

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: STREETWORKS

Report Number: P510587

Luminaire Tested: **CST-CA10-760-727-U-T2**

Issue Date: 4/6/2021

**Test Information**

Test Method: LM-79-08  
Report Number: P510587  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G3-2102-151-10)  
Test Lab: COOPER LIGHTING SOLUTIONS  
Issue Date: 4/6/2021  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: STREETWORKS  
Catalog Number: CST-CA10-760-727-U-T2  
Description: CELESTEON HIGH MAST LUMINAIRE  
Light Source: (10) 2700K CCT, 70 CRI LEDS  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 89545 lumens  
Efficiency: N/A  
Efficacy: 117.5 lumens/watt  
Luminous Opening: Circular (Dia: 2.08' x H: 0')  
IES Classification: Type II - Short  
BUG Rating: B5 - U0 - G5

Input Watts (W): 761.9  
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: 24 FT

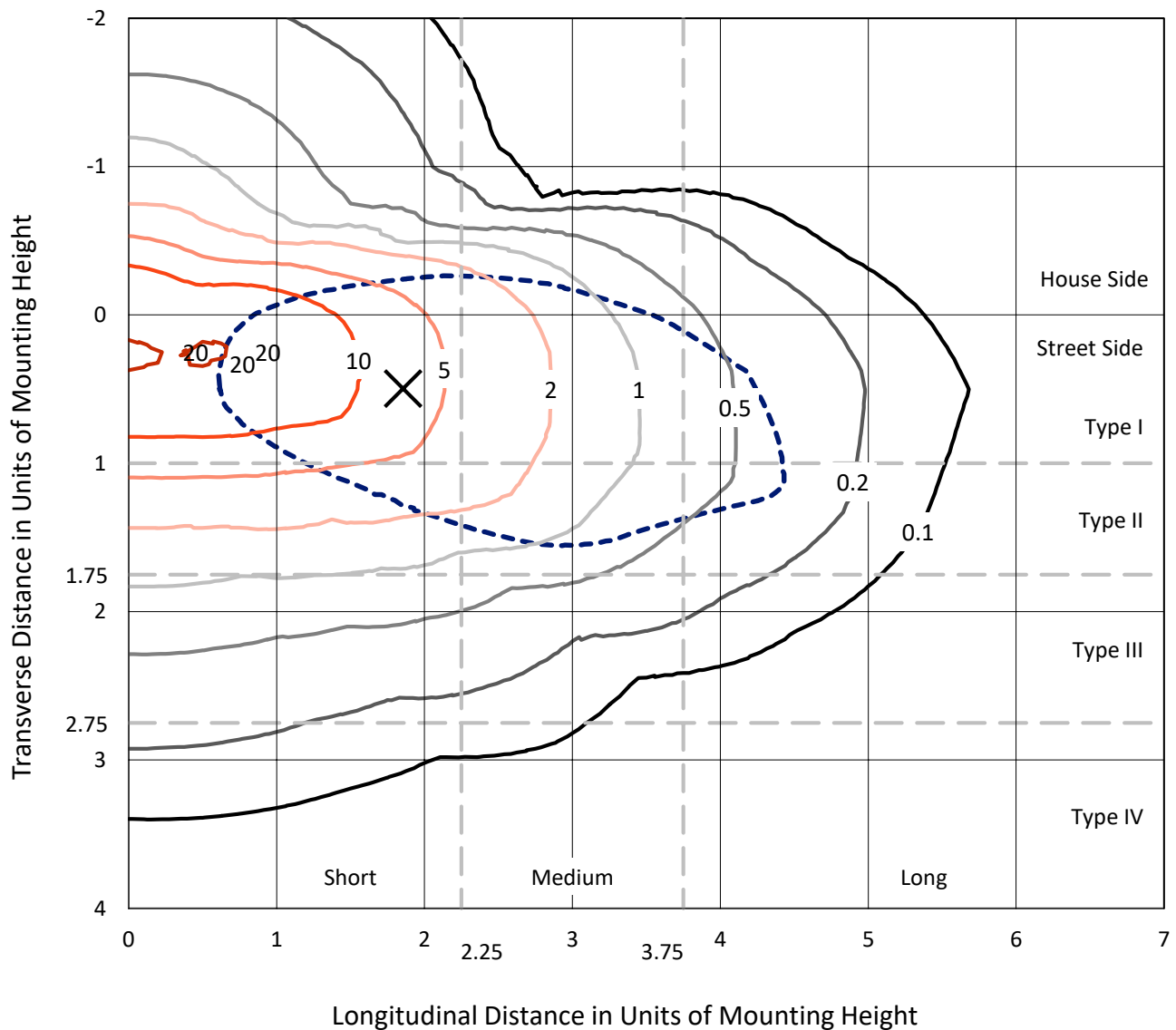


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## Iso-Footcandle Lines of Horizontal Illumination

