

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: INVUE

Report Number: P823036

Luminaire Tested: **MSA-SA2C-735-U-SL4-HSS**

Issue Date: 04/10/2024

**Test Information**

Test Method: LM-79-08  
Report Number: P823036  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-1910-543-21)  
Test Lab: INNOVATION CENTER  
Issue Date: 04/10/2024  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: INVUE  
Catalog Number: MSA-SA2C-735-U-SL4-HSS  
Description: MESA POST TOP DECORATIVE LUMINAIRE. (2) LIGHTSQUARES WITH 16 LEDS  
EACH AND TYPE IV SPILL LIGHT ELIMINATOR OPTICS WITH HOUSE SIDE SHIELD  
Light Source: -  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 9504.2 lumens  
Efficiency: N/A  
Efficacy: 84.1 lumens/watt  
Luminous Opening: Rectangular (W 0.5' x L: 1' x H: 0')  
IES Classification: Type IV - Short  
BUG Rating: B1 - U0 - G2

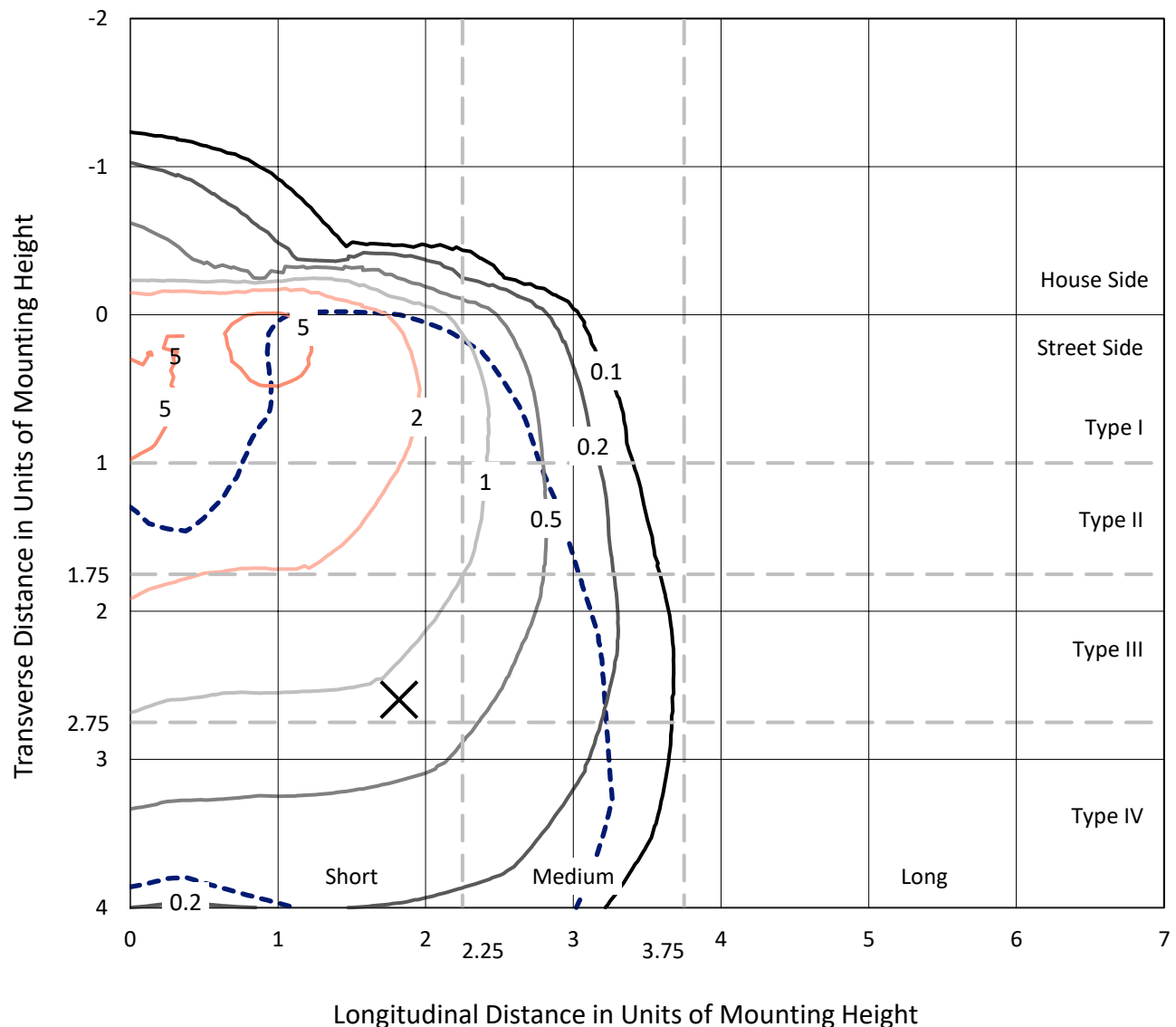
Input Watts (W): 113  
Input Voltage (V): NR  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: NR  
Total Harmonic Distortion (THDi): NR  
Frequency (hertz): 60  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 25 FT

REPORT NUMBER: P823036

CATALOG NUMBER: MSA-SA2C-735-U-SL4-HSS

## Iso-Footcandle Lines of Horizontal Illumination

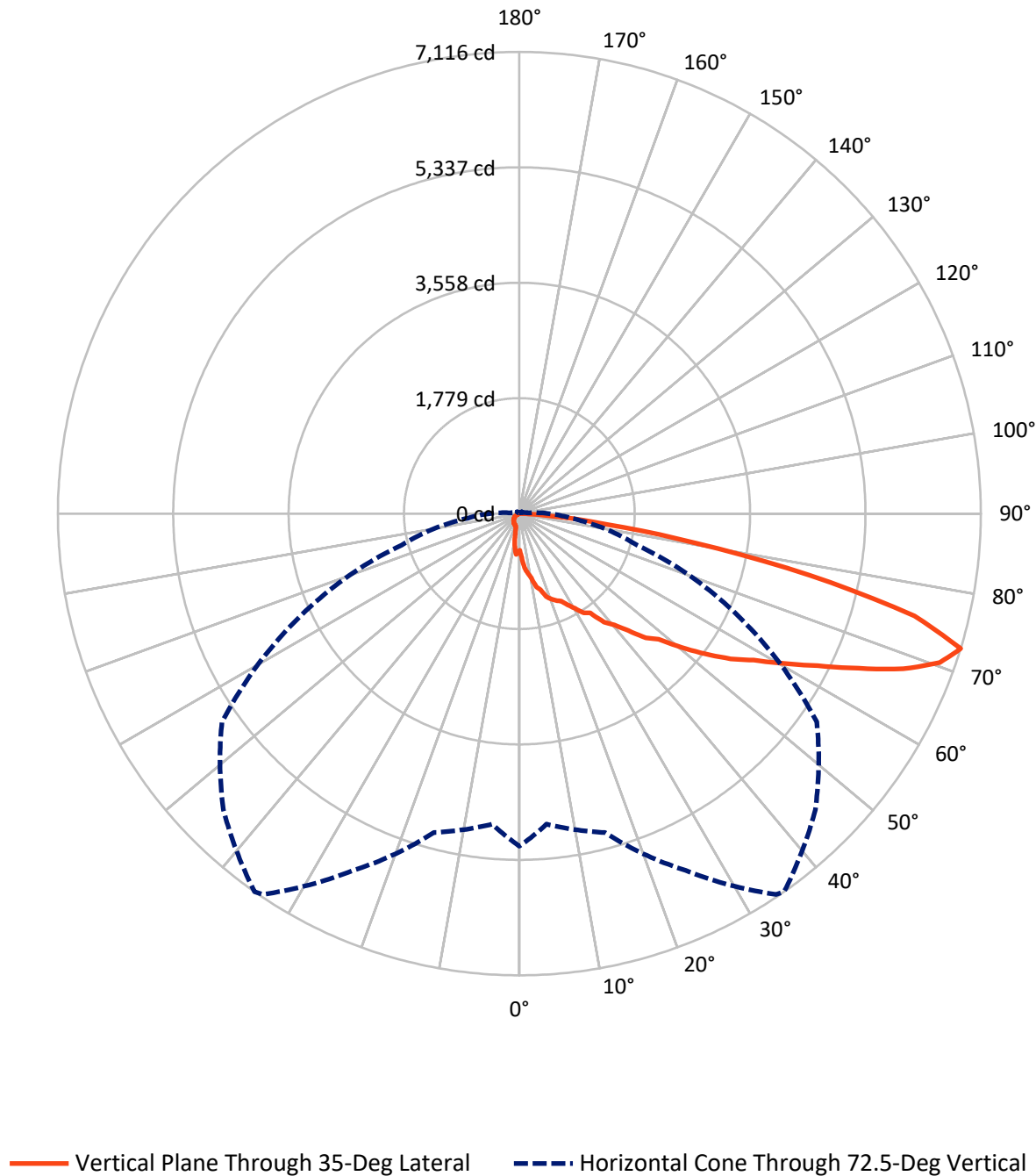
× Max cd  
- - - 1/2 Max cd



Based on 15 foot mounting height. Maximum calculated value = 6 fc  
Type IV - Short - N/A

