

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: P318788

Luminaire Tested: **GLEON-SA4A-760-U-T4FT**

Issue Date: 3/3/2020

**Test Information**

Test Method: LM-79-08  
Report Number: P318788  
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-SA4A-760-U-T4FT  
Description: GALLEON AREA AND ROADWAY LUMINAIRE  
(4) 70 CRI, 5700K, 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: 18911 lumens  
Efficiency: N/A  
Efficacy: 146.6 lumens/watt  
Luminous Opening: Rectangular (W 1' x L: 1' x H: 0')  
IES Classification: Type IV - Short  
BUG Rating: B3 - U0 - G4

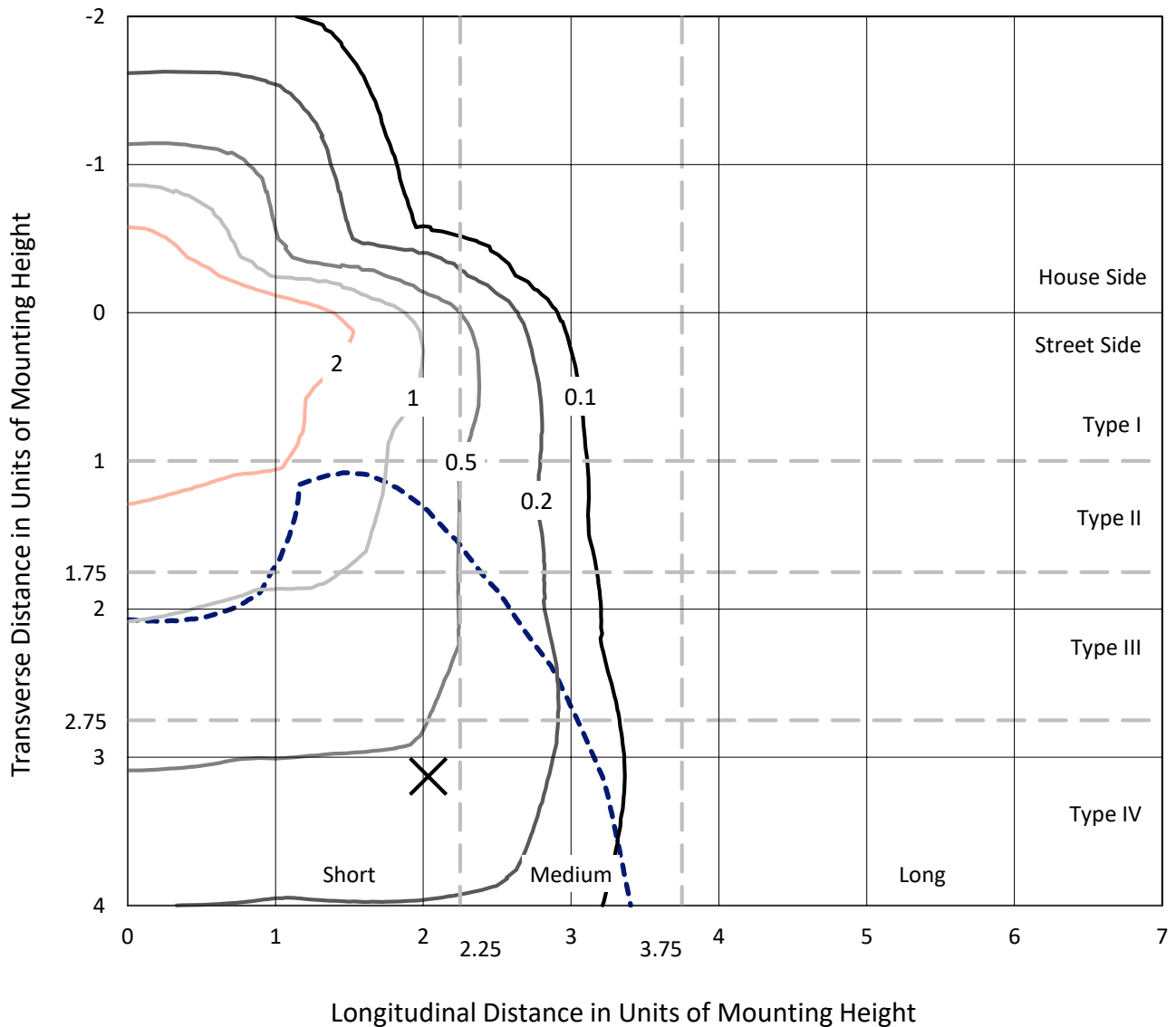
Input Watts (W): 129  
Input Voltage (V): NR  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: NR  
Total Harmonic Distortion (THDi): NR  
Frequency (hertz): 60  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 24 FT



REPORT NUMBER: P318788  
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### Iso-Footcandle Lines of Horizontal Illumination

