

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: P323833

Luminaire Tested: **GLEON-SA9A-740-U-SL4-HSS**

Issue Date: 3/3/2020

### Test Information

Test Method: LM-79-08  
Report Number: P323833  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-1903-205-25)  
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-SL4-HSS  
Description: GALLEON AREA AND ROADWAY LUMINAIRE  
(9) 70 CRI, 4000K, 615mA LIGHTSQUARES WITH 16 LEDS EACH AND TYPE IV SPILL  
LIGHT ELIMINATOR OPTICS WITH HOUSE SIDE SHIELD  
Light Source: -  
Ballast/Driver: ELECTRONIC DRIVER

### Summary

Lumens per Lamp: N/A  
Luminaire Lumens: 33813 lumens  
Efficiency: N/A  
Efficacy: 116.6 lumens/watt  
Luminous Opening: Rectangular (W 2.5' x L: 1' x H: 0')  
IES Classification: Type IV - Short  
BUG Rating: B3 - U0 - G5

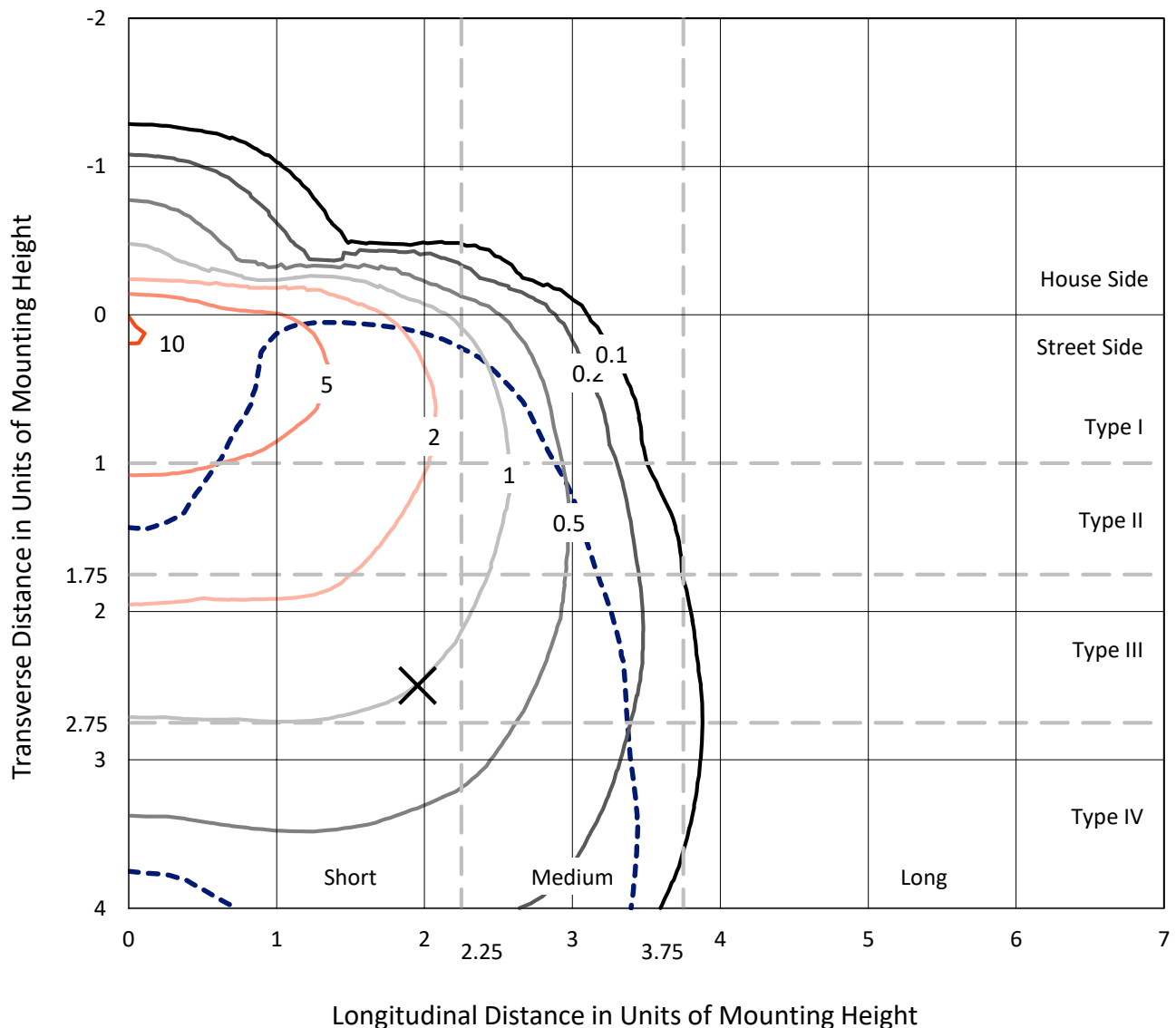
Input Watts (W): 290  
Input Voltage (V): NR  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: NR  
Total Harmonic Distortion (THDi): NR  
Frequency (hertz): 60  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 24 FT



