

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: P317776

Luminaire Tested: **GLEON-SA2D-740-U-T3R**

Issue Date: 3/3/2020

**Test Information**

Test Method: LM-79-08  
Report Number: P317776  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-1903-205-10)  
Test Lab: INNOVATION CENTER  
Issue Date: 3/3/2020  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: McGRAW-EDISON  
Catalog Number: GLEON-SA2D-740-U-T3R  
Description: GALLEON AREA AND ROADWAY LUMINAIRE  
(2) 70 CRI, 4000K, 1200mA LIGHTSQUARES WITH 16 LEDS EACH AND TYPE III  
ROADWAY OPTICS  
Light Source: -  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 16232 lumens  
Efficiency: N/A  
Efficacy: 125.8 lumens/watt  
Luminous Opening: Rectangular (W 0.5' x L: 1' x H: 0')  
IES Classification: Type IV - Medium  
BUG Rating: B2 - U0 - G3

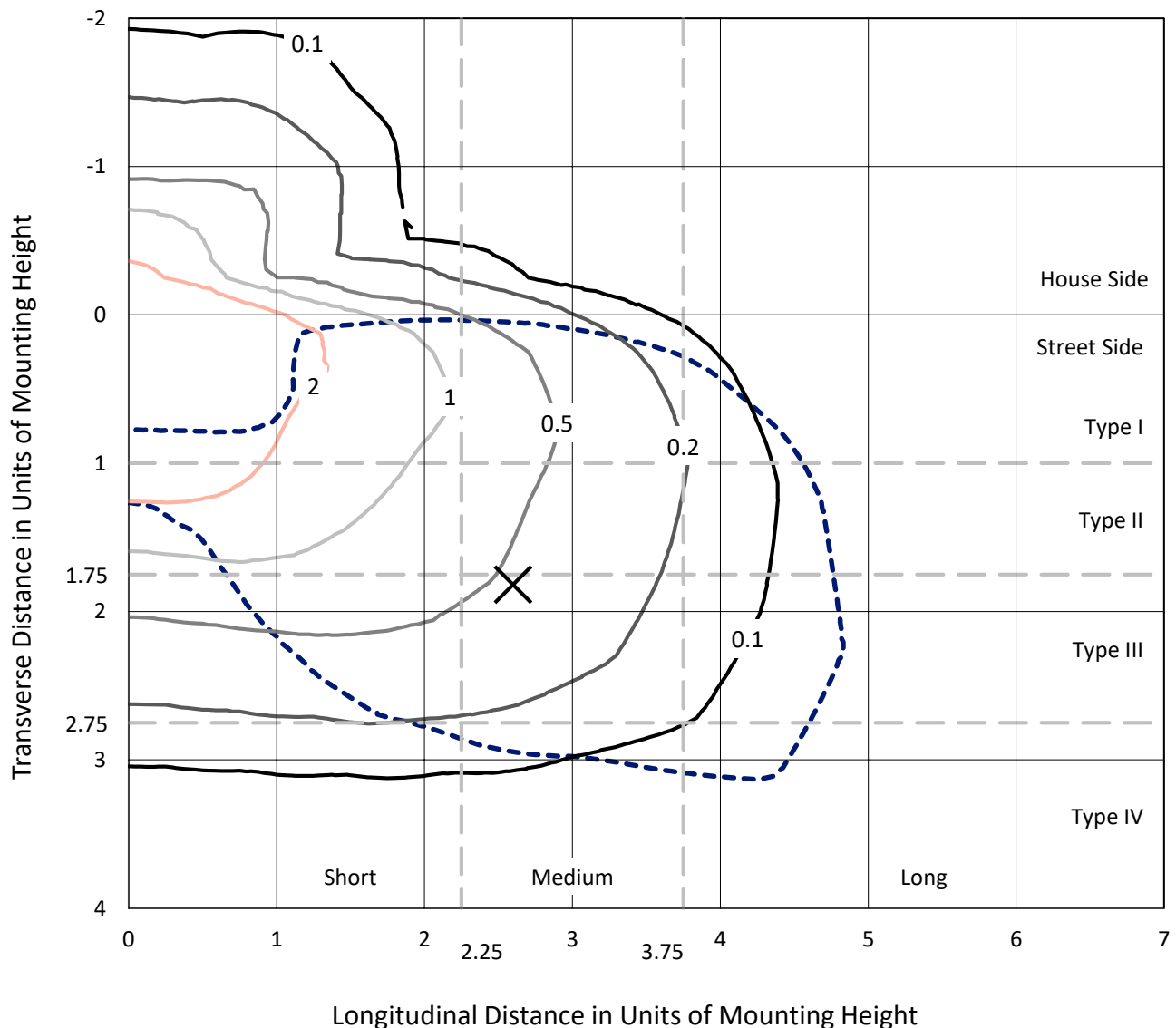
Input Watts (W): 129  
Input Voltage (V): NR  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: NR  
Total Harmonic Distortion (THDi): NR  
Frequency (hertz): 60  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 24 FT



