

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: METALUX

Report Number: P731878

Luminaire Tested: **14CZ2-35-S-B2750-W2D-3500K**

Issue Date: 1/5/2024



**Test Information**

Test Method: LM-79-08  
Report Number: P731878  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (P275670)  
Test Lab: INNOVATION CENTER(G3)  
Issue Date: 1/5/2024  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: METALUX  
Catalog Number: 14CZ2-35-S-B2750-W2D-3500K  
Description: 1X4 3500 LUMEN CRUZE TROFFER WITH BIO UP LEDS AT 3500K CCT AND SMOOTH LENS

Light Source: -  
Ballast/Driver: -

**Summary**

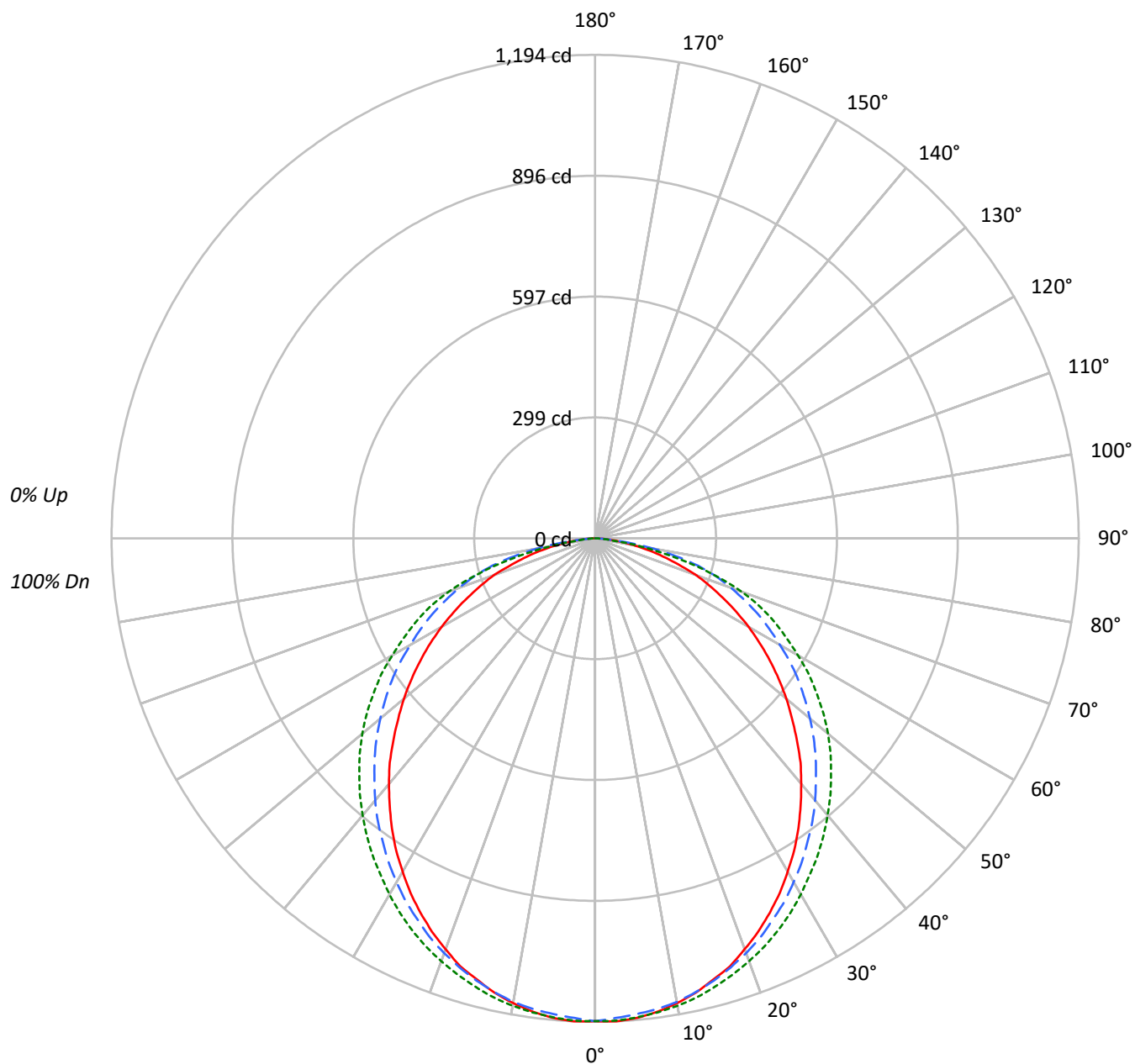
Lumens per Lamp: N/A  
Luminaire Lumens: 3341.0 lumens  
Efficiency: N/A  
Efficacy: 119.3 lumens/watt  
Spacing Criteria (0/90/45): 1.19 / 1.26 / 1.36  
Luminous Opening: Rectangular (W 0.96' x L: 3.98' x H: 0')  
CIE Type: Direct

Input Watts (W): 28  
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: P731878

CATALOG NUMBER: 14CZ2-35-S-B2750-W2D-3500K

### Luminous Intensity Polar Plot





TEST NUMBER: P731878

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**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 | 100 | 96  | 106 | 102 | 98  | 94  | 97  | 94  | 91  | 94  | 91  | 89  | 90  | 88  | 86  | 84  |    |    |
| 2   | 99  | 90  | 84  | 78  | 96  | 89  | 82  | 77  | 85  | 80  | 75  | 82  | 77  | 73  | 79  | 75  | 72  | 70  |    |    |
| 3   | 90  | 79  | 71  | 65  | 87  | 78  | 70  | 64  | 75  | 68  | 63  | 72  | 66  | 62  | 69  | 65  | 61  | 58  |    |    |
| 4   | 82  | 70  | 61  | 55  | 80  | 69  | 61  | 54  | 66  | 59  | 53  | 64  | 58  | 53  | 62  | 56  | 52  | 50  |    |    |
| 5   | 76  | 63  | 54  | 47  | 74  | 62  | 53  | 47  | 59  | 52  | 46  | 57  | 51  | 46  | 56  | 50  | 45  | 43  |    |    |
| 6   | 70  | 56  | 47  | 41  | 68  | 55  | 47  | 41  | 54  | 46  | 40  | 52  | 45  | 40  | 50  | 44  | 40  | 38  |    |    |
| 7   | 65  | 51  | 42  | 36  | 63  | 50  | 42  | 36  | 49  | 41  | 36  | 47  | 41  | 35  | 46  | 40  | 35  | 33  |    |    |
| 8   | 60  | 47  | 38  | 32  | 59  | 46  | 38  | 32  | 45  | 37  | 32  | 43  | 37  | 32  | 42  | 36  | 32  | 30  |    |    |
| 9   | 56  | 43  | 35  | 29  | 55  | 42  | 34  | 29  | 41  | 34  | 29  | 40  | 33  | 29  | 39  | 33  | 28  | 27  |    |    |
| 10  | 53  | 40  | 32  | 26  | 52  | 39  | 31  | 26  | 38  | 31  | 26  | 37  | 31  | 26  | 36  | 30  | 26  | 24  |    |    |

