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: P1590908

Luminaire Tested: 22CGTX-20-L93050-W2A-4000K

Issue Date: 9/7/2026

Report Generated By 670265710 / DESKTOP-98SHLC4

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

Scaled Data Report

**Test Information**

| | |
|---|---|
| Test Method: | LM-79-2019 |
| Report Number: | P1590908 |
| | TEST IS SCALED FROM IESNA LM-79-24 TEST DATA (G3-2512-631-1) |
| Test Lab: | COOPER LIGHTING SOLUTIONS |
| Issue Date: | 9/7/2026 |
| Manufacturer: | COOPER LIGHTING SOLUTIONS |
| Product Line: | METALUX |
| Catalog Number: | 22CGTX-20-L93050-W2A-4000K |
| Description: | 2X2 2000 LUMEN CGTX TROFFER WITH VividTune LEDS AT 4000K CCT |
| Light Source: | 4000K CCT, 90 CRI LEDS |
| Ballast/Driver: | - |

**Summary**

| | |
|---|---|
| Lumens per Lamp: | N/A |
| Luminaire Lumens: | 2221.6 lumens |
| Efficiency: | N/A |
| Efficacy: | 121.4 lumens/watt |
| Spacing Criteria (0/90/45): | 1.27 / 1.27 / 1.39 |
| Luminous Opening: | Rectangular (W 2' x L: 2' x H: 0') |
| CIE Type: | Direct |
| Input Watts (W): | 18.3 |
| Input Voltage (V): | 120 |
| Input Current (Ain): | NR |
| Voltage Rise (V): | NR |
| Power Factor: | NR |
| Total Harmonic Distortion (THDi): | NR |
| Frequency (hertz): | 60 |
| Stabilization Time: | NR |
| Operation Time: | NR |
| Ambient Temperature (°C): | NR |
| Test Distance: | 24 FT |

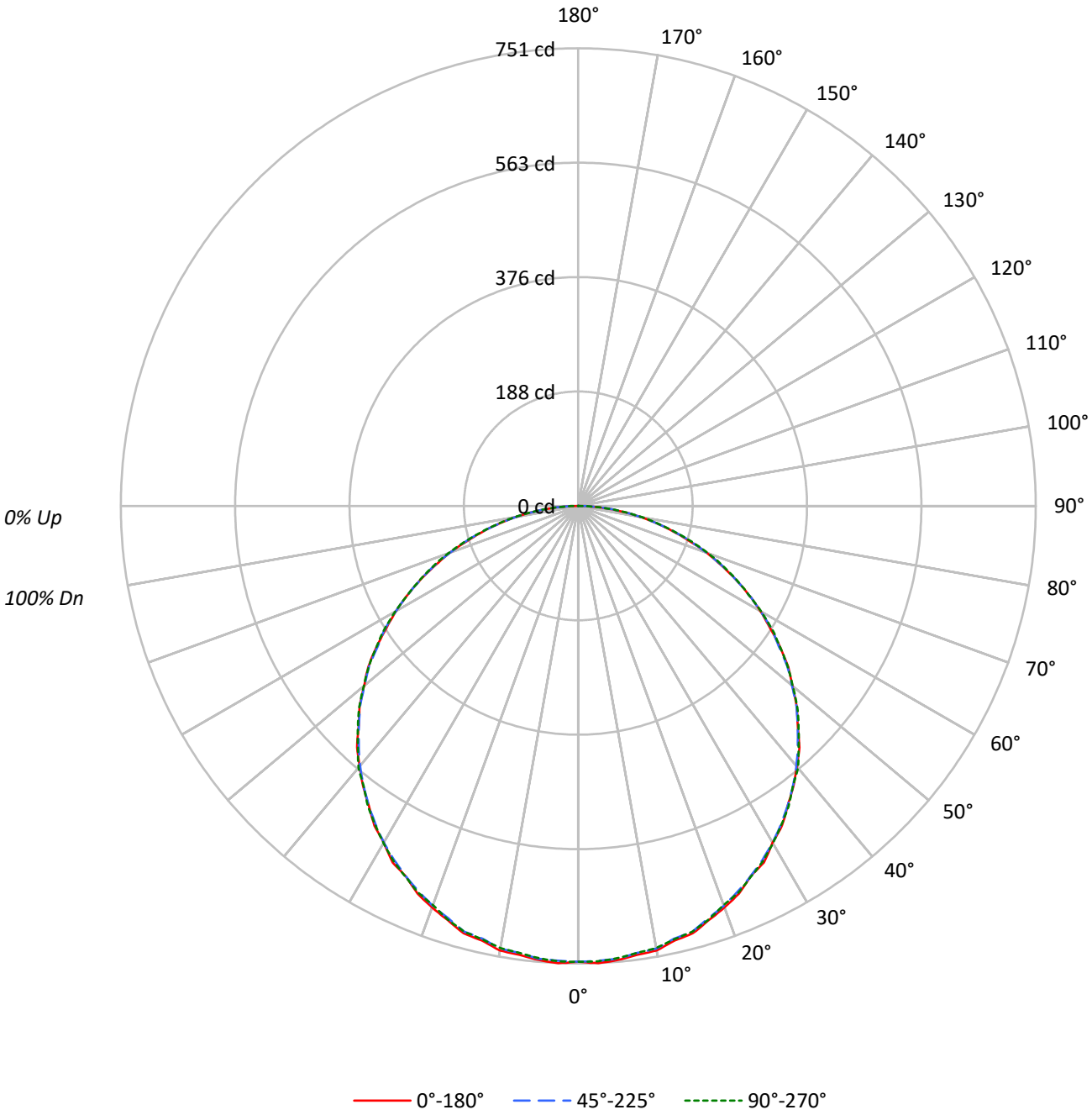


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Scaled Data Report

TEST NUMBER: P1590908
CATALOG NUMBER: 22CGTX-20-L93050-W2A-4000K

## Luminous Intensity Polar Plot



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Scaled Data Report

TEST NUMBER: P1590908
CATALOG NUMBER: 22CGTX-20-L93050-W2A-4000K

## 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 | 0 |
| RCR | | | | | | | | | | | | | | | | | | |
| 0 | 119 | 119 | 119 | 119 | 116 | 116 | 116 | 116 | 111 | 111 | 111 | 106 | 106 | 106 | 102 | 102 | 102 | 100 |
| 1 | 108 | 103 | 99 | 95 | 106 | 101 | 97 | 93 | 97 | 93 | 90 | 93 | 90 | 88 | 89 | 87 | 85 | 83 |
| 2 | 98 | 90 | 83 | 77 | 96 | 88 | 81 | 76 | 84 | 79 | 74 | 81 | 76 | 72 | 78 | 74 | 71 | 68 |
| 3 | 89 | 79 | 70 | 63 | 87 | 77 | 69 | 63 | 74 | 67 | 62 | 71 | 65 | 61 | 69 | 64 | 60 | 57 |
| 4 | 82 | 69 | 60 | 54 | 79 | 68 | 60 | 53 | 66 | 58 | 52 | 63 | 57 | 52 | 61 | 56 | 51 | 49 |
| 5 | 75 | 62 | 53 | 46 | 73 | 61 | 52 | 46 | 59 | 51 | 45 | 57 | 50 | 45 | 55 | 49 | 44 | 42 |
| 6 | 69 | 56 | 47 | 40 | 67 | 55 | 46 | 40 | 53 | 45 | 39 | 51 | 44 | 39 | 50 | 44 | 39 | 37 |
| 7 | 64 | 50 | 42 | 35 | 62 | 50 | 41 | 35 | 48 | 40 | 35 | 47 | 40 | 35 | 45 | 39 | 34 | 32 |
| 8 | 60 | 46 | 37 | 31 | 58 | 45 | 37 | 31 | 44 | 36 | 31 | 43 | 36 | 31 | 41 | 35 | 31 | 29 |
| 9 | 56 | 42 | 34 | 28 | 54 | 42 | 34 | 28 | 40 | 33 | 28 | 39 | 33 | 28 | 38 | 32 | 28 | 26 |
| 10 | 52 | 39 | 31 | 26 | 51 | 38 | 31 | 25 | 37 | 30 | 25 | 36 | 30 | 25 | 36 | 29 | 25 | 23 |

