

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: P976212

Luminaire Tested: 12SR-LD2-20-S-UNV-L840-CD1-U

Issue Date: 03/18/2025

**Test Information**

Test Method: LM-79-2019  
Report Number: P976212  
Test Lab: INNOVATION CENTER(P3)  
Issue Date: 03/18/2025  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: METALUX  
Catalog Number: 12SR-LD2-20-S-UNV-L840-CD1-U  
Description: METALUX SKYRIDGE 1x2 2000LM PACKAGE 80CRI 4000K STANDARD TROFFER  
Light Source: 4000K CCT, 80+ CRI LEDS  
Ballast/Driver: -

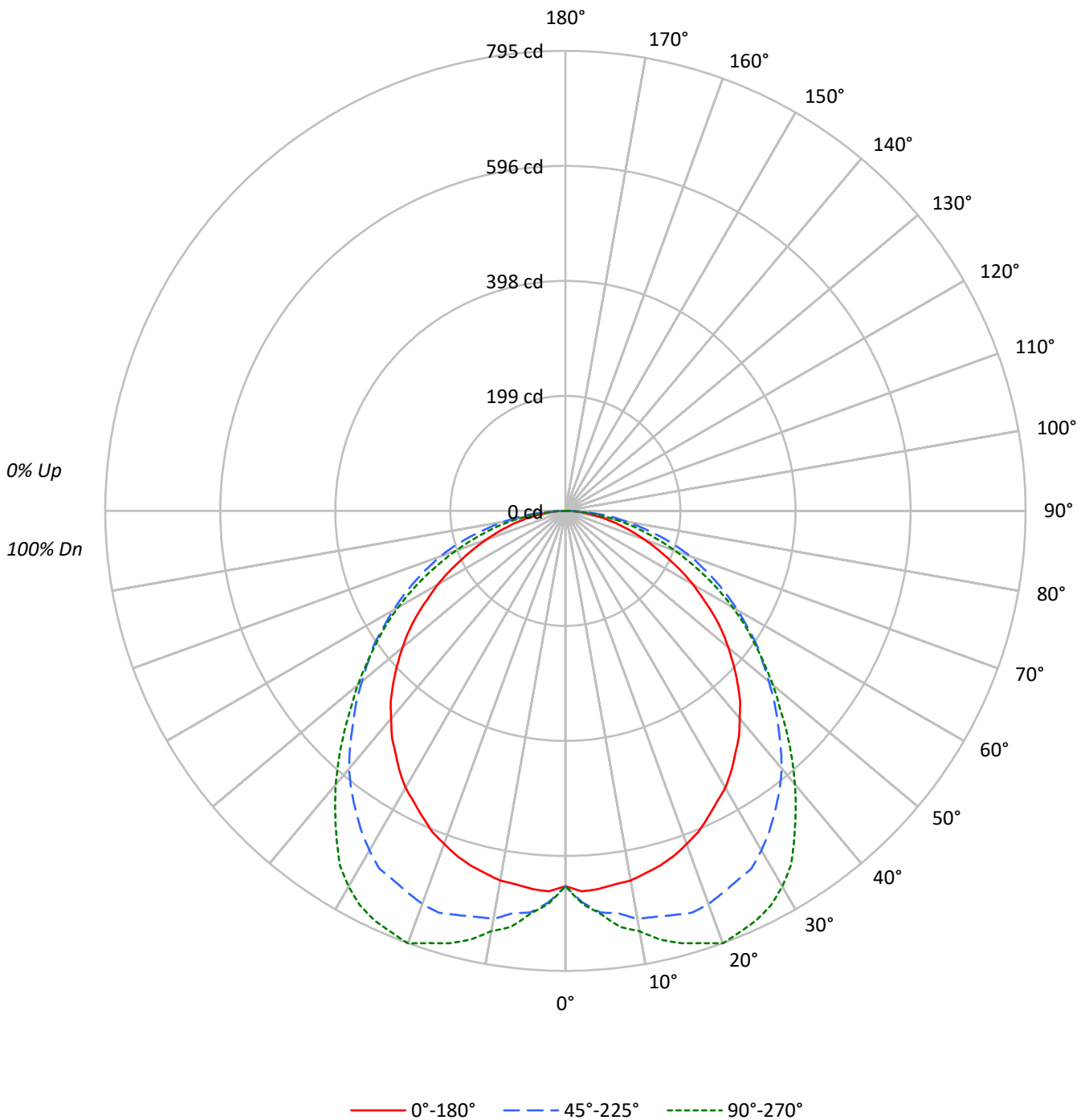
**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 2160.6 lumens  
Efficiency: N/A  
Efficacy: 142.1 lumens/watt  
Spacing Criteria (0/90/45): 1.26 / 1.54 / 1.5  
Luminous Opening: Rectangular (W 1' x L: 2' x H: 0')  
CIE Type: Direct

Input Watts (W): 15.2  
Input Voltage (V): 120  
Input Current (A<sub>in</sub>): 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: 28.75 FT

TEST NUMBER: P976212  
CATALOG NUMBER: 12SR-LD2-20-S-UNV-L840-CD1-U

### Luminous Intensity Polar Plot





TEST NUMBER: P976212  
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**COEFFICIENT OF UTILIZATION - ZONAL CAVITY METHOD:**