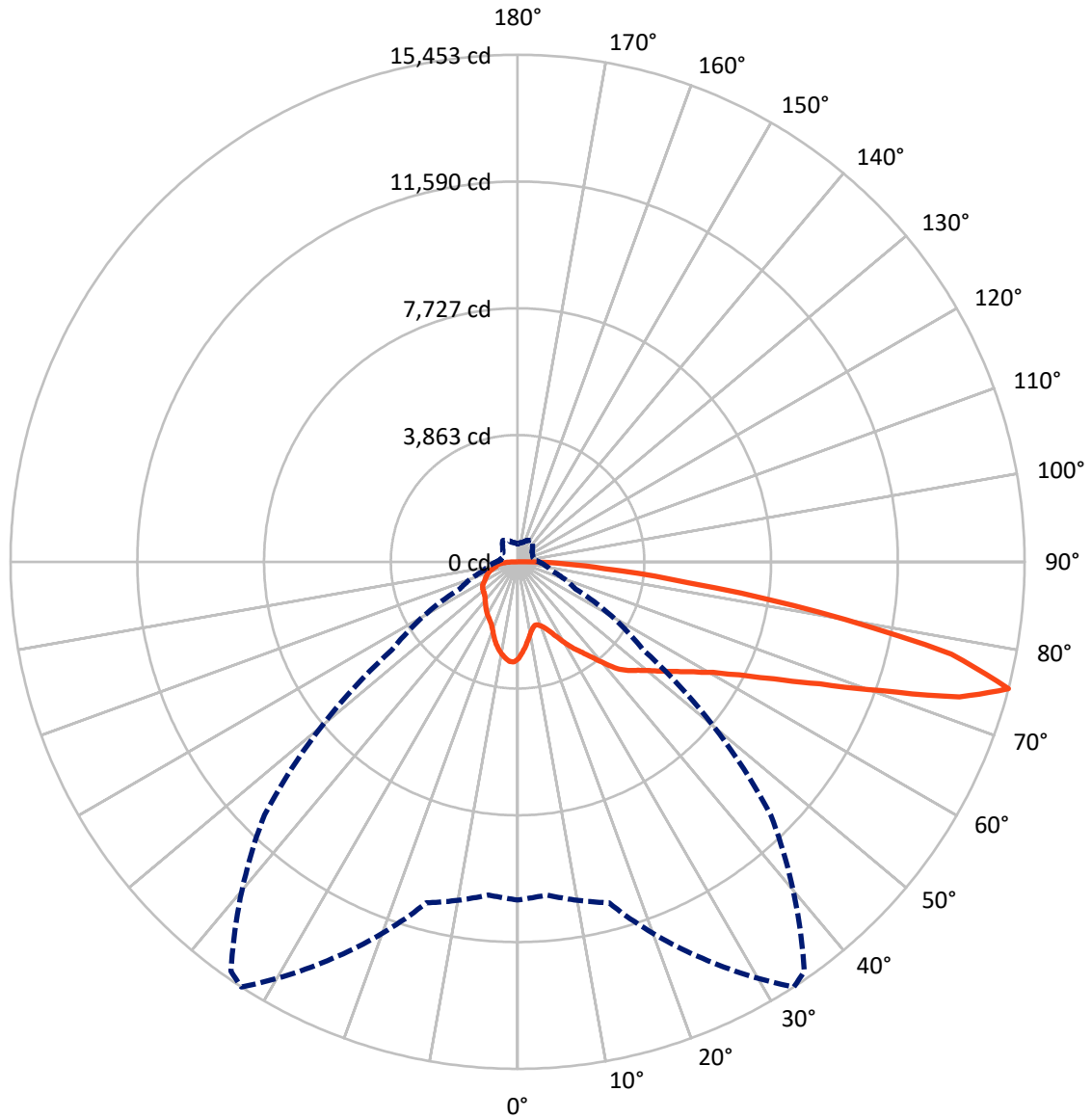
✕ Max cd  
 - - - 1/2 Max cd



Based on 25 foot mounting height. Maximum calculated value = 4.7 fc  
 Type IV - Short - N/A

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### Luminous Intensity Polar Plot



— Vertical Plane Through 33-Deg Lateral      - - - Horizontal Cone Through 75-Deg Vertical

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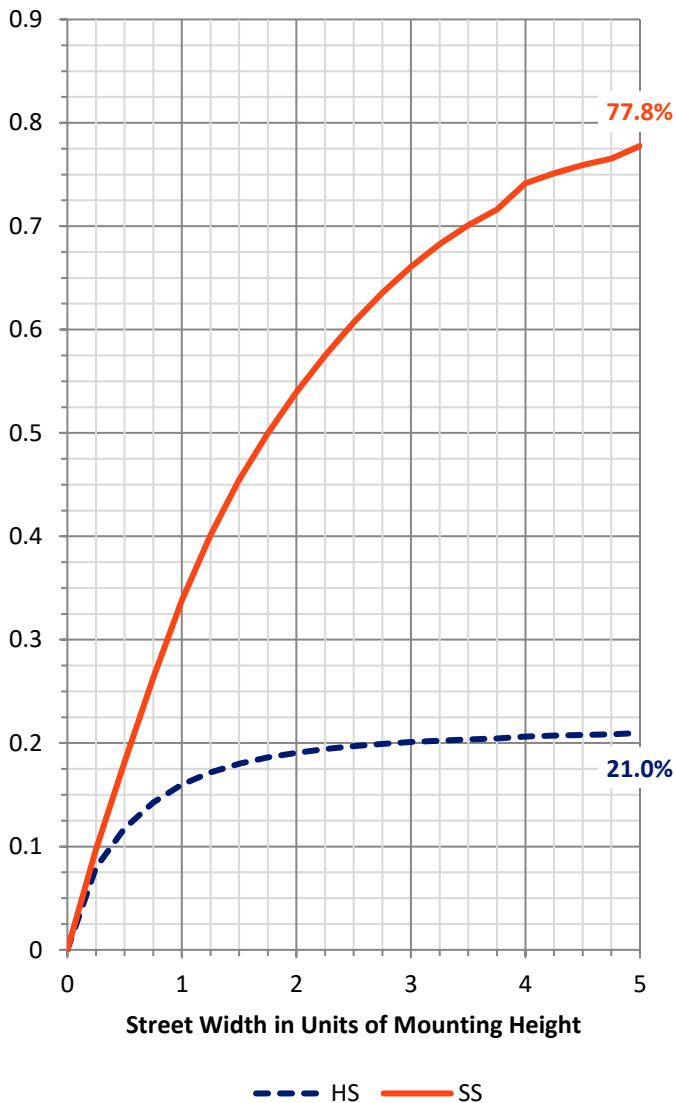
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total   |
|--------------------|-----------|----------|--------|---------|
| <b>House Side</b>  | Lumens    | 4060.7   | 0.0    | 4060.7  |
|                    | % Fixture | 21.5     | 0.0    | 21.5    |
| <b>Street Side</b> | Lumens    | 14850.3  | 0.0    | 14850.3 |
|                    | % Fixture | 78.5     | 0.0    | 78.5    |
| <b>Total</b>       | Lumens    | 18911.0  | 0.0    | 18911.0 |
|                    | % Fixture | 100.0    | 0.0    | 100.0   |

**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 267.3   | 1.4       |
| 10°-20°   | 724.0   | 3.8       |
| 20°-30°   | 1182.4  | 6.3       |
| 30°-40°   | 1760.9  | 9.3       |
| 40°-50°   | 2525.6  | 13.4      |
| 50°-60°   | 3467.3  | 18.3      |
| 60°-70°   | 4340.9  | 23.0      |
| 70°-80°   | 3927.0  | 20.8      |
| 80°-90°   | 715.3   | 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°    | 18911.0 | 100.0     |
| 0°-180°   | 18911.0 | 100.0     |

