

Cooper Lighting Solutions Photometric Lab  
1121 Highway 74 South  
Peachtree City, GA 30269



Scaled data based on original data using  
LM-79-2019 Approved Method: Electrical and Photometric Measurements of Solid-  
State Lighting Products

Test Report Prepared for  
Cooper Lighting Solutions

Brand: METALUX

Report Number: P975210

Luminaire Tested: 14EN-LD2-25-UNV-L850-CD1

Issue Date: 03/13/2025

**Test Information**

Test Method: LM-79-2019  
Report Number: P975210  
Test Lab: INNOVATION CENTER(P3)  
Issue Date: 03/13/2025  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: METALUX  
Catalog Number: 14EN-LD2-25-UNV-L850-CD1  
Description: METALUX ENCOUNTER 1x4 2500LM PACKAGE 80CRI 5000K STANDARD TROFFER  
Light Source: 5000K CCT, 80+ CRI LEDS  
Ballast/Driver: -

**Summary**

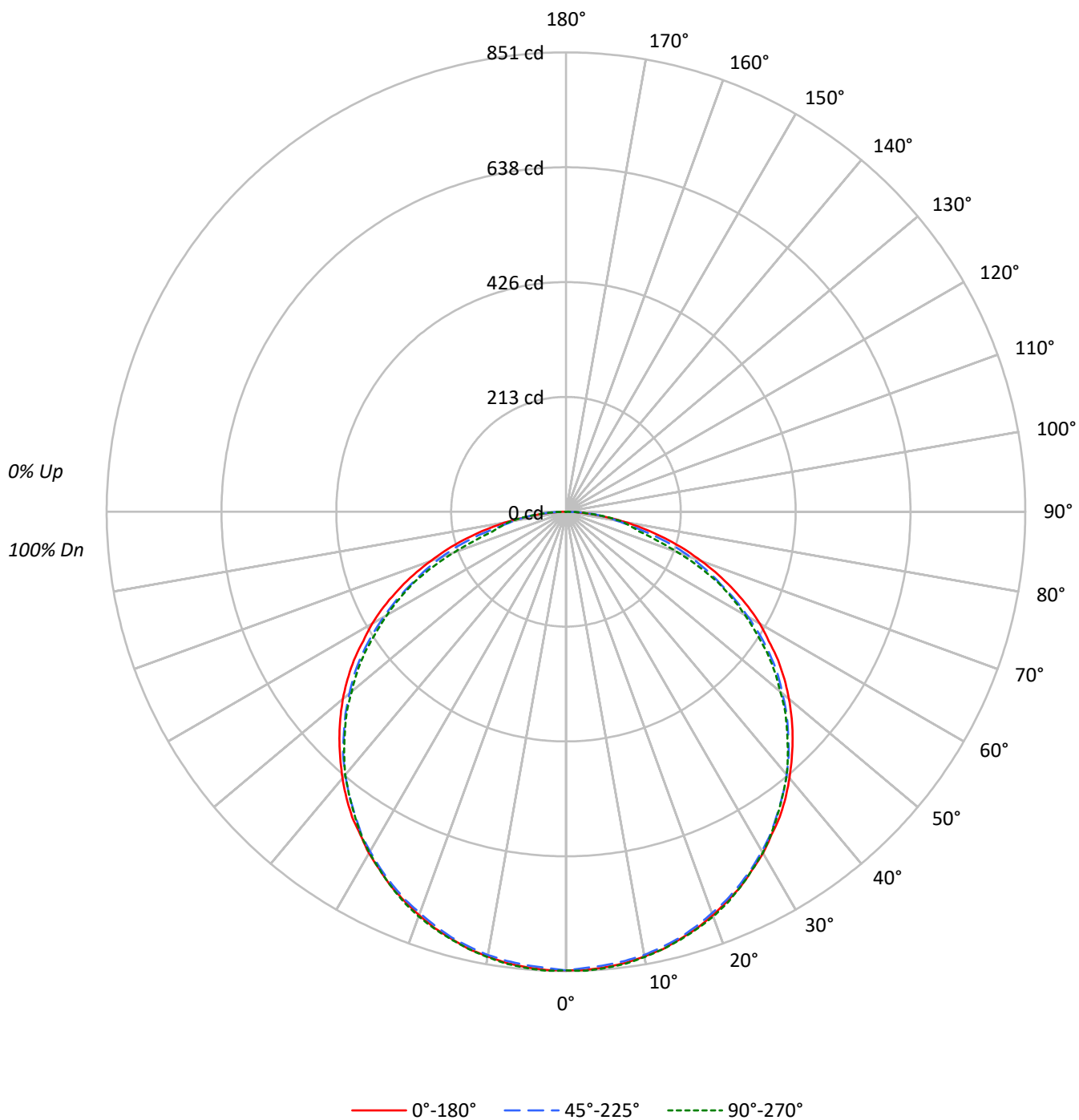
Lumens per Lamp: N/A  
Luminaire Lumens: 2507.0 lumens  
Efficiency: N/A  
Efficacy: 120.0 lumens/watt  
Spacing Criteria (0/90/45): 1.28 / 1.27 / 1.39  
Luminous Opening: Rectangular (W 1' x L: 3.83' x H: 0')  
CIE Type: Direct

Input Watts (W): 20.9  
Input Voltage (V): 120  
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: P975210

CATALOG NUMBER: 14EN-LD2-25-UNV-L850-CD1

### Luminous Intensity Polar Plot



TEST NUMBER: P975210

CATALOG NUMBER: 14EN-LD2-25-UNV-L850-CD1

**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  |
| RCR |     |     |     |     |     |     |     |     |     |     |     |  |     |     |     |  |     |
| 0   | 119 | 119 | 119 | 119 | 116 | 116 | 116 | 116 | 111 | 111 | 111 |  | 106 | 106 | 106 |  | 102 |
| 1   | 109 | 104 | 99  | 95  | 106 | 101 | 97  | 94  | 97  | 94  | 91  |  | 93  | 90  | 88  |  | 90  |
| 2   | 99  | 90  | 83  | 77  | 96  | 88  | 82  | 76  | 85  | 79  | 75  |  | 81  | 77  | 73  |  | 78  |
| 3   | 90  | 79  | 71  | 64  | 87  | 77  | 70  | 63  | 74  | 68  | 62  |  | 72  | 66  | 61  |  | 69  |
| 4   | 82  | 70  | 61  | 54  | 80  | 68  | 60  | 54  | 66  | 59  | 53  |  | 64  | 57  | 52  |  | 61  |
| 5   | 75  | 62  | 53  | 46  | 73  | 61  | 53  | 46  | 59  | 51  | 46  |  | 57  | 50  | 45  |  | 55  |
| 6   | 69  | 56  | 47  | 40  | 68  | 55  | 46  | 40  | 53  | 46  | 40  |  | 51  | 45  | 39  |  | 50  |
| 7   | 64  | 51  | 42  | 36  | 63  | 50  | 41  | 35  | 48  | 41  | 35  |  | 47  | 40  | 35  |  | 45  |
| 8   | 60  | 46  | 38  | 32  | 58  | 45  | 37  | 32  | 44  | 37  | 31  |  | 43  | 36  | 31  |  | 42  |
| 9   | 56  | 42  | 34  | 28  | 54  | 42  | 34  | 28  | 41  | 33  | 28  |  | 40  | 33  | 28  |  | 38  |
| 10  | 52  | 39  | 31  | 26  | 51  | 39  | 31  | 26  | 38  | 30  | 26  |  | 37  | 30  | 25  |  | 36  |

