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: P1432534

Luminaire Tested: EHBR1-60-UNV-N-L830-UPL24

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: | P1432534 |
| | REPORT IS A COMBINATION OF REPORTS P1431911 AND P1431635 |
| Test Lab: | INNOVATION CENTER |
| Issue Date: | 3/20/2026 |
| Manufacturer: | COOPER LIGHTING SOLUTIONS |
| Product Line: | METALUX |
| Catalog Number: | EHBR1-60-UNV-N-L830-UPL24 |
| Description: | Elevate Round Highbay at, 60000 lumens, 3000K 80CRI LEDs with N lens |
| Light Source: | - |
| Ballast/Driver: | - |

**Summary**

| | |
|---|---|
| Lumens per Lamp: | N/A |
| Luminaire Lumens: | 58602.1 lumens |
| Efficiency: | N/A |
| Efficacy: | 168.9 lumens/watt |
| Spacing Criteria (0/90/45): | 0.82 / 0.82 / 0.8 |
| Luminous Opening: | Vertical Cylinder (Dia: 1.71' x H: 0.1') |
| CIE Type: | Direct |

| | |
|---|---|
| Input Watts (W): | 346.9 |
| 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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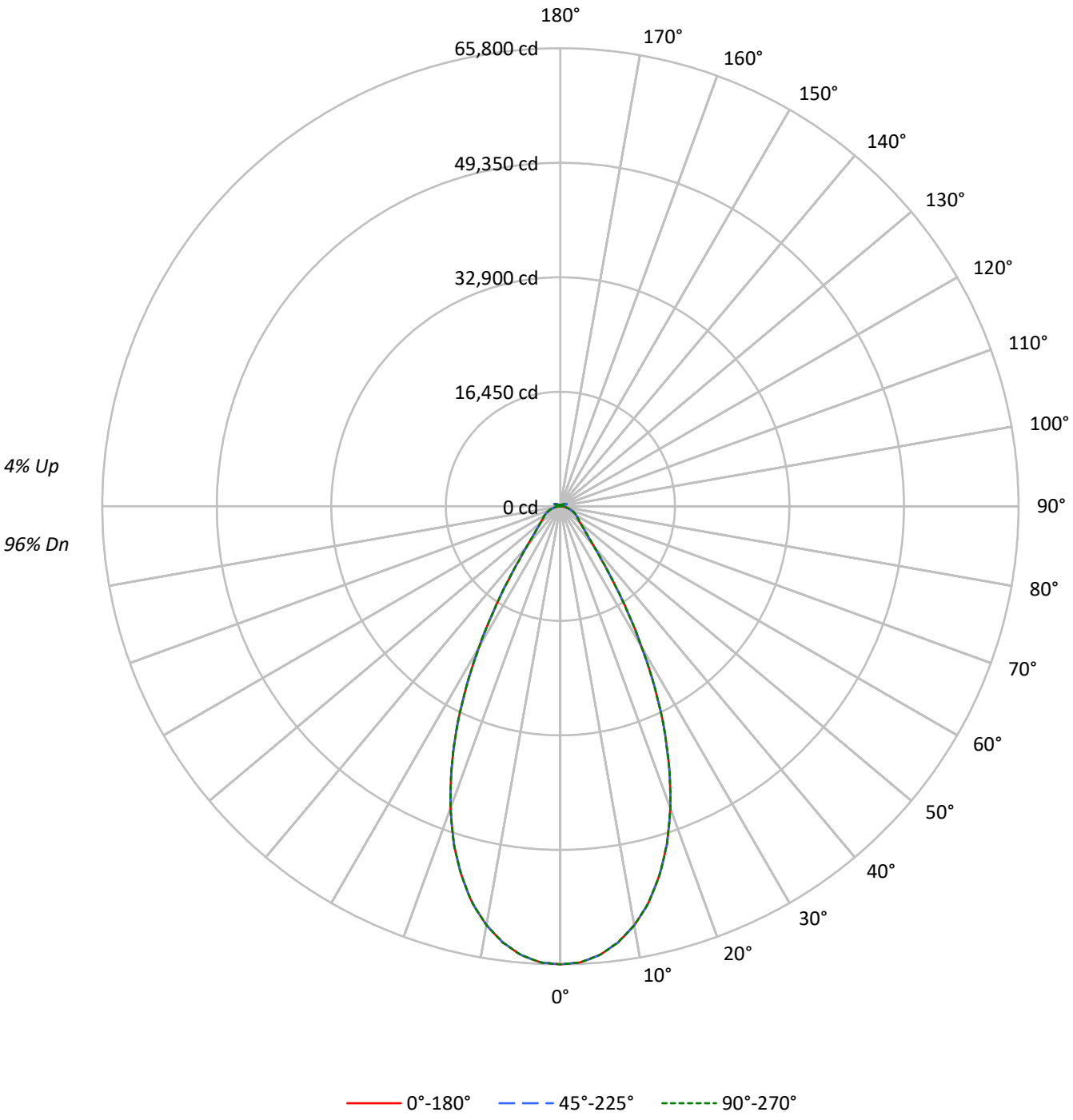
Scaled Data Report

