

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: P800833

Luminaire Tested: **ARCH-M-PA2-60-740-24VDC-T2R-HSS**

Issue Date: 5/19/2020

**Test Information**

Test Method: LM-79-08  
Report Number: P800833  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-1910-568-13)  
Test Lab: INNOVATION CENTER  
Issue Date: 5/19/2020  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: STREETWORKS  
Catalog Number: ARCH-M-PA2-60-740-24VDC-T2R-HSS  
Description: ARCHEON-M ROADWAY AND AREA LUMINAIRE  
(2) 70 CRI, 4000K, 405mA LIGHT ENGINES WITH 16 LEDS AND TYPE II ROADWAY  
OPTICS WITH HOUSE SIDE SHIELD  
Light Source: -  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 8453 lumens  
Efficiency: N/A  
Efficacy: 138.6 lumens/watt  
Luminous Opening: Rectangular (W 0.75' x L: 1' x H: 0')  
IES Classification: Type II - Medium  
BUG Rating: B1 - U0 - G2

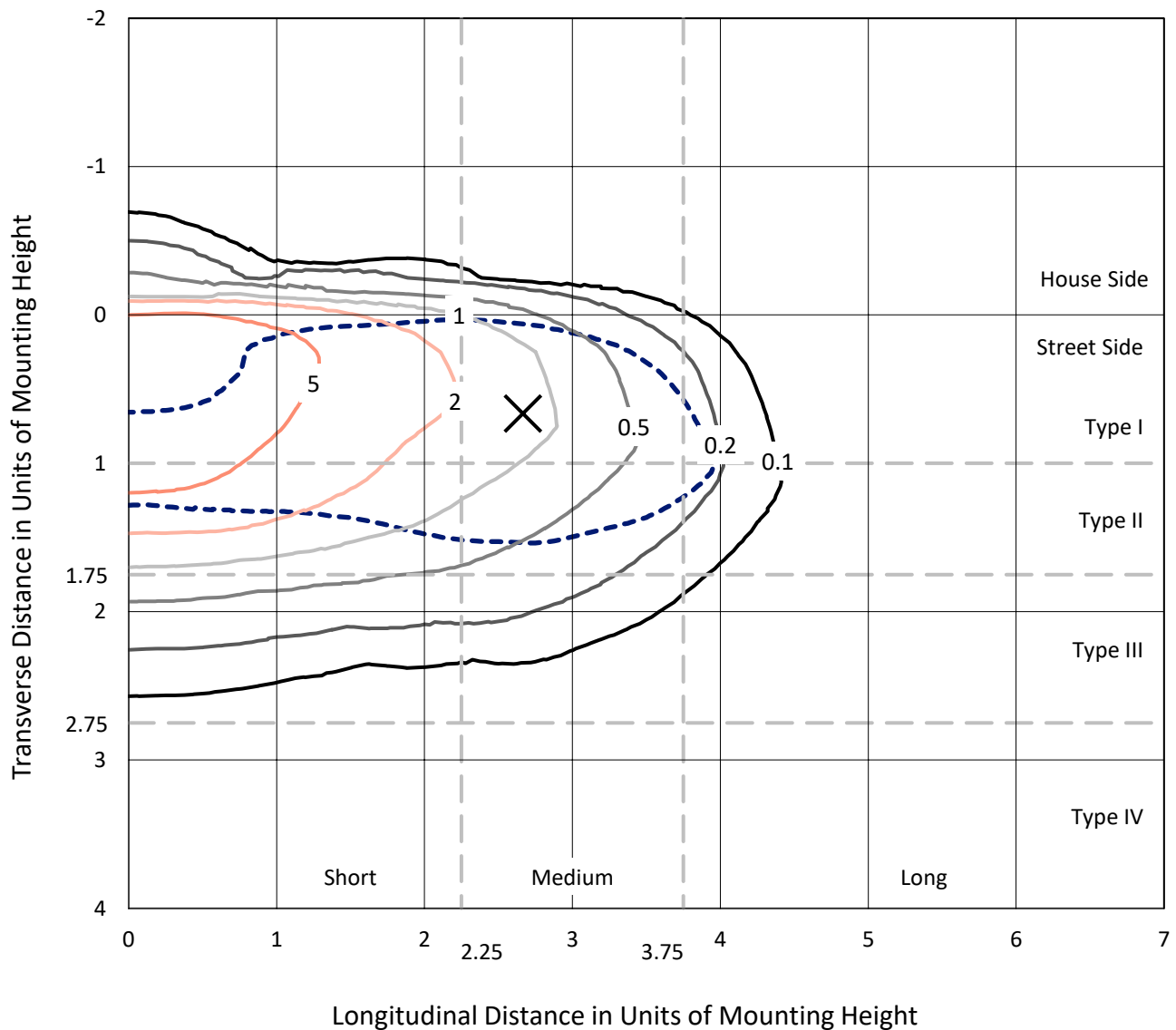
Input Watts (W): 61  
Input Voltage (V): NR  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: NR  
Total Harmonic Distortion (THDi): NR  
Frequency (hertz): 60  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 25 FT

REPORT NUMBER: P800833

CATALOG NUMBER: ARCH-M-PA2-60-740-24VDC-T2R-HSS

## Iso-Footcandle Lines of Horizontal Illumination

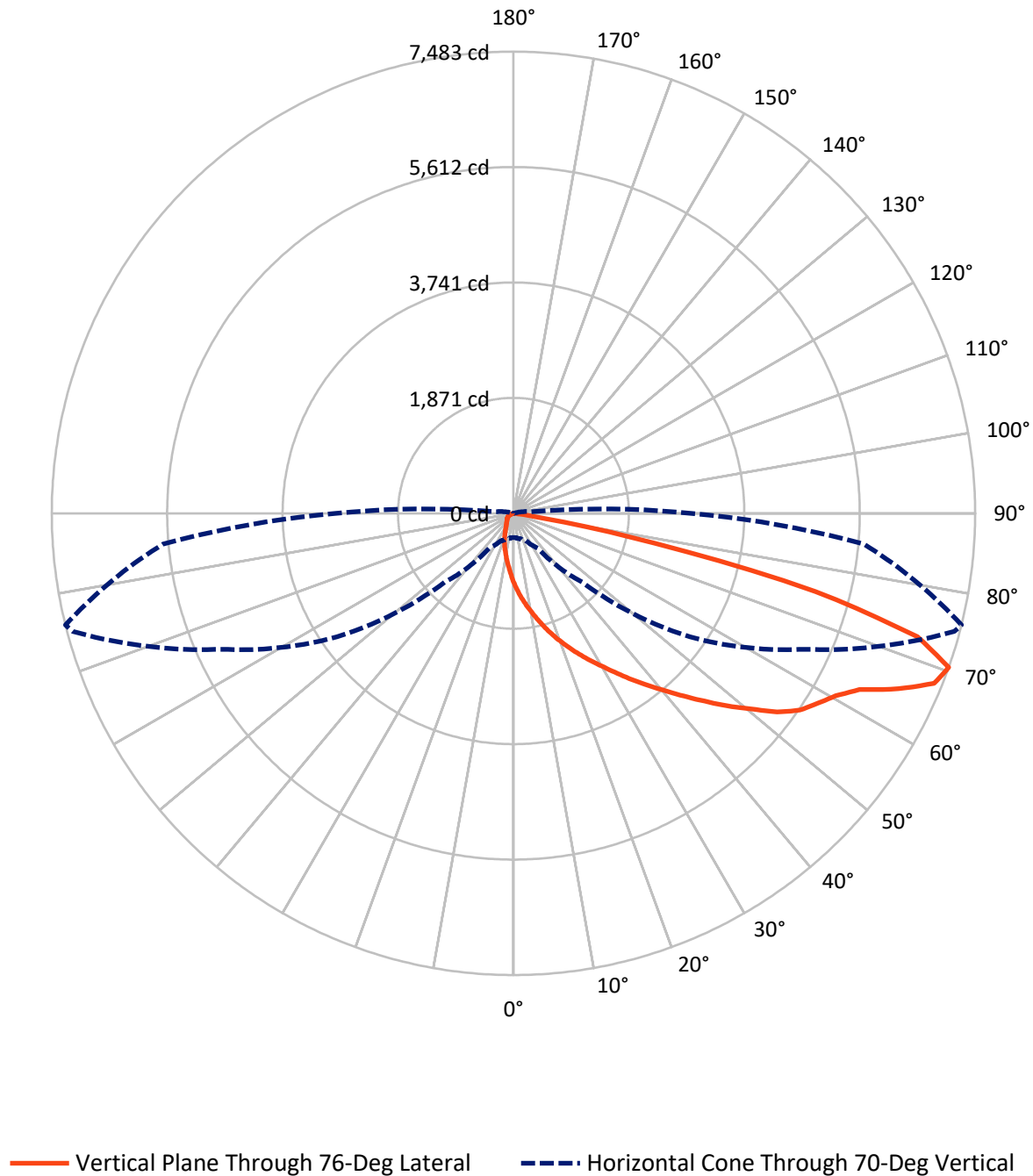
✕ Max cd  
 - - - 1/2 Max cd



Based on 15 foot mounting height. Maximum calculated value = 9.6 fc  
 Type II - Medium - N/A

