

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: P800650

Luminaire Tested: **ARCH-M-PA2-60-722-24VDC-T4W-HSS**

Issue Date: 5/19/2020

**Test Information**

Test Method: LM-79-08  
Report Number: P800650  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-1910-568-15)  
Test Lab: INNOVATION CENTER  
Issue Date: 5/19/2020  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: STREETWORKS  
Catalog Number: ARCH-M-PA2-60-722-24VDC-T4W-HSS  
Description: ARCHEON-M ROADWAY AND AREA LUMINAIRE  
(2) 70 CRI, 2200K, 405mA LIGHT ENGINES WITH 16 LEDS AND TYPE IV WIDE  
OPTICS WITH HOUSE SIDE SHIELD  
Light Source: -  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 5660 lumens  
Efficiency: N/A  
Efficacy: 92.8 lumens/watt  
Luminous Opening: Rectangular (W 0.75' x L: 1' x H: 0')  
IES Classification: Type IV - Medium  
BUG Rating: B1 - U0 - G2

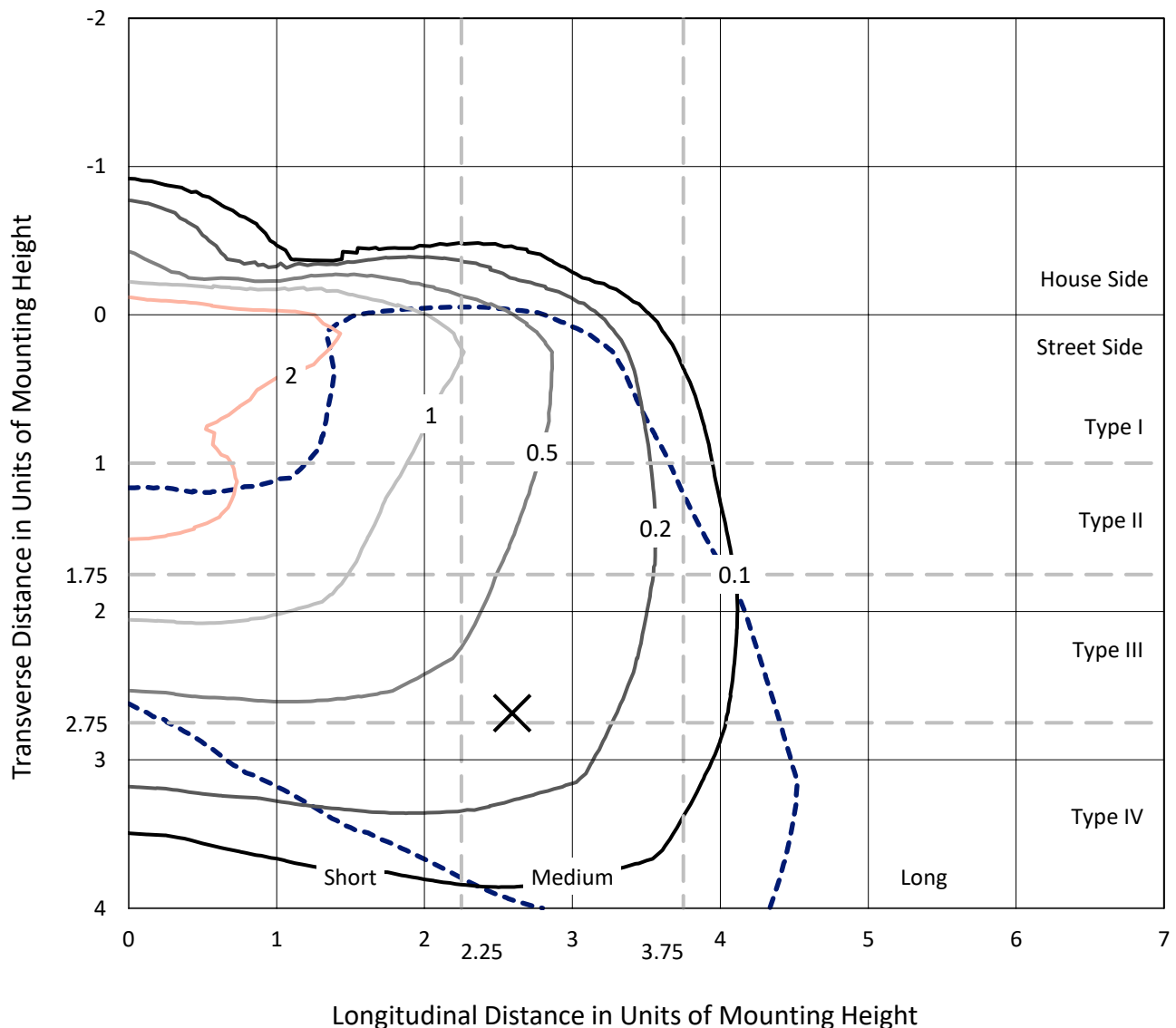
Input Watts (W): 61  
Input Voltage (V): NR  
Input Current (A<sub>in</sub>): NR  
Voltage Rise (V): NR  
Power Factor: NR  
Total Harmonic Distortion (THDi): NR  
Frequency (hertz): 60  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 25 FT

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## Iso-Footcandle Lines of Horizontal Illumination

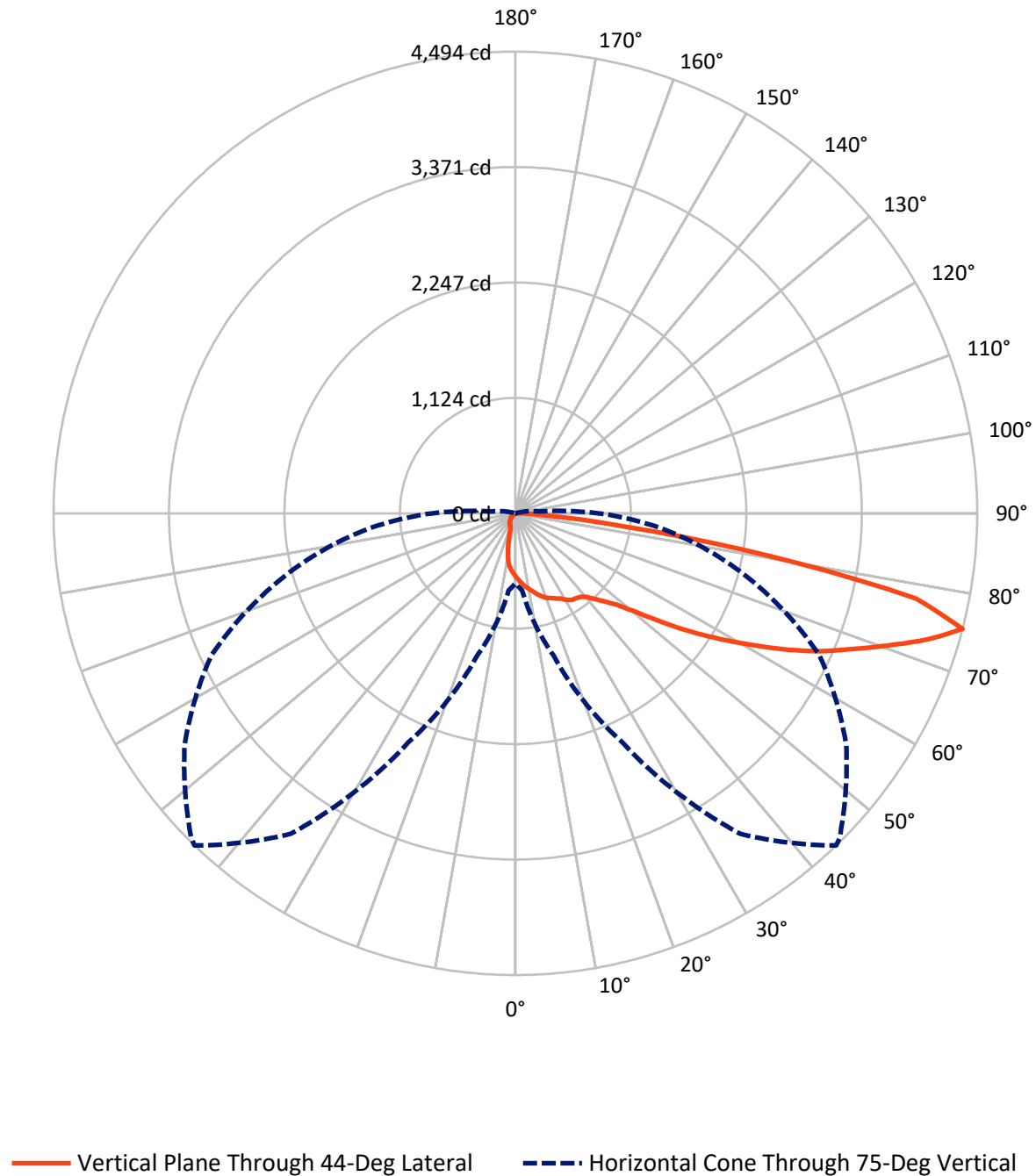
× Max cd  
 --- 1/2 Max cd



Based on 15 foot mounting height. Maximum calculated value = 3.7 fc  
 Type IV - Medium - N/A

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## Luminous Intensity Polar Plot



