

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: P319994

Luminaire Tested: **GLEON-SA0A-740-U-SL4**

Issue Date: 3/3/2020

**Test Information**

Test Method: LM-79-08  
Report Number: P319994  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-1903-205-24)  
Test Lab: INNOVATION CENTER  
Issue Date: 3/3/2020  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: MCGRAW-EDISON  
Catalog Number: GLEON-SA0A-740-U-SL4  
Description: GALLEON AREA AND ROADWAY LUMINAIRE  
(10) 70 CRI, 4000K, 615mA LIGHTSQUARES WITH 16 LEDS EACH AND TYPE IV  
SPILL LIGHT ELIMINATOR OPTICS  
Light Source: -  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 43831 lumens  
Efficiency: N/A  
Efficacy: 135.7 lumens/watt  
Luminous Opening: Rectangular (W 2.5' x L: 1' x H: 0')  
IES Classification: Type IV - Short  
BUG Rating: B3 - U0 - G5

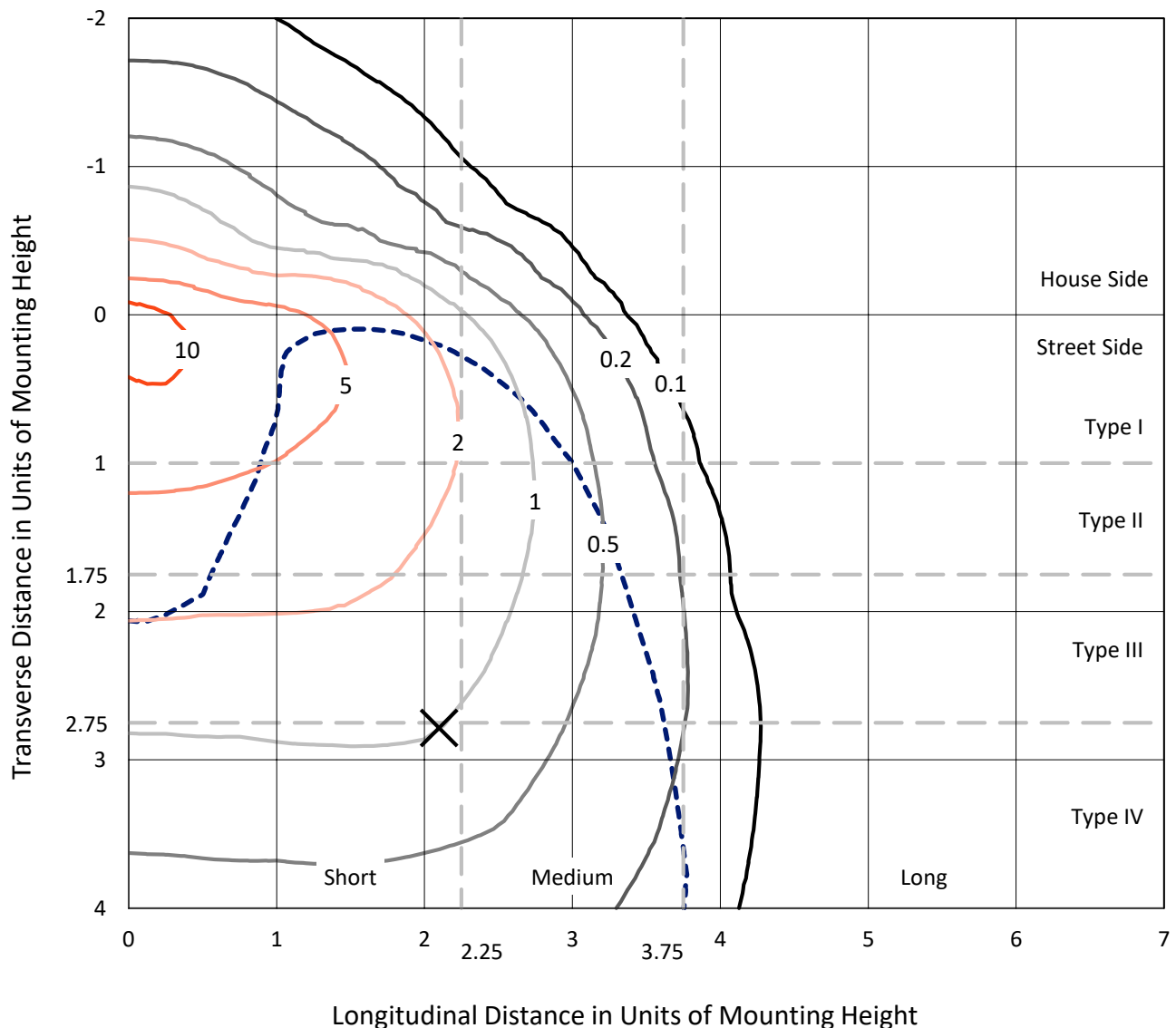
Input Watts (W): 323  
Input Voltage (V): NR  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: NR  
Total Harmonic Distortion (THDi): NR  
Frequency (hertz): 60  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 24 FT