REPORT NUMBER: P317776  
 CATALOG NUMBER: GLEON-SA2D-740-U-T3R

## Iso-Footcandle Lines of Horizontal Illumination

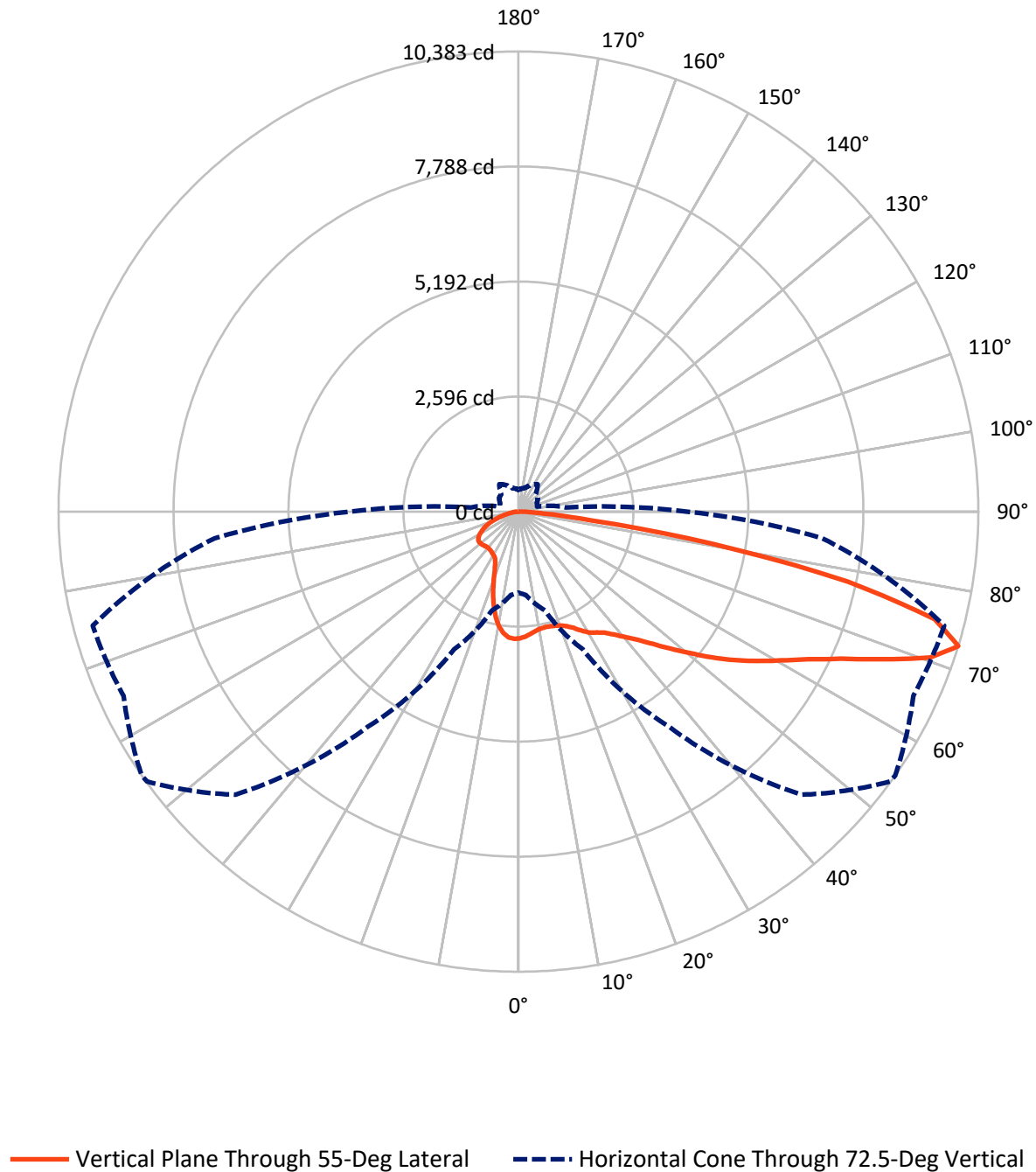
✕ Max cd  
 - - - 1/2 Max cd



Based on 25 foot mounting height. Maximum calculated value = 4.6 fc  
 Type IV - Medium - N/A

REPORT NUMBER: P317776  
CATALOG NUMBER: GLEON-SA2D-740-U-T3R

## Luminous Intensity Polar Plot



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CATALOG NUMBER: GLEON-SA2D-740-U-T3R

**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total   |
|--------------------|-----------|----------|--------|---------|
| <b>House Side</b>  | Lumens    | 3017.0   | 0.0    | 3017.0  |
|                    | % Fixture | 18.6     | 0.0    | 18.6    |
| <b>Street Side</b> | Lumens    | 13215.0  | 0.0    | 13215.0 |
|                    | % Fixture | 81.4     | 0.0    | 81.4    |
| <b>Total</b>       | Lumens    | 16232.0  | 0.0    | 16232.0 |
|                    | % Fixture | 100.0    | 0.0    | 100.0   |

**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 259.1   | 1.6       |
| 10°-20°   | 689.7   | 4.2       |
| 20°-30°   | 1137.2  | 7.0       |
| 30°-40°   | 1682.2  | 10.4      |
| 40°-50°   | 2348.0  | 14.5      |
| 50°-60°   | 3057.1  | 18.8      |
| 60°-70°   | 3757.1  | 23.1      |
| 70°-80°   | 2945.1  | 18.1      |
| 80°-90°   | 356.4   | 2.2       |
| 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°    | 16232.0 | 100.0     |
| 0°-180°   | 16232.0 | 100.0     |

