

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: P1356993

Luminaire Tested: 3ASL4-10HE-2-65-UNV

Issue Date: 2/17/2026

Test Information

Test Method: LM-79-2019
Report Number: P1356993
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-2511-597-7)
Test Lab: INNOVATION CENTER
Issue Date: 2/17/2026
Manufacturer: COOPER LIGHTING SOLUTIONS
Product Line: FAIL-SAFE
Catalog Number: 3ASL4-10HE-2-65-UNV
Description: 3FT 1000 LUMEN PER FOOT 4ASL LED LUMINAIRE WITH OPL LENS AND 6500K LEDS 2 ROW
Light Source: -
Ballast/Driver: -

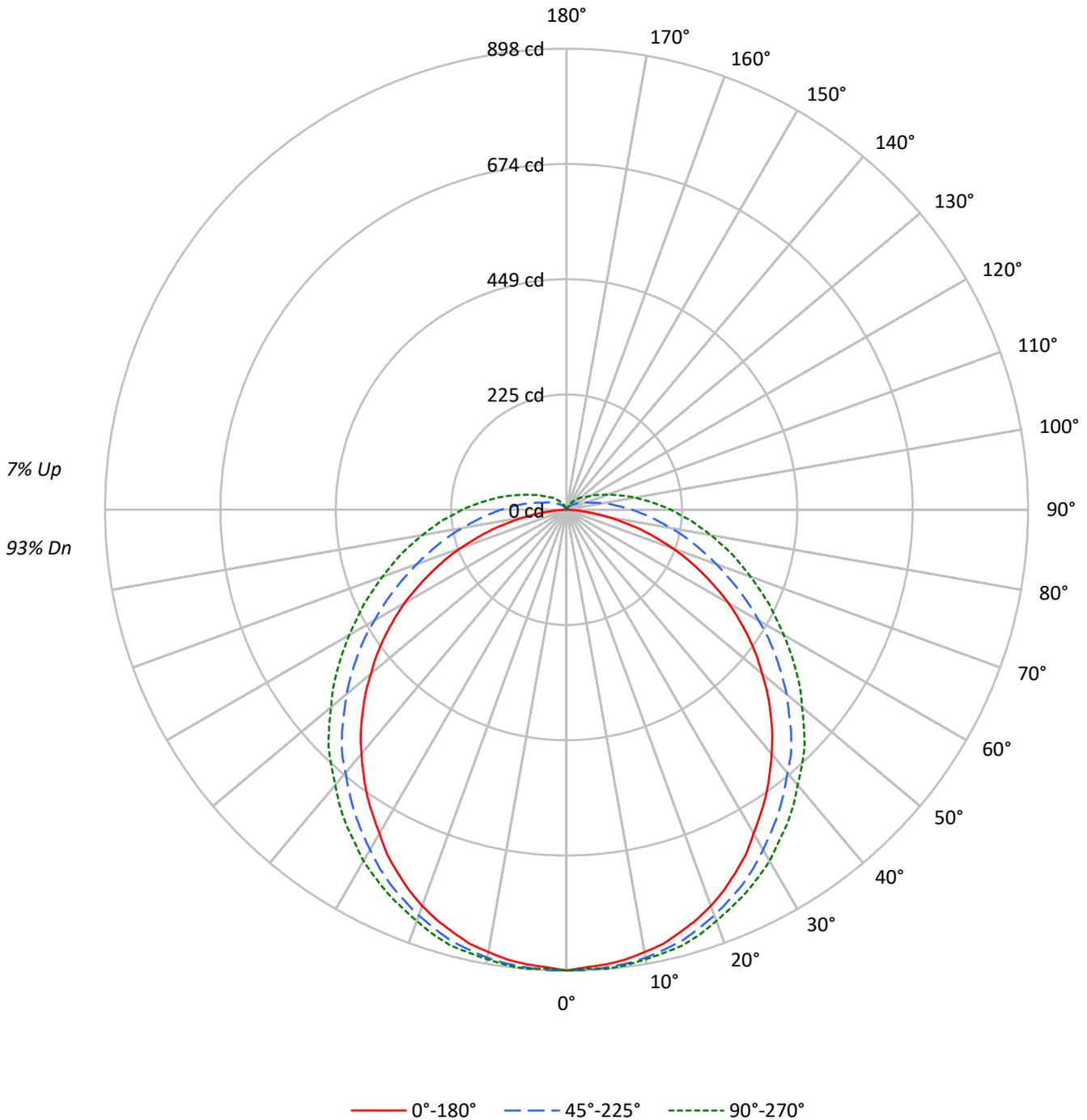
Summary

Lumens per Lamp: N/A
Luminaire Lumens: 3081.0 lumens
Efficiency: N/A
Efficacy: 123.7 lumens/watt
Spacing Criteria (0/90/45): 1.21 / 1.3 / 1.4
Luminous Opening: Rectangular w/ Sides (W: 0.33' x L: 2.98' x H: 0.1')
CIE Type: Direct

Input Watts (W): 24.9
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: P1356993
CATALOG NUMBER: 3ASL4-10HE-2-65-UNV

Luminous Intensity Polar Plot





TEST NUMBER: P1356993

CATALOG NUMBER: 3ASL4-10HE-2-65-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 | 117 | 117 | 117 | 117 | 114 | 114 | 114 | 114 | 107 | 107 | 107 | 101 | 101 | 101 | 95 | 95 | 95 | 95 | 95 | 95 | 93 |
| 1 | 105 | 100 | 95 | 90 | 102 | 97 | 92 | 88 | 91 | 87 | 84 | 86 | 83 | 80 | 81 | 79 | 77 | 77 | 77 | 77 | 74 |
| 2 | 95 | 86 | 79 | 72 | 92 | 84 | 77 | 71 | 79 | 73 | 68 | 74 | 70 | 65 | 70 | 66 | 63 | 63 | 63 | 63 | 60 |
| 3 | 86 | 75 | 66 | 59 | 83 | 73 | 65 | 58 | 69 | 62 | 56 | 65 | 59 | 55 | 62 | 57 | 53 | 53 | 53 | 53 | 50 |
| 4 | 79 | 66 | 57 | 50 | 76 | 64 | 56 | 49 | 61 | 54 | 48 | 58 | 51 | 46 | 55 | 49 | 45 | 45 | 45 | 45 | 42 |
| 5 | 72 | 59 | 50 | 43 | 70 | 57 | 49 | 42 | 54 | 47 | 41 | 52 | 45 | 40 | 49 | 43 | 39 | 39 | 39 | 39 | 36 |
| 6 | 67 | 53 | 44 | 37 | 64 | 52 | 43 | 37 | 49 | 41 | 36 | 47 | 40 | 35 | 44 | 39 | 34 | 34 | 34 | 34 | 32 |
| 7 | 62 | 48 | 39 | 33 | 60 | 47 | 38 | 32 | 45 | 37 | 32 | 43 | 36 | 31 | 41 | 35 | 30 | 30 | 30 | 30 | 28 |
| 8 | 58 | 44 | 35 | 29 | 56 | 43 | 34 | 29 | 41 | 33 | 28 | 39 | 32 | 28 | 37 | 31 | 27 | 27 | 27 | 27 | 25 |
| 9 | 54 | 40 | 32 | 26 | 52 | 39 | 31 | 26 | 37 | 30 | 25 | 36 | 29 | 25 | 34 | 29 | 24 | 24 | 24 | 24 | 22 |
| 10 | 50 | 37 | 29 | 24 | 49 | 36 | 28 | 23 | 35 | 28 | 23 | 33 | 27 | 22 | 32 | 26 | 22 | 22 | 22 | 22 | 20 |

