

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: P721841

Luminaire Tested: **CST-CA8-400-727-U-T3**

Issue Date: 10/25/2023

**Test Information**

Test Method: LM-79-08  
Report Number: P721841  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G3-2102-151-11)  
Test Lab: COOPER LIGHTING SOLUTIONS  
Issue Date: 10/25/2023  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: STREETWORKS  
Catalog Number: CST-CA8-400-727-U-T3  
Description: CELESTEON HIGH MAST LUMINAIRE  
Light Source: (8) 2700K CCT, 70 CRI LEDS  
Ballast/Driver: -

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 51539 lumens  
Efficiency: N/A  
Efficacy: 128.6 lumens/watt  
Luminous Opening: Circular (Dia: 2.08' x H: 0')  
IES Classification: Type III - Short  
BUG Rating: B4 - U0 - G5

Input Watts (W): 400.8  
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

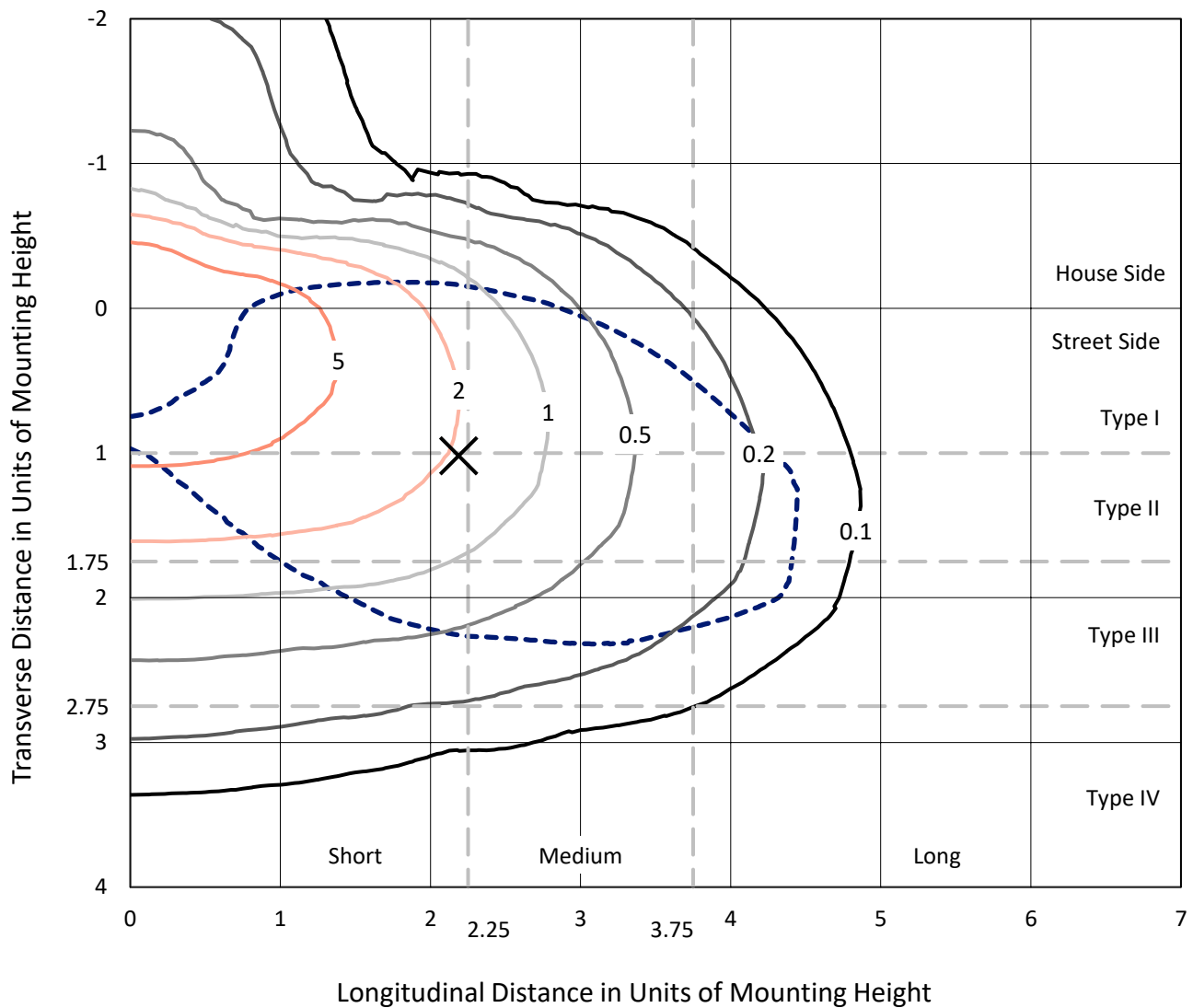


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## Iso-Footcandle Lines of Horizontal Illumination

