

Scaled data based on original data using  
LM-79-2019 Approved Method: Electrical and Photometric Measurements of Solid-  
State Lighting Products

Test Report Prepared for

Cooper Lighting Solutions

Brand: McGRAW-EDISON

Report Number: P641239

Luminaire Tested: GWS-SA5F-740-U-T2-W-GRSWH

Issue Date: 1/10/2023

**Test Information**

Test Method: LM-79-2019  
Report Number: P641239  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-2209-782-21)  
Test Lab: COOPER LIGHTING SOLUTIONS  
Issue Date: 1/10/2023  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: McGRAW-EDISON  
Catalog Number: GWS-SA5F-740-U-T2-W-GRSWH  
Description: GALLEON WALL SLIM LUMINAIRE. (5) LIGHTSQUARES WITH 16 LEDS EACH AND  
TYPE II OPTICS W/ FACTORY INSALLED GLARE SHIELD, WH  
Light Source: (80) 4000K CCT, 70 CRI LEDS  
Ballast/Driver: -

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 34798.2 lumens  
Efficiency: N/A  
Efficacy: 112.1 lumens/watt  
Luminous Opening: Rectangular (W 1.5' x L: 1' x H: 0')  
IES Classification: Type II - Short  
BUG Rating: B4 - U0 - G3

Input Watts (W): 310.3  
Input Voltage (V): 120  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: NR  
Total Harmonic Distortion (THDi): NR  
Frequency (hertz): 0  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 28.75 FT



