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: P1432415

Luminaire Tested: EHBR1-36-UNV-W-L830-UPL30

Issue Date: 3/20/2026

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: | P1432415 |
| | REPORT IS A COMBINATION OF REPORTS P1431792 AND P1431635 |
| Test Lab: | INNOVATION CENTER |
| Issue Date: | 3/20/2026 |
| Manufacturer: | COOPER LIGHTING SOLUTIONS |
| Product Line: | METALUX |
| Catalog Number: | EHBR1-36-UNV-W-L830-UPL30 |
| Description: | Elevate Round Highbay at, 36000 lumens, 3000K 80CRI LEDs with W lens |
| Light Source: | - |
| Ballast/Driver: | - |

**Summary**

| | |
|---|---|
| Lumens per Lamp: | N/A |
| Luminaire Lumens: | 36438.3 lumens |
| Efficiency: | N/A |
| Efficacy: | 170.8 lumens/watt |
| Spacing Criteria (0/90/45): | 1.54 / 1.54 / 1.31 |
| Luminous Opening: | Vertical Cylinder (Dia: 1.71' x H: 0.1') |
| CIE Type: | Direct |

| | |
|---|---|
| Input Watts (W): | 213.4 |
| Input Voltage (V): | NR |
| Input Current (Ain): | NR |
| Voltage Rise (V): | NR |
| Power Factor: | NR |
| Total Harmonic Distortion (THDi): | NR |
| Frequency (hertz): | 60 |
| Stabilization Time: | NR |
| Operation Time: | NR |
| Ambient Temperature (°C): | NR |
| Test Distance: | 24 FT |

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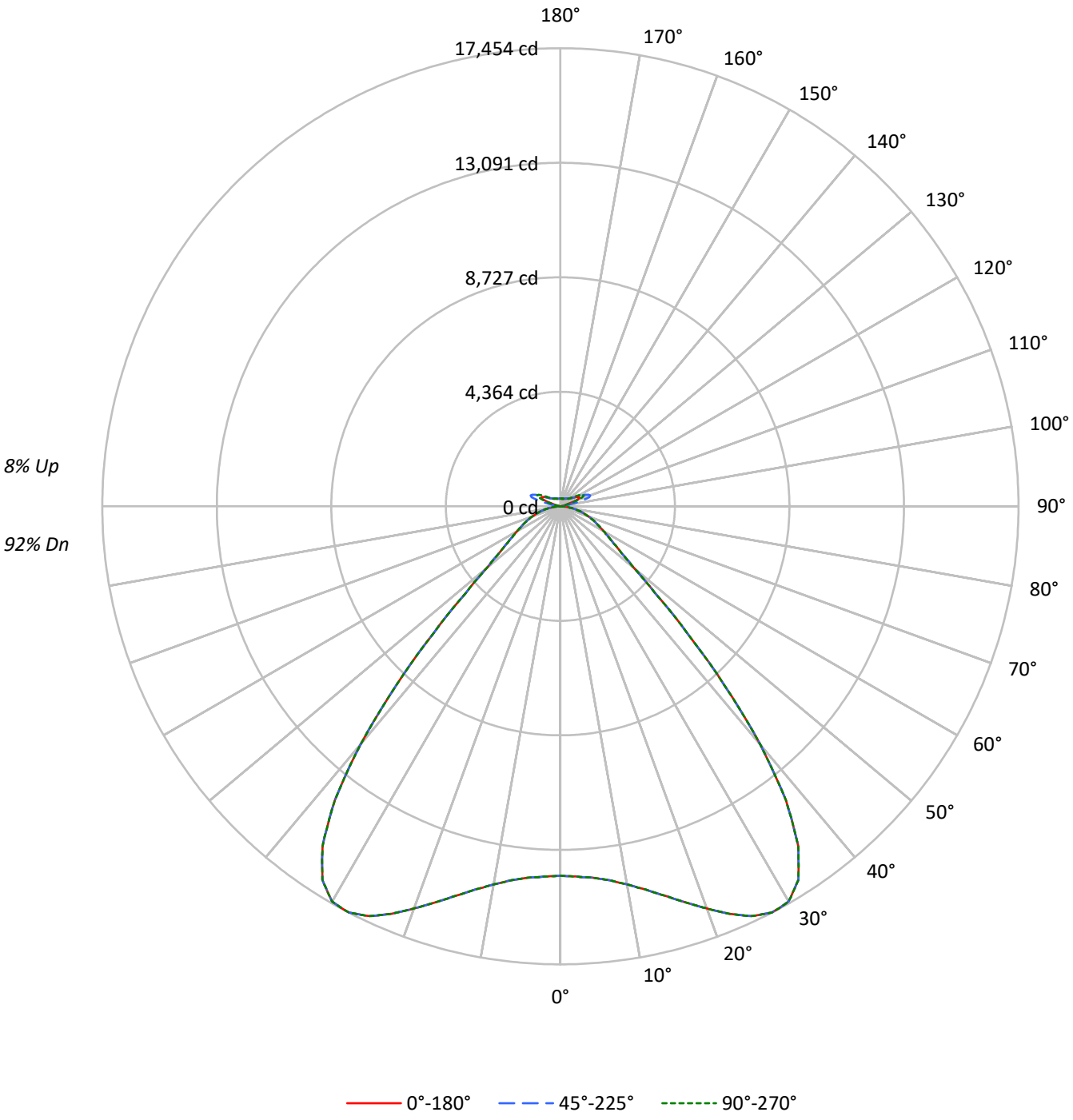
Scaled Data Report

TEST NUMBER: P1432415
CATALOG NUMBER: EHBR1-36-UNV-W-L830-UPL30

## Luminous Intensity Polar Plot



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TEST NUMBER: P1432415
CATALOG NUMBER: EHBR1-36-UNV-W-L830-UPL30

## 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 | 117 | 117 | 117 | 117 | 114 | 114 | 114 | 114 | 107 | 107 | 107 | 101 | 101 | 101 | 95 | 95 | 95 | 92 |
| 1 | 109 | 106 | 102 | 99 | 106 | 103 | 100 | 97 | 97 | 95 | 93 | 92 | 90 | 88 | 87 | 86 | 85 | 82 |
| 2 | 102 | 95 | 90 | 85 | 98 | 93 | 88 | 83 | 88 | 84 | 80 | 84 | 80 | 77 | 80 | 77 | 75 | 72 |
| 3 | 94 | 86 | 79 | 74 | 91 | 84 | 78 | 73 | 80 | 75 | 70 | 76 | 72 | 68 | 73 | 69 | 66 | 64 |
| 4 | 88 | 78 | 70 | 65 | 85 | 76 | 69 | 64 | 73 | 67 | 62 | 69 | 65 | 61 | 67 | 63 | 59 | 57 |
| 5 | 81 | 71 | 63 | 57 | 79 | 69 | 62 | 57 | 66 | 60 | 55 | 64 | 58 | 54 | 61 | 57 | 53 | 51 |
| 6 | 76 | 64 | 57 | 51 | 74 | 63 | 56 | 51 | 61 | 54 | 50 | 58 | 53 | 49 | 56 | 51 | 48 | 46 |
| 7 | 71 | 59 | 51 | 46 | 69 | 58 | 51 | 46 | 56 | 49 | 45 | 54 | 48 | 44 | 52 | 47 | 43 | 41 |
| 8 | 66 | 54 | 47 | 42 | 64 | 53 | 46 | 41 | 51 | 45 | 41 | 50 | 44 | 40 | 48 | 43 | 39 | 37 |
| 9 | 62 | 50 | 43 | 38 | 60 | 49 | 42 | 37 | 48 | 41 | 37 | 46 | 40 | 36 | 45 | 40 | 36 | 34 |
| 10 | 58 | 46 | 39 | 34 | 57 | 46 | 39 | 34 | 44 | 38 | 34 | 43 | 37 | 33 | 41 | 36 | 33 | 31 |