REPORT NUMBER: P323833  
 CATALOG NUMBER: GLEON-SA9A-740-U-SL4-HSS

## Iso-Footcandle Lines of Horizontal Illumination

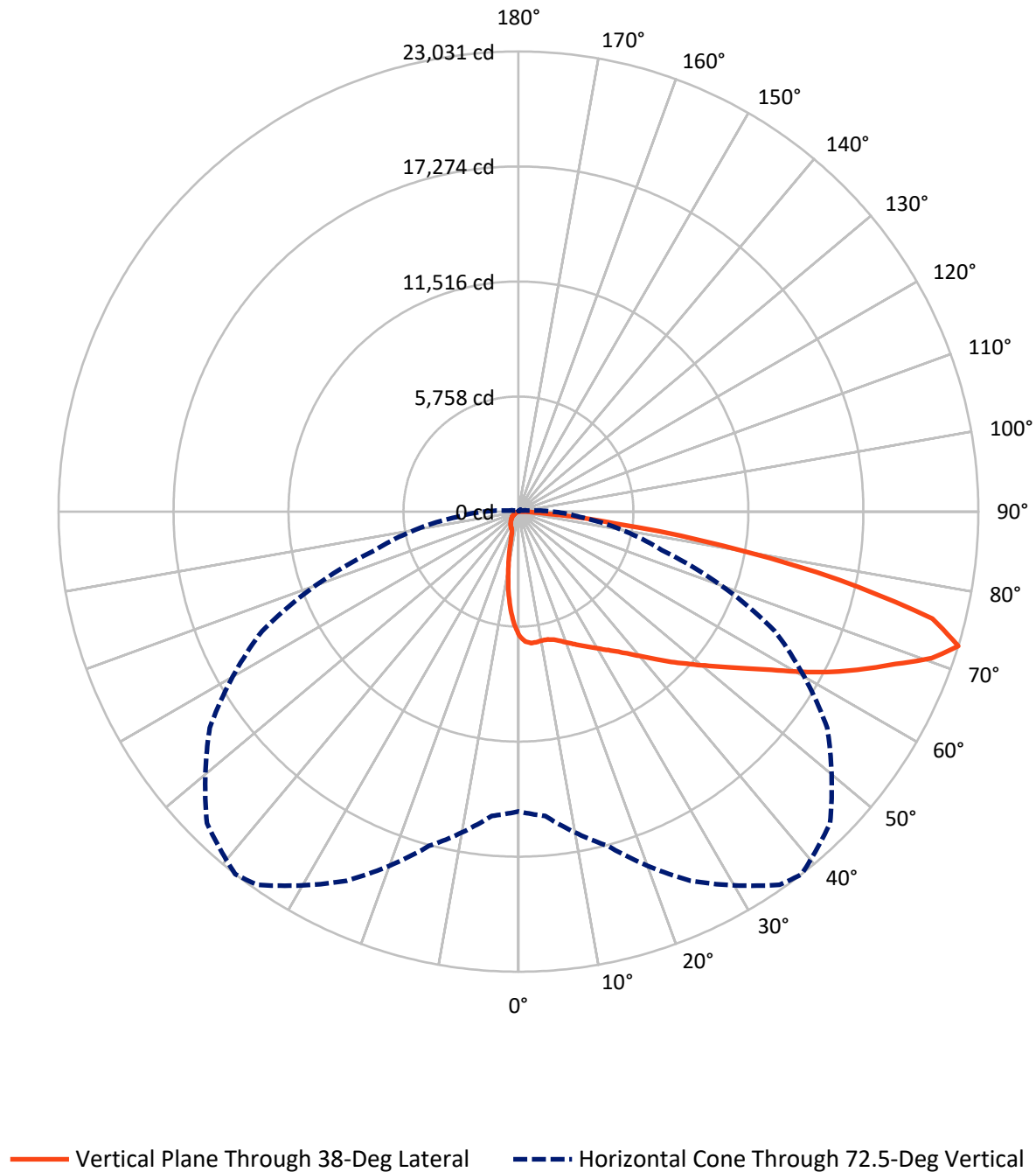
× Max cd  
 --- 1/2 Max cd



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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**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total   |
|--------------------|-----------|----------|--------|---------|
| <b>House Side</b>  | Lumens    | 2845.5   | 0.0    | 2845.5  |
|                    | % Fixture | 8.4      | 0.0    | 8.4     |
| <b>Street Side</b> | Lumens    | 30967.5  | 0.0    | 30967.5 |
|                    | % Fixture | 91.6     | 0.0    | 91.6    |
| <b>Total</b>       | Lumens    | 33813.0  | 0.0    | 33813.0 |
|                    | % Fixture | 100.0    | 0.0    | 100.0   |

**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 529.9   | 1.6       |
| 10°-20°   | 1295.7  | 3.8       |
| 20°-30°   | 2060.8  | 6.1       |
| 30°-40°   | 3098.2  | 9.2       |
| 40°-50°   | 4726.6  | 14.0      |
| 50°-60°   | 6680.2  | 19.8      |
| 60°-70°   | 8379.3  | 24.8      |
| 70°-80°   | 6265.3  | 18.5      |
| 80°-90°   | 776.9   | 2.3       |
| 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°    | 33813.0 | 100.0     |
| 0°-180°   | 33813.0 | 100.0     |

