

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



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

Test Report Prepared for  
Cooper Lighting Solutions  
(formerly Eaton)

Brand: McGRAW-EDISON

Report Number: P319912

Luminaire Tested: **GLEON-SA8A-727-U-SL4**

Issue Date: 3/3/2020

**Test Information**

Test Method: LM-79-08  
Report Number: P319912  
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-SA8A-727-U-SL4  
Description: GALLEON AREA AND ROADWAY LUMINAIRE  
(8) 70 CRI, 2700K, 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: 29679 lumens  
Efficiency: N/A  
Efficacy: 115.5 lumens/watt  
Luminous Opening: Rectangular (W 2' x L: 1' x H: 0')  
IES Classification: Type IV - Short  
BUG Rating: B3 - U0 - G5

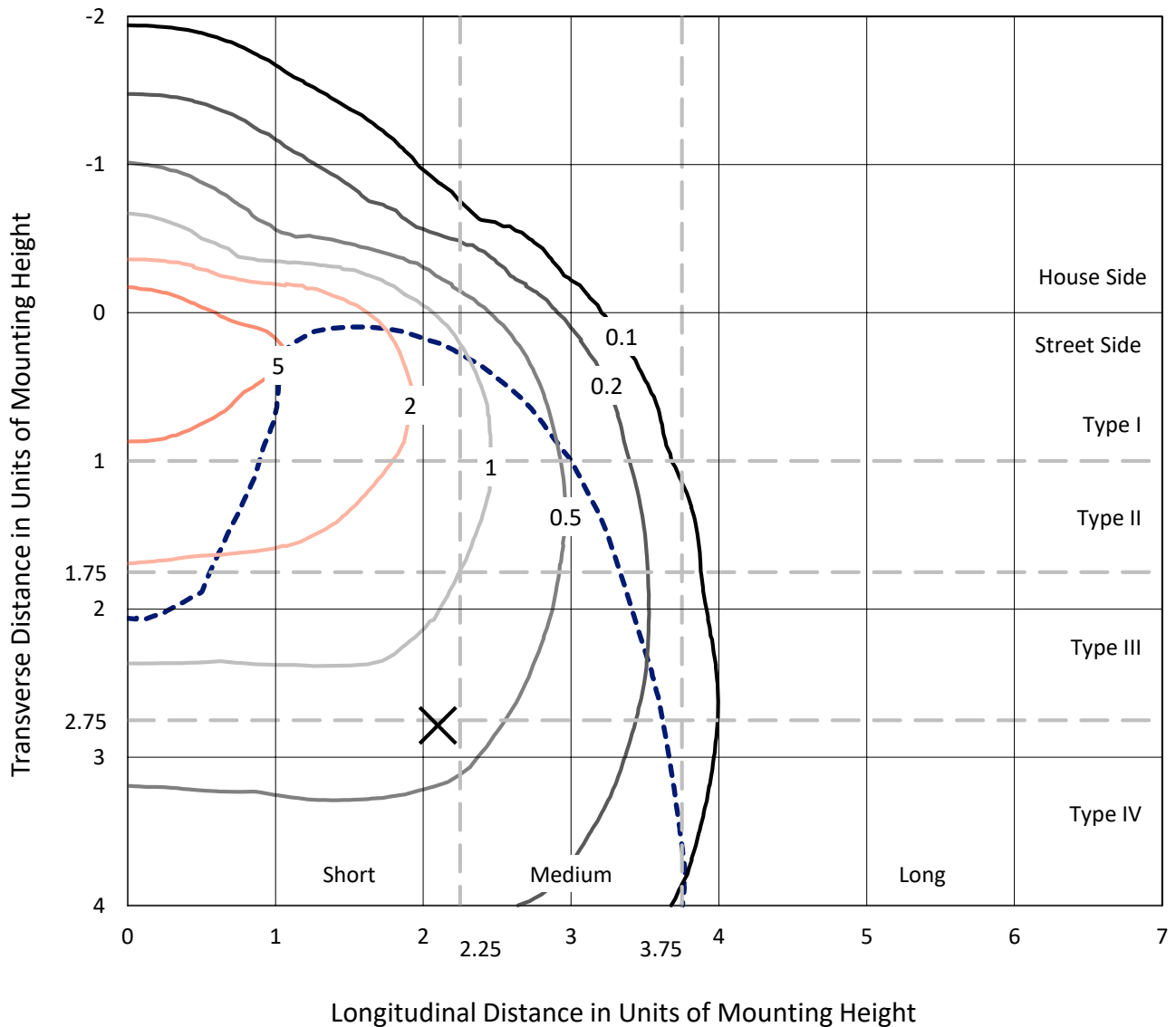
Input Watts (W): 257  
Input Voltage (V): NR  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: NR  
Total Harmonic Distortion (THDi): NR  
Frequency (hertz): 60  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 24 FT