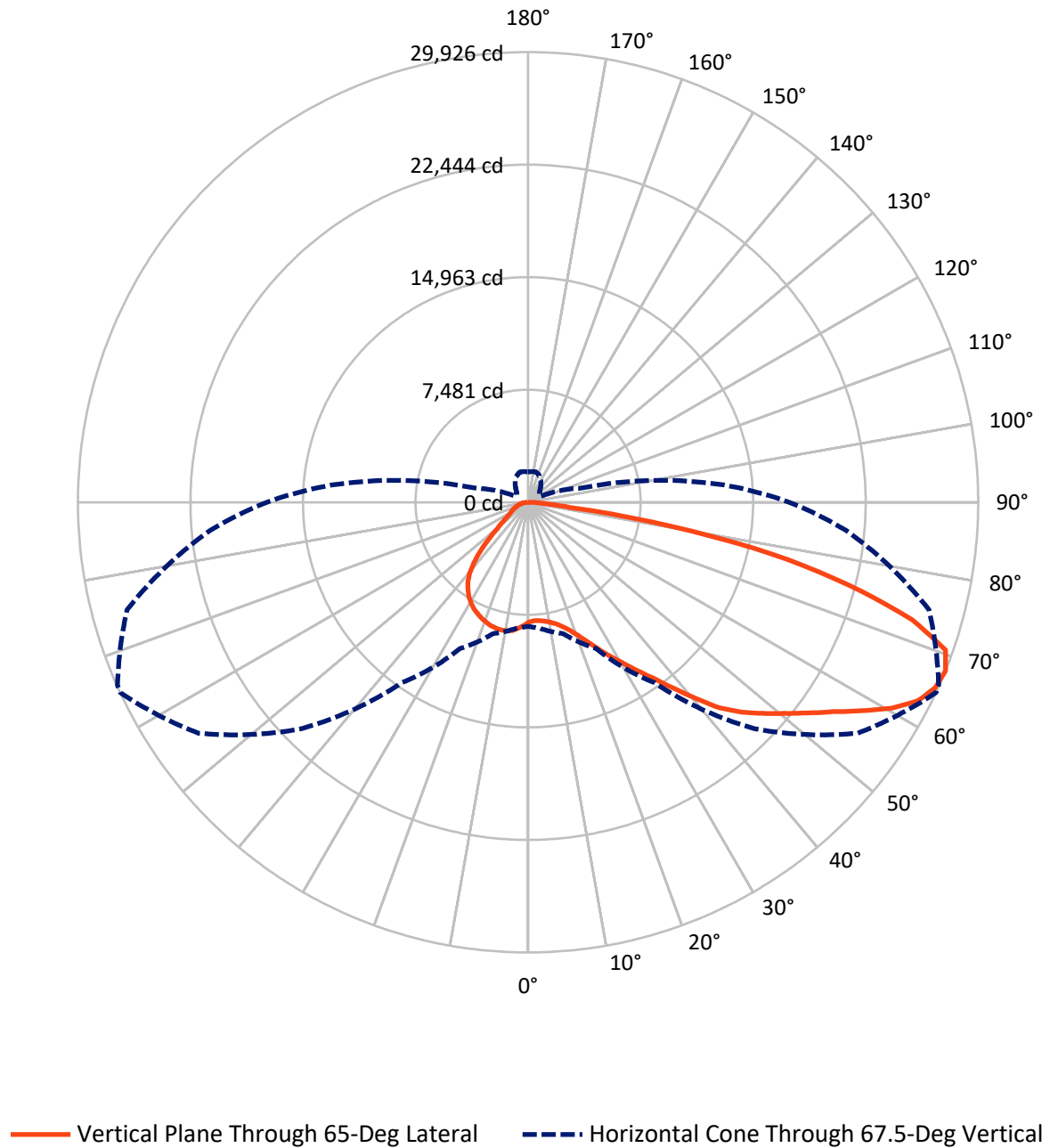
✕ Max cd  
 - - - 1/2 Max cd



Based on 30 foot mounting height. Maximum calculated value = 9.8 fc  
 Type III - Short - N/A

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## Luminous Intensity Polar Plot



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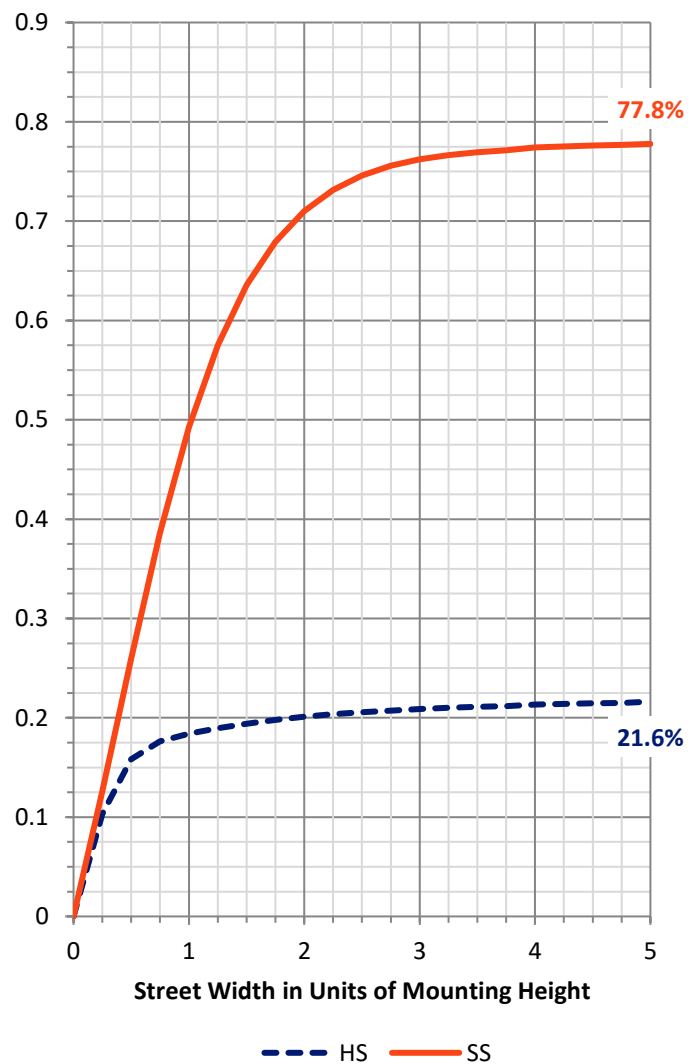
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total   |
|--------------------|-----------|----------|--------|---------|
| <b>House Side</b>  | Lumens    | 11384.3  | 0.0    | 11384.3 |
|                    | % Fixture | 22.1     | 0.0    | 22.1    |
| <b>Street Side</b> | Lumens    | 40154.7  | 0.0    | 40154.7 |
|                    | % Fixture | 77.9     | 0.0    | 77.9    |
| <b>Total</b>       | Lumens    | 51539.0  | 0.0    | 51539.0 |
|                    | % Fixture | 100.0    | 0.0    | 100.0   |

