

Signify Classified - Internal  
Cooper Lighting Solutions Photometric Lab  
1121 Highway 74 South  
Peachtree City, GA 30269



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: P510690

Luminaire Tested: **CTN-CA6-230-760-U-T4-HSS**

Issue Date: 4/6/2021

**Test Information**

Test Method: LM-79-08  
Report Number: P510690  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G3-2102-151-17)  
Test Lab: COOPER LIGHTING SOLUTIONS  
Issue Date: 4/6/2021  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: McGRAW-EDISON  
Catalog Number: CTN-CA6-230-760-U-T4-HSS  
Description: CELESTEON HIGH MAST LUMINAIRE  
Light Source: (6) 5700K CCT, 70 CRI LEDS  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 30390 lumens  
Efficiency: N/A  
Efficacy: 133.4 lumens/watt  
Luminous Opening: Circular (Dia: 2.08' x H: 0')  
IES Classification: Type IV - Short  
BUG Rating: B3 - U0 - G5

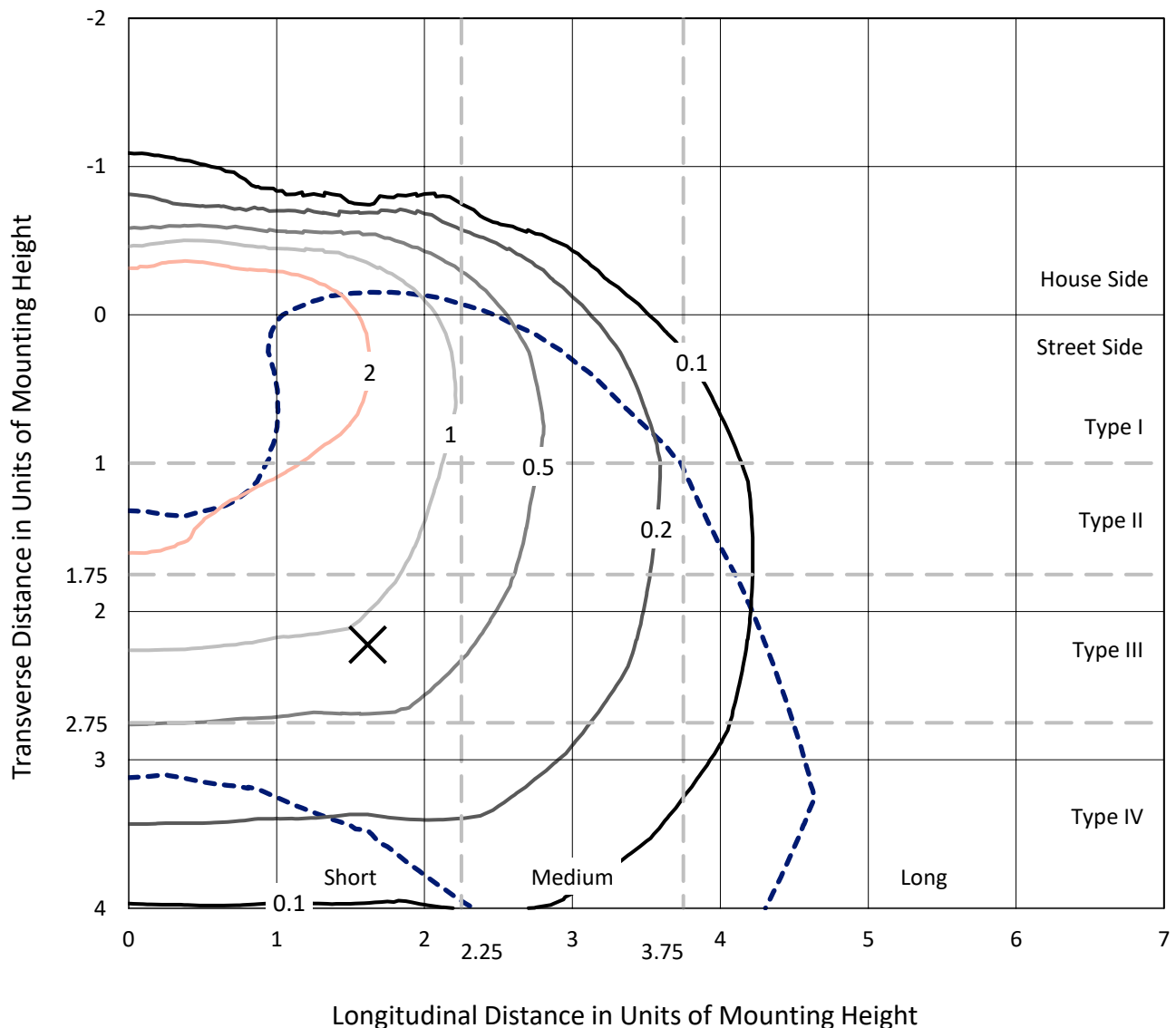
Input Watts (W): 227.8  
Input Voltage (V): 120  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: NR  
Total Harmonic Distortion (THDi): NR  
Frequency (hertz): 60  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 28.75 FT



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## Iso-Footcandle Lines of Horizontal Illumination

