

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: P348731

Luminaire Tested: **ARCH-N-PA1-20-827-24VDC-5WQ**

Issue Date: 3/3/2020

**Test Information**

Test Method: LM-79-08  
Report Number: P348731  
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-PA1-20-827-24VDC-5WQ  
Description: ARCHEON ROADWAY AND AREA LUMINAIRE  
(1) 80 CRI, 2700K, 420mA LIGHT ENGINE WITH 16 LEDS AND  
Light Source: -  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 2571 lumens  
Efficiency: N/A  
Efficacy: 116.9 lumens/watt  
Luminous Opening: Rectangular (W 0.5' x L: 0.75' x H: 0')  
IES Classification: Type V - Short  
BUG Rating: B2 - U0 - G1

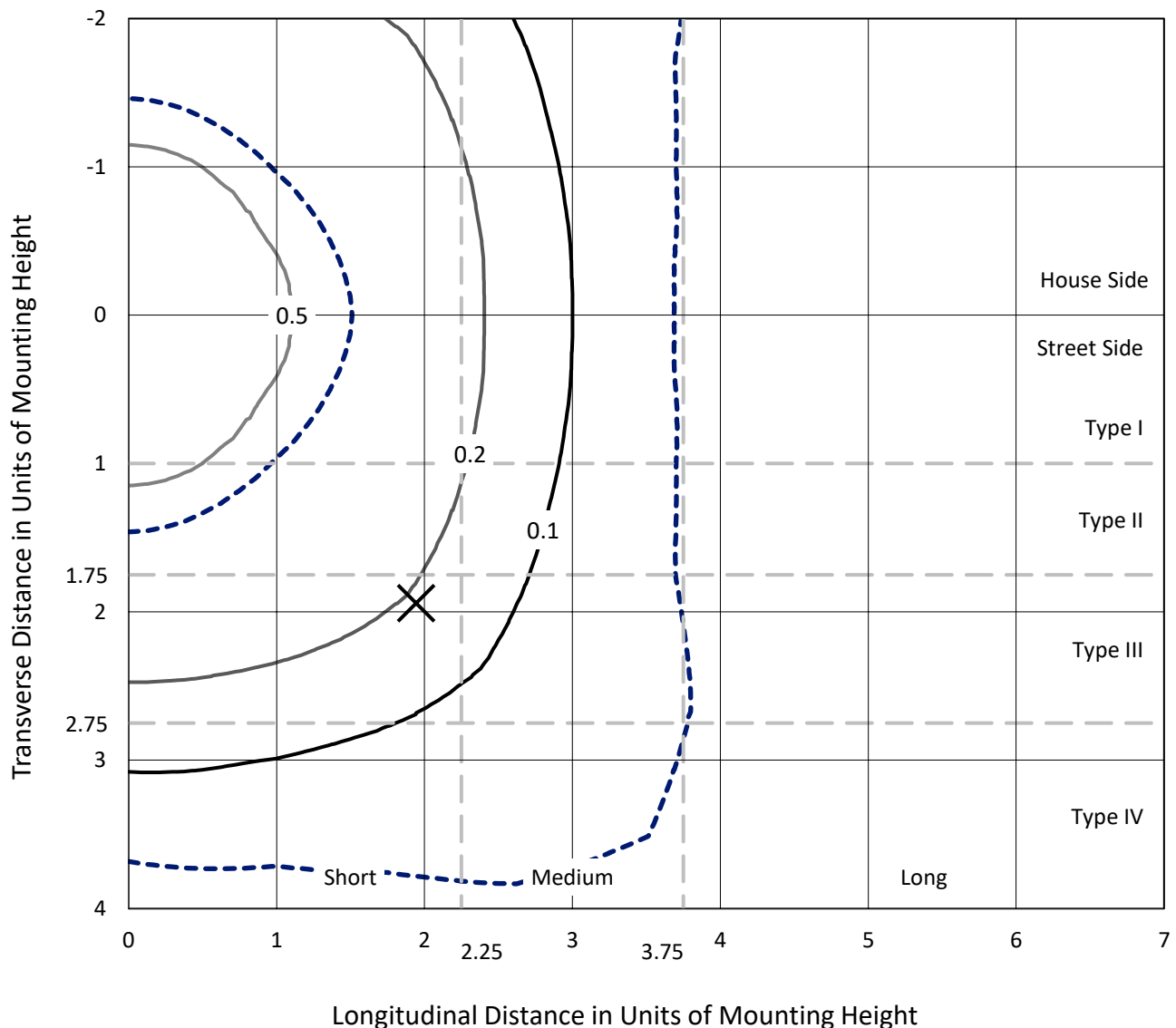
Input Watts (W): 22  
Input Voltage (V): NR  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: NR  
Total Harmonic Distortion (THDi): NR  
Frequency (hertz): 60  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 25 FT

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CATALOG NUMBER: ARCH-N-PA1-20-827-24VDC-5WQ

