

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: P800713

Luminaire Tested: **ARCH-M-PA2-60-727-24VDC-T4W-HSS**

Issue Date: 5/19/2020



**Test Information**

Test Method: LM-79-08  
Report Number: P800713  
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-PA2-60-727-24VDC-T4W-HSS  
Description: ARCHEON-M ROADWAY AND AREA LUMINAIRE  
(2) 70 CRI, 2700K, 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: 6438 lumens  
Efficiency: N/A  
Efficacy: 105.5 lumens/watt  
Luminous Opening: Rectangular (W 0.75' x L: 1' x H: 0')  
IES Classification: Type IV - Medium  
BUG Rating: B1 - U0 - G2

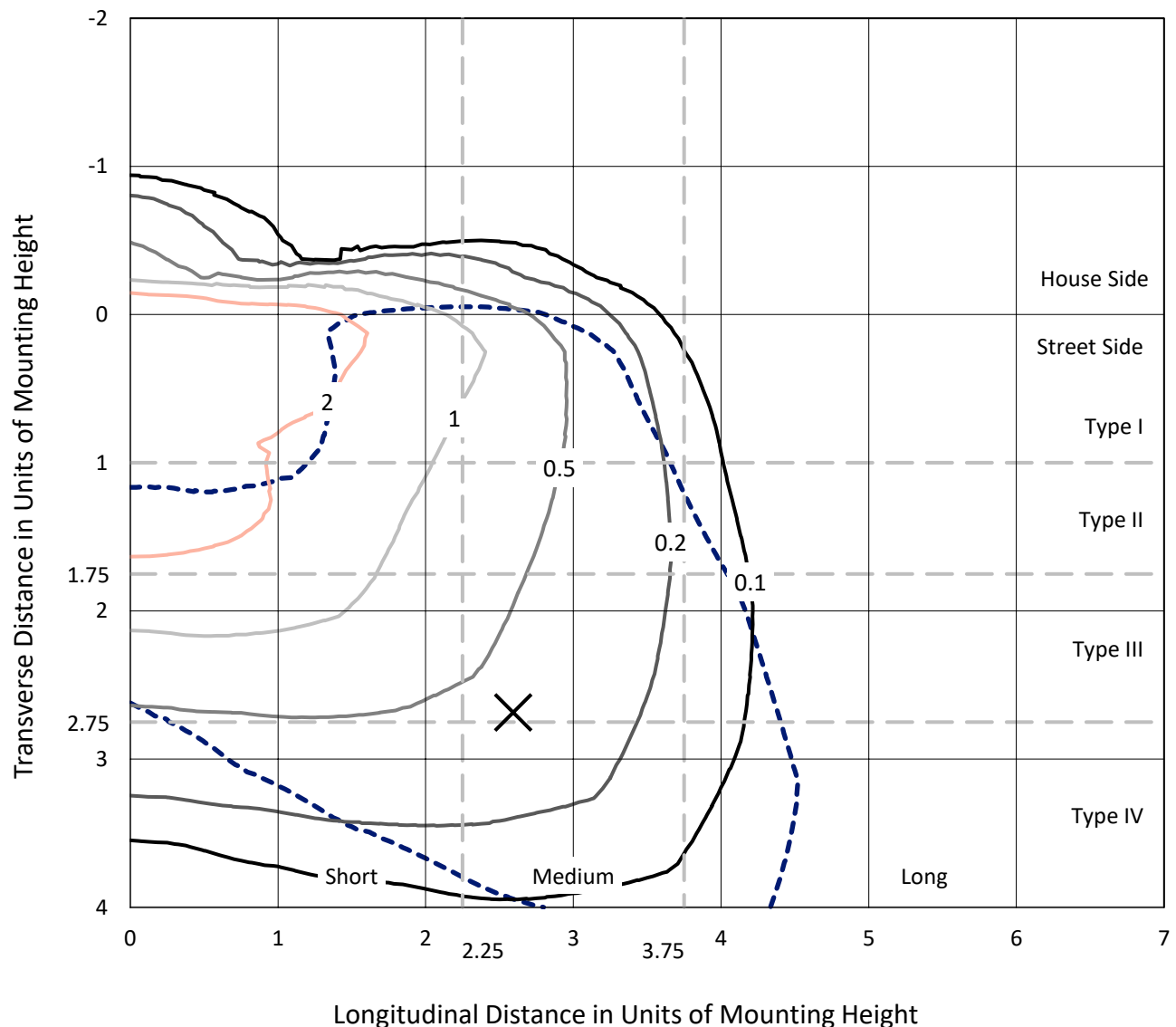
Input Watts (W): 61  
Input Voltage (V): NR  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: NR  
Total Harmonic Distortion (THDi): NR  
Frequency (hertz): 60  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 25 FT

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CATALOG NUMBER: ARCH-M-PA2-60-727-24VDC-T4W-HSS

## Iso-Footcandle Lines of Horizontal Illumination

× Max cd  
 --- 1/2 Max cd

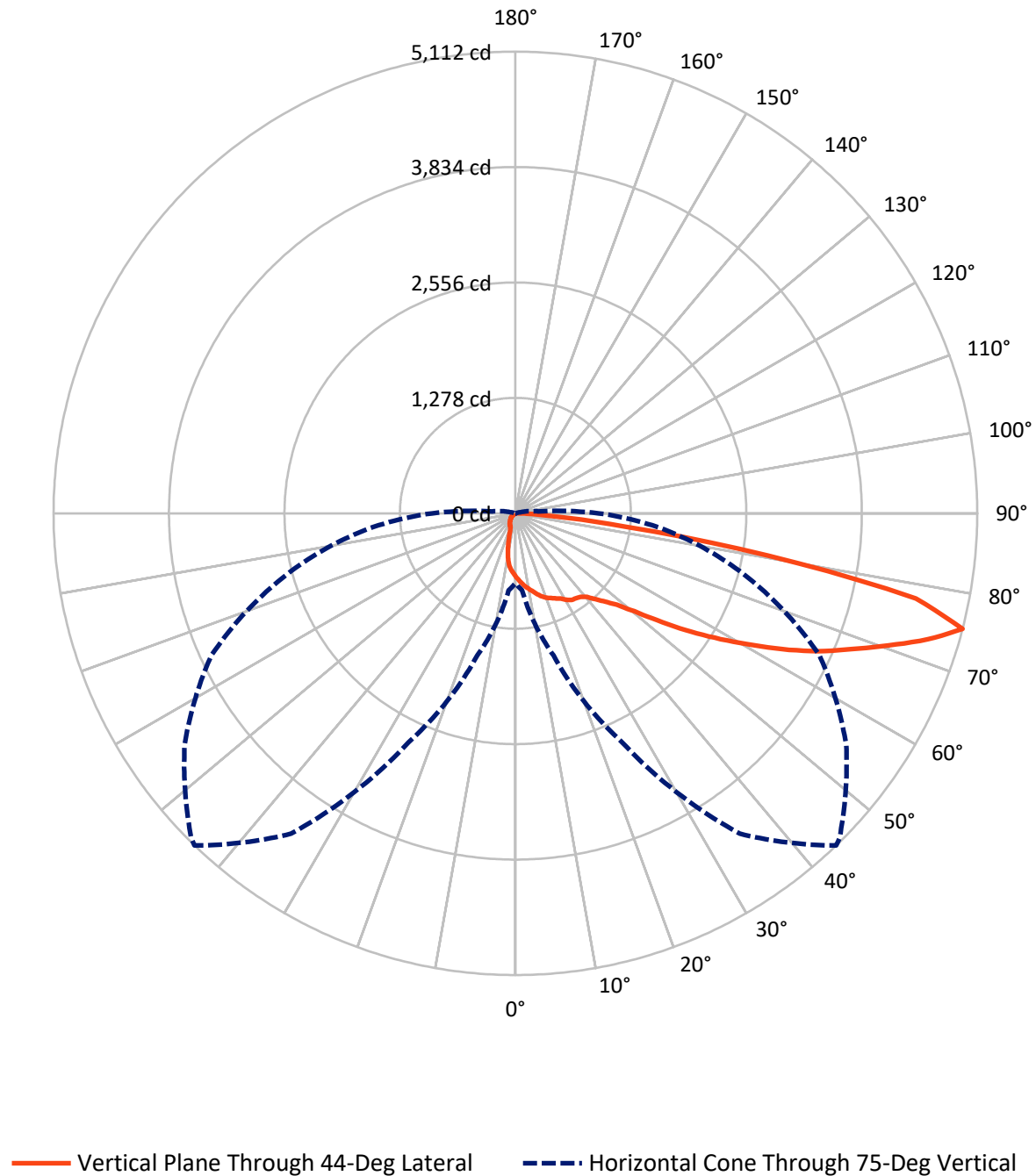


Based on 15 foot mounting height. Maximum calculated value = 4.2 fc  
 Type IV - Medium - N/A

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## Luminous Intensity Polar Plot



