

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: P510649

Luminaire Tested: **CTN-CA6-230-727-U-T3**

Issue Date: 4/6/2021

**Test Information**

Test Method: LM-79-08  
Report Number: P510649  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G3-2102-151-11)  
Test Lab: COOPER LIGHTING SOLUTIONS  
Issue Date: 4/6/2021  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: McGRAW-EDISON  
Catalog Number: CTN-CA6-230-727-U-T3  
Description: CELESTEON HIGH MAST LUMINAIRE  
Light Source: (6) 2700K CCT, 70 CRI LEDS  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 29235 lumens  
Efficiency: N/A  
Efficacy: 128.3 lumens/watt  
Luminous Opening: Circular (Dia: 2.08' x H: 0')  
IES Classification: Type III - Short  
BUG Rating: B3 - U0 - G4

Input Watts (W): 227.8  
Input Voltage (V): 120  
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: 28.75 FT



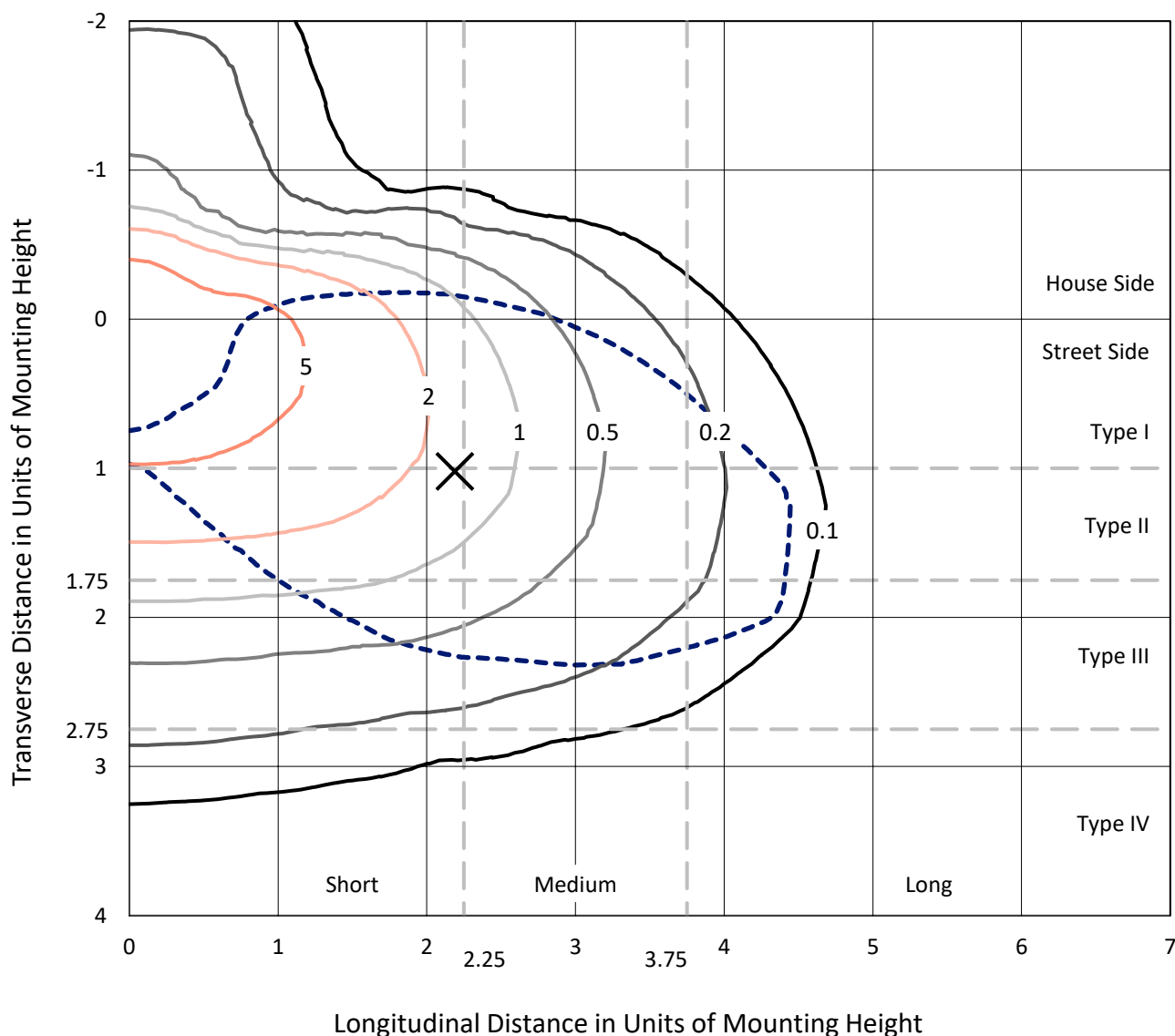
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## Iso-Footcandle Lines of Horizontal Illumination

