

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: P348569

Luminaire Tested: **ARCH-N-PA1-19-830-24VDC-T2R**

Issue Date: 3/3/2020



**Test Information**

Test Method: LM-79-08  
Report Number: P348569  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-1903-205-8)  
Test Lab: INNOVATION CENTER  
Issue Date: 3/3/2020  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: STREETWORKS  
Catalog Number: ARCH-N-PA1-19-830-24VDC-T2R  
Description: ARCHEON ROADWAY AND AREA LUMINAIRE  
(1) 80 CRI, 3000K, 370mA LIGHT ENGINE WITH 16 LEDS AND  
Light Source: -  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 2417 lumens  
Efficiency: N/A  
Efficacy: 127.2 lumens/watt  
Luminous Opening: Rectangular (W 0.5' x L: 0.75' x H: 0')  
IES Classification: Type II - Short  
BUG Rating: B1 - U0 - G1

Input Watts (W): 19  
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

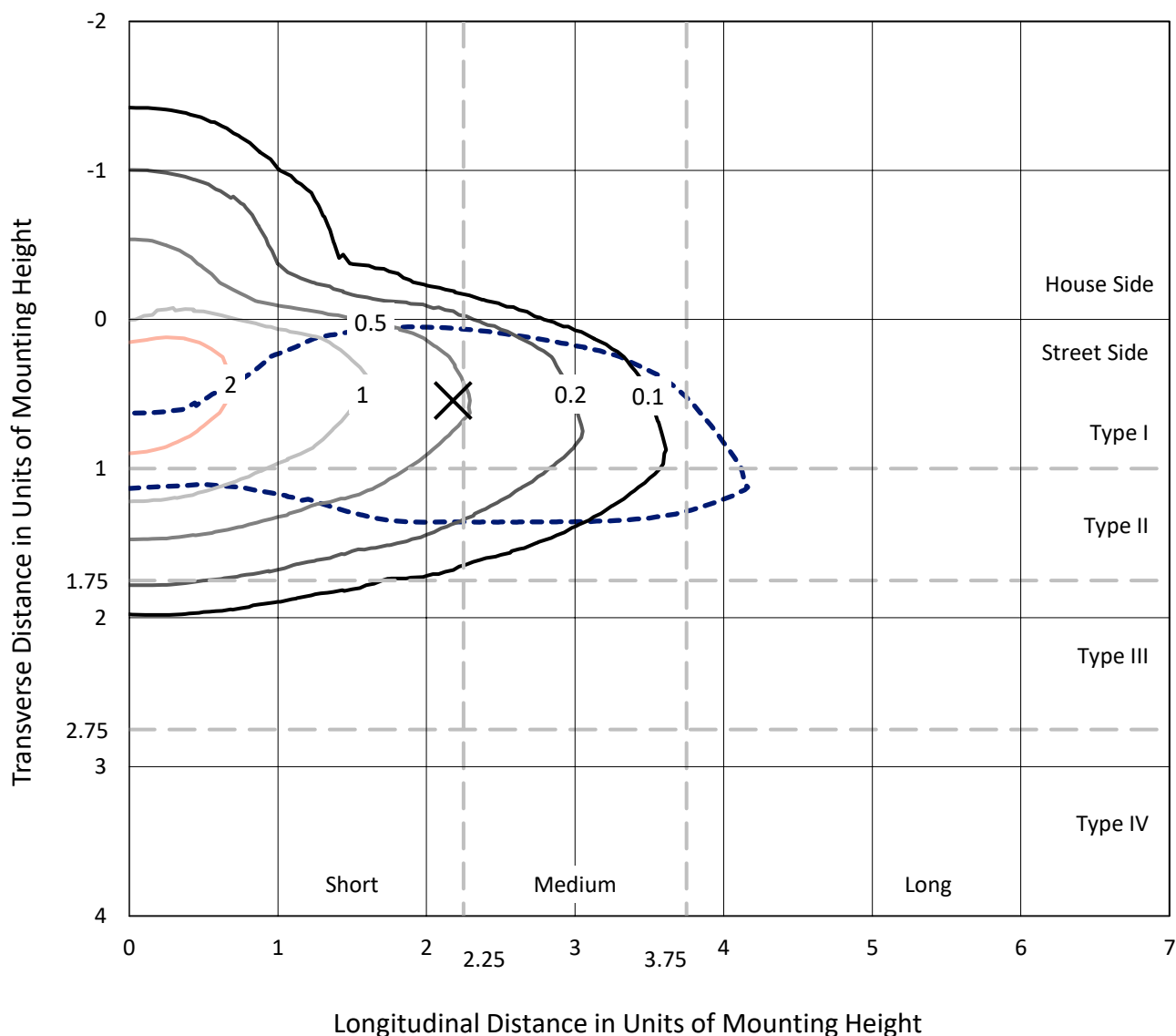
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## Iso-Footcandle Lines of Horizontal Illumination

✕ Max cd

--- 1/2 Max cd



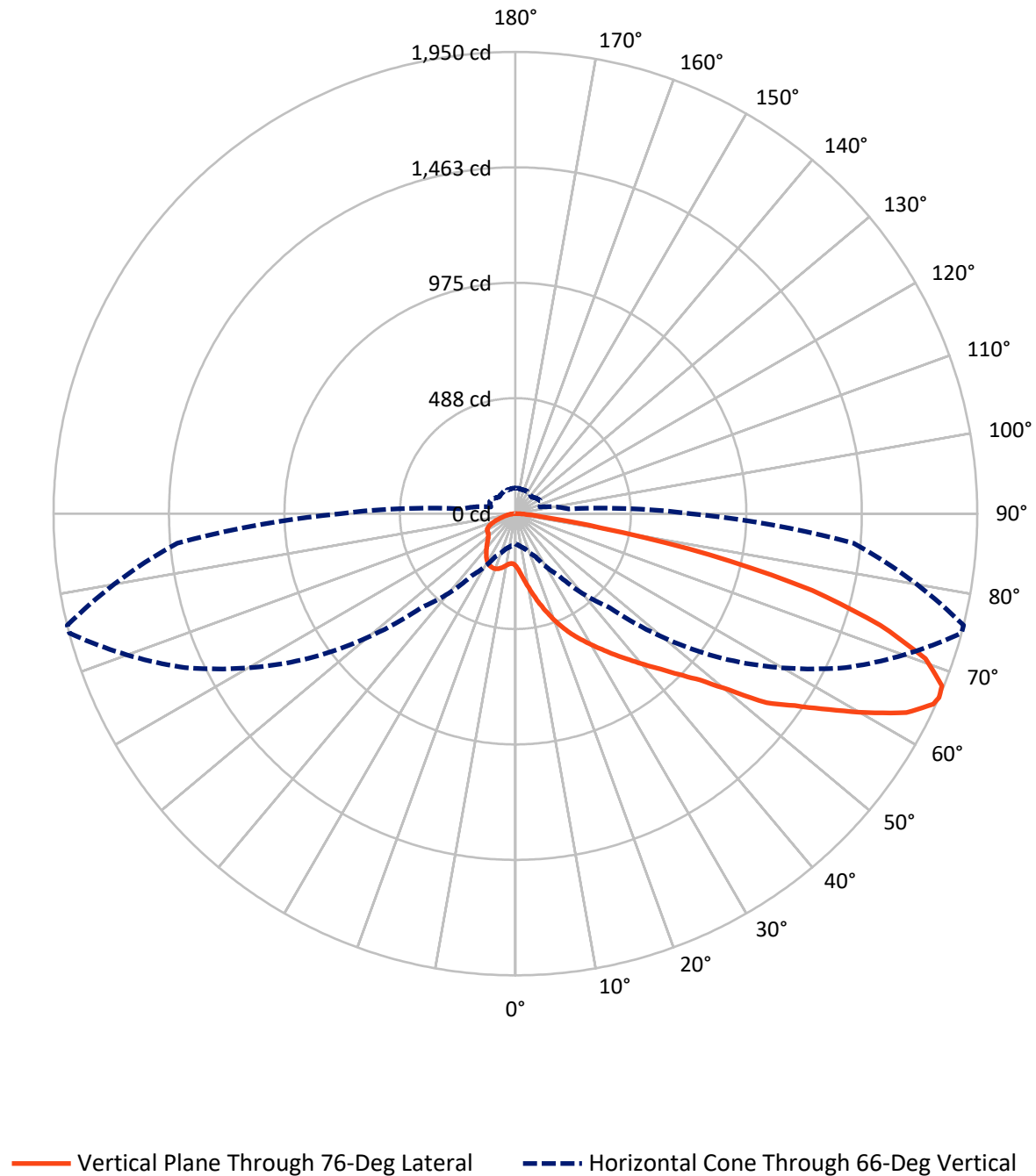
Based on 15 foot mounting height. Maximum calculated value = 2.6 fc

Type II - Short - N/A

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## Luminous Intensity Polar Plot