REPORT NUMBER: P823036  
CATALOG NUMBER: MSA-SA2C-735-U-SL4-HSS

## Luminous Intensity Polar Plot



REPORT NUMBER: P823036

CATALOG NUMBER: MSA-SA2C-735-U-SL4-HSS

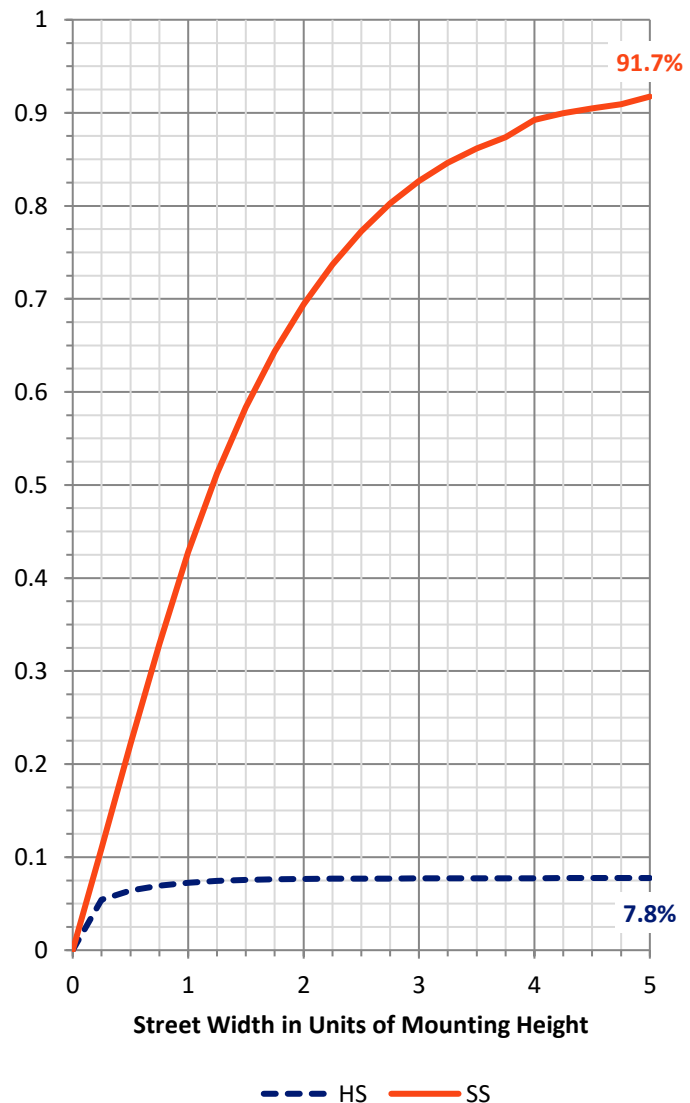
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total  |
|--------------------|-----------|----------|--------|--------|
| <b>House Side</b>  | Lumens    | 741.3    | 0.0    | 741.3  |
|                    | % Fixture | 7.8      | 0.0    | 7.8    |
| <b>Street Side</b> | Lumens    | 8762.9   | 0.0    | 8762.9 |
|                    | % Fixture | 92.2     | 0.0    | 92.2   |
| <b>Total</b>       | Lumens    | 9504.2   | 0.0    | 9504.2 |
|                    | % Fixture | 100.0    | 0.0    | 100.0  |

**ZONAL LUMENS:**

| Zone      | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10°    | 72.2   | 0.8       |
| 10°-20°   | 243.2  | 2.6       |
| 20°-30°   | 442.9  | 4.7       |
| 30°-40°   | 764.0  | 8.0       |
| 40°-50°   | 1358.2 | 14.3      |
| 50°-60°   | 2026.7 | 21.3      |
| 60°-70°   | 2589.3 | 27.2      |
| 70°-80°   | 1801.5 | 19.0      |
| 80°-90°   | 206.1  | 2.2       |
| 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°    | 9504.2 | 100.0     |
| 0°-180°   | 9504.2 | 100.0     |

**Coefficient of Utilization**



REPORT NUMBER: P823036

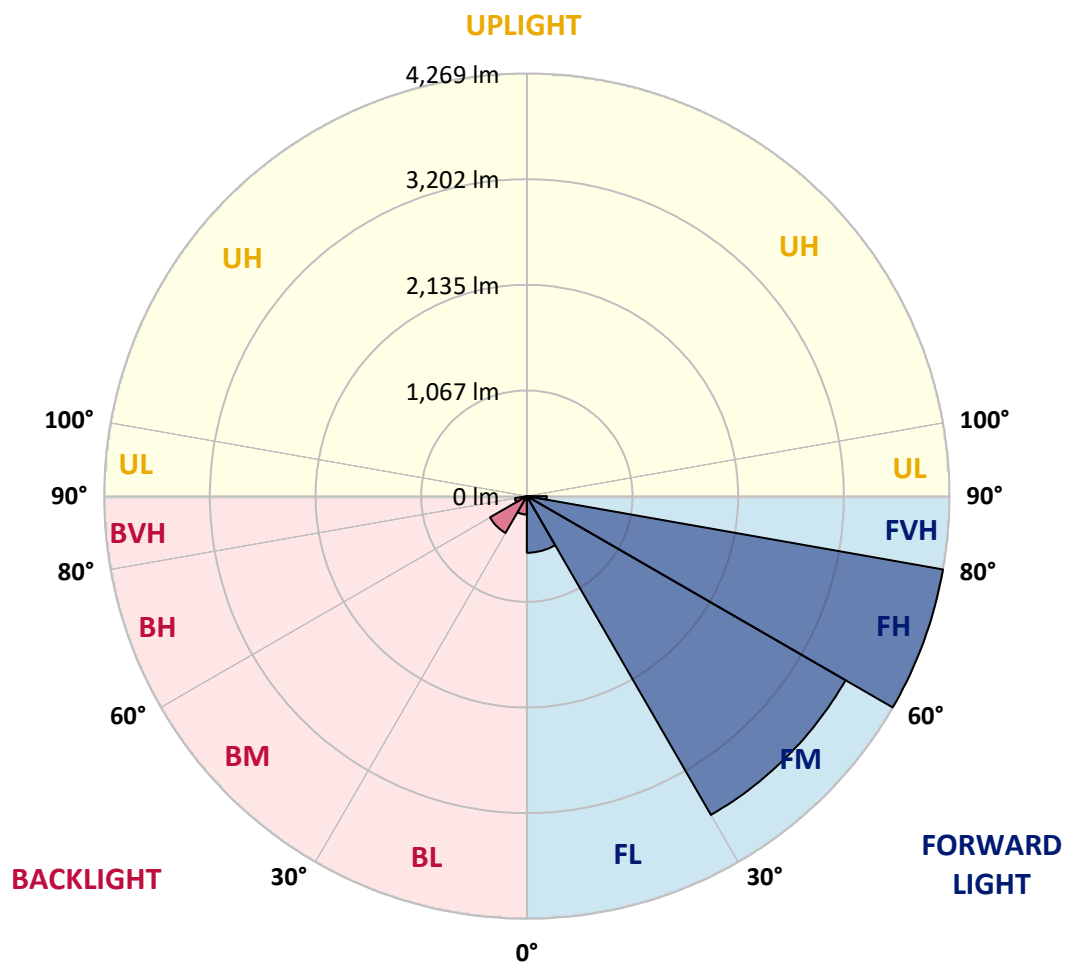
CATALOG NUMBER: MSA-SA2C-735-U-SL4-HSS

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

| Zone |             | Lumens | % Fixture | Zone Rating/Lumen Limit |      |         |
|------|-------------|--------|-----------|-------------------------|------|---------|
|      |             |        |           | B                       | U    | G       |
| FL   | (0°-30°)    | 571.9  | 6.0       |                         |      |         |
| FM   | (30°-60°)   | 3719.0 | 39.1      |                         |      |         |
| FH   | (60°-80°)   | 4269.3 | 44.9      |                         |      | G2/5000 |
| FVH  | (80°-90°)   | 202.6  | 2.1       |                         |      | G2/225  |
| BL   | (0°-30°)    | 186.4  | 2.0       | B1/500                  |      |         |
| BM   | (30°-60°)   | 429.9  | 4.5       | B1/1000                 |      |         |
| BH   | (60°-80°)   | 121.5  | 1.3       | B1/500                  |      | G1/500  |
| BVH  | (80°-90°)   | 3.5    | 0.0       |                         |      | G0/10   |
| UL   | (90°-100°)  | 0.0    | 0.0       |                         | U0/0 |         |
| UH   | (100°-180°) | 0.0    | 0.0       |                         | U0/0 |         |

