

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: P318713

Luminaire Tested: **GLEON-SA9A-740-U-T4FT**

Issue Date: 3/3/2020

### Test Information

Test Method: LM-79-08  
Report Number: P318713  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-1903-205-16)  
Test Lab: INNOVATION CENTER  
Issue Date: 3/3/2020  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: McGRAW-EDISON  
Catalog Number: GLEON-SA9A-740-U-T4FT  
Description: GALLEON AREA AND ROADWAY LUMINAIRE  
(9) 70 CRI, 4000K, 615mA LIGHTSQUARES WITH 16 LEDS EACH AND TYPE IV  
FORWARD THROW OPTICS  
Light Source: -  
Ballast/Driver: ELECTRONIC DRIVER

### Summary

Lumens per Lamp: N/A  
Luminaire Lumens: 41913 lumens  
Efficiency: N/A  
Efficacy: 144.5 lumens/watt  
Luminous Opening: Rectangular (W 2.5' x L: 1' x H: 0')  
IES Classification: Type IV - Short  
BUG Rating: B3 - U0 - G5

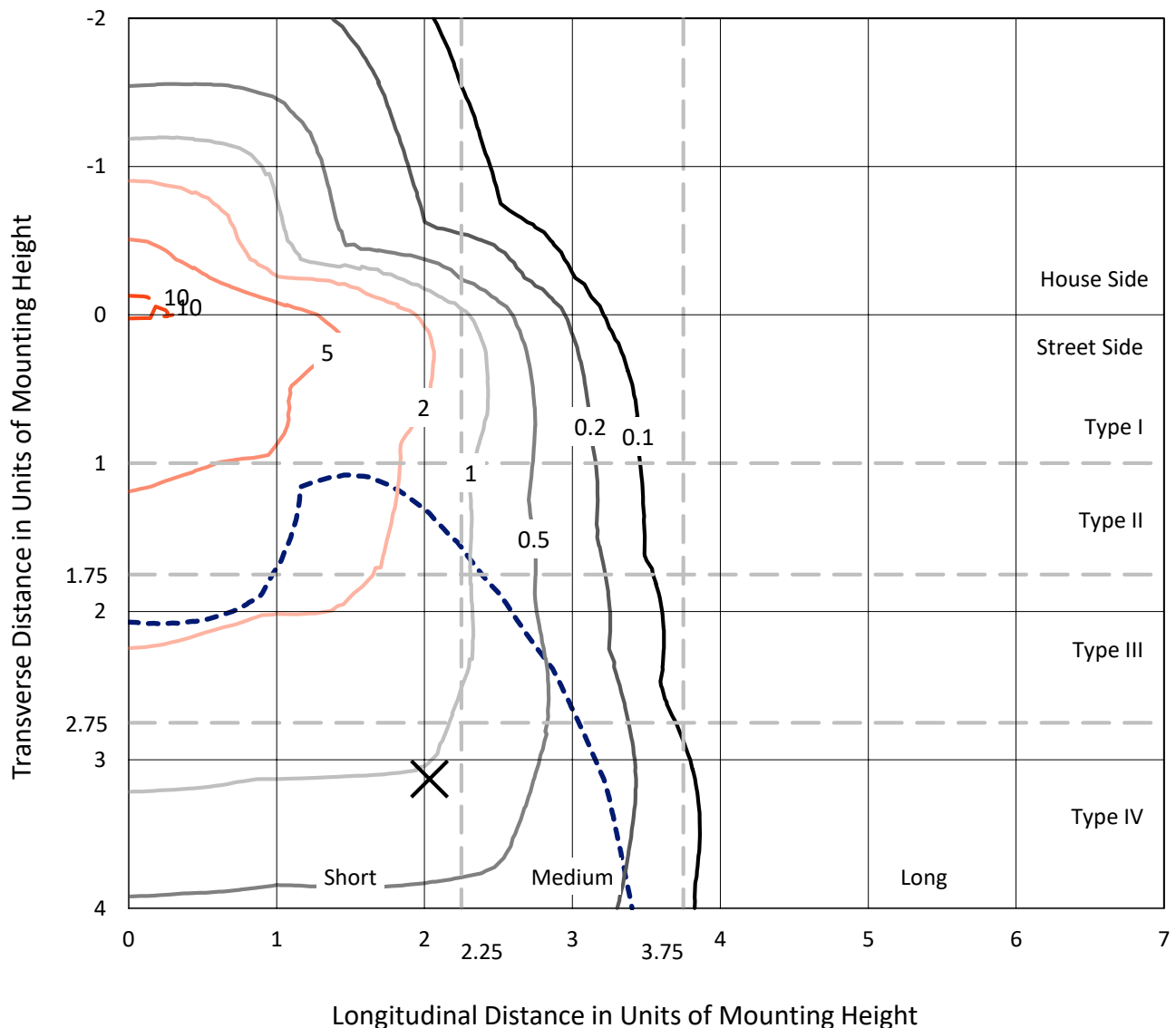
Input Watts (W): 290  
Input Voltage (V): NR  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: NR  
Total Harmonic Distortion (THDi): NR  
Frequency (hertz): 60  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 24 FT



