

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: P383628

Luminaire Tested: **GLEON-SA9A-735-U-T3R-HSS**

Issue Date: 3/3/2020

**Test Information**

Test Method: LM-79-08  
Report Number: P383628  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-1903-205-11)  
Test Lab: INNOVATION CENTER  
Issue Date: 3/3/2020  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: McGRAW-EDISON  
Catalog Number: GLEON-SA9A-735-U-T3R-HSS  
Description: GALLEON AREA AND ROADWAY LUMINAIRE  
(9) 70 CRI, 3500K, 615mA LIGHTSQUARES WITH 16 LEDS EACH AND TYPE III  
ROADWAY OPTICS WITH HOUSE SIDE SHIELD  
Light Source: -  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 29849.6 lumens  
Efficiency: N/A  
Efficacy: 102.9 lumens/watt  
Luminous Opening: Rectangular (W 2.5' x L: 1' x H: 0')  
IES Classification: Type III - Medium  
BUG Rating: B3 - U0 - G4

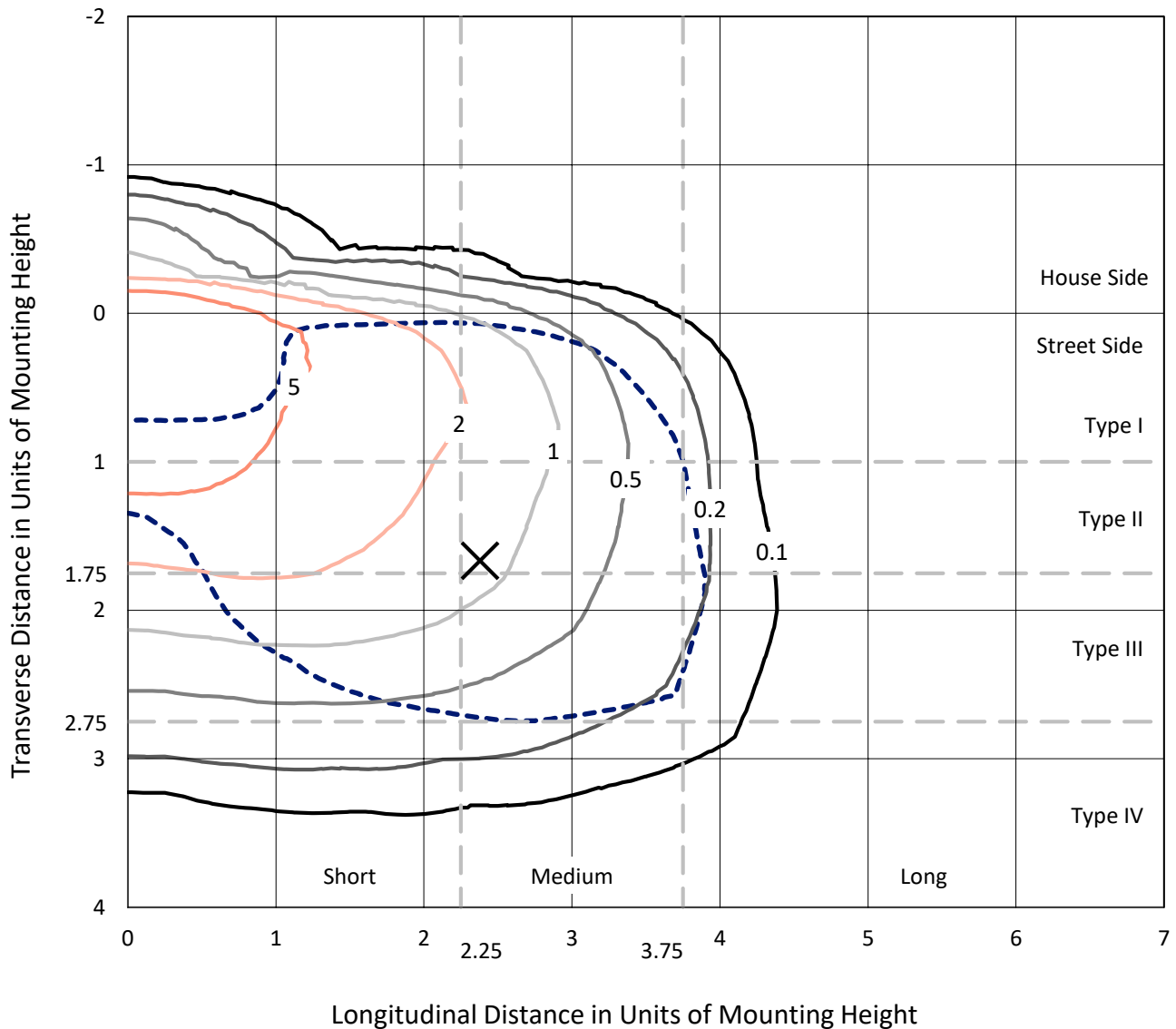
Input Watts (W): 290  
Input Voltage (V): NR  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: NR  
Total Harmonic Distortion (THDi): NR  
Frequency (hertz): 60  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 24 FT



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## Iso-Footcandle Lines of Horizontal Illumination

