

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: FAIL-SAFE

Report Number: P732427

Luminaire Tested: **14FCZ2-20-B2750-W2D-CP250-3000K**

Issue Date: 1/5/2024



**Test Information**

Test Method: LM-79-08  
Report Number: P732427  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (P275502)  
Test Lab: INNOVATION CENTER(G3)  
Issue Date: 1/5/2024  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: FAIL-SAFE  
Catalog Number: 14FCZ2-20-B2750-W2D-CP250-3000K  
Description: 1X4 2000 LUMEN SEALED CRUZE TROFFER WITH BIO UP LEDS AT 3000K CCT  
AND RIBBED LENS, WITH, CP250 BOTTOM LENS  
  
Light Source: -  
Ballast/Driver: -

**Summary**

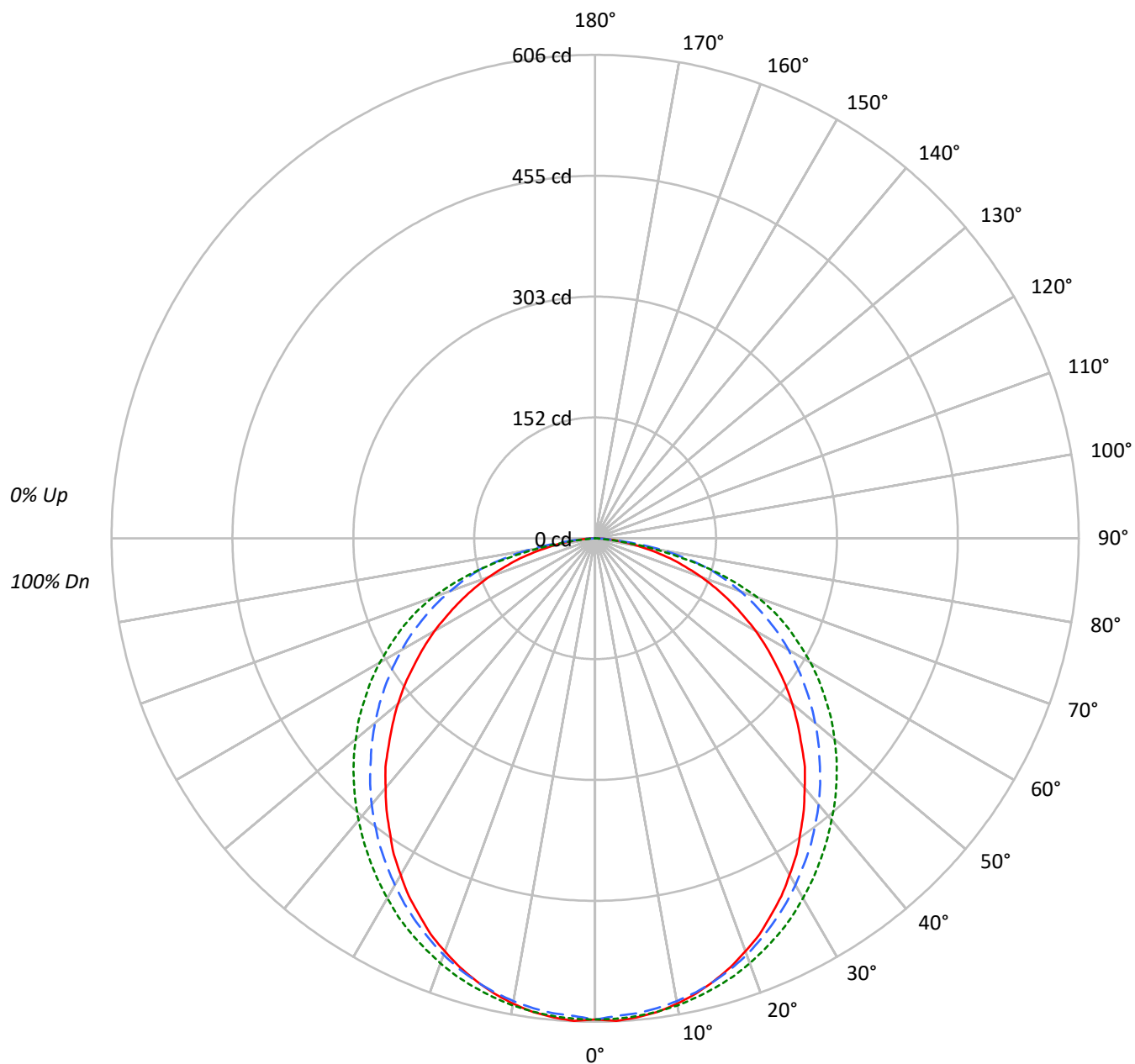
Lumens per Lamp: N/A  
Luminaire Lumens: 1751.0 lumens  
Efficiency: N/A  
Efficacy: 109.4 lumens/watt  
Spacing Criteria (0/90/45): 1.2 / 1.28 / 1.37  
Luminous Opening: Rectangular (W 0.96' x L: 3.98' x H: 0')  
CIE Type: Direct

Input Watts (W): 16  
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

TEST NUMBER: P732427

CATALOG NUMBER: 14FCZ2-20-B2750-W2D-CP250-3000K

### Luminous Intensity Polar Plot





TEST NUMBER: P732427

CATALOG NUMBER: 14FCZ2-20-B2750-W2D-CP250-3000K

**COEFFICIENT OF UTILIZATION - ZONAL CAVITY METHOD:**

|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |    |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|----|----|
| RF  | 20  |     |     |     | 20  |     |     |     |     | 20  |     |     |     |     | 20  |     |     |     |    | 20 |
| RC  | 80  |     |     |     | 70  |     |     |     |     | 50  |     |     |     |     | 30  |     |     |     |    | 10 |
| RW  | 70  | 50  | 30  | 10  | 70  | 50  | 30  | 10  | 50  | 30  | 10  | 50  | 30  | 10  | 50  | 30  | 10  | 50  | 30 | 10 |
| RCR |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |    |
| 0   | 119 | 119 | 119 | 119 | 116 | 116 | 116 | 116 | 111 | 111 | 111 | 106 | 106 | 106 | 102 | 102 | 102 | 100 |    |    |
| 1   | 109 | 104 | 99  | 95  | 106 | 101 | 97  | 94  | 97  | 94  | 91  | 93  | 90  | 88  | 90  | 87  | 85  | 83  |    |    |
| 2   | 98  | 90  | 83  | 77  | 96  | 88  | 82  | 76  | 84  | 79  | 74  | 81  | 77  | 73  | 78  | 74  | 71  | 69  |    |    |
| 3   | 89  | 79  | 70  | 64  | 87  | 77  | 69  | 63  | 74  | 67  | 62  | 71  | 66  | 61  | 69  | 64  | 60  | 58  |    |    |
| 4   | 82  | 70  | 61  | 54  | 79  | 68  | 60  | 53  | 66  | 58  | 53  | 63  | 57  | 52  | 61  | 56  | 51  | 49  |    |    |
| 5   | 75  | 62  | 53  | 46  | 73  | 61  | 52  | 46  | 59  | 51  | 45  | 57  | 50  | 45  | 55  | 49  | 44  | 42  |    |    |
| 6   | 69  | 56  | 47  | 40  | 67  | 55  | 46  | 40  | 53  | 45  | 40  | 51  | 44  | 39  | 50  | 44  | 39  | 37  |    |    |
| 7   | 64  | 51  | 42  | 35  | 63  | 50  | 41  | 35  | 48  | 41  | 35  | 47  | 40  | 35  | 45  | 39  | 34  | 32  |    |    |
| 8   | 60  | 46  | 37  | 32  | 58  | 45  | 37  | 31  | 44  | 37  | 31  | 43  | 36  | 31  | 42  | 35  | 31  | 29  |    |    |
| 9   | 56  | 42  | 34  | 28  | 54  | 42  | 34  | 28  | 41  | 33  | 28  | 39  | 33  | 28  | 38  | 32  | 28  | 26  |    |    |
| 10  | 52  | 39  | 31  | 26  | 51  | 39  | 31  | 26  | 37  | 30  | 26  | 37  | 30  | 25  | 36  | 30  | 25  | 24  |    |    |