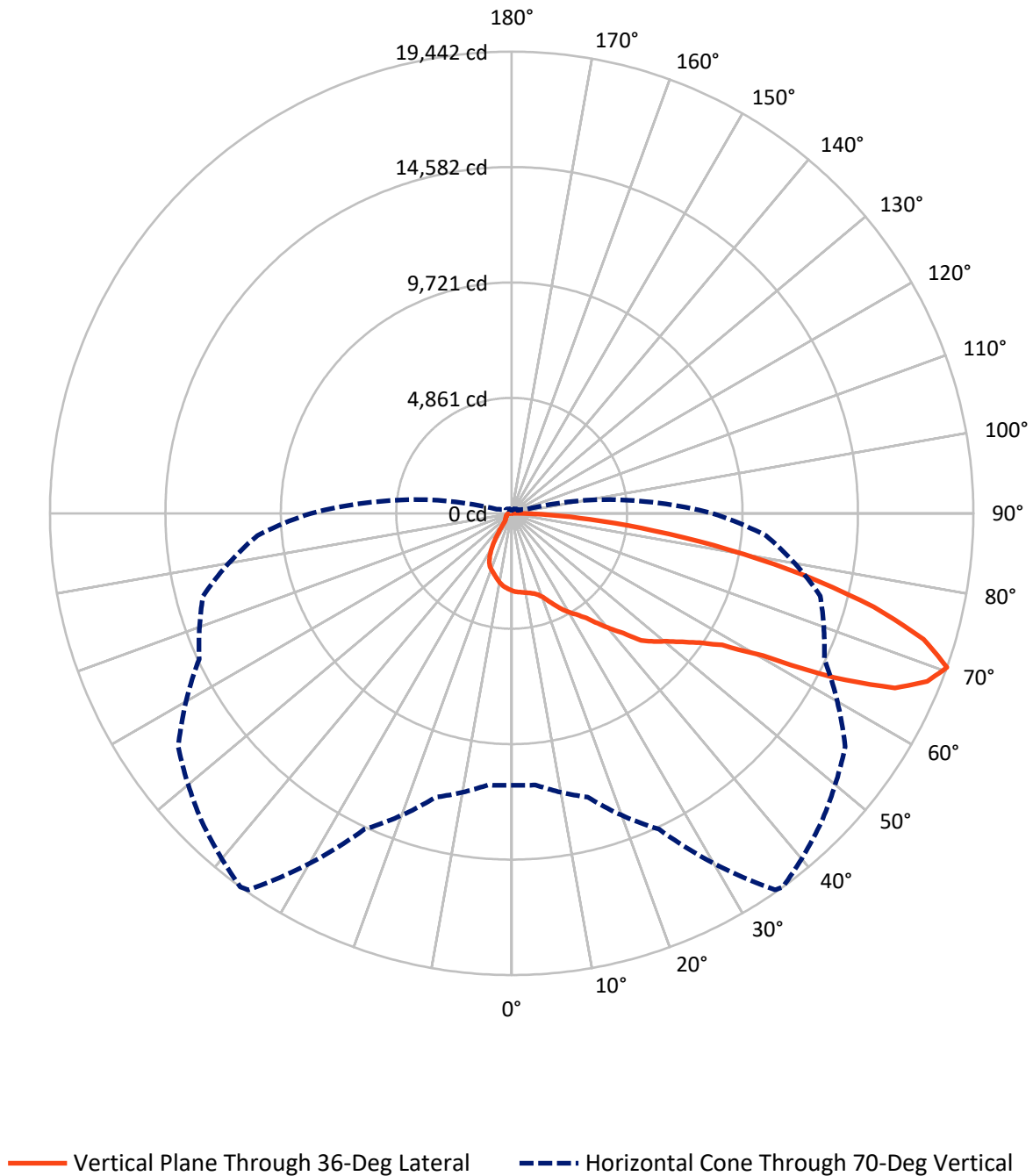
✕ Max cd  
 - - - 1/2 Max cd



Based on 30 foot mounting height. Maximum calculated value = 4.1 fc  
 Type IV - Short - N/A

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## Luminous Intensity Polar Plot



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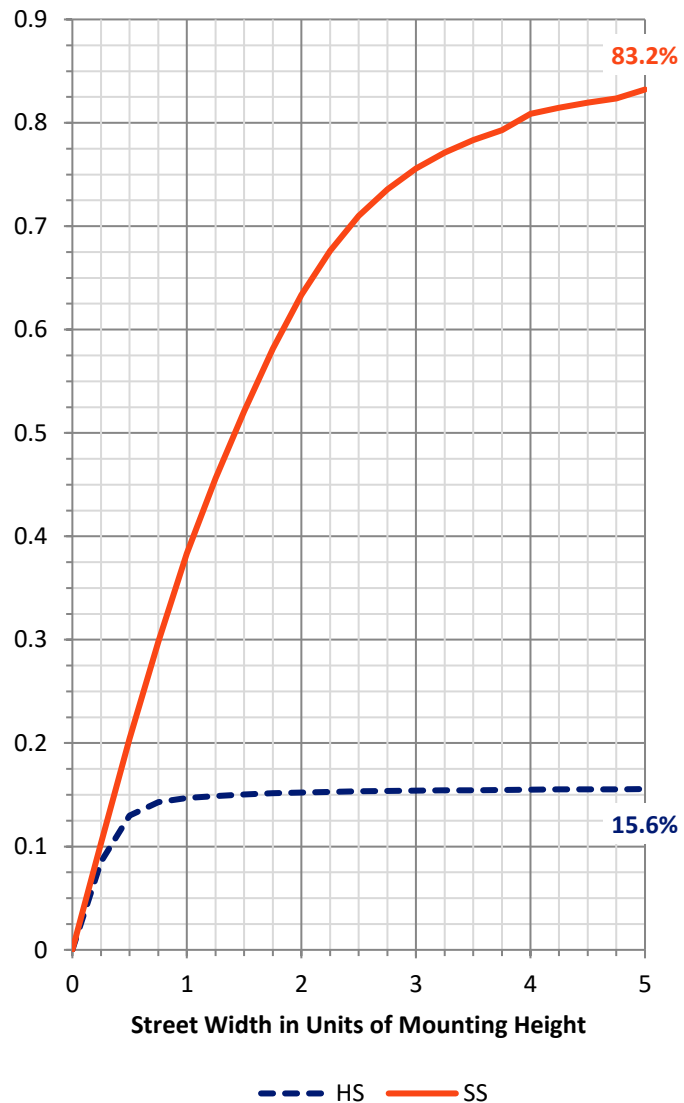
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total   |
|--------------------|-----------|----------|--------|---------|
| <b>House Side</b>  | Lumens    | 4795.8   | 0.0    | 4795.8  |
|                    | % Fixture | 15.8     | 0.0    | 15.8    |
| <b>Street Side</b> | Lumens    | 25594.2  | 0.0    | 25594.2 |
|                    | % Fixture | 84.2     | 0.0    | 84.2    |
| <b>Total</b>       | Lumens    | 30390.0  | 0.0    | 30390.0 |
|                    | % Fixture | 100.0    | 0.0    | 100.0   |

**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 308.8   | 1.0       |
| 10°-20°   | 918.4   | 3.0       |
| 20°-30°   | 1651.5  | 5.4       |
| 30°-40°   | 2613.4  | 8.6       |
| 40°-50°   | 4084.3  | 13.4      |
| 50°-60°   | 5865.0  | 19.3      |
| 60°-70°   | 7955.3  | 26.2      |
| 70°-80°   | 5887.8  | 19.4      |
| 80°-90°   | 1105.5  | 3.6       |
| 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°    | 30390.0 | 100.0     |
| 0°-180°   | 30390.0 | 100.0     |