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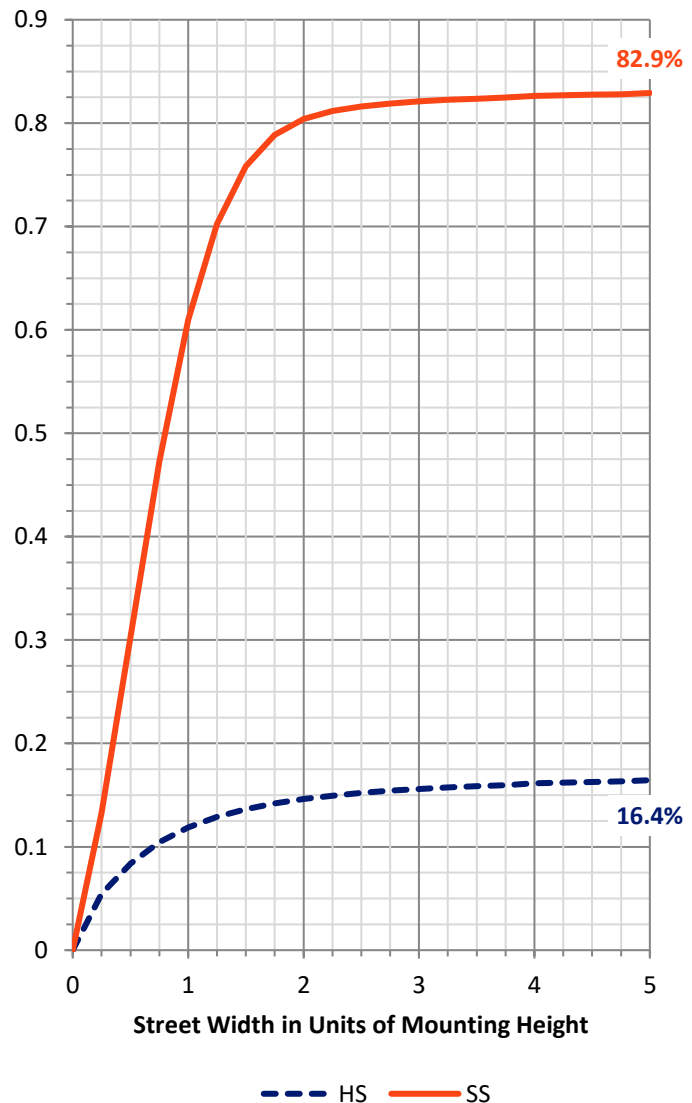
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total  |
|--------------------|-----------|----------|--------|--------|
| <b>House Side</b>  | Lumens    | 406.7    | 0.0    | 406.7  |
|                    | % Fixture | 16.8     | 0.0    | 16.8   |
| <b>Street Side</b> | Lumens    | 2010.3   | 0.0    | 2010.3 |
|                    | % Fixture | 83.2     | 0.0    | 83.2   |
| <b>Total</b>       | Lumens    | 2417.0   | 0.0    | 2417.0 |
|                    | % Fixture | 100.0    | 0.0    | 100.0  |

**ZONAL LUMENS:**

| Zone      | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10°    | 26.7   | 1.1       |
| 10°-20°   | 105.4  | 4.4       |
| 20°-30°   | 204.8  | 8.5       |
| 30°-40°   | 334.3  | 13.8      |
| 40°-50°   | 456.8  | 18.9      |
| 50°-60°   | 532.0  | 22.0      |
| 60°-70°   | 477.0  | 19.7      |
| 70°-80°   | 241.0  | 10.0      |
| 80°-90°   | 38.9   | 1.6       |
| 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°    | 2417.0 | 100.0     |
| 0°-180°   | 2417.0 | 100.0     |

**Coefficient of Utilization**



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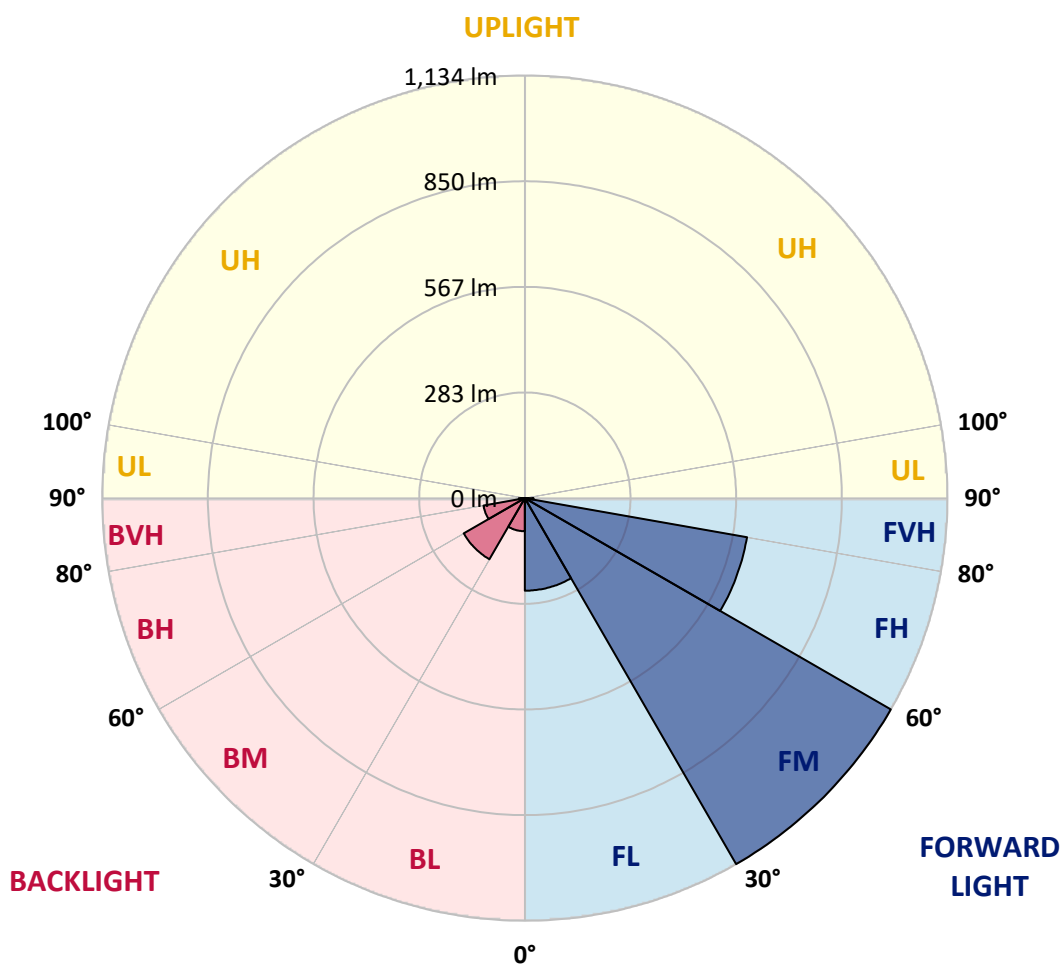
CATALOG NUMBER: ARCH-N-PA1-19-830-24VDC-T2R

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

| Zone |             | Lumens | % Fixture | Zone Rating/Lumen Limit |      |        |
|------|-------------|--------|-----------|-------------------------|------|--------|
|      |             |        |           | B                       | U    | G      |
| FL   | (0°-30°)    | 248.2  | 10.3      |                         |      |        |
| FM   | (30°-60°)   | 1133.7 | 46.9      |                         |      |        |
| FH   | (60°-80°)   | 605.4  | 25.0      |                         |      | G0/660 |
| FVH  | (80°-90°)   | 23.0   | 1.0       |                         |      | G1/100 |
| BL   | (0°-30°)    | 88.7   | 3.7       | B0/110                  |      |        |
| BM   | (30°-60°)   | 189.4  | 7.8       | B0/220                  |      |        |
| BH   | (60°-80°)   | 112.7  | 4.7       | B1/500                  |      | G1/500 |
| BVH  | (80°-90°)   | 15.9   | 0.7       |                         |      | G1/100 |
| UL   | (90°-100°)  | 0.0    | 0.0       |                         | U0/0 |        |
| UH   | (100°-180°) | 0.0    | 0.0       |                         | U0/0 |        |