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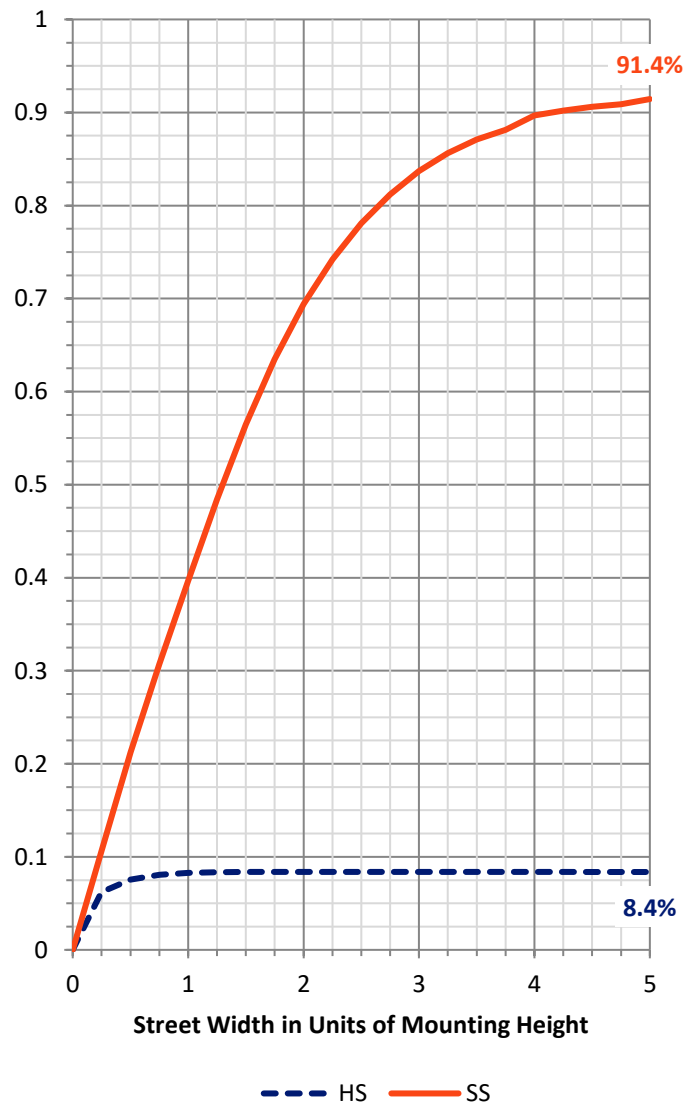
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total  |
|--------------------|-----------|----------|--------|--------|
| <b>House Side</b>  | Lumens    | 542.9    | 0.0    | 542.9  |
|                    | % Fixture | 8.4      | 0.0    | 8.4    |
| <b>Street Side</b> | Lumens    | 5895.1   | 0.0    | 5895.1 |
|                    | % Fixture | 91.6     | 0.0    | 91.6   |
| <b>Total</b>       | Lumens    | 6438.0   | 0.0    | 6438.0 |
|                    | % Fixture | 100.0    | 0.0    | 100.0  |

**ZONAL LUMENS:**

| Zone      | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10°    | 66.1   | 1.0       |
| 10°-20°   | 185.2  | 2.9       |
| 20°-30°   | 305.6  | 4.7       |
| 30°-40°   | 443.5  | 6.9       |
| 40°-50°   | 721.0  | 11.2      |
| 50°-60°   | 1271.1 | 19.7      |
| 60°-70°   | 1826.8 | 28.4      |
| 70°-80°   | 1462.9 | 22.7      |
| 80°-90°   | 155.9  | 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°    | 6438.0 | 100.0     |
| 0°-180°   | 6438.0 | 100.0     |

**Coefficient of Utilization**



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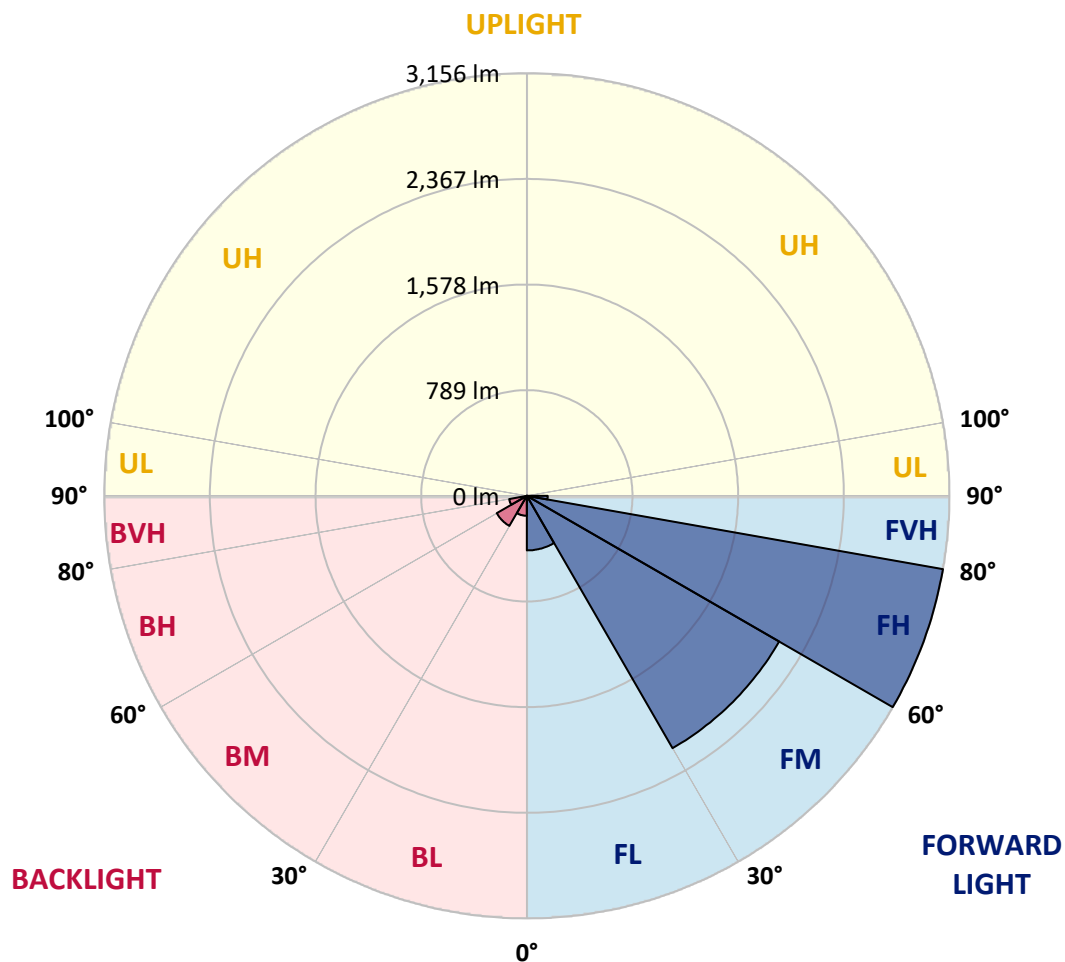
CATALOG NUMBER: ARCH-M-PA2-60-727-24VDC-T4W-HSS

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

| Zone |             | Lumens | % Fixture | Zone Rating/Lumen Limit |      |         |
|------|-------------|--------|-----------|-------------------------|------|---------|
|      |             |        |           | B                       | U    | G       |
| FL   | (0°-30°)    | 407.7  | 6.3       |                         |      |         |
| FM   | (30°-60°)   | 2176.1 | 33.8      |                         |      |         |
| FH   | (60°-80°)   | 3155.8 | 49.0      |                         |      | G2/5000 |
| FVH  | (80°-90°)   | 155.5  | 2.4       |                         |      | G2/225  |
| BL   | (0°-30°)    | 149.2  | 2.3       | B1/500                  |      |         |
| BM   | (30°-60°)   | 259.5  | 4.0       | B1/1000                 |      |         |
| BH   | (60°-80°)   | 133.9  | 2.1       | B1/500                  |      | G1/500  |
| BVH  | (80°-90°)   | 0.4    | 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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CATALOG NUMBER: ARCH-M-PA2-60-727-24VDC-T4W-HSS