REPORT NUMBER: P800833  
CATALOG NUMBER: ARCH-M-PA2-60-740-24VDC-T2R-HSS

## Luminous Intensity Polar Plot



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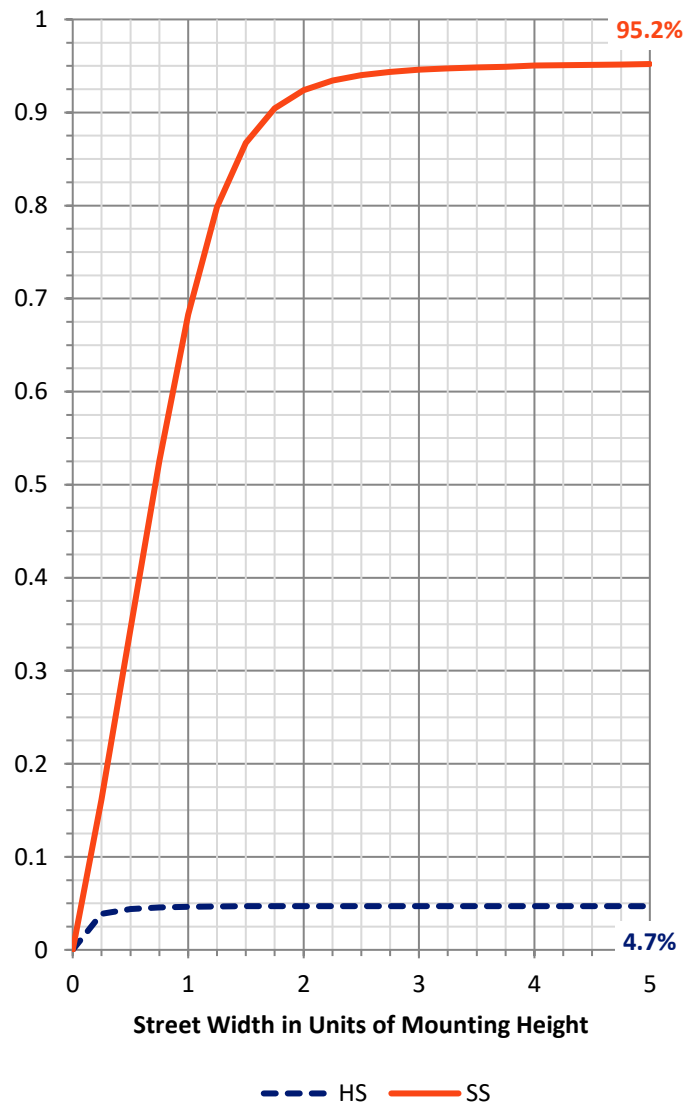
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total  |
|--------------------|-----------|----------|--------|--------|
| <b>House Side</b>  | Lumens    | 398.7    | 0.0    | 398.7  |
|                    | % Fixture | 4.7      | 0.0    | 4.7    |
| <b>Street Side</b> | Lumens    | 8054.3   | 0.0    | 8054.3 |
|                    | % Fixture | 95.3     | 0.0    | 95.3   |
| <b>Total</b>       | Lumens    | 8453.0   | 0.0    | 8453.0 |
|                    | % Fixture | 100.0    | 0.0    | 100.0  |

**ZONAL LUMENS:**

| Zone      | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10°    | 106.6  | 1.3       |
| 10°-20°   | 344.0  | 4.1       |
| 20°-30°   | 640.7  | 7.6       |
| 30°-40°   | 1133.3 | 13.4      |
| 40°-50°   | 1733.1 | 20.5      |
| 50°-60°   | 1964.9 | 23.2      |
| 60°-70°   | 1684.4 | 19.9      |
| 70°-80°   | 815.8  | 9.7       |
| 80°-90°   | 30.3   | 0.4       |
| 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°    | 8453.0 | 100.0     |
| 0°-180°   | 8453.0 | 100.0     |

**Coefficient of Utilization**



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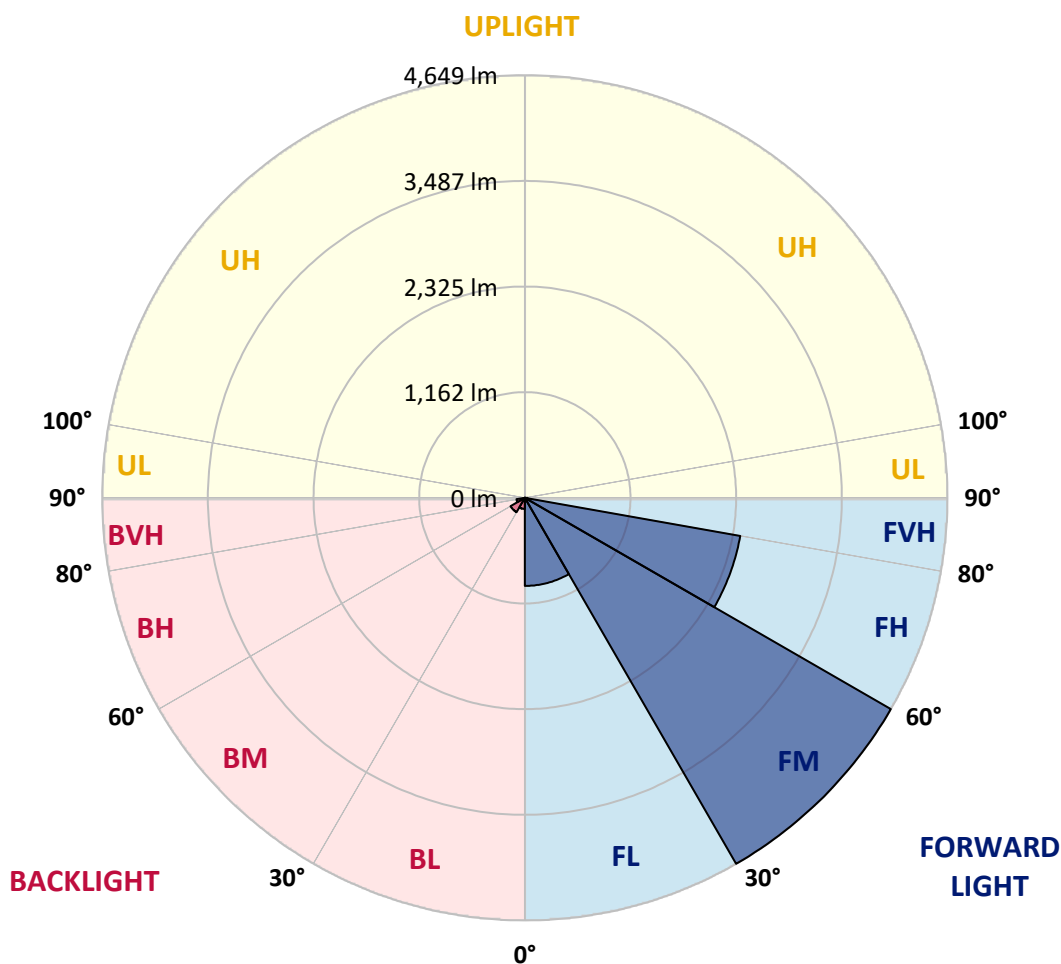
CATALOG NUMBER: ARCH-M-PA2-60-740-24VDC-T2R-HSS

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

| Zone |             | Lumens | % Fixture | Zone Rating/Lumen Limit |      |         |
|------|-------------|--------|-----------|-------------------------|------|---------|
|      |             |        |           | B                       | U    | G       |
| FL   | (0°-30°)    | 969.0  | 11.5      |                         |      |         |
| FM   | (30°-60°)   | 4649.2 | 55.0      |                         |      |         |
| FH   | (60°-80°)   | 2406.3 | 28.5      |                         |      | G2/5000 |
| FVH  | (80°-90°)   | 29.7   | 0.4       |                         |      | G1/100  |
| BL   | (0°-30°)    | 122.3  | 1.4       | B1/500                  |      |         |
| BM   | (30°-60°)   | 182.0  | 2.2       | B0/220                  |      |         |
| BH   | (60°-80°)   | 93.9   | 1.1       | B0/110                  |      | G0/110  |
| BVH  | (80°-90°)   | 0.5    | 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 II Medium



