

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: P640198

Luminaire Tested: GWS-SA5D-735-U-T2R-W-GRSWH

Issue Date: 1/10/2023

**Test Information**

Test Method: LM-79-2019  
Report Number: P640198  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-2209-782-13)  
Test Lab: COOPER LIGHTING SOLUTIONS  
Issue Date: 1/10/2023  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: McGRAW-EDISON  
Catalog Number: GWS-SA5D-735-U-T2R-W-GRSWH  
Description: GALLEON WALL SLIM LUMINAIRE. (5) LIGHTSQUARES WITH 16 LEDS EACH AND  
TYPE II ROADWAY OPTICS W/ FACTORY INSTALLED GLARE SHIELD, WH  
Light Source: (80) 3500K CCT, 70 CRI LEDS  
Ballast/Driver: -

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 26076.7 lumens  
Efficiency: N/A  
Efficacy: 127.5 lumens/watt  
Luminous Opening: Rectangular (W 1.5' x L: 1' x H: 0')  
IES Classification: Type II - Short  
BUG Rating: B3 - U0 - G3

Input Watts (W): 204.6  
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

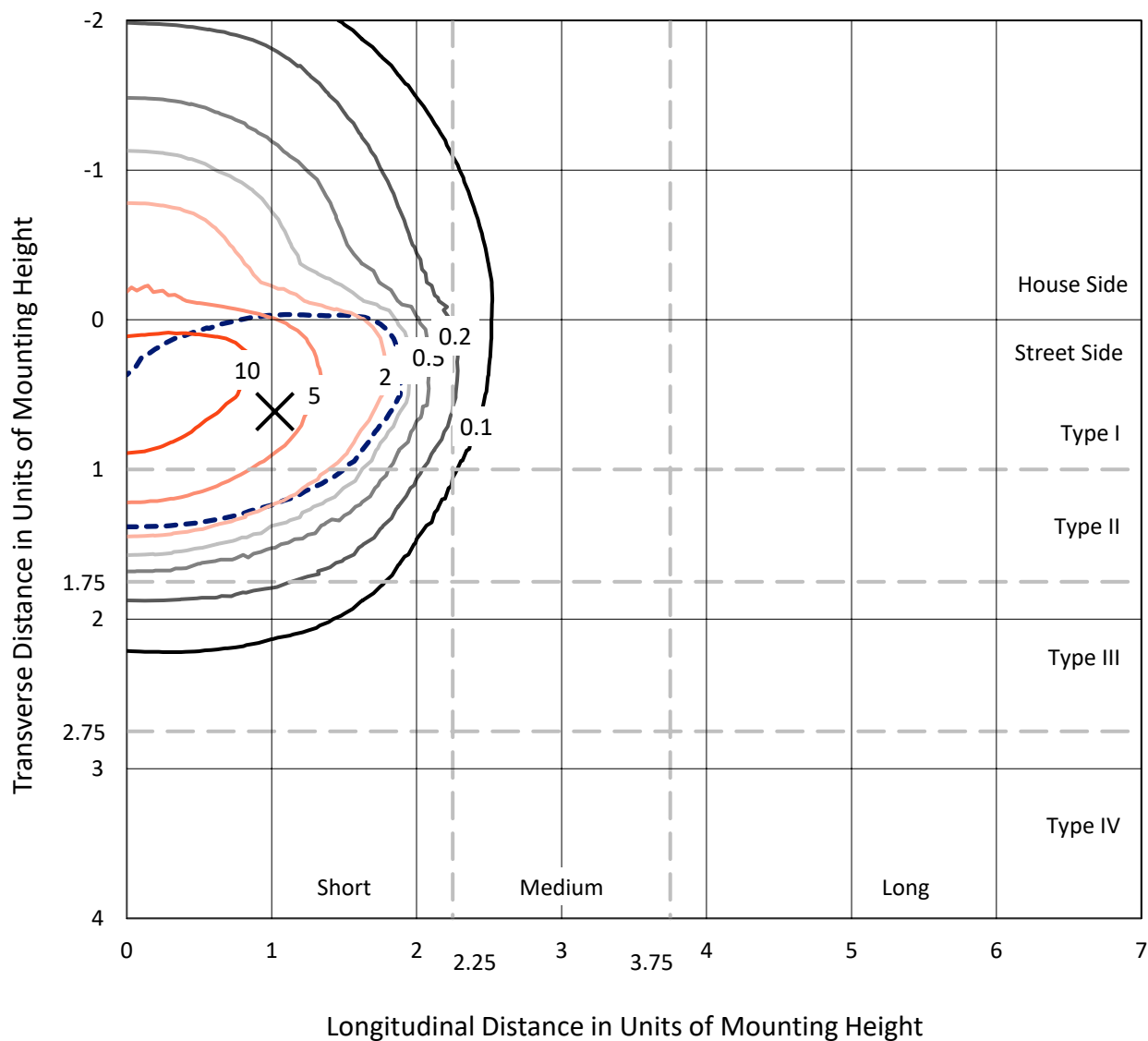


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## Iso-Footcandle Lines of Horizontal Illumination