## AVERAGE LUMINANCE (cd/sqm):

| | 0° | 45° | 90° |
|---|---|---|---|
| 0° | 66092 | 66092 | 66092 |
| 5° | 66531 | 66531 | 66531 |
| 10° | 68842 | 68842 | 68842 |
| 15° | 73205 | 73205 | 73205 |
| 20° | 79356 | 79356 | 79356 |
| 25° | 86268 | 86268 | 86268 |
| 30° | 90423 | 90423 | 90423 |
| 35° | 86069 | 86069 | 86069 |
| 40° | 68295 | 68295 | 68295 |
| 45° | 42212 | 42212 | 42212 |
| 50° | 24443 | 24443 | 24443 |
| 55° | 18493 | 18493 | 18493 |
| 60° | 15864 | 15864 | 15864 |
| 65° | 14329 | 14329 | 14329 |
| 70° | 13181 | 13181 | 13181 |
| 75° | 11646 | 11646 | 11646 |
| 80° | 9491 | 9491 | 9491 |
| 85° | 5595 | 5595 | 5595 |

## MAXIMUM LUMINANCE 45°-90°:

Horizontal Angle: 0°
Vertical Angle: 45°
Luminance: 42212 cd/sqm

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Scaled Data Report

TEST NUMBER: P1432415
CATALOG NUMBER: EHBR1-36-UNV-W-L830-UPL30

**ZONAL LUMENS:**

| Zone | Lumens | % Fixture |
|---|---|---|
| 0°-10° | 1369.3 | 3.8 |
| 10°-20° | 4389.9 | 12.0 |
| 20°-30° | 7923.9 | 21.7 |
| 30°-40° | 9575.2 | 26.3 |
| 40°-50° | 5470.6 | 15.0 |
| 50°-60° | 2317.0 | 6.4 |
| 60°-70° | 1494.5 | 4.1 |
| 70°-80° | 869.0 | 2.4 |
| 80°-90° | 235.0 | 0.6 |
| 90°-100° | 80.1 | 0.2 |
| 100°-110° | 496.6 | 1.4 |
| 110°-120° | 887.5 | 2.4 |
| 120°-130° | 521.6 | 1.4 |
| 130°-140° | 322.3 | 0.9 |
| 140°-150° | 225.7 | 0.6 |
| 150°-160° | 147.5 | 0.4 |
| 160°-170° | 84.6 | 0.2 |
| 170°-180° | 28.0 | 0.1 |
| 0°-30° | 13683.1 | 37.6 |
| 0°-40° | 23258.3 | 63.8 |
| 0°-60° | 31045.9 | 85.2 |
| 0°-90° | 33644.4 | 92.3 |
| 90°-120° | 1464.2 | 4.0 |
| 90°-150° | 2533.8 | 7.0 |
| 90°-180° | 2794.0 | 7.7 |
| 0°-180° | 36438.3 | 100.0 |

**CANDELA DISTRIBUTION:**

| | 0° | 22.5° | 45° | 67.5° | 90° | Flux |
|---|---|---|---|---|---|---|
| 0° | 14074 | 14074 | 14074 | 14074 | 14074 | |
| 5° | 14206 | 14206 | 14206 | 14206 | 14206 | 1369 |
| 15° | 15358 | 15358 | 15358 | 15358 | 15358 | 4390 |
| 25° | 17228 | 17228 | 17228 | 17228 | 17228 | 7924 |
| 35° | 15797 | 15797 | 15797 | 15797 | 15797 | 9575 |
| 45° | 6830 | 6830 | 6830 | 6830 | 6830 | 5471 |
| 55° | 2499 | 2499 | 2499 | 2499 | 2499 | 2317 |
| 65° | 1496 | 1496 | 1496 | 1496 | 1496 | 1494 |
| 75° | 820 | 820 | 820 | 820 | 820 | 869 |
| 85° | 192 | 192 | 192 | 192 | 192 | 222 |
| 90° | 22 | 34 | 58 | 38 | 22 | 18 |
| 95° | 36 | 60 | 130 | 65 | 41 | 35 |
| 105° | 174 | 342 | 872 | 377 | 230 | 233 |
| 115° | 798 | 840 | 1032 | 989 | 982 | 736 |
| 125° | 577 | 539 | 553 | 561 | 629 | 526 |
| 135° | 424 | 411 | 425 | 400 | 398 | 331 |
| 145° | 352 | 347 | 368 | 363 | 361 | 223 |
| 155° | 310 | 307 | 321 | 321 | 321 | 144 |
| 165° | 292 | 292 | 300 | 300 | 298 | 83 |
| 175° | 290 | 290 | 295 | 295 | 295 | 28 |
| 180° | 294 | 294 | 294 | 294 | 294 | |

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TEST NUMBER: P1432415
CATALOG NUMBER: EHBR1-36-UNV-W-L830-UPL30

**CANDELA DISTRIBUTION (FULL):**

| | 0° | 22.5° | 45° | 67.5° | 90° |
|---|---|---|---|---|---|
| 0° | *14073.9* | 14073.9 | 14073.9 | 14073.9 | 14073.9 |
| 2.5° | *14121.1* | 14121.1 | 14121.1 | 14121.1 | 14121.1 |
| 5° | *14205.5* | 14205.5 | 14205.5 | 14205.5 | 14205.5 |
| 7.5° | *14371.3* | 14371.3 | 14371.3 | 14371.3 | 14371.3 |
| 10° | *14626.5* | 14626.5 | 14626.5 | 14626.5 | 14626.5 |
| 12.5° | *14958.3* | 14958.3 | 14958.3 | 14958.3 | 14958.3 |
| 15° | *15358.1* | 15358.1 | 15358.1 | 15358.1 | 15358.1 |
| 17.5° | *15815.8* | 15815.8 | 15815.8 | 15815.8 | 15815.8 |
| 20° | *16310.0* | 16310.0 | 16310.0 | 16310.0 | 16310.0 |
| 22.5° | *16807.6* | 16807.6 | 16807.6 | 16807.6 | 16807.6 |
| 25° | *17227.6* | 17227.6 | 17227.6 | 17227.6 | 17227.6 |
| 27.5° | *17453.6* | *17453.6* | *17453.6* | *17453.6* | *17453.6* |
| 30° | *17392.9* | 17392.9 | 17392.9 | 17392.9 | 17392.9 |
| 32.5° | *16877.2* | 16877.2 | 16877.2 | 16877.2 | 16877.2 |
| 35° | *15796.7* | 15796.7 | 15796.7 | 15796.7 | 15796.7 |
| 37.5° | *14111.5* | 14111.5 | 14111.5 | 14111.5 | 14111.5 |
| 40° | *11837.2* | 11837.2 | 11837.2 | 11837.2 | 11837.2 |
| 42.5° | *9264.9* | 9264.9 | 9264.9 | 9264.9 | 9264.9 |
| 45° | *6829.7* | 6829.7 | 6829.7 | 6829.7 | 6829.7 |
| 47.5° | *4881.6* | 4881.6 | 4881.6 | 4881.6 | 4881.6 |
| 50° | *3642.9* | 3642.9 | 3642.9 | 3642.9 | 3642.9 |
| 52.5° | *2949.6* | 2949.6 | 2949.6 | 2949.6 | 2949.6 |
| 55° | *2499.2* | 2499.2 | 2499.2 | 2499.2 | 2499.2 |
| 57.5° | *2170.4* | 2170.4 | 2170.4 | 2170.4 | 2170.4 |
| 60° | *1907.1* | 1907.1 | 1907.1 | 1907.1 | 1907.1 |
| 62.5° | *1687.9* | 1687.9 | 1687.9 | 1687.9 | 1687.9 |
| 65° | *1495.6* | 1495.6 | 1495.6 | 1495.6 | 1495.6 |
| 67.5° | *1325.8* | 1325.8 | 1325.8 | 1325.8 | 1325.8 |
| 70° | *1156.6* | 1156.6 | 1156.6 | 1156.6 | 1156.6 |
| 72.5° | *987.9* | 987.9 | 987.9 | 987.9 | 987.9 |
| 75° | *820.4* | 820.4 | 820.4 | 820.4 | 820.4 |
| 77.5° | *659.0* | 659.0 | 659.0 | 659.0 | 659.0 |
| 80° | *499.3* | 499.3 | 499.3 | 499.3 | 499.3 |
| 82.5° | *342.5* | 342.5 | 342.5 | 342.5 | 342.5 |
| 85° | *192.3* | 192.3 | 192.3 | 192.3 | 192.3 |
| 87.5° | *60.7* | 60.7 | 60.7 | 60.7 | 60.7 |
| 90° | *21.7* | 34.5 | 58.3 | 37.7 | 21.7 |
| 92.5° | *30.7* | 51.3 | 92.6 | 48.1 | 27.5 |
| 95° | *36.1* | 59.9 | 129.6 | 64.6 | 40.8 |
| 97.5° | *45.5* | 66.2 | 148.7 | 78.9 | 63.0 |
| 100° | *59.9* | 77.3 | 231.3 | 96.4 | 83.6 |
| 102.5° | *101.1* | 163.0 | 489.9 | 180.5 | 126.5 |
| 105° | *174.1* | 342.4 | 872.5 | 377.3 | 229.7 |
| 107.5° | *301.1* | 612.1 | 1150.2 | 667.7 | 434.4 |
| 110° | *561.9* | 812.7 | 1206.3 | 917.4 | 695.2 |