|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| RF  | 20  |     |     |     | 20  |     |     |     | 20  |     |     |     | 20  |     |     |     | 20  |     |     |     | 20  |
| RC  | 80  |     |     |     | 70  |     |     |     | 50  |     |     |     | 30  |     |     |     | 10  |     |     |     | 0   |
| RW  | 70  | 50  | 30  | 10  | 70  | 50  | 30  | 10  | 50  | 30  | 10  | 50  | 30  | 10  | 50  | 30  | 10  | 50  | 30  | 10  | 0   |
| RCR |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 0   | 119 | 119 | 119 | 119 | 116 | 116 | 116 | 116 | 111 | 111 | 111 | 106 | 106 | 106 | 102 | 102 | 102 | 100 | 100 | 100 | 100 |
| 1   | 108 | 104 | 99  | 95  | 106 | 101 | 97  | 94  | 97  | 94  | 91  | 93  | 90  | 88  | 90  | 87  | 85  | 83  | 83  | 83  | 83  |
| 2   | 99  | 90  | 83  | 77  | 96  | 88  | 82  | 76  | 85  | 79  | 75  | 81  | 77  | 73  | 78  | 75  | 71  | 69  | 69  | 69  | 69  |
| 3   | 90  | 79  | 71  | 64  | 87  | 78  | 70  | 64  | 75  | 68  | 63  | 72  | 66  | 61  | 69  | 64  | 60  | 58  | 58  | 58  | 58  |
| 4   | 82  | 70  | 61  | 54  | 80  | 69  | 60  | 54  | 66  | 59  | 53  | 64  | 58  | 53  | 62  | 56  | 52  | 50  | 50  | 50  | 50  |
| 5   | 76  | 63  | 54  | 47  | 73  | 61  | 53  | 47  | 59  | 52  | 46  | 57  | 51  | 46  | 55  | 50  | 45  | 43  | 43  | 43  | 43  |
| 6   | 70  | 56  | 47  | 41  | 68  | 55  | 47  | 41  | 54  | 46  | 40  | 52  | 45  | 40  | 50  | 44  | 40  | 37  | 37  | 37  | 37  |
| 7   | 65  | 51  | 42  | 36  | 63  | 50  | 42  | 36  | 49  | 41  | 36  | 47  | 40  | 35  | 46  | 40  | 35  | 33  | 33  | 33  | 33  |
| 8   | 60  | 47  | 38  | 32  | 59  | 46  | 38  | 32  | 45  | 37  | 32  | 43  | 37  | 32  | 42  | 36  | 31  | 29  | 29  | 29  | 29  |
| 9   | 56  | 43  | 34  | 29  | 55  | 42  | 34  | 29  | 41  | 34  | 29  | 40  | 33  | 28  | 39  | 33  | 28  | 26  | 26  | 26  | 26  |
| 10  | 53  | 39  | 31  | 26  | 51  | 39  | 31  | 26  | 38  | 31  | 26  | 37  | 30  | 26  | 36  | 30  | 26  | 24  | 24  | 24  | 24  |

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

|     | 0°   | 45°  | 90°  |
|-----|------|------|------|
| 0°  | 3490 | 3490 | 3490 |
| 5°  | 3544 | 3763 | 3776 |
| 10° | 3544 | 3912 | 4030 |
| 15° | 3534 | 4028 | 4310 |
| 20° | 3508 | 4141 | 4554 |
| 25° | 3466 | 4181 | 4636 |
| 30° | 3432 | 4209 | 4657 |
| 35° | 3361 | 4150 | 4529 |
| 40° | 3289 | 4085 | 4336 |
| 45° | 3200 | 3949 | 4114 |
| 50° | 3076 | 3842 | 3920 |
| 55° | 2931 | 3787 | 3741 |
| 60° | 2742 | 3697 | 3594 |
| 65° | 2509 | 3640 | 3394 |
| 70° | 2305 | 3627 | 3174 |
| 75° | 2096 | 3498 | 2949 |
| 80° | 1857 | 3347 | 2758 |
| 85° | 1778 | 3260 | 2377 |

**MAXIMUM LUMINANCE 45°-90°:**

Horizontal Angle: 90°  
 Vertical Angle: 45°  
 Luminance: 4114 cd/sqm



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**ZONAL LUMENS:**

| Zone      | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10°    | 66.0   | 3.1       |
| 10°-20°   | 202.1  | 9.4       |
| 20°-30°   | 319.3  | 14.8      |
| 30°-40°   | 384.0  | 17.8      |
| 40°-50°   | 384.2  | 17.8      |
| 50°-60°   | 338.0  | 15.6      |
| 60°-70°   | 258.2  | 12.0      |
| 70°-80°   | 158.0  | 7.3       |
| 80°-90°   | 51.0   | 2.4       |
| 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°    | 587.3  | 27.2      |
| 0°-40°    | 971.3  | 45.0      |
| 0°-60°    | 1693.4 | 78.4      |
| 0°-90°    | 2160.6 | 100.0     |
| 90°-120°  | 0.0    | 0.0       |
| 90°-150°  | 0.0    | 0.0       |
| 90°-180°  | 0.0    | 0.0       |
| 0°-180°   | 2160.6 | 100.0     |

**CANDELA DISTRIBUTION:**

|     | 0°  | 22.5° | 45° | 67.5° | 90° | Flux |
|-----|-----|-------|-----|-------|-----|------|
| 0°  | 648 | 648   | 648 | 648   | 648 |      |
| 5°  | 656 | 670   | 697 | 699   | 699 | 62   |
| 15° | 634 | 670   | 723 | 759   | 774 | 179  |
| 25° | 584 | 625   | 704 | 759   | 781 | 269  |
| 35° | 512 | 550   | 632 | 677   | 689 | 321  |
| 45° | 420 | 449   | 519 | 538   | 540 | 324  |
| 55° | 312 | 353   | 404 | 401   | 399 | 278  |
| 65° | 197 | 252   | 286 | 272   | 266 | 196  |
| 75° | 101 | 161   | 168 | 149   | 142 | 107  |
| 85° | 29  | 58    | 53  | 41    | 38  | 32   |
| 90° | 0   | 0     | 0   | 0     | 0   |      |



TEST NUMBER: P976212  
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**CANDELA DISTRIBUTION (FULL):**