**BUG Rating: B1-U0-G2**

Type IV Short



REPORT NUMBER: P823036

CATALOG NUMBER: MSA-SA2C-735-U-SL4-HSS

**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 5°     | 15°    | 25°    | 34°    | 35°    | 45°    | 55°    | 65°    | 75°    | 85°    |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 566.1  | 566.1  | 566.1  | 566.1  | 566.1  | 566.1  | 566.1  | 566.1  | 566.1  | 566.1  | 566.1  |
| 2.5°  | 720.5  | 692.3  | 646.4  | 649.8  | 670.3  | 674.6  | 680.8  | 664.6  | 650.3  | 624.9  | 674.1  |
| 5°    | 923.0  | 882.4  | 856.6  | 848.5  | 836.6  | 837.5  | 808.3  | 818.9  | 816.1  | 834.7  | 857.2  |
| 7.5°  | 1037.2 | 1014.8 | 982.3  | 973.2  | 929.3  | 924.5  | 888.7  | 936.9  | 941.7  | 935.0  | 971.8  |
| 10°   | 1082.6 | 1053.0 | 1056.8 | 1022.9 | 1000.9 | 1006.7 | 1012.4 | 1016.2 | 1022.4 | 1028.7 | 983.8  |
| 12.5° | 1109.3 | 1114.7 | 1166.7 | 1131.3 | 1153.3 | 1153.3 | 1192.1 | 1151.0 | 1152.4 | 1107.5 | 1115.1 |
| 15°   | 1229.8 | 1259.0 | 1235.5 | 1235.0 | 1211.2 | 1217.4 | 1262.3 | 1229.8 | 1246.5 | 1233.2 | 1181.5 |
| 17.5° | 1380.7 | 1386.5 | 1342.1 | 1322.5 | 1344.0 | 1344.5 | 1325.4 | 1323.9 | 1265.6 | 1364.0 | 1301.4 |
| 20°   | 1429.0 | 1461.5 | 1398.4 | 1322.0 | 1411.4 | 1407.1 | 1405.6 | 1383.1 | 1286.2 | 1422.8 | 1371.2 |
| 22.5° | 1560.4 | 1514.0 | 1471.1 | 1420.9 | 1455.8 | 1455.8 | 1450.5 | 1401.3 | 1363.6 | 1417.5 | 1439.5 |
| 25°   | 1601.5 | 1607.2 | 1551.3 | 1535.1 | 1536.0 | 1493.1 | 1489.3 | 1468.2 | 1431.9 | 1524.1 | 1480.1 |
| 27.5° | 1742.9 | 1740.5 | 1606.3 | 1651.6 | 1593.9 | 1594.3 | 1488.8 | 1536.0 | 1542.3 | 1529.3 | 1578.6 |
| 30°   | 1881.9 | 1920.7 | 1718.1 | 1775.4 | 1714.7 | 1696.5 | 1593.4 | 1635.4 | 1646.4 | 1631.6 | 1693.7 |
| 32.5° | 2059.2 | 2116.0 | 1919.2 | 1862.8 | 1770.1 | 1821.7 | 1750.6 | 1651.2 | 1705.7 | 1838.0 | 1872.9 |
| 35°   | 2247.0 | 2274.7 | 2065.0 | 1986.1 | 1881.5 | 1881.0 | 1878.6 | 1886.8 | 1947.0 | 2096.0 | 2125.6 |
| 37.5° | 2584.3 | 2518.9 | 2329.2 | 2148.5 | 2171.9 | 2119.9 | 2083.6 | 2121.8 | 2184.4 | 2430.0 | 2556.6 |
| 40°   | 2772.5 | 2725.2 | 2458.1 | 2351.2 | 2235.0 | 2254.1 | 2352.6 | 2348.3 | 2515.0 | 2772.1 | 2961.7 |
| 42.5° | 2955.5 | 2910.6 | 2647.8 | 2561.3 | 2412.3 | 2464.4 | 2507.4 | 2561.8 | 2903.4 | 3318.2 | 3422.3 |
| 45°   | 3118.4 | 2986.5 | 2801.2 | 2804.6 | 2727.2 | 2733.3 | 2809.3 | 2859.5 | 3353.5 | 3778.8 | 3851.8 |
| 47.5° | 3216.8 | 3108.4 | 2930.6 | 2927.4 | 2922.5 | 2893.4 | 3251.3 | 3297.1 | 3712.3 | 4217.4 | 4224.0 |
| 50°   | 3355.4 | 3219.7 | 3063.9 | 3066.8 | 3177.2 | 3238.8 | 3665.9 | 3661.2 | 4058.7 | 4583.3 | 4429.0 |
| 52.5° | 3527.9 | 3362.1 | 3190.5 | 3318.2 | 3488.7 | 3589.1 | 3935.9 | 4077.3 | 4430.9 | 4813.1 | 4509.2 |
| 55°   | 3748.7 | 3541.3 | 3375.9 | 3539.3 | 3911.5 | 3950.3 | 4200.1 | 4498.7 | 4836.5 | 5047.7 | 4535.0 |
| 57.5° | 4007.6 | 3760.1 | 3626.3 | 3889.5 | 4260.8 | 4261.8 | 4584.7 | 4947.8 | 5085.4 | 5143.3 | 4505.9 |
| 60°   | 4286.6 | 3998.1 | 3863.3 | 4100.3 | 4645.9 | 4685.0 | 5012.3 | 5195.8 | 5338.2 | 5191.5 | 4453.8 |
| 62.5° | 4532.1 | 4213.5 | 4108.8 | 4387.4 | 5068.3 | 5160.9 | 5385.0 | 5358.7 | 5520.7 | 5252.2 | 4321.5 |
| 65°   | 4824.6 | 4492.5 | 4423.7 | 4835.1 | 5619.6 | 5747.1 | 5803.5 | 5647.7 | 5581.9 | 5205.3 | 3977.0 |
| 67.5° | 5114.1 | 4803.5 | 4801.7 | 5331.5 | 6342.4 | 6386.4 | 6327.1 | 6055.3 | 5510.7 | 4792.5 | 3345.8 |
| 70°   | 5318.1 | 4984.6 | 5110.3 | 5875.2 | 6999.4 | 6876.1 | 6626.8 | 6247.9 | 4996.5 | 3673.1 | 2185.8 |
| 72.5° | 5126.5 | 4805.0 | 5088.3 | 6068.7 | 7080.6 | 7115.9 | 6453.3 | 5596.7 | 3712.3 | 1878.6 | 791.2  |
| 75°   | 3895.8 | 3698.9 | 4418.0 | 5384.0 | 6286.5 | 6294.6 | 5386.4 | 3947.4 | 1828.0 | 510.2  | 218.8  |
| 77.5° | 1962.2 | 1899.6 | 2796.4 | 3822.2 | 4586.6 | 4573.2 | 3700.9 | 2114.6 | 588.1  | 169.6  | 110.4  |
| 80°   | 993.3  | 943.2  | 1190.1 | 2062.1 | 2723.8 | 2743.8 | 2113.2 | 947.0  | 296.7  | 92.2   | 76.5   |
| 82.5° | 610.1  | 579.1  | 651.2  | 933.1  | 1322.0 | 1354.0 | 801.7  | 599.6  | 183.9  | 54.5   | 69.8   |
| 85°   | 118.0  | 124.2  | 374.1  | 467.3  | 527.9  | 515.5  | 237.5  | 493.6  | 55.4   | 32.5   | 50.7   |
| 87.5° | 0.0    | 2.0    | 86.5   | 152.4  | 152.9  | 135.7  | 54.0   | 109.4  | 7.6    | 9.0    | 6.2    |
| 90°   | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |

REPORT NUMBER: P823036

CATALOG NUMBER: MSA-SA2C-735-U-SL4-HSS

**CANDELA DISTRIBUTION (continued):**

|       | 90°    | 95°    | 105°  | 115°  | 125°  | 135°  | 145°  | 155°  | 165°  | 175°  | 180°  |
|-------|--------|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 0°    | 566.1  | 566.1  | 566.1 | 566.1 | 566.1 | 566.1 | 566.1 | 566.1 | 566.1 | 566.1 | 566.1 |
| 2.5°  | 682.3  | 675.1  | 615.4 | 608.7 | 610.1 | 600.0 | 596.8 | 575.7 | 570.4 | 602.9 | 608.7 |
| 5°    | 847.6  | 799.8  | 744.3 | 724.3 | 693.3 | 640.7 | 633.0 | 619.7 | 604.9 | 610.6 | 606.3 |
| 7.5°  | 948.8  | 885.3  | 826.0 | 720.5 | 633.0 | 556.6 | 544.1 | 521.2 | 498.3 | 498.8 | 513.6 |
| 10°   | 965.1  | 911.6  | 829.9 | 701.4 | 601.5 | 506.0 | 422.9 | 362.7 | 335.4 | 311.1 | 318.2 |
| 12.5° | 1059.2 | 1009.6 | 859.0 | 695.6 | 555.6 | 406.6 | 297.6 | 238.9 | 213.1 | 204.5 | 203.6 |
| 15°   | 1134.7 | 1095.6 | 908.7 | 677.9 | 453.9 | 286.2 | 213.1 | 195.9 | 191.1 | 199.3 | 196.8 |
| 17.5° | 1246.9 | 1176.2 | 903.5 | 604.9 | 345.9 | 217.3 | 196.4 | 194.0 | 199.7 | 204.5 | 205.9 |
| 20°   | 1296.2 | 1194.4 | 867.6 | 490.2 | 259.0 | 199.3 | 191.6 | 186.8 | 197.3 | 211.7 | 208.8 |
| 22.5° | 1345.9 | 1225.5 | 825.6 | 401.3 | 208.3 | 190.6 | 186.3 | 182.5 | 190.6 | 204.5 | 207.8 |
| 25°   | 1368.3 | 1275.2 | 778.8 | 313.4 | 193.5 | 180.6 | 177.7 | 179.1 | 185.9 | 198.2 | 196.8 |
| 27.5° | 1481.6 | 1281.0 | 689.4 | 247.5 | 187.3 | 173.5 | 173.5 | 176.8 | 176.8 | 193.5 | 192.1 |
| 30°   | 1552.3 | 1377.9 | 616.8 | 208.3 | 180.1 | 163.4 | 169.2 | 170.6 | 168.2 | 186.3 | 187.8 |
| 32.5° | 1676.5 | 1404.7 | 546.1 | 191.1 | 168.6 | 162.0 | 161.0 | 162.0 | 163.9 | 181.6 | 182.0 |
| 35°   | 1867.6 | 1536.5 | 449.6 | 184.5 | 162.9 | 154.8 | 148.1 | 153.3 | 158.2 | 171.0 | 173.5 |
| 37.5° | 2241.2 | 1671.8 | 366.5 | 179.1 | 160.0 | 148.1 | 145.7 | 144.8 | 153.3 | 168.2 | 173.0 |
| 40°   | 2543.6 | 1911.1 | 298.1 | 174.9 | 154.4 | 144.3 | 138.1 | 138.5 | 146.2 | 157.2 | 164.3 |
| 42.5° | 2971.8 | 2084.1 | 252.7 | 168.2 | 146.2 | 136.2 | 129.0 | 133.3 | 136.7 | 148.1 | 152.9 |
| 45°   | 3329.2 | 2218.3 | 222.7 | 163.9 | 138.1 | 128.6 | 122.8 | 127.5 | 124.2 | 130.0 | 136.7 |
| 47.5° | 3613.4 | 2335.3 | 200.2 | 153.3 | 132.8 | 124.2 | 117.0 | 115.6 | 109.9 | 111.3 | 117.6 |
| 50°   | 3769.6 | 2315.8 | 181.6 | 142.8 | 126.1 | 119.9 | 109.9 | 99.9  | 92.2  | 91.8  | 95.6  |
| 52.5° | 3825.1 | 2211.2 | 166.3 | 133.8 | 118.0 | 110.4 | 98.9  | 85.1  | 77.4  | 75.0  | 78.3  |
| 55°   | 3840.3 | 2060.6 | 152.4 | 123.7 | 110.4 | 98.4  | 86.5  | 71.6  | 63.5  | 59.7  | 63.1  |
| 57.5° | 3790.7 | 1828.9 | 139.0 | 114.2 | 101.3 | 86.9  | 74.1  | 58.8  | 51.1  | 46.3  | 49.2  |
| 60°   | 3667.9 | 1534.6 | 127.1 | 102.3 | 91.8  | 77.0  | 62.6  | 47.3  | 39.2  | 34.8  | 36.3  |
| 62.5° | 3396.1 | 1203.1 | 114.2 | 91.3  | 81.7  | 67.4  | 52.5  | 37.3  | 29.6  | 25.8  | 26.3  |
| 65°   | 2982.2 | 896.8  | 99.4  | 80.8  | 72.7  | 58.3  | 42.0  | 28.7  | 22.5  | 19.1  | 18.6  |
| 67.5° | 2376.0 | 607.8  | 84.6  | 69.8  | 64.5  | 49.2  | 33.4  | 22.5  | 17.7  | 15.3  | 14.3  |
| 70°   | 1396.6 | 306.2  | 70.2  | 60.2  | 55.4  | 41.1  | 26.3  | 18.2  | 16.2  | 14.3  | 13.4  |
| 72.5° | 460.6  | 132.4  | 55.0  | 49.7  | 45.8  | 33.0  | 20.6  | 16.7  | 15.7  | 13.9  | 12.9  |
| 75°   | 160.5  | 76.5   | 40.6  | 38.2  | 36.3  | 24.9  | 17.2  | 15.3  | 15.3  | 13.4  | 11.9  |
| 77.5° | 105.1  | 59.2   | 30.1  | 27.7  | 27.2  | 18.2  | 14.8  | 14.3  | 13.4  | 11.0  | 9.0   |
| 80°   | 87.5   | 33.4   | 21.1  | 19.6  | 19.1  | 11.5  | 11.9  | 10.5  | 8.1   | 4.8   | 2.0   |
| 82.5° | 80.8   | 20.0   | 11.0  | 11.9  | 11.0  | 4.3   | 6.7   | 5.8   | 4.3   | 2.0   | 0.0   |
| 85°   | 47.3   | 9.0    | 6.2   | 6.2   | 4.8   | 0.9   | 3.4   | 3.4   | 2.0   | 0.5   | 0.0   |
| 87.5° | 5.2    | 4.3    | 3.4   | 3.4   | 2.4   | 0.0   | 1.4   | 0.9   | 0.0   | 0.0   | 0.0   |
| 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: SP1-2101-121-7