**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 793.2   | 1.5       |
| 10°-20°   | 2478.1  | 4.8       |
| 20°-30°   | 4290.0  | 8.3       |
| 30°-40°   | 6303.7  | 12.2      |
| 40°-50°   | 8520.2  | 16.5      |
| 50°-60°   | 10477.3 | 20.3      |
| 60°-70°   | 11227.1 | 21.8      |
| 70°-80°   | 6621.6  | 12.8      |
| 80°-90°   | 827.7   | 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°    | 51539.0 | 100.0     |
| 0°-180°   | 51539.0 | 100.0     |

**Coefficient of Utilization**



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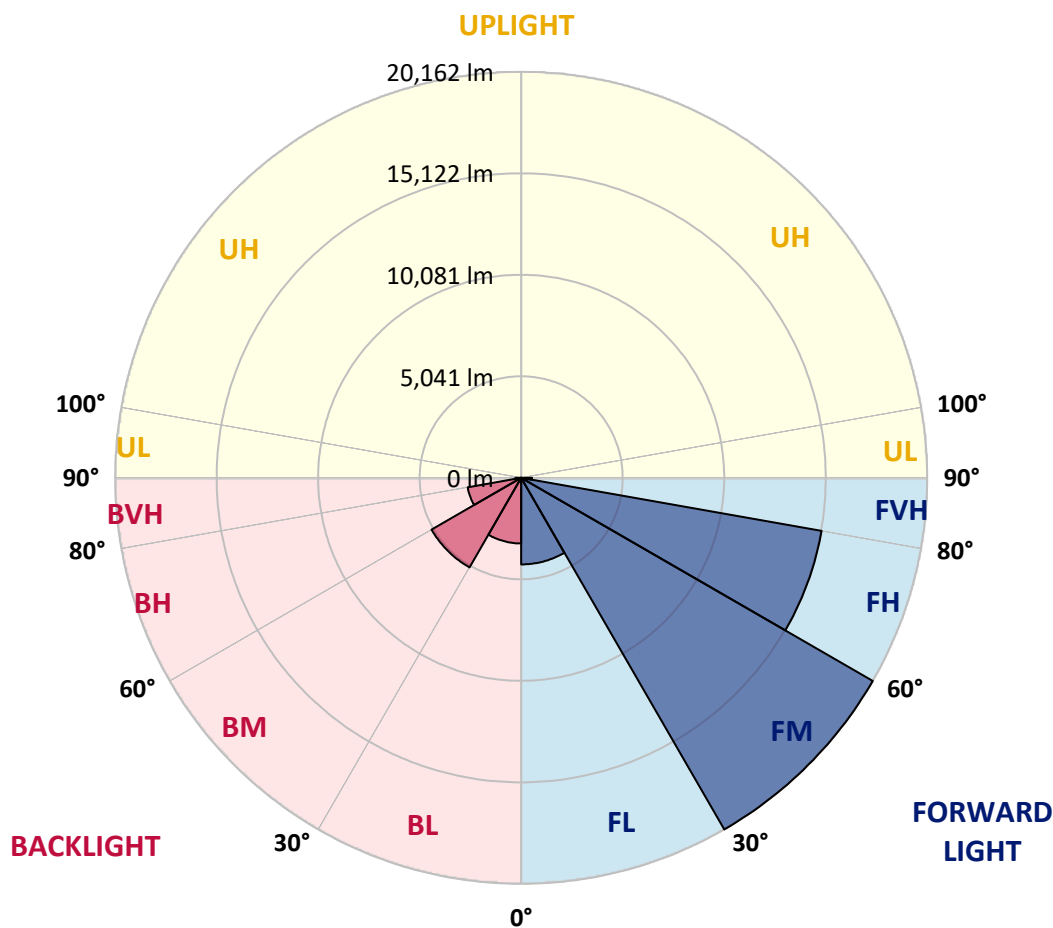
CATALOG NUMBER: CST-CA8-400-727-U-T3