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

|     | 0°   | 45°  | 90°  |
|-----|------|------|------|
| 0°  | 3367 | 3367 | 3367 |
| 5°  | 3370 | 3342 | 3365 |
| 10° | 3342 | 3333 | 3362 |
| 15° | 3297 | 3306 | 3349 |
| 20° | 3244 | 3274 | 3339 |
| 25° | 3178 | 3235 | 3328 |
| 30° | 3099 | 3196 | 3310 |
| 35° | 3014 | 3151 | 3299 |
| 40° | 2918 | 3113 | 3290 |
| 45° | 2810 | 3075 | 3287 |
| 50° | 2706 | 3041 | 3295 |
| 55° | 2592 | 3017 | 3285 |
| 60° | 2469 | 2973 | 3264 |
| 65° | 2324 | 2965 | 3265 |
| 70° | 2188 | 2940 | 3171 |
| 75° | 1898 | 2874 | 2709 |
| 80° | 1534 | 2316 | 1804 |
| 85° | 1020 | 803  | 538  |



TEST NUMBER: P731878

CATALOG NUMBER: 14CZ2-35-S-B2750-W2D-3500K

**ZONAL LUMENS:**

| Zone      | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10°    | 112.6  | 3.4       |
| 10°-20°   | 320.5  | 9.6       |
| 20°-30°   | 480.7  | 14.4      |
| 30°-40°   | 573.5  | 17.2      |
| 40°-50°   | 592.8  | 17.7      |
| 50°-60°   | 541.3  | 16.2      |
| 60°-70°   | 426.0  | 12.7      |
| 70°-80°   | 248.0  | 7.4       |
| 80°-90°   | 45.7   | 1.4       |
| 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°    | 913.8  | 27.4      |
| 0°-40°    | 1487.3 | 44.5      |
| 0°-60°    | 2621.4 | 78.5      |
| 0°-90°    | 3341.0 | 100.0     |
| 90°-120°  | 0.0    | 0.0       |
| 90°-150°  | 0.0    | 0.0       |
| 90°-180°  | 0.0    | 0.0       |
| 0°-180°   | 3341.0 | 100.0     |

**CANDELA DISTRIBUTION:**

|     | 0°   | 22.5° | 45°  | 67.5° | 90°  | Flux |
|-----|------|-------|------|-------|------|------|
| 0°  | 1193 | 1193  | 1193 | 1193  | 1193 |      |
| 5°  | 1189 | 1186  | 1180 | 1189  | 1188 | 113  |
| 15° | 1128 | 1130  | 1131 | 1146  | 1146 | 318  |
| 25° | 1020 | 1025  | 1039 | 1063  | 1068 | 470  |
| 35° | 875  | 886   | 914  | 949   | 957  | 547  |
| 45° | 704  | 727   | 770  | 813   | 823  | 544  |
| 55° | 527  | 555   | 613  | 658   | 668  | 471  |
| 65° | 348  | 384   | 444  | 479   | 489  | 345  |
| 75° | 174  | 215   | 264  | 258   | 248  | 185  |
| 85° | 32   | 45    | 25   | 20    | 17   | 41   |
| 90° | 0    | 0     | 0    | 0     | 0    |      |



TEST NUMBER: P731878

CATALOG NUMBER: 14CZ2-35-S-B2750-W2D-3500K

**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|-------|--------|--------|--------|--------|--------|
| 0°    | 1192.7 | 1192.7 | 1192.7 | 1192.7 | 1192.7 |
| 2.5°  | 1194.3 | 1191.1 | 1186.0 | 1194.3 | 1192.7 |
| 5°    | 1189.4 | 1186.0 | 1179.5 | 1189.4 | 1187.6 |
| 7.5°  | 1179.5 | 1176.0 | 1172.8 | 1182.7 | 1181.1 |
| 10°   | 1166.1 | 1164.5 | 1162.9 | 1174.4 | 1172.8 |
| 12.5° | 1149.7 | 1149.7 | 1148.0 | 1161.2 | 1161.2 |
| 15°   | 1128.1 | 1129.8 | 1131.4 | 1146.2 | 1146.2 |
| 17.5° | 1108.3 | 1106.6 | 1111.5 | 1128.1 | 1129.8 |
| 20°   | 1080.0 | 1083.3 | 1090.0 | 1109.9 | 1111.5 |
| 22.5° | 1051.8 | 1055.3 | 1066.8 | 1086.7 | 1091.6 |
| 25°   | 1020.4 | 1025.4 | 1038.6 | 1063.4 | 1068.5 |
| 27.5° | 987.3  | 994.0  | 1012.0 | 1038.6 | 1043.5 |
| 30°   | 950.7  | 960.7  | 980.6  | 1010.4 | 1015.5 |
| 32.5° | 914.4  | 924.4  | 949.1  | 979.0  | 985.7  |
| 35°   | 874.6  | 886.2  | 914.4  | 949.1  | 957.4  |
| 37.5° | 833.2  | 848.0  | 881.3  | 916.0  | 926.0  |
| 40°   | 791.8  | 808.5  | 844.8  | 881.3  | 892.9  |
| 42.5° | 750.4  | 767.0  | 806.6  | 848.0  | 859.8  |
| 45°   | 703.9  | 727.3  | 770.3  | 813.3  | 823.3  |
| 47.5° | 659.3  | 684.2  | 732.1  | 775.2  | 788.6  |
| 50°   | 616.2  | 641.0  | 692.4  | 737.2  | 750.4  |
| 52.5° | 571.6  | 598.0  | 652.6  | 699.1  | 710.6  |
| 55°   | 526.7  | 554.9  | 613.0  | 657.6  | 667.6  |
| 57.5° | 482.1  | 511.9  | 571.6  | 614.6  | 626.2  |
| 60°   | 437.4  | 468.9  | 526.7  | 569.8  | 578.1  |
| 62.5° | 392.6  | 425.6  | 485.3  | 523.5  | 531.8  |
| 65°   | 347.9  | 384.2  | 443.9  | 478.8  | 488.8  |
| 67.5° | 304.9  | 341.2  | 399.3  | 432.3  | 440.7  |
| 70°   | 265.1  | 298.2  | 356.2  | 381.0  | 384.2  |
| 72.5° | 215.4  | 256.8  | 313.0  | 326.4  | 318.1  |
| 75°   | 174.0  | 215.4  | 263.5  | 258.4  | 248.4  |
| 77.5° | 132.5  | 174.0  | 205.4  | 188.8  | 175.6  |
| 80°   | 94.4   | 135.8  | 142.5  | 117.5  | 111.0  |
| 82.5° | 61.3   | 94.4   | 79.6   | 61.3   | 49.7   |
| 85°   | 31.5   | 44.7   | 24.8   | 19.9   | 16.6   |
| 87.5° | 9.9    | 6.7    | 3.2    | 3.2    | 1.6    |
| 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: SP1-2210-795-3

Test Date: 10/06/2022

Luminaire Tested: 9WP217084MDER4AM-3500K-315MA

Data in this report applies to families of products including 9WP217084MDER4AM-3500K.

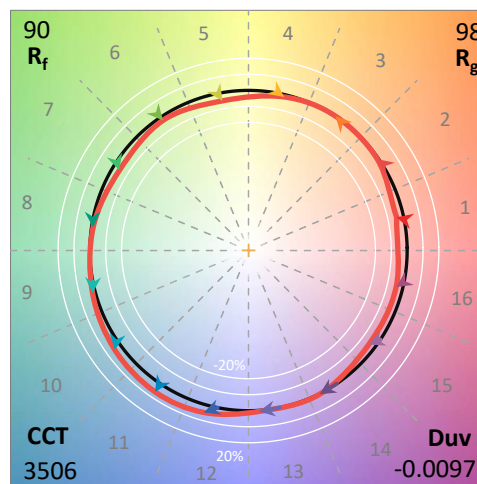
### Test Information

Test Method: LM-79-2019  
 Report Number: SP1-2210-795-3  
 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-3500K-315MA**  
 Description: METALUX

TUNABLE BOARD, 3500K-315MA, PROGRAMMED @ 4.0Vdc.