**Coefficient of Utilization**

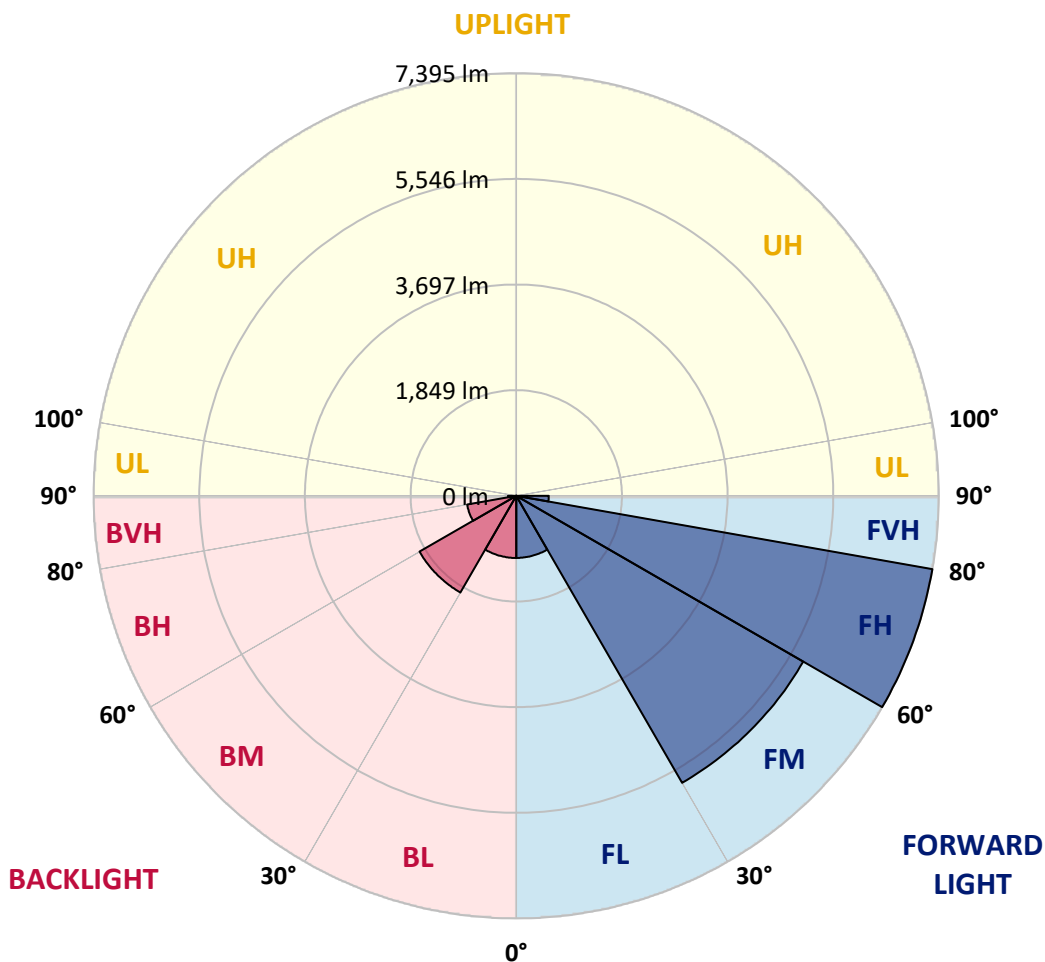


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**LUMINAIRE CLASSIFICATION SYSTEM LUMEN TABLE AND BUG RATING:**

| Zone           | Lumens | % Fixture | Zone Rating/Lumen Limit |      |         |
|----------------|--------|-----------|-------------------------|------|---------|
|                |        |           | B                       | U    | G       |
| FL (0°-30°)    | 1086.1 | 5.7       |                         |      |         |
| FM (30°-60°)   | 5799.6 | 30.7      |                         |      |         |
| FH (60°-80°)   | 7394.9 | 39.1      |                         |      | G3/7500 |
| FVH (80°-90°)  | 569.7  | 3.0       |                         |      | G4/750  |
| BL (0°-30°)    | 1087.6 | 5.8       | B3/2500                 |      |         |
| BM (30°-60°)   | 1954.3 | 10.3      | B2/2500                 |      |         |
| BH (60°-80°)   | 873.1  | 4.6       | B2/1000                 |      | G2/1000 |
| BVH (80°-90°)  | 145.6  | 0.8       |                         |      | G2/225  |
| UL (90°-100°)  | 0.0    | 0.0       |                         | U0/0 |         |
| UH (100°-180°) | 0.0    | 0.0       |                         | U0/0 |         |

**BUG Rating: B3-U0-G4**  
 Type IV Short





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**CANDELA DISTRIBUTION (FULL):**