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

| Zone |             | Lumens  | % Fixture | Zone Rating/Lumen Limit |      |         |
|------|-------------|---------|-----------|-------------------------|------|---------|
|      |             |         |           | B                       | U    | G       |
| FL   | (0°-30°)    | 4300.5  | 8.3       |                         |      |         |
| FM   | (30°-60°)   | 20162.4 | 39.1      |                         |      |         |
| FH   | (60°-80°)   | 15149.0 | 29.4      |                         |      | G5      |
| FVH  | (80°-90°)   | 542.8   | 1.1       |                         |      | G4/750  |
| BL   | (0°-30°)    | 3260.8  | 6.3       | B4/5000                 |      |         |
| BM   | (30°-60°)   | 5138.9  | 10.0      | B4/8500                 |      |         |
| BH   | (60°-80°)   | 2699.8  | 5.2       | B4/5000                 |      | G4/5000 |
| BVH  | (80°-90°)   | 284.9   | 0.6       |                         |      | G3/500  |
| UL   | (90°-100°)  | 0.0     | 0.0       |                         | U0/0 |         |
| UH   | (100°-180°) | 0.0     | 0.0       |                         | U0/0 |         |

**BUG Rating: B4-U0-G5**

Type III Short



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CATALOG NUMBER: CST-CA8-400-727-U-T3

**CANDELA DISTRIBUTION (FULL):**

|       | 0°      | 5°      | 15°     | 25°     | 35°     | 45°     | 55°     | 65°     | 66°     | 75°     | 85°     |
|-------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| 0°    | 7960.8  | 7960.8  | 7960.8  | 7960.8  | 7960.8  | 7960.8  | 7960.8  | 7960.8  | 7960.8  | 7960.8  | 7960.8  |
| 2.5°  | 7810.6  | 7795.8  | 7789.5  | 7809.5  | 7824.2  | 7841.0  | 7865.2  | 7888.3  | 7891.5  | 7921.9  | 7961.9  |
| 5°    | 7905.1  | 7892.5  | 7878.9  | 7875.7  | 7870.5  | 7869.4  | 7875.7  | 7902.0  | 7908.3  | 7937.7  | 8023.9  |
| 7.5°  | 8115.3  | 8102.7  | 8077.5  | 8068.0  | 8039.6  | 7989.2  | 7965.0  | 7978.7  | 7981.8  | 8017.6  | 8124.7  |
| 10°   | 8457.8  | 8419.0  | 8388.5  | 8357.0  | 8267.7  | 8187.8  | 8128.9  | 8103.7  | 8098.5  | 8133.2  | 8257.1  |
| 12.5° | 8866.6  | 8834.0  | 8800.4  | 8717.4  | 8603.9  | 8459.9  | 8355.9  | 8298.1  | 8293.9  | 8323.3  | 8416.9  |
| 15°   | 9298.5  | 9298.5  | 9275.4  | 9176.6  | 9065.2  | 8826.7  | 8665.9  | 8569.2  | 8575.5  | 8598.7  | 8641.7  |
| 17.5° | 9856.5  | 9810.2  | 9799.7  | 9687.3  | 9563.3  | 9345.8  | 9090.4  | 8936.0  | 8943.3  | 8953.8  | 8921.2  |
| 20°   | 10423.9 | 10410.2 | 10394.5 | 10319.9 | 10207.4 | 9927.9  | 9641.0  | 9438.2  | 9439.3  | 9401.5  | 9256.5  |
| 22.5° | 11174.2 | 11129.0 | 11140.5 | 11056.5 | 10904.1 | 10617.2 | 10287.3 | 10046.6 | 10062.4 | 10007.8 | 9745.1  |
| 25°   | 11919.2 | 11874.0 | 11849.8 | 11793.1 | 11661.7 | 11389.6 | 10997.6 | 10777.0 | 10758.0 | 10659.3 | 10277.8 |
| 27.5° | 12663.1 | 12636.9 | 12656.8 | 12588.5 | 12481.3 | 12177.7 | 11818.3 | 11573.5 | 11586.1 | 11517.8 | 10949.3 |