REPORT NUMBER: P319994  
 CATALOG NUMBER: GLEON-SA0A-740-U-SL4

## Iso-Footcandle Lines of Horizontal Illumination

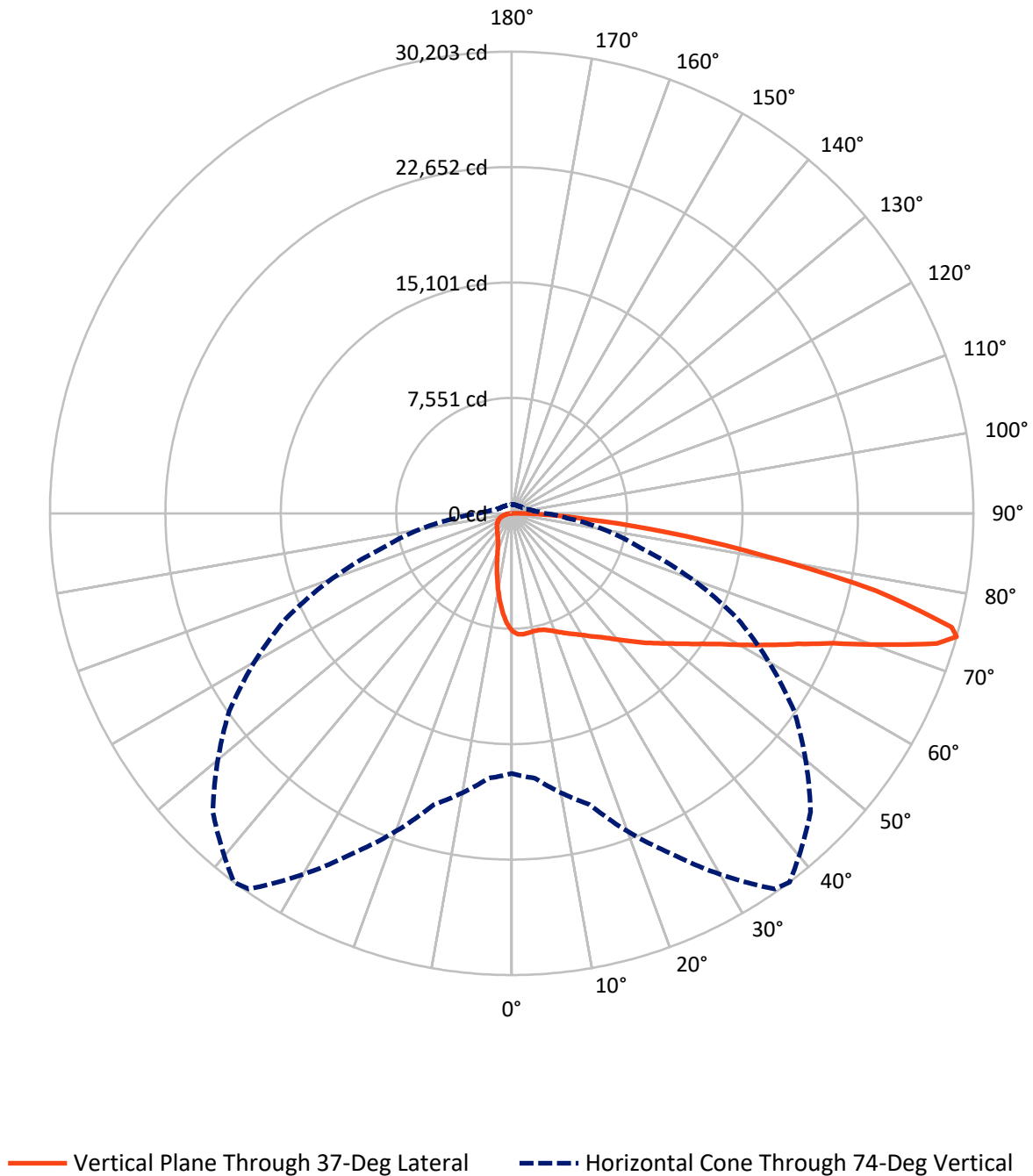
✕ Max cd  
 - - - 1/2 Max cd



Based on 25 foot mounting height. Maximum calculated value = 12.6 fc  
 Type IV - Short - N/A

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## Luminous Intensity Polar Plot



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**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total   |
|--------------------|-----------|----------|--------|---------|
| <b>House Side</b>  | Lumens    | 6030.8   | 0.0    | 6030.8  |
|                    | % Fixture | 13.8     | 0.0    | 13.8    |
| <b>Street Side</b> | Lumens    | 37800.2  | 0.0    | 37800.2 |
|                    | % Fixture | 86.2     | 0.0    | 86.2    |