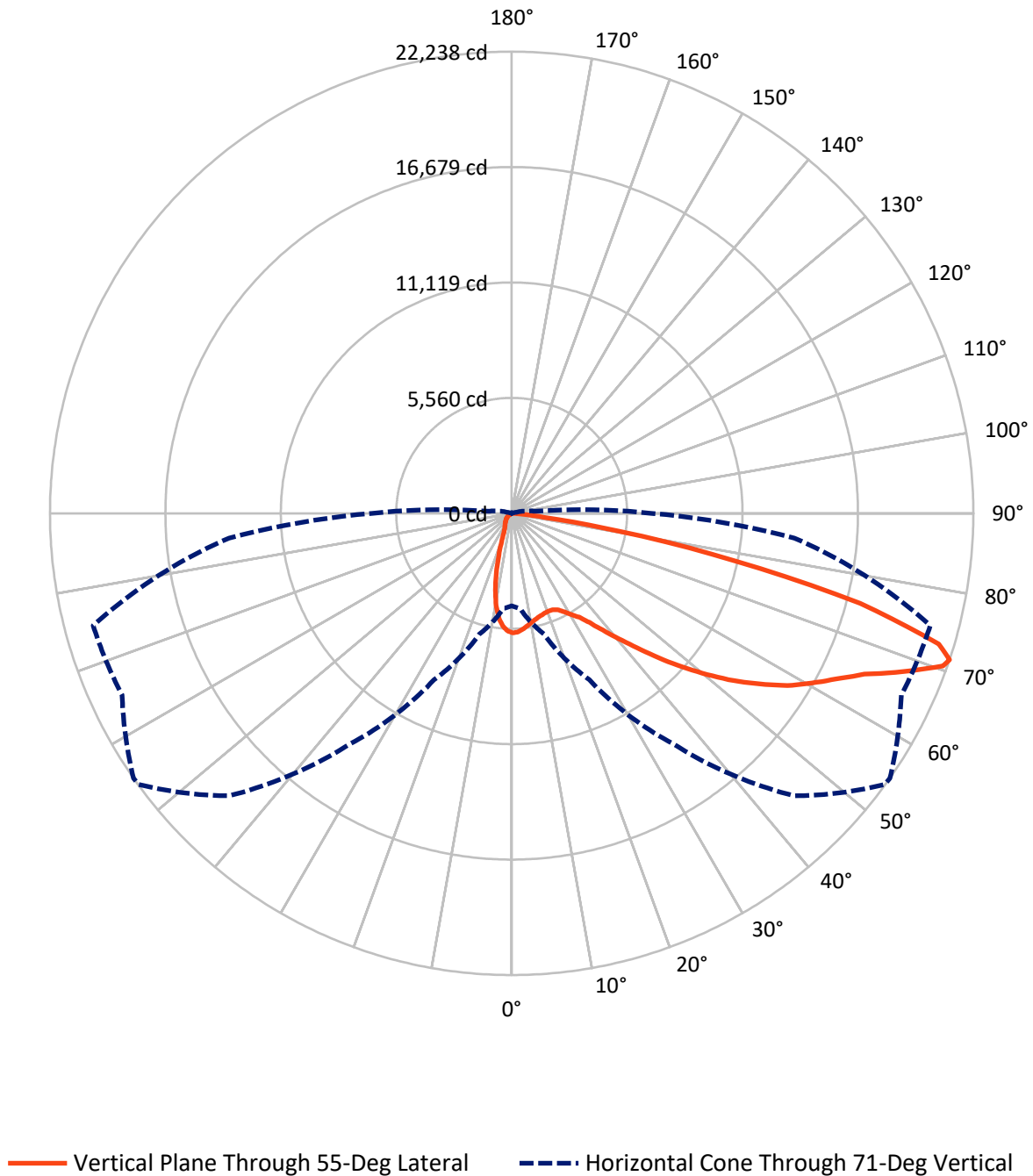
✕ Max cd  
 - - - 1/2 Max cd



Based on 25 foot mounting height. Maximum calculated value = 9.4 fc  
 Type III - Medium - N/A

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## Luminous Intensity Polar Plot



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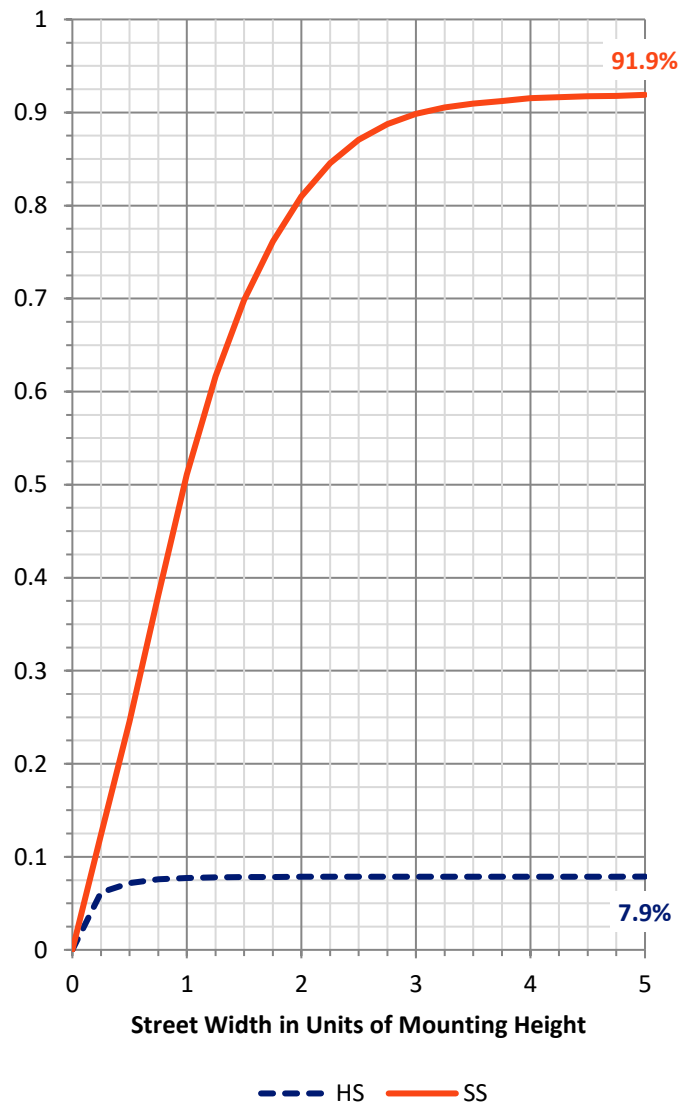
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total   |
|--------------------|-----------|----------|--------|---------|
| <b>House Side</b>  | Lumens    | 2363.3   | 0.0    | 2363.3  |
|                    | % Fixture | 7.9      | 0.0    | 7.9     |
| <b>Street Side</b> | Lumens    | 27486.3  | 0.0    | 27486.3 |
|                    | % Fixture | 92.1     | 0.0    | 92.1    |
| <b>Total</b>       | Lumens    | 29849.6  | 0.0    | 29849.6 |
|                    | % Fixture | 100.0    | 0.0    | 100.0   |