### Spectral Parameters

|                           |         |           |      |      |      |
|---------------------------|---------|-----------|------|------|------|
| CCT (K):                  | 3506    | CRI (Ra): | 90.1 |      |      |
| CIE u':                   | 0.2401  | R1:       | 96.2 | R9:  | 75.4 |
| CIE v':                   | 0.4983  | R2:       | 91.5 | R10: | 83.5 |
| Duv:                      | -0.0097 | R3:       | 88.2 | R11: | 96.0 |
| CIE x:                    | 0.3952  | R4:       | 94.5 | R12: | 76.6 |
| CIE y:                    | 0.3646  | R5:       | 94.6 | R13: | 94.5 |
| CIE z:                    | 0.2402  | R6:       | 84.9 | R14: | 94.8 |
| Peak Wavelength (nm):     | 632     | R7:       | 86.1 |      |      |
| Dominant Wavelength (nm): | 586     | R8:       | 84.7 |      |      |
| Purity:                   | 28.3    |           |      |      |      |
| Rf:                       | 90.4    |           |      |      |      |
| Rg:                       | 97.8    |           |      |      |      |



### Test Conditions

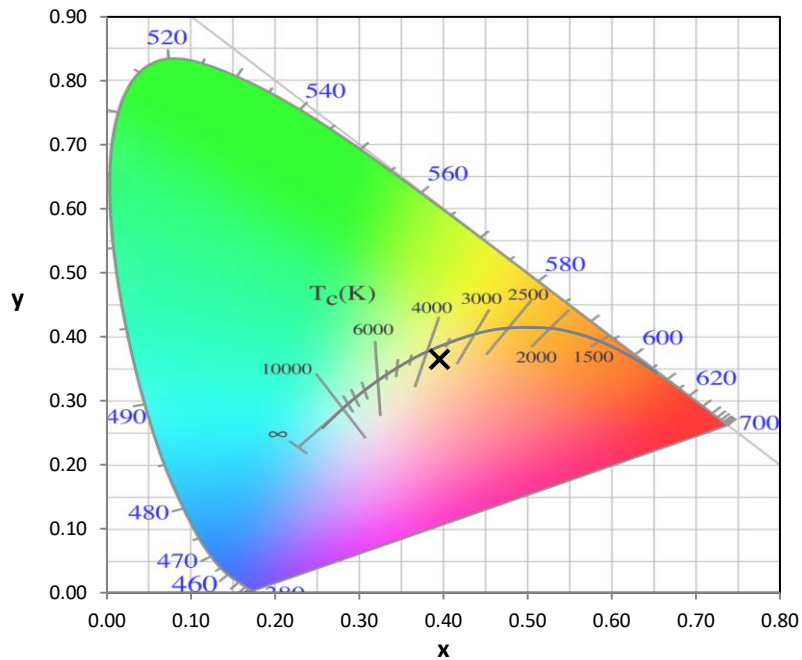
Stabilization Time: 42M  
 Operation Time: 12H  
 Room Temperature (°C) / RH%: 24.0/38%  
 Sphere Temperature (°C): 24.4

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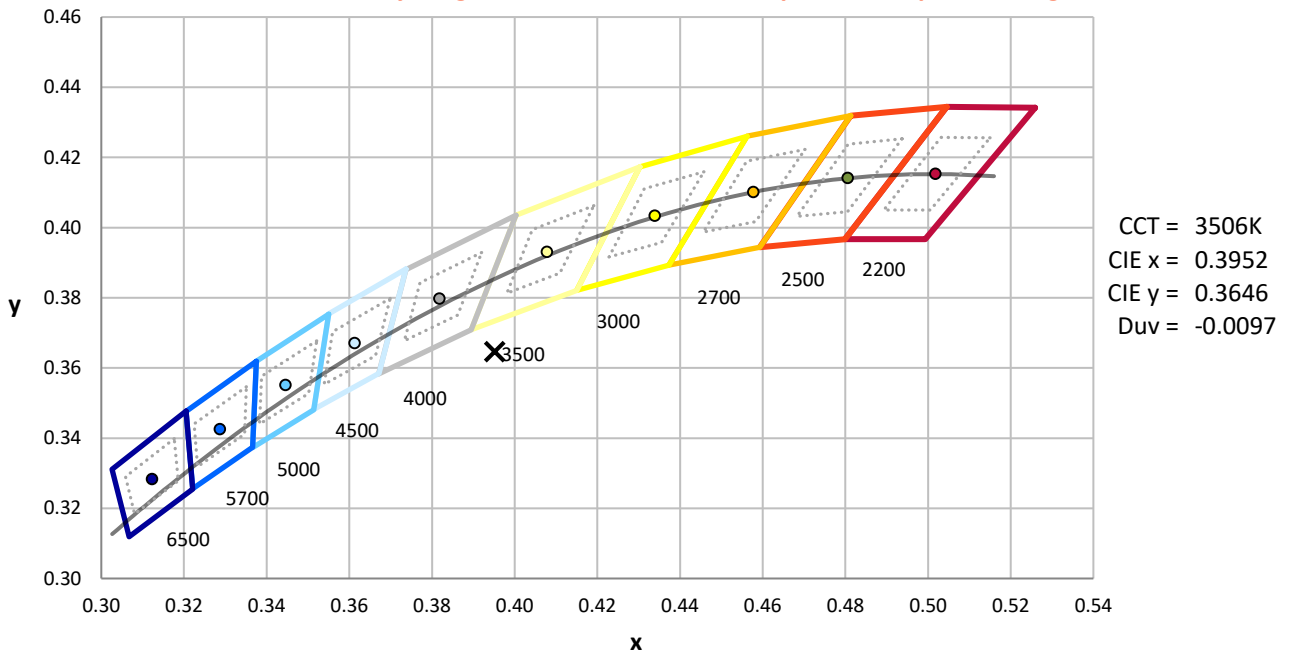
| Measurement and Test Equipment |                       |                  |                      |
|--------------------------------|-----------------------|------------------|----------------------|
| Instrument                     | Identification Number | Calibration Date | Calibration Due Date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