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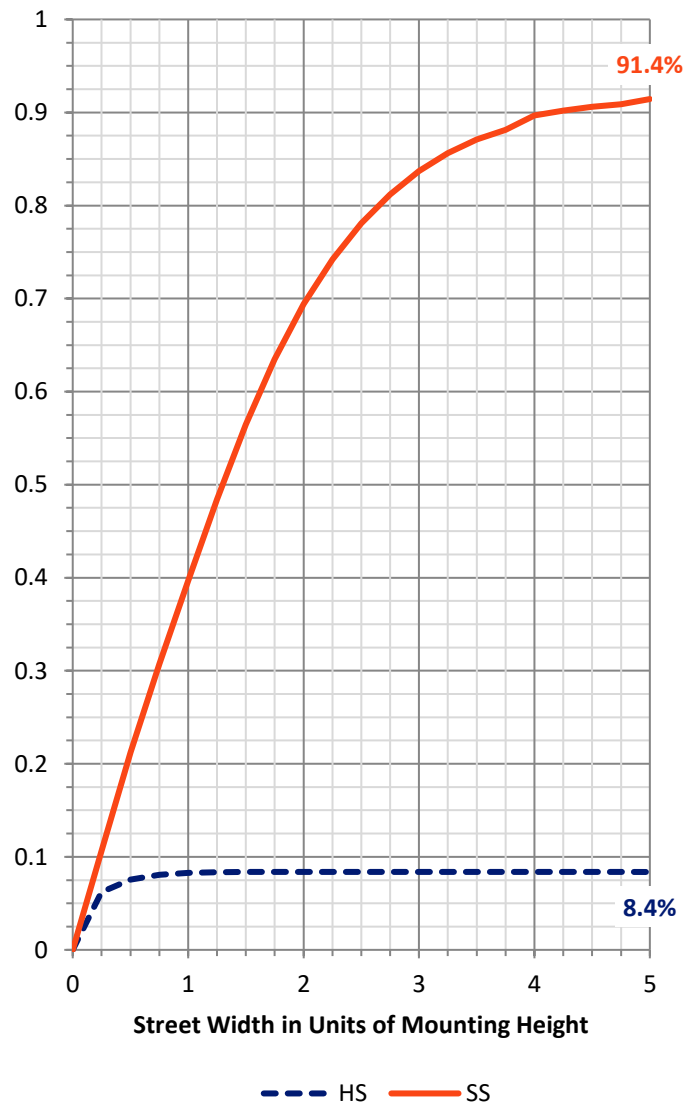
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total  |
|--------------------|-----------|----------|--------|--------|
| <b>House Side</b>  | Lumens    | 477.3    | 0.0    | 477.3  |
|                    | % Fixture | 8.4      | 0.0    | 8.4    |
| <b>Street Side</b> | Lumens    | 5182.7   | 0.0    | 5182.7 |
|                    | % Fixture | 91.6     | 0.0    | 91.6   |
| <b>Total</b>       | Lumens    | 5660.0   | 0.0    | 5660.0 |
|                    | % Fixture | 100.0    | 0.0    | 100.0  |

**ZONAL LUMENS:**

| Zone      | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10°    | 58.1   | 1.0       |
| 10°-20°   | 162.8  | 2.9       |
| 20°-30°   | 268.7  | 4.7       |
| 30°-40°   | 389.9  | 6.9       |
| 40°-50°   | 633.9  | 11.2      |
| 50°-60°   | 1117.5 | 19.7      |
| 60°-70°   | 1606.0 | 28.4      |
| 70°-80°   | 1286.1 | 22.7      |
| 80°-90°   | 137.0  | 2.4       |
| 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°    | 5660.0 | 100.0     |
| 0°-180°   | 5660.0 | 100.0     |

**Coefficient of Utilization**



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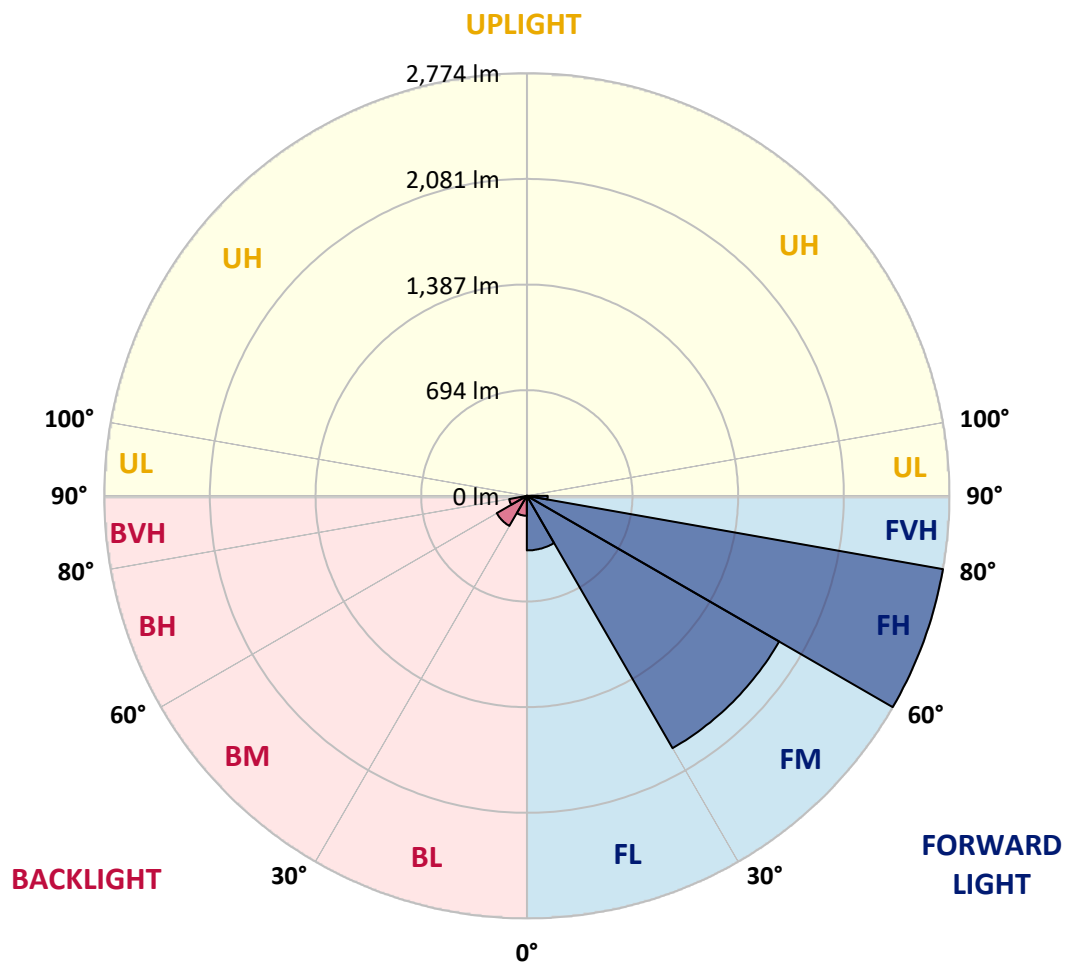
CATALOG NUMBER: ARCH-M-PA2-60-722-24VDC-T4W-HSS

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

| Zone |             | Lumens | % Fixture | Zone Rating/Lumen Limit |      |         |
|------|-------------|--------|-----------|-------------------------|------|---------|
|      |             |        |           | B                       | U    | G       |
| FL   | (0°-30°)    | 358.4  | 6.3       |                         |      |         |
| FM   | (30°-60°)   | 1913.1 | 33.8      |                         |      |         |
| FH   | (60°-80°)   | 2774.4 | 49.0      |                         |      | G2/5000 |
| FVH  | (80°-90°)   | 136.7  | 2.4       |                         |      | G2/225  |
| BL   | (0°-30°)    | 131.1  | 2.3       | B1/500                  |      |         |
| BM   | (30°-60°)   | 228.2  | 4.0       | B1/1000                 |      |         |
| BH   | (60°-80°)   | 117.7  | 2.1       | B1/500                  |      | G1/500  |
| BVH  | (80°-90°)   | 0.3    | 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 Medium