**AVERAGE LUMINANCE (cd/sqm):**

|     | 0°   | 45°  | 90°  |
|-----|------|------|------|
| 0°  | 1703 | 1703 | 1703 |
| 5°  | 1708 | 1694 | 1704 |
| 10° | 1698 | 1689 | 1704 |
| 15° | 1679 | 1681 | 1703 |
| 20° | 1655 | 1669 | 1703 |
| 25° | 1623 | 1653 | 1701 |
| 30° | 1588 | 1636 | 1698 |
| 35° | 1546 | 1621 | 1696 |
| 40° | 1505 | 1606 | 1699 |
| 45° | 1459 | 1588 | 1708 |
| 50° | 1416 | 1581 | 1720 |
| 55° | 1362 | 1576 | 1735 |
| 60° | 1314 | 1578 | 1759 |
| 65° | 1246 | 1583 | 1786 |
| 70° | 1170 | 1595 | 1785 |
| 75° | 1060 | 1610 | 1614 |
| 80° | 870  | 1390 | 1148 |
| 85° | 644  | 657  | 266  |



TEST NUMBER: P732427

CATALOG NUMBER: 14FCZ2-20-B2750-W2D-CP250-3000K

**ZONAL LUMENS:**

| Zone      | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10°    | 57.1   | 3.3       |
| 10°-20°   | 163.1  | 9.3       |
| 20°-30°   | 245.6  | 14.0      |
| 30°-40°   | 294.8  | 16.8      |
| 40°-50°   | 307.2  | 17.5      |
| 50°-60°   | 284.4  | 16.2      |
| 60°-70°   | 229.8  | 13.1      |
| 70°-80°   | 140.1  | 8.0       |
| 80°-90°   | 28.9   | 1.7       |
| 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°-30°    | 465.8  | 26.6      |
| 0°-40°    | 760.6  | 43.4      |
| 0°-60°    | 1352.2 | 77.2      |
| 0°-90°    | 1751.0 | 100.0     |
| 90°-120°  | 0.0    | 0.0       |
| 90°-150°  | 0.0    | 0.0       |
| 90°-180°  | 0.0    | 0.0       |
| 0°-180°   | 1751.0 | 100.0     |

**CANDELA DISTRIBUTION:**

|     | 0°  | 22.5° | 45° | 67.5° | 90° | Flux |
|-----|-----|-------|-----|-------|-----|------|
| 0°  | 603 | 603   | 603 | 603   | 603 |      |
| 5°  | 603 | 601   | 598 | 602   | 601 | 57   |
| 15° | 575 | 575   | 575 | 583   | 583 | 162  |
| 25° | 521 | 524   | 531 | 544   | 546 | 240  |
| 35° | 449 | 456   | 470 | 488   | 492 | 281  |
| 45° | 366 | 376   | 398 | 420   | 428 | 282  |
| 55° | 277 | 291   | 320 | 345   | 353 | 248  |
| 65° | 187 | 205   | 237 | 261   | 267 | 185  |
| 75° | 97  | 119   | 148 | 150   | 148 | 102  |
| 85° | 20  | 30    | 20  | 11    | 8   | 24   |
| 90° | 0   | 0     | 0   | 0     | 0   |      |



TEST NUMBER: P732427

CATALOG NUMBER: 14FCZ2-20-B2750-W2D-CP250-3000K

**CANDELA DISTRIBUTION (FULL):**

|       | 0°    | 22.5° | 45°   | 67.5° | 90°   |
|-------|-------|-------|-------|-------|-------|
| 0°    | 603.2 | 603.2 | 603.2 | 603.2 | 603.2 |
| 2.5°  | 605.6 | 603.7 | 599.4 | 603.7 | 602.8 |
| 5°    | 602.8 | 601.3 | 597.8 | 602.1 | 601.3 |
| 7.5°  | 598.9 | 597.3 | 594.2 | 599.4 | 598.5 |
| 10°   | 592.3 | 591.5 | 589.2 | 595.1 | 594.6 |
| 12.5° | 584.5 | 584.1 | 582.9 | 589.6 | 589.2 |
| 15°   | 574.7 | 575.1 | 575.1 | 582.9 | 582.9 |
| 17.5° | 563.8 | 564.5 | 566.2 | 574.7 | 575.9 |
| 20°   | 550.9 | 552.5 | 555.6 | 565.4 | 566.9 |
| 22.5° | 537.7 | 538.8 | 543.5 | 555.2 | 556.8 |
| 25°   | 521.2 | 524.3 | 530.6 | 543.9 | 546.3 |
| 27.5° | 505.6 | 508.3 | 516.9 | 530.6 | 534.5 |
| 30°   | 487.3 | 491.6 | 501.8 | 516.6 | 520.9 |
| 32.5° | 469.7 | 474.4 | 486.1 | 503.3 | 507.1 |
| 35°   | 448.7 | 455.7 | 470.5 | 487.7 | 492.3 |
| 37.5° | 429.5 | 436.1 | 453.0 | 471.7 | 477.1 |
| 40°   | 408.4 | 416.6 | 435.8 | 455.7 | 461.1 |
| 42.5° | 388.9 | 396.6 | 417.4 | 437.7 | 445.1 |
| 45°   | 365.5 | 376.4 | 397.8 | 420.1 | 427.9 |
| 47.5° | 344.0 | 354.9 | 379.5 | 403.3 | 410.4 |
| 50°   | 322.5 | 334.2 | 360.0 | 384.6 | 391.6 |
| 52.5° | 300.2 | 312.8 | 340.4 | 365.0 | 373.3 |
| 55°   | 276.8 | 291.3 | 320.2 | 345.2 | 352.6 |
| 57.5° | 254.5 | 269.4 | 300.2 | 325.6 | 333.0 |
| 60°   | 232.7 | 248.0 | 279.6 | 303.8 | 311.6 |
| 62.5° | 208.5 | 226.5 | 259.3 | 283.0 | 288.9 |
| 65°   | 186.6 | 205.0 | 237.0 | 260.8 | 267.4 |
| 67.5° | 163.6 | 183.5 | 215.5 | 237.3 | 243.7 |
| 70°   | 141.8 | 162.4 | 193.3 | 213.6 | 216.3 |
| 72.5° | 118.3 | 139.4 | 170.6 | 183.5 | 183.5 |
| 75°   | 97.2  | 118.7 | 147.6 | 149.9 | 148.0 |
| 77.5° | 74.2  | 98.0  | 116.7 | 112.0 | 107.4 |
| 80°   | 53.5  | 77.0  | 85.5  | 77.0  | 70.6  |
| 82.5° | 35.9  | 55.8  | 51.5  | 41.0  | 36.3  |
| 85°   | 19.9  | 29.7  | 20.3  | 11.3  | 8.2   |
| 87.5° | 7.4   | 6.7   | 1.9   | 1.9   | 1.9   |
| 90°   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |



Report Generated By 670246072 / DESKTOP-50001EG







— 0°-180°    - - 45°-225°    - - - 90°-270°







LM-79-2019: Approved Method: Electrical and Photometric Measurements of Solid-State Lighting Products

Report Prepared for

Cooper Lighting Solutions

(formerly Eaton)

METALUX

Report Number: SP1-2210-795-2

Test Date: 10/06/2022

Luminaire Tested: 9WP217084MDER4AM-3000K-315MA

Data in this report applies to families of products including 9WP217084MDER4AM-3000K.

