

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: P510487

Luminaire Tested: **CST-CA10-310-740-U-T2**

Issue Date: 4/6/2021

**Test Information**

Test Method: LM-79-08  
Report Number: P510487  
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-CA10-310-740-U-T2  
Description: CELESTEON HIGH MAST LUMINAIRE  
Light Source: (10) 4000K CCT, 70 CRI LEDS  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 48095 lumens  
Efficiency: N/A  
Efficacy: 154.0 lumens/watt  
Luminous Opening: Circular (Dia: 2.08' x H: 0')  
IES Classification: Type II - Short  
BUG Rating: B4 - U0 - G5

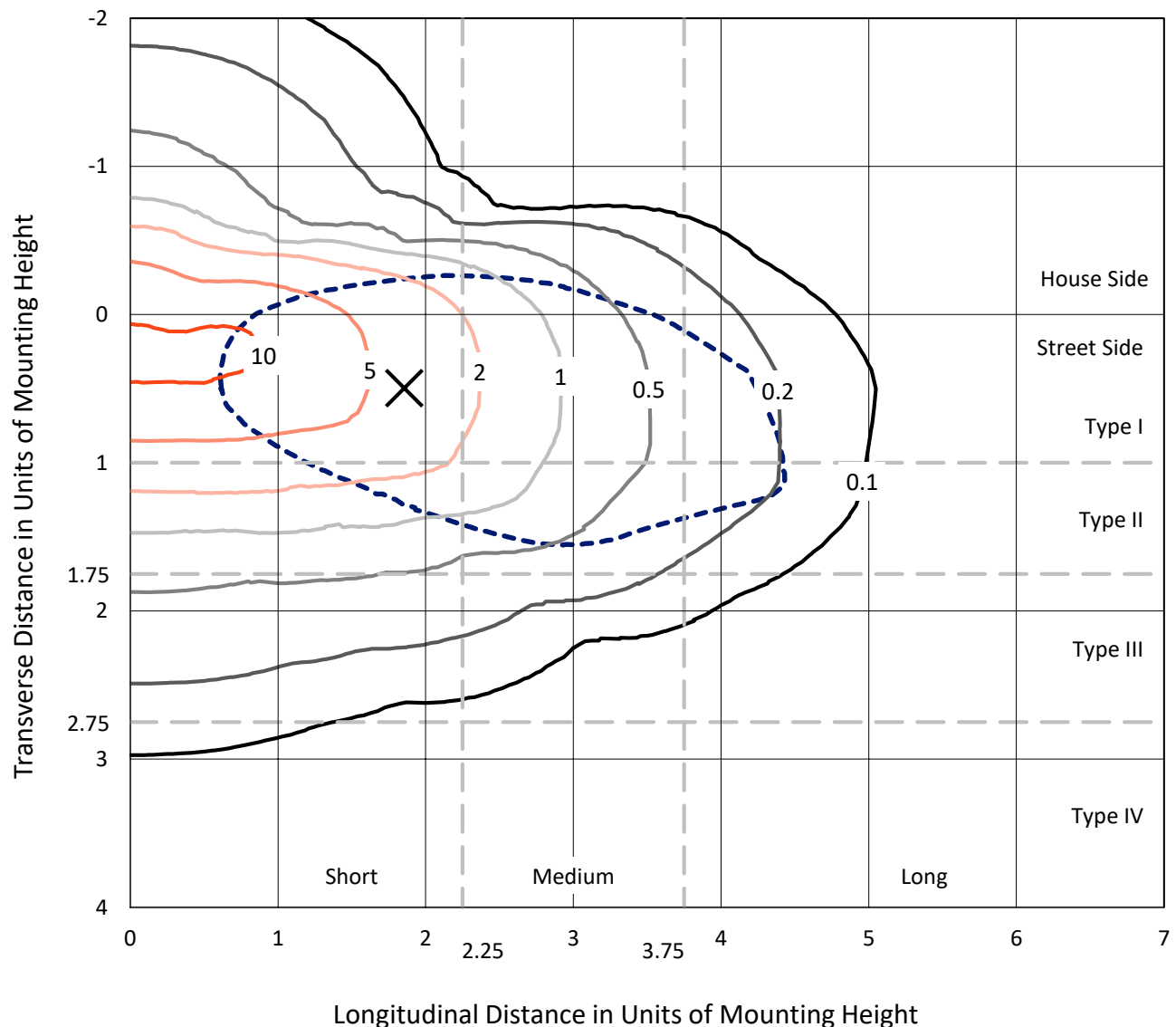
Input Watts (W): 312.4  
Input Voltage (V): 120  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: NR  
Total Harmonic Distortion (THDi): NR  
Frequency (hertz): 60  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 24 FT



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## Iso-Footcandle Lines of Horizontal Illumination

