

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: P348733

Luminaire Tested: **ARCH-N-PA1-40-827-24VDC-5WQ**

Issue Date: 3/3/2020

**Test Information**

Test Method: LM-79-08  
Report Number: P348733  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-1903-205-2)  
Test Lab: INNOVATION CENTER  
Issue Date: 3/3/2020  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: STREETWORKS  
Catalog Number: ARCH-N-PA1-40-827-24VDC-5WQ  
Description: ARCHEON ROADWAY AND AREA LUMINAIRE  
(1) 80 CRI, 2700K, 740mA LIGHT ENGINE WITH 16 LEDS AND  
Light Source: -  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 4175 lumens  
Efficiency: N/A  
Efficacy: 109.9 lumens/watt  
Luminous Opening: Rectangular (W 0.5' x L: 0.75' x H: 0')  
IES Classification: Type V - Short  
BUG Rating: B3 - U0 - G1

Input Watts (W): 38  
Input Voltage (V): NR  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: NR  
Total Harmonic Distortion (THDi): NR  
Frequency (hertz): 60  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 25 FT

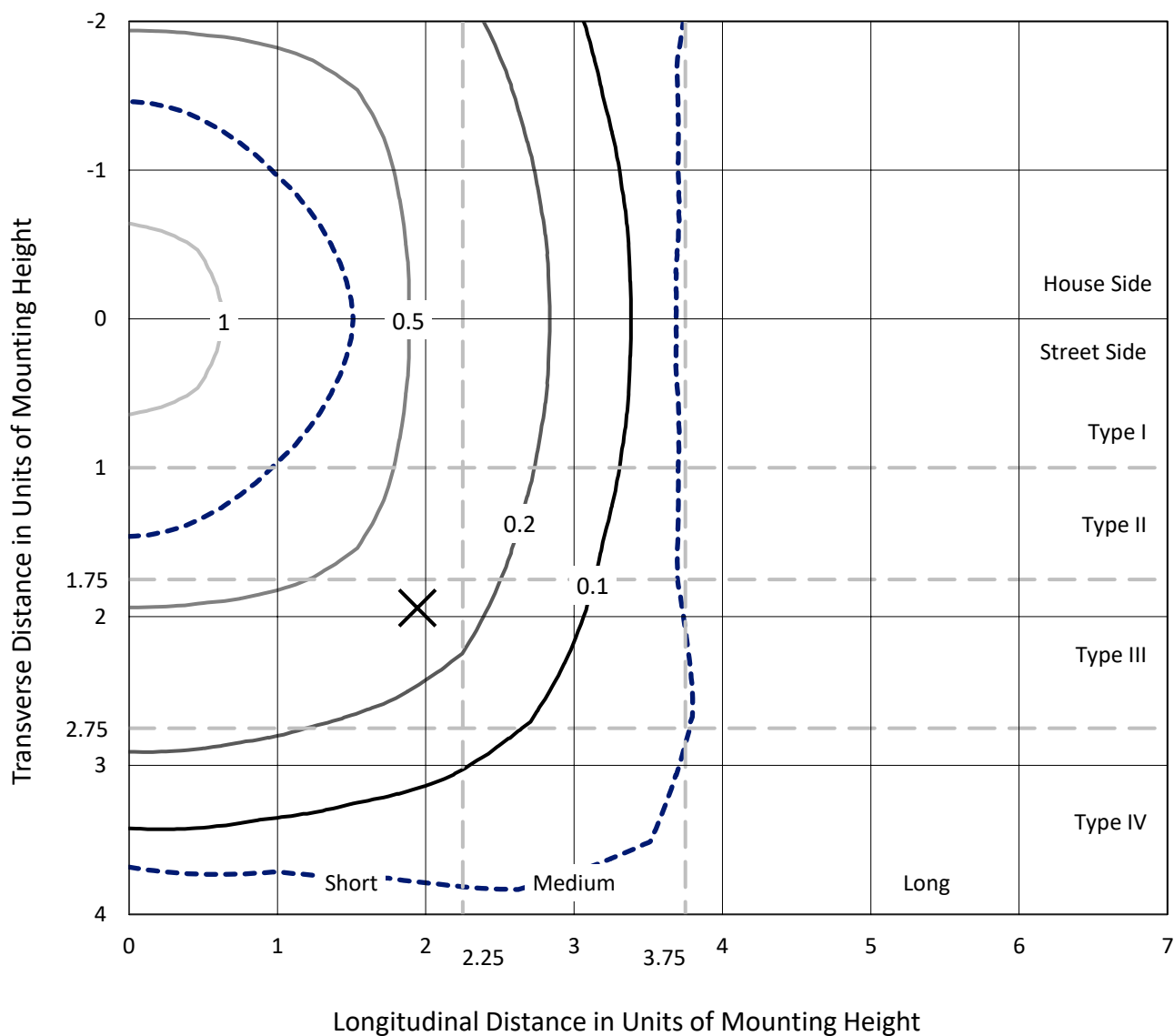
REPORT NUMBER: P348733

CATALOG NUMBER: ARCH-N-PA1-40-827-24VDC-5WQ

## Iso-Footcandle Lines of Horizontal Illumination

× Max cd

--- 1/2 Max cd



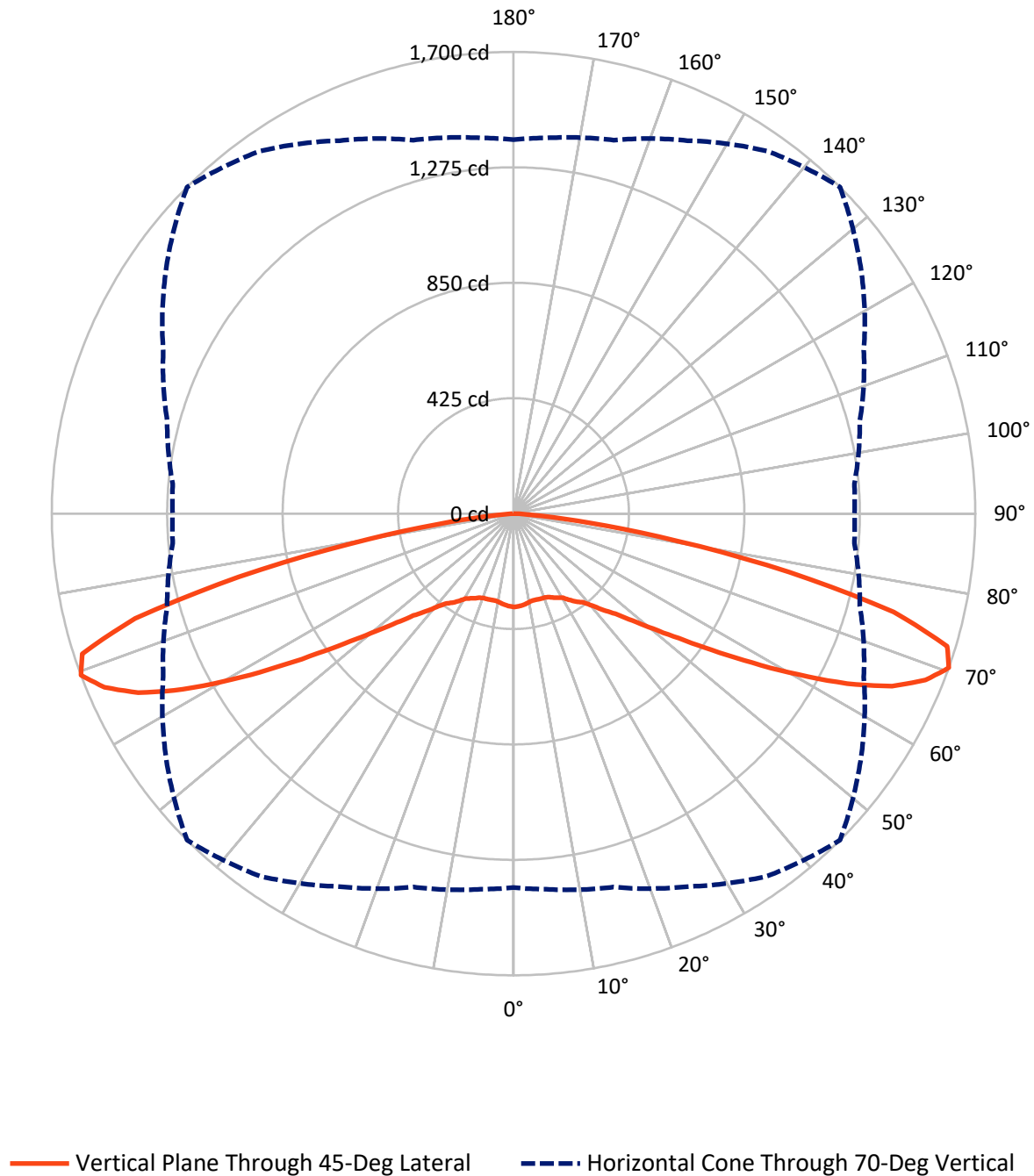
Based on 15 foot mounting height. Maximum calculated value = 1.5 fc

