

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: PrentaLux

Report Number: P879273

Luminaire Tested: PRLX-210-940-LL4-C-U-S-X-X-WHHR-BR-X

Issue Date: 9/24/2024

**Test Information**

Test Method: LM-79-2019  
Report Number: P879273  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G3-2405-094-3)  
Test Lab: COOPER LIGHTING SOLUTIONS  
Issue Date: 9/24/2024  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: Pentalux  
Catalog Number: PRLX-210-940-LL4-C-U-S-X-X-WHHR-BR-X  
Description: Pentalux 200 SERIES 3D PRINTED LUMINAIRE, 210 SHADE, CLEAR LENS.  
Light Source: 4000K CCT, 90 CRI LEDS  
Ballast/Driver: -

**Summary**

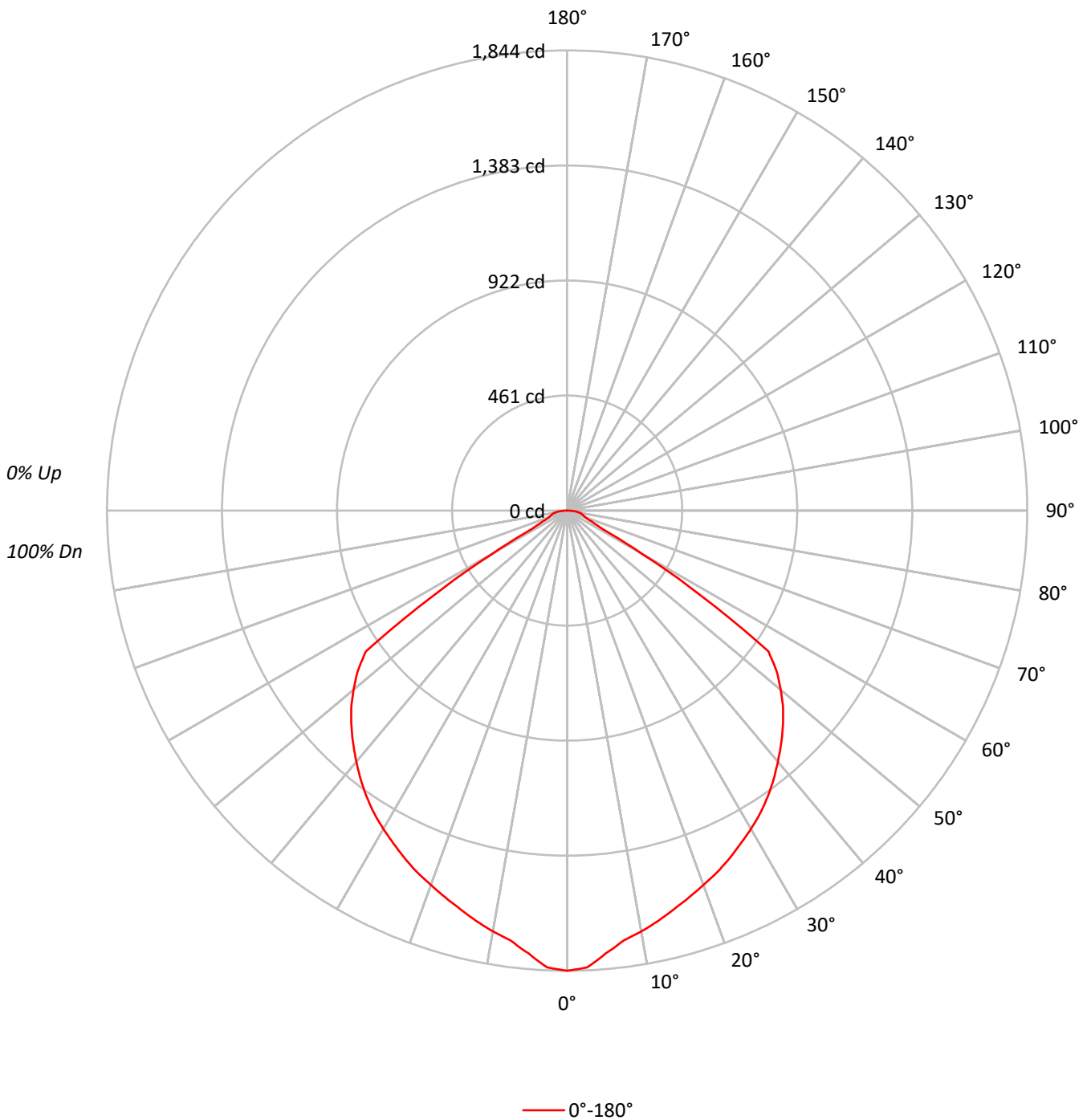
Lumens per Lamp: N/A  
Luminaire Lumens: 4163.6 lumens  
Efficiency: N/A  
Efficacy: 181.8 lumens/watt  
Spacing Criteria (0/90/45): 1.2 / 1.2 / 1.37  
Luminous Opening: Circular (Dia: 1.42' x H: 0')  
CIE Type: Direct

Input Watts (W): 22.9  
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: 0.5 HR  
Operation Time: 3 HR  
Ambient Temperature (°C): NR  
Test Distance: 24 FT

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CATALOG NUMBER: PRLX-210-940-LL4-C-U-S-X-X-WHHR-BR-X