|       | 0°      | 5°      | 15°     | 25°     | 33°     | 35°     | 45°     | 55°    | 65°    | 75°    | 85°    |
|-------|---------|---------|---------|---------|---------|---------|---------|--------|--------|--------|--------|
| 0°    | 2955.9  | 2955.9  | 2955.9  | 2955.9  | 2955.9  | 2955.9  | 2955.9  | 2955.9 | 2955.9 | 2955.9 | 2955.9 |
| 2.5°  | 2744.9  | 2734.4  | 2754.0  | 2756.7  | 2773.6  | 2780.2  | 2803.7  | 2840.3 | 2870.3 | 2904.9 | 2936.3 |
| 5°    | 2496.0  | 2488.8  | 2516.3  | 2535.9  | 2573.1  | 2588.8  | 2644.3  | 2722.0 | 2791.3 | 2869.7 | 2940.9 |
| 7.5°  | 2259.5  | 2255.6  | 2286.3  | 2330.7  | 2373.9  | 2395.4  | 2491.4  | 2604.5 | 2720.1 | 2846.8 | 2955.9 |
| 10°   | 2060.3  | 2059.0  | 2088.4  | 2132.2  | 2195.5  | 2219.7  | 2343.8  | 2492.8 | 2654.8 | 2829.2 | 2981.4 |
| 12.5° | 1948.6  | 1953.2  | 1966.9  | 2003.5  | 2062.3  | 2086.4  | 2224.3  | 2399.3 | 2599.9 | 2823.3 | 3018.6 |
| 15°   | 1976.0  | 1983.2  | 1959.7  | 1958.4  | 2000.2  | 2019.2  | 2148.5  | 2332.7 | 2560.7 | 2833.1 | 3072.8 |
| 17.5° | 2093.0  | 2094.3  | 2032.2  | 1993.0  | 2018.5  | 2028.3  | 2125.0  | 2294.8 | 2537.8 | 2855.3 | 3140.8 |
| 20°   | 2257.6  | 2254.3  | 2144.6  | 2079.3  | 2093.0  | 2095.6  | 2158.3  | 2295.5 | 2535.9 | 2893.8 | 3228.9 |
| 22.5° | 2475.8  | 2451.6  | 2304.0  | 2215.1  | 2211.9  | 2207.9  | 2243.9  | 2343.8 | 2564.6 | 2956.5 | 3334.1 |
| 25°   | 2760.6  | 2737.7  | 2534.6  | 2413.1  | 2386.9  | 2377.1  | 2382.4  | 2447.0 | 2621.4 | 3023.8 | 3451.7 |
| 27.5° | 3077.4  | 3037.5  | 2841.6  | 2669.8  | 2615.6  | 2601.8  | 2570.5  | 2592.7 | 2683.5 | 3088.5 | 3591.5 |
| 30°   | 3342.6  | 3321.1  | 3149.9  | 2946.1  | 2882.1  | 2862.5  | 2780.2  | 2756.0 | 2773.0 | 3176.7 | 3767.9 |
| 32.5° | 3490.9  | 3476.5  | 3372.7  | 3208.0  | 3148.6  | 3121.2  | 3004.9  | 2956.5 | 2916.7 | 3315.8 | 4007.0 |
| 35°   | 3670.5  | 3661.4  | 3598.7  | 3479.1  | 3391.0  | 3362.2  | 3272.1  | 3221.8 | 3119.2 | 3507.2 | 4315.9 |
| 37.5° | 3899.2  | 3889.4  | 3890.7  | 3794.0  | 3688.8  | 3662.0  | 3602.6  | 3549.7 | 3381.8 | 3758.7 | 4651.7 |
| 40°   | 4157.9  | 4138.9  | 4131.7  | 4127.1  | 4060.5  | 4045.5  | 4014.1  | 3942.3 | 3711.0 | 4059.2 | 4982.9 |
| 42.5° | 4547.2  | 4479.9  | 4336.2  | 4390.4  | 4456.4  | 4448.5  | 4474.0  | 4370.8 | 4076.8 | 4414.6 | 5306.2 |
| 45°   | 4922.8  | 4812.4  | 4564.2  | 4575.9  | 4720.3  | 4764.1  | 4954.8  | 4881.6 | 4473.4 | 4803.9 | 5640.7 |
| 47.5° | 5093.9  | 5010.3  | 4799.3  | 4800.0  | 4943.0  | 5033.8  | 5451.9  | 5399.7 | 4890.1 | 5246.1 | 6049.0 |
| 50°   | 5285.3  | 5201.7  | 5012.3  | 5083.5  | 5208.3  | 5304.9  | 5932.0  | 5905.3 | 5286.6 | 5730.2 | 6538.2 |
| 52.5° | 5494.4  | 5352.6  | 5232.4  | 5359.8  | 5534.9  | 5647.2  | 6412.8  | 6339.7 | 5650.5 | 6217.5 | 7100.7 |
| 55°   | 5497.0  | 5458.4  | 5549.9  | 5643.3  | 5905.3  | 6043.1  | 6916.5  | 6723.1 | 5947.1 | 6696.3 | 7558.6 |
| 57.5° | 5809.9  | 5747.2  | 5941.2  | 5984.3  | 6326.6  | 6482.1  | 7417.5  | 7056.9 | 6248.9 | 7063.4 | 7805.5 |
| 60°   | 6224.0  | 6170.5  | 6329.2  | 6442.9  | 6847.9  | 7055.6  | 7952.5  | 7399.9 | 6486.0 | 7340.4 | 7793.8 |
| 62.5° | 6939.3  | 6878.6  | 6876.6  | 7036.0  | 7581.5  | 7823.2  | 8552.8  | 7736.3 | 6580.1 | 7395.3 | 7461.3 |
| 65°   | 7986.5  | 7889.8  | 7707.5  | 7783.3  | 8594.6  | 8835.7  | 9223.7  | 7979.9 | 6455.9 | 7101.3 | 6604.9 |
| 67.5° | 9005.5  | 9002.3  | 8778.2  | 8933.7  | 9932.5  | 10125.8 | 9988.0  | 8004.1 | 6068.6 | 6077.7 | 5085.4 |
| 70°   | 10021.3 | 10034.4 | 9996.5  | 10537.4 | 11740.0 | 11941.2 | 10801.9 | 7679.4 | 5197.8 | 4389.1 | 3046.7 |
| 72.5° | 10826.1 | 10822.8 | 11013.6 | 12408.2 | 14085.7 | 14040.7 | 11487.8 | 6695.7 | 3731.9 | 2369.3 | 1456.1 |
| 75°   | 10304.8 | 10191.1 | 10759.5 | 13334.5 | 15453.0 | 15232.8 | 10904.5 | 4670.6 | 1936.8 | 1078.5 | 783.9  |
| 77.5° | 6721.2  | 6828.9  | 7663.1  | 11015.5 | 13516.8 | 13248.9 | 8000.2  | 2179.2 | 912.6  | 707.5  | 568.3  |
| 80°   | 2434.0  | 2547.6  | 3588.2  | 6239.7  | 9312.5  | 9268.8  | 3939.7  | 895.6  | 617.3  | 534.3  | 414.2  |
| 82.5° | 837.4   | 879.3   | 1415.6  | 2771.0  | 5257.9  | 5453.9  | 1482.2  | 508.9  | 448.8  | 378.9  | 283.5  |
| 85°   | 328.6   | 376.3   | 647.4   | 1333.3  | 2652.1  | 2671.7  | 600.3   | 304.4  | 312.2  | 248.2  | 155.5  |
| 87.5° | 124.8   | 151.6   | 309.6   | 619.3   | 1211.1  | 1112.5  | 214.9   | 145.0  | 177.7  | 147.6  | 73.8   |
| 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: P318788  
 CATALOG NUMBER: GLEON-SA4A-760-U-T4FT

