 0.0                         |                |                                   |                             |

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**Summary**

$R_f = 69.9$   
 $R_g = 98.3$   
 $CIE R_a = 71.5$   
 $R_9 = -16.1$



**Color Vector Graphics**





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

|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 86 | CES26 = 54 | CES51 = 77 | CES76 = 48 |
| CES02 = 63 | CES27 = 74 | CES52 = 80 | CES77 = 75 |
| CES03 = 31 | CES28 = 80 | CES53 = 66 | CES78 = 56 |
| CES04 = 71 | CES29 = 44 | CES54 = 77 | CES79 = 81 |
| CES05 = 50 | CES30 = 46 | CES55 = 74 | CES80 = 80 |
| CES06 = 52 | CES31 = 50 | CES56 = 63 | CES81 = 73 |
| CES07 = 42 | CES32 = 49 | CES57 = 60 | CES82 = 91 |
| CES08 = 41 | CES33 = 53 | CES58 = 63 | CES83 = 84 |
| CES09 = 29 | CES34 = 66 | CES59 = 85 | CES84 = 90 |
| CES10 = 77 | CES35 = 82 | CES60 = 89 | CES85 = 87 |
| CES11 = 60 | CES36 = 78 | CES61 = 85 | CES86 = 65 |
| CES12 = 66 | CES37 = 75 | CES62 = 69 | CES87 = 78 |
| CES13 = 43 | CES38 = 53 | CES63 = 68 | CES88 = 73 |
| CES14 = 74 | CES39 = 91 | CES64 = 68 | CES89 = 68 |
| CES15 = 71 | CES40 = 85 | CES65 = 65 | CES90 = 68 |
| CES16 = 48 | CES41 = 76 | CES66 = 62 | CES91 = 91 |
| CES17 = 50 | CES42 = 76 | CES67 = 60 | CES92 = 71 |
| CES18 = 57 | CES43 = 65 | CES68 = 68 | CES93 = 82 |
| CES19 = 73 | CES44 = 98 | CES69 = 77 | CES94 = 57 |
| CES20 = 67 | CES45 = 75 | CES70 = 60 | CES95 = 78 |
| CES21 = 88 | CES46 = 70 | CES71 = 57 | CES96 = 80 |
| CES22 = 80 | CES47 = 63 | CES72 = 86 | CES97 = 79 |
| CES23 = 92 | CES48 = 51 | CES73 = 52 | CES98 = 71 |
| CES24 = 91 | CES49 = 68 | CES74 = 90 | CES99 = 64 |
| CES25 = 73 | CES50 = 77 | CES75 = 58 |            |



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Color Rendition by Hue-Angle Bin



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Measure Comparisons



(END OF REPORT)