REPORT NUMBER: P800833

CATALOG NUMBER: ARCH-M-PA2-60-740-24VDC-T2R-HSS

**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 5°     | 15°    | 25°    | 35°    | 45°    | 55°    | 65°    | 75°    | 76°    | 85°    |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 1131.5 | 1131.5 | 1131.5 | 1131.5 | 1131.5 | 1131.5 | 1131.5 | 1131.5 | 1131.5 | 1131.5 | 1131.5 |
| 2.5°  | 1546.6 | 1538.2 | 1529.8 | 1497.4 | 1467.8 | 1441.1 | 1390.4 | 1324.3 | 1265.2 | 1252.5 | 1183.6 |
| 5°    | 1816.9 | 1807.0 | 1794.3 | 1762.0 | 1724.0 | 1678.9 | 1604.3 | 1503.0 | 1398.9 | 1376.4 | 1248.3 |
| 7.5°  | 1999.8 | 1991.4 | 1973.1 | 1957.6 | 1919.6 | 1876.0 | 1792.9 | 1674.7 | 1531.2 | 1503.0 | 1322.9 |
| 10°   | 2125.1 | 2119.4 | 2116.6 | 2103.9 | 2075.8 | 2040.6 | 1957.6 | 1833.7 | 1664.9 | 1632.5 | 1401.7 |
| 12.5° | 2170.1 | 2170.1 | 2184.2 | 2205.3 | 2209.5 | 2198.2 | 2122.2 | 1998.4 | 1805.6 | 1771.8 | 1494.6 |
| 15°   | 2109.6 | 2116.6 | 2147.6 | 2215.1 | 2285.5 | 2331.9 | 2284.1 | 2168.7 | 1960.4 | 1923.8 | 1604.3 |
| 17.5° | 2092.7 | 2099.7 | 2120.8 | 2179.9 | 2274.2 | 2398.1 | 2422.0 | 2333.3 | 2106.8 | 2075.8 | 1716.9 |
| 20°   | 2140.5 | 2147.6 | 2165.9 | 2216.5 | 2288.3 | 2413.6 | 2513.5 | 2492.4 | 2261.6 | 2229.2 | 1830.9 |
| 22.5° | 2254.5 | 2258.8 | 2258.8 | 2298.2 | 2361.5 | 2454.4 | 2571.2 | 2643.0 | 2420.6 | 2385.4 | 1943.5 |
| 25°   | 2499.4 | 2491.0 | 2457.2 | 2437.5 | 2478.3 | 2554.3 | 2644.4 | 2775.2 | 2597.9 | 2550.1 | 2064.5 |
| 27.5° | 2820.3 | 2848.4 | 2766.8 | 2672.5 | 2641.5 | 2685.2 | 2747.1 | 2892.1 | 2769.6 | 2718.9 | 2174.3 |
| 30°   | 3255.1 | 3243.9 | 3136.9 | 3001.8 | 2868.1 | 2852.6 | 2873.8 | 2992.0 | 2941.3 | 2893.5 | 2296.8 |
| 32.5° | 3612.6 | 3633.7 | 3521.1 | 3356.5 | 3156.6 | 3062.3 | 3039.8 | 3111.6 | 3124.3 | 3093.3 | 2441.7 |
| 35°   | 3979.9 | 4002.4 | 3892.7 | 3709.7 | 3471.9 | 3314.2 | 3249.5 | 3259.4 | 3350.8 | 3311.4 | 2593.7 |
| 37.5° | 4309.2 | 4328.9 | 4220.6 | 4033.4 | 3795.6 | 3602.7 | 3509.9 | 3433.9 | 3570.4 | 3535.2 | 2754.1 |
| 40°   | 4559.7 | 4562.5 | 4489.4 | 4321.9 | 4096.7 | 3896.9 | 3791.3 | 3642.2 | 3802.6 | 3778.7 | 2921.6 |
| 42.5° | 4737.1 | 4742.7 | 4689.2 | 4545.7 | 4337.4 | 4151.6 | 4065.8 | 3888.4 | 4070.0 | 4048.9 | 3115.8 |
| 45°   | 4820.1 | 4829.9 | 4824.3 | 4692.0 | 4518.9 | 4358.5 | 4330.3 | 4150.2 | 4362.7 | 4343.0 | 3339.6 |
| 47.5° | 4741.3 | 4741.3 | 4813.0 | 4794.8 | 4635.7 | 4528.8 | 4561.1 | 4423.2 | 4680.8 | 4662.5 | 3567.6 |
| 50°   | 4413.4 | 4417.6 | 4564.0 | 4773.6 | 4680.8 | 4656.8 | 4758.2 | 4690.6 | 4969.3 | 4980.5 | 3840.6 |
| 52.5° | 3552.1 | 3545.0 | 4039.0 | 4441.5 | 4649.8 | 4714.5 | 4939.7 | 4963.6 | 5315.5 | 5349.2 | 4112.2 |
| 55°   | 2654.2 | 2650.0 | 3122.9 | 3853.3 | 4433.1 | 4685.0 | 5041.0 | 5207.1 | 5611.0 | 5632.1 | 4314.9 |
| 57.5° | 2101.1 | 2089.9 | 2350.2 | 3106.0 | 3943.3 | 4552.7 | 5045.3 | 5253.5 | 5775.7 | 5812.2 | 4511.9 |
| 60°   | 1615.6 | 1605.8 | 1800.0 | 2310.8 | 3249.5 | 4200.9 | 4924.2 | 5256.4 | 5934.7 | 5999.4 | 4776.5 |
| 62.5° | 1155.4 | 1166.7 | 1315.8 | 1657.8 | 2499.4 | 3704.1 | 4766.6 | 5295.8 | 6217.6 | 6290.7 | 5152.2 |
| 65°   | 779.7  | 774.0  | 897.9  | 1128.7 | 1777.4 | 3035.6 | 4524.5 | 5378.8 | 6727.0 | 6855.1 | 5602.6 |
| 67.5° | 541.8  | 546.0  | 602.3  | 734.6  | 1128.7 | 2330.5 | 4122.1 | 5425.2 | 7253.3 | 7353.3 | 5917.8 |
| 70°   | 391.2  | 396.9  | 427.8  | 494.0  | 689.6  | 1580.4 | 3484.5 | 5212.7 | 7395.5 | 7482.7 | 5698.3 |
| 72.5° | 257.5  | 268.8  | 315.2  | 350.4  | 440.5  | 989.3  | 2567.0 | 4490.8 | 6783.3 | 6848.0 | 4780.7 |
| 75°   | 139.3  | 142.1  | 202.7  | 261.8  | 313.8  | 616.4  | 1531.2 | 3028.6 | 5074.8 | 5053.7 | 3152.4 |
| 77.5° | 108.4  | 112.6  | 125.3  | 187.2  | 211.1  | 339.2  | 605.1  | 1367.9 | 2403.7 | 2339.0 | 1075.2 |
| 80°   | 66.1   | 69.0   | 87.3   | 111.2  | 147.8  | 197.0  | 177.3  | 371.5  | 488.3  | 457.4  | 157.6  |
| 82.5° | 39.4   | 42.2   | 52.1   | 92.9   | 116.8  | 92.9   | 61.9   | 90.1   | 91.5   | 90.1   | 39.4   |
| 85°   | 7.0    | 7.0    | 36.6   | 64.7   | 61.9   | 26.7   | 36.6   | 29.6   | 26.7   | 28.1   | 8.4    |
| 87.5° | 0.0    | 0.0    | 14.1   | 19.7   | 28.1   | 9.9    | 14.1   | 7.0    | 7.0    | 7.0    | 4.2    |
| 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: P800833

CATALOG NUMBER: ARCH-M-PA2-60-740-24VDC-T2R-HSS

**CANDELA DISTRIBUTION (continued):**

|       | 90°    | 95°    | 105°   | 115°   | 125°   | 135°   | 145°   | 155°   | 165°   | 175°   | 180°   |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 1131.5 | 1131.5 | 1131.5 | 1131.5 | 1131.5 | 1131.5 | 1131.5 | 1131.5 | 1131.5 | 1131.5 | 1131.5 |
| 2.5°  | 1141.3 | 1093.5 | 995.0  | 909.1  | 823.3  | 760.0  | 712.1  | 662.8  | 646.0  | 624.9  | 613.6  |
| 5°    | 1161.0 | 1066.8 | 871.1  | 714.9  | 582.6  | 481.3  | 416.6  | 377.2  | 351.8  | 333.5  | 329.3  |
| 7.5°  | 1190.6 | 1045.6 | 771.2  | 560.1  | 415.2  | 313.8  | 260.4  | 233.6  | 219.5  | 211.1  | 208.3  |
| 10°   | 1225.8 | 1027.3 | 672.7  | 436.3  | 292.7  | 220.9  | 191.4  | 180.1  | 174.5  | 171.7  | 170.3  |
| 12.5° | 1275.0 | 1020.3 | 589.7  | 336.4  | 220.9  | 181.5  | 166.1  | 159.0  | 154.8  | 150.6  | 149.2  |
| 15°   | 1339.8 | 1023.1 | 513.7  | 260.4  | 183.0  | 161.8  | 149.2  | 142.1  | 136.5  | 132.3  | 132.3  |
| 17.5° | 1407.3 | 1027.3 | 439.1  | 211.1  | 166.1  | 147.8  | 133.7  | 123.8  | 119.6  | 115.4  | 114.0  |
| 20°   | 1470.7 | 1025.9 | 367.3  | 180.1  | 150.6  | 132.3  | 118.2  | 108.4  | 101.3  | 97.1   | 97.1   |
| 22.5° | 1531.2 | 1017.5 | 299.8  | 161.8  | 137.9  | 116.8  | 101.3  | 91.5   | 85.8   | 81.6   | 81.6   |
| 25°   | 1595.9 | 1000.6 | 244.9  | 147.8  | 122.4  | 102.7  | 87.3   | 77.4   | 73.2   | 69.0   | 69.0   |
| 27.5° | 1646.6 | 972.5  | 199.8  | 135.1  | 108.4  | 88.7   | 74.6   | 66.1   | 61.9   | 59.1   | 59.1   |
| 30°   | 1701.5 | 931.6  | 166.1  | 121.0  | 94.3   | 76.0   | 63.3   | 56.3   | 52.1   | 50.7   | 50.7   |
| 32.5° | 1762.0 | 886.6  | 142.1  | 107.0  | 80.2   | 64.7   | 53.5   | 49.3   | 45.0   | 43.6   | 43.6   |
| 35°   | 1832.3 | 847.2  | 128.1  | 92.9   | 70.4   | 54.9   | 46.4   | 42.2   | 39.4   | 39.4   | 39.4   |
| 37.5° | 1912.6 | 806.4  | 115.4  | 81.6   | 60.5   | 46.4   | 39.4   | 38.0   | 36.6   | 35.2   | 35.2   |
| 40°   | 1999.8 | 762.8  | 104.1  | 71.8   | 52.1   | 39.4   | 33.8   | 33.8   | 32.4   | 32.4   | 32.4   |
| 42.5° | 2098.3 | 724.8  | 94.3   | 63.3   | 45.0   | 33.8   | 29.6   | 29.6   | 28.1   | 28.1   | 28.1   |
| 45°   | 2205.3 | 689.6  | 85.8   | 56.3   | 39.4   | 29.6   | 26.7   | 25.3   | 23.9   | 23.9   | 23.9   |
| 47.5° | 2331.9 | 669.9  | 78.8   | 49.3   | 33.8   | 25.3   | 22.5   | 21.1   | 19.7   | 18.3   | 18.3   |
| 50°   | 2493.8 | 678.3  | 71.8   | 40.8   | 29.6   | 21.1   | 18.3   | 16.9   | 15.5   | 14.1   | 14.1   |
| 52.5° | 2621.8 | 674.1  | 61.9   | 35.2   | 23.9   | 16.9   | 14.1   | 12.7   | 11.3   | 9.9    | 9.9    |
| 55°   | 2714.7 | 657.2  | 53.5   | 29.6   | 18.3   | 14.1   | 11.3   | 8.4    | 7.0    | 7.0    | 7.0    |
| 57.5° | 2806.2 | 640.3  | 45.0   | 23.9   | 14.1   | 9.9    | 7.0    | 5.6    | 5.6    | 5.6    | 5.6    |
| 60°   | 2948.3 | 616.4  | 39.4   | 19.7   | 11.3   | 7.0    | 4.2    | 4.2    | 2.8    | 2.8    | 2.8    |
| 62.5° | 3121.4 | 586.9  | 32.4   | 16.9   | 8.4    | 5.6    | 2.8    | 2.8    | 0.0    | 0.0    | 0.0    |
| 65°   | 3311.4 | 534.8  | 26.7   | 12.7   | 7.0    | 4.2    | 2.8    | 0.0    | 0.0    | 0.0    | 0.0    |
| 67.5° | 3267.8 | 429.2  | 22.5   | 8.4    | 5.6    | 2.8    | 1.4    | 0.0    | 0.0    | 0.0    | 0.0    |
| 70°   | 2890.6 | 289.9  | 18.3   | 7.0    | 4.2    | 2.8    | 1.4    | 0.0    | 0.0    | 0.0    | 0.0    |
| 72.5° | 2264.4 | 171.7  | 12.7   | 5.6    | 2.8    | 1.4    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |
| 75°   | 1449.5 | 85.8   | 8.4    | 4.2    | 2.8    | 1.4    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |
| 77.5° | 485.5  | 42.2   | 5.6    | 2.8    | 1.4    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |
| 80°   | 69.0   | 14.1   | 2.8    | 1.4    | 1.4    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |
| 82.5° | 15.5   | 5.6    | 1.4    | 1.4    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |
| 85°   | 5.6    | 2.8    | 1.4    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |
| 87.5° | 2.8    | 1.4    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 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: SP1-2101-121-2