REPORT NUMBER: P319912  
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### Iso-Footcandle Lines of Horizontal Illumination

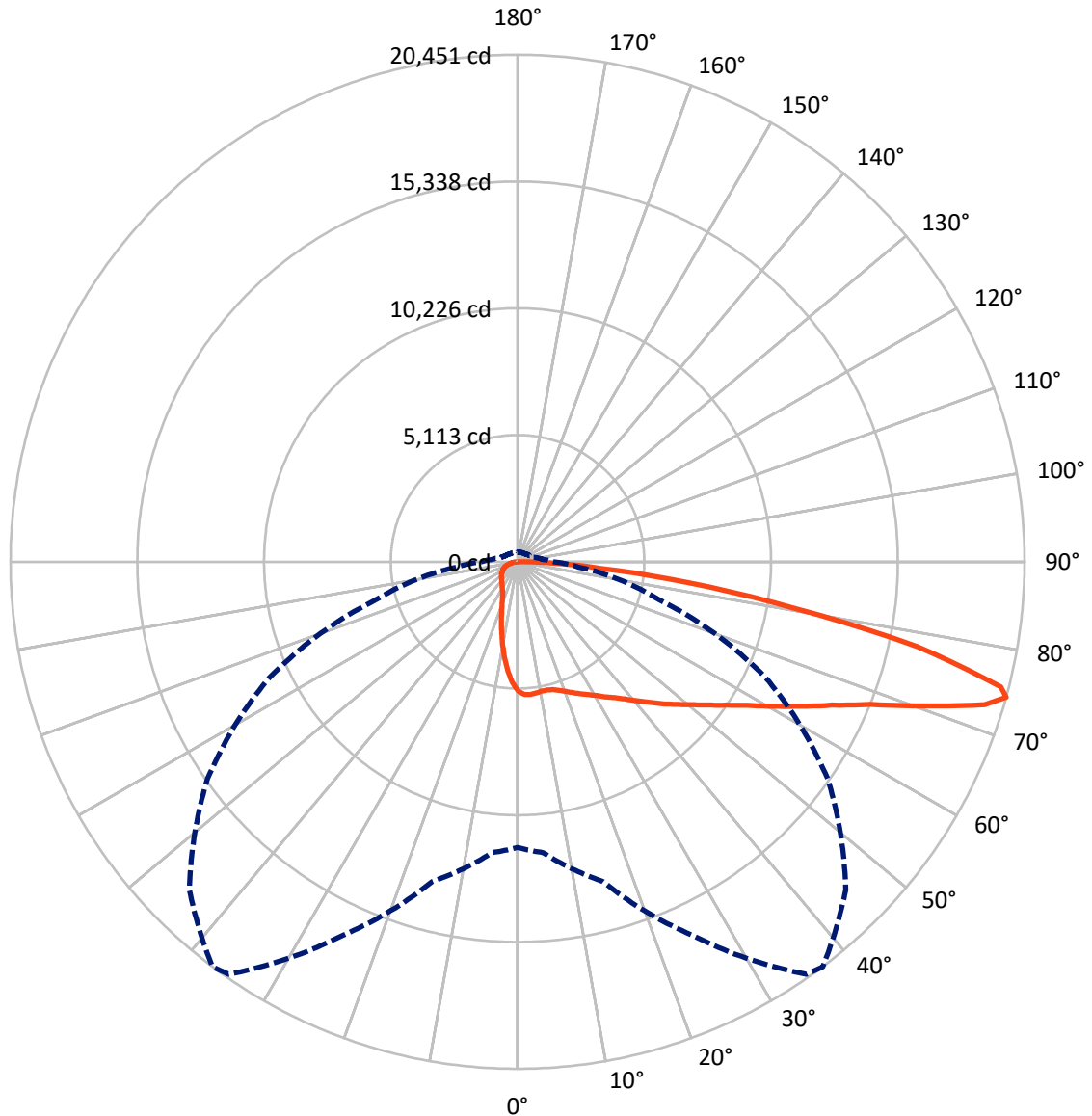
× Max cd  
 - - - 1/2 Max cd



Based on 25 foot mounting height. Maximum calculated value = 8.5 fc  
 Type IV - Short - N/A

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### Luminous Intensity Polar Plot



— Vertical Plane Through 37-Deg Lateral      - - - Horizontal Cone Through 74-Deg Vertical

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**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total   |
|--------------------|-----------|----------|--------|---------|
| <b>House Side</b>  | Lumens    | 4083.6   | 0.0    | 4083.6  |
|                    | % Fixture | 13.8     | 0.0    | 13.8    |
| <b>Street Side</b> | Lumens    | 25595.4  | 0.0    | 25595.4 |
|                    | % Fixture | 86.2     | 0.0    | 86.2    |
| <b>Total</b>       | Lumens    | 29679.0  | 0.0    | 29679.0 |
|                    | % Fixture | 100.0    | 0.0    | 100.0   |

**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 460.5   | 1.6       |
| 10°-20°   | 1180.4  | 4.0       |
| 20°-30°   | 1818.7  | 6.1       |
| 30°-40°   | 2644.7  | 8.9       |
| 40°-50°   | 3892.6  | 13.1      |
| 50°-60°   | 5466.4  | 18.4      |
| 60°-70°   | 6918.8  | 23.3      |
| 70°-80°   | 6092.3  | 20.5      |
| 80°-90°   | 1204.6  | 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°    | 29679.0 | 100.0     |
| 0°-180°   | 29679.0 | 100.0     |

