

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: FAIL-SAFE

Report Number: P1356982

Luminaire Tested: 3ASL4-10-1-40-UNV

Issue Date: 2/17/2026

Test Information

Test Method: LM-79-2019
Report Number: P1356982
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-2511-597-6)
Test Lab: INNOVATION CENTER
Issue Date: 2/17/2026
Manufacturer: COOPER LIGHTING SOLUTIONS
Product Line: FAIL-SAFE
Catalog Number: 3ASL4-10-1-40-UNV
Description: 3FT 1000 LUMEN PER FOOT 4ASL LED LUMINAIRE WITH OPL LENS AND 4000K LEDS 1 ROW
Light Source: -
Ballast/Driver: -

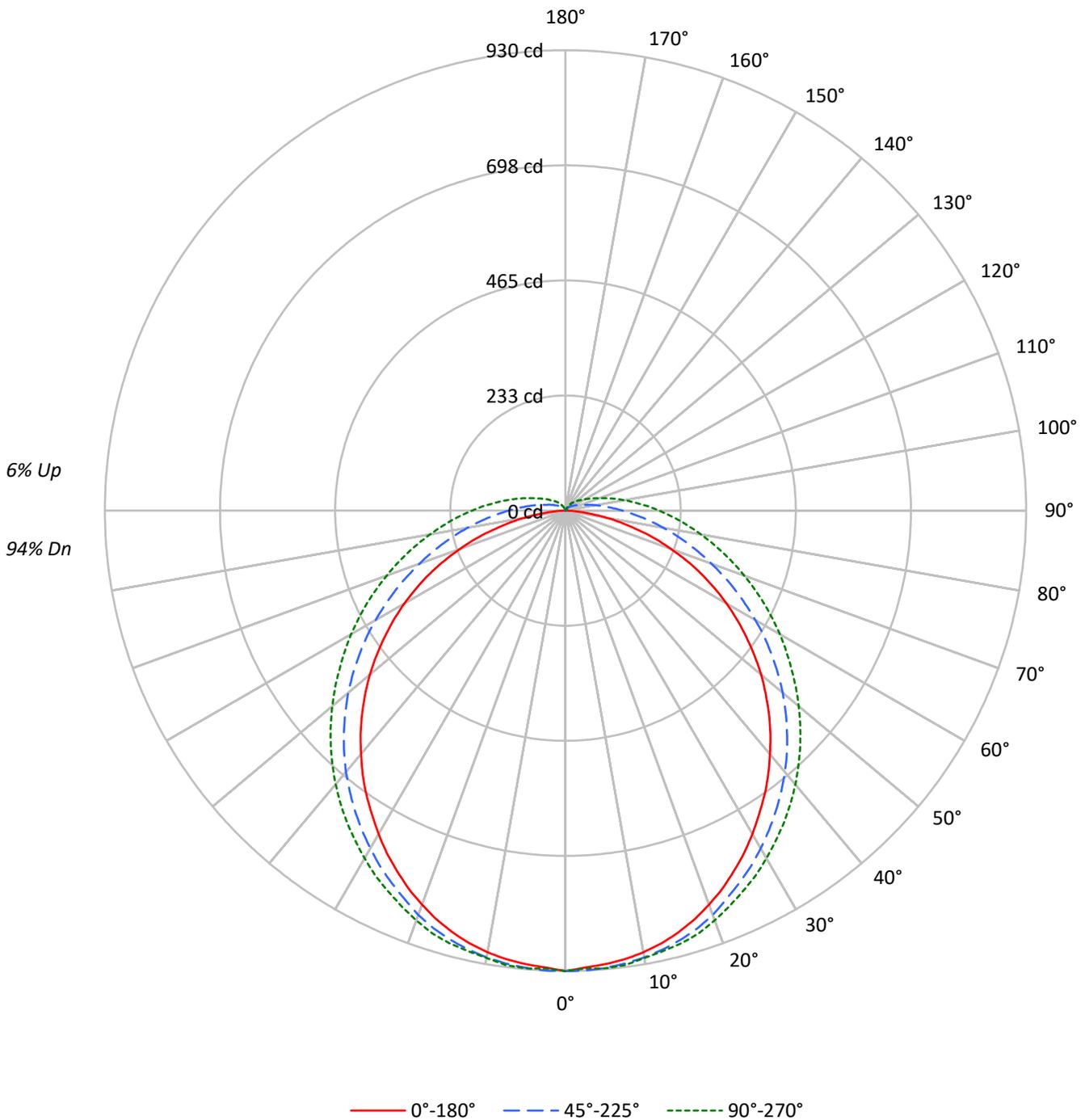
Summary

Lumens per Lamp: N/A
Luminaire Lumens: 3114.0 lumens
Efficiency: N/A
Efficacy: 118.0 lumens/watt
Spacing Criteria (0/90/45): 1.21 / 1.3 / 1.39
Luminous Opening: Rectangular w/ Sides (W: 0.33' x L: 2.98' x H: 0.1')
CIE Type: Direct

Input Watts (W): 26.4
Input Voltage (V): NR
Input Current (A_{in}): 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

TEST NUMBER: P1356982
CATALOG NUMBER: 3ASL4-10-1-40-UNV

Luminous Intensity Polar Plot





TEST NUMBER: P1356982
 CATALOG NUMBER: 3ASL4-10-1-40-UNV

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 | 50 | 30 | 10 | 0 |
| RCR | | | | | | | | | | | | | | | | | | | | | |
| 0 | 118 | 118 | 118 | 118 | 114 | 114 | 114 | 114 | 108 | 108 | 108 | 102 | 102 | 102 | 96 | 96 | 96 | 96 | 96 | 96 | 94 |
| 1 | 106 | 100 | 95 | 91 | 102 | 97 | 93 | 89 | 92 | 88 | 85 | 87 | 84 | 81 | 82 | 80 | 78 | 82 | 80 | 78 | 75 |
| 2 | 95 | 86 | 79 | 73 | 92 | 84 | 77 | 71 | 79 | 74 | 69 | 75 | 70 | 66 | 71 | 67 | 64 | 71 | 67 | 64 | 61 |
| 3 | 87 | 76 | 67 | 60 | 84 | 73 | 65 | 59 | 69 | 63 | 57 | 66 | 60 | 55 | 62 | 58 | 54 | 62 | 58 | 54 | 51 |
| 4 | 79 | 67 | 57 | 50 | 76 | 65 | 56 | 50 | 62 | 54 | 48 | 58 | 52 | 47 | 56 | 50 | 46 | 56 | 50 | 46 | 43 |
| 5 | 73 | 59 | 50 | 43 | 70 | 58 | 49 | 43 | 55 | 47 | 42 | 52 | 46 | 41 | 50 | 44 | 40 | 50 | 44 | 40 | 37 |
| 6 | 67 | 53 | 44 | 38 | 65 | 52 | 43 | 37 | 50 | 42 | 36 | 47 | 41 | 35 | 45 | 39 | 35 | 45 | 39 | 35 | 32 |
| 7 | 62 | 48 | 39 | 33 | 60 | 47 | 39 | 33 | 45 | 37 | 32 | 43 | 36 | 31 | 41 | 35 | 31 | 41 | 35 | 31 | 29 |
| 8 | 58 | 44 | 35 | 29 | 56 | 43 | 35 | 29 | 41 | 34 | 29 | 39 | 33 | 28 | 38 | 32 | 27 | 38 | 32 | 27 | 25 |
| 9 | 54 | 40 | 32 | 26 | 52 | 39 | 32 | 26 | 38 | 31 | 26 | 36 | 30 | 25 | 35 | 29 | 25 | 35 | 29 | 25 | 23 |
| 10 | 51 | 37 | 29 | 24 | 49 | 36 | 29 | 24 | 35 | 28 | 23 | 34 | 27 | 23 | 32 | 27 | 22 | 32 | 27 | 22 | 21 |