|       | 0°    | 22.5° | 45°   | 67.5° | 90°   |
|-------|-------|-------|-------|-------|-------|
| 0°    | 648.5 | 648.5 | 648.5 | 648.5 | 648.5 |
| 2.5°  | 658.1 | 655.9 | 677.3 | 679.8 | 679.8 |
| 5°    | 655.9 | 670.2 | 696.6 | 699.0 | 699.0 |
| 7.5°  | 651.0 | 679.8 | 701.3 | 718.3 | 725.4 |
| 10°   | 648.5 | 682.3 | 715.8 | 727.9 | 737.5 |
| 12.5° | 641.3 | 677.3 | 718.3 | 744.7 | 759.0 |
| 15°   | 634.2 | 670.2 | 723.0 | 759.0 | 773.5 |
| 17.5° | 624.6 | 665.3 | 727.9 | 766.4 | 783.1 |
| 20°   | 612.5 | 658.1 | 723.0 | 771.0 | 795.2 |
| 22.5° | 600.4 | 641.3 | 713.3 | 768.6 | 787.8 |
| 25°   | 583.6 | 624.6 | 704.0 | 759.0 | 780.7 |
| 27.5° | 566.9 | 607.8 | 696.6 | 749.3 | 768.6 |
| 30°   | 552.3 | 590.8 | 677.3 | 727.9 | 749.3 |
| 32.5° | 533.3 | 571.8 | 655.9 | 706.2 | 725.4 |
| 35°   | 511.6 | 550.1 | 631.7 | 677.3 | 689.4 |
| 37.5° | 492.4 | 525.9 | 607.8 | 643.8 | 653.4 |
| 40°   | 468.2 | 499.6 | 581.4 | 607.8 | 617.2 |
| 42.5° | 446.8 | 477.9 | 550.1 | 579.0 | 579.0 |
| 45°   | 420.4 | 449.3 | 518.8 | 538.0 | 540.5 |
| 47.5° | 393.8 | 427.6 | 489.9 | 502.0 | 502.0 |
| 50°   | 367.4 | 403.6 | 458.9 | 468.2 | 468.2 |
| 52.5° | 341.0 | 377.0 | 430.0 | 434.7 | 432.5 |
| 55°   | 312.4 | 353.1 | 403.6 | 401.2 | 398.7 |
| 57.5° | 281.1 | 326.7 | 372.3 | 367.4 | 367.4 |
| 60°   | 254.7 | 302.5 | 343.5 | 336.3 | 333.9 |
| 62.5° | 225.9 | 276.2 | 314.6 | 305.0 | 300.3 |
| 65°   | 197.0 | 252.2 | 285.8 | 271.5 | 266.5 |
| 67.5° | 170.6 | 230.5 | 256.9 | 237.9 | 233.0 |
| 70°   | 146.5 | 206.6 | 230.5 | 206.6 | 201.7 |
| 72.5° | 122.5 | 182.5 | 199.5 | 177.8 | 170.6 |
| 75°   | 100.8 | 160.8 | 168.2 | 148.9 | 141.8 |
| 77.5° | 79.4  | 136.8 | 136.8 | 117.6 | 115.4 |
| 80°   | 59.9  | 112.9 | 108.0 | 91.2  | 89.0  |
| 82.5° | 43.2  | 84.1  | 81.6  | 67.3  | 62.6  |
| 85°   | 28.8  | 57.7  | 52.8  | 40.9  | 38.5  |
| 87.5° | 14.5  | 28.8  | 23.9  | 16.8  | 16.8  |
| 90°   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |



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**CIE UGR TABLE:**

| Reflectances:   |      |                  |      |      |      |      |                |      |      |      |      |
|-----------------|------|------------------|------|------|------|------|----------------|------|------|------|------|
| Ceiling         |      | 0.7              | 0.7  | 0.5  | 0.5  | 0.3  | 0.7            | 0.7  | 0.5  | 0.5  | 0.3  |
| Wall            |      | 0.5              | 0.3  | 0.5  | 0.3  | 0.3  | 0.5            | 0.3  | 0.5  | 0.3  | 0.3  |
| Reference plane |      | 0.2              | 0.2  | 0.2  | 0.2  | 0.2  | 0.2            | 0.2  | 0.2  | 0.2  | 0.2  |
| Room Dimensions |      | Viewed crosswise |      |      |      |      | Viewed endwise |      |      |      |      |
| X=2H            | Y=2H | 15.8             | 17.4 | 16.2 | 17.8 | 18.1 | 16.8           | 18.4 | 17.2 | 18.7 | 19.1 |
|                 | 3H   | 17.5             | 19.0 | 17.9 | 19.3 | 19.7 | 18.5           | 20.0 | 18.9 | 20.3 | 20.7 |
|                 | 4H   | 18.1             | 19.5 | 18.5 | 19.9 | 20.3 | 19.2           | 20.6 | 19.6 | 20.9 | 21.3 |
|                 | 6H   | 18.6             | 19.9 | 19.0 | 20.3 | 20.6 | 19.7           | 21.0 | 20.1 | 21.4 | 21.8 |
|                 | 8H   | 18.7             | 20.0 | 19.2 | 20.4 | 20.8 | 19.9           | 21.1 | 20.3 | 21.5 | 21.9 |
|                 | 12H  | 18.8             | 20.0 | 19.3 | 20.4 | 20.8 | 20.0           | 21.2 | 20.4 | 21.6 | 22.0 |
| 4H              | 2H   | 16.8             | 18.2 | 17.2 | 18.5 | 18.9 | 17.5           | 18.9 | 17.9 | 19.2 | 19.6 |
|                 | 3H   | 18.8             | 20.0 | 19.2 | 20.4 | 20.8 | 19.5           | 20.7 | 19.9 | 21.0 | 21.4 |
|                 | 4H   | 19.6             | 20.7 | 20.1 | 21.1 | 21.6 | 20.3           | 21.3 | 20.7 | 21.7 | 22.2 |
|                 | 6H   | 20.3             | 21.2 | 20.8 | 21.7 | 22.1 | 20.9           | 21.8 | 21.3 | 22.3 | 22.7 |
|                 | 8H   | 20.5             | 21.4 | 21.0 | 21.8 | 22.3 | 21.1           | 22.0 | 21.6 | 22.4 | 22.9 |
|                 | 12H  | 20.7             | 21.5 | 21.1 | 21.9 | 22.4 | 21.3           | 22.1 | 21.8 | 22.5 | 23.0 |
| 8H              | 4H   | 20.1             | 21.0 | 20.6 | 21.5 | 21.9 | 20.7           | 21.5 | 21.1 | 22.0 | 22.5 |
|                 | 6H   | 21.0             | 21.8 | 21.5 | 22.3 | 22.7 | 21.4           | 22.2 | 21.9 | 22.7 | 23.1 |
|                 | 8H   | 21.4             | 22.1 | 21.9 | 22.6 | 23.1 | 21.7           | 22.4 | 22.3 | 22.9 | 23.4 |
|                 | 12H  | 21.7             | 22.3 | 22.2 | 22.8 | 23.3 | 22.0           | 22.6 | 22.5 | 23.1 | 23.6 |
| 12H             | 4H   | 20.2             | 21.0 | 20.7 | 21.5 | 21.9 | 20.7           | 21.5 | 21.2 | 22.0 | 22.5 |
|                 | 6H   | 21.2             | 21.8 | 21.7 | 22.3 | 22.8 | 21.6           | 22.2 | 22.1 | 22.7 | 23.2 |
|                 | 8H   | 21.6             | 22.2 | 22.1 | 22.7 | 23.2 | 21.9           | 22.5 | 22.4 | 23.0 | 23.6 |

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

Report Prepared for

Cooper Lighting Solutions

Metalux

Report Number: SP1-2506-457-7

Test Date: 07/02/2025

Luminaire Tested: 24SR-LD2-64-C-UNV-L940-CD1-U

Data in this report applies to families of products including 24SR-LD2-64-C-UNV-L940-CD1-U

