

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



Scaled data based on original data using  
LM-79-08 Approved Method: Electrical and Photometric Measurements of Solid-  
State Lighting Products

Test Report Prepared for  
Cooper Lighting Solutions  
(formerly Eaton)

Brand: McGRAW-EDISON

Report Number: P322816

Luminaire Tested: **GLEON-SA2D-727-U-T4W-HSS**

Issue Date: 3/3/2020

**Test Information**

Test Method: LM-79-08  
Report Number: P322816  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-1903-205-19)  
Test Lab: INNOVATION CENTER  
Issue Date: 3/3/2020  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: McGRAW-EDISON  
Catalog Number: GLEON-SA2D-727-U-T4W-HSS  
Description: GALLEON AREA AND ROADWAY LUMINAIRE  
(2) 70 CRI, 2700K, 1200mA LIGHTSQUARES WITH 16 LEDS EACH AND TYPE IV WIDE OPTICS WITH HOUSE SIDE SHIELD  
Light Source: -  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 9624 lumens  
Efficiency: N/A  
Efficacy: 74.6 lumens/watt  
Luminous Opening: Rectangular (W 0.5' x L: 1' x H: 0')  
IES Classification: Type IV - Short  
BUG Rating: B1 - U0 - G2

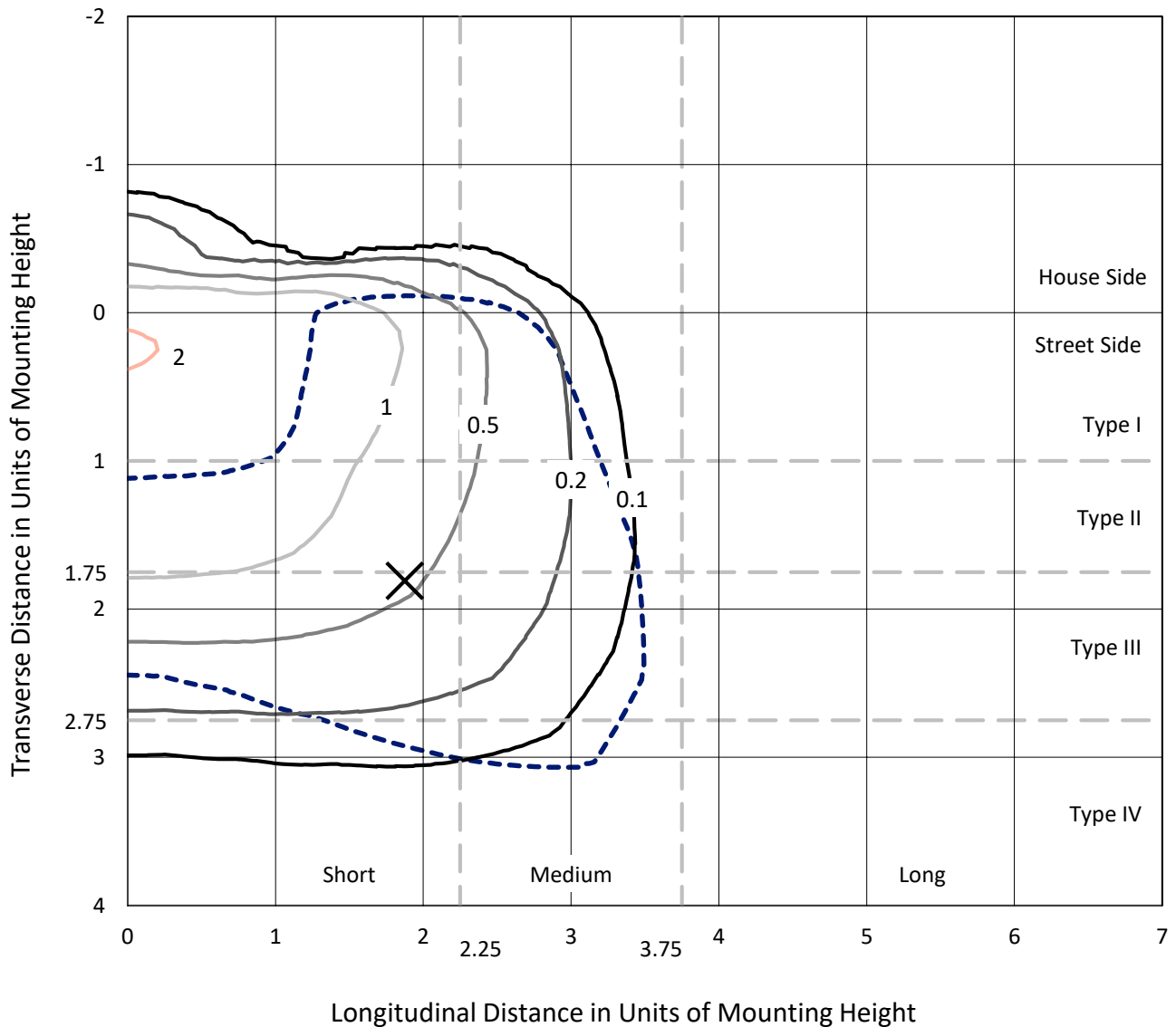
Input Watts (W): 129  
Input Voltage (V): NR  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: NR  
Total Harmonic Distortion (THDi): NR  
Frequency (hertz): 60  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 24 FT