**Coefficient of Utilization**



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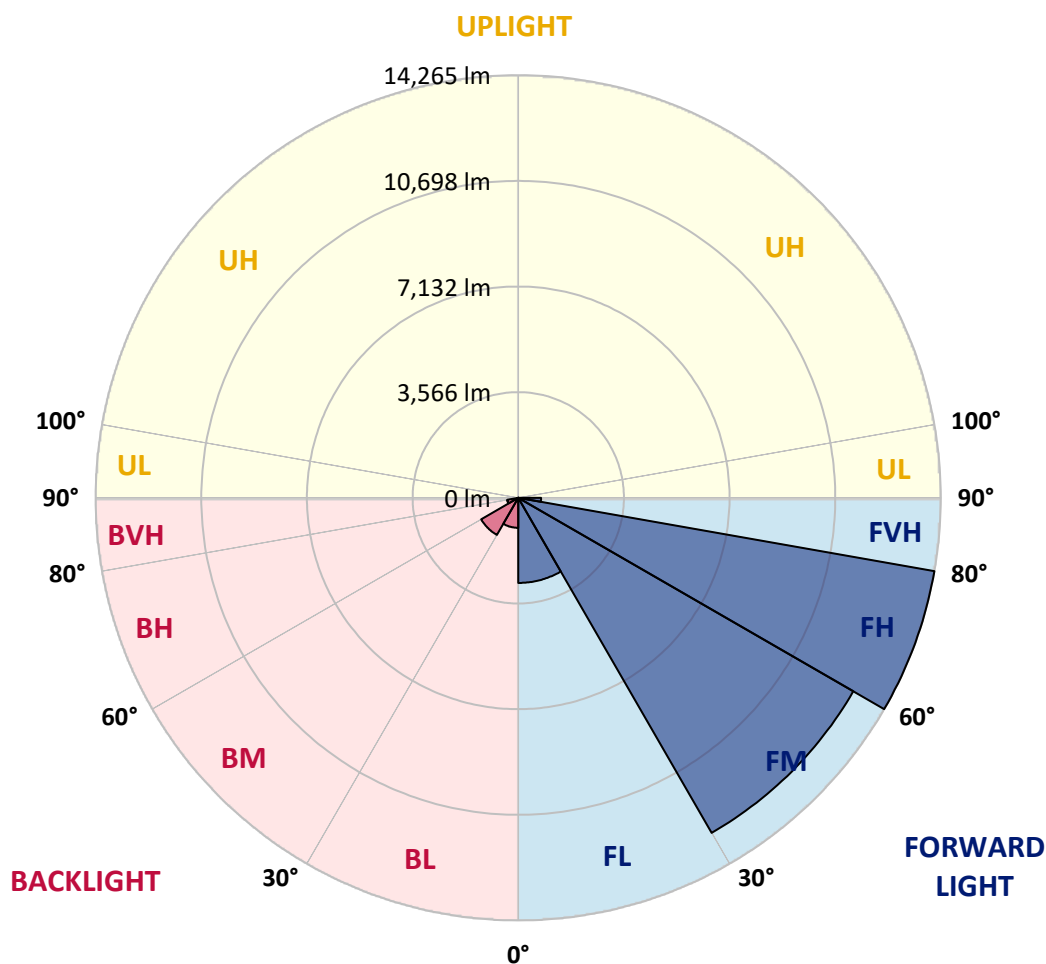
CATALOG NUMBER: GLEON-SA9A-740-U-SL4-HSS

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

| Zone |             | Lumens  | % Fixture | Zone Rating/Lumen Limit |      |        |
|------|-------------|---------|-----------|-------------------------|------|--------|
|      |             |         |           | B                       | U    | G      |
| FL   | (0°-30°)    | 2873.3  | 8.5       |                         |      |        |
| FM   | (30°-60°)   | 13060.1 | 38.6      |                         |      |        |
| FH   | (60°-80°)   | 14264.5 | 42.2      |                         |      | G5     |
| FVH  | (80°-90°)   | 769.6   | 2.3       |                         |      | G5     |
| BL   | (0°-30°)    | 1013.2  | 3.0       | B3/2500                 |      |        |
| BM   | (30°-60°)   | 1445.0  | 4.3       | B2/2500                 |      |        |
| BH   | (60°-80°)   | 380.1   | 1.1       | B1/500                  |      | G1/500 |
| BVH  | (80°-90°)   | 7.2     | 0.0       |                         |      | G0/10  |
| 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: P323833