**Test Information**

Test Method: LM-79-2019  
 Report Number: SP1-2506-457-7  
 Test Lab: COOPER LIGHTING SOLUTIONS  
 Photometer: SP1 - 76IN SPHERE  
 Measurement Geometry: 4π  
 Issue Date: 07/02/2025  
 Manufacturer: COOPER LIGHTING SOLUTIONS  
 Product Line: Metalux  
 Catalog Number: **24SR-LD2-64-C-UNV-L940-CD1-U**  
 Description: 2X4 SKYRIDGE 6400LM Fixture with new LTN chip

**Spectral Parameters**

CCT (K): 3850  
 CIE u': 0.2283  
 CIE v': 0.5037  
 Duv: -0.0006  
 CIE x: 0.3868  
 CIE y: 0.3794  
 CIE z: 0.2338  
 Peak Wavelength (nm): 630  
 Dominant Wavelength (nm): 579  
 Purity: 29.94798  
 Rf: 91.3  
 Rg: 99.8

|           |      |      |      |
|-----------|------|------|------|
| CRI (Ra): | 94.0 |      |      |
| R1:       | 95.3 | R9:  | 65.3 |
| R2:       | 96.3 | R10: | 89.6 |
| R3:       | 95.7 | R11: | 95.5 |
| R4:       | 95.2 | R12: | 76.1 |
| R5:       | 94.4 | R13: | 95.5 |
| R6:       | 94.3 | R14: | 96.8 |
| R7:       | 94.1 | R15: | 92.3 |
| R8:       | 86.7 |      |      |



**Test Conditions**

Stabilization Time: 38M  
 Operation Time: 1H 38M  
 Sphere Temperature (°C): 24.4

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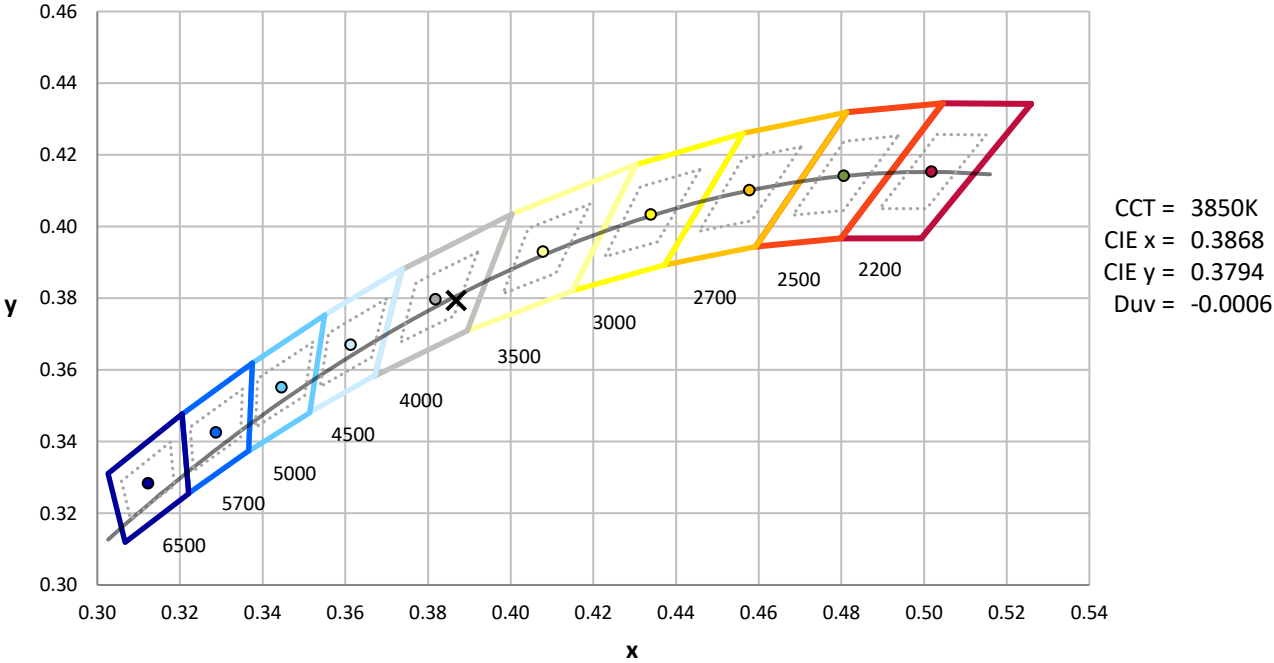
| Measurement and Test Equipment |                       |                  |                      |
|--------------------------------|-----------------------|------------------|----------------------|
| Instrument                     | Identification Number | Calibration Date | Calibration Due Date |
| Photometer                     | 76INCH SPHERE IN0058  | 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 4000K 4-step quadrangle

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**Photopic Flux vs. Wavelength**