✕ Max cd  
 - - - 1/2 Max cd

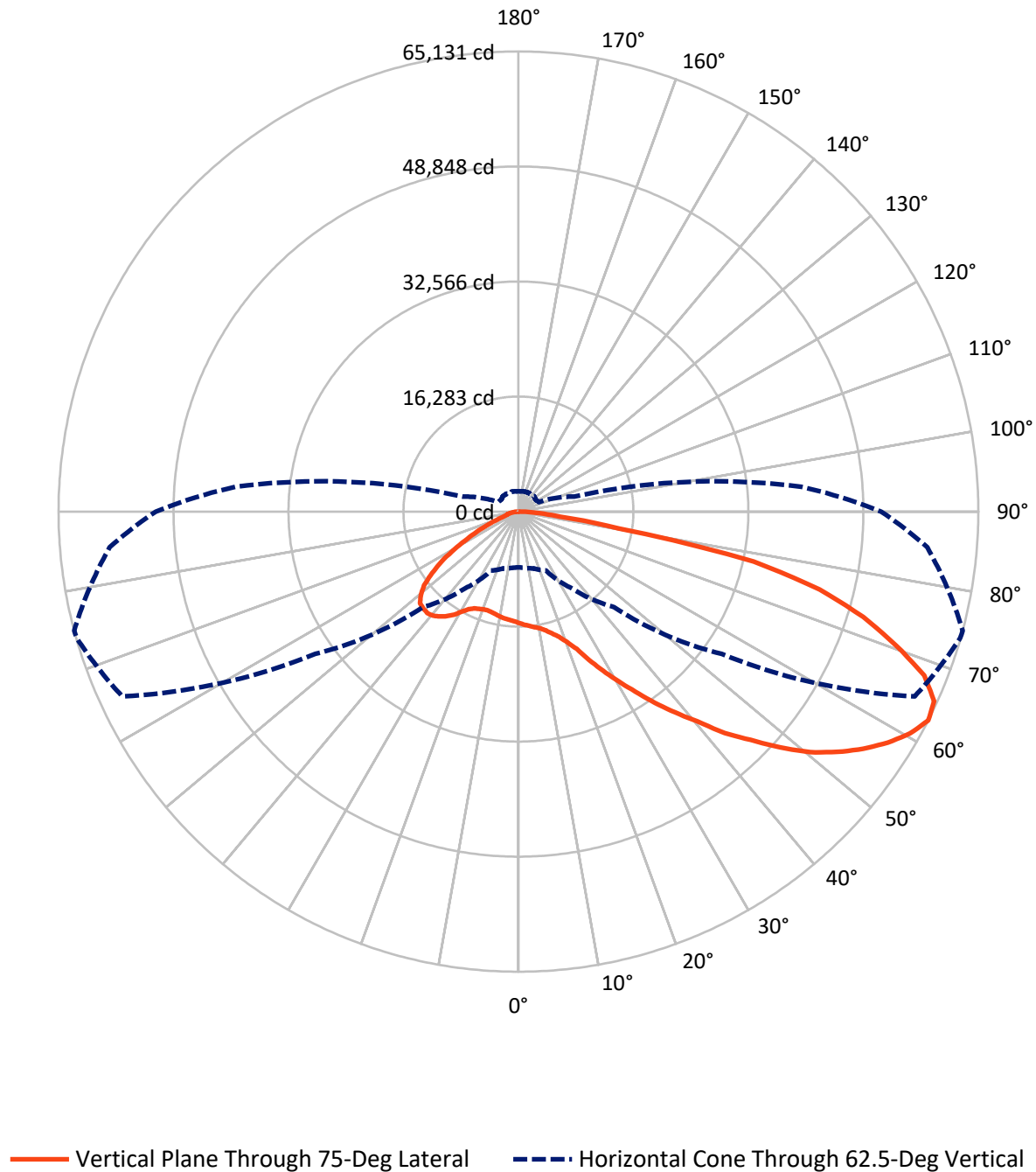


Based on 30 foot mounting height. Maximum calculated value = 20.6 fc  
 Type II - Short - N/A

FIELD PERFORMANCE MAY DIFFER FROM LABORATORY PERFORMANCE

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## Luminous Intensity Polar Plot