✕ Max cd  
 - - - 1/2 Max cd

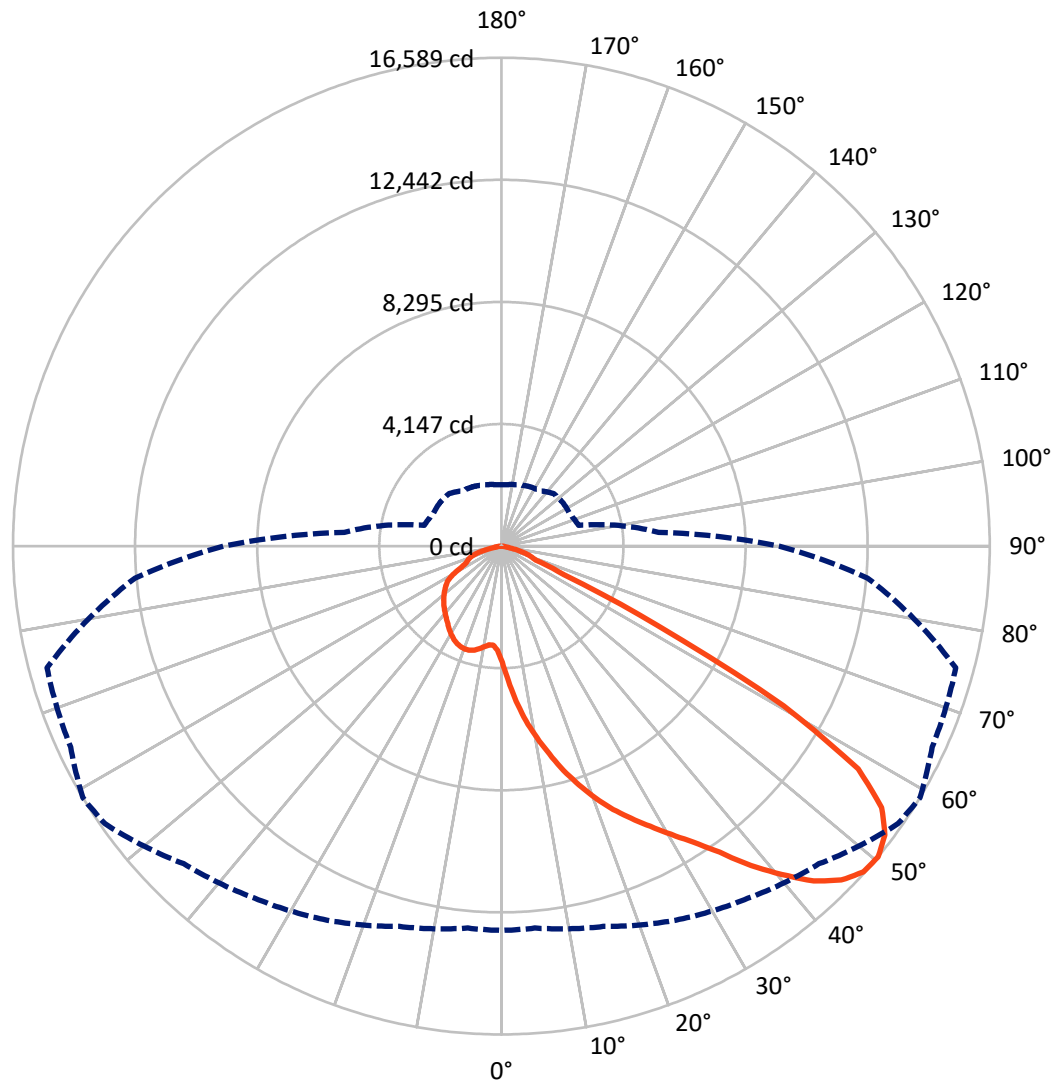


Based on 25 foot mounting height. Maximum calculated value = 12.5 fc  
 Type II - Short - N/A

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## Luminous Intensity Polar Plot



— Vertical Plane Through 59-Deg Lateral    - - - Horizontal Cone Through 50-Deg Vertical

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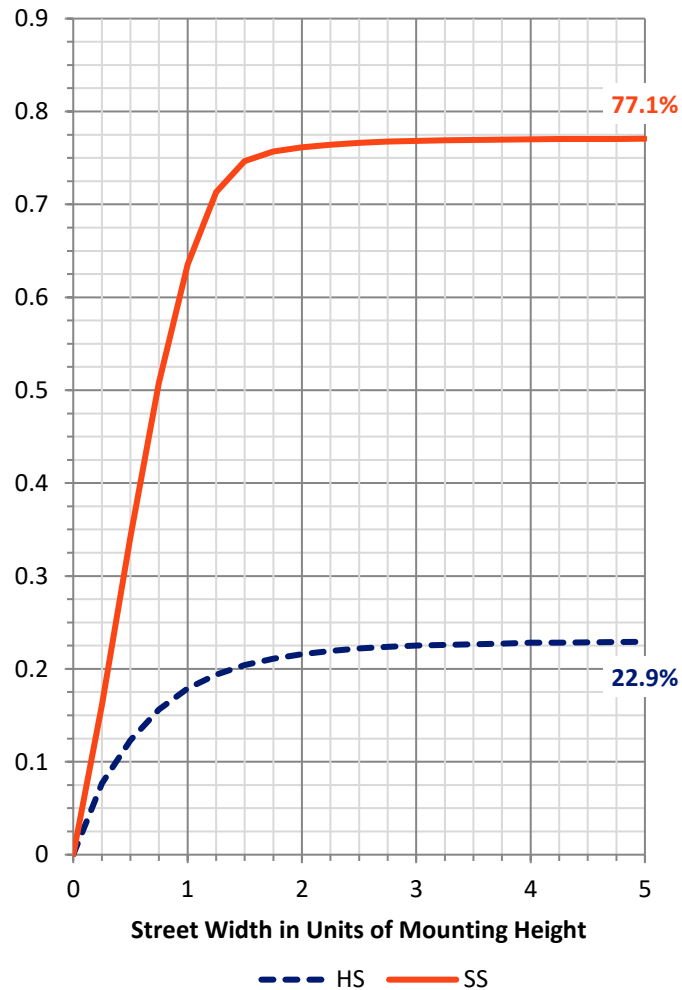
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total   |
|--------------------|-----------|----------|--------|---------|
| <b>House Side</b>  | Lumens    | 5998.1   | 0.0    | 5998.1  |
|                    | % Fixture | 23.0     | 0.0    | 23.0    |
| <b>Street Side</b> | Lumens    | 20078.6  | 0.0    | 20078.6 |
|                    | % Fixture | 77.0     | 0.0    | 77.0    |
| <b>Total</b>       | Lumens    | 26076.7  | 0.0    | 26076.7 |
|                    | % Fixture | 100.0    | 0.0    | 100.0   |

**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 443.2   | 1.7       |
| 10°-20°   | 1608.9  | 6.2       |
| 20°-30°   | 3046.7  | 11.7      |
| 30°-40°   | 5052.4  | 19.4      |
| 40°-50°   | 6901.8  | 26.5      |
| 50°-60°   | 6265.0  | 24.0      |
| 60°-70°   | 2086.3  | 8.0       |
| 70°-80°   | 608.5   | 2.3       |
| 80°-90°   | 63.9    | 0.2       |
| 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°    | 26076.7 | 100.0     |
| 0°-180°   | 26076.7 | 100.0     |