× Max cd

--- 1/2 Max cd

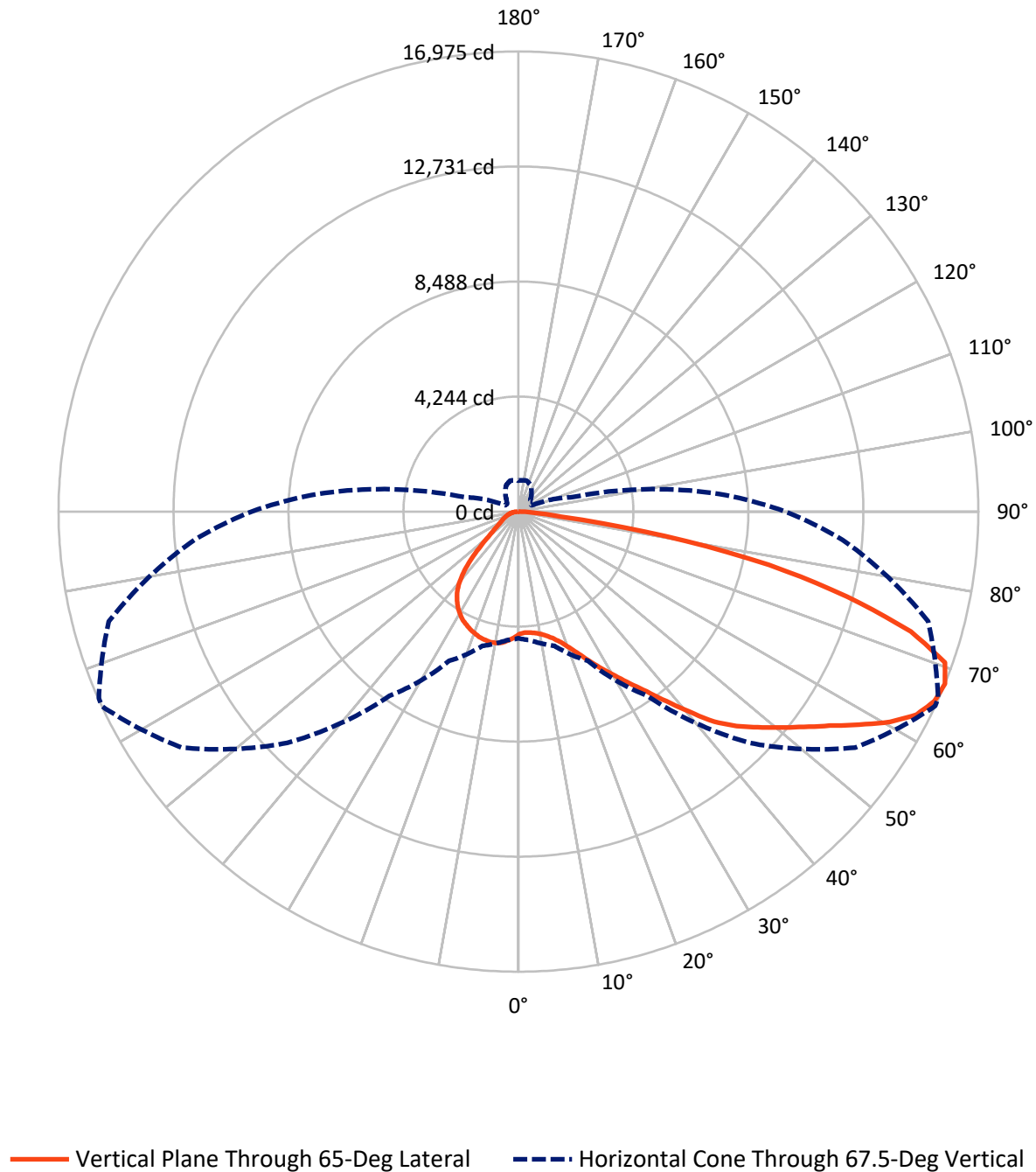


Based on 25 foot mounting height. Maximum calculated value = 8 fc

Type III - Short - N/A

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## Luminous Intensity Polar Plot



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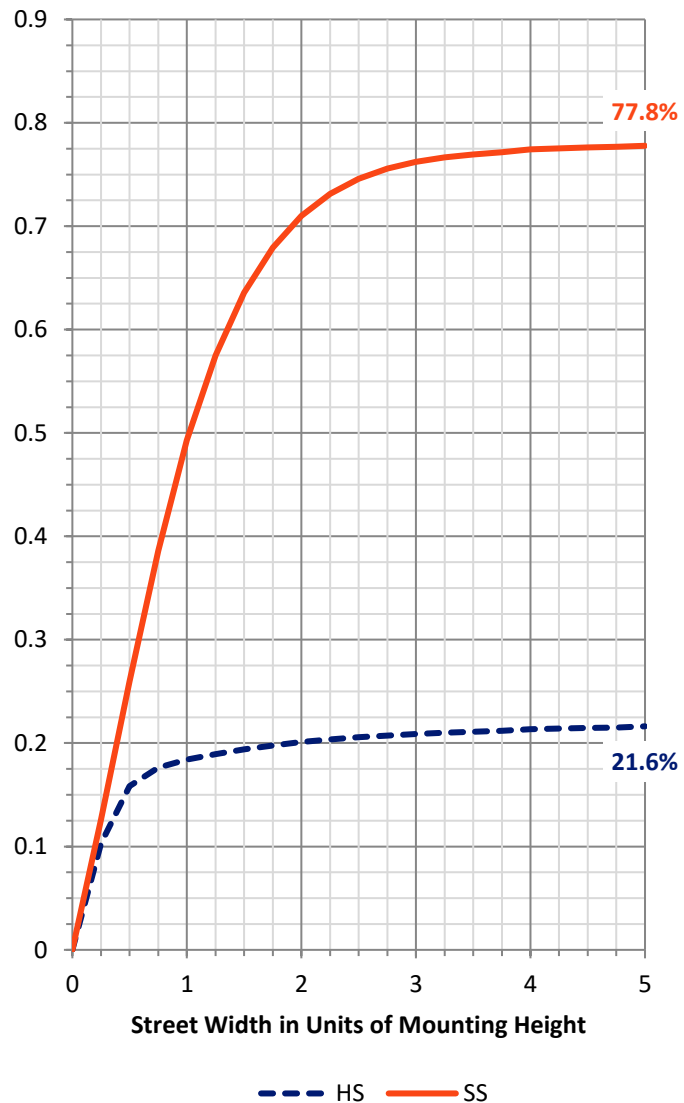
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total   |
|--------------------|-----------|----------|--------|---------|
| <b>House Side</b>  | Lumens    | 6457.6   | 0.0    | 6457.6  |
|                    | % Fixture | 22.1     | 0.0    | 22.1    |
| <b>Street Side</b> | Lumens    | 22777.4  | 0.0    | 22777.4 |
|                    | % Fixture | 77.9     | 0.0    | 77.9    |
| <b>Total</b>       | Lumens    | 29235.0  | 0.0    | 29235.0 |
|                    | % Fixture | 100.0    | 0.0    | 100.0   |

**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 449.9   | 1.5       |
| 10°-20°   | 1405.7  | 4.8       |
| 20°-30°   | 2433.4  | 8.3       |
| 30°-40°   | 3575.7  | 12.2      |
| 40°-50°   | 4833.0  | 16.5      |
| 50°-60°   | 5943.2  | 20.3      |
| 60°-70°   | 6368.5  | 21.8      |
| 70°-80°   | 3756.1  | 12.8      |
| 80°-90°   | 469.5   | 1.6       |
| 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°    | 29235.0 | 100.0     |
| 0°-180°   | 29235.0 | 100.0     |