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**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 5°     | 15°    | 25°    | 35°    | 44°    | 45°    | 55°    | 65°    | 75°    | 85°    |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 616.1  | 616.1  | 616.1  | 616.1  | 616.1  | 616.1  | 616.1  | 616.1  | 616.1  | 616.1  | 616.1  |
| 2.5°  | 671.4  | 670.4  | 667.2  | 662.0  | 656.8  | 651.6  | 650.5  | 642.2  | 632.8  | 625.5  | 619.2  |
| 5°    | 730.9  | 729.9  | 724.7  | 713.2  | 701.7  | 688.1  | 687.1  | 667.2  | 649.5  | 629.6  | 612.9  |
| 7.5°  | 792.5  | 790.4  | 781.1  | 763.3  | 743.5  | 722.6  | 720.5  | 691.3  | 665.1  | 639.0  | 615.0  |
| 10°   | 840.6  | 838.5  | 824.9  | 804.0  | 776.9  | 750.8  | 747.6  | 717.4  | 691.3  | 657.8  | 625.5  |
| 12.5° | 887.6  | 883.4  | 865.6  | 842.7  | 809.2  | 784.2  | 781.1  | 749.7  | 718.4  | 683.9  | 644.3  |
| 15°   | 931.4  | 926.2  | 909.5  | 880.2  | 844.7  | 820.7  | 818.6  | 785.2  | 752.9  | 713.2  | 669.3  |
| 17.5° | 961.7  | 959.6  | 939.8  | 907.4  | 872.9  | 853.1  | 851.0  | 816.6  | 784.2  | 742.4  | 695.4  |
| 20°   | 977.4  | 977.4  | 958.6  | 923.1  | 891.7  | 878.2  | 875.0  | 842.7  | 811.3  | 771.7  | 722.6  |
| 22.5° | 980.5  | 983.6  | 969.0  | 930.4  | 907.4  | 895.9  | 893.8  | 865.6  | 835.3  | 798.8  | 752.9  |
| 25°   | 986.8  | 986.8  | 979.4  | 937.7  | 921.0  | 917.8  | 916.8  | 891.7  | 864.6  | 828.0  | 783.1  |
| 27.5° | 994.1  | 994.1  | 988.8  | 948.1  | 941.9  | 940.8  | 939.8  | 928.3  | 906.4  | 863.5  | 818.6  |
| 30°   | 1012.9 | 1013.9 | 1009.7 | 969.0  | 964.8  | 976.3  | 978.4  | 972.1  | 945.0  | 891.7  | 855.2  |
| 32.5° | 1059.8 | 1050.5 | 1039.0 | 983.6  | 990.9  | 1005.6 | 1006.6 | 994.1  | 964.8  | 922.0  | 899.0  |
| 35°   | 1177.8 | 1122.5 | 1070.3 | 996.2  | 999.3  | 1013.9 | 1016.0 | 1014.9 | 997.2  | 960.7  | 949.2  |
| 37.5° | 1287.5 | 1209.2 | 1135.0 | 1025.4 | 1014.9 | 1030.6 | 1034.8 | 1052.5 | 1039.0 | 1013.9 | 1017.0 |
| 40°   | 1351.2 | 1320.9 | 1268.7 | 1105.8 | 1046.3 | 1070.3 | 1074.5 | 1101.6 | 1096.4 | 1086.0 | 1105.8 |
| 42.5° | 1547.5 | 1549.6 | 1493.2 | 1225.9 | 1103.7 | 1142.3 | 1147.6 | 1169.5 | 1176.8 | 1182.0 | 1230.1 |
| 45°   | 1775.1 | 1782.4 | 1768.9 | 1442.0 | 1212.3 | 1224.8 | 1232.1 | 1261.4 | 1288.5 | 1321.9 | 1409.7 |
| 47.5° | 2048.7 | 2042.4 | 1992.3 | 1706.2 | 1401.3 | 1331.3 | 1336.6 | 1392.9 | 1439.9 | 1513.0 | 1638.3 |
| 50°   | 2290.9 | 2306.6 | 2211.6 | 1952.6 | 1667.6 | 1499.5 | 1494.2 | 1549.6 | 1634.2 | 1736.5 | 1894.2 |
| 52.5° | 2535.3 | 2512.3 | 2383.9 | 2197.0 | 1982.9 | 1728.1 | 1712.5 | 1742.7 | 1861.8 | 1982.9 | 2144.8 |
| 55°   | 2600.0 | 2602.1 | 2558.3 | 2464.3 | 2246.0 | 2005.9 | 1979.8 | 1977.7 | 2126.0 | 2208.5 | 2407.9 |
| 57.5° | 2727.4 | 2732.6 | 2743.1 | 2761.9 | 2658.5 | 2283.6 | 2256.5 | 2227.2 | 2371.3 | 2419.4 | 2672.1 |
| 60°   | 2856.9 | 2863.2 | 2926.9 | 3028.1 | 2959.2 | 2583.3 | 2554.1 | 2485.2 | 2565.6 | 2630.3 | 2949.8 |
| 62.5° | 2840.2 | 2884.0 | 3068.9 | 3270.4 | 3262.0 | 2912.2 | 2875.7 | 2709.7 | 2760.8 | 2817.2 | 3204.6 |
| 65°   | 2564.5 | 2611.5 | 3027.1 | 3337.2 | 3565.9 | 3237.0 | 3177.5 | 2941.5 | 2944.6 | 3012.5 | 3450.0 |
| 67.5° | 2318.1 | 2369.3 | 2766.0 | 3309.0 | 3766.4 | 3528.3 | 3466.7 | 3174.3 | 3125.2 | 3238.0 | 3581.6 |
| 70°   | 2176.1 | 2227.2 | 2558.3 | 3221.3 | 3822.8 | 3851.0 | 3797.7 | 3440.6 | 3340.3 | 3443.7 | 3434.3 |
| 72.5° | 1703.1 | 1783.5 | 2293.0 | 3054.2 | 3883.3 | 4196.6 | 4154.8 | 3777.9 | 3523.1 | 3228.6 | 2614.6 |
| 75°   | 678.7  | 752.9  | 1431.6 | 2458.0 | 3807.1 | 4494.2 | 4461.8 | 3929.3 | 3261.0 | 2305.6 | 1338.6 |
| 77.5° | 204.7  | 219.3  | 397.8  | 1215.4 | 2791.1 | 3984.6 | 3974.2 | 3303.8 | 2307.7 | 1070.3 | 365.5  |
| 80°   | 67.9   | 75.2   | 122.2  | 335.2  | 1273.9 | 2489.3 | 2536.3 | 2105.1 | 1048.4 | 245.4  | 74.1   |
| 82.5° | 28.2   | 31.3   | 61.6   | 134.7  | 451.1  | 1072.4 | 1056.7 | 942.9  | 365.5  | 152.5  | 27.1   |
| 85°   | 7.3    | 9.4    | 28.2   | 77.3   | 165.0  | 369.6  | 388.4  | 316.4  | 206.7  | 126.3  | 8.4    |
| 87.5° | 0.0    | 0.0    | 13.6   | 31.3   | 74.1   | 111.7  | 116.9  | 96.1   | 116.9  | 95.0   | 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    |



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CATALOG NUMBER: ARCH-M-PA2-60-722-24VDC-T4W-HSS

**CANDELA DISTRIBUTION (continued):**

|       | 90°    | 95°    | 105°  | 115°  | 125°  | 135°  | 145°  | 155°  | 165°  | 175°  | 180°  |
|-------|--------|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 0°    | 616.1  | 616.1  | 616.1 | 616.1 | 616.1 | 616.1 | 616.1 | 616.1 | 616.1 | 616.1 | 616.1 |
| 2.5°  | 614.0  | 608.8  | 599.4 | 593.1 | 584.7 | 582.7 | 578.5 | 573.3 | 572.2 | 567.0 | 568.0 |
| 5°    | 603.5  | 595.2  | 578.5 | 567.0 | 553.4 | 549.2 | 541.9 | 536.7 | 532.5 | 525.2 | 526.3 |
| 7.5°  | 601.5  | 588.9  | 565.9 | 544.0 | 522.1 | 506.4 | 484.5 | 466.8 | 452.1 | 436.5 | 439.6 |
| 10°   | 608.8  | 593.1  | 560.7 | 530.4 | 490.8 | 440.6 | 383.2 | 345.6 | 326.8 | 308.0 | 310.1 |
| 12.5° | 623.4  | 604.6  | 562.8 | 516.9 | 436.5 | 350.8 | 271.5 | 220.3 | 206.7 | 198.4 | 199.4 |
| 15°   | 645.3  | 622.3  | 569.1 | 490.8 | 363.4 | 253.7 | 180.6 | 158.7 | 163.9 | 167.1 | 167.1 |
| 17.5° | 668.3  | 642.2  | 574.3 | 443.8 | 280.9 | 177.5 | 147.2 | 145.1 | 152.5 | 159.8 | 159.8 |
| 20°   | 696.5  | 663.1  | 575.3 | 384.3 | 202.6 | 144.1 | 138.9 | 138.9 | 144.1 | 152.5 | 152.5 |
| 22.5° | 723.6  | 686.0  | 565.9 | 316.4 | 154.5 | 133.7 | 133.7 | 133.7 | 136.8 | 145.1 | 146.2 |
| 25°   | 756.0  | 714.2  | 546.1 | 244.3 | 132.6 | 127.4 | 127.4 | 128.4 | 130.5 | 137.8 | 138.9 |
| 27.5° | 790.4  | 743.5  | 512.7 | 178.6 | 121.1 | 120.1 | 121.1 | 122.2 | 123.2 | 130.5 | 132.6 |
| 30°   | 830.1  | 775.8  | 469.9 | 133.7 | 110.7 | 110.7 | 113.8 | 115.9 | 115.9 | 122.2 | 124.3 |
| 32.5° | 876.1  | 818.6  | 418.7 | 110.7 | 100.2 | 99.2  | 104.4 | 107.6 | 107.6 | 112.8 | 114.9 |
| 35°   | 933.5  | 862.5  | 357.1 | 98.2  | 91.9  | 89.8  | 91.9  | 97.1  | 99.2  | 103.4 | 104.4 |
| 37.5° | 1009.7 | 914.7  | 291.3 | 90.8  | 85.6  | 81.4  | 81.4  | 82.5  | 86.7  | 90.8  | 91.9  |
| 40°   | 1106.8 | 972.1  | 226.6 | 85.6  | 79.4  | 75.2  | 72.0  | 71.0  | 70.0  | 73.1  | 75.2  |
| 42.5° | 1229.0 | 1036.9 | 169.2 | 80.4  | 74.1  | 67.9  | 63.7  | 59.5  | 54.3  | 53.3  | 54.3  |
| 45°   | 1385.6 | 1116.2 | 125.3 | 76.2  | 71.0  | 61.6  | 54.3  | 47.0  | 37.6  | 34.5  | 35.5  |
| 47.5° | 1570.5 | 1198.7 | 98.2  | 72.0  | 68.9  | 54.3  | 44.9  | 32.4  | 23.0  | 20.9  | 21.9  |
| 50°   | 1766.8 | 1278.1 | 83.5  | 66.8  | 64.7  | 47.0  | 32.4  | 19.8  | 13.6  | 13.6  | 14.6  |
| 52.5° | 1933.8 | 1323.0 | 76.2  | 62.7  | 58.5  | 38.6  | 20.9  | 11.5  | 8.4   | 8.4   | 9.4   |
| 55°   | 2095.7 | 1347.0 | 71.0  | 58.5  | 50.1  | 27.1  | 11.5  | 7.3   | 5.2   | 5.2   | 5.2   |
| 57.5° | 2262.8 | 1357.4 | 64.7  | 53.3  | 39.7  | 16.7  | 6.3   | 4.2   | 3.1   | 3.1   | 3.1   |
| 60°   | 2411.0 | 1337.6 | 55.3  | 43.9  | 26.1  | 8.4   | 3.1   | 3.1   | 2.1   | 1.0   | 1.0   |
| 62.5° | 2535.3 | 1300.0 | 38.6  | 31.3  | 15.7  | 4.2   | 2.1   | 1.0   | 0.0   | 0.0   | 0.0   |
| 65°   | 2611.5 | 1239.4 | 25.1  | 20.9  | 9.4   | 3.1   | 1.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 67.5° | 2589.6 | 1125.6 | 15.7  | 13.6  | 4.2   | 2.1   | 1.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 70°   | 2336.9 | 923.1  | 11.5  | 8.4   | 3.1   | 1.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 72.5° | 1684.3 | 624.4  | 8.4   | 5.2   | 2.1   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 75°   | 810.3  | 222.4  | 5.2   | 4.2   | 1.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 77.5° | 198.4  | 49.1   | 3.1   | 2.1   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 80°   | 43.9   | 9.4    | 2.1   | 1.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 82.5° | 14.6   | 4.2    | 1.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 85°   | 5.2    | 2.1    | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 87.5° | 3.1    | 1.0    | 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   |