Type V - Short - N/A

REPORT NUMBER: P348733

CATALOG NUMBER: ARCH-N-PA1-40-827-24VDC-5WQ

## Luminous Intensity Polar Plot



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CATALOG NUMBER: ARCH-N-PA1-40-827-24VDC-5WQ

**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total  |
|--------------------|-----------|----------|--------|--------|
| <b>House Side</b>  | Lumens    | 2087.5   | 0.0    | 2087.5 |
|                    | % Fixture | 50.0     | 0.0    | 50.0   |
| <b>Street Side</b> | Lumens    | 2087.5   | 0.0    | 2087.5 |
|                    | % Fixture | 50.0     | 0.0    | 50.0   |
| <b>Total</b>       | Lumens    | 4175.0   | 0.0    | 4175.0 |
|                    | % Fixture | 100.0    | 0.0    | 100.0  |

**Coefficient of Utilization**

**ZONAL LUMENS:**

| Zone      | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10°    | 32.1   | 0.8       |
| 10°-20°   | 93.7   | 2.2       |
| 20°-30°   | 159.7  | 3.8       |
| 30°-40°   | 249.6  | 6.0       |
| 40°-50°   | 422.9  | 10.1      |
| 50°-60°   | 771.3  | 18.5      |
| 60°-70°   | 1327.8 | 31.8      |
| 70°-80°   | 1040.8 | 24.9      |
| 80°-90°   | 77.2   | 1.8       |
| 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°    | 4175.0 | 100.0     |
| 0°-180°   | 4175.0 | 100.0     |



REPORT NUMBER: P348733

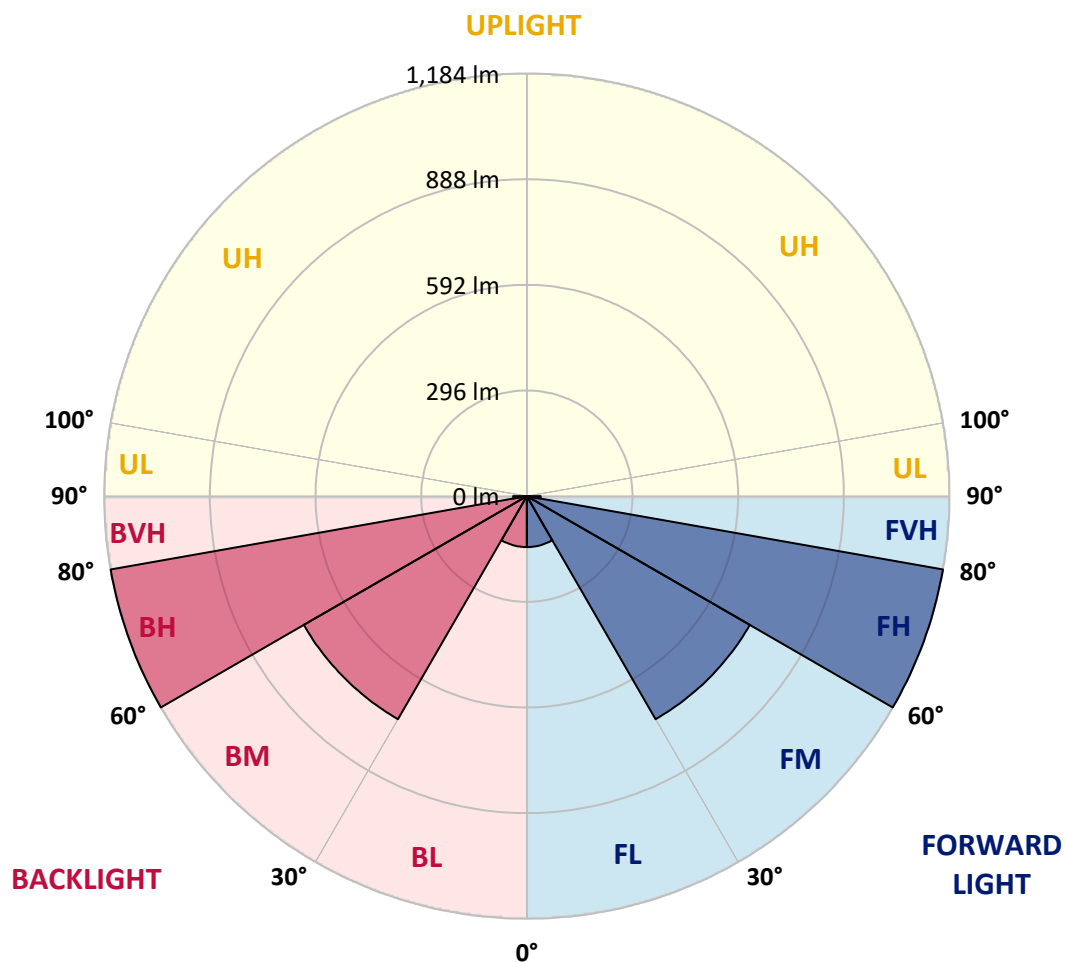
CATALOG NUMBER: ARCH-N-PA1-40-827-24VDC-5WQ

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

| Zone |             | Lumens | % Fixture | Zone Rating/Lumen Limit |      |         |
|------|-------------|--------|-----------|-------------------------|------|---------|
|      |             |        |           | B                       | U    | G       |
| FL   | (0°-30°)    | 142.7  | 3.4       |                         |      |         |
| FM   | (30°-60°)   | 721.9  | 17.3      |                         |      |         |
| FH   | (60°-80°)   | 1184.3 | 28.4      |                         |      | G1/1800 |
| FVH  | (80°-90°)   | 38.6   | 0.9       |                         |      | G1/100  |
| BL   | (0°-30°)    | 142.7  | 3.4       | B1/500                  |      |         |
| BM   | (30°-60°)   | 721.9  | 17.3      | B1/1000                 |      |         |
| BH   | (60°-80°)   | 1184.3 | 28.4      | B3/2500                 |      | G1/1800 |
| BVH  | (80°-90°)   | 38.6   | 0.9       |                         |      | G1/100  |
| UL   | (90°-100°)  | 0.0    | 0.0       |                         | U0/0 |         |
| UH   | (100°-180°) | 0.0    | 0.0       |                         | U0/0 |         |

**BUG Rating: B3-U0-G1**

Type V Short





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CATALOG NUMBER: ARCH-N-PA1-40-827-24VDC-5WQ