✕ Max cd  
 - - - 1/2 Max cd

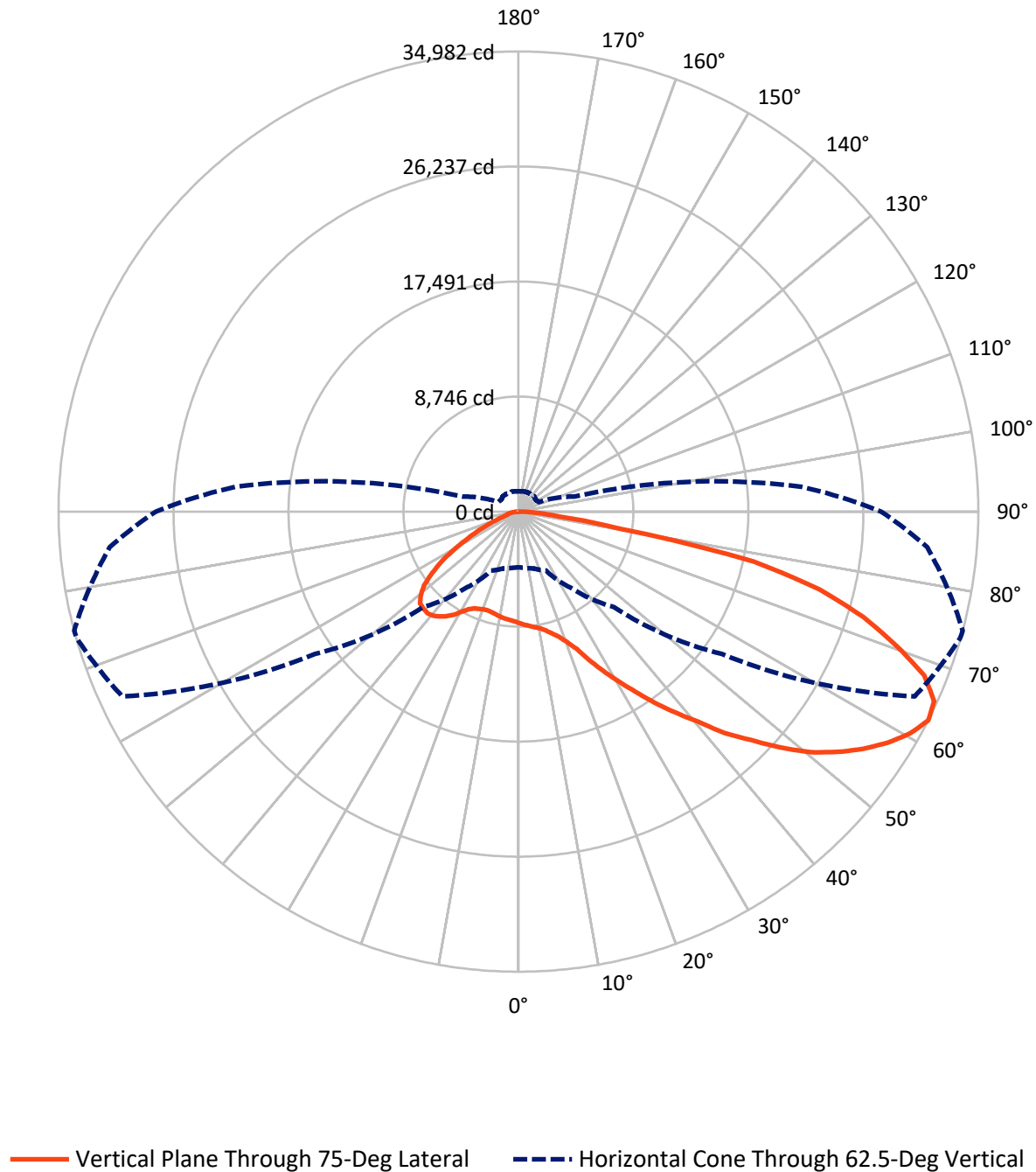


Based on 30 foot mounting height. Maximum calculated value = 11.1 fc  
 Type II - Short - N/A

FIELD PERFORMANCE MAY DIFFER FROM LABORATORY PERFORMANCE

REPORT NUMBER: P510487  
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## Luminous Intensity Polar Plot



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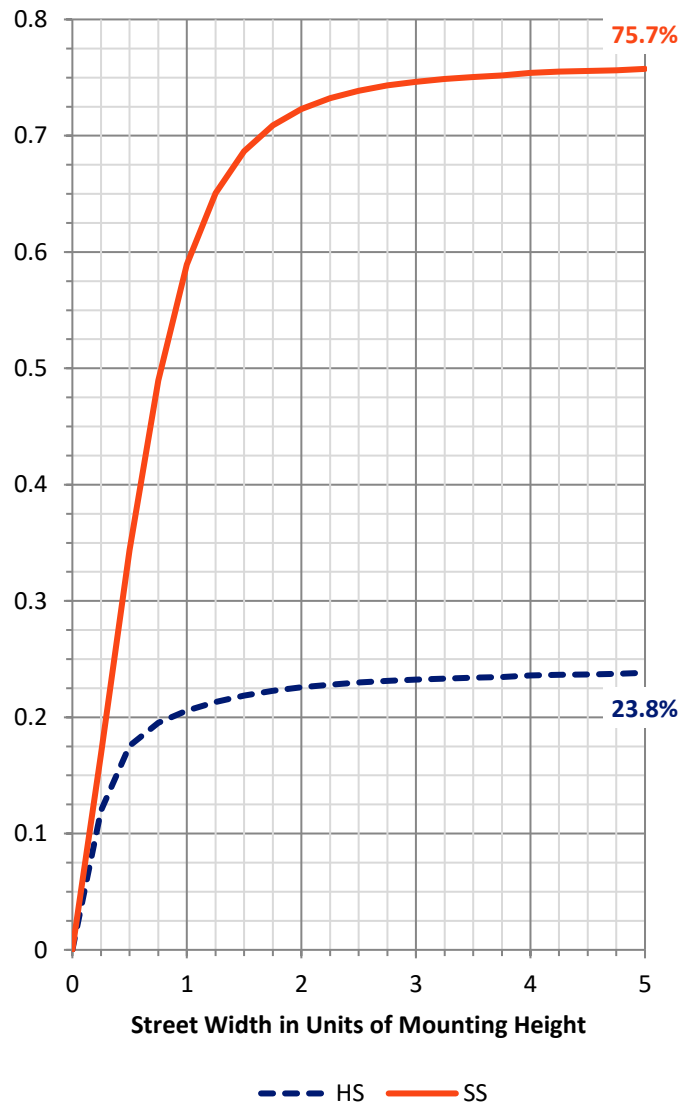
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total   |
|--------------------|-----------|----------|--------|---------|
| <b>House Side</b>  | Lumens    | 11652.6  | 0.0    | 11652.6 |
|                    | % Fixture | 24.2     | 0.0    | 24.2    |
| <b>Street Side</b> | Lumens    | 36442.4  | 0.0    | 36442.4 |
|                    | % Fixture | 75.8     | 0.0    | 75.8    |
| <b>Total</b>       | Lumens    | 48095.0  | 0.0    | 48095.0 |
|                    | % Fixture | 100.0    | 0.0    | 100.0   |

**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 815.6   | 1.7       |
| 10°-20°   | 2475.3  | 5.1       |
| 20°-30°   | 4269.3  | 8.9       |
| 30°-40°   | 6295.2  | 13.1      |
| 40°-50°   | 8298.5  | 17.3      |
| 50°-60°   | 9766.5  | 20.3      |
| 60°-70°   | 9716.7  | 20.2      |
| 70°-80°   | 5666.5  | 11.8      |
| 80°-90°   | 791.2   | 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°    | 48095.0 | 100.0     |
| 0°-180°   | 48095.0 | 100.0     |