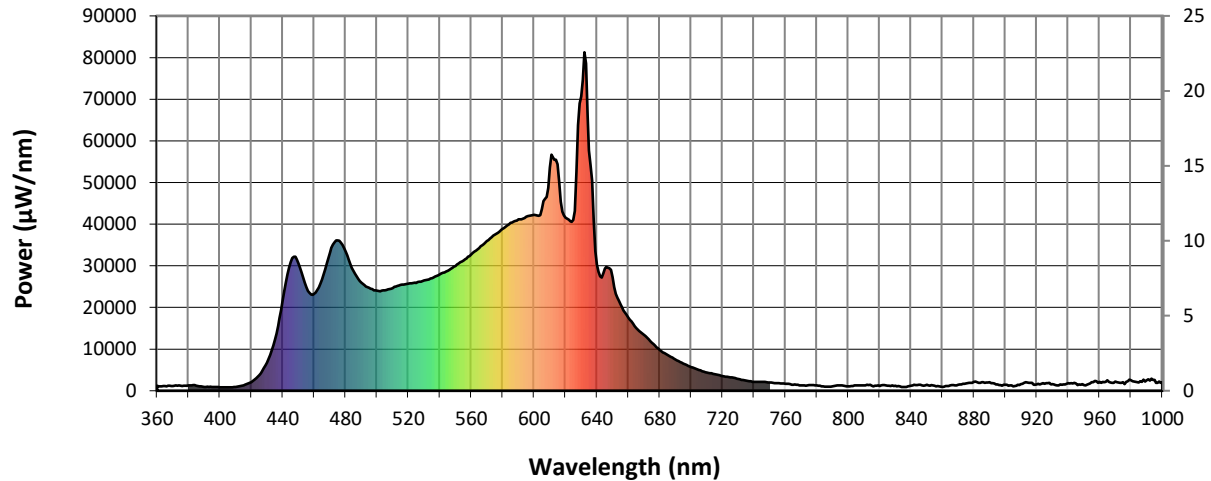
**CIE 1931 Chromaticity Diagram with 2017 ANSI 7-Step and 4-Step Quadrangles**



Point lies outside the range

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**Photopic Flux vs. Wavelength**

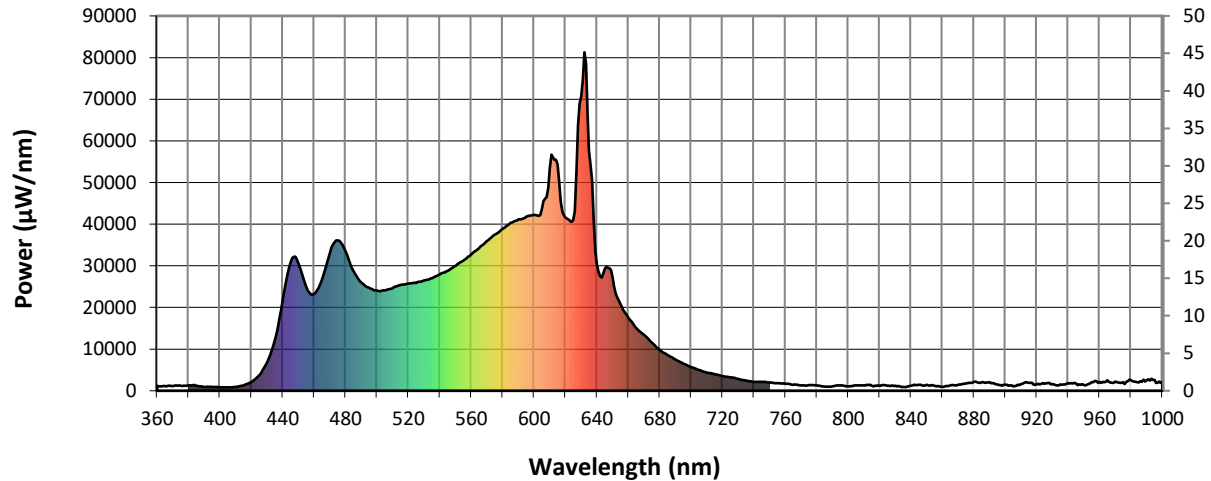


#####

| 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       | 1172             | NR               | 490       | 25948            | NR               | 620       | 41537            | NR               | 750       | 1967             | NR               | 880       | 2125             | NR               |
| 365       | 1124             | NR               | 495       | 24688            | NR               | 625       | 40984            | NR               | 755       | 1800             | NR               | 885       | 2057             | NR               |
| 370       | 1161             | NR               | 500       | 24010            | NR               | 630       | 70640            | NR               | 760       | 1684             | NR               | 890       | 2080             | NR               |
| 375       | 1195             | NR               | 505       | 24099            | NR               | 635       | 57718            | NR               | 765       | 1458             | NR               | 895       | 1496             | NR               |
| 380       | 1247             | NR               | 510       | 24608            | NR               | 640       | 30257            | NR               | 770       | 1312             | NR               | 900       | 1417             | NR               |
| 385       | 1197             | NR               | 515       | 25386            | NR               | 645       | 29336            | NR               | 775       | 1355             | NR               | 905       | 1054             | NR               |
| 390       | 930              | NR               | 520       | 25689            | NR               | 650       | 27279            | NR               | 780       | 1313             | NR               | 910       | 1583             | NR               |
| 395       | 934              | NR               | 525       | 25906            | NR               | 655       | 20755            | NR               | 785       | 1001             | NR               | 915       | 1866             | NR               |
| 400       | 841              | NR               | 530       | 26477            | NR               | 660       | 17587            | NR               | 790       | 1065             | NR               | 920       | 1529             | NR               |
| 405       | 808              | NR               | 535       | 27006            | NR               | 665       | 15073            | NR               | 795       | 1315             | NR               | 925       | 1671             | NR               |
| 410       | 914              | NR               | 540       | 27913            | NR               | 670       | 13454            | NR               | 800       | 1029             | NR               | 930       | 1617             | NR               |
| 415       | 1302             | NR               | 545       | 28798            | NR               | 675       | 11513            | NR               | 805       | 1267             | NR               | 935       | 1522             | NR               |
| 420       | 2088             | NR               | 550       | 29982            | NR               | 680       | 9839             | NR               | 810       | 1312             | NR               | 940       | 1792             | NR               |
| 425       | 3768             | NR               | 555       | 31264            | NR               | 685       | 8568             | NR               | 815       | 1239             | NR               | 945       | 1727             | NR               |
| 430       | 6771             | NR               | 560       | 32729            | NR               | 690       | 7487             | NR               | 820       | 1107             | NR               | 950       | 1375             | NR               |
| 435       | 12240            | NR               | 565       | 34271            | NR               | 695       | 6502             | NR               | 825       | 1209             | NR               | 955       | 2031             | NR               |
| 440       | 21697            | NR               | 570       | 35931            | NR               | 700       | 5703             | NR               | 830       | 1175             | NR               | 960       | 2155             | NR               |
| 445       | 30873            | NR               | 575       | 37457            | NR               | 705       | 4977             | NR               | 835       | 916              | NR               | 965       | 2519             | NR               |
| 450       | 30626            | NR               | 580       | 38827            | NR               | 710       | 4394             | NR               | 840       | 1171             | NR               | 970       | 2234             | NR               |
| 455       | 24859            | NR               | 585       | 40347            | NR               | 715       | 3979             | NR               | 845       | 1406             | NR               | 975       | 2064             | NR               |
| 460       | 23253            | NR               | 590       | 41126            | NR               | 720       | 3528             | NR               | 850       | 1407             | NR               | 980       | 2541             | NR               |
| 465       | 26717            | NR               | 595       | 41803            | NR               | 725       | 3206             | NR               | 855       | 1173             | NR               | 985       | 1959             | NR               |
| 470       | 33149            | NR               | 600       | 42231            | NR               | 730       | 2798             | NR               | 860       | 928              | NR               | 990       | 2532             | NR               |
| 475       | 36075            | NR               | 605       | 43629            | NR               | 735       | 2417             | NR               | 865       | 1256             | NR               | 995       | 2564             | NR               |
| 480       | 33381            | NR               | 610       | 53581            | NR               | 740       | 2135             | NR               | 870       | 1460             | NR               | 1000      | 2056             | NR               |
| 485       | 28773            | NR               | 615       | 54375            | NR               | 745       | 2151             | NR               | 875       | 1741             | NR               |           |                  |                  |