**CANDELA DISTRIBUTION (continued):**

|       | 90°    | 95°    | 105°   | 115°   | 125°   | 135°   | 145°   | 155°   | 165°   | 175°   | 180°   |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 2955.9 | 2955.9 | 2955.9 | 2955.9 | 2955.9 | 2955.9 | 2955.9 | 2955.9 | 2955.9 | 2955.9 | 2955.9 |
| 2.5°  | 2960.5 | 2974.2 | 3002.9 | 3022.5 | 3043.4 | 3049.3 | 3051.9 | 3057.1 | 3062.4 | 3060.4 | 3061.1 |
| 5°    | 2978.8 | 3005.5 | 3051.9 | 3071.5 | 3080.7 | 3070.2 | 3050.0 | 3033.6 | 3021.9 | 3015.3 | 3013.4 |
| 7.5°  | 3008.8 | 3046.7 | 3096.3 | 3093.1 | 3072.2 | 3025.8 | 2973.5 | 2934.3 | 2901.7 | 2889.9 | 2883.4 |
| 10°   | 3048.7 | 3093.1 | 3127.7 | 3090.5 | 3029.7 | 2949.4 | 2871.0 | 2810.2 | 2761.2 | 2742.3 | 2739.0 |
| 12.5° | 3099.6 | 3144.7 | 3151.2 | 3072.2 | 2971.6 | 2861.8 | 2755.4 | 2675.0 | 2601.8 | 2578.3 | 2573.1 |
| 15°   | 3165.6 | 3208.0 | 3167.5 | 3040.2 | 2899.7 | 2752.1 | 2614.3 | 2505.2 | 2428.1 | 2399.3 | 2388.9 |
| 17.5° | 3234.8 | 3275.3 | 3170.8 | 2987.3 | 2805.7 | 2622.1 | 2449.0 | 2337.3 | 2249.1 | 2215.8 | 2211.9 |
| 20°   | 3317.8 | 3336.1 | 3157.1 | 2911.5 | 2676.3 | 2453.6 | 2271.3 | 2166.1 | 2119.1 | 2095.6 | 2093.0 |
| 22.5° | 3420.3 | 3400.7 | 3125.7 | 2808.9 | 2512.3 | 2258.9 | 2110.6 | 2061.6 | 2049.9 | 2044.6 | 2046.6 |
| 25°   | 3528.8 | 3468.7 | 3079.4 | 2675.0 | 2305.3 | 2064.2 | 1993.0 | 2006.7 | 2022.4 | 2020.5 | 2020.5 |
| 27.5° | 3648.3 | 3537.9 | 3008.2 | 2497.3 | 2076.0 | 1904.8 | 1913.3 | 1963.6 | 1987.1 | 1986.5 | 1985.8 |
| 30°   | 3801.8 | 3616.3 | 2917.4 | 2283.7 | 1861.7 | 1792.5 | 1844.1 | 1905.5 | 1937.5 | 1936.2 | 1936.8 |
| 32.5° | 3990.6 | 3702.5 | 2793.9 | 2045.3 | 1706.9 | 1709.5 | 1769.0 | 1829.7 | 1867.0 | 1863.7 | 1864.3 |
| 35°   | 4211.4 | 3799.2 | 2626.7 | 1810.1 | 1604.3 | 1643.5 | 1690.6 | 1733.0 | 1768.3 | 1763.7 | 1759.2 |
| 37.5° | 4451.8 | 3893.9 | 2404.6 | 1599.8 | 1520.7 | 1582.1 | 1621.3 | 1628.5 | 1644.8 | 1633.1 | 1624.6 |
| 40°   | 4680.4 | 3966.5 | 2118.4 | 1427.3 | 1436.5 | 1529.9 | 1555.4 | 1526.6 | 1497.2 | 1493.3 | 1481.5 |
| 42.5° | 4879.7 | 3990.6 | 1829.1 | 1289.5 | 1347.6 | 1475.0 | 1490.7 | 1430.6 | 1377.7 | 1352.9 | 1342.4 |
| 45°   | 5090.0 | 3999.1 | 1559.3 | 1173.9 | 1262.1 | 1426.0 | 1443.0 | 1362.7 | 1288.2 | 1234.6 | 1217.0 |
| 47.5° | 5365.0 | 4060.5 | 1349.6 | 1088.3 | 1196.7 | 1393.4 | 1417.5 | 1308.4 | 1211.8 | 1135.3 | 1119.0 |
| 50°   | 5725.0 | 4182.0 | 1179.1 | 1023.0 | 1154.3 | 1371.8 | 1399.2 | 1255.5 | 1149.0 | 1056.9 | 1040.6 |
| 52.5° | 6124.7 | 4293.7 | 1041.3 | 970.1  | 1113.1 | 1333.9 | 1375.7 | 1217.6 | 1090.3 | 984.4  | 966.8  |
| 55°   | 6404.3 | 4208.1 | 930.2  | 915.2  | 1059.5 | 1279.7 | 1343.1 | 1185.6 | 1006.0 | 913.9  | 898.2  |
| 57.5° | 6457.9 | 3915.5 | 845.9  | 858.4  | 994.9  | 1211.8 | 1292.8 | 1114.4 | 960.3  | 883.2  | 866.8  |
| 60°   | 6311.6 | 3507.9 | 783.2  | 806.1  | 925.6  | 1126.2 | 1198.7 | 1064.1 | 916.5  | 850.5  | 836.8  |
| 62.5° | 5943.8 | 3090.5 | 736.9  | 759.1  | 861.0  | 1039.3 | 1139.9 | 1011.2 | 872.1  | 813.3  | 799.6  |
| 65°   | 5201.1 | 2594.7 | 692.4  | 717.3  | 800.9  | 964.2  | 1087.0 | 962.2  | 828.3  | 783.2  | 770.2  |
| 67.5° | 3926.0 | 1943.4 | 650.6  | 672.8  | 747.3  | 898.9  | 1029.5 | 913.9  | 785.8  | 757.1  | 741.4  |
| 70°   | 2311.8 | 1217.0 | 602.9  | 626.5  | 691.1  | 830.9  | 968.1  | 861.0  | 732.9  | 719.9  | 699.6  |
| 72.5° | 1075.9 | 732.3  | 548.7  | 571.6  | 620.6  | 740.1  | 889.1  | 791.7  | 670.2  | 641.5  | 614.0  |
| 75°   | 642.1  | 535.7  | 484.7  | 505.0  | 539.6  | 643.4  | 789.8  | 721.2  | 610.8  | 572.9  | 544.1  |
| 77.5° | 480.1  | 409.6  | 414.2  | 435.7  | 463.8  | 563.1  | 699.6  | 665.6  | 565.0  | 535.7  | 516.1  |
| 80°   | 345.6  | 310.9  | 337.7  | 361.2  | 390.6  | 512.1  | 670.2  | 615.3  | 510.8  | 471.6  | 453.3  |
| 82.5° | 230.6  | 223.4  | 254.1  | 278.3  | 307.0  | 448.1  | 629.7  | 538.9  | 436.4  | 386.7  | 346.2  |
| 85°   | 127.4  | 134.6  | 171.1  | 181.6  | 206.4  | 315.5  | 516.1  | 433.1  | 328.6  | 264.6  | 252.8  |
| 87.5° | 52.9   | 62.1   | 92.1   | 88.8   | 109.7  | 188.1  | 339.7  | 261.3  | 209.0  | 156.1  | 121.5  |
| 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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1121 Highway 74 South  
Peachtree City, GA 30269



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

Report Prepared for

Cooper Lighting Solutions

McGRAW-EDISON

Report Number: SP1-1908-441-9-R4

Test Date: 10/23/2019

Luminaire Tested: SA1C-760-U-5WQ

Data in this report applies to families of products SA1C-760-U-5WQ .