**Coefficient of Utilization**



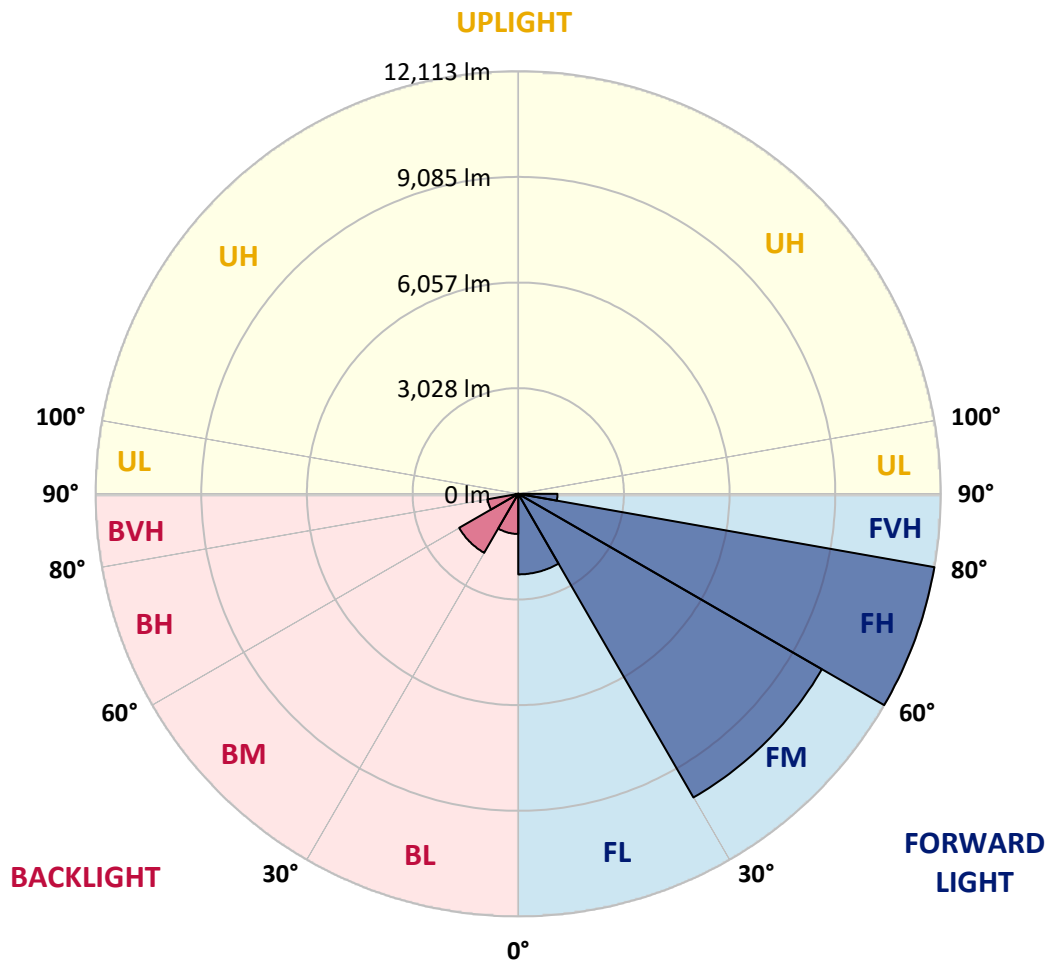
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 CATALOG NUMBER: GLEON-SA8A-727-U-SL4