AVERAGE LUMINANCE (cd/sqm):

| | 0° | 45° | 90° |
|-----|-------|-------|-------|
| 0° | 10082 | 10082 | 10082 |
| 5° | 9975 | 9874 | 9829 |
| 10° | 9910 | 9668 | 9571 |
| 15° | 9802 | 9449 | 9370 |
| 20° | 9647 | 9202 | 9121 |
| 25° | 9460 | 8908 | 8853 |
| 30° | 9255 | 8639 | 8601 |
| 35° | 9052 | 8363 | 8350 |
| 40° | 8822 | 8085 | 8091 |
| 45° | 8602 | 7782 | 7827 |
| 50° | 8347 | 7466 | 7550 |
| 55° | 8029 | 7109 | 7273 |
| 60° | 7678 | 6737 | 7030 |
| 65° | 7229 | 6344 | 6786 |
| 70° | 6540 | 5931 | 6548 |
| 75° | 5653 | 5562 | 6366 |
| 80° | 4438 | 5242 | 6255 |
| 85° | 2523 | 5016 | 6297 |

MAXIMUM LUMINANCE 45°-90°:

Horizontal Angle: 0°
 Vertical Angle: 45°
 Luminance: 8602 cd/sqm



TEST NUMBER: P1356982
 CATALOG NUMBER: 3ASL4-10-1-40-UNV

ZONAL LUMENS:

| Zone | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10° | 88.1 | 2.8 |
| 10°-20° | 252.8 | 8.1 |
| 20°-30° | 382.3 | 12.3 |
| 30°-40° | 462.1 | 14.8 |
| 40°-50° | 485.8 | 15.6 |
| 50°-60° | 452.6 | 14.5 |
| 60°-70° | 371.8 | 11.9 |
| 70°-80° | 264.0 | 8.5 |
| 80°-90° | 159.1 | 5.1 |
| 90°-100° | 89.1 | 2.9 |
| 100°-110° | 49.4 | 1.6 |
| 110°-120° | 27.5 | 0.9 |
| 120°-130° | 15.9 | 0.5 |
| 130°-140° | 8.7 | 0.3 |
| 140°-150° | 3.9 | 0.1 |
| 150°-160° | 0.9 | 0.0 |
| 160°-170° | 0.0 | 0.0 |
| 170°-180° | 0.0 | 0.0 |
| 0°-30° | 723.2 | 23.2 |
| 0°-40° | 1185.3 | 38.1 |
| 0°-60° | 2123.7 | 68.2 |
| 0°-90° | 2918.7 | 93.7 |
| 90°-120° | 166.0 | 5.3 |
| 90°-150° | 194.4 | 6.2 |
| 90°-180° | 195.0 | 6.3 |
| 0°-180° | 3114.0 | 100.0 |

CANDELA DISTRIBUTION:

| | 0° | 22.5° | 45° | 67.5° | 90° | Flux |
|------|-----|-------|-----|-------|-----|------|
| 0° | 930 | 930 | 930 | 930 | 930 | |
| 5° | 920 | 928 | 927 | 926 | 928 | 87 |
| 15° | 882 | 893 | 898 | 902 | 905 | 249 |
| 25° | 804 | 819 | 830 | 842 | 848 | 370 |
| 35° | 701 | 719 | 741 | 760 | 769 | 438 |
| 45° | 581 | 602 | 632 | 659 | 670 | 448 |
| 55° | 446 | 471 | 508 | 542 | 557 | 399 |
| 65° | 303 | 330 | 378 | 422 | 442 | 299 |
| 75° | 153 | 192 | 255 | 307 | 329 | 163 |
| 85° | 28 | 82 | 154 | 210 | 232 | 35 |
| 90° | 0 | 48 | 115 | 168 | 188 | 1 |
| 95° | 0 | 28 | 84 | 133 | 152 | 0 |
| 105° | 0 | 10 | 44 | 80 | 95 | 0 |
| 115° | 0 | 5 | 27 | 48 | 58 | 0 |
| 125° | 0 | 3 | 17 | 32 | 37 | 0 |
| 135° | 0 | 1 | 10 | 20 | 25 | 0 |
| 145° | 1 | 0 | 4 | 12 | 15 | 1 |
| 155° | 1 | 1 | 0 | 3 | 4 | 1 |
| 165° | 0 | 0 | 0 | 0 | 0 | 0 |
| 175° | 0 | 0 | 0 | 0 | 0 | 0 |
| 180° | 0 | 0 | 0 | 0 | 0 | 0 |



TEST NUMBER: P1356982
 CATALOG NUMBER: 3ASL4-10-1-40-UNV

CANDELA DISTRIBUTION (FULL):