Luminaire Tested: IFLD-S-SA2A-740-U-T3R-HSS

Test Date: 03/05/2021

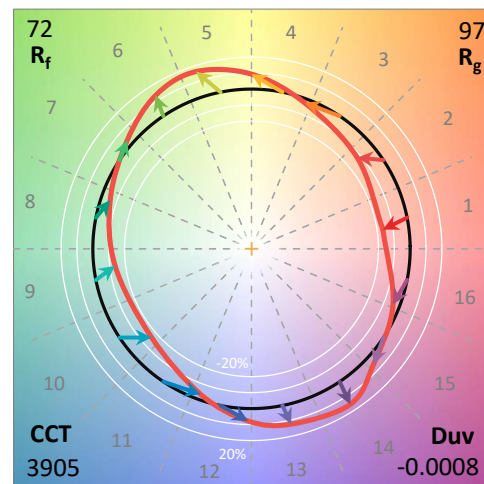
### Test Information

Test Method: LM-79-08  
 Report Number: SP1-2101-121-2  
 Test Lab: COOPER LIGHTING SOLUTIONS  
 Photometer: SP1  
 Measurement Geometry:  $4\pi$   
 Issue Date: 03/05/2021  
 Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
 Product Line: STREETWORKS  
 Catalog Number: **IFLD-S-SA2A-740-U-T3R-HSS**  
 Description: STREETWORKS INF FLOOD

SHIELD, DRIVER PROGRAMMED @ 615mA.

### Spectral Parameters

|                           |         |           |      |      |       |
|---------------------------|---------|-----------|------|------|-------|
| CCT (K):                  | 3905    | CRI (Ra): | 71.2 |      |       |
| CIE u':                   | 0.2273  | R1:       | 68.9 | R9:  | -29.7 |
| CIE v':                   | 0.5024  | R2:       | 77.0 | R10: | 46.2  |
| Duv:                      | -0.0008 | R3:       | 84.0 | R11: | 68.8  |
| CIE x:                    | 0.3841  | R4:       | 71.6 | R12: | 45.6  |
| CIE y:                    | 0.3774  | R5:       | 68.9 | R13: | 69.5  |
| CIE z:                    | 0.2385  | R6:       | 68.3 | R14: | 90.7  |
| Peak Wavelength (nm):     | 443     | R7:       | 78.7 |      |       |
| Dominant Wavelength (nm): | 579     | R8:       | 52.2 |      |       |
| Purity:                   | 28.7    |           |      |      |       |
| Rf:                       | 71.7    |           |      |      |       |
| Rg:                       | 96.9    |           |      |      |       |



### Test Conditions

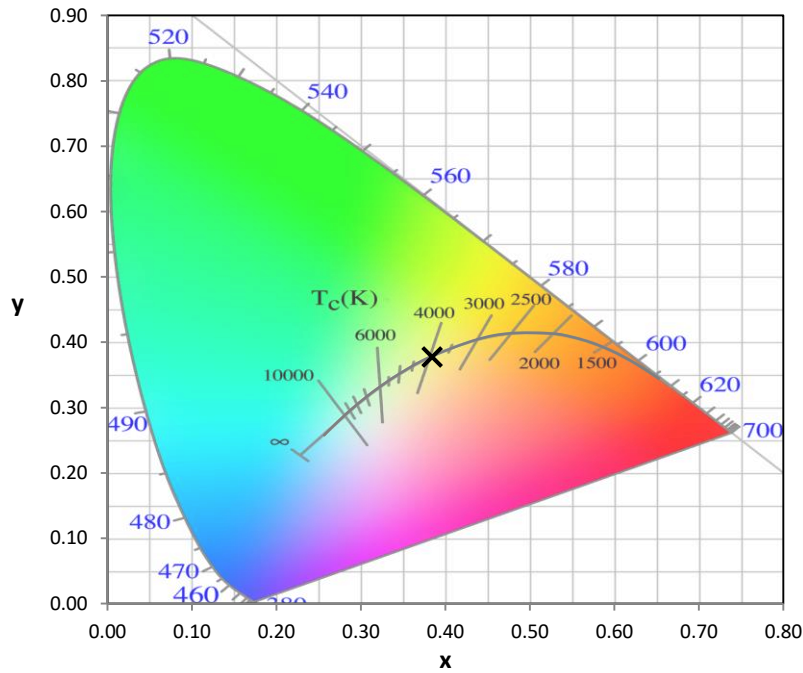
Stabilization Time: 211M  
 Operation Time: 12H  
 Room Temperature (°C) / RH%: 24.8/312%  
 Sphere Temperature (°C): 24.1

REPORT NUMBER: SP1-2101-121-2

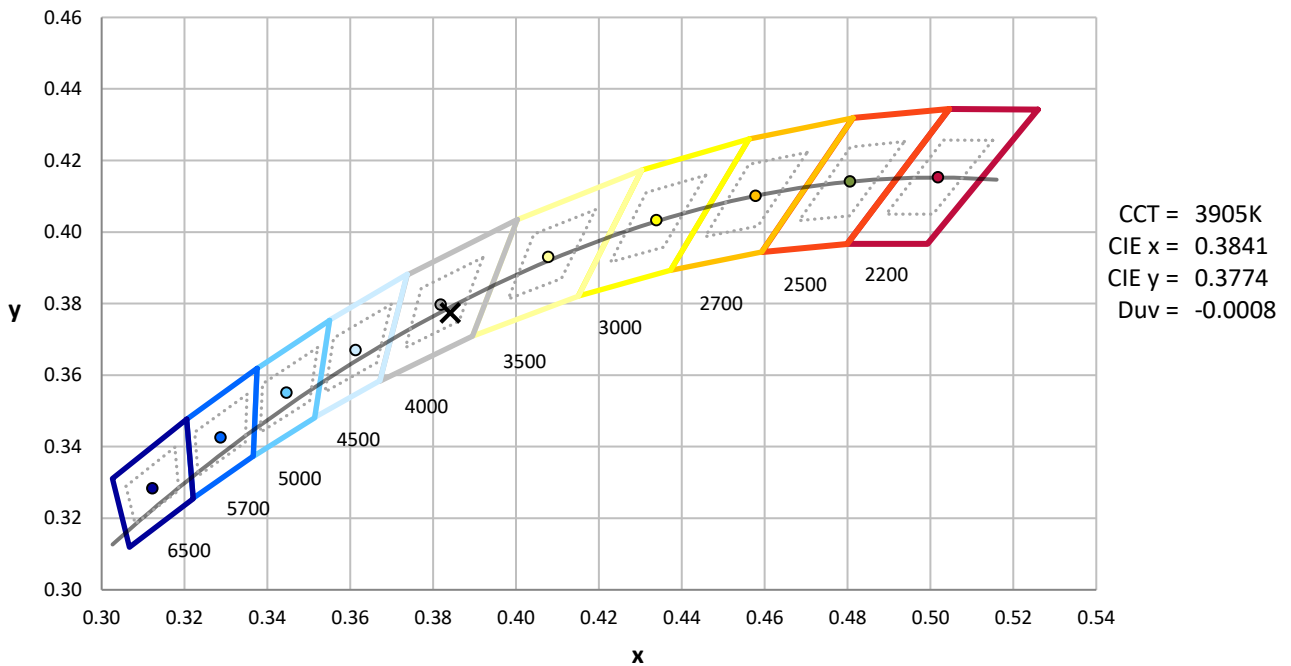
| Measurement and Test Equipment |                       |                  |                      |
|--------------------------------|-----------------------|------------------|----------------------|
| Instrument                     | Identification Number | Calibration Date | Calibration Due Date |
| 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: SP1-2101-121-2

**CIE 1931 Chromaticity Diagram**



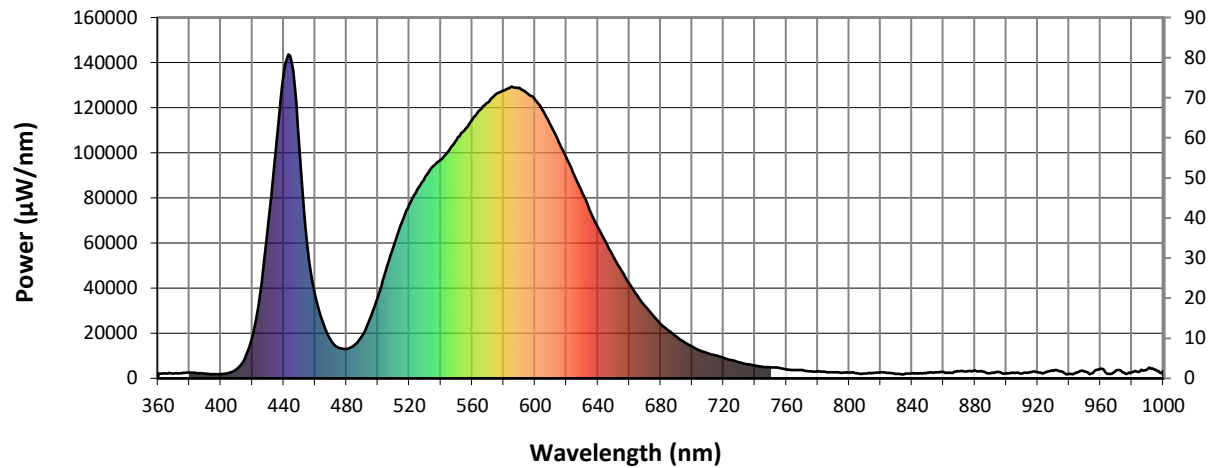
**CIE 1931 Chromaticity Diagram with 2017 ANSI 7-Step and 4-Step Quadrangles**