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

|     | 0°   | 45°  | 90°  |
|-----|------|------|------|
| 0°  | 2386 | 2386 | 2386 |
| 5°  | 2387 | 2376 | 2391 |
| 10° | 2385 | 2377 | 2389 |
| 15° | 2381 | 2374 | 2385 |
| 20° | 2377 | 2365 | 2384 |
| 25° | 2374 | 2361 | 2374 |
| 30° | 2368 | 2355 | 2364 |
| 35° | 2367 | 2340 | 2344 |
| 40° | 2361 | 2332 | 2332 |
| 45° | 2358 | 2311 | 2300 |
| 50° | 2357 | 2287 | 2264 |
| 55° | 2349 | 2258 | 2226 |
| 60° | 2330 | 2189 | 2151 |
| 65° | 2282 | 2096 | 2070 |
| 70° | 2187 | 2013 | 1818 |
| 75° | 2056 | 1812 | 1524 |
| 80° | 1822 | 1564 | 1714 |
| 85° | 1411 | 1624 | 1537 |

**MAXIMUM LUMINANCE 45°-90°:**

Horizontal Angle: 0°

Vertical Angle: 45°

Luminance: 2358 cd/sqm

TEST NUMBER: P975210

CATALOG NUMBER: 14EN-LD2-25-UNV-L850-CD1

**ZONAL LUMENS:**

| Zone      | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10°    | 80.4   | 3.2       |
| 10°-20°   | 231.1  | 9.2       |
| 20°-30°   | 352.2  | 14.0      |
| 30°-40°   | 428.9  | 17.1      |
| 40°-50°   | 451.0  | 18.0      |
| 50°-60°   | 414.0  | 16.5      |
| 60°-70°   | 318.0  | 12.7      |
| 70°-80°   | 177.5  | 7.1       |
| 80°-90°   | 53.9   | 2.2       |
| 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°    | 663.7  | 26.5      |
| 0°-40°    | 1092.6 | 43.6      |
| 0°-60°    | 1957.6 | 78.1      |
| 0°-90°    | 2507.0 | 100.0     |
| 90°-120°  | 0.0    | 0.0       |
| 90°-150°  | 0.0    | 0.0       |
| 90°-180°  | 0.0    | 0.0       |
| 0°-180°   | 2507.0 | 100.0     |

**CANDELA DISTRIBUTION:**

|     | 0°  | 22.5° | 45° | 67.5° | 90° | Flux |
|-----|-----|-------|-----|-------|-----|------|
| 0°  | 850 | 850   | 850 | 850   | 850 |      |
| 5°  | 847 | 847   | 843 | 847   | 848 | 81   |
| 15° | 819 | 819   | 816 | 819   | 820 | 231  |
| 25° | 766 | 763   | 762 | 765   | 766 | 353  |
| 35° | 691 | 688   | 683 | 684   | 684 | 432  |
| 45° | 594 | 590   | 582 | 579   | 579 | 458  |
| 55° | 480 | 476   | 461 | 453   | 455 | 428  |
| 65° | 343 | 334   | 315 | 312   | 312 | 339  |
| 75° | 190 | 180   | 167 | 144   | 140 | 200  |
| 85° | 44  | 45    | 50  | 49    | 48  | 53   |
| 90° | 0   | 0     | 0   | 0     | 0   |      |

TEST NUMBER: P975210

CATALOG NUMBER: 14EN-LD2-25-UNV-L850-CD1

**CANDELA DISTRIBUTION (FULL):**

|       | 0°    | 22.5° | 45°   | 67.5° | 90°   |
|-------|-------|-------|-------|-------|-------|
| 0°    | 849.6 | 849.6 | 849.6 | 849.6 | 849.6 |
| 2.5°  | 849.6 | 849.6 | 845.7 | 849.6 | 851.0 |
| 5°    | 846.9 | 846.9 | 843.0 | 846.9 | 848.3 |
| 7.5°  | 843.0 | 843.0 | 839.1 | 841.7 | 844.4 |
| 10°   | 836.4 | 836.4 | 833.7 | 836.4 | 837.7 |
| 12.5° | 829.8 | 828.4 | 825.7 | 828.4 | 829.8 |
| 15°   | 819.1 | 819.1 | 816.5 | 819.1 | 820.4 |
| 17.5° | 808.6 | 807.2 | 804.5 | 808.6 | 809.9 |
| 20°   | 795.3 | 794.0 | 791.3 | 795.3 | 797.9 |
| 22.5° | 780.7 | 779.4 | 778.0 | 782.1 | 783.3 |
| 25°   | 766.1 | 763.4 | 762.1 | 764.8 | 766.1 |
| 27.5° | 747.5 | 746.3 | 744.9 | 746.3 | 747.5 |
| 30°   | 730.4 | 727.7 | 726.3 | 726.3 | 729.0 |
| 32.5° | 709.1 | 707.8 | 706.4 | 707.8 | 707.8 |
| 35°   | 690.6 | 687.9 | 682.7 | 683.9 | 683.9 |
| 37.5° | 668.1 | 664.0 | 660.1 | 660.1 | 660.1 |
| 40°   | 644.2 | 641.5 | 636.2 | 634.9 | 636.2 |
| 42.5° | 619.1 | 616.3 | 611.1 | 607.0 | 608.4 |
| 45°   | 593.8 | 589.9 | 581.9 | 579.2 | 579.2 |
| 47.5° | 567.3 | 563.3 | 554.1 | 550.0 | 551.4 |
| 50°   | 539.5 | 534.2 | 523.6 | 518.3 | 518.3 |
| 52.5° | 510.3 | 505.0 | 494.4 | 487.8 | 487.8 |
| 55°   | 479.8 | 475.9 | 461.3 | 453.3 | 454.7 |
| 57.5° | 445.3 | 441.4 | 426.8 | 417.5 | 417.5 |
| 60°   | 414.8 | 407.0 | 389.7 | 383.1 | 383.1 |
| 62.5° | 380.4 | 371.2 | 353.9 | 345.9 | 347.3 |
| 65°   | 343.4 | 334.0 | 315.4 | 311.5 | 311.5 |
| 67.5° | 306.2 | 298.2 | 281.0 | 274.3 | 267.7 |
| 70°   | 266.4 | 258.5 | 245.2 | 229.4 | 221.4 |
| 72.5° | 229.4 | 220.0 | 208.2 | 184.2 | 176.3 |
| 75°   | 189.5 | 180.3 | 167.0 | 144.5 | 140.5 |
| 77.5° | 151.1 | 143.2 | 124.5 | 119.3 | 122.0 |
| 80°   | 112.7 | 110.0 | 96.7  | 102.1 | 106.0 |
| 82.5° | 75.5  | 74.3  | 76.9  | 79.6  | 79.6  |
| 85°   | 43.8  | 45.1  | 50.4  | 49.0  | 47.7  |
| 87.5° | 18.5  | 22.6  | 21.2  | 21.2  | 21.2  |
| 90°   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |

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

Report Prepared for

Cooper Lighting Solutions

Metalux

Report Number: SP1-2506-457-4

Test Date: 07/15/2025

Luminaire Tested: 14EN-LD2-51-UNV-L950-CD1-U

Data in this report applies to families of products including 14EN-LD2-51-UNV-L950-CD1-U

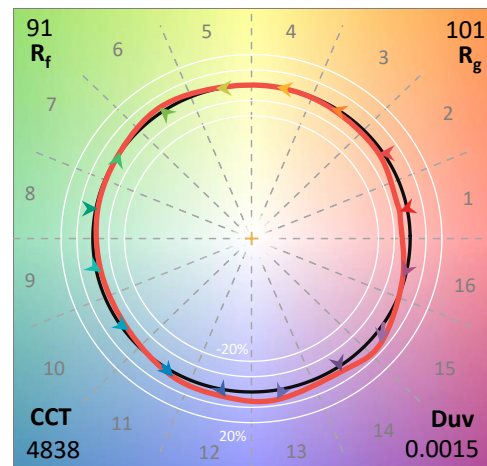
### Test Information

Test Method: LM-79-2019  
 Report Number: SP1-2506-457-4  
 Test Lab: COOPER LIGHTING SOLUTIONS  
 Photometer: SP1 - 76IN SPHERE  
 Measurement Geometry:  $4\pi$   
 Issue Date: 07/15/2025  
 Manufacturer: COOPER LIGHTING SOLUTIONS  
 Product Line: Metalux  
 Catalog Number: **14EN-LD2-51-UNV-L950-CD1-U**  
 Description: 1x4 ENCOUNTER 5100LM WITH LIGHTNING BOARDS