**Coefficient of Utilization**



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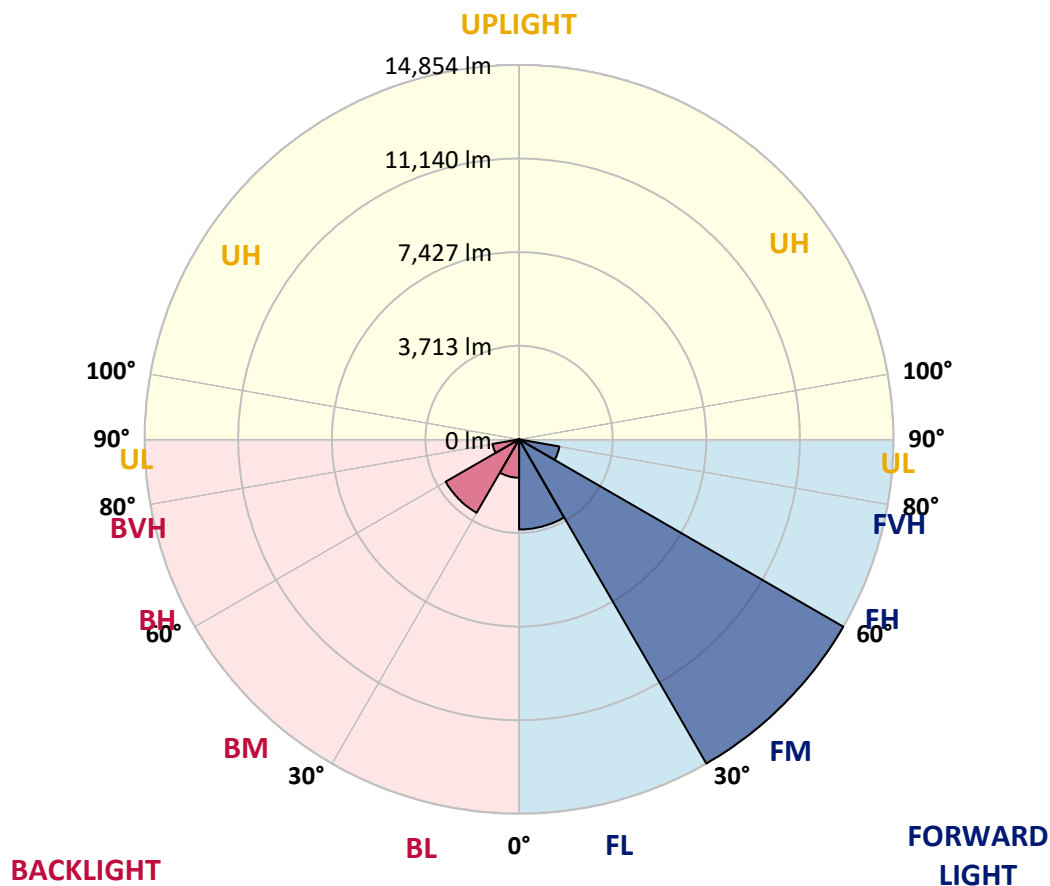
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**LUMINAIRE CLASSIFICATION SYSTEM LUMEN TABLE AND BUG RATING:**

| Zone |             | Lumens  | % Fixture | Zone Rating/Lumen Limit |      |         |
|------|-------------|---------|-----------|-------------------------|------|---------|
|      |             |         |           | B                       | U    | G       |
| FL   | (0°-30°)    | 3575.8  | 13.7      |                         |      |         |
| FM   | (30°-60°)   | 14853.6 | 57.0      |                         |      |         |
| FH   | (60°-80°)   | 1624.2  | 6.2       |                         |      | G1/1800 |
| FVH  | (80°-90°)   | 25.0    | 0.1       |                         |      | G1/100  |
| BL   | (0°-30°)    | 1523.1  | 5.8       | B3/2500                 |      |         |
| BM   | (30°-60°)   | 3365.5  | 12.9      | B3/5000                 |      |         |
| BH   | (60°-80°)   | 1070.6  | 4.1       | B3/2500                 |      | G3/2500 |
| BVH  | (80°-90°)   | 38.9    | 0.1       |                         |      | G1/100  |
| UL   | (90°-100°)  | 0.0     | 0.0       |                         | U0/0 |         |
| UH   | (100°-180°) | 0.0     | 0.0       |                         | U0/0 |         |

**BUG Rating: B3-U0-G3**

Type II Short



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**CANDELA DISTRIBUTION (FULL):**