**BUG Rating: B1-U0-G1**

Type II Short



REPORT NUMBER: P348569

CATALOG NUMBER: ARCH-N-PA1-19-830-24VDC-T2R

**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 5°     | 15°    | 25°    | 35°    | 45°    | 55°    | 65°    | 75°    | 76°    | 85°    |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 220.7  | 220.7  | 220.7  | 220.7  | 220.7  | 220.7  | 220.7  | 220.7  | 220.7  | 220.7  | 220.7  |
| 2.5°  | 293.0  | 288.6  | 288.2  | 281.7  | 280.2  | 267.8  | 258.7  | 249.2  | 238.4  | 236.2  | 227.7  |
| 5°    | 376.4  | 376.0  | 370.3  | 359.7  | 351.4  | 330.3  | 309.3  | 287.2  | 262.9  | 259.0  | 239.8  |
| 7.5°  | 451.4  | 450.7  | 446.4  | 435.0  | 423.0  | 397.0  | 367.1  | 333.1  | 293.8  | 287.9  | 256.1  |
| 10°   | 508.3  | 508.1  | 506.6  | 498.2  | 488.1  | 463.1  | 430.1  | 383.8  | 329.6  | 321.7  | 276.5  |
| 12.5° | 552.3  | 552.8  | 553.8  | 550.8  | 546.0  | 524.7  | 490.9  | 437.4  | 367.9  | 360.0  | 299.3  |
| 15°   | 582.1  | 583.6  | 588.7  | 592.8  | 595.4  | 582.3  | 549.6  | 492.3  | 410.7  | 401.2  | 324.4  |
| 17.5° | 597.1  | 598.8  | 607.5  | 620.2  | 631.8  | 630.5  | 604.5  | 544.7  | 451.8  | 442.7  | 351.5  |
| 20°   | 610.1  | 611.3  | 621.2  | 636.3  | 656.9  | 666.0  | 651.4  | 595.1  | 496.8  | 486.0  | 380.2  |
| 22.5° | 647.7  | 649.2  | 652.2  | 660.8  | 679.0  | 695.7  | 688.7  | 642.7  | 538.1  | 528.0  | 407.5  |
| 25°   | 720.2  | 722.1  | 715.7  | 708.4  | 711.8  | 723.5  | 724.8  | 686.2  | 580.0  | 568.6  | 436.8  |
| 27.5° | 807.6  | 810.3  | 799.4  | 780.6  | 764.2  | 759.7  | 758.1  | 721.8  | 619.9  | 606.7  | 465.7  |
| 30°   | 893.2  | 897.8  | 883.6  | 859.3  | 829.2  | 808.0  | 792.3  | 756.7  | 659.3  | 646.7  | 493.1  |
| 32.5° | 976.8  | 974.9  | 954.3  | 930.5  | 895.2  | 868.7  | 830.8  | 794.1  | 703.6  | 689.1  | 520.2  |
| 35°   | 1034.1 | 1034.7 | 1015.6 | 987.4  | 953.7  | 933.4  | 882.3  | 834.5  | 748.8  | 735.5  | 551.1  |
| 37.5° | 1082.8 | 1079.8 | 1058.1 | 1031.8 | 1002.8 | 994.1  | 942.6  | 879.0  | 797.8  | 783.2  | 583.9  |
| 40°   | 1099.0 | 1095.5 | 1081.3 | 1062.4 | 1039.1 | 1038.4 | 1009.2 | 929.3  | 853.2  | 838.8  | 620.9  |
| 42.5° | 1089.2 | 1084.7 | 1078.9 | 1073.7 | 1066.5 | 1069.8 | 1071.7 | 988.4  | 914.1  | 897.9  | 663.7  |
| 45°   | 1052.8 | 1046.0 | 1050.1 | 1061.4 | 1076.9 | 1095.4 | 1128.2 | 1053.8 | 982.3  | 968.7  | 714.0  |
| 47.5° | 997.0  | 990.8  | 1003.6 | 1027.7 | 1069.8 | 1116.8 | 1181.6 | 1126.0 | 1063.7 | 1050.2 | 785.7  |
| 50°   | 918.4  | 920.2  | 938.5  | 982.2  | 1045.9 | 1126.6 | 1247.4 | 1221.6 | 1182.0 | 1169.4 | 883.4  |
| 52.5° | 789.4  | 789.7  | 841.2  | 913.0  | 1003.6 | 1121.5 | 1283.9 | 1343.8 | 1343.6 | 1328.4 | 976.4  |
| 55°   | 669.6  | 676.9  | 717.6  | 813.1  | 935.0  | 1101.2 | 1309.4 | 1403.2 | 1449.7 | 1431.9 | 1063.2 |
| 57.5° | 552.6  | 556.8  | 595.5  | 691.3  | 837.1  | 1046.9 | 1335.6 | 1474.5 | 1571.9 | 1560.7 | 1171.0 |
| 60°   | 419.5  | 426.0  | 466.0  | 554.5  | 711.9  | 950.7  | 1338.1 | 1548.9 | 1718.1 | 1706.7 | 1291.4 |
| 62.5° | 272.3  | 283.6  | 321.0  | 404.0  | 560.4  | 812.3  | 1281.0 | 1597.6 | 1856.6 | 1852.5 | 1398.2 |
| 65°   | 156.5  | 165.0  | 191.0  | 255.0  | 386.6  | 638.5  | 1145.2 | 1578.9 | 1941.8 | 1939.5 | 1438.2 |
| 66°   | 127.8  | 133.2  | 153.1  | 199.3  | 319.0  | 560.7  | 1066.2 | 1539.4 | 1950.3 | 1950.4 | 1433.6 |
| 67.5° | 102.2  | 104.6  | 113.6  | 142.7  | 235.4  | 444.4  | 925.2  | 1452.4 | 1939.8 | 1942.6 | 1404.0 |
| 70°   | 84.6   | 85.8   | 88.6   | 95.7   | 128.5  | 268.0  | 656.7  | 1226.1 | 1834.3 | 1836.5 | 1288.3 |
| 72.5° | 75.9   | 76.6   | 77.7   | 78.7   | 90.7   | 149.7  | 401.1  | 980.9  | 1608.3 | 1611.1 | 1112.2 |
| 75°   | 68.8   | 69.2   | 69.0   | 69.1   | 76.1   | 95.4   | 207.3  | 732.3  | 1300.4 | 1294.7 | 852.0  |
| 77.5° | 60.4   | 60.8   | 60.0   | 60.1   | 67.3   | 73.4   | 103.1  | 512.7  | 877.6  | 837.0  | 480.0  |
| 80°   | 51.0   | 51.4   | 51.0   | 51.6   | 58.6   | 55.4   | 60.0   | 288.4  | 388.0  | 367.0  | 170.7  |
| 82.5° | 38.6   | 40.0   | 40.9   | 43.2   | 48.2   | 39.4   | 40.1   | 112.3  | 118.2  | 112.5  | 52.4   |
| 85°   | 16.9   | 20.6   | 30.9   | 33.1   | 36.3   | 23.6   | 26.3   | 45.8   | 48.1   | 46.6   | 19.0   |
| 87.5° | 4.4    | 4.8    | 15.3   | 19.2   | 20.1   | 10.7   | 13.7   | 20.8   | 22.0   | 20.8   | 6.3    |
| 90°   | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |



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CATALOG NUMBER: ARCH-N-PA1-19-830-24VDC-T2R

**CANDELA DISTRIBUTION (continued):**

|       | 90°   | 95°   | 105°  | 115°  | 125°  | 135°  | 145°  | 155°  | 165°  | 175°  | 180°  |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 0°    | 220.7 | 220.7 | 220.7 | 220.7 | 220.7 | 220.7 | 220.7 | 220.7 | 220.7 | 220.7 | 220.7 |
| 2.5°  | 223.2 | 219.2 | 211.9 | 205.5 | 200.7 | 197.4 | 194.1 | 192.5 | 191.5 | 190.5 | 190.7 |
| 5°    | 230.3 | 222.2 | 209.8 | 201.0 | 196.1 | 193.0 | 191.4 | 190.7 | 190.3 | 189.3 | 189.3 |
| 7.5°  | 241.1 | 229.6 | 212.5 | 203.5 | 199.6 | 197.3 | 196.3 | 195.9 | 195.5 | 194.3 | 194.5 |
| 10°   | 254.6 | 238.5 | 218.2 | 209.4 | 205.9 | 203.2 | 201.9 | 201.4 | 200.5 | 199.1 | 199.3 |
| 12.5° | 270.5 | 249.6 | 225.6 | 216.5 | 212.2 | 208.7 | 206.4 | 205.0 | 203.4 | 201.7 | 201.8 |
| 15°   | 287.9 | 261.7 | 233.7 | 222.8 | 217.0 | 212.0 | 208.3 | 206.0 | 203.5 | 201.4 | 201.3 |
| 17.5° | 305.6 | 273.3 | 239.8 | 226.2 | 218.3 | 211.9 | 206.9 | 203.2 | 200.1 | 197.5 | 197.3 |
| 20°   | 324.6 | 283.8 | 243.3 | 225.9 | 215.7 | 208.0 | 201.4 | 196.8 | 193.4 | 190.8 | 190.4 |
| 22.5° | 344.0 | 293.7 | 243.9 | 222.5 | 209.9 | 200.5 | 193.5 | 188.4 | 185.0 | 182.2 | 181.3 |
| 25°   | 361.7 | 301.3 | 241.5 | 216.0 | 201.8 | 191.6 | 184.8 | 179.6 | 176.8 | 173.6 | 172.6 |
| 27.5° | 377.9 | 306.6 | 236.7 | 207.8 | 192.7 | 182.7 | 176.3 | 171.8 | 168.8 | 166.3 | 165.5 |
| 30°   | 392.4 | 309.5 | 228.9 | 197.9 | 183.3 | 174.2 | 168.8 | 165.8 | 163.1 | 160.0 | 159.4 |
| 32.5° | 406.2 | 309.5 | 218.9 | 187.2 | 174.0 | 166.7 | 163.5 | 161.6 | 158.7 | 155.7 | 154.8 |
| 35°   | 420.0 | 307.6 | 207.1 | 175.9 | 165.5 | 161.4 | 161.2 | 159.0 | 154.5 | 150.4 | 149.3 |
| 37.5° | 434.5 | 303.8 | 193.8 | 165.4 | 158.5 | 159.0 | 160.4 | 155.5 | 149.1 | 143.3 | 141.7 |
| 40°   | 450.9 | 298.4 | 180.0 | 156.3 | 152.7 | 158.0 | 158.2 | 150.4 | 137.9 | 132.6 | 131.2 |
| 42.5° | 470.2 | 293.1 | 167.2 | 148.3 | 148.1 | 154.8 | 154.0 | 139.4 | 131.9 | 129.2 | 128.5 |
| 45°   | 495.5 | 290.1 | 155.1 | 140.6 | 144.5 | 149.6 | 146.9 | 133.3 | 130.2 | 128.7 | 128.0 |
| 47.5° | 535.5 | 291.6 | 143.9 | 134.6 | 140.9 | 144.4 | 133.6 | 130.9 | 128.7 | 126.8 | 126.1 |
| 50°   | 585.5 | 290.7 | 134.9 | 130.4 | 136.8 | 139.0 | 127.6 | 127.7 | 126.5 | 124.4 | 123.4 |
| 52.5° | 623.2 | 283.7 | 129.1 | 128.0 | 133.2 | 129.4 | 123.8 | 124.6 | 124.0 | 120.9 | 119.8 |
| 55°   | 659.6 | 277.6 | 126.1 | 127.1 | 130.5 | 117.4 | 119.4 | 121.2 | 120.6 | 117.6 | 117.1 |
| 57.5° | 704.8 | 276.4 | 124.3 | 127.3 | 128.3 | 111.4 | 115.1 | 117.5 | 117.1 | 115.8 | 115.5 |
| 60°   | 760.2 | 276.8 | 122.7 | 127.8 | 125.9 | 107.0 | 111.1 | 114.1 | 114.4 | 114.1 | 114.0 |
| 62.5° | 790.6 | 267.8 | 118.6 | 126.6 | 121.5 | 103.1 | 106.9 | 111.3 | 111.4 | 111.9 | 111.8 |
| 65°   | 764.7 | 241.1 | 110.9 | 122.6 | 114.2 | 99.9  | 103.3 | 108.1 | 106.9 | 109.1 | 109.1 |
| 66°   | 739.6 | 225.6 | 107.2 | 120.0 | 111.1 | 98.7  | 102.2 | 106.5 | 104.9 | 108.0 | 108.0 |
| 67.5° | 688.4 | 199.6 | 100.4 | 114.4 | 106.7 | 97.0  | 100.8 | 103.8 | 101.7 | 106.2 | 105.9 |
| 70°   | 594.6 | 154.4 | 86.6  | 101.7 | 99.4  | 94.4  | 99.0  | 98.4  | 95.3  | 102.2 | 100.8 |
| 72.5° | 501.4 | 117.3 | 69.6  | 85.2  | 88.3  | 91.2  | 96.5  | 91.5  | 87.6  | 92.4  | 89.5  |
| 75°   | 389.0 | 88.2  | 55.0  | 66.2  | 74.6  | 86.2  | 93.5  | 83.5  | 77.9  | 77.4  | 75.8  |
| 77.5° | 210.3 | 60.6  | 43.6  | 50.5  | 59.2  | 80.0  | 91.4  | 75.0  | 66.5  | 64.5  | 63.3  |
| 80°   | 83.3  | 39.4  | 31.7  | 38.3  | 41.4  | 71.0  | 86.5  | 65.1  | 54.8  | 52.8  | 51.0  |
| 82.5° | 34.4  | 23.3  | 20.4  | 25.7  | 27.0  | 60.7  | 77.6  | 53.3  | 42.3  | 58.6  | 62.2  |
| 85°   | 14.8  | 12.8  | 12.1  | 13.3  | 15.3  | 42.6  | 61.8  | 40.7  | 45.7  | 40.8  | 32.4  |
| 87.5° | 4.4   | 5.4   | 5.2   | 5.1   | 5.6   | 10.2  | 32.9  | 22.6  | 33.6  | 12.7  | 9.5   |
| 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)