**Coefficient of Utilization**



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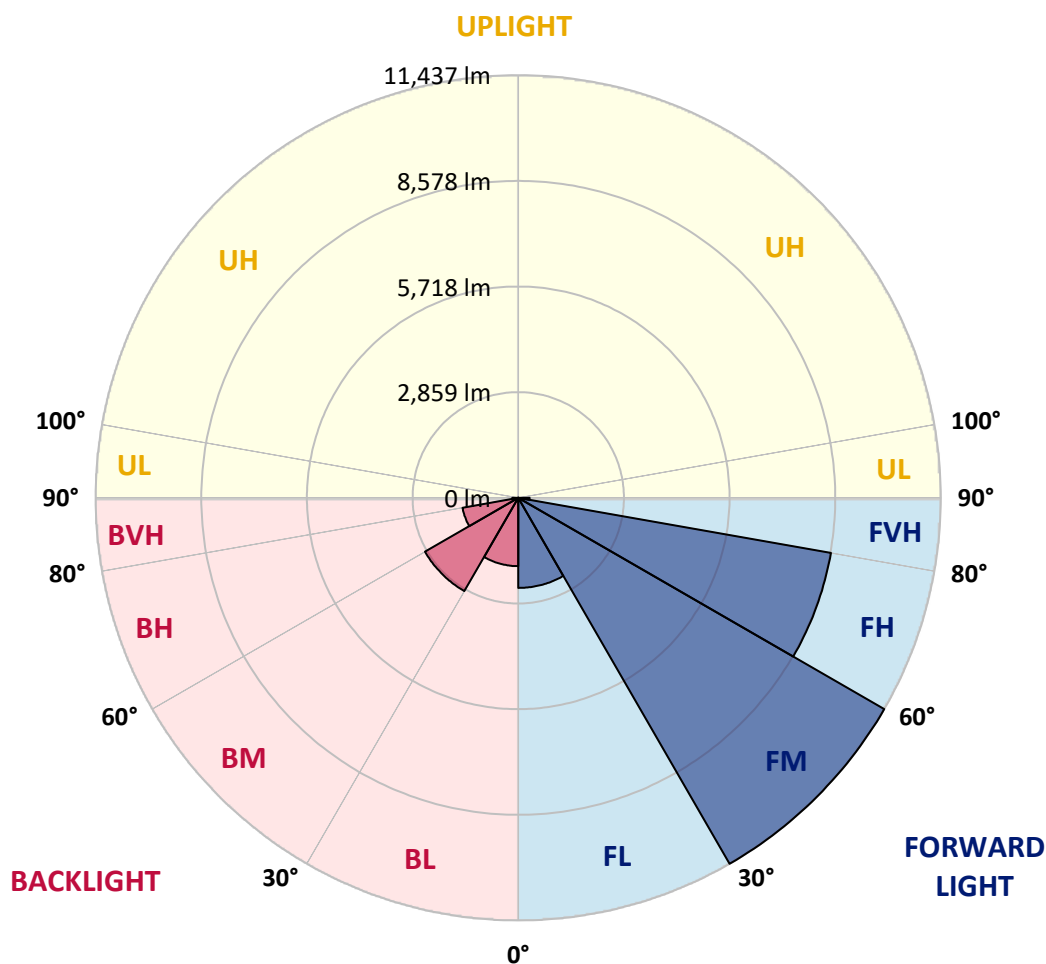
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**LUMINAIRE CLASSIFICATION SYSTEM LUMEN TABLE AND BUG RATING:**

| Zone |             | Lumens  | % Fixture | Zone Rating/Lumen Limit |      |          |
|------|-------------|---------|-----------|-------------------------|------|----------|
|      |             |         |           | B                       | U    | G        |
| FL   | (0°-30°)    | 2439.4  | 8.3       |                         |      |          |
| FM   | (30°-60°)   | 11436.9 | 39.1      |                         |      |          |
| FH   | (60°-80°)   | 8593.1  | 29.4      |                         |      | G4/12000 |
| FVH  | (80°-90°)   | 307.9   | 1.1       |                         |      | G3/500   |
| BL   | (0°-30°)    | 1849.6  | 6.3       | B3/2500                 |      |          |
| BM   | (30°-60°)   | 2915.0  | 10.0      | B3/5000                 |      |          |
| BH   | (60°-80°)   | 1531.4  | 5.2       | B3/2500                 |      | G3/2500  |
| BVH  | (80°-90°)   | 161.6   | 0.6       |                         |      | G2/225   |
| UL   | (90°-100°)  | 0.0     | 0.0       |                         | U0/0 |          |
| UH   | (100°-180°) | 0.0     | 0.0       |                         | U0/0 |          |