TEST NUMBER: P1432415
CATALOG NUMBER: EHBR1-36-UNV-W-L830-UPL30

**CANDELA DISTRIBUTION (continued):**

| | 0° | 22.5° | 45° | 67.5° | 90° |
|---|---|---|---|---|---|
| 112.5° | *758.7* | 873.0 | 1155.5 | 1012.7 | 904.8 |
| 115° | *798.4* | 839.7 | 1031.7 | 988.9 | 982.5 |
| 117.5° | *771.4* | 766.7 | 876.2 | 888.8 | 949.2 |
| 120° | *714.2* | 682.6 | 731.8 | 776.2 | 857.1 |
| 122.5° | *642.9* | 604.7 | 627.0 | 660.3 | 741.3 |
| 125° | *576.7* | 538.7 | 552.9 | 560.9 | 629.2 |
| 127.5° | *518.1* | 492.6 | 500.6 | 491.0 | 533.9 |
| 130° | *478.9* | 456.7 | 467.8 | 445.6 | 466.2 |
| 132.5° | *446.7* | 432.5 | 445.1 | 418.1 | 424.5 |
| 135° | *423.5* | 410.7 | 425.1 | 399.7 | 398.1 |
| 137.5° | *403.4* | 392.3 | 406.6 | 387.5 | 382.7 |
| 140° | *385.5* | 376.0 | 391.8 | 377.6 | 374.4 |
| 142.5° | *365.4* | 359.0 | 378.1 | 368.6 | 365.4 |
| 145° | *351.7* | 347.0 | 367.6 | 362.8 | 361.2 |
| 147.5° | *339.6* | 336.4 | 355.5 | 353.9 | 353.9 |
| 150° | *328.5* | 325.3 | 344.3 | 342.7 | 344.3 |
| 152.5° | *317.4* | 314.2 | 331.6 | 330.0 | 331.6 |
| 155° | *310.0* | 306.8 | 321.1 | 321.1 | 321.1 |
| 157.5° | *303.6* | 302.0 | 313.1 | 313.1 | 313.1 |
| 160° | *299.5* | 297.9 | 307.3 | 307.3 | 305.7 |
| 162.5° | *295.3* | 293.7 | 304.7 | 303.1 | 303.1 |
| 165° | *292.1* | 292.1 | 300.0 | 300.0 | 298.4 |
| 167.5° | *292.1* | 290.5 | 298.4 | 298.4 | 296.8 |
| 170° | *290.5* | 290.5 | 296.8 | 295.3 | 293.7 |
| 172.5° | *291.0* | 291.0 | 297.4 | 295.8 | 294.2 |
| 175° | *290.0* | 290.0 | 294.8 | 294.8 | 294.8 |
| 177.5° | *291.6* | 291.6 | 294.8 | 294.8 | 293.2 |
| 180° | *293.8* | 293.8 | 293.8 | 293.8 | 293.8 |

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Scaled Data Report

TEST NUMBER: P1432415
CATALOG NUMBER: EHBR1-36-UNV-W-L830-UPL30

**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 | 18.45 | 19.63 | 18.94 | 20.10 | 20.61 | 18.45 | 19.63 | 18.94 | 20.10 | 20.61 |
| | 3H | 19.95 | 20.99 | 20.46 | 21.48 | 22.03 | 19.95 | 20.99 | 20.46 | 21.48 | 22.03 |
| | 4H | 20.51 | 21.48 | 21.04 | 21.99 | 22.55 | 20.51 | 21.48 | 21.04 | 21.99 | 22.55 |
| | 6H | 20.89 | 21.79 | 21.43 | 22.31 | 22.89 | 20.89 | 21.79 | 21.43 | 22.31 | 22.89 |
| | 8H | 20.99 | 21.84 | 21.55 | 22.38 | 22.96 | 20.99 | 21.84 | 21.55 | 22.38 | 22.96 |
| | 12H | 21.02 | 21.84 | 21.59 | 22.37 | 22.98 | 21.02 | 21.84 | 21.59 | 22.37 | 22.98 |
| 4H | 2H | 18.89 | 19.87 | 19.42 | 20.37 | 20.94 | 18.89 | 19.87 | 19.42 | 20.37 | 20.94 |
| | 3H | 20.61 | 21.41 | 21.15 | 21.96 | 22.55 | 20.61 | 21.41 | 21.15 | 21.96 | 22.55 |
| | 4H | 21.29 | 22.01 | 21.85 | 22.57 | 23.19 | 21.29 | 22.01 | 21.85 | 22.57 | 23.19 |
| | 6H | 21.78 | 22.41 | 22.37 | 22.99 | 23.63 | 21.78 | 22.41 | 22.37 | 22.99 | 23.63 |
| | 8H | 21.91 | 22.50 | 22.51 | 23.08 | 23.72 | 21.91 | 22.50 | 22.51 | 23.08 | 23.72 |
| | 12H | 21.97 | 22.49 | 22.58 | 23.10 | 23.75 | 21.97 | 22.49 | 22.58 | 23.10 | 23.75 |
| 8H | 4H | 21.49 | 22.07 | 22.08 | 22.65 | 23.30 | 21.49 | 22.07 | 22.08 | 22.65 | 23.30 |
| | 6H | 22.08 | 22.56 | 22.71 | 23.19 | 23.84 | 22.08 | 22.56 | 22.71 | 23.19 | 23.84 |
| | 8H | 22.27 | 22.70 | 22.91 | 23.34 | 24.00 | 22.27 | 22.70 | 22.91 | 23.34 | 24.00 |
| | 12H | 22.38 | 22.75 | 23.01 | 23.37 | 24.11 | 22.38 | 22.75 | 23.01 | 23.37 | 24.11 |
| 12H | 4H | 21.48 | 22.00 | 22.09 | 22.61 | 23.26 | 21.48 | 22.00 | 22.09 | 22.61 | 23.26 |
| | 6H | 22.10 | 22.53 | 22.74 | 23.17 | 23.83 | 22.10 | 22.53 | 22.74 | 23.17 | 23.83 |
| | 8H | 22.32 | 22.70 | 22.96 | 23.32 | 24.06 | 22.32 | 22.70 | 22.96 | 23.32 | 24.06 |

Cooper Lighting Solutions Photometric Lab
1121 Highway 74 South
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: SP1-2506-472-2

Test Date: 07/31/2025

Luminaire Tested: EHBR-60-L830-N

Data in this report applies to families of products including EHBR-60-L830-N

Report Generated By FNC07603 / LDUCLS01DT446
Version: v7.04

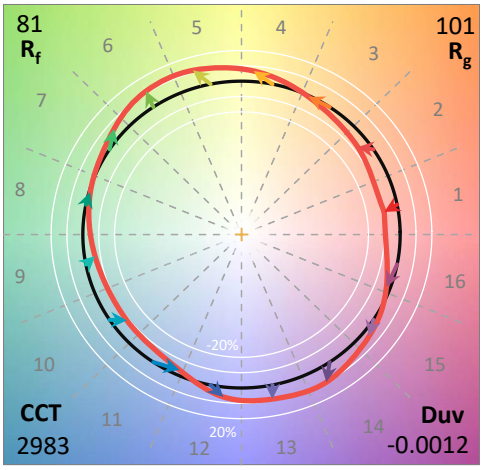
## Test Information

| | |
|---|---|
| Test Method: | LM-79-2019 |
| Report Number: | SP1-2506-472-2 |
| Test Lab: | COOPER LIGHTING SOLUTIONS |
| Photometer: | SP1 - 76IN SPHERE |
| Measurement Geometry: | 4π |
| Issue Date: | 08/05/2025 |
| Manufacturer: | COOPER LIGHTING SOLUTIONS |
| Product Line: | Metalux |
| Catalog Number: | **EHBR-60-L830-N** |
| Description: | Elevate Round Highbay at, 60000 lumens, 3000K 80CRI LEDs with N lens |