**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 5°     | 15°    | 25°    | 35°    | 45°    | 55°    | 65°    | 75°    | 85°    | 90°    |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 343.6  | 343.6  | 343.6  | 343.6  | 343.6  | 343.6  | 343.6  | 343.6  | 343.6  | 343.6  | 343.6  |
| 2.5°  | 342.1  | 342.5  | 342.1  | 342.4  | 341.7  | 341.9  | 341.9  | 341.9  | 341.8  | 341.9  | 341.7  |
| 5°    | 339.0  | 339.3  | 338.8  | 339.0  | 338.6  | 339.0  | 339.2  | 339.0  | 338.8  | 338.9  | 338.4  |
| 7.5°  | 334.5  | 334.8  | 334.4  | 334.8  | 334.2  | 334.9  | 334.8  | 334.4  | 333.9  | 333.9  | 333.4  |
| 10°   | 332.0  | 332.1  | 331.0  | 330.6  | 329.4  | 329.7  | 330.1  | 330.5  | 330.9  | 331.7  | 331.6  |
| 12.5° | 332.1  | 332.1  | 330.5  | 328.7  | 326.9  | 327.3  | 328.0  | 329.5  | 331.2  | 332.7  | 332.8  |
| 15°   | 333.5  | 333.4  | 330.9  | 328.0  | 326.8  | 328.0  | 328.4  | 329.4  | 332.0  | 334.6  | 334.8  |
| 17.5° | 334.5  | 334.5  | 330.6  | 327.3  | 327.2  | 329.1  | 329.0  | 329.4  | 332.3  | 336.1  | 336.3  |
| 20°   | 336.3  | 336.3  | 331.3  | 327.7  | 327.7  | 329.8  | 329.9  | 330.6  | 333.5  | 337.8  | 338.5  |
| 22.5° | 340.3  | 340.4  | 335.2  | 332.3  | 332.6  | 333.8  | 334.2  | 335.3  | 337.9  | 342.6  | 343.5  |
| 25°   | 346.0  | 346.2  | 340.8  | 339.2  | 340.2  | 342.5  | 342.2  | 343.1  | 346.0  | 350.5  | 351.3  |
| 27.5° | 353.8  | 353.1  | 348.2  | 347.5  | 348.4  | 350.1  | 350.0  | 350.1  | 352.4  | 356.6  | 357.6  |
| 30°   | 364.0  | 363.8  | 360.2  | 360.6  | 360.2  | 359.6  | 359.8  | 360.9  | 362.1  | 365.4  | 366.4  |
| 32.5° | 374.0  | 374.3  | 372.1  | 374.1  | 377.2  | 379.2  | 376.1  | 373.0  | 371.6  | 373.4  | 374.3  |
| 35°   | 391.9  | 392.6  | 389.2  | 387.8  | 391.9  | 398.0  | 389.0  | 384.1  | 386.8  | 389.2  | 389.9  |
| 37.5° | 422.5  | 422.9  | 417.1  | 411.6  | 408.5  | 414.3  | 405.3  | 405.7  | 415.4  | 419.8  | 419.7  |
| 40°   | 457.3  | 457.4  | 453.5  | 448.7  | 443.5  | 444.8  | 441.2  | 442.3  | 448.7  | 452.7  | 453.8  |
| 42.5° | 498.7  | 498.3  | 492.2  | 485.3  | 483.8  | 485.2  | 479.1  | 478.3  | 485.6  | 492.8  | 492.9  |
| 45°   | 552.4  | 551.4  | 543.6  | 536.0  | 528.7  | 525.6  | 524.1  | 528.1  | 538.2  | 544.8  | 545.0  |
| 47.5° | 610.3  | 607.7  | 603.5  | 597.4  | 591.1  | 588.0  | 585.6  | 587.5  | 594.8  | 597.4  | 597.7  |
| 50°   | 669.8  | 670.4  | 671.2  | 668.8  | 666.5  | 665.5  | 659.0  | 655.3  | 657.5  | 652.7  | 652.0  |
| 52.5° | 740.4  | 741.5  | 749.5  | 756.3  | 760.3  | 762.3  | 750.0  | 737.2  | 730.0  | 720.6  | 717.9  |
| 55°   | 823.7  | 825.4  | 837.2  | 856.0  | 875.3  | 885.5  | 863.3  | 839.3  | 817.0  | 799.5  | 793.8  |
| 57.5° | 916.5  | 919.6  | 935.8  | 971.8  | 1011.5 | 1035.6 | 998.1  | 954.4  | 911.5  | 886.2  | 881.8  |
| 60°   | 1025.3 | 1028.3 | 1050.7 | 1102.3 | 1166.6 | 1202.9 | 1146.0 | 1074.6 | 1021.1 | 997.0  | 988.8  |
| 62.5° | 1154.8 | 1155.1 | 1182.6 | 1242.9 | 1327.7 | 1378.3 | 1301.2 | 1205.8 | 1150.7 | 1121.5 | 1113.7 |
| 65°   | 1294.2 | 1294.9 | 1323.3 | 1388.5 | 1476.2 | 1531.2 | 1444.2 | 1344.7 | 1277.3 | 1234.4 | 1228.3 |
| 67.5° | 1392.6 | 1395.5 | 1425.5 | 1504.0 | 1586.0 | 1635.6 | 1545.5 | 1433.1 | 1355.2 | 1304.0 | 1298.9 |
| 70°   | 1376.9 | 1388.2 | 1423.4 | 1515.0 | 1629.1 | 1699.8 | 1562.0 | 1422.6 | 1319.9 | 1259.4 | 1255.1 |
| 72.5° | 1200.8 | 1222.5 | 1269.5 | 1389.6 | 1572.0 | 1669.4 | 1472.3 | 1274.1 | 1157.9 | 1106.4 | 1098.6 |
| 75°   | 817.7  | 852.9  | 923.8  | 1097.1 | 1343.1 | 1445.4 | 1239.5 | 1015.9 | 906.5  | 835.3  | 830.0  |
| 77.5° | 364.6  | 372.6  | 462.4  | 661.9  | 926.8  | 1038.0 | 900.6  | 664.6  | 498.8  | 397.9  | 376.6  |
| 80°   | 101.6  | 102.9  | 137.3  | 246.5  | 463.9  | 609.9  | 498.0  | 258.9  | 145.6  | 102.6  | 96.7   |
| 82.5° | 32.3   | 35.1   | 42.8   | 63.9   | 155.9  | 278.3  | 160.1  | 69.1   | 49.2   | 39.2   | 35.4   |
| 85°   | 15.7   | 15.6   | 21.7   | 26.0   | 39.8   | 61.6   | 42.4   | 32.0   | 28.0   | 18.6   | 16.8   |
| 87.5° | 6.6    | 6.8    | 10.1   | 9.1    | 11.6   | 9.9    | 13.7   | 14.4   | 15.1   | 8.3    | 7.2    |
| 90°   | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |

Report Prepared for

Cooper Lighting Solutions

(formerly Eaton)

STREETWORKS

Report Number: SP1-2101-121-9

Luminaire Tested: IFLD-S-SA2A-827-U-T2

Test Date: 03/05/2021

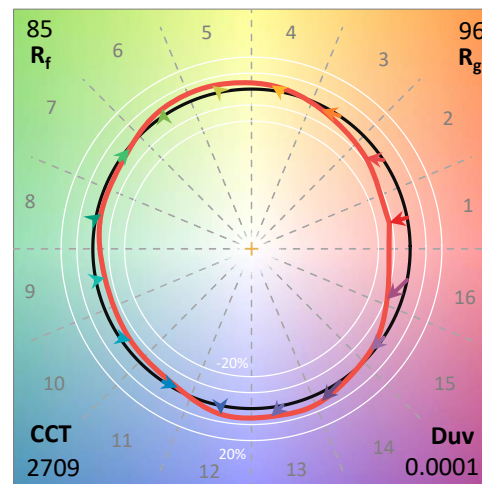
### Test Information

Test Method: LM-79-08  
 Report Number: SP1-2101-121-9  
 Test Lab: COOPER LIGHTING SOLUTIONS  
 Photometer: SP1  
 Measurement Geometry:  $4\pi$   
 Issue Date: 03/05/2021  
 Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
 Product Line: STREETWORKS  
 Catalog Number: **IFLD-S-SA2A-827-U-T2**  
 Description: STREETWORKS INF FLOOD

PROGRAMMED @ 615mA.

### Spectral Parameters

|                           |        |           |      |      |      |
|---------------------------|--------|-----------|------|------|------|
| CCT (K):                  | 2709   | CRI (Ra): | 82.1 |      |      |
| CIE u':                   | 0.2620 | R1:       | 80.4 | R9:  | 4.5  |
| CIE v':                   | 0.5273 | R2:       | 91.2 | R10: | 81.3 |
| Duv:                      | 0.0001 | R3:       | 95.2 | R11: | 81.0 |
| CIE x:                    | 0.4591 | R4:       | 80.5 | R12: | 79.0 |
| CIE y:                    | 0.4107 | R5:       | 81.2 | R13: | 82.9 |
| CIE z:                    | 0.1301 | R6:       | 90.9 | R14: | 97.9 |
| Peak Wavelength (nm):     | 606    | R7:       | 81.1 |      |      |
| Dominant Wavelength (nm): | 584    | R8:       | 56.0 |      |      |
| Purity:                   | 61.2   |           |      |      |      |
| Rf:                       | 85.2   |           |      |      |      |
| Rg:                       | 96.4   |           |      |      |      |



### Test Conditions

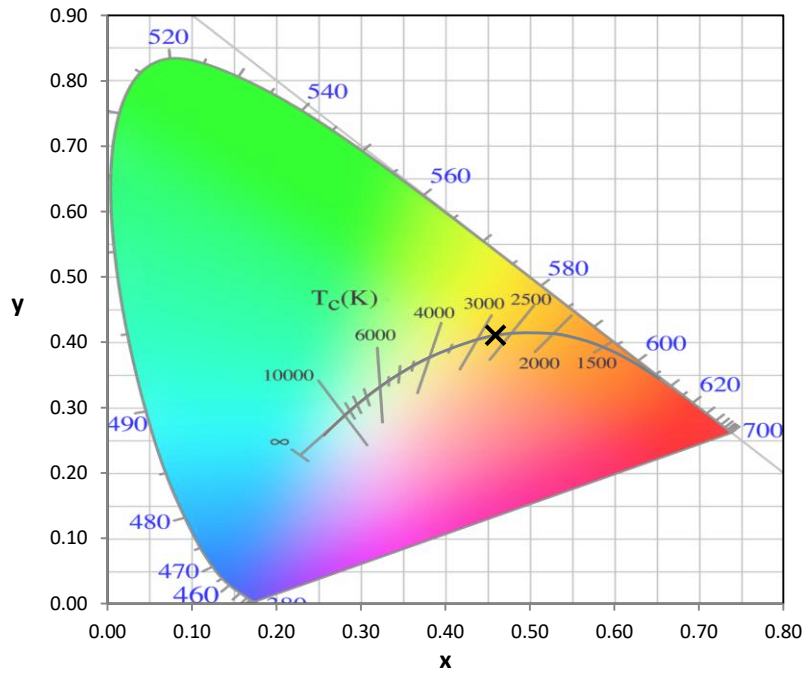
Stabilization Time: 60M  
 Operation Time: 12H  
 Room Temperature (°C) / RH%: 24.9/31%  
 Sphere Temperature (°C): 24.4