### Spectral Parameters

CCT (K): 4838  
 CIE  $u'$ : 0.2122  
 CIE  $v'$ : 0.4888  
 Duv: 0.0015  
 CIE x: 0.3502  
 CIE y: 0.3586  
 CIE z: 0.2912  
 Peak Wavelength (nm): 630  
 Dominant Wavelength (nm): 573  
 Purity: 12.68613  
 R<sub>f</sub>: 91.2  
 R<sub>g</sub>: 100.8

CRI (Ra): 93.6  
 R1: 94.4  
 R2: 94.8  
 R3: 93.6  
 R4: 94.8  
 R5: 93.3  
 R6: 91.9  
 R7: 95.9  
 R8: 89.8  
 R9: 69.6  
 R10: 86.3  
 R11: 94.3  
 R12: 70.2  
 R13: 94.4  
 R14: 96.0  
 R15: 92.2



### Test Conditions

Stabilization Time: M  
 Operation Time: 1H 0M  
 Sphere Temperature (°C): 25.0

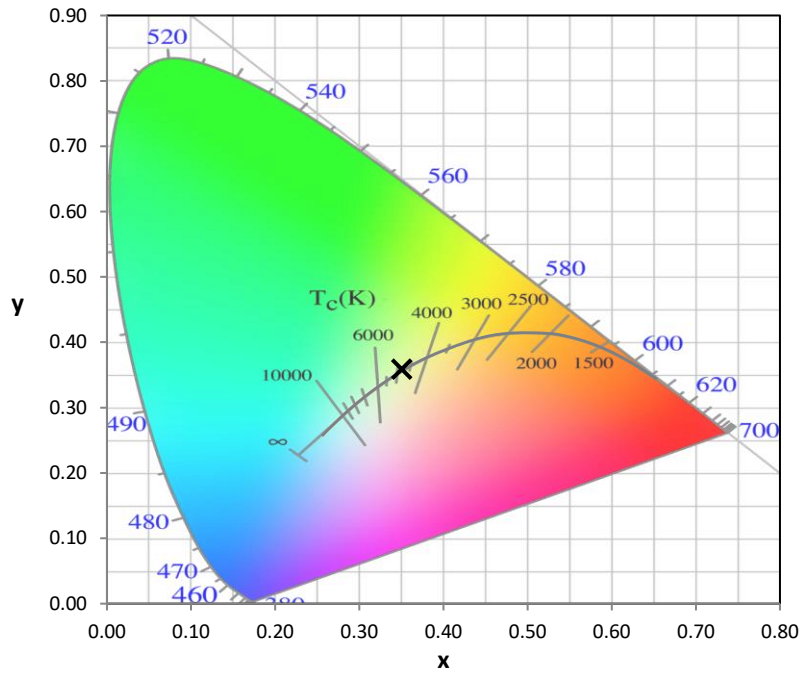


REPORT NUMBER: SP1-2506-457-4

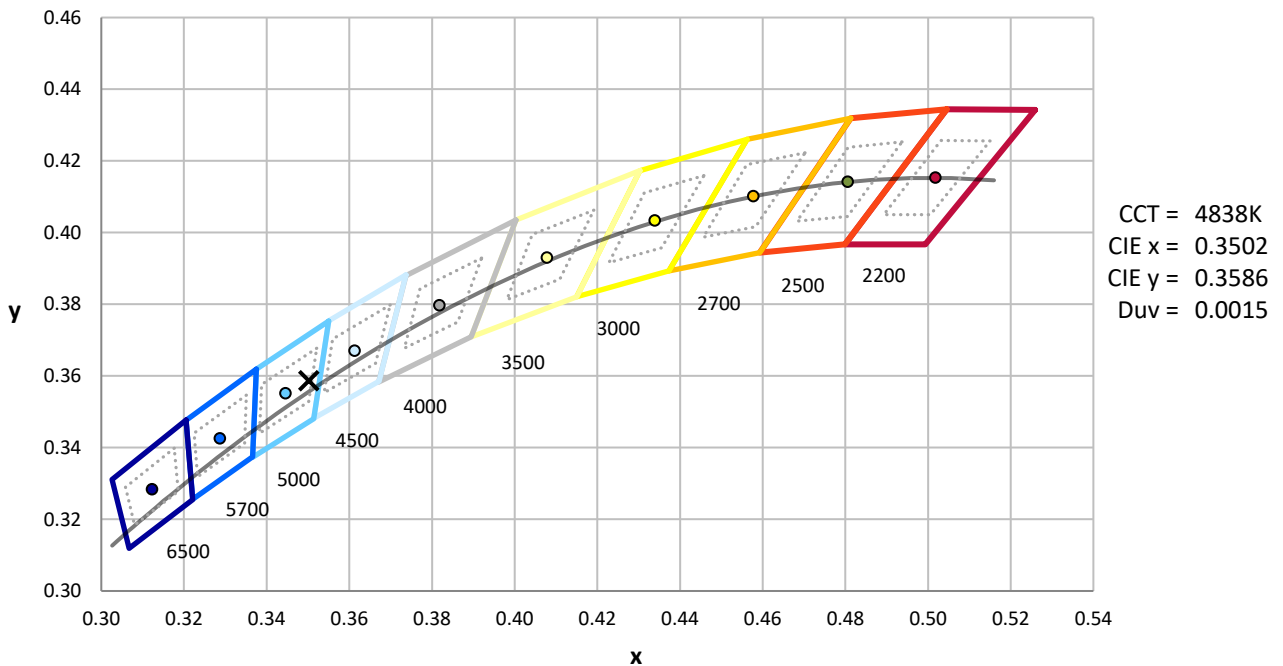
| Measurement and Test Equipment |                       |                  |                      |
|--------------------------------|-----------------------|------------------|----------------------|
| Instrument                     | Identification Number | Calibration Date | Calibration Due Date |
| Photometer                     | 76INCH SPHERE IN0058  | 6/16/2025        | 12/16/2025           |
| Power Meter                    | XITRON INXT2011004    | 1/21/2025        | 1/21/2026            |
| AC Power Source                | CHROMA 61603 IN0063   | 10/22/2024       | 10/22/2025           |
| DC Power Source                | AGILENT E3634A IN0208 | 10/22/2024       | 10/22/2025           |
| Sphere Thermometer             | ONSET IN0085          | 10/22/2024       | 10/22/2025           |
| Room Thermometer               | ONSET IN0046          | 10/22/2024       | 10/22/2025           |

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**CIE 1931 Chromaticity Diagram**