LM-79-08: Approved Method: Electrical and Photometric Measurements of Solid-  
State Lighting Products

Report Prepared for

Cooper Lighting Solutions

(formerly Eaton)

STREETWORKS

Report Number: SP1-2101-121-4

Luminaire Tested: IFLD-S-SA2B-722-U-T3R

Test Date: 03/03/2021

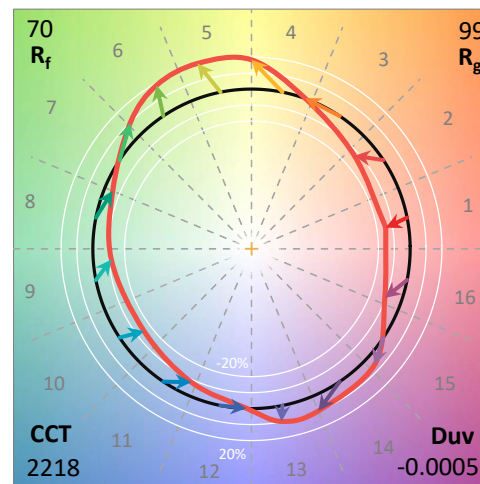
### Test Information

Test Method: LM-79-08  
 Report Number: SP1-2101-121-4  
 Test Lab: COOPER LIGHTING SOLUTIONS  
 Photometer: SP1  
 Measurement Geometry:  $4\pi$   
 Issue Date: 03/03/2021  
 Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
 Product Line: STREETWORKS  
 Catalog Number: **IFLD-S-SA2B-722-U-T3R**  
 Description: STREETWORKS INF FLOOD

PROGRAMMED @ 800mA.

### Spectral Parameters

|                           |         |           |      |      |       |
|---------------------------|---------|-----------|------|------|-------|
| CCT (K):                  | 2218    | CRI (Ra): | 72.2 |      |       |
| CIE u':                   | 0.2889  | R1:       | 69.1 | R9:  | -16.8 |
| CIE v':                   | 0.5350  | R2:       | 83.2 | R10: | 61.9  |
| Duv:                      | -0.0005 | R3:       | 95.4 | R11: | 60.1  |
| CIE x:                    | 0.5026  | R4:       | 66.4 | R12: | 51.2  |
| CIE y:                    | 0.4136  | R5:       | 66.2 | R13: | 71.3  |
| CIE z:                    | 0.0839  | R6:       | 76.7 | R14: | 97.1  |
| Peak Wavelength (nm):     | 606     | R7:       | 76.7 |      |       |
| Dominant Wavelength (nm): | 587     | R8:       | 43.9 |      |       |
| Purity:                   | 75.3    |           |      |      |       |
| Rf:                       | 70      |           |      |      |       |
| Rg:                       | 99.3    |           |      |      |       |



### Test Conditions

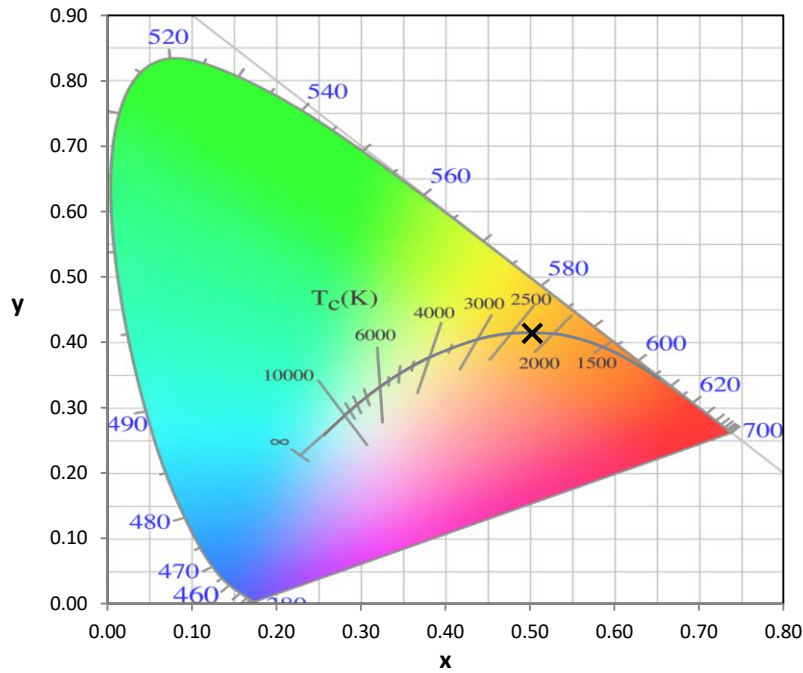
Stabilization Time: 95M  
 Operation Time: 12H  
 Room Temperature (°C) / RH%: 25.3/31%  
 Sphere Temperature (°C): 24.8

REPORT NUMBER: SP1-2101-121-4

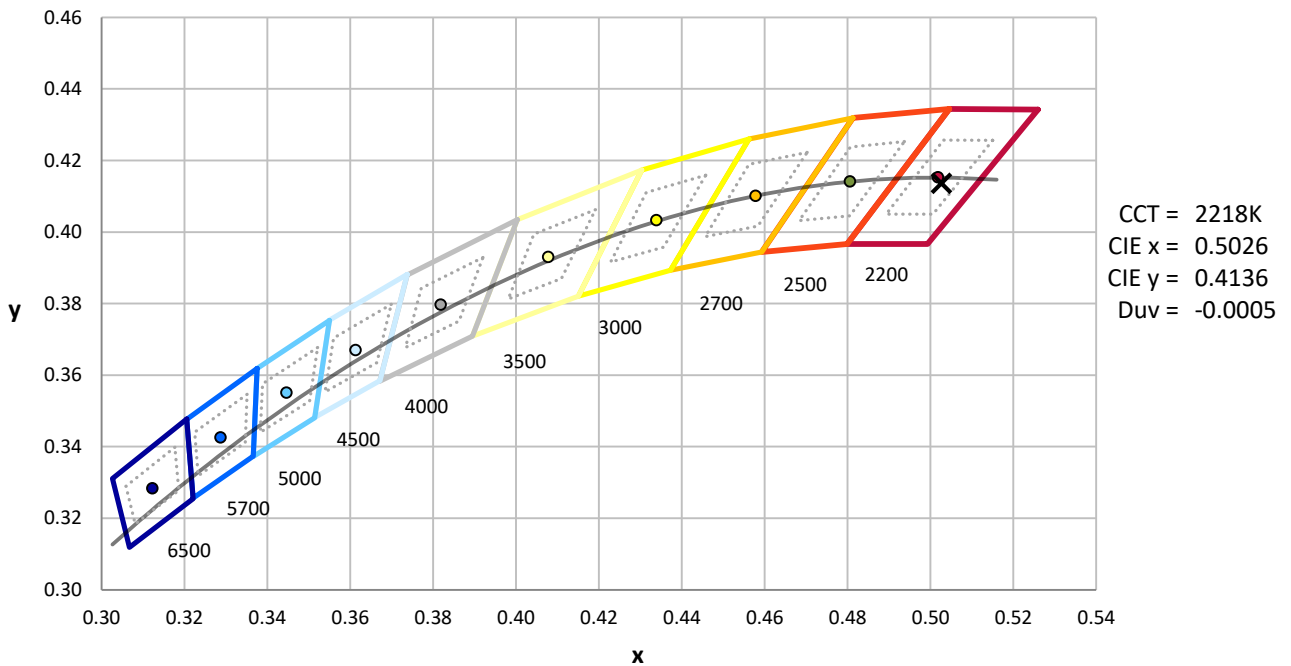
| Measurement and Test Equipment |                       |                  |                      |
|--------------------------------|-----------------------|------------------|----------------------|
| Instrument                     | Identification Number | Calibration Date | Calibration Due Date |
| 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            |

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**CIE 1931 Chromaticity Diagram**