**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 490.8   | 1.6       |
| 10°-20°   | 1108.1  | 3.7       |
| 20°-30°   | 1780.7  | 6.0       |
| 30°-40°   | 3025.5  | 10.1      |
| 40°-50°   | 4696.0  | 15.7      |
| 50°-60°   | 6313.7  | 21.2      |
| 60°-70°   | 7723.7  | 25.9      |
| 70°-80°   | 4515.9  | 15.1      |
| 80°-90°   | 195.2   | 0.7       |
| 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°    | 29849.6 | 100.0     |
| 0°-180°   | 29849.6 | 100.0     |

**Coefficient of Utilization**



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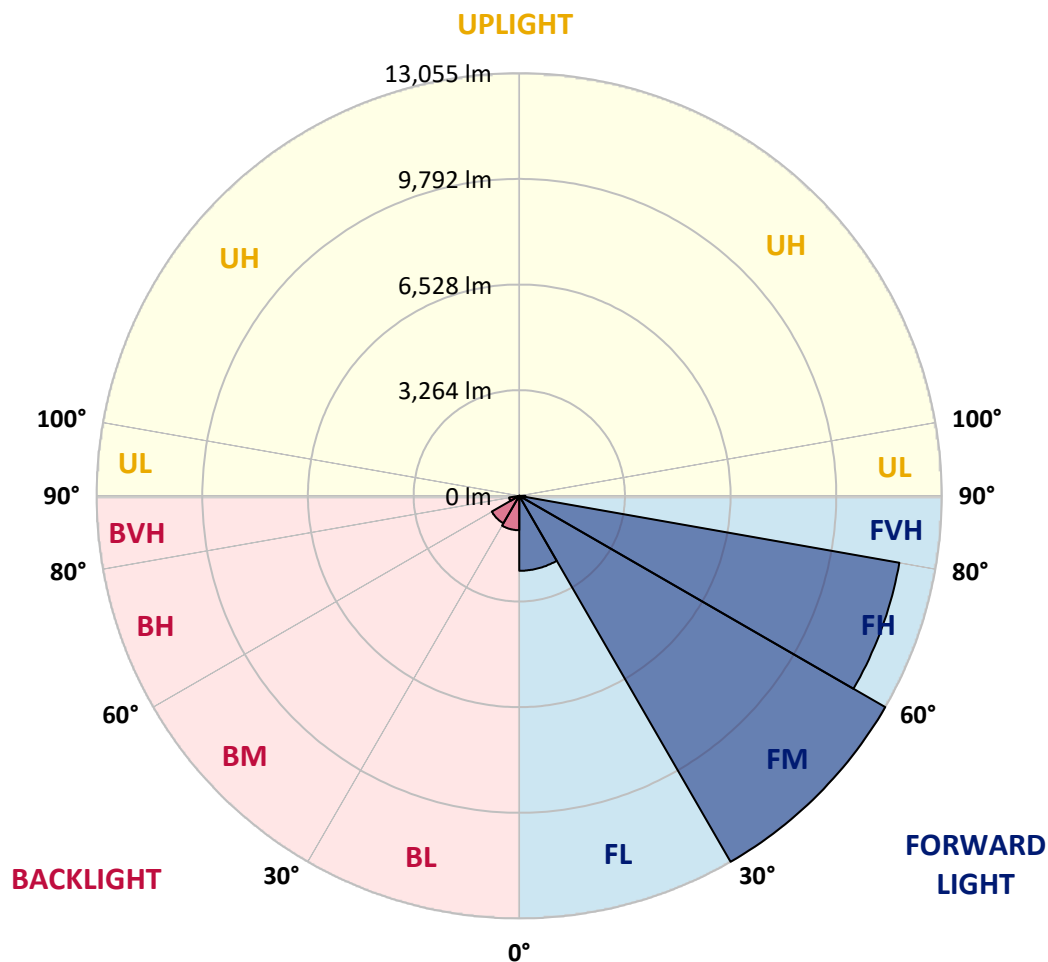
CATALOG NUMBER: GLEON-SA9A-735-U-T3R-HSS

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

| Zone |             | Lumens  | % Fixture | Zone Rating/Lumen Limit |      |          |
|------|-------------|---------|-----------|-------------------------|------|----------|
|      |             |         |           | B                       | U    | G        |
| FL   | (0°-30°)    | 2315.9  | 7.8       |                         |      |          |
| FM   | (30°-60°)   | 13055.3 | 43.7      |                         |      |          |
| FH   | (60°-80°)   | 11922.9 | 39.9      |                         |      | G4/12000 |
| FVH  | (80°-90°)   | 192.1   | 0.6       |                         |      | G2/225   |
| BL   | (0°-30°)    | 1063.7  | 3.6       | B3/2500                 |      |          |
| BM   | (30°-60°)   | 979.9   | 3.3       | B1/1000                 |      |          |
| BH   | (60°-80°)   | 316.6   | 1.1       | B1/500                  |      | G1/500   |
| BVH  | (80°-90°)   | 3.1     | 0.0       |                         |      | G0/10    |
| UL   | (90°-100°)  | 0.0     | 0.0       |                         | U0/0 |          |
| UH   | (100°-180°) | 0.0     | 0.0       |                         | U0/0 |          |