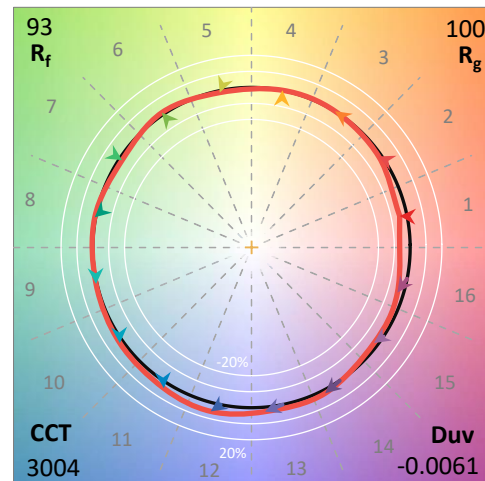
### Test Information

Test Method: LM-79-2019  
 Report Number: SP1-2210-795-2  
 Test Lab: COOPER LIGHTING SOLUTIONS  
 Photometer: SP1 - 76IN SPHERE  
 Measurement Geometry:  $4\pi$   
 Issue Date: 10/06/2022  
 Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
 Product Line: METALUX  
 Catalog Number: **9WP217084MDER4AM-3000K-315MA**  
 Description: METALUX

TUNABLE BOARD, 3000K-315MA, PROGRAMMED @ 2.6Vdc.

### Spectral Parameters

|                           |         |           |      |      |      |
|---------------------------|---------|-----------|------|------|------|
| CCT (K):                  | 3004    | CRI (Ra): | 93.2 |      |      |
| CIE u':                   | 0.2526  | R1:       | 98.5 | R9:  | 67.1 |
| CIE v':                   | 0.5127  | R2:       | 96.3 | R10: | 94.0 |
| Duv:                      | -0.0061 | R3:       | 94.1 | R11: | 97.7 |
| CIE x:                    | 0.4279  | R4:       | 96.5 | R12: | 86.0 |
| CIE y:                    | 0.3860  | R5:       | 98.5 | R13: | 98.4 |
| CIE z:                    | 0.1861  | R6:       | 90.3 | R14: | 98.1 |
| Peak Wavelength (nm):     | 632     | R7:       | 88.3 |      |      |
| Dominant Wavelength (nm): | 585     | R8:       | 83.1 |      |      |
| Purity:                   | 44.5    |           |      |      |      |
| Rf:                       | 92.5    |           |      |      |      |
| Rg:                       | 99.9    |           |      |      |      |



### Test Conditions

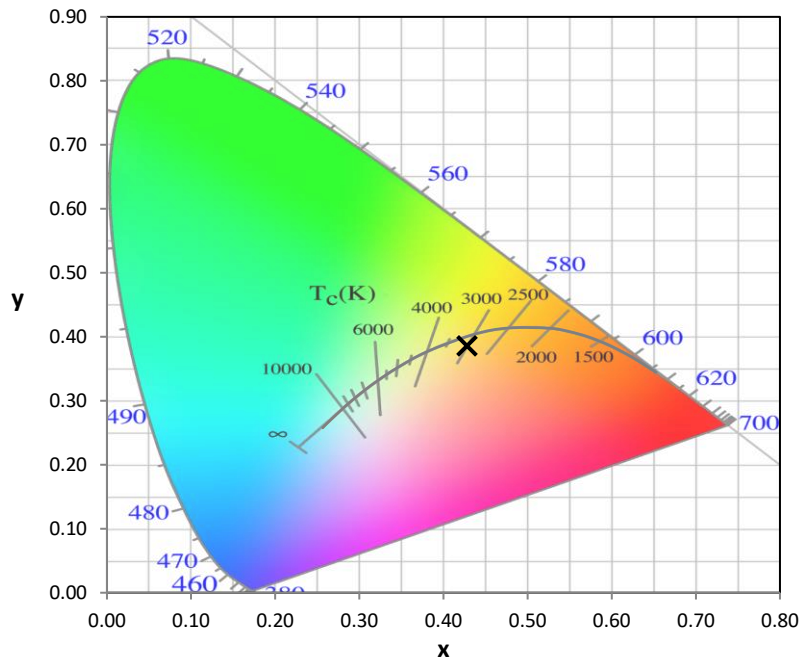
Stabilization Time: 53M  
 Operation Time: 12H  
 Room Temperature (°C) / RH%: 24.0/38%  
 Sphere Temperature (°C): 24.4

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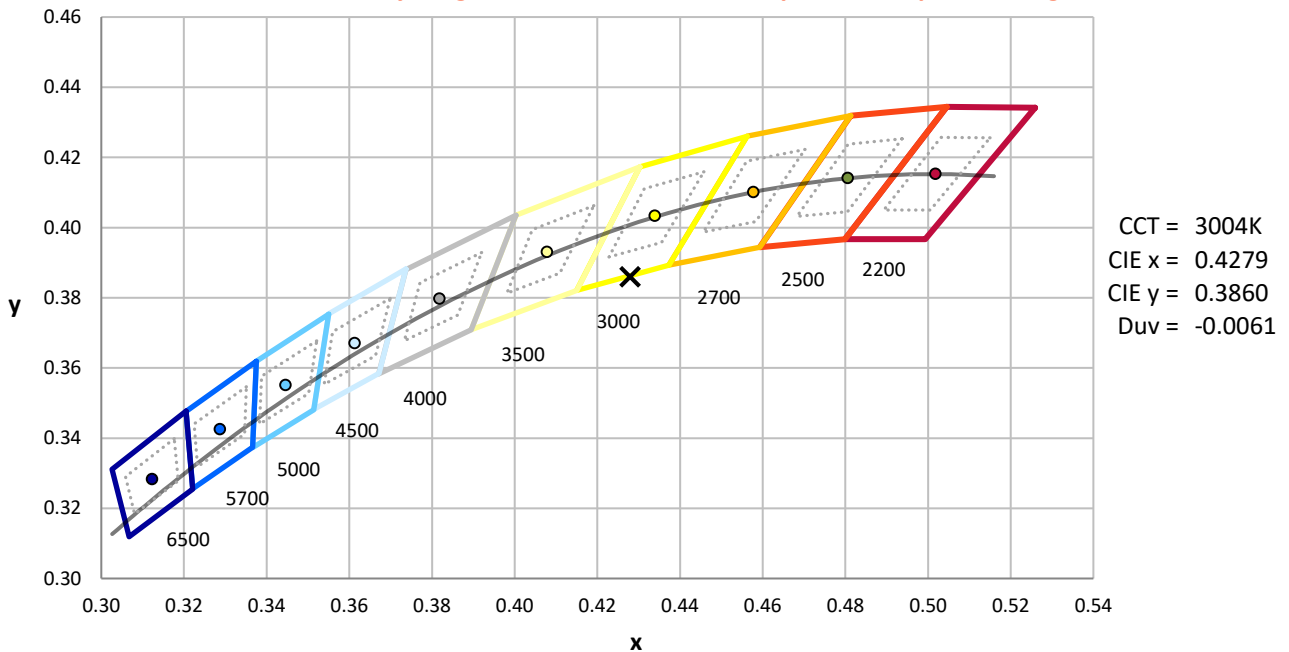
| Measurement and Test Equipment |                       |                  |                      |
|--------------------------------|-----------------------|------------------|----------------------|
| Instrument                     | Identification Number | Calibration Date | Calibration Due Date |
| Photometer                     | 76INCH SPHERE IN0058  | 8/8/2022         | 2/8/2023             |
| Power Meter                    | XITRON 2801 IN0071    | 11/29/2021       | 11/29/2022           |
| AC Power Source                | CHROMA 61603 IN0063   | 11/29/2021       | 11/29/2022           |
| DC Power Source                | AGILENT E3634A IN0208 | 11/29/2021       | 11/29/2022           |
| Sphere Thermometer             | ONSET IN0085          | 11/29/2021       | 11/29/2022           |
| Room Thermometer               | ONSET IN0046          | 11/29/2021       | 11/29/2022           |