|       | 0°      | 5°      | 15°     | 25°     | 35°     | 45°     | 55°     | 59°     | 65°     | 75°     | 85°     |
|-------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| 0°    | 3950.8  | 3950.8  | 3950.8  | 3950.8  | 3950.8  | 3950.8  | 3950.8  | 3950.8  | 3950.8  | 3950.8  | 3950.8  |
| 2.5°  | 5119.1  | 5157.3  | 5097.8  | 5102.1  | 4953.4  | 4885.4  | 4694.2  | 4581.7  | 4507.3  | 4299.2  | 4110.1  |
| 5°    | 6151.4  | 6106.8  | 6060.0  | 6032.4  | 5902.8  | 5720.2  | 5482.3  | 5293.2  | 5119.1  | 4711.2  | 4318.3  |
| 7.5°  | 6784.3  | 6761.0  | 6729.1  | 6712.1  | 6584.7  | 6393.5  | 6155.6  | 5994.2  | 5741.4  | 5189.1  | 4571.0  |
| 10°   | 7321.7  | 7294.1  | 7275.0  | 7287.7  | 7183.7  | 7060.5  | 6801.3  | 6616.5  | 6331.9  | 5694.7  | 4876.9  |
| 12.5° | 7738.1  | 7752.9  | 7759.3  | 7827.3  | 7782.7  | 7708.3  | 7440.7  | 7245.3  | 6928.8  | 6227.8  | 5235.9  |
| 15°   | 8067.3  | 8063.0  | 8137.4  | 8267.0  | 8339.2  | 8292.4  | 8077.9  | 7914.4  | 7527.8  | 6752.5  | 5622.5  |
| 17.5° | 8143.8  | 8148.0  | 8264.8  | 8492.1  | 8727.9  | 8842.6  | 8721.5  | 8526.1  | 8143.8  | 7270.8  | 6023.9  |
| 20°   | 8205.4  | 8213.8  | 8334.9  | 8594.1  | 8938.2  | 9258.9  | 9278.0  | 9137.8  | 8808.6  | 7831.5  | 6431.7  |
| 22.5° | 8594.1  | 8613.2  | 8645.0  | 8808.6  | 9118.7  | 9524.4  | 9747.4  | 9717.7  | 9441.6  | 8419.9  | 6871.4  |
| 25°   | 9615.7  | 9558.4  | 9403.3  | 9356.6  | 9475.6  | 9804.8  | 10185.0 | 10242.4 | 10106.4 | 9067.7  | 7345.1  |
| 27.5° | 10877.5 | 10815.9 | 10586.5 | 10344.3 | 10087.3 | 10202.0 | 10607.7 | 10779.7 | 10781.9 | 9781.4  | 7820.9  |
| 30°   | 12022.3 | 11973.5 | 11786.6 | 11440.3 | 10996.4 | 10830.7 | 11130.2 | 11361.7 | 11499.8 | 10605.6 | 8362.5  |
| 32.5° | 13001.5 | 12956.9 | 12704.2 | 12421.7 | 11988.4 | 11654.9 | 11763.2 | 11986.2 | 12309.1 | 11671.9 | 9035.9  |
| 35°   | 13825.7 | 13781.1 | 13538.9 | 13254.3 | 12852.9 | 12653.2 | 12615.0 | 12767.9 | 13186.3 | 12784.9 | 9809.0  |
| 37.5° | 14494.8 | 14450.2 | 14197.4 | 13929.8 | 13623.9 | 13636.6 | 13694.0 | 13768.3 | 14008.4 | 13976.5 | 10635.3 |
| 40°   | 14928.1 | 14881.4 | 14700.8 | 14509.6 | 14316.4 | 14469.3 | 14753.9 | 14664.7 | 14792.2 | 14938.7 | 11395.7 |
| 42.5° | 15121.4 | 15061.9 | 14957.8 | 14915.3 | 14855.9 | 15093.8 | 15641.8 | 15552.6 | 15399.6 | 15580.2 | 11960.7 |
| 45°   | 14928.1 | 14877.1 | 14875.0 | 15004.6 | 15142.6 | 15448.5 | 16255.6 | 16183.4 | 15796.8 | 15890.3 | 12298.5 |
| 47.5° | 14335.5 | 14290.9 | 14411.9 | 14751.8 | 15091.6 | 15537.7 | 16529.7 | 16542.4 | 16079.3 | 16019.9 | 12517.3 |
| 50°   | 13054.6 | 13024.9 | 13375.4 | 14019.0 | 14605.2 | 15259.5 | 16442.6 | 16589.1 | 16147.3 | 15979.5 | 12489.6 |
| 52.5° | 10450.5 | 10588.6 | 11351.1 | 12425.9 | 13564.4 | 14770.9 | 16119.7 | 16310.9 | 15820.2 | 15714.0 | 12341.0 |
| 55°   | 7153.9  | 7217.7  | 7980.2  | 9549.9  | 11355.4 | 13713.1 | 15378.4 | 15673.6 | 15433.6 | 15669.4 | 12496.0 |
| 57.5° | 3704.4  | 3755.4  | 4356.5  | 5749.9  | 7701.9  | 10837.1 | 13320.2 | 14288.7 | 14654.1 | 15894.6 | 12978.2 |
| 60°   | 1520.8  | 1563.3  | 1811.8  | 2485.2  | 3885.0  | 6310.7  | 9586.0  | 11021.9 | 11880.0 | 14516.0 | 11525.3 |
| 62.5° | 1104.5  | 1125.8  | 1244.7  | 1482.6  | 2034.9  | 3092.7  | 5424.9  | 5953.8  | 6557.1  | 9097.5  | 7317.5  |
| 65°   | 930.4   | 953.7   | 1049.3  | 1193.7  | 1484.7  | 1896.8  | 2317.4  | 2330.1  | 2568.0  | 3706.5  | 2712.5  |
| 67.5° | 779.5   | 800.8   | 885.7   | 1008.9  | 1200.1  | 1346.7  | 1244.7  | 1246.8  | 1242.6  | 1344.5  | 1299.9  |
| 70°   | 607.5   | 624.5   | 709.4   | 841.1   | 941.0   | 864.5   | 972.8   | 1076.9  | 1032.3  | 1072.7  | 1134.3  |
| 72.5° | 443.9   | 463.1   | 537.4   | 637.2   | 611.7   | 616.0   | 788.0   | 894.2   | 868.8   | 913.4   | 970.7   |
| 75°   | 320.7   | 333.5   | 371.7   | 318.6   | 335.6   | 405.7   | 554.4   | 611.7   | 637.2   | 675.5   | 726.4   |
| 77.5° | 104.1   | 104.1   | 116.8   | 146.6   | 182.7   | 225.2   | 282.5   | 305.9   | 344.1   | 386.6   | 422.7   |
| 80°   | 53.1    | 55.2    | 65.8    | 80.7    | 102.0   | 129.6   | 165.7   | 176.3   | 195.4   | 218.8   | 233.6   |
| 82.5° | 25.5    | 27.6    | 31.9    | 40.4    | 53.1    | 68.0    | 91.3    | 102.0   | 114.7   | 129.6   | 140.2   |
| 85°   | 6.4     | 6.4     | 8.5     | 12.7    | 17.0    | 25.5    | 34.0    | 40.4    | 51.0    | 61.6    | 68.0    |
| 87.5° | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     | 2.1     | 6.4     | 8.5     | 10.6    | 12.7    | 17.0    |
| 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: P640198