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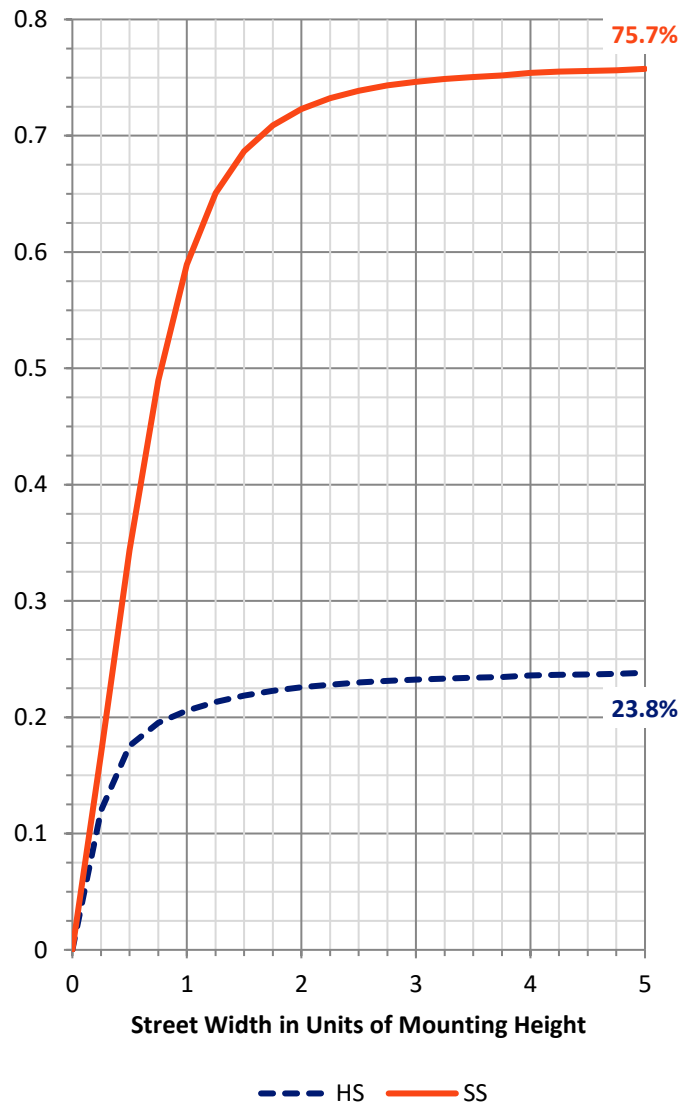
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total   |
|--------------------|-----------|----------|--------|---------|
| <b>House Side</b>  | Lumens    | 21695.2  | 0.0    | 21695.2 |
|                    | % Fixture | 24.2     | 0.0    | 24.2    |
| <b>Street Side</b> | Lumens    | 67849.8  | 0.0    | 67849.8 |
|                    | % Fixture | 75.8     | 0.0    | 75.8    |
| <b>Total</b>       | Lumens    | 89545.0  | 0.0    | 89545.0 |
|                    | % Fixture | 100.0    | 0.0    | 100.0   |

**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 1518.5  | 1.7       |
| 10°-20°   | 4608.7  | 5.1       |
| 20°-30°   | 7948.8  | 8.9       |
| 30°-40°   | 11720.7 | 13.1      |
| 40°-50°   | 15450.4 | 17.3      |
| 50°-60°   | 18183.7 | 20.3      |
| 60°-70°   | 18091.0 | 20.2      |
| 70°-80°   | 10550.2 | 11.8      |
| 80°-90°   | 1473.1  | 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°    | 89545.0 | 100.0     |
| 0°-180°   | 89545.0 | 100.0     |

**Coefficient of Utilization**



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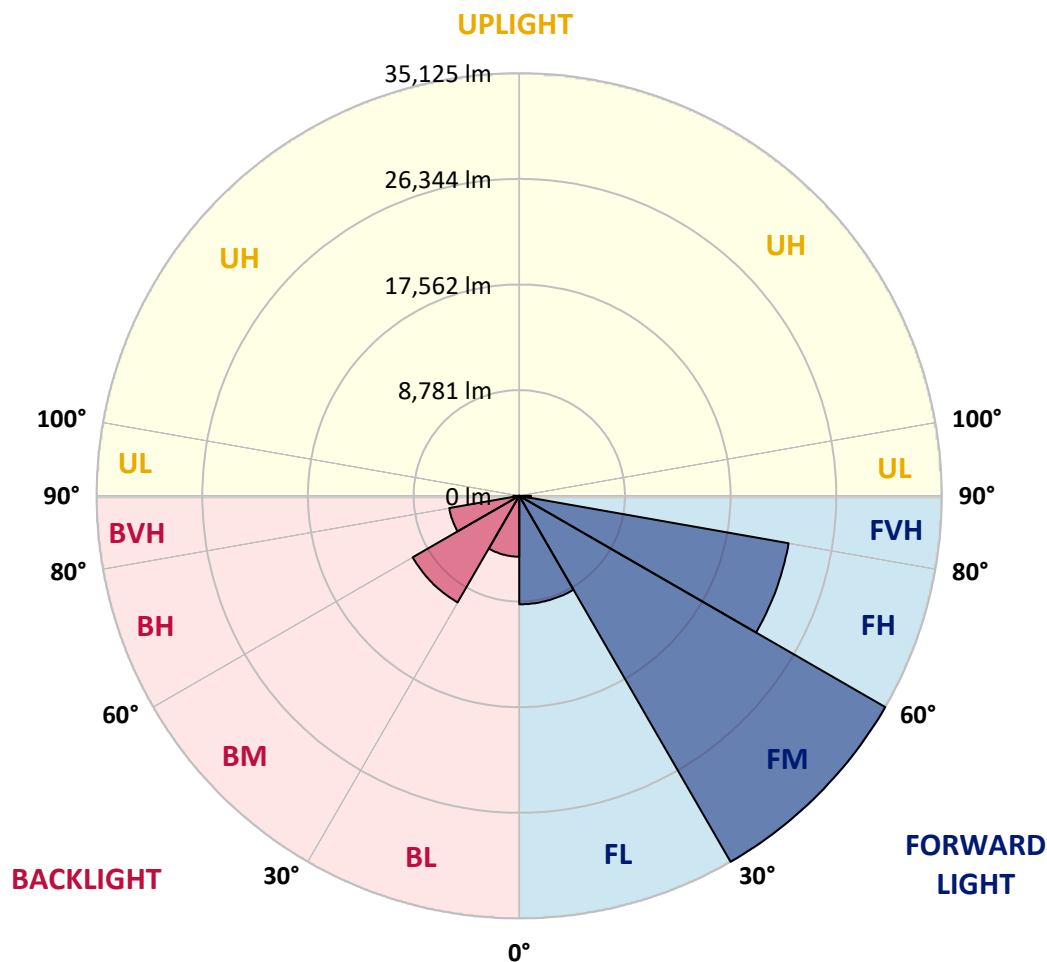
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**LUMINAIRE CLASSIFICATION SYSTEM LUMEN TABLE AND BUG RATING:**