## AVERAGE LUMINANCE (cd/sqm):

| | 0° | 45° | 90° |
|---|---|---|---|
| 0° | 2013 | 2013 | 2013 |
| 5° | 2021 | 2015 | 2012 |
| 10° | 2024 | 2016 | 2013 |
| 15° | 2023 | 2015 | 2015 |
| 20° | 2009 | 2000 | 1997 |
| 25° | 1990 | 1990 | 1993 |
| 30° | 1983 | 1983 | 1986 |
| 35° | 1970 | 1970 | 1977 |
| 40° | 1961 | 1957 | 1972 |
| 45° | 1939 | 1939 | 1947 |
| 50° | 1920 | 1916 | 1924 |
| 55° | 1899 | 1884 | 1899 |
| 60° | 1859 | 1859 | 1865 |
| 65° | 1817 | 1817 | 1824 |
| 70° | 1763 | 1755 | 1788 |
| 75° | 1672 | 1694 | 1704 |
| 80° | 1592 | 1592 | 1640 |
| 85° | 1411 | 1473 | 1442 |

## MAXIMUM LUMINANCE 45°-90°:

Horizontal Angle: 90°
Vertical Angle: 45°
Luminance: 1947 cd/sqm

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Scaled Data Report

TEST NUMBER: P1590908
CATALOG NUMBER: 22CGTX-20-L93050-W2A-4000K

**ZONAL LUMENS:**

| Zone | Lumens | % Fixture |
|---|---|---|
| 0°-10° | 70.9 | 3.2 |
| 10°-20° | 203.7 | 9.2 |
| 20°-30° | 309.6 | 13.9 |
| 30°-40° | 375.8 | 16.9 |
| 40°-50° | 393.7 | 17.7 |
| 50°-60° | 361.0 | 16.3 |
| 60°-70° | 282.2 | 12.7 |
| 70°-80° | 171.9 | 7.7 |
| 80°-90° | 52.8 | 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° | 584.3 | 26.3 |
| 0°-40° | 960.0 | 43.2 |
| 0°-60° | 1714.7 | 77.2 |
| 0°-90° | 2221.6 | 100.0 |
| 90°-120° | 0.0 | 0.0 |
| 90°-150° | 0.0 | 0.0 |
| 90°-180° | 0.0 | 0.0 |
| 0°-180° | 2221.6 | 100.0 |

**CANDELA DISTRIBUTION:**

| | 0° | 22.5° | 45° | 67.5° | 90° | Flux |
|---|---|---|---|---|---|---|
| 0° | 748 | 748 | 748 | 748 | 748 | |
| 5° | 748 | 747 | 746 | 746 | 745 | 71 |
| 15° | 726 | 721 | 723 | 721 | 723 | 204 |
| 25° | 670 | 671 | 670 | 670 | 671 | 310 |
| 35° | 600 | 601 | 600 | 600 | 602 | 376 |
| 45° | 509 | 510 | 509 | 510 | 512 | 394 |
| 55° | 405 | 404 | 402 | 405 | 405 | 361 |
| 65° | 285 | 284 | 285 | 286 | 286 | 282 |
| 75° | 161 | 162 | 163 | 164 | 164 | 171 |
| 85° | 46 | 46 | 48 | 48 | 47 | 52 |
| 90° | 0 | 0 | 0 | 0 | 0 | |

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Scaled Data Report

TEST NUMBER: P1590908
CATALOG NUMBER: 22CGTX-20-L93050-W2A-4000K

**CANDELA DISTRIBUTION (FULL):**

| | 0° | 22.5° | 45° | 67.5° | 90° |
|---|---|---|---|---|---|
| 0° | *748.1* | 748.1 | 748.1 | 748.1 | 748.1 |
| 2.5° | *751.2* | *749.1* | *747.1* | *746.0* | *748.1* |
| 5° | *748.1* | 747.1 | 746.0 | 746.0 | 745.0 |
| 7.5° | *742.9* | 742.9 | 739.8 | 741.9 | 739.8 |
| 10° | *740.8* | 737.7 | 737.7 | 736.7 | 736.7 |
| 12.5° | *730.5* | 731.5 | 727.3 | 730.5 | 728.4 |
| 15° | *726.3* | 721.1 | 723.2 | 721.1 | 723.2 |
| 17.5° | *712.8* | 712.8 | 709.7 | 711.8 | 711.8 |
| 20° | *701.4* | 699.3 | 698.3 | 697.3 | 697.3 |
| 22.5° | *688.9* | 687.9 | 684.8 | 687.9 | 686.9 |
| 25° | *670.3* | 671.3 | 670.3 | 670.3 | 671.3 |
| 27.5° | *659.9* | 656.8 | 654.7 | 656.8 | 656.8 |
| 30° | *638.1* | 638.1 | 638.1 | 639.1 | 639.1 |
| 32.5° | *622.5* | 620.5 | 619.4 | 620.5 | 620.5 |
| 35° | *599.7* | 600.8 | 599.7 | 599.7 | 601.8 |
| 37.5° | *580.0* | 581.0 | 579.0 | 581.0 | 579.0 |
| 40° | *558.2* | 558.2 | 557.2 | 555.1 | 561.3 |
| 42.5° | *537.5* | 533.3 | 533.3 | 535.4 | 535.4 |
| 45° | *509.4* | 510.5 | 509.4 | 510.5 | 511.5 |
| 47.5° | *486.6* | 484.5 | 485.6 | 485.6 | 487.7 |
| 50° | *458.6* | 458.6 | 457.6 | 459.6 | 459.6 |
| 52.5° | *434.7* | 431.6 | 432.7 | 431.6 | 433.7 |
| 55° | *404.7* | 403.6 | 401.5 | 404.7 | 404.7 |
| 57.5° | *373.5* | 374.6 | 376.6 | 374.6 | 377.7 |
| 60° | *345.5* | 345.5 | 345.5 | 347.6 | 346.6 |
| 62.5° | *315.4* | 313.3 | 315.4 | 316.5 | 315.4 |
| 65° | *285.3* | 284.3 | 285.3 | 286.4 | 286.4 |
| 67.5° | *253.2* | 253.2 | 255.2 | 255.2 | 257.3 |
| 70° | *224.1* | 223.1 | 223.1 | 223.1 | 227.2 |
| 72.5° | *190.9* | 192.0 | 193.0 | 194.0 | 195.1 |
| 75° | *160.8* | 161.9 | 162.9 | 163.9 | 163.9 |
| 77.5° | *131.8* | 131.8 | 131.8 | 133.8 | 133.8 |
| 80° | *102.7* | 101.7 | 102.7 | 103.8 | 105.8 |
| 82.5° | *74.7* | 73.7 | 74.7 | 75.7 | 75.7 |
| 85° | *45.7* | 45.7 | 47.7 | 47.7 | 46.7 |
| 87.5° | *20.8* | 19.7 | 21.8 | 21.8 | 20.8 |
| 90° | *0.0* | 0.0 | 0.0 | 0.0 | 0.0 |

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TEST NUMBER: P1590908
CATALOG NUMBER: 22CGTX-20-L93050-W2A-4000K