REPORT NUMBER: P322816  
 CATALOG NUMBER: GLEON-SA2D-727-U-T4W-HSS

### Iso-Footcandle Lines of Horizontal Illumination

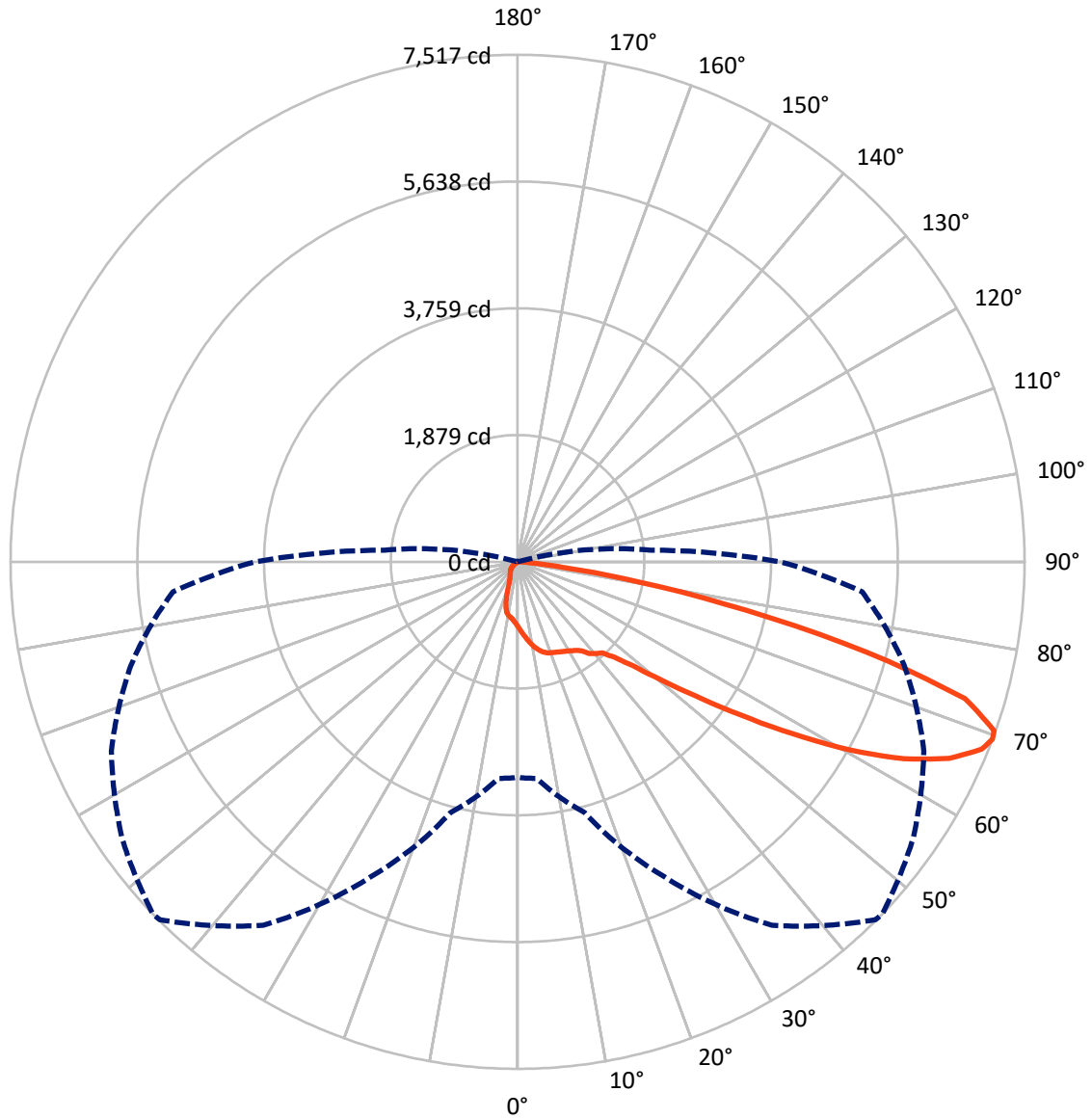
✕ Max cd  
 - - - 1/2 Max cd



Based on 25 foot mounting height. Maximum calculated value = 2.2 fc  
 Type IV - Short - N/A

REPORT NUMBER: P322816  
CATALOG NUMBER: GLEON-SA2D-727-U-T4W-HSS

### Luminous Intensity Polar Plot



— Vertical Plane Through 46-Deg Lateral    - - - Horizontal Cone Through 69-Deg Vertical

REPORT NUMBER: P322816  
 CATALOG NUMBER: GLEON-SA2D-727-U-T4W-HSS