**BUG Rating: B3-U0-G4**

Type III Medium





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**CANDELA DISTRIBUTION (FULL):**

|       | 0°      | 5°      | 15°     | 25°     | 35°     | 45°     | 54°     | 55°     | 65°     | 75°     | 85°     |
|-------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| 0°    | 5756.6  | 5756.6  | 5756.6  | 5756.6  | 5756.6  | 5756.6  | 5756.6  | 5756.6  | 5756.6  | 5756.6  | 5756.6  |
| 2.5°  | 5587.7  | 5594.4  | 5618.5  | 5629.2  | 5654.8  | 5697.6  | 5719.1  | 5720.4  | 5755.3  | 5768.7  | 5779.4  |
| 5°    | 5192.4  | 5232.5  | 5272.7  | 5315.6  | 5393.4  | 5496.6  | 5598.4  | 5607.8  | 5720.4  | 5803.5  | 5847.7  |
| 7.5°  | 4851.9  | 4888.1  | 4936.4  | 5004.6  | 5114.6  | 5276.8  | 5446.9  | 5467.1  | 5680.2  | 5869.2  | 5968.3  |
| 10°   | 4502.1  | 4531.6  | 4601.3  | 4701.8  | 4853.3  | 5070.3  | 5299.6  | 5333.0  | 5644.0  | 5957.6  | 6131.9  |
| 12.5° | 4128.2  | 4145.6  | 4230.0  | 4374.7  | 4597.3  | 4873.3  | 5174.9  | 5219.2  | 5621.2  | 6059.5  | 6324.9  |
| 15°   | 3844.0  | 3852.0  | 3932.4  | 4082.6  | 4337.2  | 4696.4  | 5078.4  | 5132.0  | 5626.5  | 6181.5  | 6535.3  |
| 17.5° | 3771.6  | 3775.7  | 3818.5  | 3921.7  | 4146.9  | 4538.2  | 5002.0  | 5067.7  | 5642.7  | 6300.8  | 6747.1  |
| 20°   | 4065.2  | 4037.0  | 3992.8  | 3976.7  | 4073.2  | 4443.1  | 4956.4  | 5030.2  | 5664.1  | 6406.6  | 6937.4  |
| 22.5° | 4870.7  | 4787.6  | 4603.9  | 4358.6  | 4209.8  | 4449.8  | 4968.5  | 5042.2  | 5732.5  | 6536.7  | 7157.2  |
| 25°   | 6066.2  | 5950.9  | 5638.7  | 5156.1  | 4692.4  | 4642.8  | 5069.0  | 5144.1  | 5865.1  | 6692.1  | 7367.6  |
| 27.5° | 7426.6  | 7312.6  | 6930.7  | 6241.7  | 5451.0  | 5024.8  | 5299.6  | 5369.3  | 6062.2  | 6830.2  | 7528.5  |
| 30°   | 8729.3  | 8697.2  | 8246.9  | 7464.1  | 6405.3  | 5644.0  | 5597.1  | 5656.1  | 6208.3  | 6913.3  | 7655.8  |
| 32.5° | 9833.8  | 9782.8  | 9421.0  | 8659.7  | 7497.7  | 6387.9  | 5946.9  | 5964.3  | 6318.2  | 7020.5  | 7822.0  |
| 35°   | 10857.7 | 10794.8 | 10477.1 | 9757.4  | 8618.1  | 7296.6  | 6485.7  | 6460.3  | 6558.1  | 7236.3  | 8063.3  |
| 37.5° | 11751.8 | 11809.4 | 11456.9 | 10772.0 | 9623.4  | 8241.5  | 7212.1  | 7135.7  | 6933.4  | 7587.5  | 8413.1  |
| 40°   | 12499.7 | 12499.7 | 12316.1 | 11745.0 | 10709.0 | 9218.6  | 8033.8  | 7933.2  | 7497.7  | 8129.0  | 8856.7  |
| 42.5° | 12769.1 | 12826.7 | 12895.0 | 12572.1 | 11680.8 | 10234.5 | 8949.2  | 8844.7  | 8292.5  | 8896.9  | 9416.9  |
| 45°   | 12785.1 | 12876.3 | 13226.1 | 13224.8 | 12558.7 | 11243.8 | 9981.3  | 9931.6  | 9311.1  | 9883.3  | 10111.2 |
| 47.5° | 12558.7 | 12672.6 | 13248.8 | 13575.9 | 13254.2 | 12183.3 | 11109.7 | 11048.2 | 10508.0 | 11092.3 | 10837.7 |
| 50°   | 12208.8 | 12334.8 | 13005.0 | 13714.0 | 13727.4 | 13001.0 | 12298.6 | 12206.2 | 11825.5 | 12474.2 | 11588.3 |
| 52.5° | 11582.9 | 11826.8 | 12786.5 | 13746.1 | 14038.3 | 13707.3 | 13429.8 | 13389.6 | 13299.8 | 13805.1 | 12186.0 |
| 55°   | 10243.9 | 10514.7 | 12238.3 | 13756.9 | 14326.5 | 14333.2 | 14490.0 | 14500.7 | 14681.7 | 15048.9 | 12631.0 |
| 57.5° | 9611.3  | 9764.1  | 11281.3 | 13807.8 | 14754.0 | 15043.6 | 15570.3 | 15653.4 | 15933.5 | 16229.7 | 13139.0 |
| 60°   | 9213.2  | 9394.2  | 10809.5 | 13738.1 | 15425.5 | 15975.1 | 16571.5 | 16599.6 | 16899.9 | 17448.1 | 13826.6 |
| 62.5° | 8895.6  | 9073.8  | 10512.0 | 13470.0 | 16180.1 | 17095.6 | 17549.9 | 17552.6 | 17777.7 | 18899.6 | 14608.0 |
| 65°   | 8111.5  | 8261.6  | 9910.2  | 13168.5 | 16678.7 | 18204.0 | 18686.5 | 18669.1 | 18852.7 | 20430.2 | 15515.3 |
| 67.5° | 6977.6  | 7092.9  | 8681.1  | 12025.2 | 16491.1 | 19211.9 | 20402.1 | 20344.4 | 20122.0 | 21753.1 | 15871.9 |
| 70°   | 5394.7  | 5436.2  | 6842.2  | 10021.4 | 14732.6 | 19599.2 | 22060.1 | 22030.5 | 20900.7 | 21515.9 | 14565.0 |
| 71°   | 4459.2  | 4595.9  | 6030.0  | 8844.7  | 13554.5 | 19241.4 | 22220.9 | 22238.3 | 20704.9 | 20869.8 | 13665.7 |
| 72.5° | 2589.4  | 2706.1  | 4370.7  | 6792.7  | 11507.9 | 17748.3 | 21387.2 | 21513.2 | 19790.9 | 18982.7 | 11672.7 |
| 75°   | 554.9   | 593.8   | 1620.4  | 3287.8  | 6330.2  | 12439.3 | 16881.1 | 17330.1 | 16130.6 | 12913.9 | 7035.2  |
| 77.5° | 386.0   | 416.9   | 694.3   | 1491.8  | 2092.3  | 6146.6  | 10486.5 | 10993.2 | 9636.8  | 4853.3  | 2251.7  |
| 80°   | 305.5   | 340.5   | 541.5   | 737.1   | 565.6   | 1982.3  | 4912.2  | 5221.8  | 3214.0  | 1082.9  | 379.3   |
| 82.5° | 170.2   | 202.4   | 422.2   | 398.1   | 217.1   | 376.6   | 1375.2  | 1554.8  | 643.3   | 218.4   | 89.8    |
| 85°   | 49.6    | 60.3    | 272.1   | 289.5   | 92.5    | 72.4    | 234.6   | 290.8   | 121.9   | 57.7    | 40.2    |
| 87.5° | 0.0     | 0.0     | 131.3   | 111.2   | 26.8    | 10.7    | 21.4    | 24.1    | 24.1    | 24.1    | 26.8    |
| 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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**CANDELA DISTRIBUTION (continued):**