| 30°   | 13433.4 | 13403.9 | 13491.2 | 13380.8 | 13314.6 | 13019.3 | 12674.7 | 12386.8 | 12397.3 | 12422.5 | 11784.7 |
| 32.5° | 14014.5 | 14049.1 | 14201.5 | 14188.9 | 14176.3 | 13847.4 | 13484.9 | 13325.1 | 13340.9 | 13429.2 | 12776.6 |
| 35°   | 14575.6 | 14578.7 | 14793.1 | 14954.9 | 15023.2 | 14747.9 | 14371.7 | 14366.5 | 14469.4 | 14738.4 | 14159.5 |
| 37.5° | 15041.1 | 15030.6 | 15316.4 | 15567.5 | 15754.6 | 15541.3 | 15334.2 | 15656.8 | 15750.4 | 16308.3 | 15551.8 |
| 40°   | 15295.4 | 15317.4 | 15685.2 | 15998.4 | 16366.1 | 16265.3 | 16287.3 | 17112.2 | 17342.3 | 17830.9 | 16593.1 |
| 42.5° | 15116.7 | 15184.0 | 15756.7 | 16395.6 | 16950.4 | 17084.9 | 17528.3 | 18684.2 | 18781.9 | 18870.2 | 17617.6 |
| 45°   | 14817.3 | 14887.7 | 15522.3 | 16554.2 | 17432.7 | 18001.2 | 18763.0 | 19893.6 | 20000.8 | 19902.1 | 18469.8 |
| 47.5° | 14505.2 | 14577.7 | 15284.9 | 16490.1 | 17832.0 | 18921.7 | 19861.1 | 20963.4 | 21100.0 | 20794.2 | 19289.4 |
| 50°   | 14109.0 | 14221.5 | 14994.8 | 16354.6 | 18155.6 | 19914.7 | 20900.3 | 22064.6 | 22127.6 | 21686.3 | 19910.5 |
| 52.5° | 13621.5 | 13745.4 | 14581.9 | 16122.3 | 18408.9 | 20608.2 | 21952.2 | 23259.3 | 23253.0 | 22728.7 | 20620.8 |
| 55°   | 13108.7 | 13221.1 | 14082.8 | 15756.7 | 18550.7 | 21142.0 | 22792.8 | 24576.0 | 24651.6 | 24212.4 | 21263.9 |
| 57.5° | 12451.9 | 12553.8 | 13493.3 | 15264.9 | 18403.6 | 21594.9 | 24154.6 | 26140.6 | 26178.5 | 25245.3 | 21775.6 |
| 60°   | 11581.9 | 11732.1 | 12675.7 | 14639.7 | 17981.2 | 22119.2 | 25655.2 | 27786.2 | 27832.4 | 26261.5 | 22104.5 |
| 62.5° | 10626.7 | 10686.6 | 11648.1 | 13677.1 | 17366.5 | 22523.8 | 26695.4 | 29073.4 | 29006.1 | 27055.9 | 22203.3 |
| 65°   | 9462.4  | 9509.7  | 10341.9 | 12439.3 | 16224.3 | 22302.1 | 27068.5 | 29735.4 | 29652.4 | 27555.0 | 21899.6 |
| 67.5° | 8243.5  | 8389.5  | 9043.1  | 10722.3 | 14630.2 | 21278.6 | 26753.2 | 29925.6 | 29883.6 | 27592.8 | 21174.6 |
| 70°   | 6661.0  | 6712.5  | 7303.0  | 8735.3  | 12207.1 | 19229.5 | 25702.4 | 29438.0 | 29405.4 | 26748.0 | 19694.0 |
| 72.5° | 4697.1  | 4646.6  | 4933.5  | 6056.8  | 8817.2  | 15296.4 | 21944.8 | 26698.6 | 26753.2 | 23927.6 | 17150.0 |
| 75°   | 2493.5  | 2590.2  | 3036.8  | 3708.3  | 4998.6  | 9833.3  | 17495.7 | 22096.1 | 22077.2 | 20008.2 | 13556.3 |
| 77.5° | 1328.2  | 1326.1  | 1632.9  | 1919.8  | 2447.3  | 4518.4  | 11539.8 | 16663.5 | 16756.0 | 15502.4 | 9307.9  |
| 80°   | 637.8   | 662.0   | 680.9   | 780.7   | 1220.0  | 2087.9  | 4827.4  | 9663.1  | 10293.6 | 9245.9  | 4421.7  |
| 82.5° | 510.7   | 512.8   | 514.9   | 492.8   | 504.4   | 850.1   | 1859.9  | 2796.2  | 2897.0  | 2328.6  | 1425.9  |
| 85°   | 378.3   | 355.2   | 352.0   | 298.4   | 337.3   | 510.7   | 938.4   | 1193.7  | 1134.9  | 1104.4  | 804.9   |
| 87.5° | 152.4   | 142.9   | 138.7   | 130.3   | 130.3   | 192.3   | 331.0   | 431.9   | 430.8   | 393.0   | 270.1   |
| 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-CA8-400-727-U-T3