Point lies inside the ANSI 4000K 4-step quadrangle

REPORT NUMBER: SP1-2101-121-2

### Photopic Flux vs. Wavelength

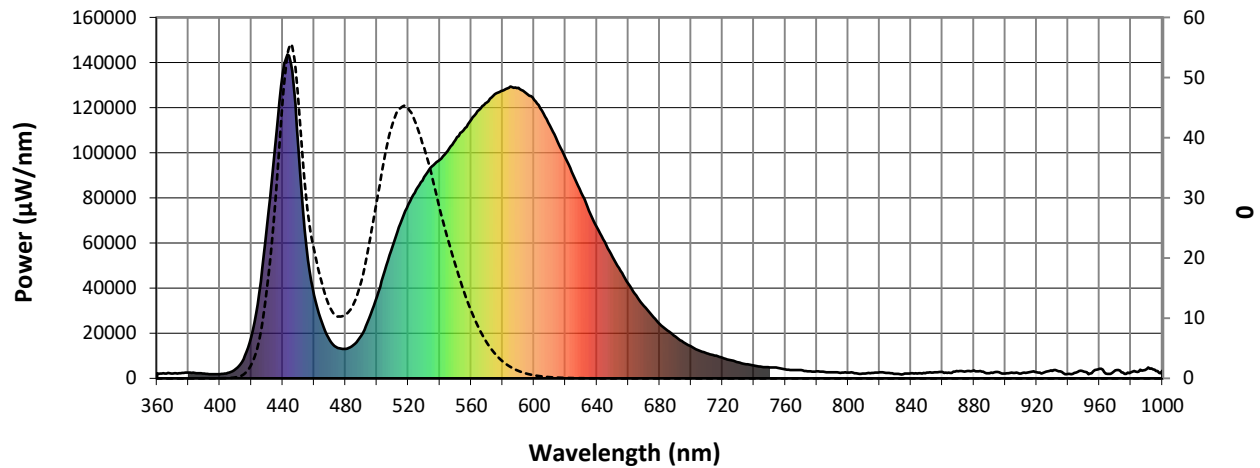


#####

| 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       | 2304             | 0.0              | 490       | 19043            | 2.7              | 620       | 97577            | 25.4             | 750       | 4830             | 0.0              | 880       | 3505             | 0.0              |
| 365       | 2150             | 0.0              | 495       | 26606            | 4.8              | 625       | 90158            | 19.9             | 755       | 4664             | 0.0              | 885       | 2991             | 0.0              |
| 370       | 2146             | 0.0              | 500       | 36376            | 8.0              | 630       | 82240            | 14.9             | 760       | 4006             | 0.0              | 890       | 2327             | 0.0              |
| 375       | 2332             | 0.0              | 505       | 47714            | 13.3             | 635       | 74361            | 11.2             | 765       | 3715             | 0.0              | 895       | 2775             | 0.0              |
| 380       | 2527             | 0.0              | 510       | 58741            | 20.2             | 640       | 66994            | 8.0              | 770       | 3696             | 0.0              | 900       | 2141             | 0.0              |
| 385       | 2304             | 0.0              | 515       | 68716            | 28.5             | 645       | 60405            | 5.8              | 775       | 3117             | 0.0              | 905       | 2421             | 0.0              |
| 390       | 2064             | 0.0              | 520       | 77136            | 37.4             | 650       | 53806            | 3.9              | 780       | 3062             | 0.0              | 910       | 2200             | 0.0              |
| 395       | 1856             | 0.0              | 525       | 83567            | 44.9             | 655       | 47610            | 2.7              | 785       | 2907             | 0.0              | 915       | 2716             | 0.0              |
| 400       | 1856             | 0.0              | 530       | 89283            | 52.6             | 660       | 42018            | 1.8              | 790       | 2655             | 0.0              | 920       | 2656             | 0.0              |
| 405       | 2374             | 0.0              | 535       | 94097            | 58.4             | 665       | 36742            | 1.2              | 795       | 2467             | 0.0              | 925       | 2671             | 0.0              |
| 410       | 4084             | 0.0              | 540       | 96845            | 63.1             | 670       | 32105            | 0.7              | 800       | 2609             | 0.0              | 930       | 3292             | 0.0              |
| 415       | 8543             | 0.0              | 545       | 100829           | 67.1             | 675       | 27946            | 0.5              | 805       | 2293             | 0.0              | 935       | 3188             | 0.0              |
| 420       | 18394            | 0.1              | 550       | 105648           | 71.8             | 680       | 24146            | 0.3              | 810       | 2188             | 0.0              | 940       | 1997             | 0.0              |
| 425       | 37987            | 0.2              | 555       | 110017           | 75.1             | 685       | 21191            | 0.2              | 815       | 2386             | 0.0              | 945       | 2623             | 0.0              |
| 430       | 67605            | 0.5              | 560       | 114586           | 77.9             | 690       | 18544            | 0.1              | 820       | 2712             | 0.0              | 950       | 2969             | 0.0              |
| 435       | 102160           | 1.2              | 565       | 118987           | 79.1             | 695       | 16058            | 0.1              | 825       | 2473             | 0.0              | 955       | 2277             | 0.0              |
| 440       | 135103           | 2.1              | 570       | 122326           | 79.5             | 700       | 14133            | 0.0              | 830       | 1969             | 0.0              | 960       | 4267             | 0.0              |
| 445       | 140126           | 2.9              | 575       | 125968           | 78.4             | 705       | 12309            | 0.0              | 835       | 1917             | 0.0              | 965       | 2034             | 0.0              |
| 450       | 102339           | 2.7              | 580       | 127613           | 75.8             | 710       | 11142            | 0.0              | 840       | 2248             | 0.0              | 970       | 3586             | 0.0              |
| 455       | 58751            | 2.0              | 585       | 129466           | 71.9             | 715       | 10143            | 0.0              | 845       | 2266             | 0.0              | 975       | 2505             | 0.0              |
| 460       | 36892            | 1.5              | 590       | 128813           | 66.6             | 720       | 9072             | 0.0              | 850       | 2558             | 0.0              | 980       | 2666             | 0.0              |
| 465       | 24637            | 1.3              | 595       | 126387           | 59.9             | 725       | 8130             | 0.0              | 855       | 2767             | 0.0              | 985       | 2934             | 0.0              |
| 470       | 16738            | 1.0              | 600       | 123477           | 53.2             | 730       | 7149             | 0.0              | 860       | 2826             | 0.0              | 990       | 4120             | 0.0              |
| 475       | 13456            | 1.1              | 605       | 118718           | 46.0             | 735       | 6311             | 0.0              | 865       | 2385             | 0.0              | 995       | 3858             | 0.0              |
| 480       | 13081            | 1.2              | 610       | 112091           | 38.5             | 740       | 5711             | 0.0              | 870       | 3194             | 0.0              | 1000      | 3405             | 0.0              |
| 485       | 14734            | 1.7              | 615       | 105039           | 31.7             | 745       | 5111             | 0.0              | 875       | 3189             | 0.0              |           |                  |                  |