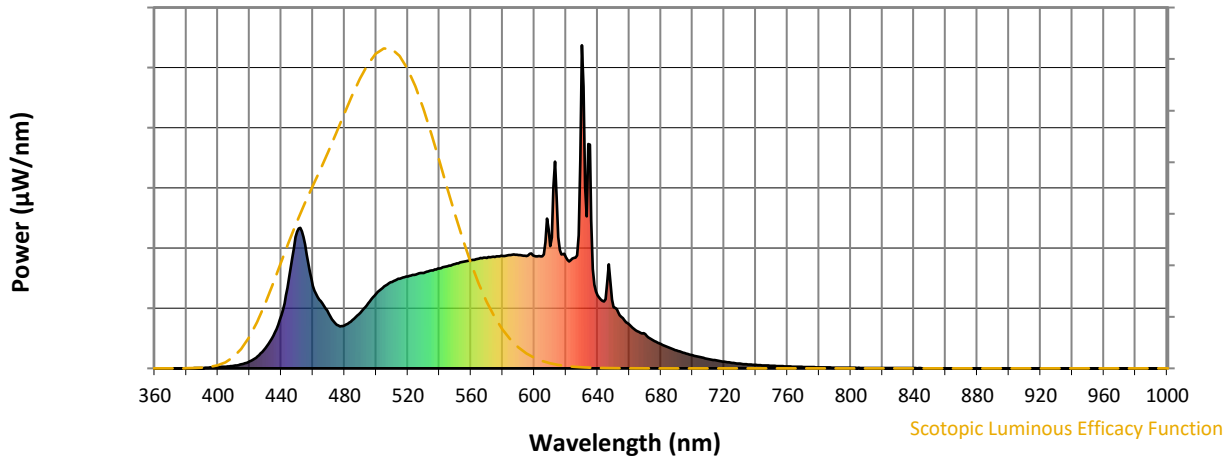


**Photopic Lumens: NR**

| $\lambda$<br>(nm) | Power<br>W <sup>^</sup> /nm | Lumens<br>( $\phi$ /nm) | $\lambda$<br>(nm) | Power<br>W <sup>^</sup> /nm | Lumens<br>( $\phi$ /nm) | $\lambda$<br>(nm) | Power<br>W <sup>^</sup> /nm | Lumens<br>( $\phi$ /nm) | $\lambda$<br>(nm) | Power<br>W <sup>^</sup> /nm | Lumens<br>( $\phi$ /nm) | $\lambda$<br>(nm) | Power<br>W <sup>^</sup> /nm | Lumens<br>( $\phi$ /nm) |
|-------------------|-----------------------------|-------------------------|-------------------|-----------------------------|-------------------------|-------------------|-----------------------------|-------------------------|-------------------|-----------------------------|-------------------------|-------------------|-----------------------------|-------------------------|
| 360               | 0                           | NR                      | 490               | 173                         | NR                      | 620               | 343                         | NR                      | 750               | 8                           | NR                      | 880               | 0                           | NR                      |
| 365               | 0                           | NR                      | 495               | 201                         | NR                      | 625               | 342                         | NR                      | 755               | 7                           | NR                      | 885               | 0                           | NR                      |
| 370               | 0                           | NR                      | 500               | 231                         | NR                      | 630               | 1000                        | NR                      | 760               | 6                           | NR                      | 890               | 0                           | NR                      |
| 375               | 0                           | NR                      | 505               | 253                         | NR                      | 635               | 692                         | NR                      | 765               | 5                           | NR                      | 895               | 0                           | NR                      |
| 380               | 0                           | NR                      | 510               | 268                         | NR                      | 640               | 226                         | NR                      | 770               | 4                           | NR                      | 900               | 0                           | NR                      |
| 385               | 1                           | NR                      | 515               | 277                         | NR                      | 645               | 214                         | NR                      | 775               | 4                           | NR                      | 905               | 0                           | NR                      |
| 390               | 1                           | NR                      | 520               | 284                         | NR                      | 650               | 190                         | NR                      | 780               | 3                           | NR                      | 910               | 0                           | NR                      |
| 395               | 3                           | NR                      | 525               | 290                         | NR                      | 655               | 160                         | NR                      | 785               | 3                           | NR                      | 915               | 0                           | NR                      |
| 400               | 4                           | NR                      | 530               | 296                         | NR                      | 660               | 136                         | NR                      | 790               | 2                           | NR                      | 920               | 0                           | NR                      |
| 405               | 5                           | NR                      | 535               | 303                         | NR                      | 665               | 115                         | NR                      | 795               | 2                           | NR                      | 925               | 0                           | NR                      |
| 410               | 8                           | NR                      | 540               | 310                         | NR                      | 670               | 106                         | NR                      | 800               | 2                           | NR                      | 930               | 0                           | NR                      |
| 415               | 13                          | NR                      | 545               | 316                         | NR                      | 675               | 87                          | NR                      | 805               | 2                           | NR                      | 935               | 0                           | NR                      |
| 420               | 22                          | NR                      | 550               | 323                         | NR                      | 680               | 75                          | NR                      | 810               | 1                           | NR                      | 940               | 0                           | NR                      |
| 425               | 37                          | NR                      | 555               | 330                         | NR                      | 685               | 64                          | NR                      | 815               | 1                           | NR                      | 945               | 0                           | NR                      |
| 430               | 62                          | NR                      | 560               | 335                         | NR                      | 690               | 55                          | NR                      | 820               | 1                           | NR                      | 950               | 0                           | NR                      |
| 435               | 102                         | NR                      | 565               | 340                         | NR                      | 695               | 47                          | NR                      | 825               | 1                           | NR                      | 955               | 0                           | NR                      |
| 440               | 164                         | NR                      | 570               | 342                         | NR                      | 700               | 40                          | NR                      | 830               | 1                           | NR                      | 960               | 0                           | NR                      |
| 445               | 281                         | NR                      | 575               | 345                         | NR                      | 705               | 34                          | NR                      | 835               | 1                           | NR                      | 965               | 0                           | NR                      |
| 450               | 423                         | NR                      | 580               | 348                         | NR                      | 710               | 29                          | NR                      | 840               | 1                           | NR                      | 970               | 0                           | NR                      |
| 455               | 384                         | NR                      | 585               | 350                         | NR                      | 715               | 25                          | NR                      | 845               | 1                           | NR                      | 975               | 0                           | NR                      |
| 460               | 256                         | NR                      | 590               | 351                         | NR                      | 720               | 21                          | NR                      | 850               | 0                           | NR                      | 980               | 0                           | NR                      |
| 465               | 208                         | NR                      | 595               | 348                         | NR                      | 725               | 17                          | NR                      | 855               | 0                           | NR                      | 985               | 0                           | NR                      |
| 470               | 169                         | NR                      | 600               | 348                         | NR                      | 730               | 14                          | NR                      | 860               | 0                           | NR                      | 990               | 0                           | NR                      |
| 475               | 135                         | NR                      | 605               | 347                         | NR                      | 735               | 12                          | NR                      | 865               | 0                           | NR                      | 995               | 0                           | NR                      |
| 480               | 133                         | NR                      | 610               | 379                         | NR                      | 740               | 11                          | NR                      | 870               | 0                           | NR                      | 1000              | 0                           | NR                      |
| 485               | 149                         | NR                      | 615               | 406                         | NR                      | 745               | 9                           | NR                      | 875               | 0                           | NR                      |                   |                             |                         |