| <b>Total</b>       | Lumens    | 43831.0  | 0.0    | 43831.0 |
|                    | % Fixture | 100.0    | 0.0    | 100.0   |

**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 680.1   | 1.6       |
| 10°-20°   | 1743.2  | 4.0       |
| 20°-30°   | 2686.0  | 6.1       |
| 30°-40°   | 3905.8  | 8.9       |
| 40°-50°   | 5748.7  | 13.1      |
| 50°-60°   | 8073.0  | 18.4      |
| 60°-70°   | 10217.9 | 23.3      |
| 70°-80°   | 8997.3  | 20.5      |
| 80°-90°   | 1779.0  | 4.1       |
| 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°    | 43831.0 | 100.0     |
| 0°-180°   | 43831.0 | 100.0     |

**Coefficient of Utilization**



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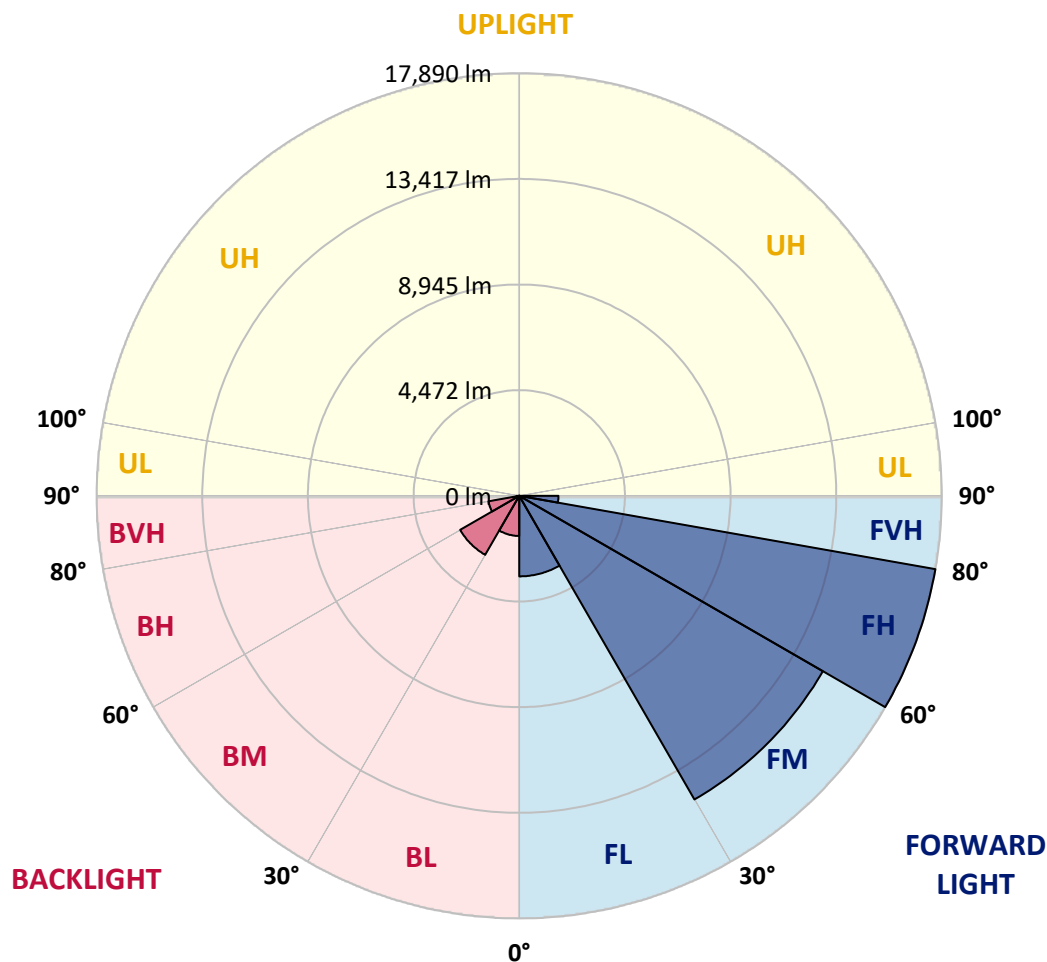
CATALOG NUMBER: GLEON-SA0A-740-U-SL4