## Iso-Footcandle Lines of Horizontal Illumination

× Max cd  
 - - - 1/2 Max cd

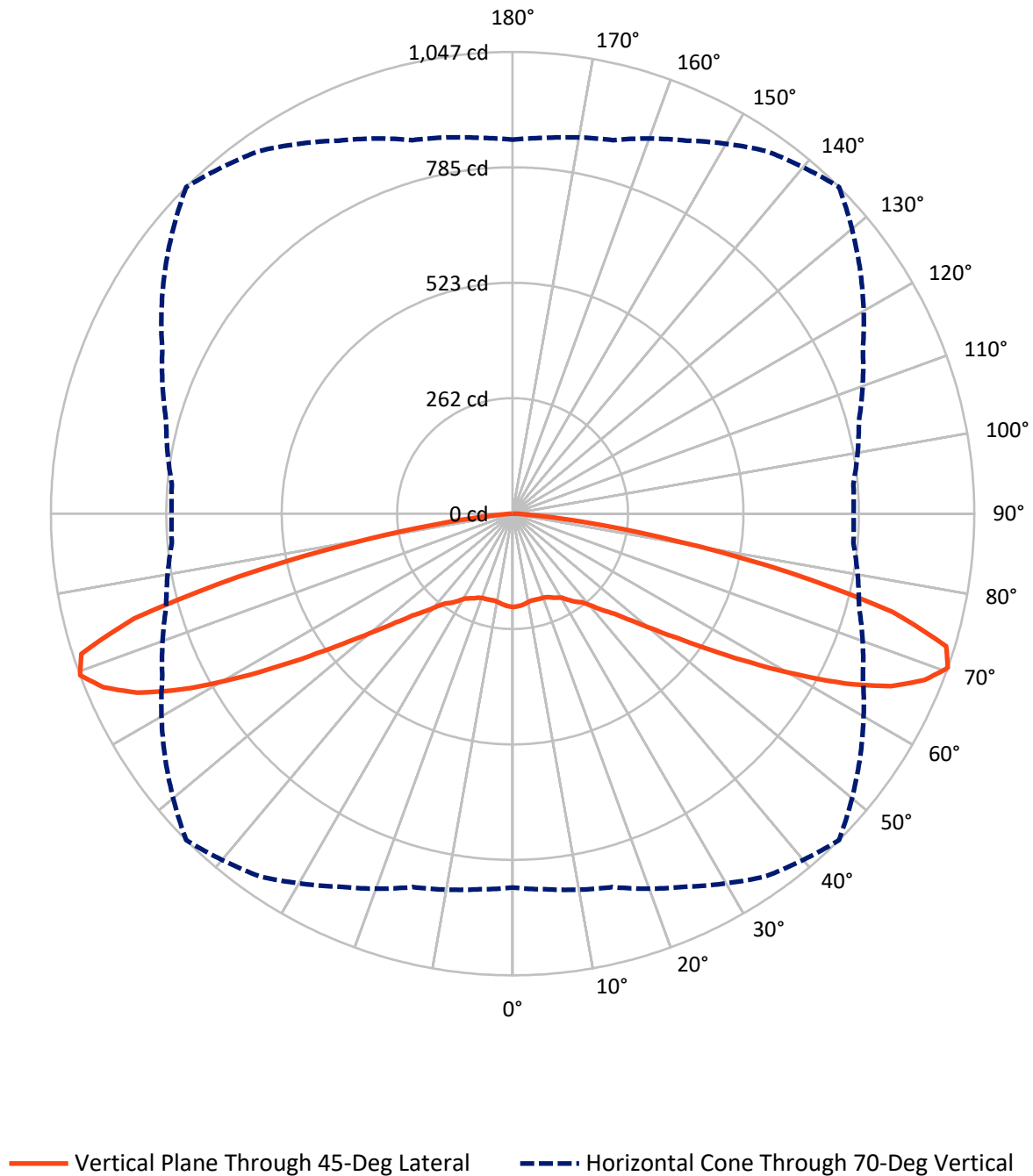


Based on 15 foot mounting height. Maximum calculated value = 0.9 fc  
 Type V - Short - N/A

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CATALOG NUMBER: ARCH-N-PA1-20-827-24VDC-5WQ

## Luminous Intensity Polar Plot



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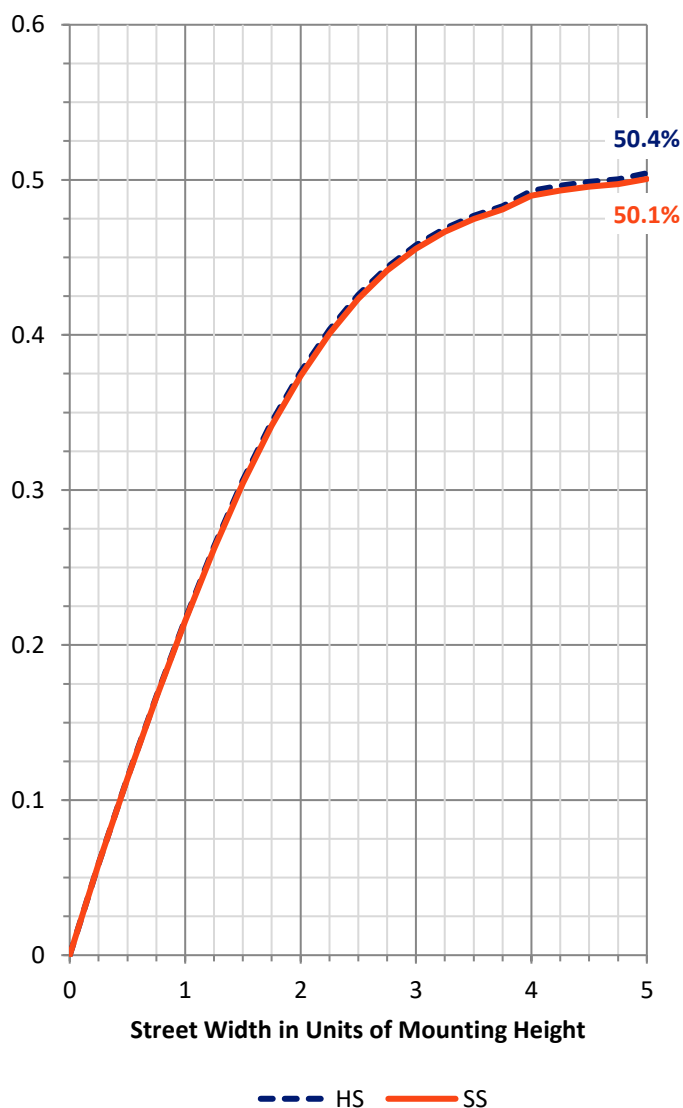
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total  |
|--------------------|-----------|----------|--------|--------|
| <b>House Side</b>  | Lumens    | 1285.5   | 0.0    | 1285.5 |
|                    | % Fixture | 50.0     | 0.0    | 50.0   |
| <b>Street Side</b> | Lumens    | 1285.5   | 0.0    | 1285.5 |
|                    | % Fixture | 50.0     | 0.0    | 50.0   |
| <b>Total</b>       | Lumens    | 2571.0   | 0.0    | 2571.0 |
|                    | % Fixture | 100.0    | 0.0    | 100.0  |

**ZONAL LUMENS:**

| Zone      | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10°    | 19.7   | 0.8       |
| 10°-20°   | 57.7   | 2.2       |
| 20°-30°   | 98.4   | 3.8       |
| 30°-40°   | 153.7  | 6.0       |
| 40°-50°   | 260.4  | 10.1      |
| 50°-60°   | 475.0  | 18.5      |
| 60°-70°   | 817.7  | 31.8      |
| 70°-80°   | 640.9  | 24.9      |
| 80°-90°   | 47.5   | 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°    | 2571.0 | 100.0     |
| 0°-180°   | 2571.0 | 100.0     |