### Luminous Intensity Polar Plot





TEST NUMBER: P879273

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

|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| RF  | 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  | 0   |
| RCR |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 0   | 119 | 119 | 119 | 119 | 116 | 116 | 116 | 116 | 111 | 111 | 111 | 106 | 106 | 106 | 102 | 102 | 102 | 100 |
| 1   | 111 | 107 | 103 | 100 | 108 | 105 | 102 | 99  | 101 | 98  | 96  | 97  | 95  | 93  | 93  | 92  | 90  | 88  |
| 2   | 102 | 95  | 90  | 85  | 100 | 94  | 88  | 84  | 90  | 86  | 82  | 87  | 83  | 80  | 84  | 81  | 78  | 76  |
| 3   | 94  | 85  | 78  | 72  | 92  | 84  | 77  | 72  | 81  | 75  | 71  | 78  | 73  | 69  | 76  | 72  | 68  | 66  |
| 4   | 87  | 76  | 68  | 62  | 85  | 75  | 68  | 62  | 73  | 66  | 61  | 70  | 65  | 60  | 68  | 64  | 60  | 58  |
| 5   | 80  | 69  | 60  | 54  | 78  | 68  | 60  | 54  | 65  | 59  | 54  | 64  | 58  | 53  | 62  | 57  | 52  | 51  |
| 6   | 74  | 62  | 54  | 48  | 72  | 61  | 53  | 48  | 59  | 52  | 47  | 58  | 52  | 47  | 56  | 51  | 46  | 45  |
| 7   | 69  | 56  | 48  | 42  | 67  | 56  | 48  | 42  | 54  | 47  | 42  | 53  | 46  | 42  | 51  | 46  | 41  | 40  |
| 8   | 64  | 51  | 43  | 38  | 63  | 51  | 43  | 38  | 49  | 43  | 38  | 48  | 42  | 37  | 47  | 41  | 37  | 35  |
| 9   | 60  | 47  | 39  | 34  | 59  | 47  | 39  | 34  | 46  | 39  | 34  | 44  | 38  | 34  | 43  | 38  | 34  | 32  |
| 10  | 56  | 44  | 36  | 31  | 55  | 43  | 36  | 31  | 42  | 35  | 31  | 41  | 35  | 31  | 40  | 35  | 31  | 29  |

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

|     |       |
|-----|-------|
|     | 0°    |
| 0°  | 12592 |
| 5°  | 12210 |
| 10° | 11871 |
| 15° | 11692 |
| 20° | 11601 |
| 25° | 11590 |
| 30° | 11617 |
| 35° | 11677 |
| 40° | 11710 |
| 45° | 11807 |
| 50° | 11876 |
| 55° | 11718 |
| 60° | 4772  |
| 65° | 1868  |
| 70° | 1505  |
| 75° | 1702  |
| 80° | 1994  |
| 85° | 2264  |

**MAXIMUM LUMINANCE 45°-90°:**

Horizontal Angle: 0°  
 Vertical Angle: 50°  
 Luminance: 11876 cd/sqm

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**ZONAL LUMENS:**

| Zone      | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10°    | 167.8  | 4.0       |
| 10°-20°   | 467.3  | 11.2      |
| 20°-30°   | 709.7  | 17.0      |
| 30°-40°   | 876.2  | 21.0      |
| 40°-50°   | 943.0  | 22.6      |
| 50°-60°   | 760.7  | 18.3      |
| 60°-70°   | 141.4  | 3.4       |
| 70°-80°   | 67.5   | 1.6       |
| 80°-90°   | 29.9   | 0.7       |
| 90°-100°  | 0.0    | 0.0       |
| 100°-110° | 0.0    | 0.0       |
| 110°-120° | 0.0    | 0.0       |
| 120°-130° | 0.0    | 0.0       |
| 130°-140° | 0.0    | 0.0       |
| 140°-150° | 0.0    | 0.0       |
| 150°-160° | 0.0    | 0.0       |
| 160°-170° | 0.0    | 0.0       |
| 170°-180° | 0.0    | 0.0       |
| 0°-30°    | 1344.8 | 32.3      |
| 0°-40°    | 2221.0 | 53.3      |
| 0°-60°    | 3924.7 | 94.3      |
| 0°-90°    | 4163.6 | 100.0     |
| 90°-120°  | 0.0    | 0.0       |
| 90°-150°  | 0.0    | 0.0       |
| 90°-180°  | 0.0    | 0.0       |
| 0°-180°   | 4163.6 | 100.0     |

**CANDELA DISTRIBUTION:**

|     | 0°   | Flux |
|-----|------|------|
| 0°  | 1844 |      |
| 5°  | 1781 | 168  |
| 15° | 1654 | 467  |
| 25° | 1538 | 710  |
| 35° | 1401 | 876  |
| 45° | 1223 | 943  |
| 55° | 984  | 761  |
| 65° | 116  | 141  |
| 75° | 64   | 68   |
| 85° | 29   | 30   |
| 90° | 0    |      |

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**CANDELA DISTRIBUTION (FULL):**

|       | 0°     |
|-------|--------|
| 0°    | 1844.0 |
| 2.5°  | 1832.7 |
| 5°    | 1781.2 |
| 7.5°  | 1737.6 |
| 10°   | 1712.0 |
| 12.5° | 1684.4 |
| 15°   | 1653.8 |
| 17.5° | 1624.9 |
| 20°   | 1596.4 |
| 22.5° | 1569.6 |
| 25°   | 1538.2 |
| 27.5° | 1505.1 |
| 30°   | 1473.2 |
| 32.5° | 1438.9 |
| 35°   | 1400.7 |
| 37.5° | 1358.8 |
| 40°   | 1313.6 |
| 42.5° | 1269.2 |
| 45°   | 1222.6 |
| 47.5° | 1173.6 |
| 50°   | 1117.9 |
| 52.5° | 1058.4 |
| 55°   | 984.2  |
| 57.5° | 645.3  |
| 60°   | 349.4  |
| 62.5° | 158.4  |
| 65°   | 115.6  |
| 67.5° | 89.2   |
| 70°   | 75.4   |
| 72.5° | 70.0   |
| 75°   | 64.5   |
| 77.5° | 58.2   |
| 80°   | 50.7   |
| 82.5° | 40.6   |
| 85°   | 28.9   |
| 87.5° | 15.1   |
| 90°   | 0.0    |