| Zone |             | Lumens  | % Fixture | Zone Rating/Lumen Limit |      |        |
|------|-------------|---------|-----------|-------------------------|------|--------|
|      |             |         |           | B                       | U    | G      |
| FL   | (0°-30°)    | 9016.8  | 10.1      |                         |      |        |
| FM   | (30°-60°)   | 35124.8 | 39.2      |                         |      |        |
| FH   | (60°-80°)   | 22730.7 | 25.4      |                         |      | G5     |
| FVH  | (80°-90°)   | 977.5   | 1.1       |                         |      | G5     |
| BL   | (0°-30°)    | 5059.2  | 5.6       | B5                      |      |        |
| BM   | (30°-60°)   | 10229.9 | 11.4      | B5                      |      |        |
| BH   | (60°-80°)   | 5910.5  | 6.6       | B5                      |      | G5     |
| BVH  | (80°-90°)   | 495.6   | 0.6       |                         |      | G3/500 |
| UL   | (90°-100°)  | 0.0     | 0.0       |                         | U0/0 |        |
| UH   | (100°-180°) | 0.0     | 0.0       |                         | U0/0 |        |

**BUG Rating: B5-U0-G5**

Type II Short



FIELD PERFORMANCE MAY DIFFER FROM LABORATORY PERFORMANCE

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**CANDELA DISTRIBUTION (FULL):**