REPORT NUMBER: SP1-2210-795-3

**Scotopic Flux vs. Wavelength**



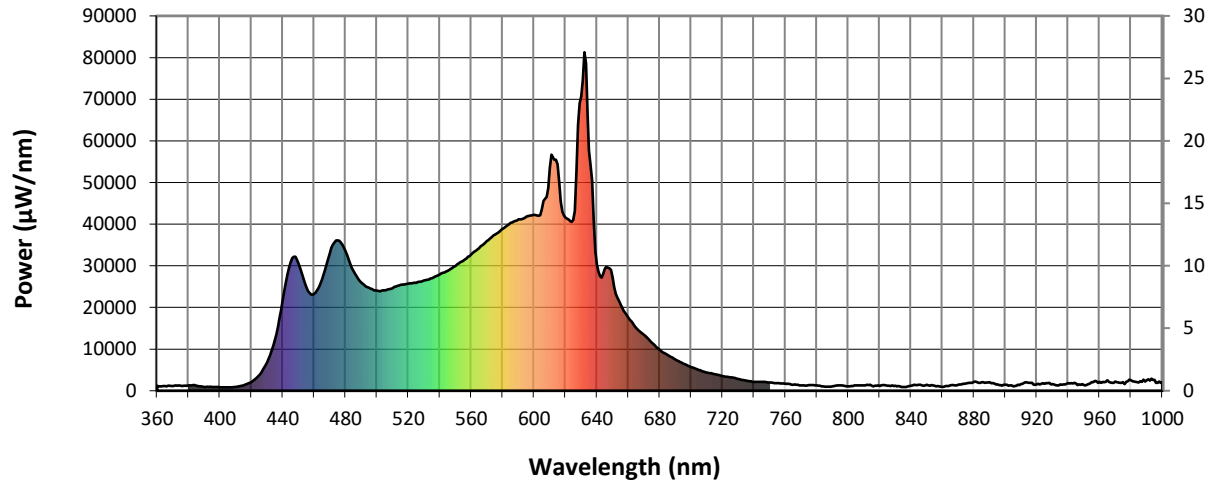
**Scotopic Lumens: 4472.9**

**S/P: 1.81**

| 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       | 1172             | NR               | 490       | 25948            | NR               | 620       | 41537            | NR               | 750       | 1967             | NR               | 880       | 2125             | NR               |
| 365       | 1124             | NR               | 495       | 24688            | NR               | 625       | 40984            | NR               | 755       | 1800             | NR               | 885       | 2057             | NR               |
| 370       | 1161             | NR               | 500       | 24010            | NR               | 630       | 70640            | NR               | 760       | 1684             | NR               | 890       | 2080             | NR               |
| 375       | 1195             | NR               | 505       | 24099            | NR               | 635       | 57718            | NR               | 765       | 1458             | NR               | 895       | 1496             | NR               |
| 380       | 1247             | NR               | 510       | 24608            | NR               | 640       | 30257            | NR               | 770       | 1312             | NR               | 900       | 1417             | NR               |
| 385       | 1197             | NR               | 515       | 25386            | NR               | 645       | 29336            | NR               | 775       | 1355             | NR               | 905       | 1054             | NR               |
| 390       | 930              | NR               | 520       | 25689            | NR               | 650       | 27279            | NR               | 780       | 1313             | NR               | 910       | 1583             | NR               |
| 395       | 934              | NR               | 525       | 25906            | NR               | 655       | 20755            | NR               | 785       | 1001             | NR               | 915       | 1866             | NR               |
| 400       | 841              | NR               | 530       | 26477            | NR               | 660       | 17587            | NR               | 790       | 1065             | NR               | 920       | 1529             | NR               |
| 405       | 808              | NR               | 535       | 27006            | NR               | 665       | 15073            | NR               | 795       | 1315             | NR               | 925       | 1671             | NR               |
| 410       | 914              | NR               | 540       | 27913            | NR               | 670       | 13454            | NR               | 800       | 1029             | NR               | 930       | 1617             | NR               |
| 415       | 1302             | NR               | 545       | 28798            | NR               | 675       | 11513            | NR               | 805       | 1267             | NR               | 935       | 1522             | NR               |
| 420       | 2088             | NR               | 550       | 29982            | NR               | 680       | 9839             | NR               | 810       | 1312             | NR               | 940       | 1792             | NR               |
| 425       | 3768             | NR               | 555       | 31264            | NR               | 685       | 8568             | NR               | 815       | 1239             | NR               | 945       | 1727             | NR               |
| 430       | 6771             | NR               | 560       | 32729            | NR               | 690       | 7487             | NR               | 820       | 1107             | NR               | 950       | 1375             | NR               |
| 435       | 12240            | NR               | 565       | 34271            | NR               | 695       | 6502             | NR               | 825       | 1209             | NR               | 955       | 2031             | NR               |
| 440       | 21697            | NR               | 570       | 35931            | NR               | 700       | 5703             | NR               | 830       | 1175             | NR               | 960       | 2155             | NR               |
| 445       | 30873            | NR               | 575       | 37457            | NR               | 705       | 4977             | NR               | 835       | 916              | NR               | 965       | 2519             | NR               |
| 450       | 30626            | NR               | 580       | 38827            | NR               | 710       | 4394             | NR               | 840       | 1171             | NR               | 970       | 2234             | NR               |
| 455       | 24859            | NR               | 585       | 40347            | NR               | 715       | 3979             | NR               | 845       | 1406             | NR               | 975       | 2064             | NR               |
| 460       | 23253            | NR               | 590       | 41126            | NR               | 720       | 3528             | NR               | 850       | 1407             | NR               | 980       | 2541             | NR               |
| 465       | 26717            | NR               | 595       | 41803            | NR               | 725       | 3206             | NR               | 855       | 1173             | NR               | 985       | 1959             | NR               |
| 470       | 33149            | NR               | 600       | 42231            | NR               | 730       | 2798             | NR               | 860       | 928              | NR               | 990       | 2532             | NR               |
| 475       | 36075            | NR               | 605       | 43629            | NR               | 735       | 2417             | NR               | 865       | 1256             | NR               | 995       | 2564             | NR               |
| 480       | 33381            | NR               | 610       | 53581            | NR               | 740       | 2135             | NR               | 870       | 1460             | NR               | 1000      | 2056             | NR               |
| 485       | 28773            | NR               | 615       | 54375            | NR               | 745       | 2151             | NR               | 875       | 1741             | NR               |           |                  |                  |

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**Melanopic Flux vs. Wavelength**