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

Type III Short





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**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 5°     | 15°    | 25°    | 35°     | 45°     | 55°     | 65°     | 66°     | 75°     | 85°     |
|-------|--------|--------|--------|--------|---------|---------|---------|---------|---------|---------|---------|
| 0°    | 4515.7 | 4515.7 | 4515.7 | 4515.7 | 4515.7  | 4515.7  | 4515.7  | 4515.7  | 4515.7  | 4515.7  | 4515.7  |
| 2.5°  | 4430.5 | 4422.1 | 4418.5 | 4429.9 | 4438.2  | 4447.7  | 4461.5  | 4474.6  | 4476.4  | 4493.6  | 4516.3  |
| 5°    | 4484.1 | 4477.0 | 4469.2 | 4467.4 | 4464.4  | 4463.8  | 4467.4  | 4482.3  | 4485.9  | 4502.6  | 4551.5  |
| 7.5°  | 4603.3 | 4596.2 | 4581.9 | 4576.5 | 4560.4  | 4531.8  | 4518.1  | 4525.8  | 4527.6  | 4547.9  | 4608.7  |
| 10°   | 4797.6 | 4775.6 | 4758.3 | 4740.4 | 4689.7  | 4644.4  | 4611.1  | 4596.8  | 4593.8  | 4613.5  | 4683.8  |
| 12.5° | 5029.5 | 5011.0 | 4991.9 | 4944.9 | 4880.5  | 4798.8  | 4739.8  | 4707.0  | 4704.6  | 4721.3  | 4774.4  |
| 15°   | 5274.5 | 5274.5 | 5261.4 | 5205.3 | 5142.2  | 5006.8  | 4915.7  | 4860.8  | 4864.4  | 4877.5  | 4901.9  |
| 17.5° | 5591.0 | 5564.8 | 5558.8 | 5495.0 | 5424.7  | 5301.3  | 5156.5  | 5068.8  | 5073.0  | 5079.0  | 5060.5  |
| 20°   | 5912.8 | 5905.1 | 5896.2 | 5853.8 | 5790.1  | 5631.5  | 5468.8  | 5353.8  | 5354.3  | 5332.9  | 5250.6  |
| 22.5° | 6338.4 | 6312.8 | 6319.4 | 6271.7 | 6185.2  | 6022.5  | 5835.4  | 5698.9  | 5707.8  | 5676.8  | 5527.8  |
| 25°   | 6761.0 | 6735.4 | 6721.7 | 6689.5 | 6615.0  | 6460.6  | 6238.3  | 6113.1  | 6102.4  | 6046.4  | 5830.0  |
| 27.5° | 7183.0 | 7168.1 | 7179.5 | 7140.7 | 7079.9  | 6907.7  | 6703.8  | 6564.9  | 6572.1  | 6533.3  | 6210.9  |
| 30°   | 7619.9 | 7603.3 | 7652.7 | 7590.1 | 7552.6  | 7385.1  | 7189.6  | 7026.3  | 7032.2  | 7046.5  | 6684.7  |
| 32.5° | 7949.6 | 7969.2 | 8055.7 | 8048.5 | 8041.4  | 7854.8  | 7649.2  | 7558.6  | 7567.5  | 7617.6  | 7247.4  |
| 35°   | 8267.9 | 8269.6 | 8391.2 | 8483.0 | 8521.8  | 8365.6  | 8152.2  | 8149.2  | 8207.7  | 8360.2  | 8031.8  |
| 37.5° | 8531.9 | 8525.9 | 8688.1 | 8830.5 | 8936.6  | 8815.6  | 8698.2  | 8881.2  | 8934.2  | 9250.7  | 8821.6  |
| 40°   | 8676.2 | 8688.7 | 8897.3 | 9074.9 | 9283.5  | 9226.3  | 9238.8  | 9706.7  | 9837.3  | 10114.4 | 9412.3  |
| 42.5° | 8574.8 | 8613.0 | 8937.8 | 9300.2 | 9614.9  | 9691.2  | 9942.8  | 10598.4 | 10653.9 | 10703.9 | 9993.4  |
| 45°   | 8404.9 | 8444.9 | 8804.9 | 9390.2 | 9888.5  | 10211.0 | 10643.1 | 11284.5 | 11345.3 | 11289.2 | 10476.8 |
| 47.5° | 8227.9 | 8269.0 | 8670.2 | 9353.9 | 10115.0 | 10733.1 | 11266.0 | 11891.3 | 11968.7 | 11795.3 | 10941.7 |
| 50°   | 8003.2 | 8067.0 | 8505.7 | 9277.0 | 10298.6 | 11296.4 | 11855.5 | 12515.9 | 12551.7 | 12301.3 | 11294.0 |
| 52.5° | 7726.6 | 7797.0 | 8271.4 | 9145.2 | 10442.3 | 11689.8 | 12452.1 | 13193.6 | 13190.1 | 12892.6 | 11696.9 |
| 55°   | 7435.8 | 7499.5 | 7988.3 | 8937.8 | 10522.7 | 11992.6 | 12929.0 | 13940.5 | 13983.4 | 13734.3 | 12061.7 |
| 57.5° | 7063.2 | 7121.0 | 7653.9 | 8658.9 | 10439.3 | 12249.5 | 13701.5 | 14828.0 | 14849.5 | 14320.2 | 12352.0 |
| 60°   | 6569.7 | 6654.9 | 7190.2 | 8304.2 | 10199.7 | 12546.9 | 14552.6 | 15761.4 | 15787.7 | 14896.6 | 12538.6 |
| 62.5° | 6027.9 | 6061.9 | 6607.3 | 7758.2 | 9851.0  | 12776.4 | 15142.7 | 16491.6 | 16453.5 | 15347.2 | 12594.6 |
| 65°   | 5367.5 | 5394.3 | 5866.4 | 7056.1 | 9203.1  | 12650.6 | 15354.3 | 16867.1 | 16820.0 | 15630.3 | 12422.3 |
| 67.5° | 4676.0 | 4758.9 | 5129.6 | 6082.1 | 8298.8  | 12070.1 | 15175.5 | 16975.0 | 16951.2 | 15651.8 | 12011.1 |
| 70°   | 3778.4 | 3807.6 | 4142.6 | 4955.0 | 6924.4  | 10907.8 | 14579.5 | 16698.4 | 16680.0 | 15172.5 | 11171.2 |
| 72.5° | 2664.4 | 2635.7 | 2798.5 | 3435.7 | 5001.5  | 8676.7  | 12448.0 | 15144.5 | 15175.5 | 13572.7 | 9728.2  |
| 75°   | 1414.4 | 1469.3 | 1722.6 | 2103.5 | 2835.4  | 5577.9  | 9924.3  | 12533.8 | 12523.1 | 11349.4 | 7689.7  |
| 77.5° | 753.4  | 752.2  | 926.3  | 1089.0 | 1388.2  | 2563.0  | 6545.9  | 9452.2  | 9504.7  | 8793.6  | 5279.8  |
| 80°   | 361.8  | 375.5  | 386.2  | 442.9  | 692.0   | 1184.4  | 2738.3  | 5481.3  | 5838.9  | 5244.7  | 2508.2  |
| 82.5° | 289.7  | 290.9  | 292.1  | 279.5  | 286.1   | 482.2   | 1055.0  | 1586.1  | 1643.3  | 1320.9  | 808.8   |
| 85°   | 214.6  | 201.5  | 199.7  | 169.3  | 191.3   | 289.7   | 532.3   | 677.1   | 643.7   | 626.5   | 456.6   |
| 87.5° | 86.4   | 81.1   | 78.7   | 73.9   | 73.9    | 109.1   | 187.8   | 245.0   | 244.4   | 222.9   | 153.2   |
| 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°    | 4515.7  | 4515.7 | 4515.7 | 4515.7 | 4515.7 | 4515.7 | 4515.7 | 4515.7 | 4515.7 | 4515.7 | 4515.7 |
| 2.5°  | 4534.2  | 4555.6 | 4605.7 | 4648.6 | 4664.7 | 4704.1 | 4741.0 | 4762.5 | 4777.4 | 4786.3 | 4826.8 |
| 5°    | 4581.3  | 4624.2 | 4704.1 | 4764.3 | 4822.7 | 4895.4 | 4942.5 | 4972.3 | 4989.0 | 4998.5 | 5027.7 |
| 7.5°  | 4653.4  | 4696.9 | 4781.5 | 4873.9 | 4927.6 | 4987.2 | 5017.6 | 5039.0 | 5049.8 | 5046.8 | 5070.0 |
| 10°   | 4717.8  | 4760.7 | 4845.3 | 4916.2 | 4946.6 | 4980.6 | 4996.7 | 5001.5 | 5002.1 | 5004.5 | 5027.7 |
| 12.5° | 4805.4  | 4831.6 | 4876.9 | 4923.4 | 4916.8 | 4918.0 | 4931.7 | 4925.8 | 4912.1 | 4909.7 | 4925.2 |
| 15°   | 4899.6  | 4900.2 | 4903.7 | 4893.6 | 4852.5 | 4834.6 | 4815.5 | 4799.4 | 4761.9 | 4759.5 | 4783.9 |
| 17.5° | 5017.6  | 4989.6 | 4924.6 | 4855.4 | 4757.7 | 4690.3 | 4622.4 | 4594.4 | 4548.5 | 4539.5 | 4551.5 |
| 20°   | 5169.6  | 5111.2 | 4953.2 | 4781.5 | 4598.6 | 4478.1 | 4395.9 | 4313.0 | 4249.3 | 4233.8 | 4245.1 |
| 22.5° | 5387.7  | 5272.7 | 4989.6 | 4702.9 | 4419.7 | 4214.1 | 4054.4 | 3954.8 | 3847.5 | 3792.7 | 3798.1 |
| 25°   | 5651.2  | 5471.2 | 5052.7 | 4603.3 | 4209.3 | 3912.5 | 3653.2 | 3453.5 | 3332.5 | 3252.1 | 3273.5 |
| 27.5° | 5996.3  | 5748.9 | 5128.4 | 4505.0 | 3947.7 | 3526.8 | 3150.7 | 2880.1 | 2756.7 | 2718.6 | 2693.6 |
| 30°   | 6396.2  | 6084.5 | 5208.3 | 4359.5 | 3665.1 | 3049.4 | 2567.8 | 2342.5 | 2201.2 | 2178.6 | 2159.5 |
| 32.5° | 6931.5  | 6507.1 | 5357.9 | 4201.6 | 3327.8 | 2572.0 | 2049.2 | 1789.9 | 1757.8 | 1739.3 | 1735.1 |
| 35°   | 7621.7  | 7060.8 | 5514.7 | 3996.5 | 2887.9 | 2012.3 | 1550.3 | 1410.3 | 1394.8 | 1415.0 | 1416.8 |
| 37.5° | 8354.3  | 7661.7 | 5702.4 | 3765.3 | 2381.8 | 1501.5 | 1186.1 | 1089.0 | 1106.3 | 1169.5 | 1183.8 |
| 40°   | 8850.2  | 8057.4 | 5872.9 | 3451.1 | 1756.6 | 1090.8 | 863.1  | 842.2  | 937.6  | 1018.7 | 1035.3 |
| 42.5° | 9325.8  | 8357.3 | 5942.1 | 3035.7 | 1252.9 | 776.7  | 696.8  | 768.3  | 901.8  | 990.6  | 1002.6 |
| 45°   | 9731.8  | 8706.0 | 5768.0 | 2537.4 | 849.4  | 649.1  | 667.6  | 766.5  | 914.9  | 1013.3 | 1022.2 |
| 47.5° | 10118.0 | 8990.9 | 5530.2 | 1999.2 | 670.0  | 624.7  | 667.0  | 782.6  | 944.1  | 1037.1 | 1042.5 |
| 50°   | 10487.0 | 9207.8 | 5124.3 | 1521.1 | 627.6  | 613.3  | 672.3  | 807.7  | 960.2  | 1018.7 | 1016.3 |
| 52.5° | 10760.5 | 9319.9 | 4692.1 | 1227.9 | 611.0  | 604.4  | 686.7  | 839.2  | 963.2  | 998.4  | 996.0  |
| 55°   | 10961.4 | 9298.4 | 4408.4 | 1005.5 | 597.2  | 600.8  | 709.9  | 863.1  | 991.8  | 1044.9 | 1043.1 |
| 57.5° | 10979.9 | 9201.3 | 4085.9 | 849.4  | 580.6  | 600.2  | 734.9  | 896.5  | 1134.9 | 1232.6 | 1202.8 |
| 60°   | 10957.8 | 9040.3 | 3764.1 | 745.7  | 562.1  | 603.8  | 761.2  | 996.6  | 1341.1 | 1418.0 | 1397.1 |
| 62.5° | 10849.4 | 8740.5 | 3281.9 | 677.1  | 546.0  | 616.9  | 780.8  | 1075.9 | 1331.0 | 1339.9 | 1310.1 |
| 65°   | 10514.4 | 8339.4 | 2648.9 | 608.0  | 529.9  | 625.9  | 796.9  | 1096.7 | 1222.5 | 1193.9 | 1179.0 |
| 67.5° | 9851.6  | 7443.5 | 2043.3 | 544.8  | 509.0  | 624.1  | 844.6  | 1066.9 | 1181.4 | 1160.5 | 1141.4 |
| 70°   | 8909.8  | 6425.5 | 1418.6 | 479.8  | 473.9  | 612.7  | 832.7  | 1077.1 | 1161.7 | 1129.5 | 1103.9 |
| 72.5° | 7443.5  | 5040.8 | 902.4  | 426.8  | 421.4  | 585.9  | 802.9  | 1070.5 | 1148.6 | 1134.3 | 1099.1 |
| 75°   | 5604.7  | 3518.5 | 573.4  | 369.0  | 374.9  | 537.0  | 755.2  | 1035.3 | 1142.0 | 1097.3 | 1030.0 |
| 77.5° | 3528.6  | 1736.9 | 445.8  | 313.5  | 322.5  | 463.1  | 652.7  | 904.2  | 1096.1 | 1069.3 | 982.9  |
| 80°   | 1334.6  | 705.1  | 348.7  | 254.5  | 262.3  | 360.0  | 535.3  | 743.9  | 1009.1 | 1053.2 | 1016.3 |
| 82.5° | 614.5   | 441.1  | 261.7  | 204.4  | 207.4  | 262.3  | 399.4  | 550.8  | 854.1  | 966.8  | 1059.2 |
| 85°   | 358.8   | 289.1  | 174.6  | 136.5  | 141.9  | 155.0  | 224.7  | 336.2  | 553.7  | 737.3  | 824.9  |
| 87.5° | 122.2   | 100.7  | 68.0   | 57.8   | 56.0   | 63.8   | 54.2   | 110.3  | 164.5  | 289.7  | 330.8  |
| 90°   | 0.0     | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |



Report Prepared for

Cooper Lighting Solutions

(formerly Eaton)

STREETWORKS

Report Number: SP1-2104-215-5

Luminaire Tested: CST-CA6-230-727-U-T4

Test Date: 04/22/2021

### Test Information

Test Method: LM-79-08  
 Report Number: SP1-2104-215-5  
 Test Lab: COOPER LIGHTING SOLUTIONS  
 Photometer: SP1  
 Measurement Geometry:  $4\pi$   
 Issue Date: 04/22/2021  
 Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
 Product Line: STREETWORKS  
 Catalog Number: **CST-CA6-230-727-U-T4**  
 Description: STREETWORKS HIGH MAST LUMINAIRE

### Spectral Parameters

|                           |         |           |      |      |       |
|---------------------------|---------|-----------|------|------|-------|
| CCT (K):                  | 2613    | CRI (Ra): | 72.6 |      |       |
| CIE u':                   | 0.2668  | R1:       | 69.4 | R9:  | -28.6 |
| CIE v':                   | 0.5272  | R2:       | 84.5 | R10: | 65.5  |
| Duv:                      | -0.0012 | R3:       | 95.0 | R11: | 63.4  |
| CIE x:                    | 0.4648  | R4:       | 67.5 | R12: | 56.9  |
| CIE y:                    | 0.4082  | R5:       | 68.5 | R13: | 72.3  |
| CIE z:                    | 0.1270  | R6:       | 79.7 | R14: | 97.8  |
| Peak Wavelength (nm):     | 603     | R7:       | 75.4 |      |       |
| Dominant Wavelength (nm): | 585     | R8:       | 41.2 |      |       |
| Purity:                   | 62.2    |           |      |      |       |
|                           |         |           |      |      |       |
| Rf:                       | 75.3    |           |      |      |       |
| Rg:                       | 95.8    |           |      |      |       |



### Test Conditions

Stabilization Time: 121M  
 Operation Time: 12H  
 Room Temperature (°C) / RH%: 25.5/25%  
 Sphere Temperature (°C): 24.8

REPORT NUMBER: SP1-2104-215-5

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

REPORT NUMBER: SP1-2104-215-5

**CIE 1931 Chromaticity Diagram**



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



Point lies inside the ANSI 2700K 7-step quadrangle

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### Photopic Flux vs. Wavelength