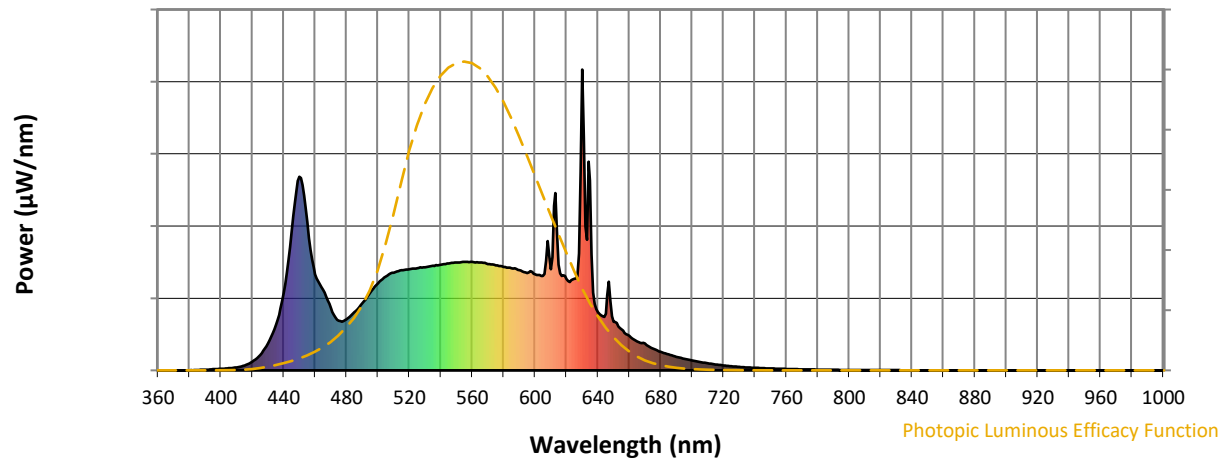
**CIE 1931 Chromaticity Diagram with 2017 ANSI 7-Step and 4-Step Quadrangles**



Point lies inside the ANSI 5000K 4-step quadrangle

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### Photopic Flux vs. Wavelength

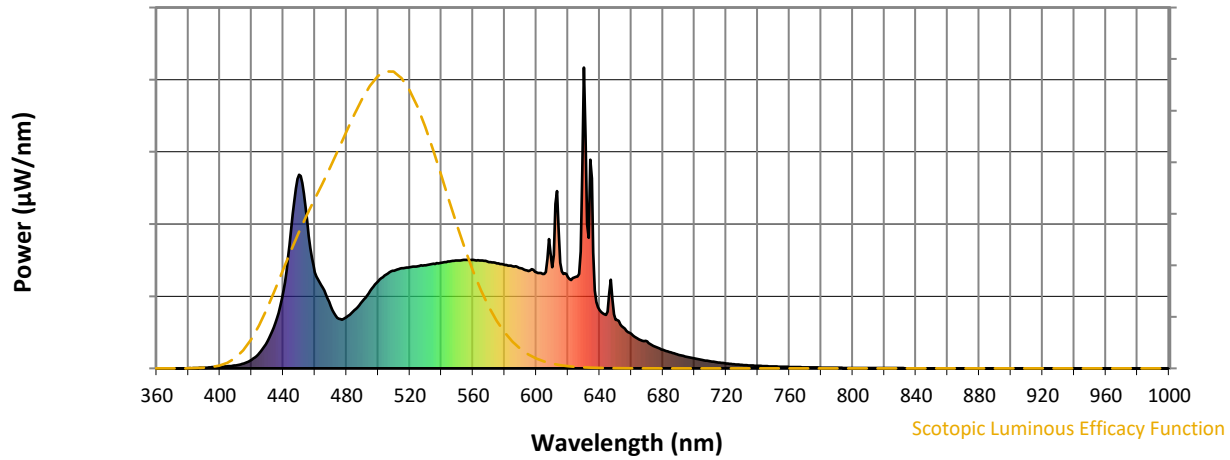


### Photopic Lumens: NR

| λ (nm) | Power W <sup>λ</sup> /nm | Lumens (φ/nm) | λ (nm) | Power W <sup>λ</sup> /nm | Lumens (φ/nm) | λ (nm) | Power W <sup>λ</sup> /nm | Lumens (φ/nm) | λ (nm) | Power W <sup>λ</sup> /nm | Lumens (φ/nm) | λ (nm) | Power W <sup>λ</sup> /nm | Lumens (φ/nm) |
|--------|--------------------------|---------------|--------|--------------------------|---------------|--------|--------------------------|---------------|--------|--------------------------|---------------|--------|--------------------------|---------------|
| 360    | 0                        | NR            | 490    | 223                      | NR            | 620    | 303                      | NR            | 750    | 6                        | NR            | 880    | 0                        | NR            |
| 365    | 0                        | NR            | 495    | 258                      | NR            | 625    | 305                      | NR            | 755    | 5                        | NR            | 885    | 0                        | NR            |
| 370    | 0                        | NR            | 500    | 290                      | NR            | 630    | 1000                     | NR            | 760    | 5                        | NR            | 890    | 0                        | NR            |
| 375    | 0                        | NR            | 505    | 311                      | NR            | 635    | 631                      | NR            | 765    | 4                        | NR            | 895    | 0                        | NR            |
| 380    | 0                        | NR            | 510    | 325                      | NR            | 640    | 194                      | NR            | 770    | 4                        | NR            | 900    | 0                        | NR            |
| 385    | 1                        | NR            | 515    | 333                      | NR            | 645    | 188                      | NR            | 775    | 3                        | NR            | 905    | 0                        | NR            |
| 390    | 2                        | NR            | 520    | 336                      | NR            | 650    | 162                      | NR            | 780    | 3                        | NR            | 910    | 0                        | NR            |
| 395    | 4                        | NR            | 525    | 340                      | NR            | 655    | 136                      | NR            | 785    | 2                        | NR            | 915    | 0                        | NR            |
| 400    | 5                        | NR            | 530    | 343                      | NR            | 660    | 115                      | NR            | 790    | 2                        | NR            | 920    | 0                        | NR            |
| 405    | 7                        | NR            | 535    | 348                      | NR            | 665    | 96                       | NR            | 795    | 2                        | NR            | 925    | 0                        | NR            |
| 410    | 10                       | NR            | 540    | 352                      | NR            | 670    | 89                       | NR            | 800    | 1                        | NR            | 930    | 0                        | NR            |
| 415    | 16                       | NR            | 545    | 356                      | NR            | 675    | 72                       | NR            | 805    | 1                        | NR            | 935    | 0                        | NR            |
| 420    | 28                       | NR            | 550    | 358                      | NR            | 680    | 62                       | NR            | 810    | 1                        | NR            | 940    | 0                        | NR            |
| 425    | 52                       | NR            | 555    | 361                      | NR            | 685    | 53                       | NR            | 815    | 1                        | NR            | 945    | 0                        | NR            |
| 430    | 89                       | NR            | 560    | 361                      | NR            | 690    | 45                       | NR            | 820    | 1                        | NR            | 950    | 0                        | NR            |
| 435    | 151                      | NR            | 565    | 359                      | NR            | 695    | 39                       | NR            | 825    | 1                        | NR            | 955    | 0                        | NR            |
| 440    | 256                      | NR            | 570    | 354                      | NR            | 700    | 33                       | NR            | 830    | 1                        | NR            | 960    | 0                        | NR            |
| 445    | 462                      | NR            | 575    | 349                      | NR            | 705    | 28                       | NR            | 835    | 1                        | NR            | 965    | 0                        | NR            |
| 450    | 643                      | NR            | 580    | 344                      | NR            | 710    | 23                       | NR            | 840    | 0                        | NR            | 970    | 0                        | NR            |
| 455    | 492                      | NR            | 585    | 339                      | NR            | 715    | 20                       | NR            | 845    | 0                        | NR            | 975    | 0                        | NR            |
| 460    | 319                      | NR            | 590    | 333                      | NR            | 720    | 16                       | NR            | 850    | 0                        | NR            | 980    | 0                        | NR            |
| 465    | 269                      | NR            | 595    | 324                      | NR            | 725    | 14                       | NR            | 855    | 0                        | NR            | 985    | 0                        | NR            |
| 470    | 207                      | NR            | 600    | 319                      | NR            | 730    | 11                       | NR            | 860    | 0                        | NR            | 990    | 0                        | NR            |
| 475    | 165                      | NR            | 605    | 314                      | NR            | 735    | 10                       | NR            | 865    | 0                        | NR            | 995    | 0                        | NR            |
| 480    | 171                      | NR            | 610    | 336                      | NR            | 740    | 8                        | NR            | 870    | 0                        | NR            | 1000   | 0                        | NR            |
| 485    | 194                      | NR            | 615    | 351                      | NR            | 745    | 7                        | NR            | 875    | 0                        | NR            |        |                          |               |

