

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: P510661

Luminaire Tested: **CST-CA6-230-730-U-T4**

Issue Date: 4/6/2021

**Test Information**

Test Method: LM-79-08  
Report Number: P510661  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G3-2102-151-12)  
Test Lab: COOPER LIGHTING SOLUTIONS  
Issue Date: 4/6/2021  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: STREETWORKS  
Catalog Number: CST-CA6-230-730-U-T4  
Description: CELESTEON HIGH MAST LUMINAIRE  
Light Source: (6) 3000K CCT, 70 CRI LEDS  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 33381 lumens  
Efficiency: N/A  
Efficacy: 146.5 lumens/watt  
Luminous Opening: Circular (Dia: 2.08' x H: 0')  
IES Classification: Type IV - Short  
BUG Rating: B3 - U0 - G5

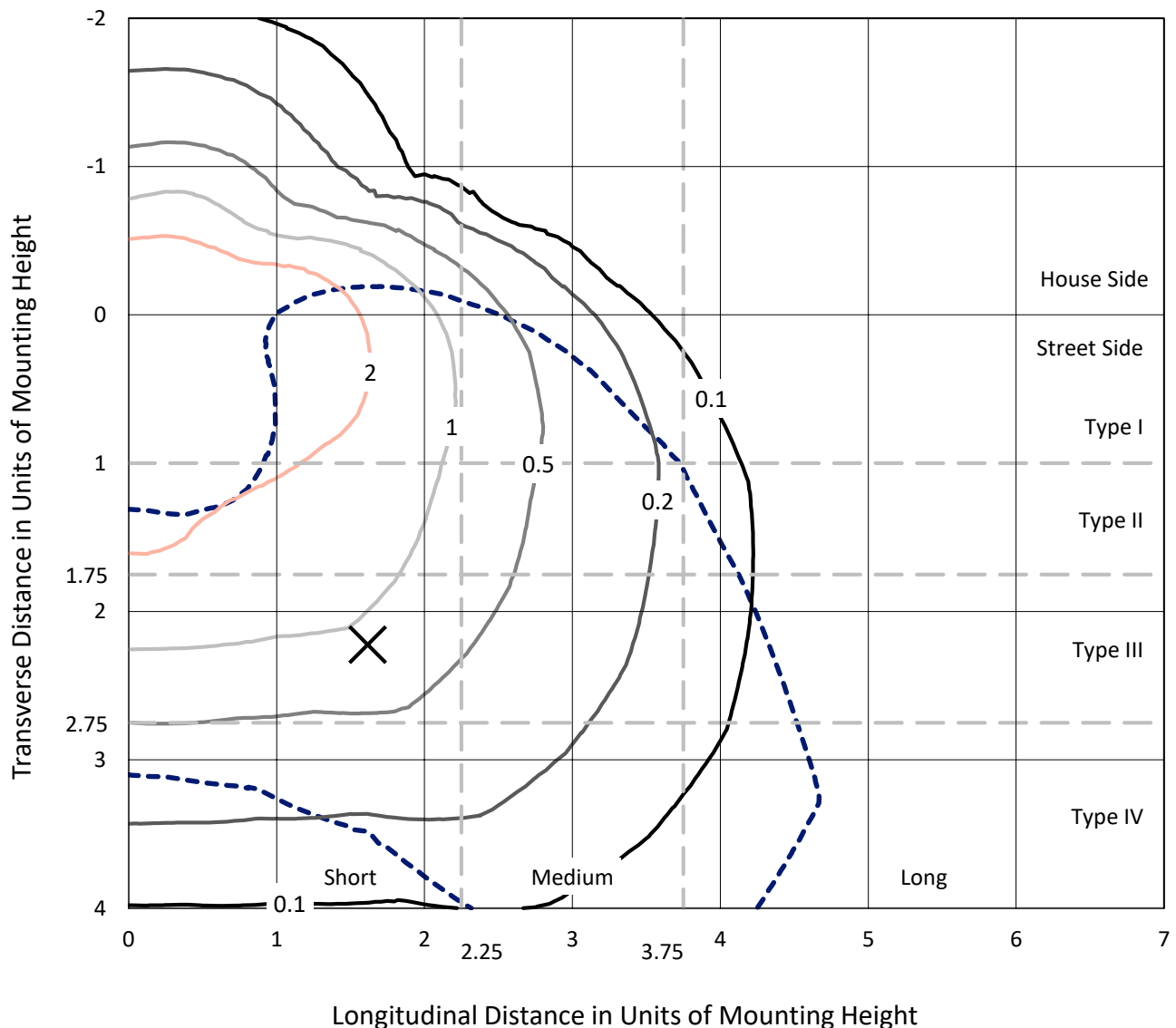
Input Watts (W): 227.8  
Input Voltage (V): 120  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: NR  
Total Harmonic Distortion (THDi): NR  
Frequency (hertz): 60  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 24 FT



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## Iso-Footcandle Lines of Horizontal Illumination

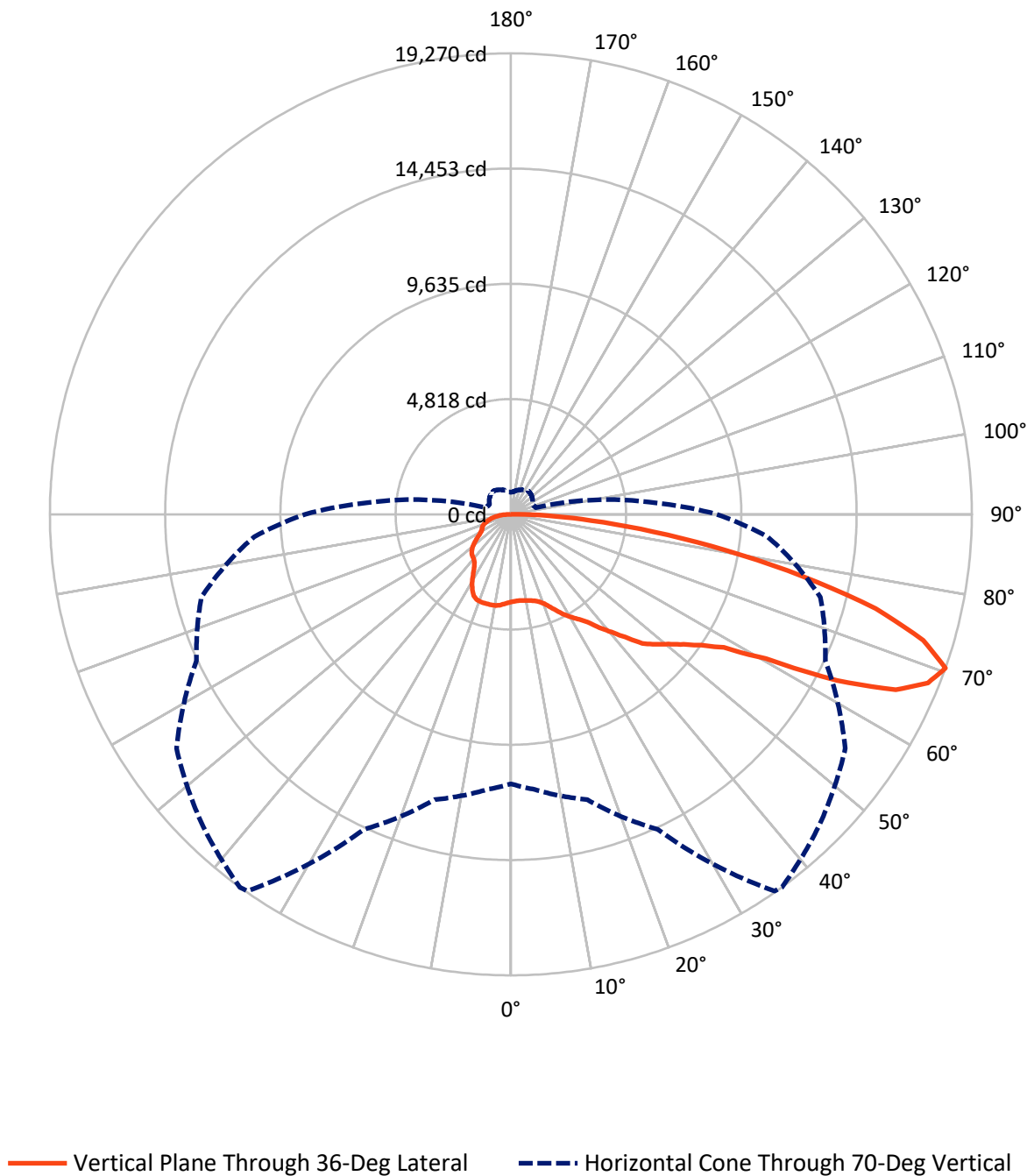
✕ Max cd  
 - - - 1/2 Max cd



Based on 30 foot mounting height. Maximum calculated value = 4.2 fc  
 Type IV - Short - N/A

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## Luminous Intensity Polar Plot