## Spectral Parameters

| | |
|---|---|
| CCT (K): | 2983 |
| CIE u': | 0.2516 |
| CIE v': | 0.5201 |
| Duv: | -0.0012 |
| CIE x: | 0.4364 |
| CIE y: | 0.4010 |
| CIE z: | 0.1626 |
| Peak Wavelength (nm): | 630 |
| Dominant Wavelength (nm): | 583 |
| Purity: | 51.34918 |
| Rf: | 81.2 |
| Rg: | 101.5 |

| | | | | | |
|---|---|---|---|---|---|
| CRI (Ra): | 83.4 | | | | |
| R1: | 84.0 | R9: | 29.4 | | |
| R2: | 87.5 | R10: | 68.6 | | |
| R3: | 88.9 | R11: | 82.2 | | |
| R4: | 83.8 | R12: | 61.6 | | |
| R5: | 81.9 | R13: | 83.9 | | |
| R6: | 83.1 | R14: | 92.5 | | |
| R7: | 87.1 | R15: | 79.8 | | |
| R8: | 70.9 | | | | |




## Test Conditions

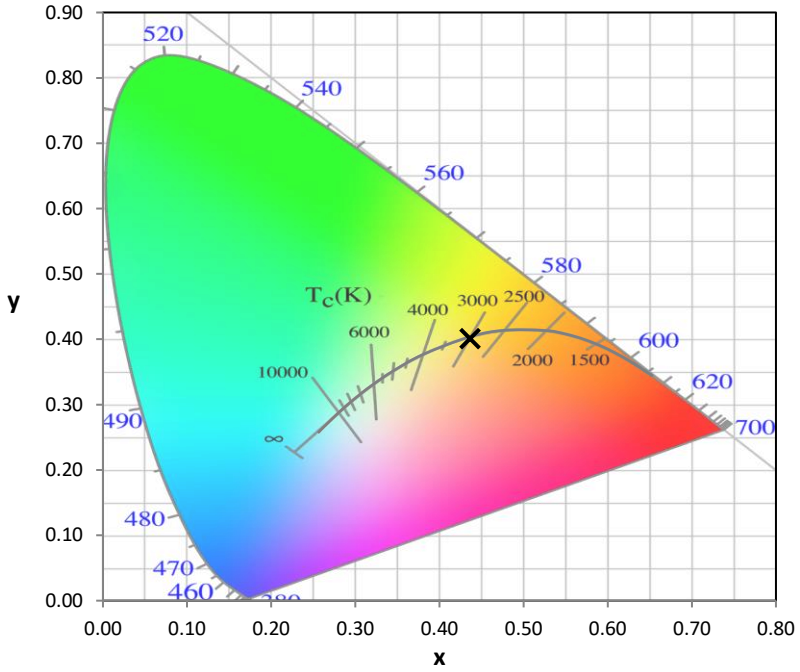
| | |
|---|---|
| Stabilization Time: | 38M |
| Operation Time: | 1H 38M |
| Sphere Temperature (°C): | 25.0 |

REPORT NUMBER: SP1-2506-472-2

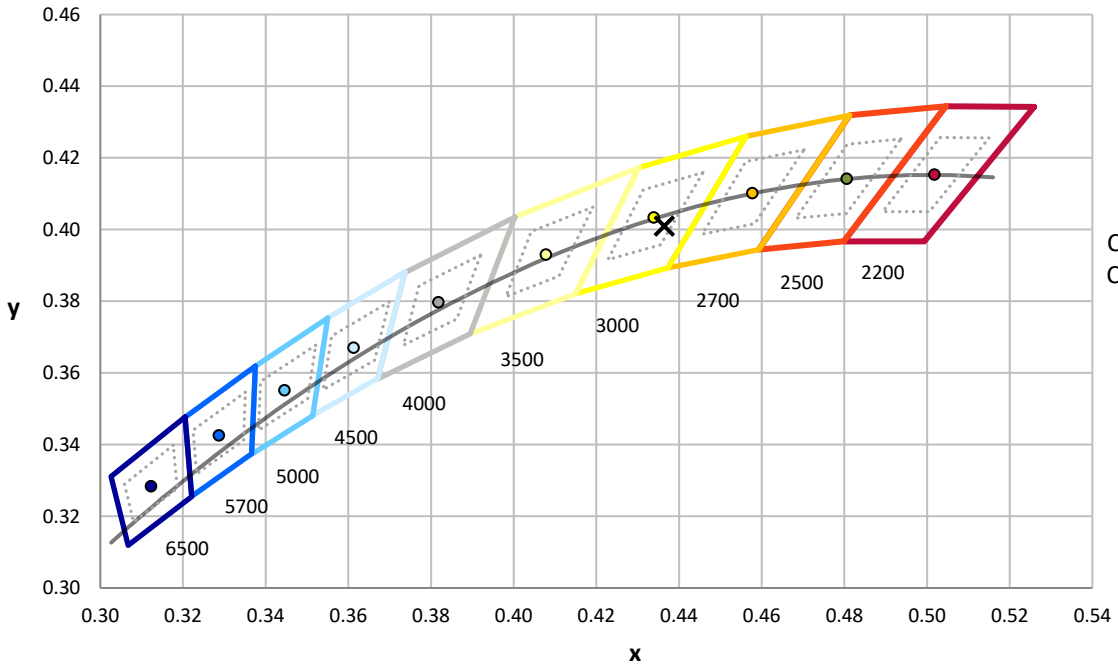
| Measurement and Test Equipment | | | |
|---|---|---|---|
| Instrument | Identification Number | Calibration Date | Calibration Due Date |
| Photometer | 76INCH SPHERE IN0058 | 6/16/2025 | 12/16/2025 |
| Power Meter | XITRON INXT2011004 | 1/21/2025 | 1/21/2026 |
| AC Power Source | CHROMA 61603 IN0063 | 10/22/2024 | 10/22/2025 |
| DC Power Source | AGILENT E3634A IN0208 | 10/22/2024 | 10/22/2025 |
| Sphere Thermometer | ONSET IN0085 | 10/22/2024 | 10/22/2025 |
| Room Thermometer | ONSET IN0046 | 10/22/2024 | 10/22/2025 |