INVUE

Report Number: SP1-2104-224-6

Luminaire Tested: CCW-SA-2A-830-U-SL4

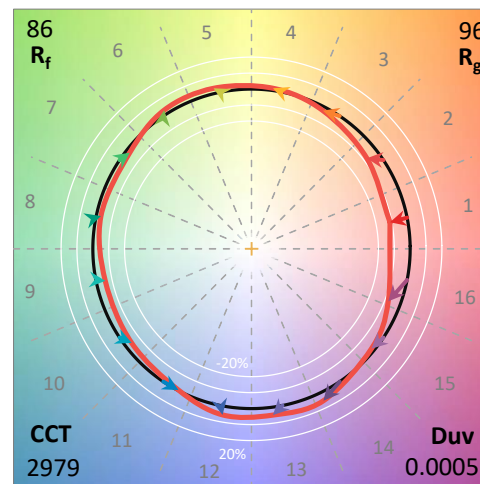
Test Date: 04/27/2021

### Test Information

Test Method: LM-79-08  
 Report Number: SP1-2104-224-6  
 Test Lab: COOPER LIGHTING SOLUTIONS  
 Photometer: SP1  
 Measurement Geometry:  $4\pi$   
 Issue Date: 04/27/2021  
 Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
 Product Line: INVUE  
 Catalog Number: **CCW-SA-2A-830-U-SL4**  
 Description: INVUE WALL PACK ClearCurve Light Square

### Spectral Parameters

|                           |        |           |      |      |      |
|---------------------------|--------|-----------|------|------|------|
| CCT (K):                  | 2979   | CRI (Ra): | 83.1 |      |      |
| CIE u':                   | 0.2511 | R1:       | 81.3 | R9:  | 7.1  |
| CIE v':                   | 0.5225 | R2:       | 91.2 | R10: | 80.8 |
| Duv:                      | 0.0005 | R3:       | 96.2 | R11: | 82.0 |
| CIE x:                    | 0.4390 | R4:       | 81.7 | R12: | 76.3 |
| CIE y:                    | 0.4060 | R5:       | 82.0 | R13: | 83.6 |
| CIE z:                    | 0.1550 | R6:       | 90.2 | R14: | 98.4 |
| Peak Wavelength (nm):     | 603    | R7:       | 82.8 |      |      |
| Dominant Wavelength (nm): | 582    | R8:       | 58.9 |      |      |
| Purity:                   | 54     |           |      |      |      |
| Rf:                       | 86     |           |      |      |      |
| Rg:                       | 96.1   |           |      |      |      |



### Test Conditions

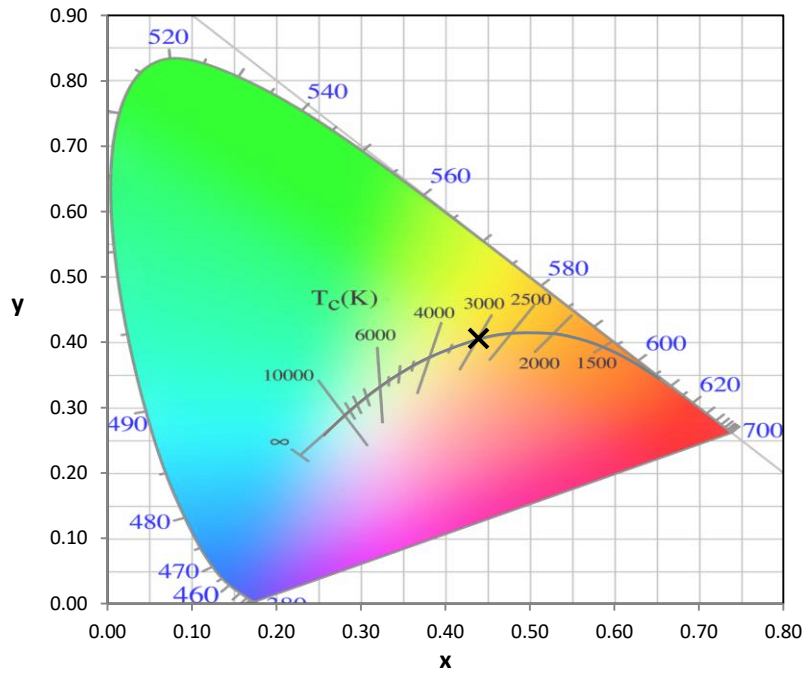
Stabilization Time: 78M  
 Operation Time: 12H  
 Room Temperature (°C) / RH%: 25.0/47%  
 Sphere Temperature (°C): 24.1

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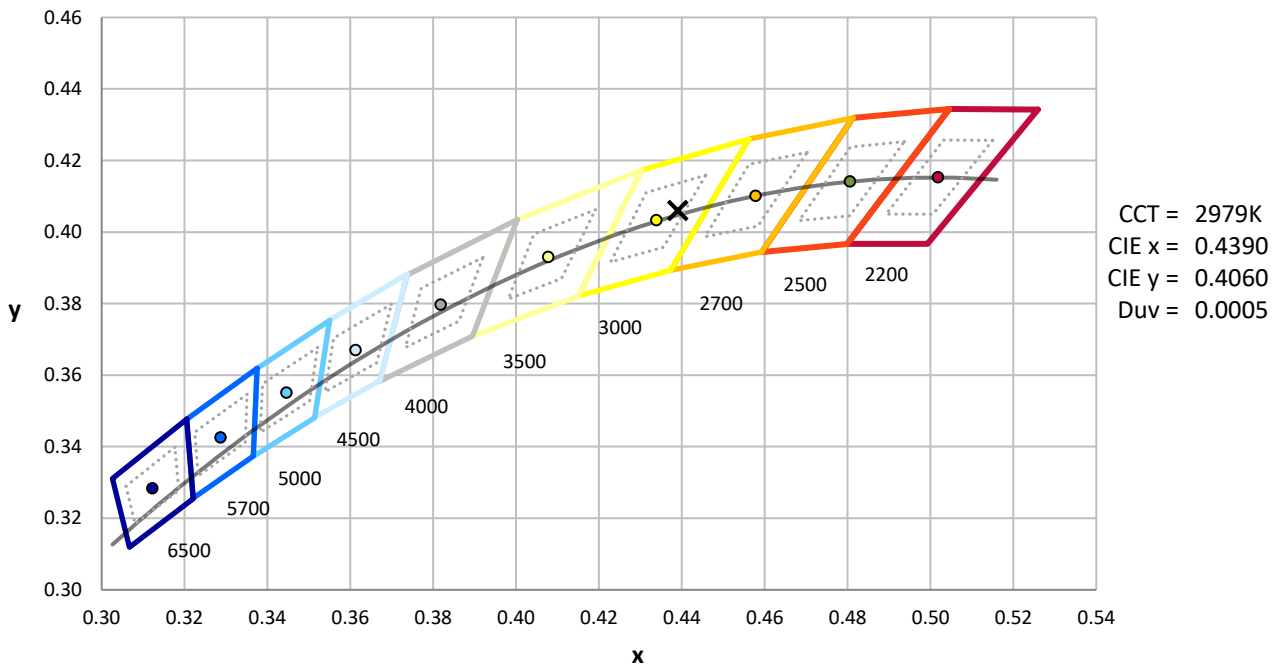
| Measurement and Test Equipment |                       |                  |                      |
|--------------------------------|-----------------------|------------------|----------------------|
| Instrument                     | Identification Number | Calibration Date | Calibration Due Date |
| Photometer                     | IN0058                | 1/31/2021        | 7/31/2021            |
| Power Meter                    | IN0071                | 12/1/2020        | 12/1/2021            |
| AC Power Source                | IN0063                | 12/1/2020        | 12/1/2021            |
| DC Power Source                | IN0208                | 12/1/2020        | 12/1/2021            |
| Sphere Thermometer             | IN0085                | 12/1/2020        | 12/1/2021            |
| Room Thermometer               | IN0046                | 12/1/2020        | 12/1/2021            |