|       | 90°    | 95°    | 105°   | 115°   | 125°   | 135°   | 145°   | 155°   | 165°   | 175°   | 180°   |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 5756.6 | 5756.6 | 5756.6 | 5756.6 | 5756.6 | 5756.6 | 5756.6 | 5756.6 | 5756.6 | 5756.6 | 5756.6 |
| 2.5°  | 5779.4 | 5788.7 | 5755.3 | 5711.0 | 5664.1 | 5606.5 | 5546.2 | 5499.3 | 5497.9 | 5475.2 | 5452.3 |
| 5°    | 5850.4 | 5845.1 | 5752.6 | 5611.8 | 5445.6 | 5272.7 | 5107.9 | 4921.6 | 4860.0 | 4783.5 | 4758.1 |
| 7.5°  | 5981.7 | 5944.2 | 5748.6 | 5440.3 | 5075.7 | 4713.8 | 4339.9 | 3963.3 | 3802.5 | 3657.7 | 3632.2 |
| 10°   | 6146.6 | 6075.6 | 5723.1 | 5182.9 | 4514.1 | 3846.6 | 3282.4 | 2770.4 | 2545.3 | 2372.4 | 2364.3 |
| 12.5° | 6318.2 | 6209.6 | 5652.1 | 4794.3 | 3778.4 | 2840.1 | 2190.1 | 1686.1 | 1498.5 | 1377.9 | 1388.6 |
| 15°   | 6497.8 | 6335.6 | 5499.3 | 4270.2 | 2940.6 | 1927.4 | 1345.6 | 1049.5 | 974.4  | 943.6  | 951.6  |
| 17.5° | 6681.4 | 6422.7 | 5286.2 | 3638.9 | 2113.7 | 1243.8 | 931.5  | 848.5  | 848.5  | 855.1  | 857.8  |
| 20°   | 6840.9 | 6469.6 | 4972.5 | 2931.2 | 1432.8 | 906.0  | 814.9  | 802.8  | 809.5  | 820.2  | 821.6  |
| 22.5° | 6999.1 | 6472.3 | 4563.7 | 2214.2 | 1002.5 | 793.5  | 776.1  | 770.7  | 774.7  | 786.8  | 788.1  |
| 25°   | 7127.7 | 6440.2 | 4051.8 | 1574.9 | 800.2  | 747.8  | 739.8  | 737.1  | 739.8  | 754.6  | 754.6  |
| 27.5° | 7180.0 | 6323.5 | 3427.2 | 1107.1 | 717.1  | 697.0  | 694.3  | 697.0  | 701.0  | 711.7  | 713.0  |
| 30°   | 7185.4 | 6119.8 | 2746.3 | 801.5  | 650.0  | 628.6  | 633.9  | 643.3  | 639.3  | 636.6  | 639.3  |
| 32.5° | 7198.7 | 5883.9 | 2082.8 | 659.4  | 593.8  | 560.2  | 553.5  | 553.5  | 537.5  | 528.1  | 522.7  |
| 35°   | 7243.0 | 5606.5 | 1510.5 | 592.4  | 536.1  | 497.3  | 471.8  | 442.3  | 411.5  | 395.3  | 391.3  |
| 37.5° | 7312.6 | 5315.6 | 1081.6 | 548.2  | 485.1  | 441.0  | 392.7  | 340.5  | 296.2  | 284.1  | 284.1  |
| 40°   | 7440.0 | 5015.5 | 800.2  | 513.4  | 445.0  | 390.0  | 317.7  | 249.3  | 209.1  | 202.4  | 202.4  |
| 42.5° | 7641.0 | 4699.1 | 638.0  | 482.5  | 410.2  | 337.8  | 242.6  | 180.9  | 151.5  | 147.5  | 146.1  |
| 45°   | 7850.2 | 4350.6 | 557.5  | 453.0  | 372.6  | 277.4  | 179.6  | 134.0  | 116.6  | 112.6  | 112.6  |
| 47.5° | 8059.3 | 3979.4 | 518.7  | 424.9  | 336.4  | 215.7  | 134.0  | 105.9  | 97.8   | 97.8   | 99.2   |
| 50°   | 8236.2 | 3592.0 | 490.6  | 394.0  | 289.5  | 163.5  | 105.9  | 89.8   | 87.1   | 92.5   | 93.8   |
| 52.5° | 8280.4 | 3211.3 | 455.7  | 355.2  | 231.9  | 124.6  | 87.1   | 79.1   | 79.1   | 79.1   | 79.1   |
| 55°   | 8253.6 | 2916.5 | 410.2  | 306.9  | 171.6  | 99.2   | 75.1   | 69.7   | 68.4   | 68.4   | 68.4   |
| 57.5° | 8344.7 | 2742.3 | 328.4  | 238.6  | 123.3  | 80.4   | 65.7   | 61.7   | 59.0   | 57.7   | 57.7   |
| 60°   | 8528.3 | 2628.4 | 234.6  | 171.6  | 92.5   | 67.0   | 56.3   | 52.3   | 48.3   | 45.6   | 45.6   |
| 62.5° | 8772.3 | 2529.2 | 174.2  | 127.3  | 71.1   | 53.7   | 46.9   | 42.9   | 37.5   | 34.8   | 34.8   |
| 65°   | 8959.9 | 2352.3 | 132.7  | 95.2   | 53.7   | 42.9   | 36.1   | 34.8   | 26.8   | 24.1   | 22.8   |
| 67.5° | 8673.1 | 1963.5 | 107.2  | 69.7   | 40.2   | 33.5   | 28.1   | 26.8   | 16.1   | 13.4   | 13.4   |
| 70°   | 7438.7 | 1367.1 | 85.8   | 51.0   | 29.5   | 26.8   | 22.8   | 17.4   | 12.0   | 10.7   | 10.7   |
| 71°   | 6745.7 | 1141.9 | 77.7   | 42.9   | 25.4   | 25.4   | 21.4   | 14.7   | 10.7   | 9.4    | 9.4    |
| 72.5° | 5603.8 | 810.9  | 65.7   | 33.5   | 22.8   | 26.8   | 22.8   | 13.4   | 10.7   | 9.4    | 8.0    |
| 75°   | 3252.9 | 339.1  | 45.6   | 22.8   | 17.4   | 32.1   | 29.5   | 12.0   | 8.0    | 6.7    | 6.7    |
| 77.5° | 978.4  | 124.6  | 25.4   | 14.7   | 13.4   | 28.1   | 33.5   | 10.7   | 4.0    | 1.3    | 1.3    |
| 80°   | 178.3  | 53.7   | 16.1   | 9.4    | 9.4    | 17.4   | 25.4   | 5.4    | 0.0    | 0.0    | 0.0    |
| 82.5° | 63.0   | 26.8   | 9.4    | 5.4    | 4.0    | 8.0    | 12.0   | 0.0    | 0.0    | 0.0    | 0.0    |
| 85°   | 36.1   | 18.7   | 5.4    | 2.7    | 0.0    | 1.3    | 2.7    | 0.0    | 0.0    | 0.0    | 0.0    |
| 87.5° | 24.1   | 5.4    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 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