**Coefficient of Utilization**



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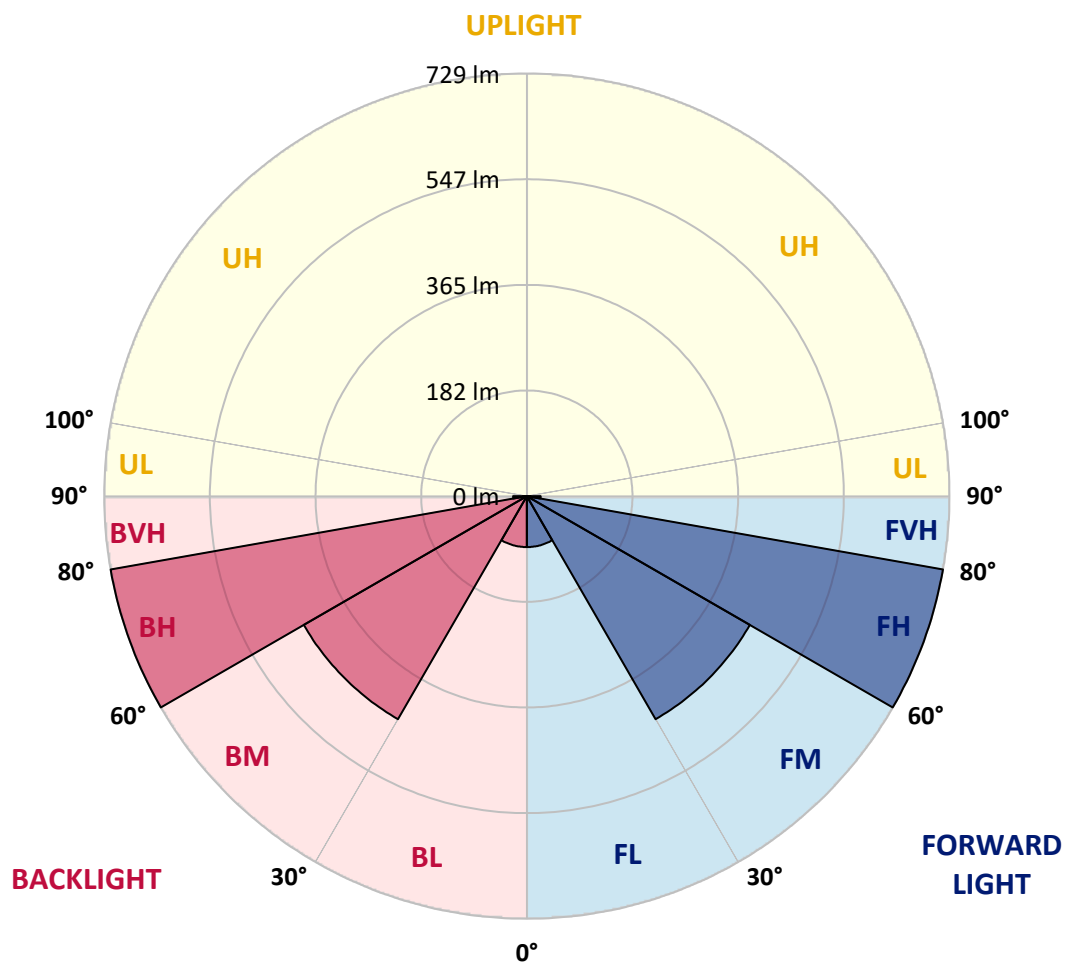
CATALOG NUMBER: ARCH-N-PA1-20-827-24VDC-5WQ

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

| Zone |             | Lumens | % Fixture | Zone Rating/Lumen Limit |      |         |
|------|-------------|--------|-----------|-------------------------|------|---------|
|      |             |        |           | B                       | U    | G       |
| FL   | (0°-30°)    | 87.9   | 3.4       |                         |      |         |
| FM   | (30°-60°)   | 444.5  | 17.3      |                         |      |         |
| FH   | (60°-80°)   | 729.3  | 28.4      |                         |      | G1/1800 |
| FVH  | (80°-90°)   | 23.8   | 0.9       |                         |      | G1/100  |
| BL   | (0°-30°)    | 87.9   | 3.4       | B0/110                  |      |         |
| BM   | (30°-60°)   | 444.5  | 17.3      | B1/1000                 |      |         |
| BH   | (60°-80°)   | 729.3  | 28.4      | B2/1000                 |      | G1/1800 |
| BVH  | (80°-90°)   | 23.8   | 0.9       |                         |      | G1/100  |
| UL   | (90°-100°)  | 0.0    | 0.0       |                         | U0/0 |         |
| UH   | (100°-180°) | 0.0    | 0.0       |                         | U0/0 |         |

**BUG Rating: B2-U0-G1**

Type V Short



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CATALOG NUMBER: ARCH-N-PA1-20-827-24VDC-5WQ