**Coefficient of Utilization**



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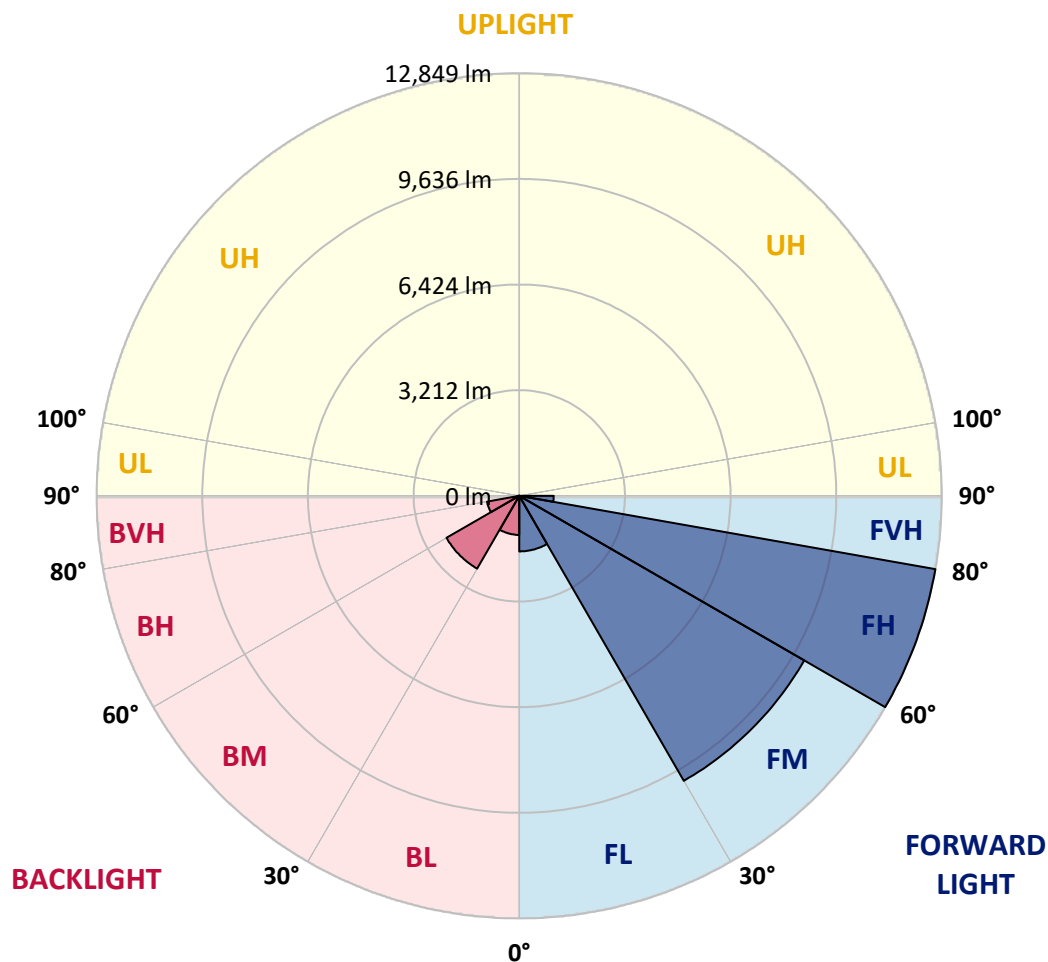
CATALOG NUMBER: CTN-CA6-230-760-U-T4-HSS

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

| Zone |             | Lumens  | % Fixture | Zone Rating/Lumen Limit |      |         |
|------|-------------|---------|-----------|-------------------------|------|---------|
|      |             |         |           | B                       | U    | G       |
| FL   | (0°-30°)    | 1690.3  | 5.6       |                         |      |         |
| FM   | (30°-60°)   | 10007.2 | 32.9      |                         |      |         |
| FH   | (60°-80°)   | 12848.6 | 42.3      |                         |      | G5      |
| FVH  | (80°-90°)   | 1048.2  | 3.4       |                         |      | G5      |
| BL   | (0°-30°)    | 1188.4  | 3.9       | B3/2500                 |      |         |
| BM   | (30°-60°)   | 2555.6  | 8.4       | B3/5000                 |      |         |
| BH   | (60°-80°)   | 994.5   | 3.3       | B2/1000                 |      | G2/1000 |
| BVH  | (80°-90°)   | 57.3    | 0.2       |                         |      | G1/100  |
| UL   | (90°-100°)  | 0.0     | 0.0       |                         | U0/0 |         |
| UH   | (100°-180°) | 0.0     | 0.0       |                         | U0/0 |         |

**BUG Rating: B3-U0-G5**

Type IV Short





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**CANDELA DISTRIBUTION (FULL):**