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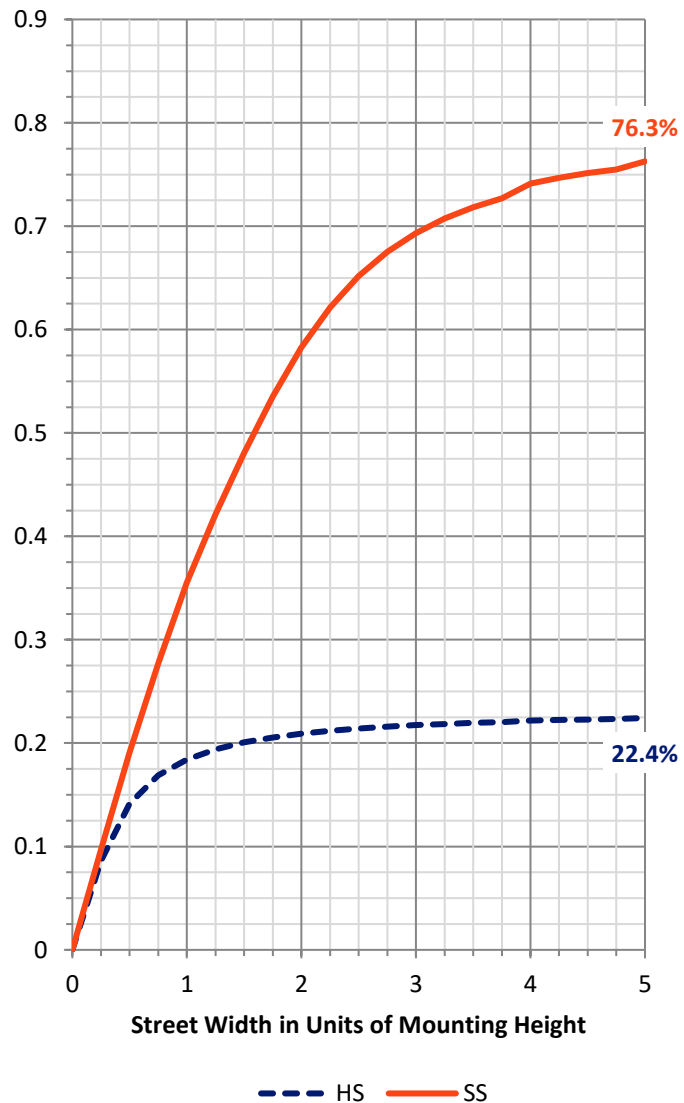
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total   |
|--------------------|-----------|----------|--------|---------|
| <b>House Side</b>  | Lumens    | 7605.7   | 0.0    | 7605.7  |
|                    | % Fixture | 22.8     | 0.0    | 22.8    |
| <b>Street Side</b> | Lumens    | 25775.4  | 0.0    | 25775.4 |
|                    | % Fixture | 77.2     | 0.0    | 77.2    |
| <b>Total</b>       | Lumens    | 33381.0  | 0.0    | 33381.0 |
|                    | % Fixture | 100.0    | 0.0    | 100.0   |

**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 354.2   | 1.1       |
| 10°-20°   | 1095.1  | 3.3       |
| 20°-30°   | 1975.3  | 5.9       |
| 30°-40°   | 3059.3  | 9.2       |
| 40°-50°   | 4647.1  | 13.9      |
| 50°-60°   | 6441.2  | 19.3      |
| 60°-70°   | 8375.8  | 25.1      |
| 70°-80°   | 6185.5  | 18.5      |
| 80°-90°   | 1247.5  | 3.7       |
| 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°    | 33381.0 | 100.0     |
| 0°-180°   | 33381.0 | 100.0     |

**Coefficient of Utilization**



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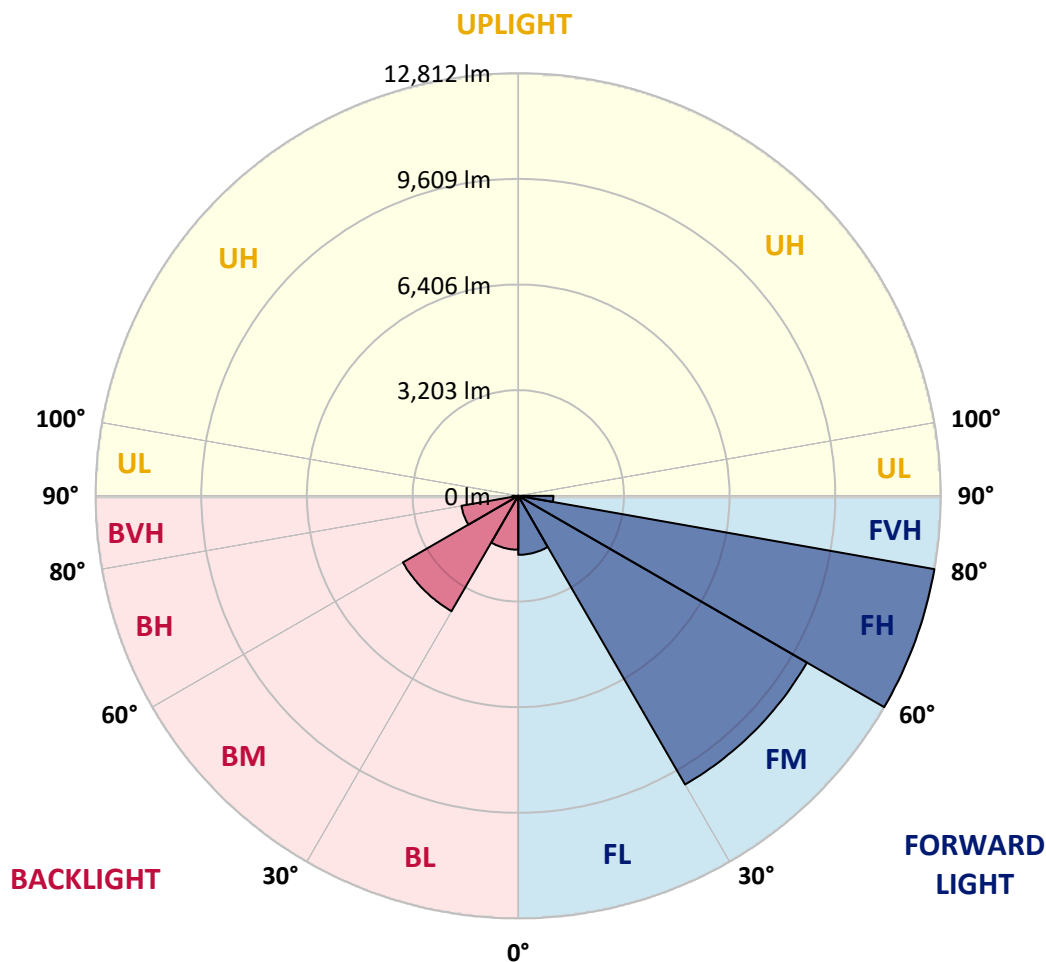
CATALOG NUMBER: CST-CA6-230-730-U-T4

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

| Zone |             | Lumens  | % Fixture | Zone Rating/Lumen Limit |      |         |
|------|-------------|---------|-----------|-------------------------|------|---------|
|      |             |         |           | B                       | U    | G       |
| FL   | (0°-30°)    | 1789.6  | 5.4       |                         |      |         |
| FM   | (30°-60°)   | 10107.7 | 30.3      |                         |      |         |
| FH   | (60°-80°)   | 12812.4 | 38.4      |                         |      | G5      |
| FVH  | (80°-90°)   | 1065.7  | 3.2       |                         |      | G5      |
| BL   | (0°-30°)    | 1635.0  | 4.9       | B3/2500                 |      |         |
| BM   | (30°-60°)   | 4040.0  | 12.1      | B3/5000                 |      |         |
| BH   | (60°-80°)   | 1748.9  | 5.2       | B3/2500                 |      | G3/2500 |
| BVH  | (80°-90°)   | 181.7   | 0.5       |                         |      | G2/225  |
| UL   | (90°-100°)  | 0.0     | 0.0       |                         | U0/0 |         |
| UH   | (100°-180°) | 0.0     | 0.0       |                         | U0/0 |         |

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

Type IV Short



FIELD PERFORMANCE MAY DIFFER FROM LABORATORY PERFORMANCE

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**CANDELA DISTRIBUTION (FULL):**