CATALOG NUMBER: GLEON-SA9A-740-U-SL4-HSS

**CANDELA DISTRIBUTION (FULL):**

|       | 0°      | 5°      | 15°     | 25°     | 35°     | 38°     | 45°     | 55°     | 65°     | 75°     | 85°     |
|-------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| 0°    | 6218.1  | 6218.1  | 6218.1  | 6218.1  | 6218.1  | 6218.1  | 6218.1  | 6218.1  | 6218.1  | 6218.1  | 6218.1  |
| 2.5°  | 6600.1  | 6601.5  | 6586.0  | 6560.7  | 6528.4  | 6511.6  | 6483.5  | 6438.6  | 6390.8  | 6305.2  | 6212.5  |
| 5°    | 6734.9  | 6734.9  | 6715.2  | 6681.5  | 6629.5  | 6614.1  | 6560.7  | 6489.1  | 6390.8  | 6251.8  | 6095.9  |
| 7.5°  | 6720.8  | 6723.6  | 6697.0  | 6661.8  | 6609.9  | 6595.8  | 6531.3  | 6451.2  | 6329.0  | 6160.5  | 5961.1  |
| 10°   | 6647.8  | 6654.8  | 6633.8  | 6616.9  | 6569.2  | 6553.7  | 6493.3  | 6413.3  | 6291.1  | 6111.4  | 5882.5  |
| 12.5° | 6573.4  | 6580.4  | 6587.4  | 6602.9  | 6573.4  | 6567.8  | 6520.0  | 6452.6  | 6336.1  | 6149.3  | 5890.9  |
| 15°   | 6525.6  | 6539.7  | 6590.2  | 6650.6  | 6657.6  | 6652.0  | 6621.1  | 6557.9  | 6440.0  | 6246.2  | 5951.3  |
| 17.5° | 6525.6  | 6548.1  | 6653.4  | 6768.6  | 6809.3  | 6813.5  | 6786.8  | 6698.4  | 6557.9  | 6350.1  | 6007.5  |
| 20°   | 6580.4  | 6611.3  | 6775.6  | 6938.5  | 7005.9  | 7005.9  | 6953.9  | 6830.4  | 6666.1  | 6444.2  | 6045.4  |
| 22.5° | 6720.8  | 6761.6  | 6968.0  | 7156.2  | 7227.8  | 7212.3  | 7142.1  | 6962.4  | 6778.4  | 6550.9  | 6093.1  |
| 25°   | 6997.5  | 7028.4  | 7243.2  | 7432.8  | 7476.3  | 7441.2  | 7352.7  | 7122.4  | 6921.6  | 6695.6  | 6180.2  |
| 27.5° | 7354.2  | 7358.4  | 7580.2  | 7740.3  | 7713.6  | 7689.8  | 7578.8  | 7323.3  | 7128.1  | 6902.0  | 6330.4  |
| 30°   | 7745.9  | 7745.9  | 7941.1  | 8063.3  | 7981.9  | 7962.2  | 7851.3  | 7566.2  | 7392.1  | 7182.8  | 6543.9  |
| 32.5° | 8125.1  | 8141.9  | 8300.6  | 8377.9  | 8286.6  | 8266.9  | 8158.8  | 7873.7  | 7743.1  | 7611.1  | 6876.7  |
| 35°   | 8491.6  | 8504.2  | 8654.5  | 8696.6  | 8609.6  | 8615.2  | 8538.0  | 8296.4  | 8247.3  | 8230.4  | 7378.0  |
| 37.5° | 8846.9  | 8849.7  | 9002.8  | 9029.4  | 8985.9  | 9033.7  | 9040.7  | 8827.2  | 8918.5  | 9054.7  | 8084.4  |
| 40°   | 9171.3  | 9174.1  | 9325.7  | 9394.6  | 9469.0  | 9530.8  | 9585.5  | 9471.8  | 9773.7  | 10089.7 | 8925.5  |