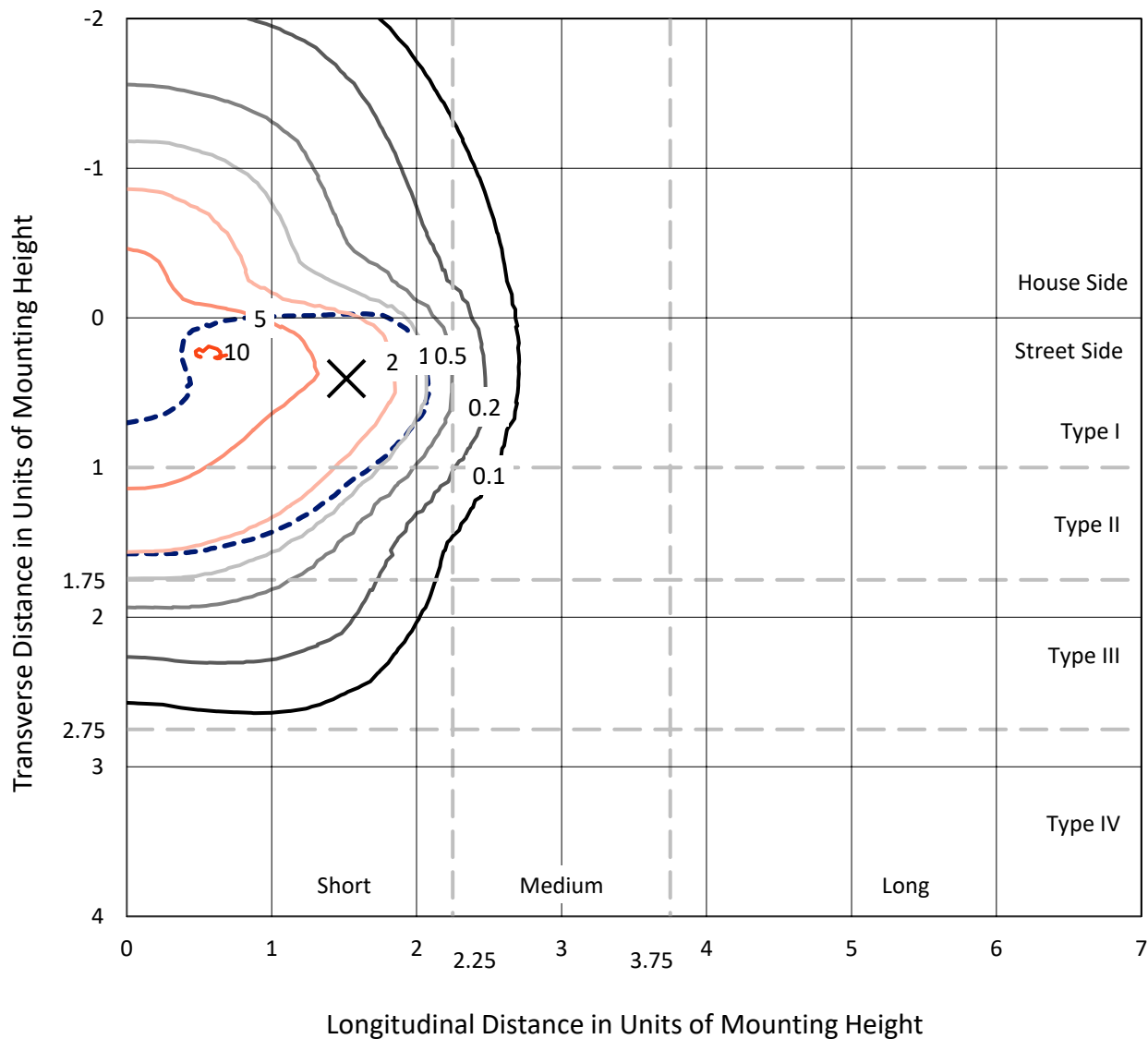
REPORT NUMBER: P641239

CATALOG NUMBER: GWS-SA5F-740-U-T2-W-GRSWH

## Iso-Footcandle Lines of Horizontal Illumination

✕ Max cd

--- 1/2 Max cd

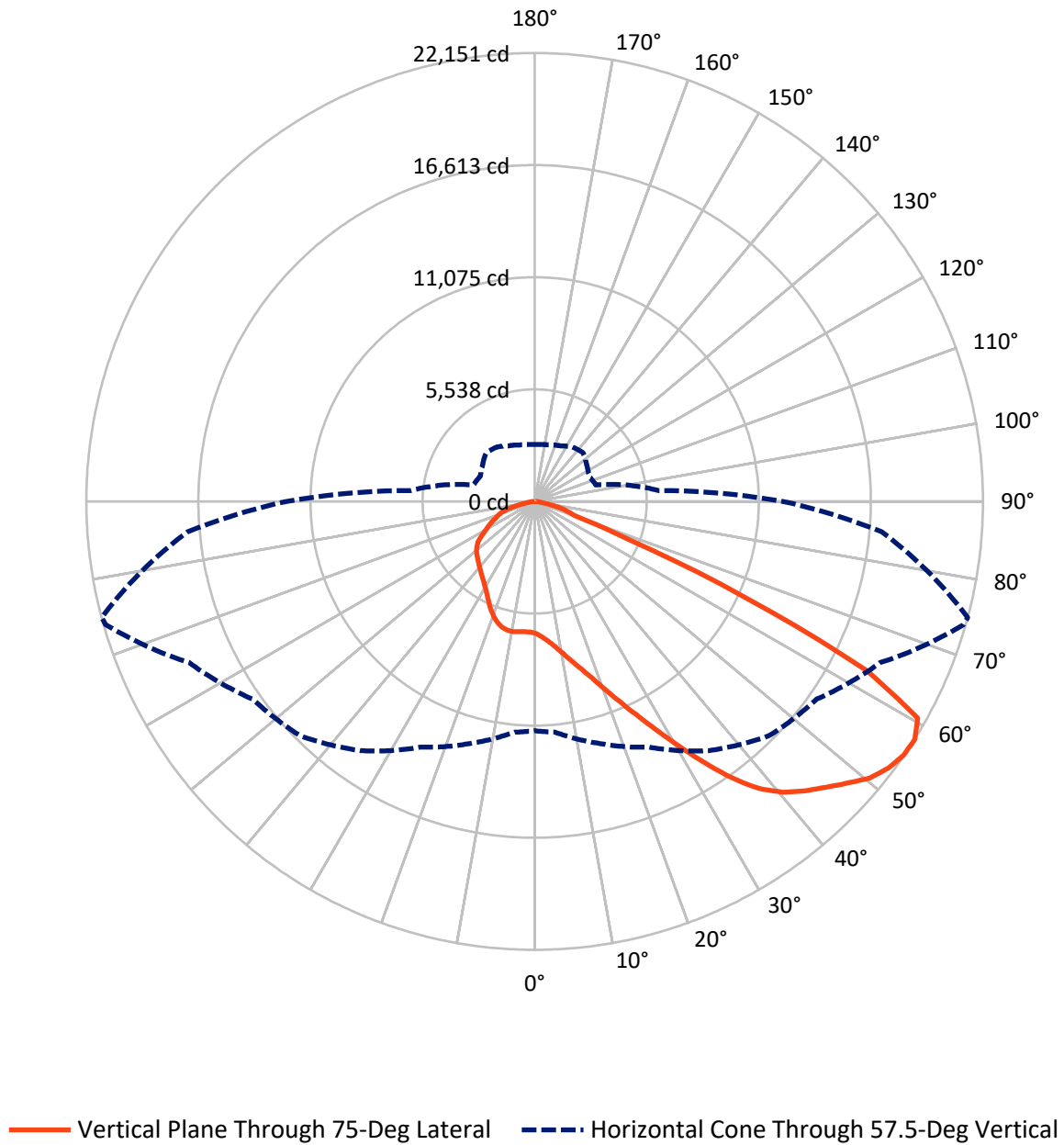


Based on 30 foot mounting height. Maximum calculated value = 10.3 fc  
 Type II - Short - N/A

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CATALOG NUMBER: GWS-SA5F-740-U-T2-W-GRSWH

## Luminous Intensity Polar Plot



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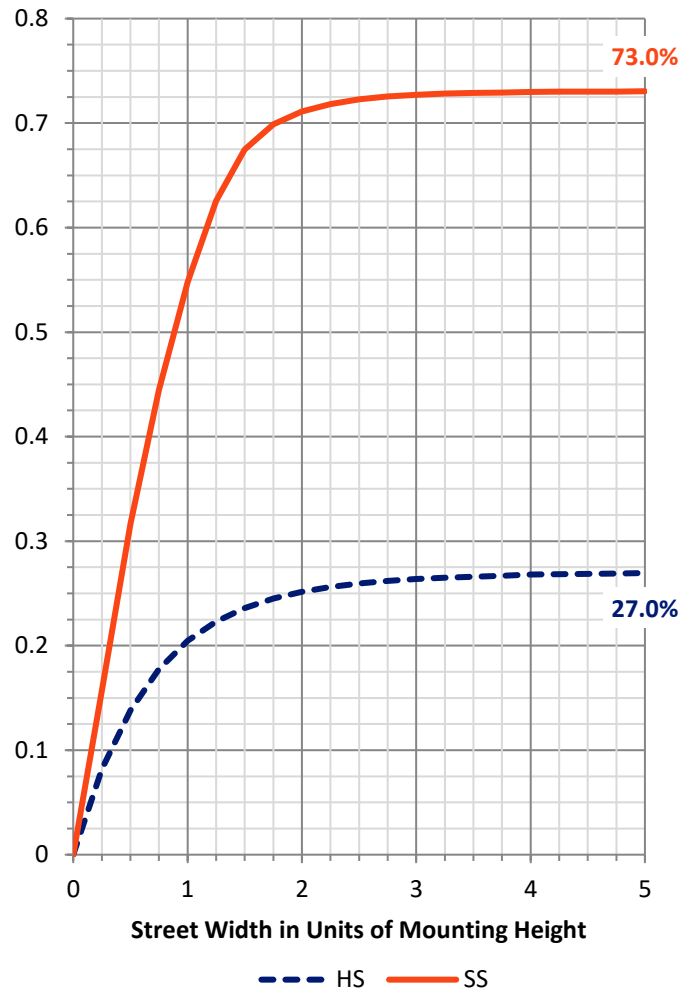
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total   |
|--------------------|-----------|----------|--------|---------|
| <b>House Side</b>  | Lumens    | 9413.6   | 0.0    | 9413.6  |
|                    | % Fixture | 27.1     | 0.0    | 27.1    |
| <b>Street Side</b> | Lumens    | 25384.6  | 0.0    | 25384.6 |
|                    | % Fixture | 72.9     | 0.0    | 72.9    |
| <b>Total</b>       | Lumens    | 34798.2  | 0.0    | 34798.2 |
|                    | % Fixture | 100.0    | 0.0    | 100.0   |