**Coefficient of Utilization**



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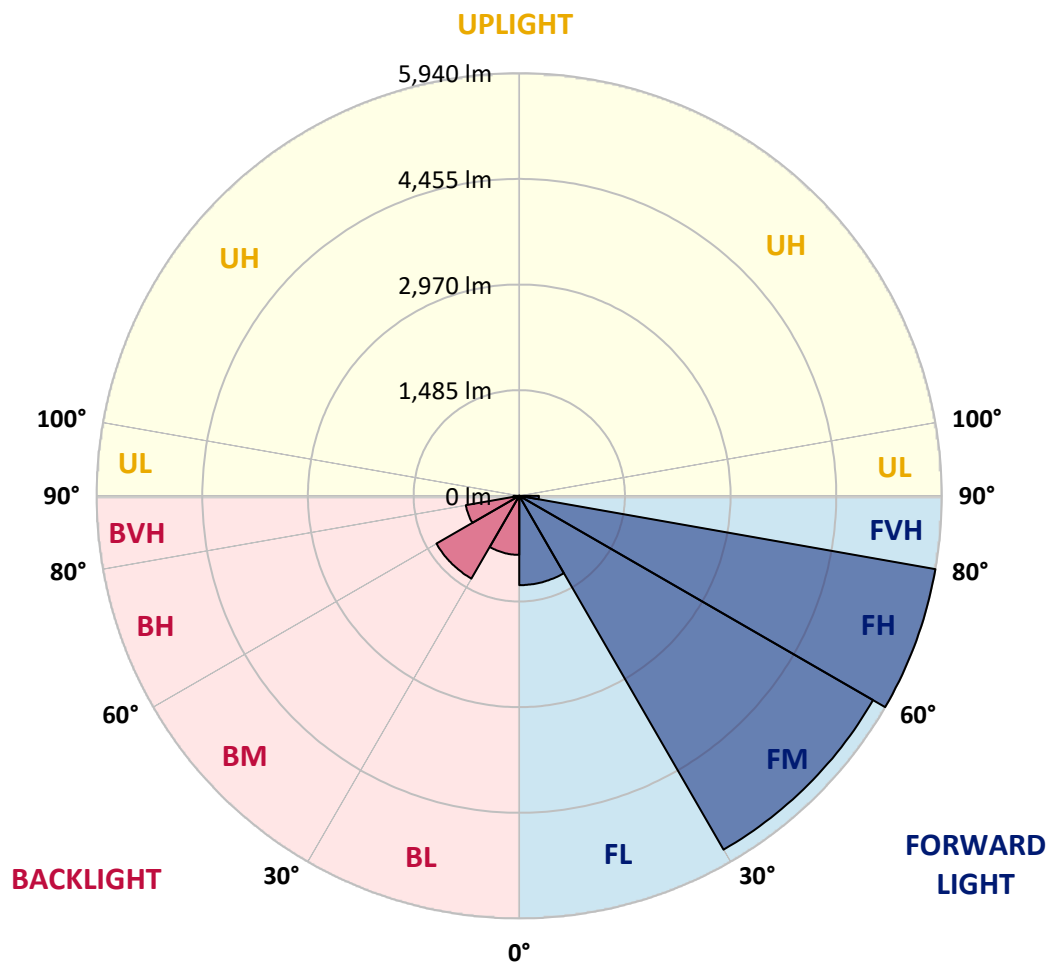
CATALOG NUMBER: GLEON-SA2D-740-U-T3R

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

| Zone |             | Lumens | % Fixture | Zone Rating/Lumen Limit |      |         |
|------|-------------|--------|-----------|-------------------------|------|---------|
|      |             |        |           | B                       | U    | G       |
| FL   | (0°-30°)    | 1255.9 | 7.7       |                         |      |         |
| FM   | (30°-60°)   | 5743.2 | 35.4      |                         |      |         |
| FH   | (60°-80°)   | 5940.4 | 36.6      |                         |      | G3/7500 |
| FVH  | (80°-90°)   | 275.6  | 1.7       |                         |      | G3/500  |
| BL   | (0°-30°)    | 830.1  | 5.1       | B2/1000                 |      |         |
| BM   | (30°-60°)   | 1344.1 | 8.3       | B2/2500                 |      |         |
| BH   | (60°-80°)   | 761.9  | 4.7       | B2/1000                 |      | G2/1000 |
| BVH  | (80°-90°)   | 80.9   | 0.5       |                         |      | G1/100  |
| UL   | (90°-100°)  | 0.0    | 0.0       |                         | U0/0 |         |
| UH   | (100°-180°) | 0.0    | 0.0       |                         | U0/0 |         |

**BUG Rating: B2-U0-G3**

Type IV Medium





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CATALOG NUMBER: GLEON-SA2D-740-U-T3R