REPORT NUMBER: SP1-2104-224-6

**CIE 1931 Chromaticity Diagram**



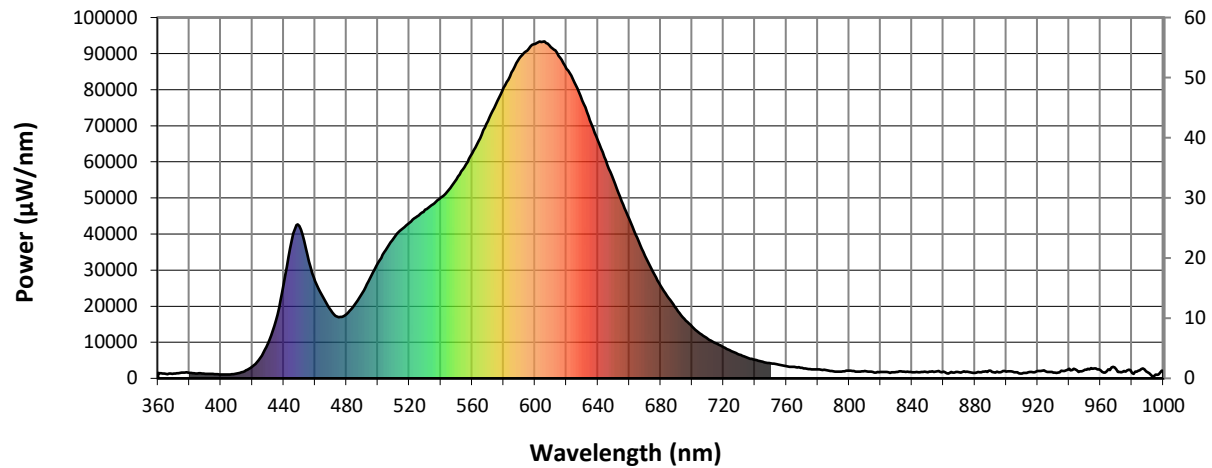
**CIE 1931 Chromaticity Diagram with 2017 ANSI 7-Step and 4-Step Quadrangles**



Point lies inside the ANSI 3000K 4-step quadrangle

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### Photopic Flux vs. Wavelength

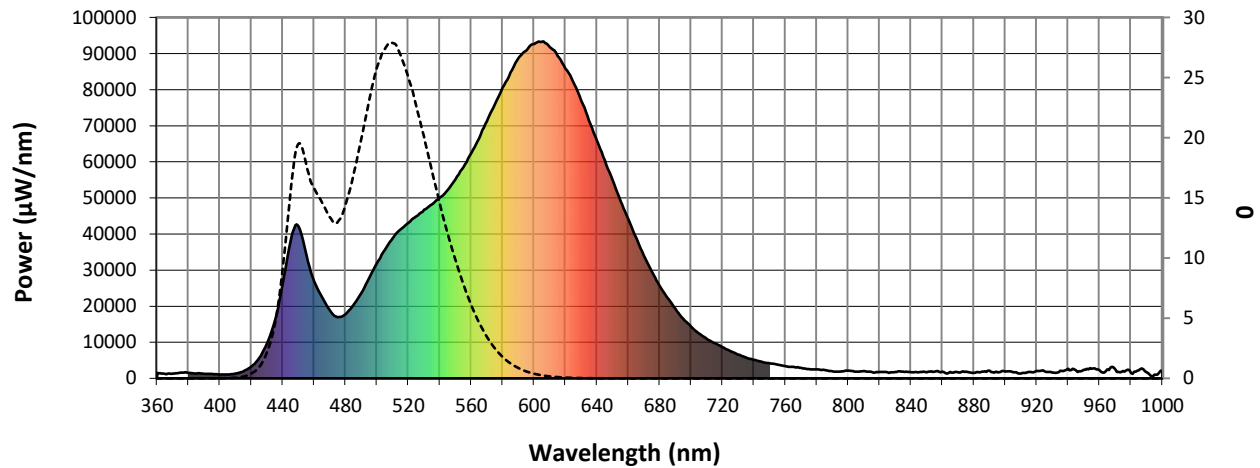


#####

| 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       | 1540             | 0.0              | 490       | 23715            | 3.4              | 620       | 85792            | 22.3             | 750       | 4198             | 0.0              | 880       | 1529             | 0.0              |
| 365       | 1274             | 0.0              | 495       | 27763            | 5.0              | 625       | 82163            | 18.1             | 755       | 3846             | 0.0              | 885       | 1863             | 0.0              |
| 370       | 1307             | 0.0              | 500       | 32023            | 7.1              | 630       | 76960            | 13.9             | 760       | 3380             | 0.0              | 890       | 2114             | 0.0              |
| 375       | 1612             | 0.0              | 505       | 35605            | 10.0             | 635       | 71512            | 10.7             | 765       | 3174             | 0.0              | 895       | 1695             | 0.0              |
| 380       | 1536             | 0.0              | 510       | 38842            | 13.3             | 640       | 65929            | 7.9              | 770       | 2898             | 0.0              | 900       | 1843             | 0.0              |
| 385       | 1342             | 0.0              | 515       | 41267            | 17.1             | 645       | 60362            | 5.8              | 775       | 2539             | 0.0              | 905       | 1730             | 0.0              |
| 390       | 1278             | 0.0              | 520       | 43140            | 20.9             | 650       | 55010            | 4.0              | 780       | 2473             | 0.0              | 910       | 1325             | 0.0              |
| 395       | 1204             | 0.0              | 525       | 44884            | 24.1             | 655       | 49154            | 2.8              | 785       | 2349             | 0.0              | 915       | 1786             | 0.0              |
| 400       | 1038             | 0.0              | 530       | 46722            | 27.5             | 660       | 44162            | 1.8              | 790       | 1939             | 0.0              | 920       | 2044             | 0.0              |
| 405       | 1061             | 0.0              | 535       | 48254            | 29.9             | 665       | 38916            | 1.2              | 795       | 1859             | 0.0              | 925       | 1947             | 0.0              |
| 410       | 1327             | 0.0              | 540       | 50064            | 32.6             | 670       | 33949            | 0.7              | 800       | 2145             | 0.0              | 930       | 1610             | 0.0              |
| 415       | 1996             | 0.0              | 545       | 52217            | 34.8             | 675       | 29528            | 0.5              | 805       | 1833             | 0.0              | 935       | 2111             | 0.0              |
| 420       | 3268             | 0.0              | 550       | 55198            | 37.5             | 680       | 25626            | 0.3              | 810       | 2023             | 0.0              | 940       | 2657             | 0.0              |
| 425       | 5667             | 0.0              | 555       | 58564            | 40.0             | 685       | 22299            | 0.2              | 815       | 1752             | 0.0              | 945       | 2238             | 0.0              |
| 430       | 9713             | 0.1              | 560       | 62385            | 42.4             | 690       | 19299            | 0.1              | 820       | 1756             | 0.0              | 950       | 2401             | 0.0              |
| 435       | 16063            | 0.2              | 565       | 66522            | 44.2             | 695       | 16488            | 0.1              | 825       | 1713             | 0.0              | 955       | 2656             | 0.0              |
| 440       | 26124            | 0.4              | 570       | 71254            | 46.3             | 700       | 14392            | 0.0              | 830       | 1766             | 0.0              | 960       | 2228             | 0.0              |
| 445       | 38102            | 0.8              | 575       | 75923            | 47.2             | 705       | 12426            | 0.0              | 835       | 1901             | 0.0              | 965       | 2517             | 0.0              |
| 450       | 42175            | 1.1              | 580       | 80516            | 47.8             | 710       | 10953            | 0.0              | 840       | 1722             | 0.0              | 970       | 2476             | 0.0              |
| 455       | 34315            | 1.1              | 585       | 84772            | 47.1             | 715       | 9724             | 0.0              | 845       | 1694             | 0.0              | 975       | 2085             | 0.0              |
| 460       | 26966            | 1.1              | 590       | 88815            | 45.9             | 720       | 8614             | 0.0              | 850       | 1717             | 0.0              | 980       | 1509             | 0.0              |
| 465       | 22504            | 1.2              | 595       | 90846            | 43.1             | 725       | 7544             | 0.0              | 855       | 1853             | 0.0              | 985       | 2241             | 0.0              |
| 470       | 18776            | 1.2              | 600       | 92683            | 39.9             | 730       | 6583             | 0.0              | 860       | 1827             | 0.0              | 990       | 1651             | 0.0              |
| 475       | 16954            | 1.3              | 605       | 93294            | 36.1             | 735       | 5796             | 0.0              | 865       | 1745             | 0.0              | 995       | 1035             | 0.0              |
| 480       | 17815            | 1.7              | 610       | 91814            | 31.5             | 740       | 5170             | 0.0              | 870       | 1690             | 0.0              | 1000      | 2009             | 0.0              |
| 485       | 20300            | 2.4              | 615       | 89370            | 27.0             | 745       | 4593             | 0.0              | 875       | 1834             | 0.0              |           |                  |                  |

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### Scotopic Flux vs. Wavelength