**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 652.1   | 1.9       |
| 10°-20°   | 2076.3  | 6.0       |
| 20°-30°   | 3682.2  | 10.6      |
| 30°-40°   | 5636.9  | 16.2      |
| 40°-50°   | 7848.8  | 22.6      |
| 50°-60°   | 8993.3  | 25.8      |
| 60°-70°   | 4620.9  | 13.3      |
| 70°-80°   | 1163.3  | 3.3       |
| 80°-90°   | 124.4   | 0.4       |
| 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°    | 34798.2 | 100.0     |
| 0°-180°   | 34798.2 | 100.0     |

**Coefficient of Utilization**



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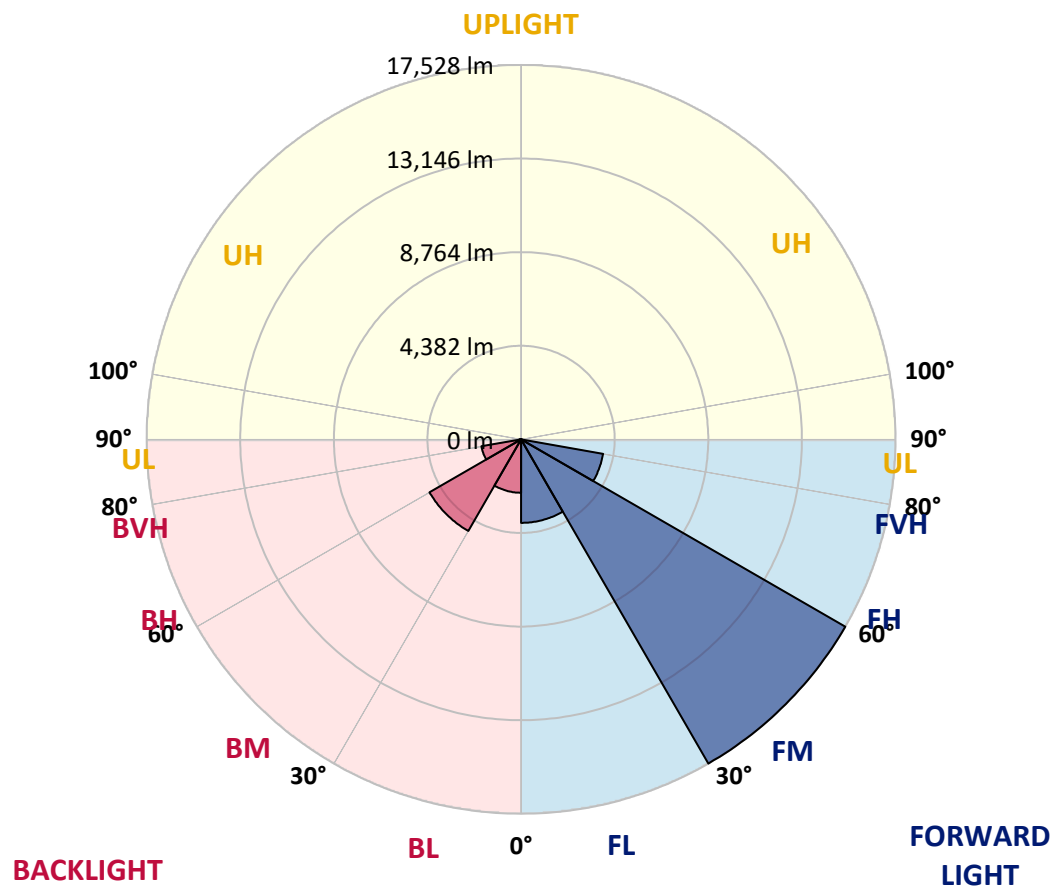
CATALOG NUMBER: GWS-SA5F-740-U-T2-W-GRSWH

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

| Zone |             | Lumens  | % Fixture | Zone Rating/Lumen Limit |      |         |
|------|-------------|---------|-----------|-------------------------|------|---------|
|      |             |         |           | B                       | U    | G       |
| FL   | (0°-30°)    | 3909.8  | 11.2      |                         |      |         |
| FM   | (30°-60°)   | 17528.3 | 50.4      |                         |      |         |
| FH   | (60°-80°)   | 3900.5  | 11.2      |                         |      | G2/5000 |
| FVH  | (80°-90°)   | 46.0    | 0.1       |                         |      | G1/100  |
| BL   | (0°-30°)    | 2500.8  | 7.2       | B4/5000                 |      |         |
| BM   | (30°-60°)   | 4950.7  | 14.2      | B3/5000                 |      |         |
| BH   | (60°-80°)   | 1883.7  | 5.4       | B3/2500                 |      | G3/2500 |
| BVH  | (80°-90°)   | 78.3    | 0.2       |                         |      | G1/100  |
| UL   | (90°-100°)  | 0.0     | 0.0       |                         | U0/0 |         |
| UH   | (100°-180°) | 0.0     | 0.0       |                         | U0/0 |         |