REPORT NUMBER: SP1-2101-121-2

### Scotopic Flux vs. Wavelength



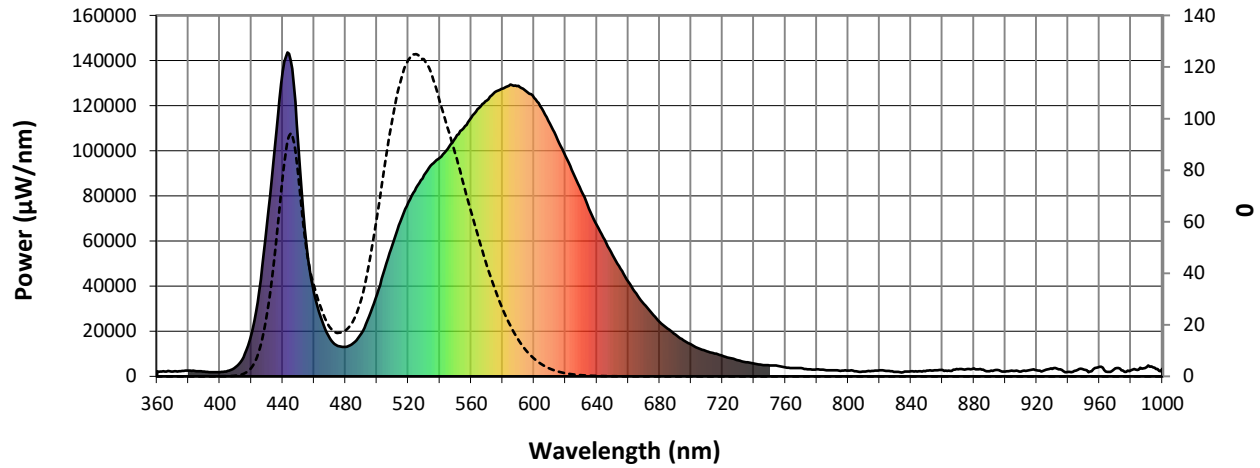
Scotopic Lumens: 10425.8

S/P: 1.47

| $\lambda$<br>(nm) | Power<br>( $\mu\text{W/nm}$ ) | Lumens<br>( $\Phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>( $\mu\text{W/nm}$ ) | Lumens<br>( $\Phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>( $\mu\text{W/nm}$ ) | Lumens<br>( $\Phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>( $\mu\text{W/nm}$ ) | Lumens<br>( $\Phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>( $\mu\text{W/nm}$ ) | Lumens<br>( $\Phi/\text{nm}$ ) |
|-------------------|-------------------------------|--------------------------------|-------------------|-------------------------------|--------------------------------|-------------------|-------------------------------|--------------------------------|-------------------|-------------------------------|--------------------------------|-------------------|-------------------------------|--------------------------------|
| 360               | 2304                          | 0.0                            | 490               | 19043                         | 29.3                           | 620               | 97577                         | 1.2                            | 750               | 4830                          | 0.0                            | 880               | 3505                          | 0.0                            |
| 365               | 2150                          | 0.0                            | 495               | 26606                         | 43.0                           | 625               | 90158                         | 0.8                            | 755               | 4664                          | 0.0                            | 885               | 2991                          | 0.0                            |
| 370               | 2146                          | 0.0                            | 500               | 36376                         | 60.8                           | 630               | 82240                         | 0.5                            | 760               | 4006                          | 0.0                            | 890               | 2327                          | 0.0                            |
| 375               | 2332                          | 0.0                            | 505               | 47714                         | 81.1                           | 635               | 74361                         | 0.3                            | 765               | 3715                          | 0.0                            | 895               | 2775                          | 0.0                            |
| 380               | 2527                          | 0.0                            | 510               | 58741                         | 99.6                           | 640               | 66994                         | 0.2                            | 770               | 3696                          | 0.0                            | 900               | 2141                          | 0.0                            |
| 385               | 2304                          | 0.0                            | 515               | 68716                         | 113.9                          | 645               | 60405                         | 0.1                            | 775               | 3117                          | 0.0                            | 905               | 2421                          | 0.0                            |
| 390               | 2064                          | 0.0                            | 520               | 77136                         | 122.6                          | 650               | 53806                         | 0.1                            | 780               | 3062                          | 0.0                            | 910               | 2200                          | 0.0                            |
| 395               | 1856                          | 0.0                            | 525               | 83567                         | 125.0                          | 655               | 47610                         | 0.0                            | 785               | 2907                          | 0.0                            | 915               | 2716                          | 0.0                            |
| 400               | 1856                          | 0.0                            | 530               | 89283                         | 123.1                          | 660               | 42018                         | 0.0                            | 790               | 2655                          | 0.0                            | 920               | 2656                          | 0.0                            |
| 405               | 2374                          | 0.1                            | 535               | 94097                         | 117.3                          | 665               | 36742                         | 0.0                            | 795               | 2467                          | 0.0                            | 925               | 2671                          | 0.0                            |
| 410               | 4084                          | 0.2                            | 540               | 96845                         | 107.0                          | 670               | 32105                         | 0.0                            | 800               | 2609                          | 0.0                            | 930               | 3292                          | 0.0                            |
| 415               | 8543                          | 0.9                            | 545               | 100829                        | 96.7                           | 675               | 27946                         | 0.0                            | 805               | 2293                          | 0.0                            | 935               | 3188                          | 0.0                            |
| 420               | 18394                         | 3.0                            | 550               | 105648                        | 86.4                           | 680               | 24146                         | 0.0                            | 810               | 2188                          | 0.0                            | 940               | 1997                          | 0.0                            |
| 425               | 37987                         | 9.3                            | 555               | 110017                        | 75.2                           | 685               | 21191                         | 0.0                            | 815               | 2386                          | 0.0                            | 945               | 2623                          | 0.0                            |
| 430               | 67605                         | 23.0                           | 560               | 114586                        | 64.0                           | 690               | 18544                         | 0.0                            | 820               | 2712                          | 0.0                            | 950               | 2969                          | 0.0                            |
| 435               | 102160                        | 45.7                           | 565               | 118987                        | 53.4                           | 695               | 16058                         | 0.0                            | 825               | 2473                          | 0.0                            | 955               | 2277                          | 0.0                            |
| 440               | 135103                        | 75.5                           | 570               | 122326                        | 43.2                           | 700               | 14133                         | 0.0                            | 830               | 1969                          | 0.0                            | 960               | 4267                          | 0.0                            |
| 445               | 140126                        | 93.8                           | 575               | 125968                        | 34.3                           | 705               | 12309                         | 0.0                            | 835               | 1917                          | 0.0                            | 965               | 2034                          | 0.0                            |
| 450               | 102339                        | 79.3                           | 580               | 127613                        | 26.3                           | 710               | 11142                         | 0.0                            | 840               | 2248                          | 0.0                            | 970               | 3586                          | 0.0                            |
| 455               | 58751                         | 51.3                           | 585               | 129466                        | 19.8                           | 715               | 10143                         | 0.0                            | 845               | 2266                          | 0.0                            | 975               | 2505                          | 0.0                            |
| 460               | 36892                         | 35.6                           | 590               | 128813                        | 14.3                           | 720               | 9072                          | 0.0                            | 850               | 2558                          | 0.0                            | 980               | 2666                          | 0.0                            |
| 465               | 24637                         | 26.0                           | 595               | 126387                        | 10.1                           | 725               | 8130                          | 0.0                            | 855               | 2767                          | 0.0                            | 985               | 2934                          | 0.0                            |
| 470               | 16738                         | 19.3                           | 600               | 123477                        | 7.0                            | 730               | 7149                          | 0.0                            | 860               | 2826                          | 0.0                            | 990               | 4120                          | 0.0                            |
| 475               | 13456                         | 16.8                           | 605               | 118718                        | 4.7                            | 735               | 6311                          | 0.0                            | 865               | 2385                          | 0.0                            | 995               | 3858                          | 0.0                            |
| 480               | 13081                         | 17.7                           | 610               | 112091                        | 3.0                            | 740               | 5711                          | 0.0                            | 870               | 3194                          | 0.0                            | 1000              | 3405                          | 0.0                            |
| 485               | 14734                         | 21.4                           | 615               | 105039                        | 1.9                            | 745               | 5111                          | 0.0                            | 875               | 3189                          | 0.0                            |                   |                               |                                |

REPORT NUMBER: SP1-2101-121-2

### Melanopic Flux vs. Wavelength


**Melanopic Lumens: 3927.2      M/P: 0.55**

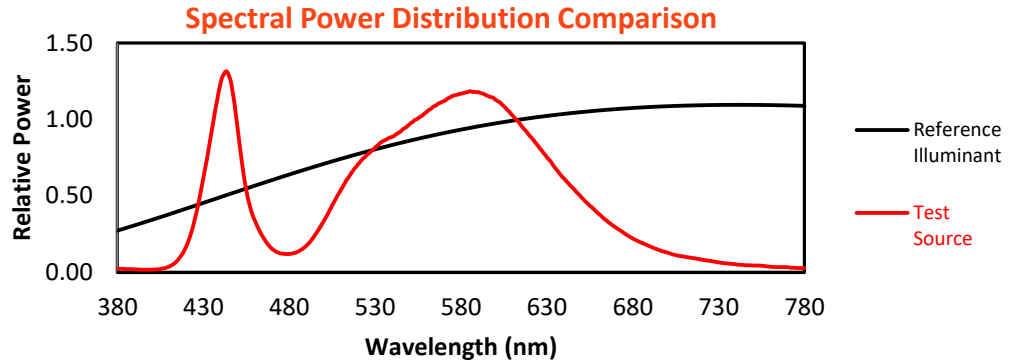
| λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) |
|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|
| 360       | 2304             | 0.0              | 490       | 19043            | 15.8             | 620       | 97577            | 0.1              | 750       | 4830             | 0.0              | 880       | 3505             | 0.0              |
| 365       | 2150             | 0.0              | 495       | 26606            | 22.0             | 625       | 90158            | 0.0              | 755       | 4664             | 0.0              | 885       | 2991             | 0.0              |
| 370       | 2146             | 0.0              | 500       | 36376            | 29.2             | 630       | 82240            | 0.0              | 760       | 4006             | 0.0              | 890       | 2327             | 0.0              |
| 375       | 2332             | 0.0              | 505       | 47714            | 36.6             | 635       | 74361            | 0.0              | 765       | 3715             | 0.0              | 895       | 2775             | 0.0              |
| 380       | 2527             | 0.0              | 510       | 58741            | 42.2             | 640       | 66994            | 0.0              | 770       | 3696             | 0.0              | 900       | 2141             | 0.0              |
| 385       | 2304             | 0.0              | 515       | 68716            | 44.9             | 645       | 60405            | 0.0              | 775       | 3117             | 0.0              | 905       | 2421             | 0.0              |
| 390       | 2064             | 0.0              | 520       | 77136            | 44.9             | 650       | 53806            | 0.0              | 780       | 3062             | 0.0              | 910       | 2200             | 0.0              |
| 395       | 1856             | 0.0              | 525       | 83567            | 42.4             | 655       | 47610            | 0.0              | 785       | 2907             | 0.0              | 915       | 2716             | 0.0              |
| 400       | 1856             | 0.0              | 530       | 89283            | 38.6             | 660       | 42018            | 0.0              | 790       | 2655             | 0.0              | 920       | 2656             | 0.0              |
| 405       | 2374             | 0.0              | 535       | 94097            | 33.9             | 665       | 36742            | 0.0              | 795       | 2467             | 0.0              | 925       | 2671             | 0.0              |
| 410       | 4084             | 0.2              | 540       | 96845            | 28.3             | 670       | 32105            | 0.0              | 800       | 2609             | 0.0              | 930       | 3292             | 0.0              |
| 415       | 8543             | 0.6              | 545       | 100829           | 23.4             | 675       | 27946            | 0.0              | 805       | 2293             | 0.0              | 935       | 3188             | 0.0              |
| 420       | 18394            | 2.1              | 550       | 105648           | 19.0             | 680       | 24146            | 0.0              | 810       | 2188             | 0.0              | 940       | 1997             | 0.0              |
| 425       | 37987            | 5.9              | 555       | 110017           | 14.8             | 685       | 21191            | 0.0              | 815       | 2386             | 0.0              | 945       | 2623             | 0.0              |
| 430       | 67605            | 14.3             | 560       | 114586           | 11.3             | 690       | 18544            | 0.0              | 820       | 2712             | 0.0              | 950       | 2969             | 0.0              |
| 435       | 102160           | 27.3             | 565       | 118987           | 8.4              | 695       | 16058            | 0.0              | 825       | 2473             | 0.0              | 955       | 2277             | 0.0              |
| 440       | 135103           | 45.1             | 570       | 122326           | 6.0              | 700       | 14133            | 0.0              | 830       | 1969             | 0.0              | 960       | 4267             | 0.0              |
| 445       | 140126           | 55.3             | 575       | 125968           | 4.2              | 705       | 12309            | 0.0              | 835       | 1917             | 0.0              | 965       | 2034             | 0.0              |
| 450       | 102339           | 47.2             | 580       | 127613           | 2.9              | 710       | 11142            | 0.0              | 840       | 2248             | 0.0              | 970       | 3586             | 0.0              |
| 455       | 58751            | 30.8             | 585       | 129466           | 1.9              | 715       | 10143            | 0.0              | 845       | 2266             | 0.0              | 975       | 2505             | 0.0              |
| 460       | 36892            | 21.7             | 590       | 128813           | 1.3              | 720       | 9072             | 0.0              | 850       | 2558             | 0.0              | 980       | 2666             | 0.0              |
| 465       | 24637            | 16.1             | 595       | 126387           | 0.8              | 725       | 8130             | 0.0              | 855       | 2767             | 0.0              | 985       | 2934             | 0.0              |
| 470       | 16738            | 12.0             | 600       | 123477           | 0.5              | 730       | 7149             | 0.0              | 860       | 2826             | 0.0              | 990       | 4120             | 0.0              |
| 475       | 13456            | 10.3             | 605       | 118718           | 0.3              | 735       | 6311             | 0.0              | 865       | 2385             | 0.0              | 995       | 3858             | 0.0              |
| 480       | 13081            | 10.5             | 610       | 112091           | 0.2              | 740       | 5711             | 0.0              | 870       | 3194             | 0.0              | 1000      | 3405             | 0.0              |
| 485       | 14734            | 12.1             | 615       | 105039           | 0.1              | 745       | 5111             | 0.0              | 875       | 3189             | 0.0              |           |                  |                  |