| 42.5° | 9431.1  | 9460.6  | 9652.9  | 9783.5  | 9980.1  | 10098.1 | 10246.9 | 10241.3 | 10791.8 | 11266.4 | 9942.2  |
| 45°   | 9660.0  | 9710.5  | 9978.7  | 10207.6 | 10544.6 | 10732.8 | 10965.9 | 11148.5 | 11937.7 | 12576.6 | 10971.5 |
| 47.5° | 9961.9  | 10009.6 | 10315.8 | 10690.7 | 11140.1 | 11387.2 | 11773.4 | 12168.0 | 13197.3 | 13862.9 | 11977.0 |
| 50°   | 10387.4 | 10366.3 | 10668.2 | 11206.1 | 11783.2 | 12107.6 | 12658.1 | 13249.3 | 14447.1 | 14983.5 | 12568.2 |
| 52.5° | 10840.9 | 10832.5 | 11055.8 | 11766.4 | 12541.5 | 12920.7 | 13648.1 | 14367.1 | 15642.1 | 15755.9 | 12839.2 |
| 55°   | 11402.7 | 11342.3 | 11530.4 | 12405.3 | 13441.7 | 13848.9 | 14705.5 | 15473.6 | 16594.2 | 16191.2 | 12975.4 |
| 57.5° | 11991.0 | 11891.3 | 12071.1 | 13117.3 | 14456.9 | 14938.6 | 15876.7 | 16552.1 | 17227.6 | 16488.9 | 12974.0 |
| 60°   | 12599.1 | 12481.1 | 12694.6 | 14007.6 | 15718.0 | 16275.5 | 17146.1 | 17280.9 | 17818.8 | 16639.2 | 12878.5 |
| 62.5° | 13107.4 | 13037.2 | 13354.6 | 14959.7 | 17126.5 | 17674.1 | 18105.2 | 17943.7 | 18317.3 | 16755.7 | 12655.3 |
| 65°   | 13645.3 | 13649.5 | 14162.0 | 16070.4 | 18623.4 | 18992.7 | 19029.2 | 18803.2 | 18734.3 | 16731.9 | 11899.8 |
| 67.5° | 14372.7 | 14440.1 | 15295.3 | 17578.6 | 20079.6 | 20364.7 | 20361.9 | 19734.2 | 19039.1 | 15782.6 | 10224.5 |
| 70°   | 15142.2 | 15300.9 | 16601.3 | 19304.5 | 21669.3 | 21958.5 | 21809.7 | 20326.8 | 17926.9 | 12762.0 | 7236.2  |
| 72.5° | 15013.0 | 15288.3 | 17327.3 | 20392.8 | 22810.9 | 23031.4 | 22063.9 | 18870.6 | 14169.1 | 7417.3  | 3081.0  |
| 75°   | 11582.4 | 11901.2 | 15887.9 | 19314.3 | 21613.1 | 21415.1 | 18957.6 | 14684.4 | 7743.1  | 2069.9  | 693.7   |
| 77.5° | 6118.4  | 6288.3  | 10495.5 | 14713.9 | 16852.6 | 16438.4 | 13354.6 | 8146.2  | 2360.6  | 512.6   | 311.7   |
| 80°   | 3204.5  | 3243.9  | 4573.7  | 8348.4  | 10401.4 | 10404.2 | 7914.5  | 3578.1  | 973.2   | 262.6   | 209.2   |
| 82.5° | 1716.0  | 1749.7  | 2416.7  | 3857.5  | 5450.0  | 4940.2  | 3030.4  | 1968.8  | 565.9   | 148.9   | 200.8   |
| 85°   | 412.9   | 419.9   | 1370.6  | 1762.4  | 2142.9  | 1530.7  | 900.1   | 1652.8  | 153.1   | 87.1    | 162.9   |
| 87.5° | 158.7   | 161.5   | 508.3   | 762.5   | 546.3   | 353.9   | 421.3   | 616.5   | 19.7    | 33.7    | 25.3    |
| 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: P323833