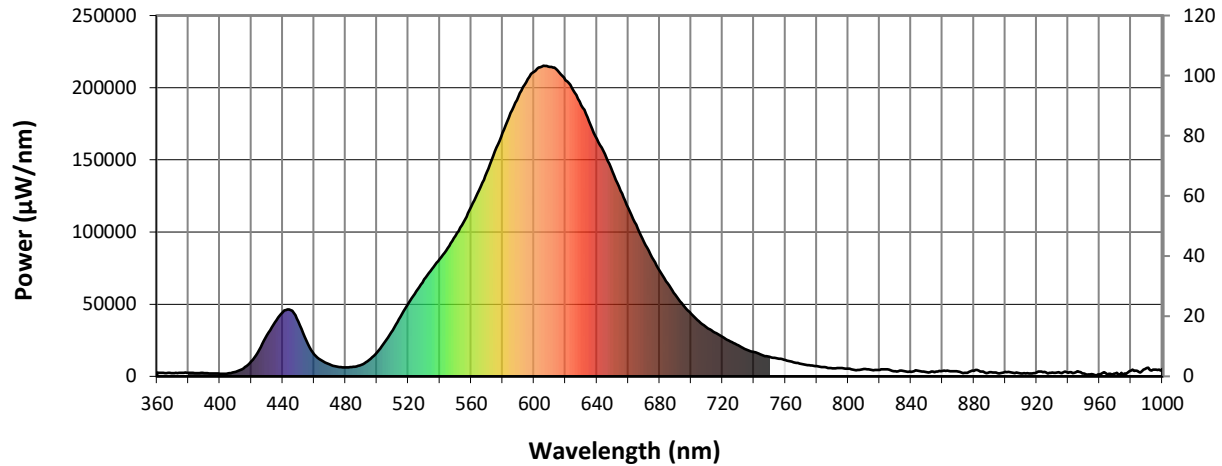
**CIE 1931 Chromaticity Diagram with 2017 ANSI 7-Step and 4-Step Quadrangles**



Point lies inside the ANSI 2200K 4-step quadrangle

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### Photopic Flux vs. Wavelength

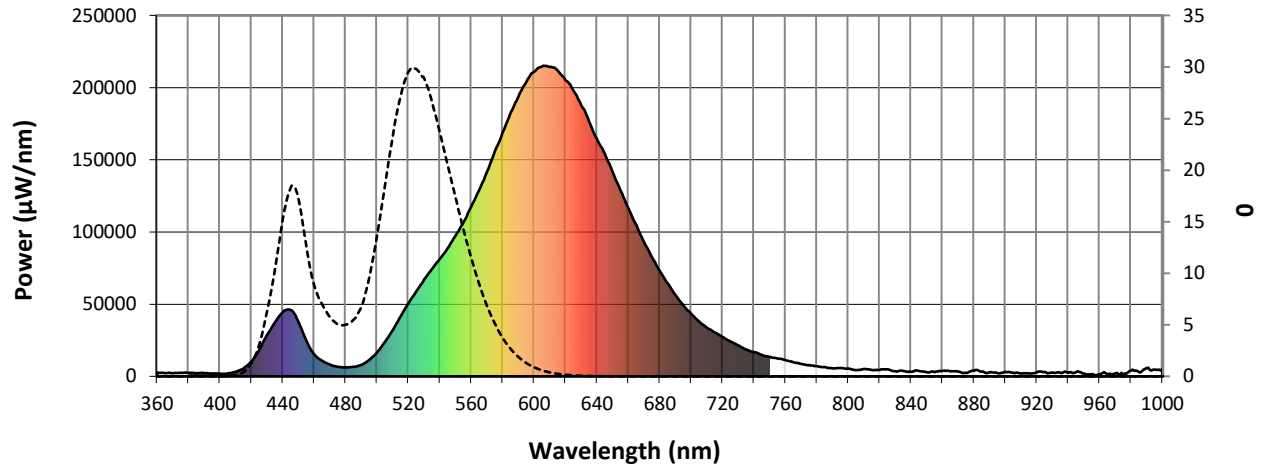


#####

| 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       | 2623             | 0.0              | 490       | 7941             | 1.1              | 620       | 205150           | 53.4             | 750       | 13431            | 0.0              | 880       | 3867             | 0.0              |
| 365       | 2260             | 0.0              | 495       | 11299            | 2.0              | 625       | 198277           | 43.7             | 755       | 12426            | 0.0              | 885       | 3345             | 0.0              |
| 370       | 2306             | 0.0              | 500       | 16633            | 3.7              | 630       | 187878           | 34.0             | 760       | 11385            | 0.0              | 890       | 2956             | 0.0              |
| 375       | 2437             | 0.0              | 505       | 23672            | 6.6              | 635       | 176836           | 26.6             | 765       | 9797             | 0.0              | 895       | 2272             | 0.0              |
| 380       | 2473             | 0.0              | 510       | 32025            | 11.0             | 640       | 164455           | 19.7             | 770       | 8562             | 0.0              | 900       | 3003             | 0.0              |
| 385       | 2203             | 0.0              | 515       | 41295            | 17.1             | 645       | 154086           | 14.8             | 775       | 7810             | 0.0              | 905       | 2480             | 0.0              |
| 390       | 2262             | 0.0              | 520       | 50628            | 24.6             | 650       | 141592           | 10.3             | 780       | 7052             | 0.0              | 910       | 2068             | 0.0              |
| 395       | 2028             | 0.0              | 525       | 58836            | 31.6             | 655       | 128604           | 7.4              | 785       | 6345             | 0.0              | 915       | 2064             | 0.0              |
| 400       | 1806             | 0.0              | 530       | 67109            | 39.5             | 660       | 116713           | 4.9              | 790       | 5524             | 0.0              | 920       | 2581             | 0.0              |
| 405       | 1945             | 0.0              | 535       | 74404            | 46.1             | 665       | 104993           | 3.3              | 795       | 5788             | 0.0              | 925       | 3137             | 0.0              |
| 410       | 3199             | 0.0              | 540       | 81280            | 53.0             | 670       | 93149            | 2.0              | 800       | 5282             | 0.0              | 930       | 2747             | 0.0              |
| 415       | 5572             | 0.0              | 545       | 88806            | 59.1             | 675       | 82543            | 1.4              | 805       | 4258             | 0.0              | 935       | 2471             | 0.0              |
| 420       | 10322            | 0.0              | 550       | 97367            | 66.2             | 680       | 73089            | 0.8              | 810       | 5156             | 0.0              | 940       | 2339             | 0.0              |
| 425       | 18494            | 0.1              | 555       | 106598           | 72.8             | 685       | 64438            | 0.6              | 815       | 4391             | 0.0              | 945       | 2917             | 0.0              |
| 430       | 28541            | 0.2              | 560       | 117615           | 79.9             | 690       | 56546            | 0.3              | 820       | 4383             | 0.0              | 950       | 1966             | 0.0              |
| 435       | 37453            | 0.4              | 565       | 129103           | 85.8             | 695       | 49328            | 0.2              | 825       | 4881             | 0.0              | 955       | 1580             | 0.0              |
| 440       | 44455            | 0.7              | 570       | 141415           | 92.0             | 700       | 43493            | 0.1              | 830       | 3588             | 0.0              | 960       | 1318             | 0.0              |
| 445       | 45934            | 1.0              | 575       | 155854           | 97.0             | 705       | 38035            | 0.1              | 835       | 3835             | 0.0              | 965       | 1419             | 0.0              |
| 450       | 37926            | 1.0              | 580       | 168613           | 100.2            | 710       | 33716            | 0.0              | 840       | 3014             | 0.0              | 970       | 1917             | 0.0              |
| 455       | 24793            | 0.8              | 585       | 182390           | 101.3            | 715       | 30449            | 0.0              | 845       | 3765             | 0.0              | 975       | 1210             | 0.0              |
| 460       | 15340            | 0.6              | 590       | 194054           | 100.3            | 720       | 27240            | 0.0              | 850       | 2906             | 0.0              | 980       | 3915             | 0.0              |
| 465       | 10883            | 0.6              | 595       | 203639           | 96.5             | 725       | 24231            | 0.0              | 855       | 2947             | 0.0              | 985       | 3180             | 0.0              |
| 470       | 8138             | 0.5              | 600       | 211043           | 91.0             | 730       | 21490            | 0.0              | 860       | 3864             | 0.0              | 990       | 5676             | 0.0              |
| 475       | 6653             | 0.5              | 605       | 214591           | 83.1             | 735       | 18548            | 0.0              | 865       | 3546             | 0.0              | 995       | 4736             | 0.0              |
| 480       | 6220             | 0.6              | 610       | 214337           | 73.6             | 740       | 16963            | 0.0              | 870       | 3253             | 0.0              | 1000      | 5113             | 0.0              |
| 485       | 6613             | 0.8              | 615       | 211915           | 64.0             | 745       | 14922            | 0.0              | 875       | 2450             | 0.0              |           |                  |                  |

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### Scotopic Flux vs. Wavelength