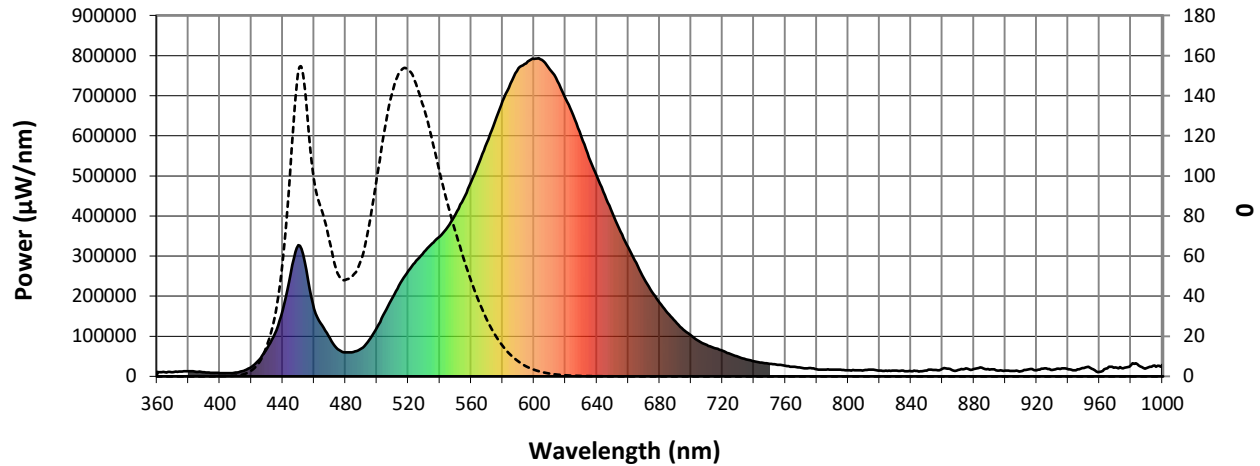


#####

| 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       | 11220            | 0.0              | 490       | 69401            | 9.9              | 620       | 692536           | 180.2            | 750       | 31541            | 0.0              | 880       | 18253            | 0.0              |
| 365       | 10182            | 0.0              | 495       | 90053            | 16.3             | 625       | 651217           | 143.7            | 755       | 28760            | 0.0              | 885       | 21369            | 0.0              |
| 370       | 10420            | 0.0              | 500       | 121940           | 26.9             | 630       | 598624           | 108.3            | 760       | 26534            | 0.0              | 890       | 16745            | 0.0              |
| 375       | 12164            | 0.0              | 505       | 159641           | 44.7             | 635       | 546251           | 82.1             | 765       | 24261            | 0.0              | 895       | 14205            | 0.0              |
| 380       | 12715            | 0.0              | 510       | 197034           | 67.7             | 640       | 499000           | 59.6             | 770       | 21584            | 0.0              | 900       | 14113            | 0.0              |
| 385       | 11387            | 0.0              | 515       | 232805           | 96.4             | 645       | 451749           | 43.5             | 775       | 20805            | 0.0              | 905       | 13457            | 0.0              |
| 390       | 10503            | 0.0              | 520       | 263165           | 127.6            | 650       | 406338           | 29.7             | 780       | 17853            | 0.0              | 910       | 12811            | 0.0              |
| 395       | 8950             | 0.0              | 525       | 288012           | 154.6            | 655       | 360522           | 20.7             | 785       | 17033            | 0.0              | 915       | 17471            | 0.0              |
| 400       | 8271             | 0.0              | 530       | 310825           | 183.0            | 660       | 321663           | 13.4             | 790       | 16986            | 0.0              | 920       | 15483            | 0.0              |
| 405       | 7777             | 0.0              | 535       | 330894           | 205.2            | 665       | 283133           | 9.0              | 795       | 16655            | 0.0              | 925       | 19757            | 0.0              |
| 410       | 9299             | 0.0              | 540       | 349086           | 227.5            | 670       | 244093           | 5.3              | 800       | 15070            | 0.0              | 930       | 16307            | 0.0              |
| 415       | 13971            | 0.0              | 545       | 372506           | 247.9            | 675       | 210996           | 3.5              | 805       | 15366            | 0.0              | 935       | 18687            | 0.0              |
| 420       | 23461            | 0.1              | 550       | 403721           | 274.3            | 680       | 183942           | 2.1              | 810       | 15472            | 0.0              | 940       | 17986            | 0.0              |
| 425       | 41887            | 0.2              | 555       | 442032           | 301.9            | 685       | 158373           | 1.4              | 815       | 17184            | 0.0              | 945       | 15266            | 0.0              |
| 430       | 69840            | 0.6              | 560       | 485515           | 329.9            | 690       | 137120           | 0.8              | 820       | 14166            | 0.0              | 950       | 21027            | 0.0              |
| 435       | 106868           | 1.3              | 565       | 532962           | 354.4            | 695       | 116757           | 0.5              | 825       | 13854            | 0.0              | 955       | 19232            | 0.0              |
| 440       | 164642           | 2.6              | 570       | 582457           | 378.7            | 700       | 102093           | 0.3              | 830       | 14283            | 0.0              | 960       | 11261            | 0.0              |
| 445       | 256049           | 5.3              | 575       | 634550           | 394.8            | 705       | 87819            | 0.2              | 835       | 14112            | 0.0              | 965       | 20156            | 0.0              |
| 450       | 327314           | 8.5              | 580       | 686476           | 407.9            | 710       | 78011            | 0.1              | 840       | 13092            | 0.0              | 970       | 22393            | 0.0              |
| 455       | 265614           | 8.9              | 585       | 730571           | 405.9            | 715       | 70264            | 0.1              | 845       | 12158            | 0.0              | 975       | 20121            | 0.0              |
| 460       | 168394           | 6.9              | 590       | 768228           | 397.2            | 720       | 63584            | 0.0              | 850       | 14790            | 0.0              | 980       | 28091            | 0.0              |
| 465       | 127370           | 6.6              | 595       | 780593           | 370.0            | 725       | 55749            | 0.0              | 855       | 15683            | 0.0              | 985       | 27040            | 0.0              |
| 470       | 94724            | 5.9              | 600       | 791888           | 341.3            | 730       | 48683            | 0.0              | 860       | 19011            | 0.0              | 990       | 20772            | 0.0              |
| 475       | 67810            | 5.3              | 605       | 789088           | 305.6            | 735       | 42520            | 0.0              | 865       | 18194            | 0.0              | 995       | 26800            | 0.0              |
| 480       | 59825            | 5.7              | 610       | 765121           | 262.9            | 740       | 37531            | 0.0              | 870       | 15713            | 0.0              | 1000      | 28539            | 0.0              |
| 485       | 61079            | 7.2              | 615       | 735839           | 222.1            | 745       | 34522            | 0.0              | 875       | 19703            | 0.0              |           |                  |                  |

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### Scotopic Flux vs. Wavelength