**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 5°     | 15°    | 25°    | 35°    | 45°    | 54°     | 55°     | 65°    | 75°     | 85°    |
|-------|--------|--------|--------|--------|--------|--------|---------|---------|--------|---------|--------|
| 0°    | 2863.0 | 2863.0 | 2863.0 | 2863.0 | 2863.0 | 2863.0 | 2863.0  | 2863.0  | 2863.0 | 2863.0  | 2863.0 |
| 2.5°  | 2769.8 | 2763.2 | 2771.4 | 2782.9 | 2795.5 | 2812.5 | 2822.4  | 2826.8  | 2843.8 | 2850.4  | 2864.6 |
| 5°    | 2641.5 | 2638.2 | 2651.9 | 2671.6 | 2699.6 | 2739.1 | 2770.9  | 2776.9  | 2821.9 | 2853.7  | 2882.7 |
| 7.5°  | 2548.3 | 2548.3 | 2564.2 | 2587.8 | 2619.0 | 2672.2 | 2717.1  | 2725.4  | 2801.6 | 2870.1  | 2923.8 |
| 10°   | 2474.3 | 2477.0 | 2495.6 | 2523.6 | 2560.3 | 2616.8 | 2676.6  | 2685.9  | 2796.1 | 2908.5  | 2994.0 |
| 12.5° | 2424.9 | 2431.5 | 2448.5 | 2473.7 | 2519.2 | 2587.8 | 2663.4  | 2676.0  | 2807.6 | 2963.3  | 3078.4 |
| 15°   | 2456.2 | 2467.1 | 2468.8 | 2479.2 | 2504.4 | 2579.0 | 2671.1  | 2684.2  | 2832.3 | 3019.2  | 3174.4 |
| 17.5° | 2593.2 | 2597.1 | 2580.1 | 2558.1 | 2546.1 | 2593.8 | 2694.1  | 2707.8  | 2861.9 | 3074.6  | 3266.5 |
| 20°   | 2801.6 | 2799.4 | 2762.6 | 2703.4 | 2642.0 | 2649.7 | 2731.9  | 2746.2  | 2901.9 | 3123.4  | 3358.6 |
| 22.5° | 3064.7 | 3057.1 | 3000.6 | 2891.5 | 2786.8 | 2742.9 | 2798.3  | 2810.3  | 2962.2 | 3193.0  | 3457.3 |
| 25°   | 3383.8 | 3366.8 | 3292.3 | 3145.9 | 2991.8 | 2878.9 | 2898.1  | 2909.6  | 3049.9 | 3270.9  | 3547.7 |
| 27.5° | 3720.4 | 3703.4 | 3608.6 | 3431.5 | 3226.5 | 3050.5 | 3035.7  | 3045.5  | 3149.7 | 3328.4  | 3614.6 |
| 30°   | 4072.4 | 4054.3 | 3967.7 | 3769.2 | 3475.4 | 3228.1 | 3164.0  | 3167.8  | 3219.9 | 3359.7  | 3669.5 |
| 32.5° | 4426.0 | 4409.0 | 4312.0 | 4081.7 | 3745.7 | 3418.9 | 3256.6  | 3251.7  | 3262.1 | 3392.0  | 3731.4 |
| 35°   | 4784.6 | 4791.2 | 4677.7 | 4422.8 | 4045.0 | 3631.1 | 3366.3  | 3355.9  | 3332.8 | 3458.4  | 3819.1 |
| 37.5° | 5168.4 | 5164.0 | 5017.1 | 4750.6 | 4358.1 | 3861.3 | 3523.6  | 3522.0  | 3442.5 | 3583.9  | 3956.7 |
| 40°   | 5425.0 | 5427.7 | 5338.3 | 5086.1 | 4674.4 | 4116.3 | 3725.4  | 3721.5  | 3617.4 | 3772.0  | 4137.1 |