REPORT NUMBER: SP1-2506-457-7

**Scotopic Flux vs. Wavelength**



**Scotopic Lumens: NR**

**S/P: 1.74**

| λ (nm) | Power W <sup>^</sup> /nm | Lumens (φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (φ/nm) |
|--------|--------------------------|---------------|--------|--------------------------|---------------|--------|--------------------------|---------------|--------|--------------------------|---------------|--------|--------------------------|---------------|
| 360    | 0                        | NR            | 490    | 173                      | NR            | 620    | 343                      | NR            | 750    | 8                        | NR            | 880    | 0                        | NR            |
| 365    | 0                        | NR            | 495    | 201                      | NR            | 625    | 342                      | NR            | 755    | 7                        | NR            | 885    | 0                        | NR            |
| 370    | 0                        | NR            | 500    | 231                      | NR            | 630    | 1000                     | NR            | 760    | 6                        | NR            | 890    | 0                        | NR            |
| 375    | 0                        | NR            | 505    | 253                      | NR            | 635    | 692                      | NR            | 765    | 5                        | NR            | 895    | 0                        | NR            |
| 380    | 0                        | NR            | 510    | 268                      | NR            | 640    | 226                      | NR            | 770    | 4                        | NR            | 900    | 0                        | NR            |
| 385    | 1                        | NR            | 515    | 277                      | NR            | 645    | 214                      | NR            | 775    | 4                        | NR            | 905    | 0                        | NR            |
| 390    | 1                        | NR            | 520    | 284                      | NR            | 650    | 190                      | NR            | 780    | 3                        | NR            | 910    | 0                        | NR            |
| 395    | 3                        | NR            | 525    | 290                      | NR            | 655    | 160                      | NR            | 785    | 3                        | NR            | 915    | 0                        | NR            |
| 400    | 4                        | NR            | 530    | 296                      | NR            | 660    | 136                      | NR            | 790    | 2                        | NR            | 920    | 0                        | NR            |
| 405    | 5                        | NR            | 535    | 303                      | NR            | 665    | 115                      | NR            | 795    | 2                        | NR            | 925    | 0                        | NR            |
| 410    | 8                        | NR            | 540    | 310                      | NR            | 670    | 106                      | NR            | 800    | 2                        | NR            | 930    | 0                        | NR            |
| 415    | 13                       | NR            | 545    | 316                      | NR            | 675    | 87                       | NR            | 805    | 2                        | NR            | 935    | 0                        | NR            |
| 420    | 22                       | NR            | 550    | 323                      | NR            | 680    | 75                       | NR            | 810    | 1                        | NR            | 940    | 0                        | NR            |
| 425    | 37                       | NR            | 555    | 330                      | NR            | 685    | 64                       | NR            | 815    | 1                        | NR            | 945    | 0                        | NR            |
| 430    | 62                       | NR            | 560    | 335                      | NR            | 690    | 55                       | NR            | 820    | 1                        | NR            | 950    | 0                        | NR            |
| 435    | 102                      | NR            | 565    | 340                      | NR            | 695    | 47                       | NR            | 825    | 1                        | NR            | 955    | 0                        | NR            |
| 440    | 164                      | NR            | 570    | 342                      | NR            | 700    | 40                       | NR            | 830    | 1                        | NR            | 960    | 0                        | NR            |
| 445    | 281                      | NR            | 575    | 345                      | NR            | 705    | 34                       | NR            | 835    | 1                        | NR            | 965    | 0                        | NR            |
| 450    | 423                      | NR            | 580    | 348                      | NR            | 710    | 29                       | NR            | 840    | 1                        | NR            | 970    | 0                        | NR            |
| 455    | 384                      | NR            | 585    | 350                      | NR            | 715    | 25                       | NR            | 845    | 1                        | NR            | 975    | 0                        | NR            |
| 460    | 256                      | NR            | 590    | 351                      | NR            | 720    | 21                       | NR            | 850    | 0                        | NR            | 980    | 0                        | NR            |
| 465    | 208                      | NR            | 595    | 348                      | NR            | 725    | 17                       | NR            | 855    | 0                        | NR            | 985    | 0                        | NR            |
| 470    | 169                      | NR            | 600    | 348                      | NR            | 730    | 14                       | NR            | 860    | 0                        | NR            | 990    | 0                        | NR            |
| 475    | 135                      | NR            | 605    | 347                      | NR            | 735    | 12                       | NR            | 865    | 0                        | NR            | 995    | 0                        | NR            |
| 480    | 133                      | NR            | 610    | 379                      | NR            | 740    | 11                       | NR            | 870    | 0                        | NR            | 1000   | 0                        | NR            |
| 485    | 149                      | NR            | 615    | 406                      | NR            | 745    | 9                        | NR            | 875    | 0                        | NR            |        |                          |               |

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Melanopic Flux vs. Wavelength



Melanopic Luminous Efficacy Function

Melanopic Lumens: NR

M/P: 3.6

| λ (nm) | Power W <sup>^</sup> /nm | Lumens (φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (φ/nm) |
|--------|--------------------------|---------------|--------|--------------------------|---------------|--------|--------------------------|---------------|--------|--------------------------|---------------|--------|--------------------------|---------------|
| 360    | 0                        | NR            | 490    | 173                      | NR            | 620    | 343                      | NR            | 750    | 8                        | NR            | 880    | 0                        | NR            |
| 365    | 0                        | NR            | 495    | 201                      | NR            | 625    | 342                      | NR            | 755    | 7                        | NR            | 885    | 0                        | NR            |
| 370    | 0                        | NR            | 500    | 231                      | NR            | 630    | 1000                     | NR            | 760    | 6                        | NR            | 890    | 0                        | NR            |
| 375    | 0                        | NR            | 505    | 253                      | NR            | 635    | 692                      | NR            | 765    | 5                        | NR            | 895    | 0                        | NR            |
| 380    | 0                        | NR            | 510    | 268                      | NR            | 640    | 226                      | NR            | 770    | 4                        | NR            | 900    | 0                        | NR            |
| 385    | 1                        | NR            | 515    | 277                      | NR            | 645    | 214                      | NR            | 775    | 4                        | NR            | 905    | 0                        | NR            |
| 390    | 1                        | NR            | 520    | 284                      | NR            | 650    | 190                      | NR            | 780    | 3                        | NR            | 910    | 0                        | NR            |
| 395    | 3                        | NR            | 525    | 290                      | NR            | 655    | 160                      | NR            | 785    | 3                        | NR            | 915    | 0                        | NR            |
| 400    | 4                        | NR            | 530    | 296                      | NR            | 660    | 136                      | NR            | 790    | 2                        | NR            | 920    | 0                        | NR            |
| 405    | 5                        | NR            | 535    | 303                      | NR            | 665    | 115                      | NR            | 795    | 2                        | NR            | 925    | 0                        | NR            |
| 410    | 8                        | NR            | 540    | 310                      | NR            | 670    | 106                      | NR            | 800    | 2                        | NR            | 930    | 0                        | NR            |
| 415    | 13                       | NR            | 545    | 316                      | NR            | 675    | 87                       | NR            | 805    | 2                        | NR            | 935    | 0                        | NR            |
| 420    | 22                       | NR            | 550    | 323                      | NR            | 680    | 75                       | NR            | 810    | 1                        | NR            | 940    | 0                        | NR            |
| 425    | 37                       | NR            | 555    | 330                      | NR            | 685    | 64                       | NR            | 815    | 1                        | NR            | 945    | 0                        | NR            |
| 430    | 62                       | NR            | 560    | 335                      | NR            | 690    | 55                       | NR            | 820    | 1                        | NR            | 950    | 0                        | NR            |
| 435    | 102                      | NR            | 565    | 340                      | NR            | 695    | 47                       | NR            | 825    | 1                        | NR            | 955    | 0                        | NR            |
| 440    | 164                      | NR            | 570    | 342                      | NR            | 700    | 40                       | NR            | 830    | 1                        | NR            | 960    | 0                        | NR            |
| 445    | 281                      | NR            | 575    | 345                      | NR            | 705    | 34                       | NR            | 835    | 1                        | NR            | 965    | 0                        | NR            |
| 450    | 423                      | NR            | 580    | 348                      | NR            | 710    | 29                       | NR            | 840    | 1                        | NR            | 970    | 0                        | NR            |
| 455    | 384                      | NR            | 585    | 350                      | NR            | 715    | 25                       | NR            | 845    | 1                        | NR            | 975    | 0                        | NR            |
| 460    | 256                      | NR            | 590    | 351                      | NR            | 720    | 21                       | NR            | 850    | 0                        | NR            | 980    | 0                        | NR            |
| 465    | 208                      | NR            | 595    | 348                      | NR            | 725    | 17                       | NR            | 855    | 0                        | NR            | 985    | 0                        | NR            |
| 470    | 169                      | NR            | 600    | 348                      | NR            | 730    | 14                       | NR            | 860    | 0                        | NR            | 990    | 0                        | NR            |
| 475    | 135                      | NR            | 605    | 347                      | NR            | 735    | 12                       | NR            | 865    | 0                        | NR            | 995    | 0                        | NR            |
| 480    | 133                      | NR            | 610    | 379                      | NR            | 740    | 11                       | NR            | 870    | 0                        | NR            | 1000   | 0                        | NR            |
| 485    | 149                      | NR            | 615    | 406                      | NR            | 745    | 9                        | NR            | 875    | 0                        | NR            |        |                          |               |