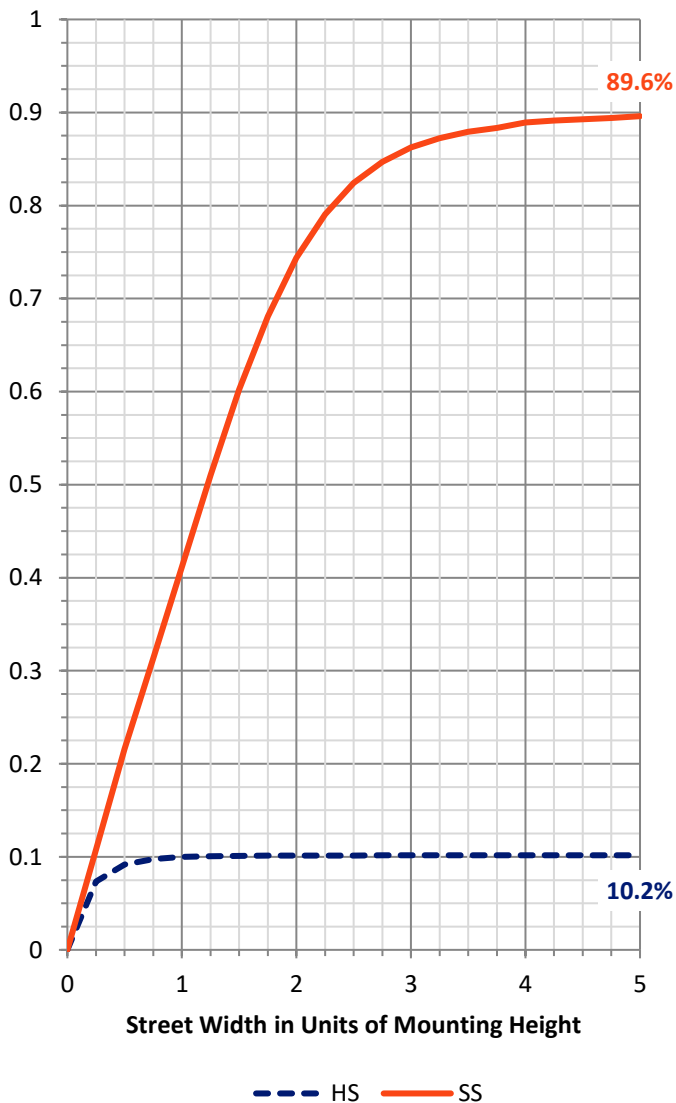
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total  |
|--------------------|-----------|----------|--------|--------|
| <b>House Side</b>  | Lumens    | 987.7    | 0.0    | 987.7  |
|                    | % Fixture | 10.3     | 0.0    | 10.3   |
| <b>Street Side</b> | Lumens    | 8636.3   | 0.0    | 8636.3 |
|                    | % Fixture | 89.7     | 0.0    | 89.7   |
| <b>Total</b>       | Lumens    | 9624.0   | 0.0    | 9624.0 |
|                    | % Fixture | 100.0    | 0.0    | 100.0  |