REPORT NUMBER: SP1-2101-121-2

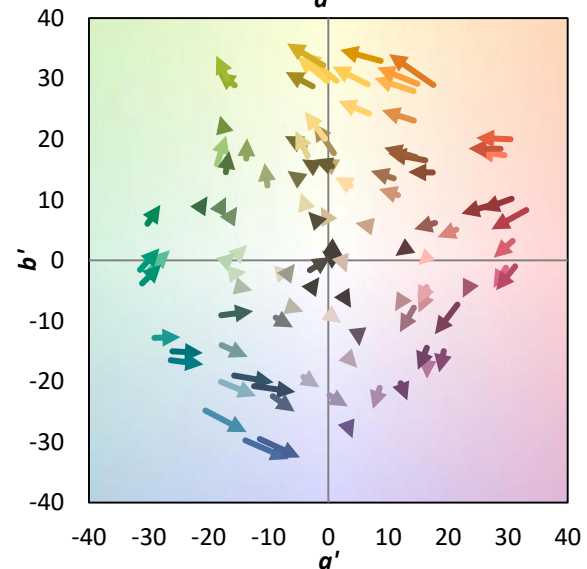
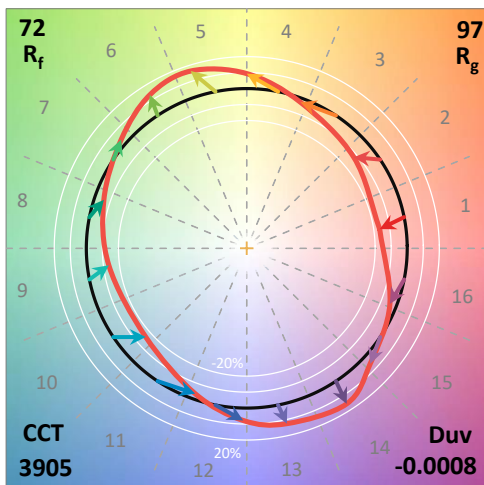
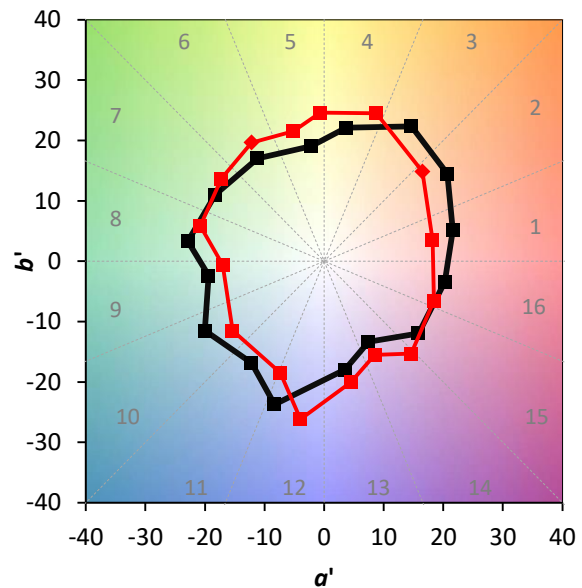
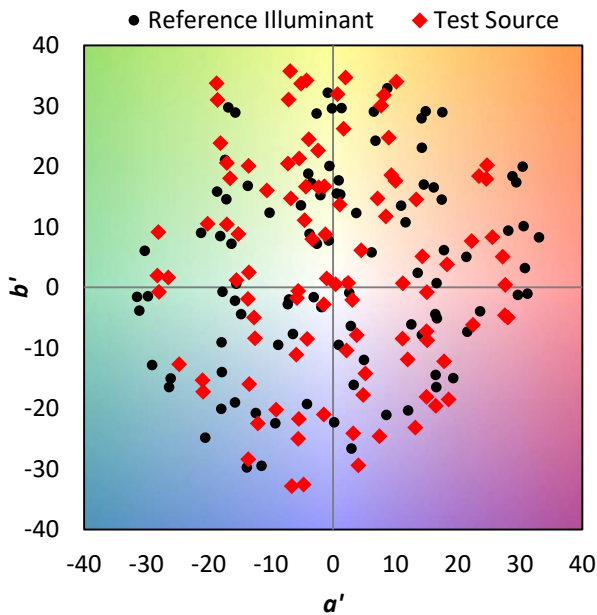
TM-30-18