**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 | 14.39 | 16.06 | 14.76 | 16.37 | 16.69 | 14.41 | 16.07 | 14.77 | 16.39 | 16.70 |
| | 3H | 16.31 | 17.82 | 16.69 | 18.15 | 18.51 | 16.35 | 17.86 | 16.73 | 18.19 | 18.54 |
| | 4H | 17.06 | 18.48 | 17.46 | 18.83 | 19.20 | 17.11 | 18.54 | 17.51 | 18.88 | 19.26 |
| | 6H | 17.65 | 18.97 | 18.06 | 19.33 | 19.72 | 17.72 | 19.04 | 18.13 | 19.40 | 19.79 |
| | 8H | 17.86 | 19.12 | 18.28 | 19.51 | 19.91 | 17.93 | 19.19 | 18.35 | 19.58 | 19.98 |
| | 12H | 18.00 | 19.21 | 18.43 | 19.59 | 20.02 | 18.08 | 19.29 | 18.51 | 19.67 | 20.10 |
| 4H | 2H | 15.07 | 16.49 | 15.46 | 16.84 | 17.21 | 15.08 | 16.50 | 15.48 | 16.85 | 17.22 |
| | 3H | 17.21 | 18.41 | 17.62 | 18.81 | 19.20 | 17.24 | 18.44 | 17.65 | 18.84 | 19.24 |
| | 4H | 18.10 | 19.18 | 18.53 | 19.60 | 20.03 | 18.15 | 19.23 | 18.58 | 19.64 | 20.08 |
| | 6H | 18.82 | 19.78 | 19.28 | 20.22 | 20.67 | 18.89 | 19.84 | 19.34 | 20.28 | 20.74 |
| | 8H | 19.09 | 19.98 | 19.55 | 20.42 | 20.88 | 19.16 | 20.05 | 19.62 | 20.49 | 20.96 |
| | 12H | 19.28 | 20.09 | 19.76 | 20.56 | 21.03 | 19.36 | 20.16 | 19.84 | 20.64 | 21.11 |
| 8H | 4H | 18.46 | 19.35 | 18.92 | 19.79 | 20.25 | 18.50 | 19.39 | 18.96 | 19.83 | 20.30 |
| | 6H | 19.32 | 20.07 | 19.81 | 20.55 | 21.03 | 19.38 | 20.13 | 19.88 | 20.62 | 21.09 |
| | 8H | 19.67 | 20.34 | 20.17 | 20.84 | 21.33 | 19.74 | 20.41 | 20.25 | 20.91 | 21.40 |
| | 12H | 19.95 | 20.54 | 20.45 | 21.03 | 21.59 | 20.03 | 20.62 | 20.53 | 21.11 | 21.67 |
| 12H | 4H | 18.51 | 19.31 | 18.98 | 19.78 | 20.25 | 18.55 | 19.35 | 19.03 | 19.82 | 20.29 |
| | 6H | 19.40 | 20.07 | 19.91 | 20.57 | 21.06 | 19.46 | 20.13 | 19.97 | 20.63 | 21.12 |
| | 8H | 19.81 | 20.40 | 20.32 | 20.89 | 21.45 | 19.88 | 20.47 | 20.39 | 20.96 | 21.52 |

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Peachtree City, GA 30269

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

Report Prepared for

Cooper Lighting Solutions

Metalux

Report Number: SP1-2512-631-31-R2

Test Date: 02/05/2026

Luminaire Tested: 22CGTX-50-L93050-W2A-4000K

Data in this report applies to families of products including 22CGTX

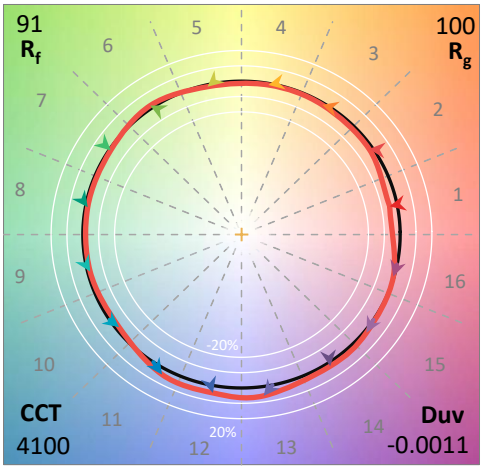
Report Generated By FNC07603 / LDUCLS01DT446
Version: v7.05

## Test Information

| | |
|---|---|
| Test Method: | LM-79-2019 |
| Report Number: | SP1-2512-631-31-R2 |
| Test Lab: | COOPER LIGHTING SOLUTIONS |
| Photometer: | SP1 - 76IN SPHERE |
| Measurement Geometry: | 4π |
| Issue Date: | 07/28/2026 |
| Manufacturer: | COOPER LIGHTING SOLUTIONS |
| Product Line: | Metalux |
| Catalog Number: | **22CGTX-50-L93050-W2A-4000K** |
| Description: | *THIS IS A REVISION OF REPORT SP1-2512-631-31-R2 TO UPDATE THE CATALOG INFORMATION* 2X2 5000 LUMEN HE CGTX TUNABLE WHITE FROM 3000K TO 5000K - 4.5 Volt |

## Spectral Parameters

| | | | | | |
|---|---|---|---|---|---|
| CCT (K): | 4100 | CRI (Ra): | 94.2 | | |
| CIE u': | 0.2240 | R1: | 95.8 | R9: | 68.3 |
| CIE v': | 0.4984 | R2: | 96.4 | R10: | 89.3 |
| Duv: | -0.0011 | R3: | 94.9 | R11: | 95.3 |
| CIE x: | 0.3754 | R4: | 95.5 | R12: | 73.6 |
| CIE y: | 0.3712 | R5: | 94.7 | R13: | 96.1 |
| CIE z: | 0.2534 | R6: | 93.8 | R14: | 96.4 |
| Peak Wavelength (nm): | 630 | R7: | 94.6 | R15: | 93.4 |
| Dominant Wavelength (nm): | 579 | R8: | 88.1 | | |
| Purity: | 24.05581 | | | | |
| Rf: | 90.9 | | | | |
| Rg: | 99.8 | | | | |



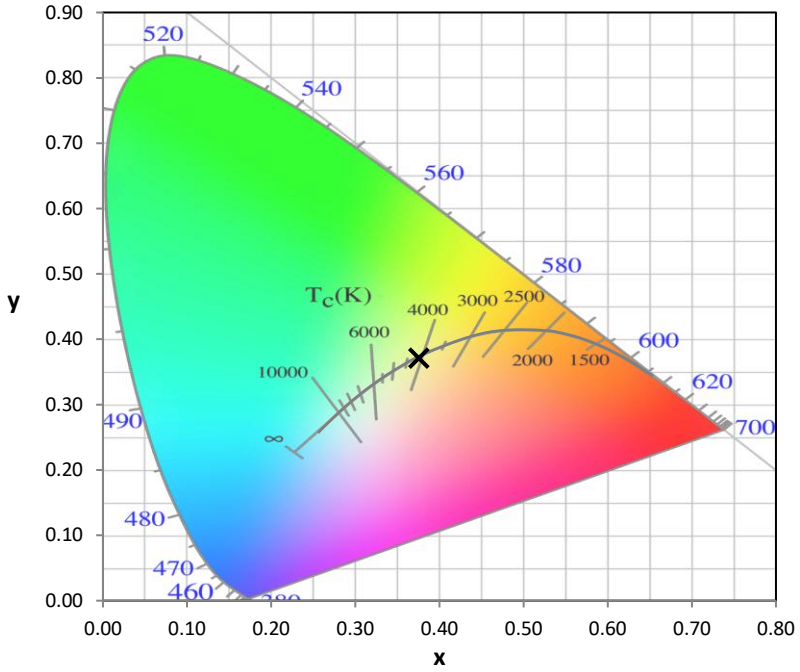

## Test Conditions

| | |
|---|---|
| Stabilization Time: | 20M |
| Operation Time: | 1H 20M |
| Sphere Temperature (°C): | 25.1 |