AVERAGE LUMINANCE (cd/sqm):

| | 0° | 45° | 90° |
|-----|------|------|------|
| 0° | 9728 | 9728 | 9728 |
| 5° | 9643 | 9529 | 9506 |
| 10° | 9571 | 9349 | 9274 |
| 15° | 9475 | 9151 | 9088 |
| 20° | 9355 | 8905 | 8827 |
| 25° | 9166 | 8662 | 8603 |
| 30° | 8933 | 8383 | 8379 |
| 35° | 8748 | 8125 | 8120 |
| 40° | 8535 | 7847 | 7846 |
| 45° | 8318 | 7606 | 7648 |
| 50° | 8041 | 7289 | 7351 |
| 55° | 7772 | 6948 | 7117 |
| 60° | 7442 | 6566 | 6867 |
| 65° | 6936 | 6210 | 6674 |
| 70° | 6364 | 5873 | 6497 |
| 75° | 5542 | 5610 | 6438 |
| 80° | 4261 | 5373 | 6417 |
| 85° | 2506 | 5346 | 6602 |

MAXIMUM LUMINANCE 45°-90°:

Horizontal Angle: 0°
 Vertical Angle: 45°
 Luminance: 8318 cd/sqm



TEST NUMBER: P1356993
 CATALOG NUMBER: 3ASL4-10HE-2-65-UNV

ZONAL LUMENS:

| Zone | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10° | 85.1 | 2.8 |
| 10°-20° | 244.7 | 7.9 |
| 20°-30° | 370.7 | 12.0 |
| 30°-40° | 448.4 | 14.6 |
| 40°-50° | 472.7 | 15.3 |
| 50°-60° | 441.2 | 14.3 |
| 60°-70° | 364.2 | 11.8 |
| 70°-80° | 264.2 | 8.6 |
| 80°-90° | 166.9 | 5.4 |
| 90°-100° | 99.7 | 3.2 |
| 100°-110° | 57.1 | 1.9 |
| 110°-120° | 32.4 | 1.1 |
| 120°-130° | 18.5 | 0.6 |
| 130°-140° | 10.0 | 0.3 |
| 140°-150° | 4.4 | 0.1 |
| 150°-160° | 0.8 | 0.0 |
| 160°-170° | 0.0 | 0.0 |
| 170°-180° | 0.0 | 0.0 |
| 0°-30° | 700.5 | 22.7 |
| 0°-40° | 1148.8 | 37.3 |
| 0°-60° | 2062.7 | 66.9 |
| 0°-90° | 2858.1 | 92.8 |
| 90°-120° | 189.2 | 6.1 |
| 90°-150° | 222.1 | 7.2 |
| 90°-180° | 223.0 | 7.2 |
| 0°-180° | 3081.0 | 100.0 |

CANDELA DISTRIBUTION:

| | 0° | 22.5° | 45° | 67.5° | 90° | Flux |
|------|-----|-------|-----|-------|-----|------|
| 0° | 898 | 898 | 898 | 898 | 898 | |
| 5° | 889 | 898 | 895 | 895 | 898 | 84 |
| 15° | 852 | 864 | 869 | 872 | 878 | 241 |
| 25° | 779 | 790 | 807 | 818 | 824 | 359 |
| 35° | 677 | 694 | 720 | 739 | 748 | 423 |
| 45° | 562 | 584 | 618 | 644 | 655 | 433 |
| 55° | 432 | 457 | 497 | 531 | 545 | 386 |
| 65° | 291 | 322 | 370 | 415 | 435 | 289 |
| 75° | 150 | 189 | 257 | 310 | 333 | 157 |
| 85° | 28 | 88 | 164 | 220 | 243 | 35 |
| 90° | 0 | 54 | 127 | 181 | 203 | 1 |
| 95° | 0 | 34 | 96 | 147 | 166 | 0 |
| 105° | 0 | 11 | 54 | 93 | 107 | 0 |
| 115° | 0 | 6 | 31 | 56 | 68 | 0 |
| 125° | 0 | 3 | 20 | 37 | 42 | 0 |
| 135° | 0 | 0 | 11 | 23 | 28 | 0 |
| 145° | 0 | 0 | 6 | 14 | 17 | 0 |
| 155° | 0 | 0 | 0 | 3 | 6 | 0 |
| 165° | 0 | 0 | 0 | 0 | 0 | 0 |
| 175° | 0 | 0 | 0 | 0 | 0 | 0 |
| 180° | 0 | 0 | 0 | 0 | 0 | 0 |



TEST NUMBER: P1356993

CATALOG NUMBER: 3ASL4-10HE-2-65-UNV

CANDELA DISTRIBUTION (FULL):

| | 0° | 22.5° | 45° | 67.5° | 90° |
|--------|-------|-------|-------|-------|-------|
| 0° | 897.5 | 897.5 | 897.5 | 897.5 | 897.5 |
| 2.5° | 891.8 | 900.3 | 897.5 | 894.6 | 894.6 |
| 5° | 889.0 | 897.5 | 894.6 | 894.6 | 897.5 |
| 7.5° | 883.4 | 891.8 | 891.8 | 891.8 | 894.6 |
| 10° | 874.9 | 886.2 | 886.2 | 886.2 | 889.0 |
| 12.5° | 866.4 | 874.9 | 877.7 | 880.5 | 883.4 |
| 15° | 852.3 | 863.6 | 869.2 | 872.1 | 877.7 |
| 17.5° | 838.2 | 846.7 | 855.1 | 863.6 | 866.4 |
| 20° | 821.3 | 832.6 | 841.0 | 849.5 | 852.3 |
| 22.5° | 801.5 | 812.8 | 824.1 | 832.6 | 838.2 |
| 25° | 778.9 | 790.2 | 807.2 | 818.4 | 824.1 |
| 27.5° | 756.4 | 767.6 | 787.4 | 801.5 | 807.2 |
| 30° | 728.1 | 745.1 | 764.8 | 781.8 | 790.2 |
| 32.5° | 702.7 | 719.7 | 742.2 | 762.0 | 767.6 |
| 35° | 677.3 | 694.3 | 719.7 | 739.4 | 747.9 |
| 37.5° | 649.1 | 668.9 | 694.3 | 716.8 | 725.3 |
| 40° | 620.9 | 640.6 | 668.9 | 694.3 | 699.9 |
| 42.5° | 592.7 | 612.4 | 646.3 | 668.9 | 677.3 |
| 45° | 561.6 | 584.2 | 618.1 | 643.5 | 654.8 |
| 47.5° | 530.6 | 553.2 | 587.0 | 615.2 | 626.5 |
| 50° | 496.7 | 522.1 | 558.8 | 587.0 | 598.3 |
| 52.5° | 465.7 | 491.1 | 527.8 | 558.8 | 572.9 |
| 55° | 431.8 | 457.2 | 496.7 | 530.6 | 544.7 |
| 57.5° | 397.9 | 423.3 | 465.7 | 502.4 | 516.5 |
| 60° | 364.1 | 389.5 | 431.8 | 474.1 | 488.2 |
| 62.5° | 327.4 | 355.6 | 400.8 | 443.1 | 460.0 |
| 65° | 290.7 | 321.7 | 369.7 | 414.9 | 434.6 |
| 67.5° | 256.8 | 287.9 | 338.7 | 389.5 | 406.4 |
| 70° | 220.1 | 254.0 | 310.4 | 361.2 | 381.0 |
| 72.5° | 183.4 | 220.1 | 282.2 | 335.8 | 355.6 |
| 75° | 149.6 | 189.1 | 256.8 | 310.4 | 333.0 |
| 77.5° | 112.9 | 160.9 | 231.4 | 287.9 | 307.6 |
| 80° | 81.8 | 132.6 | 206.0 | 265.3 | 285.0 |
| 82.5° | 53.6 | 107.2 | 183.4 | 242.7 | 262.5 |
| 85° | 28.2 | 87.5 | 163.7 | 220.1 | 242.7 |
| 87.5° | 8.5 | 67.7 | 143.9 | 200.4 | 220.1 |
| 90° | 0.0 | 53.6 | 127.0 | 180.6 | 203.2 |
| 92.5° | 0.0 | 42.3 | 110.1 | 163.7 | 183.4 |
| 95° | 0.0 | 33.9 | 96.0 | 146.8 | 166.5 |
| 97.5° | 0.0 | 28.2 | 84.7 | 132.6 | 149.6 |
| 100° | 0.0 | 22.6 | 73.4 | 118.5 | 135.5 |
| 102.5° | 0.0 | 16.9 | 62.1 | 104.4 | 121.4 |
| 105° | 0.0 | 11.3 | 53.6 | 93.1 | 107.2 |
| 107.5° | 0.0 | 8.5 | 45.2 | 81.8 | 96.0 |
| 110° | 0.0 | 8.5 | 42.3 | 70.6 | 84.7 |