|       | 0°      | 5°      | 15°     | 25°     | 35°     | 36°     | 45°     | 55°     | 65°     | 75°     | 85°     |
|-------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| 0°    | 3656.2  | 3656.2  | 3656.2  | 3656.2  | 3656.2  | 3656.2  | 3656.2  | 3656.2  | 3656.2  | 3656.2  | 3656.2  |
| 2.5°  | 3634.1  | 3629.3  | 3626.5  | 3632.0  | 3634.1  | 3634.8  | 3636.2  | 3634.8  | 3631.3  | 3643.8  | 3659.0  |
| 5°    | 3634.8  | 3632.0  | 3626.5  | 3621.7  | 3621.7  | 3621.7  | 3622.3  | 3638.2  | 3645.2  | 3643.8  | 3662.4  |
| 7.5°  | 3640.3  | 3638.2  | 3627.9  | 3624.4  | 3632.7  | 3635.5  | 3649.3  | 3644.5  | 3652.1  | 3664.5  | 3680.4  |
| 10°   | 3641.0  | 3638.2  | 3629.3  | 3636.9  | 3660.4  | 3664.5  | 3670.7  | 3684.6  | 3687.3  | 3702.5  | 3718.4  |
| 12.5° | 3647.9  | 3647.9  | 3651.4  | 3668.0  | 3692.8  | 3697.7  | 3721.2  | 3732.2  | 3748.8  | 3756.4  | 3775.8  |
| 15°   | 3684.6  | 3683.9  | 3692.2  | 3710.8  | 3750.9  | 3753.7  | 3782.7  | 3815.9  | 3828.3  | 3847.0  | 3878.1  |
| 17.5° | 3771.6  | 3775.8  | 3776.5  | 3790.3  | 3838.0  | 3839.4  | 3887.1  | 3918.2  | 3946.5  | 3979.7  | 4050.9  |
| 20°   | 3978.3  | 3970.7  | 3962.4  | 3962.4  | 3981.1  | 3990.7  | 4027.4  | 4077.1  | 4135.2  | 4193.9  | 4277.6  |
| 22.5° | 4238.2  | 4253.4  | 4223.0  | 4207.1  | 4216.1  | 4205.0  | 4232.6  | 4272.7  | 4340.5  | 4428.2  | 4534.0  |
| 25°   | 4548.5  | 4549.9  | 4547.8  | 4483.5  | 4463.5  | 4470.4  | 4493.2  | 4530.5  | 4620.4  | 4690.2  | 4843.6  |
| 27.5° | 4851.2  | 4845.0  | 4822.9  | 4755.2  | 4735.8  | 4745.5  | 4744.8  | 4847.8  | 4939.7  | 5028.9  | 5209.2  |
| 30°   | 5126.3  | 5142.9  | 5103.5  | 4989.5  | 4991.5  | 4990.1  | 5021.9  | 5154.6  | 5322.6  | 5488.5  | 5673.7  |
| 32.5° | 5611.5  | 5561.0  | 5507.8  | 5282.5  | 5241.0  | 5236.2  | 5254.9  | 5452.5  | 5701.3  | 5981.3  | 6203.8  |
| 35°   | 6068.3  | 6055.9  | 6003.4  | 5774.6  | 5534.8  | 5530.6  | 5505.1  | 5745.6  | 6095.3  | 6613.7  | 6891.5  |
| 37.5° | 6535.6  | 6517.6  | 6465.8  | 6270.9  | 6032.4  | 6009.6  | 5794.7  | 6058.0  | 6530.7  | 7353.2  | 7749.2  |
| 40°   | 7092.6  | 7081.6  | 7001.4  | 6751.9  | 6507.2  | 6472.7  | 6249.4  | 6386.3  | 7080.2  | 8338.1  | 8617.3  |
| 42.5° | 7581.3  | 7579.2  | 7487.3  | 7255.8  | 7047.7  | 7013.2  | 6823.1  | 6965.5  | 7843.9  | 9303.0  | 9467.5  |
| 45°   | 7940.0  | 7994.6  | 7998.7  | 7866.7  | 7723.0  | 7692.6  | 7642.1  | 7838.4  | 8727.2  | 10178.7 | 10154.5 |
| 47.5° | 8242.7  | 8289.7  | 8240.7  | 8172.9  | 8123.8  | 8125.9  | 8204.0  | 8593.8  | 9599.5  | 10941.7 | 10753.7 |
| 50°   | 8748.7  | 8719.6  | 8464.6  | 8424.5  | 8486.7  | 8523.3  | 8750.0  | 9409.4  | 10598.2 | 11657.7 | 11291.4 |
| 52.5° | 9478.5  | 9367.2  | 8866.8  | 8785.3  | 9021.0  | 9034.8  | 9395.6  | 10138.6 | 11596.2 | 12272.2 | 11783.5 |
| 55°   | 10477.2 | 10385.3 | 9819.9  | 9443.3  | 9562.1  | 9655.4  | 10163.4 | 10885.7 | 12411.1 | 12850.0 | 12162.3 |
| 57.5° | 11953.5 | 11960.5 | 11499.5 | 10797.2 | 10392.9 | 10492.4 | 10889.2 | 11612.1 | 13084.3 | 13333.8 | 12398.6 |
| 60°   | 13136.8 | 13355.9 | 13218.4 | 12897.7 | 12317.1 | 12249.4 | 11947.3 | 12368.9 | 13659.3 | 13745.0 | 12624.7 |
| 62.5° | 13957.2 | 14056.7 | 14529.5 | 14597.2 | 15260.7 | 15289.1 | 13842.5 | 13255.7 | 14291.0 | 14014.6 | 12672.3 |
| 65°   | 13915.7 | 13977.2 | 14724.4 | 15633.9 | 17594.1 | 17681.8 | 16835.2 | 14597.2 | 14723.7 | 14134.8 | 12533.4 |
| 67.5° | 12946.7 | 13039.3 | 13989.0 | 15689.2 | 18837.5 | 18804.3 | 18267.3 | 16464.7 | 14866.1 | 13942.0 | 11871.3 |
| 70°   | 11263.8 | 11549.2 | 12346.8 | 14523.3 | 19225.9 | 19270.1 | 18280.4 | 17061.2 | 14499.1 | 13396.7 | 10767.5 |
| 72.5° | 9283.6  | 9373.5  | 10126.8 | 12562.4 | 18090.3 | 18025.3 | 17531.2 | 16274.0 | 13835.6 | 12410.4 | 8835.7  |
| 75°   | 7060.2  | 7060.2  | 7972.5  | 10011.4 | 15535.1 | 15763.2 | 15955.3 | 14739.6 | 12257.0 | 10115.1 | 6016.5  |
| 77.5° | 4686.7  | 4854.7  | 5589.4  | 7523.2  | 12297.0 | 12465.7 | 13129.2 | 12563.8 | 10035.6 | 7417.5  | 2748.0  |
| 80°   | 2486.1  | 2506.8  | 3294.7  | 4999.1  | 8795.7  | 9113.6  | 10025.9 | 9690.0  | 7218.4  | 3475.1  | 694.6   |
| 82.5° | 869.5   | 949.0   | 1448.7  | 2897.3  | 5795.3  | 5993.7  | 6651.0  | 5758.0  | 2549.7  | 769.3   | 384.3   |
| 85°   | 432.0   | 447.2   | 637.9   | 1379.5  | 3262.9  | 3359.0  | 3885.7  | 2242.8  | 410.5   | 335.9   | 261.3   |
| 87.5° | 208.0   | 212.9   | 244.7   | 493.5   | 1418.3  | 1483.9  | 1571.0  | 729.9   | 152.1   | 127.9   | 113.3   |
| 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-CA6-230-730-U-T4

**CANDELA DISTRIBUTION (continued):**

|       | 90°     | 95°     | 105°   | 115°   | 125°   | 135°   | 145°   | 155°   | 165°   | 175°   | 180°   |
|-------|---------|---------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 3656.2  | 3656.2  | 3656.2 | 3656.2 | 3656.2 | 3656.2 | 3656.2 | 3656.2 | 3656.2 | 3656.2 | 3656.2 |
| 2.5°  | 3662.4  | 3668.7  | 3680.4 | 3683.9 | 3675.6 | 3690.8 | 3705.3 | 3718.4 | 3717.7 | 3722.6 | 3739.8 |
| 5°    | 3670.7  | 3683.9  | 3696.3 | 3718.4 | 3739.8 | 3752.3 | 3764.0 | 3775.1 | 3778.5 | 3788.9 | 3799.3 |
| 7.5°  | 3696.3  | 3709.4  | 3737.8 | 3776.5 | 3777.9 | 3809.0 | 3829.0 | 3832.5 | 3835.2 | 3835.2 | 3859.4 |
| 10°   | 3735.7  | 3759.9  | 3805.5 | 3832.5 | 3856.6 | 3846.3 | 3867.0 | 3853.9 | 3844.2 | 3848.4 | 3864.9 |
| 12.5° | 3803.4  | 3824.9  | 3890.5 | 3920.2 | 3898.1 | 3894.0 | 3873.2 | 3843.5 | 3809.7 | 3806.2 | 3821.4 |
| 15°   | 3909.9  | 3950.0  | 4008.7 | 4037.0 | 3981.7 | 3932.7 | 3862.9 | 3802.0 | 3736.4 | 3712.2 | 3721.9 |
| 17.5° | 4081.3  | 4129.7  | 4193.9 | 4174.6 | 4073.7 | 3976.9 | 3861.5 | 3732.9 | 3605.8 | 3517.3 | 3540.1 |
| 20°   | 4332.2  | 4368.1  | 4420.6 | 4342.5 | 4195.3 | 4035.7 | 3846.3 | 3643.1 | 3428.1 | 3267.1 | 3248.4 |
| 22.5° | 4595.5  | 4650.1  | 4618.3 | 4473.9 | 4281.0 | 4058.5 | 3814.5 | 3512.5 | 3180.0 | 2978.2 | 2947.8 |
| 25°   | 4912.7  | 4930.7  | 4820.8 | 4603.1 | 4305.2 | 4022.5 | 3711.5 | 3321.7 | 2926.4 | 2736.3 | 2727.3 |
| 27.5° | 5249.3  | 5208.6  | 5004.0 | 4662.5 | 4278.3 | 3916.1 | 3504.9 | 3020.4 | 2696.9 | 2528.9 | 2502.7 |
| 30°   | 5629.5  | 5534.8  | 5155.3 | 4668.8 | 4176.7 | 3708.7 | 3243.6 | 2784.7 | 2510.3 | 2341.6 | 2314.7 |
| 32.5° | 6118.8  | 5895.6  | 5295.6 | 4604.5 | 3962.4 | 3404.6 | 2929.8 | 2583.5 | 2342.3 | 2173.0 | 2148.8 |
| 35°   | 6744.3  | 6367.6  | 5444.2 | 4488.4 | 3698.4 | 3100.5 | 2669.9 | 2412.8 | 2206.2 | 2002.3 | 1969.8 |
| 37.5° | 7465.2  | 7026.3  | 5621.9 | 4341.8 | 3408.8 | 2833.0 | 2494.4 | 2304.3 | 2105.3 | 1874.4 | 1835.7 |
| 40°   | 8302.9  | 7685.7  | 5895.6 | 4167.0 | 3148.9 | 2640.2 | 2409.4 | 2267.0 | 2049.3 | 1808.8 | 1764.5 |
| 42.5° | 9028.6  | 8383.0  | 6221.1 | 3979.0 | 2903.5 | 2479.9 | 2371.4 | 2242.1 | 2014.0 | 1759.7 | 1709.2 |
| 45°   | 9699.7  | 8958.8  | 6539.0 | 3750.9 | 2645.1 | 2370.0 | 2325.7 | 2179.9 | 1951.8 | 1698.9 | 1646.3 |
| 47.5° | 10245.0 | 9423.9  | 6815.5 | 3541.5 | 2438.4 | 2269.1 | 2226.2 | 2061.7 | 1847.5 | 1625.6 | 1586.9 |
| 50°   | 10663.8 | 9773.6  | 6966.9 | 3374.9 | 2220.0 | 2154.3 | 2097.7 | 1928.3 | 1722.4 | 1530.9 | 1497.7 |
| 52.5° | 11092.4 | 10124.1 | 7041.5 | 3383.2 | 2016.8 | 1983.6 | 1925.6 | 1780.4 | 1622.8 | 1475.6 | 1439.7 |
| 55°   | 11341.9 | 10267.8 | 6962.7 | 3182.1 | 1830.2 | 1791.5 | 1741.0 | 1665.7 | 1571.7 | 1441.1 | 1407.2 |
| 57.5° | 11487.7 | 10357.0 | 6722.9 | 2595.3 | 1605.6 | 1568.9 | 1577.2 | 1571.0 | 1493.6 | 1356.0 | 1324.9 |
| 60°   | 11592.8 | 10163.4 | 6231.5 | 1907.6 | 1414.1 | 1386.5 | 1454.9 | 1432.8 | 1365.7 | 1258.6 | 1232.3 |
| 62.5° | 11507.7 | 9795.1  | 5346.8 | 1434.1 | 1257.9 | 1316.7 | 1376.8 | 1336.0 | 1244.8 | 1147.3 | 1116.9 |
| 65°   | 10989.4 | 9072.1  | 4064.0 | 1152.2 | 1207.4 | 1288.3 | 1336.7 | 1271.0 | 1178.4 | 1063.0 | 1049.2 |
| 67.5° | 10046.0 | 7761.7  | 2396.9 | 1056.1 | 1169.4 | 1255.1 | 1295.2 | 1208.1 | 1126.6 | 1016.0 | 999.4  |
| 70°   | 8606.3  | 5810.5  | 1070.6 | 983.5  | 1103.1 | 1188.1 | 1214.4 | 1132.1 | 1043.6 | 940.0  | 923.4  |
| 72.5° | 6405.6  | 3503.5  | 721.6  | 908.2  | 1004.9 | 1080.3 | 1109.3 | 1022.2 | 959.3  | 912.3  | 907.5  |
| 75°   | 3557.4  | 1216.4  | 665.6  | 822.5  | 897.8  | 965.5  | 1001.5 | 940.0  | 890.2  | 825.9  | 799.7  |
| 77.5° | 1132.8  | 517.0   | 632.4  | 735.4  | 830.8  | 886.8  | 881.2  | 788.6  | 772.7  | 694.6  | 687.7  |
| 80°   | 452.0   | 450.6   | 584.7  | 602.0  | 709.1  | 756.1  | 743.7  | 626.9  | 647.6  | 602.0  | 584.0  |
| 82.5° | 354.6   | 412.6   | 468.6  | 459.6  | 551.5  | 606.8  | 589.6  | 460.3  | 520.4  | 478.3  | 437.5  |
| 85°   | 269.6   | 361.5   | 300.7  | 299.3  | 385.0  | 450.6  | 461.7  | 353.9  | 354.6  | 322.8  | 287.5  |
| 87.5° | 138.9   | 133.4   | 115.4  | 114.7  | 128.6  | 183.2  | 224.6  | 201.1  | 159.0  | 119.6  | 114.7  |
| 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: SP1-2104-215-6