TEST NUMBER: P879273  
 CATALOG NUMBER: PRLX-210-940-LL4-C-U-S-X-X-WHHR-BR-X

**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 | 19.24            | 20.74 | 19.60 | 21.05 | 21.36 | 19.24          | 20.74 | 19.60 | 21.05 | 21.36 |
|                 | 3H   | 19.24            | 20.57 | 19.62 | 20.89 | 21.26 | 19.24          | 20.57 | 19.62 | 20.89 | 21.26 |
|                 | 4H   | 19.26            | 20.50 | 19.66 | 20.85 | 21.23 | 19.26          | 20.50 | 19.66 | 20.85 | 21.23 |
|                 | 6H   | 19.31            | 20.44 | 19.72 | 20.81 | 21.20 | 19.31          | 20.44 | 19.72 | 20.81 | 21.20 |
|                 | 8H   | 19.33            | 20.41 | 19.76 | 20.80 | 21.20 | 19.33          | 20.41 | 19.76 | 20.80 | 21.20 |
|                 | 12H  | 19.36            | 20.39 | 19.79 | 20.77 | 21.20 | 19.36          | 20.39 | 19.79 | 20.77 | 21.20 |
| 4H              | 2H   | 19.12            | 20.36 | 19.52 | 20.70 | 21.08 | 19.12          | 20.36 | 19.52 | 20.70 | 21.08 |
|                 | 3H   | 19.18            | 20.18 | 19.59 | 20.58 | 20.99 | 19.18          | 20.18 | 19.59 | 20.58 | 20.99 |
|                 | 4H   | 19.24            | 20.13 | 19.67 | 20.55 | 20.99 | 19.24          | 20.13 | 19.67 | 20.55 | 20.99 |
|                 | 6H   | 19.36            | 20.14 | 19.82 | 20.58 | 21.04 | 19.36          | 20.14 | 19.82 | 20.58 | 21.04 |
|                 | 8H   | 19.42            | 20.14 | 19.88 | 20.59 | 21.06 | 19.42          | 20.14 | 19.88 | 20.59 | 21.06 |
|                 | 12H  | 19.48            | 20.13 | 19.96 | 20.61 | 21.08 | 19.48          | 20.13 | 19.96 | 20.61 | 21.08 |
| 8H              | 4H   | 19.20            | 19.93 | 19.67 | 20.37 | 20.84 | 19.20          | 19.93 | 19.67 | 20.37 | 20.84 |
|                 | 6H   | 19.37            | 19.97 | 19.87 | 20.47 | 20.95 | 19.37          | 19.97 | 19.87 | 20.47 | 20.95 |
|                 | 8H   | 19.47            | 20.02 | 19.98 | 20.53 | 21.02 | 19.47          | 20.02 | 19.98 | 20.53 | 21.02 |
|                 | 12H  | 19.59            | 20.08 | 20.10 | 20.57 | 21.14 | 19.59          | 20.08 | 20.10 | 20.57 | 21.14 |
| 12H             | 4H   | 19.18            | 19.83 | 19.66 | 20.31 | 20.78 | 19.18          | 19.83 | 19.66 | 20.31 | 20.78 |
|                 | 6H   | 19.35            | 19.90 | 19.87 | 20.41 | 20.90 | 19.35          | 19.90 | 19.87 | 20.41 | 20.90 |
|                 | 8H   | 19.49            | 19.99 | 20.00 | 20.48 | 21.05 | 19.49          | 19.99 | 20.00 | 20.48 | 21.05 |

Signify Classified - Internal  
Cooper Lighting Solutions Photometric Lab  
1121 Highway 74 South  
Peachtree City, GA 30269





**Test Information**

Test Method: LM-79-2019  
 Report Number: SP1-2203-582-4  
 Test Lab: COOPER LIGHTING SOLUTIONS  
 Photometer: SP1 - 76IN SPHERE  
 Measurement Geometry: 4π  
 Issue Date: 05/26/2022  
 Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
 Product Line: SHAPER  
 Catalog Number: **225-90-40K-27L-UNV-STD-X-X-WHHR-SR-X**  
 Description: Shaper 3D PRINTED 200 Series Pendants

**Spectral Parameters**

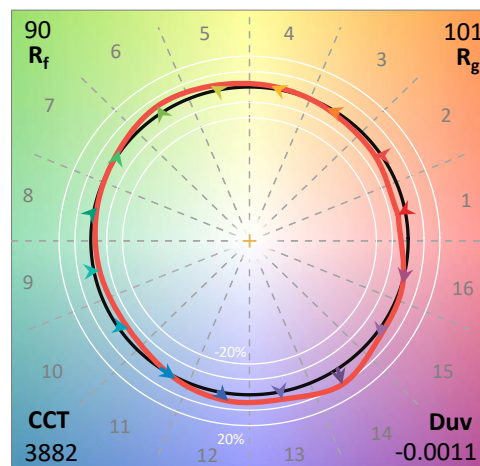
CCT (K): 3882  
 CIE u': 0.2279  
 CIE v': 0.5024  
 Duv: -0.0011  
 CIE x: 0.3849  
 CIE y: 0.3772  
 CIE z: 0.2379  
 Peak Wavelength (nm): 448  
 Dominant Wavelength (nm): 580  
 Purity: 28.8  
 Rf: 89.9  
 Rg: 101.4