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 CATALOG NUMBER: 3ASL4-10HE-2-65-UNV

CANDELA DISTRIBUTION (continued):

| | 0° | 22.5° | 45° | 67.5° | 90° |
|--------|-----|-------|------|-------|------|
| 112.5° | 0.0 | 5.6 | 36.7 | 64.9 | 76.2 |
| 115° | 0.0 | 5.6 | 31.0 | 56.4 | 67.7 |
| 117.5° | 0.0 | 5.6 | 28.2 | 50.8 | 62.1 |
| 120° | 0.0 | 5.6 | 25.4 | 45.2 | 53.6 |
| 122.5° | 0.0 | 2.8 | 22.6 | 39.5 | 48.0 |
| 125° | 0.0 | 2.8 | 19.8 | 36.7 | 42.3 |
| 127.5° | 0.0 | 2.8 | 16.9 | 33.9 | 39.5 |
| 130° | 0.0 | 2.8 | 16.9 | 31.0 | 36.7 |
| 132.5° | 0.0 | 0.0 | 14.1 | 28.2 | 33.9 |
| 135° | 0.0 | 0.0 | 11.3 | 22.6 | 28.2 |
| 137.5° | 0.0 | 0.0 | 11.3 | 19.8 | 25.4 |
| 140° | 0.0 | 0.0 | 8.5 | 19.8 | 22.6 |
| 142.5° | 0.0 | 0.0 | 5.6 | 16.9 | 19.8 |
| 145° | 0.0 | 0.0 | 5.6 | 14.1 | 16.9 |
| 147.5° | 0.0 | 0.0 | 2.8 | 11.3 | 14.1 |
| 150° | 0.0 | 0.0 | 2.8 | 8.5 | 11.3 |
| 152.5° | 0.0 | 0.0 | 0.0 | 5.6 | 8.5 |
| 155° | 0.0 | 0.0 | 0.0 | 2.8 | 5.6 |
| 157.5° | 0.0 | 0.0 | 0.0 | 0.0 | 2.8 |
| 160° | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 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 |



TEST NUMBER: P1356993
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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 | 17.20 | 18.74 | 17.68 | 19.20 | 19.69 | 19.24 | 20.77 | 19.71 | 21.23 | 21.72 |
| | 3H | 18.71 | 20.11 | 19.19 | 20.58 | 21.11 | 21.68 | 23.08 | 22.16 | 23.55 | 24.08 |
| | 4H | 19.19 | 20.52 | 19.70 | 21.00 | 21.55 | 22.88 | 24.20 | 23.38 | 24.69 | 25.23 |
| | 6H | 19.46 | 20.70 | 19.98 | 21.20 | 21.76 | 24.13 | 25.37 | 24.65 | 25.87 | 26.43 |
| | 8H | 19.52 | 20.70 | 20.05 | 21.23 | 21.79 | 24.77 | 25.96 | 25.31 | 26.48 | 27.05 |
| | 12H | 19.53 | 20.67 | 20.07 | 21.19 | 21.79 | 25.48 | 26.62 | 26.02 | 27.14 | 27.73 |
| 4H | 2H | 18.08 | 19.41 | 18.59 | 19.89 | 20.44 | 19.67 | 21.00 | 20.18 | 21.49 | 22.03 |
| | 3H | 19.82 | 20.95 | 20.34 | 21.49 | 22.05 | 22.34 | 23.47 | 22.86 | 24.00 | 24.57 |
| | 4H | 20.43 | 21.47 | 20.97 | 22.01 | 22.61 | 23.71 | 24.75 | 24.25 | 25.29 | 25.89 |
| | 6H | 20.83 | 21.75 | 21.39 | 22.32 | 22.93 | 25.16 | 26.08 | 25.72 | 26.65 | 27.26 |
| | 8H | 20.93 | 21.79 | 21.50 | 22.36 | 22.98 | 25.92 | 26.78 | 26.48 | 27.35 | 27.97 |
| | 12H | 20.98 | 21.76 | 21.56 | 22.36 | 22.99 | 26.75 | 27.53 | 27.34 | 28.13 | 28.76 |
| 8H | 4H | 21.12 | 21.98 | 21.68 | 22.55 | 23.17 | 23.93 | 24.80 | 24.50 | 25.36 | 25.99 |
| | 6H | 21.71 | 22.44 | 22.30 | 23.05 | 23.68 | 25.56 | 26.29 | 26.16 | 26.90 | 27.53 |
| | 8H | 21.89 | 22.55 | 22.50 | 23.17 | 23.82 | 26.46 | 27.12 | 27.07 | 27.74 | 28.38 |
| | 12H | 22.02 | 22.61 | 22.63 | 23.21 | 23.92 | 27.48 | 28.07 | 28.09 | 28.67 | 29.38 |
| 12H | 4H | 21.32 | 22.10 | 21.90 | 22.70 | 23.33 | 23.94 | 24.73 | 24.53 | 25.32 | 25.95 |
| | 6H | 22.01 | 22.67 | 22.61 | 23.29 | 23.93 | 25.60 | 26.26 | 26.21 | 26.88 | 27.52 |
| | 8H | 22.29 | 22.88 | 22.90 | 23.49 | 24.20 | 26.57 | 27.16 | 27.18 | 27.77 | 28.48 |

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

Report Prepared for

Cooper Lighting Solutions

Fail-Safe

Report Number: SP1-2511-597-6

Test Date: 11/18/2025

Luminaire Tested: 4ASL-2-65-UNV-OPL-1_600mA

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

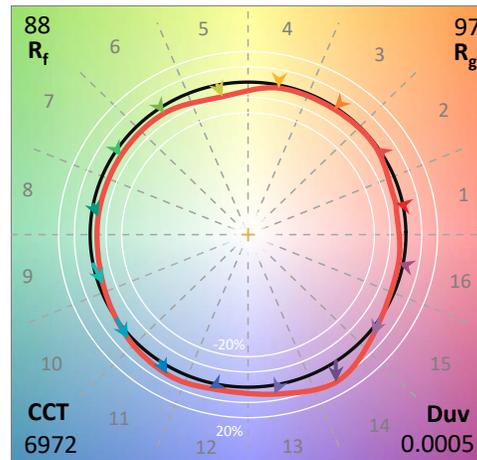
Test Information

Test Method: LM-79-2019
 Report Number: SP1-2511-597-6
 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-2-65-UNV-OPL-1_600mA**
 Description: 2foot 4ASL LED LUMINAIRE WITH OPL LENS AND 6500K LEDs with 1 rows at 600mA