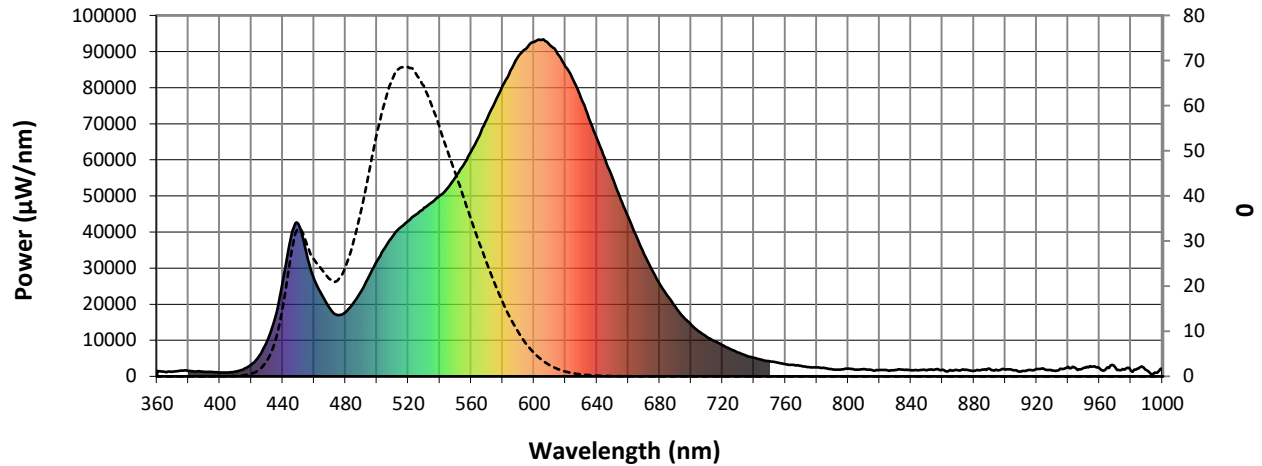
Scotopic Lumens: 6076.4

S/P: 1.34

| 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       | 1540             | 0.0              | 490       | 23715            | 36.5             | 620       | 85792            | 1.1              | 750       | 4198             | 0.0              | 880       | 1529             | 0.0              |
| 365       | 1274             | 0.0              | 495       | 27763            | 44.9             | 625       | 82163            | 0.7              | 755       | 3846             | 0.0              | 885       | 1863             | 0.0              |
| 370       | 1307             | 0.0              | 500       | 32023            | 53.6             | 630       | 76960            | 0.4              | 760       | 3380             | 0.0              | 890       | 2114             | 0.0              |
| 375       | 1612             | 0.0              | 505       | 35605            | 60.5             | 635       | 71512            | 0.3              | 765       | 3174             | 0.0              | 895       | 1695             | 0.0              |
| 380       | 1536             | 0.0              | 510       | 38842            | 65.8             | 640       | 65929            | 0.2              | 770       | 2898             | 0.0              | 900       | 1843             | 0.0              |
| 385       | 1342             | 0.0              | 515       | 41267            | 68.4             | 645       | 60362            | 0.1              | 775       | 2539             | 0.0              | 905       | 1730             | 0.0              |
| 390       | 1278             | 0.0              | 520       | 43140            | 68.6             | 650       | 55010            | 0.1              | 780       | 2473             | 0.0              | 910       | 1325             | 0.0              |
| 395       | 1204             | 0.0              | 525       | 44884            | 67.1             | 655       | 49154            | 0.0              | 785       | 2349             | 0.0              | 915       | 1786             | 0.0              |
| 400       | 1038             | 0.0              | 530       | 46722            | 64.4             | 660       | 44162            | 0.0              | 790       | 1939             | 0.0              | 920       | 2044             | 0.0              |
| 405       | 1061             | 0.0              | 535       | 48254            | 60.1             | 665       | 38916            | 0.0              | 795       | 1859             | 0.0              | 925       | 1947             | 0.0              |
| 410       | 1327             | 0.1              | 540       | 50064            | 55.3             | 670       | 33949            | 0.0              | 800       | 2145             | 0.0              | 930       | 1610             | 0.0              |
| 415       | 1996             | 0.2              | 545       | 52217            | 50.1             | 675       | 29528            | 0.0              | 805       | 1833             | 0.0              | 935       | 2111             | 0.0              |
| 420       | 3268             | 0.5              | 550       | 55198            | 45.1             | 680       | 25626            | 0.0              | 810       | 2023             | 0.0              | 940       | 2657             | 0.0              |
| 425       | 5667             | 1.4              | 555       | 58564            | 40.0             | 685       | 22299            | 0.0              | 815       | 1752             | 0.0              | 945       | 2238             | 0.0              |
| 430       | 9713             | 3.3              | 560       | 62385            | 34.9             | 690       | 19299            | 0.0              | 820       | 1756             | 0.0              | 950       | 2401             | 0.0              |
| 435       | 16063            | 7.2              | 565       | 66522            | 29.8             | 695       | 16488            | 0.0              | 825       | 1713             | 0.0              | 955       | 2656             | 0.0              |
| 440       | 26124            | 14.6             | 570       | 71254            | 25.1             | 700       | 14392            | 0.0              | 830       | 1766             | 0.0              | 960       | 2228             | 0.0              |
| 445       | 38102            | 25.5             | 575       | 75923            | 20.7             | 705       | 12426            | 0.0              | 835       | 1901             | 0.0              | 965       | 2517             | 0.0              |
| 450       | 42175            | 32.7             | 580       | 80516            | 16.6             | 710       | 10953            | 0.0              | 840       | 1722             | 0.0              | 970       | 2476             | 0.0              |
| 455       | 34315            | 30.0             | 585       | 84772            | 13.0             | 715       | 9724             | 0.0              | 845       | 1694             | 0.0              | 975       | 2085             | 0.0              |
| 460       | 26966            | 26.0             | 590       | 88815            | 9.9              | 720       | 8614             | 0.0              | 850       | 1717             | 0.0              | 980       | 1509             | 0.0              |
| 465       | 22504            | 23.8             | 595       | 90846            | 7.2              | 725       | 7544             | 0.0              | 855       | 1853             | 0.0              | 985       | 2241             | 0.0              |
| 470       | 18776            | 21.6             | 600       | 92683            | 5.2              | 730       | 6583             | 0.0              | 860       | 1827             | 0.0              | 990       | 1651             | 0.0              |
| 475       | 16954            | 21.2             | 605       | 93294            | 3.7              | 735       | 5796             | 0.0              | 865       | 1745             | 0.0              | 995       | 1035             | 0.0              |
| 480       | 17815            | 24.1             | 610       | 91814            | 2.5              | 740       | 5170             | 0.0              | 870       | 1690             | 0.0              | 1000      | 2009             | 0.0              |
| 485       | 20300            | 29.4             | 615       | 89370            | 1.7              | 745       | 4593             | 0.0              | 875       | 1834             | 0.0              |           |                  |                  |

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### Melanopic Flux vs. Wavelength


**Melanopic Lumens: 2300.1**
**M/P: 0.51**

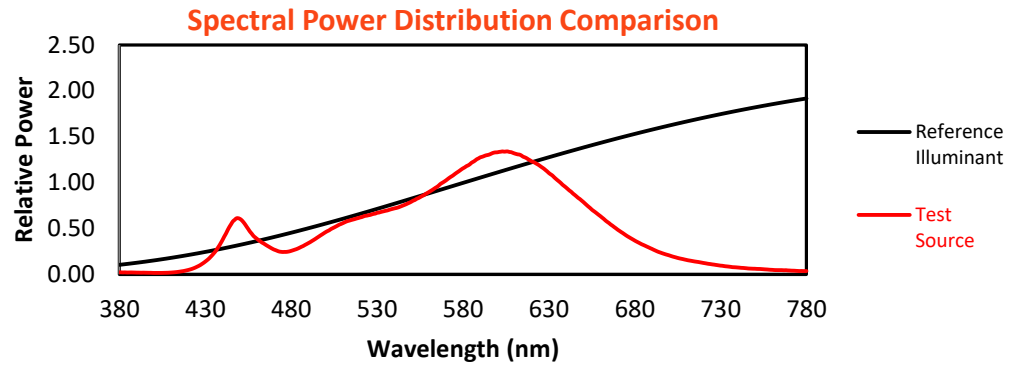
| λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) |
|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|
| 360       | 1540             | 0.0              | 490       | 23715            | 19.7             | 620       | 85792            | 0.1              | 750       | 4198             | 0.0              | 880       | 1529             | 0.0              |
| 365       | 1274             | 0.0              | 495       | 27763            | 22.9             | 625       | 82163            | 0.0              | 755       | 3846             | 0.0              | 885       | 1863             | 0.0              |
| 370       | 1307             | 0.0              | 500       | 32023            | 25.7             | 630       | 76960            | 0.0              | 760       | 3380             | 0.0              | 890       | 2114             | 0.0              |
| 375       | 1612             | 0.0              | 505       | 35605            | 27.3             | 635       | 71512            | 0.0              | 765       | 3174             | 0.0              | 895       | 1695             | 0.0              |
| 380       | 1536             | 0.0              | 510       | 38842            | 27.9             | 640       | 65929            | 0.0              | 770       | 2898             | 0.0              | 900       | 1843             | 0.0              |
| 385       | 1342             | 0.0              | 515       | 41267            | 27.0             | 645       | 60362            | 0.0              | 775       | 2539             | 0.0              | 905       | 1730             | 0.0              |
| 390       | 1278             | 0.0              | 520       | 43140            | 25.1             | 650       | 55010            | 0.0              | 780       | 2473             | 0.0              | 910       | 1325             | 0.0              |
| 395       | 1204             | 0.0              | 525       | 44884            | 22.8             | 655       | 49154            | 0.0              | 785       | 2349             | 0.0              | 915       | 1786             | 0.0              |
| 400       | 1038             | 0.0              | 530       | 46722            | 20.2             | 660       | 44162            | 0.0              | 790       | 1939             | 0.0              | 920       | 2044             | 0.0              |
| 405       | 1061             | 0.0              | 535       | 48254            | 17.4             | 665       | 38916            | 0.0              | 795       | 1859             | 0.0              | 925       | 1947             | 0.0              |
| 410       | 1327             | 0.1              | 540       | 50064            | 14.7             | 670       | 33949            | 0.0              | 800       | 2145             | 0.0              | 930       | 1610             | 0.0              |
| 415       | 1996             | 0.1              | 545       | 52217            | 12.1             | 675       | 29528            | 0.0              | 805       | 1833             | 0.0              | 935       | 2111             | 0.0              |
| 420       | 3268             | 0.4              | 550       | 55198            | 9.9              | 680       | 25626            | 0.0              | 810       | 2023             | 0.0              | 940       | 2657             | 0.0              |
| 425       | 5667             | 0.9              | 555       | 58564            | 7.9              | 685       | 22299            | 0.0              | 815       | 1752             | 0.0              | 945       | 2238             | 0.0              |
| 430       | 9713             | 2.1              | 560       | 62385            | 6.2              | 690       | 19299            | 0.0              | 820       | 1756             | 0.0              | 950       | 2401             | 0.0              |
| 435       | 16063            | 4.3              | 565       | 66522            | 4.7              | 695       | 16488            | 0.0              | 825       | 1713             | 0.0              | 955       | 2656             | 0.0              |
| 440       | 26124            | 8.7              | 570       | 71254            | 3.5              | 700       | 14392            | 0.0              | 830       | 1766             | 0.0              | 960       | 2228             | 0.0              |
| 445       | 38102            | 15.0             | 575       | 75923            | 2.5              | 705       | 12426            | 0.0              | 835       | 1901             | 0.0              | 965       | 2517             | 0.0              |
| 450       | 42175            | 19.4             | 580       | 80516            | 1.8              | 710       | 10953            | 0.0              | 840       | 1722             | 0.0              | 970       | 2476             | 0.0              |
| 455       | 34315            | 18.0             | 585       | 84772            | 1.3              | 715       | 9724             | 0.0              | 845       | 1694             | 0.0              | 975       | 2085             | 0.0              |
| 460       | 26966            | 15.9             | 590       | 88815            | 0.9              | 720       | 8614             | 0.0              | 850       | 1717             | 0.0              | 980       | 1509             | 0.0              |
| 465       | 22504            | 14.7             | 595       | 90846            | 0.6              | 725       | 7544             | 0.0              | 855       | 1853             | 0.0              | 985       | 2241             | 0.0              |
| 470       | 18776            | 13.4             | 600       | 92683            | 0.4              | 730       | 6583             | 0.0              | 860       | 1827             | 0.0              | 990       | 1651             | 0.0              |
| 475       | 16954            | 12.9             | 605       | 93294            | 0.3              | 735       | 5796             | 0.0              | 865       | 1745             | 0.0              | 995       | 1035             | 0.0              |
| 480       | 17815            | 14.3             | 610       | 91814            | 0.2              | 740       | 5170             | 0.0              | 870       | 1690             | 0.0              | 1000      | 2009             | 0.0              |
| 485       | 20300            | 16.7             | 615       | 89370            | 0.1              | 745       | 4593             | 0.0              | 875       | 1834             | 0.0              |           |                  |                  |