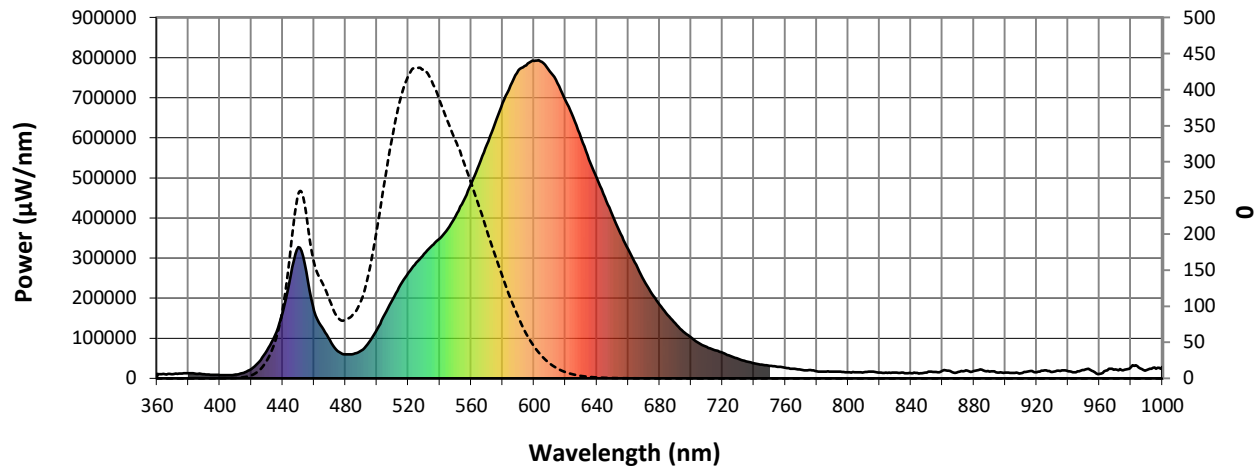
Scotopic Lumens: 37163.1

S/P: 1.07

| 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       | 11220            | 0.0              | 490       | 69401            | 106.9            | 620       | 692536           | 8.7              | 750       | 31541            | 0.0              | 880       | 18253            | 0.0              |
| 365       | 10182            | 0.0              | 495       | 90053            | 145.6            | 625       | 651217           | 5.5              | 755       | 28760            | 0.0              | 885       | 21369            | 0.0              |
| 370       | 10420            | 0.0              | 500       | 121940           | 204.0            | 630       | 598624           | 3.4              | 760       | 26534            | 0.0              | 890       | 16745            | 0.0              |
| 375       | 12164            | 0.0              | 505       | 159641           | 271.4            | 635       | 546251           | 2.1              | 765       | 24261            | 0.0              | 895       | 14205            | 0.0              |
| 380       | 12715            | 0.0              | 510       | 197034           | 334.0            | 640       | 499000           | 1.3              | 770       | 21584            | 0.0              | 900       | 14113            | 0.0              |
| 385       | 11387            | 0.0              | 515       | 232805           | 385.9            | 645       | 451749           | 0.8              | 775       | 20805            | 0.0              | 905       | 13457            | 0.0              |
| 390       | 10503            | 0.0              | 520       | 263165           | 418.3            | 650       | 406338           | 0.5              | 780       | 17853            | 0.0              | 910       | 12811            | 0.0              |
| 395       | 8950             | 0.1              | 525       | 288012           | 430.9            | 655       | 360522           | 0.3              | 785       | 17033            | 0.0              | 915       | 17471            | 0.0              |
| 400       | 8271             | 0.1              | 530       | 310825           | 428.5            | 660       | 321663           | 0.2              | 790       | 16986            | 0.0              | 920       | 15483            | 0.0              |
| 405       | 7777             | 0.2              | 535       | 330894           | 412.3            | 665       | 283133           | 0.1              | 795       | 16655            | 0.0              | 925       | 19757            | 0.0              |
| 410       | 9299             | 0.6              | 540       | 349086           | 385.7            | 670       | 244093           | 0.1              | 800       | 15070            | 0.0              | 930       | 16307            | 0.0              |
| 415       | 13971            | 1.4              | 545       | 372506           | 357.2            | 675       | 210996           | 0.0              | 805       | 15366            | 0.0              | 935       | 18687            | 0.0              |
| 420       | 23461            | 3.9              | 550       | 403721           | 330.1            | 680       | 183942           | 0.0              | 810       | 15472            | 0.0              | 940       | 17986            | 0.0              |
| 425       | 41887            | 10.2             | 555       | 442032           | 302.1            | 685       | 158373           | 0.0              | 815       | 17184            | 0.0              | 945       | 15266            | 0.0              |
| 430       | 69840            | 23.8             | 560       | 485515           | 271.4            | 690       | 137120           | 0.0              | 820       | 14166            | 0.0              | 950       | 21027            | 0.0              |
| 435       | 106868           | 47.8             | 565       | 532962           | 239.1            | 695       | 116757           | 0.0              | 825       | 13854            | 0.0              | 955       | 19232            | 0.0              |
| 440       | 164642           | 92.0             | 570       | 582457           | 205.6            | 700       | 102093           | 0.0              | 830       | 14283            | 0.0              | 960       | 11261            | 0.0              |
| 445       | 256049           | 171.5            | 575       | 634550           | 172.8            | 705       | 87819            | 0.0              | 835       | 14112            | 0.0              | 965       | 20156            | 0.0              |
| 450       | 327314           | 253.7            | 580       | 686476           | 141.4            | 710       | 78011            | 0.0              | 840       | 13092            | 0.0              | 970       | 22393            | 0.0              |
| 455       | 265614           | 232.1            | 585       | 730571           | 111.7            | 715       | 70264            | 0.0              | 845       | 12158            | 0.0              | 975       | 20121            | 0.0              |
| 460       | 168394           | 162.6            | 590       | 768228           | 85.5             | 720       | 63584            | 0.0              | 850       | 14790            | 0.0              | 980       | 28091            | 0.0              |
| 465       | 127370           | 134.5            | 595       | 780593           | 62.2             | 725       | 55749            | 0.0              | 855       | 15683            | 0.0              | 985       | 27040            | 0.0              |
| 470       | 94724            | 109.1            | 600       | 791888           | 44.6             | 730       | 48683            | 0.0              | 860       | 19011            | 0.0              | 990       | 20772            | 0.0              |
| 475       | 67810            | 84.8             | 605       | 789088           | 31.0             | 735       | 42520            | 0.0              | 865       | 18194            | 0.0              | 995       | 26800            | 0.0              |
| 480       | 59825            | 80.8             | 610       | 765121           | 20.7             | 740       | 37531            | 0.0              | 870       | 15713            | 0.0              | 1000      | 28539            | 0.0              |
| 485       | 61079            | 88.5             | 615       | 735839           | 13.6             | 745       | 34522            | 0.0              | 875       | 19703            | 0.0              |           |                  |                  |

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### Melanopic Flux vs. Wavelength