| 42.5° | 5525.3 | 5543.4 | 5566.4 | 5406.3 | 5005.5 | 4411.8 | 3966.1  | 3960.6  | 3861.3 | 4041.7  | 4349.3 |
| 45°   | 5532.4 | 5568.6 | 5711.1 | 5690.9 | 5341.1 | 4750.1 | 4273.6  | 4258.3  | 4187.0 | 4400.3  | 4602.6 |
| 47.5° | 5471.0 | 5508.3 | 5745.1 | 5860.3 | 5641.0 | 5107.0 | 4633.3  | 4621.2  | 4559.8 | 4848.7  | 4876.7 |
| 50°   | 5336.7 | 5372.3 | 5675.0 | 5943.1 | 5887.7 | 5450.2 | 5047.8  | 5016.0  | 4983.1 | 5366.8  | 5190.3 |
| 52.5° | 5085.0 | 5153.6 | 5581.2 | 5962.8 | 6035.2 | 5755.0 | 5483.6  | 5462.8  | 5480.9 | 5913.5  | 5504.5 |
| 55°   | 4489.1 | 4565.8 | 5339.4 | 5946.3 | 6144.3 | 6011.0 | 5919.5  | 5918.4  | 6012.1 | 6486.9  | 5841.6 |
| 57.5° | 4155.2 | 4209.5 | 4847.1 | 5918.4 | 6273.7 | 6265.4 | 6351.0  | 6361.4  | 6543.9 | 7111.4  | 6194.7 |
| 60°   | 3966.6 | 4023.6 | 4597.6 | 5814.8 | 6474.3 | 6594.4 | 6791.2  | 6812.0  | 7084.5 | 7802.7  | 6619.6 |
| 62.5° | 3795.0 | 3857.5 | 4443.0 | 5603.7 | 6710.6 | 7064.8 | 7318.6  | 7337.3  | 7656.9 | 8513.3  | 7030.2 |
| 65°   | 3501.7 | 3572.4 | 4216.6 | 5465.0 | 6925.5 | 7678.3 | 7989.1  | 8001.7  | 8314.3 | 9257.8  | 7344.4 |
| 67.5° | 3087.2 | 3151.9 | 3789.5 | 5158.5 | 7084.5 | 8423.4 | 8880.6  | 8887.7  | 8966.1 | 9783.6  | 7505.0 |
| 70°   | 2603.1 | 2627.8 | 3181.0 | 4525.8 | 6896.5 | 9120.2 | 9857.6  | 9859.2  | 9560.4 | 10120.2 | 7478.7 |
| 72.5° | 1829.0 | 1887.1 | 2309.2 | 3426.0 | 5926.6 | 9035.2 | 10364.7 | 10383.4 | 9836.7 | 9950.2  | 6881.1 |
| 75°   | 1121.7 | 1183.1 | 1448.5 | 2076.2 | 3759.9 | 7105.9 | 9576.3  | 9705.7  | 9318.7 | 8871.8  | 5621.2 |
| 77.5° | 750.0  | 773.0  | 945.2  | 1210.5 | 1703.4 | 4088.3 | 7362.5  | 7605.9  | 7741.3 | 6469.9  | 3594.9 |
| 80°   | 418.3  | 462.2  | 626.7  | 752.2  | 757.7  | 1624.5 | 4414.5  | 4471.5  | 4307.1 | 2576.2  | 1109.1 |
| 82.5° | 221.5  | 245.6  | 418.3  | 441.9  | 413.4  | 543.9  | 1645.3  | 1647.0  | 1376.1 | 690.8   | 329.5  |
| 85°   | 171.6  | 191.9  | 286.7  | 269.7  | 211.1  | 241.2  | 542.8   | 572.4   | 468.2  | 282.9   | 107.5  |
| 87.5° | 85.5   | 106.4  | 194.6  | 171.1  | 82.8   | 69.1   | 194.1   | 207.2   | 184.8  | 110.7   | 38.9   |
| 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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CATALOG NUMBER: GLEON-SA2D-740-U-T3R