Luminaire Tested: CST-CA6-230-730-U-T4

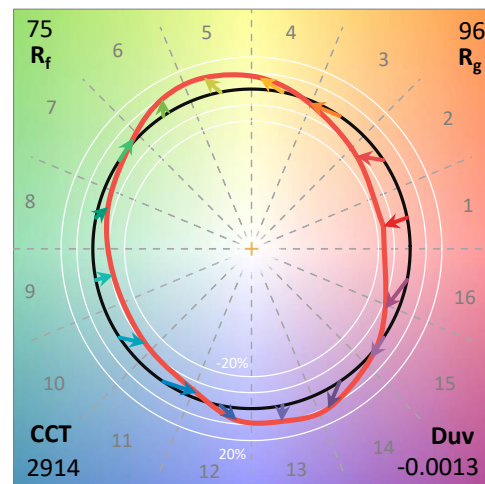
Test Date: 04/22/2021

### Test Information

Test Method: LM-79-08  
 Report Number: SP1-2104-215-6  
 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-CA6-230-730-U-T4**  
 Description: STREETWORKS HIGH MAST LUMINAIRE

### Spectral Parameters

|                           |         |           |      |      |       |
|---------------------------|---------|-----------|------|------|-------|
| CCT (K):                  | 2914    | CRI (Ra): | 73.2 |      |       |
| CIE u':                   | 0.2541  | R1:       | 70.1 | R9:  | -27.2 |
| CIE v':                   | 0.5212  | R2:       | 83.3 | R10: | 61.9  |
| Duv:                      | -0.0013 | R3:       | 94.2 | R11: | 65.4  |
| CIE x:                    | 0.4410  | R4:       | 69.4 | R12: | 53.3  |
| CIE y:                    | 0.4020  | R5:       | 69.3 | R13: | 72.6  |
| CIE z:                    | 0.1571  | R6:       | 77.3 | R14: | 96.9  |
| Peak Wavelength (nm):     | 599     | R7:       | 77.5 |      |       |
| Dominant Wavelength (nm): | 583     | R8:       | 44.9 |      |       |
| Purity:                   | 53.4    |           |      |      |       |
| Rf:                       | 75.3    |           |      |      |       |
| Rg:                       | 95.7    |           |      |      |       |



### Test Conditions

Stabilization Time: 72M  
 Operation Time: 12H  
 Room Temperature (°C) / RH%: 25.6/15%  
 Sphere Temperature (°C): 24.0