**Coefficient of Utilization**

**ZONAL LUMENS:**

| Zone      | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10°    | 96.0   | 1.0       |
| 10°-20°   | 291.2  | 3.0       |
| 20°-30°   | 457.9  | 4.8       |
| 30°-40°   | 656.7  | 6.8       |
| 40°-50°   | 1135.0 | 11.8      |
| 50°-60°   | 2242.3 | 23.3      |
| 60°-70°   | 3133.7 | 32.6      |
| 70°-80°   | 1513.9 | 15.7      |
| 80°-90°   | 97.3   | 1.0       |
| 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°    | 9624.0 | 100.0     |
| 0°-180°   | 9624.0 | 100.0     |

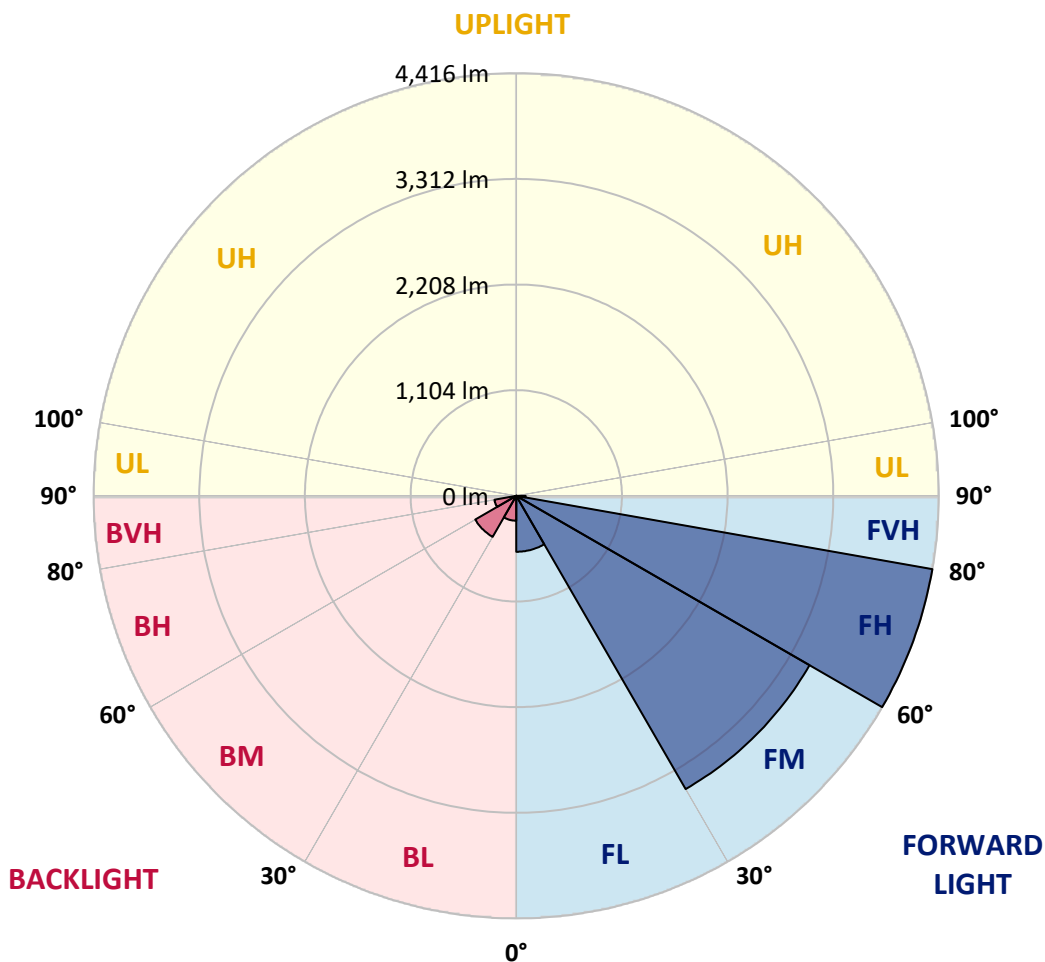


REPORT NUMBER: P322816  
 CATALOG NUMBER: GLEON-SA2D-727-U-T4W-HSS

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

| Zone           | Lumens | % Fixture | Zone Rating/Lumen Limit |      |         |
|----------------|--------|-----------|-------------------------|------|---------|
|                |        |           | B                       | U    | G       |
| FL (0°-30°)    | 584.8  | 6.1       |                         |      |         |
| FM (30°-60°)   | 3539.0 | 36.8      |                         |      |         |
| FH (60°-80°)   | 4416.1 | 45.9      |                         |      | G2/5000 |
| FVH (80°-90°)  | 96.5   | 1.0       |                         |      | G1/100  |
| BL (0°-30°)    | 260.3  | 2.7       | B1/500                  |      |         |
| BM (30°-60°)   | 495.0  | 5.1       | B1/1000                 |      |         |
| BH (60°-80°)   | 231.6  | 2.4       | B1/500                  |      | G1/500  |
| BVH (80°-90°)  | 0.8    | 0.0       |                         |      | G0/10   |
| UL (90°-100°)  | 0.0    | 0.0       |                         | U0/0 |         |
| UH (100°-180°) | 0.0    | 0.0       |                         | U0/0 |         |