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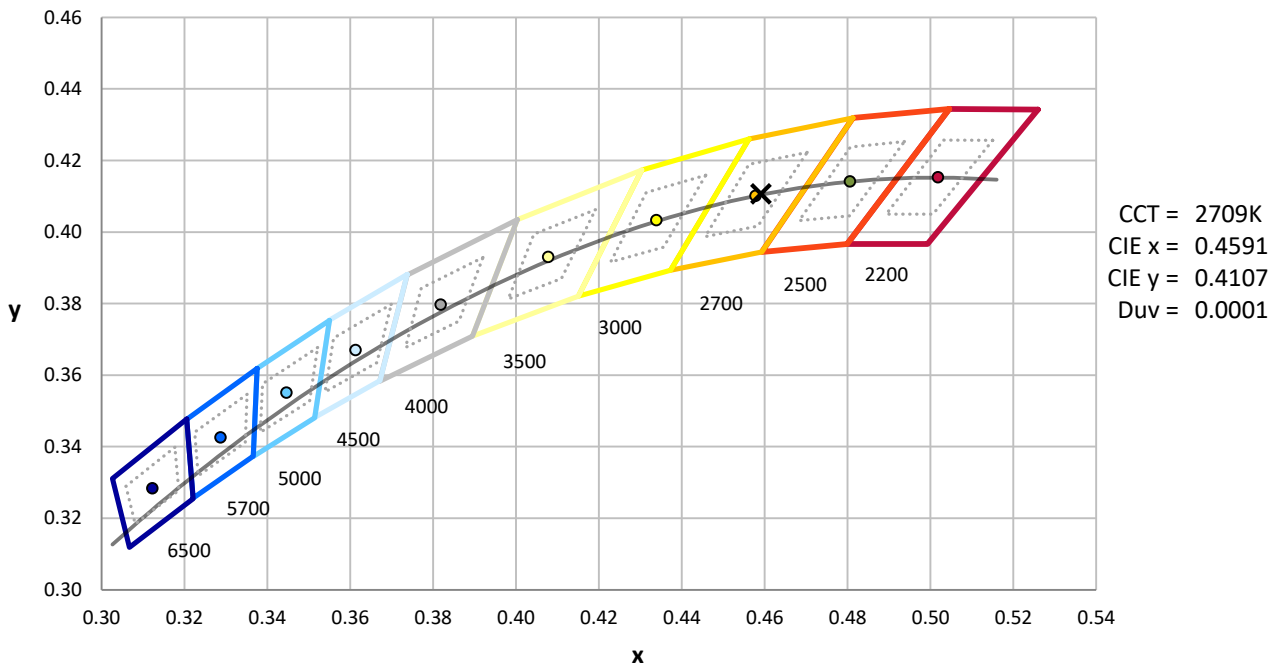
| Measurement and Test Equipment |                       |                  |                      |
|--------------------------------|-----------------------|------------------|----------------------|
| Instrument                     | Identification Number | Calibration Date | Calibration Due Date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

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**CIE 1931 Chromaticity Diagram**

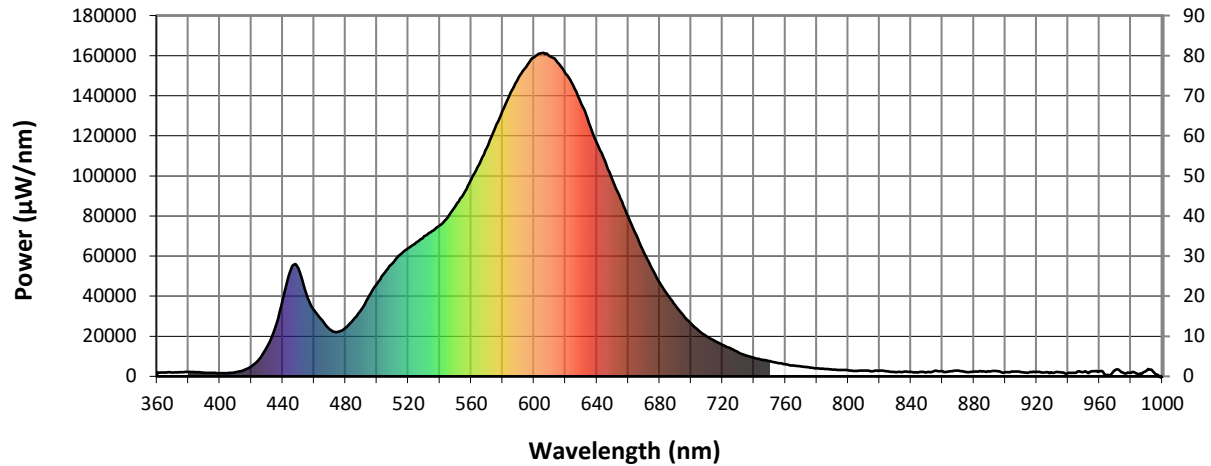


**CIE 1931 Chromaticity Diagram with 2017 ANSI 7-Step and 4-Step Quadrangles**



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### Photopic Flux vs. Wavelength