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

| Zone           | Lumens  | % Fixture | Zone Rating/Lumen Limit |      |         |
|----------------|---------|-----------|-------------------------|------|---------|
|                |         |           | B                       | U    | G       |
| FL (0°-30°)    | 2309.4  | 7.8       |                         |      |         |
| FM (30°-60°)   | 10049.5 | 33.9      |                         |      |         |
| FH (60°-80°)   | 12113.4 | 40.8      |                         |      | G5      |
| FVH (80°-90°)  | 1123.0  | 3.8       |                         |      | G5      |
| BL (0°-30°)    | 1150.3  | 3.9       | B3/2500                 |      |         |
| BM (30°-60°)   | 1954.2  | 6.6       | B2/2500                 |      |         |
| BH (60°-80°)   | 897.6   | 3.0       | B2/1000                 |      | G2/1000 |
| BVH (80°-90°)  | 81.6    | 0.3       |                         |      | G1/100  |
| 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°    | 5229.3  | 5229.3  | 5229.3  | 5229.3  | 5229.3  | 5229.3  | 5229.3  | 5229.3  | 5229.3  | 5229.3  | 5229.3  |
| 2.5°  | 5408.1  | 5409.1  | 5408.1  | 5399.7  | 5379.9  | 5363.1  | 5349.6  | 5329.7  | 5285.8  | 5252.3  | 5202.1  |
| 5°    | 5459.3  | 5453.1  | 5448.9  | 5433.2  | 5401.8  | 5383.0  | 5356.9  | 5319.2  | 5247.1  | 5180.2  | 5098.6  |
| 7.5°  | 5435.3  | 5428.0  | 5418.6  | 5399.7  | 5364.2  | 5348.5  | 5311.9  | 5262.8  | 5176.0  | 5088.2  | 4971.1  |
| 10°   | 5361.1  | 5359.0  | 5354.8  | 5350.6  | 5320.3  | 5307.7  | 5274.3  | 5222.0  | 5136.3  | 5029.6  | 4892.7  |
| 12.5° | 5278.5  | 5283.7  | 5300.4  | 5322.4  | 5308.8  | 5302.5  | 5281.6  | 5246.1  | 5158.2  | 5043.2  | 4878.1  |
| 15°   | 5226.2  | 5240.8  | 5285.8  | 5343.3  | 5354.8  | 5352.7  | 5347.5  | 5324.5  | 5231.4  | 5103.9  | 4911.5  |
| 17.5° | 5208.4  | 5232.5  | 5318.2  | 5413.3  | 5446.8  | 5454.1  | 5456.2  | 5416.5  | 5313.0  | 5178.1  | 4946.0  |
| 20°   | 5240.8  | 5271.1  | 5396.6  | 5527.3  | 5580.6  | 5584.8  | 5575.4  | 5506.4  | 5390.3  | 5241.9  | 4964.8  |
| 22.5° | 5339.1  | 5366.3  | 5523.1  | 5670.5  | 5731.1  | 5737.4  | 5709.2  | 5604.6  | 5471.9  | 5317.1  | 4991.0  |
| 25°   | 5528.3  | 5561.8  | 5718.6  | 5866.0  | 5897.4  | 5898.4  | 5857.6  | 5728.0  | 5578.5  | 5422.7  | 5047.4  |
| 27.5° | 5775.0  | 5808.5  | 5949.6  | 6093.9  | 6077.2  | 6067.8  | 6012.4  | 5882.7  | 5717.5  | 5568.0  | 5147.8  |
| 30°   | 6050.0  | 6086.6  | 6220.4  | 6322.9  | 6283.1  | 6264.3  | 6219.4  | 6052.1  | 5911.0  | 5766.7  | 5301.5  |
| 32.5° | 6334.4  | 6367.8  | 6484.9  | 6555.0  | 6504.8  | 6496.4  | 6428.5  | 6275.8  | 6162.9  | 6069.9  | 5550.3  |
| 35°   | 6626.0  | 6650.1  | 6765.1  | 6804.8  | 6737.9  | 6735.8  | 6717.0  | 6576.9  | 6505.8  | 6549.7  | 5912.0  |