**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 5°     | 15°    | 25°    | 35°    | 44°    | 45°    | 55°    | 65°    | 75°    | 85°    |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 700.8  | 700.8  | 700.8  | 700.8  | 700.8  | 700.8  | 700.8  | 700.8  | 700.8  | 700.8  | 700.8  |
| 2.5°  | 763.7  | 762.5  | 758.9  | 753.0  | 747.1  | 741.1  | 739.9  | 730.4  | 719.8  | 711.4  | 704.3  |
| 5°    | 831.4  | 830.2  | 824.3  | 811.2  | 798.1  | 782.7  | 781.5  | 758.9  | 738.8  | 716.2  | 697.2  |
| 7.5°  | 901.5  | 899.1  | 888.4  | 868.2  | 845.7  | 821.9  | 819.5  | 786.3  | 756.6  | 726.9  | 699.6  |
| 10°   | 956.1  | 953.7  | 938.3  | 914.5  | 883.7  | 854.0  | 850.4  | 816.0  | 786.3  | 748.3  | 711.4  |
| 12.5° | 1009.6 | 1004.8 | 984.6  | 958.5  | 920.5  | 892.0  | 888.4  | 852.8  | 817.1  | 778.0  | 732.8  |
| 15°   | 1059.4 | 1053.5 | 1034.5 | 1001.2 | 960.9  | 933.5  | 931.2  | 893.2  | 856.3  | 811.2  | 761.3  |
| 17.5° | 1093.9 | 1091.5 | 1068.9 | 1032.1 | 992.9  | 970.4  | 968.0  | 928.8  | 892.0  | 844.5  | 791.0  |
| 20°   | 1111.7 | 1111.7 | 1090.3 | 1049.9 | 1014.3 | 998.9  | 995.3  | 958.5  | 922.9  | 877.7  | 821.9  |
| 22.5° | 1115.3 | 1118.8 | 1102.2 | 1058.3 | 1032.1 | 1019.1 | 1016.7 | 984.6  | 950.2  | 908.6  | 856.3  |
| 25°   | 1122.4 | 1122.4 | 1114.1 | 1066.6 | 1047.6 | 1044.0 | 1042.8 | 1014.3 | 983.4  | 941.9  | 890.8  |
| 27.5° | 1130.7 | 1130.7 | 1124.8 | 1078.4 | 1071.3 | 1070.1 | 1068.9 | 1055.9 | 1030.9 | 982.2  | 931.2  |
| 30°   | 1152.1 | 1153.3 | 1148.5 | 1102.2 | 1097.4 | 1110.5 | 1112.9 | 1105.8 | 1074.9 | 1014.3 | 972.7  |
| 32.5° | 1205.5 | 1194.8 | 1181.8 | 1118.8 | 1127.1 | 1143.8 | 1145.0 | 1130.7 | 1097.4 | 1048.8 | 1022.6 |
| 35°   | 1339.7 | 1276.8 | 1217.4 | 1133.1 | 1136.6 | 1153.3 | 1155.6 | 1154.5 | 1134.3 | 1092.7 | 1079.6 |
| 37.5° | 1464.5 | 1375.4 | 1291.0 | 1166.3 | 1154.5 | 1172.3 | 1177.0 | 1197.2 | 1181.8 | 1153.3 | 1156.8 |
| 40°   | 1536.9 | 1502.5 | 1443.1 | 1257.8 | 1190.1 | 1217.4 | 1222.2 | 1253.0 | 1247.1 | 1235.2 | 1257.8 |
| 42.5° | 1760.2 | 1762.6 | 1698.4 | 1394.4 | 1255.4 | 1299.4 | 1305.3 | 1330.2 | 1338.6 | 1344.5 | 1399.1 |
| 45°   | 2019.1 | 2027.4 | 2012.0 | 1640.2 | 1378.9 | 1393.2 | 1401.5 | 1434.8 | 1465.6 | 1503.6 | 1603.4 |
| 47.5° | 2330.3 | 2323.2 | 2266.2 | 1940.7 | 1593.9 | 1514.3 | 1520.3 | 1584.4 | 1637.9 | 1721.0 | 1863.5 |
| 50°   | 2605.8 | 2623.7 | 2515.6 | 2221.0 | 1896.8 | 1705.6 | 1699.6 | 1762.6 | 1858.8 | 1975.2 | 2154.5 |
| 52.5° | 2883.8 | 2857.6 | 2711.6 | 2499.0 | 2255.5 | 1965.7 | 1947.9 | 1982.3 | 2117.7 | 2255.5 | 2439.6 |
| 55°   | 2957.4 | 2959.8 | 2909.9 | 2803.0 | 2554.8 | 2281.6 | 2251.9 | 2249.5 | 2418.2 | 2512.0 | 2738.9 |
| 57.5° | 3102.3 | 3108.3 | 3120.1 | 3141.5 | 3023.9 | 2597.5 | 2566.7 | 2533.4 | 2697.3 | 2751.9 | 3039.4 |
| 60°   | 3249.6 | 3256.7 | 3329.2 | 3444.4 | 3366.0 | 2938.4 | 2905.2 | 2826.8 | 2918.2 | 2991.9 | 3355.3 |
| 62.5° | 3230.6 | 3280.5 | 3490.7 | 3719.9 | 3710.4 | 3312.5 | 3271.0 | 3082.1 | 3140.3 | 3204.5 | 3645.1 |
| 65°   | 2917.0 | 2970.5 | 3443.2 | 3795.9 | 4056.0 | 3681.9 | 3614.2 | 3345.8 | 3349.4 | 3426.6 | 3924.2 |
| 67.5° | 2636.7 | 2694.9 | 3146.3 | 3763.9 | 4284.1 | 4013.3 | 3943.2 | 3610.7 | 3554.8 | 3683.1 | 4073.9 |
| 70°   | 2475.2 | 2533.4 | 2909.9 | 3664.1 | 4348.2 | 4380.3 | 4319.7 | 3913.5 | 3799.5 | 3917.1 | 3906.4 |
| 72.5° | 1937.2 | 2028.6 | 2608.2 | 3474.1 | 4417.1 | 4773.4 | 4725.9 | 4297.2 | 4007.4 | 3672.4 | 2974.0 |
| 75°   | 772.0  | 856.3  | 1628.4 | 2795.9 | 4330.4 | 5111.9 | 5075.1 | 4469.4 | 3709.2 | 2622.5 | 1522.7 |
| 77.5° | 232.8  | 249.4  | 452.5  | 1382.5 | 3174.8 | 4532.3 | 4520.4 | 3757.9 | 2624.9 | 1217.4 | 415.7  |
| 80°   | 77.2   | 85.5   | 139.0  | 381.3  | 1449.0 | 2831.5 | 2885.0 | 2394.4 | 1192.5 | 279.1  | 84.3   |
| 82.5° | 32.1   | 35.6   | 70.1   | 153.2  | 513.1  | 1219.8 | 1202.0 | 1072.5 | 415.7  | 173.4  | 30.9   |
| 85°   | 8.3    | 10.7   | 32.1   | 87.9   | 187.7  | 420.5  | 441.8  | 359.9  | 235.2  | 143.7  | 9.5    |
| 87.5° | 0.0    | 0.0    | 15.4   | 35.6   | 84.3   | 127.1  | 133.0  | 109.3  | 133.0  | 108.1  | 4.8    |
| 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: P800713

CATALOG NUMBER: ARCH-M-PA2-60-727-24VDC-T4W-HSS

**CANDELA DISTRIBUTION (continued):**

|       | 90°    | 95°    | 105°  | 115°  | 125°  | 135°  | 145°  | 155°  | 165°  | 175°  | 180°  |
|-------|--------|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 0°    | 700.8  | 700.8  | 700.8 | 700.8 | 700.8 | 700.8 | 700.8 | 700.8 | 700.8 | 700.8 | 700.8 |
| 2.5°  | 698.4  | 692.4  | 681.7 | 674.6 | 665.1 | 662.7 | 658.0 | 652.1 | 650.9 | 644.9 | 646.1 |
| 5°    | 686.5  | 677.0  | 658.0 | 644.9 | 629.5 | 624.7 | 616.4 | 610.5 | 605.7 | 597.4 | 598.6 |
| 7.5°  | 684.1  | 669.9  | 643.7 | 618.8 | 593.9 | 576.0 | 551.1 | 530.9 | 514.3 | 496.5 | 500.0 |
| 10°   | 692.4  | 674.6  | 637.8 | 603.4 | 558.2 | 501.2 | 435.9 | 393.1 | 371.8 | 350.4 | 352.8 |
| 12.5° | 709.1  | 687.7  | 640.2 | 587.9 | 496.5 | 399.1 | 308.8 | 250.6 | 235.2 | 225.7 | 226.9 |
| 15°   | 734.0  | 707.9  | 647.3 | 558.2 | 413.3 | 288.6 | 205.5 | 180.5 | 186.5 | 190.0 | 190.0 |
| 17.5° | 760.1  | 730.4  | 653.2 | 504.8 | 319.5 | 201.9 | 167.5 | 165.1 | 173.4 | 181.7 | 181.7 |
| 20°   | 792.2  | 754.2  | 654.4 | 437.1 | 230.4 | 163.9 | 158.0 | 158.0 | 163.9 | 173.4 | 173.4 |
| 22.5° | 823.1  | 780.3  | 643.7 | 359.9 | 175.8 | 152.0 | 152.0 | 152.0 | 155.6 | 165.1 | 166.3 |
| 25°   | 859.9  | 812.4  | 621.2 | 277.9 | 150.8 | 144.9 | 144.9 | 146.1 | 148.5 | 156.8 | 158.0 |
| 27.5° | 899.1  | 845.7  | 583.2 | 203.1 | 137.8 | 136.6 | 137.8 | 139.0 | 140.2 | 148.5 | 150.8 |
| 30°   | 944.2  | 882.5  | 534.5 | 152.0 | 125.9 | 125.9 | 129.5 | 131.8 | 131.8 | 139.0 | 141.3 |
| 32.5° | 996.5  | 931.2  | 476.3 | 125.9 | 114.0 | 112.8 | 118.8 | 122.3 | 122.3 | 128.3 | 130.6 |
| 35°   | 1061.8 | 981.1  | 406.2 | 111.6 | 104.5 | 102.1 | 104.5 | 110.5 | 112.8 | 117.6 | 118.8 |
| 37.5° | 1148.5 | 1040.4 | 331.4 | 103.3 | 97.4  | 92.6  | 92.6  | 93.8  | 98.6  | 103.3 | 104.5 |
| 40°   | 1259.0 | 1105.8 | 257.7 | 97.4  | 90.3  | 85.5  | 82.0  | 80.8  | 79.6  | 83.1  | 85.5  |
| 42.5° | 1397.9 | 1179.4 | 192.4 | 91.5  | 84.3  | 77.2  | 72.5  | 67.7  | 61.8  | 60.6  | 61.8  |
| 45°   | 1576.1 | 1269.7 | 142.5 | 86.7  | 80.8  | 70.1  | 61.8  | 53.4  | 42.8  | 39.2  | 40.4  |
| 47.5° | 1786.3 | 1363.5 | 111.6 | 82.0  | 78.4  | 61.8  | 51.1  | 36.8  | 26.1  | 23.8  | 24.9  |
| 50°   | 2009.6 | 1453.8 | 95.0  | 76.0  | 73.6  | 53.4  | 36.8  | 22.6  | 15.4  | 15.4  | 16.6  |
| 52.5° | 2199.6 | 1504.8 | 86.7  | 71.3  | 66.5  | 43.9  | 23.8  | 13.1  | 9.5   | 9.5   | 10.7  |
| 55°   | 2383.7 | 1532.2 | 80.8  | 66.5  | 57.0  | 30.9  | 13.1  | 8.3   | 5.9   | 5.9   | 5.9   |
| 57.5° | 2573.8 | 1544.0 | 73.6  | 60.6  | 45.1  | 19.0  | 7.1   | 4.8   | 3.6   | 3.6   | 3.6   |
| 60°   | 2742.4 | 1521.5 | 62.9  | 49.9  | 29.7  | 9.5   | 3.6   | 3.6   | 2.4   | 1.2   | 1.2   |
| 62.5° | 2883.8 | 1478.7 | 43.9  | 35.6  | 17.8  | 4.8   | 2.4   | 1.2   | 0.0   | 0.0   | 0.0   |
| 65°   | 2970.5 | 1409.8 | 28.5  | 23.8  | 10.7  | 3.6   | 1.2   | 0.0   | 0.0   | 0.0   | 0.0   |
| 67.5° | 2945.5 | 1280.4 | 17.8  | 15.4  | 4.8   | 2.4   | 1.2   | 0.0   | 0.0   | 0.0   | 0.0   |
| 70°   | 2658.1 | 1049.9 | 13.1  | 9.5   | 3.6   | 1.2   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 72.5° | 1915.8 | 710.3  | 9.5   | 5.9   | 2.4   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 75°   | 921.7  | 253.0  | 5.9   | 4.8   | 1.2   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 77.5° | 225.7  | 55.8   | 3.6   | 2.4   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 80°   | 49.9   | 10.7   | 2.4   | 1.2   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 82.5° | 16.6   | 4.8    | 1.2   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 85°   | 5.9    | 2.4    | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 87.5° | 3.6    | 1.2    | 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: SP1-2101-121-5