CRI (Ra): 90.9

|          |           |
|----------|-----------|
| R1: 91.6 | R9: 62.0  |
| R2: 92.7 | R10: 82.3 |
| R3: 92.5 | R11: 91.9 |
| R4: 91.7 | R12: 75.2 |
| R5: 91.1 | R13: 91.6 |
| R6: 89.5 | R14: 95.5 |
| R7: 92.8 |           |
| R8: 85.5 |           |

**Test Conditions**

Stabilization Time: 63M  
 Operation Time: 12H  
 Room Temperature (°C) / RH%: 24.7/42%  
 Sphere Temperature (°C): 24.9



REPORT NUMBER: SP1-2203-582-4

| Measurement and Test Equipment |                       |                  |                      |
|--------------------------------|-----------------------|------------------|----------------------|
| Instrument                     | Identification Number | Calibration Date | Calibration Due Date |
| Photometer                     | 76INCH SPHERE IN0058  | 2/7/2022         | 8/7/2022             |
| 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**



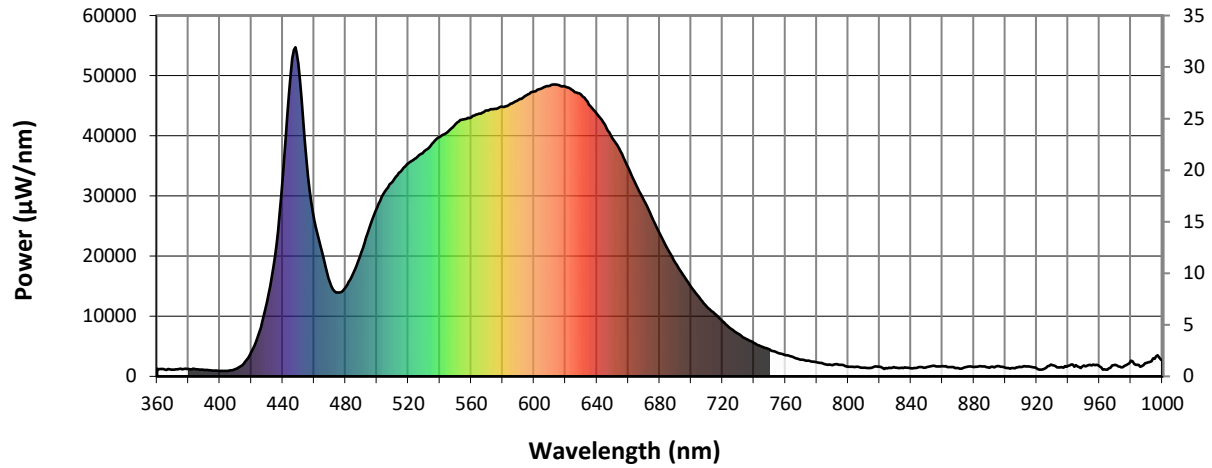
**CIE 1931 Chromaticity Diagram with 2017 ANSI 7-Step and 4-Step Quadrangles**



Point lies inside the ANSI 4000K 4-step quadrangle

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**Photopic Flux vs. Wavelength**



#####

| λ (nm) | Power (µW/nm) | Lumens (φ/nm) | λ (nm) | Power (µW/nm) | Lumens (φ/nm) | λ (nm) | Power (µW/nm) | Lumens (φ/nm) | λ (nm) | Power (µW/nm) | Lumens (φ/nm) | λ (nm) | Power (µW/nm) | Lumens (φ/nm) |
|--------|---------------|---------------|--------|---------------|---------------|--------|---------------|---------------|--------|---------------|---------------|--------|---------------|---------------|
| 360    | 1253          | NR            | 490    | 20634         | NR            | 620    | 48151         | NR            | 750    | 4452          | NR            | 880    | 1536          | NR            |
| 365    | 1099          | NR            | 495    | 24539         | NR            | 625    | 47538         | NR            | 755    | 3931          | NR            | 885    | 1648          | NR            |
| 370    | 1097          | NR            | 500    | 28068         | NR            | 630    | 46833         | NR            | 760    | 3534          | NR            | 890    | 1444          | NR            |
| 375    | 1255          | NR            | 505    | 30716         | NR            | 635    | 45186         | NR            | 765    | 3183          | NR            | 895    | 1689          | NR            |
| 380    | 1225          | NR            | 510    | 32426         | NR            | 640    | 43606         | NR            | 770    | 2768          | NR            | 900    | 1457          | NR            |
| 385    | 1163          | NR            | 515    | 34008         | NR            | 645    | 41852         | NR            | 775    | 2598          | NR            | 905    | 1381          | NR            |
| 390    | 1078          | NR            | 520    | 35441         | NR            | 650    | 39544         | NR            | 780    | 2363          | NR            | 910    | 1536          | NR            |
| 395    | 965           | NR            | 525    | 36312         | NR            | 655    | 37429         | NR            | 785    | 2048          | NR            | 915    | 1672          | NR            |
| 400    | 895           | NR            | 530    | 37399         | NR            | 660    | 34686         | NR            | 790    | 1873          | NR            | 920    | 1329          | NR            |
| 405    | 904           | NR            | 535    | 38667         | NR            | 665    | 31761         | NR            | 795    | 1938          | NR            | 925    | 1260          | NR            |
| 410    | 1207          | NR            | 540    | 39805         | NR            | 670    | 29259         | NR            | 800    | 1613          | NR            | 930    | 1839          | NR            |
| 415    | 2092          | NR            | 545    | 40639         | NR            | 675    | 26459         | NR            | 805    | 1586          | NR            | 935    | 1503          | NR            |
| 420    | 4020          | NR            | 550    | 41923         | NR            | 680    | 23768         | NR            | 810    | 1448          | NR            | 940    | 1777          | NR            |
| 425    | 7356          | NR            | 555    | 42736         | NR            | 685    | 21181         | NR            | 815    | 1432          | NR            | 945    | 1847          | NR            |
| 430    | 12370         | NR            | 560    | 43056         | NR            | 690    | 18864         | NR            | 820    | 1616          | NR            | 950    | 1817          | NR            |
| 435    | 19911         | NR            | 565    | 43662         | NR            | 695    | 16795         | NR            | 825    | 1327          | NR            | 955    | 1795          | NR            |
| 440    | 32902         | NR            | 570    | 44212         | NR            | 700    | 14887         | NR            | 830    | 1431          | NR            | 960    | 1671          | NR            |
| 445    | 50207         | NR            | 575    | 44462         | NR            | 705    | 13192         | NR            | 835    | 1404          | NR            | 965    | 1118          | NR            |
| 450    | 51979         | NR            | 580    | 44777         | NR            | 710    | 11574         | NR            | 840    | 1324          | NR            | 970    | 1937          | NR            |
| 455    | 36175         | NR            | 585    | 45311         | NR            | 715    | 10423         | NR            | 845    | 1523          | NR            | 975    | 1568          | NR            |
| 460    | 26157         | NR            | 590    | 45989         | NR            | 720    | 9166          | NR            | 850    | 1538          | NR            | 980    | 2595          | NR            |
| 465    | 20687         | NR            | 595    | 46710         | NR            | 725    | 7985          | NR            | 855    | 1763          | NR            | 985    | 1892          | NR            |
| 470    | 15600         | NR            | 600    | 47363         | NR            | 730    | 7063          | NR            | 860    | 1682          | NR            | 990    | 2249          | NR            |
| 475    | 13920         | NR            | 605    | 47873         | NR            | 735    | 6214          | NR            | 865    | 1563          | NR            | 995    | 2939          | NR            |
| 480    | 14825         | NR            | 610    | 48310         | NR            | 740    | 5551          | NR            | 870    | 1403          | NR            | 1000   | 2611          | NR            |
| 485    | 17185         | NR            | 615    | 48452         | NR            | 745    | 4959          | NR            | 875    | 1570          | NR            |        |               |               |