**Melanopic Lumens: 1922.8**

**S/P: 0.78**

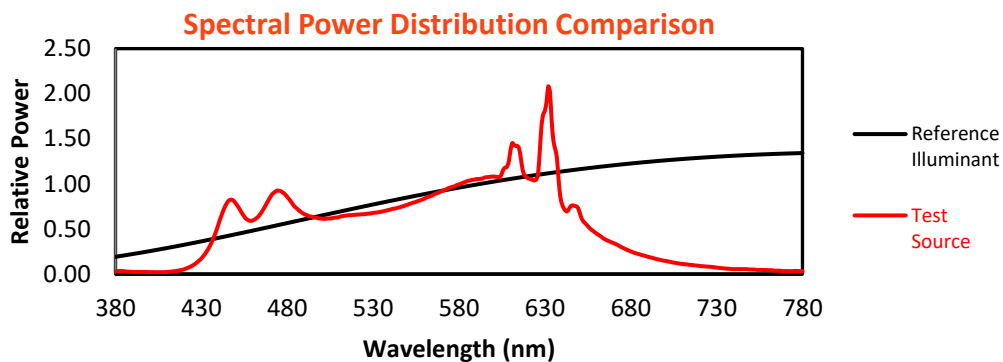
| λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) |
|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|
| 360       | 1172             | NR               | 490       | 25948            | NR               | 620       | 41537            | NR               | 750       | 1967             | NR               | 880       | 2125             | NR               |
| 365       | 1124             | NR               | 495       | 24688            | NR               | 625       | 40984            | NR               | 755       | 1800             | NR               | 885       | 2057             | NR               |
| 370       | 1161             | NR               | 500       | 24010            | NR               | 630       | 70640            | NR               | 760       | 1684             | NR               | 890       | 2080             | NR               |
| 375       | 1195             | NR               | 505       | 24099            | NR               | 635       | 57718            | NR               | 765       | 1458             | NR               | 895       | 1496             | NR               |
| 380       | 1247             | NR               | 510       | 24608            | NR               | 640       | 30257            | NR               | 770       | 1312             | NR               | 900       | 1417             | NR               |
| 385       | 1197             | NR               | 515       | 25386            | NR               | 645       | 29336            | NR               | 775       | 1355             | NR               | 905       | 1054             | NR               |
| 390       | 930              | NR               | 520       | 25689            | NR               | 650       | 27279            | NR               | 780       | 1313             | NR               | 910       | 1583             | NR               |
| 395       | 934              | NR               | 525       | 25906            | NR               | 655       | 20755            | NR               | 785       | 1001             | NR               | 915       | 1866             | NR               |
| 400       | 841              | NR               | 530       | 26477            | NR               | 660       | 17587            | NR               | 790       | 1065             | NR               | 920       | 1529             | NR               |
| 405       | 808              | NR               | 535       | 27006            | NR               | 665       | 15073            | NR               | 795       | 1315             | NR               | 925       | 1671             | NR               |
| 410       | 914              | NR               | 540       | 27913            | NR               | 670       | 13454            | NR               | 800       | 1029             | NR               | 930       | 1617             | NR               |
| 415       | 1302             | NR               | 545       | 28798            | NR               | 675       | 11513            | NR               | 805       | 1267             | NR               | 935       | 1522             | NR               |
| 420       | 2088             | NR               | 550       | 29982            | NR               | 680       | 9839             | NR               | 810       | 1312             | NR               | 940       | 1792             | NR               |
| 425       | 3768             | NR               | 555       | 31264            | NR               | 685       | 8568             | NR               | 815       | 1239             | NR               | 945       | 1727             | NR               |
| 430       | 6771             | NR               | 560       | 32729            | NR               | 690       | 7487             | NR               | 820       | 1107             | NR               | 950       | 1375             | NR               |
| 435       | 12240            | NR               | 565       | 34271            | NR               | 695       | 6502             | NR               | 825       | 1209             | NR               | 955       | 2031             | NR               |
| 440       | 21697            | NR               | 570       | 35931            | NR               | 700       | 5703             | NR               | 830       | 1175             | NR               | 960       | 2155             | NR               |
| 445       | 30873            | NR               | 575       | 37457            | NR               | 705       | 4977             | NR               | 835       | 916              | NR               | 965       | 2519             | NR               |
| 450       | 30626            | NR               | 580       | 38827            | NR               | 710       | 4394             | NR               | 840       | 1171             | NR               | 970       | 2234             | NR               |
| 455       | 24859            | NR               | 585       | 40347            | NR               | 715       | 3979             | NR               | 845       | 1406             | NR               | 975       | 2064             | NR               |
| 460       | 23253            | NR               | 590       | 41126            | NR               | 720       | 3528             | NR               | 850       | 1407             | NR               | 980       | 2541             | NR               |
| 465       | 26717            | NR               | 595       | 41803            | NR               | 725       | 3206             | NR               | 855       | 1173             | NR               | 985       | 1959             | NR               |
| 470       | 33149            | NR               | 600       | 42231            | NR               | 730       | 2798             | NR               | 860       | 928              | NR               | 990       | 2532             | NR               |
| 475       | 36075            | NR               | 605       | 43629            | NR               | 735       | 2417             | NR               | 865       | 1256             | NR               | 995       | 2564             | NR               |
| 480       | 33381            | NR               | 610       | 53581            | NR               | 740       | 2135             | NR               | 870       | 1460             | NR               | 1000      | 2056             | NR               |
| 485       | 28773            | NR               | 615       | 54375            | NR               | 745       | 2151             | NR               | 875       | 1741             | NR               |           |                  |                  |

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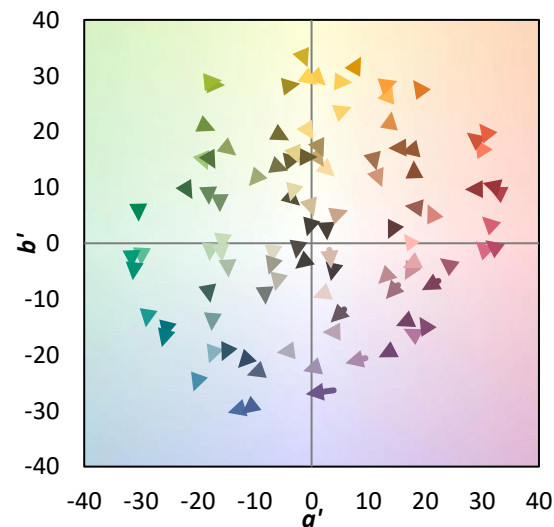
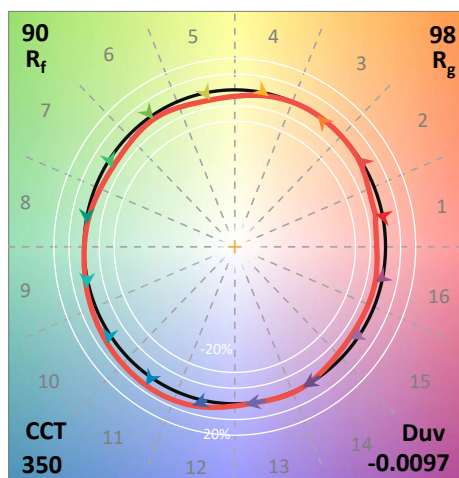
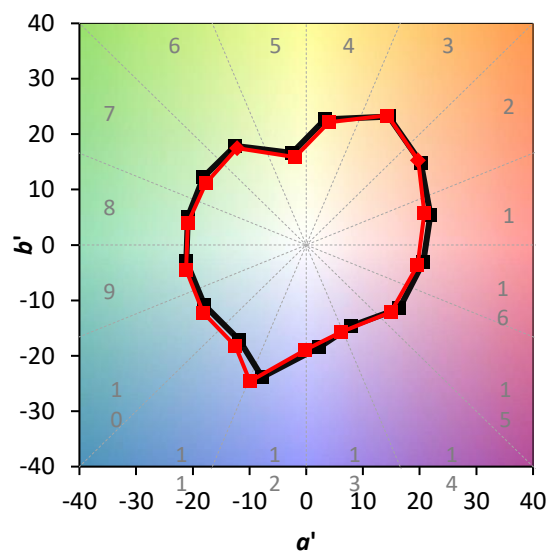
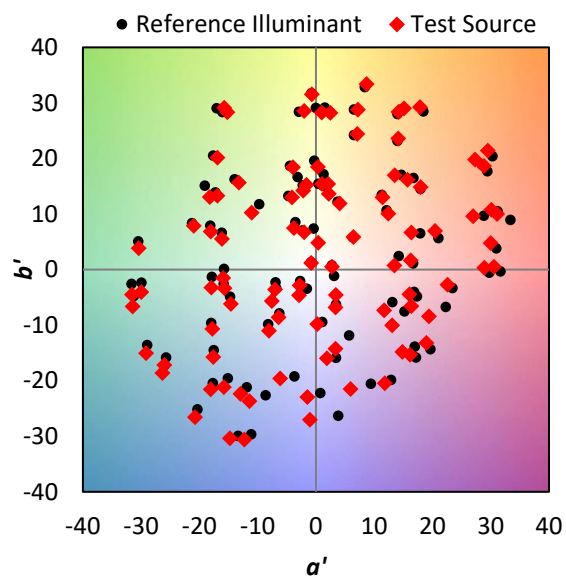
**TM-30-18**