REPORT NUMBER: P318713  
 CATALOG NUMBER: GLEON-SA9A-740-U-T4FT

## Iso-Footcandle Lines of Horizontal Illumination

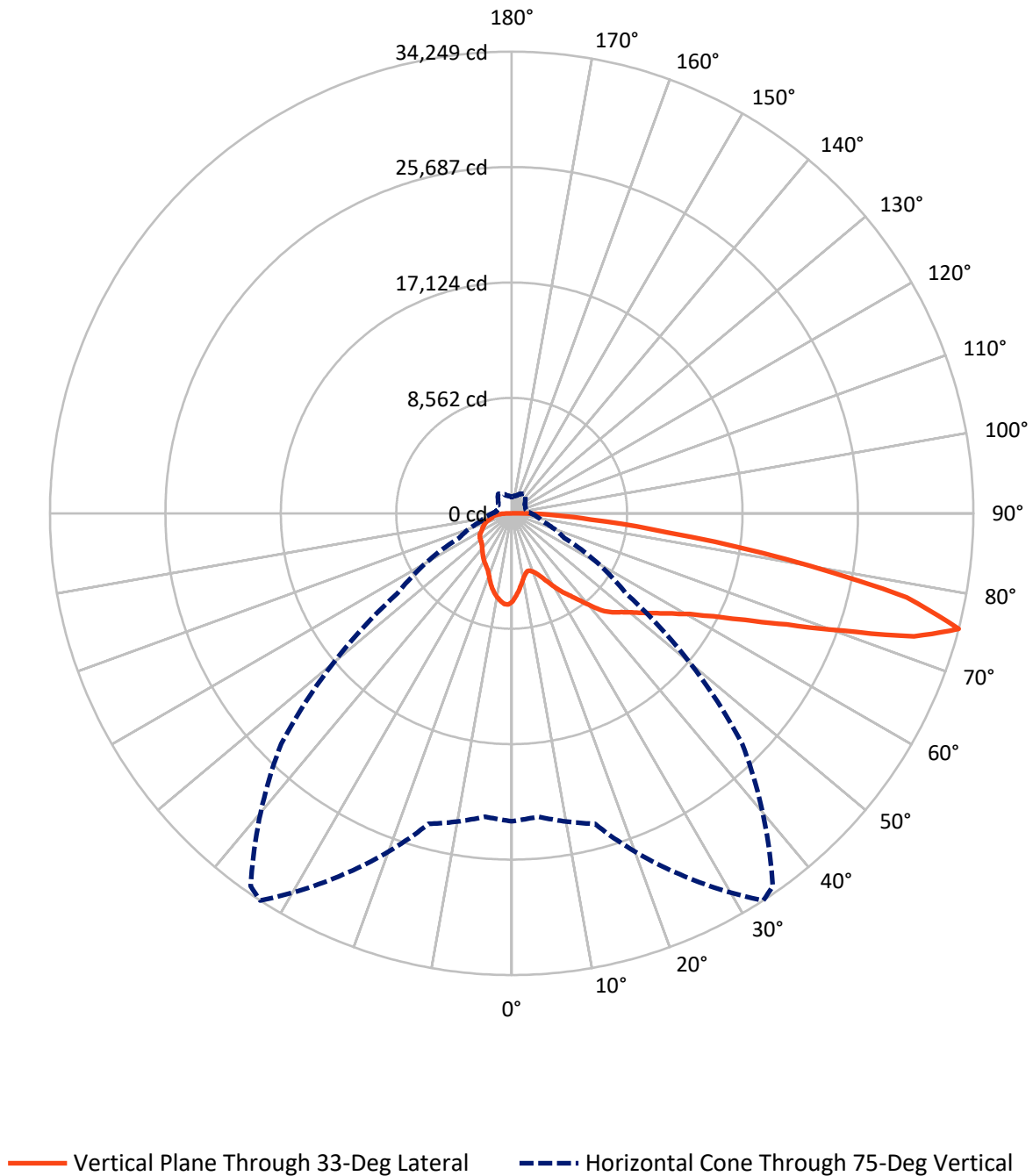
× Max cd  
 - - - 1/2 Max cd



Based on 25 foot mounting height. Maximum calculated value = 10.5 fc  
 Type IV - Short - N/A

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## Luminous Intensity Polar Plot



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CATALOG NUMBER: GLEON-SA9A-740-U-T4FT

**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total   |
|--------------------|-----------|----------|--------|---------|
| <b>House Side</b>  | Lumens    | 8999.8   | 0.0    | 8999.8  |
|                    | % Fixture | 21.5     | 0.0    | 21.5    |
| <b>Street Side</b> | Lumens    | 32913.2  | 0.0    | 32913.2 |
|                    | % Fixture | 78.5     | 0.0    | 78.5    |
| <b>Total</b>       | Lumens    | 41913.0  | 0.0    | 41913.0 |
|                    | % Fixture | 100.0    | 0.0    | 100.0   |

**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 592.5   | 1.4       |
| 10°-20°   | 1604.7  | 3.8       |
| 20°-30°   | 2620.7  | 6.3       |
| 30°-40°   | 3902.8  | 9.3       |
| 40°-50°   | 5597.7  | 13.4      |
| 50°-60°   | 7684.7  | 18.3      |
| 60°-70°   | 9621.0  | 23.0      |
| 70°-80°   | 8703.6  | 20.8      |
| 80°-90°   | 1585.4  | 3.8       |
| 90°-100°  | 0.0     | 0.0       |
| 100°-110° | 0.0     | 0.0       |
| 110°-120° | 0.0     | 0.0       |
| 120°-130° | 0.0     | 0.0       |
| 130°-140° | 0.0     | 0.0       |
| 140°-150° | 0.0     | 0.0       |
| 150°-160° | 0.0     | 0.0       |
| 160°-170° | 0.0     | 0.0       |
| 170°-180° | 0.0     | 0.0       |
| 0°-90°    | 41913.0 | 100.0     |
| 0°-180°   | 41913.0 | 100.0     |