**CANDELA DISTRIBUTION (continued):**

|       | 90°     | 95°     | 105°    | 115°   | 125°   | 135°   | 145°   | 155°   | 165°   | 175°   | 180°   |
|-------|---------|---------|---------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 7960.8  | 7960.8  | 7960.8  | 7960.8 | 7960.8 | 7960.8 | 7960.8 | 7960.8 | 7960.8 | 7960.8 | 7960.8 |
| 2.5°  | 7993.4  | 8031.2  | 8119.5  | 8195.1 | 8223.5 | 8292.9 | 8358.0 | 8395.9 | 8422.1 | 8437.9 | 8509.3 |
| 5°    | 8076.4  | 8152.1  | 8292.9  | 8399.0 | 8502.0 | 8630.2 | 8713.2 | 8765.7 | 8795.2 | 8812.0 | 8863.5 |
| 7.5°  | 8203.6  | 8280.3  | 8429.5  | 8592.3 | 8686.9 | 8792.0 | 8845.6 | 8883.4 | 8902.3 | 8897.1 | 8938.1 |
| 10°   | 8317.0  | 8392.7  | 8541.9  | 8667.0 | 8720.5 | 8780.4 | 8808.8 | 8817.2 | 8818.3 | 8822.5 | 8863.5 |
| 12.5° | 8471.5  | 8517.7  | 8597.6  | 8679.6 | 8668.0 | 8670.1 | 8694.3 | 8683.8 | 8659.6 | 8655.4 | 8682.7 |
| 15°   | 8637.5  | 8638.6  | 8644.9  | 8627.0 | 8554.5 | 8523.0 | 8489.4 | 8461.0 | 8394.8 | 8390.6 | 8433.7 |
| 17.5° | 8845.6  | 8796.2  | 8681.7  | 8559.8 | 8387.4 | 8268.7 | 8148.9 | 8099.5 | 8018.6 | 8002.9 | 8023.9 |
| 20°   | 9113.5  | 9010.6  | 8732.1  | 8429.5 | 8106.9 | 7894.6 | 7749.6 | 7603.6 | 7491.1 | 7463.8 | 7483.8 |
| 22.5° | 9498.1  | 9295.3  | 8796.2  | 8290.8 | 7791.6 | 7429.1 | 7147.5 | 6972.0 | 6782.9 | 6686.2 | 6695.7 |
| 25°   | 9962.6  | 9645.2  | 8907.6  | 8115.3 | 7420.7 | 6897.4 | 6440.3 | 6088.3 | 5875.0 | 5733.1 | 5771.0 |
| 27.5° | 10571.0 | 10134.9 | 9041.0  | 7941.9 | 6959.4 | 6217.6 | 5554.5 | 5077.4 | 4859.9 | 4792.7 | 4748.5 |
| 30°   | 11276.1 | 10726.5 | 9181.8  | 7685.5 | 6461.3 | 5375.9 | 4526.8 | 4129.6 | 3880.6 | 3840.7 | 3807.0 |
| 32.5° | 12219.7 | 11471.5 | 9445.6  | 7407.1 | 5866.6 | 4534.2 | 3612.6 | 3155.5 | 3098.8 | 3066.2 | 3058.9 |
| 35°   | 13436.5 | 12447.7 | 9722.0  | 7045.6 | 5091.1 | 3547.5 | 2733.1 | 2486.2 | 2458.9 | 2494.6 | 2497.7 |
| 37.5° | 14727.9 | 13506.9 | 10053.0 | 6637.9 | 4199.0 | 2647.0 | 2091.1 | 1919.8 | 1950.3 | 2061.7 | 2086.9 |
| 40°   | 15602.2 | 14204.6 | 10353.5 | 6084.1 | 3096.7 | 1923.0 | 1521.6 | 1484.8 | 1652.9 | 1795.8 | 1825.2 |
| 42.5° | 16440.7 | 14733.2 | 10475.4 | 5351.7 | 2208.8 | 1369.2 | 1228.4 | 1354.5 | 1589.9 | 1746.4 | 1767.4 |
| 45°   | 17156.3 | 15347.9 | 10168.5 | 4473.2 | 1497.4 | 1144.3 | 1176.9 | 1351.3 | 1613.0 | 1786.4 | 1802.1 |
| 47.5° | 17837.2 | 15850.2 | 9749.3  | 3524.4 | 1181.1 | 1101.2 | 1175.8 | 1379.7 | 1664.5 | 1828.4 | 1837.8 |
| 50°   | 18487.7 | 16232.7 | 9033.7  | 2681.6 | 1106.5 | 1081.3 | 1185.3 | 1423.8 | 1692.8 | 1795.8 | 1791.6 |
| 52.5° | 18970.0 | 16430.2 | 8271.9  | 2164.6 | 1077.1 | 1065.5 | 1210.5 | 1479.5 | 1698.1 | 1760.1 | 1755.9 |
| 55°   | 19324.1 | 16392.4 | 7771.7  | 1772.7 | 1052.9 | 1059.2 | 1251.5 | 1521.6 | 1748.5 | 1842.0 | 1838.9 |
| 57.5° | 19356.7 | 16221.1 | 7203.2  | 1497.4 | 1023.5 | 1058.2 | 1295.6 | 1580.4 | 2000.7 | 2173.0 | 2120.5 |
| 60°   | 19317.8 | 15937.4 | 6635.8  | 1314.5 | 990.9  | 1064.5 | 1341.9 | 1756.9 | 2364.3 | 2499.8 | 2463.1 |
| 62.5° | 19126.6 | 15408.9 | 5785.7  | 1193.7 | 962.5  | 1087.6 | 1376.5 | 1896.7 | 2346.4 | 2362.2 | 2309.6 |
| 65°   | 18536.0 | 14701.7 | 4669.7  | 1071.8 | 934.2  | 1103.3 | 1404.9 | 1933.5 | 2155.2 | 2104.7 | 2078.5 |
| 67.5° | 17367.5 | 13122.3 | 3602.1  | 960.4  | 897.4  | 1100.2 | 1489.0 | 1880.9 | 2082.7 | 2045.9 | 2012.3 |
| 70°   | 15707.3 | 11327.6 | 2500.9  | 845.9  | 835.4  | 1080.2 | 1468.0 | 1898.8 | 2048.0 | 1991.3 | 1946.1 |
| 72.5° | 13122.3 | 8886.6  | 1590.9  | 752.4  | 742.9  | 1032.9 | 1415.4 | 1887.2 | 2024.9 | 1999.7 | 1937.7 |
| 75°   | 9880.6  | 6202.8  | 1010.9  | 650.4  | 660.9  | 946.8  | 1331.4 | 1825.2 | 2013.3 | 1934.5 | 1815.8 |
| 77.5° | 6220.7  | 3062.0  | 786.0   | 552.7  | 568.5  | 816.5  | 1150.6 | 1594.1 | 1932.4 | 1885.1 | 1732.8 |
| 80°   | 2352.7  | 1243.1  | 614.7   | 448.7  | 462.3  | 634.7  | 943.6  | 1311.4 | 1779.0 | 1856.8 | 1791.6 |
| 82.5° | 1083.4  | 777.6   | 461.3   | 360.4  | 365.7  | 462.3  | 704.0  | 970.9  | 1505.8 | 1704.4 | 1867.3 |
| 85°   | 632.6   | 509.6   | 307.9   | 240.6  | 250.1  | 273.2  | 396.1  | 592.6  | 976.2  | 1299.8 | 1454.3 |
| 87.5° | 215.4   | 177.6   | 119.8   | 101.9  | 98.8   | 112.4  | 95.6   | 194.4  | 290.0  | 510.7  | 583.2  |
| 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