### Summary

$R_f = 90.4$   
 $R_g = 97.8$   
 CIE  $R_a = 90.1$   
 $R_g = 75.4$



### Color Vector Graphics

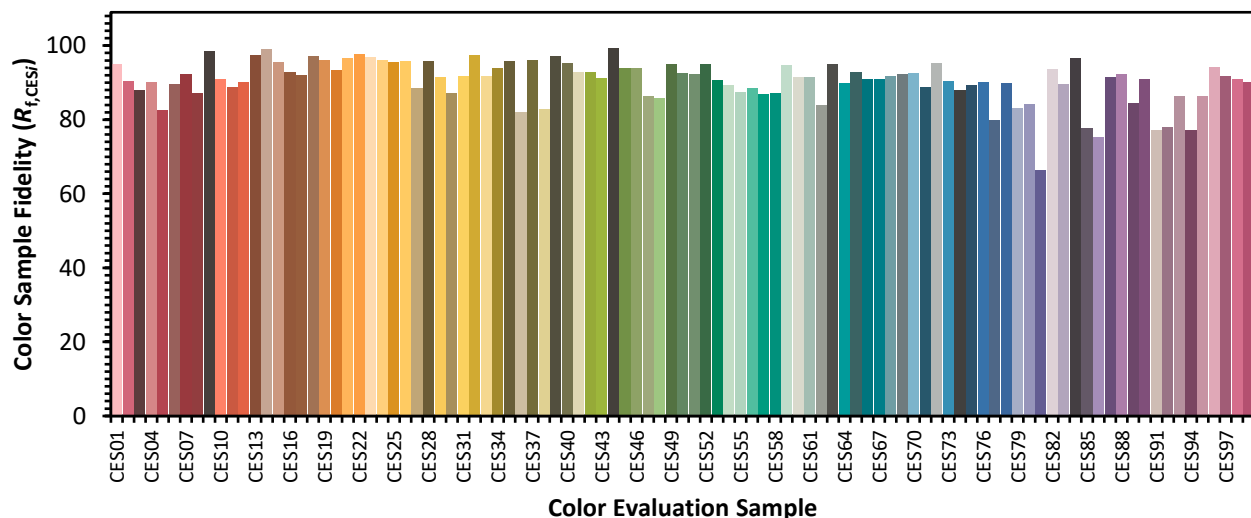


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**Individual Sample Fidelity Index ( $R_{f,i}$ )**