CATALOG NUMBER: GLEON-SA9A-740-U-SL4-HSS

**CANDELA DISTRIBUTION (continued):**

|       | 90°     | 95°    | 105°   | 115°   | 125°   | 135°   | 145°   | 155°   | 165°   | 175°   | 180°   |
|-------|---------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 6218.1  | 6218.1 | 6218.1 | 6218.1 | 6218.1 | 6218.1 | 6218.1 | 6218.1 | 6218.1 | 6218.1 | 6218.1 |
| 2.5°  | 6156.3  | 6119.8 | 6029.9 | 5916.2 | 5815.1 | 5742.1 | 5632.5 | 5560.9 | 5513.2 | 5511.8 | 5493.5 |
| 5°    | 6000.4  | 5926.0 | 5732.2 | 5501.9 | 5292.7 | 5104.5 | 4882.6 | 4707.1 | 4576.5 | 4555.4 | 4510.5 |
| 7.5°  | 5833.3  | 5711.2 | 5413.5 | 5054.0 | 4702.9 | 4346.2 | 3932.0 | 3675.0 | 3454.5 | 3349.2 | 3337.9 |
| 10°   | 5730.8  | 5559.5 | 5136.8 | 4617.2 | 4066.8 | 3486.8 | 2944.8 | 2569.8 | 2298.8 | 2221.6 | 2164.0 |
| 12.5° | 5709.8  | 5483.7 | 4923.4 | 4207.2 | 3420.8 | 2654.1 | 2054.4 | 1655.6 | 1439.4 | 1370.6 | 1352.3 |
| 15°   | 5730.8  | 5448.6 | 4743.6 | 3801.4 | 2766.4 | 1883.1 | 1379.0 | 1147.3 | 1065.8 | 1046.2 | 1044.8 |
| 17.5° | 5743.5  | 5406.4 | 4540.0 | 3350.6 | 2131.7 | 1345.3 | 1056.0 | 988.6  | 976.0  | 974.6  | 977.4  |
| 20°   | 5742.1  | 5341.8 | 4297.1 | 2847.9 | 1585.4 | 1057.4 | 954.9  | 940.9  | 938.1  | 939.5  | 938.1  |
| 22.5° | 5732.2  | 5266.0 | 4030.2 | 2329.7 | 1197.8 | 945.1  | 911.4  | 902.9  | 901.5  | 901.5  | 901.5  |
| 25°   | 5750.5  | 5205.6 | 3736.8 | 1834.0 | 987.2  | 893.1  | 872.1  | 865.0  | 863.6  | 863.6  | 860.8  |
| 27.5° | 5816.5  | 5171.9 | 3415.2 | 1411.3 | 891.7  | 846.8  | 829.9  | 828.5  | 824.3  | 822.9  | 825.7  |
| 30°   | 5923.2  | 5171.9 | 3062.7 | 1098.1 | 834.1  | 799.0  | 786.4  | 783.6  | 782.2  | 780.8  | 782.2  |
| 32.5° | 6111.4  | 5211.2 | 2677.9 | 912.8  | 779.4  | 745.7  | 737.2  | 741.5  | 737.2  | 737.2  | 737.2  |
| 35°   | 6451.2  | 5329.2 | 2274.9 | 796.2  | 721.8  | 693.7  | 685.3  | 690.9  | 688.1  | 688.1  | 686.7  |
| 37.5° | 6946.9  | 5548.3 | 1869.1 | 726.0  | 671.2  | 641.8  | 630.5  | 638.9  | 636.1  | 636.1  | 634.7  |
| 40°   | 7550.7  | 5867.0 | 1482.9 | 672.6  | 622.1  | 591.2  | 581.4  | 585.6  | 578.6  | 578.6  | 581.4  |