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

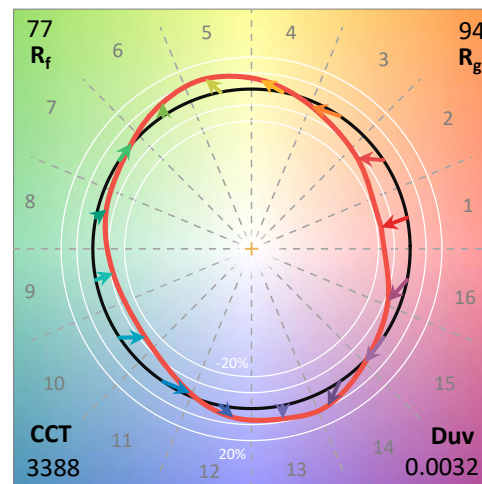
### Test Information

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

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| 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**



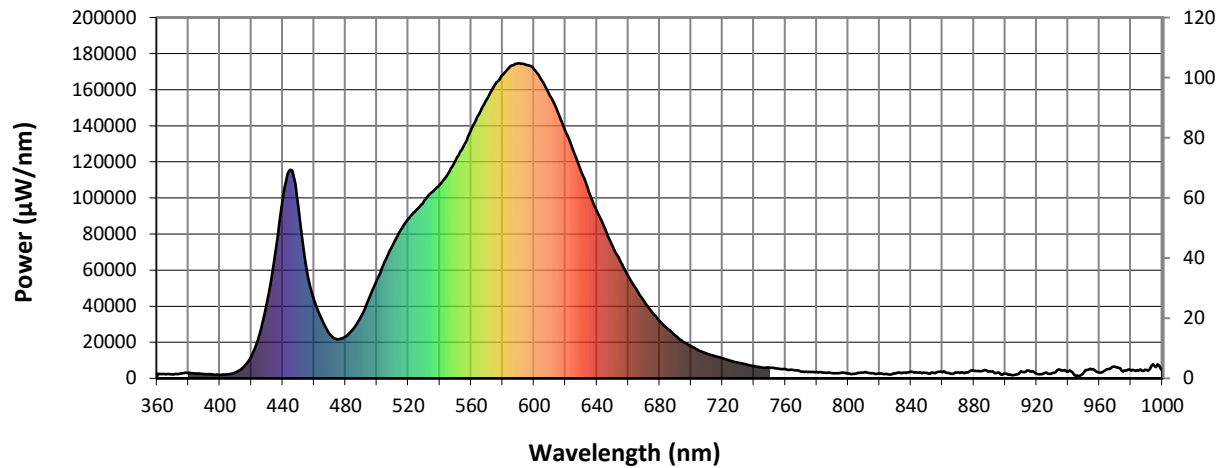
**CIE 1931 Chromaticity Diagram with 2017 ANSI 7-Step and 4-Step Quadrangles**



Point lies inside the ANSI 3500K 4-step quadrangle

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### Photopic Flux vs. Wavelength