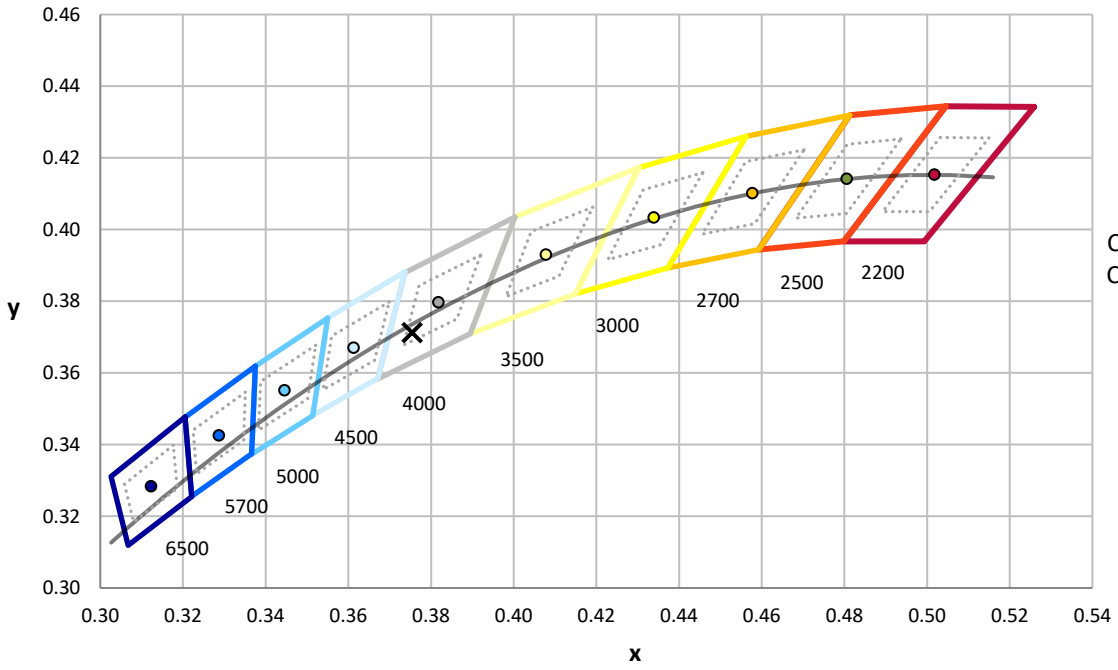
| Measurement and Test Equipment | | | |
|---|---|---|---|
| Instrument | Identification Number | Calibration Date | Calibration Due Date |
| Photometer | 76INCH SPHERE IN0058 | 12/16/2025 | 6/16/2026 |
| Power Meter | XITRON INXT2011004 | 10/21/2025 | 10/21/2026 |
| AC Power Source | CHROMA 61603 IN0063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