CATALOG NUMBER: GWS-SA5D-735-U-T2R-W-GRSWH

**CANDELA DISTRIBUTION (continued):**

|       | 90°    | 95°    | 105°   | 115°   | 125°   | 135°   | 145°   | 155°   | 165°   | 175°   | 180°   |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 3950.8 | 3950.8 | 3950.8 | 3950.8 | 3950.8 | 3950.8 | 3950.8 | 3950.8 | 3950.8 | 3950.8 | 3950.8 |
| 2.5°  | 4025.1 | 3906.2 | 3753.3 | 3623.7 | 3504.7 | 3413.4 | 3334.8 | 3296.6 | 3260.5 | 3235.0 | 3243.5 |
| 5°    | 4135.6 | 3931.7 | 3647.1 | 3449.5 | 3328.4 | 3266.8 | 3224.4 | 3203.1 | 3198.9 | 3181.9 | 3175.5 |
| 7.5°  | 4297.0 | 4006.0 | 3625.8 | 3426.2 | 3345.4 | 3313.6 | 3290.2 | 3277.5 | 3283.8 | 3266.8 | 3260.5 |
| 10°   | 4496.7 | 4129.2 | 3678.9 | 3502.6 | 3432.5 | 3409.2 | 3383.7 | 3366.7 | 3358.2 | 3332.7 | 3328.4 |
| 12.5° | 4745.2 | 4282.2 | 3774.5 | 3600.3 | 3530.2 | 3489.9 | 3455.9 | 3426.2 | 3407.0 | 3375.2 | 3366.7 |
| 15°   | 5012.8 | 4452.1 | 3887.1 | 3695.9 | 3613.1 | 3553.6 | 3498.4 | 3453.8 | 3419.8 | 3377.3 | 3370.9 |
| 17.5° | 5303.8 | 4630.5 | 3980.5 | 3761.8 | 3655.6 | 3577.0 | 3496.2 | 3430.4 | 3383.7 | 3328.4 | 3322.1 |
| 20°   | 5607.6 | 4811.1 | 4050.6 | 3793.6 | 3657.7 | 3551.5 | 3443.1 | 3356.1 | 3296.6 | 3241.4 | 3237.1 |
| 22.5° | 5922.0 | 4976.7 | 4093.1 | 3785.1 | 3623.7 | 3492.0 | 3362.4 | 3264.7 | 3194.6 | 3128.8 | 3124.5 |
| 25°   | 6238.4 | 5136.0 | 4103.7 | 3751.1 | 3555.7 | 3402.8 | 3273.2 | 3158.5 | 3079.9 | 3005.6 | 2997.1 |
| 27.5° | 6559.2 | 5269.9 | 4078.2 | 3683.2 | 3464.4 | 3298.7 | 3169.1 | 3056.6 | 2975.8 | 2901.5 | 2888.8 |
| 30°   | 6901.2 | 5384.6 | 4023.0 | 3594.0 | 3358.2 | 3188.3 | 3060.8 | 2975.8 | 2899.4 | 2825.0 | 2812.3 |
| 32.5° | 7266.5 | 5484.4 | 3944.4 | 3485.6 | 3235.0 | 3077.8 | 2984.3 | 2907.9 | 2831.4 | 2765.6 | 2752.8 |
| 35°   | 7701.9 | 5550.2 | 3827.6 | 3345.4 | 3120.3 | 2997.1 | 2933.4 | 2844.2 | 2750.7 | 2678.5 | 2672.1 |
| 37.5° | 8152.3 | 5601.2 | 3687.4 | 3211.6 | 3020.5 | 2950.4 | 2897.3 | 2776.2 | 2659.4 | 2572.3 | 2561.7 |
| 40°   | 8587.7 | 5643.7 | 3513.2 | 3086.3 | 2929.1 | 2916.4 | 2844.2 | 2693.3 | 2491.6 | 2393.8 | 2385.4 |
| 42.5° | 8993.4 | 5656.4 | 3330.6 | 2952.5 | 2846.3 | 2839.9 | 2759.2 | 2525.5 | 2370.5 | 2308.9 | 2300.4 |
| 45°   | 9271.6 | 5645.8 | 3141.5 | 2827.2 | 2763.4 | 2729.5 | 2644.5 | 2404.5 | 2308.9 | 2253.7 | 2243.0 |
| 47.5° | 9477.7 | 5590.6 | 2929.1 | 2695.5 | 2670.0 | 2623.2 | 2440.6 | 2328.0 | 2238.8 | 2183.6 | 2172.9 |
| 50°   | 9441.6 | 5361.2 | 2714.6 | 2568.0 | 2557.4 | 2517.0 | 2291.9 | 2232.4 | 2153.8 | 2094.4 | 2085.9 |
| 52.5° | 9254.7 | 4925.8 | 2495.8 | 2427.8 | 2449.1 | 2370.5 | 2185.7 | 2117.7 | 2049.7 | 1981.8 | 1966.9 |
| 55°   | 9301.4 | 4611.4 | 2330.1 | 2291.9 | 2330.1 | 2151.7 | 2066.7 | 1994.5 | 1930.8 | 1864.9 | 1852.2 |
| 57.5° | 9505.3 | 4301.3 | 2153.8 | 2145.3 | 2185.7 | 1983.9 | 1913.8 | 1822.5 | 1731.1 | 1678.0 | 1678.0 |
| 60°   | 7982.3 | 3135.2 | 1843.7 | 1864.9 | 1956.3 | 1848.0 | 1786.4 | 1692.9 | 1593.1 | 1546.3 | 1546.3 |
| 62.5° | 4719.7 | 1966.9 | 1529.3 | 1506.0 | 1563.3 | 1631.3 | 1665.3 | 1588.8 | 1469.9 | 1408.3 | 1410.4 |
| 65°   | 2079.5 | 1431.6 | 1348.8 | 1329.7 | 1312.7 | 1359.4 | 1452.9 | 1459.2 | 1333.9 | 1261.7 | 1263.8 |
| 67.5° | 1280.8 | 1295.7 | 1261.7 | 1246.8 | 1232.0 | 1223.5 | 1215.0 | 1219.2 | 1185.2 | 1119.4 | 1117.3 |
| 70°   | 1155.5 | 1195.9 | 1172.5 | 1159.8 | 1140.6 | 1125.8 | 1074.8 | 991.9  | 934.6  | 917.6  | 936.7  |
| 72.5° | 994.1  | 1049.3 | 1036.6 | 1030.2 | 1006.8 | 970.7  | 902.7  | 822.0  | 754.1  | 711.6  | 720.1  |
| 75°   | 749.8  | 794.4  | 800.8  | 802.9  | 777.4  | 743.4  | 673.3  | 605.4  | 545.9  | 501.3  | 511.9  |
| 77.5° | 431.2  | 456.7  | 463.1  | 469.4  | 450.3  | 437.6  | 390.8  | 342.0  | 310.1  | 263.4  | 276.1  |
| 80°   | 240.0  | 250.6  | 250.6  | 252.8  | 242.1  | 227.3  | 195.4  | 167.8  | 152.9  | 131.7  | 133.8  |
| 82.5° | 144.4  | 148.7  | 150.8  | 152.9  | 146.6  | 131.7  | 108.3  | 89.2   | 80.7   | 70.1   | 68.0   |
| 85°   | 70.1   | 74.3   | 74.3   | 76.5   | 65.8   | 57.4   | 44.6   | 34.0   | 29.7   | 21.2   | 23.4   |
| 87.5° | 17.0   | 19.1   | 19.1   | 17.0   | 14.9   | 10.6   | 6.4    | 2.1    | 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

All Brands

Data applicable to all product families using SA light engines

Report Number: SP1-2101-121-7

Luminaire Tested: IFLD-S-SA2A-735-U-T2

Test Date: 03/04/2021

### Test Information

Test Method: LM-79-08  
 Report Number: SP1-2101-121-7  
 Test Lab: COOPER LIGHTING SOLUTIONS  
 Photometer: SP1  
 Measurement Geometry:  $4\pi$   
 Issue Date: 03/04/2021  
 Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
 Product Line: STREETWORKS  
 Catalog Number: **IFLD-S-SA2A-735-U-T2**  
 Description: STREETWORKS INF FLOOD

PROGRAMMED @ 615mA.