|       | 0°      | 5°      | 15°     | 25°     | 35°     | 36°     | 45°     | 55°     | 65°     | 75°     | 85°     |
|-------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| 0°    | 3256.1  | 3256.1  | 3256.1  | 3256.1  | 3256.1  | 3256.1  | 3256.1  | 3256.1  | 3256.1  | 3256.1  | 3256.1  |
| 2.5°  | 3322.1  | 3315.1  | 3309.5  | 3311.6  | 3307.4  | 3310.2  | 3303.8  | 3296.1  | 3277.9  | 3270.2  | 3266.7  |
| 5°    | 3351.6  | 3349.5  | 3343.8  | 3339.6  | 3331.9  | 3329.1  | 3322.1  | 3328.4  | 3318.6  | 3293.3  | 3278.6  |
| 7.5°  | 3369.1  | 3368.4  | 3362.1  | 3353.0  | 3357.2  | 3360.7  | 3367.7  | 3357.9  | 3345.2  | 3333.3  | 3303.1  |
| 10°   | 3376.8  | 3376.8  | 3369.1  | 3374.0  | 3395.8  | 3397.9  | 3401.4  | 3407.7  | 3395.8  | 3378.2  | 3348.0  |
| 12.5° | 3396.5  | 3395.1  | 3397.9  | 3414.0  | 3436.4  | 3441.4  | 3458.9  | 3458.9  | 3460.3  | 3449.8  | 3414.7  |
| 15°   | 3445.6  | 3445.6  | 3451.9  | 3466.6  | 3505.2  | 3508.0  | 3534.0  | 3557.1  | 3559.9  | 3544.5  | 3517.8  |
| 17.5° | 3559.2  | 3556.4  | 3552.9  | 3562.0  | 3603.4  | 3604.8  | 3649.7  | 3679.2  | 3686.9  | 3703.8  | 3699.5  |
| 20°   | 3775.3  | 3772.5  | 3771.8  | 3772.5  | 3769.7  | 3765.5  | 3809.7  | 3841.3  | 3880.6  | 3910.0  | 3924.8  |
| 22.5° | 4084.7  | 4078.4  | 4078.4  | 4044.0  | 4017.4  | 4021.6  | 4028.6  | 4046.1  | 4098.1  | 4150.0  | 4205.4  |
| 25°   | 4418.0  | 4413.8  | 4417.3  | 4329.6  | 4293.8  | 4307.8  | 4298.7  | 4326.1  | 4394.1  | 4439.0  | 4498.0  |
| 27.5° | 4690.2  | 4696.5  | 4676.9  | 4608.8  | 4585.7  | 4596.2  | 4575.1  | 4653.7  | 4728.8  | 4807.4  | 4896.5  |
| 30°   | 5029.1  | 4995.4  | 4947.0  | 4864.2  | 4855.8  | 4857.2  | 4855.8  | 4982.1  | 5137.8  | 5250.1  | 5373.6  |
| 32.5° | 5471.8  | 5477.4  | 5368.7  | 5173.6  | 5102.1  | 5092.2  | 5120.3  | 5305.5  | 5516.0  | 5765.1  | 5927.8  |
| 35°   | 5919.4  | 5928.5  | 5849.3  | 5645.8  | 5441.6  | 5410.8  | 5369.4  | 5610.0  | 5913.8  | 6413.3  | 6658.9  |
| 37.5° | 6394.4  | 6426.7  | 6332.7  | 6150.9  | 5908.9  | 5880.1  | 5684.4  | 5920.8  | 6369.8  | 7180.9  | 7502.9  |
| 40°   | 7030.1  | 6995.7  | 6882.0  | 6651.2  | 6426.0  | 6379.7  | 6152.4  | 6276.5  | 6956.4  | 8142.1  | 8375.7  |
| 42.5° | 7498.7  | 7488.9  | 7392.8  | 7164.8  | 6938.1  | 6901.0  | 6717.8  | 6852.6  | 7695.2  | 9116.6  | 9221.2  |
| 45°   | 7870.6  | 7930.9  | 7928.8  | 7785.7  | 7658.0  | 7636.9  | 7528.9  | 7727.4  | 8588.3  | 10036.4 | 9985.2  |
| 47.5° | 8201.0  | 8238.2  | 8178.6  | 8116.1  | 8056.5  | 8063.5  | 8143.5  | 8551.8  | 9501.1  | 10839.8 | 10613.1 |
| 50°   | 8742.0  | 8694.3  | 8426.9  | 8379.2  | 8463.4  | 8466.9  | 8710.4  | 9339.0  | 10506.5 | 11534.3 | 11145.0 |
| 52.5° | 9463.2  | 9411.3  | 8861.9  | 8780.6  | 8979.8  | 8994.5  | 9399.4  | 10123.4 | 11543.5 | 12198.1 | 11674.0 |
| 55°   | 10536.7 | 10416.0 | 9827.3  | 9462.5  | 9553.7  | 9613.4  | 10103.8 | 10877.6 | 12355.2 | 12783.2 | 12074.6 |
| 57.5° | 11855.0 | 11942.7 | 11641.0 | 10816.6 | 10437.0 | 10459.5 | 10909.9 | 11599.6 | 13071.6 | 13295.4 | 12308.9 |
| 60°   | 13248.4 | 13227.3 | 13353.6 | 13006.3 | 12279.4 | 12158.8 | 11929.3 | 12336.3 | 13626.5 | 13726.9 | 12550.3 |
| 62.5° | 14011.7 | 14134.5 | 14555.4 | 14624.9 | 15280.9 | 15217.1 | 13653.2 | 13249.8 | 14267.8 | 13997.7 | 12616.2 |
| 65°   | 14007.5 | 14060.8 | 14844.5 | 15706.1 | 17755.5 | 17737.2 | 17010.4 | 14570.9 | 14745.6 | 14142.2 | 12484.3 |
| 67.5° | 13102.4 | 13185.2 | 14101.5 | 15784.7 | 18899.1 | 18877.3 | 18375.0 | 16428.0 | 14895.7 | 13968.2 | 11869.0 |
| 70°   | 11452.3 | 11480.3 | 12374.2 | 14678.2 | 19358.6 | 19442.1 | 18422.0 | 17140.8 | 14522.5 | 13451.1 | 10747.1 |
| 72.5° | 9447.8  | 9389.5  | 10263.7 | 12534.8 | 18188.3 | 18138.5 | 17643.2 | 16289.8 | 13893.8 | 12447.1 | 8765.1  |
| 75°   | 6956.4  | 7118.5  | 7902.9  | 10064.5 | 15572.8 | 15755.2 | 15974.8 | 14987.6 | 12339.8 | 10258.1 | 6061.1  |
| 77.5° | 4593.4  | 4799.7  | 5592.5  | 7546.4  | 12328.6 | 12612.0 | 13181.0 | 12747.4 | 10038.5 | 7358.4  | 2886.4  |
| 80°   | 2373.5  | 2529.3  | 3242.8  | 5007.3  | 8838.1  | 9247.1  | 10290.4 | 9654.8  | 7117.1  | 3327.0  | 646.2   |
| 82.5° | 898.1   | 877.7   | 1453.0  | 2866.0  | 5666.8  | 6038.7  | 6797.1  | 5789.6  | 2532.8  | 584.4   | 300.3   |
| 85°   | 394.3   | 417.5   | 602.0   | 1307.1  | 3240.0  | 3288.4  | 3850.4  | 2257.1  | 371.1   | 279.2   | 204.2   |
| 87.5° | 170.5   | 195.7   | 252.6   | 376.1   | 1093.1  | 1262.2  | 1561.8  | 717.0   | 112.3   | 96.8    | 102.4   |
| 90°   | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     |



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CATALOG NUMBER: CTN-CA6-230-760-U-T4-HSS