|       | 0°      | 5°      | 15°     | 25°     | 35°     | 45°     | 55°     | 65°     | 74°     | 75°     | 85°     |
|-------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| 0°    | 15784.7 | 15784.7 | 15784.7 | 15784.7 | 15784.7 | 15784.7 | 15784.7 | 15784.7 | 15784.7 | 15784.7 | 15784.7 |
| 2.5°  | 16649.1 | 16580.9 | 16590.1 | 16542.2 | 16470.3 | 16416.9 | 16276.8 | 16125.7 | 16035.4 | 16028.0 | 15899.0 |
| 5°    | 17485.8 | 17507.9 | 17513.4 | 17360.4 | 17209.3 | 17037.9 | 16824.2 | 16533.0 | 16295.2 | 16258.4 | 16007.7 |
| 7.5°  | 18248.7 | 18246.9 | 18235.8 | 18151.1 | 18081.0 | 17826.7 | 17399.1 | 16942.1 | 16555.1 | 16520.1 | 16112.8 |
| 10°   | 19030.1 | 19024.6 | 18914.0 | 18772.1 | 18613.6 | 18379.6 | 18012.8 | 17465.5 | 16838.9 | 16792.8 | 16210.5 |
| 12.5° | 19881.6 | 19820.8 | 19750.7 | 19579.3 | 19391.4 | 18985.9 | 18600.7 | 18005.5 | 17351.2 | 17268.3 | 16383.7 |
| 15°   | 20583.7 | 20521.1 | 20423.4 | 20307.3 | 20110.1 | 19800.5 | 19391.4 | 18685.5 | 17983.4 | 17902.3 | 16772.6 |
| 17.5° | 21278.5 | 21249.0 | 21179.0 | 21055.5 | 20904.4 | 20637.2 | 20261.2 | 19662.3 | 18742.6 | 18643.1 | 17419.4 |
| 20°   | 21848.0 | 21778.0 | 21726.4 | 21783.5 | 21796.4 | 21599.2 | 21392.8 | 20889.7 | 19876.1 | 19723.1 | 18213.7 |
| 22.5° | 22172.4 | 22157.6 | 22439.6 | 22649.7 | 22734.4 | 22778.7 | 22714.2 | 22308.7 | 21390.9 | 21123.7 | 19319.5 |
| 25°   | 22480.1 | 22456.2 | 22839.5 | 23364.7 | 23864.2 | 24118.5 | 24289.9 | 24343.3 | 23501.1 | 23259.7 | 21097.9 |
| 27.5° | 22489.3 | 22555.7 | 23112.2 | 23993.2 | 24754.3 | 25530.2 | 26352.1 | 26446.1 | 25707.1 | 25515.4 | 23121.5 |
| 30°   | 22539.1 | 22568.6 | 23119.6 | 24131.4 | 25716.3 | 26960.3 | 28031.0 | 28560.0 | 27922.3 | 27833.8 | 25349.6 |
| 32.5° | 21907.0 | 21945.7 | 22802.6 | 24372.8 | 26442.4 | 28440.2 | 29861.1 | 30646.2 | 30487.7 | 30375.3 | 27727.0 |
| 35°   | 21249.0 | 21282.2 | 22277.4 | 24030.0 | 26982.4 | 29783.7 | 31514.2 | 33056.7 | 33346.1 | 33261.3 | 30378.9 |
| 37.5° | 20217.0 | 20327.6 | 21370.7 | 23620.9 | 27076.4 | 30771.5 | 33091.7 | 35458.1 | 36331.6 | 36077.3 | 33183.9 |
| 40°   | 19096.5 | 19177.6 | 20392.1 | 22763.9 | 26971.4 | 31420.2 | 34641.7 | 38115.6 | 39173.4 | 39037.1 | 35968.6 |
| 42.5° | 17681.1 | 17898.6 | 19114.9 | 21669.2 | 26431.4 | 31823.8 | 36075.5 | 41128.8 | 42665.8 | 42848.2 | 38526.6 |
| 45°   | 16488.7 | 16483.2 | 17612.9 | 20084.3 | 25452.8 | 31919.6 | 37395.0 | 44175.2 | 46423.5 | 46080.7 | 41908.3 |
| 47.5° | 15086.3 | 15143.4 | 16322.9 | 18506.8 | 24009.8 | 31615.6 | 38423.4 | 47776.2 | 50052.3 | 49866.1 | 44682.0 |
| 50°   | 11840.9 | 12251.8 | 14485.5 | 17150.4 | 22058.1 | 30767.8 | 39280.3 | 51283.4 | 53456.2 | 53540.9 | 47203.1 |
| 52.5° | 10208.0 | 10366.5 | 11599.4 | 15784.7 | 20325.7 | 29345.1 | 40220.2 | 55229.1 | 56745.8 | 56530.2 | 50065.2 |
| 55°   | 9553.8  | 9638.6  | 10230.1 | 13331.8 | 18650.5 | 27142.7 | 40671.7 | 58832.0 | 59311.2 | 59276.2 | 52420.4 |
| 57.5° | 9080.1  | 9144.6  | 9564.8  | 11125.8 | 16811.3 | 24315.7 | 40290.2 | 61176.2 | 61920.8 | 61692.3 | 54643.0 |
| 60°   | 8396.4  | 8448.0  | 9074.6  | 10025.6 | 14918.6 | 21461.0 | 37944.2 | 62239.6 | 63813.5 | 63728.7 | 56607.6 |
| 62.5° | 7882.2  | 7970.7  | 8320.9  | 9212.8  | 13302.3 | 19109.4 | 35148.5 | 61907.9 | 65055.6 | 65131.2 | 58107.7 |
| 65°   | 7338.6  | 7417.8  | 7714.5  | 8494.1  | 11837.2 | 17563.2 | 32133.4 | 60245.5 | 64484.3 | 64685.2 | 58351.0 |
| 67.5° | 6667.7  | 6728.6  | 7080.6  | 7755.1  | 10125.1 | 16016.9 | 28733.2 | 57306.1 | 61314.4 | 61961.3 | 55929.4 |
| 70°   | 5823.7  | 5845.8  | 6277.0  | 6735.9  | 8407.5  | 13685.6 | 22846.9 | 52494.2 | 56727.4 | 56740.3 | 51357.1 |
| 72.5° | 4635.0  | 4653.4  | 4767.7  | 5116.0  | 6315.7  | 10830.9 | 16792.8 | 43861.9 | 51150.7 | 51056.7 | 45644.0 |
| 75°   | 3151.4  | 3313.6  | 3709.8  | 4041.6  | 4555.7  | 7605.8  | 10443.9 | 29551.5 | 43336.6 | 44073.8 | 37492.7 |
| 77.5° | 2489.8  | 2504.5  | 2668.6  | 2972.7  | 3416.8  | 5681.8  | 5853.2  | 16350.5 | 32308.5 | 34061.1 | 29470.4 |
| 80°   | 1736.0  | 1761.8  | 1673.4  | 1747.1  | 2382.9  | 3888.6  | 3420.5  | 7115.6  | 13473.7 | 14386.0 | 17694.0 |
| 82.5° | 827.5   | 857.0   | 984.1   | 914.1   | 1185.0  | 1653.1  | 1806.1  | 3676.7  | 5820.0  | 5973.0  | 6888.9  |
| 85°   | 545.5   | 545.5   | 547.4   | 517.9   | 691.1   | 720.6   | 820.1   | 1568.3  | 2841.8  | 2937.6  | 2921.1  |
| 87.5° | 175.1   | 193.5   | 188.0   | 219.3   | 265.4   | 239.6   | 250.6   | 492.1   | 974.9   | 965.7   | 807.2   |
| 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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CATALOG NUMBER: CST-CA10-760-727-U-T2