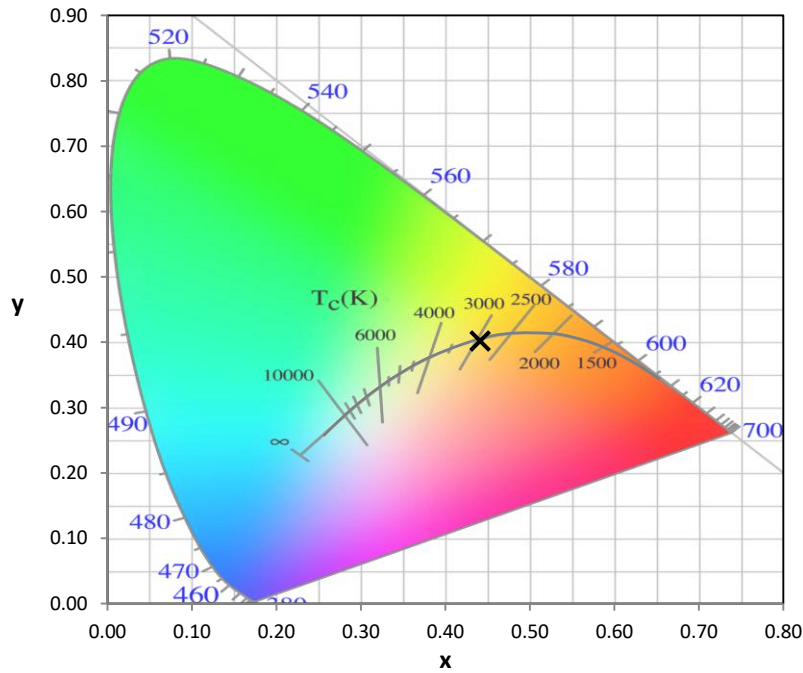
REPORT NUMBER: SP1-2104-215-6

| 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            |

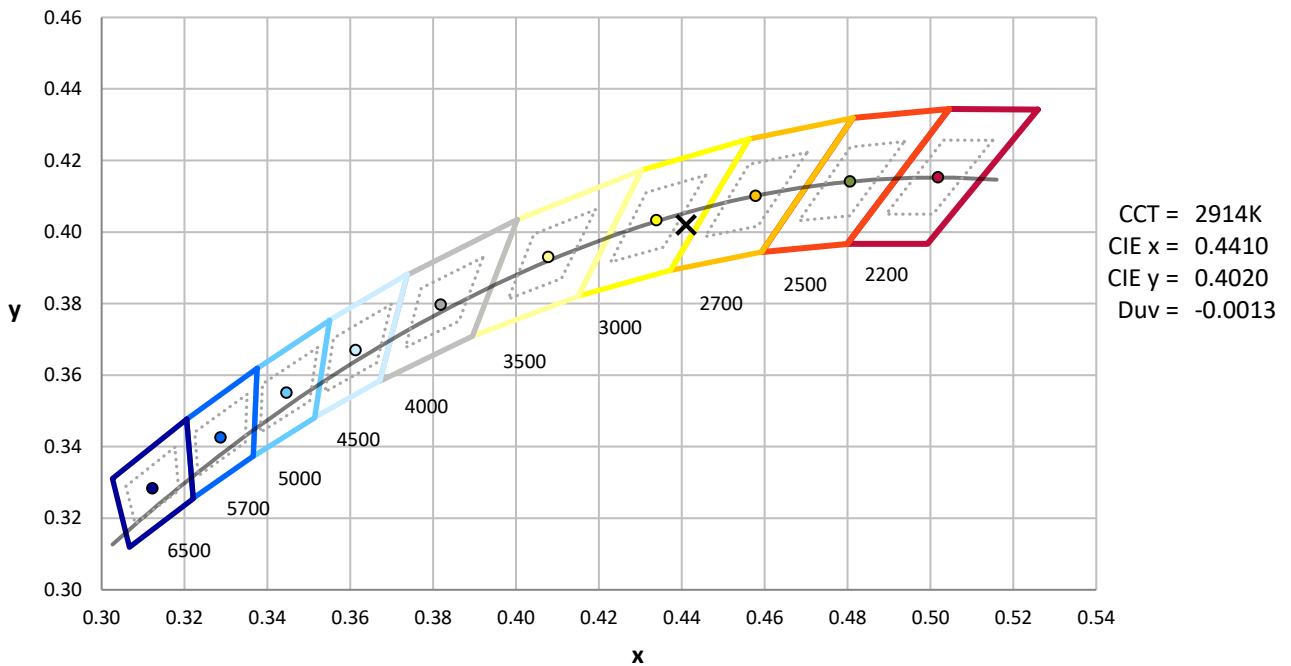


REPORT NUMBER: SP1-2104-215-6

**CIE 1931 Chromaticity Diagram**



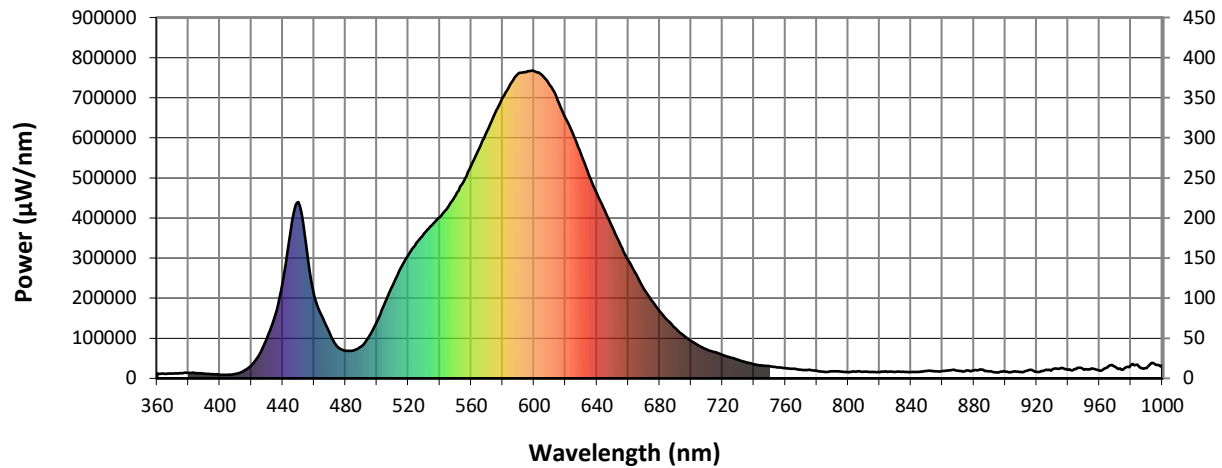
**CIE 1931 Chromaticity Diagram with 2017 ANSI 7-Step and 4-Step Quadrangles**



Point lies inside the ANSI 3000K 7-step quadrangle

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### Photopic Flux vs. Wavelength

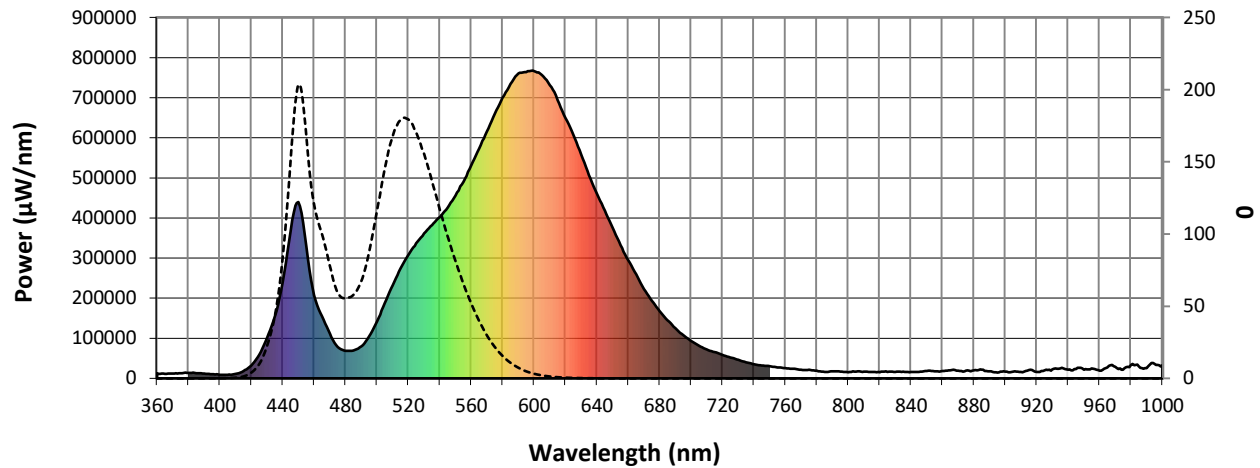


#####

| 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       | 12827            | 0.0              | 490       | 80096            | 11.4             | 620       | 649050           | 168.9            | 750       | 30187            | 0.0              | 880       | 19756            | 0.0              |
| 365       | 11336            | 0.0              | 495       | 104447           | 18.9             | 625       | 608162           | 134.2            | 755       | 27442            | 0.0              | 885       | 21245            | 0.0              |
| 370       | 11776            | 0.0              | 500       | 142477           | 31.4             | 630       | 557990           | 101.0            | 760       | 25382            | 0.0              | 890       | 17771            | 0.0              |
| 375       | 13009            | 0.0              | 505       | 187724           | 52.5             | 635       | 506861           | 76.2             | 765       | 23778            | 0.0              | 895       | 14356            | 0.0              |
| 380       | 13906            | 0.0              | 510       | 232209           | 79.8             | 640       | 460827           | 55.1             | 770       | 21474            | 0.0              | 900       | 16683            | 0.0              |
| 385       | 12960            | 0.0              | 515       | 273388           | 113.2            | 645       | 418064           | 40.3             | 775       | 21394            | 0.0              | 905       | 16548            | 0.0              |
| 390       | 11750            | 0.0              | 520       | 308378           | 149.5            | 650       | 376246           | 27.5             | 780       | 18945            | 0.0              | 910       | 15630            | 0.0              |
| 395       | 10399            | 0.0              | 525       | 336804           | 180.8            | 655       | 332016           | 19.0             | 785       | 16318            | 0.0              | 915       | 20907            | 0.0              |
| 400       | 9192             | 0.0              | 530       | 361609           | 212.9            | 660       | 294638           | 12.3             | 790       | 17841            | 0.0              | 920       | 16083            | 0.0              |
| 405       | 8943             | 0.0              | 535       | 382440           | 237.2            | 665       | 259105           | 8.2              | 795       | 16506            | 0.0              | 925       | 20203            | 0.0              |
| 410       | 11120            | 0.0              | 540       | 401976           | 261.9            | 670       | 223041           | 4.9              | 800       | 15058            | 0.0              | 930       | 22625            | 0.0              |
| 415       | 18193            | 0.0              | 545       | 426232           | 283.7            | 675       | 193569           | 3.2              | 805       | 16851            | 0.0              | 935       | 24828            | 0.0              |
| 420       | 32317            | 0.1              | 550       | 455969           | 309.9            | 680       | 167520           | 1.9              | 810       | 16679            | 0.0              | 940       | 21275            | 0.0              |
| 425       | 59220            | 0.3              | 555       | 490448           | 335.0            | 685       | 144697           | 1.2              | 815       | 15851            | 0.0              | 945       | 23270            | 0.0              |
| 430       | 100522           | 0.8              | 560       | 530799           | 360.7            | 690       | 125032           | 0.7              | 820       | 15536            | 0.0              | 950       | 21756            | 0.0              |
| 435       | 155311           | 1.8              | 565       | 572799           | 380.9            | 695       | 107458           | 0.5              | 825       | 16381            | 0.0              | 955       | 24823            | 0.0              |
| 440       | 239817           | 3.8              | 570       | 615361           | 400.1            | 700       | 93549            | 0.3              | 830       | 16149            | 0.0              | 960       | 19499            | 0.0              |
| 445       | 368265           | 7.7              | 575       | 659689           | 410.5            | 705       | 81608            | 0.2              | 835       | 16687            | 0.0              | 965       | 27077            | 0.0              |
| 450       | 439895           | 11.4             | 580       | 700037           | 416.0            | 710       | 71559            | 0.1              | 840       | 16206            | 0.0              | 970       | 28727            | 0.0              |
| 455       | 329010           | 11.0             | 585       | 734518           | 408.1            | 715       | 65193            | 0.1              | 845       | 16062            | 0.0              | 975       | 21725            | 0.0              |
| 460       | 207545           | 8.5              | 590       | 760906           | 393.4            | 720       | 58466            | 0.0              | 850       | 18530            | 0.0              | 980       | 33536            | 0.0              |
| 465       | 154577           | 8.0              | 595       | 763605           | 362.0            | 725       | 52265            | 0.0              | 855       | 17709            | 0.0              | 985       | 30537            | 0.0              |
| 470       | 110708           | 6.9              | 600       | 766048           | 330.1            | 730       | 46287            | 0.0              | 860       | 18086            | 0.0              | 990       | 25187            | 0.0              |
| 475       | 78445            | 6.2              | 605       | 756483           | 293.0            | 735       | 40164            | 0.0              | 865       | 19763            | 0.0              | 995       | 35676            | 0.0              |
| 480       | 68887            | 6.5              | 610       | 730981           | 251.1            | 740       | 35097            | 0.0              | 870       | 19416            | 0.0              | 1000      | 32909            | 0.0              |
| 485       | 69832            | 8.3              | 615       | 694682           | 209.7            | 745       | 32334            | 0.0              | 875       | 19352            | 0.0              |           |                  |                  |