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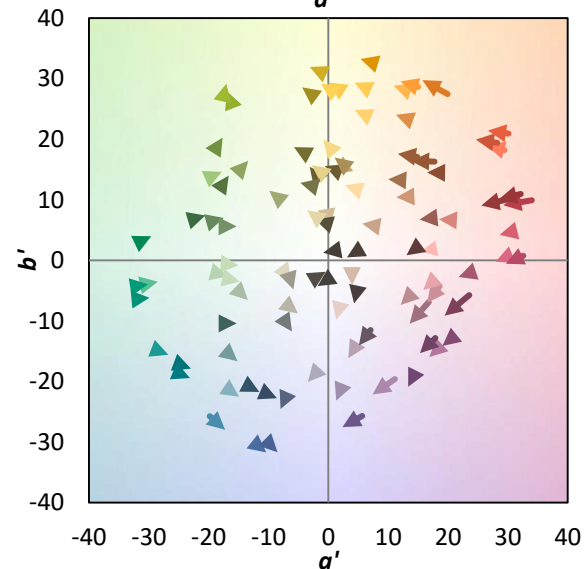
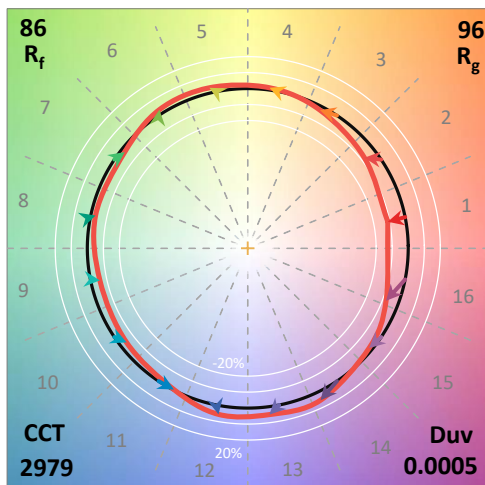
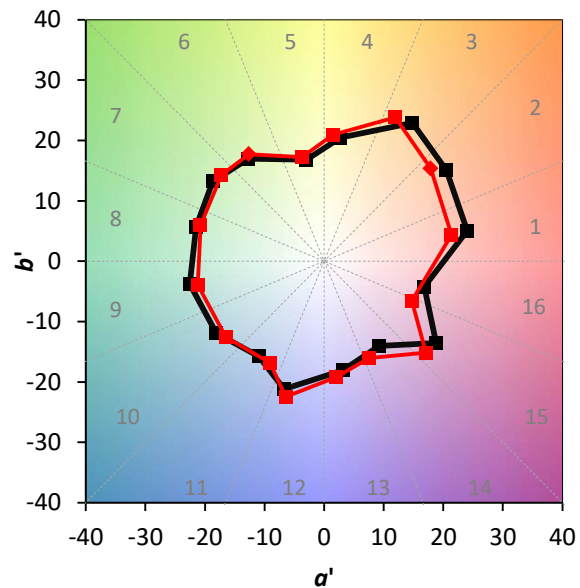
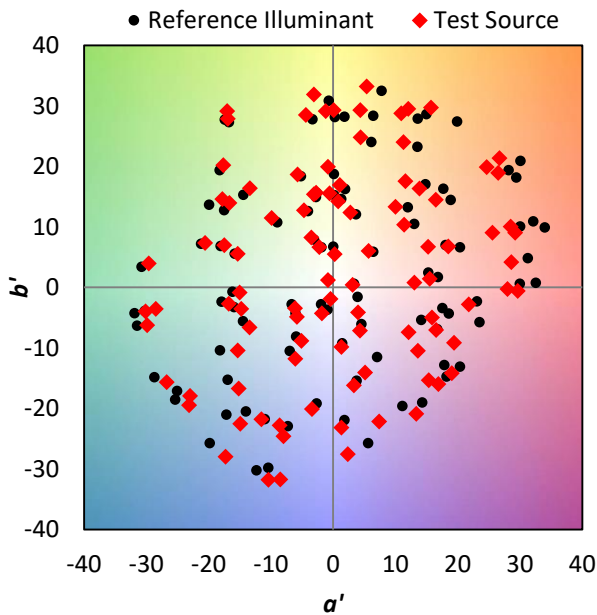
TM-30-18