**Coefficient of Utilization**



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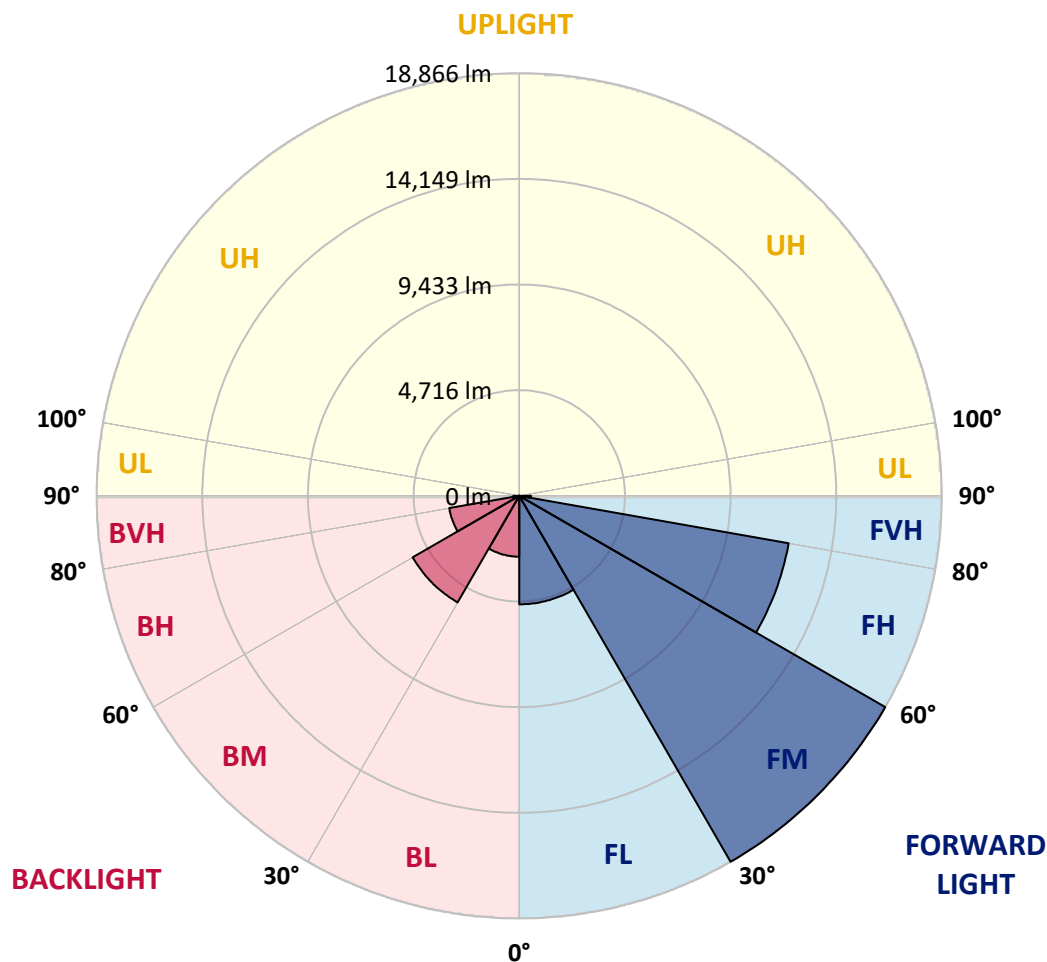
CATALOG NUMBER: CST-CA10-310-740-U-T2

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

| Zone |             | Lumens  | % Fixture | Zone Rating/Lumen Limit |      |         |
|------|-------------|---------|-----------|-------------------------|------|---------|
|      |             |         |           | B                       | U    | G       |
| FL   | (0°-30°)    | 4843.0  | 10.1      |                         |      |         |
| FM   | (30°-60°)   | 18865.7 | 39.2      |                         |      |         |
| FH   | (60°-80°)   | 12208.7 | 25.4      |                         |      | G5      |
| FVH  | (80°-90°)   | 525.0   | 1.1       |                         |      | G4/750  |
| BL   | (0°-30°)    | 2717.3  | 5.6       | B4/5000                 |      |         |
| BM   | (30°-60°)   | 5494.5  | 11.4      | B4/8500                 |      |         |
| BH   | (60°-80°)   | 3174.6  | 6.6       | B4/5000                 |      | G4/5000 |
| BVH  | (80°-90°)   | 266.2   | 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 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°    | 8478.1  | 8478.1  | 8478.1  | 8478.1  | 8478.1  | 8478.1  | 8478.1  | 8478.1  | 8478.1  | 8478.1  | 8478.1  |
| 2.5°  | 8942.3  | 8905.7  | 8910.6  | 8884.9  | 8846.3  | 8817.6  | 8742.3  | 8661.2  | 8612.7  | 8608.7  | 8539.4  |
| 5°    | 9391.7  | 9403.6  | 9406.5  | 9324.4  | 9243.2  | 9151.1  | 9036.3  | 8879.9  | 8752.2  | 8732.4  | 8597.8  |
| 7.5°  | 9801.5  | 9800.5  | 9794.5  | 9749.0  | 9711.4  | 9574.8  | 9345.2  | 9099.7  | 8891.8  | 8873.0  | 8654.2  |
| 10°   | 10221.2 | 10218.2 | 10158.8 | 10082.6 | 9997.5  | 9871.8  | 9674.8  | 9380.8  | 9044.2  | 9019.5  | 8706.7  |
| 12.5° | 10678.5 | 10645.8 | 10608.2 | 10516.1 | 10415.2 | 10197.4 | 9990.5  | 9670.8  | 9319.4  | 9274.9  | 8799.8  |
| 15°   | 11055.6 | 11022.0 | 10969.5 | 10907.1 | 10801.2 | 10634.9 | 10415.2 | 10036.1 | 9658.9  | 9615.4  | 9008.6  |
| 17.5° | 11428.8 | 11413.0 | 11375.3 | 11309.0 | 11227.8 | 11084.3 | 10882.4 | 10560.7 | 10066.8 | 10013.3 | 9356.0  |
| 20°   | 11734.7 | 11697.0 | 11669.3 | 11700.0 | 11706.9 | 11601.0 | 11490.2 | 11219.9 | 10675.5 | 10593.4 | 9782.7  |
| 22.5° | 11908.9 | 11900.9 | 12052.4 | 12165.2 | 12210.8 | 12234.5 | 12199.9 | 11982.1 | 11489.2 | 11345.6 | 10376.6 |
| 25°   | 12074.2 | 12061.3 | 12267.2 | 12549.3 | 12817.5 | 12954.1 | 13046.2 | 13074.9 | 12622.5 | 12492.9 | 11331.8 |
| 27.5° | 12079.1 | 12114.8 | 12413.7 | 12886.8 | 13295.6 | 13712.4 | 14153.8 | 14204.3 | 13807.4 | 13704.4 | 12418.6 |
| 30°   | 12105.8 | 12121.7 | 12417.6 | 12961.1 | 13812.3 | 14480.5 | 15055.6 | 15339.7 | 14997.2 | 14949.7 | 13615.4 |