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### Scotopic Flux vs. Wavelength



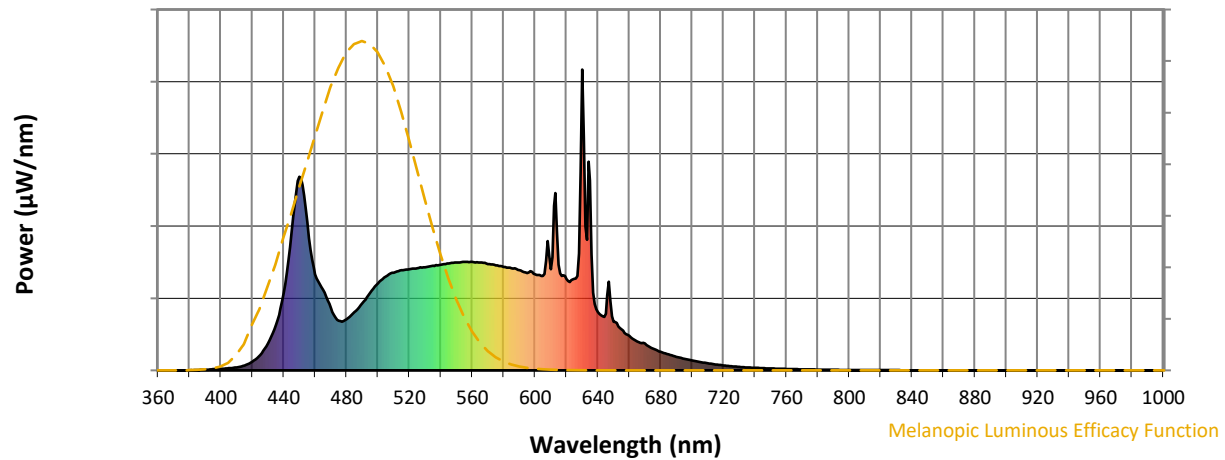
Scotopic Lumens: NR

S/P: 2.02

| $\lambda$<br>(nm) | Power<br>$\text{W}^\wedge/\text{nm}$ | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>$\text{W}^\wedge/\text{nm}$ | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>$\text{W}^\wedge/\text{nm}$ | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>$\text{W}^\wedge/\text{nm}$ | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>$\text{W}^\wedge/\text{nm}$ | Lumens<br>( $\phi/\text{nm}$ ) |
|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|
| 360               | 0                                    | NR                             | 490               | 223                                  | NR                             | 620               | 303                                  | NR                             | 750               | 6                                    | NR                             | 880               | 0                                    | NR                             |
| 365               | 0                                    | NR                             | 495               | 258                                  | NR                             | 625               | 305                                  | NR                             | 755               | 5                                    | NR                             | 885               | 0                                    | NR                             |
| 370               | 0                                    | NR                             | 500               | 290                                  | NR                             | 630               | 1000                                 | NR                             | 760               | 5                                    | NR                             | 890               | 0                                    | NR                             |
| 375               | 0                                    | NR                             | 505               | 311                                  | NR                             | 635               | 631                                  | NR                             | 765               | 4                                    | NR                             | 895               | 0                                    | NR                             |
| 380               | 0                                    | NR                             | 510               | 325                                  | NR                             | 640               | 194                                  | NR                             | 770               | 4                                    | NR                             | 900               | 0                                    | NR                             |
| 385               | 1                                    | NR                             | 515               | 333                                  | NR                             | 645               | 188                                  | NR                             | 775               | 3                                    | NR                             | 905               | 0                                    | NR                             |
| 390               | 2                                    | NR                             | 520               | 336                                  | NR                             | 650               | 162                                  | NR                             | 780               | 3                                    | NR                             | 910               | 0                                    | NR                             |
| 395               | 4                                    | NR                             | 525               | 340                                  | NR                             | 655               | 136                                  | NR                             | 785               | 2                                    | NR                             | 915               | 0                                    | NR                             |
| 400               | 5                                    | NR                             | 530               | 343                                  | NR                             | 660               | 115                                  | NR                             | 790               | 2                                    | NR                             | 920               | 0                                    | NR                             |
| 405               | 7                                    | NR                             | 535               | 348                                  | NR                             | 665               | 96                                   | NR                             | 795               | 2                                    | NR                             | 925               | 0                                    | NR                             |
| 410               | 10                                   | NR                             | 540               | 352                                  | NR                             | 670               | 89                                   | NR                             | 800               | 1                                    | NR                             | 930               | 0                                    | NR                             |
| 415               | 16                                   | NR                             | 545               | 356                                  | NR                             | 675               | 72                                   | NR                             | 805               | 1                                    | NR                             | 935               | 0                                    | NR                             |
| 420               | 28                                   | NR                             | 550               | 358                                  | NR                             | 680               | 62                                   | NR                             | 810               | 1                                    | NR                             | 940               | 0                                    | NR                             |
| 425               | 52                                   | NR                             | 555               | 361                                  | NR                             | 685               | 53                                   | NR                             | 815               | 1                                    | NR                             | 945               | 0                                    | NR                             |
| 430               | 89                                   | NR                             | 560               | 361                                  | NR                             | 690               | 45                                   | NR                             | 820               | 1                                    | NR                             | 950               | 0                                    | NR                             |
| 435               | 151                                  | NR                             | 565               | 359                                  | NR                             | 695               | 39                                   | NR                             | 825               | 1                                    | NR                             | 955               | 0                                    | NR                             |
| 440               | 256                                  | NR                             | 570               | 354                                  | NR                             | 700               | 33                                   | NR                             | 830               | 1                                    | NR                             | 960               | 0                                    | NR                             |
| 445               | 462                                  | NR                             | 575               | 349                                  | NR                             | 705               | 28                                   | NR                             | 835               | 1                                    | NR                             | 965               | 0                                    | NR                             |
| 450               | 643                                  | NR                             | 580               | 344                                  | NR                             | 710               | 23                                   | NR                             | 840               | 0                                    | NR                             | 970               | 0                                    | NR                             |
| 455               | 492                                  | NR                             | 585               | 339                                  | NR                             | 715               | 20                                   | NR                             | 845               | 0                                    | NR                             | 975               | 0                                    | NR                             |
| 460               | 319                                  | NR                             | 590               | 333                                  | NR                             | 720               | 16                                   | NR                             | 850               | 0                                    | NR                             | 980               | 0                                    | NR                             |
| 465               | 269                                  | NR                             | 595               | 324                                  | NR                             | 725               | 14                                   | NR                             | 855               | 0                                    | NR                             | 985               | 0                                    | NR                             |
| 470               | 207                                  | NR                             | 600               | 319                                  | NR                             | 730               | 11                                   | NR                             | 860               | 0                                    | NR                             | 990               | 0                                    | NR                             |
| 475               | 165                                  | NR                             | 605               | 314                                  | NR                             | 735               | 10                                   | NR                             | 865               | 0                                    | NR                             | 995               | 0                                    | NR                             |
| 480               | 171                                  | NR                             | 610               | 336                                  | NR                             | 740               | 8                                    | NR                             | 870               | 0                                    | NR                             | 1000              | 0                                    | NR                             |
| 485               | 194                                  | NR                             | 615               | 351                                  | NR                             | 745               | 7                                    | NR                             | 875               | 0                                    | NR                             |                   |                                      |                                |

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### Melanopic Flux vs. Wavelength