### Spectral Parameters

|                           |        |           |      |      |       |
|---------------------------|--------|-----------|------|------|-------|
| CCT (K):                  | 3388   | CRI (Ra): | 73.1 |      |       |
| CIE u':                   | 0.2371 | R1:       | 68.9 | R9:  | -34.6 |
| CIE v':                   | 0.5177 | R2:       | 81.1 | R10: | 57.8  |
| Duv:                      | 0.0032 | R3:       | 93.1 | R11: | 68.6  |
| CIE x:                    | 0.4153 | R4:       | 71.6 | R12: | 53.9  |
| CIE y:                    | 0.4030 | R5:       | 69.4 | R13: | 70.9  |
| CIE z:                    | 0.1817 | R6:       | 75.0 | R14: | 96.2  |
| Peak Wavelength (nm):     | 590    | R7:       | 79.5 |      |       |
| Dominant Wavelength (nm): | 580    | R8:       | 46.4 |      |       |
| Purity:                   | 45.7   |           |      |      |       |
| Rf:                       | 76.9   |           |      |      |       |
| Rg:                       | 94.4   |           |      |      |       |



### Test Conditions

Stabilization Time: 81M  
 Operation Time: 12H  
 Room Temperature (°C) / RH%: 25.0/30%  
 Sphere Temperature (°C): 24.1

REPORT NUMBER: SP1-2101-121-7

| 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 3500K 4-step quadrangle

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### Photopic Flux vs. Wavelength



#####

| λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) |
|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|
| 360       | 2672             | 0.0              | 490       | 34553            | 4.9              | 620       | 136720           | 35.6             | 750       | 5870             | 0.0              | 880       | 4216             | 0.0              |
| 365       | 2252             | 0.0              | 495       | 44336            | 8.0              | 625       | 126308           | 27.9             | 755       | 5421             | 0.0              | 885       | 4132             | 0.0              |
| 370       | 2217             | 0.0              | 500       | 54643            | 12.1             | 630       | 114625           | 20.7             | 760       | 5097             | 0.0              | 890       | 3992             | 0.0              |
| 375       | 2697             | 0.0              | 505       | 64676            | 18.1             | 635       | 103216           | 15.5             | 765       | 4626             | 0.0              | 895       | 3214             | 0.0              |
| 380       | 3039             | 0.0              | 510       | 73825            | 25.4             | 640       | 92605            | 11.1             | 770       | 3782             | 0.0              | 900       | 2580             | 0.0              |
| 385       | 2655             | 0.0              | 515       | 81872            | 33.9             | 645       | 83234            | 8.0              | 775       | 3506             | 0.0              | 905       | 1776             | 0.0              |
| 390       | 2357             | 0.0              | 520       | 88574            | 43.0             | 650       | 73263            | 5.4              | 780       | 3507             | 0.0              | 910       | 3995             | 0.0              |
| 395       | 2186             | 0.0              | 525       | 93289            | 50.1             | 655       | 64627            | 3.7              | 785       | 3267             | 0.0              | 915       | 4288             | 0.0              |
| 400       | 2015             | 0.0              | 530       | 98393            | 57.9             | 660       | 56614            | 2.4              | 790       | 2849             | 0.0              | 920       | 2446             | 0.0              |
| 405       | 2234             | 0.0              | 535       | 103269           | 64.0             | 665       | 49537            | 1.6              | 795       | 3037             | 0.0              | 925       | 3009             | 0.0              |
| 410       | 3412             | 0.0              | 540       | 107316           | 69.9             | 670       | 42866            | 0.9              | 800       | 2716             | 0.0              | 930       | 3026             | 0.0              |
| 415       | 6135             | 0.0              | 545       | 113101           | 75.3             | 675       | 36708            | 0.6              | 805       | 2648             | 0.0              | 935       | 4734             | 0.0              |
| 420       | 12146            | 0.0              | 550       | 120690           | 82.0             | 680       | 31814            | 0.4              | 810       | 3187             | 0.0              | 940       | 3719             | 0.0              |
| 425       | 23983            | 0.1              | 555       | 128583           | 87.8             | 685       | 27485            | 0.2              | 815       | 2931             | 0.0              | 945       | 1480             | 0.0              |
| 430       | 42142            | 0.3              | 560       | 137796           | 93.6             | 690       | 23698            | 0.1              | 820       | 2717             | 0.0              | 950       | 3450             | 0.0              |
| 435       | 68228            | 0.8              | 565       | 146577           | 97.5             | 695       | 20309            | 0.1              | 825       | 2236             | 0.0              | 955       | 5051             | 0.0              |
| 440       | 99323            | 1.6              | 570       | 154581           | 100.5            | 700       | 17890            | 0.1              | 830       | 2628             | 0.0              | 960       | 3176             | 0.0              |
| 445       | 115584           | 2.4              | 575       | 162633           | 101.2            | 705       | 15500            | 0.0              | 835       | 3140             | 0.0              | 965       | 5178             | 0.0              |
| 450       | 94997            | 2.5              | 580       | 168101           | 99.9             | 710       | 13699            | 0.0              | 840       | 3675             | 0.0              | 970       | 6385             | 0.0              |
| 455       | 61433            | 2.1              | 585       | 173145           | 96.2             | 715       | 12398            | 0.0              | 845       | 3283             | 0.0              | 975       | 3810             | 0.0              |
| 460       | 43373            | 1.8              | 590       | 174675           | 90.3             | 720       | 11147            | 0.0              | 850       | 3055             | 0.0              | 980       | 4322             | 0.0              |
| 465       | 32472            | 1.7              | 595       | 173724           | 82.3             | 725       | 9761             | 0.0              | 855       | 2932             | 0.0              | 985       | 4200             | 0.0              |
| 470       | 24257            | 1.5              | 600       | 171241           | 73.8             | 730       | 8651             | 0.0              | 860       | 3382             | 0.0              | 990       | 4661             | 0.0              |
| 475       | 21690            | 1.7              | 605       | 165134           | 64.0             | 735       | 7730             | 0.0              | 865       | 2605             | 0.0              | 995       | 6746             | 0.0              |
| 480       | 23173            | 2.2              | 610       | 156652           | 53.8             | 740       | 6847             | 0.0              | 870       | 3325             | 0.0              | 1000      | 4150             | 0.0              |
| 485       | 27564            | 3.3              | 615       | 147879           | 44.6             | 745       | 6124             | 0.0              | 875       | 3325             | 0.0              |           |                  |                  |