Luminaire Tested: IFLD-S-SA2A-735-U-T2

Test Date: 03/04/2021

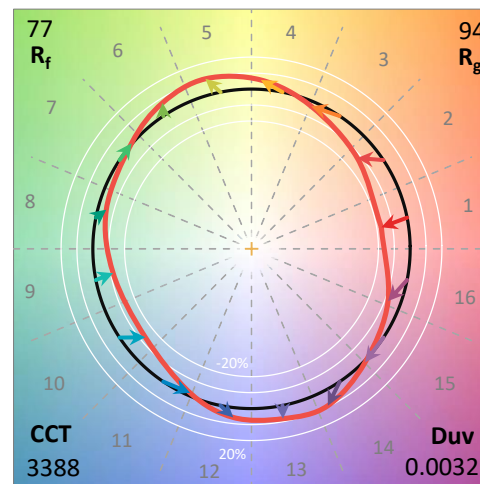
### Test Information

Test Method: LM-79-08  
 Report Number: SP1-2101-121-7  
 Test Lab: COOPER LIGHTING SOLUTIONS  
 Photometer: SP1  
 Measurement Geometry:  $4\pi$   
 Issue Date: 03/04/2021  
 Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
 Product Line: STREETWORKS  
 Catalog Number: **IFLD-S-SA2A-735-U-T2**  
 Description: STREETWORKS INF FLOOD

PROGRAMMED @ 615mA.

### Spectral Parameters

|                           |        |           |      |      |       |
|---------------------------|--------|-----------|------|------|-------|
| CCT (K):                  | 3388   | CRI (Ra): | 73.1 |      |       |
| CIE u':                   | 0.2371 | R1:       | 68.9 | R9:  | -34.6 |
| CIE v':                   | 0.5177 | R2:       | 81.1 | R10: | 57.8  |
| Duv:                      | 0.0032 | R3:       | 93.1 | R11: | 68.6  |
| CIE x:                    | 0.4153 | R4:       | 71.6 | R12: | 53.9  |
| CIE y:                    | 0.4030 | R5:       | 69.4 | R13: | 70.9  |
| CIE z:                    | 0.1817 | R6:       | 75.0 | R14: | 96.2  |
| Peak Wavelength (nm):     | 590    | R7:       | 79.5 |      |       |
| Dominant Wavelength (nm): | 580    | R8:       | 46.4 |      |       |
| Purity:                   | 45.7   |           |      |      |       |
| Rf:                       | 76.9   |           |      |      |       |
| Rg:                       | 94.4   |           |      |      |       |



### Test Conditions

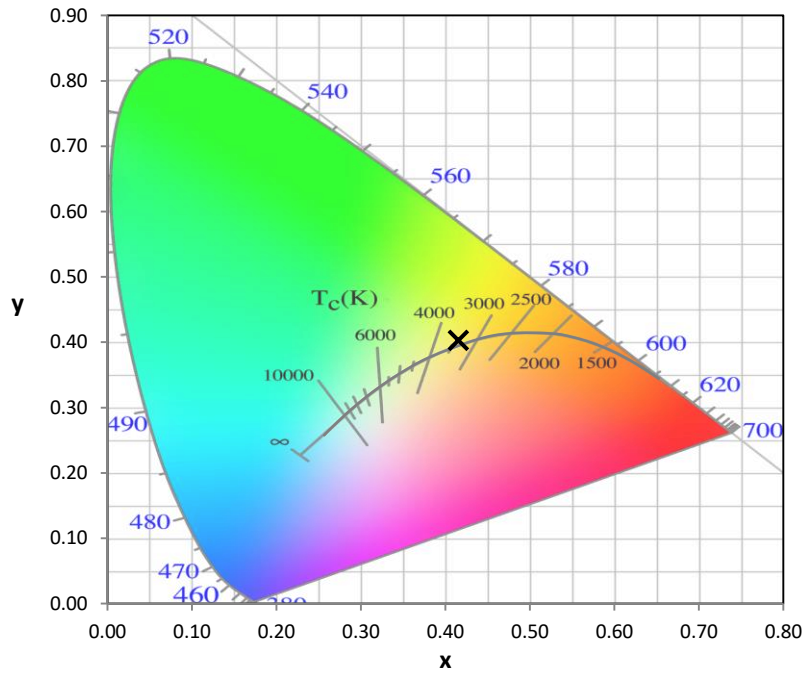
Stabilization Time: 81M  
 Operation Time: 12H  
 Room Temperature (°C) / RH%: 25.0/30%  
 Sphere Temperature (°C): 24.1

REPORT NUMBER: SP1-2101-121-7

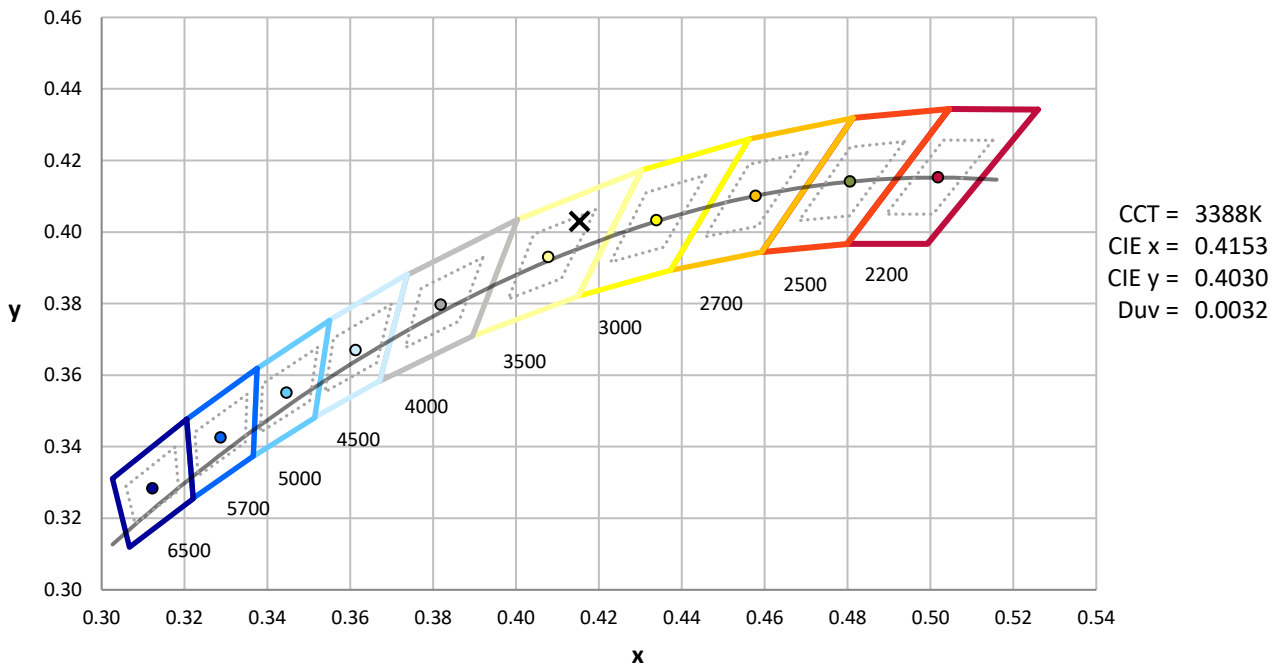
| Measurement and Test Equipment |                       |                  |                      |
|--------------------------------|-----------------------|------------------|----------------------|
| Instrument                     | Identification Number | Calibration Date | Calibration Due Date |
| 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: SP1-2101-121-7