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**Scotopic Flux vs. Wavelength**



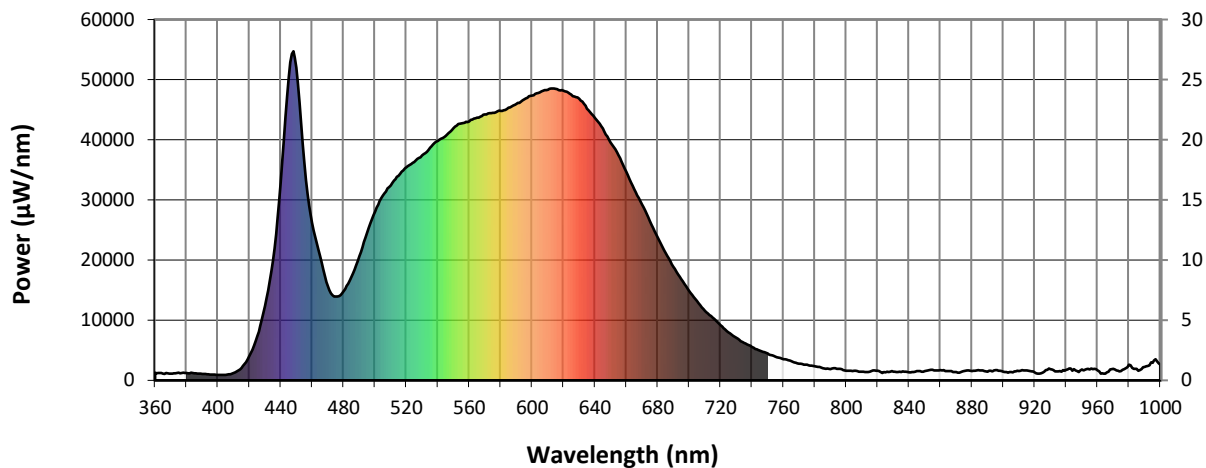
**Scotopic Lumens: 5055.1**

**S/P: 1.71**

| $\lambda$<br>(nm) | Power<br>( $\mu$ W/nm) | Lumens<br>( $\phi$ /nm) | $\lambda$<br>(nm) | Power<br>( $\mu$ W/nm) | Lumens<br>( $\phi$ /nm) | $\lambda$<br>(nm) | Power<br>( $\mu$ W/nm) | Lumens<br>( $\phi$ /nm) | $\lambda$<br>(nm) | Power<br>( $\mu$ W/nm) | Lumens<br>( $\phi$ /nm) | $\lambda$<br>(nm) | Power<br>( $\mu$ W/nm) | Lumens<br>( $\phi$ /nm) |
|-------------------|------------------------|-------------------------|-------------------|------------------------|-------------------------|-------------------|------------------------|-------------------------|-------------------|------------------------|-------------------------|-------------------|------------------------|-------------------------|
| 360               | 1253                   | NR                      | 490               | 20634                  | NR                      | 620               | 48151                  | NR                      | 750               | 4452                   | NR                      | 880               | 1536                   | NR                      |
| 365               | 1099                   | NR                      | 495               | 24539                  | NR                      | 625               | 47538                  | NR                      | 755               | 3931                   | NR                      | 885               | 1648                   | NR                      |
| 370               | 1097                   | NR                      | 500               | 28068                  | NR                      | 630               | 46833                  | NR                      | 760               | 3534                   | NR                      | 890               | 1444                   | NR                      |
| 375               | 1255                   | NR                      | 505               | 30716                  | NR                      | 635               | 45186                  | NR                      | 765               | 3183                   | NR                      | 895               | 1689                   | NR                      |
| 380               | 1225                   | NR                      | 510               | 32426                  | NR                      | 640               | 43606                  | NR                      | 770               | 2768                   | NR                      | 900               | 1457                   | NR                      |
| 385               | 1163                   | NR                      | 515               | 34008                  | NR                      | 645               | 41852                  | NR                      | 775               | 2598                   | NR                      | 905               | 1381                   | NR                      |
| 390               | 1078                   | NR                      | 520               | 35441                  | NR                      | 650               | 39544                  | NR                      | 780               | 2363                   | NR                      | 910               | 1536                   | NR                      |
| 395               | 965                    | NR                      | 525               | 36312                  | NR                      | 655               | 37429                  | NR                      | 785               | 2048                   | NR                      | 915               | 1672                   | NR                      |
| 400               | 895                    | NR                      | 530               | 37399                  | NR                      | 660               | 34686                  | NR                      | 790               | 1873                   | NR                      | 920               | 1329                   | NR                      |
| 405               | 904                    | NR                      | 535               | 38667                  | NR                      | 665               | 31761                  | NR                      | 795               | 1938                   | NR                      | 925               | 1260                   | NR                      |
| 410               | 1207                   | NR                      | 540               | 39805                  | NR                      | 670               | 29259                  | NR                      | 800               | 1613                   | NR                      | 930               | 1839                   | NR                      |
| 415               | 2092                   | NR                      | 545               | 40639                  | NR                      | 675               | 26459                  | NR                      | 805               | 1586                   | NR                      | 935               | 1503                   | NR                      |
| 420               | 4020                   | NR                      | 550               | 41923                  | NR                      | 680               | 23768                  | NR                      | 810               | 1448                   | NR                      | 940               | 1777                   | NR                      |
| 425               | 7356                   | NR                      | 555               | 42736                  | NR                      | 685               | 21181                  | NR                      | 815               | 1432                   | NR                      | 945               | 1847                   | NR                      |
| 430               | 12370                  | NR                      | 560               | 43056                  | NR                      | 690               | 18864                  | NR                      | 820               | 1616                   | NR                      | 950               | 1817                   | NR                      |
| 435               | 19911                  | NR                      | 565               | 43662                  | NR                      | 695               | 16795                  | NR                      | 825               | 1327                   | NR                      | 955               | 1795                   | NR                      |
| 440               | 32902                  | NR                      | 570               | 44212                  | NR                      | 700               | 14887                  | NR                      | 830               | 1431                   | NR                      | 960               | 1671                   | NR                      |
| 445               | 50207                  | NR                      | 575               | 44462                  | NR                      | 705               | 13192                  | NR                      | 835               | 1404                   | NR                      | 965               | 1118                   | NR                      |
| 450               | 51979                  | NR                      | 580               | 44777                  | NR                      | 710               | 11574                  | NR                      | 840               | 1324                   | NR                      | 970               | 1937                   | NR                      |
| 455               | 36175                  | NR                      | 585               | 45311                  | NR                      | 715               | 10423                  | NR                      | 845               | 1523                   | NR                      | 975               | 1568                   | NR                      |
| 460               | 26157                  | NR                      | 590               | 45989                  | NR                      | 720               | 9166                   | NR                      | 850               | 1538                   | NR                      | 980               | 2595                   | NR                      |
| 465               | 20687                  | NR                      | 595               | 46710                  | NR                      | 725               | 7985                   | NR                      | 855               | 1763                   | NR                      | 985               | 1892                   | NR                      |
| 470               | 15600                  | NR                      | 600               | 47363                  | NR                      | 730               | 7063                   | NR                      | 860               | 1682                   | NR                      | 990               | 2249                   | NR                      |
| 475               | 13920                  | NR                      | 605               | 47873                  | NR                      | 735               | 6214                   | NR                      | 865               | 1563                   | NR                      | 995               | 2939                   | NR                      |
| 480               | 14825                  | NR                      | 610               | 48310                  | NR                      | 740               | 5551                   | NR                      | 870               | 1403                   | NR                      | 1000              | 2611                   | NR                      |
| 485               | 17185                  | NR                      | 615               | 48452                  | NR                      | 745               | 4959                   | NR                      | 875               | 1570                   | NR                      |                   |                        |                         |

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Melanopic Flux vs. Wavelength