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### Scotopic Flux vs. Wavelength



Scotopic Lumens: 12126

S/P: 1.36

| 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       | 2672             | 0.0              | 490       | 34553            | 53.2             | 620       | 136720           | 1.7              | 750       | 5870             | 0.0              | 880       | 4216             | 0.0              |
| 365       | 2252             | 0.0              | 495       | 44336            | 71.7             | 625       | 126308           | 1.1              | 755       | 5421             | 0.0              | 885       | 4132             | 0.0              |
| 370       | 2217             | 0.0              | 500       | 54643            | 91.4             | 630       | 114625           | 0.6              | 760       | 5097             | 0.0              | 890       | 3992             | 0.0              |
| 375       | 2697             | 0.0              | 505       | 64676            | 110.0            | 635       | 103216           | 0.4              | 765       | 4626             | 0.0              | 895       | 3214             | 0.0              |
| 380       | 3039             | 0.0              | 510       | 73825            | 125.1            | 640       | 92605            | 0.2              | 770       | 3782             | 0.0              | 900       | 2580             | 0.0              |
| 385       | 2655             | 0.0              | 515       | 81872            | 135.7            | 645       | 83234            | 0.1              | 775       | 3506             | 0.0              | 905       | 1776             | 0.0              |
| 390       | 2357             | 0.0              | 520       | 88574            | 140.8            | 650       | 73263            | 0.1              | 780       | 3507             | 0.0              | 910       | 3995             | 0.0              |
| 395       | 2186             | 0.0              | 525       | 93289            | 139.6            | 655       | 64627            | 0.1              | 785       | 3267             | 0.0              | 915       | 4288             | 0.0              |
| 400       | 2015             | 0.0              | 530       | 98393            | 135.7            | 660       | 56614            | 0.0              | 790       | 2849             | 0.0              | 920       | 2446             | 0.0              |
| 405       | 2234             | 0.1              | 535       | 103269           | 128.7            | 665       | 49537            | 0.0              | 795       | 3037             | 0.0              | 925       | 3009             | 0.0              |
| 410       | 3412             | 0.2              | 540       | 107316           | 118.6            | 670       | 42866            | 0.0              | 800       | 2716             | 0.0              | 930       | 3026             | 0.0              |
| 415       | 6135             | 0.6              | 545       | 113101           | 108.4            | 675       | 36708            | 0.0              | 805       | 2648             | 0.0              | 935       | 4734             | 0.0              |
| 420       | 12146            | 2.0              | 550       | 120690           | 98.7             | 680       | 31814            | 0.0              | 810       | 3187             | 0.0              | 940       | 3719             | 0.0              |
| 425       | 23983            | 5.9              | 555       | 128583           | 87.9             | 685       | 27485            | 0.0              | 815       | 2931             | 0.0              | 945       | 1480             | 0.0              |
| 430       | 42142            | 14.3             | 560       | 137796           | 77.0             | 690       | 23698            | 0.0              | 820       | 2717             | 0.0              | 950       | 3450             | 0.0              |
| 435       | 68228            | 30.5             | 565       | 146577           | 65.8             | 695       | 20309            | 0.0              | 825       | 2236             | 0.0              | 955       | 5051             | 0.0              |
| 440       | 99323            | 55.5             | 570       | 154581           | 54.6             | 700       | 17890            | 0.0              | 830       | 2628             | 0.0              | 960       | 3176             | 0.0              |
| 445       | 115584           | 77.4             | 575       | 162633           | 44.3             | 705       | 15500            | 0.0              | 835       | 3140             | 0.0              | 965       | 5178             | 0.0              |
| 450       | 94997            | 73.6             | 580       | 168101           | 34.6             | 710       | 13699            | 0.0              | 840       | 3675             | 0.0              | 970       | 6385             | 0.0              |
| 455       | 61433            | 53.7             | 585       | 173145           | 26.5             | 715       | 12398            | 0.0              | 845       | 3283             | 0.0              | 975       | 3810             | 0.0              |
| 460       | 43373            | 41.9             | 590       | 174675           | 19.5             | 720       | 11147            | 0.0              | 850       | 3055             | 0.0              | 980       | 4322             | 0.0              |
| 465       | 32472            | 34.3             | 595       | 173724           | 13.9             | 725       | 9761             | 0.0              | 855       | 2932             | 0.0              | 985       | 4200             | 0.0              |
| 470       | 24257            | 27.9             | 600       | 171241           | 9.7              | 730       | 8651             | 0.0              | 860       | 3382             | 0.0              | 990       | 4661             | 0.0              |
| 475       | 21690            | 27.1             | 605       | 165134           | 6.5              | 735       | 7730             | 0.0              | 865       | 2605             | 0.0              | 995       | 6746             | 0.0              |
| 480       | 23173            | 31.3             | 610       | 156652           | 4.2              | 740       | 6847             | 0.0              | 870       | 3325             | 0.0              | 1000      | 4150             | 0.0              |
| 485       | 27564            | 40.0             | 615       | 147879           | 2.7              | 745       | 6124             | 0.0              | 875       | 3325             | 0.0              |           |                  |                  |

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### Melanopic Flux vs. Wavelength