**CIE 1931 Chromaticity Diagram**



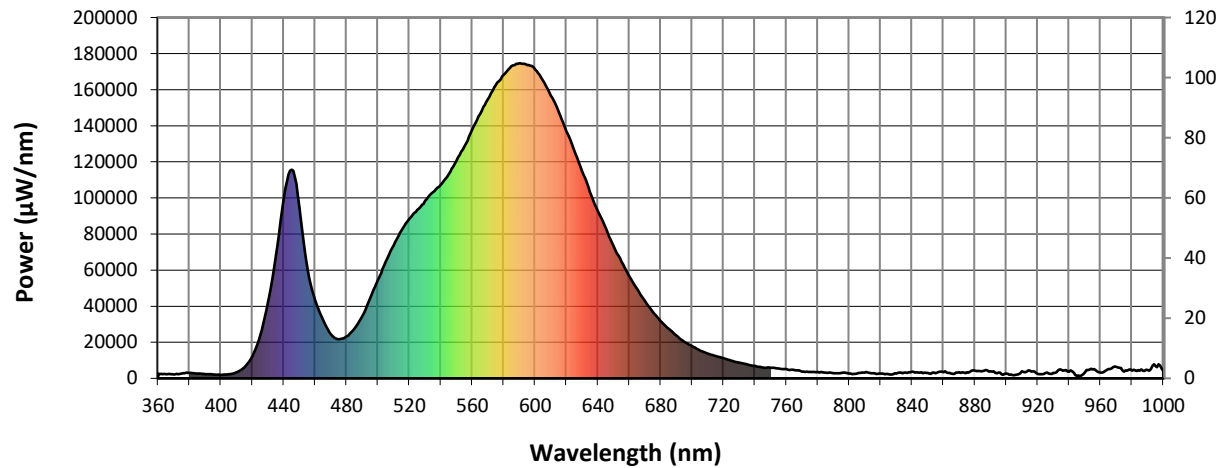
**CIE 1931 Chromaticity Diagram with 2017 ANSI 7-Step and 4-Step Quadrangles**



Point lies inside the ANSI 3500K 4-step quadrangle

REPORT NUMBER: SP1-2101-121-7

### Photopic Flux vs. Wavelength

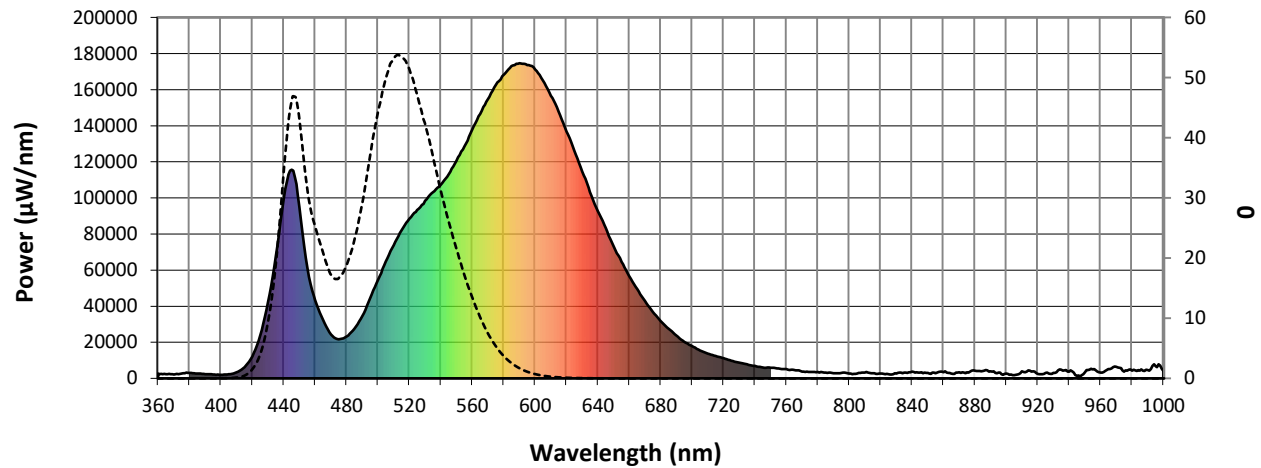


#####

| 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       | 2672             | 0.0              | 490       | 34553            | 4.9              | 620       | 136720           | 35.6             | 750       | 5870             | 0.0              | 880       | 4216             | 0.0              |
| 365       | 2252             | 0.0              | 495       | 44336            | 8.0              | 625       | 126308           | 27.9             | 755       | 5421             | 0.0              | 885       | 4132             | 0.0              |
| 370       | 2217             | 0.0              | 500       | 54643            | 12.1             | 630       | 114625           | 20.7             | 760       | 5097             | 0.0              | 890       | 3992             | 0.0              |
| 375       | 2697             | 0.0              | 505       | 64676            | 18.1             | 635       | 103216           | 15.5             | 765       | 4626             | 0.0              | 895       | 3214             | 0.0              |
| 380       | 3039             | 0.0              | 510       | 73825            | 25.4             | 640       | 92605            | 11.1             | 770       | 3782             | 0.0              | 900       | 2580             | 0.0              |
| 385       | 2655             | 0.0              | 515       | 81872            | 33.9             | 645       | 83234            | 8.0              | 775       | 3506             | 0.0              | 905       | 1776             | 0.0              |
| 390       | 2357             | 0.0              | 520       | 88574            | 43.0             | 650       | 73263            | 5.4              | 780       | 3507             | 0.0              | 910       | 3995             | 0.0              |
| 395       | 2186             | 0.0              | 525       | 93289            | 50.1             | 655       | 64627            | 3.7              | 785       | 3267             | 0.0              | 915       | 4288             | 0.0              |
| 400       | 2015             | 0.0              | 530       | 98393            | 57.9             | 660       | 56614            | 2.4              | 790       | 2849             | 0.0              | 920       | 2446             | 0.0              |
| 405       | 2234             | 0.0              | 535       | 103269           | 64.0             | 665       | 49537            | 1.6              | 795       | 3037             | 0.0              | 925       | 3009             | 0.0              |
| 410       | 3412             | 0.0              | 540       | 107316           | 69.9             | 670       | 42866            | 0.9              | 800       | 2716             | 0.0              | 930       | 3026             | 0.0              |
| 415       | 6135             | 0.0              | 545       | 113101           | 75.3             | 675       | 36708            | 0.6              | 805       | 2648             | 0.0              | 935       | 4734             | 0.0              |
| 420       | 12146            | 0.0              | 550       | 120690           | 82.0             | 680       | 31814            | 0.4              | 810       | 3187             | 0.0              | 940       | 3719             | 0.0              |
| 425       | 23983            | 0.1              | 555       | 128583           | 87.8             | 685       | 27485            | 0.2              | 815       | 2931             | 0.0              | 945       | 1480             | 0.0              |
| 430       | 42142            | 0.3              | 560       | 137796           | 93.6             | 690       | 23698            | 0.1              | 820       | 2717             | 0.0              | 950       | 3450             | 0.0              |
| 435       | 68228            | 0.8              | 565       | 146577           | 97.5             | 695       | 20309            | 0.1              | 825       | 2236             | 0.0              | 955       | 5051             | 0.0              |
| 440       | 99323            | 1.6              | 570       | 154581           | 100.5            | 700       | 17890            | 0.1              | 830       | 2628             | 0.0              | 960       | 3176             | 0.0              |
| 445       | 115584           | 2.4              | 575       | 162633           | 101.2            | 705       | 15500            | 0.0              | 835       | 3140             | 0.0              | 965       | 5178             | 0.0              |
| 450       | 94997            | 2.5              | 580       | 168101           | 99.9             | 710       | 13699            | 0.0              | 840       | 3675             | 0.0              | 970       | 6385             | 0.0              |
| 455       | 61433            | 2.1              | 585       | 173145           | 96.2             | 715       | 12398            | 0.0              | 845       | 3283             | 0.0              | 975       | 3810             | 0.0              |
| 460       | 43373            | 1.8              | 590       | 174675           | 90.3             | 720       | 11147            | 0.0              | 850       | 3055             | 0.0              | 980       | 4322             | 0.0              |
| 465       | 32472            | 1.7              | 595       | 173724           | 82.3             | 725       | 9761             | 0.0              | 855       | 2932             | 0.0              | 985       | 4200             | 0.0              |
| 470       | 24257            | 1.5              | 600       | 171241           | 73.8             | 730       | 8651             | 0.0              | 860       | 3382             | 0.0              | 990       | 4661             | 0.0              |
| 475       | 21690            | 1.7              | 605       | 165134           | 64.0             | 735       | 7730             | 0.0              | 865       | 2605             | 0.0              | 995       | 6746             | 0.0              |
| 480       | 23173            | 2.2              | 610       | 156652           | 53.8             | 740       | 6847             | 0.0              | 870       | 3325             | 0.0              | 1000      | 4150             | 0.0              |
| 485       | 27564            | 3.3              | 615       | 147879           | 44.6             | 745       | 6124             | 0.0              | 875       | 3325             | 0.0              |           |                  |                  |