TEST NUMBER: P1432534
CATALOG NUMBER: EHBR1-60-UNV-N-L830-UPL24

## Luminous Intensity Polar Plot



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TEST NUMBER: P1432534
CATALOG NUMBER: EHBR1-60-UNV-N-L830-UPL24

## 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 | 118 | 118 | 118 | 118 | 115 | 115 | 115 | 115 | 109 | 109 | 109 | 104 | 104 | 104 | 99 | 99 | 99 | 96 |
| 1 | 111 | 108 | 105 | 102 | 108 | 106 | 103 | 100 | 101 | 99 | 97 | 96 | 95 | 93 | 92 | 91 | 90 | 88 |
| 2 | 105 | 99 | 94 | 90 | 102 | 97 | 93 | 89 | 93 | 90 | 87 | 90 | 87 | 84 | 86 | 84 | 82 | 80 |
| 3 | 99 | 91 | 86 | 81 | 96 | 90 | 84 | 80 | 86 | 82 | 78 | 83 | 80 | 77 | 81 | 78 | 75 | 73 |
| 4 | 93 | 85 | 78 | 74 | 91 | 83 | 77 | 73 | 81 | 76 | 72 | 78 | 74 | 70 | 76 | 72 | 69 | 67 |
| 5 | 88 | 79 | 72 | 68 | 86 | 78 | 72 | 67 | 75 | 70 | 66 | 73 | 69 | 65 | 71 | 67 | 64 | 63 |
| 6 | 83 | 74 | 67 | 62 | 82 | 73 | 67 | 62 | 71 | 65 | 61 | 69 | 64 | 61 | 67 | 63 | 60 | 58 |
| 7 | 79 | 69 | 63 | 58 | 77 | 68 | 62 | 58 | 67 | 61 | 57 | 65 | 60 | 57 | 64 | 59 | 56 | 54 |
| 8 | 75 | 65 | 59 | 54 | 74 | 64 | 58 | 54 | 63 | 57 | 53 | 61 | 57 | 53 | 60 | 56 | 53 | 51 |
| 9 | 72 | 61 | 55 | 51 | 70 | 61 | 55 | 51 | 59 | 54 | 50 | 58 | 53 | 50 | 57 | 53 | 49 | 48 |
| 10 | 68 | 58 | 52 | 48 | 67 | 57 | 52 | 48 | 56 | 51 | 47 | 55 | 50 | 47 | 54 | 50 | 47 | 45 |