**CANDELA DISTRIBUTION (continued):**

|       | 90°    | 95°    | 105°   | 115°   | 125°   | 135°   | 145°   | 155°   | 165°   | 175°   | 180°   |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 2863.0 | 2863.0 | 2863.0 | 2863.0 | 2863.0 | 2863.0 | 2863.0 | 2863.0 | 2863.0 | 2863.0 | 2863.0 |
| 2.5°  | 2870.1 | 2875.0 | 2881.1 | 2874.5 | 2872.3 | 2863.5 | 2848.7 | 2845.4 | 2837.8 | 2838.3 | 2842.7 |
| 5°    | 2895.3 | 2903.5 | 2900.3 | 2875.0 | 2844.9 | 2802.7 | 2758.8 | 2721.5 | 2696.9 | 2695.2 | 2693.6 |
| 7.5°  | 2943.6 | 2949.1 | 2923.3 | 2851.5 | 2767.0 | 2669.4 | 2577.3 | 2496.7 | 2447.9 | 2435.9 | 2433.1 |
| 10°   | 3019.2 | 3018.1 | 2947.4 | 2802.7 | 2634.4 | 2460.0 | 2312.0 | 2200.1 | 2134.9 | 2115.7 | 2110.8 |
| 12.5° | 3103.7 | 3091.0 | 2955.6 | 2713.9 | 2446.9 | 2205.1 | 2017.6 | 1893.1 | 1825.1 | 1803.2 | 1797.7 |
| 15°   | 3190.8 | 3159.6 | 2935.3 | 2581.2 | 2216.6 | 1930.4 | 1733.6 | 1618.4 | 1581.7 | 1569.6 | 1567.5 |
| 17.5° | 3272.0 | 3211.7 | 2877.2 | 2401.3 | 1954.0 | 1656.8 | 1503.3 | 1457.3 | 1466.0 | 1481.9 | 1482.5 |
| 20°   | 3351.5 | 3246.8 | 2784.0 | 2174.4 | 1677.1 | 1431.5 | 1379.4 | 1413.4 | 1455.1 | 1487.4 | 1491.8 |
| 22.5° | 3429.9 | 3271.4 | 2664.0 | 1912.3 | 1429.3 | 1304.8 | 1341.6 | 1403.5 | 1451.2 | 1486.3 | 1492.3 |
| 25°   | 3495.7 | 3277.5 | 2498.4 | 1632.7 | 1257.1 | 1257.1 | 1323.5 | 1382.1 | 1429.3 | 1463.8 | 1469.9 |
| 27.5° | 3519.8 | 3236.9 | 2264.8 | 1373.9 | 1170.5 | 1235.2 | 1298.3 | 1347.1 | 1387.1 | 1423.8 | 1430.4 |
| 30°   | 3529.1 | 3161.8 | 1995.1 | 1166.1 | 1134.9 | 1211.6 | 1264.3 | 1305.9 | 1343.8 | 1378.3 | 1384.3 |
| 32.5° | 3530.7 | 3071.3 | 1708.9 | 1048.3 | 1110.2 | 1187.0 | 1222.1 | 1258.8 | 1299.4 | 1313.1 | 1315.3 |
| 35°   | 3541.2 | 2964.4 | 1407.4 | 988.0  | 1087.2 | 1163.9 | 1191.9 | 1218.2 | 1152.4 | 1157.4 | 1161.7 |
| 37.5° | 3571.3 | 2858.6 | 1155.2 | 954.0  | 1072.4 | 1151.9 | 1185.3 | 1089.9 | 1038.4 | 1026.3 | 1024.7 |
| 40°   | 3627.8 | 2745.6 | 968.2  | 926.5  | 1066.9 | 1157.9 | 1143.1 | 1017.6 | 928.7  | 862.4  | 852.5  |
| 42.5° | 3706.2 | 2623.9 | 848.7  | 908.5  | 1070.7 | 1187.0 | 1084.4 | 947.9  | 800.4  | 757.7  | 752.2  |
| 45°   | 3794.5 | 2496.2 | 784.0  | 895.8  | 1083.9 | 1209.4 | 1072.4 | 855.3  | 740.7  | 708.3  | 705.6  |
| 47.5° | 3880.0 | 2339.9 | 750.6  | 890.4  | 1102.0 | 1191.4 | 1021.4 | 826.8  | 712.2  | 695.2  | 696.8  |
| 50°   | 3978.1 | 2199.0 | 730.3  | 884.3  | 1117.9 | 1179.8 | 963.8  | 812.0  | 701.2  | 722.0  | 744.0  |
| 52.5° | 4060.9 | 2053.2 | 712.2  | 872.3  | 1123.9 | 1159.6 | 949.0  | 814.7  | 701.2  | 741.2  | 762.1  |
| 55°   | 4159.0 | 1943.0 | 691.3  | 847.1  | 1112.4 | 1102.0 | 938.6  | 831.2  | 709.4  | 684.2  | 686.4  |
| 57.5° | 4285.7 | 1906.8 | 668.3  | 807.6  | 1074.0 | 1018.1 | 933.7  | 847.1  | 704.5  | 688.6  | 694.1  |
| 60°   | 4461.1 | 1945.2 | 659.0  | 756.0  | 1014.3 | 952.3  | 934.2  | 838.8  | 670.0  | 642.6  | 643.1  |