Melanopic Lumens: 2034.1 S/P: 0.69

| λ (nm) | Power (µW/nm) | Lumens (φ/nm) | λ (nm) | Power (µW/nm) | Lumens (φ/nm) | λ (nm) | Power (µW/nm) | Lumens (φ/nm) | λ (nm) | Power (µW/nm) | Lumens (φ/nm) | λ (nm) | Power (µW/nm) | Lumens (φ/nm) |
|--------|---------------|---------------|--------|---------------|---------------|--------|---------------|---------------|--------|---------------|---------------|--------|---------------|---------------|
| 360    | 1253          | NR            | 490    | 20634         | NR            | 620    | 48151         | NR            | 750    | 4452          | NR            | 880    | 1536          | NR            |
| 365    | 1099          | NR            | 495    | 24539         | NR            | 625    | 47538         | NR            | 755    | 3931          | NR            | 885    | 1648          | NR            |
| 370    | 1097          | NR            | 500    | 28068         | NR            | 630    | 46833         | NR            | 760    | 3534          | NR            | 890    | 1444          | NR            |
| 375    | 1255          | NR            | 505    | 30716         | NR            | 635    | 45186         | NR            | 765    | 3183          | NR            | 895    | 1689          | NR            |
| 380    | 1225          | NR            | 510    | 32426         | NR            | 640    | 43606         | NR            | 770    | 2768          | NR            | 900    | 1457          | NR            |
| 385    | 1163          | NR            | 515    | 34008         | NR            | 645    | 41852         | NR            | 775    | 2598          | NR            | 905    | 1381          | NR            |
| 390    | 1078          | NR            | 520    | 35441         | NR            | 650    | 39544         | NR            | 780    | 2363          | NR            | 910    | 1536          | NR            |
| 395    | 965           | NR            | 525    | 36312         | NR            | 655    | 37429         | NR            | 785    | 2048          | NR            | 915    | 1672          | NR            |
| 400    | 895           | NR            | 530    | 37399         | NR            | 660    | 34686         | NR            | 790    | 1873          | NR            | 920    | 1329          | NR            |
| 405    | 904           | NR            | 535    | 38667         | NR            | 665    | 31761         | NR            | 795    | 1938          | NR            | 925    | 1260          | NR            |
| 410    | 1207          | NR            | 540    | 39805         | NR            | 670    | 29259         | NR            | 800    | 1613          | NR            | 930    | 1839          | NR            |
| 415    | 2092          | NR            | 545    | 40639         | NR            | 675    | 26459         | NR            | 805    | 1586          | NR            | 935    | 1503          | NR            |