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

| Zone |             | Lumens  | % Fixture | Zone Rating/Lumen Limit |      |         |
|------|-------------|---------|-----------|-------------------------|------|---------|
|      |             |         |           | B                       | U    | G       |
| FL   | (0°-30°)    | 3410.6  | 7.8       |                         |      |         |
| FM   | (30°-60°)   | 14841.5 | 33.9      |                         |      |         |
| FH   | (60°-80°)   | 17889.6 | 40.8      |                         |      | G5      |
| FVH  | (80°-90°)   | 1658.5  | 3.8       |                         |      | G5      |
| BL   | (0°-30°)    | 1698.7  | 3.9       | B3/2500                 |      |         |
| BM   | (30°-60°)   | 2886.0  | 6.6       | B3/5000                 |      |         |
| BH   | (60°-80°)   | 1325.6  | 3.0       | B3/2500                 |      | G3/2500 |
| BVH  | (80°-90°)   | 120.5   | 0.3       |                         |      | G2/225  |
| UL   | (90°-100°)  | 0.0     | 0.0       |                         | U0/0 |         |
| UH   | (100°-180°) | 0.0     | 0.0       |                         | U0/0 |         |

**BUG Rating: B3-U0-G5**

Type IV Short





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**CANDELA DISTRIBUTION (FULL):**