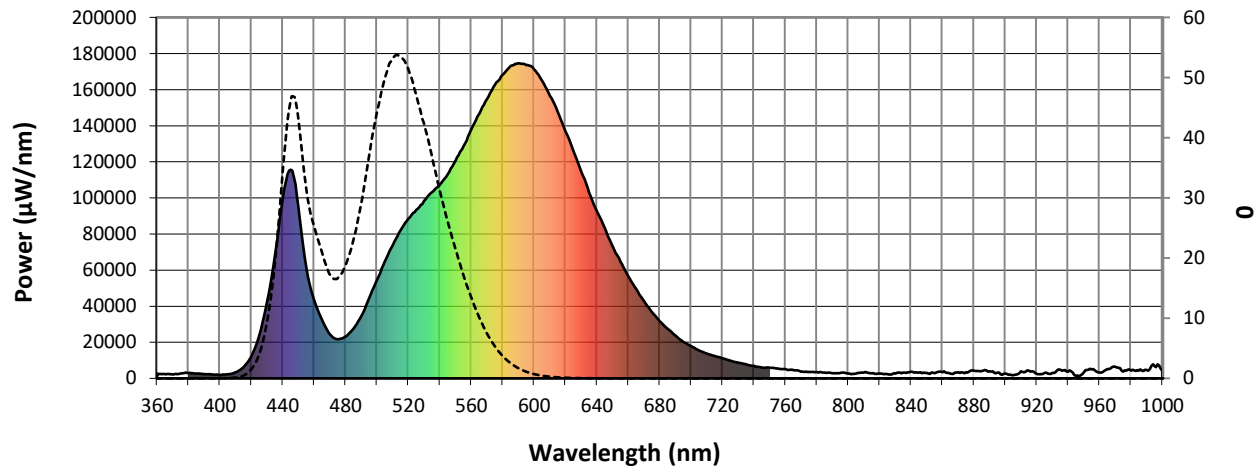


#####

| 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



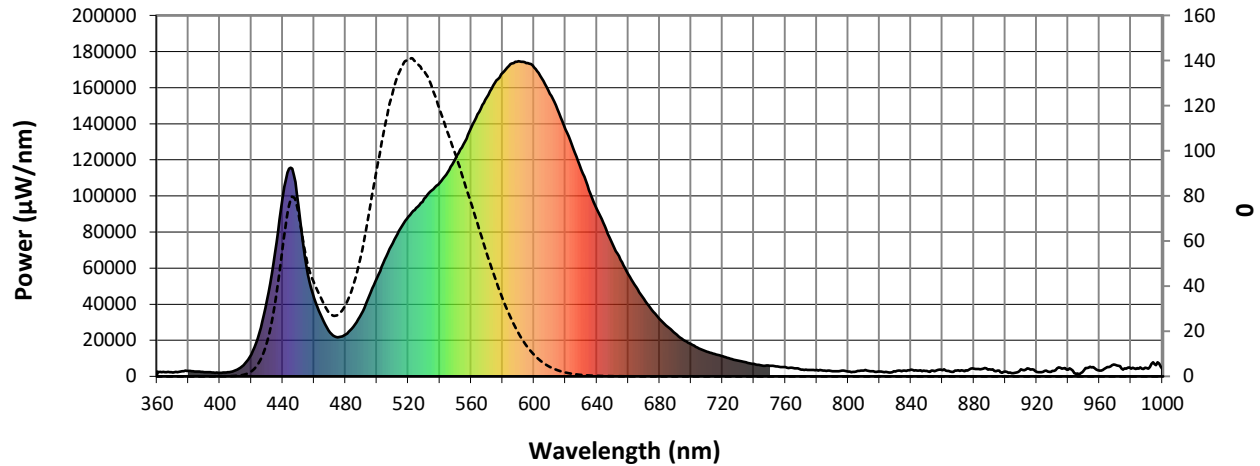
Scotopic Lumens: 12126

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

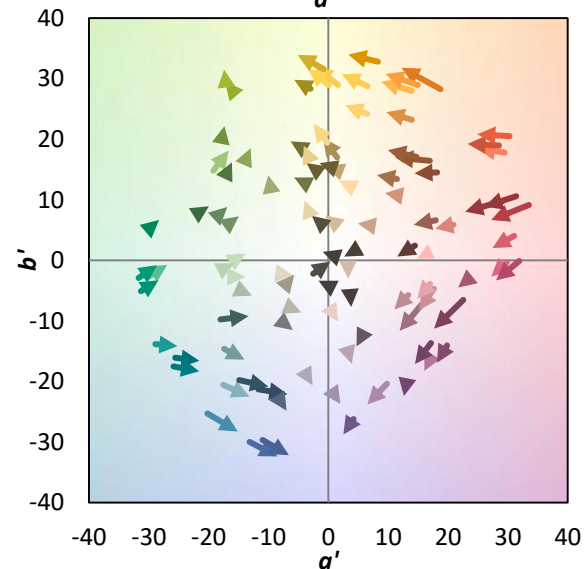
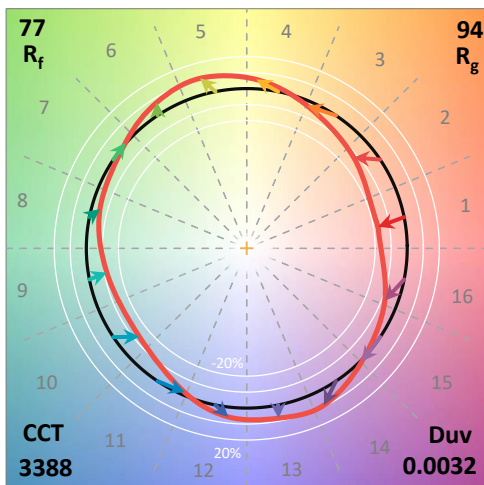
### Summary