**CANDELA DISTRIBUTION (FULL):**

|       | 0°    | 5°    | 15°   | 25°   | 35°    | 45°    | 55°   | 65°   | 75°   | 85°   | 90°   |
|-------|-------|-------|-------|-------|--------|--------|-------|-------|-------|-------|-------|
| 0°    | 211.6 | 211.6 | 211.6 | 211.6 | 211.6  | 211.6  | 211.6 | 211.6 | 211.6 | 211.6 | 211.6 |
| 2.5°  | 210.7 | 210.9 | 210.7 | 210.8 | 210.4  | 210.6  | 210.6 | 210.6 | 210.5 | 210.6 | 210.4 |
| 5°    | 208.8 | 209.0 | 208.6 | 208.8 | 208.5  | 208.8  | 208.9 | 208.8 | 208.6 | 208.7 | 208.4 |
| 7.5°  | 206.0 | 206.2 | 205.9 | 206.2 | 205.8  | 206.2  | 206.2 | 205.9 | 205.6 | 205.6 | 205.3 |
| 10°   | 204.4 | 204.5 | 203.9 | 203.6 | 202.8  | 203.0  | 203.3 | 203.5 | 203.8 | 204.3 | 204.2 |
| 12.5° | 204.5 | 204.5 | 203.5 | 202.4 | 201.3  | 201.6  | 202.0 | 202.9 | 203.9 | 204.9 | 205.0 |
| 15°   | 205.4 | 205.3 | 203.8 | 202.0 | 201.2  | 202.0  | 202.2 | 202.8 | 204.4 | 206.1 | 206.2 |
| 17.5° | 206.0 | 206.0 | 203.6 | 201.6 | 201.5  | 202.7  | 202.6 | 202.8 | 204.6 | 207.0 | 207.1 |
| 20°   | 207.1 | 207.1 | 204.0 | 201.8 | 201.8  | 203.1  | 203.2 | 203.6 | 205.4 | 208.0 | 208.4 |
| 22.5° | 209.6 | 209.6 | 206.4 | 204.6 | 204.8  | 205.6  | 205.8 | 206.5 | 208.1 | 211.0 | 211.5 |
| 25°   | 213.0 | 213.2 | 209.9 | 208.9 | 209.5  | 210.9  | 210.7 | 211.3 | 213.0 | 215.8 | 216.4 |
| 27.5° | 217.9 | 217.5 | 214.4 | 214.0 | 214.6  | 215.6  | 215.5 | 215.6 | 217.0 | 219.6 | 220.2 |
| 30°   | 224.2 | 224.0 | 221.8 | 222.1 | 221.8  | 221.5  | 221.5 | 222.2 | 223.0 | 225.0 | 225.6 |
| 32.5° | 230.3 | 230.5 | 229.1 | 230.4 | 232.3  | 233.5  | 231.6 | 229.7 | 228.9 | 230.0 | 230.5 |
| 35°   | 241.4 | 241.8 | 239.7 | 238.8 | 241.4  | 245.1  | 239.6 | 236.5 | 238.2 | 239.7 | 240.1 |
| 37.5° | 260.2 | 260.4 | 256.8 | 253.4 | 251.6  | 255.1  | 249.6 | 249.9 | 255.8 | 258.5 | 258.5 |
| 40°   | 281.6 | 281.7 | 279.3 | 276.3 | 273.1  | 273.9  | 271.7 | 272.4 | 276.3 | 278.8 | 279.5 |
| 42.5° | 307.1 | 306.8 | 303.1 | 298.9 | 297.9  | 298.8  | 295.0 | 294.5 | 299.0 | 303.4 | 303.5 |
| 45°   | 340.2 | 339.6 | 334.7 | 330.1 | 325.6  | 323.7  | 322.7 | 325.2 | 331.4 | 335.5 | 335.6 |
| 47.5° | 375.8 | 374.2 | 371.6 | 367.9 | 364.0  | 362.1  | 360.6 | 361.8 | 366.3 | 367.9 | 368.1 |
| 50°   | 412.5 | 412.8 | 413.3 | 411.9 | 410.4  | 409.8  | 405.8 | 403.5 | 404.9 | 401.9 | 401.5 |
| 52.5° | 455.9 | 456.6 | 461.5 | 465.7 | 468.2  | 469.5  | 461.9 | 454.0 | 449.6 | 443.8 | 442.1 |
| 55°   | 507.2 | 508.3 | 515.5 | 527.1 | 539.0  | 545.3  | 531.6 | 516.8 | 503.1 | 492.3 | 488.8 |
| 57.5° | 564.4 | 566.3 | 576.3 | 598.5 | 622.9  | 637.8  | 614.6 | 587.8 | 561.3 | 545.7 | 543.0 |
| 60°   | 631.4 | 633.3 | 647.0 | 678.8 | 718.4  | 740.7  | 705.7 | 661.7 | 628.8 | 613.9 | 608.9 |
| 62.5° | 711.2 | 711.3 | 728.2 | 765.4 | 817.6  | 848.8  | 801.3 | 742.5 | 708.6 | 690.7 | 685.8 |
| 65°   | 797.0 | 797.4 | 814.9 | 855.0 | 909.1  | 942.9  | 889.3 | 828.1 | 786.6 | 760.1 | 756.4 |
| 67.5° | 857.6 | 859.4 | 877.8 | 926.1 | 976.7  | 1007.2 | 951.7 | 882.5 | 834.6 | 803.0 | 799.9 |
| 70°   | 847.9 | 854.9 | 876.6 | 933.0 | 1003.2 | 1046.7 | 961.9 | 876.1 | 812.8 | 775.5 | 772.9 |
| 72.5° | 739.5 | 752.8 | 781.7 | 855.7 | 968.1  | 1028.0 | 906.7 | 784.6 | 713.0 | 681.3 | 676.5 |
| 75°   | 503.6 | 525.2 | 568.9 | 675.6 | 827.1  | 890.1  | 763.3 | 625.6 | 558.2 | 514.4 | 511.1 |
| 77.5° | 224.5 | 229.5 | 284.7 | 407.6 | 570.7  | 639.2  | 554.6 | 409.2 | 307.2 | 245.0 | 231.9 |
| 80°   | 62.6  | 63.4  | 84.5  | 151.8 | 285.7  | 375.6  | 306.7 | 159.5 | 89.6  | 63.2  | 59.5  |
| 82.5° | 19.9  | 21.6  | 26.4  | 39.4  | 96.0   | 171.4  | 98.6  | 42.5  | 30.3  | 24.2  | 21.8  |
| 85°   | 9.7   | 9.6   | 13.4  | 16.0  | 24.5   | 37.9   | 26.1  | 19.7  | 17.3  | 11.5  | 10.4  |
| 87.5° | 4.1   | 4.2   | 6.2   | 5.6   | 7.1    | 6.1    | 8.4   | 8.8   | 9.3   | 5.1   | 4.4   |
| 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



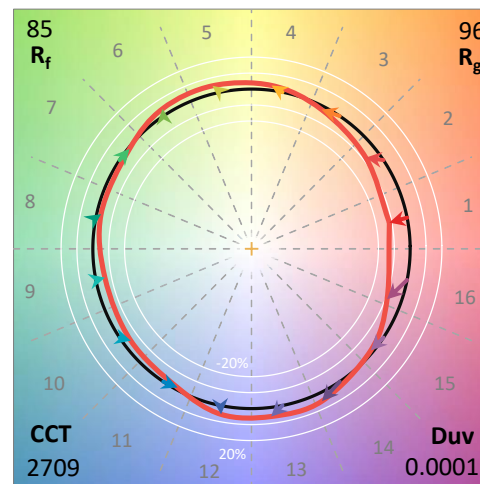
### Test Information

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

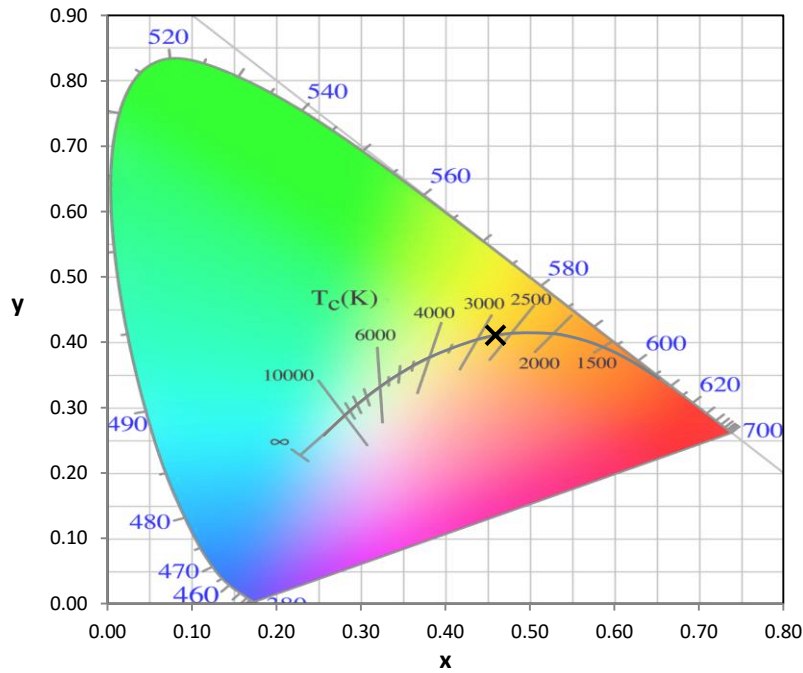
Stabilization Time: 60M  
 Operation Time: 12H  
 Room Temperature (°C) / RH%: 24.9/31%  
 Sphere Temperature (°C): 24.4