**CANDELA DISTRIBUTION (continued):**

|       | 90°     | 95°    | 105°   | 115°   | 125°   | 135°   | 145°   | 155°   | 165°   | 175°   | 180°   |
|-------|---------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 3256.1  | 3256.1 | 3256.1 | 3256.1 | 3256.1 | 3256.1 | 3256.1 | 3256.1 | 3256.1 | 3256.1 | 3256.1 |
| 2.5°  | 3260.3  | 3256.1 | 3249.1 | 3231.6 | 3202.8 | 3199.3 | 3196.5 | 3193.7 | 3188.1 | 3190.9 | 3207.0 |
| 5°    | 3267.4  | 3259.6 | 3234.4 | 3209.1 | 3183.9 | 3161.4 | 3134.1 | 3123.5 | 3109.5 | 3100.4 | 3117.2 |
| 7.5°  | 3291.2  | 3275.1 | 3237.9 | 3203.5 | 3134.8 | 3101.8 | 3066.7 | 3025.3 | 2995.8 | 2976.9 | 2993.7 |
| 10°   | 3331.2  | 3310.9 | 3264.6 | 3193.7 | 3113.0 | 3022.5 | 2960.8 | 2892.0 | 2835.9 | 2820.4 | 2835.9 |
| 12.5° | 3396.5  | 3366.3 | 3312.3 | 3216.1 | 3073.0 | 2954.4 | 2837.3 | 2746.8 | 2656.3 | 2630.3 | 2638.0 |
| 15°   | 3502.4  | 3478.5 | 3395.8 | 3263.2 | 3073.7 | 2892.7 | 2718.7 | 2572.8 | 2454.2 | 2412.8 | 2410.0 |
| 17.5° | 3672.2  | 3646.9 | 3551.5 | 3356.5 | 3099.0 | 2844.3 | 2602.2 | 2379.8 | 2200.2 | 2109.0 | 2094.3 |
| 20°   | 3915.6  | 3880.6 | 3736.0 | 3494.0 | 3153.7 | 2823.2 | 2494.2 | 2195.3 | 1916.1 | 1744.9 | 1718.9 |
| 22.5° | 4186.5  | 4149.3 | 3936.0 | 3599.9 | 3193.0 | 2781.9 | 2391.1 | 1991.1 | 1623.5 | 1414.4 | 1385.0 |
| 25°   | 4523.2  | 4441.8 | 4127.5 | 3700.3 | 3183.9 | 2694.9 | 2223.4 | 1714.0 | 1315.5 | 1134.5 | 1114.8 |
| 27.5° | 4855.8  | 4752.7 | 4322.6 | 3752.9 | 3143.9 | 2556.6 | 1977.8 | 1389.9 | 1030.0 | 901.6  | 885.4  |
| 30°   | 5268.3  | 5069.1 | 4495.9 | 3777.4 | 3042.8 | 2349.7 | 1648.8 | 1056.6 | 771.1  | 682.7  | 667.2  |
| 32.5° | 5758.8  | 5457.1 | 4658.6 | 3750.1 | 2874.5 | 2033.9 | 1281.8 | 773.9  | 573.2  | 517.8  | 517.1  |
| 35°   | 6405.6  | 5932.8 | 4837.5 | 3660.3 | 2616.3 | 1693.7 | 898.8  | 529.0  | 446.9  | 428.0  | 431.5  |
| 37.5° | 7162.0  | 6576.8 | 5019.3 | 3512.9 | 2324.4 | 1295.9 | 599.2  | 407.6  | 392.9  | 393.6  | 394.3  |
| 40°   | 7959.7  | 7288.2 | 5264.1 | 3306.0 | 1970.1 | 938.0  | 431.5  | 366.2  | 365.5  | 372.6  | 374.7  |
| 42.5° | 8721.6  | 7979.3 | 5565.8 | 3030.2 | 1599.0 | 620.2  | 374.0  | 349.4  | 340.3  | 343.1  | 345.2  |
| 45°   | 9429.5  | 8572.2 | 5822.6 | 2761.5 | 1201.1 | 442.7  | 366.9  | 329.8  | 315.7  | 314.3  | 315.7  |
| 47.5° | 9999.9  | 9047.2 | 5979.1 | 2445.8 | 856.0  | 367.6  | 352.2  | 311.5  | 291.9  | 287.7  | 285.6  |
| 50°   | 10434.2 | 9400.1 | 6035.9 | 2088.0 | 578.8  | 350.8  | 332.6  | 290.5  | 266.6  | 267.3  | 267.3  |
| 52.5° | 10858.0 | 9720.7 | 5969.9 | 1727.3 | 425.9  | 336.1  | 319.2  | 273.6  | 248.4  | 261.7  | 265.2  |
| 55°   | 11163.2 | 9855.4 | 5777.7 | 1337.3 | 355.0  | 317.8  | 304.5  | 254.0  | 236.4  | 258.2  | 265.2  |
| 57.5° | 11341.4 | 9961.4 | 5424.8 | 965.4  | 325.5  | 300.3  | 285.6  | 235.7  | 219.6  | 225.2  | 228.7  |
| 60°   | 11452.3 | 9813.3 | 4958.2 | 660.2  | 310.1  | 286.3  | 266.6  | 223.8  | 202.1  | 188.7  | 186.6  |
| 62.5° | 11391.2 | 9442.9 | 4343.6 | 453.9  | 294.0  | 270.8  | 250.5  | 212.6  | 183.8  | 166.3  | 164.9  |
| 65°   | 10893.8 | 8757.4 | 3334.7 | 367.6  | 284.1  | 263.8  | 240.6  | 202.1  | 171.2  | 154.4  | 152.2  |
| 67.5° | 9971.2  | 7525.4 | 1947.6 | 326.9  | 279.9  | 256.8  | 232.9  | 192.2  | 164.2  | 145.9  | 143.1  |
| 70°   | 8455.0  | 5660.5 | 652.5  | 291.9  | 279.2  | 256.1  | 226.6  | 185.2  | 156.5  | 137.5  | 134.7  |
| 72.5° | 6099.7  | 3415.4 | 317.8  | 256.8  | 261.0  | 245.6  | 221.7  | 179.6  | 151.5  | 127.7  | 122.8  |
| 75°   | 3466.6  | 1112.0 | 287.0  | 221.7  | 242.8  | 234.3  | 218.9  | 180.3  | 153.7  | 115.8  | 110.2  |
| 77.5° | 986.5   | 324.8  | 277.1  | 188.7  | 229.4  | 242.1  | 204.9  | 162.8  | 157.2  | 107.3  | 100.3  |
| 80°   | 333.3   | 289.1  | 267.3  | 146.6  | 185.2  | 200.0  | 177.5  | 143.1  | 158.6  | 97.5   | 90.5   |
| 82.5° | 267.3   | 290.5  | 224.5  | 117.2  | 141.0  | 151.5  | 141.0  | 128.4  | 128.4  | 87.0   | 81.4   |
| 85°   | 214.0   | 269.4  | 142.4  | 93.3   | 105.2  | 116.5  | 99.6   | 96.1   | 89.8   | 73.0   | 70.9   |
| 87.5° | 124.2   | 84.2   | 58.9   | 47.7   | 44.2   | 44.9   | 38.6   | 46.3   | 56.8   | 49.8   | 49.1   |
| 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

(formerly Eaton)

STREETWORKS

Report Number: SP1-2104-215-3

Luminaire Tested: CST-CA6-230-757-U-T4

Test Date: 04/21/2021

### Test Information

Test Method: LM-79-08  
 Report Number: SP1-2104-215-3  
 Test Lab: COOPER LIGHTING SOLUTIONS  
 Photometer: SP1  
 Measurement Geometry:  $4\pi$   
 Issue Date: 04/21/2021  
 Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
 Product Line: STREETWORKS  
 Catalog Number: **CST-CA6-230-757-U-T4**  
 Description: STREETWORKS HIGH MAST LUMINAIRE

### Spectral Parameters

|                           |        |           |      |      |       |
|---------------------------|--------|-----------|------|------|-------|
| CCT (K):                  | 5385   | CRI (Ra): | 74.4 |      |       |
| CIE u':                   | 0.2065 | R1:       | 71.8 | R9:  | -25.2 |
| CIE v':                   | 0.4808 | R2:       | 79.4 | R10: | 50.6  |
| Duv:                      | 0.0018 | R3:       | 84.2 | R11: | 72.0  |
| CIE x:                    | 0.3351 | R4:       | 74.7 | R12: | 46.0  |
| CIE y:                    | 0.3467 | R5:       | 72.8 | R13: | 73.1  |
| CIE z:                    | 0.3182 | R6:       | 71.2 | R14: | 91.2  |
| Peak Wavelength (nm):     | 450    | R7:       | 82.2 |      |       |
| Dominant Wavelength (nm): | 560    | R8:       | 58.6 |      |       |
| Purity:                   | 4.7    |           |      |      |       |
| Rf:                       | 75.3   |           |      |      |       |
| Rg:                       | 94.2   |           |      |      |       |



### Test Conditions

Stabilization Time: 66M  
 Operation Time: 12H  
 Room Temperature (°C) / RH%: 25.7/32%  
 Sphere Temperature (°C): 24.8