| 42.5° | 8296.4  | 6271.5 | 1145.9 | 620.7  | 572.9  | 543.5  | 537.8  | 533.6  | 521.0  | 514.0  | 515.4  |
| 45°   | 9124.9  | 6692.7 | 893.1  | 570.1  | 526.6  | 502.7  | 494.3  | 483.1  | 462.0  | 448.0  | 449.4  |
| 47.5° | 9865.0  | 7017.1 | 726.0  | 521.0  | 484.5  | 466.2  | 453.6  | 432.5  | 401.6  | 384.8  | 386.2  |
| 50°   | 10254.0 | 7066.3 | 617.9  | 471.8  | 445.2  | 426.9  | 408.6  | 376.3  | 339.8  | 321.6  | 320.2  |
| 52.5° | 10353.7 | 6836.0 | 537.8  | 426.9  | 405.8  | 384.8  | 360.9  | 317.4  | 276.6  | 257.0  | 254.2  |
| 55°   | 10390.2 | 6484.9 | 466.2  | 384.8  | 363.7  | 339.8  | 308.9  | 259.8  | 221.9  | 202.2  | 200.8  |
| 57.5° | 10269.4 | 5961.1 | 410.0  | 346.9  | 321.6  | 292.1  | 254.2  | 207.8  | 171.3  | 155.9  | 155.9  |
| 60°   | 10001.2 | 5252.0 | 366.5  | 306.1  | 278.0  | 244.3  | 205.0  | 161.5  | 127.8  | 115.1  | 115.1  |
| 62.5° | 9466.2  | 4333.6 | 325.8  | 264.0  | 237.3  | 202.2  | 165.7  | 122.2  | 89.9   | 82.9   | 84.3   |
| 65°   | 8456.5  | 3287.4 | 285.1  | 226.1  | 202.2  | 167.1  | 129.2  | 87.1   | 60.4   | 60.4   | 63.2   |
| 67.5° | 6896.4  | 2283.3 | 242.9  | 192.4  | 174.1  | 136.2  | 98.3   | 60.4   | 42.1   | 47.7   | 53.4   |
| 70°   | 4565.3  | 1280.7 | 207.8  | 158.7  | 148.9  | 108.1  | 73.0   | 40.7   | 33.7   | 44.9   | 54.8   |
| 72.5° | 1723.0  | 498.5  | 174.1  | 127.8  | 129.2  | 82.9   | 52.0   | 30.9   | 30.9   | 49.1   | 64.6   |
| 75°   | 480.3   | 244.3  | 125.0  | 94.1   | 101.1  | 60.4   | 37.9   | 26.7   | 29.5   | 56.2   | 75.8   |
| 77.5° | 282.3   | 179.7  | 81.4   | 54.8   | 68.8   | 42.1   | 25.3   | 21.1   | 25.3   | 47.7   | 73.0   |
| 80°   | 227.5   | 95.5   | 47.7   | 28.1   | 37.9   | 23.9   | 16.9   | 12.6   | 7.0    | 18.3   | 37.9   |
| 82.5° | 227.5   | 57.6   | 22.5   | 19.7   | 19.7   | 12.6   | 8.4    | 5.6    | 1.4    | 0.0    | 9.8    |
| 85°   | 153.1   | 23.9   | 14.0   | 12.6   | 9.8    | 4.2    | 2.8    | 1.4    | 0.0    | 0.0    | 0.0    |
| 87.5° | 25.3    | 9.8    | 5.6    | 2.8    | 1.4    | 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    |