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**CIE 1931 Chromaticity Diagram**



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

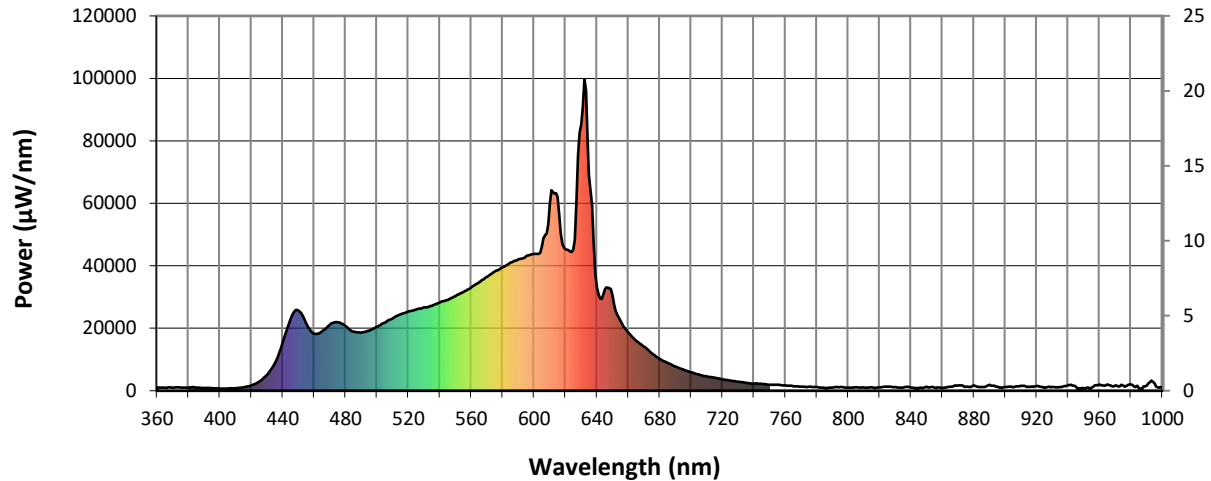


Point lies outside the range



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**Photopic Flux vs. Wavelength**

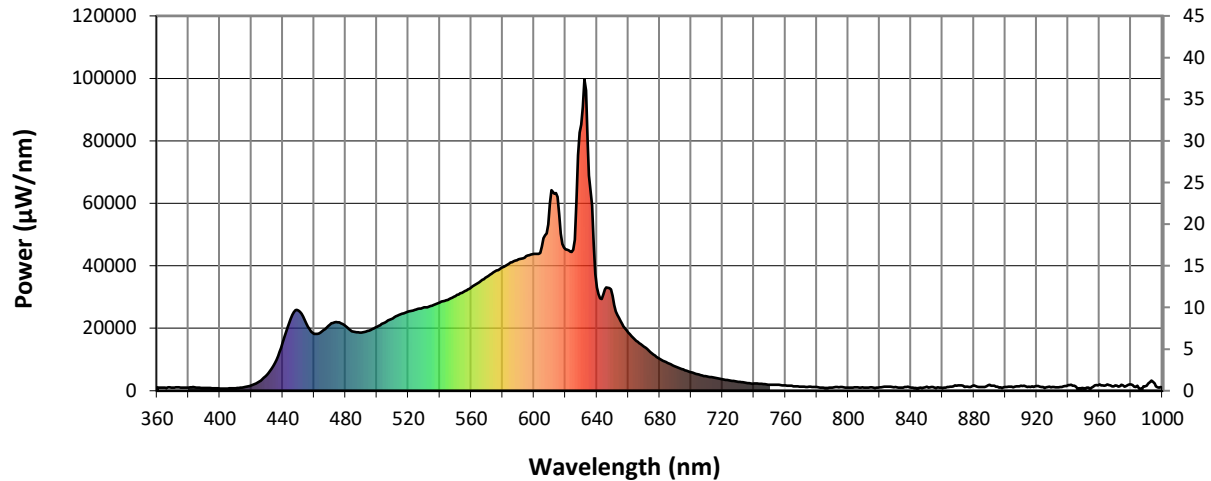


#####

| 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       | 1141             | NR               | 490       | 18648            | NR               | 620       | 45240            | NR               | 750       | 1949             | NR               | 880       | 1696             | NR               |
| 365       | 981              | NR               | 495       | 19266            | NR               | 625       | 45103            | NR               | 755       | 1928             | NR               | 885       | 1176             | NR               |
| 370       | 993              | NR               | 500       | 20501            | NR               | 630       | 85243            | NR               | 760       | 1686             | NR               | 890       | 1892             | NR               |
| 375       | 1026             | NR               | 505       | 21835            | NR               | 635       | 68928            | NR               | 765       | 1435             | NR               | 895       | 1303             | NR               |
| 380       | 1011             | NR               | 510       | 23128            | NR               | 640       | 33096            | NR               | 770       | 1270             | NR               | 900       | 1197             | NR               |
| 385       | 1002             | NR               | 515       | 24473            | NR               | 645       | 32437            | NR               | 775       | 1334             | NR               | 905       | 1148             | NR               |
| 390       | 868              | NR               | 520       | 25336            | NR               | 650       | 30398            | NR               | 780       | 1218             | NR               | 910       | 1595             | NR               |
| 395       | 834              | NR               | 525       | 26013            | NR               | 655       | 22347            | NR               | 785       | 928              | NR               | 915       | 1266             | NR               |
| 400       | 731              | NR               | 530       | 26667            | NR               | 660       | 18602            | NR               | 790       | 989              | NR               | 920       | 1495             | NR               |
| 405       | 725              | NR               | 535       | 27195            | NR               | 665       | 15938            | NR               | 795       | 1224             | NR               | 925       | 855              | NR               |
| 410       | 825              | NR               | 540       | 28268            | NR               | 670       | 14142            | NR               | 800       | 1005             | NR               | 930       | 1185             | NR               |
| 415       | 1102             | NR               | 545       | 29091            | NR               | 675       | 11970            | NR               | 805       | 1076             | NR               | 935       | 1186             | NR               |
| 420       | 1695             | NR               | 550       | 30262            | NR               | 680       | 10212            | NR               | 810       | 1018             | NR               | 940       | 1843             | NR               |
| 425       | 2899             | NR               | 555       | 31582            | NR               | 685       | 8911             | NR               | 815       | 1059             | NR               | 945       | 1344             | NR               |
| 430       | 5092             | NR               | 560       | 33069            | NR               | 690       | 7775             | NR               | 820       | 1047             | NR               | 950       | 827              | NR               |
| 435       | 8866             | NR               | 565       | 34747            | NR               | 695       | 6796             | NR               | 825       | 1259             | NR               | 955       | 984              | NR               |
| 440       | 15398            | NR               | 570       | 36451            | NR               | 700       | 5894             | NR               | 830       | 1151             | NR               | 960       | 1985             | NR               |
| 445       | 23004            | NR               | 575       | 38145            | NR               | 705       | 5150             | NR               | 835       | 1045             | NR               | 965       | 2009             | NR               |
| 450       | 25734            | NR               | 580       | 39543            | NR               | 710       | 4545             | NR               | 840       | 1037             | NR               | 970       | 1686             | NR               |
| 455       | 21534            | NR               | 585       | 41063            | NR               | 715       | 4197             | NR               | 845       | 888              | NR               | 975       | 1733             | NR               |
| 460       | 18246            | NR               | 590       | 42070            | NR               | 720       | 3650             | NR               | 850       | 1271             | NR               | 980       | 2039             | NR               |
| 465       | 18978            | NR               | 595       | 43067            | NR               | 725       | 3265             | NR               | 855       | 1028             | NR               | 985       | 919              | NR               |
| 470       | 21128            | NR               | 600       | 43863            | NR               | 730       | 2885             | NR               | 860       | 867              | NR               | 990       | 1621             | NR               |
| 475       | 21866            | NR               | 605       | 46127            | NR               | 735       | 2521             | NR               | 865       | 1316             | NR               | 995       | 2360             | NR               |
| 480       | 20628            | NR               | 610       | 59905            | NR               | 740       | 2317             | NR               | 870       | 1674             | NR               | 1000      | 905              | NR               |
| 485       | 18888            | NR               | 615       | 62018            | NR               | 745       | 2212             | NR               | 875       | 1299             | NR               |           |                  |                  |