REPORT NUMBER: SP1-2104-215-3

| 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: SP1-2104-215-3

**CIE 1931 Chromaticity Diagram**



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



Point lies inside the ANSI 5700K 7-step quadrangle

REPORT NUMBER: SP1-2104-215-3

### 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       | 16696            | 0.0              | 490       | 164243           | 23.3             | 620       | 415797           | 108.2            | 750       | 22190            | 0.0              | 880       | 22866            | 0.0              |
| 365       | 13447            | 0.0              | 495       | 207773           | 37.7             | 625       | 382869           | 84.5             | 755       | 18942            | 0.0              | 885       | 21901            | 0.0              |
| 370       | 14521            | 0.0              | 500       | 267487           | 59.0             | 630       | 344785           | 62.4             | 760       | 18760            | 0.0              | 890       | 20912            | 0.0              |
| 375       | 15598            | 0.0              | 505       | 333279           | 93.2             | 635       | 309549           | 46.5             | 765       | 19375            | 0.0              | 895       | 19858            | 0.0              |
| 380       | 16553            | 0.0              | 510       | 393084           | 135.0            | 640       | 280226           | 33.5             | 770       | 16788            | 0.0              | 900       | 21828            | 0.0              |
| 385       | 15196            | 0.0              | 515       | 446481           | 185.0            | 645       | 249624           | 24.0             | 775       | 17302            | 0.0              | 905       | 17086            | 0.0              |
| 390       | 13481            | 0.0              | 520       | 488198           | 236.7            | 650       | 224464           | 16.4             | 780       | 15672            | 0.0              | 910       | 17542            | 0.0              |
| 395       | 11977            | 0.0              | 525       | 518433           | 278.3            | 655       | 199646           | 11.5             | 785       | 14771            | 0.0              | 915       | 16185            | 0.0              |
| 400       | 11331            | 0.0              | 530       | 543281           | 319.9            | 660       | 175926           | 7.3              | 790       | 13984            | 0.0              | 920       | 17995            | 0.0              |
| 405       | 11814            | 0.0              | 535       | 561190           | 348.0            | 665       | 155139           | 4.9              | 795       | 14040            | 0.0              | 925       | 15557            | 0.0              |
| 410       | 16208            | 0.0              | 540       | 572451           | 373.0            | 670       | 134630           | 2.9              | 800       | 13342            | 0.0              | 930       | 26095            | 0.0              |
| 415       | 26808            | 0.0              | 545       | 585457           | 389.7            | 675       | 117218           | 2.0              | 805       | 14668            | 0.0              | 935       | 19199            | 0.0              |
| 420       | 50871            | 0.1              | 550       | 599090           | 407.1            | 680       | 102027           | 1.2              | 810       | 14789            | 0.0              | 940       | 23080            | 0.0              |
| 425       | 101020           | 0.5              | 555       | 616995           | 421.4            | 685       | 89213            | 0.8              | 815       | 17650            | 0.0              | 945       | 26343            | 0.0              |
| 430       | 192411           | 1.5              | 560       | 629425           | 427.7            | 690       | 78917            | 0.4              | 820       | 14937            | 0.0              | 950       | 29934            | 0.0              |
| 435       | 336902           | 4.0              | 565       | 636833           | 423.4            | 695       | 68780            | 0.3              | 825       | 16011            | 0.0              | 955       | 22346            | 0.0              |
| 440       | 581105           | 9.1              | 570       | 639836           | 416.0            | 700       | 60229            | 0.2              | 830       | 16981            | 0.0              | 960       | 16017            | 0.0              |
| 445       | 974221           | 20.3             | 575       | 636704           | 396.2            | 705       | 53321            | 0.1              | 835       | 15554            | 0.0              | 965       | 18299            | 0.0              |
| 450       | 1195987          | 31.0             | 580       | 633339           | 376.3            | 710       | 47871            | 0.1              | 840       | 16030            | 0.0              | 970       | 16401            | 0.0              |
| 455       | 889289           | 29.8             | 585       | 623206           | 346.3            | 715       | 44671            | 0.0              | 845       | 19004            | 0.0              | 975       | 23481            | 0.0              |
| 460       | 566512           | 23.2             | 590       | 607134           | 313.9            | 720       | 40236            | 0.0              | 850       | 18632            | 0.0              | 980       | 26457            | 0.0              |
| 465       | 410582           | 21.2             | 595       | 578226           | 274.1            | 725       | 35616            | 0.0              | 855       | 21549            | 0.0              | 985       | 32065            | 0.0              |
| 470       | 276356           | 17.2             | 600       | 554348           | 238.9            | 730       | 31102            | 0.0              | 860       | 21257            | 0.0              | 990       | 31414            | 0.0              |
| 475       | 187504           | 14.7             | 605       | 526616           | 203.9            | 735       | 28341            | 0.0              | 865       | 20272            | 0.0              | 995       | 30650            | 0.0              |
| 480       | 156769           | 14.9             | 610       | 490933           | 168.7            | 740       | 25553            | 0.0              | 870       | 20808            | 0.0              | 1000      | 26490            | 0.0              |
| 485       | 151040           | 17.9             | 615       | 453646           | 136.9            | 745       | 23976            | 0.0              | 875       | 22729            | 0.0              |           |                  |                  |

REPORT NUMBER: SP1-2104-215-3

### Scotopic Flux vs. Wavelength



Scotopic Lumens: 72376.6

S/P: 1.89

| 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       | 16696            | 0.0              | 490       | 164243           | 252.9            | 620       | 415797           | 5.2              | 750       | 22190            | 0.0              | 880       | 22866            | 0.0              |
| 365       | 13447            | 0.0              | 495       | 207773           | 335.9            | 625       | 382869           | 3.2              | 755       | 18942            | 0.0              | 885       | 21901            | 0.0              |
| 370       | 14521            | 0.0              | 500       | 267487           | 447.4            | 630       | 344785           | 2.0              | 760       | 18760            | 0.0              | 890       | 20912            | 0.0              |
| 375       | 15598            | 0.0              | 505       | 333279           | 566.6            | 635       | 309549           | 1.2              | 765       | 19375            | 0.0              | 895       | 19858            | 0.0              |
| 380       | 16553            | 0.0              | 510       | 393084           | 666.2            | 640       | 280226           | 0.7              | 770       | 16788            | 0.0              | 900       | 21828            | 0.0              |
| 385       | 15196            | 0.0              | 515       | 446481           | 740.0            | 645       | 249624           | 0.4              | 775       | 17302            | 0.0              | 905       | 17086            | 0.0              |
| 390       | 13481            | 0.1              | 520       | 488198           | 776.0            | 650       | 224464           | 0.3              | 780       | 15672            | 0.0              | 910       | 17542            | 0.0              |
| 395       | 11977            | 0.1              | 525       | 518433           | 775.6            | 655       | 199646           | 0.2              | 785       | 14771            | 0.0              | 915       | 16185            | 0.0              |
| 400       | 11331            | 0.2              | 530       | 543281           | 749.0            | 660       | 175926           | 0.1              | 790       | 13984            | 0.0              | 920       | 17995            | 0.0              |
| 405       | 11814            | 0.4              | 535       | 561190           | 699.3            | 665       | 155139           | 0.1              | 795       | 14040            | 0.0              | 925       | 15557            | 0.0              |
| 410       | 16208            | 1.0              | 540       | 572451           | 632.6            | 670       | 134630           | 0.0              | 800       | 13342            | 0.0              | 930       | 26095            | 0.0              |
| 415       | 26808            | 2.8              | 545       | 585457           | 561.3            | 675       | 117218           | 0.0              | 805       | 14668            | 0.0              | 935       | 19199            | 0.0              |
| 420       | 50871            | 8.4              | 550       | 599090           | 489.9            | 680       | 102027           | 0.0              | 810       | 14789            | 0.0              | 940       | 23080            | 0.0              |
| 425       | 101020           | 24.7             | 555       | 616995           | 421.7            | 685       | 89213            | 0.0              | 815       | 17650            | 0.0              | 945       | 26343            | 0.0              |
| 430       | 192411           | 65.5             | 560       | 629425           | 351.8            | 690       | 78917            | 0.0              | 820       | 14937            | 0.0              | 950       | 29934            | 0.0              |
| 435       | 336902           | 150.6            | 565       | 636833           | 285.7            | 695       | 68780            | 0.0              | 825       | 16011            | 0.0              | 955       | 22346            | 0.0              |
| 440       | 581105           | 324.8            | 570       | 639836           | 225.8            | 700       | 60229            | 0.0              | 830       | 16981            | 0.0              | 960       | 16017            | 0.0              |
| 445       | 974221           | 652.3            | 575       | 636704           | 173.4            | 705       | 53321            | 0.0              | 835       | 15554            | 0.0              | 965       | 18299            | 0.0              |
| 450       | 1195987          | 927.0            | 580       | 633339           | 130.5            | 710       | 47871            | 0.0              | 840       | 16030            | 0.0              | 970       | 16401            | 0.0              |
| 455       | 889289           | 777.1            | 585       | 623206           | 95.2             | 715       | 44671            | 0.0              | 845       | 19004            | 0.0              | 975       | 23481            | 0.0              |
| 460       | 566512           | 547.2            | 590       | 607134           | 67.6             | 720       | 40236            | 0.0              | 850       | 18632            | 0.0              | 980       | 26457            | 0.0              |
| 465       | 410582           | 433.6            | 595       | 578226           | 46.1             | 725       | 35616            | 0.0              | 855       | 21549            | 0.0              | 985       | 32065            | 0.0              |
| 470       | 276356           | 318.2            | 600       | 554348           | 31.2             | 730       | 31102            | 0.0              | 860       | 21257            | 0.0              | 990       | 31414            | 0.0              |
| 475       | 187504           | 234.4            | 605       | 526616           | 20.7             | 735       | 28341            | 0.0              | 865       | 20272            | 0.0              | 995       | 30650            | 0.0              |
| 480       | 156769           | 211.8            | 610       | 490933           | 13.3             | 740       | 25553            | 0.0              | 870       | 20808            | 0.0              | 1000      | 26490            | 0.0              |
| 485       | 151040           | 218.9            | 615       | 453646           | 8.4              | 745       | 23976            | 0.0              | 875       | 22729            | 0.0              |           |                  |                  |