**CANDELA DISTRIBUTION (continued):**

|       | 90°     | 95°     | 105°    | 115°    | 125°    | 135°    | 145°    | 155°    | 165°    | 175°    | 180°    |
|-------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| 0°    | 15784.7 | 15784.7 | 15784.7 | 15784.7 | 15784.7 | 15784.7 | 15784.7 | 15784.7 | 15784.7 | 15784.7 | 15784.7 |
| 2.5°  | 15806.9 | 15731.3 | 15554.4 | 15399.6 | 15246.6 | 15130.5 | 15031.0 | 14898.3 | 14835.6 | 14778.5 | 14898.3 |
| 5°    | 15852.9 | 15718.4 | 15401.4 | 15084.4 | 14793.2 | 14579.5 | 14448.6 | 14352.8 | 14266.2 | 14266.2 | 14306.7 |
| 7.5°  | 15906.4 | 15723.9 | 15270.6 | 14820.9 | 14384.1 | 14140.8 | 13954.7 | 13833.1 | 13763.0 | 13766.7 | 13853.3 |
| 10°   | 15941.4 | 15661.3 | 15121.3 | 14515.0 | 14039.5 | 13648.8 | 13466.3 | 13291.2 | 13158.6 | 13079.3 | 13167.8 |
| 12.5° | 15981.9 | 15641.0 | 14920.4 | 14236.7 | 13658.0 | 13215.7 | 12836.0 | 12705.2 | 12576.2 | 12476.7 | 12524.6 |
| 15°   | 16232.6 | 15718.4 | 14752.7 | 13882.8 | 13212.0 | 12661.0 | 12163.4 | 11923.8 | 11886.9 | 11818.7 | 11835.3 |
| 17.5° | 16641.7 | 15926.6 | 14644.0 | 13449.7 | 12675.7 | 12025.2 | 11394.9 | 11085.3 | 11011.5 | 10976.5 | 10995.0 |
| 20°   | 17251.7 | 16322.9 | 14677.1 | 13145.7 | 12071.2 | 11343.3 | 10528.7 | 10165.6 | 9920.5  | 9935.3  | 10007.1 |
| 22.5° | 18184.2 | 16962.4 | 14857.7 | 12812.1 | 11417.0 | 10462.3 | 9640.4  | 9146.5  | 8899.5  | 8846.1  | 8927.2  |
| 25°   | 19669.6 | 17992.6 | 15056.8 | 12493.3 | 10784.9 | 9511.4  | 8601.0  | 8066.5  | 7749.5  | 7729.3  | 7819.6  |
| 27.5° | 21573.4 | 19572.0 | 15489.9 | 12216.8 | 9999.8  | 8368.8  | 7463.9  | 7006.8  | 6669.6  | 6629.0  | 6599.6  |
| 30°   | 23521.4 | 21326.4 | 16273.1 | 11796.6 | 9083.8  | 7189.3  | 6402.4  | 6044.8  | 5667.0  | 5514.1  | 5547.2  |
| 32.5° | 25585.5 | 22961.1 | 17190.9 | 11501.8 | 8059.2  | 6151.7  | 5468.0  | 5127.0  | 4780.6  | 4559.4  | 4507.8  |
| 35°   | 27664.3 | 24586.6 | 17963.1 | 11061.3 | 7087.9  | 5327.9  | 4673.7  | 4321.7  | 4019.4  | 3838.8  | 3825.9  |
| 37.5° | 30097.0 | 26278.4 | 18582.3 | 10593.2 | 6079.8  | 4682.9  | 3896.0  | 3693.2  | 3547.6  | 3389.2  | 3405.7  |
| 40°   | 32533.3 | 28250.4 | 19078.1 | 9819.2  | 5243.2  | 3990.0  | 3315.4  | 3356.0  | 3387.3  | 3254.6  | 3243.6  |
| 42.5° | 34556.9 | 29907.1 | 19304.7 | 8816.6  | 4502.3  | 3387.3  | 3059.3  | 3243.6  | 3379.9  | 3293.3  | 3282.3  |
| 45°   | 36611.7 | 31302.3 | 19216.3 | 7572.6  | 3886.8  | 3099.8  | 3039.0  | 3227.0  | 3402.1  | 3381.8  | 3372.6  |
| 47.5° | 38845.4 | 33130.4 | 19063.3 | 6155.4  | 3446.3  | 3072.2  | 3083.2  | 3171.7  | 3392.8  | 3429.7  | 3415.0  |
| 50°   | 41576.6 | 34813.0 | 18158.4 | 4793.5  | 3232.5  | 3116.4  | 3182.7  | 3136.7  | 3324.7  | 3400.2  | 3413.1  |
| 52.5° | 44294.9 | 36108.6 | 16947.6 | 4154.0  | 3147.7  | 3158.8  | 3321.0  | 3164.3  | 3247.3  | 3313.6  | 3374.4  |
| 55°   | 46392.2 | 37428.2 | 14988.6 | 3768.8  | 3120.1  | 3179.1  | 3359.7  | 3223.3  | 3221.5  | 3221.5  | 3241.7  |
| 57.5° | 48539.2 | 39195.5 | 13029.6 | 3520.0  | 3072.2  | 3201.2  | 3313.6  | 3234.4  | 3208.5  | 3171.7  | 3147.7  |
| 60°   | 50033.8 | 39849.8 | 10512.1 | 3356.0  | 3022.4  | 3169.8  | 3184.6  | 3173.5  | 3094.3  | 3059.3  | 3031.6  |
| 62.5° | 51360.8 | 40205.5 | 8184.5  | 3168.0  | 2954.2  | 3096.1  | 3018.7  | 2994.8  | 2948.7  | 2863.9  | 2878.7  |
| 65°   | 51005.1 | 39442.5 | 6236.5  | 2956.1  | 2906.3  | 3007.7  | 2873.1  | 2816.0  | 2819.7  | 2731.2  | 2760.7  |
| 67.5° | 48716.1 | 36020.2 | 4478.3  | 2631.7  | 2775.5  | 2832.6  | 2707.3  | 2664.9  | 2602.2  | 2558.0  | 2598.5  |
| 70°   | 44092.2 | 31930.7 | 3020.6  | 2183.9  | 2476.9  | 2600.4  | 2517.4  | 2443.7  | 2346.1  | 2316.6  | 2360.8  |
| 72.5° | 37111.2 | 26654.4 | 2084.4  | 1756.3  | 2137.8  | 2298.1  | 2266.8  | 2191.2  | 2121.2  | 2193.1  | 2279.7  |
| 75°   | 30487.7 | 19719.4 | 1701.0  | 1439.3  | 1643.9  | 1914.8  | 2007.0  | 2029.1  | 2239.2  | 2939.5  | 3011.4  |
| 77.5° | 21945.7 | 12224.2 | 1529.6  | 1170.3  | 1312.2  | 1531.5  | 1715.8  | 1791.3  | 2734.9  | 2618.8  | 2613.3  |
| 80°   | 12795.5 | 7124.8  | 1166.6  | 923.3   | 1061.5  | 1122.3  | 1341.7  | 2102.8  | 2359.0  | 2023.5  | 1973.8  |
| 82.5° | 5838.4  | 3144.0  | 812.7   | 739.0   | 737.2   | 742.7   | 914.1   | 2023.5  | 1809.8  | 1594.1  | 1535.2  |
| 85°   | 2147.0  | 1105.8  | 493.9   | 427.6   | 490.2   | 425.7   | 599.0   | 1483.6  | 1048.6  | 1032.0  | 860.7   |
| 87.5° | 528.9   | 226.7   | 167.7   | 140.1   | 114.3   | 108.7   | 182.5   | 488.4   | 256.2   | 234.1   | 224.8   |
| 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            |