**Test Information**

Test Method: LM-79-2008  
 Report Number: SP1-1908-441-9-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-760-U-5WQ**  
 Description: MCGRAW EDISON ROADWAY AND AREA LUMINAIRE

\*\*\*THIS IS A REVISION OF SP1-1908-441-4-R3. TO UPDATE THE CATALOG INFORMATION.\*\*\*TESTED IN SITU. ROADWAY AND AREA LUMINAIRE. (1) 70 CRI, 5000K, 1050MA LIGHTSQUARE WITH 16 LEDS AND TYPE V WIDE OPTICS.

**Spectral Parameters**

|                           |        |           |      |      |       |
|---------------------------|--------|-----------|------|------|-------|
| CCT (K):                  | 5474   | CRI (Ra): | 71.7 | R9:  | -27.1 |
| CIE u':                   | 0.2052 | R1:       | 70.6 | R10: | 40.8  |
| CIE v':                   | 0.4804 | R2:       | 74.6 | R11: | 74.6  |
| Duv:                      | 0.0025 | R3:       | 78.3 | R12: | 50.4  |
| CIE x:                    | 0.3330 | R4:       | 73.8 | R13: | 70.0  |
| CIE y:                    | 0.3466 | R5:       | 72.4 | R14: | 87.8  |
| CIE z:                    | 0.3204 | R6:       | 67.5 |      |       |
| Peak Wavelength (nm):     | 442    | R7:       | 77.5 |      |       |
| Dominant Wavelength (nm): | 554    | R8:       | 58.9 |      |       |
| Purity:                   | 4.1    |           |      |      |       |
| Rf:                       | 72.1   |           |      |      |       |
| Rg:                       | 97.2   |           |      |      |       |



**Test Conditions**

Stabilization Time: 240M  
 Operation Time: 12H  
 Room Temperature (°C) / RH%: 24.6/31%  
 Sphere Temperature (°C): 25.9

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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 5700K 4-step quadrangle

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**Photopic Flux vs. Wavelength**



#####

| $\lambda$<br>(nm) | Power<br>( $\mu\text{W}/\text{nm}$ ) | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>( $\mu\text{W}/\text{nm}$ ) | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>( $\mu\text{W}/\text{nm}$ ) | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>( $\mu\text{W}/\text{nm}$ ) | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>( $\mu\text{W}/\text{nm}$ ) | Lumens<br>( $\phi/\text{nm}$ ) |
|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|
| 360               | 3540                                 | NR                             | 490               | 33363                                | NR                             | 620               | 80193                                | NR                             | 750               | 4663                                 | NR                             | 880               | 4678                                 | NR                             |
| 365               | 2862                                 | NR                             | 495               | 44177                                | NR                             | 625               | 73091                                | NR                             | 755               | 4147                                 | NR                             | 885               | 4128                                 | NR                             |
| 370               | 2865                                 | NR                             | 500               | 57019                                | NR                             | 630               | 66269                                | NR                             | 760               | 4040                                 | NR                             | 890               | 4504                                 | NR                             |
| 375               | 3254                                 | NR                             | 505               | 70030                                | NR                             | 635               | 60012                                | NR                             | 765               | 3474                                 | NR                             | 895               | 4371                                 | NR                             |
| 380               | 3076                                 | NR                             | 510               | 81972                                | NR                             | 640               | 53914                                | NR                             | 770               | 3469                                 | NR                             | 900               | 4082                                 | NR                             |
| 385               | 2904                                 | NR                             | 515               | 92590                                | NR                             | 645               | 48385                                | NR                             | 775               | 3181                                 | NR                             | 905               | 2982                                 | NR                             |
| 390               | 2689                                 | NR                             | 520               | 100305                               | NR                             | 650               | 43219                                | NR                             | 780               | 2969                                 | NR                             | 910               | 4351                                 | NR                             |
| 395               | 2619                                 | NR                             | 525               | 107452                               | NR                             | 655               | 38562                                | NR                             | 785               | 3132                                 | NR                             | 915               | 3365                                 | NR                             |
| 400               | 2679                                 | NR                             | 530               | 111373                               | NR                             | 660               | 34110                                | NR                             | 790               | 2507                                 | NR                             | 920               | 3430                                 | NR                             |
| 405               | 3515                                 | NR                             | 535               | 114505                               | NR                             | 665               | 30085                                | NR                             | 795               | 2968                                 | NR                             | 925               | 4264                                 | NR                             |
| 410               | 6934                                 | NR                             | 540               | 116408                               | NR                             | 670               | 26205                                | NR                             | 800               | 2758                                 | NR                             | 930               | 4095                                 | NR                             |
| 415               | 14943                                | NR                             | 545               | 118700                               | NR                             | 675               | 22906                                | NR                             | 805               | 2872                                 | NR                             | 935               | 5048                                 | NR                             |
| 420               | 31939                                | NR                             | 550               | 119209                               | NR                             | 680               | 20058                                | NR                             | 810               | 3094                                 | NR                             | 940               | 4074                                 | NR                             |
| 425               | 64701                                | NR                             | 555               | 120742                               | NR                             | 685               | 17413                                | NR                             | 815               | 3222                                 | NR                             | 945               | 4949                                 | NR                             |
| 430               | 110939                               | NR                             | 560               | 121594                               | NR                             | 690               | 15447                                | NR                             | 820               | 3238                                 | NR                             | 950               | 4387                                 | NR                             |
| 435               | 164597                               | NR                             | 565               | 121913                               | NR                             | 695               | 13398                                | NR                             | 825               | 3524                                 | NR                             | 955               | 4978                                 | NR                             |
| 440               | 207696                               | NR                             | 570               | 122147                               | NR                             | 700               | 11777                                | NR                             | 830               | 2921                                 | NR                             | 960               | 4706                                 | NR                             |
| 445               | 201830                               | NR                             | 575               | 121605                               | NR                             | 705               | 10412                                | NR                             | 835               | 3595                                 | NR                             | 965               | 5083                                 | NR                             |
| 450               | 145410                               | NR                             | 580               | 120248                               | NR                             | 710               | 9544                                 | NR                             | 840               | 3016                                 | NR                             | 970               | 4522                                 | NR                             |
| 455               | 89594                                | NR                             | 585               | 117717                               | NR                             | 715               | 8940                                 | NR                             | 845               | 4032                                 | NR                             | 975               | 4740                                 | NR                             |
| 460               | 58321                                | NR                             | 590               | 114359                               | NR                             | 720               | 7897                                 | NR                             | 850               | 3579                                 | NR                             | 980               | 6122                                 | NR                             |
| 465               | 39318                                | NR                             | 595               | 109974                               | NR                             | 725               | 7045                                 | NR                             | 855               | 4571                                 | NR                             | 985               | 6450                                 | NR                             |
| 470               | 27693                                | NR                             | 600               | 105269                               | NR                             | 730               | 6483                                 | NR                             | 860               | 4485                                 | NR                             | 990               | 4875                                 | NR                             |
| 475               | 23081                                | NR                             | 605               | 99453                                | NR                             | 735               | 5838                                 | NR                             | 865               | 3978                                 | NR                             | 995               | 4764                                 | NR                             |
| 480               | 23002                                | NR                             | 610               | 92921                                | NR                             | 740               | 5261                                 | NR                             | 870               | 4298                                 | NR                             | 1000              | 3640                                 | NR                             |
| 485               | 26201                                | NR                             | 615               | 86989                                | NR                             | 745               | 4760                                 | NR                             | 875               | 4356                                 | NR                             |                   |                                      |                                |