Spectral Parameters

CCT (K): 6972
 CIE u': 0.1979
 CIE v': 0.4612
 Duv: 0.0005
 CIE x: 0.3066
 CIE y: 0.3177
 CIE z: 0.3758
 Peak Wavelength (nm): 455
 Dominant Wavelength (nm): 483
 Purity: 10.33335
 Rf: 88.2
 Rg: 97.1

| | | | |
|-----------|------|------|------|
| CRI (Ra): | 94.3 | | |
| R1: | 96.1 | R9: | 82.6 |
| R2: | 98.8 | R10: | 95.4 |
| R3: | 96.4 | R11: | 95.2 |
| R4: | 92.8 | R12: | 63.5 |
| R5: | 92.9 | R13: | 99.3 |
| R6: | 92.2 | R14: | 98.1 |
| R7: | 93.5 | R15: | 93.7 |
| R8: | 91.4 | | |



Test Conditions

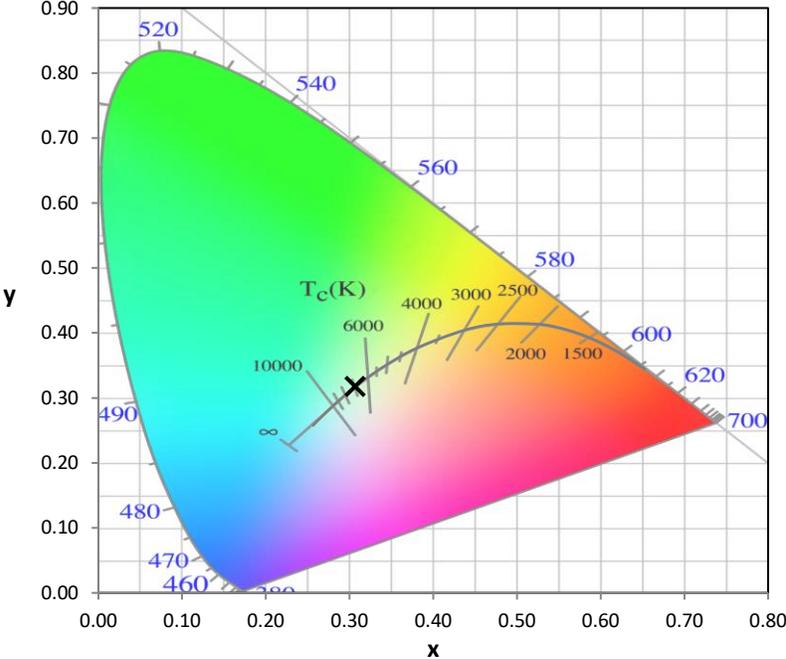
Stabilization Time: 20M
 Operation Time: 1H 20M
 Sphere Temperature (°C): 24.1

REPORT NUMBER: SP1-2511-597-6

| 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



Point lies inside the ANSI 6500K 7-step quadrangle

REPORT NUMBER: SP1-2511-597-6

Photopic Flux vs. Wavelength

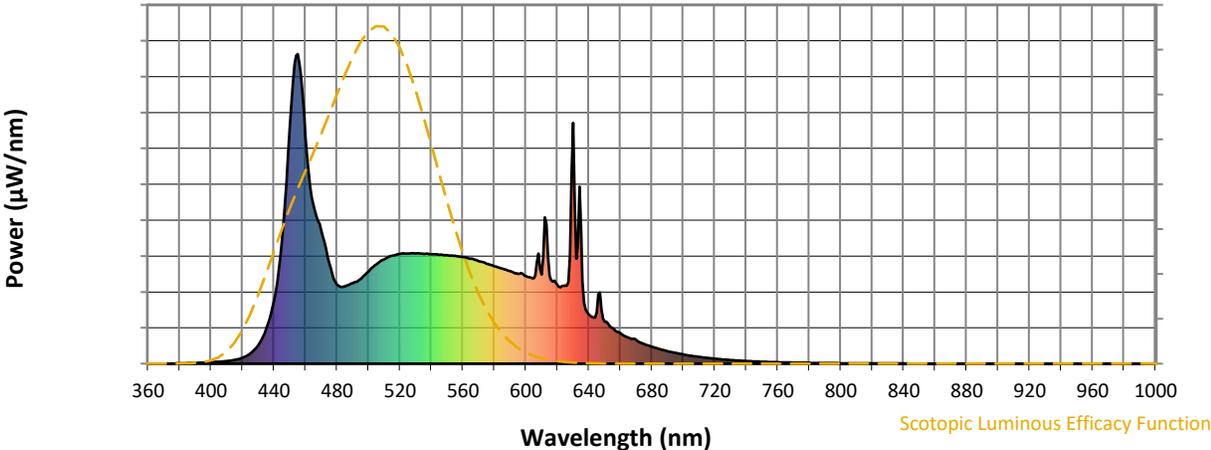


Photopic Lumens: NR

| 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 | 260 | NR | 620 | 255 | NR | 750 | 6 | NR | 880 | 0 | NR |
| 365 | 0 | NR | 495 | 274 | NR | 625 | 252 | NR | 755 | 6 | NR | 885 | 0 | NR |
| 370 | 0 | NR | 500 | 297 | NR | 630 | 778 | NR | 760 | 5 | NR | 890 | 0 | NR |
| 375 | 0 | NR | 505 | 320 | NR | 635 | 431 | NR | 765 | 4 | NR | 895 | 0 | NR |
| 380 | 1 | NR | 510 | 337 | NR | 640 | 160 | NR | 770 | 4 | NR | 900 | 0 | NR |
| 385 | 2 | NR | 515 | 349 | NR | 645 | 165 | NR | 775 | 3 | NR | 905 | 0 | NR |
| 390 | 2 | NR | 520 | 354 | NR | 650 | 135 | NR | 780 | 3 | NR | 910 | 0 | NR |
| 395 | 3 | NR | 525 | 356 | NR | 655 | 115 | NR | 785 | 2 | NR | 915 | 0 | NR |
| 400 | 5 | NR | 530 | 356 | NR | 660 | 99 | NR | 790 | 2 | NR | 920 | 0 | NR |
| 405 | 6 | NR | 535 | 355 | NR | 665 | 84 | NR | 795 | 2 | NR | 925 | 0 | NR |
| 410 | 8 | NR | 540 | 354 | NR | 670 | 77 | NR | 800 | 2 | NR | 930 | 0 | NR |
| 415 | 12 | NR | 545 | 351 | NR | 675 | 64 | NR | 805 | 1 | NR | 935 | 0 | NR |
| 420 | 19 | NR | 550 | 350 | NR | 680 | 55 | NR | 810 | 1 | NR | 940 | 0 | NR |
| 425 | 33 | NR | 555 | 348 | NR | 685 | 47 | NR | 815 | 1 | NR | 945 | 0 | NR |
| 430 | 60 | NR | 560 | 344 | NR | 690 | 41 | NR | 820 | 1 | NR | 950 | 0 | NR |
| 435 | 113 | NR | 565 | 339 | NR | 695 | 35 | NR | 825 | 1 | NR | 955 | 0 | NR |
| 440 | 206 | NR | 570 | 331 | NR | 700 | 30 | NR | 830 | 1 | NR | 960 | 0 | NR |
| 445 | 392 | NR | 575 | 323 | NR | 705 | 26 | NR | 835 | 1 | NR | 965 | 0 | NR |
| 450 | 764 | NR | 580 | 315 | NR | 710 | 22 | NR | 840 | 1 | NR | 970 | 0 | NR |
| 455 | 1000 | NR | 585 | 307 | NR | 715 | 19 | NR | 845 | 0 | NR | 975 | 0 | NR |
| 460 | 736 | NR | 590 | 299 | NR | 720 | 16 | NR | 850 | 0 | NR | 980 | 0 | NR |
| 465 | 513 | NR | 595 | 290 | NR | 725 | 14 | NR | 855 | 0 | NR | 985 | 0 | NR |
| 470 | 430 | NR | 600 | 282 | NR | 730 | 12 | NR | 860 | 0 | NR | 990 | 0 | NR |
| 475 | 325 | NR | 605 | 276 | NR | 735 | 10 | NR | 865 | 0 | NR | 995 | 0 | NR |
| 480 | 256 | NR | 610 | 287 | NR | 740 | 9 | NR | 870 | 0 | NR | 1000 | 0 | NR |
| 485 | 250 | NR | 615 | 284 | NR | 745 | 7 | NR | 875 | 0 | NR | | | |