**BUG Rating: B4-U0-G3**

Type II Short



REPORT NUMBER: P641239

CATALOG NUMBER: GWS-SA5F-740-U-T2-W-GRSWH

**CANDELA DISTRIBUTION (FULL):**

|       | 0°      | 5°      | 15°     | 25°     | 35°     | 45°     | 55°     | 65°     | 74°     | 75°     | 85°     |
|-------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| 0°    | 6516.9  | 6516.9  | 6516.9  | 6516.9  | 6516.9  | 6516.9  | 6516.9  | 6516.9  | 6516.9  | 6516.9  | 6516.9  |
| 2.5°  | 7001.6  | 7019.5  | 7001.6  | 7031.5  | 6971.7  | 6944.7  | 6878.9  | 6780.2  | 6702.4  | 6690.4  | 6603.6  |
| 5°    | 7546.2  | 7585.1  | 7561.1  | 7549.2  | 7468.4  | 7408.5  | 7309.8  | 7112.3  | 6950.7  | 6926.8  | 6756.2  |
| 7.5°  | 7896.2  | 7923.2  | 7923.2  | 7932.1  | 7902.2  | 7833.4  | 7728.7  | 7495.3  | 7267.9  | 7232.0  | 6974.7  |
| 10°   | 8012.9  | 8033.9  | 8072.8  | 8147.6  | 8207.4  | 8228.4  | 8159.5  | 7935.1  | 7656.9  | 7621.0  | 7261.9  |
| 12.5° | 8039.9  | 8063.8  | 8123.6  | 8261.3  | 8425.8  | 8575.5  | 8587.4  | 8422.9  | 8111.7  | 8072.8  | 7594.0  |
| 15°   | 8090.7  | 8114.7  | 8195.5  | 8366.0  | 8608.4  | 8895.6  | 9072.1  | 8958.4  | 8614.4  | 8572.5  | 7971.0  |
| 17.5° | 8084.7  | 8111.7  | 8231.4  | 8458.8  | 8784.9  | 9200.8  | 9541.9  | 9589.8  | 9233.7  | 9161.9  | 8398.9  |
| 20°   | 8069.8  | 8093.7  | 8222.4  | 8500.7  | 8904.6  | 9476.1  | 10092.5 | 10340.8 | 9957.8  | 9892.0  | 8898.6  |
| 22.5° | 8189.5  | 8216.4  | 8315.1  | 8545.5  | 8967.4  | 9688.5  | 10601.1 | 11199.6 | 10816.6 | 10723.8 | 9473.1  |
| 25°   | 8458.8  | 8497.7  | 8557.5  | 8716.1  | 9081.1  | 9877.0  | 11121.8 | 12172.0 | 11780.0 | 11669.3 | 10098.5 |
| 27.5° | 8874.7  | 8922.5  | 9006.3  | 9081.1  | 9335.5  | 10116.4 | 11639.4 | 13261.1 | 12869.2 | 12752.5 | 10759.7 |
| 30°   | 9383.3  | 9446.2  | 9553.9  | 9604.7  | 9778.3  | 10469.5 | 12201.9 | 14383.2 | 14155.8 | 13994.2 | 11504.8 |
| 32.5° | 10086.5 | 10173.3 | 10275.0 | 10289.9 | 10394.7 | 11005.1 | 12758.5 | 15496.3 | 15493.3 | 15379.6 | 12351.5 |
| 35°   | 11002.1 | 11094.8 | 11115.8 | 11136.7 | 11187.6 | 11741.1 | 13431.7 | 16510.6 | 16902.6 | 16770.9 | 13273.1 |
| 37.5° | 12001.4 | 12136.1 | 12169.0 | 12076.3 | 12148.1 | 12626.8 | 14188.7 | 17324.5 | 18129.3 | 17988.7 | 14164.8 |
| 40°   | 13069.6 | 13123.5 | 13213.3 | 13066.6 | 13156.4 | 13641.1 | 14930.7 | 17845.1 | 19044.9 | 18895.3 | 14867.9 |