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### Melanopic Flux vs. Wavelength



**Melanopic Lumens: 29860.2**      **M/P: 0.78**

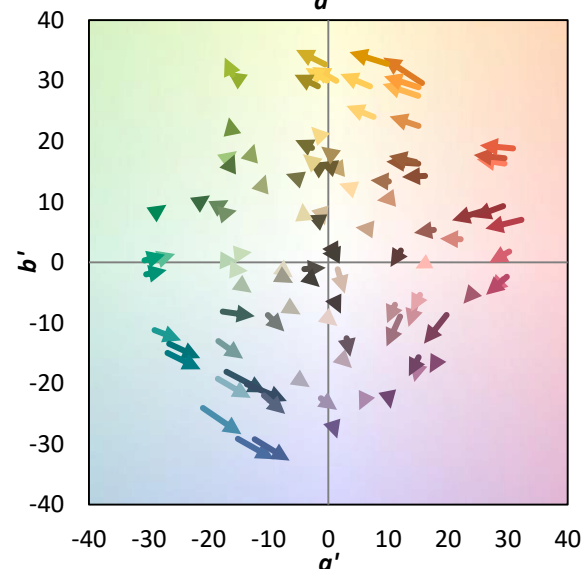
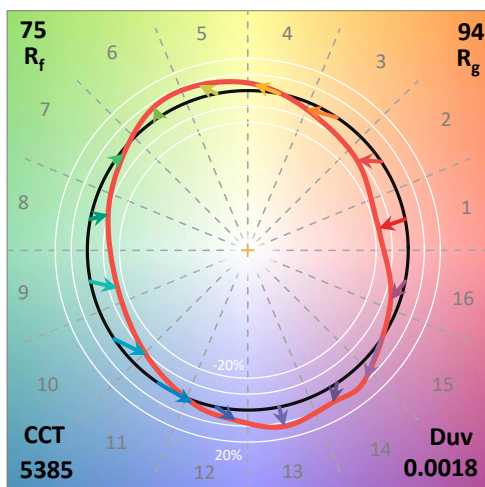
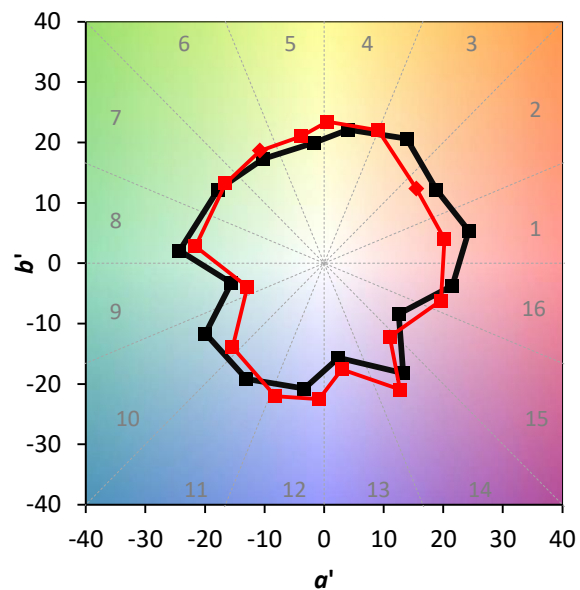
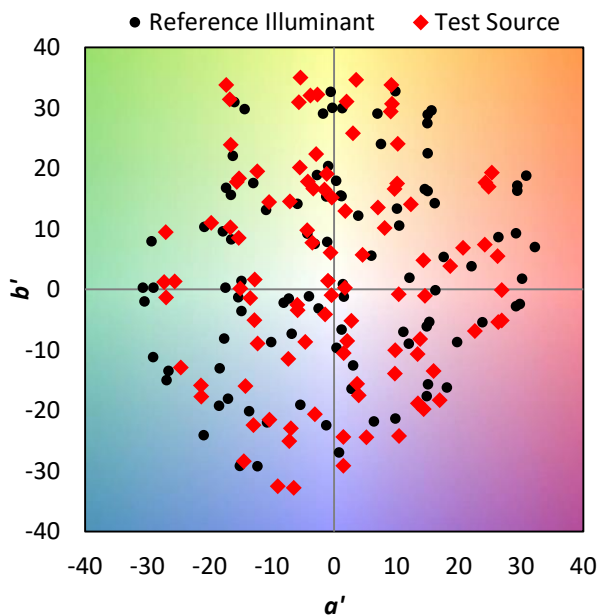
| λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) |
|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|
| 360       | 16696            | 0.0              | 490       | 164243           | 136.7            | 620       | 415797           | 0.3              | 750       | 22190            | 0.0              | 880       | 22866            | 0.0              |
| 365       | 13447            | 0.0              | 495       | 207773           | 171.5            | 625       | 382869           | 0.2              | 755       | 18942            | 0.0              | 885       | 21901            | 0.0              |
| 370       | 14521            | 0.0              | 500       | 267487           | 215.0            | 630       | 344785           | 0.1              | 760       | 18760            | 0.0              | 890       | 20912            | 0.0              |
| 375       | 15598            | 0.0              | 505       | 333279           | 255.8            | 635       | 309549           | 0.1              | 765       | 19375            | 0.0              | 895       | 19858            | 0.0              |
| 380       | 16553            | 0.0              | 510       | 393084           | 282.2            | 640       | 280226           | 0.0              | 770       | 16788            | 0.0              | 900       | 21828            | 0.0              |
| 385       | 15196            | 0.0              | 515       | 446481           | 291.7            | 645       | 249624           | 0.0              | 775       | 17302            | 0.0              | 905       | 17086            | 0.0              |
| 390       | 13481            | 0.0              | 520       | 488198           | 284.2            | 650       | 224464           | 0.0              | 780       | 15672            | 0.0              | 910       | 17542            | 0.0              |
| 395       | 11977            | 0.1              | 525       | 518433           | 262.9            | 655       | 199646           | 0.0              | 785       | 14771            | 0.0              | 915       | 16185            | 0.0              |
| 400       | 11331            | 0.1              | 530       | 543281           | 234.8            | 660       | 175926           | 0.0              | 790       | 13984            | 0.0              | 920       | 17995            | 0.0              |
| 405       | 11814            | 0.2              | 535       | 561190           | 202.0            | 665       | 155139           | 0.0              | 795       | 14040            | 0.0              | 925       | 15557            | 0.0              |
| 410       | 16208            | 0.6              | 540       | 572451           | 167.5            | 670       | 134630           | 0.0              | 800       | 13342            | 0.0              | 930       | 26095            | 0.0              |
| 415       | 26808            | 1.8              | 545       | 585457           | 136.0            | 675       | 117218           | 0.0              | 805       | 14668            | 0.0              | 935       | 19199            | 0.0              |
| 420       | 50871            | 5.8              | 550       | 599090           | 107.5            | 680       | 102027           | 0.0              | 810       | 14789            | 0.0              | 940       | 23080            | 0.0              |
| 425       | 101020           | 15.7             | 555       | 616995           | 83.2             | 685       | 89213            | 0.0              | 815       | 17650            | 0.0              | 945       | 26343            | 0.0              |
| 430       | 192411           | 40.6             | 560       | 629425           | 62.1             | 690       | 78917            | 0.0              | 820       | 14937            | 0.0              | 950       | 29934            | 0.0              |
| 435       | 336902           | 89.9             | 565       | 636833           | 44.7             | 695       | 68780            | 0.0              | 825       | 16011            | 0.0              | 955       | 22346            | 0.0              |
| 440       | 581105           | 194.2            | 570       | 639836           | 31.3             | 700       | 60229            | 0.0              | 830       | 16981            | 0.0              | 960       | 16017            | 0.0              |
| 445       | 974221           | 384.3            | 575       | 636704           | 21.2             | 705       | 53321            | 0.0              | 835       | 15554            | 0.0              | 965       | 18299            | 0.0              |
| 450       | 1195987          | 551.1            | 580       | 633339           | 14.2             | 710       | 47871            | 0.0              | 840       | 16030            | 0.0              | 970       | 16401            | 0.0              |
| 455       | 889289           | 465.9            | 585       | 623206           | 9.3              | 715       | 44671            | 0.0              | 845       | 19004            | 0.0              | 975       | 23481            | 0.0              |
| 460       | 566512           | 333.8            | 590       | 607134           | 6.0              | 720       | 40236            | 0.0              | 850       | 18632            | 0.0              | 980       | 26457            | 0.0              |
| 465       | 410582           | 268.3            | 595       | 578226           | 3.7              | 725       | 35616            | 0.0              | 855       | 21549            | 0.0              | 985       | 32065            | 0.0              |
| 470       | 276356           | 197.8            | 600       | 554348           | 2.3              | 730       | 31102            | 0.0              | 860       | 21257            | 0.0              | 990       | 31414            | 0.0              |
| 475       | 187504           | 143.2            | 605       | 526616           | 1.5              | 735       | 28341            | 0.0              | 865       | 20272            | 0.0              | 995       | 30650            | 0.0              |
| 480       | 156769           | 126.0            | 610       | 490933           | 0.9              | 740       | 25553            | 0.0              | 870       | 20808            | 0.0              | 1000      | 26490            | 0.0              |
| 485       | 151040           | 124.5            | 615       | 453646           | 0.5              | 745       | 23976            | 0.0              | 875       | 22729            | 0.0              |           |                  |                  |