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Scotopic Flux vs. Wavelength



Scotopic Lumens: 13759.3 S/P: 1.85

| 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    | 3540          | NR            | 490    | 33363         | NR            | 620    | 80193         | NR            | 750    | 4663          | NR            | 880    | 4678          | NR            |
| 365    | 2862          | NR            | 495    | 44177         | NR            | 625    | 73091         | NR            | 755    | 4147          | NR            | 885    | 4128          | NR            |
| 370    | 2865          | NR            | 500    | 57019         | NR            | 630    | 66269         | NR            | 760    | 4040          | NR            | 890    | 4504          | NR            |
| 375    | 3254          | NR            | 505    | 70030         | NR            | 635    | 60012         | NR            | 765    | 3474          | NR            | 895    | 4371          | NR            |
| 380    | 3076          | NR            | 510    | 81972         | NR            | 640    | 53914         | NR            | 770    | 3469          | NR            | 900    | 4082          | NR            |
| 385    | 2904          | NR            | 515    | 92590         | NR            | 645    | 48385         | NR            | 775    | 3181          | NR            | 905    | 2982          | NR            |
| 390    | 2689          | NR            | 520    | 100305        | NR            | 650    | 43219         | NR            | 780    | 2969          | NR            | 910    | 4351          | NR            |
| 395    | 2619          | NR            | 525    | 107452        | NR            | 655    | 38562         | NR            | 785    | 3132          | NR            | 915    | 3365          | NR            |
| 400    | 2679          | NR            | 530    | 111373        | NR            | 660    | 34110         | NR            | 790    | 2507          | NR            | 920    | 3430          | NR            |
| 405    | 3515          | NR            | 535    | 114505        | NR            | 665    | 30085         | NR            | 795    | 2968          | NR            | 925    | 4264          | NR            |
| 410    | 6934          | NR            | 540    | 116408        | NR            | 670    | 26205         | NR            | 800    | 2758          | NR            | 930    | 4095          | NR            |
| 415    | 14943         | NR            | 545    | 118700        | NR            | 675    | 22906         | NR            | 805    | 2872          | NR            | 935    | 5048          | NR            |
| 420    | 31939         | NR            | 550    | 119209        | NR            | 680    | 20058         | NR            | 810    | 3094          | NR            | 940    | 4074          | NR            |
| 425    | 64701         | NR            | 555    | 120742        | NR            | 685    | 17413         | NR            | 815    | 3222          | NR            | 945    | 4949          | NR            |
| 430    | 110939        | NR            | 560    | 121594        | NR            | 690    | 15447         | NR            | 820    | 3238          | NR            | 950    | 4387          | NR            |
| 435    | 164597        | NR            | 565    | 121913        | NR            | 695    | 13398         | NR            | 825    | 3524          | NR            | 955    | 4978          | NR            |
| 440    | 207696        | NR            | 570    | 122147        | NR            | 700    | 11777         | NR            | 830    | 2921          | NR            | 960    | 4706          | NR            |
| 445    | 201830        | NR            | 575    | 121605        | NR            | 705    | 10412         | NR            | 835    | 3595          | NR            | 965    | 5083          | NR            |
| 450    | 145410        | NR            | 580    | 120248        | NR            | 710    | 9544          | NR            | 840    | 3016          | NR            | 970    | 4522          | NR            |
| 455    | 89594         | NR            | 585    | 117717        | NR            | 715    | 8940          | NR            | 845    | 4032          | NR            | 975    | 4740          | NR            |
| 460    | 58321         | NR            | 590    | 114359        | NR            | 720    | 7897          | NR            | 850    | 3579          | NR            | 980    | 6122          | NR            |
| 465    | 39318         | NR            | 595    | 109974        | NR            | 725    | 7045          | NR            | 855    | 4571          | NR            | 985    | 6450          | NR            |
| 470    | 27693         | NR            | 600    | 105269        | NR            | 730    | 6483          | NR            | 860    | 4485          | NR            | 990    | 4875          | NR            |
| 475    | 23081         | NR            | 605    | 99453         | NR            | 735    | 5838          | NR            | 865    | 3978          | NR            | 995    | 4764          | NR            |
| 480    | 23002         | NR            | 610    | 92921         | NR            | 740    | 5261          | NR            | 870    | 4298          | NR            | 1000   | 3640          | NR            |
| 485    | 26201         | NR            | 615    | 86989         | NR            | 745    | 4760          | NR            | 875    | 4356          | NR            |        |               |               |

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**Melanopic Flux vs. Wavelength**