| 32.5° | 11766.3 | 11787.1 | 12247.4 | 13090.7 | 14202.3 | 15275.3 | 16038.5 | 16460.2 | 16375.1 | 16314.7 | 14892.3 |
| 35°   | 11413.0 | 11430.8 | 11965.3 | 12906.6 | 14492.4 | 15996.9 | 16926.4 | 17754.9 | 17910.3 | 17864.8 | 16316.7 |
| 37.5° | 10858.6 | 10918.0 | 11478.3 | 12686.9 | 14542.9 | 16527.5 | 17773.7 | 19044.7 | 19513.9 | 19377.3 | 17823.2 |
| 40°   | 10256.8 | 10300.4 | 10952.7 | 12226.6 | 14486.4 | 16875.9 | 18606.2 | 20472.0 | 21040.2 | 20967.0 | 19318.9 |
| 42.5° | 9496.6  | 9613.4  | 10266.7 | 11638.6 | 14196.4 | 17092.7 | 19376.3 | 22090.4 | 22916.0 | 23014.0 | 20692.8 |
| 45°   | 8856.2  | 8853.2  | 9460.0  | 10787.4 | 13670.8 | 17144.2 | 20085.0 | 23726.7 | 24934.3 | 24750.2 | 22509.1 |
| 47.5° | 8102.9  | 8133.6  | 8767.1  | 9940.1  | 12895.7 | 16980.8 | 20637.3 | 25660.8 | 26883.3 | 26783.3 | 23998.9 |
| 50°   | 6359.8  | 6580.5  | 7780.2  | 9211.5  | 11847.5 | 16525.5 | 21097.6 | 27544.5 | 28711.5 | 28757.1 | 25353.0 |
| 52.5° | 5482.8  | 5567.9  | 6230.1  | 8478.1  | 10917.0 | 15761.4 | 21602.4 | 29663.8 | 30478.4 | 30362.6 | 26890.2 |
| 55°   | 5131.4  | 5176.9  | 5494.6  | 7160.6  | 10017.3 | 14578.5 | 21845.0 | 31598.9 | 31856.3 | 31837.5 | 28155.2 |
| 57.5° | 4877.0  | 4911.6  | 5137.3  | 5975.7  | 9029.4  | 13060.1 | 21640.1 | 32858.0 | 33257.9 | 33135.2 | 29349.0 |
| 60°   | 4509.7  | 4537.5  | 4874.0  | 5384.8  | 8012.8  | 11526.8 | 20380.0 | 33429.2 | 34274.5 | 34229.0 | 30404.2 |
| 62.5° | 4233.6  | 4281.1  | 4469.2  | 4948.3  | 7144.7  | 10263.7 | 18878.4 | 33251.0 | 34941.6 | 34982.2 | 31209.9 |
| 65°   | 3941.6  | 3984.1  | 4143.5  | 4562.2  | 6357.8  | 9433.3  | 17259.0 | 32358.1 | 34634.8 | 34742.7 | 31340.6 |
| 67.5° | 3581.3  | 3613.9  | 3803.0  | 4165.3  | 5438.2  | 8602.8  | 15432.7 | 30779.3 | 32932.3 | 33279.7 | 30039.9 |
| 70°   | 3127.9  | 3139.8  | 3371.4  | 3617.9  | 4515.7  | 7350.6  | 12271.1 | 28194.8 | 30468.5 | 30475.4 | 27584.1 |
| 72.5° | 2489.5  | 2499.4  | 2560.7  | 2747.8  | 3392.2  | 5817.3  | 9019.5  | 23558.4 | 27473.2 | 27422.8 | 24515.6 |
| 75°   | 1692.6  | 1779.7  | 1992.6  | 2170.7  | 2446.9  | 4085.1  | 5609.5  | 15872.2 | 23276.3 | 23672.2 | 20137.5 |
| 77.5° | 1337.3  | 1345.2  | 1433.3  | 1596.6  | 1835.2  | 3051.7  | 3143.8  | 8781.9  | 17353.0 | 18294.4 | 15828.7 |
| 80°   | 932.4   | 946.3   | 898.8   | 938.4   | 1279.9  | 2088.6  | 1837.2  | 3821.8  | 7236.8  | 7726.8  | 9503.5  |
| 82.5° | 444.4   | 460.3   | 528.6   | 491.0   | 636.5   | 887.9   | 970.1   | 1974.7  | 3125.9  | 3208.1  | 3700.1  |
| 85°   | 293.0   | 293.0   | 294.0   | 278.1   | 371.2   | 387.0   | 440.5   | 842.4   | 1526.3  | 1577.8  | 1568.9  |
| 87.5° | 94.0    | 103.9   | 101.0   | 117.8   | 142.5   | 128.7   | 134.6   | 264.3   | 523.6   | 518.7   | 433.6   |
| 90°   | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     |