REPORT NUMBER: SP1-2210-795-2

Scotopic Flux vs. Wavelength



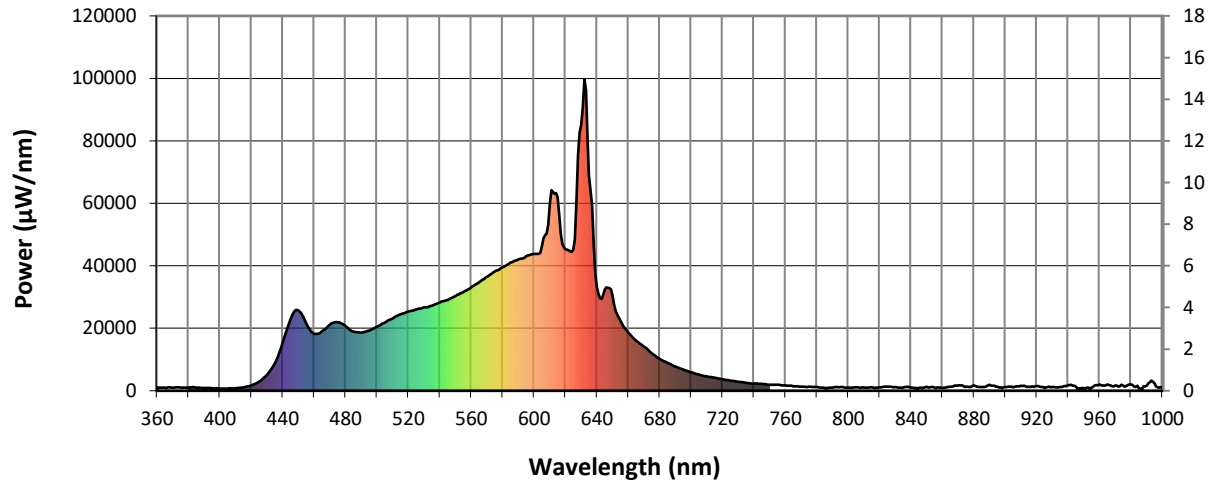
Scotopic Lumens: 3849.1

S/P: 1.53

| 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       | 1141             | NR               | 490       | 18648            | NR               | 620       | 45240            | NR               | 750       | 1949             | NR               | 880       | 1696             | NR               |
| 365       | 981              | NR               | 495       | 19266            | NR               | 625       | 45103            | NR               | 755       | 1928             | NR               | 885       | 1176             | NR               |
| 370       | 993              | NR               | 500       | 20501            | NR               | 630       | 85243            | NR               | 760       | 1686             | NR               | 890       | 1892             | NR               |
| 375       | 1026             | NR               | 505       | 21835            | NR               | 635       | 68928            | NR               | 765       | 1435             | NR               | 895       | 1303             | NR               |
| 380       | 1011             | NR               | 510       | 23128            | NR               | 640       | 33096            | NR               | 770       | 1270             | NR               | 900       | 1197             | NR               |
| 385       | 1002             | NR               | 515       | 24473            | NR               | 645       | 32437            | NR               | 775       | 1334             | NR               | 905       | 1148             | NR               |
| 390       | 868              | NR               | 520       | 25336            | NR               | 650       | 30398            | NR               | 780       | 1218             | NR               | 910       | 1595             | NR               |
| 395       | 834              | NR               | 525       | 26013            | NR               | 655       | 22347            | NR               | 785       | 928              | NR               | 915       | 1266             | NR               |
| 400       | 731              | NR               | 530       | 26667            | NR               | 660       | 18602            | NR               | 790       | 989              | NR               | 920       | 1495             | NR               |
| 405       | 725              | NR               | 535       | 27195            | NR               | 665       | 15938            | NR               | 795       | 1224             | NR               | 925       | 855              | NR               |
| 410       | 825              | NR               | 540       | 28268            | NR               | 670       | 14142            | NR               | 800       | 1005             | NR               | 930       | 1185             | NR               |
| 415       | 1102             | NR               | 545       | 29091            | NR               | 675       | 11970            | NR               | 805       | 1076             | NR               | 935       | 1186             | NR               |
| 420       | 1695             | NR               | 550       | 30262            | NR               | 680       | 10212            | NR               | 810       | 1018             | NR               | 940       | 1843             | NR               |
| 425       | 2899             | NR               | 555       | 31582            | NR               | 685       | 8911             | NR               | 815       | 1059             | NR               | 945       | 1344             | NR               |
| 430       | 5092             | NR               | 560       | 33069            | NR               | 690       | 7775             | NR               | 820       | 1047             | NR               | 950       | 827              | NR               |
| 435       | 8866             | NR               | 565       | 34747            | NR               | 695       | 6796             | NR               | 825       | 1259             | NR               | 955       | 984              | NR               |
| 440       | 15398            | NR               | 570       | 36451            | NR               | 700       | 5894             | NR               | 830       | 1151             | NR               | 960       | 1985             | NR               |
| 445       | 23004            | NR               | 575       | 38145            | NR               | 705       | 5150             | NR               | 835       | 1045             | NR               | 965       | 2009             | NR               |
| 450       | 25734            | NR               | 580       | 39543            | NR               | 710       | 4545             | NR               | 840       | 1037             | NR               | 970       | 1686             | NR               |
| 455       | 21534            | NR               | 585       | 41063            | NR               | 715       | 4197             | NR               | 845       | 888              | NR               | 975       | 1733             | NR               |
| 460       | 18246            | NR               | 590       | 42070            | NR               | 720       | 3650             | NR               | 850       | 1271             | NR               | 980       | 2039             | NR               |
| 465       | 18978            | NR               | 595       | 43067            | NR               | 725       | 3265             | NR               | 855       | 1028             | NR               | 985       | 919              | NR               |
| 470       | 21128            | NR               | 600       | 43863            | NR               | 730       | 2885             | NR               | 860       | 867              | NR               | 990       | 1621             | NR               |
| 475       | 21866            | NR               | 605       | 46127            | NR               | 735       | 2521             | NR               | 865       | 1316             | NR               | 995       | 2360             | NR               |
| 480       | 20628            | NR               | 610       | 59905            | NR               | 740       | 2317             | NR               | 870       | 1674             | NR               | 1000      | 905              | NR               |
| 485       | 18888            | NR               | 615       | 62018            | NR               | 745       | 2212             | NR               | 875       | 1299             | NR               |           |                  |                  |