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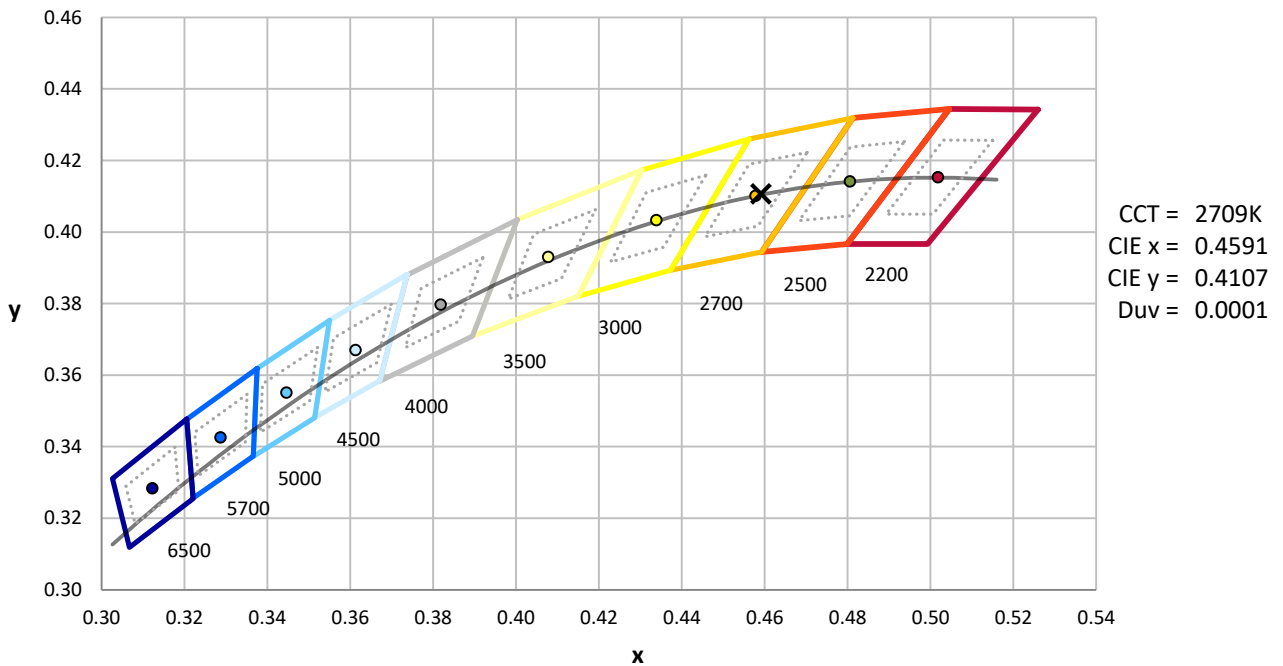
| Measurement and Test Equipment |                       |                  |                      |
|--------------------------------|-----------------------|------------------|----------------------|
| Instrument                     | Identification Number | Calibration Date | Calibration Due Date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



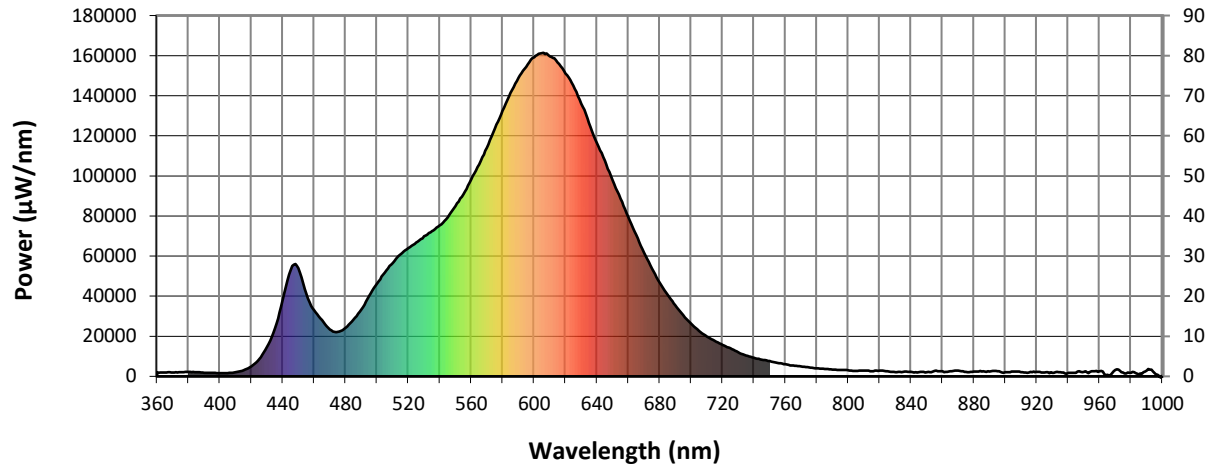
**CIE 1931 Chromaticity Diagram with 2017 ANSI 7-Step and 4-Step Quadrangles**



Point lies inside the ANSI 2700K 4-step quadrangle

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### Photopic Flux vs. Wavelength