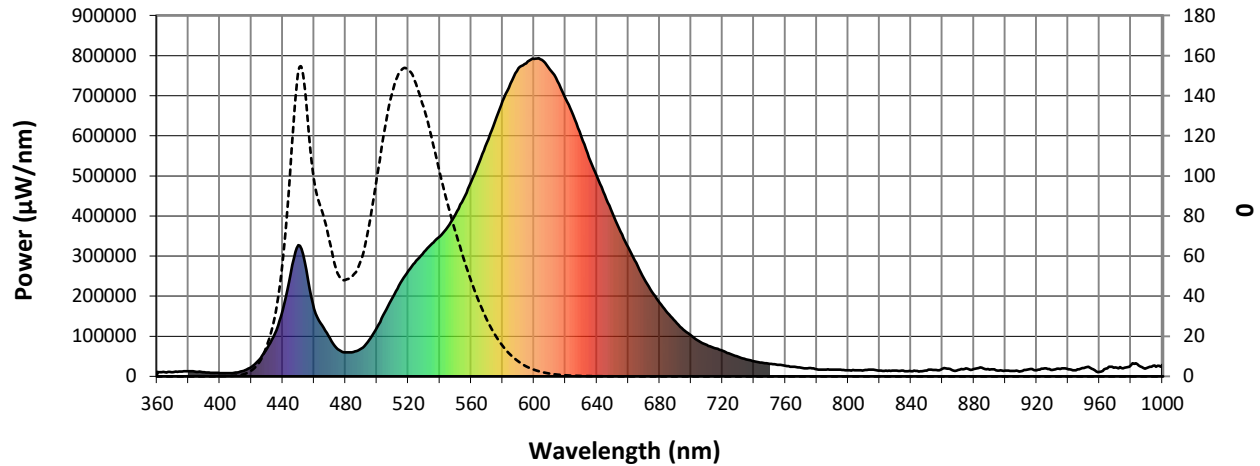


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| λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) |
|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|
| 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