REPORT NUMBER: SP1-2512-631-31-R2

## CIE 1931 Chromaticity Diagram




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

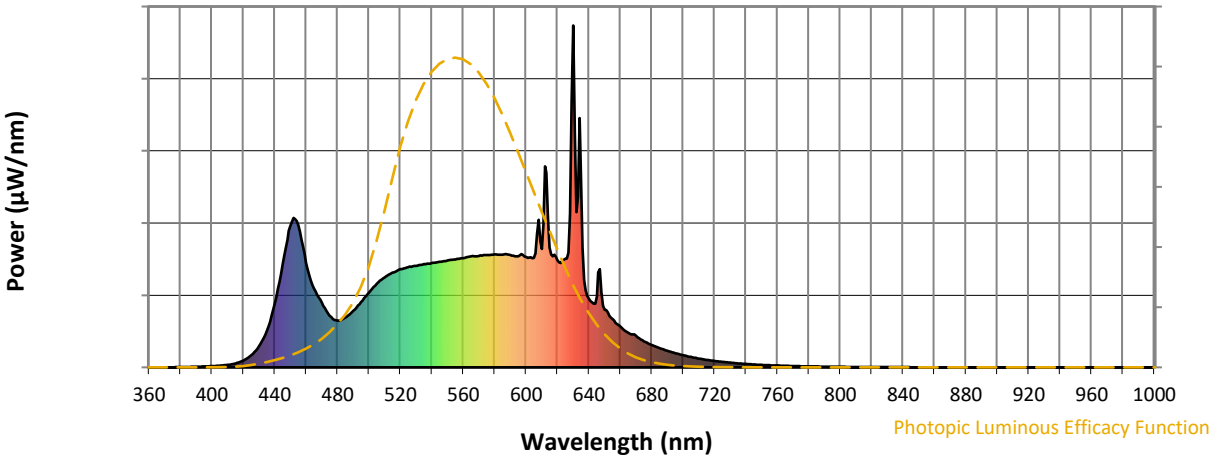



CCT = 4100K
CIE x = 0.3754
CIE y = 0.3712
Duv = -0.0011

Point lies inside the ANSI 4000K 4-step quadrangle

REPORT NUMBER: SP1-2512-631-31-R2

## Photopic Flux vs. Wavelength

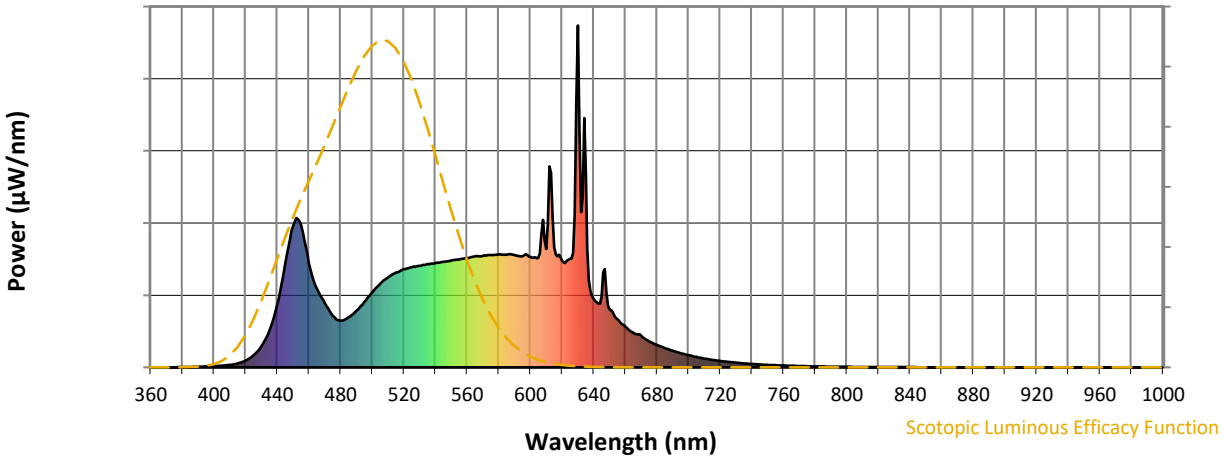



## Photopic Lumens: NR

| λ (nm) | Power W^/nm | Lumens (ϕ/nm) | λ (nm) | Power W^/nm | Lumens (ϕ/nm) | λ (nm) | Power W^/nm | Lumens (ϕ/nm) | λ (nm) | Power W^/nm | Lumens (ϕ/nm) | λ (nm) | Power W^/nm | Lumens (ϕ/nm) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 360 | 0 | NR | 490 | 165 | NR | 620 | 313 | NR | 750 | 7 | NR | 880 | 0 | NR |
| 365 | 0 | NR | 495 | 191 | NR | 625 | 318 | NR | 755 | 6 | NR | 885 | 0 | NR |
| 370 | 0 | NR | 500 | 219 | NR | 630 | 1000 | NR | 760 | 5 | NR | 890 | 0 | NR |
| 375 | 0 | NR | 505 | 245 | NR | 635 | 564 | NR | 765 | 5 | NR | 895 | 0 | NR |
| 380 | 1 | NR | 510 | 263 | NR | 640 | 200 | NR | 770 | 4 | NR | 900 | 0 | NR |
| 385 | 1 | NR | 515 | 277 | NR | 645 | 207 | NR | 775 | 3 | NR | 905 | 0 | NR |
| 390 | 2 | NR | 520 | 287 | NR | 650 | 169 | NR | 780 | 3 | NR | 910 | 0 | NR |
| 395 | 2 | NR | 525 | 293 | NR | 655 | 141 | NR | 785 | 2 | NR | 915 | 0 | NR |
| 400 | 4 | NR | 530 | 297 | NR | 660 | 120 | NR | 790 | 2 | NR | 920 | 0 | NR |
| 405 | 5 | NR | 535 | 302 | NR | 665 | 102 | NR | 795 | 2 | NR | 925 | 0 | NR |
| 410 | 7 | NR | 540 | 305 | NR | 670 | 93 | NR | 800 | 2 | NR | 930 | 0 | NR |
| 415 | 12 | NR | 545 | 309 | NR | 675 | 76 | NR | 805 | 1 | NR | 935 | 0 | NR |
| 420 | 20 | NR | 550 | 313 | NR | 680 | 65 | NR | 810 | 1 | NR | 940 | 0 | NR |
| 425 | 36 | NR | 555 | 316 | NR | 685 | 56 | NR | 815 | 1 | NR | 945 | 0 | NR |
| 430 | 62 | NR | 560 | 320 | NR | 690 | 49 | NR | 820 | 1 | NR | 950 | 0 | NR |
| 435 | 108 | NR | 565 | 325 | NR | 695 | 42 | NR | 825 | 1 | NR | 955 | 0 | NR |
| 440 | 185 | NR | 570 | 326 | NR | 700 | 36 | NR | 830 | 1 | NR | 960 | 0 | NR |
| 445 | 301 | NR | 575 | 329 | NR | 705 | 31 | NR | 835 | 1 | NR | 965 | 0 | NR |
| 450 | 413 | NR | 580 | 330 | NR | 710 | 26 | NR | 840 | 1 | NR | 970 | 0 | NR |
| 455 | 415 | NR | 585 | 329 | NR | 715 | 22 | NR | 845 | 0 | NR | 975 | 0 | NR |
| 460 | 305 | NR | 590 | 329 | NR | 720 | 19 | NR | 850 | 0 | NR | 980 | 0 | NR |
| 465 | 231 | NR | 595 | 325 | NR | 725 | 16 | NR | 855 | 0 | NR | 985 | 0 | NR |
| 470 | 188 | NR | 600 | 323 | NR | 730 | 14 | NR | 860 | 0 | NR | 990 | 0 | NR |
| 475 | 151 | NR | 605 | 320 | NR | 735 | 12 | NR | 865 | 0 | NR | 995 | 0 | NR |
| 480 | 137 | NR | 610 | 346 | NR | 740 | 10 | NR | 870 | 0 | NR | 1000 | 0 | NR |
| 485 | 146 | NR | 615 | 351 | NR | 745 | 9 | NR | 875 | 0 | NR | | | |

REPORT NUMBER: SP1-2512-631-31-R2

## Scotopic Flux vs. Wavelength

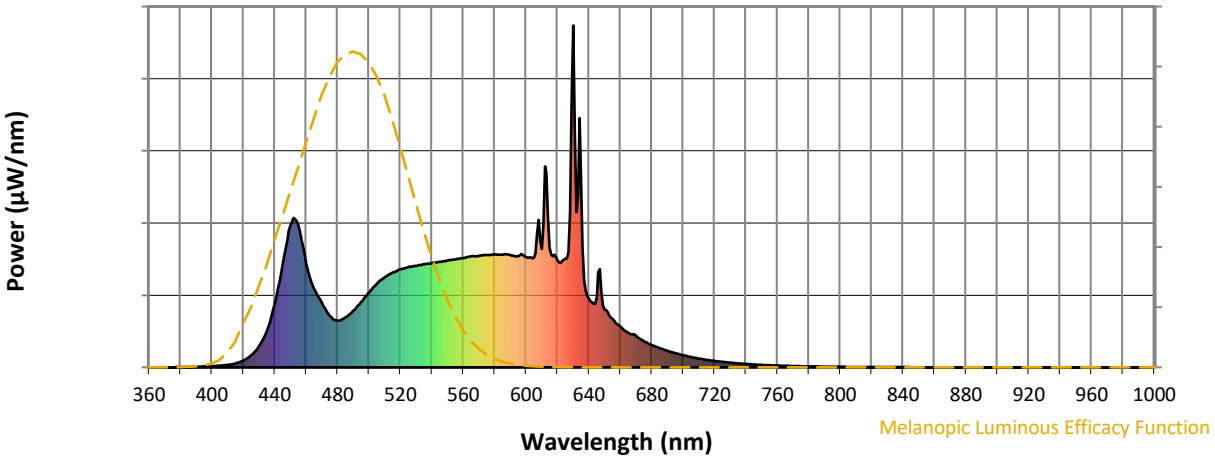



**Scotopic Lumens: NR** **S/P: 1.82**

| λ (nm) | Power W^/nm | Lumens (ϕ/nm) | λ (nm) | Power W^/nm | Lumens (ϕ/nm) | λ (nm) | Power W^/nm | Lumens (ϕ/nm) | λ (nm) | Power W^/nm | Lumens (ϕ/nm) | λ (nm) | Power W^/nm | Lumens (ϕ/nm) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 360 | 0 | NR | 490 | 165 | NR | 620 | 313 | NR | 750 | 7 | NR | 880 | 0 | NR |
| 365 | 0 | NR | 495 | 191 | NR | 625 | 318 | NR | 755 | 6 | NR | 885 | 0 | NR |
| 370 | 0 | NR | 500 | 219 | NR | 630 | 1000 | NR | 760 | 5 | NR | 890 | 0 | NR |
| 375 | 0 | NR | 505 | 245 | NR | 635 | 564 | NR | 765 | 5 | NR | 895 | 0 | NR |
| 380 | 1 | NR | 510 | 263 | NR | 640 | 200 | NR | 770 | 4 | NR | 900 | 0 | NR |
| 385 | 1 | NR | 515 | 277 | NR | 645 | 207 | NR | 775 | 3 | NR | 905 | 0 | NR |
| 390 | 2 | NR | 520 | 287 | NR | 650 | 169 | NR | 780 | 3 | NR | 910 | 0 | NR |
| 395 | 2 | NR | 525 | 293 | NR | 655 | 141 | NR | 785 | 2 | NR | 915 | 0 | NR |
| 400 | 4 | NR | 530 | 297 | NR | 660 | 120 | NR | 790 | 2 | NR | 920 | 0 | NR |
| 405 | 5 | NR | 535 | 302 | NR | 665 | 102 | NR | 795 | 2 | NR | 925 | 0 | NR |
| 410 | 7 | NR | 540 | 305 | NR | 670 | 93 | NR | 800 | 2 | NR | 930 | 0 | NR |
| 415 | 12 | NR | 545 | 309 | NR | 675 | 76 | NR | 805 | 1 | NR | 935 | 0 | NR |
| 420 | 20 | NR | 550 | 313 | NR | 680 | 65 | NR | 810 | 1 | NR | 940 | 0 | NR |
| 425 | 36 | NR | 555 | 316 | NR | 685 | 56 | NR | 815 | 1 | NR | 945 | 0 | NR |
| 430 | 62 | NR | 560 | 320 | NR | 690 | 49 | NR | 820 | 1 | NR | 950 | 0 | NR |
| 435 | 108 | NR | 565 | 325 | NR | 695 | 42 | NR | 825 | 1 | NR | 955 | 0 | NR |
| 440 | 185 | NR | 570 | 326 | NR | 700 | 36 | NR | 830 | 1 | NR | 960 | 0 | NR |
| 445 | 301 | NR | 575 | 329 | NR | 705 | 31 | NR | 835 | 1 | NR | 965 | 0 | NR |
| 450 | 413 | NR | 580 | 330 | NR | 710 | 26 | NR | 840 | 1 | NR | 970 | 0 | NR |
| 455 | 415 | NR | 585 | 329 | NR | 715 | 22 | NR | 845 | 0 | NR | 975 | 0 | NR |
| 460 | 305 | NR | 590 | 329 | NR | 720 | 19 | NR | 850 | 0 | NR | 980 | 0 | NR |
| 465 | 231 | NR | 595 | 325 | NR | 725 | 16 | NR | 855 | 0 | NR | 985 | 0 | NR |
| 470 | 188 | NR | 600 | 323 | NR | 730 | 14 | NR | 860 | 0 | NR | 990 | 0 | NR |
| 475 | 151 | NR | 605 | 320 | NR | 735 | 12 | NR | 865 | 0 | NR | 995 | 0 | NR |
| 480 | 137 | NR | 610 | 346 | NR | 740 | 10 | NR | 870 | 0 | NR | 1000 | 0 | NR |
| 485 | 146 | NR | 615 | 351 | NR | 745 | 9 | NR | 875 | 0 | NR | | | |