REPORT NUMBER: SP1-2104-215-6

### Scotopic Flux vs. Wavelength



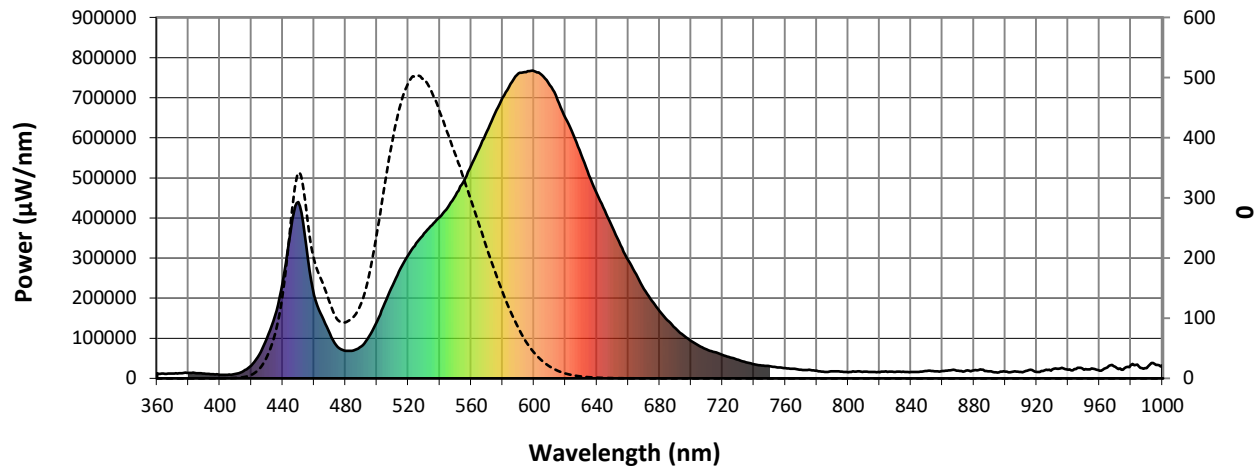
Scotopic Lumens: 43125.2

S/P: 1.19

| 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       | 12827            | 0.0              | 490       | 80096            | 123.3            | 620       | 649050           | 8.1              | 750       | 30187            | 0.0              | 880       | 19756            | 0.0              |
| 365       | 11336            | 0.0              | 495       | 104447           | 168.8            | 625       | 608162           | 5.1              | 755       | 27442            | 0.0              | 885       | 21245            | 0.0              |
| 370       | 11776            | 0.0              | 500       | 142477           | 238.3            | 630       | 557990           | 3.2              | 760       | 25382            | 0.0              | 890       | 17771            | 0.0              |
| 375       | 13009            | 0.0              | 505       | 187724           | 319.1            | 635       | 506861           | 1.9              | 765       | 23778            | 0.0              | 895       | 14356            | 0.0              |
| 380       | 13906            | 0.0              | 510       | 232209           | 393.6            | 640       | 460827           | 1.2              | 770       | 21474            | 0.0              | 900       | 16683            | 0.0              |
| 385       | 12960            | 0.0              | 515       | 273388           | 453.1            | 645       | 418064           | 0.7              | 775       | 21394            | 0.0              | 905       | 16548            | 0.0              |
| 390       | 11750            | 0.0              | 520       | 308378           | 490.2            | 650       | 376246           | 0.4              | 780       | 18945            | 0.0              | 910       | 15630            | 0.0              |
| 395       | 10399            | 0.1              | 525       | 336804           | 503.9            | 655       | 332016           | 0.3              | 785       | 16318            | 0.0              | 915       | 20907            | 0.0              |
| 400       | 9192             | 0.1              | 530       | 361609           | 498.6            | 660       | 294638           | 0.2              | 790       | 17841            | 0.0              | 920       | 16083            | 0.0              |
| 405       | 8943             | 0.3              | 535       | 382440           | 476.6            | 665       | 259105           | 0.1              | 795       | 16506            | 0.0              | 925       | 20203            | 0.0              |
| 410       | 11120            | 0.7              | 540       | 401976           | 444.2            | 670       | 223041           | 0.1              | 800       | 15058            | 0.0              | 930       | 22625            | 0.0              |
| 415       | 18193            | 1.9              | 545       | 426232           | 408.7            | 675       | 193569           | 0.0              | 805       | 16851            | 0.0              | 935       | 24828            | 0.0              |
| 420       | 32317            | 5.3              | 550       | 455969           | 372.8            | 680       | 167520           | 0.0              | 810       | 16679            | 0.0              | 940       | 21275            | 0.0              |
| 425       | 59220            | 14.5             | 555       | 490448           | 335.2            | 685       | 144697           | 0.0              | 815       | 15851            | 0.0              | 945       | 23270            | 0.0              |
| 430       | 100522           | 34.2             | 560       | 530799           | 296.7            | 690       | 125032           | 0.0              | 820       | 15536            | 0.0              | 950       | 21756            | 0.0              |
| 435       | 155311           | 69.4             | 565       | 572799           | 257.0            | 695       | 107458           | 0.0              | 825       | 16381            | 0.0              | 955       | 24823            | 0.0              |
| 440       | 239817           | 134.0            | 570       | 615361           | 217.2            | 700       | 93549            | 0.0              | 830       | 16149            | 0.0              | 960       | 19499            | 0.0              |
| 445       | 368265           | 246.6            | 575       | 659689           | 179.7            | 705       | 81608            | 0.0              | 835       | 16687            | 0.0              | 965       | 27077            | 0.0              |
| 450       | 439895           | 340.9            | 580       | 700037           | 144.2            | 710       | 71559            | 0.0              | 840       | 16206            | 0.0              | 970       | 28727            | 0.0              |
| 455       | 329010           | 287.5            | 585       | 734518           | 112.3            | 715       | 65193            | 0.0              | 845       | 16062            | 0.0              | 975       | 21725            | 0.0              |
| 460       | 207545           | 200.5            | 590       | 760906           | 84.7             | 720       | 58466            | 0.0              | 850       | 18530            | 0.0              | 980       | 33536            | 0.0              |
| 465       | 154577           | 163.3            | 595       | 763605           | 60.9             | 725       | 52265            | 0.0              | 855       | 17709            | 0.0              | 985       | 30537            | 0.0              |
| 470       | 110708           | 127.5            | 600       | 766048           | 43.2             | 730       | 46287            | 0.0              | 860       | 18086            | 0.0              | 990       | 25187            | 0.0              |
| 475       | 78445            | 98.1             | 605       | 756483           | 29.7             | 735       | 40164            | 0.0              | 865       | 19763            | 0.0              | 995       | 35676            | 0.0              |
| 480       | 68887            | 93.1             | 610       | 730981           | 19.8             | 740       | 35097            | 0.0              | 870       | 19416            | 0.0              | 1000      | 32909            | 0.0              |
| 485       | 69832            | 101.2            | 615       | 694682           | 12.8             | 745       | 32334            | 0.0              | 875       | 19352            | 0.0              |           |                  |                  |

REPORT NUMBER: SP1-2104-215-6

### Melanopic Flux vs. Wavelength

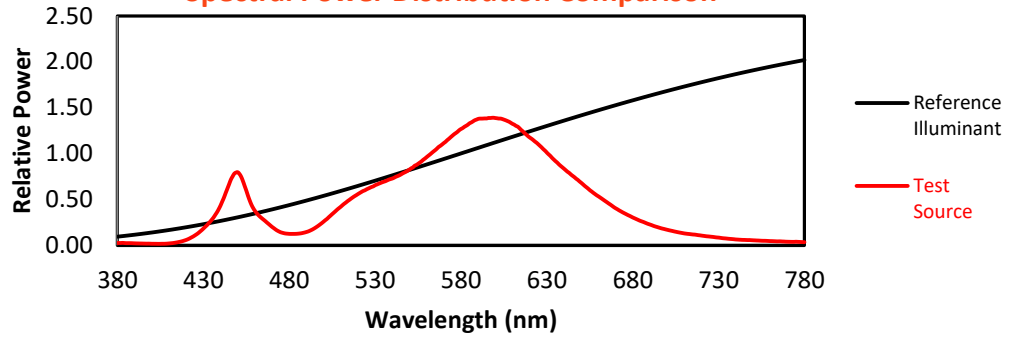

**Melanopic Lumens: 15555.2      M/P: 0.43**

| 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       | 12827            | 0.0              | 490       | 80096            | 66.7             | 620       | 649050           | 0.5              | 750       | 30187            | 0.0              | 880       | 19756            | 0.0              |
| 365       | 11336            | 0.0              | 495       | 104447           | 86.2             | 625       | 608162           | 0.3              | 755       | 27442            | 0.0              | 885       | 21245            | 0.0              |
| 370       | 11776            | 0.0              | 500       | 142477           | 114.5            | 630       | 557990           | 0.2              | 760       | 25382            | 0.0              | 890       | 17771            | 0.0              |
| 375       | 13009            | 0.0              | 505       | 187724           | 144.1            | 635       | 506861           | 0.1              | 765       | 23778            | 0.0              | 895       | 14356            | 0.0              |
| 380       | 13906            | 0.0              | 510       | 232209           | 166.7            | 640       | 460827           | 0.1              | 770       | 21474            | 0.0              | 900       | 16683            | 0.0              |
| 385       | 12960            | 0.0              | 515       | 273388           | 178.6            | 645       | 418064           | 0.0              | 775       | 21394            | 0.0              | 905       | 16548            | 0.0              |
| 390       | 11750            | 0.0              | 520       | 308378           | 179.5            | 650       | 376246           | 0.0              | 780       | 18945            | 0.0              | 910       | 15630            | 0.0              |
| 395       | 10399            | 0.1              | 525       | 336804           | 170.8            | 655       | 332016           | 0.0              | 785       | 16318            | 0.0              | 915       | 20907            | 0.0              |
| 400       | 9192             | 0.1              | 530       | 361609           | 156.3            | 660       | 294638           | 0.0              | 790       | 17841            | 0.0              | 920       | 16083            | 0.0              |
| 405       | 8943             | 0.2              | 535       | 382440           | 137.6            | 665       | 259105           | 0.0              | 795       | 16506            | 0.0              | 925       | 20203            | 0.0              |
| 410       | 11120            | 0.4              | 540       | 401976           | 117.6            | 670       | 223041           | 0.0              | 800       | 15058            | 0.0              | 930       | 22625            | 0.0              |
| 415       | 18193            | 1.2              | 545       | 426232           | 99.0             | 675       | 193569           | 0.0              | 805       | 16851            | 0.0              | 935       | 24828            | 0.0              |
| 420       | 32317            | 3.7              | 550       | 455969           | 81.9             | 680       | 167520           | 0.0              | 810       | 16679            | 0.0              | 940       | 21275            | 0.0              |
| 425       | 59220            | 9.2              | 555       | 490448           | 66.1             | 685       | 144697           | 0.0              | 815       | 15851            | 0.0              | 945       | 23270            | 0.0              |
| 430       | 100522           | 21.2             | 560       | 530799           | 52.4             | 690       | 125032           | 0.0              | 820       | 15536            | 0.0              | 950       | 21756            | 0.0              |
| 435       | 155311           | 41.4             | 565       | 572799           | 40.2             | 695       | 107458           | 0.0              | 825       | 16381            | 0.0              | 955       | 24823            | 0.0              |
| 440       | 239817           | 80.1             | 570       | 615361           | 30.1             | 700       | 93549            | 0.0              | 830       | 16149            | 0.0              | 960       | 19499            | 0.0              |
| 445       | 368265           | 145.3            | 575       | 659689           | 22.0             | 705       | 81608            | 0.0              | 835       | 16687            | 0.0              | 965       | 27077            | 0.0              |
| 450       | 439895           | 202.7            | 580       | 700037           | 15.7             | 710       | 71559            | 0.0              | 840       | 16206            | 0.0              | 970       | 28727            | 0.0              |
| 455       | 329010           | 172.4            | 585       | 734518           | 10.9             | 715       | 65193            | 0.0              | 845       | 16062            | 0.0              | 975       | 21725            | 0.0              |
| 460       | 207545           | 122.3            | 590       | 760906           | 7.5              | 720       | 58466            | 0.0              | 850       | 18530            | 0.0              | 980       | 33536            | 0.0              |
| 465       | 154577           | 101.0            | 595       | 763605           | 4.9              | 725       | 52265            | 0.0              | 855       | 17709            | 0.0              | 985       | 30537            | 0.0              |
| 470       | 110708           | 79.3             | 600       | 766048           | 3.2              | 730       | 46287            | 0.0              | 860       | 18086            | 0.0              | 990       | 25187            | 0.0              |
| 475       | 78445            | 59.9             | 605       | 756483           | 2.1              | 735       | 40164            | 0.0              | 865       | 19763            | 0.0              | 995       | 35676            | 0.0              |
| 480       | 68887            | 55.4             | 610       | 730981           | 1.3              | 740       | 35097            | 0.0              | 870       | 19416            | 0.0              | 1000      | 32909            | 0.0              |
| 485       | 69832            | 57.6             | 615       | 694682           | 0.8              | 745       | 32334            | 0.0              | 875       | 19352            | 0.0              |           |                  |                  |