**Melanopic Lumens: 5527.6 M/P: 0.74**

| 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    | 3540          | NR            | 490    | 33363         | NR            | 620    | 80193         | NR            | 750    | 4663          | NR            | 880    | 4678          | NR            |
| 365    | 2862          | NR            | 495    | 44177         | NR            | 625    | 73091         | NR            | 755    | 4147          | NR            | 885    | 4128          | NR            |
| 370    | 2865          | NR            | 500    | 57019         | NR            | 630    | 66269         | NR            | 760    | 4040          | NR            | 890    | 4504          | NR            |
| 375    | 3254          | NR            | 505    | 70030         | NR            | 635    | 60012         | NR            | 765    | 3474          | NR            | 895    | 4371          | NR            |
| 380    | 3076          | NR            | 510    | 81972         | NR            | 640    | 53914         | NR            | 770    | 3469          | NR            | 900    | 4082          | NR            |
| 385    | 2904          | NR            | 515    | 92590         | NR            | 645    | 48385         | NR            | 775    | 3181          | NR            | 905    | 2982          | NR            |
| 390    | 2689          | NR            | 520    | 100305        | NR            | 650    | 43219         | NR            | 780    | 2969          | NR            | 910    | 4351          | NR            |
| 395    | 2619          | NR            | 525    | 107452        | NR            | 655    | 38562         | NR            | 785    | 3132          | NR            | 915    | 3365          | NR            |
| 400    | 2679          | NR            | 530    | 111373        | NR            | 660    | 34110         | NR            | 790    | 2507          | NR            | 920    | 3430          | NR            |
| 405    | 3515          | NR            | 535    | 114505        | NR            | 665    | 30085         | NR            | 795    | 2968          | NR            | 925    | 4264          | NR            |
| 410    | 6934          | NR            | 540    | 116408        | NR            | 670    | 26205         | NR            | 800    | 2758          | NR            | 930    | 4095          | NR            |
| 415    | 14943         | NR            | 545    | 118700        | NR            | 675    | 22906         | NR            | 805    | 2872          | NR            | 935    | 5048          | NR            |
| 420    | 31939         | NR            | 550    | 119209        | NR            | 680    | 20058         | NR            | 810    | 3094          | NR            | 940    | 4074          | NR            |
| 425    | 64701         | NR            | 555    | 120742        | NR            | 685    | 17413         | NR            | 815    | 3222          | NR            | 945    | 4949          | NR            |
| 430    | 110939        | NR            | 560    | 121594        | NR            | 690    | 15447         | NR            | 820    | 3238          | NR            | 950    | 4387          | NR            |
| 435    | 164597        | NR            | 565    | 121913        | NR            | 695    | 13398         | NR            | 825    | 3524          | NR            | 955    | 4978          | NR            |
| 440    | 207696        | NR            | 570    | 122147        | NR            | 700    | 11777         | NR            | 830    | 2921          | NR            | 960    | 4706          | NR            |
| 445    | 201830        | NR            | 575    | 121605        | NR            | 705    | 10412         | NR            | 835    | 3595          | NR            | 965    | 5083          | NR            |
| 450    | 145410        | NR            | 580    | 120248        | NR            | 710    | 9544          | NR            | 840    | 3016          | NR            | 970    | 4522          | NR            |
| 455    | 89594         | NR            | 585    | 117717        | NR            | 715    | 8940          | NR            | 845    | 4032          | NR            | 975    | 4740          | NR            |
| 460    | 58321         | NR            | 590    | 114359        | NR            | 720    | 7897          | NR            | 850    | 3579          | NR            | 980    | 6122          | NR            |
| 465    | 39318         | NR            | 595    | 109974        | NR            | 725    | 7045          | NR            | 855    | 4571          | NR            | 985    | 6450          | NR            |
| 470    | 27693         | NR            | 600    | 105269        | NR            | 730    | 6483          | NR            | 860    | 4485          | NR            | 990    | 4875          | NR            |
| 475    | 23081         | NR            | 605    | 99453         | NR            | 735    | 5838          | NR            | 865    | 3978          | NR            | 995    | 4764          | NR            |
| 480    | 23002         | NR            | 610    | 92921         | NR            | 740    | 5261          | NR            | 870    | 4298          | NR            | 1000   | 3640          | NR            |
| 485    | 26201         | NR            | 615    | 86989         | NR            | 745    | 4760          | NR            | 875    | 4356          | NR            |        |               |               |

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**Summary**

$R_f = 72.1$   
 $R_g = 97.2$   
 CIE  $R_a = 71.7$   
 $R_g = -27.1$



**Color Vector Graphics**





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

|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 85 | CES26 = 54 | CES51 = 88 | CES76 = 43 |
| CES02 = 59 | CES27 = 79 | CES52 = 90 | CES77 = 64 |
| CES03 = 30 | CES28 = 77 | CES53 = 77 | CES78 = 46 |
| CES04 = 69 | CES29 = 50 | CES54 = 81 | CES79 = 74 |
| CES05 = 46 | CES30 = 59 | CES55 = 80 | CES80 = 70 |
| CES06 = 50 | CES31 = 55 | CES56 = 70 | CES81 = 71 |
| CES07 = 38 | CES32 = 52 | CES57 = 68 | CES82 = 88 |
| CES08 = 38 | CES33 = 63 | CES58 = 70 | CES83 = 82 |
| CES09 = 29 | CES34 = 63 | CES59 = 88 | CES84 = 87 |
| CES10 = 72 | CES35 = 79 | CES60 = 92 | CES85 = 84 |
| CES11 = 55 | CES36 = 90 | CES61 = 88 | CES86 = 76 |
| CES12 = 61 | CES37 = 72 | CES62 = 81 | CES87 = 75 |
| CES13 = 41 | CES38 = 68 | CES63 = 75 | CES88 = 77 |
| CES14 = 74 | CES39 = 91 | CES64 = 72 | CES89 = 76 |
| CES15 = 70 | CES40 = 83 | CES65 = 65 | CES90 = 76 |
| CES16 = 46 | CES41 = 84 | CES66 = 66 | CES91 = 92 |
| CES17 = 48 | CES42 = 70 | CES67 = 64 | CES92 = 70 |
| CES18 = 55 | CES43 = 69 | CES68 = 71 | CES93 = 83 |
| CES19 = 70 | CES44 = 98 | CES69 = 80 | CES94 = 60 |
| CES20 = 64 | CES45 = 79 | CES70 = 58 | CES95 = 73 |
| CES21 = 85 | CES46 = 78 | CES71 = 55 | CES96 = 79 |
| CES22 = 77 | CES47 = 76 | CES72 = 84 | CES97 = 84 |
| CES23 = 91 | CES48 = 68 | CES73 = 47 | CES98 = 73 |
| CES24 = 90 | CES49 = 78 | CES74 = 94 | CES99 = 62 |
| CES25 = 71 | CES50 = 87 | CES75 = 51 |            |



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Color Rendition by Hue-Angle Bin



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Measure Comparisons



(END OF REPORT)