| | 0° | 22.5° | 45° | 67.5° | 90° |
|--------|-------|-------|-------|-------|-------|
| 0° | 930.1 | 930.1 | 930.1 | 930.1 | 930.1 |
| 2.5° | 923.8 | 932.2 | 930.1 | 925.9 | 925.9 |
| 5° | 919.6 | 928.0 | 927.0 | 925.9 | 928.0 |
| 7.5° | 914.3 | 922.8 | 922.8 | 923.8 | 925.9 |
| 10° | 905.9 | 916.4 | 916.4 | 916.4 | 917.5 |
| 12.5° | 895.4 | 905.9 | 908.0 | 909.1 | 911.2 |
| 15° | 881.7 | 893.3 | 897.5 | 901.7 | 904.9 |
| 17.5° | 865.9 | 877.5 | 884.9 | 890.1 | 895.4 |
| 20° | 847.0 | 859.6 | 869.1 | 875.4 | 880.7 |
| 22.5° | 827.0 | 839.6 | 849.1 | 858.6 | 864.9 |
| 25° | 803.9 | 818.6 | 830.2 | 841.7 | 848.1 |
| 27.5° | 780.7 | 795.4 | 810.2 | 823.9 | 831.2 |
| 30° | 754.4 | 771.2 | 788.1 | 803.9 | 811.2 |
| 32.5° | 727.1 | 744.9 | 764.9 | 781.8 | 790.2 |
| 35° | 700.8 | 718.6 | 740.7 | 759.7 | 769.1 |
| 37.5° | 672.3 | 690.2 | 715.5 | 736.5 | 746.0 |
| 40° | 641.8 | 661.8 | 689.2 | 711.3 | 721.8 |
| 42.5° | 612.4 | 632.4 | 661.8 | 686.0 | 696.5 |
| 45° | 580.8 | 601.8 | 632.4 | 658.7 | 670.2 |
| 47.5° | 548.2 | 570.3 | 602.9 | 630.3 | 642.9 |
| 50° | 515.6 | 538.7 | 572.4 | 601.8 | 614.5 |
| 52.5° | 480.8 | 505.0 | 540.8 | 572.4 | 586.1 |
| 55° | 446.1 | 471.4 | 508.2 | 541.9 | 556.6 |
| 57.5° | 411.4 | 436.7 | 476.6 | 512.4 | 528.2 |
| 60° | 375.6 | 401.9 | 443.0 | 481.9 | 499.8 |
| 62.5° | 338.8 | 366.2 | 409.3 | 451.4 | 470.3 |
| 65° | 303.0 | 330.4 | 377.7 | 421.9 | 441.9 |
| 67.5° | 265.1 | 294.6 | 345.1 | 391.4 | 412.5 |
| 70° | 226.2 | 259.9 | 313.5 | 363.0 | 384.0 |
| 72.5° | 191.5 | 226.2 | 284.1 | 334.6 | 356.7 |
| 75° | 152.6 | 191.5 | 254.6 | 307.2 | 329.3 |
| 77.5° | 118.9 | 161.0 | 227.3 | 280.9 | 303.0 |
| 80° | 85.2 | 131.5 | 201.0 | 255.7 | 277.8 |
| 82.5° | 54.7 | 105.2 | 176.8 | 232.5 | 253.6 |
| 85° | 28.4 | 82.1 | 153.6 | 210.4 | 231.5 |
| 87.5° | 8.4 | 63.1 | 132.6 | 188.3 | 209.4 |
| 90° | 0.0 | 48.4 | 114.7 | 168.3 | 188.3 |
| 92.5° | 0.0 | 36.8 | 98.9 | 150.5 | 170.5 |
| 95° | 0.0 | 28.4 | 84.2 | 132.6 | 151.5 |
| 97.5° | 0.0 | 22.1 | 72.6 | 116.8 | 135.7 |
| 100° | 0.0 | 17.9 | 62.1 | 103.1 | 121.0 |
| 102.5° | 0.0 | 14.7 | 53.7 | 91.5 | 107.3 |
| 105° | 0.0 | 10.5 | 44.2 | 80.0 | 94.7 |
| 107.5° | 0.0 | 7.4 | 38.9 | 70.5 | 83.1 |
| 110° | 0.0 | 6.3 | 34.7 | 61.0 | 73.7 |



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 CATALOG NUMBER: 3ASL4-10-1-40-UNV

CANDELA DISTRIBUTION (continued):

| | 0° | 22.5° | 45° | 67.5° | 90° |
|--------|-----|-------|------|-------|------|
| 112.5° | 0.0 | 5.3 | 30.5 | 54.7 | 65.2 |
| 115° | 0.0 | 5.3 | 27.4 | 48.4 | 57.9 |
| 117.5° | 0.0 | 4.2 | 23.1 | 43.1 | 51.6 |
| 120° | 0.0 | 4.2 | 21.0 | 38.9 | 46.3 |
| 122.5° | 0.0 | 3.2 | 18.9 | 34.7 | 42.1 |
| 125° | 0.0 | 3.2 | 16.8 | 31.6 | 36.8 |
| 127.5° | 0.0 | 2.1 | 14.7 | 28.4 | 33.7 |
| 130° | 0.0 | 2.1 | 13.7 | 25.3 | 30.5 |
| 132.5° | 0.0 | 1.1 | 12.6 | 23.1 | 27.4 |
| 135° | 0.0 | 1.1 | 10.5 | 20.0 | 25.3 |
| 137.5° | 0.0 | 0.0 | 9.5 | 17.9 | 22.1 |
| 140° | 0.0 | 0.0 | 7.4 | 15.8 | 20.0 |
| 142.5° | 1.1 | 0.0 | 6.3 | 13.7 | 16.8 |
| 145° | 1.1 | 0.0 | 4.2 | 11.6 | 14.7 |
| 147.5° | 1.1 | 1.1 | 3.2 | 9.5 | 11.6 |
| 150° | 1.1 | 1.1 | 2.1 | 6.3 | 9.5 |
| 152.5° | 1.1 | 1.1 | 1.1 | 4.2 | 6.3 |
| 155° | 1.1 | 1.1 | 0.0 | 3.2 | 4.2 |
| 157.5° | 1.1 | 1.1 | 0.0 | 1.1 | 2.1 |
| 160° | 1.1 | 1.1 | 0.0 | 0.0 | 1.1 |
| 162.5° | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 165° | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 167.5° | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 170° | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 172.5° | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 175° | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 177.5° | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 180° | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |



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CIE UGR TABLE:

| Reflectances: | | | | | | | | | | | |
|-----------------|------|------------------|-------|-------|-------|-------|----------------|-------|-------|-------|-------|
| Ceiling | | 0.7 | 0.7 | 0.5 | 0.5 | 0.3 | 0.7 | 0.7 | 0.5 | 0.5 | 0.3 |
| Wall | | 0.5 | 0.3 | 0.5 | 0.3 | 0.3 | 0.5 | 0.3 | 0.5 | 0.3 | 0.3 |
| Reference plane | | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 |
| Room dimensions | | Viewed crosswise | | | | | Viewed endwise | | | | |
| X=2H | Y=2H | 17.42 | 18.98 | 17.88 | 19.42 | 19.89 | 19.38 | 20.93 | 19.84 | 21.37 | 21.84 |
| | 3H | 18.92 | 20.33 | 19.39 | 20.78 | 21.29 | 21.77 | 23.19 | 22.25 | 23.64 | 24.15 |
| | 4H | 19.39 | 20.73 | 19.88 | 21.20 | 21.72 | 22.93 | 24.27 | 23.42 | 24.74 | 25.26 |
| | 6H | 19.67 | 20.92 | 20.17 | 21.40 | 21.94 | 24.12 | 25.37 | 24.63 | 25.85 | 26.39 |
| | 8H | 19.72 | 20.92 | 20.24 | 21.42 | 21.97 | 24.73 | 25.92 | 25.25 | 26.43 | 26.98 |
| | 12H | 19.73 | 20.88 | 20.26 | 21.38 | 21.96 | 25.39 | 26.54 | 25.91 | 27.04 | 27.61 |
| 4H | 2H | 18.28 | 19.62 | 18.78 | 20.09 | 20.62 | 19.81 | 21.15 | 20.31 | 21.62 | 22.15 |
| | 3H | 20.01 | 21.15 | 20.52 | 21.67 | 22.21 | 22.43 | 23.58 | 22.94 | 24.09 | 24.64 |
| | 4H | 20.61 | 21.65 | 21.14 | 22.18 | 22.76 | 23.76 | 24.80 | 24.28 | 25.33 | 25.90 |
| | 6H | 21.01 | 21.93 | 21.55 | 22.48 | 23.07 | 25.14 | 26.06 | 25.68 | 26.61 | 27.20 |
| | 8H | 21.10 | 21.97 | 21.65 | 22.52 | 23.12 | 25.85 | 26.72 | 26.40 | 27.27 | 27.87 |
| | 12H | 21.14 | 21.93 | 21.72 | 22.51 | 23.12 | 26.63 | 27.42 | 27.21 | 28.00 | 28.61 |
| 8H | 4H | 21.25 | 22.12 | 21.81 | 22.67 | 23.28 | 23.97 | 24.84 | 24.52 | 25.39 | 25.99 |
| | 6H | 21.82 | 22.56 | 22.41 | 23.15 | 23.76 | 25.52 | 26.25 | 26.10 | 26.85 | 27.46 |
| | 8H | 22.00 | 22.66 | 22.60 | 23.27 | 23.89 | 26.37 | 27.03 | 26.96 | 27.64 | 28.26 |
| | 12H | 22.11 | 22.70 | 22.71 | 23.29 | 23.98 | 27.34 | 27.93 | 27.93 | 28.52 | 29.21 |
| 12H | 4H | 21.43 | 22.22 | 22.01 | 22.80 | 23.41 | 23.98 | 24.77 | 24.55 | 25.35 | 25.96 |
| | 6H | 22.09 | 22.76 | 22.69 | 23.36 | 23.99 | 25.55 | 26.22 | 26.15 | 26.82 | 27.45 |
| | 8H | 22.36 | 22.95 | 22.96 | 23.55 | 24.24 | 26.47 | 27.06 | 27.07 | 27.66 | 28.35 |

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

Report Prepared for

Cooper Lighting Solutions

Fail-Safe

Report Number: SP1-2511-597-4

Test Date: 11/18/2025

Luminaire Tested: 4ASL-2-40-UNV-OPL-1_600mA

Data in this report applies to families of products including 4ASL

Test Information

Test Method: LM-79-2019
 Report Number: SP1-2511-597-4
 Test Lab: COOPER LIGHTING SOLUTIONS
 Photometer: SP1 - 76IN SPHERE
 Measurement Geometry: 4π
 Issue Date: 11/18/2025
 Manufacturer: COOPER LIGHTING SOLUTIONS
 Product Line: Fail-Safe
 Catalog Number: **4ASL-2-40-UNV-OPL-1_600mA**
 Description: 2foot 4ASL LED LUMINAIRE WITH OPL LENS AND 4000K LEDs with 1 rows at 600mA

Spectral Parameters

CCT (K): 4015
 CIE u': 0.2259
 CIE v': 0.4990
 Duv: -0.0019
 CIE x: 0.3785
 CIE y: 0.3715
 CIE z: 0.2500
 Peak Wavelength (nm): 630
 Dominant Wavelength (nm): 580
 Purity: 25.06827
 R_f: 90.7
 R_g: 100.2

CRI (Ra): 93.9
 R1: 95.7
 R2: 96.3
 R3: 94.8
 R4: 95.2
 R5: 94.6
 R6: 93.5
 R7: 94.0
 R8: 87.2
 R9: 66.3
 R10: 89.1
 R11: 95.0
 R12: 73.8
 R13: 96.0
 R14: 96.4
 R15: 93.2



Test Conditions

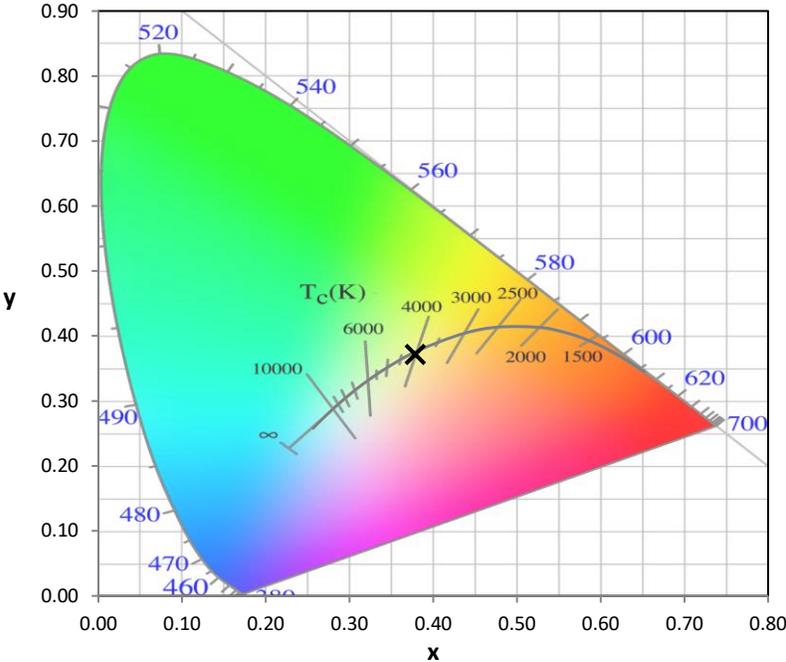
Stabilization Time: 23M
 Operation Time: 1H 23M
 Sphere Temperature (°C): 24.1