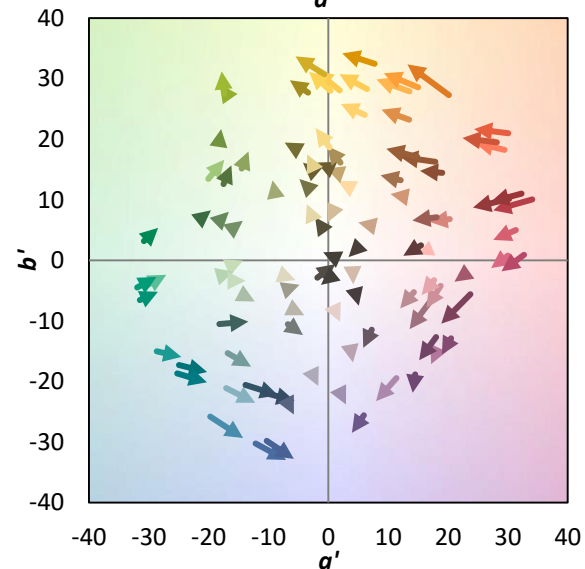
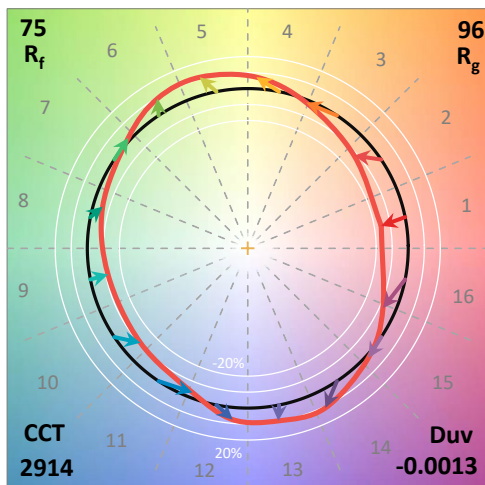
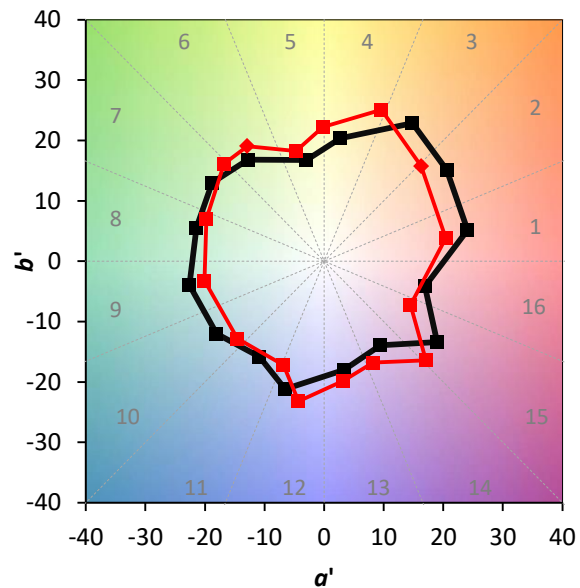
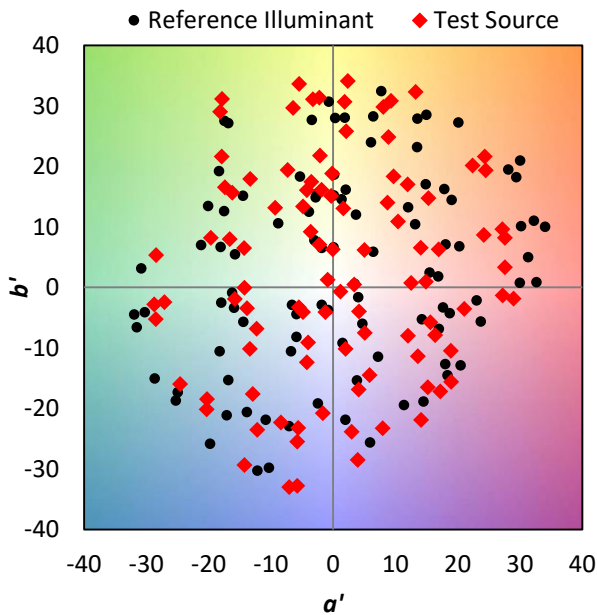
### Summary