REPORT NUMBER: SP1-2512-631-31-R2

## Melanopic Flux vs. Wavelength




**Melanopic Lumens: NR** **M/P: 3.81**

| λ (nm) | Power W^/nm | Lumens (ϕ/nm) | λ (nm) | Power W^/nm | Lumens (ϕ/nm) | λ (nm) | Power W^/nm | Lumens (ϕ/nm) | λ (nm) | Power W^/nm | Lumens (ϕ/nm) | λ (nm) | Power W^/nm | Lumens (ϕ/nm) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 360 | 0 | NR | 490 | 165 | NR | 620 | 313 | NR | 750 | 7 | NR | 880 | 0 | NR |
| 365 | 0 | NR | 495 | 191 | NR | 625 | 318 | NR | 755 | 6 | NR | 885 | 0 | NR |
| 370 | 0 | NR | 500 | 219 | NR | 630 | 1000 | NR | 760 | 5 | NR | 890 | 0 | NR |
| 375 | 0 | NR | 505 | 245 | NR | 635 | 564 | NR | 765 | 5 | NR | 895 | 0 | NR |
| 380 | 1 | NR | 510 | 263 | NR | 640 | 200 | NR | 770 | 4 | NR | 900 | 0 | NR |
| 385 | 1 | NR | 515 | 277 | NR | 645 | 207 | NR | 775 | 3 | NR | 905 | 0 | NR |
| 390 | 2 | NR | 520 | 287 | NR | 650 | 169 | NR | 780 | 3 | NR | 910 | 0 | NR |
| 395 | 2 | NR | 525 | 293 | NR | 655 | 141 | NR | 785 | 2 | NR | 915 | 0 | NR |
| 400 | 4 | NR | 530 | 297 | NR | 660 | 120 | NR | 790 | 2 | NR | 920 | 0 | NR |
| 405 | 5 | NR | 535 | 302 | NR | 665 | 102 | NR | 795 | 2 | NR | 925 | 0 | NR |
| 410 | 7 | NR | 540 | 305 | NR | 670 | 93 | NR | 800 | 2 | NR | 930 | 0 | NR |
| 415 | 12 | NR | 545 | 309 | NR | 675 | 76 | NR | 805 | 1 | NR | 935 | 0 | NR |
| 420 | 20 | NR | 550 | 313 | NR | 680 | 65 | NR | 810 | 1 | NR | 940 | 0 | NR |
| 425 | 36 | NR | 555 | 316 | NR | 685 | 56 | NR | 815 | 1 | NR | 945 | 0 | NR |
| 430 | 62 | NR | 560 | 320 | NR | 690 | 49 | NR | 820 | 1 | NR | 950 | 0 | NR |
| 435 | 108 | NR | 565 | 325 | NR | 695 | 42 | NR | 825 | 1 | NR | 955 | 0 | NR |
| 440 | 185 | NR | 570 | 326 | NR | 700 | 36 | NR | 830 | 1 | NR | 960 | 0 | NR |
| 445 | 301 | NR | 575 | 329 | NR | 705 | 31 | NR | 835 | 1 | NR | 965 | 0 | NR |
| 450 | 413 | NR | 580 | 330 | NR | 710 | 26 | NR | 840 | 1 | NR | 970 | 0 | NR |
| 455 | 415 | NR | 585 | 329 | NR | 715 | 22 | NR | 845 | 0 | NR | 975 | 0 | NR |
| 460 | 305 | NR | 590 | 329 | NR | 720 | 19 | NR | 850 | 0 | NR | 980 | 0 | NR |
| 465 | 231 | NR | 595 | 325 | NR | 725 | 16 | NR | 855 | 0 | NR | 985 | 0 | NR |
| 470 | 188 | NR | 600 | 323 | NR | 730 | 14 | NR | 860 | 0 | NR | 990 | 0 | NR |
| 475 | 151 | NR | 605 | 320 | NR | 735 | 12 | NR | 865 | 0 | NR | 995 | 0 | NR |
| 480 | 137 | NR | 610 | 346 | NR | 740 | 10 | NR | 870 | 0 | NR | 1000 | 0 | NR |
| 485 | 146 | NR | 615 | 351 | NR | 745 | 9 | NR | 875 | 0 | NR | | | |

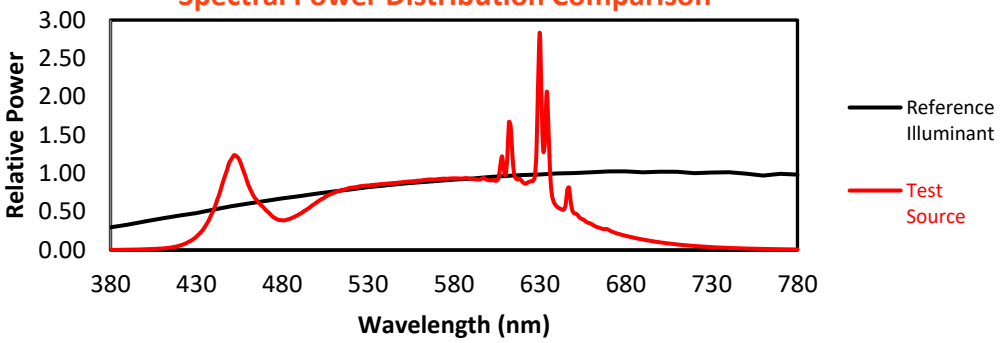
REPORT NUMBER: SP1-2512-631-31-R2

# TM-30-18

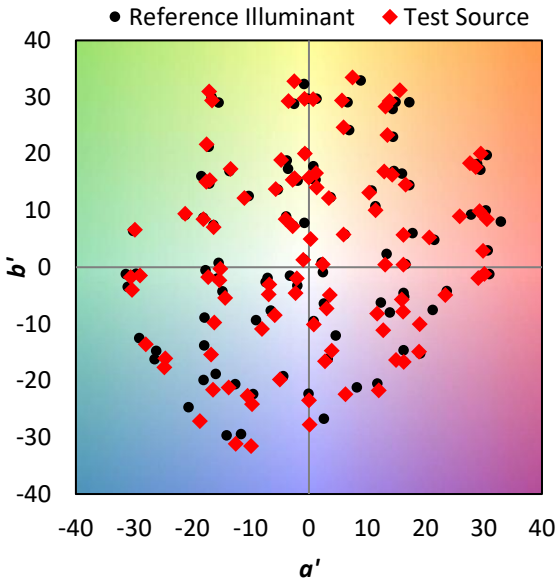
## Summary

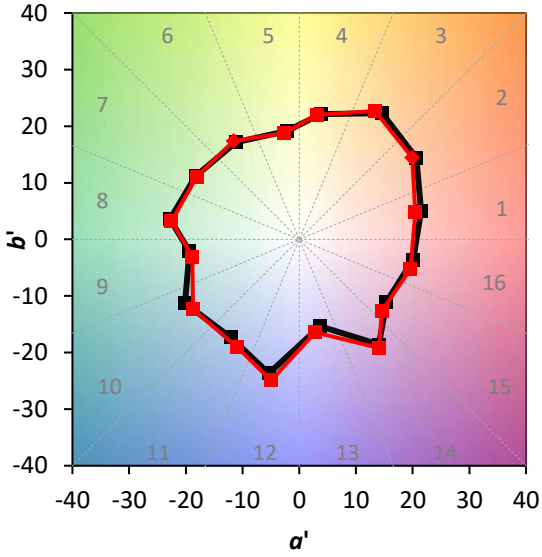
$R_f$ = 90.9
$R_g$ = 99.8
CIE $R_a$ = 94.2
$R_9$ = 68.3