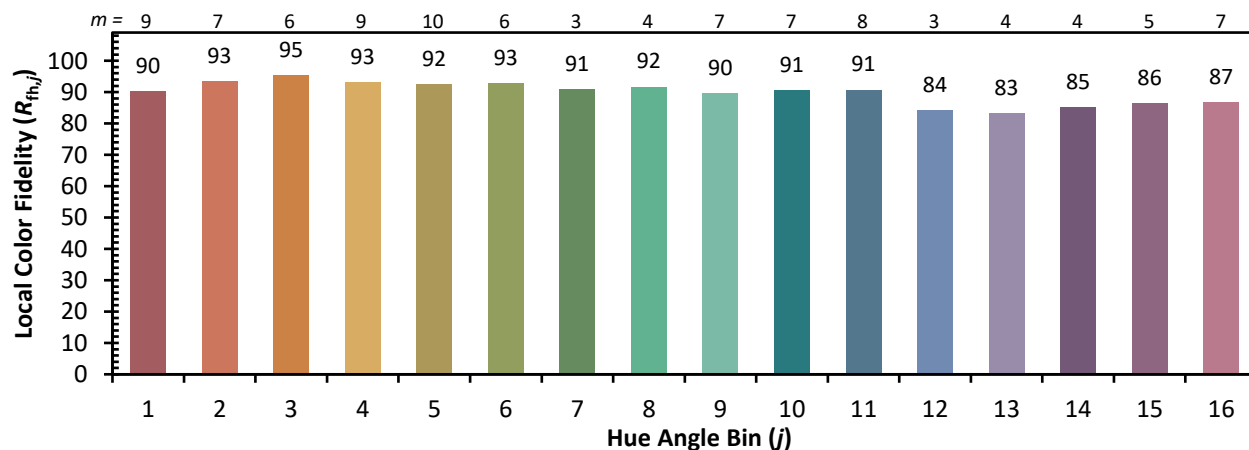
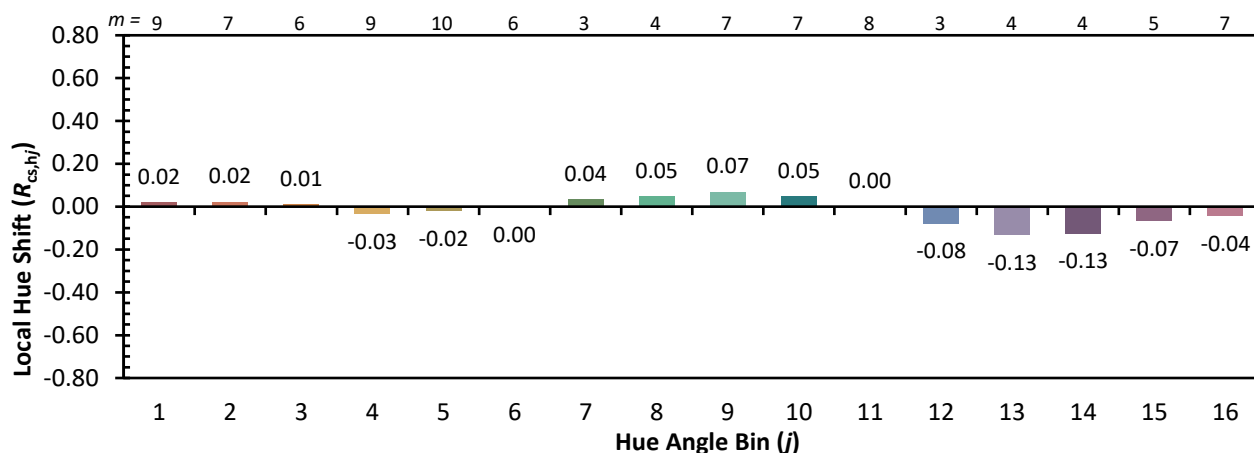
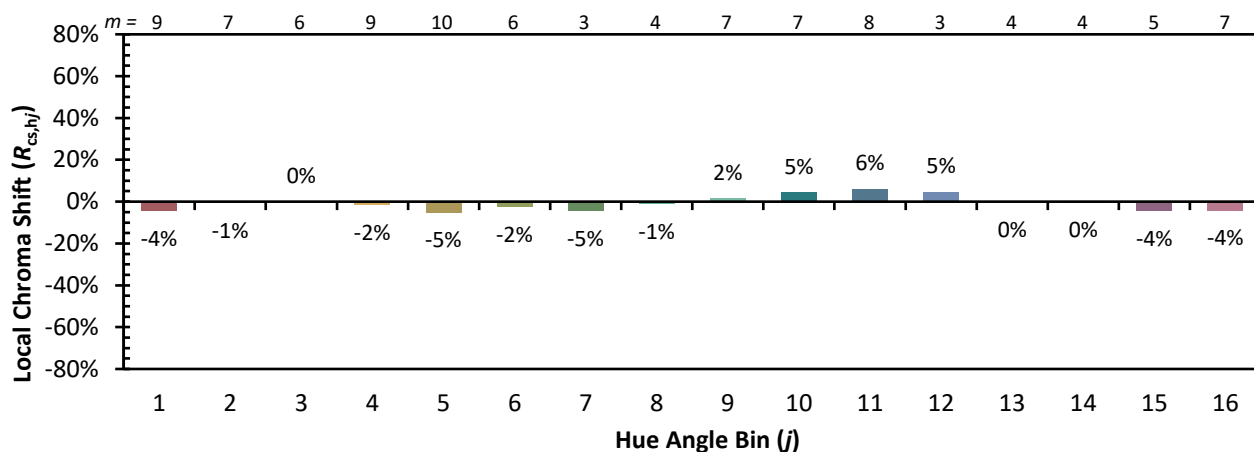
|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 86 | CES26 = 96 | CES51 = 92 | CES76 = 90 |
| CES02 = 63 | CES27 = 88 | CES52 = 95 | CES77 = 80 |
| CES03 = 32 | CES28 = 96 | CES53 = 91 | CES78 = 90 |
| CES04 = 70 | CES29 = 91 | CES54 = 89 | CES79 = 83 |
| CES05 = 50 | CES30 = 87 | CES55 = 87 | CES80 = 84 |
| CES06 = 51 | CES31 = 92 | CES56 = 88 | CES81 = 66 |
| CES07 = 43 | CES32 = 97 | CES57 = 87 | CES82 = 94 |
| CES08 = 42 | CES33 = 92 | CES58 = 87 | CES83 = 89 |
| CES09 = 29 | CES34 = 94 | CES59 = 95 | CES84 = 96 |
| CES10 = 76 | CES35 = 96 | CES60 = 91 | CES85 = 77 |
| CES11 = 58 | CES36 = 82 | CES61 = 91 | CES86 = 75 |
| CES12 = 64 | CES37 = 96 | CES62 = 84 | CES87 = 91 |
| CES13 = 44 | CES38 = 83 | CES63 = 95 | CES88 = 92 |
| CES14 = 74 | CES39 = 97 | CES64 = 90 | CES89 = 84 |
| CES15 = 72 | CES40 = 95 | CES65 = 93 | CES90 = 91 |
| CES16 = 48 | CES41 = 93 | CES66 = 91 | CES91 = 77 |
| CES17 = 49 | CES42 = 93 | CES67 = 91 | CES92 = 78 |
| CES18 = 56 | CES43 = 91 | CES68 = 92 | CES93 = 86 |
| CES19 = 71 | CES44 = 99 | CES69 = 92 | CES94 = 77 |
| CES20 = 67 | CES45 = 94 | CES70 = 92 | CES95 = 86 |
| CES21 = 86 | CES46 = 94 | CES71 = 89 | CES96 = 94 |
| CES22 = 78 | CES47 = 86 | CES72 = 95 | CES97 = 92 |
| CES23 = 91 | CES48 = 86 | CES73 = 90 | CES98 = 91 |
| CES24 = 90 | CES49 = 95 | CES74 = 88 | CES99 = 90 |
| CES25 = 71 | CES50 = 92 | CES75 = 89 |            |



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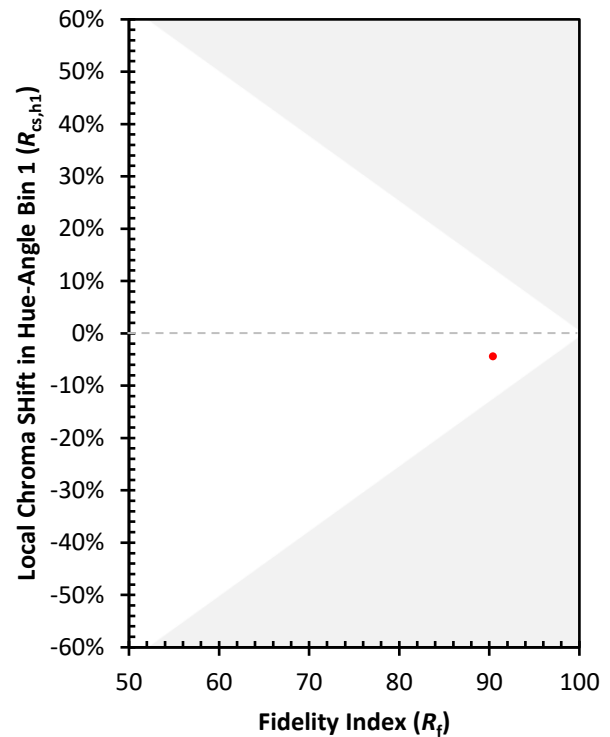
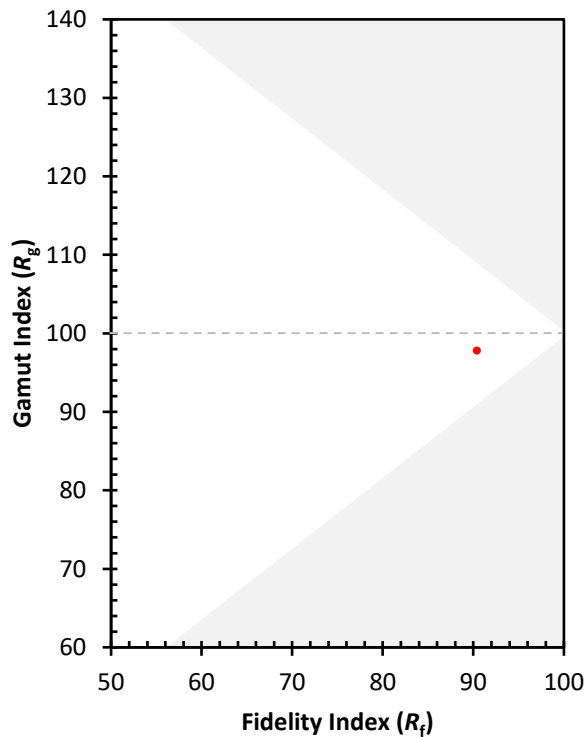
Color Rendition by Hue-Angle Bin



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**Measure Comparisons**



(END OF REPORT)