REPORT NUMBER: SP1-2506-472-2

## CIE 1931 Chromaticity Diagram




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

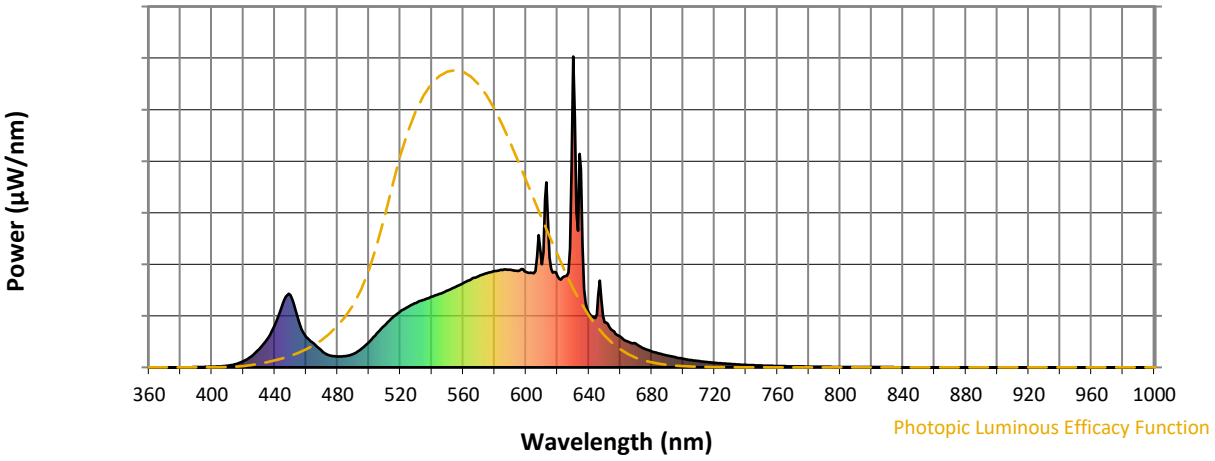



CCT = 2983K
CIE x = 0.4364
CIE y = 0.4010
Duv = -0.0012

Point lies inside the ANSI 3000K 4-step quadrangle

REPORT NUMBER: SP1-2506-472-2

## 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 | 43 | NR | 620 | 294 | NR | 750 | 6 | NR | 880 | 0 | NR |
| 365 | 0 | NR | 495 | 59 | NR | 625 | 294 | NR | 755 | 5 | NR | 885 | 0 | NR |
| 370 | 0 | NR | 500 | 81 | NR | 630 | 1000 | NR | 760 | 4 | NR | 890 | 0 | NR |
| 375 | 0 | NR | 505 | 109 | NR | 635 | 637 | NR | 765 | 4 | NR | 895 | 0 | NR |
| 380 | 0 | NR | 510 | 135 | NR | 640 | 175 | NR | 770 | 3 | NR | 900 | 0 | NR |
| 385 | 0 | NR | 515 | 160 | NR | 645 | 171 | NR | 775 | 3 | NR | 905 | 0 | NR |
| 390 | 1 | NR | 520 | 180 | NR | 650 | 146 | NR | 780 | 2 | NR | 910 | 0 | NR |
| 395 | 1 | NR | 525 | 195 | NR | 655 | 119 | NR | 785 | 2 | NR | 915 | 0 | NR |
| 400 | 2 | NR | 530 | 207 | NR | 660 | 99 | NR | 790 | 2 | NR | 920 | 0 | NR |
| 405 | 3 | NR | 535 | 218 | NR | 665 | 82 | NR | 795 | 2 | NR | 925 | 0 | NR |
| 410 | 5 | NR | 540 | 227 | NR | 670 | 76 | NR | 800 | 1 | NR | 930 | 0 | NR |
| 415 | 10 | NR | 545 | 237 | NR | 675 | 61 | NR | 805 | 1 | NR | 935 | 0 | NR |
| 420 | 20 | NR | 550 | 247 | NR | 680 | 52 | NR | 810 | 1 | NR | 940 | 0 | NR |
| 425 | 35 | NR | 555 | 259 | NR | 685 | 44 | NR | 815 | 1 | NR | 945 | 0 | NR |
| 430 | 58 | NR | 560 | 271 | NR | 690 | 38 | NR | 820 | 1 | NR | 950 | 0 | NR |
| 435 | 90 | NR | 565 | 283 | NR | 695 | 33 | NR | 825 | 1 | NR | 955 | 0 | NR |
| 440 | 135 | NR | 570 | 293 | NR | 700 | 27 | NR | 830 | 1 | NR | 960 | 0 | NR |
| 445 | 204 | NR | 575 | 303 | NR | 705 | 24 | NR | 835 | 1 | NR | 965 | 0 | NR |
| 450 | 233 | NR | 580 | 310 | NR | 710 | 20 | NR | 840 | 0 | NR | 970 | 0 | NR |
| 455 | 153 | NR | 585 | 313 | NR | 715 | 17 | NR | 845 | 0 | NR | 975 | 0 | NR |
| 460 | 98 | NR | 590 | 314 | NR | 720 | 15 | NR | 850 | 0 | NR | 980 | 0 | NR |
| 465 | 76 | NR | 595 | 310 | NR | 725 | 13 | NR | 855 | 0 | NR | 985 | 0 | NR |
| 470 | 53 | NR | 600 | 307 | NR | 730 | 11 | NR | 860 | 0 | NR | 990 | 0 | NR |
| 475 | 39 | NR | 605 | 303 | NR | 735 | 9 | NR | 865 | 0 | NR | 995 | 0 | NR |
| 480 | 35 | NR | 610 | 331 | NR | 740 | 8 | NR | 870 | 0 | NR | 1000 | 0 | NR |
| 485 | 36 | NR | 615 | 353 | NR | 745 | 7 | NR | 875 | 0 | NR | | | |

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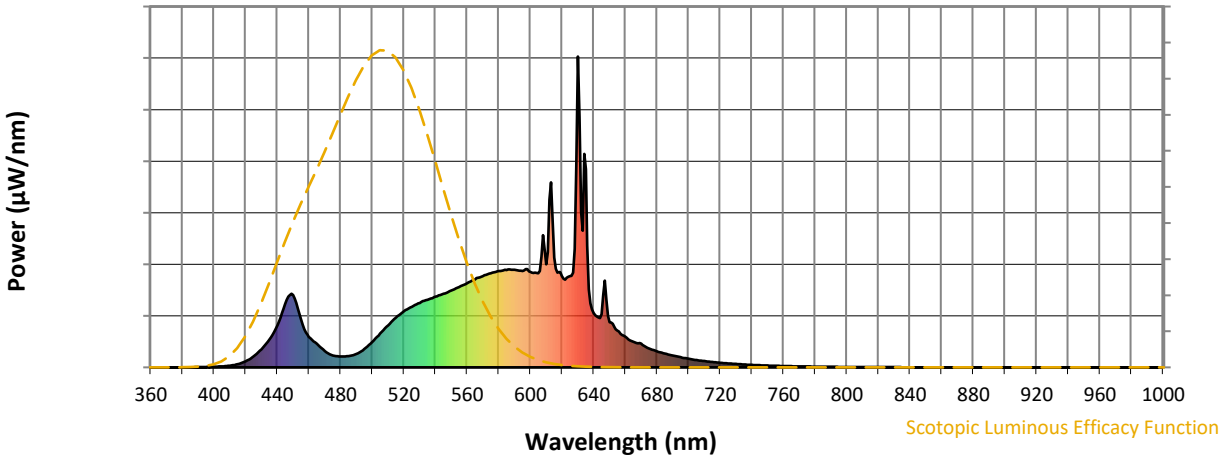
## Scotopic Flux vs. Wavelength




**Scotopic Lumens: NR** **S/P: 1.27**

| 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 | 43 | NR | 620 | 294 | NR | 750 | 6 | NR | 880 | 0 | NR |
| 365 | 0 | NR | 495 | 59 | NR | 625 | 294 | NR | 755 | 5 | NR | 885 | 0 | NR |
| 370 | 0 | NR | 500 | 81 | NR | 630 | 1000 | NR | 760 | 4 | NR | 890 | 0 | NR |
| 375 | 0 | NR | 505 | 109 | NR | 635 | 637 | NR | 765 | 4 | NR | 895 | 0 | NR |
| 380 | 0 | NR | 510 | 135 | NR | 640 | 175 | NR | 770 | 3 | NR | 900 | 0 | NR |
| 385 | 0 | NR | 515 | 160 | NR | 645 | 171 | NR | 775 | 3 | NR | 905 | 0 | NR |
| 390 | 1 | NR | 520 | 180 | NR | 650 | 146 | NR | 780 | 2 | NR | 910 | 0 | NR |
| 395 | 1 | NR | 525 | 195 | NR | 655 | 119 | NR | 785 | 2 | NR | 915 | 0 | NR |
| 400 | 2 | NR | 530 | 207 | NR | 660 | 99 | NR | 790 | 2 | NR | 920 | 0 | NR |
| 405 | 3 | NR | 535 | 218 | NR | 665 | 82 | NR | 795 | 2 | NR | 925 | 0 | NR |
| 410 | 5 | NR | 540 | 227 | NR | 670 | 76 | NR | 800 | 1 | NR | 930 | 0 | NR |
| 415 | 10 | NR | 545 | 237 | NR | 675 | 61 | NR | 805 | 1 | NR | 935 | 0 | NR |
| 420 | 20 | NR | 550 | 247 | NR | 680 | 52 | NR | 810 | 1 | NR | 940 | 0 | NR |
| 425 | 35 | NR | 555 | 259 | NR | 685 | 44 | NR | 815 | 1 | NR | 945 | 0 | NR |
| 430 | 58 | NR | 560 | 271 | NR | 690 | 38 | NR | 820 | 1 | NR | 950 | 0 | NR |
| 435 | 90 | NR | 565 | 283 | NR | 695 | 33 | NR | 825 | 1 | NR | 955 | 0 | NR |
| 440 | 135 | NR | 570 | 293 | NR | 700 | 27 | NR | 830 | 1 | NR | 960 | 0 | NR |
| 445 | 204 | NR | 575 | 303 | NR | 705 | 24 | NR | 835 | 1 | NR | 965 | 0 | NR |
| 450 | 233 | NR | 580 | 310 | NR | 710 | 20 | NR | 840 | 0 | NR | 970 | 0 | NR |
| 455 | 153 | NR | 585 | 313 | NR | 715 | 17 | NR | 845 | 0 | NR | 975 | 0 | NR |
| 460 | 98 | NR | 590 | 314 | NR | 720 | 15 | NR | 850 | 0 | NR | 980 | 0 | NR |
| 465 | 76 | NR | 595 | 310 | NR | 725 | 13 | NR | 855 | 0 | NR | 985 | 0 | NR |
| 470 | 53 | NR | 600 | 307 | NR | 730 | 11 | NR | 860 | 0 | NR | 990 | 0 | NR |
| 475 | 39 | NR | 605 | 303 | NR | 735 | 9 | NR | 865 | 0 | NR | 995 | 0 | NR |
| 480 | 35 | NR | 610 | 331 | NR | 740 | 8 | NR | 870 | 0 | NR | 1000 | 0 | NR |
| 485 | 36 | NR | 615 | 353 | NR | 745 | 7 | NR | 875 | 0 | NR | | | |