Luminaire Tested: IFLD-S-SA2E-727-U-T2

Test Date: 03/04/2021

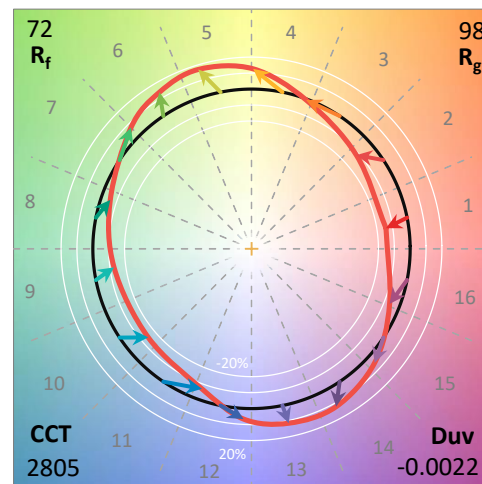
### Test Information

Test Method: LM-79-08  
 Report Number: SP1-2101-121-5  
 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-SA2E-727-U-T2**  
 Description: STREETWORKS INF FLOOD

PROGRAMMED @ 1500mA.

### Spectral Parameters

|                           |         |           |      |      |       |
|---------------------------|---------|-----------|------|------|-------|
| CCT (K):                  | 2805    | CRI (Ra): | 72.4 |      |       |
| CIE u':                   | 0.2586  | R1:       | 69.8 | R9:  | -15.0 |
| CIE v':                   | 0.5221  | R2:       | 81.3 | R10: | 55.6  |
| Duv:                      | -0.0022 | R3:       | 90.2 | R11: | 61.7  |
| CIE x:                    | 0.4477  | R4:       | 68.5 | R12: | 47.2  |
| CIE y:                    | 0.4017  | R5:       | 67.5 | R13: | 71.4  |
| CIE z:                    | 0.1506  | R6:       | 72.4 | R14: | 93.9  |
| Peak Wavelength (nm):     | 599     | R7:       | 79.4 |      |       |
| Dominant Wavelength (nm): | 584     | R8:       | 49.9 |      |       |
| Purity:                   | 55.3    |           |      |      |       |
| Rf:                       | 71.9    |           |      |      |       |
| Rg:                       | 97.9    |           |      |      |       |



### Test Conditions

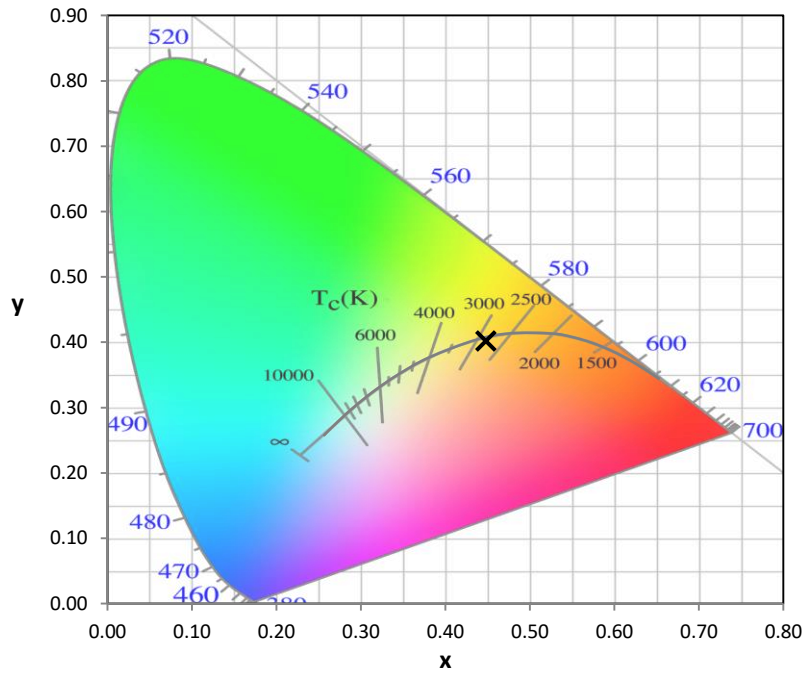
Stabilization Time: 60M  
 Operation Time: 12H  
 Room Temperature (°C) / RH%: 25.3/31%  
 Sphere Temperature (°C): 24.8

REPORT NUMBER: SP1-2101-121-5

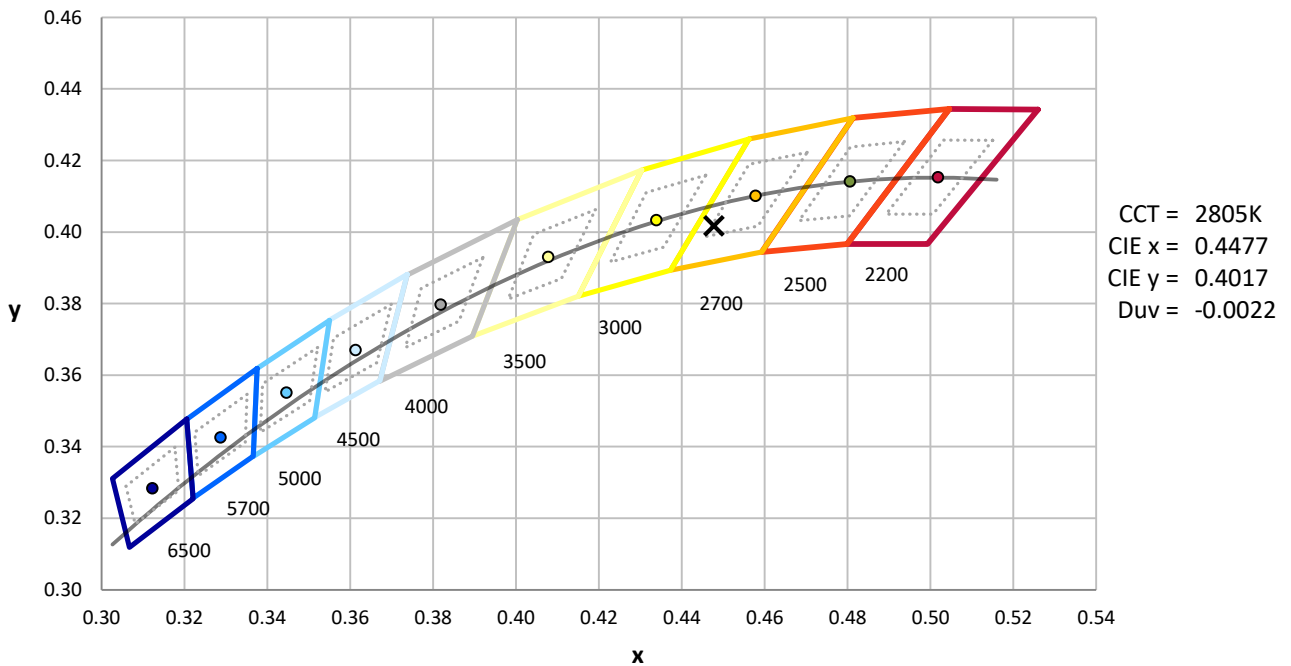
| Measurement and Test Equipment |                       |                  |                      |
|--------------------------------|-----------------------|------------------|----------------------|
| Instrument                     | Identification Number | Calibration Date | Calibration Due Date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



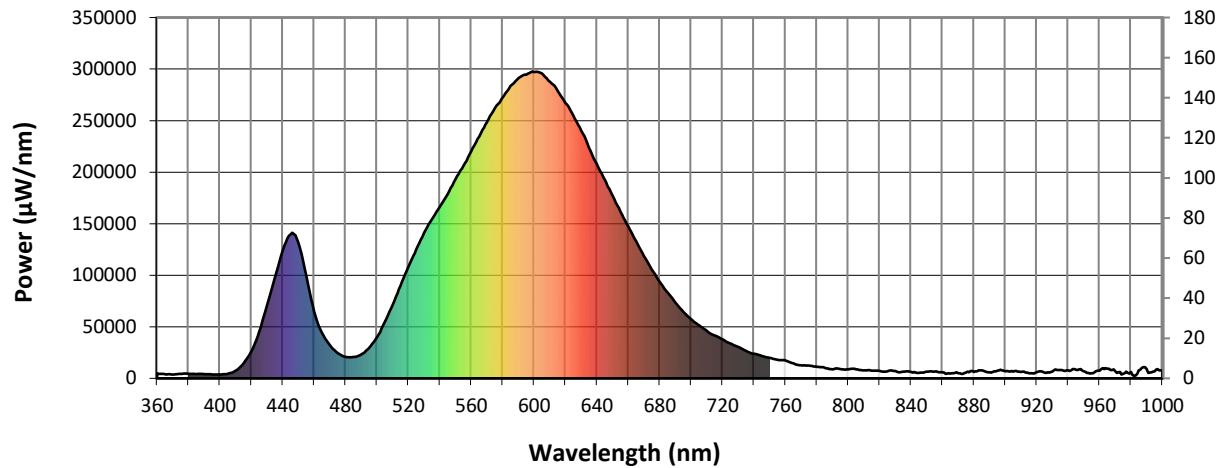
**CIE 1931 Chromaticity Diagram with 2017 ANSI 7-Step and 4-Step Quadrangles**