### Summary

$R_f = 71.7$   
 $R_g = 96.9$   
 CIE  $R_a = 71.2$   
 $R_g = -29.7$



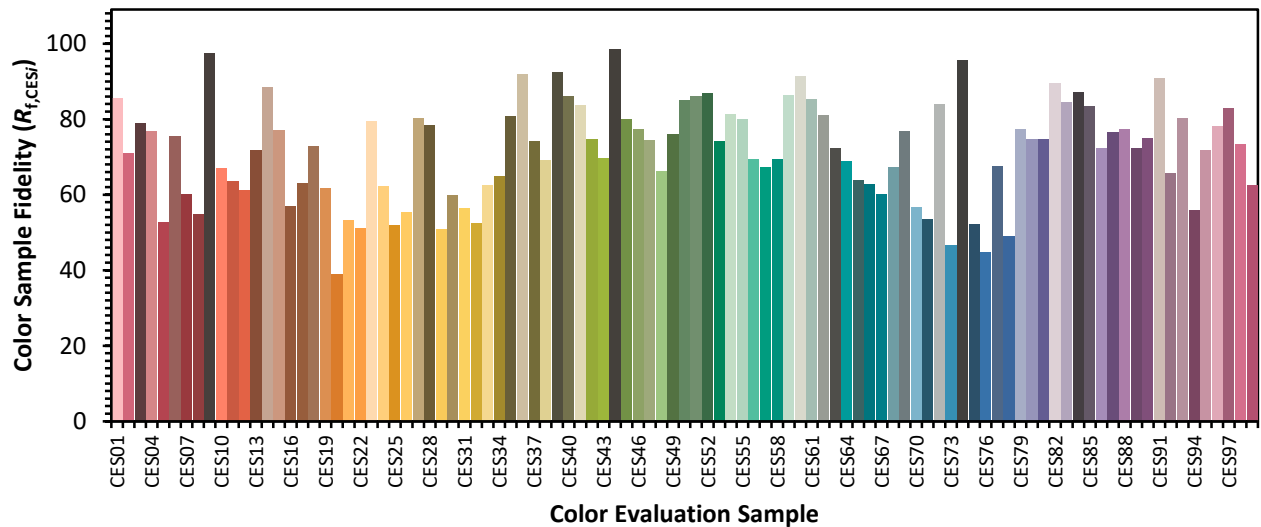
### Color Vector Graphics



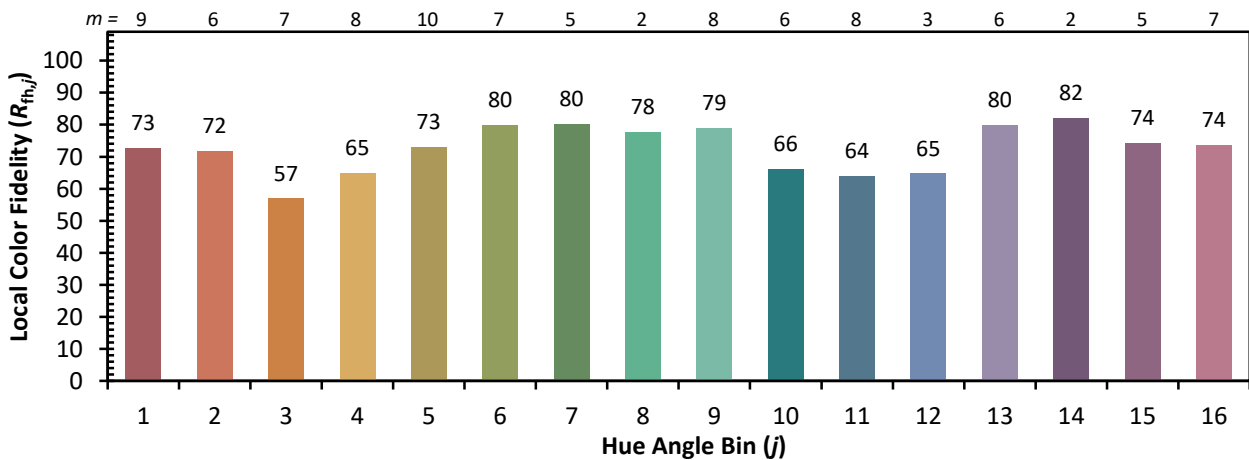
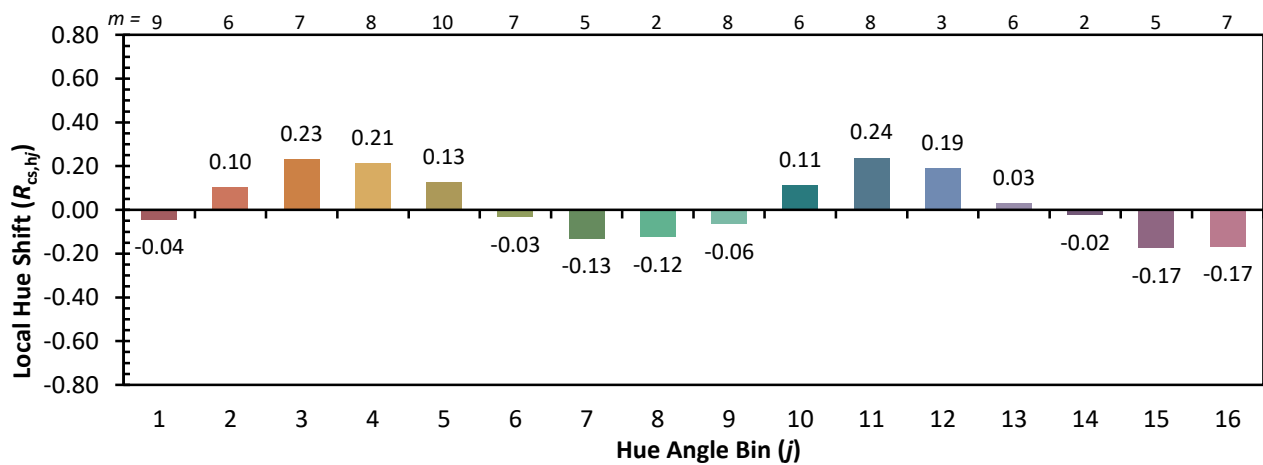
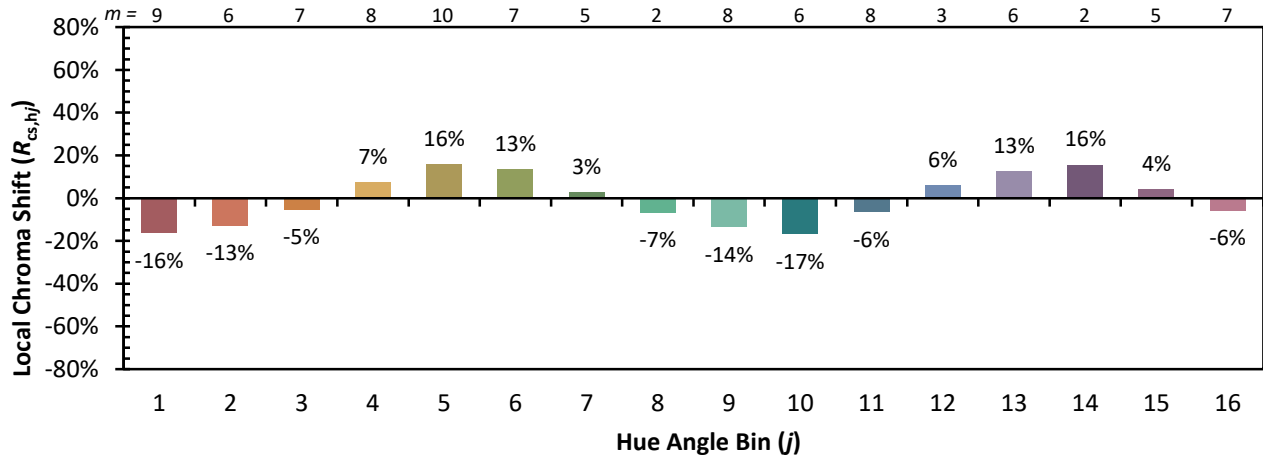


**Individual Sample Fidelity Index ( $R_{f,i}$ )**

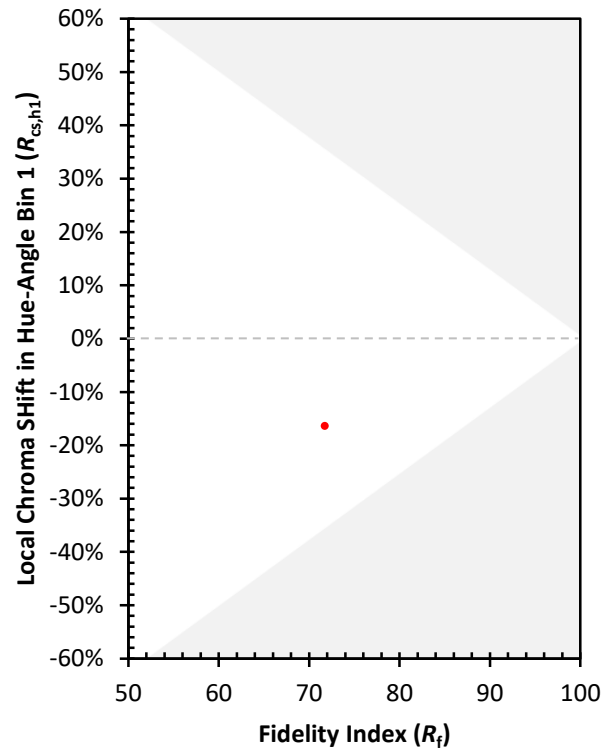
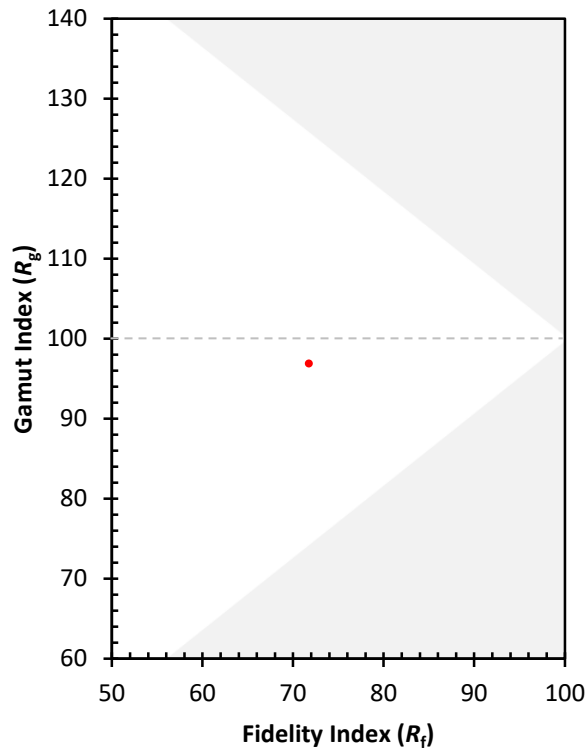
|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 85 | CES26 = 55 | CES51 = 86 | CES76 = 45 |
| CES02 = 61 | CES27 = 80 | CES52 = 87 | CES77 = 68 |
| CES03 = 30 | CES28 = 79 | CES53 = 74 | CES78 = 49 |
| CES04 = 70 | CES29 = 51 | CES54 = 81 | CES79 = 77 |
| CES05 = 47 | CES30 = 60 | CES55 = 80 | CES80 = 75 |
| CES06 = 50 | CES31 = 56 | CES56 = 69 | CES81 = 75 |
| CES07 = 40 | CES32 = 52 | CES57 = 67 | CES82 = 90 |
| CES08 = 39 | CES33 = 62 | CES58 = 69 | CES83 = 85 |
| CES09 = 29 | CES34 = 65 | CES59 = 86 | CES84 = 87 |
| CES10 = 74 | CES35 = 81 | CES60 = 91 | CES85 = 83 |
| CES11 = 57 | CES36 = 92 | CES61 = 85 | CES86 = 72 |
| CES12 = 63 | CES37 = 74 | CES62 = 81 | CES87 = 77 |
| CES13 = 42 | CES38 = 69 | CES63 = 72 | CES88 = 77 |
| CES14 = 74 | CES39 = 92 | CES64 = 69 | CES89 = 72 |
| CES15 = 71 | CES40 = 86 | CES65 = 64 | CES90 = 75 |
| CES16 = 46 | CES41 = 84 | CES66 = 63 | CES91 = 91 |
| CES17 = 49 | CES42 = 75 | CES67 = 60 | CES92 = 66 |
| CES18 = 56 | CES43 = 70 | CES68 = 67 | CES93 = 80 |
| CES19 = 72 | CES44 = 98 | CES69 = 77 | CES94 = 56 |
| CES20 = 65 | CES45 = 80 | CES70 = 57 | CES95 = 72 |
| CES21 = 86 | CES46 = 77 | CES71 = 53 | CES96 = 78 |
| CES22 = 78 | CES47 = 74 | CES72 = 84 | CES97 = 83 |
| CES23 = 92 | CES48 = 66 | CES73 = 47 | CES98 = 73 |
| CES24 = 91 | CES49 = 76 | CES74 = 96 | CES99 = 63 |
| CES25 = 72 | CES50 = 85 | CES75 = 52 |            |



Color Rendition by Hue-Angle Bin



**Measure Comparisons**



(END OF REPORT)