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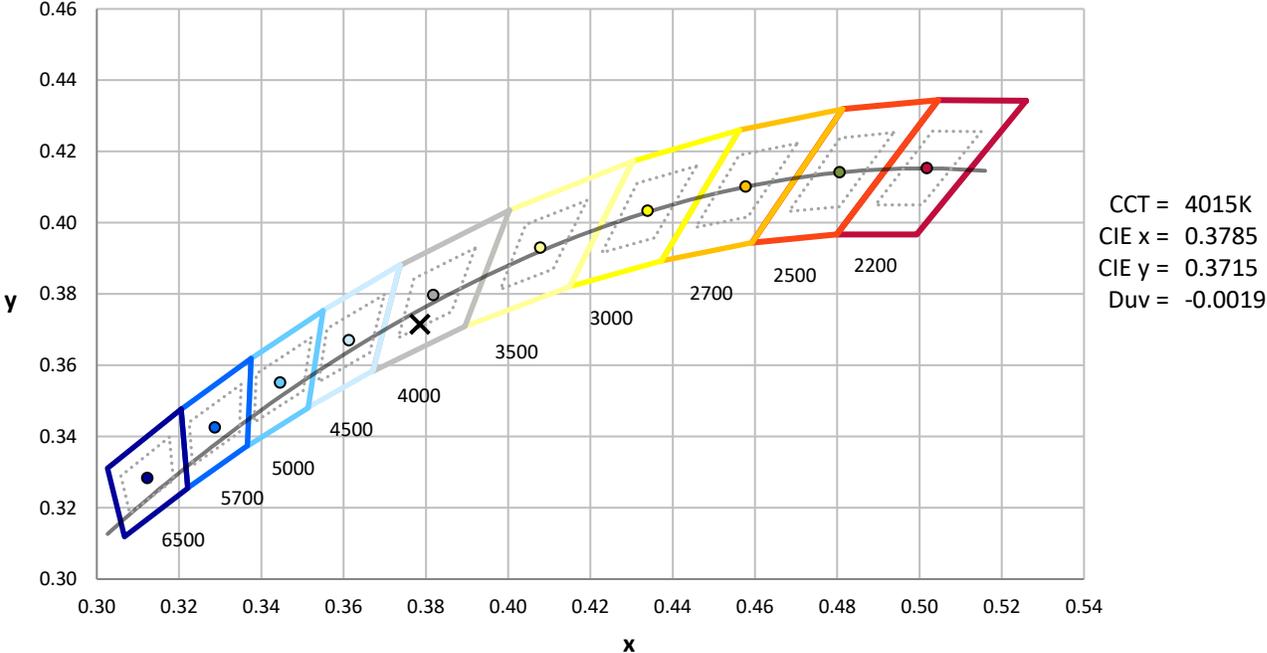
| Measurement and Test Equipment | | | |
|--------------------------------|-----------------------|------------------|----------------------|
| Instrument | Identification Number | Calibration Date | Calibration Due Date |
| Photometer | 76INCH SPHERE IN0058 | 6/16/2025 | 12/16/2025 |
| Power Meter | XITRON INXT2011004 | 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 |

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CIE 1931 Chromaticity Diagram



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

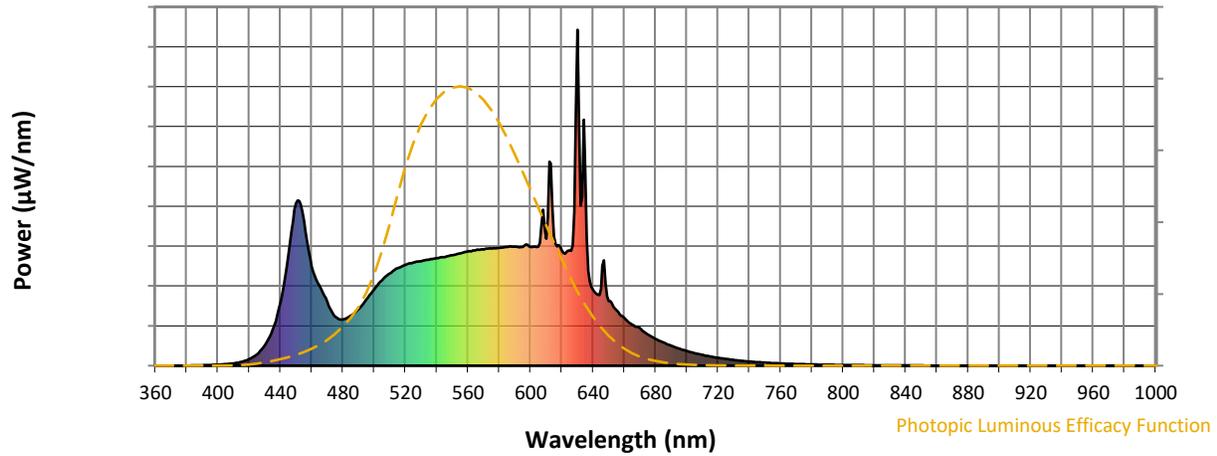


CCT = 4015K
 CIE x = 0.3785
 CIE y = 0.3715
 Duv = -0.0019

Point lies inside the ANSI 4000K 4-step quadrangle

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Photopic Flux vs. Wavelength