**Coefficient of Utilization**



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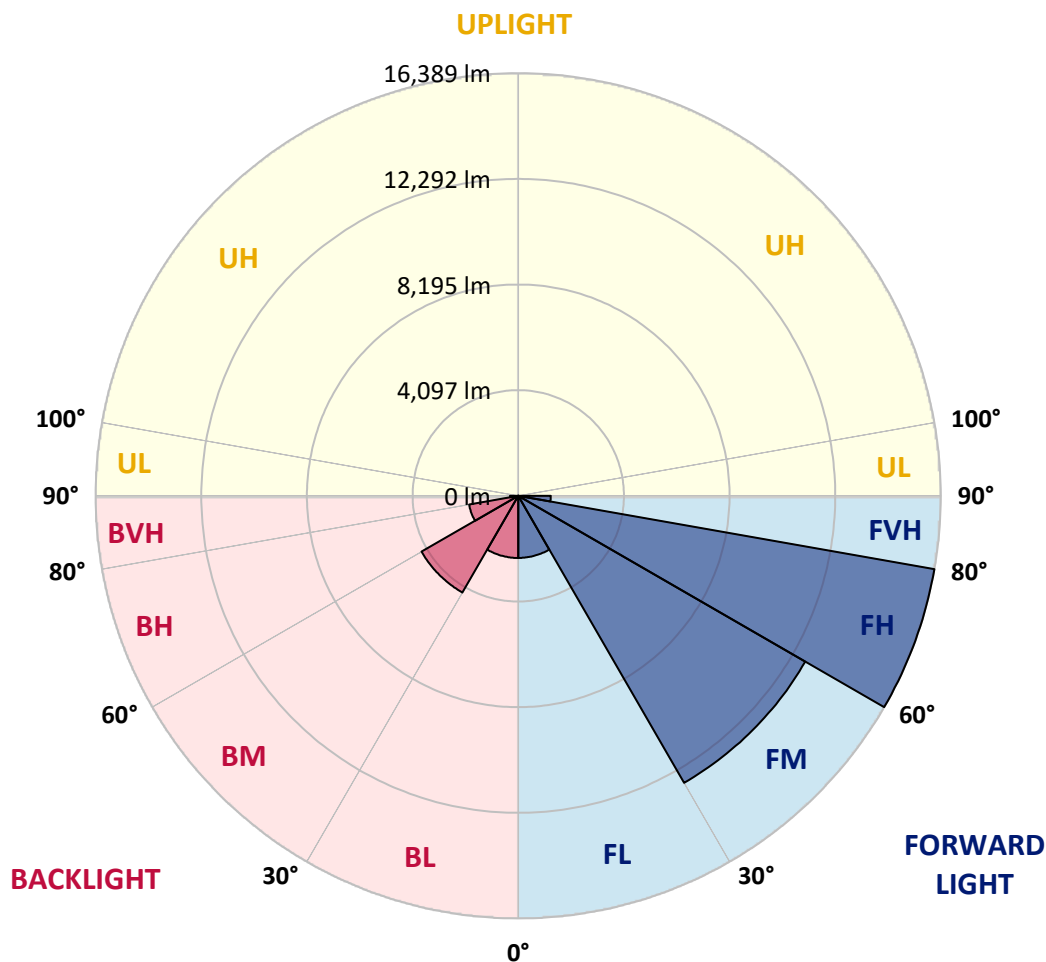
CATALOG NUMBER: GLEON-SA9A-740-U-T4FT

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

| Zone |             | Lumens  | % Fixture | Zone Rating/Lumen Limit |      |         |
|------|-------------|---------|-----------|-------------------------|------|---------|
|      |             |         |           | B                       | U    | G       |
| FL   | (0°-30°)    | 2407.3  | 5.7       |                         |      |         |
| FM   | (30°-60°)   | 12853.8 | 30.7      |                         |      |         |
| FH   | (60°-80°)   | 16389.4 | 39.1      |                         |      | G5      |
| FVH  | (80°-90°)   | 1262.6  | 3.0       |                         |      | G5      |
| BL   | (0°-30°)    | 2410.6  | 5.8       | B3/2500                 |      |         |
| BM   | (30°-60°)   | 4331.4  | 10.3      | B3/5000                 |      |         |
| BH   | (60°-80°)   | 1935.1  | 4.6       | B3/2500                 |      | G3/2500 |
| BVH  | (80°-90°)   | 322.8   | 0.8       |                         |      | G3/500  |
| 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