REPORT NUMBER: P510487

CATALOG NUMBER: CST-CA10-310-740-U-T2

**CANDELA DISTRIBUTION (continued):**

|       | 90°     | 95°     | 105°    | 115°   | 125°   | 135°   | 145°   | 155°   | 165°   | 175°   | 180°   |
|-------|---------|---------|---------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 8478.1  | 8478.1  | 8478.1  | 8478.1 | 8478.1 | 8478.1 | 8478.1 | 8478.1 | 8478.1 | 8478.1 | 8478.1 |
| 2.5°  | 8489.9  | 8449.3  | 8354.3  | 8271.2 | 8189.0 | 8126.7 | 8073.2 | 8001.9 | 7968.3 | 7937.6 | 8001.9 |
| 5°    | 8514.7  | 8442.4  | 8272.2  | 8101.9 | 7945.5 | 7830.7 | 7760.4 | 7708.9 | 7662.4 | 7662.4 | 7684.2 |
| 7.5°  | 8543.4  | 8445.4  | 8201.9  | 7960.4 | 7725.8 | 7595.1 | 7495.1 | 7429.8 | 7392.2 | 7394.2 | 7440.7 |
| 10°   | 8562.2  | 8411.7  | 8121.7  | 7796.0 | 7540.7 | 7330.8 | 7232.8 | 7138.8 | 7067.5 | 7025.0 | 7072.5 |
| 12.5° | 8584.0  | 8400.8  | 8013.8  | 7646.6 | 7335.8 | 7098.2 | 6894.3 | 6824.0 | 6754.7 | 6701.3 | 6727.0 |
| 15°   | 8718.6  | 8442.4  | 7923.7  | 7456.5 | 7096.2 | 6800.3 | 6533.0 | 6404.3 | 6384.5 | 6347.9 | 6356.8 |
| 17.5° | 8938.3  | 8554.3  | 7865.3  | 7223.9 | 6808.2 | 6458.8 | 6120.2 | 5953.9 | 5914.3 | 5895.5 | 5905.4 |
| 20°   | 9266.0  | 8767.1  | 7883.2  | 7060.6 | 6483.5 | 6092.5 | 5655.0 | 5460.0 | 5328.4 | 5336.3 | 5374.9 |
| 22.5° | 9766.8  | 9110.6  | 7980.2  | 6881.4 | 6132.1 | 5619.4 | 5177.9 | 4912.6 | 4780.0 | 4751.3 | 4794.8 |
| 25°   | 10564.7 | 9663.9  | 8087.1  | 6710.2 | 5792.6 | 5108.6 | 4619.6 | 4332.6 | 4162.3 | 4151.4 | 4199.9 |
| 27.5° | 11587.2 | 10512.2 | 8319.7  | 6561.7 | 5370.9 | 4494.9 | 4008.9 | 3763.4 | 3582.3 | 3560.5 | 3544.6 |
| 30°   | 12633.4 | 11454.5 | 8740.4  | 6336.0 | 4879.0 | 3861.4 | 3438.7 | 3246.7 | 3043.8 | 2961.6 | 2979.4 |
| 32.5° | 13742.1 | 12332.5 | 9233.3  | 6177.6 | 4328.6 | 3304.1 | 2936.9 | 2753.8 | 2567.7 | 2448.9 | 2421.2 |
| 35°   | 14858.6 | 13205.6 | 9648.1  | 5941.1 | 3807.0 | 2861.7 | 2510.3 | 2321.2 | 2158.9 | 2061.9 | 2054.9 |
| 37.5° | 16165.2 | 14114.2 | 9980.6  | 5689.6 | 3265.5 | 2515.2 | 2092.5 | 1983.7 | 1905.5 | 1820.3 | 1829.2 |
| 40°   | 17473.8 | 15173.4 | 10246.9 | 5273.9 | 2816.1 | 2143.0 | 1780.7 | 1802.5 | 1819.3 | 1748.1 | 1742.1 |
| 42.5° | 18560.6 | 16063.3 | 10368.7 | 4735.4 | 2418.2 | 1819.3 | 1643.1 | 1742.1 | 1815.4 | 1768.9 | 1762.9 |
| 45°   | 19664.3 | 16812.6 | 10321.1 | 4067.3 | 2087.6 | 1664.9 | 1632.3 | 1733.2 | 1827.3 | 1816.4 | 1811.4 |
| 47.5° | 20864.0 | 17794.5 | 10239.0 | 3306.1 | 1851.0 | 1650.1 | 1656.0 | 1703.5 | 1822.3 | 1842.1 | 1834.2 |
| 50°   | 22331.0 | 18698.2 | 9753.0  | 2574.6 | 1736.2 | 1673.8 | 1709.5 | 1684.7 | 1785.7 | 1826.3 | 1833.2 |
| 52.5° | 23791.0 | 19394.1 | 9102.6  | 2231.1 | 1690.7 | 1696.6 | 1783.7 | 1699.6 | 1744.1 | 1779.7 | 1812.4 |
| 55°   | 24917.4 | 20102.8 | 8050.4  | 2024.2 | 1675.8 | 1707.5 | 1804.5 | 1731.2 | 1730.3 | 1730.3 | 1741.1 |
| 57.5° | 26070.6 | 21052.1 | 6998.2  | 1890.6 | 1650.1 | 1719.4 | 1779.7 | 1737.2 | 1723.3 | 1703.5 | 1690.7 |
| 60°   | 26873.4 | 21403.5 | 5646.1  | 1802.5 | 1623.4 | 1702.5 | 1710.5 | 1704.5 | 1662.0 | 1643.1 | 1628.3 |
| 62.5° | 27586.1 | 21594.5 | 4395.9  | 1701.5 | 1586.7 | 1662.9 | 1621.4 | 1608.5 | 1583.8 | 1538.2 | 1546.1 |
| 65°   | 27395.0 | 21184.7 | 3349.6  | 1587.7 | 1561.0 | 1615.4 | 1543.2 | 1512.5 | 1514.5 | 1467.0 | 1482.8 |
| 67.5° | 26165.6 | 19346.6 | 2405.3  | 1413.5 | 1490.7 | 1521.4 | 1454.1 | 1431.3 | 1397.7 | 1373.9 | 1395.7 |
| 70°   | 23682.1 | 17150.1 | 1622.4  | 1173.0 | 1330.4 | 1396.7 | 1352.1 | 1312.5 | 1260.1 | 1244.2 | 1268.0 |
| 72.5° | 19932.6 | 14316.2 | 1119.5  | 943.3  | 1148.2 | 1234.3 | 1217.5 | 1176.9 | 1139.3 | 1177.9 | 1224.4 |
| 75°   | 16375.1 | 10591.4 | 913.6   | 773.1  | 882.9  | 1028.5 | 1077.9 | 1089.8 | 1202.7 | 1578.8 | 1617.4 |
| 77.5° | 11787.1 | 6565.7  | 821.6   | 628.6  | 704.8  | 822.6  | 921.5  | 962.1  | 1468.9 | 1406.6 | 1403.6 |
| 80°   | 6872.5  | 3826.8  | 626.6   | 495.9  | 570.2  | 602.8  | 720.6  | 1129.4 | 1267.0 | 1086.9 | 1060.1 |
| 82.5° | 3135.8  | 1688.7  | 436.5   | 396.9  | 395.9  | 398.9  | 491.0  | 1086.9 | 972.0  | 856.2  | 824.5  |
| 85°   | 1153.2  | 593.9   | 265.3   | 229.6  | 263.3  | 228.7  | 321.7  | 796.8  | 563.2  | 554.3  | 462.3  |
| 87.5° | 284.1   | 121.8   | 90.1    | 75.2   | 61.4   | 58.4   | 98.0   | 262.3  | 137.6  | 125.7  | 120.8  |
| 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: SP1-2104-215-1

Luminaire Tested: CST-CA6-230-740-U-T4

Test Date: 04/20/2021

### Test Information

Test Method: LM-79-08  
 Report Number: SP1-2104-215-1  
 Test Lab: COOPER LIGHTING SOLUTIONS  
 Photometer: SP1  
 Measurement Geometry:  $4\pi$   
 Issue Date: 04/20/2021  
 Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
 Product Line: STREETWORKS  
 Catalog Number: **CST-CA6-230-740-U-T4**  
 Description: STREETWORKS HIGH MAST LUMINAIRE

230W

### Spectral Parameters

|                           |         |           |      |      |       |
|---------------------------|---------|-----------|------|------|-------|
| CCT (K):                  | 3783    | CRI (Ra): | 75.1 |      |       |
| CIE u':                   | 0.2297  | R1:       | 72.8 | R9:  | -19.0 |
| CIE v':                   | 0.5046  | R2:       | 81.9 | R10: | 57.0  |
| Duv:                      | -0.0008 | R3:       | 89.0 | R11: | 70.7  |
| CIE x:                    | 0.3897  | R4:       | 74.1 | R12: | 48.2  |
| CIE y:                    | 0.3804  | R5:       | 72.3 | R13: | 74.4  |
| CIE z:                    | 0.2299  | R6:       | 74.5 | R14: | 93.7  |
| Peak Wavelength (nm):     | 450     | R7:       | 81.7 |      |       |
| Dominant Wavelength (nm): | 580     | R8:       | 54.6 |      |       |
| Purity:                   | 31.3    |           |      |      |       |
| Rf:                       | 76.5    |           |      |      |       |
| Rg:                       | 95.6    |           |      |      |       |