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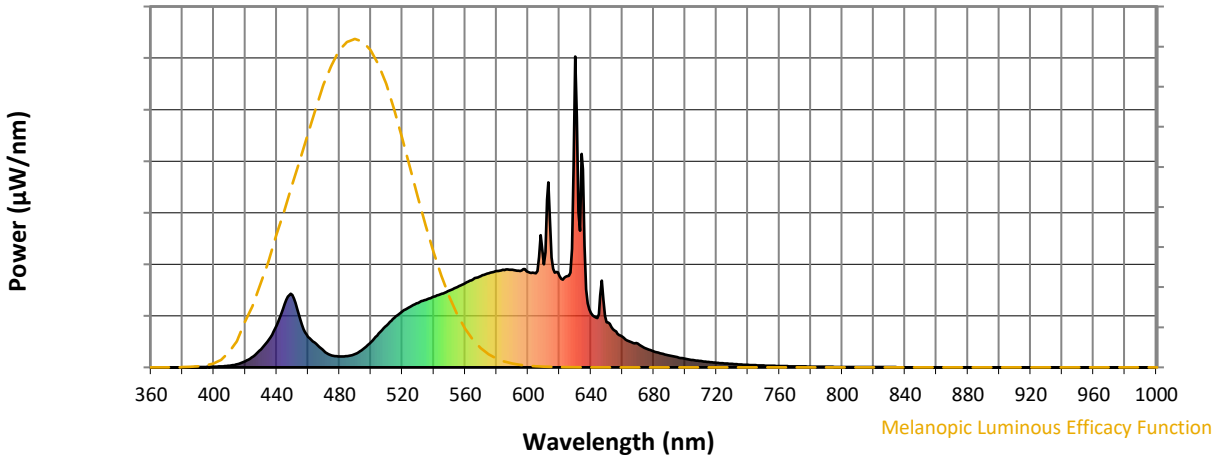
## Melanopic Flux vs. Wavelength




**Melanopic Lumens: NR** **M/P: 2.34**

| 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 | 43 | NR | 620 | 294 | NR | 750 | 6 | NR | 880 | 0 | NR |
| 365 | 0 | NR | 495 | 59 | NR | 625 | 294 | NR | 755 | 5 | NR | 885 | 0 | NR |
| 370 | 0 | NR | 500 | 81 | NR | 630 | 1000 | NR | 760 | 4 | NR | 890 | 0 | NR |
| 375 | 0 | NR | 505 | 109 | NR | 635 | 637 | NR | 765 | 4 | NR | 895 | 0 | NR |
| 380 | 0 | NR | 510 | 135 | NR | 640 | 175 | NR | 770 | 3 | NR | 900 | 0 | NR |
| 385 | 0 | NR | 515 | 160 | NR | 645 | 171 | NR | 775 | 3 | NR | 905 | 0 | NR |
| 390 | 1 | NR | 520 | 180 | NR | 650 | 146 | NR | 780 | 2 | NR | 910 | 0 | NR |
| 395 | 1 | NR | 525 | 195 | NR | 655 | 119 | NR | 785 | 2 | NR | 915 | 0 | NR |
| 400 | 2 | NR | 530 | 207 | NR | 660 | 99 | NR | 790 | 2 | NR | 920 | 0 | NR |
| 405 | 3 | NR | 535 | 218 | NR | 665 | 82 | NR | 795 | 2 | NR | 925 | 0 | NR |
| 410 | 5 | NR | 540 | 227 | NR | 670 | 76 | NR | 800 | 1 | NR | 930 | 0 | NR |
| 415 | 10 | NR | 545 | 237 | NR | 675 | 61 | NR | 805 | 1 | NR | 935 | 0 | NR |
| 420 | 20 | NR | 550 | 247 | NR | 680 | 52 | NR | 810 | 1 | NR | 940 | 0 | NR |
| 425 | 35 | NR | 555 | 259 | NR | 685 | 44 | NR | 815 | 1 | NR | 945 | 0 | NR |
| 430 | 58 | NR | 560 | 271 | NR | 690 | 38 | NR | 820 | 1 | NR | 950 | 0 | NR |
| 435 | 90 | NR | 565 | 283 | NR | 695 | 33 | NR | 825 | 1 | NR | 955 | 0 | NR |
| 440 | 135 | NR | 570 | 293 | NR | 700 | 27 | NR | 830 | 1 | NR | 960 | 0 | NR |
| 445 | 204 | NR | 575 | 303 | NR | 705 | 24 | NR | 835 | 1 | NR | 965 | 0 | NR |
| 450 | 233 | NR | 580 | 310 | NR | 710 | 20 | NR | 840 | 0 | NR | 970 | 0 | NR |
| 455 | 153 | NR | 585 | 313 | NR | 715 | 17 | NR | 845 | 0 | NR | 975 | 0 | NR |
| 460 | 98 | NR | 590 | 314 | NR | 720 | 15 | NR | 850 | 0 | NR | 980 | 0 | NR |
| 465 | 76 | NR | 595 | 310 | NR | 725 | 13 | NR | 855 | 0 | NR | 985 | 0 | NR |
| 470 | 53 | NR | 600 | 307 | NR | 730 | 11 | NR | 860 | 0 | NR | 990 | 0 | NR |
| 475 | 39 | NR | 605 | 303 | NR | 735 | 9 | NR | 865 | 0 | NR | 995 | 0 | NR |
| 480 | 35 | NR | 610 | 331 | NR | 740 | 8 | NR | 870 | 0 | NR | 1000 | 0 | NR |
| 485 | 36 | NR | 615 | 353 | NR | 745 | 7 | NR | 875 | 0 | NR | | | |

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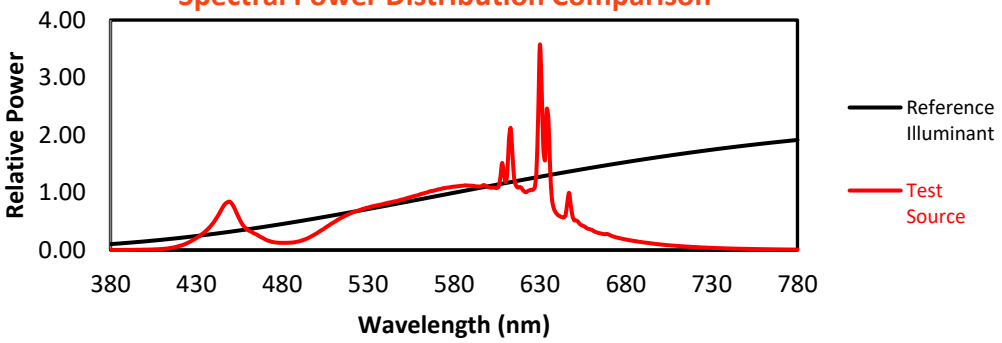
# TM-30-18