|       | 0°      | 5°      | 15°     | 25°     | 35°     | 37°     | 45°     | 55°     | 65°     | 75°     | 85°     |
|-------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| 0°    | 7722.9  | 7722.9  | 7722.9  | 7722.9  | 7722.9  | 7722.9  | 7722.9  | 7722.9  | 7722.9  | 7722.9  | 7722.9  |
| 2.5°  | 7986.9  | 7988.4  | 7986.9  | 7974.5  | 7945.2  | 7920.5  | 7900.4  | 7871.1  | 7806.2  | 7756.8  | 7682.7  |
| 5°    | 8062.5  | 8053.3  | 8047.1  | 8023.9  | 7977.6  | 7949.8  | 7911.2  | 7855.6  | 7749.1  | 7650.3  | 7529.9  |
| 7.5°  | 8027.0  | 8016.2  | 8002.3  | 7974.5  | 7922.0  | 7898.9  | 7844.8  | 7772.3  | 7644.1  | 7514.4  | 7341.5  |
| 10°   | 7917.4  | 7914.3  | 7908.1  | 7902.0  | 7857.2  | 7838.6  | 7789.2  | 7712.0  | 7585.4  | 7428.0  | 7225.7  |
| 12.5° | 7795.4  | 7803.1  | 7827.8  | 7860.3  | 7840.2  | 7830.9  | 7800.0  | 7747.6  | 7617.9  | 7448.0  | 7204.1  |
| 15°   | 7718.2  | 7739.8  | 7806.2  | 7891.1  | 7908.1  | 7905.0  | 7897.3  | 7863.4  | 7725.9  | 7537.6  | 7253.5  |
| 17.5° | 7692.0  | 7727.5  | 7854.1  | 7994.6  | 8044.0  | 8054.8  | 8057.9  | 7999.2  | 7846.4  | 7647.2  | 7304.4  |
| 20°   | 7739.8  | 7784.6  | 7969.9  | 8162.9  | 8241.6  | 8247.8  | 8233.9  | 8132.0  | 7960.6  | 7741.4  | 7332.2  |
| 22.5° | 7885.0  | 7925.1  | 8156.7  | 8374.4  | 8463.9  | 8473.2  | 8431.5  | 8277.1  | 8081.0  | 7852.5  | 7370.8  |
| 25°   | 8164.4  | 8213.8  | 8445.4  | 8663.1  | 8709.4  | 8711.0  | 8650.8  | 8459.3  | 8238.5  | 8008.5  | 7454.2  |
| 27.5° | 8528.8  | 8578.2  | 8786.6  | 8999.7  | 8975.0  | 8961.1  | 8879.3  | 8687.8  | 8443.9  | 8223.1  | 7602.4  |
| 30°   | 8934.9  | 8988.9  | 9186.5  | 9337.8  | 9279.2  | 9251.4  | 9185.0  | 8937.9  | 8729.5  | 8516.4  | 7829.4  |
| 32.5° | 9354.8  | 9404.2  | 9577.1  | 9680.6  | 9606.5  | 9594.1  | 9493.8  | 9268.3  | 9101.6  | 8964.2  | 8196.8  |
| 35°   | 9785.6  | 9821.1  | 9990.9  | 10049.6 | 9950.8  | 9947.7  | 9919.9  | 9713.0  | 9608.0  | 9672.9  | 8731.1  |
| 37.5° | 10225.6 | 10234.9 | 10380.0 | 10383.1 | 10353.7 | 10366.1 | 10395.4 | 10265.7 | 10295.1 | 10497.3 | 9425.8  |
| 40°   | 10617.8 | 10642.5 | 10747.5 | 10779.9 | 10830.8 | 10874.1 | 11020.7 | 10935.8 | 11162.8 | 11521.0 | 10290.4 |
| 42.5° | 10908.0 | 10955.9 | 11124.2 | 11207.6 | 11372.8 | 11440.7 | 11647.6 | 11726.3 | 12183.3 | 12720.6 | 11318.7 |