### Summary

$R_f = 86$   
 $R_g = 96.1$   
 CIE  $R_a = 83.1$   
 $R_9 = 7.1$



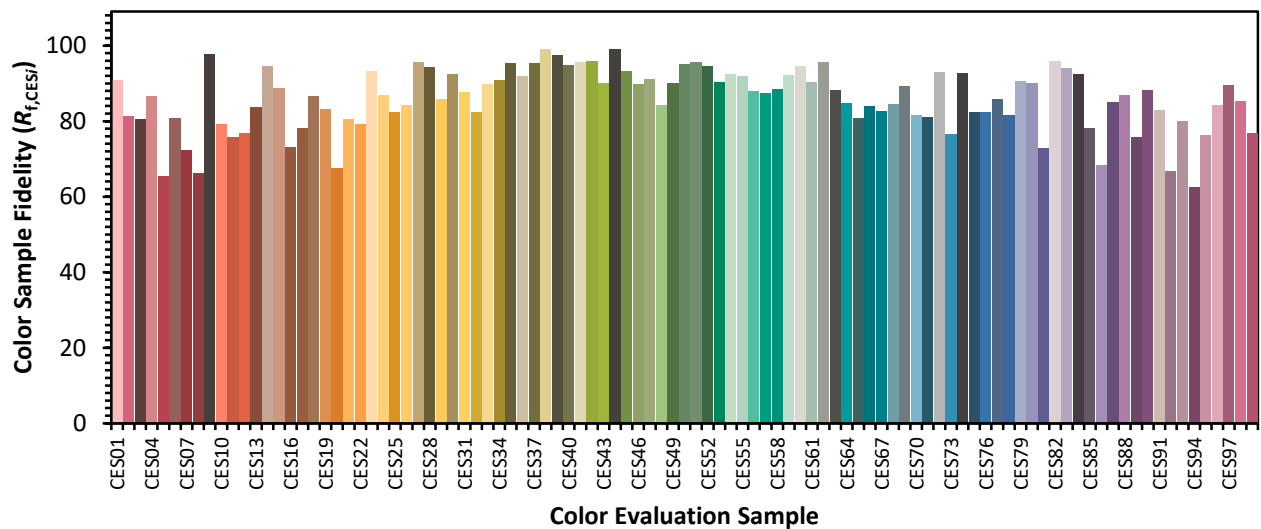
### Color Vector Graphics



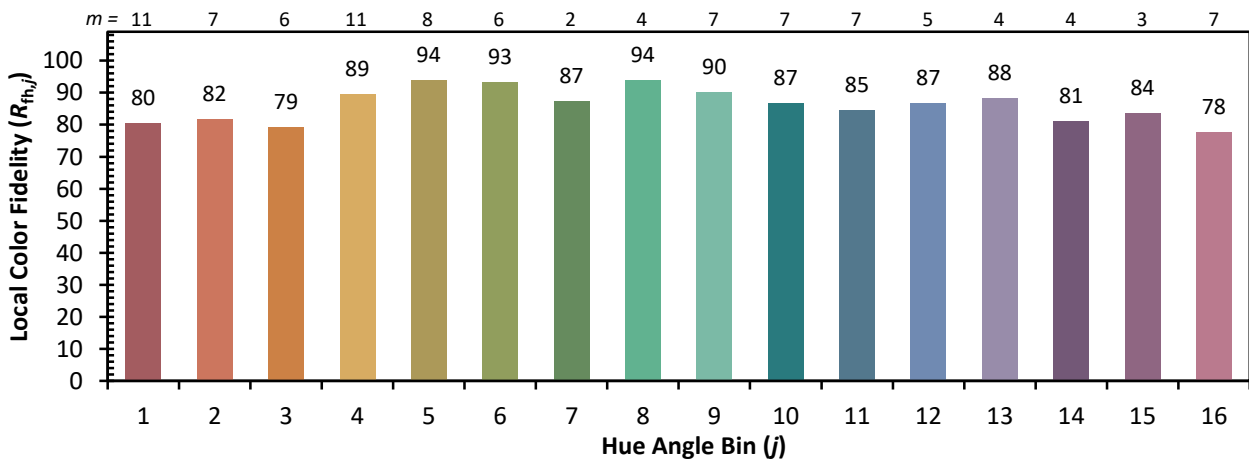
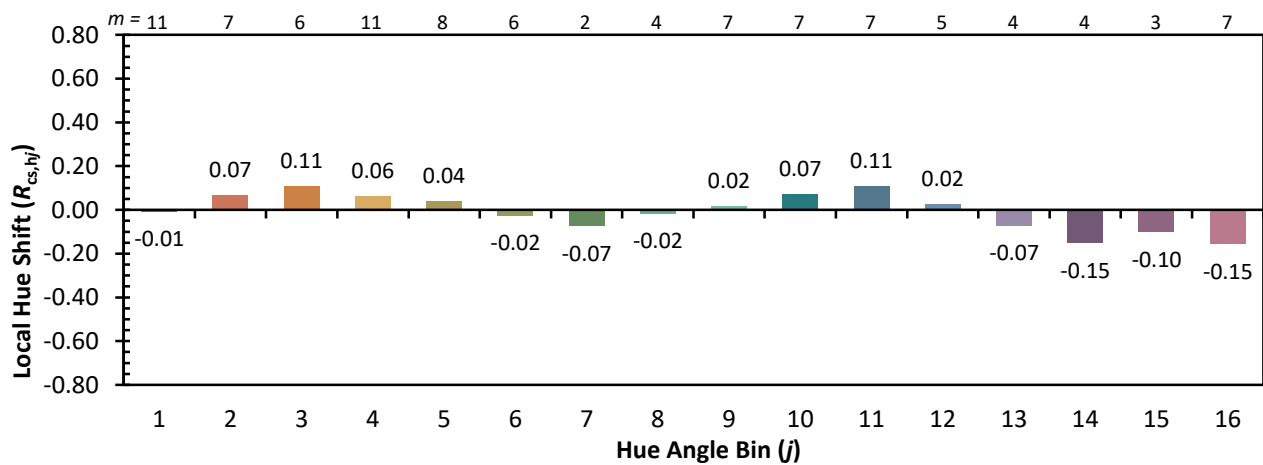
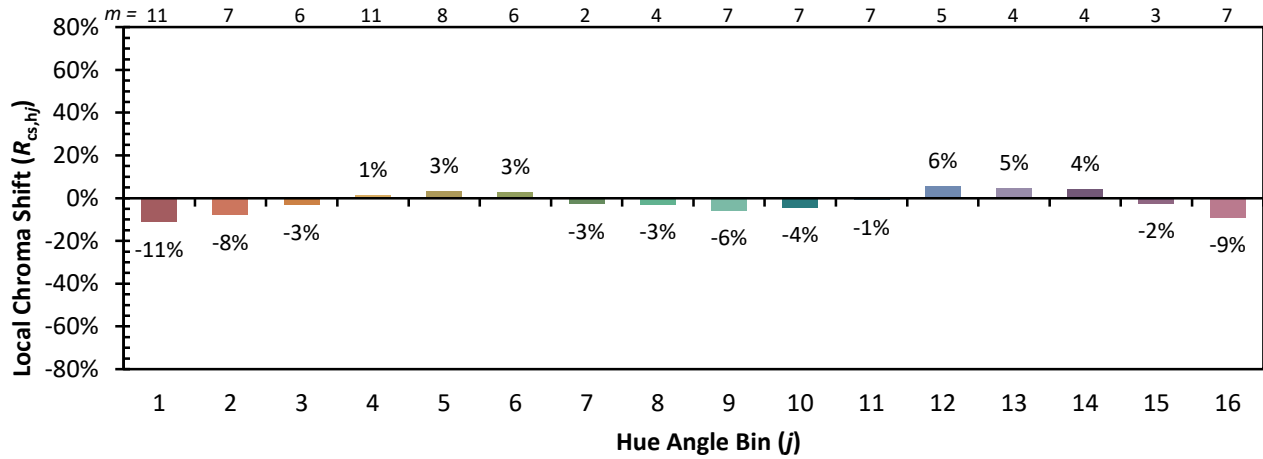


Individual Sample Fidelity Index ( $R_{f,i}$ )

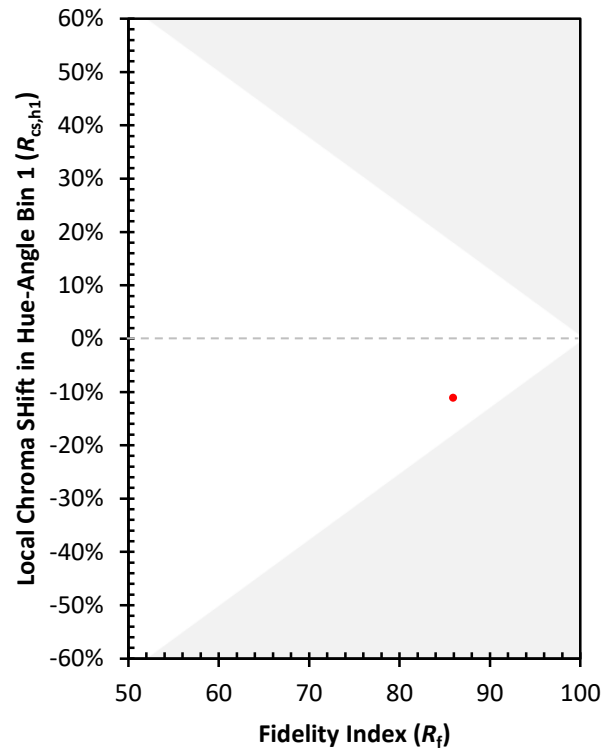
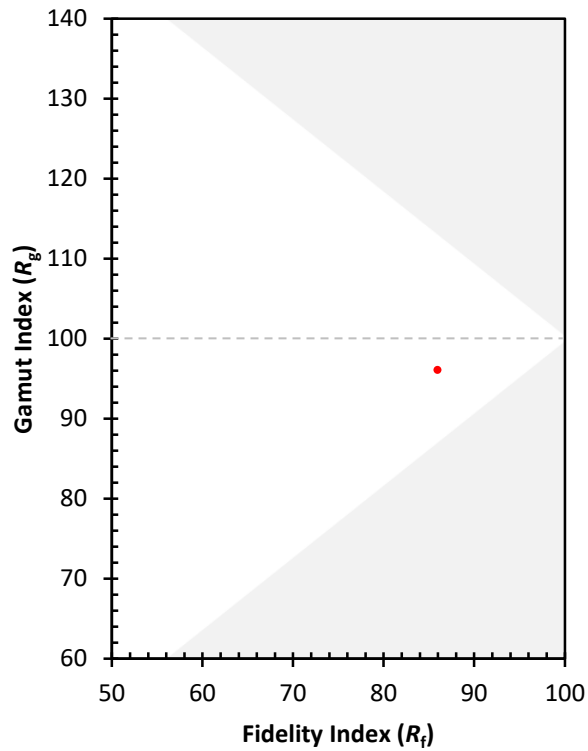
|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 86 | CES26 = 84 | CES51 = 96 | CES76 = 82 |
| CES02 = 63 | CES27 = 96 | CES52 = 95 | CES77 = 86 |
| CES03 = 31 | CES28 = 94 | CES53 = 90 | CES78 = 82 |
| CES04 = 70 | CES29 = 86 | CES54 = 92 | CES79 = 91 |
| CES05 = 50 | CES30 = 92 | CES55 = 92 | CES80 = 90 |
| CES06 = 51 | CES31 = 88 | CES56 = 88 | CES81 = 73 |
| CES07 = 42 | CES32 = 82 | CES57 = 88 | CES82 = 96 |
| CES08 = 41 | CES33 = 90 | CES58 = 89 | CES83 = 94 |
| CES09 = 29 | CES34 = 91 | CES59 = 92 | CES84 = 92 |
| CES10 = 76 | CES35 = 95 | CES60 = 95 | CES85 = 78 |
| CES11 = 59 | CES36 = 92 | CES61 = 90 | CES86 = 68 |
| CES12 = 65 | CES37 = 95 | CES62 = 96 | CES87 = 85 |
| CES13 = 44 | CES38 = 99 | CES63 = 88 | CES88 = 87 |
| CES14 = 74 | CES39 = 98 | CES64 = 85 | CES89 = 76 |
| CES15 = 72 | CES40 = 95 | CES65 = 81 | CES90 = 88 |
| CES16 = 48 | CES41 = 96 | CES66 = 84 | CES91 = 83 |
| CES17 = 50 | CES42 = 96 | CES67 = 83 | CES92 = 67 |
| CES18 = 57 | CES43 = 90 | CES68 = 84 | CES93 = 80 |
| CES19 = 72 | CES44 = 99 | CES69 = 89 | CES94 = 63 |
| CES20 = 67 | CES45 = 93 | CES70 = 82 | CES95 = 76 |
| CES21 = 87 | CES46 = 90 | CES71 = 81 | CES96 = 84 |
| CES22 = 79 | CES47 = 91 | CES72 = 93 | CES97 = 90 |
| CES23 = 92 | CES48 = 84 | CES73 = 77 | CES98 = 85 |
| CES24 = 91 | CES49 = 90 | CES74 = 93 | CES99 = 77 |
| CES25 = 72 | CES50 = 95 | CES75 = 82 |            |



Color Rendition by Hue-Angle Bin



**Measure Comparisons**



(END OF REPORT)