**BUG Rating: B1-U0-G2**  
 Type IV Short





REPORT NUMBER: P322816

CATALOG NUMBER: GLEON-SA2D-727-U-T4W-HSS

**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 5°     | 15°    | 25°    | 35°    | 45°    | 46°    | 55°    | 65°    | 75°    | 85°    |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 964.3  | 964.3  | 964.3  | 964.3  | 964.3  | 964.3  | 964.3  | 964.3  | 964.3  | 964.3  | 964.3  |
| 2.5°  | 1071.2 | 1069.9 | 1063.6 | 1060.9 | 1045.5 | 1036.5 | 1032.9 | 1021.6 | 1005.4 | 989.1  | 971.1  |
| 5°    | 1193.1 | 1192.6 | 1180.9 | 1169.6 | 1140.7 | 1113.6 | 1108.7 | 1082.5 | 1046.0 | 1011.7 | 977.4  |
| 7.5°  | 1317.6 | 1311.7 | 1300.0 | 1278.3 | 1236.4 | 1193.1 | 1189.0 | 1152.0 | 1100.1 | 1050.5 | 1001.3 |
| 10°   | 1423.2 | 1419.6 | 1404.2 | 1371.3 | 1322.1 | 1272.9 | 1268.0 | 1222.4 | 1163.7 | 1102.8 | 1040.1 |
| 12.5° | 1505.3 | 1502.6 | 1482.3 | 1441.2 | 1388.9 | 1337.9 | 1331.1 | 1290.5 | 1227.8 | 1159.7 | 1085.7 |
| 15°   | 1555.4 | 1554.1 | 1529.2 | 1485.5 | 1434.0 | 1389.8 | 1383.9 | 1348.3 | 1290.1 | 1218.8 | 1135.3 |
| 17.5° | 1567.1 | 1567.6 | 1541.9 | 1497.6 | 1455.2 | 1423.6 | 1419.1 | 1392.1 | 1343.3 | 1272.5 | 1184.9 |
| 20°   | 1541.0 | 1546.4 | 1523.4 | 1485.0 | 1458.8 | 1442.1 | 1438.5 | 1422.3 | 1381.2 | 1314.4 | 1224.7 |
| 22.5° | 1504.0 | 1506.7 | 1490.9 | 1465.2 | 1454.3 | 1457.5 | 1455.7 | 1446.7 | 1411.9 | 1350.5 | 1263.9 |
| 25°   | 1481.4 | 1481.4 | 1471.9 | 1450.3 | 1457.5 | 1476.9 | 1477.3 | 1475.5 | 1448.0 | 1394.8 | 1311.7 |
| 27.5° | 1480.5 | 1477.8 | 1467.0 | 1450.7 | 1470.6 | 1500.4 | 1502.2 | 1514.3 | 1497.2 | 1448.5 | 1371.3 |
| 30°   | 1516.6 | 1513.4 | 1490.4 | 1469.2 | 1494.5 | 1526.5 | 1531.0 | 1557.7 | 1549.1 | 1506.7 | 1437.6 |
| 32.5° | 1601.0 | 1589.7 | 1538.7 | 1504.0 | 1522.9 | 1561.3 | 1567.1 | 1609.6 | 1623.1 | 1578.4 | 1501.7 |
| 35°   | 1716.5 | 1680.8 | 1607.3 | 1569.8 | 1571.7 | 1611.8 | 1617.2 | 1679.5 | 1719.7 | 1644.3 | 1551.3 |
| 37.5° | 1875.8 | 1858.2 | 1738.6 | 1638.4 | 1646.6 | 1707.5 | 1723.3 | 1791.0 | 1779.7 | 1680.4 | 1607.7 |
| 40°   | 2225.0 | 2197.5 | 2070.3 | 1830.7 | 1718.3 | 1785.1 | 1790.0 | 1826.1 | 1827.0 | 1762.1 | 1725.1 |