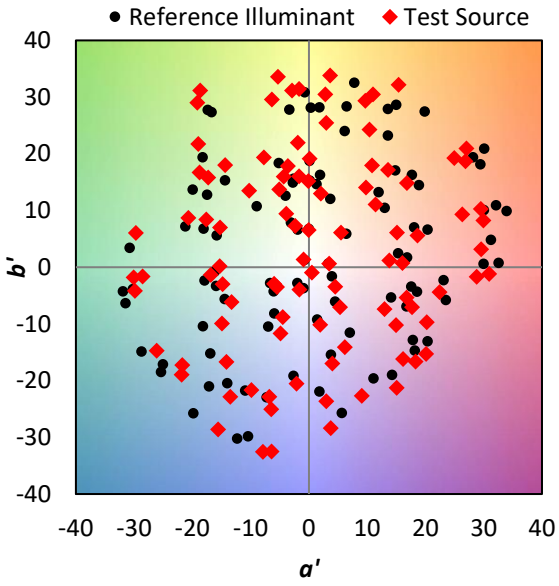
## Summary

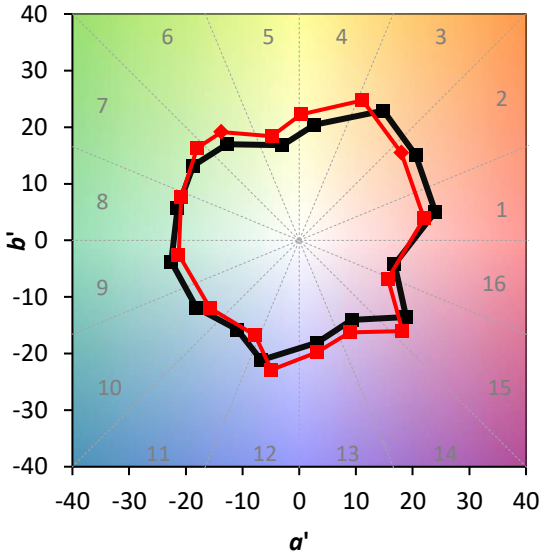
$R_f$ = 81.2
$R_g$ = 101.5
CIE $R_a$ = 83.4
$R_9$ = 29.4

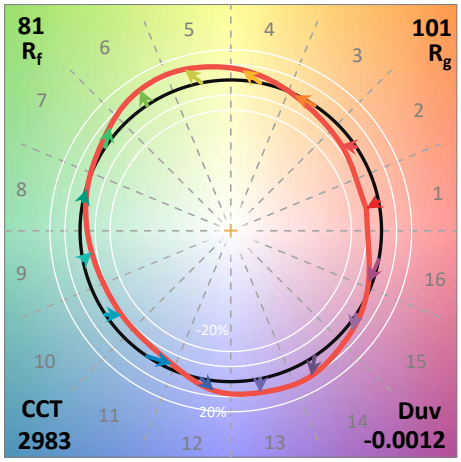
## Spectral Power Distribution Comparison

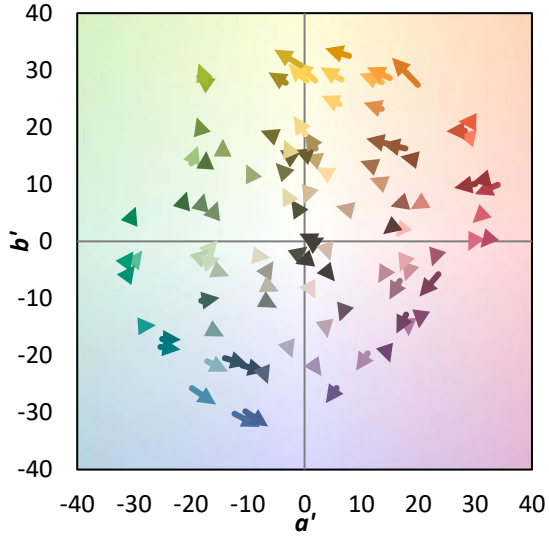



## Color Vector Graphics



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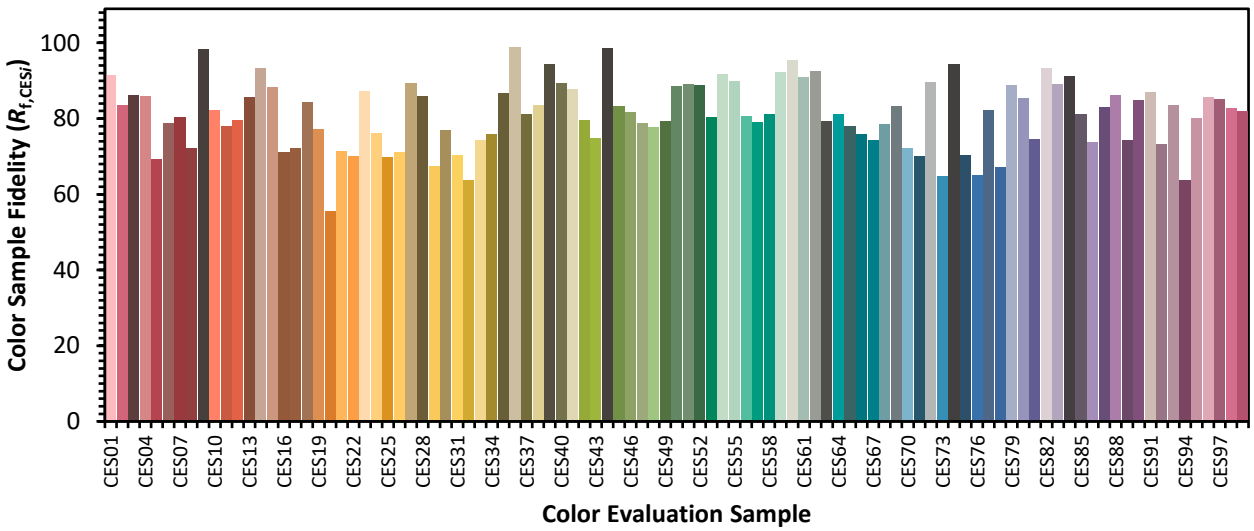
# TM-30-18

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

| | | | |
|---|---|---|---|
| CES01 = 86 | CES26 = 71 | CES51 = 89 | CES76 = 65 |
| CES02 = 63 | CES27 = 89 | CES52 = 89 | CES77 = 82 |
| CES03 = 31 | CES28 = 86 | CES53 = 80 | CES78 = 67 |
| CES04 = 70 | CES29 = 68 | CES54 = 92 | CES79 = 89 |
| CES05 = 50 | CES30 = 77 | CES55 = 90 | CES80 = 85 |
| CES06 = 51 | CES31 = 70 | CES56 = 81 | CES81 = 75 |
| CES07 = 43 | CES32 = 64 | CES57 = 79 | CES82 = 93 |
| CES08 = 41 | CES33 = 74 | CES58 = 81 | CES83 = 89 |
| CES09 = 29 | CES34 = 76 | CES59 = 92 | CES84 = 91 |
| CES10 = 76 | CES35 = 87 | CES60 = 96 | CES85 = 81 |
| CES11 = 59 | CES36 = 99 | CES61 = 91 | CES86 = 74 |
| CES12 = 65 | CES37 = 81 | CES62 = 93 | CES87 = 83 |
| CES13 = 44 | CES38 = 83 | CES63 = 79 | CES88 = 86 |
| CES14 = 74 | CES39 = 94 | CES64 = 81 | CES89 = 74 |
| CES15 = 72 | CES40 = 89 | CES65 = 78 | CES90 = 85 |
| CES16 = 48 | CES41 = 88 | CES66 = 76 | CES91 = 87 |
| CES17 = 50 | CES42 = 80 | CES67 = 74 | CES92 = 73 |
| CES18 = 57 | CES43 = 75 | CES68 = 79 | CES93 = 84 |
| CES19 = 72 | CES44 = 99 | CES69 = 83 | CES94 = 64 |
| CES20 = 67 | CES45 = 83 | CES70 = 72 | CES95 = 80 |
| CES21 = 87 | CES46 = 82 | CES71 = 70 | CES96 = 86 |
| CES22 = 79 | CES47 = 79 | CES72 = 90 | CES97 = 85 |
| CES23 = 92 | CES48 = 78 | CES73 = 65 | CES98 = 83 |
| CES24 = 91 | CES49 = 79 | CES74 = 94 | CES99 = 82 |
| CES25 = 72 | CES50 = 88 | CES75 = 70 | |