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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 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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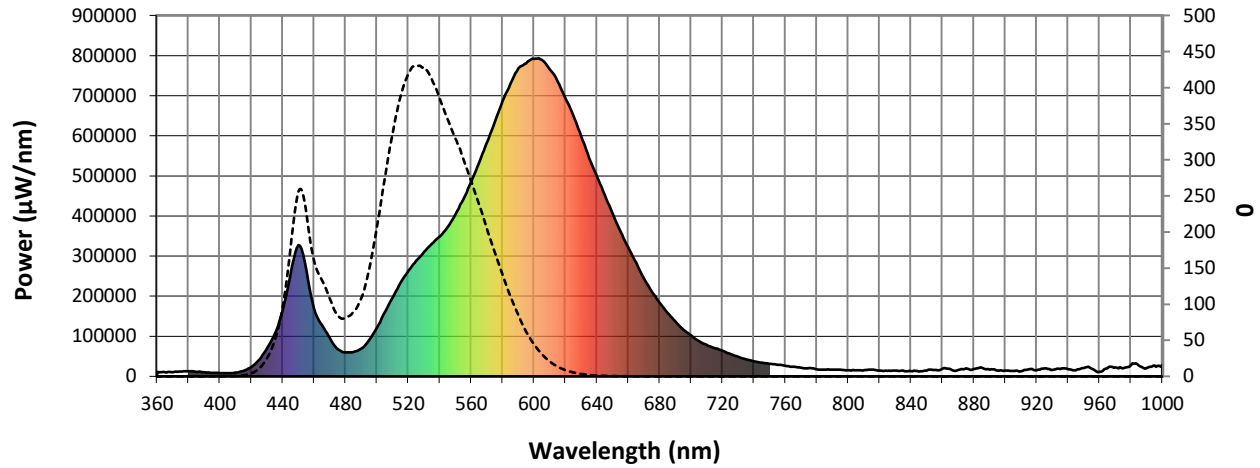
### Scotopic Flux vs. Wavelength