REPORT NUMBER: P318713

CATALOG NUMBER: GLEON-SA9A-740-U-T4FT

**CANDELA DISTRIBUTION (FULL):**

|       | 0°      | 5°      | 15°     | 25°     | 33°     | 35°     | 45°     | 55°     | 65°     | 75°     | 85°     |
|-------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| 0°    | 6551.2  | 6551.2  | 6551.2  | 6551.2  | 6551.2  | 6551.2  | 6551.2  | 6551.2  | 6551.2  | 6551.2  | 6551.2  |
| 2.5°  | 6083.6  | 6060.4  | 6103.9  | 6109.7  | 6147.3  | 6161.8  | 6213.9  | 6295.0  | 6361.6  | 6438.3  | 6507.8  |
| 5°    | 5532.0  | 5516.1  | 5576.9  | 5620.3  | 5702.8  | 5737.6  | 5860.6  | 6032.9  | 6186.4  | 6360.1  | 6517.9  |
| 7.5°  | 5007.9  | 4999.2  | 5067.3  | 5165.7  | 5261.3  | 5309.0  | 5521.9  | 5772.3  | 6028.6  | 6309.5  | 6551.2  |
| 10°   | 4566.3  | 4563.4  | 4628.6  | 4725.6  | 4866.0  | 4919.6  | 5194.7  | 5524.8  | 5883.8  | 6270.4  | 6607.7  |
| 12.5° | 4318.7  | 4328.9  | 4359.3  | 4440.4  | 4570.7  | 4624.2  | 4929.7  | 5317.7  | 5762.2  | 6257.3  | 6690.2  |
| 15°   | 4379.6  | 4395.5  | 4343.4  | 4340.5  | 4433.1  | 4475.1  | 4761.8  | 5170.0  | 5675.3  | 6279.1  | 6810.4  |
| 17.5° | 4638.7  | 4641.6  | 4504.1  | 4417.2  | 4473.7  | 4495.4  | 4709.7  | 5086.1  | 5624.7  | 6328.3  | 6961.0  |
| 20°   | 5003.6  | 4996.3  | 4753.1  | 4608.3  | 4638.7  | 4644.5  | 4783.5  | 5087.5  | 5620.3  | 6413.7  | 7156.4  |
| 22.5° | 5487.1  | 5433.5  | 5106.3  | 4909.4  | 4902.2  | 4893.5  | 4973.1  | 5194.7  | 5684.0  | 6552.7  | 7389.5  |
| 25°   | 6118.3  | 6067.7  | 5617.4  | 5348.1  | 5290.2  | 5268.5  | 5280.1  | 5423.4  | 5810.0  | 6701.8  | 7650.1  |
| 27.5° | 6820.5  | 6732.2  | 6297.9  | 5917.1  | 5796.9  | 5766.5  | 5697.0  | 5746.3  | 5947.5  | 6845.1  | 7959.9  |
| 30°   | 7408.3  | 7360.5  | 6981.2  | 6529.5  | 6387.6  | 6344.2  | 6161.8  | 6108.2  | 6145.9  | 7040.6  | 8350.8  |
| 32.5° | 7737.0  | 7705.1  | 7474.9  | 7110.1  | 6978.3  | 6917.5  | 6659.8  | 6552.7  | 6464.4  | 7349.0  | 8880.7  |
| 35°   | 8135.1  | 8114.8  | 7975.9  | 7710.9  | 7515.5  | 7451.8  | 7252.0  | 7140.5  | 6913.2  | 7773.2  | 9565.5  |
| 37.5° | 8641.8  | 8620.1  | 8623.0  | 8408.7  | 8175.7  | 8116.3  | 7984.5  | 7867.3  | 7495.2  | 8330.6  | 10309.7 |
| 40°   | 9215.2  | 9173.2  | 9157.3  | 9147.1  | 8999.4  | 8966.1  | 8896.7  | 8737.4  | 8224.9  | 8996.5  | 11043.7 |