Point lies inside the ANSI 2700K 4-step quadrangle

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### Photopic Flux vs. Wavelength

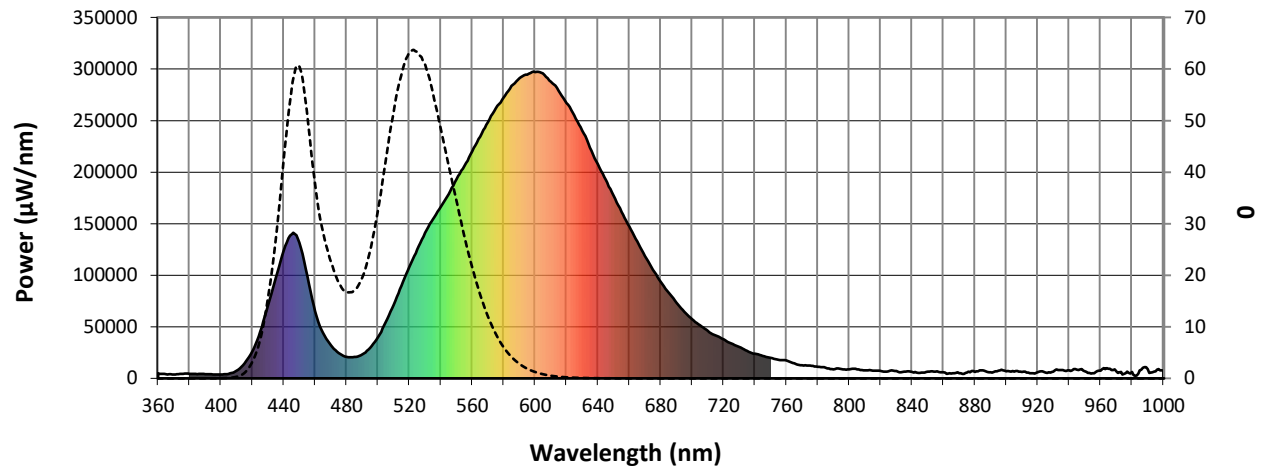


#####

| 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       | 4854             | 0.0              | 490       | 23280            | 3.3              | 620       | 266893           | 69.5             | 750       | 19996            | 0.0              | 880       | 6314             | 0.0              |
| 365       | 4049             | 0.0              | 495       | 29582            | 5.4              | 625       | 255096           | 56.3             | 755       | 17900            | 0.0              | 885       | 7853             | 0.0              |
| 370       | 3795             | 0.0              | 500       | 39981            | 8.8              | 630       | 240244           | 43.5             | 760       | 17272            | 0.0              | 890       | 5823             | 0.0              |
| 375       | 4296             | 0.0              | 505       | 54556            | 15.3             | 635       | 223787           | 33.6             | 765       | 14514            | 0.0              | 895       | 7346             | 0.0              |
| 380       | 4496             | 0.0              | 510       | 71364            | 24.5             | 640       | 207566           | 24.8             | 770       | 12643            | 0.0              | 900       | 6920             | 0.0              |
| 385       | 4186             | 0.0              | 515       | 89828            | 37.2             | 645       | 192517           | 18.5             | 775       | 12475            | 0.0              | 905       | 6608             | 0.0              |
| 390       | 3945             | 0.0              | 520       | 108414           | 52.6             | 650       | 177187           | 12.9             | 780       | 11188            | 0.0              | 910       | 6279             | 0.0              |
| 395       | 3780             | 0.0              | 525       | 124929           | 67.1             | 655       | 161553           | 9.3              | 785       | 10229            | 0.0              | 915       | 5131             | 0.0              |
| 400       | 3679             | 0.0              | 530       | 141352           | 83.2             | 660       | 147361           | 6.1              | 790       | 8578             | 0.0              | 920       | 5855             | 0.0              |
| 405       | 4475             | 0.0              | 535       | 154552           | 95.8             | 665       | 132756           | 4.2              | 795       | 9114             | 0.0              | 925       | 5678             | 0.0              |
| 410       | 7499             | 0.0              | 540       | 166297           | 108.4            | 670       | 118534           | 2.6              | 800       | 8597             | 0.0              | 930       | 6661             | 0.0              |
| 415       | 14449            | 0.0              | 545       | 178874           | 119.1            | 675       | 105260           | 1.8              | 805       | 8790             | 0.0              | 935       | 8074             | 0.0              |
| 420       | 26000            | 0.1              | 550       | 193176           | 131.3            | 680       | 93637            | 1.1              | 810       | 7814             | 0.0              | 940       | 7823             | 0.0              |
| 425       | 45491            | 0.2              | 555       | 206008           | 140.7            | 685       | 83217            | 0.7              | 815       | 7533             | 0.0              | 945       | 8364             | 0.0              |
| 430       | 70707            | 0.6              | 560       | 220126           | 149.6            | 690       | 73671            | 0.4              | 820       | 7303             | 0.0              | 950       | 6763             | 0.0              |
| 435       | 98169            | 1.2              | 565       | 234383           | 155.8            | 695       | 64520            | 0.3              | 825       | 6745             | 0.0              | 955       | 4883             | 0.0              |
| 440       | 123846           | 1.9              | 570       | 248161           | 161.4            | 700       | 57442            | 0.2              | 830       | 7209             | 0.0              | 960       | 7488             | 0.0              |
| 445       | 139822           | 2.9              | 575       | 261970           | 163.0            | 705       | 51479            | 0.1              | 835       | 6674             | 0.0              | 965       | 9316             | 0.0              |
| 450       | 131679           | 3.4              | 580       | 272271           | 161.8            | 710       | 45940            | 0.1              | 840       | 6151             | 0.0              | 970       | 6857             | 0.0              |
| 455       | 99242            | 3.3              | 585       | 283822           | 157.7            | 715       | 41575            | 0.0              | 845       | 5371             | 0.0              | 975       | 4388             | 0.0              |
| 460       | 65216            | 2.7              | 590       | 291192           | 150.6            | 720       | 37753            | 0.0              | 850       | 6484             | 0.0              | 980       | 6095             | 0.0              |
| 465       | 44137            | 2.3              | 595       | 294651           | 139.7            | 725       | 33818            | 0.0              | 855       | 6614             | 0.0              | 985       | 7701             | 0.0              |
| 470       | 32002            | 2.0              | 600       | 297168           | 128.1            | 730       | 30414            | 0.0              | 860       | 5959             | 0.0              | 990       | 9045             | 0.0              |
| 475       | 24549            | 1.9              | 605       | 295658           | 114.5            | 735       | 26662            | 0.0              | 865       | 4768             | 0.0              | 995       | 6989             | 0.0              |
| 480       | 20801            | 2.0              | 610       | 287633           | 98.8             | 740       | 23848            | 0.0              | 870       | 5098             | 0.0              | 1000      | 7341             | 0.0              |
| 485       | 20656            | 2.4              | 615       | 279152           | 84.3             | 745       | 21851            | 0.0              | 875       | 5516             | 0.0              |           |                  |                  |

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### Scotopic Flux vs. Wavelength