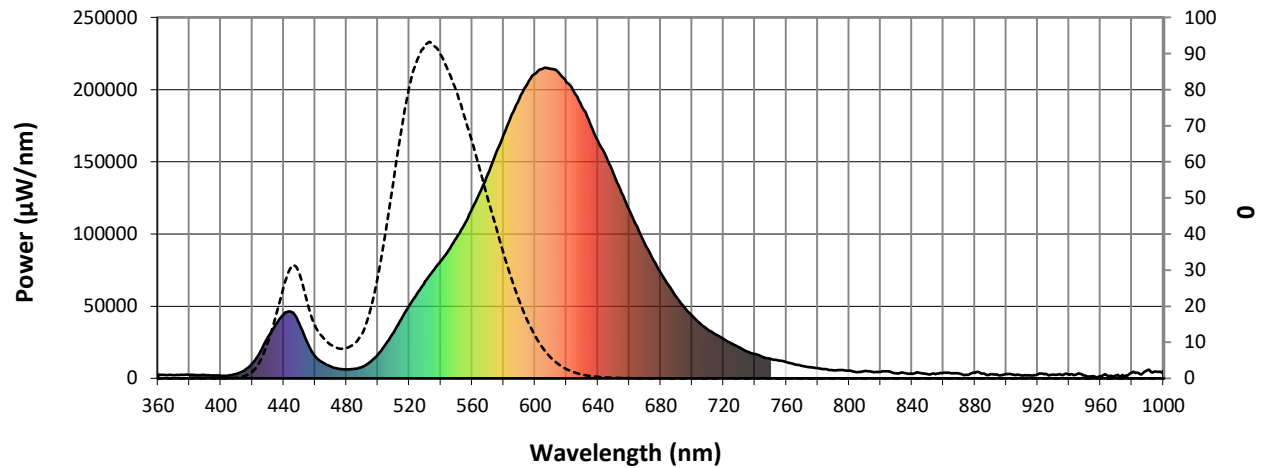
Scotopic Lumens: 7290.1

S/P: 0.84

| 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       | 2623             | 0.0              | 490       | 7941             | 12.2             | 620       | 205150           | 2.6              | 750       | 13431            | 0.0              | 880       | 3867             | 0.0              |
| 365       | 2260             | 0.0              | 495       | 11299            | 18.3             | 625       | 198277           | 1.7              | 755       | 12426            | 0.0              | 885       | 3345             | 0.0              |
| 370       | 2306             | 0.0              | 500       | 16633            | 27.8             | 630       | 187878           | 1.1              | 760       | 11385            | 0.0              | 890       | 2956             | 0.0              |
| 375       | 2437             | 0.0              | 505       | 23672            | 40.2             | 635       | 176836           | 0.7              | 765       | 9797             | 0.0              | 895       | 2272             | 0.0              |
| 380       | 2473             | 0.0              | 510       | 32025            | 54.3             | 640       | 164455           | 0.4              | 770       | 8562             | 0.0              | 900       | 3003             | 0.0              |
| 385       | 2203             | 0.0              | 515       | 41295            | 68.4             | 645       | 154086           | 0.3              | 775       | 7810             | 0.0              | 905       | 2480             | 0.0              |
| 390       | 2262             | 0.0              | 520       | 50628            | 80.5             | 650       | 141592           | 0.2              | 780       | 7052             | 0.0              | 910       | 2068             | 0.0              |
| 395       | 2028             | 0.0              | 525       | 58836            | 88.0             | 655       | 128604           | 0.1              | 785       | 6345             | 0.0              | 915       | 2064             | 0.0              |
| 400       | 1806             | 0.0              | 530       | 67109            | 92.5             | 660       | 116713           | 0.1              | 790       | 5524             | 0.0              | 920       | 2581             | 0.0              |
| 405       | 1945             | 0.1              | 535       | 74404            | 92.7             | 665       | 104993           | 0.0              | 795       | 5788             | 0.0              | 925       | 3137             | 0.0              |
| 410       | 3199             | 0.2              | 540       | 81280            | 89.8             | 670       | 93149            | 0.0              | 800       | 5282             | 0.0              | 930       | 2747             | 0.0              |
| 415       | 5572             | 0.6              | 545       | 88806            | 85.1             | 675       | 82543            | 0.0              | 805       | 4258             | 0.0              | 935       | 2471             | 0.0              |
| 420       | 10322            | 1.7              | 550       | 97367            | 79.6             | 680       | 73089            | 0.0              | 810       | 5156             | 0.0              | 940       | 2339             | 0.0              |
| 425       | 18494            | 4.5              | 555       | 106598           | 72.8             | 685       | 64438            | 0.0              | 815       | 4391             | 0.0              | 945       | 2917             | 0.0              |
| 430       | 28541            | 9.7              | 560       | 117615           | 65.7             | 690       | 56546            | 0.0              | 820       | 4383             | 0.0              | 950       | 1966             | 0.0              |
| 435       | 37453            | 16.7             | 565       | 129103           | 57.9             | 695       | 49328            | 0.0              | 825       | 4881             | 0.0              | 955       | 1580             | 0.0              |
| 440       | 44455            | 24.8             | 570       | 141415           | 49.9             | 700       | 43493            | 0.0              | 830       | 3588             | 0.0              | 960       | 1318             | 0.0              |
| 445       | 45934            | 30.8             | 575       | 155854           | 42.4             | 705       | 38035            | 0.0              | 835       | 3835             | 0.0              | 965       | 1419             | 0.0              |
| 450       | 37926            | 29.4             | 580       | 168613           | 34.7             | 710       | 33716            | 0.0              | 840       | 3014             | 0.0              | 970       | 1917             | 0.0              |
| 455       | 24793            | 21.7             | 585       | 182390           | 27.9             | 715       | 30449            | 0.0              | 845       | 3765             | 0.0              | 975       | 1210             | 0.0              |
| 460       | 15340            | 14.8             | 590       | 194054           | 21.6             | 720       | 27240            | 0.0              | 850       | 2906             | 0.0              | 980       | 3915             | 0.0              |
| 465       | 10883            | 11.5             | 595       | 203639           | 16.2             | 725       | 24231            | 0.0              | 855       | 2947             | 0.0              | 985       | 3180             | 0.0              |
| 470       | 8138             | 9.4              | 600       | 211043           | 11.9             | 730       | 21490            | 0.0              | 860       | 3864             | 0.0              | 990       | 5676             | 0.0              |
| 475       | 6653             | 8.3              | 605       | 214591           | 8.4              | 735       | 18548            | 0.0              | 865       | 3546             | 0.0              | 995       | 4736             | 0.0              |
| 480       | 6220             | 8.4              | 610       | 214337           | 5.8              | 740       | 16963            | 0.0              | 870       | 3253             | 0.0              | 1000      | 5113             | 0.0              |
| 485       | 6613             | 9.6              | 615       | 211915           | 3.9              | 745       | 14922            | 0.0              | 875       | 2450             | 0.0              |           |                  |                  |

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### Melanopic Flux vs. Wavelength


**Melanopic Lumens: 2276.7**
**M/P: 0.26**

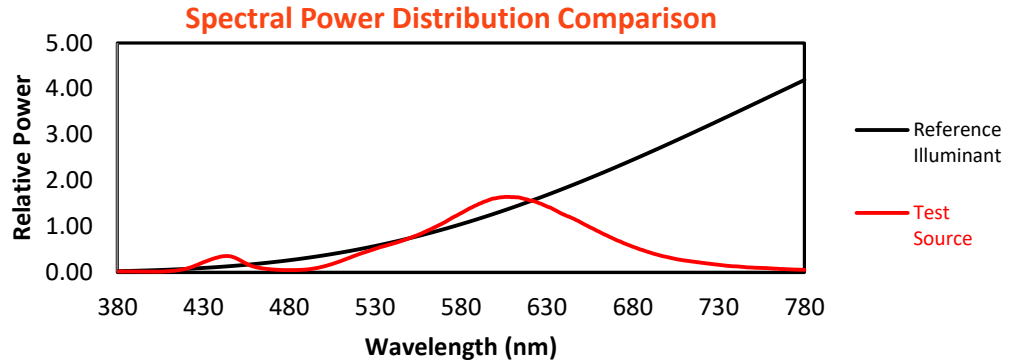
| λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) |
|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|
| 360       | 2623             | 0.0              | 490       | 7941             | 6.6              | 620       | 205150           | 0.2              | 750       | 13431            | 0.0              | 880       | 3867             | 0.0              |
| 365       | 2260             | 0.0              | 495       | 11299            | 9.3              | 625       | 198277           | 0.1              | 755       | 12426            | 0.0              | 885       | 3345             | 0.0              |
| 370       | 2306             | 0.0              | 500       | 16633            | 13.4             | 630       | 187878           | 0.1              | 760       | 11385            | 0.0              | 890       | 2956             | 0.0              |
| 375       | 2437             | 0.0              | 505       | 23672            | 18.2             | 635       | 176836           | 0.0              | 765       | 9797             | 0.0              | 895       | 2272             | 0.0              |
| 380       | 2473             | 0.0              | 510       | 32025            | 23.0             | 640       | 164455           | 0.0              | 770       | 8562             | 0.0              | 900       | 3003             | 0.0              |
| 385       | 2203             | 0.0              | 515       | 41295            | 27.0             | 645       | 154086           | 0.0              | 775       | 7810             | 0.0              | 905       | 2480             | 0.0              |
| 390       | 2262             | 0.0              | 520       | 50628            | 29.5             | 650       | 141592           | 0.0              | 780       | 7052             | 0.0              | 910       | 2068             | 0.0              |
| 395       | 2028             | 0.0              | 525       | 58836            | 29.8             | 655       | 128604           | 0.0              | 785       | 6345             | 0.0              | 915       | 2064             | 0.0              |
| 400       | 1806             | 0.0              | 530       | 67109            | 29.0             | 660       | 116713           | 0.0              | 790       | 5524             | 0.0              | 920       | 2581             | 0.0              |
| 405       | 1945             | 0.0              | 535       | 74404            | 26.8             | 665       | 104993           | 0.0              | 795       | 5788             | 0.0              | 925       | 3137             | 0.0              |
| 410       | 3199             | 0.1              | 540       | 81280            | 23.8             | 670       | 93149            | 0.0              | 800       | 5282             | 0.0              | 930       | 2747             | 0.0              |
| 415       | 5572             | 0.4              | 545       | 88806            | 20.6             | 675       | 82543            | 0.0              | 805       | 4258             | 0.0              | 935       | 2471             | 0.0              |
| 420       | 10322            | 1.2              | 550       | 97367            | 17.5             | 680       | 73089            | 0.0              | 810       | 5156             | 0.0              | 940       | 2339             | 0.0              |
| 425       | 18494            | 2.9              | 555       | 106598           | 14.4             | 685       | 64438            | 0.0              | 815       | 4391             | 0.0              | 945       | 2917             | 0.0              |
| 430       | 28541            | 6.0              | 560       | 117615           | 11.6             | 690       | 56546            | 0.0              | 820       | 4383             | 0.0              | 950       | 1966             | 0.0              |
| 435       | 37453            | 10.0             | 565       | 129103           | 9.1              | 695       | 49328            | 0.0              | 825       | 4881             | 0.0              | 955       | 1580             | 0.0              |
| 440       | 44455            | 14.9             | 570       | 141415           | 6.9              | 700       | 43493            | 0.0              | 830       | 3588             | 0.0              | 960       | 1318             | 0.0              |
| 445       | 45934            | 18.1             | 575       | 155854           | 5.2              | 705       | 38035            | 0.0              | 835       | 3835             | 0.0              | 965       | 1419             | 0.0              |
| 450       | 37926            | 17.5             | 580       | 168613           | 3.8              | 710       | 33716            | 0.0              | 840       | 3014             | 0.0              | 970       | 1917             | 0.0              |
| 455       | 24793            | 13.0             | 585       | 182390           | 2.7              | 715       | 30449            | 0.0              | 845       | 3765             | 0.0              | 975       | 1210             | 0.0              |
| 460       | 15340            | 9.0              | 590       | 194054           | 1.9              | 720       | 27240            | 0.0              | 850       | 2906             | 0.0              | 980       | 3915             | 0.0              |
| 465       | 10883            | 7.1              | 595       | 203639           | 1.3              | 725       | 24231            | 0.0              | 855       | 2947             | 0.0              | 985       | 3180             | 0.0              |
| 470       | 8138             | 5.8              | 600       | 211043           | 0.9              | 730       | 21490            | 0.0              | 860       | 3864             | 0.0              | 990       | 5676             | 0.0              |
| 475       | 6653             | 5.1              | 605       | 214591           | 0.6              | 735       | 18548            | 0.0              | 865       | 3546             | 0.0              | 995       | 4736             | 0.0              |
| 480       | 6220             | 5.0              | 610       | 214337           | 0.4              | 740       | 16963            | 0.0              | 870       | 3253             | 0.0              | 1000      | 5113             | 0.0              |
| 485       | 6613             | 5.5              | 615       | 211915           | 0.3              | 745       | 14922            | 0.0              | 875       | 2450             | 0.0              |           |                  |                  |