### Summary

$R_f = 75.3$   
 $R_g = 94.2$   
 CIE  $R_a = 74.4$   
 $R_g = -25.2$



### Color Vector Graphics



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

|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 85 | CES26 = 64 | CES51 = 91 | CES76 = 51 |
| CES02 = 59 | CES27 = 89 | CES52 = 91 | CES77 = 67 |
| CES03 = 30 | CES28 = 81 | CES53 = 81 | CES78 = 53 |
| CES04 = 69 | CES29 = 69 | CES54 = 86 | CES79 = 80 |
| CES05 = 46 | CES30 = 87 | CES55 = 84 | CES80 = 76 |
| CES06 = 50 | CES31 = 72 | CES56 = 76 | CES81 = 79 |
| CES07 = 38 | CES32 = 63 | CES57 = 76 | CES82 = 90 |
| CES08 = 38 | CES33 = 81 | CES58 = 76 | CES83 = 89 |
| CES09 = 29 | CES34 = 70 | CES59 = 87 | CES84 = 85 |
| CES10 = 72 | CES35 = 83 | CES60 = 89 | CES85 = 78 |
| CES11 = 55 | CES36 = 88 | CES61 = 83 | CES86 = 78 |
| CES12 = 61 | CES37 = 78 | CES62 = 83 | CES87 = 77 |
| CES13 = 41 | CES38 = 97 | CES63 = 76 | CES88 = 82 |
| CES14 = 74 | CES39 = 96 | CES64 = 67 | CES89 = 75 |
| CES15 = 70 | CES40 = 91 | CES65 = 64 | CES90 = 82 |
| CES16 = 46 | CES41 = 96 | CES66 = 60 | CES91 = 72 |
| CES17 = 48 | CES42 = 79 | CES67 = 57 | CES92 = 62 |
| CES18 = 55 | CES43 = 78 | CES68 = 65 | CES93 = 77 |
| CES19 = 71 | CES44 = 99 | CES69 = 73 | CES94 = 57 |
| CES20 = 64 | CES45 = 87 | CES70 = 57 | CES95 = 66 |
| CES21 = 85 | CES46 = 86 | CES71 = 49 | CES96 = 78 |
| CES22 = 77 | CES47 = 89 | CES72 = 83 | CES97 = 87 |
| CES23 = 91 | CES48 = 82 | CES73 = 47 | CES98 = 78 |
| CES24 = 90 | CES49 = 84 | CES74 = 90 | CES99 = 65 |
| CES25 = 71 | CES50 = 91 | CES75 = 51 |            |



Color Rendition by Hue-Angle Bin



**Measure Comparisons**



(END OF REPORT)