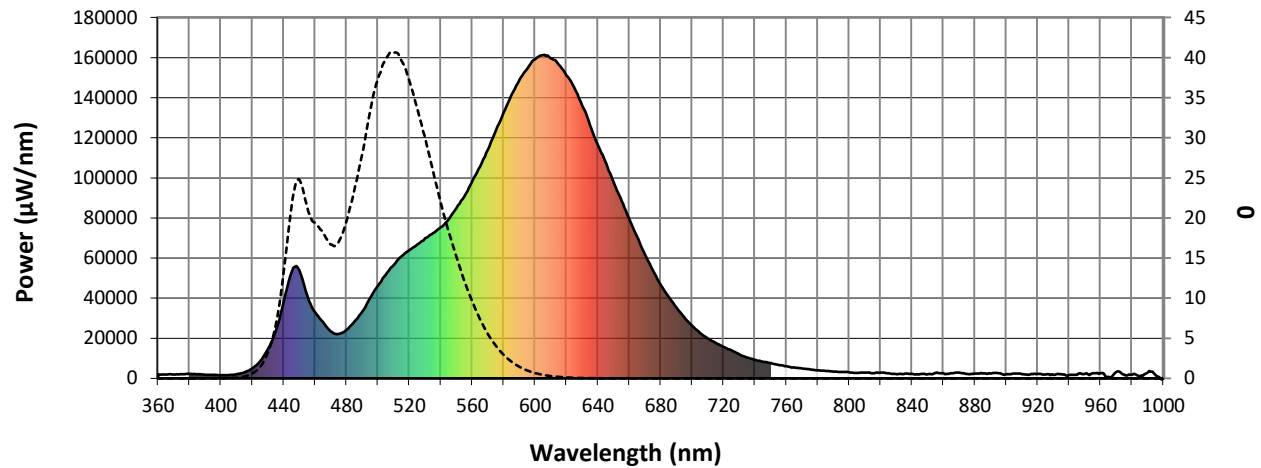


#####

| 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       | 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



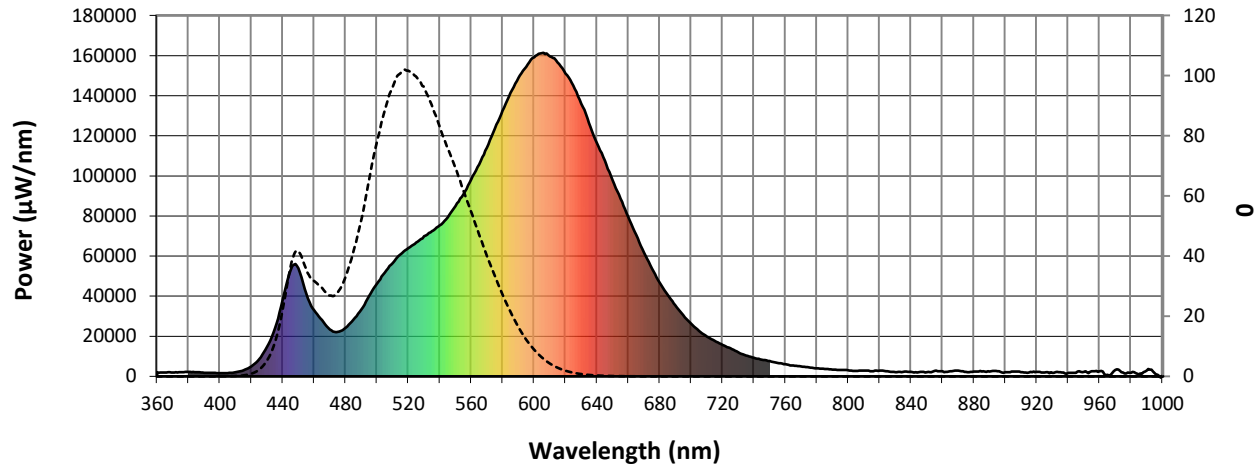
Scotopic Lumens: 8911.3

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**

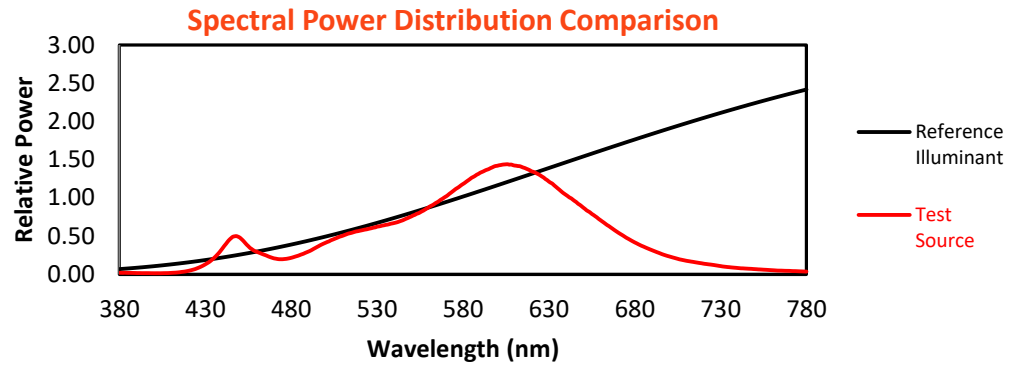
| λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) |
|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|
| 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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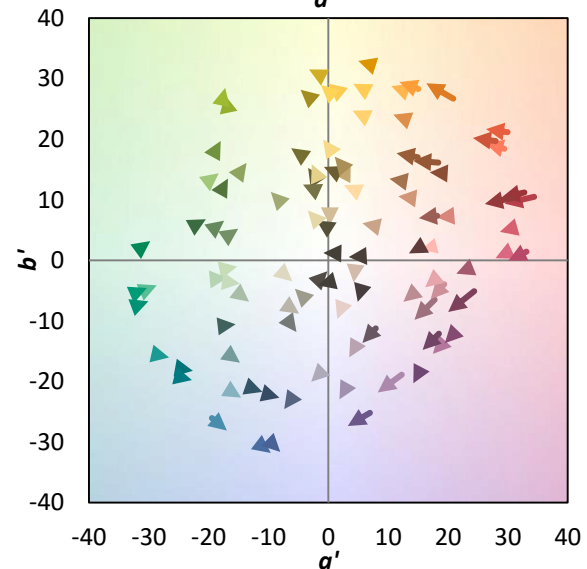
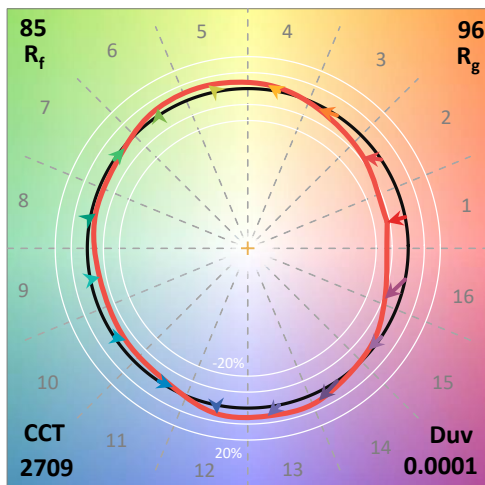
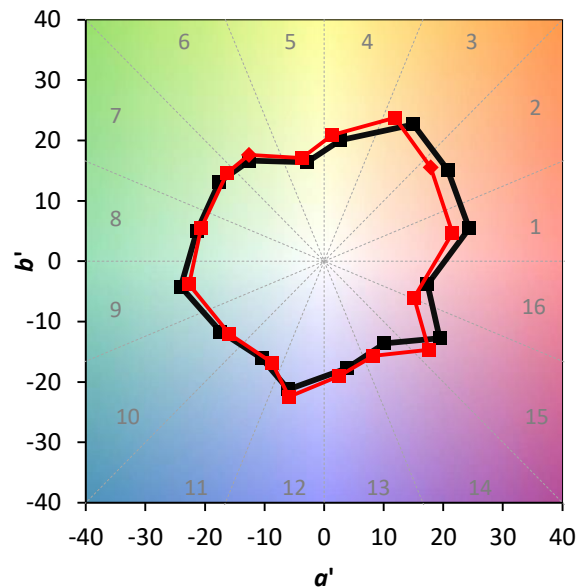
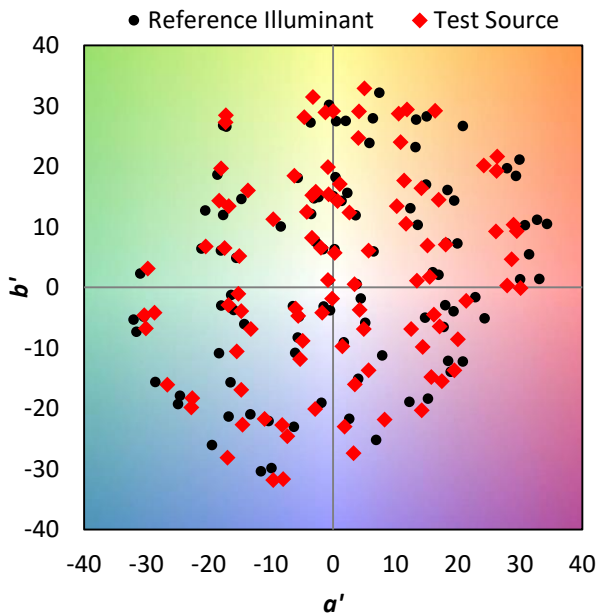
TM-30-18