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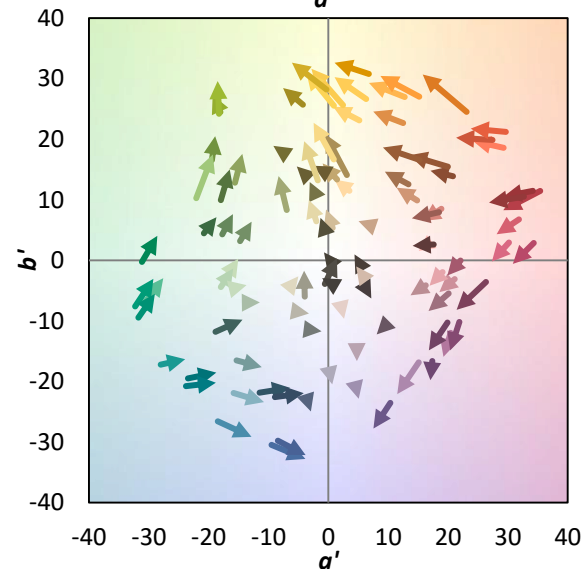
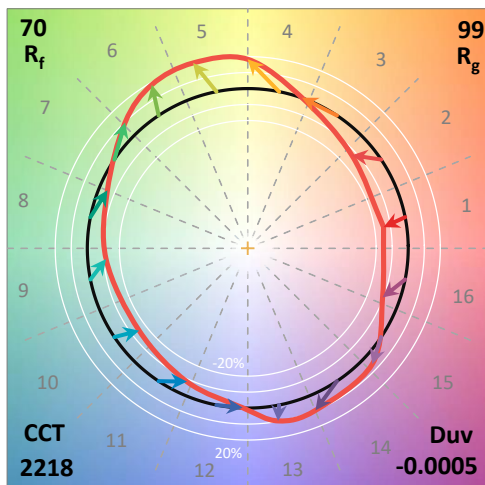
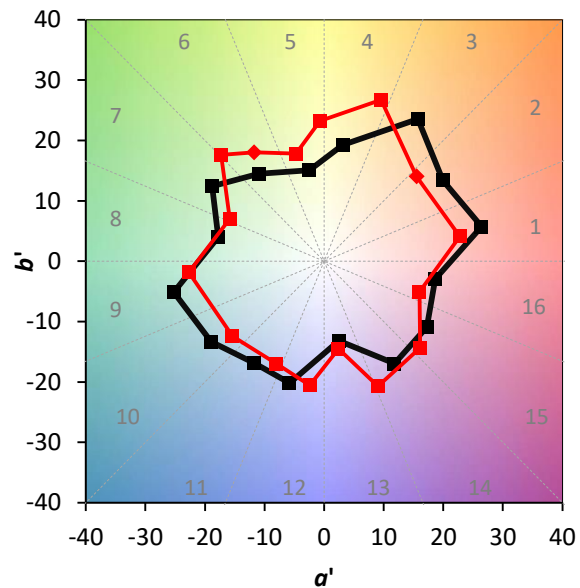
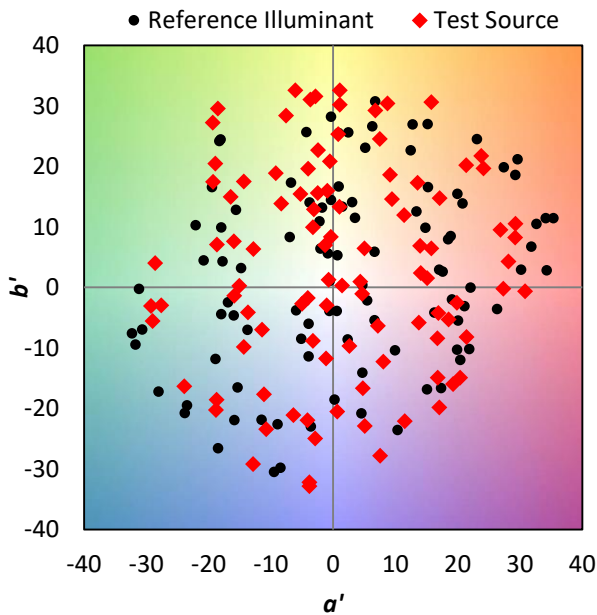
TM-30-18