REPORT NUMBER: SP1-2511-597-6

Scotopic Flux vs. Wavelength



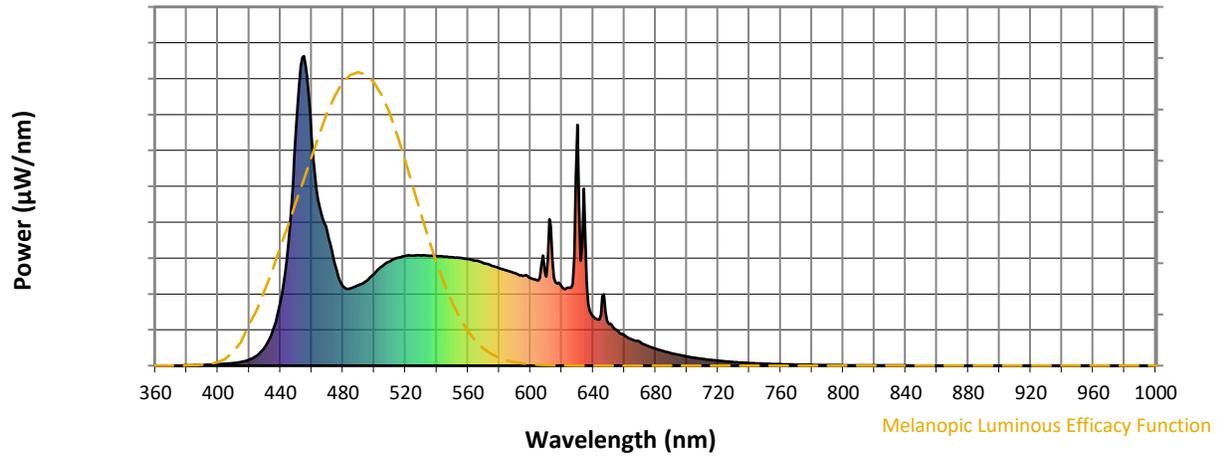
Scotopic Lumens: NR

S/P: 2.48

| 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 | 260 | NR | 620 | 255 | NR | 750 | 6 | NR | 880 | 0 | NR |
| 365 | 0 | NR | 495 | 274 | NR | 625 | 252 | NR | 755 | 6 | NR | 885 | 0 | NR |
| 370 | 0 | NR | 500 | 297 | NR | 630 | 778 | NR | 760 | 5 | NR | 890 | 0 | NR |
| 375 | 0 | NR | 505 | 320 | NR | 635 | 431 | NR | 765 | 4 | NR | 895 | 0 | NR |
| 380 | 1 | NR | 510 | 337 | NR | 640 | 160 | NR | 770 | 4 | NR | 900 | 0 | NR |
| 385 | 2 | NR | 515 | 349 | NR | 645 | 165 | NR | 775 | 3 | NR | 905 | 0 | NR |
| 390 | 2 | NR | 520 | 354 | NR | 650 | 135 | NR | 780 | 3 | NR | 910 | 0 | NR |
| 395 | 3 | NR | 525 | 356 | NR | 655 | 115 | NR | 785 | 2 | NR | 915 | 0 | NR |
| 400 | 5 | NR | 530 | 356 | NR | 660 | 99 | NR | 790 | 2 | NR | 920 | 0 | NR |
| 405 | 6 | NR | 535 | 355 | NR | 665 | 84 | NR | 795 | 2 | NR | 925 | 0 | NR |
| 410 | 8 | NR | 540 | 354 | NR | 670 | 77 | NR | 800 | 2 | NR | 930 | 0 | NR |
| 415 | 12 | NR | 545 | 351 | NR | 675 | 64 | NR | 805 | 1 | NR | 935 | 0 | NR |
| 420 | 19 | NR | 550 | 350 | NR | 680 | 55 | NR | 810 | 1 | NR | 940 | 0 | NR |
| 425 | 33 | NR | 555 | 348 | NR | 685 | 47 | NR | 815 | 1 | NR | 945 | 0 | NR |
| 430 | 60 | NR | 560 | 344 | NR | 690 | 41 | NR | 820 | 1 | NR | 950 | 0 | NR |
| 435 | 113 | NR | 565 | 339 | NR | 695 | 35 | NR | 825 | 1 | NR | 955 | 0 | NR |
| 440 | 206 | NR | 570 | 331 | NR | 700 | 30 | NR | 830 | 1 | NR | 960 | 0 | NR |
| 445 | 392 | NR | 575 | 323 | NR | 705 | 26 | NR | 835 | 1 | NR | 965 | 0 | NR |
| 450 | 764 | NR | 580 | 315 | NR | 710 | 22 | NR | 840 | 1 | NR | 970 | 0 | NR |
| 455 | 1000 | NR | 585 | 307 | NR | 715 | 19 | NR | 845 | 0 | NR | 975 | 0 | NR |
| 460 | 736 | NR | 590 | 299 | NR | 720 | 16 | NR | 850 | 0 | NR | 980 | 0 | NR |
| 465 | 513 | NR | 595 | 290 | NR | 725 | 14 | NR | 855 | 0 | NR | 985 | 0 | NR |
| 470 | 430 | NR | 600 | 282 | NR | 730 | 12 | NR | 860 | 0 | NR | 990 | 0 | NR |
| 475 | 325 | NR | 605 | 276 | NR | 735 | 10 | NR | 865 | 0 | NR | 995 | 0 | NR |
| 480 | 256 | NR | 610 | 287 | NR | 740 | 9 | NR | 870 | 0 | NR | 1000 | 0 | NR |
| 485 | 250 | NR | 615 | 284 | NR | 745 | 7 | NR | 875 | 0 | NR | | | |