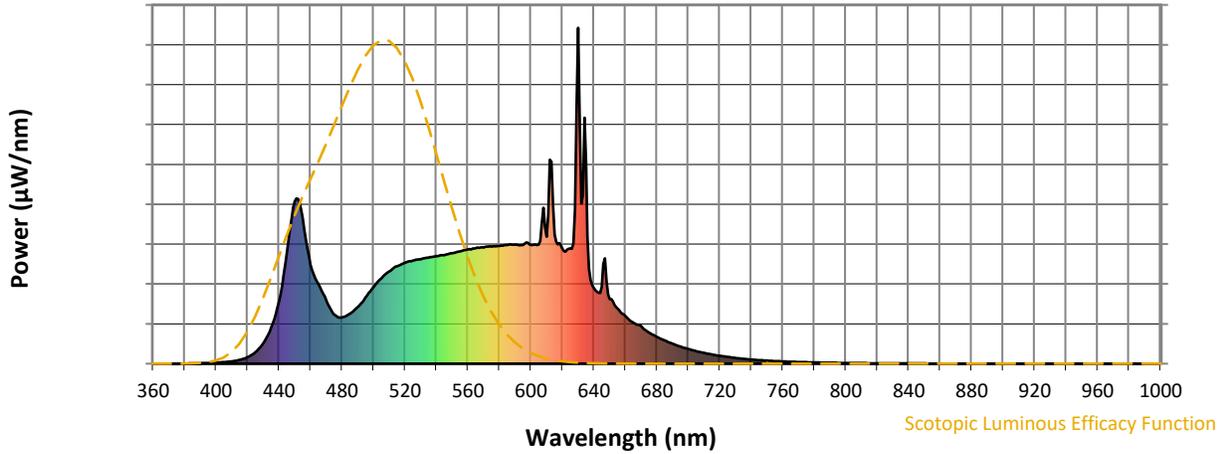


Photopic Lumens: NR

| 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 | 169 | NR | 620 | 343 | NR | 750 | 9 | NR | 880 | 0 | NR |
| 365 | 0 | NR | 495 | 197 | NR | 625 | 343 | NR | 755 | 8 | NR | 885 | 0 | NR |
| 370 | 0 | NR | 500 | 228 | NR | 630 | 1000 | NR | 760 | 7 | NR | 890 | 0 | NR |
| 375 | 0 | NR | 505 | 254 | NR | 635 | 591 | NR | 765 | 6 | NR | 895 | 0 | NR |
| 380 | 0 | NR | 510 | 274 | NR | 640 | 225 | NR | 770 | 5 | NR | 900 | 0 | NR |
| 385 | 1 | NR | 515 | 290 | NR | 645 | 229 | NR | 775 | 4 | NR | 905 | 0 | NR |
| 390 | 1 | NR | 520 | 300 | NR | 650 | 193 | NR | 780 | 4 | NR | 910 | 0 | NR |
| 395 | 2 | NR | 525 | 307 | NR | 655 | 165 | NR | 785 | 3 | NR | 915 | 0 | NR |
| 400 | 3 | NR | 530 | 311 | NR | 660 | 142 | NR | 790 | 3 | NR | 920 | 0 | NR |
| 405 | 5 | NR | 535 | 316 | NR | 665 | 122 | NR | 795 | 2 | NR | 925 | 0 | NR |
| 410 | 7 | NR | 540 | 320 | NR | 670 | 112 | NR | 800 | 2 | NR | 930 | 0 | NR |
| 415 | 11 | NR | 545 | 323 | NR | 675 | 93 | NR | 805 | 2 | NR | 935 | 0 | NR |
| 420 | 20 | NR | 550 | 329 | NR | 680 | 80 | NR | 810 | 2 | NR | 940 | 0 | NR |
| 425 | 35 | NR | 555 | 334 | NR | 685 | 69 | NR | 815 | 1 | NR | 945 | 0 | NR |
| 430 | 61 | NR | 560 | 340 | NR | 690 | 59 | NR | 820 | 1 | NR | 950 | 0 | NR |
| 435 | 108 | NR | 565 | 344 | NR | 695 | 51 | NR | 825 | 1 | NR | 955 | 0 | NR |
| 440 | 187 | NR | 570 | 346 | NR | 700 | 43 | NR | 830 | 1 | NR | 960 | 0 | NR |
| 445 | 329 | NR | 575 | 349 | NR | 705 | 37 | NR | 835 | 1 | NR | 965 | 0 | NR |
| 450 | 484 | NR | 580 | 351 | NR | 710 | 32 | NR | 840 | 1 | NR | 970 | 0 | NR |
| 455 | 433 | NR | 585 | 353 | NR | 715 | 27 | NR | 845 | 1 | NR | 975 | 0 | NR |
| 460 | 296 | NR | 590 | 354 | NR | 720 | 23 | NR | 850 | 1 | NR | 980 | 0 | NR |
| 465 | 237 | NR | 595 | 353 | NR | 725 | 20 | NR | 855 | 0 | NR | 985 | 0 | NR |
| 470 | 188 | NR | 600 | 354 | NR | 730 | 17 | NR | 860 | 0 | NR | 990 | 0 | NR |
| 475 | 146 | NR | 605 | 354 | NR | 735 | 15 | NR | 865 | 0 | NR | 995 | 0 | NR |
| 480 | 138 | NR | 610 | 378 | NR | 740 | 12 | NR | 870 | 0 | NR | 1000 | 0 | NR |
| 485 | 149 | NR | 615 | 385 | NR | 745 | 11 | NR | 875 | 0 | NR | | | |

REPORT NUMBER: SP1-2511-597-4

Scotopic Flux vs. Wavelength



Scotopic Lumens: NR

S/P: 1.79

| 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 | 169 | NR | 620 | 343 | NR | 750 | 9 | NR | 880 | 0 | NR |
| 365 | 0 | NR | 495 | 197 | NR | 625 | 343 | NR | 755 | 8 | NR | 885 | 0 | NR |
| 370 | 0 | NR | 500 | 228 | NR | 630 | 1000 | NR | 760 | 7 | NR | 890 | 0 | NR |
| 375 | 0 | NR | 505 | 254 | NR | 635 | 591 | NR | 765 | 6 | NR | 895 | 0 | NR |
| 380 | 0 | NR | 510 | 274 | NR | 640 | 225 | NR | 770 | 5 | NR | 900 | 0 | NR |
| 385 | 1 | NR | 515 | 290 | NR | 645 | 229 | NR | 775 | 4 | NR | 905 | 0 | NR |
| 390 | 1 | NR | 520 | 300 | NR | 650 | 193 | NR | 780 | 4 | NR | 910 | 0 | NR |
| 395 | 2 | NR | 525 | 307 | NR | 655 | 165 | NR | 785 | 3 | NR | 915 | 0 | NR |
| 400 | 3 | NR | 530 | 311 | NR | 660 | 142 | NR | 790 | 3 | NR | 920 | 0 | NR |
| 405 | 5 | NR | 535 | 316 | NR | 665 | 122 | NR | 795 | 2 | NR | 925 | 0 | NR |
| 410 | 7 | NR | 540 | 320 | NR | 670 | 112 | NR | 800 | 2 | NR | 930 | 0 | NR |
| 415 | 11 | NR | 545 | 323 | NR | 675 | 93 | NR | 805 | 2 | NR | 935 | 0 | NR |
| 420 | 20 | NR | 550 | 329 | NR | 680 | 80 | NR | 810 | 2 | NR | 940 | 0 | NR |
| 425 | 35 | NR | 555 | 334 | NR | 685 | 69 | NR | 815 | 1 | NR | 945 | 0 | NR |
| 430 | 61 | NR | 560 | 340 | NR | 690 | 59 | NR | 820 | 1 | NR | 950 | 0 | NR |
| 435 | 108 | NR | 565 | 344 | NR | 695 | 51 | NR | 825 | 1 | NR | 955 | 0 | NR |
| 440 | 187 | NR | 570 | 346 | NR | 700 | 43 | NR | 830 | 1 | NR | 960 | 0 | NR |
| 445 | 329 | NR | 575 | 349 | NR | 705 | 37 | NR | 835 | 1 | NR | 965 | 0 | NR |
| 450 | 484 | NR | 580 | 351 | NR | 710 | 32 | NR | 840 | 1 | NR | 970 | 0 | NR |
| 455 | 433 | NR | 585 | 353 | NR | 715 | 27 | NR | 845 | 1 | NR | 975 | 0 | NR |
| 460 | 296 | NR | 590 | 354 | NR | 720 | 23 | NR | 850 | 1 | NR | 980 | 0 | NR |
| 465 | 237 | NR | 595 | 353 | NR | 725 | 20 | NR | 855 | 0 | NR | 985 | 0 | NR |
| 470 | 188 | NR | 600 | 354 | NR | 730 | 17 | NR | 860 | 0 | NR | 990 | 0 | NR |
| 475 | 146 | NR | 605 | 354 | NR | 735 | 15 | NR | 865 | 0 | NR | 995 | 0 | NR |
| 480 | 138 | NR | 610 | 378 | NR | 740 | 12 | NR | 870 | 0 | NR | 1000 | 0 | NR |
| 485 | 149 | NR | 615 | 385 | NR | 745 | 11 | NR | 875 | 0 | NR | | | |