| 420    | 4020          | NR            | 550    | 41923         | NR            | 680    | 23768         | NR            | 810    | 1448          | NR            | 940    | 1777          | NR            |
| 425    | 7356          | NR            | 555    | 42736         | NR            | 685    | 21181         | NR            | 815    | 1432          | NR            | 945    | 1847          | NR            |
| 430    | 12370         | NR            | 560    | 43056         | NR            | 690    | 18864         | NR            | 820    | 1616          | NR            | 950    | 1817          | NR            |
| 435    | 19911         | NR            | 565    | 43662         | NR            | 695    | 16795         | NR            | 825    | 1327          | NR            | 955    | 1795          | NR            |
| 440    | 32902         | NR            | 570    | 44212         | NR            | 700    | 14887         | NR            | 830    | 1431          | NR            | 960    | 1671          | NR            |
| 445    | 50207         | NR            | 575    | 44462         | NR            | 705    | 13192         | NR            | 835    | 1404          | NR            | 965    | 1118          | NR            |
| 450    | 51979         | NR            | 580    | 44777         | NR            | 710    | 11574         | NR            | 840    | 1324          | NR            | 970    | 1937          | NR            |
| 455    | 36175         | NR            | 585    | 45311         | NR            | 715    | 10423         | NR            | 845    | 1523          | NR            | 975    | 1568          | NR            |
| 460    | 26157         | NR            | 590    | 45989         | NR            | 720    | 9166          | NR            | 850    | 1538          | NR            | 980    | 2595          | NR            |
| 465    | 20687         | NR            | 595    | 46710         | NR            | 725    | 7985          | NR            | 855    | 1763          | NR            | 985    | 1892          | NR            |
| 470    | 15600         | NR            | 600    | 47363         | NR            | 730    | 7063          | NR            | 860    | 1682          | NR            | 990    | 2249          | NR            |
| 475    | 13920         | NR            | 605    | 47873         | NR            | 735    | 6214          | NR            | 865    | 1563          | NR            | 995    | 2939          | NR            |
| 480    | 14825         | NR            | 610    | 48310         | NR            | 740    | 5551          | NR            | 870    | 1403          | NR            | 1000   | 2611          | NR            |
| 485    | 17185         | NR            | 615    | 48452         | NR            | 745    | 4959          | NR            | 875    | 1570          | NR            |        |               |               |

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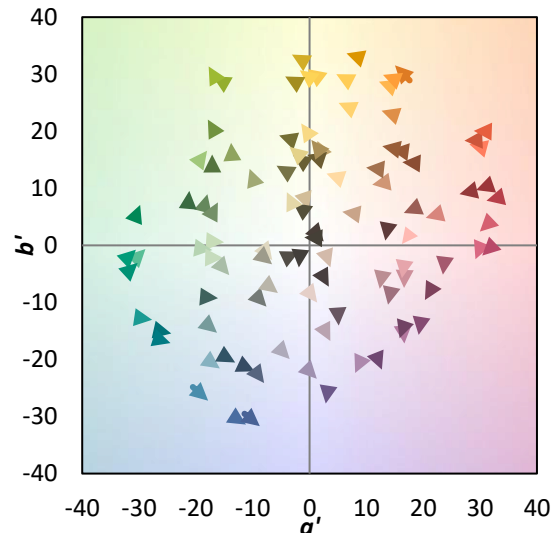
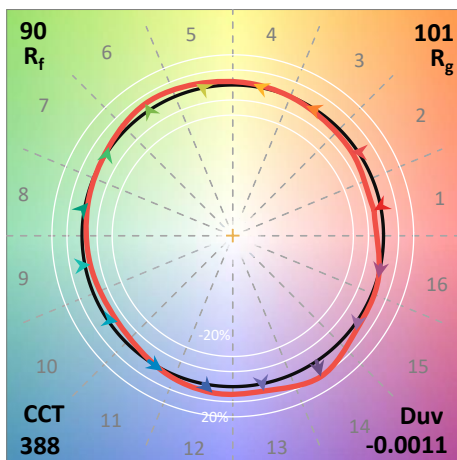
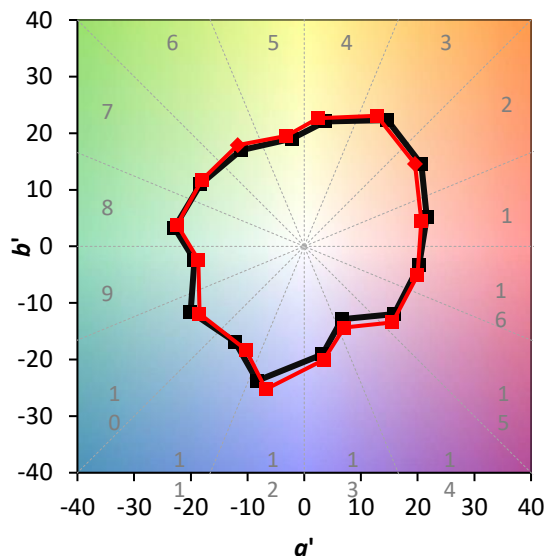
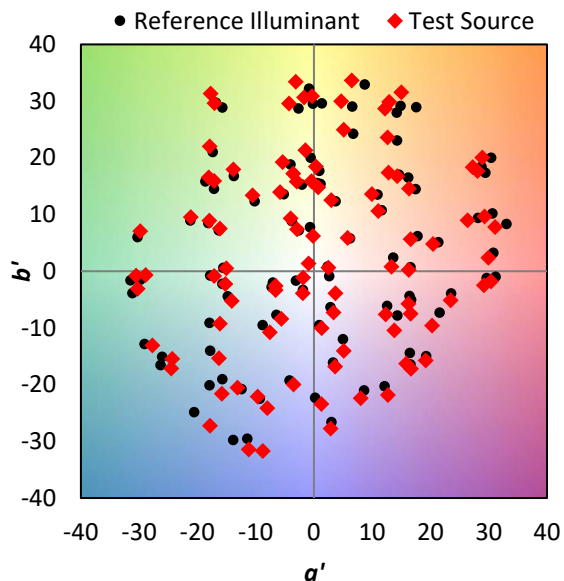
TM-30-18