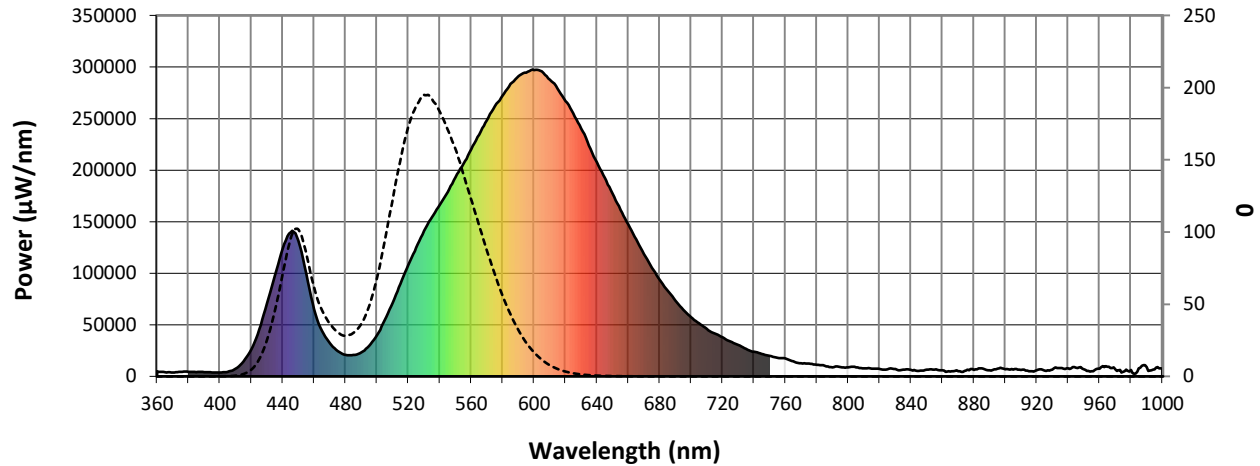
Scotopic Lumens: 15895.6

S/P: 1.11

| 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       | 4854             | 0.0              | 490       | 23280            | 35.8             | 620       | 266893           | 3.3              | 750       | 19996            | 0.0              | 880       | 6314             | 0.0              |
| 365       | 4049             | 0.0              | 495       | 29582            | 47.8             | 625       | 255096           | 2.2              | 755       | 17900            | 0.0              | 885       | 7853             | 0.0              |
| 370       | 3795             | 0.0              | 500       | 39981            | 66.9             | 630       | 240244           | 1.4              | 760       | 17272            | 0.0              | 890       | 5823             | 0.0              |
| 375       | 4296             | 0.0              | 505       | 54556            | 92.7             | 635       | 223787           | 0.9              | 765       | 14514            | 0.0              | 895       | 7346             | 0.0              |
| 380       | 4496             | 0.0              | 510       | 71364            | 121.0            | 640       | 207566           | 0.5              | 770       | 12643            | 0.0              | 900       | 6920             | 0.0              |
| 385       | 4186             | 0.0              | 515       | 89828            | 148.9            | 645       | 192517           | 0.3              | 775       | 12475            | 0.0              | 905       | 6608             | 0.0              |
| 390       | 3945             | 0.0              | 520       | 108414           | 172.3            | 650       | 177187           | 0.2              | 780       | 11188            | 0.0              | 910       | 6279             | 0.0              |
| 395       | 3780             | 0.0              | 525       | 124929           | 186.9            | 655       | 161553           | 0.1              | 785       | 10229            | 0.0              | 915       | 5131             | 0.0              |
| 400       | 3679             | 0.1              | 530       | 141352           | 194.9            | 660       | 147361           | 0.1              | 790       | 8578             | 0.0              | 920       | 5855             | 0.0              |
| 405       | 4475             | 0.1              | 535       | 154552           | 192.6            | 665       | 132756           | 0.0              | 795       | 9114             | 0.0              | 925       | 5678             | 0.0              |
| 410       | 7499             | 0.4              | 540       | 166297           | 183.8            | 670       | 118534           | 0.0              | 800       | 8597             | 0.0              | 930       | 6661             | 0.0              |
| 415       | 14449            | 1.5              | 545       | 178874           | 171.5            | 675       | 105260           | 0.0              | 805       | 8790             | 0.0              | 935       | 8074             | 0.0              |
| 420       | 26000            | 4.3              | 550       | 193176           | 158.0            | 680       | 93637            | 0.0              | 810       | 7814             | 0.0              | 940       | 7823             | 0.0              |
| 425       | 45491            | 11.1             | 555       | 206008           | 140.8            | 685       | 83217            | 0.0              | 815       | 7533             | 0.0              | 945       | 8364             | 0.0              |
| 430       | 70707            | 24.1             | 560       | 220126           | 123.0            | 690       | 73671            | 0.0              | 820       | 7303             | 0.0              | 950       | 6763             | 0.0              |
| 435       | 98169            | 43.9             | 565       | 234383           | 105.2            | 695       | 64520            | 0.0              | 825       | 6745             | 0.0              | 955       | 4883             | 0.0              |
| 440       | 123846           | 69.2             | 570       | 248161           | 87.6             | 700       | 57442            | 0.0              | 830       | 7209             | 0.0              | 960       | 7488             | 0.0              |
| 445       | 139822           | 93.6             | 575       | 261970           | 71.3             | 705       | 51479            | 0.0              | 835       | 6674             | 0.0              | 965       | 9316             | 0.0              |
| 450       | 131679           | 102.1            | 580       | 272271           | 56.1             | 710       | 45940            | 0.0              | 840       | 6151             | 0.0              | 970       | 6857             | 0.0              |
| 455       | 99242            | 86.7             | 585       | 283822           | 43.4             | 715       | 41575            | 0.0              | 845       | 5371             | 0.0              | 975       | 4388             | 0.0              |
| 460       | 65216            | 63.0             | 590       | 291192           | 32.4             | 720       | 37753            | 0.0              | 850       | 6484             | 0.0              | 980       | 6095             | 0.0              |
| 465       | 44137            | 46.6             | 595       | 294651           | 23.5             | 725       | 33818            | 0.0              | 855       | 6614             | 0.0              | 985       | 7701             | 0.0              |
| 470       | 32002            | 36.9             | 600       | 297168           | 16.7             | 730       | 30414            | 0.0              | 860       | 5959             | 0.0              | 990       | 9045             | 0.0              |
| 475       | 24549            | 30.7             | 605       | 295658           | 11.6             | 735       | 26662            | 0.0              | 865       | 4768             | 0.0              | 995       | 6989             | 0.0              |
| 480       | 20801            | 28.1             | 610       | 287633           | 7.8              | 740       | 23848            | 0.0              | 870       | 5098             | 0.0              | 1000      | 7341             | 0.0              |
| 485       | 20656            | 29.9             | 615       | 279152           | 5.2              | 745       | 21851            | 0.0              | 875       | 5516             | 0.0              |           |                  |                  |

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### Melanopic Flux vs. Wavelength


**Melanopic Lumens: 5527.7**
**M/P: 0.39**

| 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       | 4854             | 0.0              | 490       | 23280            | 19.4             | 620       | 266893           | 0.2              | 750       | 19996            | 0.0              | 880       | 6314             | 0.0              |
| 365       | 4049             | 0.0              | 495       | 29582            | 24.4             | 625       | 255096           | 0.1              | 755       | 17900            | 0.0              | 885       | 7853             | 0.0              |
| 370       | 3795             | 0.0              | 500       | 39981            | 32.1             | 630       | 240244           | 0.1              | 760       | 17272            | 0.0              | 890       | 5823             | 0.0              |
| 375       | 4296             | 0.0              | 505       | 54556            | 41.9             | 635       | 223787           | 0.1              | 765       | 14514            | 0.0              | 895       | 7346             | 0.0              |
| 380       | 4496             | 0.0              | 510       | 71364            | 51.2             | 640       | 207566           | 0.0              | 770       | 12643            | 0.0              | 900       | 6920             | 0.0              |
| 385       | 4186             | 0.0              | 515       | 89828            | 58.7             | 645       | 192517           | 0.0              | 775       | 12475            | 0.0              | 905       | 6608             | 0.0              |
| 390       | 3945             | 0.0              | 520       | 108414           | 63.1             | 650       | 177187           | 0.0              | 780       | 11188            | 0.0              | 910       | 6279             | 0.0              |
| 395       | 3780             | 0.0              | 525       | 124929           | 63.4             | 655       | 161553           | 0.0              | 785       | 10229            | 0.0              | 915       | 5131             | 0.0              |
| 400       | 3679             | 0.0              | 530       | 141352           | 61.1             | 660       | 147361           | 0.0              | 790       | 8578             | 0.0              | 920       | 5855             | 0.0              |
| 405       | 4475             | 0.1              | 535       | 154552           | 55.6             | 665       | 132756           | 0.0              | 795       | 9114             | 0.0              | 925       | 5678             | 0.0              |
| 410       | 7499             | 0.3              | 540       | 166297           | 48.7             | 670       | 118534           | 0.0              | 800       | 8597             | 0.0              | 930       | 6661             | 0.0              |
| 415       | 14449            | 1.0              | 545       | 178874           | 41.5             | 675       | 105260           | 0.0              | 805       | 8790             | 0.0              | 935       | 8074             | 0.0              |
| 420       | 26000            | 3.0              | 550       | 193176           | 34.7             | 680       | 93637            | 0.0              | 810       | 7814             | 0.0              | 940       | 7823             | 0.0              |
| 425       | 45491            | 7.1              | 555       | 206008           | 27.8             | 685       | 83217            | 0.0              | 815       | 7533             | 0.0              | 945       | 8364             | 0.0              |
| 430       | 70707            | 14.9             | 560       | 220126           | 21.7             | 690       | 73671            | 0.0              | 820       | 7303             | 0.0              | 950       | 6763             | 0.0              |
| 435       | 98169            | 26.2             | 565       | 234383           | 16.5             | 695       | 64520            | 0.0              | 825       | 6745             | 0.0              | 955       | 4883             | 0.0              |
| 440       | 123846           | 41.4             | 570       | 248161           | 12.1             | 700       | 57442            | 0.0              | 830       | 7209             | 0.0              | 960       | 7488             | 0.0              |
| 445       | 139822           | 55.1             | 575       | 261970           | 8.7              | 705       | 51479            | 0.0              | 835       | 6674             | 0.0              | 965       | 9316             | 0.0              |
| 450       | 131679           | 60.7             | 580       | 272271           | 6.1              | 710       | 45940            | 0.0              | 840       | 6151             | 0.0              | 970       | 6857             | 0.0              |
| 455       | 99242            | 52.0             | 585       | 283822           | 4.2              | 715       | 41575            | 0.0              | 845       | 5371             | 0.0              | 975       | 4388             | 0.0              |
| 460       | 65216            | 38.4             | 590       | 291192           | 2.9              | 720       | 37753            | 0.0              | 850       | 6484             | 0.0              | 980       | 6095             | 0.0              |
| 465       | 44137            | 28.8             | 595       | 294651           | 1.9              | 725       | 33818            | 0.0              | 855       | 6614             | 0.0              | 985       | 7701             | 0.0              |
| 470       | 32002            | 22.9             | 600       | 297168           | 1.3              | 730       | 30414            | 0.0              | 860       | 5959             | 0.0              | 990       | 9045             | 0.0              |
| 475       | 24549            | 18.7             | 605       | 295658           | 0.8              | 735       | 26662            | 0.0              | 865       | 4768             | 0.0              | 995       | 6989             | 0.0              |
| 480       | 20801            | 16.7             | 610       | 287633           | 0.5              | 740       | 23848            | 0.0              | 870       | 5098             | 0.0              | 1000      | 7341             | 0.0              |
| 485       | 20656            | 17.0             | 615       | 279152           | 0.3              | 745       | 21851            | 0.0              | 875       | 5516             | 0.0              |           |                  |                  |