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**Melanopic Flux vs. Wavelength**



**Melanopic Lumens: 1558.5**

**S/P: 0.62**

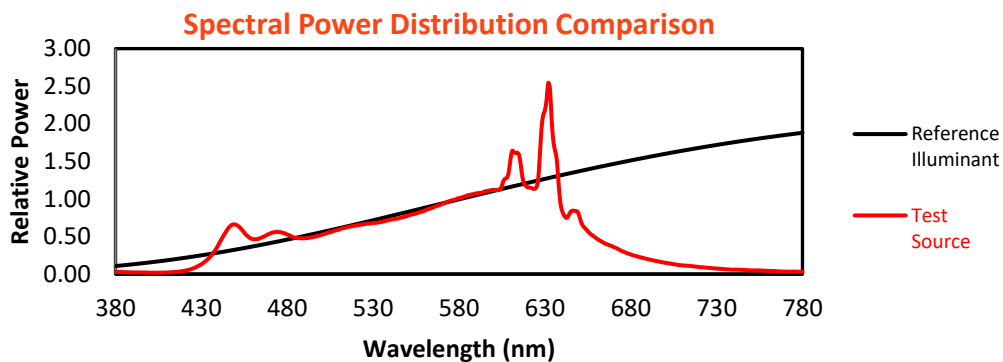
| λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) |
|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|
| 360       | 1141             | NR               | 490       | 18648            | NR               | 620       | 45240            | NR               | 750       | 1949             | NR               | 880       | 1696             | NR               |
| 365       | 981              | NR               | 495       | 19266            | NR               | 625       | 45103            | NR               | 755       | 1928             | NR               | 885       | 1176             | NR               |
| 370       | 993              | NR               | 500       | 20501            | NR               | 630       | 85243            | NR               | 760       | 1686             | NR               | 890       | 1892             | NR               |
| 375       | 1026             | NR               | 505       | 21835            | NR               | 635       | 68928            | NR               | 765       | 1435             | NR               | 895       | 1303             | NR               |
| 380       | 1011             | NR               | 510       | 23128            | NR               | 640       | 33096            | NR               | 770       | 1270             | NR               | 900       | 1197             | NR               |
| 385       | 1002             | NR               | 515       | 24473            | NR               | 645       | 32437            | NR               | 775       | 1334             | NR               | 905       | 1148             | NR               |
| 390       | 868              | NR               | 520       | 25336            | NR               | 650       | 30398            | NR               | 780       | 1218             | NR               | 910       | 1595             | NR               |
| 395       | 834              | NR               | 525       | 26013            | NR               | 655       | 22347            | NR               | 785       | 928              | NR               | 915       | 1266             | NR               |
| 400       | 731              | NR               | 530       | 26667            | NR               | 660       | 18602            | NR               | 790       | 989              | NR               | 920       | 1495             | NR               |
| 405       | 725              | NR               | 535       | 27195            | NR               | 665       | 15938            | NR               | 795       | 1224             | NR               | 925       | 855              | NR               |
| 410       | 825              | NR               | 540       | 28268            | NR               | 670       | 14142            | NR               | 800       | 1005             | NR               | 930       | 1185             | NR               |
| 415       | 1102             | NR               | 545       | 29091            | NR               | 675       | 11970            | NR               | 805       | 1076             | NR               | 935       | 1186             | NR               |
| 420       | 1695             | NR               | 550       | 30262            | NR               | 680       | 10212            | NR               | 810       | 1018             | NR               | 940       | 1843             | NR               |
| 425       | 2899             | NR               | 555       | 31582            | NR               | 685       | 8911             | NR               | 815       | 1059             | NR               | 945       | 1344             | NR               |
| 430       | 5092             | NR               | 560       | 33069            | NR               | 690       | 7775             | NR               | 820       | 1047             | NR               | 950       | 827              | NR               |
| 435       | 8866             | NR               | 565       | 34747            | NR               | 695       | 6796             | NR               | 825       | 1259             | NR               | 955       | 984              | NR               |
| 440       | 15398            | NR               | 570       | 36451            | NR               | 700       | 5894             | NR               | 830       | 1151             | NR               | 960       | 1985             | NR               |
| 445       | 23004            | NR               | 575       | 38145            | NR               | 705       | 5150             | NR               | 835       | 1045             | NR               | 965       | 2009             | NR               |
| 450       | 25734            | NR               | 580       | 39543            | NR               | 710       | 4545             | NR               | 840       | 1037             | NR               | 970       | 1686             | NR               |
| 455       | 21534            | NR               | 585       | 41063            | NR               | 715       | 4197             | NR               | 845       | 888              | NR               | 975       | 1733             | NR               |
| 460       | 18246            | NR               | 590       | 42070            | NR               | 720       | 3650             | NR               | 850       | 1271             | NR               | 980       | 2039             | NR               |
| 465       | 18978            | NR               | 595       | 43067            | NR               | 725       | 3265             | NR               | 855       | 1028             | NR               | 985       | 919              | NR               |
| 470       | 21128            | NR               | 600       | 43863            | NR               | 730       | 2885             | NR               | 860       | 867              | NR               | 990       | 1621             | NR               |
| 475       | 21866            | NR               | 605       | 46127            | NR               | 735       | 2521             | NR               | 865       | 1316             | NR               | 995       | 2360             | NR               |
| 480       | 20628            | NR               | 610       | 59905            | NR               | 740       | 2317             | NR               | 870       | 1674             | NR               | 1000      | 905              | NR               |
| 485       | 18888            | NR               | 615       | 62018            | NR               | 745       | 2212             | NR               | 875       | 1299             | NR               |           |                  |                  |