| 42.5° | 13835.6 | 13934.4 | 14069.0 | 14015.2 | 14066.0 | 14508.9 | 15451.4 | 18096.4 | 19697.2 | 19547.6 | 15373.6 |
| 45°   | 14667.4 | 14697.4 | 14784.1 | 14772.2 | 14802.1 | 15215.0 | 15825.4 | 18207.1 | 20280.7 | 20146.0 | 15804.5 |
| 47.5° | 15391.5 | 15436.4 | 15493.3 | 15427.4 | 15361.6 | 15630.9 | 16130.6 | 18302.9 | 20953.9 | 20792.3 | 16256.3 |
| 50°   | 16088.7 | 16127.6 | 16196.4 | 16004.9 | 15759.6 | 15828.4 | 16280.2 | 18434.5 | 21585.3 | 21471.6 | 16612.3 |
| 52.5° | 16217.4 | 16259.3 | 16582.4 | 16621.3 | 16307.1 | 16064.8 | 16543.5 | 18724.8 | 21956.3 | 21884.5 | 16741.0 |
| 55°   | 14598.6 | 14673.4 | 15316.7 | 16055.8 | 16830.8 | 16753.0 | 16965.4 | 18877.4 | 22102.9 | 22120.8 | 16971.4 |
| 57.5° | 11331.2 | 11438.9 | 12378.5 | 13392.8 | 15023.5 | 16373.0 | 17019.3 | 18838.5 | 22052.0 | 22150.8 | 17207.8 |
| 60°   | 7432.5  | 7495.3  | 8608.4  | 9745.4  | 11435.9 | 13303.0 | 15233.0 | 18138.3 | 21600.2 | 21740.8 | 17147.9 |
| 62.5° | 4488.2  | 4560.0  | 5454.7  | 6316.4  | 7312.8  | 8560.5  | 10331.8 | 14577.7 | 18105.4 | 18419.6 | 13733.9 |
| 65°   | 3132.8  | 3228.5  | 4012.5  | 4721.6  | 5065.7  | 4808.4  | 5233.2  | 8141.6  | 11280.3 | 11412.0 | 8392.9  |
| 67.5° | 2271.0  | 2336.9  | 2980.2  | 3823.9  | 4203.9  | 3396.1  | 2588.2  | 3605.5  | 4913.1  | 4961.0  | 3461.9  |
| 70°   | 1487.1  | 1561.9  | 2145.4  | 2911.3  | 3432.0  | 2752.8  | 1935.9  | 1950.9  | 2067.6  | 2091.5  | 2010.7  |
| 72.5° | 816.9   | 861.7   | 1325.5  | 1932.9  | 2028.7  | 1645.7  | 1511.0  | 1621.7  | 1702.5  | 1702.5  | 1723.5  |
| 75°   | 421.9   | 460.8   | 541.6   | 637.3   | 769.0   | 900.6   | 1089.1  | 1253.7  | 1340.5  | 1346.5  | 1337.5  |
| 77.5° | 215.4   | 230.4   | 290.2   | 314.2   | 344.1   | 400.9   | 520.6   | 667.2   | 745.0   | 775.0   | 769.0   |
| 80°   | 101.7   | 107.7   | 122.7   | 143.6   | 176.5   | 224.4   | 281.3   | 335.1   | 383.0   | 389.0   | 421.9   |
| 82.5° | 53.9    | 59.8    | 65.8    | 77.8    | 95.7    | 119.7   | 164.6   | 197.5   | 227.4   | 233.4   | 260.3   |
| 85°   | 20.9    | 23.9    | 26.9    | 29.9    | 41.9    | 50.9    | 68.8    | 92.8    | 113.7   | 113.7   | 134.6   |
| 87.5° | 0.0     | 0.0     | 0.0     | 0.0     | 3.0     | 6.0     | 12.0    | 15.0    | 20.9    | 20.9    | 35.9    |
| 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: P641239