Melanopic Lumens: NR

M/P: 4.31

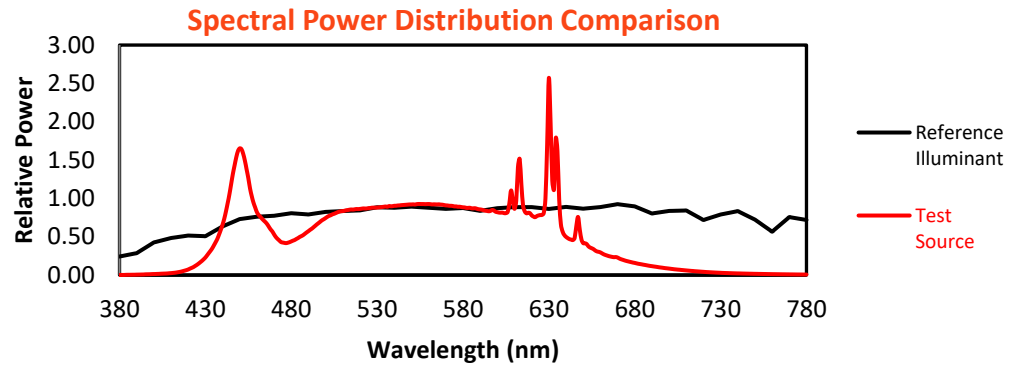
| λ<br>(nm) | Power<br>W <sup>λ</sup> /nm | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>W <sup>λ</sup> /nm | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>W <sup>λ</sup> /nm | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>W <sup>λ</sup> /nm | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>W <sup>λ</sup> /nm | Lumens<br>(φ/nm) |
|-----------|-----------------------------|------------------|-----------|-----------------------------|------------------|-----------|-----------------------------|------------------|-----------|-----------------------------|------------------|-----------|-----------------------------|------------------|
| 360       | 0                           | NR               | 490       | 223                         | NR               | 620       | 303                         | NR               | 750       | 6                           | NR               | 880       | 0                           | NR               |
| 365       | 0                           | NR               | 495       | 258                         | NR               | 625       | 305                         | NR               | 755       | 5                           | NR               | 885       | 0                           | NR               |
| 370       | 0                           | NR               | 500       | 290                         | NR               | 630       | 1000                        | NR               | 760       | 5                           | NR               | 890       | 0                           | NR               |
| 375       | 0                           | NR               | 505       | 311                         | NR               | 635       | 631                         | NR               | 765       | 4                           | NR               | 895       | 0                           | NR               |
| 380       | 0                           | NR               | 510       | 325                         | NR               | 640       | 194                         | NR               | 770       | 4                           | NR               | 900       | 0                           | NR               |
| 385       | 1                           | NR               | 515       | 333                         | NR               | 645       | 188                         | NR               | 775       | 3                           | NR               | 905       | 0                           | NR               |
| 390       | 2                           | NR               | 520       | 336                         | NR               | 650       | 162                         | NR               | 780       | 3                           | NR               | 910       | 0                           | NR               |
| 395       | 4                           | NR               | 525       | 340                         | NR               | 655       | 136                         | NR               | 785       | 2                           | NR               | 915       | 0                           | NR               |
| 400       | 5                           | NR               | 530       | 343                         | NR               | 660       | 115                         | NR               | 790       | 2                           | NR               | 920       | 0                           | NR               |
| 405       | 7                           | NR               | 535       | 348                         | NR               | 665       | 96                          | NR               | 795       | 2                           | NR               | 925       | 0                           | NR               |
| 410       | 10                          | NR               | 540       | 352                         | NR               | 670       | 89                          | NR               | 800       | 1                           | NR               | 930       | 0                           | NR               |
| 415       | 16                          | NR               | 545       | 356                         | NR               | 675       | 72                          | NR               | 805       | 1                           | NR               | 935       | 0                           | NR               |
| 420       | 28                          | NR               | 550       | 358                         | NR               | 680       | 62                          | NR               | 810       | 1                           | NR               | 940       | 0                           | NR               |
| 425       | 52                          | NR               | 555       | 361                         | NR               | 685       | 53                          | NR               | 815       | 1                           | NR               | 945       | 0                           | NR               |
| 430       | 89                          | NR               | 560       | 361                         | NR               | 690       | 45                          | NR               | 820       | 1                           | NR               | 950       | 0                           | NR               |
| 435       | 151                         | NR               | 565       | 359                         | NR               | 695       | 39                          | NR               | 825       | 1                           | NR               | 955       | 0                           | NR               |
| 440       | 256                         | NR               | 570       | 354                         | NR               | 700       | 33                          | NR               | 830       | 1                           | NR               | 960       | 0                           | NR               |
| 445       | 462                         | NR               | 575       | 349                         | NR               | 705       | 28                          | NR               | 835       | 1                           | NR               | 965       | 0                           | NR               |
| 450       | 643                         | NR               | 580       | 344                         | NR               | 710       | 23                          | NR               | 840       | 0                           | NR               | 970       | 0                           | NR               |
| 455       | 492                         | NR               | 585       | 339                         | NR               | 715       | 20                          | NR               | 845       | 0                           | NR               | 975       | 0                           | NR               |
| 460       | 319                         | NR               | 590       | 333                         | NR               | 720       | 16                          | NR               | 850       | 0                           | NR               | 980       | 0                           | NR               |
| 465       | 269                         | NR               | 595       | 324                         | NR               | 725       | 14                          | NR               | 855       | 0                           | NR               | 985       | 0                           | NR               |
| 470       | 207                         | NR               | 600       | 319                         | NR               | 730       | 11                          | NR               | 860       | 0                           | NR               | 990       | 0                           | NR               |
| 475       | 165                         | NR               | 605       | 314                         | NR               | 735       | 10                          | NR               | 865       | 0                           | NR               | 995       | 0                           | NR               |
| 480       | 171                         | NR               | 610       | 336                         | NR               | 740       | 8                           | NR               | 870       | 0                           | NR               | 1000      | 0                           | NR               |
| 485       | 194                         | NR               | 615       | 351                         | NR               | 745       | 7                           | NR               | 875       | 0                           | NR               |           |                             |                  |