### Test Conditions

Stabilization Time: 47M  
 Operation Time: 12H  
 Room Temperature (°C) / RH%: 25.5/39%  
 Sphere Temperature (°C): 24.0

REPORT NUMBER: SP1-2104-215-1

| 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: SP1-2104-215-1

**CIE 1931 Chromaticity Diagram**



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



Point lies inside the ANSI 4000K 7-step quadrangle

REPORT NUMBER: SP1-2104-215-1

### Photopic Flux vs. Wavelength

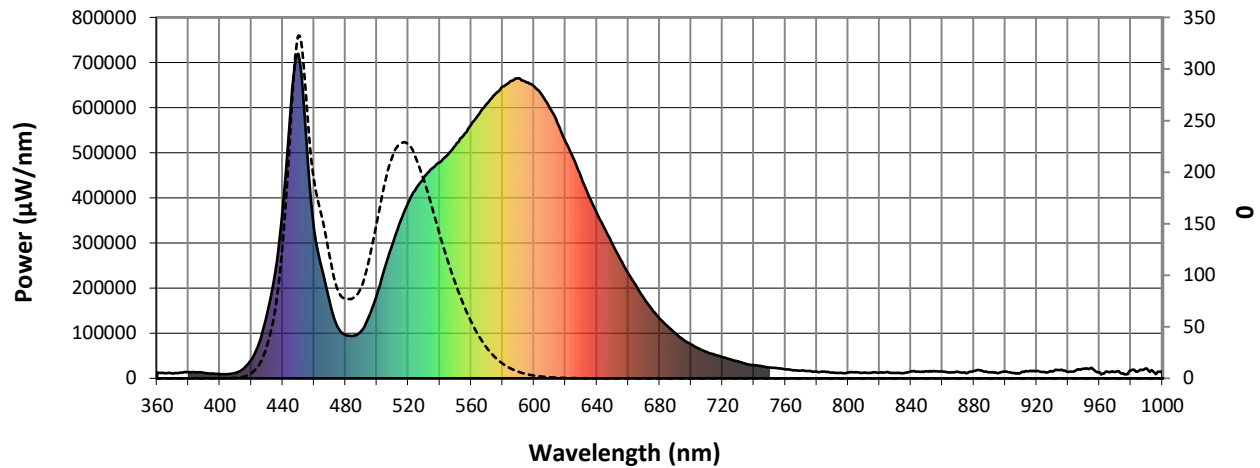


#####

| 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       | 13329            | 0.0              | 490       | 105235           | 15.0             | 620       | 524343           | 136.4            | 750       | 24224            | 0.0              | 880       | 16135            | 0.0              |
| 365       | 11697            | 0.0              | 495       | 137678           | 25.0             | 625       | 488932           | 107.9            | 755       | 22376            | 0.0              | 885       | 16876            | 0.0              |
| 370       | 10917            | 0.0              | 500       | 186689           | 41.2             | 630       | 445400           | 80.6             | 760       | 20109            | 0.0              | 890       | 13554            | 0.0              |
| 375       | 12548            | 0.0              | 505       | 244611           | 68.4             | 635       | 403534           | 60.6             | 765       | 18097            | 0.0              | 895       | 11525            | 0.0              |
| 380       | 13932            | 0.0              | 510       | 298987           | 102.7            | 640       | 366414           | 43.8             | 770       | 17366            | 0.0              | 900       | 14656            | 0.0              |
| 385       | 13265            | 0.0              | 515       | 348170           | 144.2            | 645       | 331272           | 31.9             | 775       | 16226            | 0.0              | 905       | 11999            | 0.0              |
| 390       | 11808            | 0.0              | 520       | 390427           | 189.3            | 650       | 297360           | 21.7             | 780       | 14803            | 0.0              | 910       | 12965            | 0.0              |
| 395       | 10395            | 0.0              | 525       | 421211           | 226.1            | 655       | 263291           | 15.1             | 785       | 15199            | 0.0              | 915       | 15939            | 0.0              |
| 400       | 9348             | 0.0              | 530       | 446063           | 262.6            | 660       | 232931           | 9.7              | 790       | 12989            | 0.0              | 920       | 16238            | 0.0              |
| 405       | 9479             | 0.0              | 535       | 465110           | 288.4            | 665       | 204719           | 6.5              | 795       | 12106            | 0.0              | 925       | 14419            | 0.0              |
| 410       | 12414            | 0.0              | 540       | 479189           | 312.2            | 670       | 177096           | 3.9              | 800       | 12942            | 0.0              | 930       | 14788            | 0.0              |
| 415       | 21574            | 0.0              | 545       | 495864           | 330.0            | 675       | 153254           | 2.6              | 805       | 13253            | 0.0              | 935       | 18619            | 0.0              |
| 420       | 41448            | 0.1              | 550       | 516625           | 351.1            | 680       | 132874           | 1.5              | 810       | 12808            | 0.0              | 940       | 13995            | 0.0              |
| 425       | 79385            | 0.4              | 555       | 538555           | 367.8            | 685       | 115378           | 1.0              | 815       | 12903            | 0.0              | 945       | 18047            | 0.0              |
| 430       | 141845           | 1.1              | 560       | 562412           | 382.2            | 690       | 100157           | 0.6              | 820       | 12621            | 0.0              | 950       | 21418            | 0.0              |
| 435       | 231290           | 2.7              | 565       | 585835           | 389.5            | 695       | 85561            | 0.4              | 825       | 13903            | 0.0              | 955       | 23138            | 0.0              |
| 440       | 374482           | 5.9              | 570       | 608681           | 395.8            | 700       | 75396            | 0.2              | 830       | 11870            | 0.0              | 960       | 13665            | 0.0              |
| 445       | 596715           | 12.4             | 575       | 629563           | 391.7            | 705       | 65658            | 0.1              | 835       | 11069            | 0.0              | 965       | 14793            | 0.0              |
| 450       | 719656           | 18.7             | 580       | 646820           | 384.3            | 710       | 58172            | 0.1              | 840       | 15291            | 0.0              | 970       | 14396            | 0.0              |
| 455       | 530438           | 17.8             | 585       | 659231           | 366.3            | 715       | 52563            | 0.1              | 845       | 15125            | 0.0              | 975       | 11155            | 0.0              |
| 460       | 330446           | 13.5             | 590       | 665630           | 344.2            | 720       | 47085            | 0.0              | 850       | 15336            | 0.0              | 980       | 17987            | 0.0              |
| 465       | 241999           | 12.5             | 595       | 656228           | 311.1            | 725       | 41741            | 0.0              | 855       | 15791            | 0.0              | 985       | 16185            | 0.0              |
| 470       | 167096           | 10.4             | 600       | 646946           | 278.8            | 730       | 37415            | 0.0              | 860       | 14660            | 0.0              | 990       | 22120            | 0.0              |
| 475       | 113791           | 8.9              | 605       | 628643           | 243.4            | 735       | 32125            | 0.0              | 865       | 12528            | 0.0              | 995       | 11943            | 0.0              |
| 480       | 96126            | 9.1              | 610       | 599057           | 205.8            | 740       | 29322            | 0.0              | 870       | 14089            | 0.0              | 1000      | 16020            | 0.0              |
| 485       | 94467            | 11.2             | 615       | 565669           | 170.8            | 745       | 26862            | 0.0              | 875       | 11732            | 0.0              |           |                  |                  |