REPORT NUMBER: SP1-2101-121-7

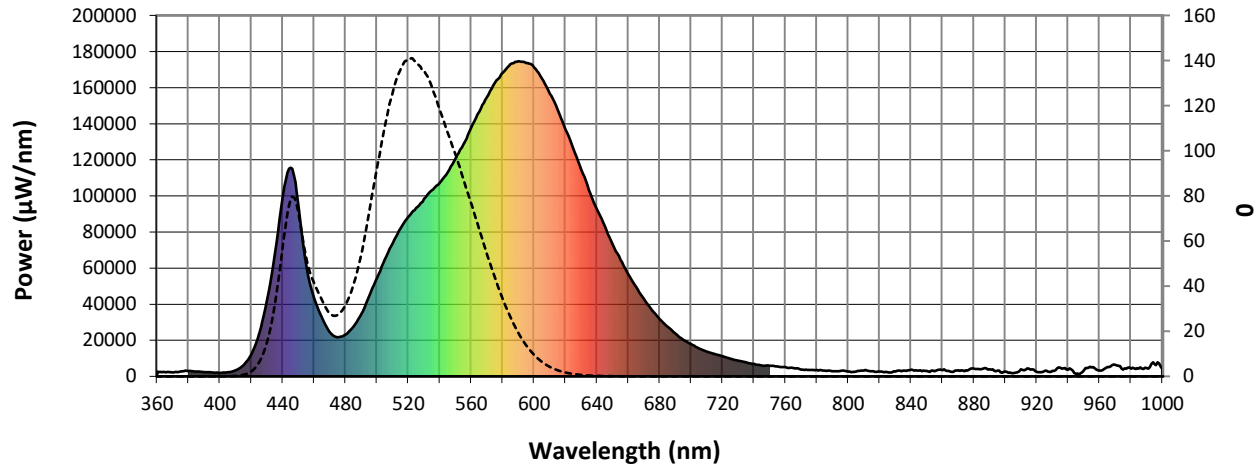
### Scotopic Flux vs. Wavelength


**Scotopic Lumens: 12126**
**S/P: 1.36**

| 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       | 2672             | 0.0              | 490       | 34553            | 53.2             | 620       | 136720           | 1.7              | 750       | 5870             | 0.0              | 880       | 4216             | 0.0              |
| 365       | 2252             | 0.0              | 495       | 44336            | 71.7             | 625       | 126308           | 1.1              | 755       | 5421             | 0.0              | 885       | 4132             | 0.0              |
| 370       | 2217             | 0.0              | 500       | 54643            | 91.4             | 630       | 114625           | 0.6              | 760       | 5097             | 0.0              | 890       | 3992             | 0.0              |
| 375       | 2697             | 0.0              | 505       | 64676            | 110.0            | 635       | 103216           | 0.4              | 765       | 4626             | 0.0              | 895       | 3214             | 0.0              |
| 380       | 3039             | 0.0              | 510       | 73825            | 125.1            | 640       | 92605            | 0.2              | 770       | 3782             | 0.0              | 900       | 2580             | 0.0              |
| 385       | 2655             | 0.0              | 515       | 81872            | 135.7            | 645       | 83234            | 0.1              | 775       | 3506             | 0.0              | 905       | 1776             | 0.0              |
| 390       | 2357             | 0.0              | 520       | 88574            | 140.8            | 650       | 73263            | 0.1              | 780       | 3507             | 0.0              | 910       | 3995             | 0.0              |
| 395       | 2186             | 0.0              | 525       | 93289            | 139.6            | 655       | 64627            | 0.1              | 785       | 3267             | 0.0              | 915       | 4288             | 0.0              |
| 400       | 2015             | 0.0              | 530       | 98393            | 135.7            | 660       | 56614            | 0.0              | 790       | 2849             | 0.0              | 920       | 2446             | 0.0              |
| 405       | 2234             | 0.1              | 535       | 103269           | 128.7            | 665       | 49537            | 0.0              | 795       | 3037             | 0.0              | 925       | 3009             | 0.0              |
| 410       | 3412             | 0.2              | 540       | 107316           | 118.6            | 670       | 42866            | 0.0              | 800       | 2716             | 0.0              | 930       | 3026             | 0.0              |
| 415       | 6135             | 0.6              | 545       | 113101           | 108.4            | 675       | 36708            | 0.0              | 805       | 2648             | 0.0              | 935       | 4734             | 0.0              |
| 420       | 12146            | 2.0              | 550       | 120690           | 98.7             | 680       | 31814            | 0.0              | 810       | 3187             | 0.0              | 940       | 3719             | 0.0              |
| 425       | 23983            | 5.9              | 555       | 128583           | 87.9             | 685       | 27485            | 0.0              | 815       | 2931             | 0.0              | 945       | 1480             | 0.0              |
| 430       | 42142            | 14.3             | 560       | 137796           | 77.0             | 690       | 23698            | 0.0              | 820       | 2717             | 0.0              | 950       | 3450             | 0.0              |
| 435       | 68228            | 30.5             | 565       | 146577           | 65.8             | 695       | 20309            | 0.0              | 825       | 2236             | 0.0              | 955       | 5051             | 0.0              |
| 440       | 99323            | 55.5             | 570       | 154581           | 54.6             | 700       | 17890            | 0.0              | 830       | 2628             | 0.0              | 960       | 3176             | 0.0              |
| 445       | 115584           | 77.4             | 575       | 162633           | 44.3             | 705       | 15500            | 0.0              | 835       | 3140             | 0.0              | 965       | 5178             | 0.0              |
| 450       | 94997            | 73.6             | 580       | 168101           | 34.6             | 710       | 13699            | 0.0              | 840       | 3675             | 0.0              | 970       | 6385             | 0.0              |
| 455       | 61433            | 53.7             | 585       | 173145           | 26.5             | 715       | 12398            | 0.0              | 845       | 3283             | 0.0              | 975       | 3810             | 0.0              |
| 460       | 43373            | 41.9             | 590       | 174675           | 19.5             | 720       | 11147            | 0.0              | 850       | 3055             | 0.0              | 980       | 4322             | 0.0              |
| 465       | 32472            | 34.3             | 595       | 173724           | 13.9             | 725       | 9761             | 0.0              | 855       | 2932             | 0.0              | 985       | 4200             | 0.0              |
| 470       | 24257            | 27.9             | 600       | 171241           | 9.7              | 730       | 8651             | 0.0              | 860       | 3382             | 0.0              | 990       | 4661             | 0.0              |
| 475       | 21690            | 27.1             | 605       | 165134           | 6.5              | 735       | 7730             | 0.0              | 865       | 2605             | 0.0              | 995       | 6746             | 0.0              |
| 480       | 23173            | 31.3             | 610       | 156652           | 4.2              | 740       | 6847             | 0.0              | 870       | 3325             | 0.0              | 1000      | 4150             | 0.0              |
| 485       | 27564            | 40.0             | 615       | 147879           | 2.7              | 745       | 6124             | 0.0              | 875       | 3325             | 0.0              |           |                  |                  |

REPORT NUMBER: SP1-2101-121-7

### Melanopic Flux vs. Wavelength



Melanopic Lumens: 4490.7

M/P: 0.5

| 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       | 2672             | 0.0              | 490       | 34553            | 28.8             | 620       | 136720           | 0.1              | 750       | 5870             | 0.0              | 880       | 4216             | 0.0              |
| 365       | 2252             | 0.0              | 495       | 44336            | 36.6             | 625       | 126308           | 0.1              | 755       | 5421             | 0.0              | 885       | 4132             | 0.0              |
| 370       | 2217             | 0.0              | 500       | 54643            | 43.9             | 630       | 114625           | 0.0              | 760       | 5097             | 0.0              | 890       | 3992             | 0.0              |
| 375       | 2697             | 0.0              | 505       | 64676            | 49.6             | 635       | 103216           | 0.0              | 765       | 4626             | 0.0              | 895       | 3214             | 0.0              |
| 380       | 3039             | 0.0              | 510       | 73825            | 53.0             | 640       | 92605            | 0.0              | 770       | 3782             | 0.0              | 900       | 2580             | 0.0              |
| 385       | 2655             | 0.0              | 515       | 81872            | 53.5             | 645       | 83234            | 0.0              | 775       | 3506             | 0.0              | 905       | 1776             | 0.0              |
| 390       | 2357             | 0.0              | 520       | 88574            | 51.6             | 650       | 73263            | 0.0              | 780       | 3507             | 0.0              | 910       | 3995             | 0.0              |
| 395       | 2186             | 0.0              | 525       | 93289            | 47.3             | 655       | 64627            | 0.0              | 785       | 3267             | 0.0              | 915       | 4288             | 0.0              |
| 400       | 2015             | 0.0              | 530       | 98393            | 42.5             | 660       | 56614            | 0.0              | 790       | 2849             | 0.0              | 920       | 2446             | 0.0              |
| 405       | 2234             | 0.0              | 535       | 103269           | 37.2             | 665       | 49537            | 0.0              | 795       | 3037             | 0.0              | 925       | 3009             | 0.0              |
| 410       | 3412             | 0.1              | 540       | 107316           | 31.4             | 670       | 42866            | 0.0              | 800       | 2716             | 0.0              | 930       | 3026             | 0.0              |
| 415       | 6135             | 0.4              | 545       | 113101           | 26.3             | 675       | 36708            | 0.0              | 805       | 2648             | 0.0              | 935       | 4734             | 0.0              |
| 420       | 12146            | 1.4              | 550       | 120690           | 21.7             | 680       | 31814            | 0.0              | 810       | 3187             | 0.0              | 940       | 3719             | 0.0              |
| 425       | 23983            | 3.7              | 555       | 128583           | 17.3             | 685       | 27485            | 0.0              | 815       | 2931             | 0.0              | 945       | 1480             | 0.0              |
| 430       | 42142            | 8.9              | 560       | 137796           | 13.6             | 690       | 23698            | 0.0              | 820       | 2717             | 0.0              | 950       | 3450             | 0.0              |
| 435       | 68228            | 18.2             | 565       | 146577           | 10.3             | 695       | 20309            | 0.0              | 825       | 2236             | 0.0              | 955       | 5051             | 0.0              |
| 440       | 99323            | 33.2             | 570       | 154581           | 7.6              | 700       | 17890            | 0.0              | 830       | 2628             | 0.0              | 960       | 3176             | 0.0              |
| 445       | 115584           | 45.6             | 575       | 162633           | 5.4              | 705       | 15500            | 0.0              | 835       | 3140             | 0.0              | 965       | 5178             | 0.0              |
| 450       | 94997            | 43.8             | 580       | 168101           | 3.8              | 710       | 13699            | 0.0              | 840       | 3675             | 0.0              | 970       | 6385             | 0.0              |
| 455       | 61433            | 32.2             | 585       | 173145           | 2.6              | 715       | 12398            | 0.0              | 845       | 3283             | 0.0              | 975       | 3810             | 0.0              |
| 460       | 43373            | 25.6             | 590       | 174675           | 1.7              | 720       | 11147            | 0.0              | 850       | 3055             | 0.0              | 980       | 4322             | 0.0              |
| 465       | 32472            | 21.2             | 595       | 173724           | 1.1              | 725       | 9761             | 0.0              | 855       | 2932             | 0.0              | 985       | 4200             | 0.0              |
| 470       | 24257            | 17.4             | 600       | 171241           | 0.7              | 730       | 8651             | 0.0              | 860       | 3382             | 0.0              | 990       | 4661             | 0.0              |
| 475       | 21690            | 16.6             | 605       | 165134           | 0.5              | 735       | 7730             | 0.0              | 865       | 2605             | 0.0              | 995       | 6746             | 0.0              |
| 480       | 23173            | 18.6             | 610       | 156652           | 0.3              | 740       | 6847             | 0.0              | 870       | 3325             | 0.0              | 1000      | 4150             | 0.0              |
| 485       | 27564            | 22.7             | 615       | 147879           | 0.2              | 745       | 6124             | 0.0              | 875       | 3325             | 0.0              |           |                  |                  |