## AVERAGE LUMINANCE (cd/sqm):

| | 0° | 45° | 90° |
|---|---|---|---|
| 0° | 309005 | 309005 | 309005 |
| 5° | 303007 | 303007 | 303007 |
| 10° | 287590 | 287590 | 287590 |
| 15° | 261668 | 261668 | 261668 |
| 20° | 224454 | 224454 | 224454 |
| 25° | 176569 | 176569 | 176569 |
| 30° | 121171 | 121171 | 121171 |
| 35° | 71980 | 71980 | 71980 |
| 40° | 42589 | 42589 | 42589 |
| 45° | 30572 | 30572 | 30572 |
| 50° | 25130 | 25130 | 25130 |
| 55° | 22839 | 22839 | 22839 |
| 60° | 21863 | 21863 | 21863 |
| 65° | 20853 | 20853 | 20853 |
| 70° | 19393 | 19393 | 19393 |
| 75° | 17532 | 17532 | 17532 |
| 80° | 14553 | 14553 | 14553 |
| 85° | 9215 | 9215 | 9215 |

## MAXIMUM LUMINANCE 45°-90°:

Horizontal Angle: 0°
Vertical Angle: 45°
Luminance: 30572 cd/sqm

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Scaled Data Report

TEST NUMBER: P1432534
CATALOG NUMBER: EHBR1-60-UNV-N-L830-UPL24

**ZONAL LUMENS:**

| Zone | Lumens | % Fixture |
|---|---|---|
| 0°-10° | 6061.3 | 10.3 |
| 10°-20° | 15214.8 | 26.0 |
| 20°-30° | 15908.7 | 27.1 |
| 30°-40° | 8619.8 | 14.7 |
| 40°-50° | 3965.5 | 6.8 |
| 50°-60° | 2794.6 | 4.8 |
| 60°-70° | 2150.7 | 3.7 |
| 70°-80° | 1303.8 | 2.2 |
| 80°-90° | 371.1 | 0.6 |
| 90°-100° | 63.3 | 0.1 |
| 100°-110° | 395.1 | 0.7 |
| 110°-120° | 706.6 | 1.2 |
| 120°-130° | 414.6 | 0.7 |
| 130°-140° | 254.3 | 0.4 |
| 140°-150° | 176.4 | 0.3 |
| 150°-160° | 114.6 | 0.2 |
| 160°-170° | 65.3 | 0.1 |
| 170°-180° | 21.6 | 0.0 |
| 0°-30° | 37184.7 | 63.5 |
| 0°-40° | 45804.5 | 78.2 |
| 0°-60° | 52564.6 | 89.7 |
| 0°-90° | 56390.2 | 96.2 |
| 90°-120° | 1165.1 | 2.0 |
| 90°-150° | 2010.4 | 3.4 |
| 90°-180° | 2212.0 | 3.8 |
| 0°-180° | 58602.1 | 100.0 |

**CANDELA DISTRIBUTION:**

| | 0° | 22.5° | 45° | 67.5° | 90° | Flux |
|---|---|---|---|---|---|---|
| 0° | 65800 | 65800 | 65800 | 65800 | 65800 | |
| 5° | 64697 | 64697 | 64697 | 64697 | 64697 | 6061 |
| 15° | 54897 | 54897 | 54897 | 54897 | 54897 | 15215 |
| 25° | 35261 | 35261 | 35261 | 35261 | 35261 | 15909 |
| 35° | 13211 | 13211 | 13211 | 13211 | 13211 | 8620 |
| 45° | 4946 | 4946 | 4946 | 4946 | 4946 | 3966 |
| 55° | 3086 | 3086 | 3086 | 3086 | 3086 | 2795 |
| 65° | 2177 | 2177 | 2177 | 2177 | 2177 | 2151 |
| 75° | 1235 | 1235 | 1235 | 1235 | 1235 | 1304 |
| 85° | 317 | 317 | 317 | 317 | 317 | 351 |
| 90° | 18 | 28 | 48 | 31 | 18 | 24 |
| 95° | 28 | 47 | 103 | 51 | 32 | 27 |
| 105° | 138 | 272 | 695 | 300 | 182 | 185 |
| 115° | 636 | 668 | 822 | 788 | 782 | 585 |
| 125° | 458 | 428 | 439 | 446 | 500 | 418 |
| 135° | 334 | 324 | 336 | 315 | 314 | 261 |
| 145° | 275 | 271 | 287 | 284 | 282 | 174 |
| 155° | 240 | 238 | 249 | 249 | 249 | 112 |
| 165° | 225 | 225 | 232 | 232 | 230 | 64 |
| 175° | 223 | 223 | 227 | 227 | 227 | 21 |
| 180° | 225 | 225 | 225 | 225 | 225 | |