### Summary

$R_f = 85.2$   
 $R_g = 96.4$   
 CIE  $R_a = 82.1$   
 $R_9 = 4.5$

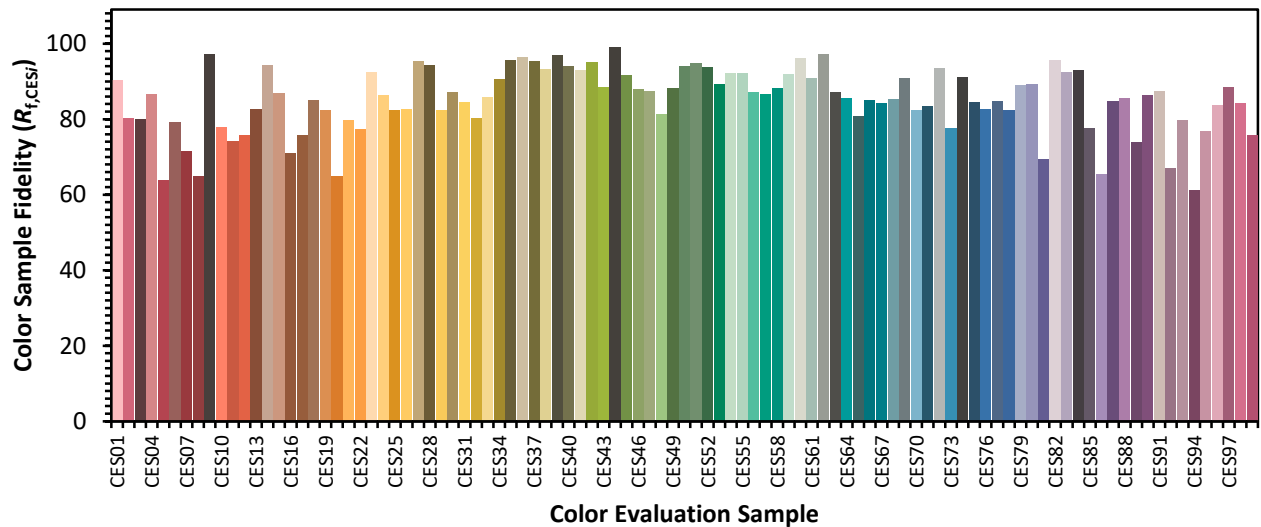


### Color Vector Graphics



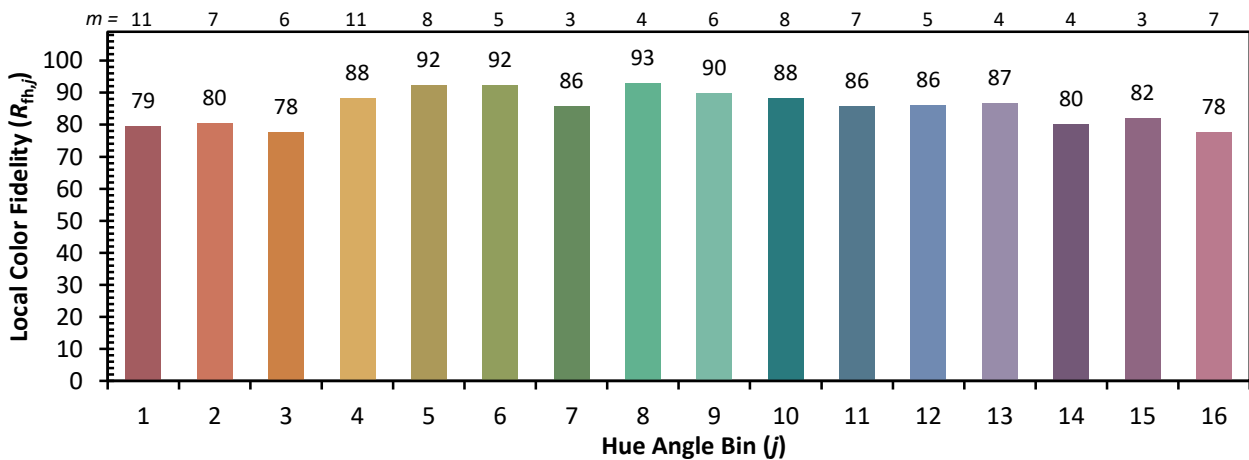
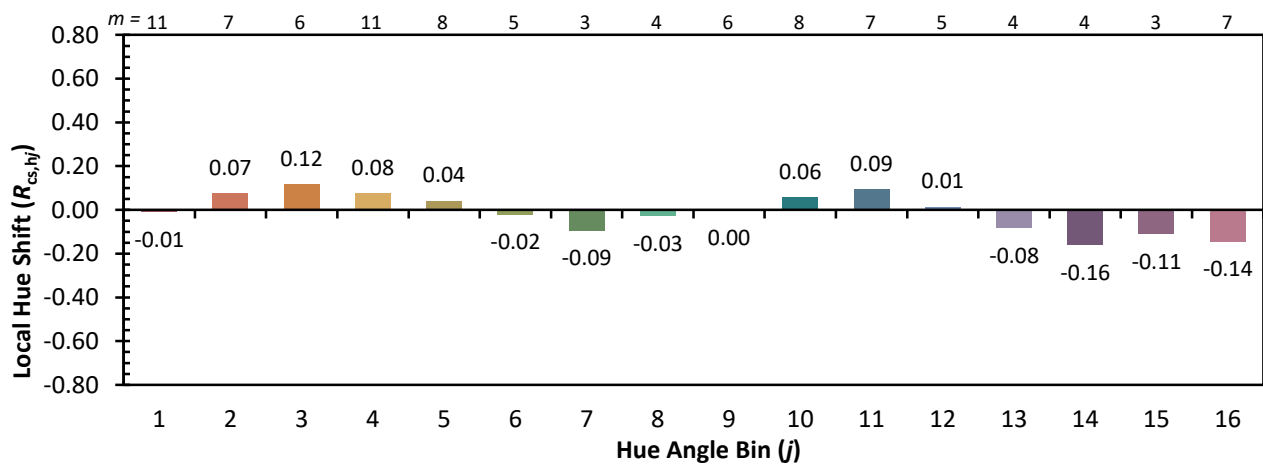
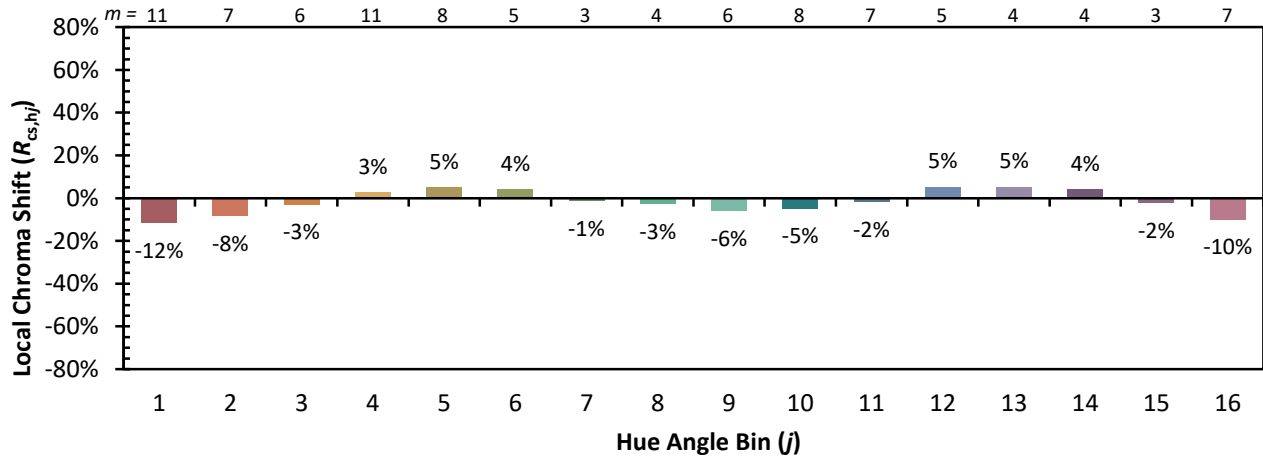
**Individual Sample Fidelity Index ( $R_{f,i}$ )**

|            |            |            |            |