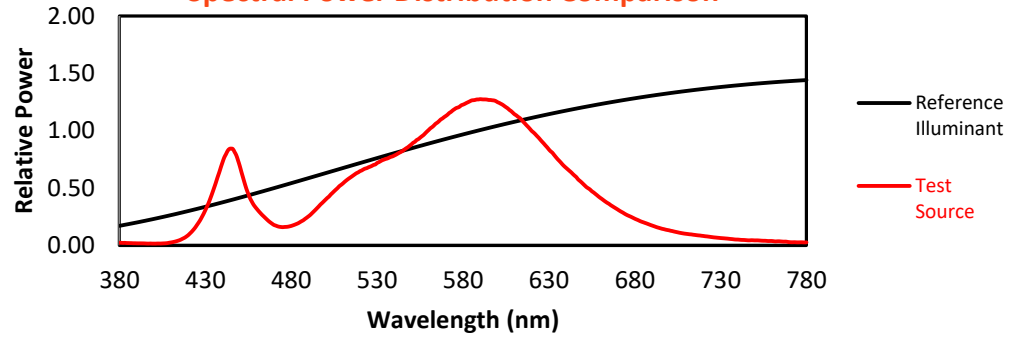
REPORT NUMBER: SP1-2101-121-7

TM-30-18

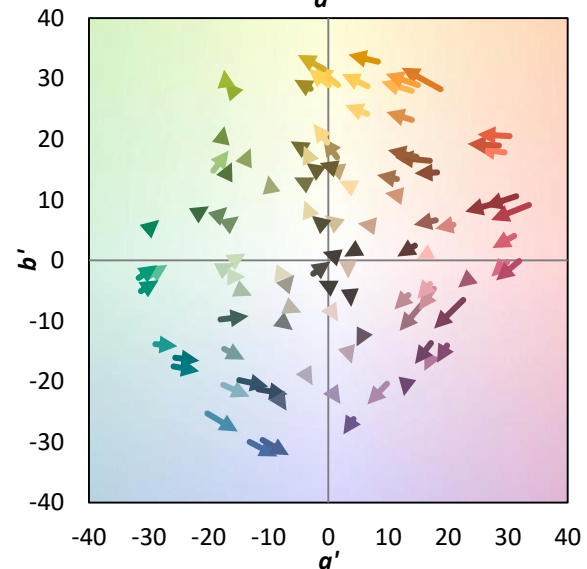
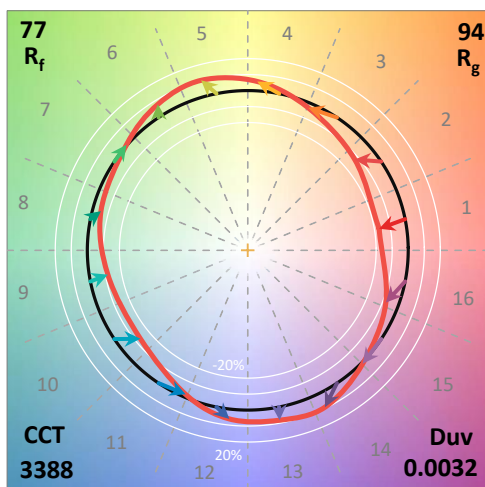
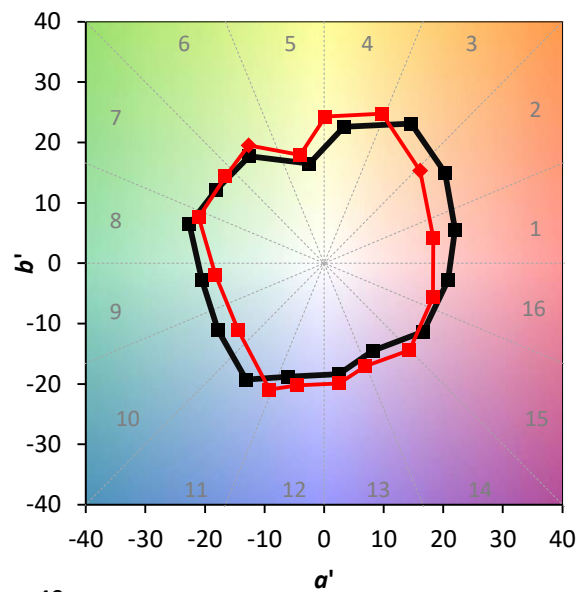
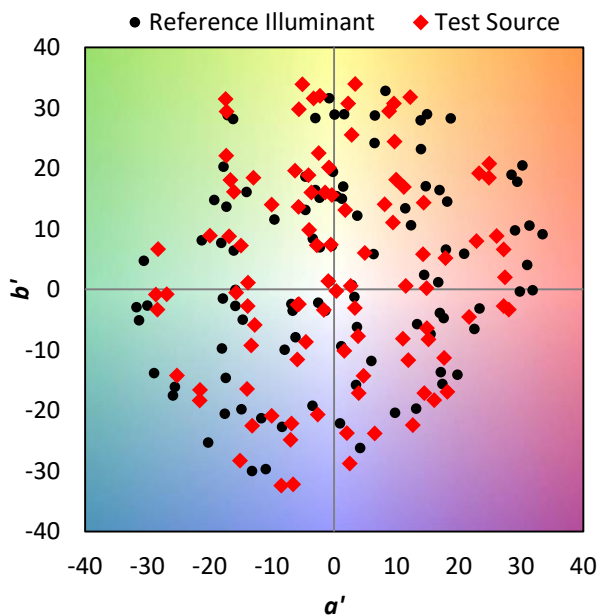
### Summary