| 37.5° | 6924.0  | 6930.3  | 7028.5  | 7030.6  | 7010.8  | 7019.1  | 7039.0  | 6951.2  | 6971.0  | 7108.0  | 6382.5  |
| 40°   | 7189.5  | 7206.3  | 7277.4  | 7299.3  | 7333.8  | 7363.1  | 7462.4  | 7404.9  | 7558.6  | 7801.1  | 6967.9  |
| 42.5° | 7386.1  | 7418.5  | 7532.4  | 7588.9  | 7700.8  | 7746.8  | 7886.9  | 7940.2  | 8249.6  | 8613.4  | 7664.2  |
| 45°   | 7552.3  | 7602.5  | 7785.4  | 7901.5  | 8090.7  | 8171.2  | 8371.9  | 8550.7  | 9030.6  | 9494.7  | 8397.0  |
| 47.5° | 7732.1  | 7795.9  | 8024.8  | 8246.5  | 8503.7  | 8594.6  | 8959.5  | 9227.1  | 9863.8  | 10381.3 | 9088.1  |
| 50°   | 7996.6  | 8045.8  | 8269.5  | 8617.6  | 8938.6  | 9055.7  | 9560.6  | 9944.3  | 10710.6 | 11226.0 | 9687.1  |
| 52.5° | 8365.7  | 8346.8  | 8536.1  | 9024.3  | 9455.0  | 9599.3  | 10202.5 | 10707.5 | 11568.9 | 11990.2 | 10193.1 |
| 55°   | 8736.8  | 8705.4  | 8838.2  | 9449.8  | 10057.2 | 10208.8 | 10909.2 | 11473.8 | 12385.4 | 12678.1 | 10581.0 |
| 57.5° | 9149.8  | 9090.2  | 9202.0  | 9929.7  | 10743.0 | 10923.9 | 11700.6 | 12288.2 | 13188.3 | 13234.3 | 10827.7 |
| 60°   | 9575.2  | 9494.7  | 9620.2  | 10524.5 | 11613.9 | 11827.1 | 12626.9 | 13082.7 | 13945.2 | 13679.7 | 10907.1 |
| 62.5° | 9947.4  | 9891.0  | 10084.4 | 11188.4 | 12595.5 | 12829.7 | 13536.4 | 13927.4 | 14691.7 | 13864.7 | 10620.7 |
| 65°   | 10272.6 | 10282.0 | 10616.5 | 11934.8 | 13690.1 | 13940.0 | 14579.8 | 14968.7 | 15279.2 | 13754.9 | 9950.6  |
| 67.5° | 10660.4 | 10713.7 | 11284.6 | 12917.5 | 15068.0 | 15341.9 | 16097.8 | 16104.1 | 15607.5 | 13110.9 | 8631.2  |
| 70°   | 11226.0 | 11335.8 | 12203.5 | 14280.8 | 17027.2 | 17403.6 | 17986.9 | 16771.1 | 15146.4 | 11365.1 | 6791.2  |
| 72.5° | 11727.8 | 11932.7 | 13181.0 | 15840.6 | 19415.0 | 19700.4 | 19091.9 | 16386.3 | 13219.7 | 8517.3  | 4230.9  |
| 74°   | 11524.0 | 11778.0 | 13358.7 | 16609.0 | 20314.1 | 20451.0 | 18718.7 | 15263.5 | 11022.1 | 5898.4  | 2458.9  |
| 75°   | 11084.9 | 11360.9 | 13099.4 | 16601.7 | 20200.1 | 20123.8 | 17817.5 | 13980.8 | 9077.6  | 4022.9  | 1636.1  |
| 77.5° | 8945.9  | 9237.6  | 11037.8 | 14228.5 | 16563.0 | 16490.9 | 13687.0 | 9378.7  | 3975.8  | 1319.4  | 831.1   |
| 80°   | 5201.1  | 5423.8  | 6851.9  | 9035.8  | 11168.5 | 11299.2 | 9001.3  | 4640.7  | 1564.0  | 741.2   | 563.5   |
| 82.5° | 2310.4  | 2464.1  | 3309.9  | 4612.5  | 6740.0  | 6908.3  | 4713.9  | 2431.7  | 966.0   | 450.6   | 338.7   |
| 85°   | 1515.9  | 1629.9  | 2009.3  | 2196.5  | 3209.5  | 3324.5  | 2307.3  | 1893.3  | 637.7   | 247.8   | 248.8   |
| 87.5° | 1090.4  | 1200.2  | 1492.9  | 1303.7  | 1473.0  | 1394.6  | 1255.6  | 1752.2  | 256.1   | 141.1   | 83.6    |
| 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: P319912  
 CATALOG NUMBER: GLEON-SA8A-727-U-SL4