| 42.5° | 10078.0 | 9928.9  | 9610.4  | 9730.6  | 9876.8  | 9859.4  | 9915.9  | 9687.1  | 9035.6  | 9784.1  | 11760.4 |
| 45°   | 10910.5 | 10665.8 | 10115.7 | 10141.7 | 10461.7 | 10558.7 | 10981.5 | 10819.3 | 9914.4  | 10647.0 | 12501.6 |
| 47.5° | 11289.8 | 11104.5 | 10636.9 | 10638.3 | 10955.4 | 11156.6 | 12083.2 | 11967.4 | 10838.1 | 11627.2 | 13406.5 |
| 50°   | 11714.0 | 11528.7 | 11108.9 | 11266.7 | 11543.2 | 11757.5 | 13147.4 | 13088.0 | 11716.9 | 12700.0 | 14490.9 |
| 52.5° | 12177.3 | 11863.2 | 11596.8 | 11879.1 | 12267.1 | 12516.1 | 14212.9 | 14050.8 | 12523.4 | 13780.0 | 15737.4 |
| 55°   | 12183.1 | 12097.7 | 12300.4 | 12507.4 | 13088.0 | 13393.5 | 15329.2 | 14900.6 | 13180.7 | 14841.3 | 16752.3 |
| 57.5° | 12876.6 | 12737.6 | 13167.6 | 13263.2 | 14021.8 | 14366.4 | 16439.6 | 15640.4 | 13849.5 | 15654.9 | 17299.6 |
| 60°   | 13794.5 | 13675.8 | 14027.6 | 14279.5 | 15177.2 | 15637.5 | 17625.4 | 16400.5 | 14375.1 | 16268.8 | 17273.5 |
| 62.5° | 15379.8 | 15245.2 | 15240.9 | 15594.1 | 16803.0 | 17338.7 | 18955.9 | 17146.1 | 14583.6 | 16390.4 | 16536.6 |
| 65°   | 17700.6 | 17486.4 | 17082.4 | 17250.4 | 19048.5 | 19582.8 | 20442.8 | 17686.2 | 14308.5 | 15738.9 | 14638.6 |
| 67.5° | 19959.2 | 19952.0 | 19455.4 | 19799.9 | 22013.6 | 22442.1 | 22136.7 | 17739.7 | 13449.9 | 13470.2 | 11271.0 |
| 70°   | 22210.5 | 22239.5 | 22155.5 | 23354.3 | 26019.6 | 26465.5 | 23940.6 | 17020.2 | 11520.0 | 9727.7  | 6752.5  |
| 72.5° | 23994.2 | 23986.9 | 24409.7 | 27500.7 | 31218.6 | 31118.7 | 25460.8 | 14839.8 | 8271.2  | 5251.1  | 3227.1  |
| 75°   | 22838.8 | 22586.9 | 23846.5 | 29553.7 | 34248.9 | 33760.9 | 24167.9 | 10351.7 | 4292.7  | 2390.3  | 1737.3  |
| 77.5° | 14896.3 | 15135.2 | 16984.0 | 24414.0 | 29957.6 | 29364.0 | 17731.0 | 4829.8  | 2022.6  | 1568.0  | 1259.6  |
| 80°   | 5394.5  | 5646.4  | 7952.7  | 13829.3 | 20639.7 | 20542.7 | 8731.6  | 1984.9  | 1368.2  | 1184.3  | 917.9   |
| 82.5° | 1856.1  | 1948.7  | 3137.4  | 6141.5  | 11653.2 | 12087.6 | 3285.0  | 1127.8  | 994.6   | 839.7   | 628.3   |
| 85°   | 728.2   | 833.9   | 1434.8  | 2954.9  | 5878.0  | 5921.4  | 1330.5  | 674.7   | 692.0   | 550.2   | 344.6   |
| 87.5° | 276.5   | 335.9   | 686.3   | 1372.5  | 2684.2  | 2465.6  | 476.3   | 321.4   | 393.8   | 327.2   | 163.6   |
| 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: P318713