Melanopic Lumens: 4490.7

M/P: 0.5

| 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       | 2672             | 0.0              | 490       | 34553            | 28.8             | 620       | 136720           | 0.1              | 750       | 5870             | 0.0              | 880       | 4216             | 0.0              |
| 365       | 2252             | 0.0              | 495       | 44336            | 36.6             | 625       | 126308           | 0.1              | 755       | 5421             | 0.0              | 885       | 4132             | 0.0              |
| 370       | 2217             | 0.0              | 500       | 54643            | 43.9             | 630       | 114625           | 0.0              | 760       | 5097             | 0.0              | 890       | 3992             | 0.0              |
| 375       | 2697             | 0.0              | 505       | 64676            | 49.6             | 635       | 103216           | 0.0              | 765       | 4626             | 0.0              | 895       | 3214             | 0.0              |
| 380       | 3039             | 0.0              | 510       | 73825            | 53.0             | 640       | 92605            | 0.0              | 770       | 3782             | 0.0              | 900       | 2580             | 0.0              |
| 385       | 2655             | 0.0              | 515       | 81872            | 53.5             | 645       | 83234            | 0.0              | 775       | 3506             | 0.0              | 905       | 1776             | 0.0              |
| 390       | 2357             | 0.0              | 520       | 88574            | 51.6             | 650       | 73263            | 0.0              | 780       | 3507             | 0.0              | 910       | 3995             | 0.0              |
| 395       | 2186             | 0.0              | 525       | 93289            | 47.3             | 655       | 64627            | 0.0              | 785       | 3267             | 0.0              | 915       | 4288             | 0.0              |
| 400       | 2015             | 0.0              | 530       | 98393            | 42.5             | 660       | 56614            | 0.0              | 790       | 2849             | 0.0              | 920       | 2446             | 0.0              |
| 405       | 2234             | 0.0              | 535       | 103269           | 37.2             | 665       | 49537            | 0.0              | 795       | 3037             | 0.0              | 925       | 3009             | 0.0              |
| 410       | 3412             | 0.1              | 540       | 107316           | 31.4             | 670       | 42866            | 0.0              | 800       | 2716             | 0.0              | 930       | 3026             | 0.0              |
| 415       | 6135             | 0.4              | 545       | 113101           | 26.3             | 675       | 36708            | 0.0              | 805       | 2648             | 0.0              | 935       | 4734             | 0.0              |
| 420       | 12146            | 1.4              | 550       | 120690           | 21.7             | 680       | 31814            | 0.0              | 810       | 3187             | 0.0              | 940       | 3719             | 0.0              |
| 425       | 23983            | 3.7              | 555       | 128583           | 17.3             | 685       | 27485            | 0.0              | 815       | 2931             | 0.0              | 945       | 1480             | 0.0              |
| 430       | 42142            | 8.9              | 560       | 137796           | 13.6             | 690       | 23698            | 0.0              | 820       | 2717             | 0.0              | 950       | 3450             | 0.0              |
| 435       | 68228            | 18.2             | 565       | 146577           | 10.3             | 695       | 20309            | 0.0              | 825       | 2236             | 0.0              | 955       | 5051             | 0.0              |
| 440       | 99323            | 33.2             | 570       | 154581           | 7.6              | 700       | 17890            | 0.0              | 830       | 2628             | 0.0              | 960       | 3176             | 0.0              |
| 445       | 115584           | 45.6             | 575       | 162633           | 5.4              | 705       | 15500            | 0.0              | 835       | 3140             | 0.0              | 965       | 5178             | 0.0              |
| 450       | 94997            | 43.8             | 580       | 168101           | 3.8              | 710       | 13699            | 0.0              | 840       | 3675             | 0.0              | 970       | 6385             | 0.0              |
| 455       | 61433            | 32.2             | 585       | 173145           | 2.6              | 715       | 12398            | 0.0              | 845       | 3283             | 0.0              | 975       | 3810             | 0.0              |
| 460       | 43373            | 25.6             | 590       | 174675           | 1.7              | 720       | 11147            | 0.0              | 850       | 3055             | 0.0              | 980       | 4322             | 0.0              |
| 465       | 32472            | 21.2             | 595       | 173724           | 1.1              | 725       | 9761             | 0.0              | 855       | 2932             | 0.0              | 985       | 4200             | 0.0              |
| 470       | 24257            | 17.4             | 600       | 171241           | 0.7              | 730       | 8651             | 0.0              | 860       | 3382             | 0.0              | 990       | 4661             | 0.0              |
| 475       | 21690            | 16.6             | 605       | 165134           | 0.5              | 735       | 7730             | 0.0              | 865       | 2605             | 0.0              | 995       | 6746             | 0.0              |
| 480       | 23173            | 18.6             | 610       | 156652           | 0.3              | 740       | 6847             | 0.0              | 870       | 3325             | 0.0              | 1000      | 4150             | 0.0              |
| 485       | 27564            | 22.7             | 615       | 147879           | 0.2              | 745       | 6124             | 0.0              | 875       | 3325             | 0.0              |           |                  |                  |

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TM-30-18

### Summary

$R_f = 76.9$   
 $R_g = 94.4$   
 CIE  $R_a = 73.1$   
 $R_g = -34.6$

### Spectral Power Distribution Comparison



### Color Vector Graphics



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

|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 86 | CES26 = 68 | CES51 = 90 | CES76 = 63 |
| CES02 = 62 | CES27 = 88 | CES52 = 89 | CES77 = 80 |
| CES03 = 31 | CES28 = 87 | CES53 = 80 | CES78 = 65 |
| CES04 = 70 | CES29 = 67 | CES54 = 84 | CES79 = 87 |
| CES05 = 48 | CES30 = 74 | CES55 = 84 | CES80 = 86 |
| CES06 = 51 | CES31 = 71 | CES56 = 75 | CES81 = 75 |
| CES07 = 40 | CES32 = 67 | CES57 = 74 | CES82 = 94 |
| CES08 = 39 | CES33 = 74 | CES58 = 76 | CES83 = 91 |
| CES09 = 29 | CES34 = 78 | CES59 = 87 | CES84 = 89 |
| CES10 = 75 | CES35 = 89 | CES60 = 93 | CES85 = 80 |
| CES11 = 58 | CES36 = 98 | CES61 = 86 | CES86 = 66 |
| CES12 = 64 | CES37 = 86 | CES62 = 89 | CES87 = 79 |
| CES13 = 43 | CES38 = 82 | CES63 = 77 | CES88 = 79 |
| CES14 = 74 | CES39 = 95 | CES64 = 74 | CES89 = 70 |
| CES15 = 71 | CES40 = 91 | CES65 = 68 | CES90 = 77 |
| CES16 = 47 | CES41 = 89 | CES66 = 71 | CES91 = 88 |
| CES17 = 50 | CES42 = 88 | CES67 = 69 | CES92 = 60 |
| CES18 = 56 | CES43 = 82 | CES68 = 74 | CES93 = 77 |
| CES19 = 72 | CES44 = 99 | CES69 = 82 | CES94 = 52 |
| CES20 = 65 | CES45 = 87 | CES70 = 67 | CES95 = 69 |
| CES21 = 86 | CES46 = 82 | CES71 = 66 | CES96 = 78 |
| CES22 = 79 | CES47 = 82 | CES72 = 88 | CES97 = 85 |
| CES23 = 92 | CES48 = 72 | CES73 = 59 | CES98 = 76 |
| CES24 = 91 | CES49 = 82 | CES74 = 97 | CES99 = 63 |
| CES25 = 72 | CES50 = 88 | CES75 = 66 |            |



Color Rendition by Hue-Angle Bin



**Measure Comparisons**


(END OF REPORT)