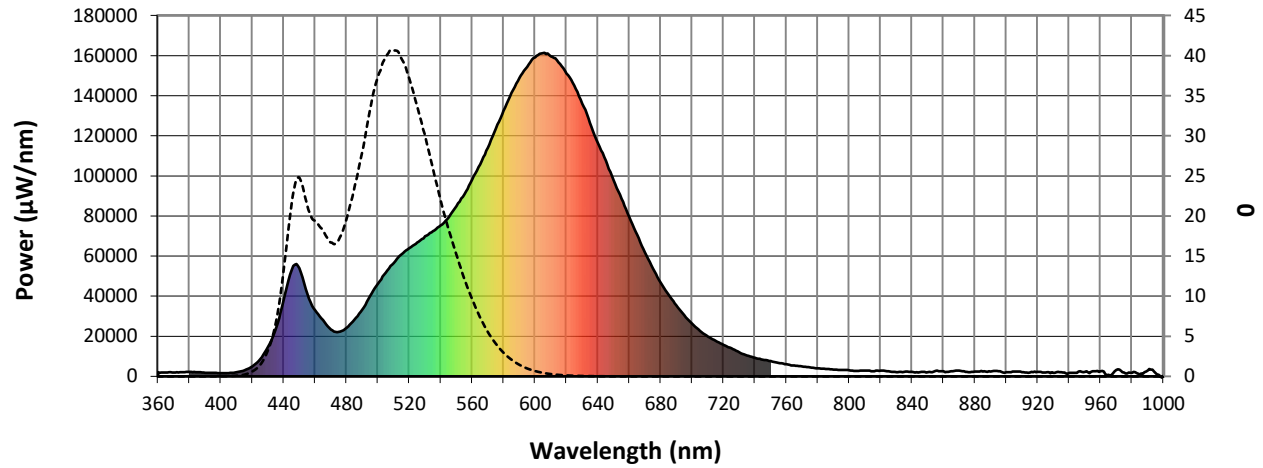


#####

| 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       | 2013             | 0.0              | 490       | 33356            | 4.7              | 620       | 150993           | 39.3             | 750       | 7593             | 0.0              | 880       | 2373             | 0.0              |
| 365       | 1908             | 0.0              | 495       | 40031            | 7.3              | 625       | 145077           | 32.0             | 755       | 6765             | 0.0              | 885       | 2481             | 0.0              |
| 370       | 1889             | 0.0              | 500       | 46287            | 10.2             | 630       | 136072           | 24.6             | 760       | 6000             | 0.0              | 890       | 2394             | 0.0              |
| 375       | 2095             | 0.0              | 505       | 51783            | 14.5             | 635       | 126417           | 19.0             | 765       | 5393             | 0.0              | 895       | 2574             | 0.0              |
| 380       | 2228             | 0.0              | 510       | 56588            | 19.4             | 640       | 116412           | 13.9             | 770       | 5030             | 0.0              | 900       | 2048             | 0.0              |
| 385       | 2074             | 0.0              | 515       | 60751            | 25.2             | 645       | 107525           | 10.4             | 775       | 4491             | 0.0              | 905       | 2381             | 0.0              |
| 390       | 1820             | 0.0              | 520       | 63966            | 31.0             | 650       | 97857            | 7.2              | 780       | 3943             | 0.0              | 910       | 2017             | 0.0              |
| 395       | 1728             | 0.0              | 525       | 66683            | 35.8             | 655       | 88582            | 5.1              | 785       | 3682             | 0.0              | 915       | 1904             | 0.0              |
| 400       | 1557             | 0.0              | 530       | 69869            | 41.1             | 660       | 79462            | 3.3              | 790       | 3402             | 0.0              | 920       | 2254             | 0.0              |
| 405       | 1644             | 0.0              | 535       | 72510            | 45.0             | 665       | 70606            | 2.2              | 795       | 3156             | 0.0              | 925       | 1998             | 0.0              |
| 410       | 2044             | 0.0              | 540       | 75299            | 49.1             | 670       | 61774            | 1.4              | 800       | 3062             | 0.0              | 930       | 1776             | 0.0              |
| 415       | 3009             | 0.0              | 545       | 79297            | 52.8             | 675       | 53771            | 0.9              | 805       | 2712             | 0.0              | 935       | 2086             | 0.0              |
| 420       | 4992             | 0.0              | 550       | 84946            | 57.7             | 680       | 46786            | 0.5              | 810       | 2896             | 0.0              | 940       | 1766             | 0.0              |
| 425       | 8631             | 0.0              | 555       | 90790            | 62.0             | 685       | 40747            | 0.4              | 815       | 2605             | 0.0              | 945       | 1738             | 0.0              |
| 430       | 14680            | 0.1              | 560       | 98231            | 66.8             | 690       | 35400            | 0.2              | 820       | 2901             | 0.0              | 950       | 2303             | 0.0              |
| 435       | 23899            | 0.3              | 565       | 105738           | 70.3             | 695       | 30445            | 0.1              | 825       | 2541             | 0.0              | 955       | 2567             | 0.0              |
| 440       | 38159            | 0.6              | 570       | 114034           | 74.1             | 700       | 26278            | 0.1              | 830       | 2014             | 0.0              | 960       | 2492             | 0.0              |
| 445       | 53061            | 1.1              | 575       | 123632           | 76.9             | 705       | 22703            | 0.0              | 835       | 2258             | 0.0              | 965       | 810              | 0.0              |
| 450       | 53893            | 1.4              | 580       | 132443           | 78.7             | 710       | 19853            | 0.0              | 840       | 2203             | 0.0              | 970       | 3201             | 0.0              |
| 455       | 41221            | 1.4              | 585       | 141502           | 78.6             | 715       | 17730            | 0.0              | 845       | 2073             | 0.0              | 975       | 1858             | 0.0              |
| 460       | 32969            | 1.4              | 590       | 148917           | 77.0             | 720       | 15616            | 0.0              | 850       | 2096             | 0.0              | 980       | 1769             | 0.0              |
| 465       | 28048            | 1.4              | 595       | 154326           | 73.2             | 725       | 13986            | 0.0              | 855       | 2751             | 0.0              | 985       | 1043             | 0.0              |
| 470       | 23347            | 1.5              | 600       | 159208           | 68.6             | 730       | 12029            | 0.0              | 860       | 2501             | 0.0              | 990       | 2950             | 0.0              |
| 475       | 22136            | 1.7              | 605       | 161290           | 62.5             | 735       | 10461            | 0.0              | 865       | 2512             | 0.0              | 995       | 1643             | 0.0              |
| 480       | 24192            | 2.3              | 610       | 159549           | 54.8             | 740       | 9230             | 0.0              | 870       | 2913             | 0.0              | 1000      | 292              | 0.0              |
| 485       | 28231            | 3.3              | 615       | 156663           | 47.3             | 745       | 8376             | 0.0              | 875       | 2299             | 0.0              |           |                  |                  |

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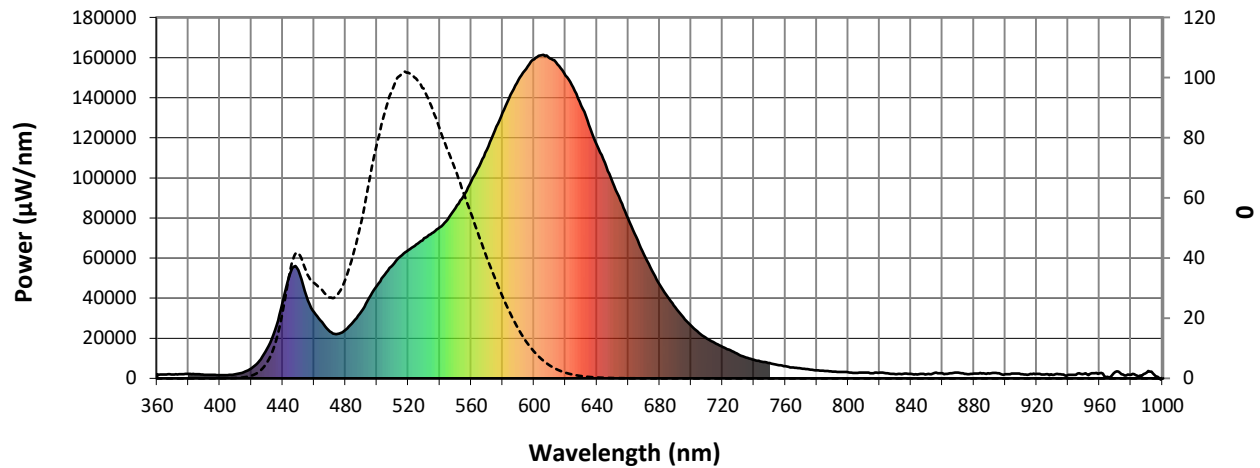
### Scotopic Flux vs. Wavelength


**Scotopic Lumens: 8911.3**
**S/P: 1.22**

| 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       | 2013             | 0.0              | 490       | 33356            | 51.4             | 620       | 150993           | 1.9              | 750       | 7593             | 0.0              | 880       | 2373             | 0.0              |
| 365       | 1908             | 0.0              | 495       | 40031            | 64.7             | 625       | 145077           | 1.2              | 755       | 6765             | 0.0              | 885       | 2481             | 0.0              |
| 370       | 1889             | 0.0              | 500       | 46287            | 77.4             | 630       | 136072           | 0.8              | 760       | 6000             | 0.0              | 890       | 2394             | 0.0              |
| 375       | 2095             | 0.0              | 505       | 51783            | 88.0             | 635       | 126417           | 0.5              | 765       | 5393             | 0.0              | 895       | 2574             | 0.0              |
| 380       | 2228             | 0.0              | 510       | 56588            | 95.9             | 640       | 116412           | 0.3              | 770       | 5030             | 0.0              | 900       | 2048             | 0.0              |
| 385       | 2074             | 0.0              | 515       | 60751            | 100.7            | 645       | 107525           | 0.2              | 775       | 4491             | 0.0              | 905       | 2381             | 0.0              |
| 390       | 1820             | 0.0              | 520       | 63966            | 101.7            | 650       | 97857            | 0.1              | 780       | 3943             | 0.0              | 910       | 2017             | 0.0              |
| 395       | 1728             | 0.0              | 525       | 66683            | 99.8             | 655       | 88582            | 0.1              | 785       | 3682             | 0.0              | 915       | 1904             | 0.0              |
| 400       | 1557             | 0.0              | 530       | 69869            | 96.3             | 660       | 79462            | 0.0              | 790       | 3402             | 0.0              | 920       | 2254             | 0.0              |
| 405       | 1644             | 0.1              | 535       | 72510            | 90.4             | 665       | 70606            | 0.0              | 795       | 3156             | 0.0              | 925       | 1998             | 0.0              |
| 410       | 2044             | 0.1              | 540       | 75299            | 83.2             | 670       | 61774            | 0.0              | 800       | 3062             | 0.0              | 930       | 1776             | 0.0              |
| 415       | 3009             | 0.3              | 545       | 79297            | 76.0             | 675       | 53771            | 0.0              | 805       | 2712             | 0.0              | 935       | 2086             | 0.0              |
| 420       | 4992             | 0.8              | 550       | 84946            | 69.5             | 680       | 46786            | 0.0              | 810       | 2896             | 0.0              | 940       | 1766             | 0.0              |
| 425       | 8631             | 2.1              | 555       | 90790            | 62.0             | 685       | 40747            | 0.0              | 815       | 2605             | 0.0              | 945       | 1738             | 0.0              |
| 430       | 14680            | 5.0              | 560       | 98231            | 54.9             | 690       | 35400            | 0.0              | 820       | 2901             | 0.0              | 950       | 2303             | 0.0              |
| 435       | 23899            | 10.7             | 565       | 105738           | 47.4             | 695       | 30445            | 0.0              | 825       | 2541             | 0.0              | 955       | 2567             | 0.0              |
| 440       | 38159            | 21.3             | 570       | 114034           | 40.2             | 700       | 26278            | 0.0              | 830       | 2014             | 0.0              | 960       | 2492             | 0.0              |
| 445       | 53061            | 35.5             | 575       | 123632           | 33.7             | 705       | 22703            | 0.0              | 835       | 2258             | 0.0              | 965       | 810              | 0.0              |
| 450       | 53893            | 41.8             | 580       | 132443           | 27.3             | 710       | 19853            | 0.0              | 840       | 2203             | 0.0              | 970       | 3201             | 0.0              |
| 455       | 41221            | 36.0             | 585       | 141502           | 21.6             | 715       | 17730            | 0.0              | 845       | 2073             | 0.0              | 975       | 1858             | 0.0              |
| 460       | 32969            | 31.8             | 590       | 148917           | 16.6             | 720       | 15616            | 0.0              | 850       | 2096             | 0.0              | 980       | 1769             | 0.0              |
| 465       | 28048            | 29.6             | 595       | 154326           | 12.3             | 725       | 13986            | 0.0              | 855       | 2751             | 0.0              | 985       | 1043             | 0.0              |
| 470       | 23347            | 26.9             | 600       | 159208           | 9.0              | 730       | 12029            | 0.0              | 860       | 2501             | 0.0              | 990       | 2950             | 0.0              |
| 475       | 22136            | 27.7             | 605       | 161290           | 6.3              | 735       | 10461            | 0.0              | 865       | 2512             | 0.0              | 995       | 1643             | 0.0              |
| 480       | 24192            | 32.7             | 610       | 159549           | 4.3              | 740       | 9230             | 0.0              | 870       | 2913             | 0.0              | 1000      | 292              | 0.0              |
| 485       | 28231            | 40.9             | 615       | 156663           | 2.9              | 745       | 8376             | 0.0              | 875       | 2299             | 0.0              |           |                  |                  |