**CANDELA DISTRIBUTION (continued):**

|       | 90°    | 95°    | 105°   | 115°   | 125°   | 135°   | 145°   | 155°   | 165°   | 175°   | 180°   |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 5229.3 | 5229.3 | 5229.3 | 5229.3 | 5229.3 | 5229.3 | 5229.3 | 5229.3 | 5229.3 | 5229.3 | 5229.3 |
| 2.5°  | 5180.2 | 5163.5 | 5125.8 | 5054.7 | 5015.0 | 4981.6 | 4926.1 | 4893.7 | 4879.1 | 4878.1 | 4884.3 |
| 5°    | 5051.6 | 5012.9 | 4915.7 | 4796.5 | 4701.4 | 4614.6 | 4506.9 | 4442.1 | 4396.1 | 4368.9 | 4376.2 |
| 7.5°  | 4902.1 | 4841.5 | 4688.8 | 4498.6 | 4345.9 | 4177.6 | 4011.4 | 3912.1 | 3834.7 | 3777.2 | 3787.7 |
| 10°   | 4799.6 | 4716.0 | 4493.3 | 4219.4 | 3965.4 | 3720.7 | 3491.8 | 3354.8 | 3246.1 | 3162.5 | 3168.7 |
| 12.5° | 4765.1 | 4652.2 | 4343.8 | 3977.9 | 3621.4 | 3286.9 | 2987.9 | 2777.8 | 2665.9 | 2570.8 | 2578.1 |
| 15°   | 4770.4 | 4618.8 | 4218.4 | 3760.5 | 3312.0 | 2890.7 | 2527.9 | 2282.2 | 2130.6 | 2064.8 | 2065.8 |
| 17.5° | 4774.6 | 4580.1 | 4086.7 | 3527.3 | 3005.7 | 2520.6 | 2126.4 | 1877.6 | 1734.4 | 1673.8 | 1674.8 |
| 20°   | 4761.0 | 4517.4 | 3923.6 | 3259.7 | 2685.8 | 2180.8 | 1799.2 | 1588.0 | 1479.3 | 1432.3 | 1432.3 |
| 22.5° | 4743.2 | 4443.1 | 3739.6 | 2991.0 | 2370.0 | 1886.0 | 1565.0 | 1404.0 | 1341.3 | 1309.9 | 1308.9 |
| 25°   | 4751.6 | 4387.7 | 3551.4 | 2715.0 | 2079.4 | 1650.8 | 1409.3 | 1302.6 | 1260.8 | 1240.9 | 1239.9 |
| 27.5° | 4796.5 | 4361.6 | 3377.8 | 2440.1 | 1825.4 | 1474.1 | 1304.7 | 1229.4 | 1202.3 | 1189.7 | 1189.7 |
| 30°   | 4878.1 | 4361.6 | 3197.0 | 2205.9 | 1614.2 | 1343.4 | 1224.2 | 1173.0 | 1154.2 | 1145.8 | 1145.8 |
| 32.5° | 5020.2 | 4385.6 | 3022.4 | 1973.8 | 1445.9 | 1240.9 | 1157.3 | 1122.8 | 1108.2 | 1104.0 | 1104.0 |
| 35°   | 5264.9 | 4467.2 | 2852.0 | 1754.3 | 1309.9 | 1157.3 | 1093.5 | 1073.7 | 1063.2 | 1062.2 | 1065.3 |
| 37.5° | 5608.8 | 4633.4 | 2692.0 | 1592.2 | 1213.8 | 1089.4 | 1040.2 | 1024.5 | 1018.3 | 1023.5 | 1027.7 |
| 40°   | 6041.6 | 4859.2 | 2546.7 | 1445.9 | 1140.6 | 1035.0 | 991.1  | 980.6  | 977.5  | 984.8  | 991.1  |
| 42.5° | 6564.4 | 5164.5 | 2427.5 | 1340.3 | 1084.1 | 989.0  | 949.3  | 936.7  | 933.6  | 941.9  | 950.3  |
| 45°   | 7129.9 | 5492.8 | 2343.9 | 1261.9 | 1040.2 | 954.5  | 912.7  | 899.1  | 892.8  | 897.0  | 906.4  |
| 47.5° | 7644.3 | 5803.3 | 2310.4 | 1206.4 | 998.4  | 925.2  | 880.3  | 863.5  | 853.1  | 851.0  | 858.3  |
| 50°   | 8078.2 | 6034.3 | 2326.1 | 1173.0 | 964.9  | 892.8  | 848.9  | 830.1  | 814.4  | 805.0  | 810.2  |
| 52.5° | 8393.9 | 6179.6 | 2340.8 | 1158.4 | 938.8  | 857.3  | 814.4  | 796.6  | 775.7  | 760.0  | 760.0  |
| 55°   | 8622.8 | 6213.1 | 2308.3 | 1146.9 | 918.9  | 818.6  | 775.7  | 759.0  | 738.1  | 720.3  | 718.2  |
| 57.5° | 8712.8 | 6119.0 | 2188.1 | 1130.1 | 905.4  | 782.0  | 734.9  | 722.4  | 704.6  | 683.7  | 682.7  |
| 60°   | 8591.5 | 5828.4 | 1956.0 | 1094.6 | 887.6  | 751.7  | 694.2  | 685.8  | 677.4  | 657.6  | 656.5  |
| 62.5° | 8104.3 | 5190.6 | 1656.0 | 1022.4 | 852.0  | 719.3  | 656.5  | 660.7  | 661.8  | 648.2  | 646.1  |