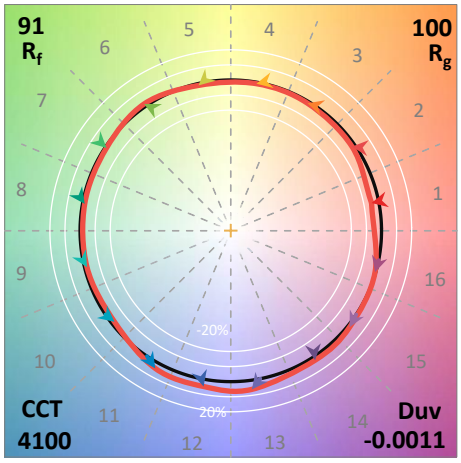
## Spectral Power Distribution Comparison

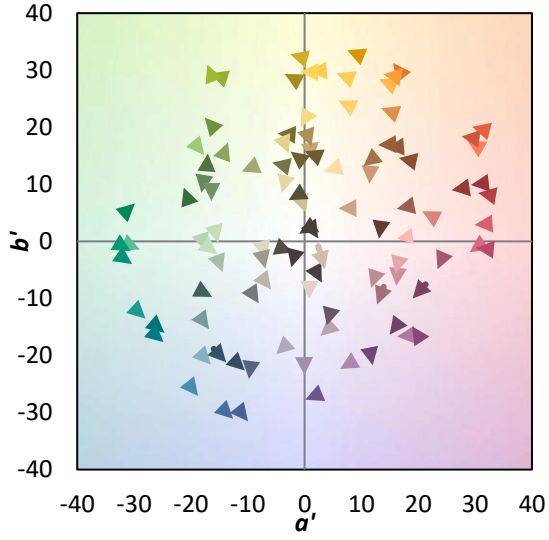



## Color Vector Graphics



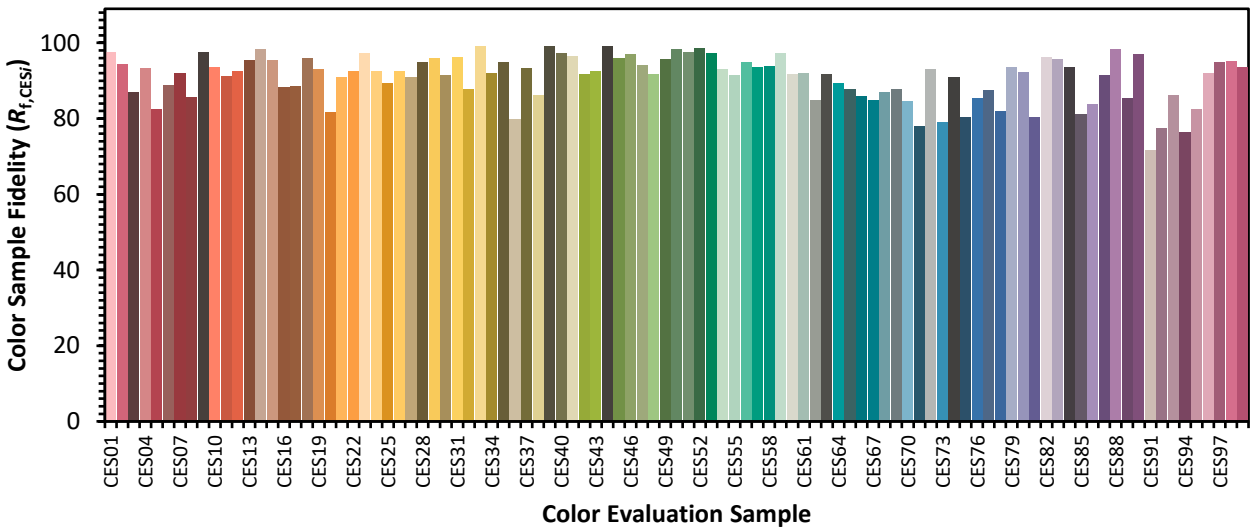



REPORT NUMBER: SP1-2512-631-31-R2

# TM-30-18

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

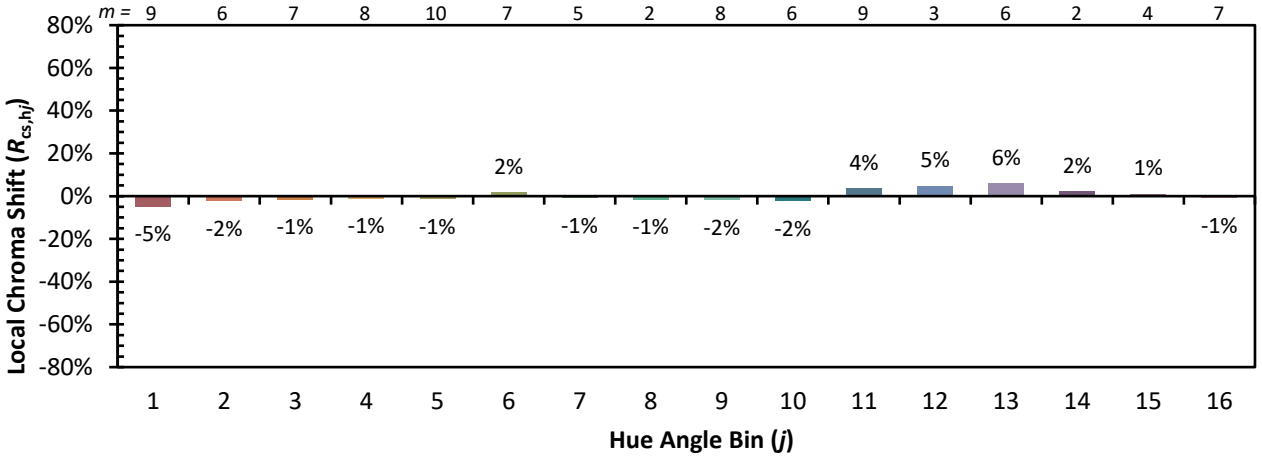
| | | | |
|---|---|---|---|
| CES01 = 86 | CES26 = 93 | CES51 = 97 | CES76 = 85 |
| CES02 = 62 | CES27 = 91 | CES52 = 99 | CES77 = 87 |
| CES03 = 31 | CES28 = 95 | CES53 = 97 | CES78 = 82 |
| CES04 = 69 | CES29 = 96 | CES54 = 93 | CES79 = 94 |
| CES05 = 49 | CES30 = 92 | CES55 = 91 | CES80 = 92 |
| CES06 = 50 | CES31 = 96 | CES56 = 95 | CES81 = 80 |
| CES07 = 42 | CES32 = 88 | CES57 = 93 | CES82 = 96 |
| CES08 = 41 | CES33 = 99 | CES58 = 94 | CES83 = 96 |
| CES09 = 29 | CES34 = 92 | CES59 = 97 | CES84 = 94 |
| CES10 = 74 | CES35 = 95 | CES60 = 92 | CES85 = 81 |
| CES11 = 57 | CES36 = 80 | CES61 = 92 | CES86 = 84 |
| CES12 = 63 | CES37 = 93 | CES62 = 85 | CES87 = 91 |
| CES13 = 43 | CES38 = 86 | CES63 = 92 | CES88 = 98 |
| CES14 = 74 | CES39 = 99 | CES64 = 89 | CES89 = 85 |
| CES15 = 71 | CES40 = 97 | CES65 = 88 | CES90 = 97 |
| CES16 = 47 | CES41 = 97 | CES66 = 86 | CES91 = 72 |
| CES17 = 49 | CES42 = 92 | CES67 = 85 | CES92 = 77 |
| CES18 = 56 | CES43 = 93 | CES68 = 87 | CES93 = 86 |
| CES19 = 71 | CES44 = 99 | CES69 = 88 | CES94 = 77 |
| CES20 = 66 | CES45 = 96 | CES70 = 85 | CES95 = 82 |
| CES21 = 85 | CES46 = 97 | CES71 = 78 | CES96 = 92 |
| CES22 = 78 | CES47 = 94 | CES72 = 93 | CES97 = 95 |
| CES23 = 91 | CES48 = 92 | CES73 = 79 | CES98 = 95 |
| CES24 = 90 | CES49 = 96 | CES74 = 91 | CES99 = 94 |
| CES25 = 71 | CES50 = 98 | CES75 = 80 | |