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### Melanopic Flux vs. Wavelength



**Melanopic Lumens: 3277.6**

**M/P: 0.45**

| 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       | 2013             | 0.0              | 490       | 33356            | 27.8             | 620       | 150993           | 0.1              | 750       | 7593             | 0.0              | 880       | 2373             | 0.0              |
| 365       | 1908             | 0.0              | 495       | 40031            | 33.0             | 625       | 145077           | 0.1              | 755       | 6765             | 0.0              | 885       | 2481             | 0.0              |
| 370       | 1889             | 0.0              | 500       | 46287            | 37.2             | 630       | 136072           | 0.0              | 760       | 6000             | 0.0              | 890       | 2394             | 0.0              |
| 375       | 2095             | 0.0              | 505       | 51783            | 39.7             | 635       | 126417           | 0.0              | 765       | 5393             | 0.0              | 895       | 2574             | 0.0              |
| 380       | 2228             | 0.0              | 510       | 56588            | 40.6             | 640       | 116412           | 0.0              | 770       | 5030             | 0.0              | 900       | 2048             | 0.0              |
| 385       | 2074             | 0.0              | 515       | 60751            | 39.7             | 645       | 107525           | 0.0              | 775       | 4491             | 0.0              | 905       | 2381             | 0.0              |
| 390       | 1820             | 0.0              | 520       | 63966            | 37.2             | 650       | 97857            | 0.0              | 780       | 3943             | 0.0              | 910       | 2017             | 0.0              |
| 395       | 1728             | 0.0              | 525       | 66683            | 33.8             | 655       | 88582            | 0.0              | 785       | 3682             | 0.0              | 915       | 1904             | 0.0              |
| 400       | 1557             | 0.0              | 530       | 69869            | 30.2             | 660       | 79462            | 0.0              | 790       | 3402             | 0.0              | 920       | 2254             | 0.0              |
| 405       | 1644             | 0.0              | 535       | 72510            | 26.1             | 665       | 70606            | 0.0              | 795       | 3156             | 0.0              | 925       | 1998             | 0.0              |
| 410       | 2044             | 0.1              | 540       | 75299            | 22.0             | 670       | 61774            | 0.0              | 800       | 3062             | 0.0              | 930       | 1776             | 0.0              |
| 415       | 3009             | 0.2              | 545       | 79297            | 18.4             | 675       | 53771            | 0.0              | 805       | 2712             | 0.0              | 935       | 2086             | 0.0              |
| 420       | 4992             | 0.6              | 550       | 84946            | 15.2             | 680       | 46786            | 0.0              | 810       | 2896             | 0.0              | 940       | 1766             | 0.0              |
| 425       | 8631             | 1.3              | 555       | 90790            | 12.2             | 685       | 40747            | 0.0              | 815       | 2605             | 0.0              | 945       | 1738             | 0.0              |
| 430       | 14680            | 3.1              | 560       | 98231            | 9.7              | 690       | 35400            | 0.0              | 820       | 2901             | 0.0              | 950       | 2303             | 0.0              |
| 435       | 23899            | 6.4              | 565       | 105738           | 7.4              | 695       | 30445            | 0.0              | 825       | 2541             | 0.0              | 955       | 2567             | 0.0              |
| 440       | 38159            | 12.8             | 570       | 114034           | 5.6              | 700       | 26278            | 0.0              | 830       | 2014             | 0.0              | 960       | 2492             | 0.0              |
| 445       | 53061            | 20.9             | 575       | 123632           | 4.1              | 705       | 22703            | 0.0              | 835       | 2258             | 0.0              | 965       | 810              | 0.0              |
| 450       | 53893            | 24.8             | 580       | 132443           | 3.0              | 710       | 19853            | 0.0              | 840       | 2203             | 0.0              | 970       | 3201             | 0.0              |
| 455       | 41221            | 21.6             | 585       | 141502           | 2.1              | 715       | 17730            | 0.0              | 845       | 2073             | 0.0              | 975       | 1858             | 0.0              |
| 460       | 32969            | 19.4             | 590       | 148917           | 1.5              | 720       | 15616            | 0.0              | 850       | 2096             | 0.0              | 980       | 1769             | 0.0              |
| 465       | 28048            | 18.3             | 595       | 154326           | 1.0              | 725       | 13986            | 0.0              | 855       | 2751             | 0.0              | 985       | 1043             | 0.0              |
| 470       | 23347            | 16.7             | 600       | 159208           | 0.7              | 730       | 12029            | 0.0              | 860       | 2501             | 0.0              | 990       | 2950             | 0.0              |
| 475       | 22136            | 16.9             | 605       | 161290           | 0.4              | 735       | 10461            | 0.0              | 865       | 2512             | 0.0              | 995       | 1643             | 0.0              |
| 480       | 24192            | 19.4             | 610       | 159549           | 0.3              | 740       | 9230             | 0.0              | 870       | 2913             | 0.0              | 1000      | 292              | 0.0              |
| 485       | 28231            | 23.3             | 615       | 156663           | 0.2              | 745       | 8376             | 0.0              | 875       | 2299             | 0.0              |           |                  |                  |