REPORT NUMBER: SP1-2511-597-4

Melanopic Flux vs. Wavelength



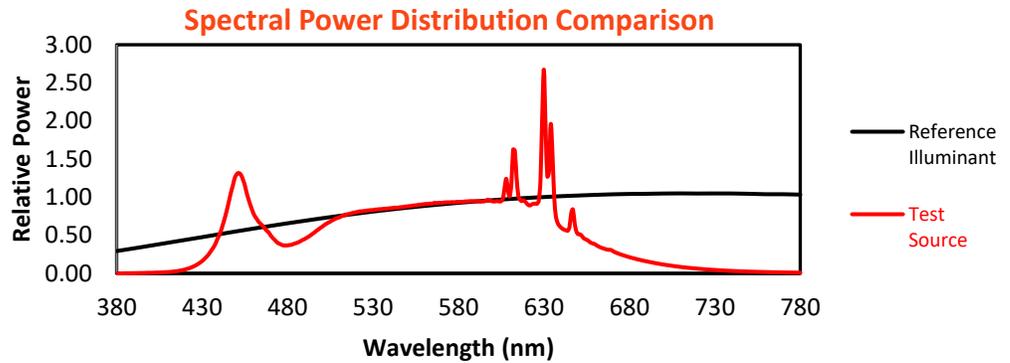
Melanopic Lumens: NR

M/P: 3.74

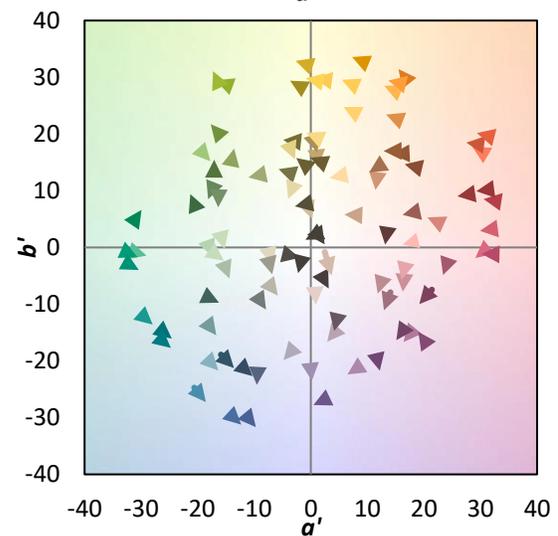
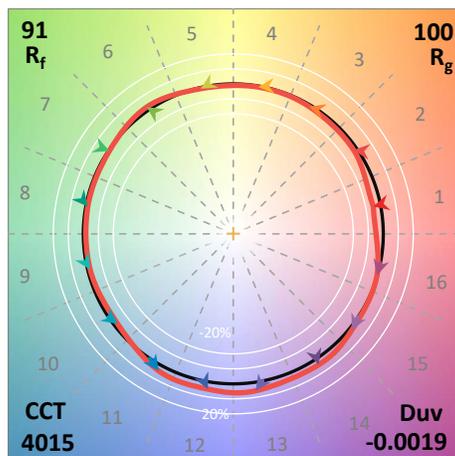
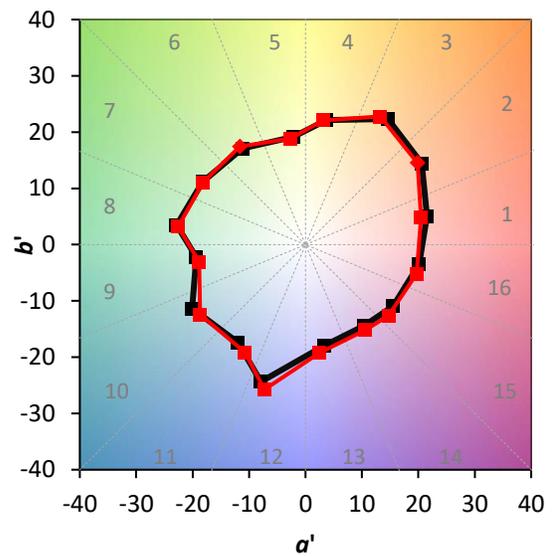
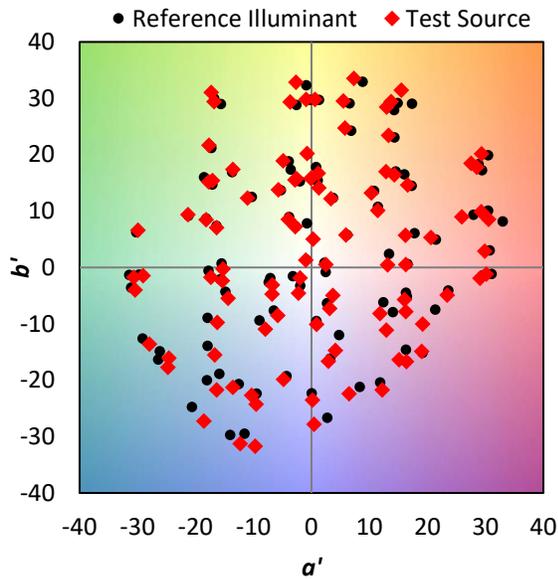
| λ (nm) | Power W [^] /nm | Lumens (φ/nm) | λ (nm) | Power W [^] /nm | Lumens (φ/nm) | λ (nm) | Power W [^] /nm | Lumens (φ/nm) | λ (nm) | Power W [^] /nm | Lumens (φ/nm) | λ (nm) | Power W [^] /nm | Lumens (φ/nm) |
|--------|--------------------------|---------------|--------|--------------------------|---------------|--------|--------------------------|---------------|--------|--------------------------|---------------|--------|--------------------------|---------------|
| 360 | 0 | NR | 490 | 169 | NR | 620 | 343 | NR | 750 | 9 | NR | 880 | 0 | NR |
| 365 | 0 | NR | 495 | 197 | NR | 625 | 343 | NR | 755 | 8 | NR | 885 | 0 | NR |
| 370 | 0 | NR | 500 | 228 | NR | 630 | 1000 | NR | 760 | 7 | NR | 890 | 0 | NR |
| 375 | 0 | NR | 505 | 254 | NR | 635 | 591 | NR | 765 | 6 | NR | 895 | 0 | NR |
| 380 | 0 | NR | 510 | 274 | NR | 640 | 225 | NR | 770 | 5 | NR | 900 | 0 | NR |
| 385 | 1 | NR | 515 | 290 | NR | 645 | 229 | NR | 775 | 4 | NR | 905 | 0 | NR |
| 390 | 1 | NR | 520 | 300 | NR | 650 | 193 | NR | 780 | 4 | NR | 910 | 0 | NR |
| 395 | 2 | NR | 525 | 307 | NR | 655 | 165 | NR | 785 | 3 | NR | 915 | 0 | NR |
| 400 | 3 | NR | 530 | 311 | NR | 660 | 142 | NR | 790 | 3 | NR | 920 | 0 | NR |
| 405 | 5 | NR | 535 | 316 | NR | 665 | 122 | NR | 795 | 2 | NR | 925 | 0 | NR |
| 410 | 7 | NR | 540 | 320 | NR | 670 | 112 | NR | 800 | 2 | NR | 930 | 0 | NR |
| 415 | 11 | NR | 545 | 323 | NR | 675 | 93 | NR | 805 | 2 | NR | 935 | 0 | NR |
| 420 | 20 | NR | 550 | 329 | NR | 680 | 80 | NR | 810 | 2 | NR | 940 | 0 | NR |
| 425 | 35 | NR | 555 | 334 | NR | 685 | 69 | NR | 815 | 1 | NR | 945 | 0 | NR |
| 430 | 61 | NR | 560 | 340 | NR | 690 | 59 | NR | 820 | 1 | NR | 950 | 0 | NR |
| 435 | 108 | NR | 565 | 344 | NR | 695 | 51 | NR | 825 | 1 | NR | 955 | 0 | NR |
| 440 | 187 | NR | 570 | 346 | NR | 700 | 43 | NR | 830 | 1 | NR | 960 | 0 | NR |
| 445 | 329 | NR | 575 | 349 | NR | 705 | 37 | NR | 835 | 1 | NR | 965 | 0 | NR |
| 450 | 484 | NR | 580 | 351 | NR | 710 | 32 | NR | 840 | 1 | NR | 970 | 0 | NR |
| 455 | 433 | NR | 585 | 353 | NR | 715 | 27 | NR | 845 | 1 | NR | 975 | 0 | NR |
| 460 | 296 | NR | 590 | 354 | NR | 720 | 23 | NR | 850 | 1 | NR | 980 | 0 | NR |
| 465 | 237 | NR | 595 | 353 | NR | 725 | 20 | NR | 855 | 0 | NR | 985 | 0 | NR |
| 470 | 188 | NR | 600 | 354 | NR | 730 | 17 | NR | 860 | 0 | NR | 990 | 0 | NR |
| 475 | 146 | NR | 605 | 354 | NR | 735 | 15 | NR | 865 | 0 | NR | 995 | 0 | NR |
| 480 | 138 | NR | 610 | 378 | NR | 740 | 12 | NR | 870 | 0 | NR | 1000 | 0 | NR |
| 485 | 149 | NR | 615 | 385 | NR | 745 | 11 | NR | 875 | 0 | NR | | | |