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### Scotopic Flux vs. Wavelength



Scotopic Lumens: 54268.8

S/P: 1.5

| λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) |
|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|
| 360       | 13329            | 0.0              | 490       | 105235           | 162.0            | 620       | 524343           | 6.6              | 750       | 24224            | 0.0              | 880       | 16135            | 0.0              |
| 365       | 11697            | 0.0              | 495       | 137678           | 222.6            | 625       | 488932           | 4.1              | 755       | 22376            | 0.0              | 885       | 16876            | 0.0              |
| 370       | 10917            | 0.0              | 500       | 186689           | 312.3            | 630       | 445400           | 2.5              | 760       | 20109            | 0.0              | 890       | 13554            | 0.0              |
| 375       | 12548            | 0.0              | 505       | 244611           | 415.8            | 635       | 403534           | 1.5              | 765       | 18097            | 0.0              | 895       | 11525            | 0.0              |
| 380       | 13932            | 0.0              | 510       | 298987           | 506.8            | 640       | 366414           | 0.9              | 770       | 17366            | 0.0              | 900       | 14656            | 0.0              |
| 385       | 13265            | 0.0              | 515       | 348170           | 577.1            | 645       | 331272           | 0.6              | 775       | 16226            | 0.0              | 905       | 11999            | 0.0              |
| 390       | 11808            | 0.0              | 520       | 390427           | 620.6            | 650       | 297360           | 0.3              | 780       | 14803            | 0.0              | 910       | 12965            | 0.0              |
| 395       | 10395            | 0.1              | 525       | 421211           | 630.1            | 655       | 263291           | 0.2              | 785       | 15199            | 0.0              | 915       | 15939            | 0.0              |
| 400       | 9348             | 0.1              | 530       | 446063           | 615.0            | 660       | 232931           | 0.1              | 790       | 12989            | 0.0              | 920       | 16238            | 0.0              |
| 405       | 9479             | 0.3              | 535       | 465110           | 579.6            | 665       | 204719           | 0.1              | 795       | 12106            | 0.0              | 925       | 14419            | 0.0              |
| 410       | 12414            | 0.7              | 540       | 479189           | 529.5            | 670       | 177096           | 0.0              | 800       | 12942            | 0.0              | 930       | 14788            | 0.0              |
| 415       | 21574            | 2.2              | 545       | 495864           | 475.4            | 675       | 153254           | 0.0              | 805       | 13253            | 0.0              | 935       | 18619            | 0.0              |
| 420       | 41448            | 6.8              | 550       | 516625           | 422.4            | 680       | 132874           | 0.0              | 810       | 12808            | 0.0              | 940       | 13995            | 0.0              |
| 425       | 79385            | 19.4             | 555       | 538555           | 368.0            | 685       | 115378           | 0.0              | 815       | 12903            | 0.0              | 945       | 18047            | 0.0              |
| 430       | 141845           | 48.3             | 560       | 562412           | 314.4            | 690       | 100157           | 0.0              | 820       | 12621            | 0.0              | 950       | 21418            | 0.0              |
| 435       | 231290           | 103.4            | 565       | 585835           | 262.8            | 695       | 85561            | 0.0              | 825       | 13903            | 0.0              | 955       | 23138            | 0.0              |
| 440       | 374482           | 209.3            | 570       | 608681           | 214.8            | 700       | 75396            | 0.0              | 830       | 11870            | 0.0              | 960       | 13665            | 0.0              |
| 445       | 596715           | 399.6            | 575       | 629563           | 171.5            | 705       | 65658            | 0.0              | 835       | 11069            | 0.0              | 965       | 14793            | 0.0              |
| 450       | 719656           | 557.8            | 580       | 646820           | 133.3            | 710       | 58172            | 0.0              | 840       | 15291            | 0.0              | 970       | 14396            | 0.0              |
| 455       | 530438           | 463.5            | 585       | 659231           | 100.8            | 715       | 52563            | 0.0              | 845       | 15125            | 0.0              | 975       | 11155            | 0.0              |
| 460       | 330446           | 319.2            | 590       | 665630           | 74.1             | 720       | 47085            | 0.0              | 850       | 15336            | 0.0              | 980       | 17987            | 0.0              |
| 465       | 241999           | 255.6            | 595       | 656228           | 52.3             | 725       | 41741            | 0.0              | 855       | 15791            | 0.0              | 985       | 16185            | 0.0              |
| 470       | 167096           | 192.4            | 600       | 646946           | 36.5             | 730       | 37415            | 0.0              | 860       | 14660            | 0.0              | 990       | 22120            | 0.0              |
| 475       | 113791           | 142.3            | 605       | 628643           | 24.7             | 735       | 32125            | 0.0              | 865       | 12528            | 0.0              | 995       | 11943            | 0.0              |
| 480       | 96126            | 129.8            | 610       | 599057           | 16.2             | 740       | 29322            | 0.0              | 870       | 14089            | 0.0              | 1000      | 16020            | 0.0              |
| 485       | 94467            | 136.9            | 615       | 565669           | 10.5             | 745       | 26862            | 0.0              | 875       | 11732            | 0.0              |           |                  |                  |