**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              |           |                  |                  |

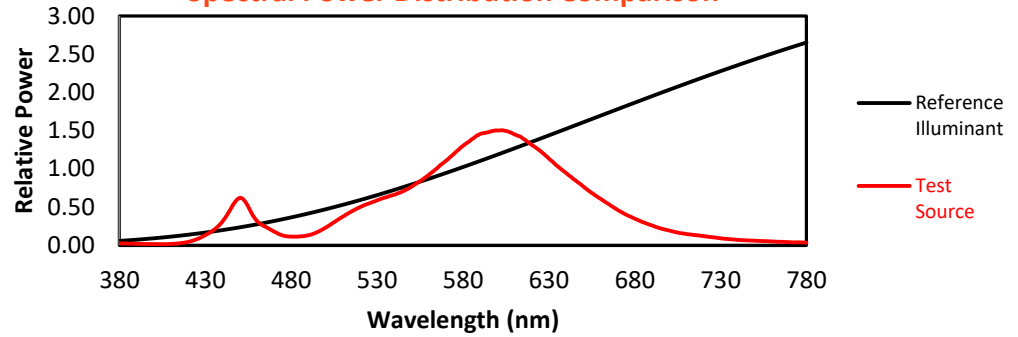
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TM-30-18

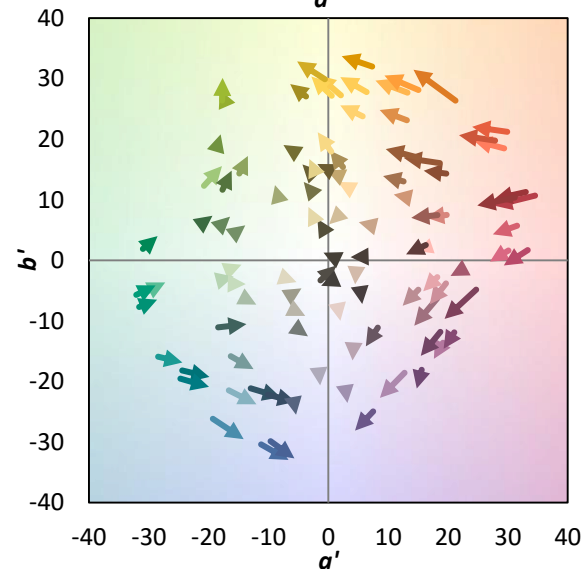
### Summary

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

### Spectral Power Distribution Comparison

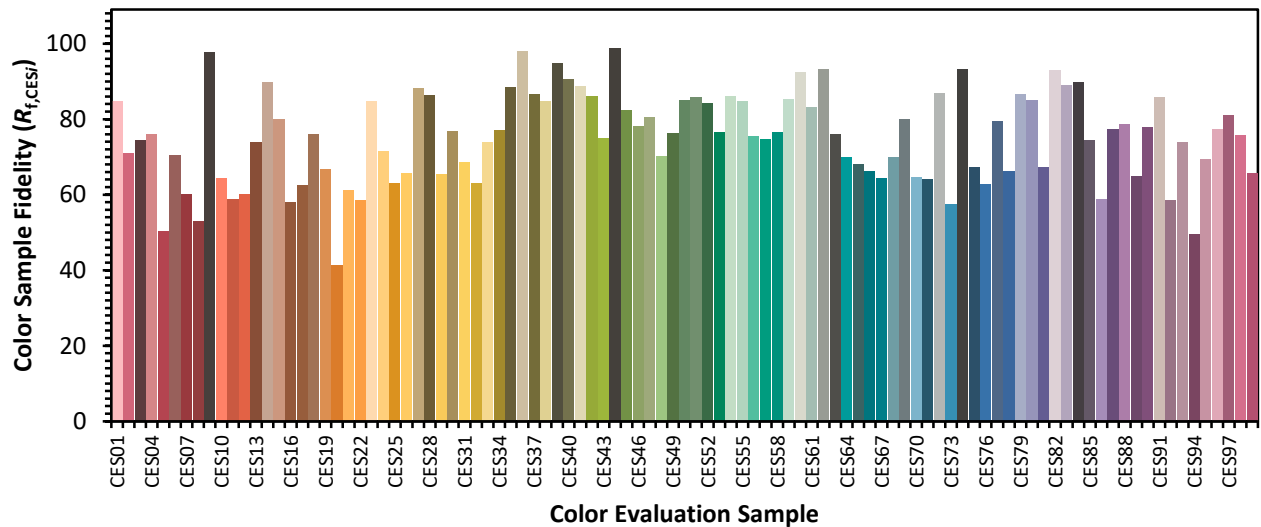


### Color Vector Graphics



**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)