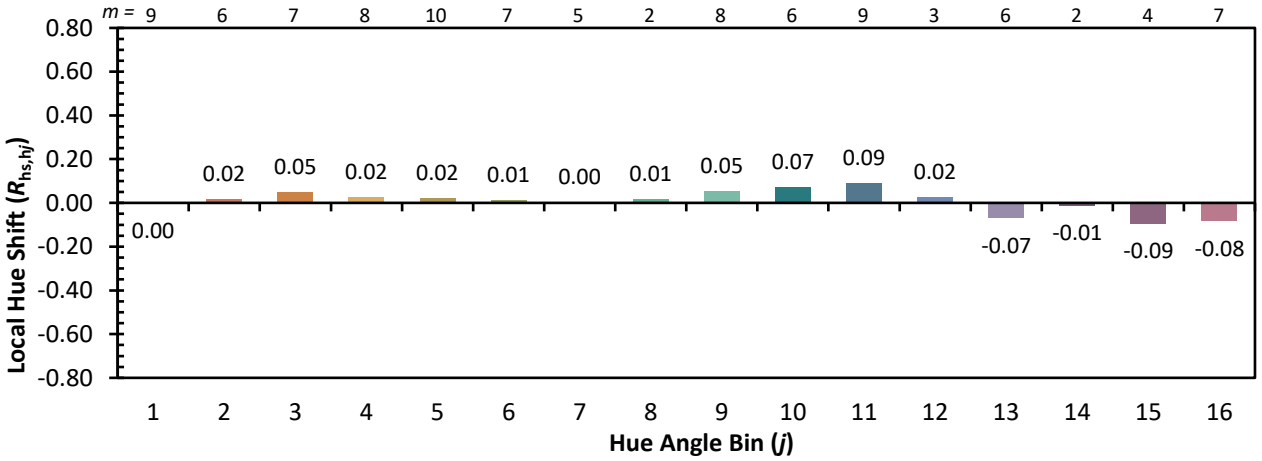


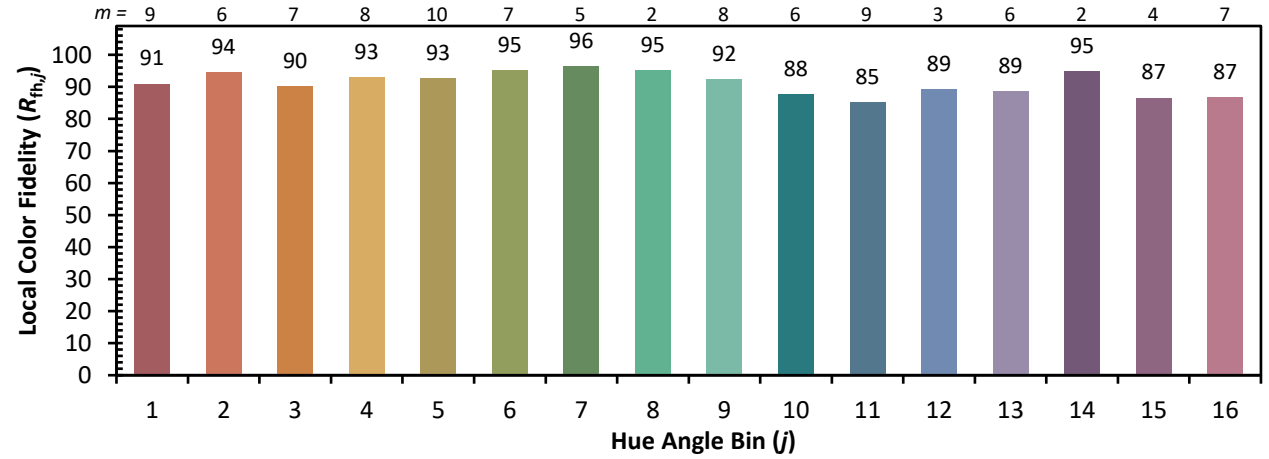
REPORT NUMBER: SP1-2512-631-31-R2

**TM-30-18**

## Color Rendition by Hue-Angle Bin



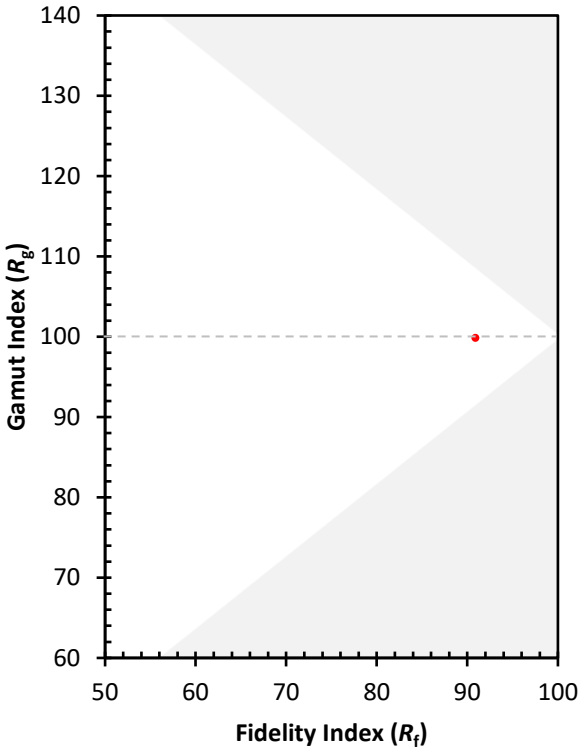



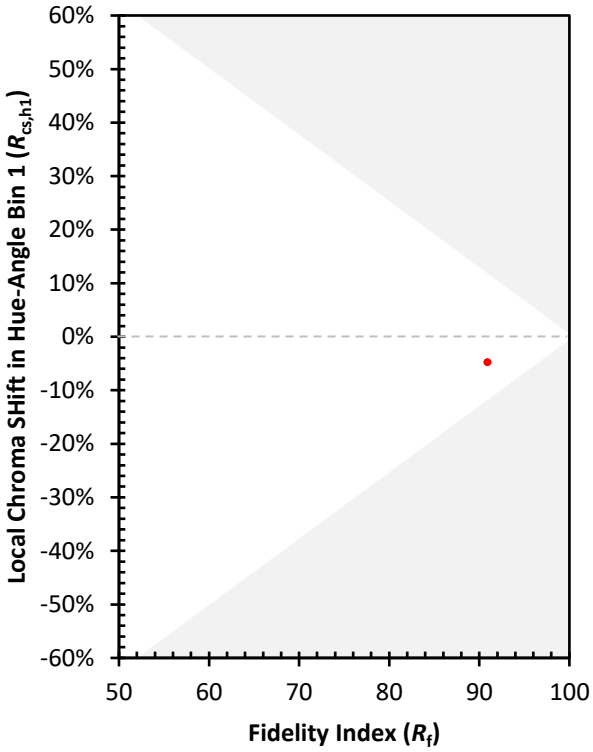



REPORT NUMBER: SP1-2512-631-31-R2

# TM-30-18

## Measure Comparisons




(END OF REPORT)