| 65°   | 7220.9 | 4314.6 | 1363.3 | 928.4  | 798.7  | 680.6  | 617.9  | 637.7  | 649.2  | 647.1  | 644.0  |
| 67.5° | 5937.1 | 3358.0 | 1155.2 | 829.0  | 728.7  | 627.3  | 576.0  | 599.0  | 608.5  | 615.8  | 613.7  |
| 70°   | 4406.6 | 2367.9 | 955.5  | 724.5  | 644.0  | 564.5  | 521.7  | 533.2  | 526.9  | 535.3  | 538.4  |
| 72.5° | 2456.8 | 1420.8 | 778.9  | 619.9  | 556.2  | 491.4  | 461.0  | 459.0  | 445.4  | 445.4  | 445.4  |
| 74°   | 1474.1 | 1042.3 | 684.8  | 555.1  | 502.9  | 443.3  | 417.1  | 407.7  | 395.2  | 396.2  | 395.2  |
| 75°   | 1185.5 | 895.9  | 628.3  | 512.3  | 465.2  | 415.0  | 388.9  | 376.4  | 367.0  | 367.0  | 365.9  |
| 77.5° | 748.5  | 680.6  | 506.0  | 407.7  | 372.2  | 341.9  | 324.1  | 307.4  | 307.4  | 306.3  | 305.3  |
| 80°   | 565.6  | 541.5  | 394.1  | 308.4  | 285.4  | 262.4  | 250.9  | 243.6  | 243.6  | 246.7  | 245.7  |
| 82.5° | 387.9  | 407.7  | 277.0  | 215.4  | 203.9  | 187.1  | 185.0  | 186.1  | 183.0  | 178.8  | 177.7  |
| 85°   | 283.3  | 306.3  | 187.1  | 135.9  | 124.4  | 114.0  | 122.3  | 126.5  | 121.3  | 111.9  | 107.7  |
| 87.5° | 108.7  | 200.7  | 100.4  | 56.5   | 52.3   | 45.0   | 52.3   | 54.4   | 58.5   | 46.0   | 47.0   |
| 90°   | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |



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

Report Prepared for

Cooper Lighting Solutions

McGRAW-EDISON

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

Test Date: 08/20/2019

Luminaire Tested: SA1C-727-U-5WQ

**Test Information**

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

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

**Spectral Parameters**

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

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

Rf: 69.9  
 Rg: 98.3



**Test Conditions**

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

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

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CIE 1931 Chromaticity Diagram



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



Point lies inside the ANSI 2700K 4-step quadrangle

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**Photopic Flux vs. Wavelength**



**Photopic Lumens: 6211.7**

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

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Scotopic Flux vs. Wavelength



Scotopic Lumens: 6474.3

S/P: 1.04

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

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**Melanopic Flux vs. Wavelength**



**Melanopic Lumens: 2145.7 M/P: 0.35**

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

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**Summary**

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



**Color Vector Graphics**





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

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



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Color Rendition by Hue-Angle Bin



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Measure Comparisons



(END OF REPORT)