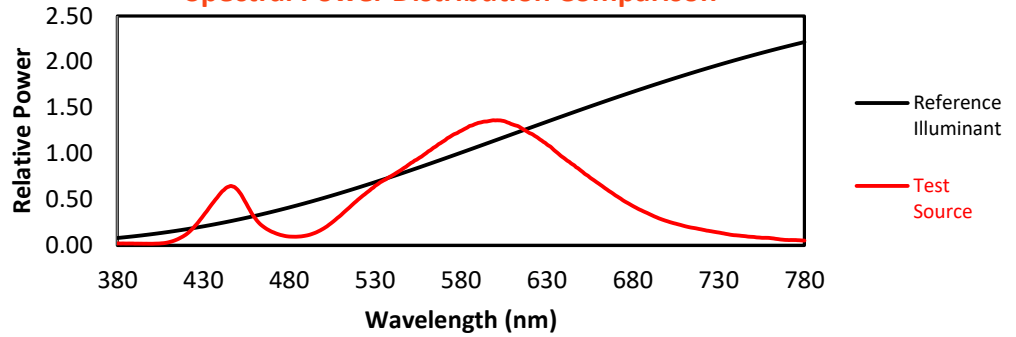
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TM-30-18

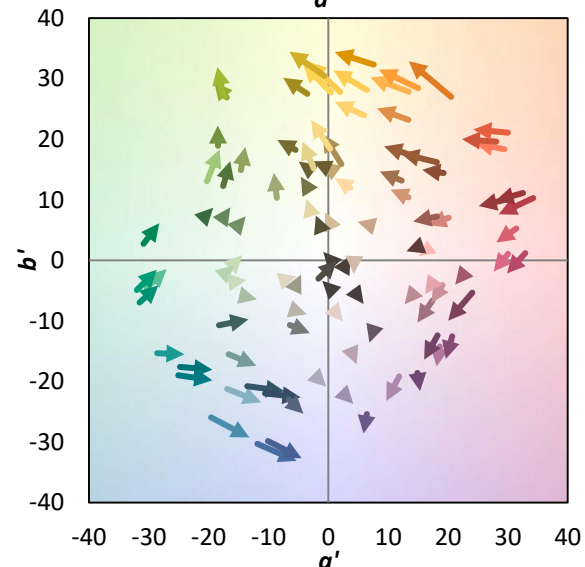
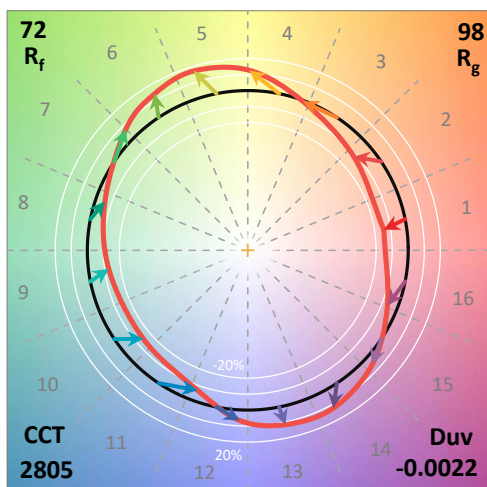
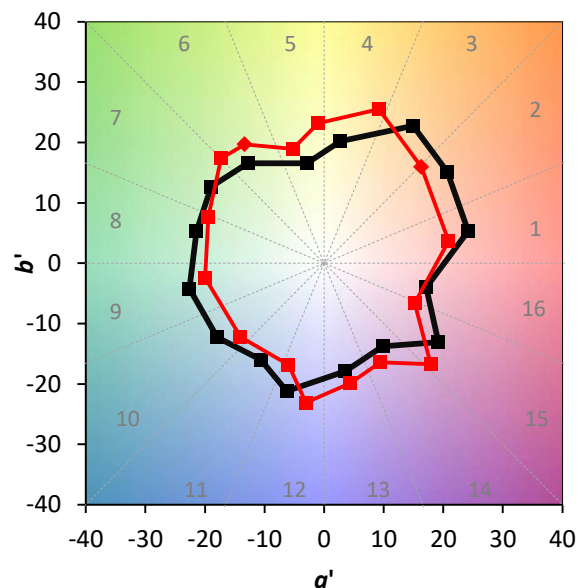
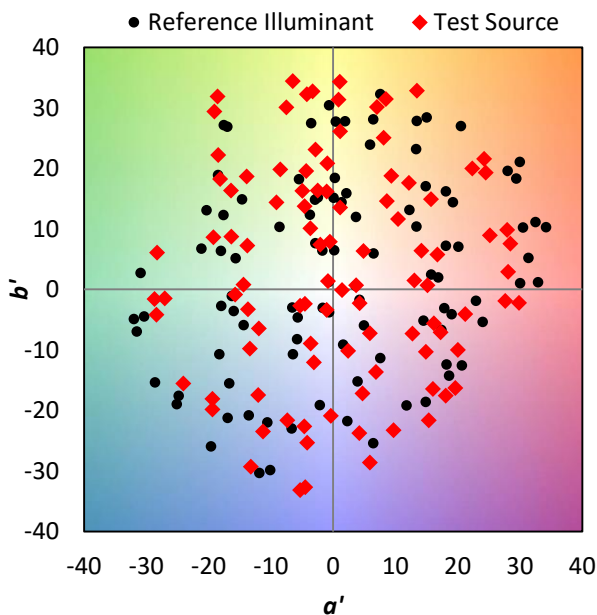
### Summary