| 42.5° | 2700.6 | 2689.4 | 2555.3 | 2179.5 | 1859.5 | 1837.0 | 1846.0 | 1906.9 | 1975.1 | 1934.4 | 1932.6 |
| 45°   | 3227.2 | 3221.4 | 3079.2 | 2642.4 | 2145.2 | 2007.1 | 2018.4 | 2100.0 | 2230.5 | 2239.5 | 2296.8 |
| 47.5° | 3650.9 | 3648.2 | 3566.6 | 3159.1 | 2582.4 | 2295.4 | 2299.0 | 2385.7 | 2614.9 | 2728.2 | 2819.8 |
| 50°   | 4037.2 | 4050.3 | 3985.8 | 3718.2 | 3178.0 | 2747.1 | 2738.5 | 2796.3 | 3164.5 | 3350.0 | 3463.7 |
| 52.5° | 4574.2 | 4592.7 | 4411.7 | 4239.8 | 3803.0 | 3307.6 | 3300.8 | 3361.2 | 3825.1 | 3964.1 | 3984.4 |
| 55°   | 5048.4 | 5016.8 | 4873.8 | 4824.2 | 4565.1 | 3999.7 | 3997.9 | 4051.2 | 4464.1 | 4523.2 | 4560.6 |
| 57.5° | 5257.8 | 5245.6 | 5314.6 | 5428.4 | 5363.4 | 4817.8 | 4813.8 | 4773.2 | 5035.8 | 5042.1 | 5157.2 |
| 60°   | 5390.0 | 5404.9 | 5616.5 | 5967.1 | 6129.1 | 5698.2 | 5672.0 | 5424.3 | 5581.8 | 5567.8 | 5691.0 |
| 62.5° | 5290.7 | 5320.1 | 5700.9 | 6285.2 | 6702.2 | 6466.6 | 6429.6 | 6020.8 | 6048.4 | 6000.1 | 6114.7 |
| 65°   | 4763.7 | 4809.3 | 5433.3 | 6225.2 | 6986.5 | 7067.2 | 7029.8 | 6547.4 | 6418.8 | 6339.4 | 6275.8 |
| 67.5° | 3868.0 | 3895.1 | 4546.6 | 5703.2 | 6858.3 | 7425.5 | 7417.8 | 7009.0 | 6698.6 | 6282.1 | 5788.4 |
| 69°   | 3196.5 | 3223.2 | 3850.4 | 5153.6 | 6576.3 | 7502.2 | 7517.1 | 7157.0 | 6645.3 | 5933.7 | 5128.7 |
| 70°   | 2707.4 | 2735.8 | 3320.2 | 4682.5 | 6249.2 | 7466.6 | 7493.2 | 7143.0 | 6492.8 | 5530.3 | 4549.8 |
| 72.5° | 1420.0 | 1444.4 | 2044.1 | 3225.9 | 5094.4 | 6856.1 | 6936.8 | 6539.3 | 5503.7 | 4016.4 | 2690.3 |
| 75°   | 446.3  | 460.3  | 798.2  | 1686.3 | 3488.0 | 5330.9 | 5349.4 | 5129.6 | 3908.1 | 2209.2 | 1120.4 |
| 77.5° | 170.1  | 166.1  | 265.8  | 621.4  | 1763.4 | 3356.7 | 3470.0 | 3205.6 | 2050.9 | 781.1  | 258.6  |
| 80°   | 91.6   | 92.1   | 138.1  | 257.2  | 754.5  | 1725.1 | 1820.7 | 1553.6 | 728.7  | 243.7  | 59.6   |
| 82.5° | 39.7   | 41.5   | 77.6   | 136.3  | 346.5  | 636.2  | 684.1  | 569.5  | 278.4  | 163.8  | 22.1   |
| 85°   | 8.6    | 9.5    | 37.5   | 74.0   | 141.2  | 178.7  | 187.3  | 184.6  | 177.3  | 127.2  | 8.6    |
| 87.5° | 0.0    | 0.0    | 16.7   | 26.6   | 35.6   | 40.6   | 35.6   | 46.5   | 97.9   | 85.7   | 4.5    |
| 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: P322816