| 45°   | 11153.5 | 11227.6 | 11497.8 | 11669.2 | 11948.7 | 12067.5 | 12364.0 | 12628.0 | 13336.7 | 14022.2 | 12401.0 |
| 47.5° | 11419.1 | 11513.3 | 11851.4 | 12178.7 | 12558.5 | 12692.8 | 13231.7 | 13626.9 | 14567.2 | 15331.5 | 13421.6 |
| 50°   | 11809.7 | 11882.3 | 12212.7 | 12726.8 | 13200.8 | 13373.7 | 14119.4 | 14686.1 | 15817.8 | 16579.0 | 14306.3 |
| 52.5° | 12354.7 | 12326.9 | 12606.4 | 13327.4 | 13963.5 | 14176.6 | 15067.4 | 15813.2 | 17085.4 | 17707.6 | 15053.5 |
| 55°   | 12902.8 | 12856.5 | 13052.6 | 13955.8 | 14852.8 | 15076.7 | 16111.1 | 16944.9 | 18291.2 | 18723.5 | 15626.3 |
| 57.5° | 13512.7 | 13424.7 | 13589.9 | 14664.5 | 15865.7 | 16132.8 | 17279.9 | 18147.6 | 19477.0 | 19544.9 | 15990.7 |
| 60°   | 14141.1 | 14022.2 | 14207.5 | 15543.0 | 17151.8 | 17466.7 | 18647.9 | 19321.0 | 20594.8 | 20202.6 | 16108.1 |
| 62.5° | 14690.7 | 14607.3 | 14893.0 | 16523.4 | 18601.5 | 18947.4 | 19991.1 | 20568.5 | 21697.2 | 20475.9 | 15685.0 |
| 65°   | 15170.9 | 15184.8 | 15678.8 | 17625.8 | 20218.1 | 20587.1 | 21532.0 | 22106.3 | 22564.9 | 20313.8 | 14695.3 |
| 67.5° | 15743.7 | 15822.4 | 16665.4 | 19077.1 | 22253.0 | 22657.5 | 23773.8 | 23783.1 | 23049.7 | 19362.7 | 12746.9 |
| 70°   | 16579.0 | 16741.1 | 18022.6 | 21090.4 | 25146.4 | 25702.2 | 26563.7 | 24768.1 | 22368.8 | 16784.3 | 10029.5 |
| 72.5° | 17320.1 | 17622.7 | 19466.2 | 23394.0 | 28672.7 | 29094.2 | 28195.7 | 24199.9 | 19523.3 | 12578.6 | 6248.4  |
| 74°   | 17019.0 | 17394.2 | 19728.6 | 24528.8 | 30000.5 | 30202.8 | 27644.5 | 22541.7 | 16277.9 | 8711.0  | 3631.4  |
| 75°   | 16370.5 | 16778.1 | 19345.7 | 24518.0 | 29832.3 | 29719.5 | 26313.6 | 20647.3 | 13406.1 | 5941.1  | 2416.3  |
| 77.5° | 13211.6 | 13642.4 | 16301.1 | 21013.2 | 24460.8 | 24354.3 | 20213.4 | 13850.8 | 5871.7  | 1948.5  | 1227.4  |
| 80°   | 7681.2  | 8010.0  | 10119.1 | 13344.4 | 16494.0 | 16687.0 | 13293.4 | 6853.6  | 2309.8  | 1094.7  | 832.2   |
| 82.5° | 3412.1  | 3639.1  | 4888.2  | 6811.9  | 9953.9  | 10202.4 | 6961.7  | 3591.2  | 1426.6  | 665.4   | 500.2   |
| 85°   | 2238.7  | 2407.0  | 2967.5  | 3243.8  | 4739.9  | 4909.8  | 3407.5  | 2796.1  | 941.8   | 365.9   | 367.5   |
| 87.5° | 1610.3  | 1772.5  | 2204.8  | 1925.3  | 2175.4  | 2059.6  | 1854.3  | 2587.7  | 378.3   | 208.4   | 123.5   |
| 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: P319994