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

### Spectral Power Distribution Comparison



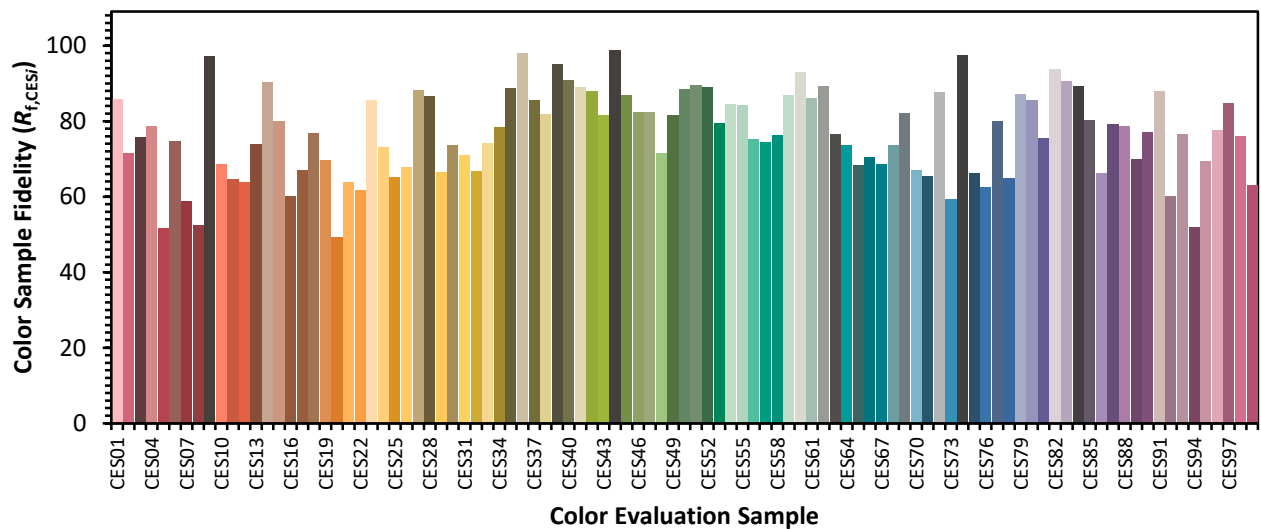
### Color Vector Graphics

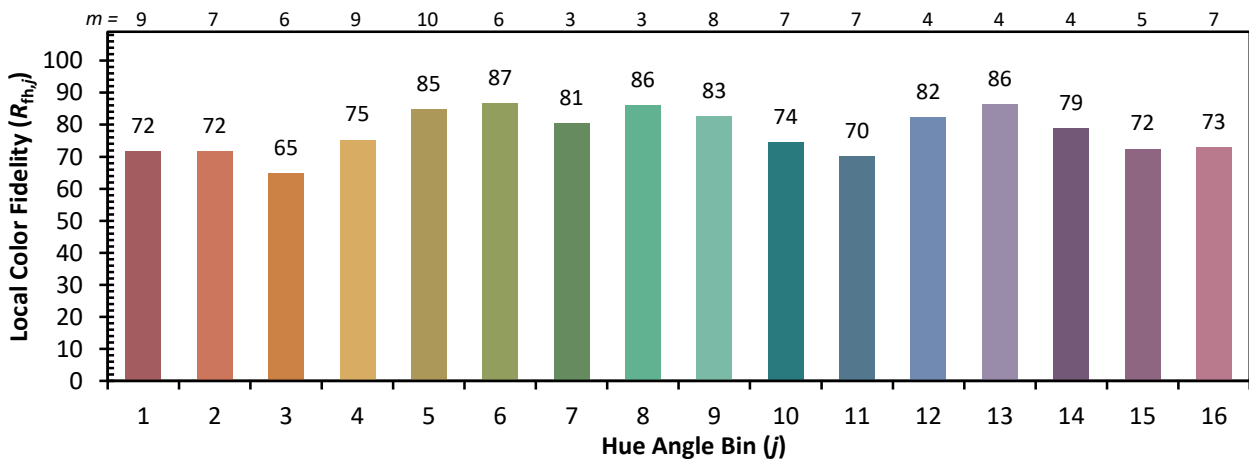
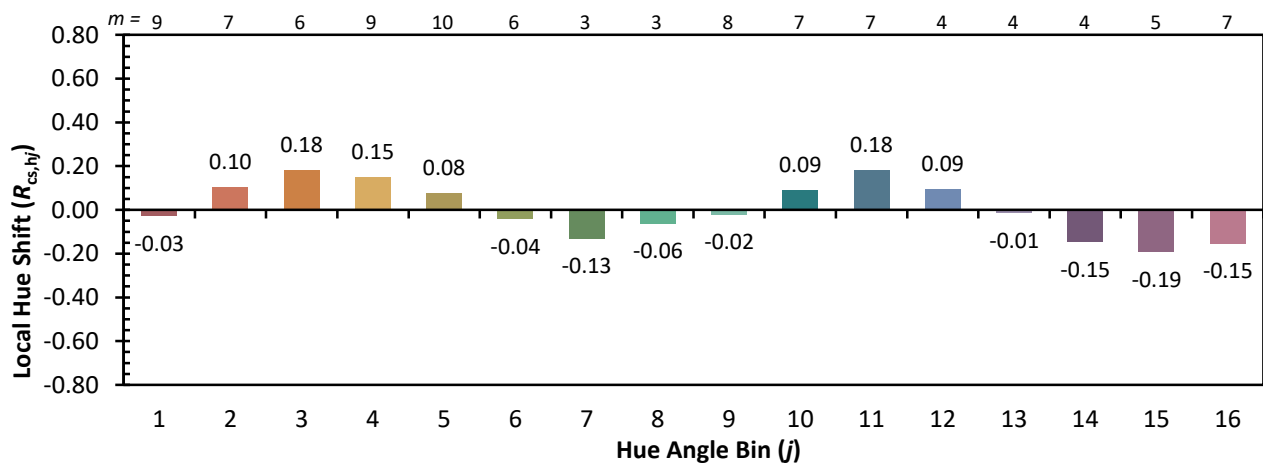




**Individual Sample Fidelity Index ( $R_{f,i}$ )**

|            |            |            |            |
|------------|------------|------------|------------|
| 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)