CATALOG NUMBER: GLEON-SA2D-727-U-T4W-HSS

**CANDELA DISTRIBUTION (continued):**

|       | 90°    | 95°    | 105°   | 115°  | 125°  | 135°  | 145°  | 155°  | 165°  | 175°  | 180°  |
|-------|--------|--------|--------|-------|-------|-------|-------|-------|-------|-------|-------|
| 0°    | 964.3  | 964.3  | 964.3  | 964.3 | 964.3 | 964.3 | 964.3 | 964.3 | 964.3 | 964.3 | 964.3 |
| 2.5°  | 965.2  | 957.1  | 943.1  | 927.7 | 916.9 | 905.6 | 896.6 | 892.5 | 888.0 | 884.9 | 888.9 |
| 5°    | 963.4  | 947.6  | 920.5  | 894.3 | 875.4 | 860.1 | 847.4 | 842.5 | 837.5 | 833.9 | 833.4 |
| 7.5°  | 979.2  | 957.1  | 915.6  | 877.2 | 847.9 | 827.1 | 810.0 | 802.7 | 796.9 | 794.2 | 791.9 |
| 10°   | 1009.4 | 981.0  | 925.5  | 875.4 | 837.5 | 802.3 | 765.3 | 736.9 | 718.4 | 709.8 | 706.6 |
| 12.5° | 1048.7 | 1013.0 | 944.4  | 884.9 | 829.8 | 762.1 | 683.6 | 615.9 | 572.2 | 557.7 | 549.2 |
| 15°   | 1094.7 | 1050.5 | 969.3  | 897.1 | 801.8 | 678.2 | 545.1 | 456.6 | 416.0 | 407.9 | 398.9 |
| 17.5° | 1138.9 | 1090.2 | 999.0  | 899.3 | 740.5 | 541.9 | 399.3 | 339.3 | 323.5 | 329.0 | 330.3 |
| 20°   | 1177.7 | 1129.4 | 1028.4 | 879.5 | 629.0 | 406.6 | 309.1 | 294.2 | 300.1 | 310.4 | 312.3 |
| 22.5° | 1217.0 | 1167.3 | 1055.4 | 827.1 | 486.4 | 308.6 | 278.4 | 282.0 | 287.9 | 298.3 | 300.1 |
| 25°   | 1264.8 | 1213.4 | 1080.7 | 731.0 | 365.0 | 262.6 | 264.4 | 269.8 | 275.7 | 285.2 | 286.1 |
| 27.5° | 1319.9 | 1271.6 | 1097.4 | 606.0 | 270.7 | 241.4 | 247.3 | 255.4 | 261.3 | 270.3 | 272.1 |
| 30°   | 1393.0 | 1348.3 | 1102.8 | 476.5 | 227.0 | 222.5 | 225.2 | 235.1 | 243.7 | 251.8 | 253.1 |
| 32.5° | 1461.5 | 1424.1 | 1084.8 | 359.6 | 210.3 | 204.9 | 204.9 | 210.7 | 220.7 | 228.3 | 230.1 |
| 35°   | 1524.7 | 1500.4 | 1027.0 | 263.1 | 197.6 | 188.6 | 184.1 | 184.1 | 190.4 | 196.7 | 198.5 |
| 37.5° | 1608.2 | 1607.3 | 933.6  | 209.8 | 185.5 | 175.1 | 165.6 | 158.4 | 156.1 | 157.5 | 158.4 |
| 40°   | 1751.2 | 1752.6 | 811.8  | 188.2 | 175.1 | 161.1 | 146.7 | 133.6 | 121.4 | 117.3 | 116.9 |
| 42.5° | 1974.6 | 1954.3 | 684.1  | 177.8 | 166.1 | 146.7 | 125.0 | 107.4 | 88.4  | 82.6  | 82.1  |
| 45°   | 2329.3 | 2208.8 | 548.7  | 168.3 | 156.6 | 130.4 | 103.3 | 79.4  | 64.1  | 59.6  | 59.6  |
| 47.5° | 2845.9 | 2543.2 | 425.1  | 157.9 | 143.9 | 111.9 | 78.1  | 57.3  | 46.9  | 44.7  | 45.1  |
| 50°   | 3380.2 | 2870.8 | 325.8  | 144.8 | 128.6 | 92.5  | 57.8  | 41.5  | 35.6  | 35.6  | 36.1  |
| 52.5° | 3854.0 | 3110.8 | 254.0  | 130.9 | 109.7 | 72.6  | 43.8  | 32.5  | 29.8  | 29.3  | 29.8  |
| 55°   | 4297.6 | 3265.6 | 194.5  | 114.6 | 87.1  | 54.1  | 33.4  | 26.6  | 24.8  | 23.9  | 23.5  |
| 57.5° | 4725.3 | 3342.3 | 145.7  | 92.5  | 63.2  | 39.3  | 26.6  | 22.6  | 20.8  | 19.4  | 19.0  |
| 60°   | 5010.1 | 3280.0 | 100.2  | 68.1  | 43.8  | 28.4  | 22.1  | 19.4  | 17.1  | 15.8  | 15.3  |