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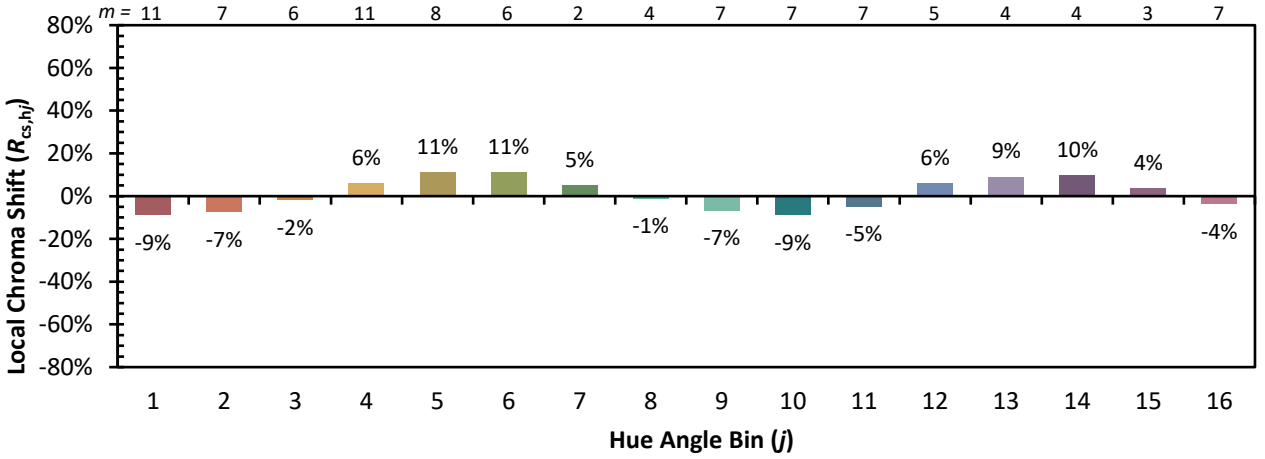
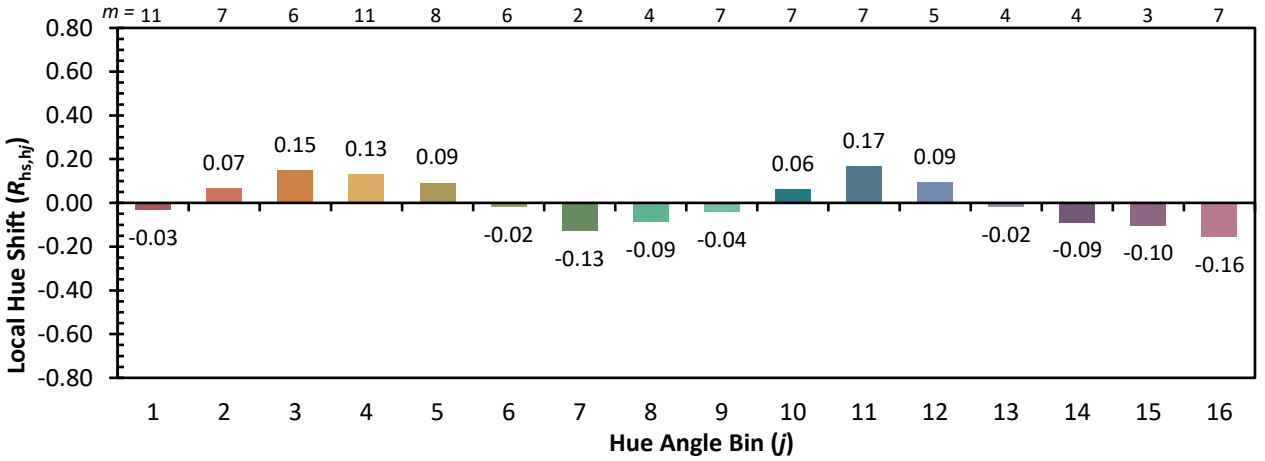
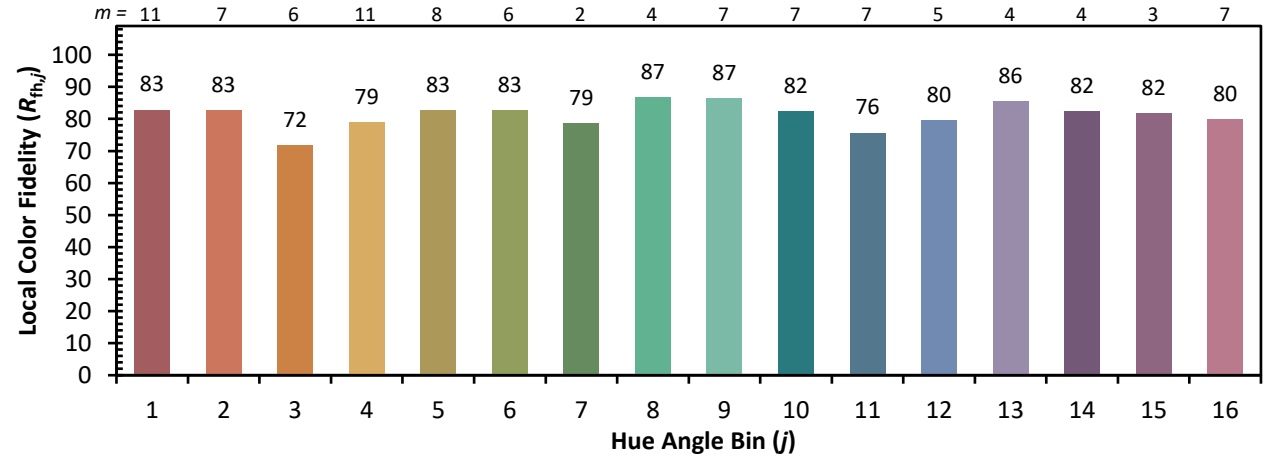
# TM-30-18

## Color Rendition by Hue-Angle Bin



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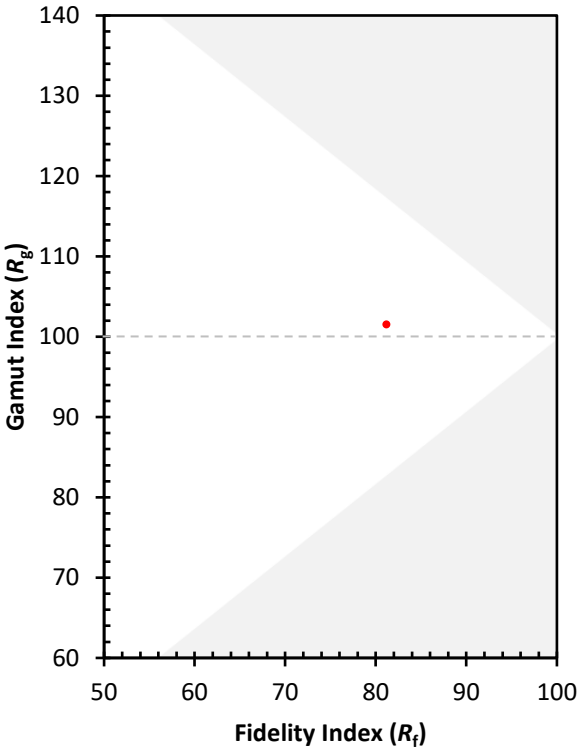
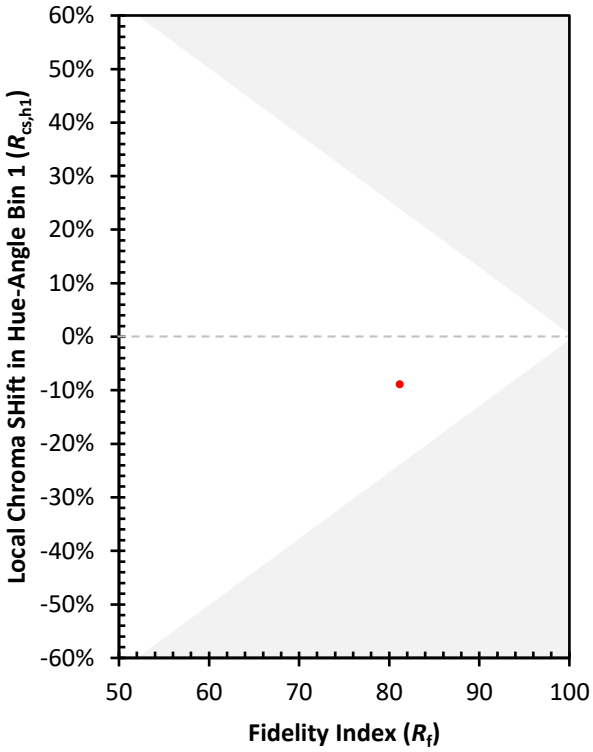
## TM-30-18

### Measure Comparisons

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