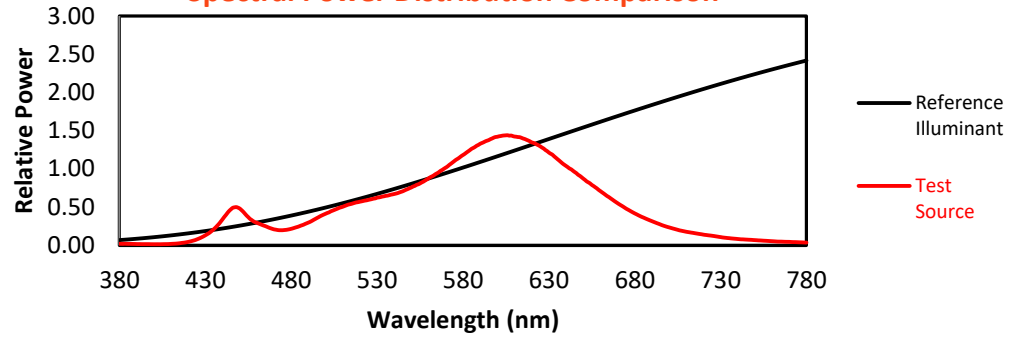
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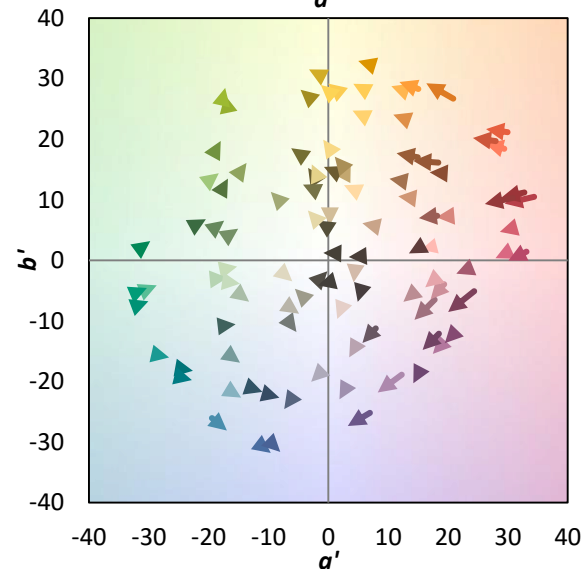
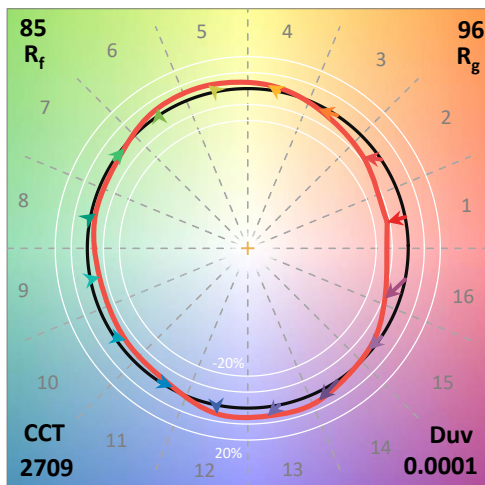
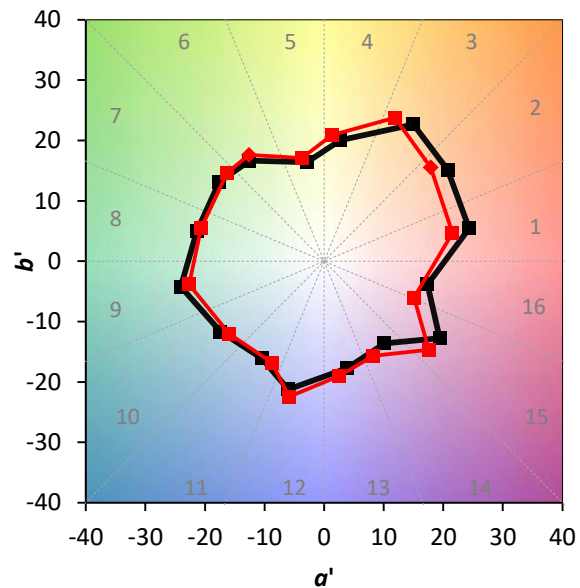
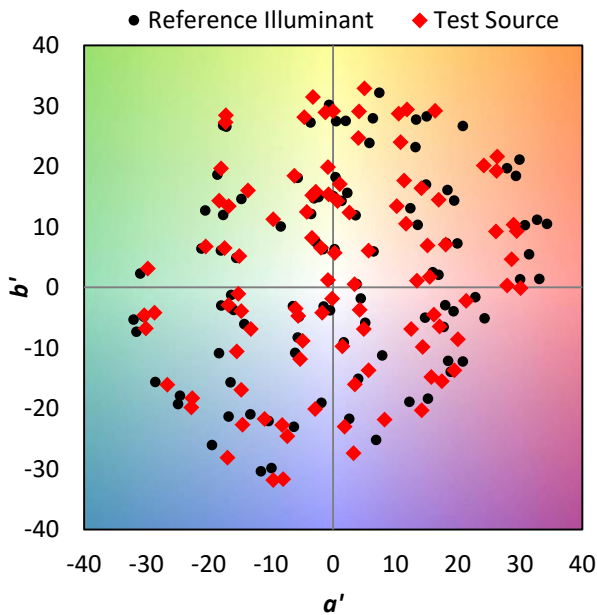
### Summary