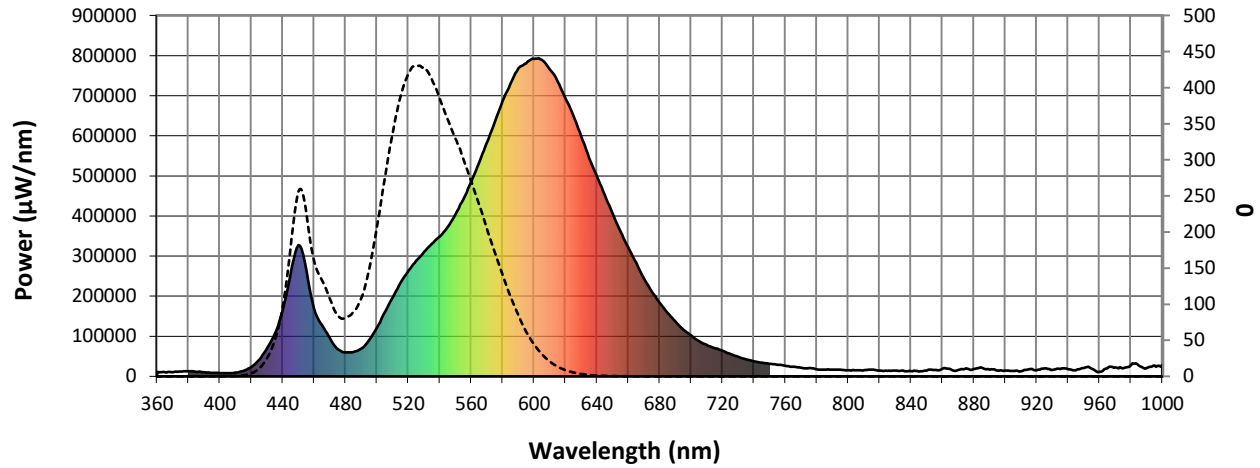
Scotopic Lumens: 37163.1

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

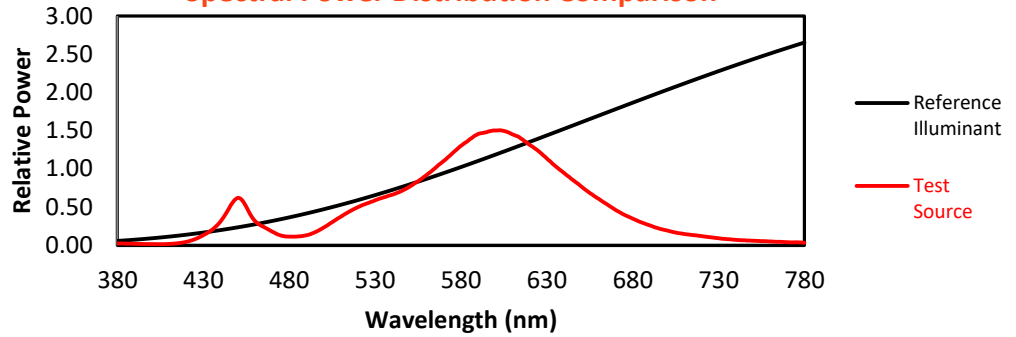

**Melanopic Lumens: 13012.4      M/P: 0.38**

| 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              |           |                  |                  |

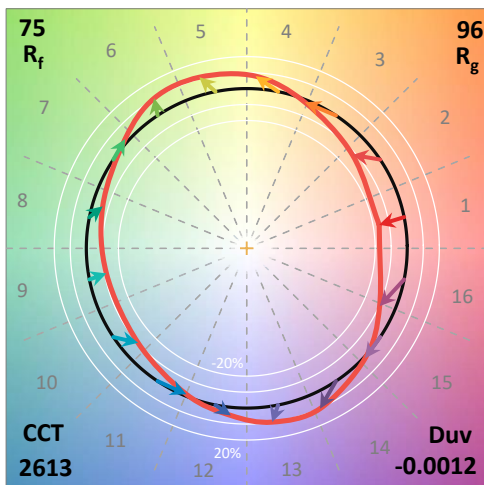
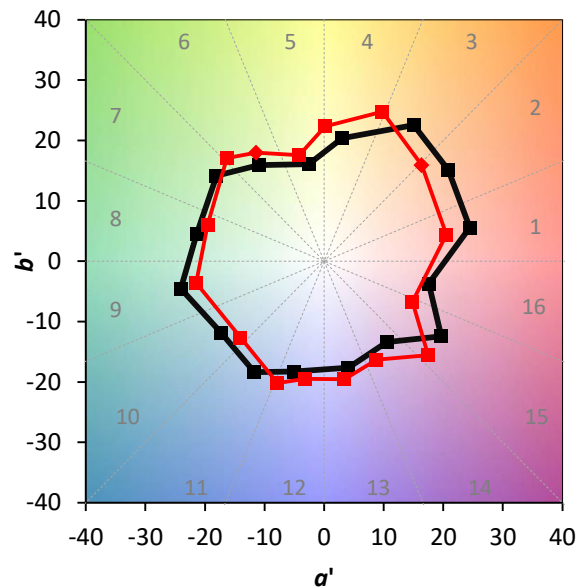
### Summary

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

### Spectral Power Distribution Comparison

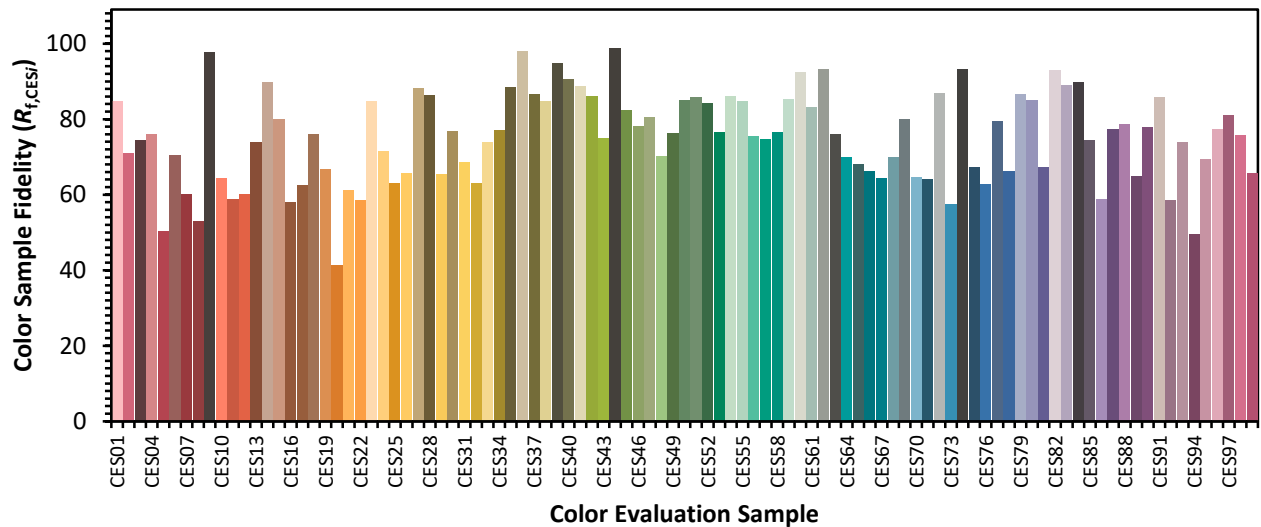


### Color Vector Graphics



**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)