CATALOG NUMBER: GLEON-SA9A-740-U-T4FT

**CANDELA DISTRIBUTION (continued):**

|       | 90°     | 95°    | 105°   | 115°   | 125°   | 135°   | 145°   | 155°   | 165°   | 175°   | 180°   |
|-------|---------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 6551.2  | 6551.2 | 6551.2 | 6551.2 | 6551.2 | 6551.2 | 6551.2 | 6551.2 | 6551.2 | 6551.2 | 6551.2 |
| 2.5°  | 6561.4  | 6591.8 | 6655.5 | 6698.9 | 6745.2 | 6758.3 | 6764.1 | 6775.6 | 6787.2 | 6782.9 | 6784.3 |
| 5°    | 6601.9  | 6661.3 | 6764.1 | 6807.5 | 6827.8 | 6804.6 | 6759.7 | 6723.5 | 6697.5 | 6683.0 | 6678.6 |
| 7.5°  | 6668.5  | 6752.5 | 6862.5 | 6855.3 | 6808.9 | 6706.2 | 6590.3 | 6503.5 | 6431.1 | 6405.0 | 6390.5 |
| 10°   | 6756.8  | 6855.3 | 6932.0 | 6849.5 | 6714.8 | 6536.8 | 6363.0 | 6228.4 | 6119.8 | 6077.8 | 6070.6 |
| 12.5° | 6869.8  | 6969.6 | 6984.1 | 6808.9 | 6586.0 | 6342.8 | 6106.8 | 5928.7 | 5766.5 | 5714.4 | 5702.8 |
| 15°   | 7016.0  | 7110.1 | 7020.3 | 6738.0 | 6426.7 | 6099.5 | 5794.0 | 5552.3 | 5381.4 | 5317.7 | 5294.6 |
| 17.5° | 7169.4  | 7259.2 | 7027.6 | 6620.7 | 6218.2 | 5811.4 | 5427.8 | 5180.2 | 4984.7 | 4910.9 | 4902.2 |
| 20°   | 7353.3  | 7393.8 | 6997.2 | 6452.8 | 5931.6 | 5437.9 | 5034.0 | 4800.9 | 4696.6 | 4644.5 | 4638.7 |
| 22.5° | 7580.6  | 7537.2 | 6927.7 | 6225.5 | 5568.2 | 5006.4 | 4677.8 | 4569.2 | 4543.2 | 4531.6 | 4535.9 |
| 25°   | 7820.9  | 7687.7 | 6824.9 | 5928.7 | 5109.2 | 4575.0 | 4417.2 | 4447.6 | 4482.3 | 4478.0 | 4478.0 |
| 27.5° | 8085.9  | 7841.2 | 6667.1 | 5534.9 | 4601.1 | 4221.7 | 4240.6 | 4352.0 | 4404.2 | 4402.7 | 4401.3 |
| 30°   | 8426.1  | 8014.9 | 6465.8 | 5061.5 | 4126.2 | 3972.7 | 4087.1 | 4223.2 | 4294.1 | 4291.2 | 4292.7 |
| 32.5° | 8844.5  | 8206.1 | 6192.2 | 4533.0 | 3783.1 | 3788.9 | 3920.6 | 4055.3 | 4137.8 | 4130.5 | 4132.0 |
| 35°   | 9333.9  | 8420.3 | 5821.6 | 4011.8 | 3555.8 | 3642.6 | 3746.9 | 3841.0 | 3919.2 | 3909.0 | 3898.9 |
| 37.5° | 9866.7  | 8630.3 | 5329.3 | 3545.6 | 3370.4 | 3506.5 | 3593.4 | 3609.3 | 3645.5 | 3619.5 | 3600.6 |
| 40°   | 10373.4 | 8791.0 | 4695.2 | 3163.4 | 3183.7 | 3390.7 | 3447.2 | 3383.5 | 3318.3 | 3309.6 | 3283.6 |