**Melanopic Lumens: 13012.4      M/P: 0.38**

| 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       | 11220            | 0.0              | 490       | 69401            | 57.8             | 620       | 692536           | 0.5              | 750       | 31541            | 0.0              | 880       | 18253            | 0.0              |
| 365       | 10182            | 0.0              | 495       | 90053            | 74.3             | 625       | 651217           | 0.3              | 755       | 28760            | 0.0              | 885       | 21369            | 0.0              |
| 370       | 10420            | 0.0              | 500       | 121940           | 98.0             | 630       | 598624           | 0.2              | 760       | 26534            | 0.0              | 890       | 16745            | 0.0              |
| 375       | 12164            | 0.0              | 505       | 159641           | 122.5            | 635       | 546251           | 0.1              | 765       | 24261            | 0.0              | 895       | 14205            | 0.0              |
| 380       | 12715            | 0.0              | 510       | 197034           | 141.5            | 640       | 499000           | 0.1              | 770       | 21584            | 0.0              | 900       | 14113            | 0.0              |
| 385       | 11387            | 0.0              | 515       | 232805           | 152.1            | 645       | 451749           | 0.0              | 775       | 20805            | 0.0              | 905       | 13457            | 0.0              |
| 390       | 10503            | 0.0              | 520       | 263165           | 153.2            | 650       | 406338           | 0.0              | 780       | 17853            | 0.0              | 910       | 12811            | 0.0              |
| 395       | 8950             | 0.0              | 525       | 288012           | 146.1            | 655       | 360522           | 0.0              | 785       | 17033            | 0.0              | 915       | 17471            | 0.0              |
| 400       | 8271             | 0.1              | 530       | 310825           | 134.3            | 660       | 321663           | 0.0              | 790       | 16986            | 0.0              | 920       | 15483            | 0.0              |
| 405       | 7777             | 0.1              | 535       | 330894           | 119.1            | 665       | 283133           | 0.0              | 795       | 16655            | 0.0              | 925       | 19757            | 0.0              |
| 410       | 9299             | 0.4              | 540       | 349086           | 102.2            | 670       | 244093           | 0.0              | 800       | 15070            | 0.0              | 930       | 16307            | 0.0              |
| 415       | 13971            | 0.9              | 545       | 372506           | 86.5             | 675       | 210996           | 0.0              | 805       | 15366            | 0.0              | 935       | 18687            | 0.0              |
| 420       | 23461            | 2.7              | 550       | 403721           | 72.5             | 680       | 183942           | 0.0              | 810       | 15472            | 0.0              | 940       | 17986            | 0.0              |
| 425       | 41887            | 6.5              | 555       | 442032           | 59.6             | 685       | 158373           | 0.0              | 815       | 17184            | 0.0              | 945       | 15266            | 0.0              |
| 430       | 69840            | 14.8             | 560       | 485515           | 47.9             | 690       | 137120           | 0.0              | 820       | 14166            | 0.0              | 950       | 21027            | 0.0              |
| 435       | 106868           | 28.5             | 565       | 532962           | 37.4             | 695       | 116757           | 0.0              | 825       | 13854            | 0.0              | 955       | 19232            | 0.0              |
| 440       | 164642           | 55.0             | 570       | 582457           | 28.5             | 700       | 102093           | 0.0              | 830       | 14283            | 0.0              | 960       | 11261            | 0.0              |
| 445       | 256049           | 101.0            | 575       | 634550           | 21.1             | 705       | 87819            | 0.0              | 835       | 14112            | 0.0              | 965       | 20156            | 0.0              |
| 450       | 327314           | 150.8            | 580       | 686476           | 15.4             | 710       | 78011            | 0.0              | 840       | 13092            | 0.0              | 970       | 22393            | 0.0              |
| 455       | 265614           | 139.2            | 585       | 730571           | 10.9             | 715       | 70264            | 0.0              | 845       | 12158            | 0.0              | 975       | 20121            | 0.0              |
| 460       | 168394           | 99.2             | 590       | 768228           | 7.5              | 720       | 63584            | 0.0              | 850       | 14790            | 0.0              | 980       | 28091            | 0.0              |
| 465       | 127370           | 83.2             | 595       | 780593           | 5.0              | 725       | 55749            | 0.0              | 855       | 15683            | 0.0              | 985       | 27040            | 0.0              |
| 470       | 94724            | 67.8             | 600       | 791888           | 3.3              | 730       | 48683            | 0.0              | 860       | 19011            | 0.0              | 990       | 20772            | 0.0              |
| 475       | 67810            | 51.8             | 605       | 789088           | 2.2              | 735       | 42520            | 0.0              | 865       | 18194            | 0.0              | 995       | 26800            | 0.0              |
| 480       | 59825            | 48.1             | 610       | 765121           | 1.4              | 740       | 37531            | 0.0              | 870       | 15713            | 0.0              | 1000      | 28539            | 0.0              |
| 485       | 61079            | 50.3             | 615       | 735839           | 0.9              | 745       | 34522            | 0.0              | 875       | 19703            | 0.0              |           |                  |                  |

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TM-30-18

### Summary

$R_f = 75.3$   
 $R_g = 95.8$   
 CIE  $R_a = 72.6$   
 $R_g = -28.6$

### Spectral Power Distribution Comparison



### Color Vector Graphics





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

|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 87 | CES26 = 66 | CES51 = 86 | CES76 = 63 |
| CES02 = 64 | CES27 = 88 | CES52 = 84 | CES77 = 79 |
| CES03 = 31 | CES28 = 86 | CES53 = 77 | CES78 = 66 |
| CES04 = 71 | CES29 = 65 | CES54 = 86 | CES79 = 87 |
| CES05 = 50 | CES30 = 77 | CES55 = 85 | CES80 = 85 |
| CES06 = 52 | CES31 = 69 | CES56 = 75 | CES81 = 67 |
| CES07 = 42 | CES32 = 63 | CES57 = 75 | CES82 = 93 |
| CES08 = 41 | CES33 = 74 | CES58 = 77 | CES83 = 89 |
| CES09 = 29 | CES34 = 77 | CES59 = 85 | CES84 = 90 |
| CES10 = 77 | CES35 = 88 | CES60 = 92 | CES85 = 74 |
| CES11 = 60 | CES36 = 98 | CES61 = 83 | CES86 = 59 |
| CES12 = 66 | CES37 = 86 | CES62 = 93 | CES87 = 77 |
| CES13 = 44 | CES38 = 85 | CES63 = 76 | CES88 = 79 |
| CES14 = 74 | CES39 = 95 | CES64 = 70 | CES89 = 65 |
| CES15 = 72 | CES40 = 91 | CES65 = 68 | CES90 = 78 |
| CES16 = 48 | CES41 = 89 | CES66 = 66 | CES91 = 86 |
| CES17 = 51 | CES42 = 86 | CES67 = 64 | CES92 = 59 |
| CES18 = 57 | CES43 = 75 | CES68 = 70 | CES93 = 74 |
| CES19 = 73 | CES44 = 99 | CES69 = 80 | CES94 = 50 |
| CES20 = 67 | CES45 = 83 | CES70 = 65 | CES95 = 69 |
| CES21 = 88 | CES46 = 78 | CES71 = 64 | CES96 = 77 |
| CES22 = 80 | CES47 = 80 | CES72 = 87 | CES97 = 81 |
| CES23 = 92 | CES48 = 70 | CES73 = 58 | CES98 = 76 |
| CES24 = 91 | CES49 = 76 | CES74 = 93 | CES99 = 66 |
| CES25 = 73 | CES50 = 85 | CES75 = 67 |            |



Color Rendition by Hue-Angle Bin



**Measure Comparisons**



(END OF REPORT)