| 62.5° | 4628.3 | 1988.0 | 658.5  | 723.7  | 940.8  | 893.7  | 921.6  | 812.0  | 652.4  | 636.5  | 642.6  |
| 65°   | 4683.2 | 1944.7 | 632.1  | 687.5  | 858.0  | 823.5  | 898.6  | 783.5  | 639.3  | 615.1  | 614.0  |
| 67.5° | 4609.7 | 1810.3 | 579.0  | 628.8  | 763.2  | 741.8  | 868.4  | 749.5  | 618.4  | 598.7  | 595.4  |
| 70°   | 4391.5 | 1510.4 | 513.2  | 551.5  | 655.2  | 649.7  | 820.7  | 710.0  | 590.5  | 573.5  | 559.2  |
| 72.5° | 3804.3 | 1076.2 | 432.6  | 458.9  | 533.4  | 551.0  | 754.9  | 658.5  | 551.0  | 514.3  | 492.3  |
| 75°   | 3124.5 | 796.6  | 355.3  | 360.8  | 405.2  | 452.9  | 664.5  | 598.1  | 504.4  | 441.9  | 424.9  |
| 77.5° | 1913.4 | 487.4  | 282.9  | 285.1  | 290.6  | 361.3  | 547.2  | 530.7  | 445.2  | 368.4  | 356.4  |
| 80°   | 619.5  | 265.9  | 204.5  | 214.9  | 198.5  | 264.8  | 423.3  | 451.8  | 382.1  | 308.1  | 295.0  |
| 82.5° | 235.7  | 155.2  | 138.2  | 145.3  | 137.6  | 177.6  | 308.7  | 361.8  | 313.1  | 253.3  | 206.1  |
| 85°   | 114.0  | 87.7   | 81.7   | 91.6   | 85.0   | 91.0   | 197.4  | 266.5  | 237.4  | 165.0  | 153.5  |
| 87.5° | 40.6   | 38.9   | 31.3   | 42.2   | 36.2   | 32.3   | 60.3   | 134.3  | 156.8  | 113.5  | 101.4  |
| 90°   | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |

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

Report Prepared for

Cooper Lighting Solutions

MCGRAW, INVUE, LUMARK AND STREETWORKS

DATA VALID FOR LUMINAIRES UTILIZING SA LIGHT ENGINES

Report Number: SP1-2101-121-2

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

Test Date: 03/05/2021

### Test Information

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

SHIELD, DRIVER PROGRAMMED @ 615mA.

### Spectral Parameters

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



### Test Conditions

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

REPORT NUMBER: SP1-2101-121-2

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

REPORT NUMBER: SP1-2101-121-2

**CIE 1931 Chromaticity Diagram**



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



Point lies inside the ANSI 4000K 4-step quadrangle

REPORT NUMBER: SP1-2101-121-2

### Photopic Flux vs. Wavelength



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

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### Scotopic Flux vs. Wavelength



Scotopic Lumens: 10425.8

S/P: 1.47

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

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### Melanopic Flux vs. Wavelength



**Melanopic Lumens: 3927.2**      **M/P: 0.55**

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

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TM-30-18

### Summary

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



### Color Vector Graphics



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

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



Color Rendition by Hue-Angle Bin



**Measure Comparisons**


(END OF REPORT)