$R_f = 75.3$   
 $R_g = 95.7$   
 CIE  $R_a = 73.2$   
 $R_g = -27.2$

### Spectral Power Distribution Comparison



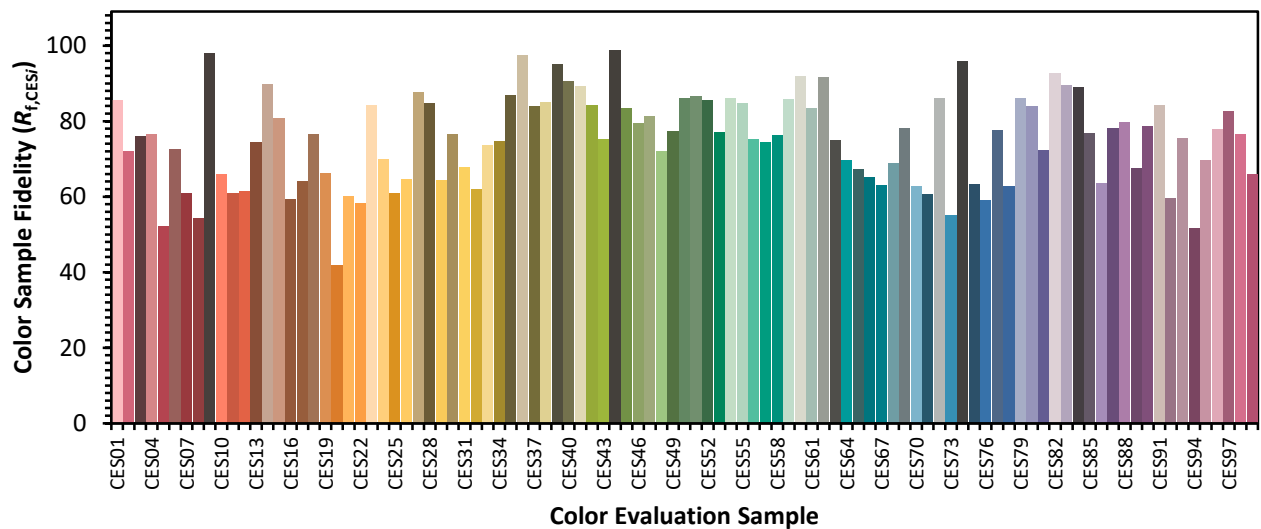
### Color Vector Graphics



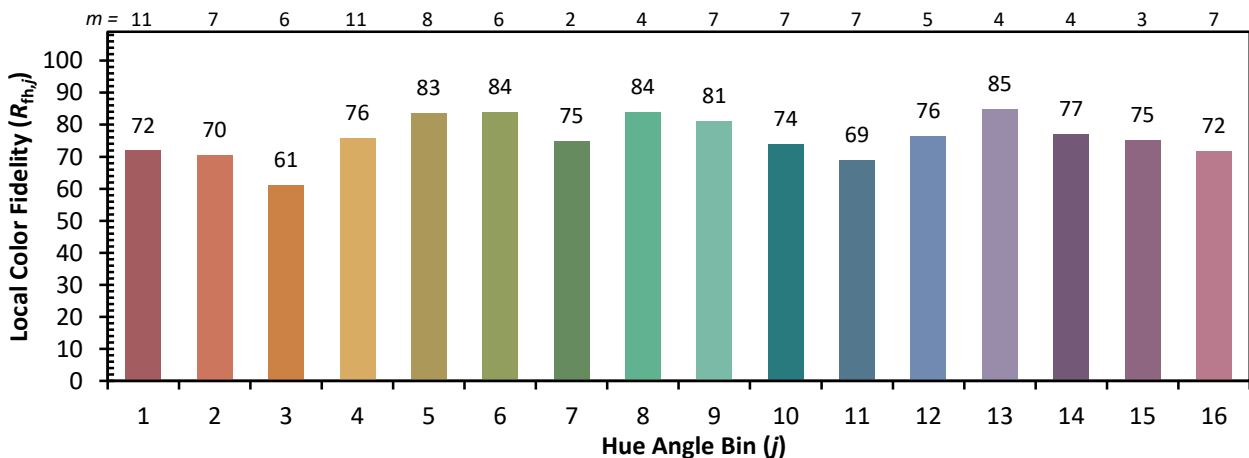
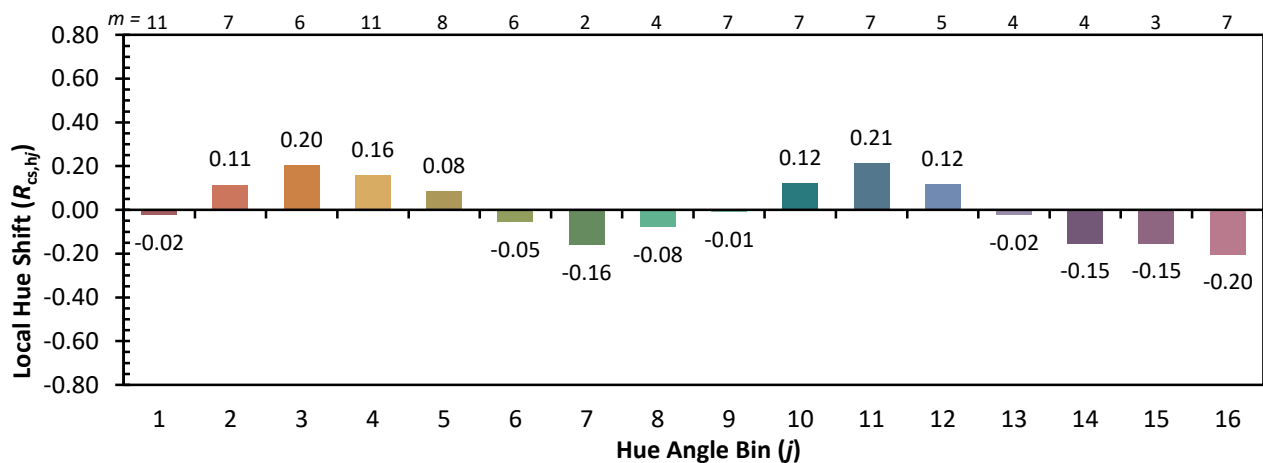
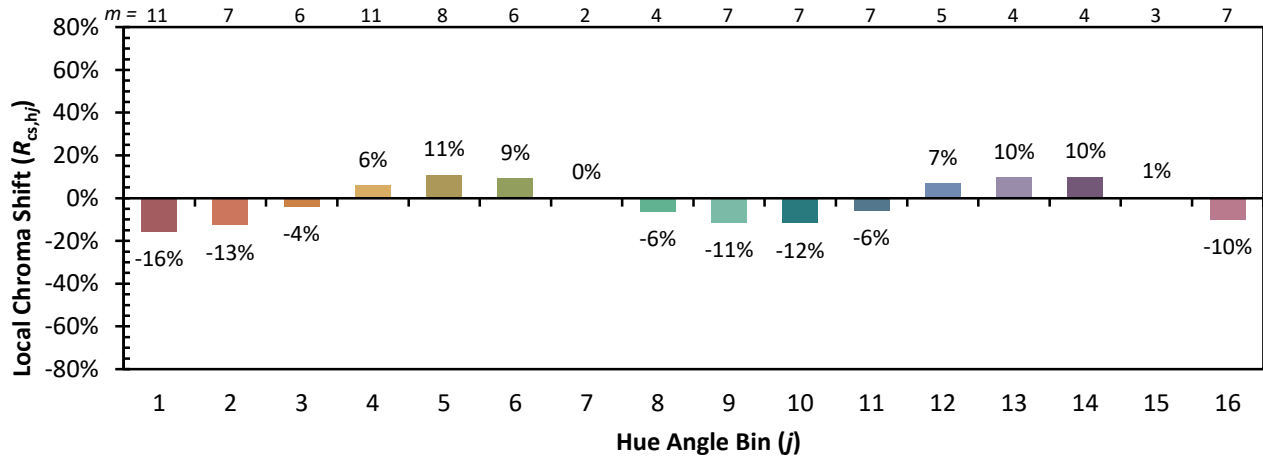


**Individual Sample Fidelity Index ( $R_{f,i}$ )**

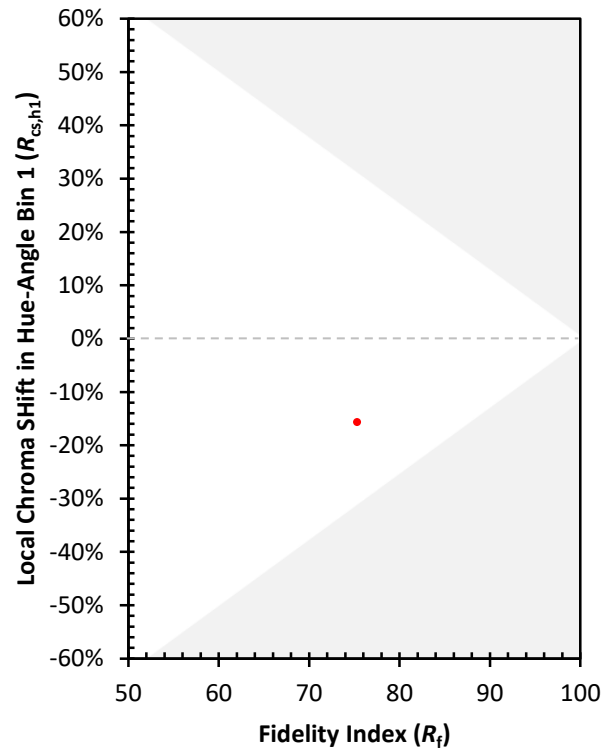
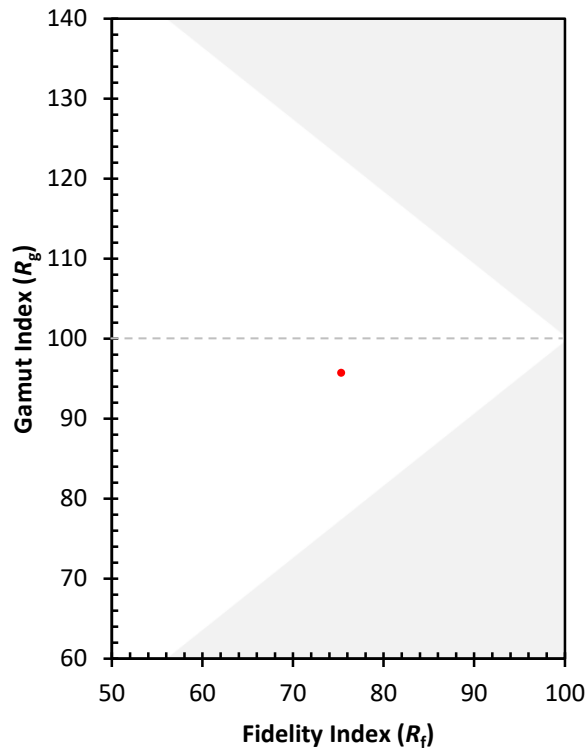
|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 86 | CES26 = 65 | CES51 = 87 | CES76 = 59 |
| CES02 = 63 | CES27 = 88 | CES52 = 86 | CES77 = 78 |
| CES03 = 31 | CES28 = 85 | CES53 = 77 | CES78 = 63 |
| CES04 = 71 | CES29 = 64 | CES54 = 86 | CES79 = 86 |
| CES05 = 49 | CES30 = 77 | CES55 = 85 | CES80 = 84 |
| CES06 = 51 | CES31 = 68 | CES56 = 75 | CES81 = 72 |
| CES07 = 42 | CES32 = 62 | CES57 = 75 | CES82 = 93 |
| CES08 = 40 | CES33 = 74 | CES58 = 76 | CES83 = 89 |
| CES09 = 29 | CES34 = 75 | CES59 = 86 | CES84 = 89 |
| CES10 = 76 | CES35 = 87 | CES60 = 92 | CES85 = 77 |
| CES11 = 59 | CES36 = 98 | CES61 = 84 | CES86 = 64 |
| CES12 = 65 | CES37 = 84 | CES62 = 92 | CES87 = 78 |
| CES13 = 43 | CES38 = 85 | CES63 = 75 | CES88 = 80 |
| CES14 = 74 | CES39 = 95 | CES64 = 70 | CES89 = 67 |
| CES15 = 71 | CES40 = 90 | CES65 = 67 | CES90 = 79 |
| CES16 = 47 | CES41 = 89 | CES66 = 65 | CES91 = 84 |
| CES17 = 50 | CES42 = 84 | CES67 = 63 | CES92 = 60 |
| CES18 = 56 | CES43 = 75 | CES68 = 69 | CES93 = 75 |
| CES19 = 73 | CES44 = 99 | CES69 = 78 | CES94 = 52 |
| CES20 = 66 | CES45 = 83 | CES70 = 63 | CES95 = 70 |
| CES21 = 87 | CES46 = 80 | CES71 = 61 | CES96 = 78 |
| CES22 = 79 | CES47 = 81 | CES72 = 86 | CES97 = 83 |
| CES23 = 92 | CES48 = 72 | CES73 = 55 | CES98 = 77 |
| CES24 = 91 | CES49 = 77 | CES74 = 96 | CES99 = 66 |
| CES25 = 73 | CES50 = 86 | CES75 = 63 |            |



Color Rendition by Hue-Angle Bin



**Measure Comparisons**



(END OF REPORT)