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



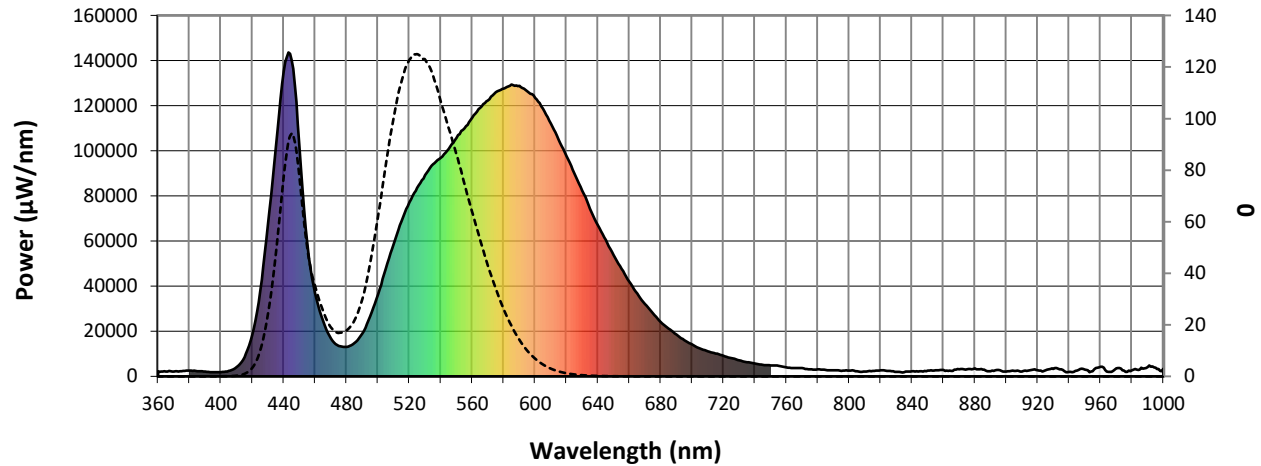
Scotopic Lumens: 10425.8

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)