### Summary

$R_f = 70$   
 $R_g = 99.3$   
 CIE  $R_a = 72.2$   
 $R_g = -16.8$



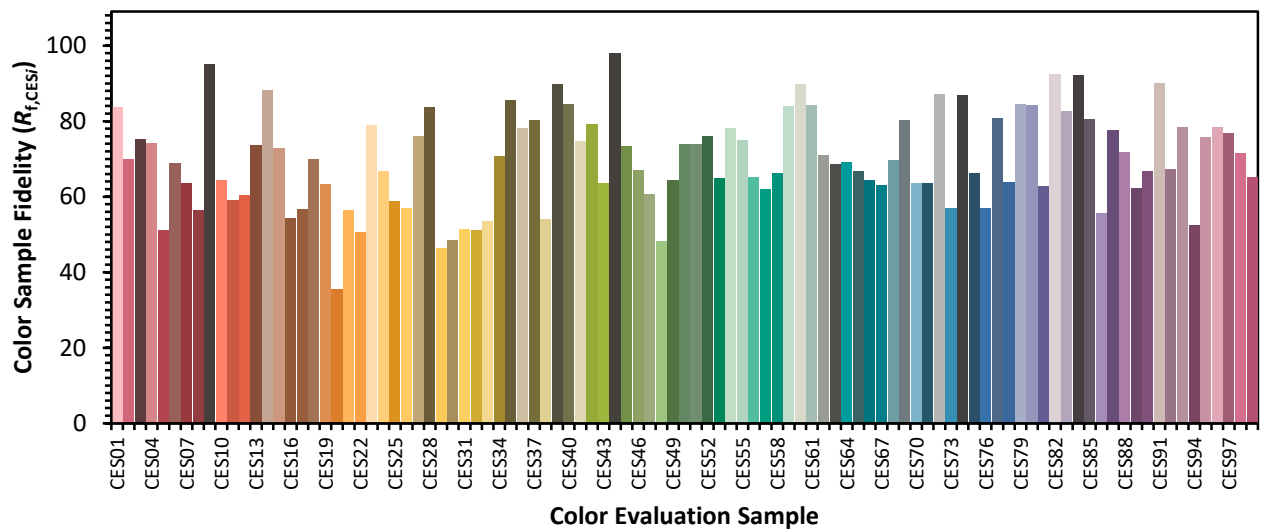
### Color Vector Graphics



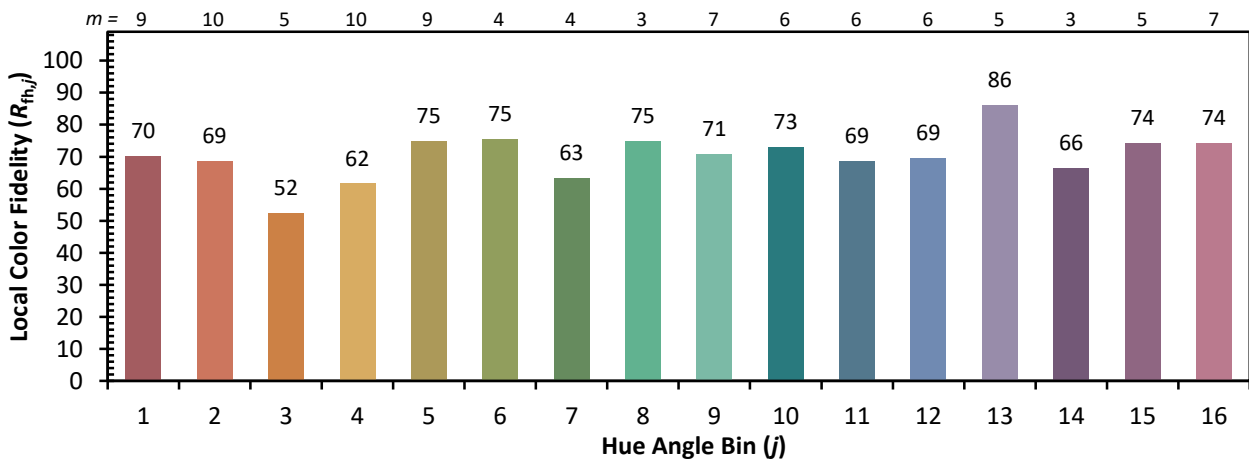
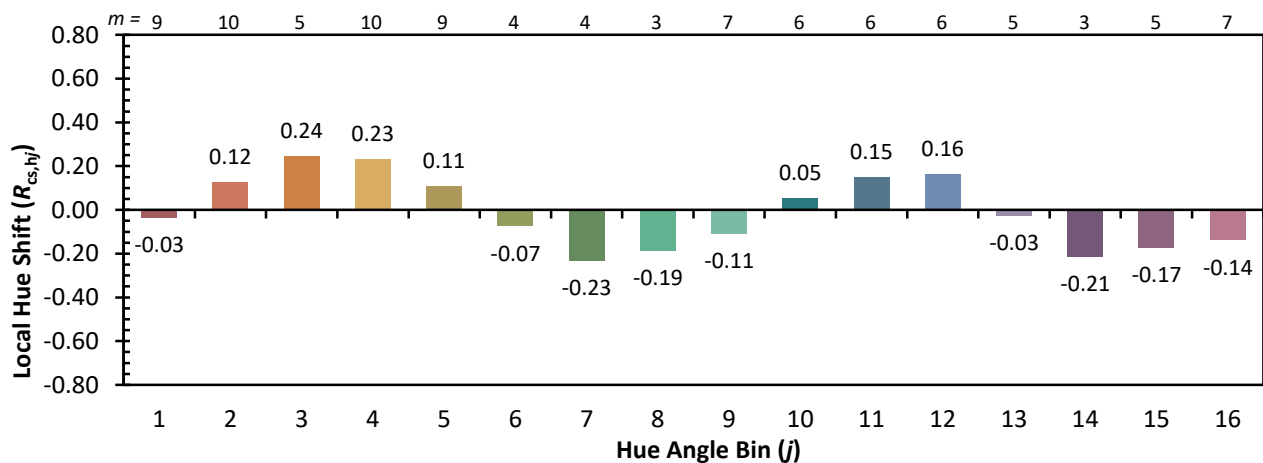
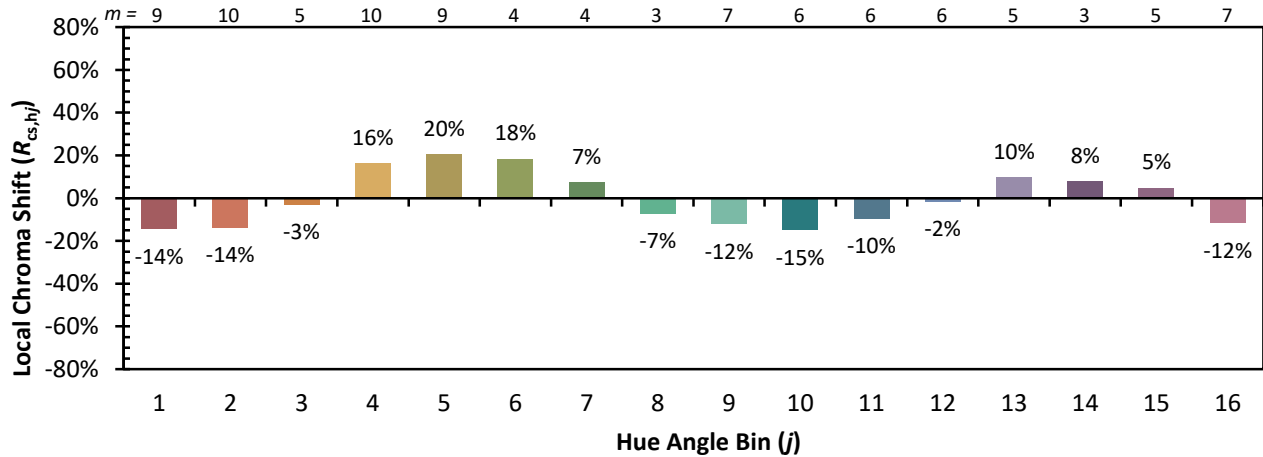


Individual Sample Fidelity Index ( $R_{f,i}$ )

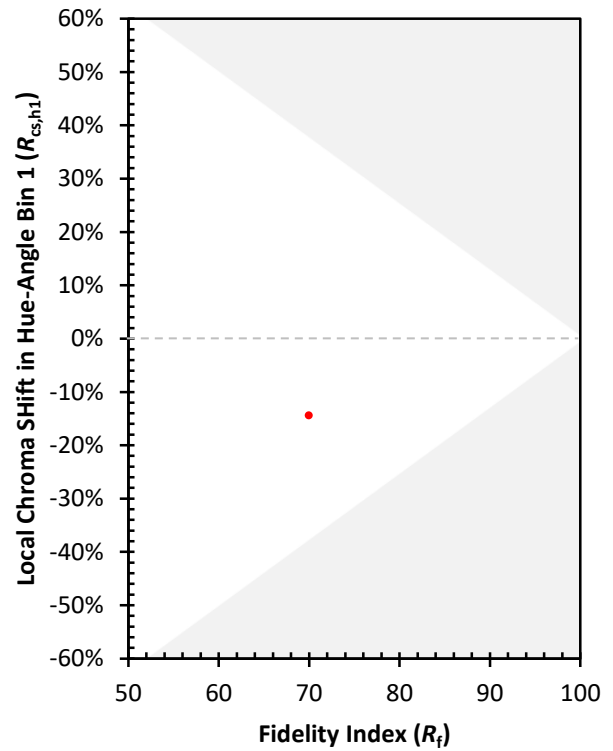
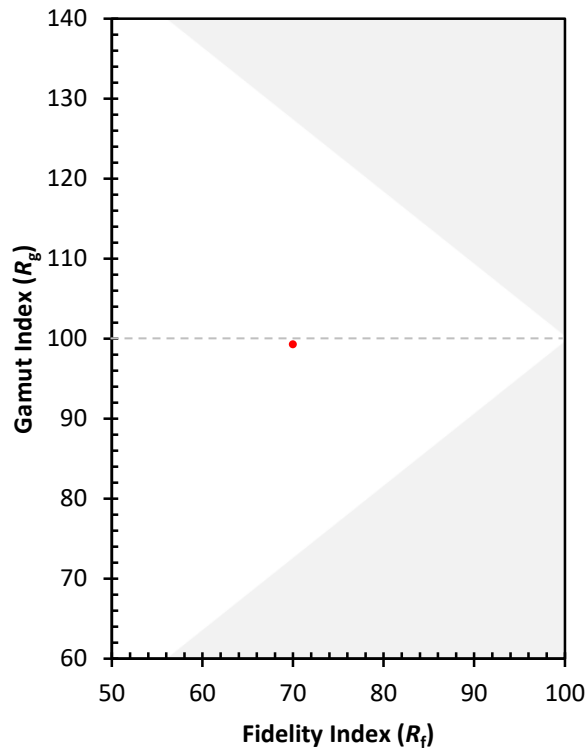
|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 87 | CES26 = 57 | CES51 = 74 | CES76 = 57 |
| CES02 = 65 | CES27 = 76 | CES52 = 76 | CES77 = 81 |
| CES03 = 32 | CES28 = 84 | CES53 = 65 | CES78 = 64 |
| CES04 = 72 | CES29 = 46 | CES54 = 78 | CES79 = 85 |
| CES05 = 52 | CES30 = 48 | CES55 = 75 | CES80 = 84 |
| CES06 = 52 | CES31 = 52 | CES56 = 65 | CES81 = 63 |
| CES07 = 44 | CES32 = 51 | CES57 = 62 | CES82 = 92 |
| CES08 = 43 | CES33 = 54 | CES58 = 66 | CES83 = 83 |
| CES09 = 29 | CES34 = 71 | CES59 = 84 | CES84 = 92 |
| CES10 = 79 | CES35 = 86 | CES60 = 90 | CES85 = 81 |
| CES11 = 62 | CES36 = 78 | CES61 = 84 | CES86 = 56 |
| CES12 = 68 | CES37 = 80 | CES62 = 71 | CES87 = 78 |
| CES13 = 45 | CES38 = 54 | CES63 = 68 | CES88 = 72 |
| CES14 = 75 | CES39 = 90 | CES64 = 69 | CES89 = 62 |
| CES15 = 72 | CES40 = 85 | CES65 = 67 | CES90 = 67 |
| CES16 = 49 | CES41 = 75 | CES66 = 64 | CES91 = 90 |
| CES17 = 51 | CES42 = 79 | CES67 = 63 | CES92 = 67 |
| CES18 = 57 | CES43 = 64 | CES68 = 70 | CES93 = 78 |
| CES19 = 74 | CES44 = 98 | CES69 = 80 | CES94 = 52 |
| CES20 = 68 | CES45 = 73 | CES70 = 64 | CES95 = 76 |
| CES21 = 89 | CES46 = 67 | CES71 = 64 | CES96 = 78 |
| CES22 = 81 | CES47 = 61 | CES72 = 87 | CES97 = 77 |
| CES23 = 92 | CES48 = 48 | CES73 = 57 | CES98 = 72 |
| CES24 = 92 | CES49 = 64 | CES74 = 87 | CES99 = 65 |
| CES25 = 74 | CES50 = 74 | CES75 = 66 |            |



Color Rendition by Hue-Angle Bin



**Measure Comparisons**



(END OF REPORT)