**Summary**

$R_f = 91.3$   
 $R_g = 99.8$   
 $CIE R_a = 94.0$   
 $R_9 = 65.3$



**Color Vector Graphics**

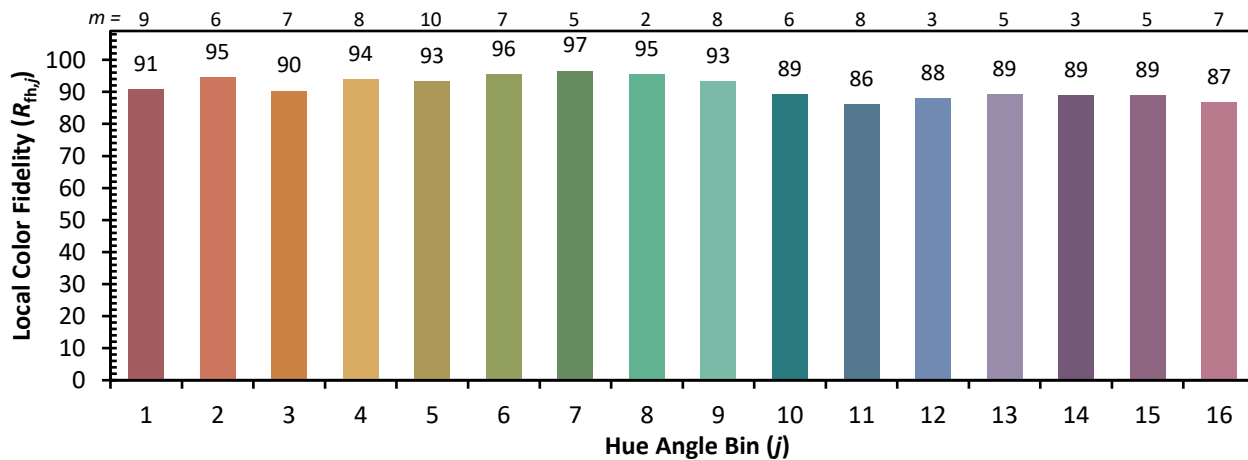
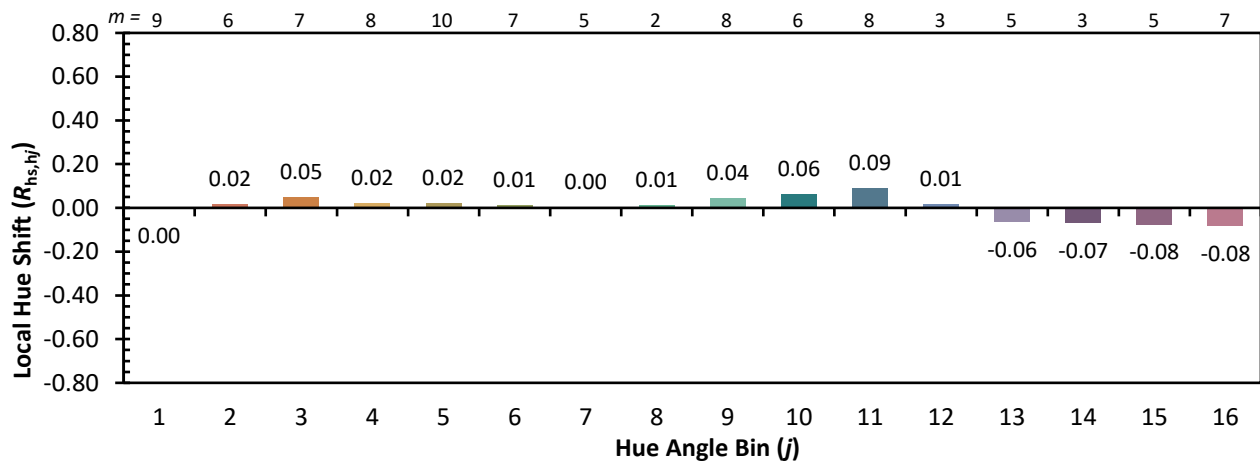
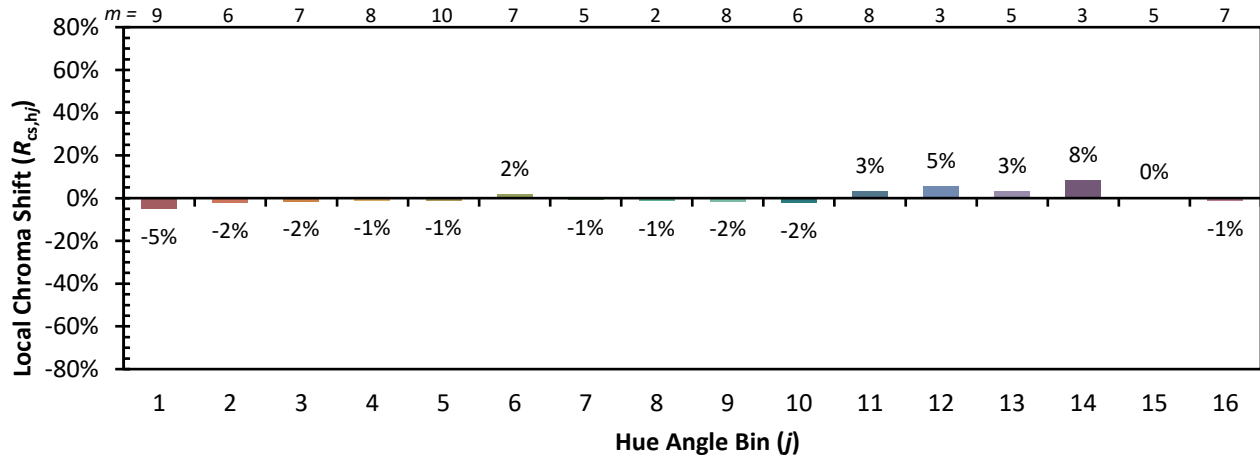