$R_f = 76.9$   
 $R_g = 94.4$   
 CIE  $R_a = 73.1$   
 $R_g = -34.6$

### Spectral Power Distribution Comparison

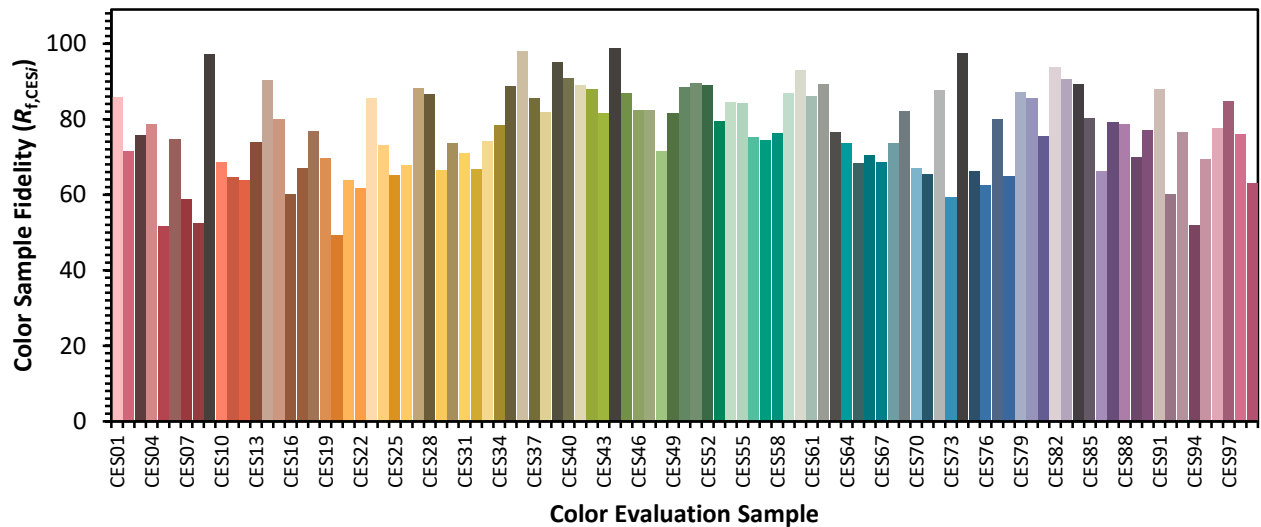


### Color Vector Graphics

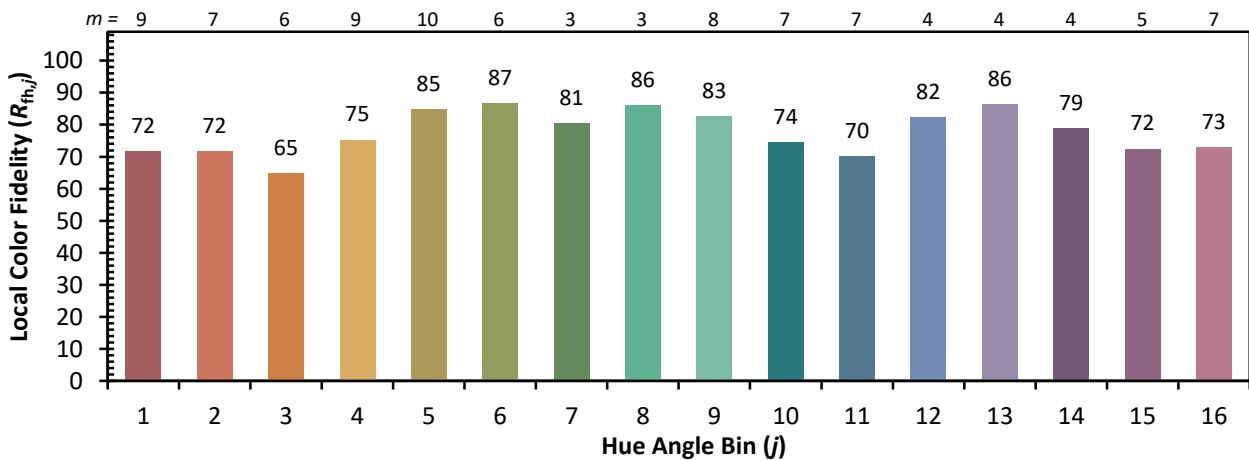
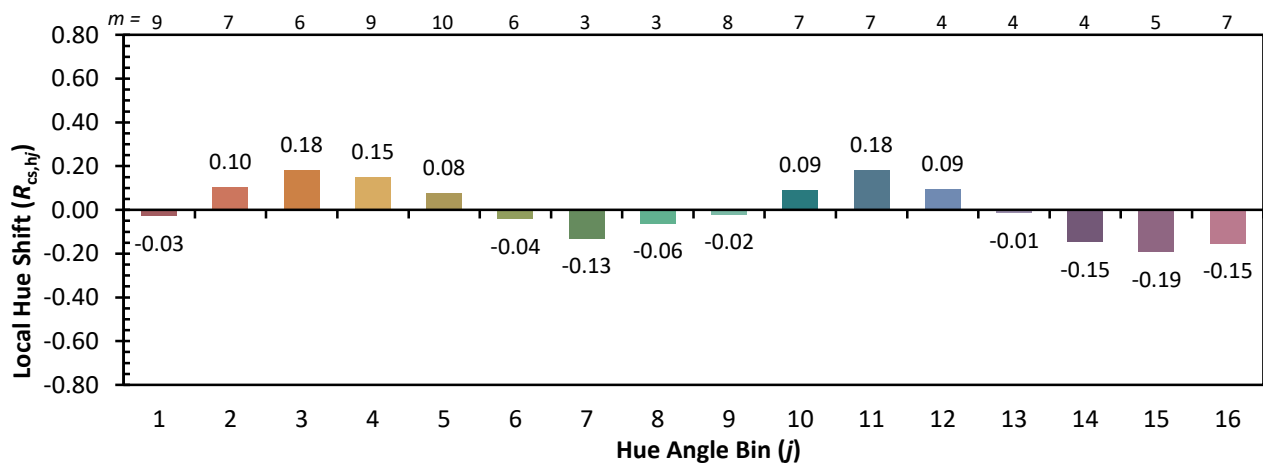
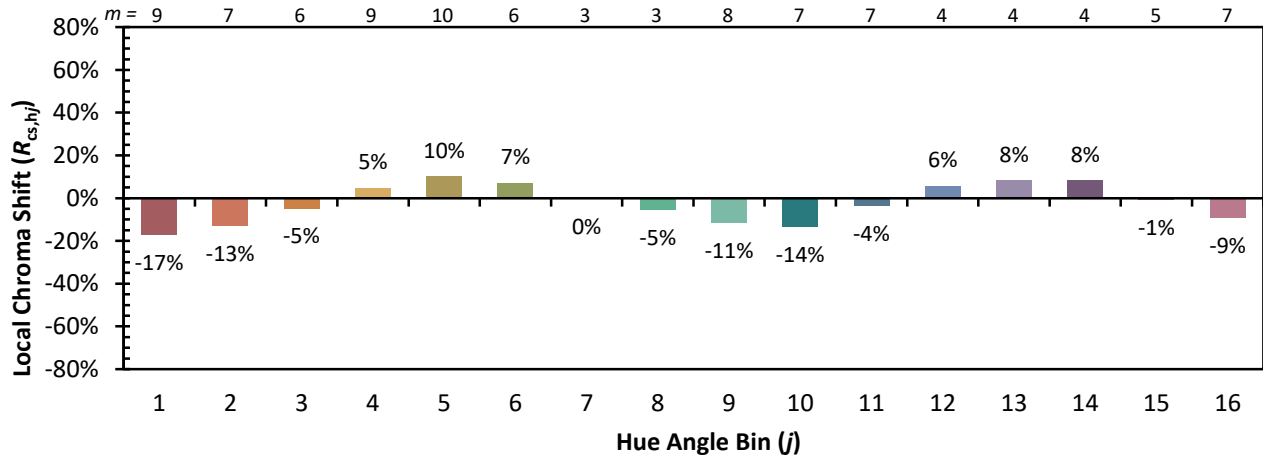


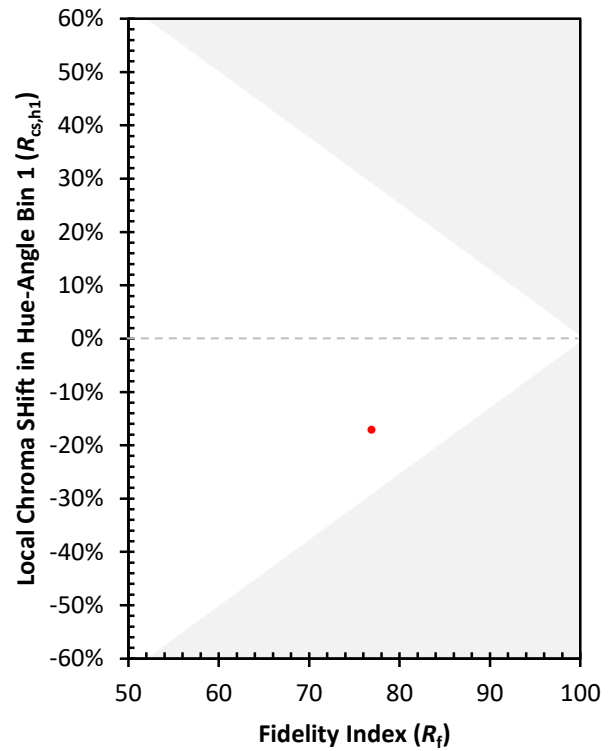
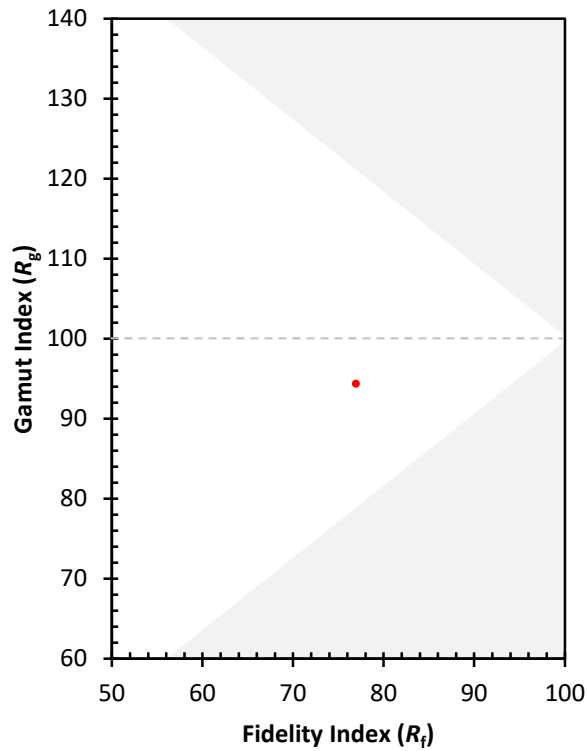
**Individual Sample Fidelity Index ( $R_{f,i}$ )**

|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 86 | CES26 = 68 | CES51 = 90 | CES76 = 63 |
| CES02 = 62 | CES27 = 88 | CES52 = 89 | CES77 = 80 |
| CES03 = 31 | CES28 = 87 | CES53 = 80 | CES78 = 65 |
| CES04 = 70 | CES29 = 67 | CES54 = 84 | CES79 = 87 |
| CES05 = 48 | CES30 = 74 | CES55 = 84 | CES80 = 86 |
| CES06 = 51 | CES31 = 71 | CES56 = 75 | CES81 = 75 |
| CES07 = 40 | CES32 = 67 | CES57 = 74 | CES82 = 94 |
| CES08 = 39 | CES33 = 74 | CES58 = 76 | CES83 = 91 |
| CES09 = 29 | CES34 = 78 | CES59 = 87 | CES84 = 89 |
| CES10 = 75 | CES35 = 89 | CES60 = 93 | CES85 = 80 |
| CES11 = 58 | CES36 = 98 | CES61 = 86 | CES86 = 66 |
| CES12 = 64 | CES37 = 86 | CES62 = 89 | CES87 = 79 |
| CES13 = 43 | CES38 = 82 | CES63 = 77 | CES88 = 79 |
| CES14 = 74 | CES39 = 95 | CES64 = 74 | CES89 = 70 |
| CES15 = 71 | CES40 = 91 | CES65 = 68 | CES90 = 77 |
| CES16 = 47 | CES41 = 89 | CES66 = 71 | CES91 = 88 |
| CES17 = 50 | CES42 = 88 | CES67 = 69 | CES92 = 60 |
| CES18 = 56 | CES43 = 82 | CES68 = 74 | CES93 = 77 |
| CES19 = 72 | CES44 = 99 | CES69 = 82 | CES94 = 52 |
| CES20 = 65 | CES45 = 87 | CES70 = 67 | CES95 = 69 |
| CES21 = 86 | CES46 = 82 | CES71 = 66 | CES96 = 78 |
| CES22 = 79 | CES47 = 82 | CES72 = 88 | CES97 = 85 |
| CES23 = 92 | CES48 = 72 | CES73 = 59 | CES98 = 76 |
| CES24 = 91 | CES49 = 82 | CES74 = 97 | CES99 = 63 |
| CES25 = 72 | CES50 = 88 | CES75 = 66 |            |



Color Rendition by Hue-Angle Bin



**Measure Comparisons**


(END OF REPORT)