REPORT NUMBER: SP1-2104-215-1

### Melanopic Flux vs. Wavelength



**Melanopic Lumens: 20938.3**      **M/P: 0.58**

| 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       | 13329            | 0.0              | 490       | 105235           | 87.6             | 620       | 524343           | 0.4              | 750       | 24224            | 0.0              | 880       | 16135            | 0.0              |
| 365       | 11697            | 0.0              | 495       | 137678           | 113.7            | 625       | 488932           | 0.3              | 755       | 22376            | 0.0              | 885       | 16876            | 0.0              |
| 370       | 10917            | 0.0              | 500       | 186689           | 150.1            | 630       | 445400           | 0.2              | 760       | 20109            | 0.0              | 890       | 13554            | 0.0              |
| 375       | 12548            | 0.0              | 505       | 244611           | 187.7            | 635       | 403534           | 0.1              | 765       | 18097            | 0.0              | 895       | 11525            | 0.0              |
| 380       | 13932            | 0.0              | 510       | 298987           | 214.7            | 640       | 366414           | 0.1              | 770       | 17366            | 0.0              | 900       | 14656            | 0.0              |
| 385       | 13265            | 0.0              | 515       | 348170           | 227.5            | 645       | 331272           | 0.0              | 775       | 16226            | 0.0              | 905       | 11999            | 0.0              |
| 390       | 11808            | 0.0              | 520       | 390427           | 227.3            | 650       | 297360           | 0.0              | 780       | 14803            | 0.0              | 910       | 12965            | 0.0              |
| 395       | 10395            | 0.1              | 525       | 421211           | 213.6            | 655       | 263291           | 0.0              | 785       | 15199            | 0.0              | 915       | 15939            | 0.0              |
| 400       | 9348             | 0.1              | 530       | 446063           | 192.8            | 660       | 232931           | 0.0              | 790       | 12989            | 0.0              | 920       | 16238            | 0.0              |
| 405       | 9479             | 0.2              | 535       | 465110           | 167.4            | 665       | 204719           | 0.0              | 795       | 12106            | 0.0              | 925       | 14419            | 0.0              |
| 410       | 12414            | 0.5              | 540       | 479189           | 140.2            | 670       | 177096           | 0.0              | 800       | 12942            | 0.0              | 930       | 14788            | 0.0              |
| 415       | 21574            | 1.4              | 545       | 495864           | 115.2            | 675       | 153254           | 0.0              | 805       | 13253            | 0.0              | 935       | 18619            | 0.0              |
| 420       | 41448            | 4.7              | 550       | 516625           | 92.7             | 680       | 132874           | 0.0              | 810       | 12808            | 0.0              | 940       | 13995            | 0.0              |
| 425       | 79385            | 12.4             | 555       | 538555           | 72.6             | 685       | 115378           | 0.0              | 815       | 12903            | 0.0              | 945       | 18047            | 0.0              |
| 430       | 141845           | 30.0             | 560       | 562412           | 55.5             | 690       | 100157           | 0.0              | 820       | 12621            | 0.0              | 950       | 21418            | 0.0              |
| 435       | 231290           | 61.7             | 565       | 585835           | 41.1             | 695       | 85561            | 0.0              | 825       | 13903            | 0.0              | 955       | 23138            | 0.0              |
| 440       | 374482           | 125.1            | 570       | 608681           | 29.7             | 700       | 75396            | 0.0              | 830       | 11870            | 0.0              | 960       | 13665            | 0.0              |
| 445       | 596715           | 235.4            | 575       | 629563           | 21.0             | 705       | 65658            | 0.0              | 835       | 11069            | 0.0              | 965       | 14793            | 0.0              |
| 450       | 719656           | 331.6            | 580       | 646820           | 14.5             | 710       | 58172            | 0.0              | 840       | 15291            | 0.0              | 970       | 14396            | 0.0              |
| 455       | 530438           | 277.9            | 585       | 659231           | 9.8              | 715       | 52563            | 0.0              | 845       | 15125            | 0.0              | 975       | 11155            | 0.0              |
| 460       | 330446           | 194.7            | 590       | 665630           | 6.5              | 720       | 47085            | 0.0              | 850       | 15336            | 0.0              | 980       | 17987            | 0.0              |
| 465       | 241999           | 158.1            | 595       | 656228           | 4.2              | 725       | 41741            | 0.0              | 855       | 15791            | 0.0              | 985       | 16185            | 0.0              |
| 470       | 167096           | 119.6            | 600       | 646946           | 2.7              | 730       | 37415            | 0.0              | 860       | 14660            | 0.0              | 990       | 22120            | 0.0              |
| 475       | 113791           | 86.9             | 605       | 628643           | 1.7              | 735       | 32125            | 0.0              | 865       | 12528            | 0.0              | 995       | 11943            | 0.0              |
| 480       | 96126            | 77.2             | 610       | 599057           | 1.1              | 740       | 29322            | 0.0              | 870       | 14089            | 0.0              | 1000      | 16020            | 0.0              |
| 485       | 94467            | 77.9             | 615       | 565669           | 0.7              | 745       | 26862            | 0.0              | 875       | 11732            | 0.0              |           |                  |                  |

### Summary

$R_f = 76.5$   
 $R_g = 95.6$   
 CIE  $R_a = 75.1$   
 $R_g = -19.0$



### Color Vector Graphics



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

|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 86 | CES26 = 66 | CES51 = 90 | CES76 = 56 |
| CES02 = 61 | CES27 = 89 | CES52 = 89 | CES77 = 73 |
| CES03 = 31 | CES28 = 83 | CES53 = 81 | CES78 = 58 |
| CES04 = 70 | CES29 = 69 | CES54 = 87 | CES79 = 84 |
| CES05 = 48 | CES30 = 84 | CES55 = 86 | CES80 = 81 |
| CES06 = 51 | CES31 = 72 | CES56 = 77 | CES81 = 79 |
| CES07 = 40 | CES32 = 64 | CES57 = 77 | CES82 = 92 |
| CES08 = 39 | CES33 = 79 | CES58 = 77 | CES83 = 90 |
| CES09 = 29 | CES34 = 73 | CES59 = 87 | CES84 = 87 |
| CES10 = 74 | CES35 = 85 | CES60 = 90 | CES85 = 78 |
| CES11 = 57 | CES36 = 91 | CES61 = 84 | CES86 = 73 |
| CES12 = 63 | CES37 = 81 | CES62 = 87 | CES87 = 79 |
| CES13 = 42 | CES38 = 94 | CES63 = 75 | CES88 = 83 |
| CES14 = 74 | CES39 = 96 | CES64 = 69 | CES89 = 73 |
| CES15 = 71 | CES40 = 91 | CES65 = 66 | CES90 = 83 |
| CES16 = 47 | CES41 = 94 | CES66 = 63 | CES91 = 76 |
| CES17 = 49 | CES42 = 82 | CES67 = 60 | CES92 = 62 |
| CES18 = 56 | CES43 = 78 | CES68 = 68 | CES93 = 77 |
| CES19 = 72 | CES44 = 99 | CES69 = 76 | CES94 = 57 |
| CES20 = 65 | CES45 = 86 | CES70 = 60 | CES95 = 69 |
| CES21 = 86 | CES46 = 84 | CES71 = 54 | CES96 = 79 |
| CES22 = 78 | CES47 = 87 | CES72 = 85 | CES97 = 86 |
| CES23 = 92 | CES48 = 80 | CES73 = 52 | CES98 = 79 |
| CES24 = 91 | CES49 = 82 | CES74 = 94 | CES99 = 69 |
| CES25 = 72 | CES50 = 90 | CES75 = 56 |            |



Color Rendition by Hue-Angle Bin



**Measure Comparisons**



(END OF REPORT)