CATALOG NUMBER: GLEON-SA0A-740-U-SL4

**CANDELA DISTRIBUTION (continued):**

|       | 90°     | 95°    | 105°   | 115°   | 125°   | 135°   | 145°   | 155°   | 165°   | 175°   | 180°   |
|-------|---------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 7722.9  | 7722.9 | 7722.9 | 7722.9 | 7722.9 | 7722.9 | 7722.9 | 7722.9 | 7722.9 | 7722.9 | 7722.9 |
| 2.5°  | 7650.3  | 7625.6 | 7570.0 | 7465.0 | 7406.3 | 7356.9 | 7275.1 | 7227.2 | 7205.6 | 7204.1 | 7213.3 |
| 5°    | 7460.4  | 7403.3 | 7259.7 | 7083.7 | 6943.2 | 6815.0 | 6656.0 | 6560.3 | 6492.3 | 6452.2 | 6463.0 |
| 7.5°  | 7239.6  | 7150.0 | 6924.6 | 6643.6 | 6418.2 | 6169.6 | 5924.1 | 5777.5 | 5663.2 | 5578.3 | 5593.7 |
| 10°   | 7088.3  | 6964.8 | 6635.9 | 6231.4 | 5856.2 | 5494.9 | 5156.8 | 4954.5 | 4794.0 | 4670.5 | 4679.7 |
| 12.5° | 7037.3  | 6870.6 | 6415.1 | 5874.7 | 5348.3 | 4854.2 | 4412.6 | 4102.3 | 3937.1 | 3796.6 | 3807.4 |
| 15°   | 7045.1  | 6821.2 | 6229.8 | 5553.6 | 4891.2 | 4269.0 | 3733.3 | 3370.4 | 3146.6 | 3049.3 | 3050.9 |
| 17.5° | 7051.2  | 6764.1 | 6035.3 | 5209.3 | 4438.9 | 3722.5 | 3140.4 | 2772.9 | 2561.4 | 2471.9 | 2473.4 |
| 20°   | 7031.2  | 6671.4 | 5794.5 | 4814.0 | 3966.4 | 3220.7 | 2657.1 | 2345.3 | 2184.7 | 2115.2 | 2115.2 |
| 22.5° | 7004.9  | 6561.8 | 5522.7 | 4417.2 | 3500.1 | 2785.3 | 2311.3 | 2073.5 | 1980.9 | 1934.6 | 1933.0 |
| 25°   | 7017.3  | 6480.0 | 5244.8 | 4009.6 | 3070.9 | 2437.9 | 2081.2 | 1923.8 | 1862.0 | 1832.7 | 1831.1 |
| 27.5° | 7083.7  | 6441.4 | 4988.5 | 3603.6 | 2695.7 | 2177.0 | 1926.9 | 1815.7 | 1775.5 | 1757.0 | 1757.0 |
| 30°   | 7204.1  | 6441.4 | 4721.4 | 3257.7 | 2383.9 | 1984.0 | 1808.0 | 1732.3 | 1704.5 | 1692.2 | 1692.2 |
| 32.5° | 7414.1  | 6476.9 | 4463.6 | 2915.0 | 2135.3 | 1832.7 | 1709.2 | 1658.2 | 1636.6 | 1630.4 | 1630.4 |
| 35°   | 7775.3  | 6597.3 | 4211.9 | 2590.8 | 1934.6 | 1709.2 | 1615.0 | 1585.6 | 1570.2 | 1568.7 | 1573.3 |
| 37.5° | 8283.3  | 6842.8 | 3975.7 | 2351.4 | 1792.5 | 1608.8 | 1536.2 | 1513.1 | 1503.8 | 1511.5 | 1517.7 |
| 40°   | 8922.5  | 7176.3 | 3761.1 | 2135.3 | 1684.5 | 1528.5 | 1463.7 | 1448.2 | 1443.6 | 1454.4 | 1463.7 |
| 42.5° | 9694.5  | 7627.1 | 3585.1 | 1979.3 | 1601.1 | 1460.6 | 1401.9 | 1383.4 | 1378.7 | 1391.1 | 1403.5 |
| 45°   | 10529.8 | 8111.9 | 3461.5 | 1863.6 | 1536.2 | 1409.6 | 1347.9 | 1327.8 | 1318.5 | 1324.7 | 1338.6 |
| 47.5° | 11289.4 | 8570.5 | 3412.1 | 1781.7 | 1474.5 | 1366.4 | 1300.0 | 1275.3 | 1259.9 | 1256.8 | 1267.6 |
| 50°   | 11930.1 | 8911.7 | 3435.3 | 1732.3 | 1425.1 | 1318.5 | 1253.7 | 1225.9 | 1202.7 | 1188.8 | 1196.6 |
| 52.5° | 12396.4 | 9126.3 | 3456.9 | 1710.7 | 1386.5 | 1266.0 | 1202.7 | 1176.5 | 1145.6 | 1122.5 | 1122.5 |
| 55°   | 12734.5 | 9175.7 | 3409.0 | 1693.7 | 1357.1 | 1208.9 | 1145.6 | 1120.9 | 1090.0 | 1063.8 | 1060.7 |
| 57.5° | 12867.3 | 9036.8 | 3231.5 | 1669.0 | 1337.1 | 1154.9 | 1085.4 | 1066.9 | 1040.6 | 1009.7 | 1008.2 |
| 60°   | 12688.2 | 8607.5 | 2888.7 | 1616.5 | 1310.8 | 1110.1 | 1025.2 | 1012.8 | 1000.5 | 971.1  | 969.6  |
| 62.5° | 11968.7 | 7665.7 | 2445.6 | 1510.0 | 1258.3 | 1062.2 | 969.6  | 975.8  | 977.3  | 957.3  | 954.2  |
| 65°   | 10664.1 | 6371.9 | 2013.3 | 1371.0 | 1179.6 | 1005.1 | 912.5  | 941.8  | 958.8  | 955.7  | 951.1  |
| 67.5° | 8768.1  | 4959.2 | 1706.1 | 1224.4 | 1076.1 | 926.4  | 850.7  | 884.7  | 898.6  | 909.4  | 906.3  |
| 70°   | 6507.8  | 3497.1 | 1411.2 | 1070.0 | 951.1  | 833.7  | 770.4  | 787.4  | 778.2  | 790.5  | 795.1  |
| 72.5° | 3628.3  | 2098.2 | 1150.2 | 915.6  | 821.4  | 725.7  | 680.9  | 677.8  | 657.7  | 657.7  | 657.7  |
| 74°   | 2177.0  | 1539.3 | 1011.3 | 819.8  | 742.6  | 654.6  | 616.0  | 602.1  | 583.6  | 585.2  | 583.6  |
| 75°   | 1750.8  | 1323.2 | 927.9  | 756.5  | 687.1  | 612.9  | 574.4  | 555.8  | 541.9  | 541.9  | 540.4  |
| 77.5° | 1105.5  | 1005.1 | 747.3  | 602.1  | 549.6  | 504.9  | 478.6  | 453.9  | 453.9  | 452.4  | 450.8  |
| 80°   | 835.3   | 799.8  | 582.1  | 455.5  | 421.5  | 387.5  | 370.5  | 359.7  | 359.7  | 364.4  | 362.8  |
| 82.5° | 572.8   | 602.1  | 409.1  | 318.1  | 301.1  | 276.4  | 273.3  | 274.8  | 270.2  | 264.0  | 262.5  |
| 85°   | 418.4   | 452.4  | 276.4  | 200.7  | 183.7  | 168.3  | 180.6  | 186.8  | 179.1  | 165.2  | 159.0  |
| 87.5° | 160.6   | 296.4  | 148.2  | 83.4   | 77.2   | 66.4   | 77.2   | 80.3   | 86.5   | 67.9   | 69.5   |
| 90°   | 0.0     | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |

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

Report Prepared for

Cooper Lighting Solutions

MCGRAW, INVUE, LUMARK AND STREETWORKS

DATA VALID FOR LUMINAIRES UTILIZING SA LIGHT ENGINES

Report Number: SP1-2101-121-2

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

Test Date: 03/05/2021

### Test Information

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

SHIELD, DRIVER PROGRAMMED @ 615mA.

### Spectral Parameters

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



### Test Conditions

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

REPORT NUMBER: SP1-2101-121-2

| Measurement and Test Equipment |                       |                  |                      |
|--------------------------------|-----------------------|------------------|----------------------|
| Instrument                     | Identification Number | Calibration Date | Calibration Due Date |
| Photometer                     | IN0058                | 1/31/2021        | 7/31/2021            |
| Power Meter                    | IN0071                | 12/1/2020        | 12/1/2021            |
| AC Power Source                | IN0063                | 12/1/2020        | 12/1/2021            |
| DC Power Source                | IN0208                | 12/1/2020        | 12/1/2021            |
| Sphere Thermometer             | IN0085                | 12/1/2020        | 12/1/2021            |
| Room Thermometer               | IN0046                | 12/1/2020        | 12/1/2021            |

REPORT NUMBER: SP1-2101-121-2

**CIE 1931 Chromaticity Diagram**



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



Point lies inside the ANSI 4000K 4-step quadrangle

REPORT NUMBER: SP1-2101-121-2

### Photopic Flux vs. Wavelength



#####

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

REPORT NUMBER: SP1-2101-121-2

### Scotopic Flux vs. Wavelength


**Scotopic Lumens: 10425.8**
**S/P: 1.47**

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

REPORT NUMBER: SP1-2101-121-2

### Melanopic Flux vs. Wavelength



**Melanopic Lumens: 3927.2**

**M/P: 0.55**

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

REPORT NUMBER: SP1-2101-121-2

TM-30-18

### Summary

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



### Color Vector Graphics



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

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



**Color Rendition by Hue-Angle Bin**


**Measure Comparisons**


(END OF REPORT)