|------------|------------|------------|------------|
| 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 |            |

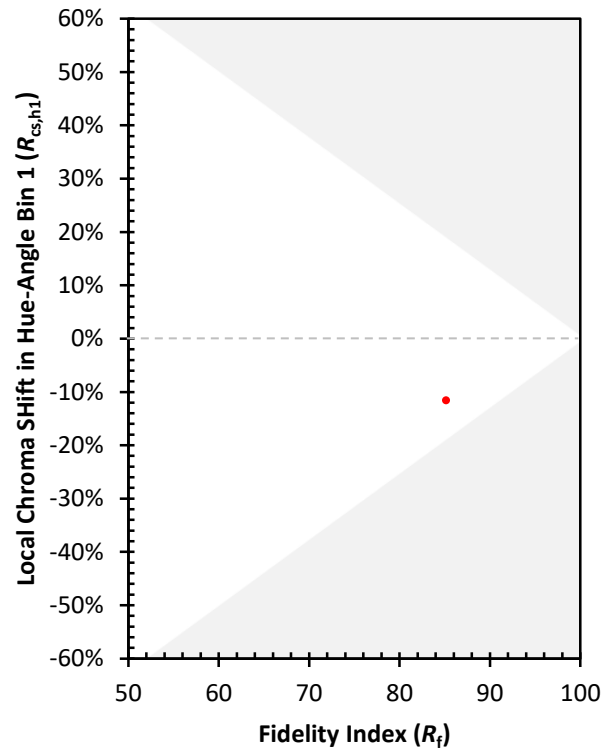
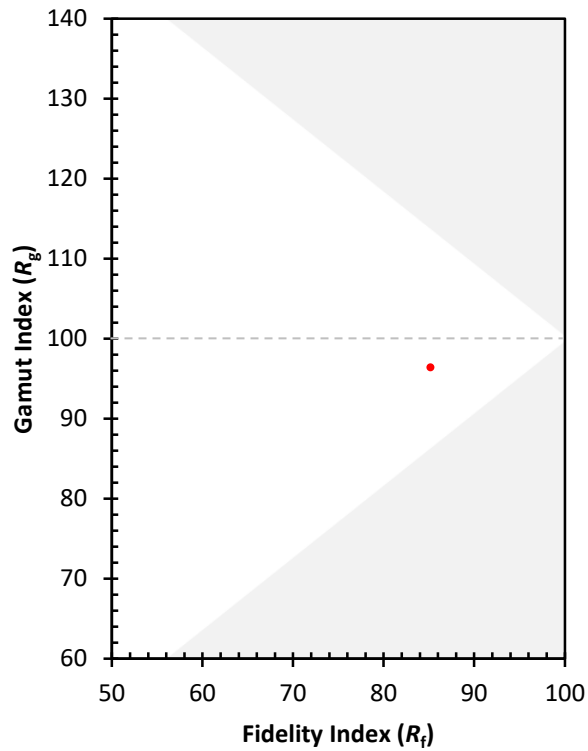




Color Rendition by Hue-Angle Bin



**Measure Comparisons**



(END OF REPORT)