REPORT NUMBER: SP1-2511-597-6

Melanopic Flux vs. Wavelength



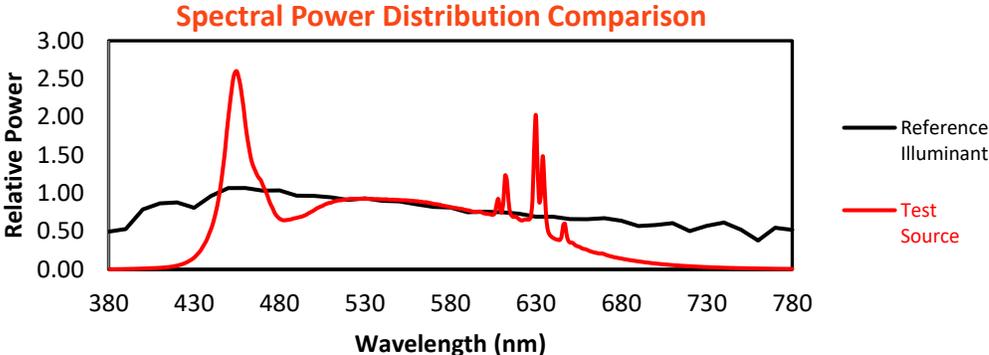
Melanopic Lumens: NR

M/P: 5.67

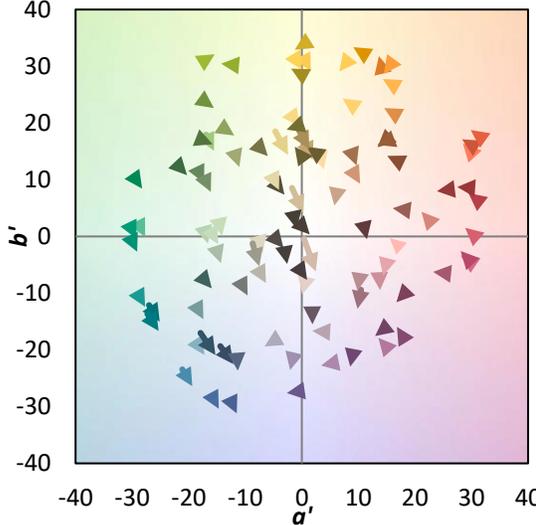
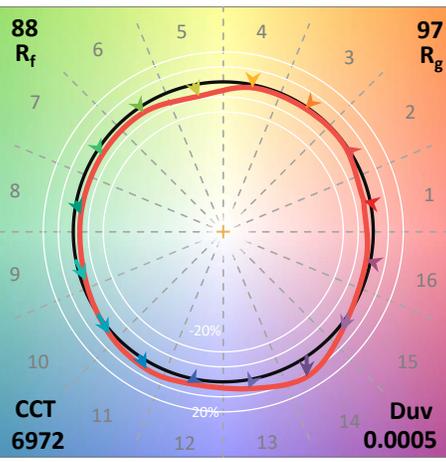
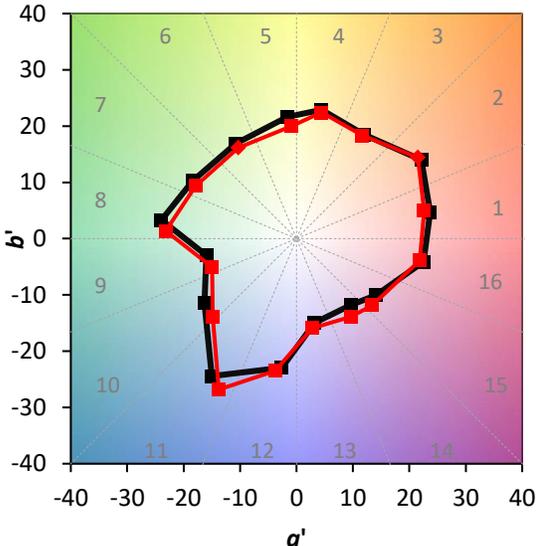
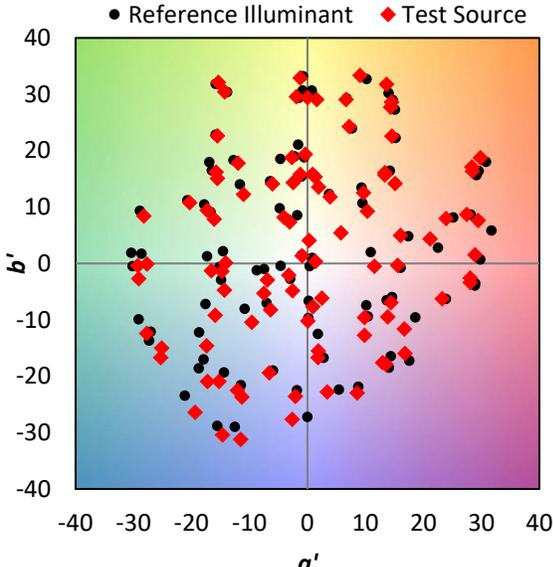
| λ (nm) | Power W [^] /nm | Lumens (φ/nm) | λ (nm) | Power W [^] /nm | Lumens (φ/nm) | λ (nm) | Power W [^] /nm | Lumens (φ/nm) | λ (nm) | Power W [^] /nm | Lumens (φ/nm) | λ (nm) | Power W [^] /nm | Lumens (φ/nm) |
|--------|--------------------------|---------------|--------|--------------------------|---------------|--------|--------------------------|---------------|--------|--------------------------|---------------|--------|--------------------------|---------------|
| 360 | 0 | NR | 490 | 260 | NR | 620 | 255 | NR | 750 | 6 | NR | 880 | 0 | NR |
| 365 | 0 | NR | 495 | 274 | NR | 625 | 252 | NR | 755 | 6 | NR | 885 | 0 | NR |
| 370 | 0 | NR | 500 | 297 | NR | 630 | 778 | NR | 760 | 5 | NR | 890 | 0 | NR |
| 375 | 0 | NR | 505 | 320 | NR | 635 | 431 | NR | 765 | 4 | NR | 895 | 0 | NR |
| 380 | 1 | NR | 510 | 337 | NR | 640 | 160 | NR | 770 | 4 | NR | 900 | 0 | NR |
| 385 | 2 | NR | 515 | 349 | NR | 645 | 165 | NR | 775 | 3 | NR | 905 | 0 | NR |
| 390 | 2 | NR | 520 | 354 | NR | 650 | 135 | NR | 780 | 3 | NR | 910 | 0 | NR |
| 395 | 3 | NR | 525 | 356 | NR | 655 | 115 | NR | 785 | 2 | NR | 915 | 0 | NR |
| 400 | 5 | NR | 530 | 356 | NR | 660 | 99 | NR | 790 | 2 | NR | 920 | 0 | NR |
| 405 | 6 | NR | 535 | 355 | NR | 665 | 84 | NR | 795 | 2 | NR | 925 | 0 | NR |
| 410 | 8 | NR | 540 | 354 | NR | 670 | 77 | NR | 800 | 2 | NR | 930 | 0 | NR |
| 415 | 12 | NR | 545 | 351 | NR | 675 | 64 | NR | 805 | 1 | NR | 935 | 0 | NR |
| 420 | 19 | NR | 550 | 350 | NR | 680 | 55 | NR | 810 | 1 | NR | 940 | 0 | NR |
| 425 | 33 | NR | 555 | 348 | NR | 685 | 47 | NR | 815 | 1 | NR | 945 | 0 | NR |
| 430 | 60 | NR | 560 | 344 | NR | 690 | 41 | NR | 820 | 1 | NR | 950 | 0 | NR |
| 435 | 113 | NR | 565 | 339 | NR | 695 | 35 | NR | 825 | 1 | NR | 955 | 0 | NR |
| 440 | 206 | NR | 570 | 331 | NR | 700 | 30 | NR | 830 | 1 | NR | 960 | 0 | NR |
| 445 | 392 | NR | 575 | 323 | NR | 705 | 26 | NR | 835 | 1 | NR | 965 | 0 | NR |
| 450 | 764 | NR | 580 | 315 | NR | 710 | 22 | NR | 840 | 1 | NR | 970 | 0 | NR |
| 455 | 1000 | NR | 585 | 307 | NR | 715 | 19 | NR | 845 | 0 | NR | 975 | 0 | NR |
| 460 | 736 | NR | 590 | 299 | NR | 720 | 16 | NR | 850 | 0 | NR | 980 | 0 | NR |
| 465 | 513 | NR | 595 | 290 | NR | 725 | 14 | NR | 855 | 0 | NR | 985 | 0 | NR |
| 470 | 430 | NR | 600 | 282 | NR | 730 | 12 | NR | 860 | 0 | NR | 990 | 0 | NR |
| 475 | 325 | NR | 605 | 276 | NR | 735 | 10 | NR | 865 | 0 | NR | 995 | 0 | NR |
| 480 | 256 | NR | 610 | 287 | NR | 740 | 9 | NR | 870 | 0 | NR | 1000 | 0 | NR |
| 485 | 250 | NR | 615 | 284 | NR | 745 | 7 | NR | 875 | 0 | NR | | | |