Summary

$R_f = 90.7$
 $R_g = 100.2$
 CIE $R_a = 93.9$
 $R_9 = 66.3$

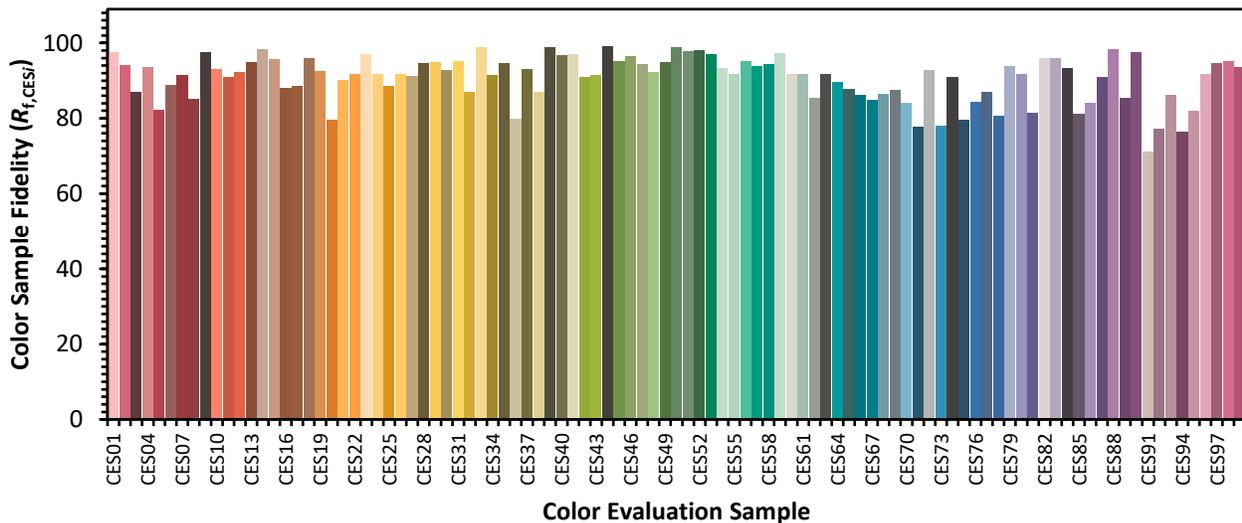


Color Vector Graphics



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

| | | | |
|------------|------------|------------|------------|
| CES01 = 86 | CES26 = 92 | CES51 = 98 | CES76 = 84 |
| CES02 = 62 | CES27 = 91 | CES52 = 98 | CES77 = 87 |
| CES03 = 31 | CES28 = 95 | CES53 = 97 | CES78 = 81 |
| CES04 = 69 | CES29 = 95 | CES54 = 93 | CES79 = 94 |
| CES05 = 49 | CES30 = 93 | CES55 = 92 | CES80 = 92 |
| CES06 = 50 | CES31 = 95 | CES56 = 95 | CES81 = 81 |
| CES07 = 42 | CES32 = 87 | CES57 = 94 | CES82 = 96 |
| CES08 = 41 | CES33 = 99 | CES58 = 94 | CES83 = 96 |
| CES09 = 29 | CES34 = 91 | CES59 = 97 | CES84 = 93 |
| 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 = 87 | CES63 = 92 | CES88 = 98 |
| CES14 = 74 | CES39 = 99 | CES64 = 90 | CES89 = 85 |
| CES15 = 71 | CES40 = 97 | CES65 = 88 | CES90 = 98 |
| CES16 = 47 | CES41 = 97 | CES66 = 86 | CES91 = 71 |
| CES17 = 49 | CES42 = 91 | CES67 = 85 | CES92 = 77 |
| CES18 = 56 | CES43 = 91 | CES68 = 87 | CES93 = 86 |
| CES19 = 71 | CES44 = 99 | CES69 = 87 | CES94 = 76 |
| CES20 = 66 | CES45 = 95 | CES70 = 84 | CES95 = 82 |
| CES21 = 85 | CES46 = 96 | CES71 = 78 | CES96 = 92 |
| CES22 = 78 | CES47 = 94 | CES72 = 93 | CES97 = 95 |
| CES23 = 91 | CES48 = 92 | CES73 = 78 | CES98 = 95 |
| CES24 = 90 | CES49 = 95 | CES74 = 91 | CES99 = 94 |
| CES25 = 71 | CES50 = 99 | CES75 = 80 | |



Color Rendition by Hue-Angle Bin



Measure Comparisons



(END OF REPORT)