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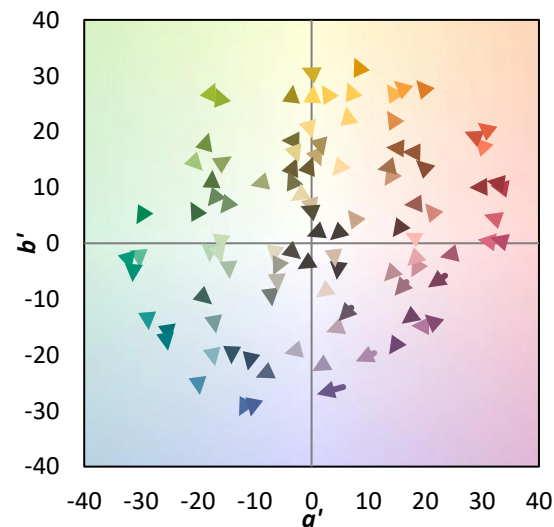
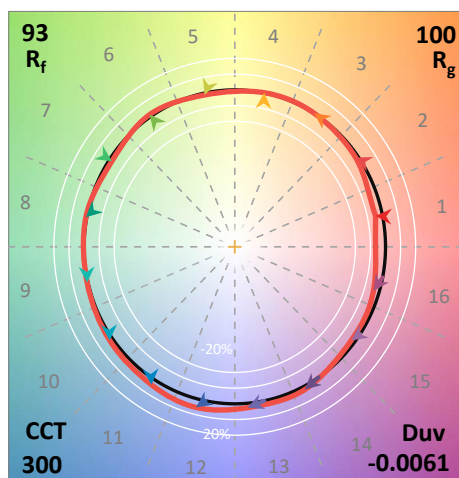
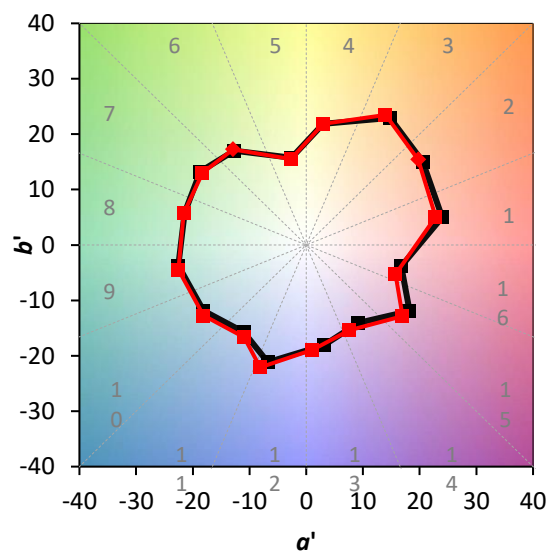
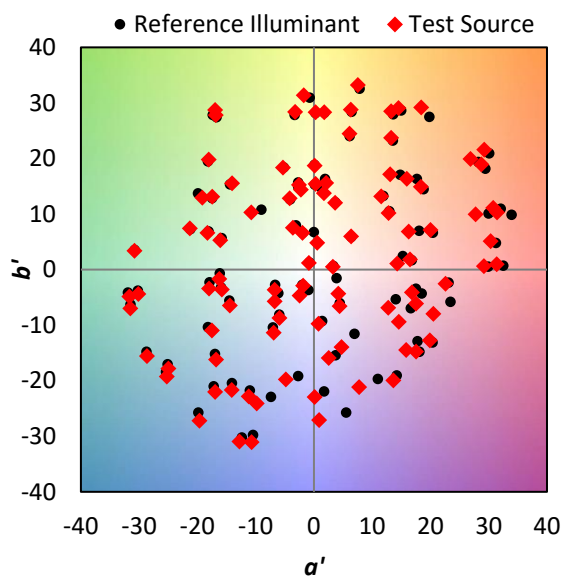
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### Summary

$R_f = 92.5$   
 $R_g = 99.9$   
 CIE  $R_a = 93.2$   
 $R_g = 67.1$



### Color Vector Graphics

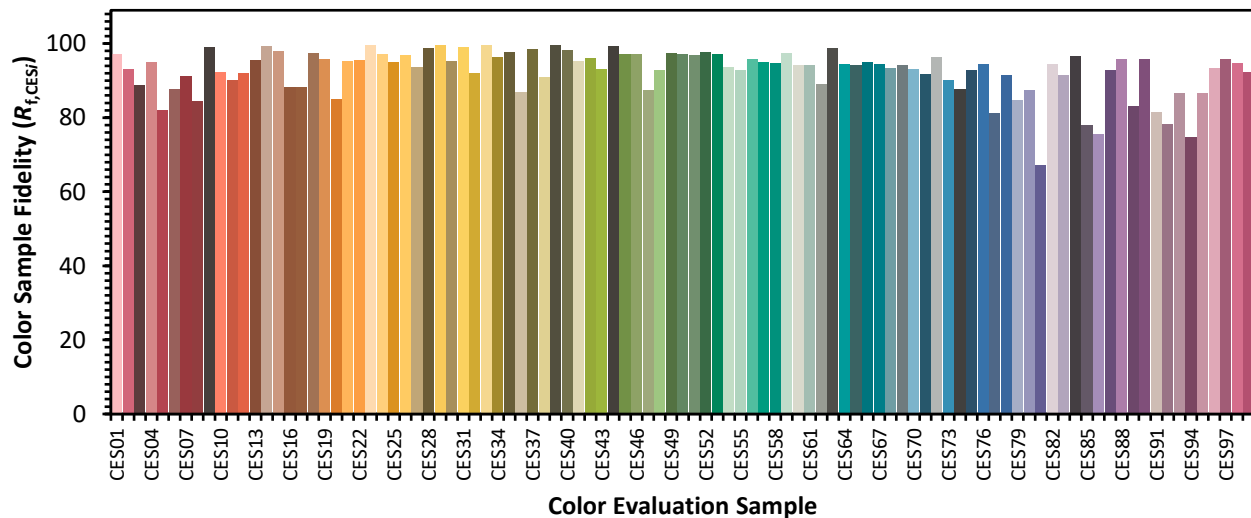


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**Individual Sample Fidelity Index ( $R_{f,i}$ )**