$R_f = 71.9$   
 $R_g = 97.9$   
 CIE  $R_a = 72.4$   
 $R_g = -15.0$

### Spectral Power Distribution Comparison



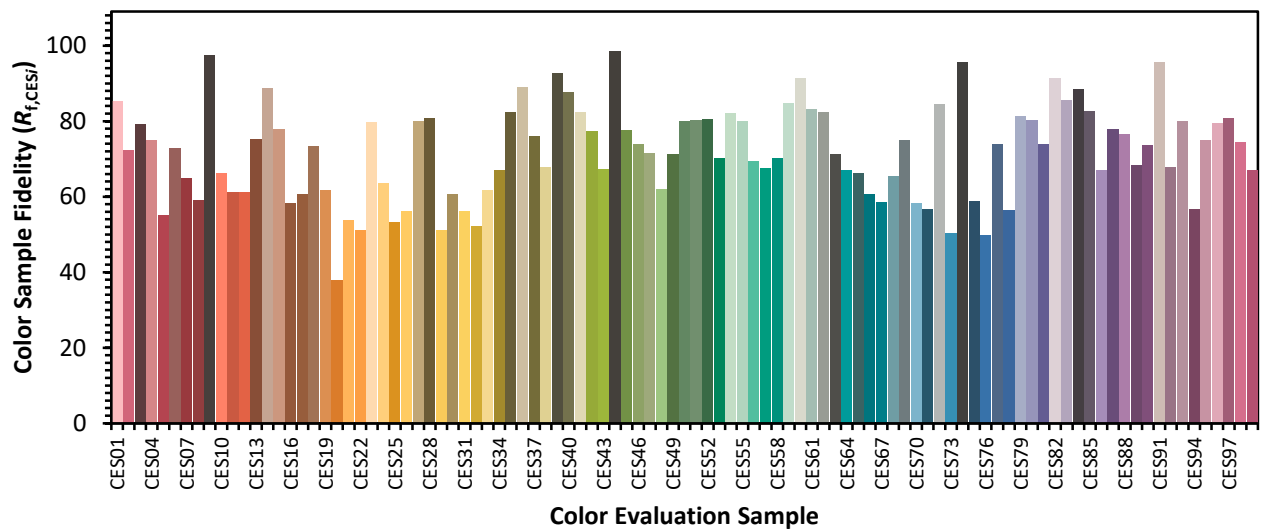
### Color Vector Graphics



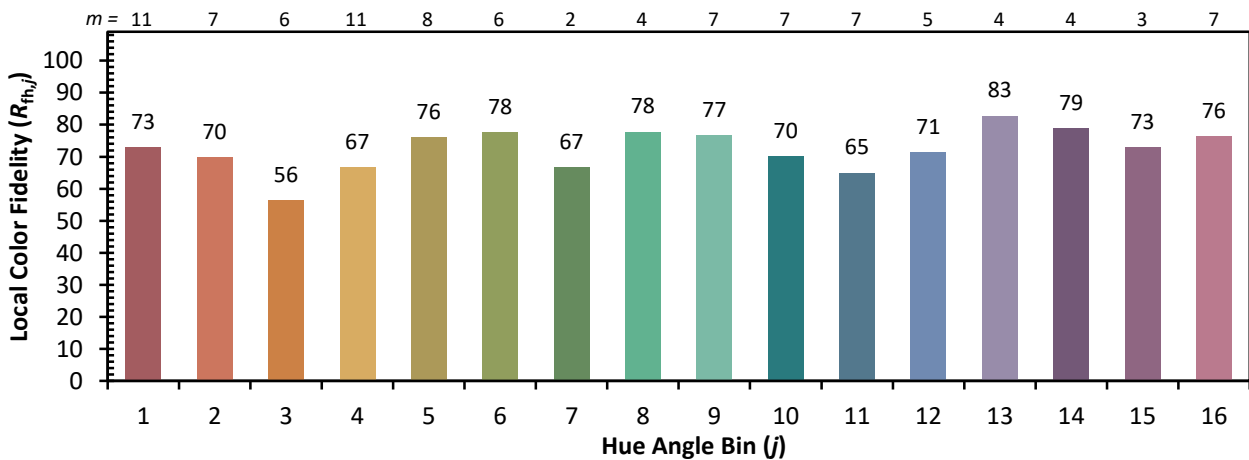
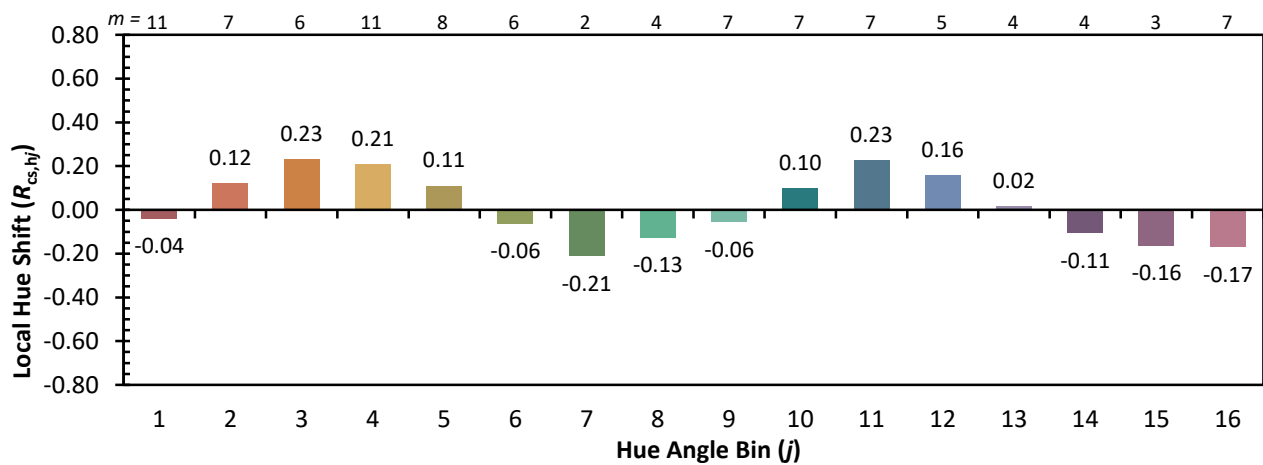
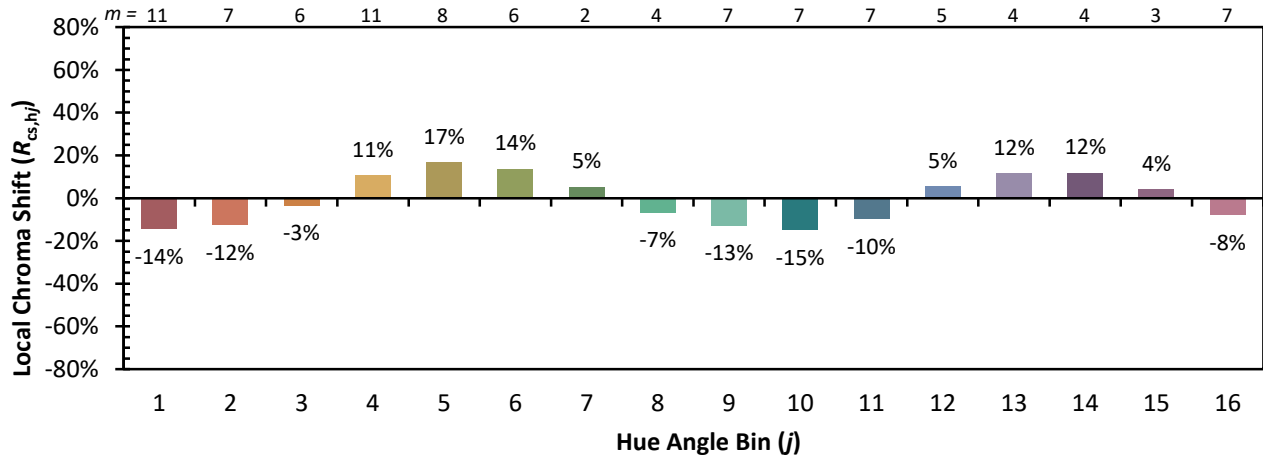


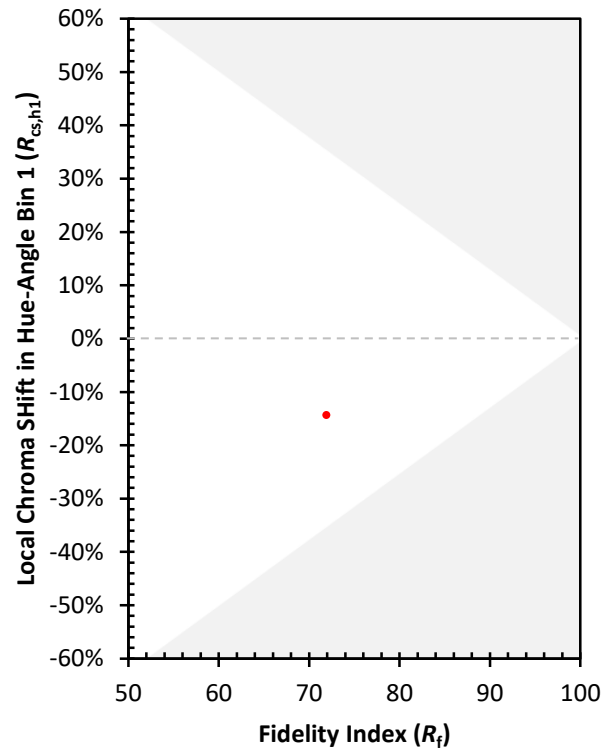
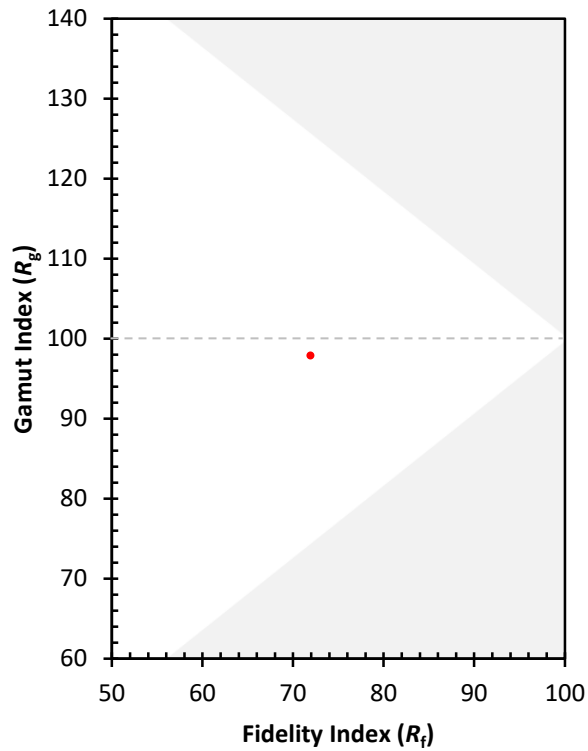
**Individual Sample Fidelity Index ( $R_{f,i}$ )**

|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 86 | CES26 = 56 | CES51 = 80 | CES76 = 50 |
| CES02 = 63 | CES27 = 80 | CES52 = 81 | CES77 = 74 |
| CES03 = 31 | CES28 = 81 | CES53 = 70 | CES78 = 56 |
| CES04 = 71 | CES29 = 51 | CES54 = 82 | CES79 = 81 |
| CES05 = 50 | CES30 = 61 | CES55 = 80 | CES80 = 80 |
| CES06 = 52 | CES31 = 56 | CES56 = 69 | CES81 = 74 |
| CES07 = 42 | CES32 = 52 | CES57 = 67 | CES82 = 91 |
| CES08 = 41 | CES33 = 62 | CES58 = 70 | CES83 = 86 |
| CES09 = 29 | CES34 = 67 | CES59 = 85 | CES84 = 89 |
| CES10 = 76 | CES35 = 83 | CES60 = 91 | CES85 = 83 |
| CES11 = 60 | CES36 = 89 | CES61 = 83 | CES86 = 67 |
| CES12 = 66 | CES37 = 76 | CES62 = 82 | CES87 = 78 |
| CES13 = 43 | CES38 = 68 | CES63 = 71 | CES88 = 76 |
| CES14 = 74 | CES39 = 93 | CES64 = 67 | CES89 = 68 |
| CES15 = 71 | CES40 = 88 | CES65 = 66 | CES90 = 74 |
| CES16 = 48 | CES41 = 82 | CES66 = 61 | CES91 = 96 |
| CES17 = 50 | CES42 = 77 | CES67 = 58 | CES92 = 68 |
| CES18 = 57 | CES43 = 67 | CES68 = 65 | CES93 = 80 |
| CES19 = 73 | CES44 = 99 | CES69 = 75 | CES94 = 57 |
| CES20 = 67 | CES45 = 78 | CES70 = 58 | CES95 = 75 |
| CES21 = 88 | CES46 = 74 | CES71 = 57 | CES96 = 79 |
| CES22 = 80 | CES47 = 71 | CES72 = 85 | CES97 = 81 |
| CES23 = 92 | CES48 = 62 | CES73 = 50 | CES98 = 75 |
| CES24 = 91 | CES49 = 71 | CES74 = 96 | CES99 = 67 |
| CES25 = 73 | CES50 = 80 | CES75 = 59 |            |



Color Rendition by Hue-Angle Bin



**Measure Comparisons**


(END OF REPORT)