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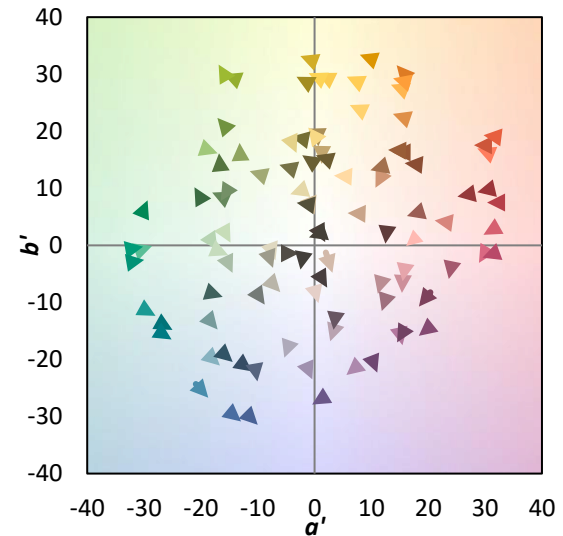
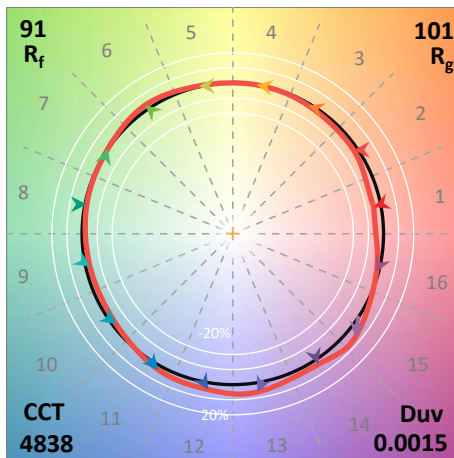
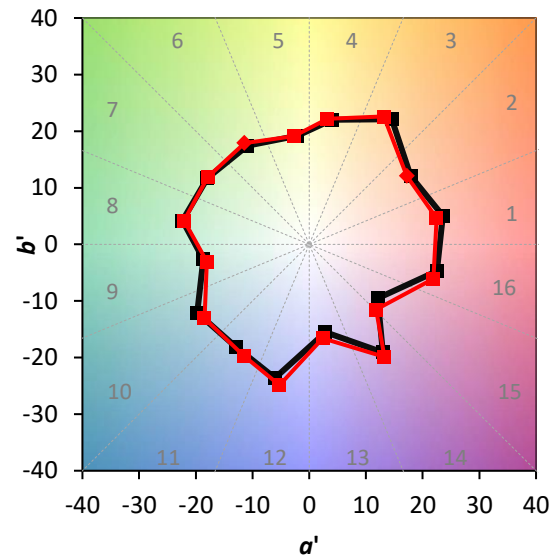
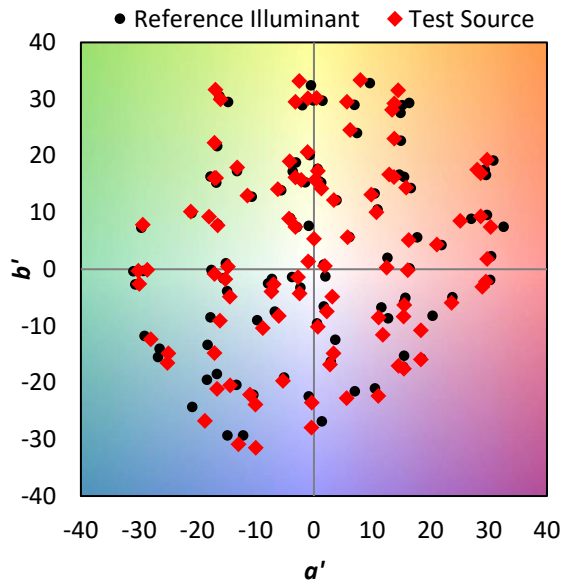
TM-30-18

### Summary

$R_f = 91.2$   
 $R_g = 100.8$   
 $CIE R_a = 93.6$   
 $R_9 = 69.6$

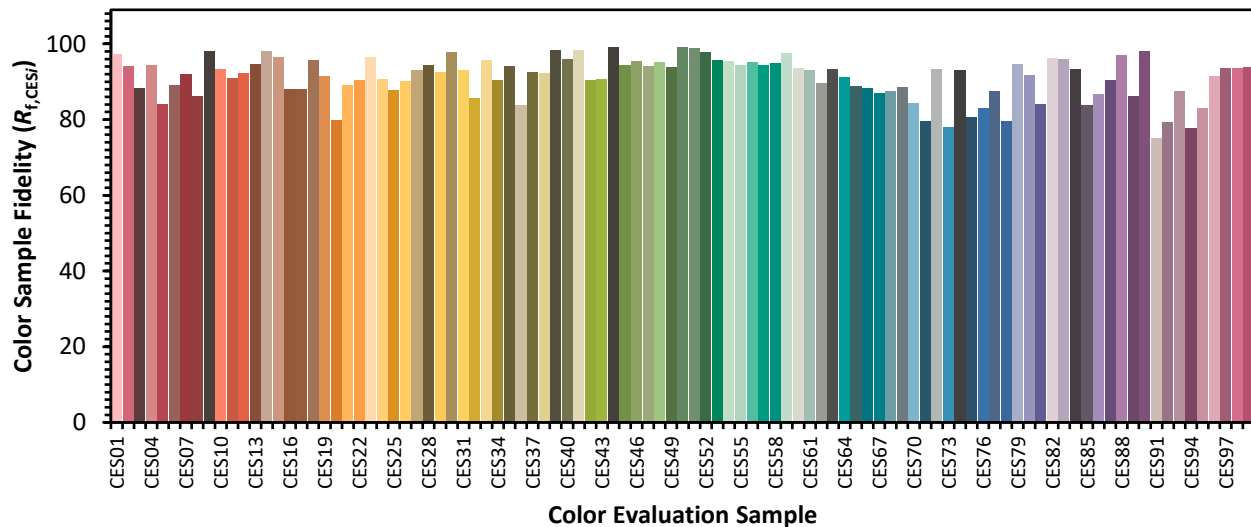


### Color Vector Graphics

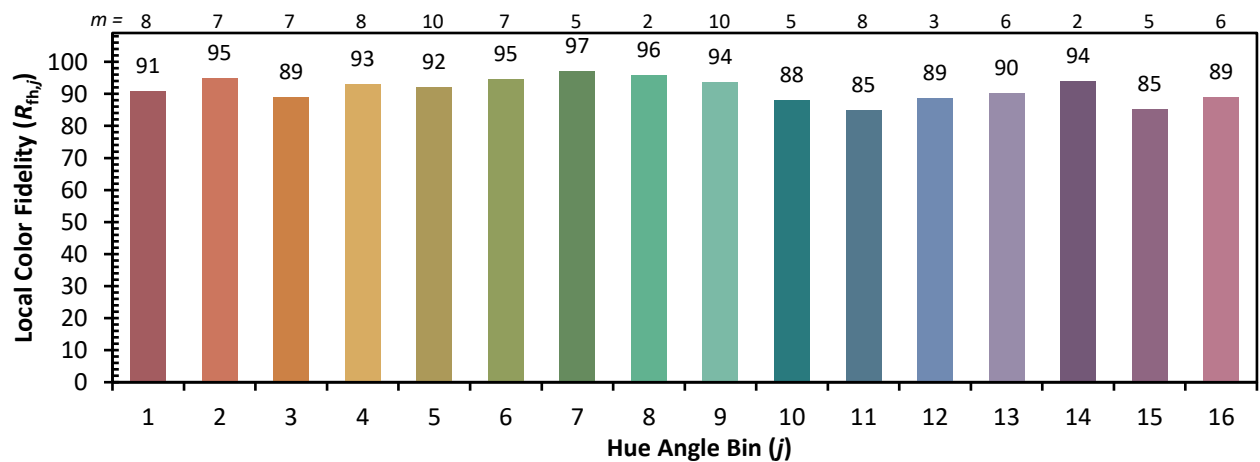
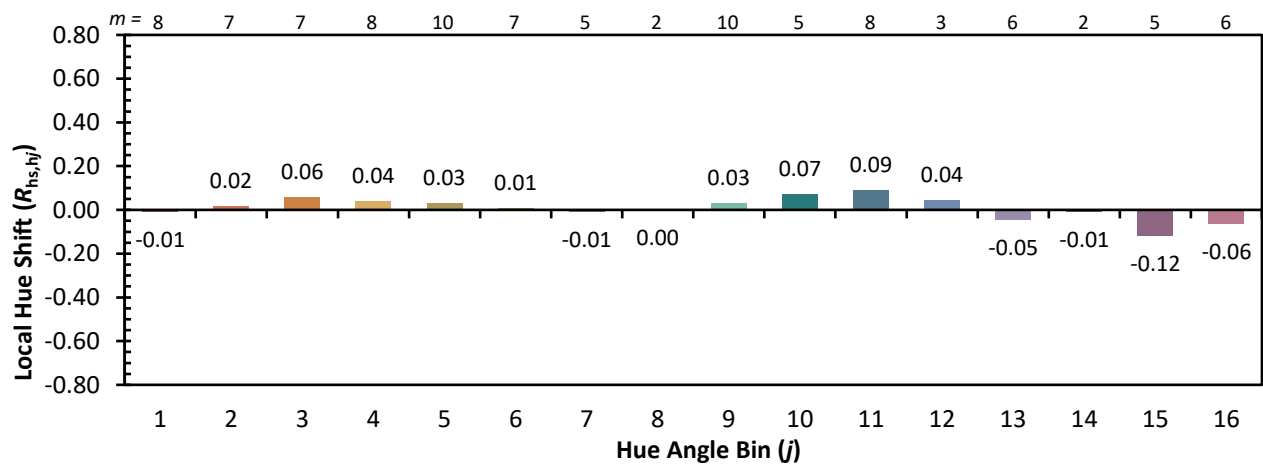
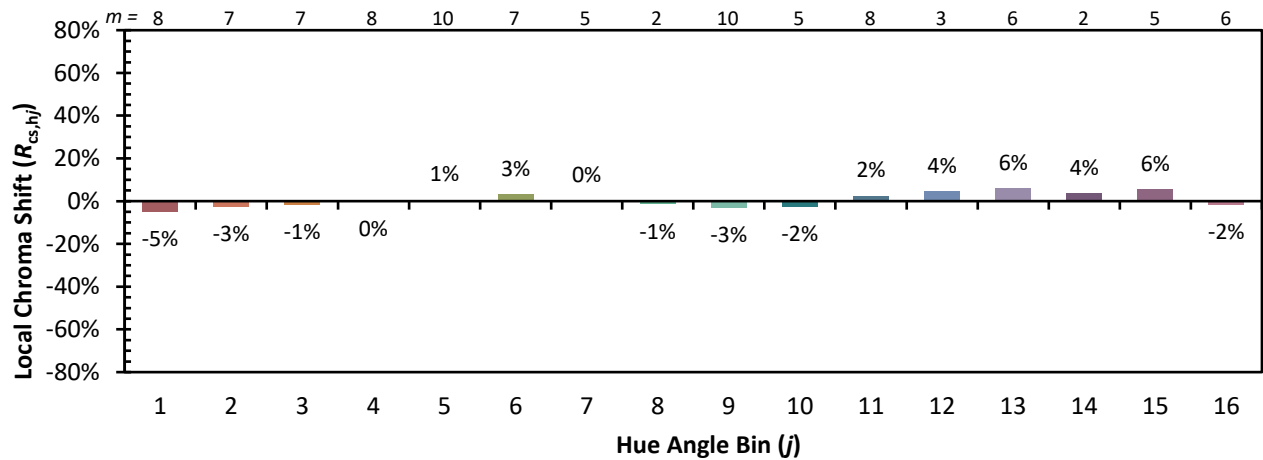