$R_f = 85.2$   
 $R_g = 96.4$   
 CIE  $R_a = 82.1$   
 $R_g = 4.5$

### Spectral Power Distribution Comparison

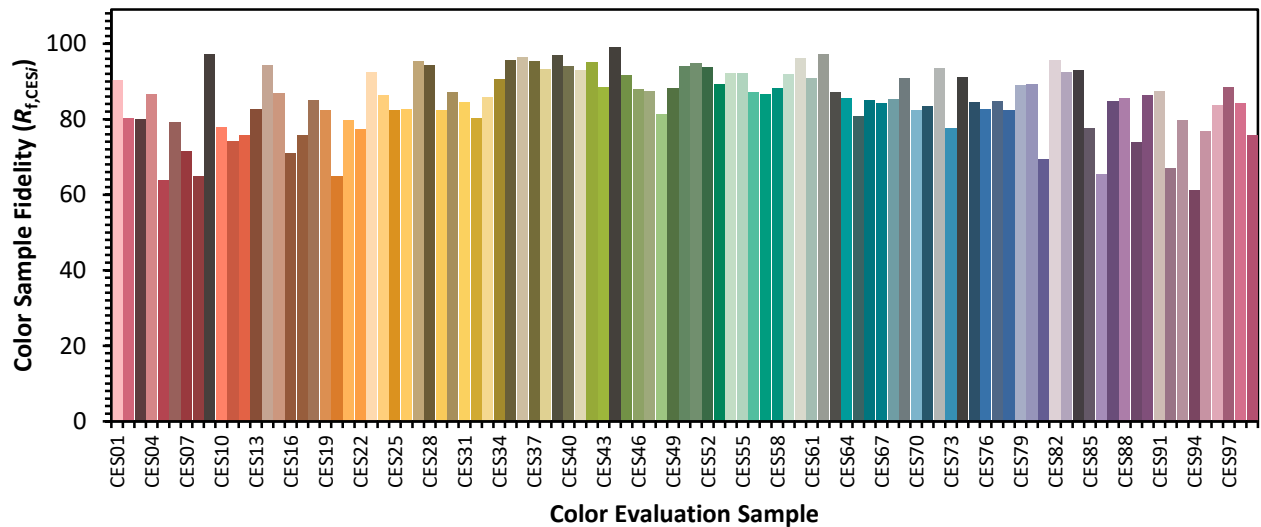


### Color Vector Graphics

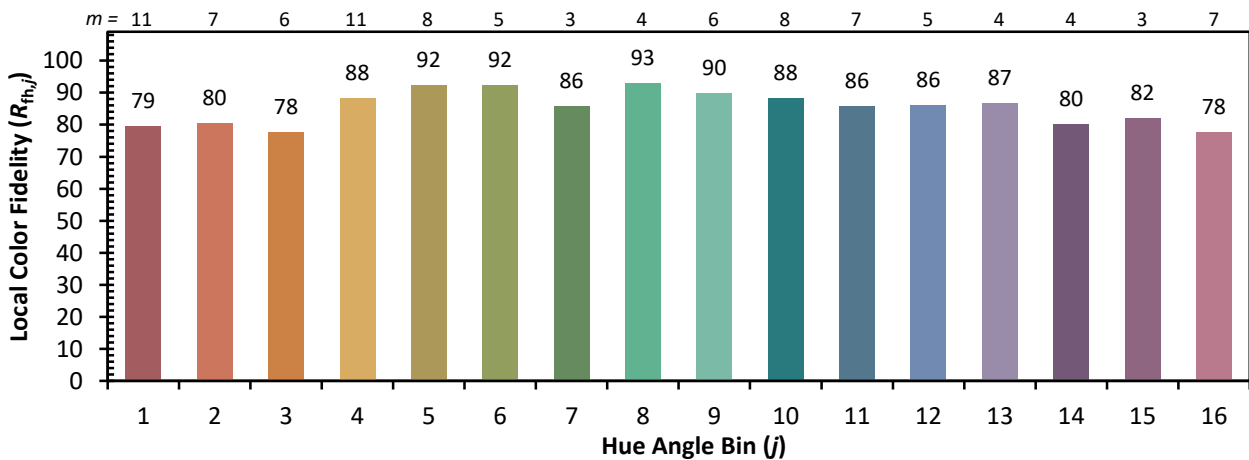
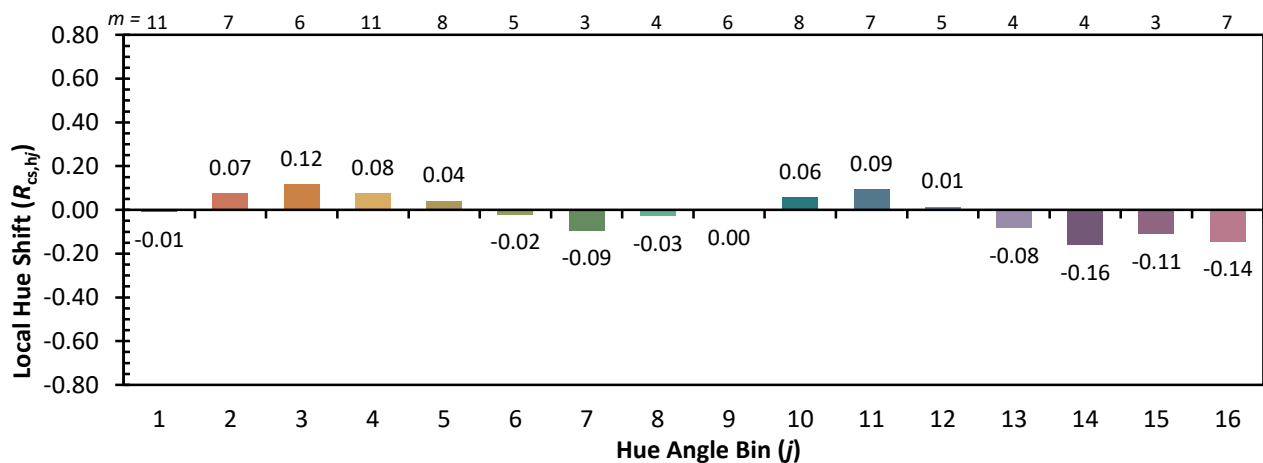
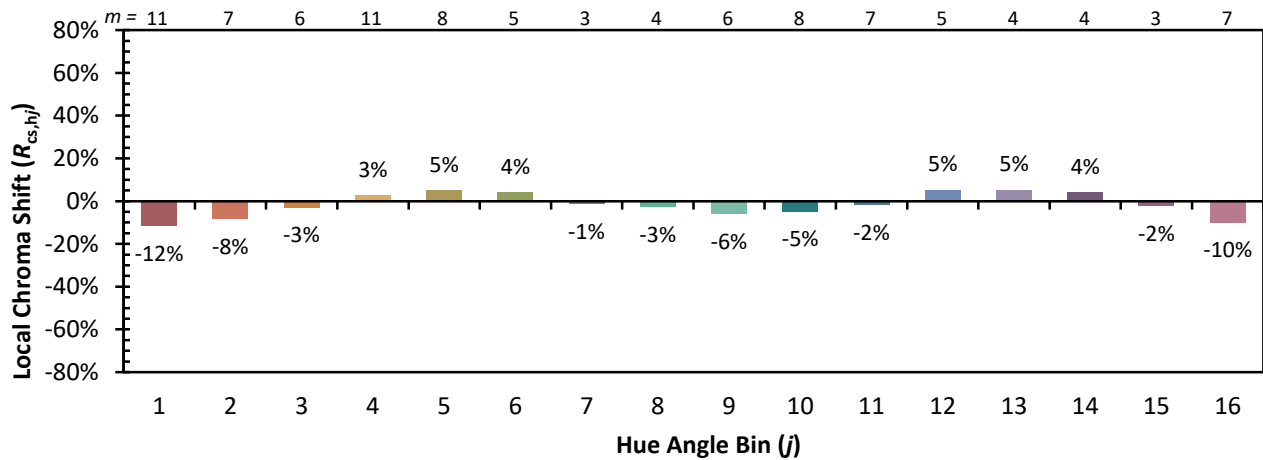


**Individual Sample Fidelity Index ( $R_{f,i}$ )**

|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 86 | CES26 = 83 | CES51 = 95 | CES76 = 83 |
| CES02 = 64 | CES27 = 95 | CES52 = 94 | CES77 = 85 |
| CES03 = 31 | CES28 = 94 | CES53 = 89 | CES78 = 82 |
| CES04 = 71 | CES29 = 82 | CES54 = 92 | CES79 = 89 |
| CES05 = 50 | CES30 = 87 | CES55 = 92 | CES80 = 89 |
| CES06 = 52 | CES31 = 85 | CES56 = 87 | CES81 = 69 |
| CES07 = 43 | CES32 = 80 | CES57 = 87 | CES82 = 96 |
| CES08 = 42 | CES33 = 86 | CES58 = 88 | CES83 = 93 |
| CES09 = 29 | CES34 = 91 | CES59 = 92 | CES84 = 93 |
| CES10 = 77 | CES35 = 96 | CES60 = 96 | CES85 = 78 |
| CES11 = 60 | CES36 = 96 | CES61 = 91 | CES86 = 65 |
| CES12 = 66 | CES37 = 95 | CES62 = 97 | CES87 = 85 |
| CES13 = 44 | CES38 = 93 | CES63 = 87 | CES88 = 86 |
| CES14 = 74 | CES39 = 97 | CES64 = 86 | CES89 = 74 |
| CES15 = 72 | CES40 = 94 | CES65 = 81 | CES90 = 86 |
| CES16 = 48 | CES41 = 93 | CES66 = 85 | CES91 = 87 |
| CES17 = 50 | CES42 = 95 | CES67 = 84 | CES92 = 67 |
| CES18 = 57 | CES43 = 88 | CES68 = 85 | CES93 = 80 |
| CES19 = 73 | CES44 = 99 | CES69 = 91 | CES94 = 61 |
| CES20 = 67 | CES45 = 92 | CES70 = 82 | CES95 = 77 |
| CES21 = 87 | CES46 = 88 | CES71 = 83 | CES96 = 84 |
| CES22 = 79 | CES47 = 88 | CES72 = 93 | CES97 = 88 |
| CES23 = 92 | CES48 = 81 | CES73 = 78 | CES98 = 84 |
| CES24 = 91 | CES49 = 88 | CES74 = 91 | CES99 = 76 |
| CES25 = 72 | CES50 = 94 | CES75 = 85 |            |



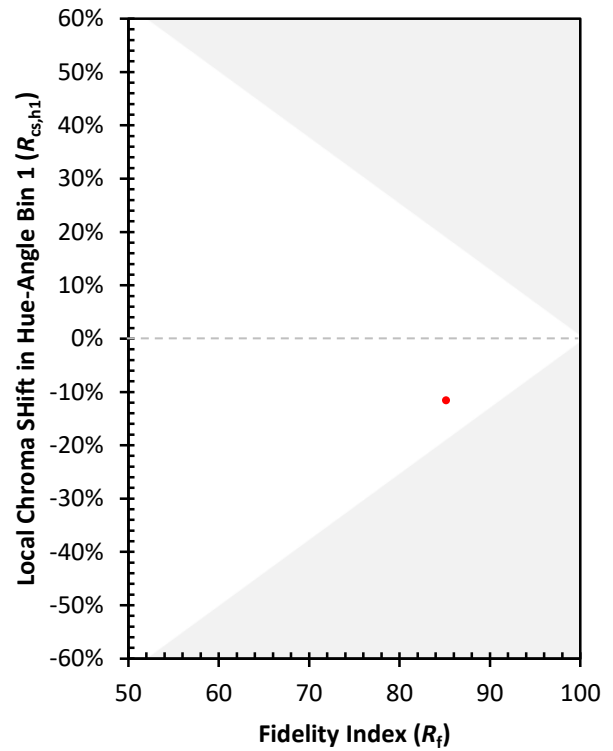
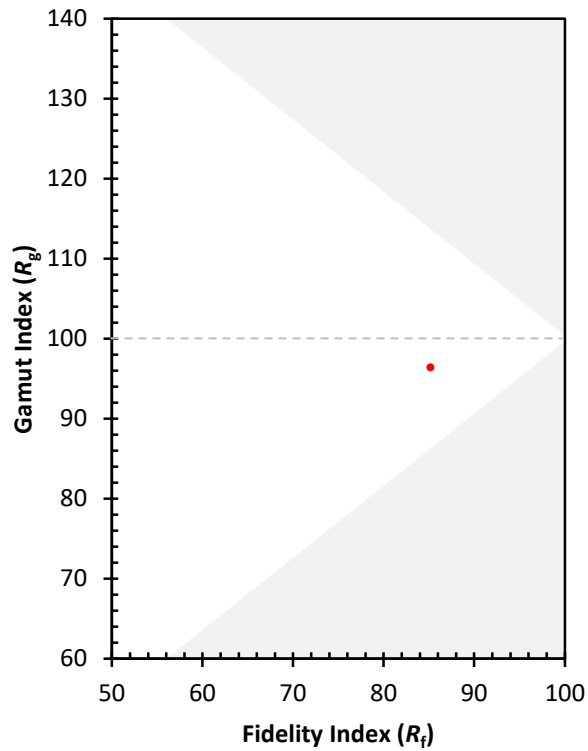
### Color Rendition by Hue-Angle Bin



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**Measure Comparisons**



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