**Individual Sample Fidelity Index ( $R_{f,i}$ )**

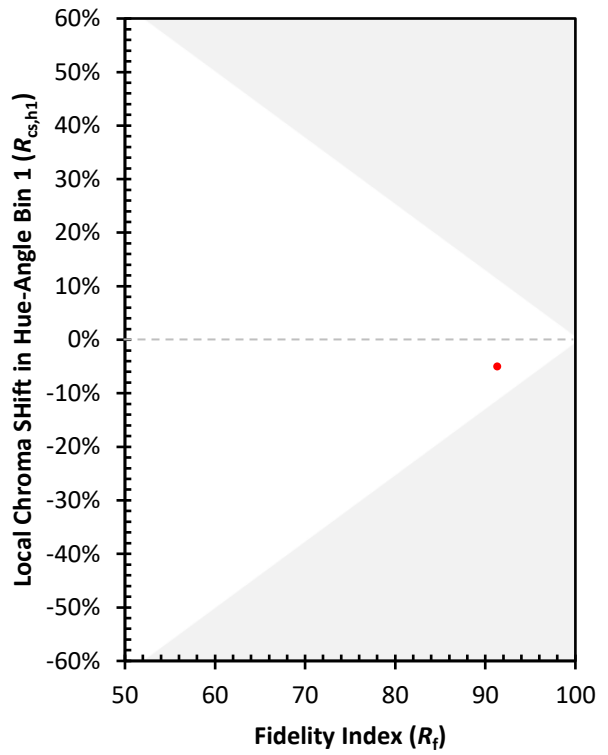
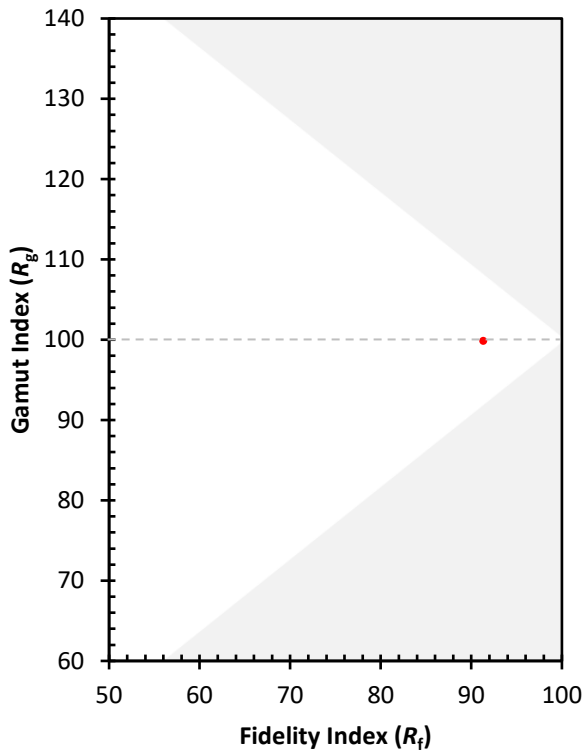
|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 86 | CES26 = 93 | CES51 = 98 | CES76 = 87 |
| CES02 = 62 | CES27 = 91 | CES52 = 99 | CES77 = 88 |
| CES03 = 31 | CES28 = 96 | CES53 = 97 | CES78 = 83 |
| CES04 = 69 | CES29 = 96 | CES54 = 94 | CES79 = 93 |
| CES05 = 49 | CES30 = 93 | CES55 = 92 | CES80 = 92 |
| CES06 = 50 | CES31 = 96 | CES56 = 95 | CES81 = 79 |
| CES07 = 42 | CES32 = 88 | CES57 = 94 | CES82 = 96 |
| CES08 = 41 | CES33 = 99 | CES58 = 95 | CES83 = 95 |
| CES09 = 29 | CES34 = 93 | CES59 = 97 | CES84 = 94 |
| CES10 = 74 | CES35 = 96 | CES60 = 93 | CES85 = 81 |
| CES11 = 57 | CES36 = 81 | CES61 = 92 | CES86 = 83 |
| CES12 = 63 | CES37 = 94 | CES62 = 87 | CES87 = 92 |
| CES13 = 43 | CES38 = 88 | CES63 = 93 | CES88 = 98 |
| CES14 = 74 | CES39 = 99 | CES64 = 91 | CES89 = 85 |
| CES15 = 71 | CES40 = 97 | CES65 = 89 | CES90 = 97 |
| CES16 = 47 | CES41 = 97 | CES66 = 88 | CES91 = 73 |
| CES17 = 49 | CES42 = 93 | CES67 = 87 | CES92 = 77 |
| CES18 = 56 | CES43 = 93 | CES68 = 88 | CES93 = 86 |
| CES19 = 71 | CES44 = 99 | CES69 = 89 | CES94 = 76 |
| CES20 = 66 | CES45 = 96 | CES70 = 86 | CES95 = 83 |
| CES21 = 85 | CES46 = 97 | CES71 = 81 | CES96 = 92 |
| CES22 = 78 | CES47 = 93 | CES72 = 94 | CES97 = 95 |
| CES23 = 91 | CES48 = 92 | CES73 = 80 | CES98 = 95 |
| CES24 = 90 | CES49 = 96 | CES74 = 91 | CES99 = 93 |
| CES25 = 71 | CES50 = 98 | CES75 = 83 |            |



Color Rendition by Hue-Angle Bin



Measure Comparisons



(END OF REPORT)