| 42.5° | 10815.0 | 8844.5 | 4053.8 | 2857.9 | 2986.8 | 3269.1 | 3303.9 | 3170.7 | 3053.4 | 2998.4 | 2975.2 |
| 45°   | 11281.2 | 8863.4 | 3455.9 | 2601.7 | 2797.1 | 3160.5 | 3198.2 | 3020.1 | 2855.0 | 2736.3 | 2697.2 |
| 47.5° | 11890.7 | 8999.4 | 2991.1 | 2412.0 | 2652.3 | 3088.1 | 3141.7 | 2899.9 | 2685.6 | 2516.3 | 2480.1 |
| 50°   | 12688.4 | 9268.7 | 2613.3 | 2267.2 | 2558.2 | 3040.4 | 3101.2 | 2782.6 | 2546.7 | 2342.5 | 2306.3 |
| 52.5° | 13574.5 | 9516.3 | 2307.8 | 2150.0 | 2467.0 | 2956.4 | 3049.0 | 2698.7 | 2416.4 | 2181.8 | 2142.7 |
| 55°   | 14194.1 | 9326.6 | 2061.6 | 2028.3 | 2348.3 | 2836.2 | 2976.7 | 2627.7 | 2229.6 | 2025.5 | 1990.7 |
| 57.5° | 14312.8 | 8678.0 | 1874.9 | 1902.4 | 2205.0 | 2685.6 | 2865.2 | 2469.9 | 2128.2 | 1957.4 | 1921.2 |
| 60°   | 13988.5 | 7774.6 | 1735.9 | 1786.6 | 2051.5 | 2496.0 | 2656.7 | 2358.4 | 2031.2 | 1885.0 | 1854.6 |
| 62.5° | 13173.4 | 6849.5 | 1633.1 | 1682.3 | 1908.2 | 2303.4 | 2526.4 | 2241.2 | 1932.8 | 1802.5 | 1772.1 |
| 65°   | 11527.3 | 5750.6 | 1534.7 | 1589.7 | 1775.0 | 2136.9 | 2409.1 | 2132.6 | 1835.8 | 1735.9 | 1706.9 |
| 67.5° | 8701.2  | 4307.2 | 1442.0 | 1491.2 | 1656.3 | 1992.2 | 2281.7 | 2025.5 | 1741.7 | 1678.0 | 1643.2 |
| 70°   | 5123.7  | 2697.2 | 1336.3 | 1388.4 | 1531.8 | 1841.6 | 2145.6 | 1908.2 | 1624.4 | 1595.5 | 1550.6 |
| 72.5° | 2384.5  | 1623.0 | 1216.1 | 1266.8 | 1375.4 | 1640.3 | 1970.4 | 1754.7 | 1485.4 | 1421.7 | 1360.9 |
| 75°   | 1423.2  | 1187.2 | 1074.3 | 1119.1 | 1195.9 | 1426.1 | 1750.4 | 1598.4 | 1353.7 | 1269.7 | 1206.0 |
| 77.5° | 1064.1  | 907.8  | 917.9  | 965.7  | 1027.9 | 1248.0 | 1550.6 | 1475.3 | 1252.3 | 1187.2 | 1143.8 |
| 80°   | 765.9   | 689.1  | 748.5  | 800.6  | 865.8  | 1135.1 | 1485.4 | 1363.8 | 1132.2 | 1045.3 | 1004.8 |
| 82.5° | 511.1   | 495.1  | 563.2  | 616.8  | 680.5  | 993.2  | 1395.7 | 1194.4 | 967.1  | 857.1  | 767.3  |
| 85°   | 282.3   | 298.2  | 379.3  | 402.5  | 457.5  | 699.3  | 1143.8 | 959.9  | 728.2  | 586.4  | 560.3  |
| 87.5° | 117.3   | 137.5  | 204.1  | 196.9  | 243.2  | 417.0  | 752.8  | 579.1  | 463.3  | 346.0  | 269.3  |
| 90°   | 0.0     | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |

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

Report Prepared for

Cooper Lighting Solutions

MCGRAW, INVUE, LUMARK AND STREETWORKS

DATA VALID FOR LUMINAIRES UTILIZING SA LIGHT ENGINES

Report Number: SP1-2101-121-2

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

Test Date: 03/05/2021

### Test Information

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

SHIELD, DRIVER PROGRAMMED @ 615mA.

### Spectral Parameters

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



### Test Conditions

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

REPORT NUMBER: SP1-2101-121-2

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

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**CIE 1931 Chromaticity Diagram**



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



Point lies inside the ANSI 4000K 4-step quadrangle

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### Photopic Flux vs. Wavelength



#####

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

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### Scotopic Flux vs. Wavelength



Scotopic Lumens: 10425.8

S/P: 1.47

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

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### Melanopic Flux vs. Wavelength



**Melanopic Lumens: 3927.2**

**M/P: 0.55**

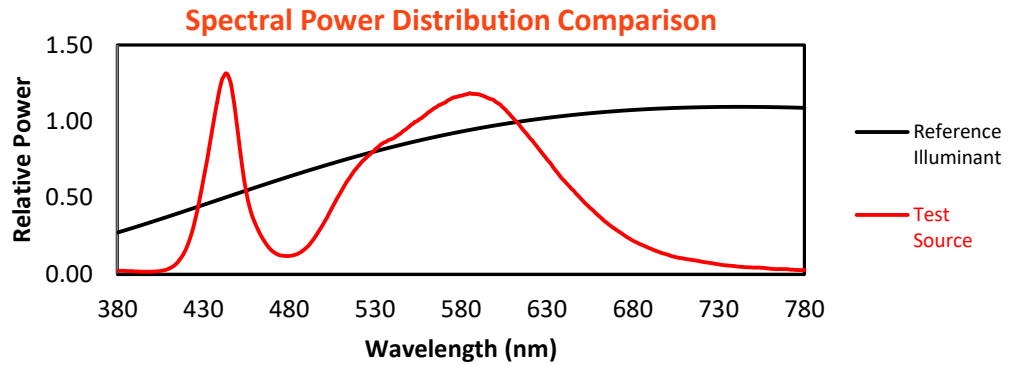
| λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) |
|-----------|------------------|------------------|-----------|------------------|------------------|-----------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

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TM-30-18

### Summary

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



### Color Vector Graphics



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

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



### Color Rendition by Hue-Angle Bin



**Measure Comparisons**


(END OF REPORT)