CATALOG NUMBER: GWS-SA5F-740-U-T2-W-GRSWH

**CANDELA DISTRIBUTION (continued):**

|       | 90°     | 95°    | 105°   | 115°   | 125°   | 135°   | 145°   | 155°   | 165°   | 175°   | 180°   |
|-------|---------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 6516.9  | 6516.9 | 6516.9 | 6516.9 | 6516.9 | 6516.9 | 6516.9 | 6516.9 | 6516.9 | 6516.9 | 6516.9 |
| 2.5°  | 6582.7  | 6495.9 | 6457.0 | 6394.2 | 6343.3 | 6286.5 | 6241.6 | 6208.7 | 6187.7 | 6175.8 | 6163.8 |
| 5°    | 6690.4  | 6558.8 | 6454.0 | 6328.4 | 6241.6 | 6157.8 | 6089.0 | 6041.1 | 6017.2 | 5999.2 | 5987.3 |
| 7.5°  | 6858.0  | 6681.4 | 6484.0 | 6289.5 | 6136.9 | 6002.2 | 5915.4 | 5864.6 | 5831.7 | 5819.7 | 5810.7 |
| 10°   | 7088.4  | 6843.0 | 6516.9 | 6208.7 | 5981.3 | 5834.7 | 5774.8 | 5750.9 | 5753.9 | 5747.9 | 5744.9 |
| 12.5° | 7348.7  | 7013.6 | 6507.9 | 6065.1 | 5813.7 | 5726.9 | 5729.9 | 5768.8 | 5813.7 | 5825.7 | 5828.7 |
| 15°   | 7629.9  | 7181.1 | 6421.1 | 5879.5 | 5682.1 | 5691.0 | 5768.8 | 5861.6 | 5945.4 | 5978.3 | 5984.3 |
| 17.5° | 7935.1  | 7321.8 | 6262.5 | 5676.1 | 5574.3 | 5670.1 | 5813.7 | 5966.3 | 6089.0 | 6142.9 | 6157.8 |
| 20°   | 8276.2  | 7441.4 | 6038.1 | 5475.6 | 5472.6 | 5631.2 | 5840.6 | 6041.1 | 6196.7 | 6268.5 | 6280.5 |
| 22.5° | 8638.3  | 7516.2 | 5762.8 | 5290.1 | 5367.9 | 5580.3 | 5819.7 | 6029.1 | 6193.7 | 6265.5 | 6280.5 |
| 25°   | 9003.3  | 7540.2 | 5460.6 | 5119.5 | 5260.2 | 5499.5 | 5718.0 | 5885.5 | 6041.1 | 6104.0 | 6115.9 |
| 27.5° | 9344.4  | 7471.4 | 5173.4 | 4972.9 | 5161.4 | 5379.9 | 5526.5 | 5616.2 | 5724.0 | 5771.8 | 5780.8 |
| 30°   | 9691.5  | 7333.7 | 4931.0 | 4856.2 | 5050.7 | 5215.3 | 5281.1 | 5287.1 | 5329.0 | 5329.0 | 5335.0 |
| 32.5° | 10041.6 | 7130.3 | 4718.6 | 4742.5 | 4913.1 | 5020.8 | 5029.8 | 4961.0 | 4910.1 | 4826.3 | 4823.3 |
| 35°   | 10445.5 | 6923.8 | 4545.1 | 4613.9 | 4751.5 | 4817.3 | 4790.4 | 4658.8 | 4536.1 | 4398.4 | 4392.5 |
| 37.5° | 10819.6 | 6711.4 | 4398.4 | 4482.2 | 4569.0 | 4616.9 | 4554.0 | 4395.4 | 4293.7 | 4153.1 | 4132.1 |
| 40°   | 11127.7 | 6519.9 | 4257.8 | 4344.6 | 4386.5 | 4428.4 | 4326.6 | 4198.0 | 4212.9 | 4135.1 | 4132.1 |
| 42.5° | 11307.3 | 6334.3 | 4126.2 | 4192.0 | 4218.9 | 4248.8 | 4159.1 | 4063.3 | 4144.1 | 4084.3 | 4087.3 |
| 45°   | 11438.9 | 6172.8 | 4006.5 | 4030.4 | 4096.2 | 4141.1 | 4057.3 | 3949.6 | 3967.6 | 3737.2 | 3683.3 |
| 47.5° | 11588.5 | 6083.0 | 3892.8 | 3868.8 | 3985.5 | 4063.3 | 3934.7 | 3779.1 | 3671.3 | 3443.9 | 3423.0 |
| 50°   | 11747.1 | 6050.1 | 3773.1 | 3707.3 | 3847.9 | 3922.7 | 3773.1 | 3578.6 | 3438.0 | 3315.3 | 3303.3 |
| 52.5° | 11801.0 | 6047.1 | 3623.5 | 3512.8 | 3653.4 | 3758.1 | 3632.5 | 3435.0 | 3267.4 | 3147.7 | 3141.7 |
| 55°   | 12013.4 | 6133.9 | 3432.0 | 3246.5 | 3378.1 | 3593.6 | 3500.8 | 3216.5 | 3081.9 | 3028.0 | 3022.1 |