Summary

$R_f = 88.2$
 $R_g = 97.1$
 CIE $R_a = 94.3$
 $R_9 = 82.6$

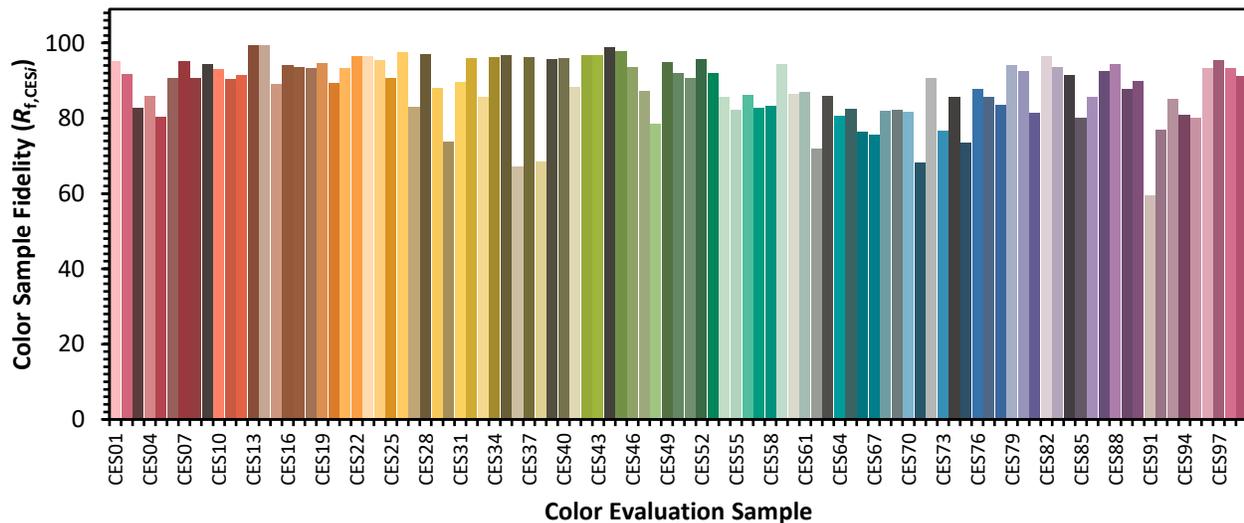


Color Vector Graphics

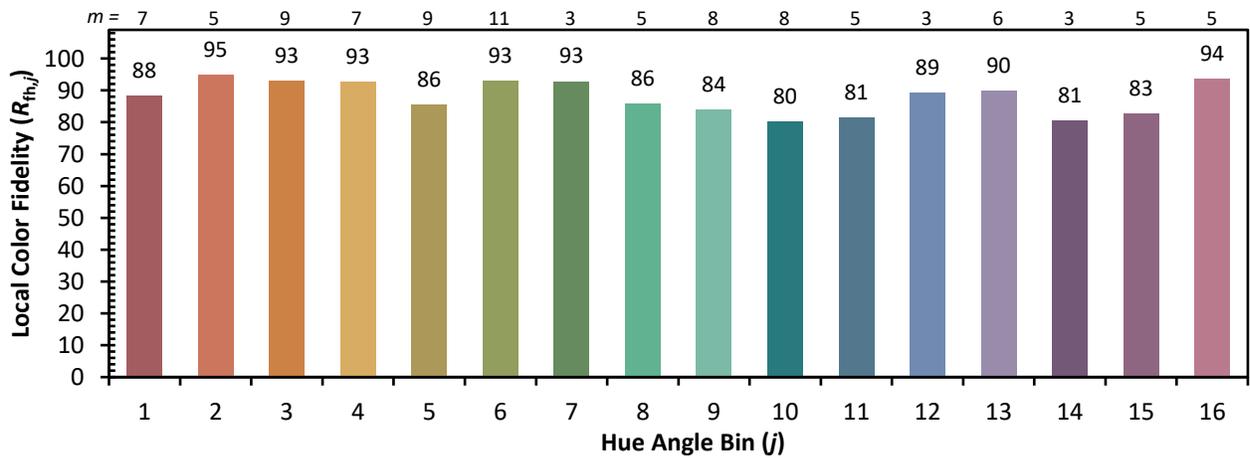
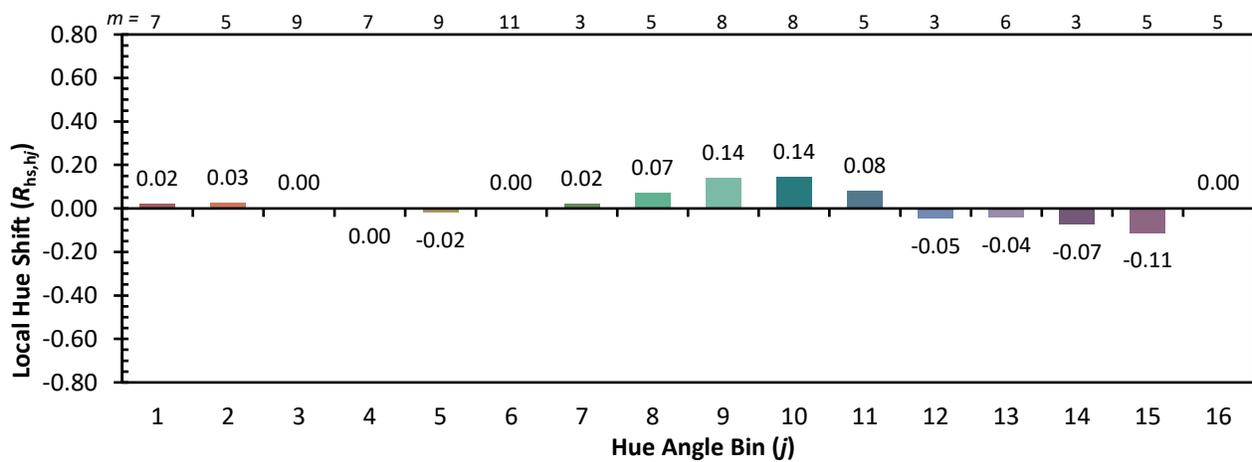
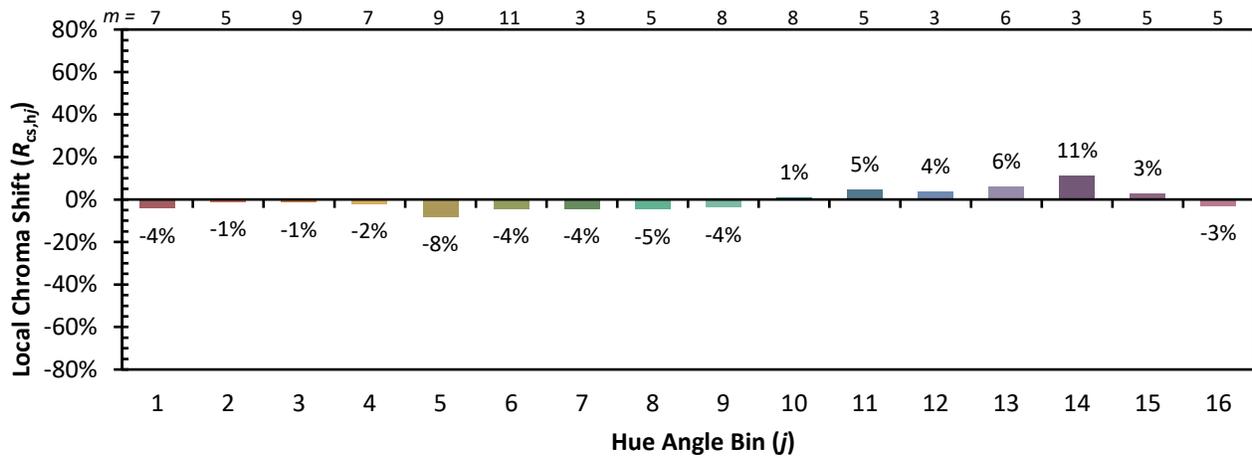