| 62.5° | 5170.7 | 3109.9 | 64.5   | 49.2  | 31.1  | 21.2  | 17.6  | 16.2  | 13.1  | 11.7  | 11.7  |
| 65°   | 5105.7 | 2829.2 | 45.1   | 35.2  | 22.6  | 15.8  | 13.1  | 13.1  | 9.5   | 7.7   | 7.2   |
| 67.5° | 4524.5 | 2390.2 | 34.3   | 26.2  | 16.2  | 11.7  | 9.9   | 11.3  | 5.9   | 3.6   | 3.6   |
| 69°   | 3892.8 | 1980.9 | 29.3   | 21.7  | 13.5  | 9.5   | 8.6   | 10.4  | 4.1   | 2.7   | 2.3   |
| 70°   | 3383.4 | 1708.8 | 26.6   | 19.0  | 11.3  | 8.1   | 7.7   | 9.9   | 4.1   | 2.3   | 1.8   |
| 72.5° | 2024.2 | 953.0  | 20.3   | 13.5  | 7.2   | 6.3   | 6.3   | 11.3  | 4.1   | 2.3   | 1.8   |
| 75°   | 818.1  | 335.7  | 14.9   | 9.5   | 5.4   | 5.4   | 7.7   | 14.4  | 3.6   | 1.8   | 1.4   |
| 77.5° | 185.5  | 73.6   | 8.6    | 5.9   | 3.6   | 5.4   | 9.0   | 11.3  | 2.3   | 0.9   | 0.0   |
| 80°   | 45.1   | 18.0   | 5.4    | 3.6   | 2.3   | 4.1   | 6.8   | 6.3   | 0.5   | 0.0   | 0.0   |
| 82.5° | 14.9   | 6.3    | 2.3    | 1.8   | 0.5   | 1.4   | 3.2   | 1.8   | 0.0   | 0.0   | 0.0   |
| 85°   | 6.3    | 3.6    | 0.9    | 0.5   | 0.0   | 0.0   | 0.5   | 0.0   | 0.0   | 0.0   | 0.0   |
| 87.5° | 4.1    | 1.4    | 0.0    | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 90°   | 0.0    | 0.0    | 0.0    | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |



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



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            |

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

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

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

**Photopic Flux vs. Wavelength**



**Photopic Lumens: 6211.7**

| $\lambda$ (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                              | 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                         |                |                                   |                             |

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

**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           |        |               |               |

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

Melanopic Flux vs. Wavelength



Melanopic Lumens: 2145.7 M/P: 0.35

| 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          | 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           |        |               |               |

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

TM-30-18

**Summary**

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



**Color Vector Graphics**





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

TM-30-18

**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 |            |



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

TM-30-18

Color Rendition by Hue-Angle Bin



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

TM-30-18

Measure Comparisons



(END OF REPORT)