| 57.5° | 12261.8 | 6148.8 | 3129.8 | 2956.2 | 3138.7 | 3393.1 | 3276.4 | 3031.0 | 2884.4 | 2818.6 | 2812.6 |
| 60°   | 12160.0 | 5780.8 | 2806.6 | 2734.8 | 2935.3 | 3204.6 | 3096.9 | 2884.4 | 2713.9 | 2651.0 | 2645.0 |
| 62.5° | 9266.6  | 4081.3 | 2570.2 | 2543.3 | 2716.9 | 2932.3 | 2911.3 | 2689.9 | 2528.4 | 2483.5 | 2477.5 |
| 65°   | 5574.3  | 2866.5 | 2342.8 | 2339.8 | 2462.5 | 2669.0 | 2695.9 | 2516.4 | 2345.8 | 2283.0 | 2283.0 |
| 67.5° | 2755.8  | 2193.2 | 2085.5 | 2070.6 | 2148.4 | 2295.0 | 2408.7 | 2262.1 | 2118.4 | 2058.6 | 2049.6 |
| 70°   | 1947.9  | 1932.9 | 1897.0 | 1855.1 | 1870.1 | 1929.9 | 1977.8 | 1855.1 | 1702.5 | 1642.7 | 1630.7 |
| 72.5° | 1684.6  | 1687.6 | 1663.6 | 1630.7 | 1618.7 | 1576.9 | 1535.0 | 1445.2 | 1352.4 | 1289.6 | 1295.6 |
| 75°   | 1307.6  | 1313.5 | 1328.5 | 1316.5 | 1283.6 | 1238.7 | 1193.9 | 1080.2 | 1005.4 | 945.5  | 933.5  |
| 77.5° | 763.0   | 792.9  | 840.8  | 828.8  | 834.8  | 772.0  | 754.0  | 643.3  | 574.5  | 532.6  | 523.6  |
| 80°   | 430.9   | 448.8  | 469.8  | 484.7  | 466.8  | 439.8  | 400.9  | 341.1  | 320.2  | 290.2  | 284.3  |
| 82.5° | 260.3   | 278.3  | 287.2  | 299.2  | 293.2  | 257.3  | 227.4  | 188.5  | 170.6  | 155.6  | 152.6  |
| 85°   | 131.7   | 143.6  | 152.6  | 158.6  | 140.6  | 116.7  | 104.7  | 83.8   | 71.8   | 62.8   | 62.8   |
| 87.5° | 32.9    | 35.9   | 41.9   | 35.9   | 32.9   | 15.0   | 12.0   | 3.0    | 0.0    | 0.0    | 0.0    |
| 90°   | 0.0     | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |

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

Report Prepared for

Cooper Lighting Solutions

MCGRAW, INVUE, LUMARK AND STREETWORKS

DATA VALID FOR LUMINAIRES UTILIZING SA LIGHT ENGINES

Report Number: SP1-2101-121-2

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

Test Date: 03/05/2021

### Test Information

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

SHIELD, DRIVER PROGRAMMED @ 615mA.

### Spectral Parameters

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



### Test Conditions

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

REPORT NUMBER: SP1-2101-121-2

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

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**CIE 1931 Chromaticity Diagram**



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



Point lies inside the ANSI 4000K 4-step quadrangle

REPORT NUMBER: SP1-2101-121-2

### Photopic Flux vs. Wavelength



#####

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

REPORT NUMBER: SP1-2101-121-2

### 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              |           |                  |                  |

### 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)