**Individual Sample Fidelity Index ( $R_{f,i}$ )**

|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 85 | CES26 = 90 | CES51 = 99 | CES76 = 83 |
| CES02 = 61 | CES27 = 93 | CES52 = 98 | CES77 = 88 |
| CES03 = 31 | CES28 = 94 | CES53 = 96 | CES78 = 80 |
| CES04 = 69 | CES29 = 92 | CES54 = 96 | CES79 = 95 |
| CES05 = 48 | CES30 = 98 | CES55 = 94 | CES80 = 92 |
| CES06 = 50 | CES31 = 93 | CES56 = 95 | CES81 = 84 |
| CES07 = 41 | CES32 = 86 | CES57 = 94 | CES82 = 96 |
| CES08 = 40 | CES33 = 96 | CES58 = 95 | CES83 = 96 |
| CES09 = 29 | CES34 = 90 | CES59 = 98 | CES84 = 93 |
| CES10 = 73 | CES35 = 94 | CES60 = 94 | CES85 = 84 |
| CES11 = 56 | CES36 = 84 | CES61 = 93 | CES86 = 87 |
| CES12 = 62 | CES37 = 93 | CES62 = 90 | CES87 = 90 |
| CES13 = 42 | CES38 = 92 | CES63 = 93 | CES88 = 97 |
| CES14 = 74 | CES39 = 98 | CES64 = 91 | CES89 = 86 |
| CES15 = 71 | CES40 = 96 | CES65 = 89 | CES90 = 98 |
| CES16 = 47 | CES41 = 98 | CES66 = 88 | CES91 = 75 |
| CES17 = 48 | CES42 = 91 | CES67 = 87 | CES92 = 79 |
| CES18 = 56 | CES43 = 91 | CES68 = 88 | CES93 = 88 |
| CES19 = 70 | CES44 = 99 | CES69 = 89 | CES94 = 78 |
| CES20 = 65 | CES45 = 94 | CES70 = 84 | CES95 = 83 |
| CES21 = 85 | CES46 = 95 | CES71 = 80 | CES96 = 92 |
| CES22 = 77 | CES47 = 94 | CES72 = 93 | CES97 = 93 |
| CES23 = 91 | CES48 = 95 | CES73 = 78 | CES98 = 93 |
| CES24 = 90 | CES49 = 94 | CES74 = 93 | CES99 = 94 |
| CES25 = 70 | CES50 = 99 | CES75 = 81 |            |

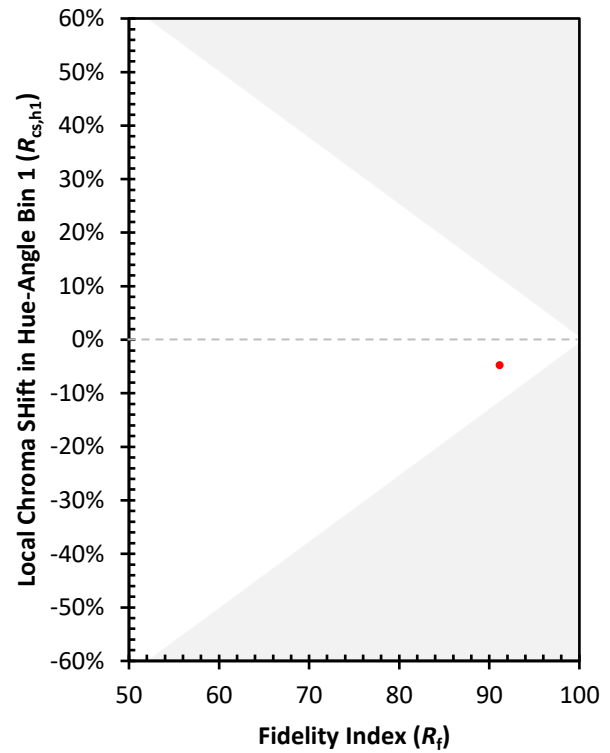
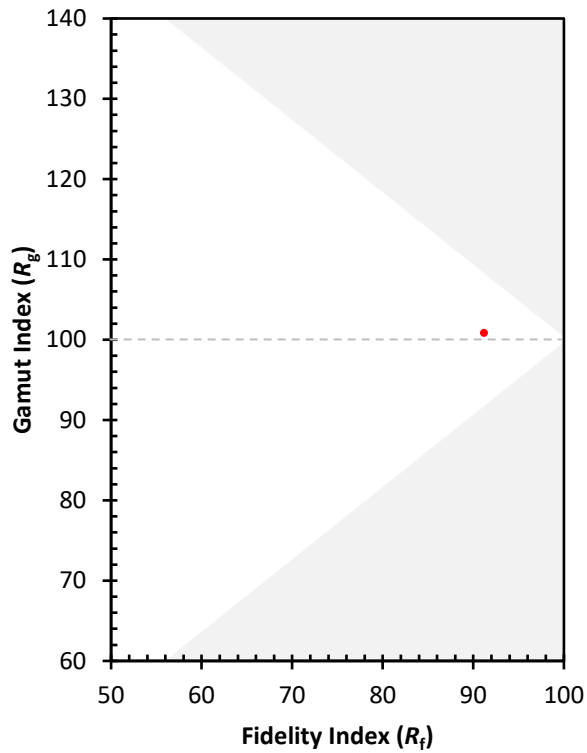


Color Rendition by Hue-Angle Bin





**Measure Comparisons**



(END OF REPORT)