**Summary**

$R_f = 89.9$   
 $R_g = 101.4$   
 CIE  $R_a = 90.9$   
 $R_9 = 62.0$



**Color Vector Graphics**



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

|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 86 | CES26 = 86 | CES51 = 97 | CES76 = 78 |
| CES02 = 62 | CES27 = 95 | CES52 = 96 | CES77 = 85 |
| CES03 = 31 | CES28 = 93 | CES53 = 92 | CES78 = 77 |
| CES04 = 69 | CES29 = 86 | CES54 = 96 | CES79 = 93 |
| CES05 = 49 | CES30 = 93 | CES55 = 96 | CES80 = 89 |
| CES06 = 51 | CES31 = 87 | CES56 = 92 | CES81 = 90 |
| CES07 = 42 | CES32 = 82 | CES57 = 91 | CES82 = 95 |
| CES08 = 41 | CES33 = 89 | CES58 = 92 | CES83 = 95 |
| CES09 = 29 | CES34 = 87 | CES59 = 96 | CES84 = 93 |
| CES10 = 74 | CES35 = 92 | CES60 = 95 | CES85 = 86 |
| CES11 = 57 | CES36 = 89 | CES61 = 93 | CES86 = 89 |
| CES12 = 63 | CES37 = 90 | CES62 = 94 | CES87 = 89 |
| CES13 = 43 | CES38 = 99 | CES63 = 91 | CES88 = 94 |
| CES14 = 74 | CES39 = 98 | CES64 = 90 | CES89 = 86 |
| CES15 = 71 | CES40 = 95 | CES65 = 88 | CES90 = 95 |
| CES16 = 47 | CES41 = 96 | CES66 = 87 | CES91 = 79 |
| CES17 = 49 | CES42 = 89 | CES67 = 86 | CES92 = 82 |
| CES18 = 56 | CES43 = 87 | CES68 = 86 | CES93 = 89 |
| CES19 = 71 | CES44 = 99 | CES69 = 88 | CES94 = 81 |
| CES20 = 66 | CES45 = 92 | CES70 = 82 | CES95 = 84 |
| CES21 = 85 | CES46 = 92 | CES71 = 79 | CES96 = 91 |
| CES22 = 78 | CES47 = 92 | CES72 = 93 | CES97 = 92 |
| CES23 = 91 | CES48 = 93 | CES73 = 76 | CES98 = 91 |
| CES24 = 90 | CES49 = 91 | CES74 = 96 | CES99 = 91 |
| CES25 = 71 | CES50 = 97 | CES75 = 79 |            |





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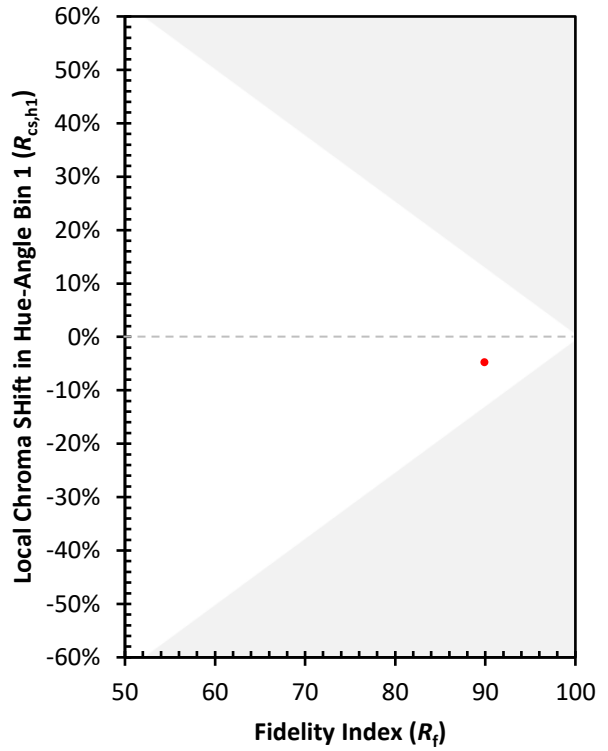
Color Rendition by Hue-Angle Bin



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Measure Comparisons



(END OF REPORT)