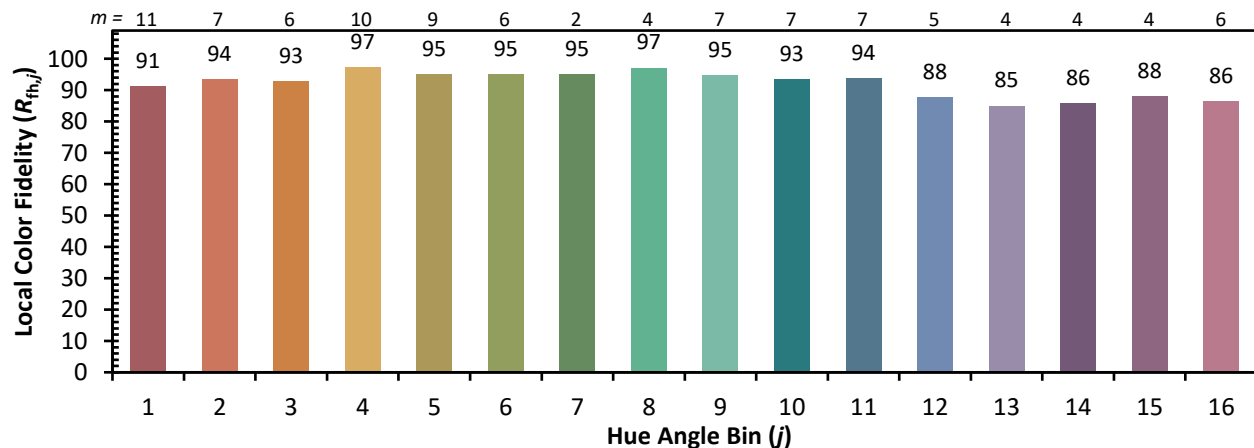
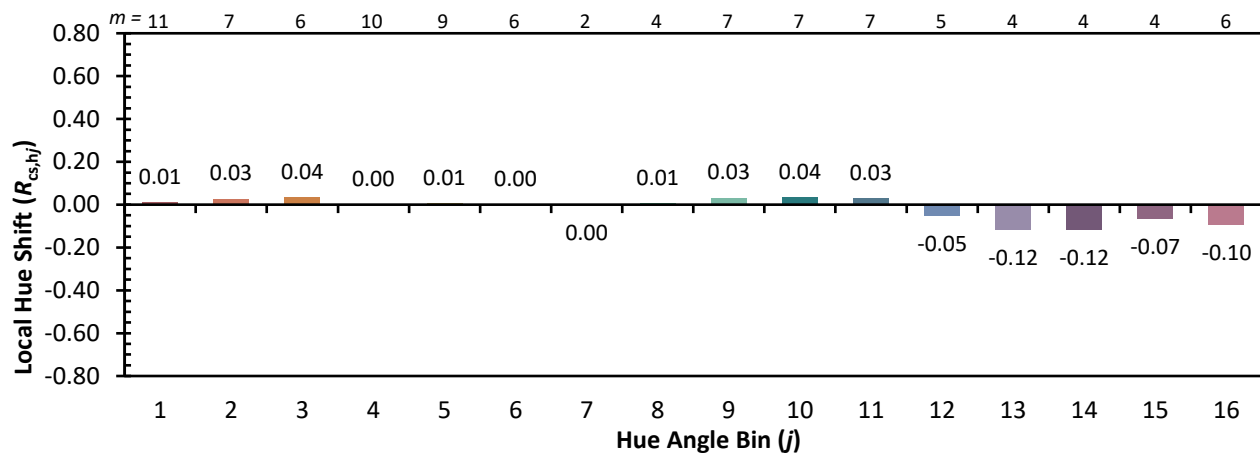
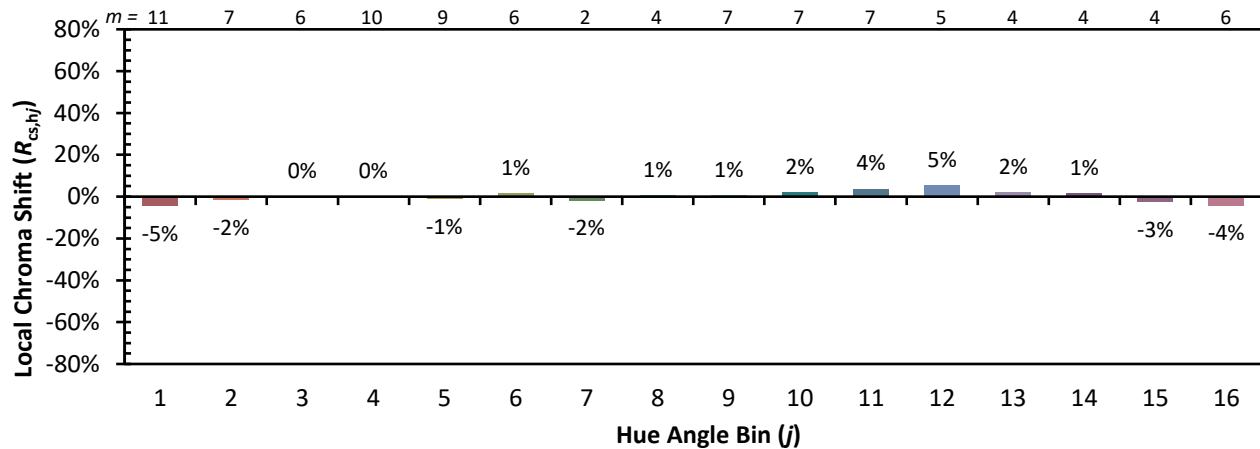
|            |             |            |            |
|------------|-------------|------------|------------|
| CES01 = 86 | CES26 = 97  | CES51 = 97 | CES76 = 94 |
| CES02 = 63 | CES27 = 93  | CES52 = 98 | CES77 = 81 |
| CES03 = 32 | CES28 = 99  | CES53 = 97 | CES78 = 91 |
| CES04 = 70 | CES29 = 99  | CES54 = 93 | CES79 = 85 |
| CES05 = 51 | CES30 = 95  | CES55 = 93 | CES80 = 87 |
| CES06 = 51 | CES31 = 99  | CES56 = 96 | CES81 = 67 |
| CES07 = 44 | CES32 = 92  | CES57 = 95 | CES82 = 94 |
| CES08 = 42 | CES33 = 99  | CES58 = 95 | CES83 = 91 |
| CES09 = 29 | CES34 = 96  | CES59 = 97 | CES84 = 97 |
| CES10 = 76 | CES35 = 98  | CES60 = 94 | CES85 = 78 |
| CES11 = 59 | CES36 = 87  | CES61 = 94 | CES86 = 76 |
| CES12 = 65 | CES37 = 98  | CES62 = 89 | CES87 = 93 |
| CES13 = 44 | CES38 = 91  | CES63 = 99 | CES88 = 96 |
| CES14 = 74 | CES39 = 100 | CES64 = 94 | CES89 = 83 |
| CES15 = 72 | CES40 = 98  | CES65 = 94 | CES90 = 96 |
| CES16 = 48 | CES41 = 95  | CES66 = 95 | CES91 = 81 |
| CES17 = 50 | CES42 = 96  | CES67 = 94 | CES92 = 78 |
| CES18 = 57 | CES43 = 93  | CES68 = 93 | CES93 = 86 |
| CES19 = 72 | CES44 = 99  | CES69 = 94 | CES94 = 75 |
| CES20 = 67 | CES45 = 97  | CES70 = 93 | CES95 = 86 |
| CES21 = 86 | CES46 = 97  | CES71 = 92 | CES96 = 93 |
| CES22 = 79 | CES47 = 87  | CES72 = 96 | CES97 = 96 |
| CES23 = 92 | CES48 = 93  | CES73 = 90 | CES98 = 95 |
| CES24 = 90 | CES49 = 97  | CES74 = 88 | CES99 = 92 |
| CES25 = 72 | CES50 = 97  | CES75 = 93 |            |



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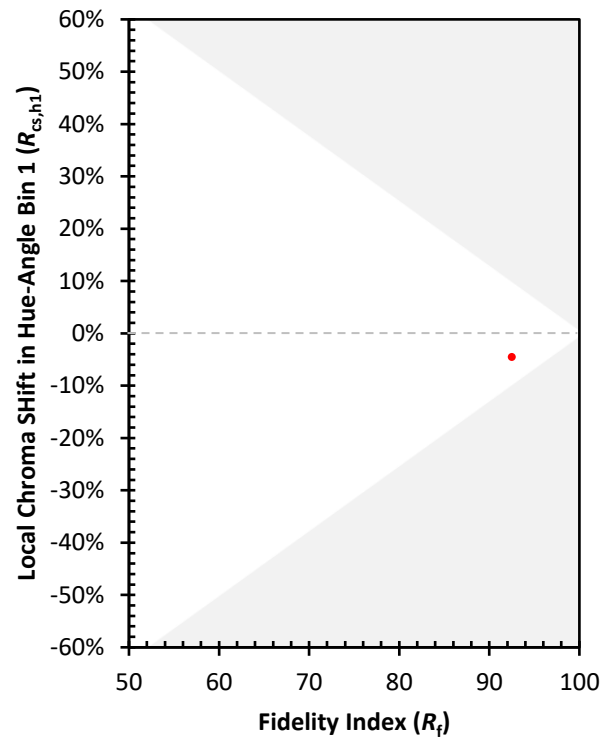
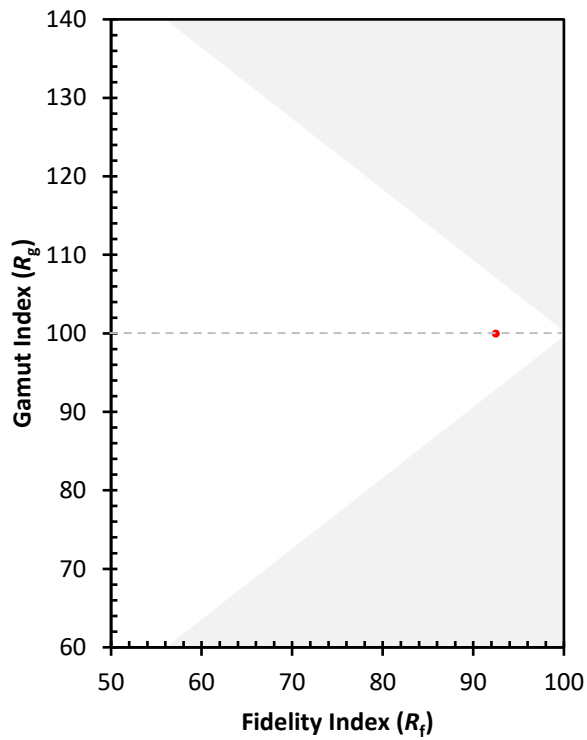
Color Rendition by Hue-Angle Bin



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**Measure Comparisons**



(END OF REPORT)