Individual Sample Fidelity Index ($R_{f,i}$)

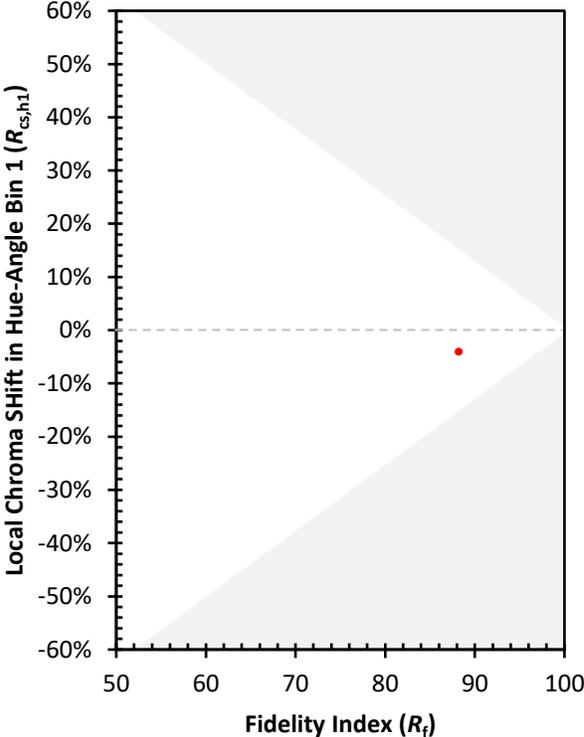
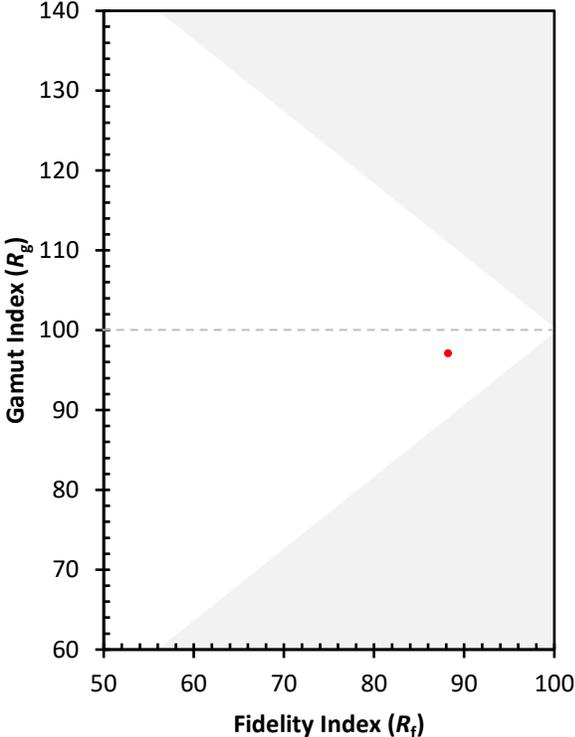
| | | | |
|------------|------------|------------|------------|
| CES01 = 85 | CES26 = 97 | CES51 = 91 | CES76 = 88 |
| CES02 = 60 | CES27 = 83 | CES52 = 96 | CES77 = 86 |
| CES03 = 31 | CES28 = 97 | CES53 = 92 | CES78 = 83 |
| CES04 = 68 | CES29 = 88 | CES54 = 86 | CES79 = 94 |
| CES05 = 47 | CES30 = 74 | CES55 = 82 | CES80 = 93 |
| CES06 = 49 | CES31 = 90 | CES56 = 86 | CES81 = 81 |
| CES07 = 40 | CES32 = 96 | CES57 = 83 | CES82 = 96 |
| CES08 = 39 | CES33 = 86 | CES58 = 83 | CES83 = 94 |
| CES09 = 29 | CES34 = 96 | CES59 = 94 | CES84 = 91 |
| CES10 = 72 | CES35 = 97 | CES60 = 87 | CES85 = 80 |
| CES11 = 55 | CES36 = 67 | CES61 = 87 | CES86 = 86 |
| CES12 = 61 | CES37 = 96 | CES62 = 72 | CES87 = 93 |
| CES13 = 42 | CES38 = 68 | CES63 = 86 | CES88 = 94 |
| CES14 = 74 | CES39 = 96 | CES64 = 81 | CES89 = 88 |
| CES15 = 71 | CES40 = 96 | CES65 = 83 | CES90 = 90 |
| CES16 = 46 | CES41 = 88 | CES66 = 76 | CES91 = 60 |
| CES17 = 48 | CES42 = 97 | CES67 = 76 | CES92 = 77 |
| CES18 = 55 | CES43 = 97 | CES68 = 82 | CES93 = 85 |
| CES19 = 69 | CES44 = 99 | CES69 = 82 | CES94 = 81 |
| CES20 = 64 | CES45 = 98 | CES70 = 82 | CES95 = 80 |
| CES21 = 84 | CES46 = 93 | CES71 = 68 | CES96 = 93 |
| CES22 = 76 | CES47 = 87 | CES72 = 91 | CES97 = 95 |
| CES23 = 91 | CES48 = 79 | CES73 = 77 | CES98 = 93 |
| CES24 = 89 | CES49 = 95 | CES74 = 86 | CES99 = 91 |
| CES25 = 69 | CES50 = 92 | CES75 = 74 | |



Color Rendition by Hue-Angle Bin



Measure Comparisons



(END OF REPORT)