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Scaled Data Report

TEST NUMBER: P1432534
CATALOG NUMBER: EHBR1-60-UNV-N-L830-UPL24

**CANDELA DISTRIBUTION (FULL):**

| | 0° | 22.5° | 45° | 67.5° | 90° |
|---|---|---|---|---|---|
| 0° | 65800.5 | 65800.5 | 65800.5 | 65800.5 | 65800.5 |
| 2.5° | 65567.2 | 65567.2 | 65567.2 | 65567.2 | 65567.2 |
| 5° | 64696.7 | 64696.7 | 64696.7 | 64696.7 | 64696.7 |
| 7.5° | 63210.6 | 63210.6 | 63210.6 | 63210.6 | 63210.6 |
| 10° | 61102.4 | 61102.4 | 61102.4 | 61102.4 | 61102.4 |
| 12.5° | 58377.6 | 58377.6 | 58377.6 | 58377.6 | 58377.6 |
| 15° | 54896.6 | 54896.6 | 54896.6 | 54896.6 | 54896.6 |
| 17.5° | 50858.1 | 50858.1 | 50858.1 | 50858.1 | 50858.1 |
| 20° | 46131.8 | 46131.8 | 46131.8 | 46131.8 | 46131.8 |
| 22.5° | 40869.6 | 40869.6 | 40869.6 | 40869.6 | 40869.6 |
| 25° | 35260.6 | 35260.6 | 35260.6 | 35260.6 | 35260.6 |
| 27.5° | 29314.3 | 29314.3 | 29314.3 | 29314.3 | 29314.3 |
| 30° | 23307.2 | 23307.2 | 23307.2 | 23307.2 | 23307.2 |
| 32.5° | 17887.5 | 17887.5 | 17887.5 | 17887.5 | 17887.5 |
| 35° | 13210.9 | 13210.9 | 13210.9 | 13210.9 | 13210.9 |
| 37.5° | 9699.9 | 9699.9 | 9699.9 | 9699.9 | 9699.9 |
| 40° | 7381.7 | 7381.7 | 7381.7 | 7381.7 | 7381.7 |
| 42.5° | 5919.1 | 5919.1 | 5919.1 | 5919.1 | 5919.1 |
| 45° | 4946.5 | 4946.5 | 4946.5 | 4946.5 | 4946.5 |
| 47.5° | 4245.6 | 4245.6 | 4245.6 | 4245.6 | 4245.6 |
| 50° | 3745.2 | 3745.2 | 3745.2 | 3745.2 | 3745.2 |
| 52.5° | 3379.8 | 3379.8 | 3379.8 | 3379.8 | 3379.8 |
| 55° | 3086.5 | 3086.5 | 3086.5 | 3086.5 | 3086.5 |
| 57.5° | 2848.5 | 2848.5 | 2848.5 | 2848.5 | 2848.5 |
| 60° | 2628.3 | 2628.3 | 2628.3 | 2628.3 | 2628.3 |
| 62.5° | 2408.1 | 2408.1 | 2408.1 | 2408.1 | 2408.1 |
| 65° | 2176.6 | 2176.6 | 2176.6 | 2176.6 | 2176.6 |
| 67.5° | 1940.6 | 1940.6 | 1940.6 | 1940.6 | 1940.6 |
| 70° | 1701.6 | 1701.6 | 1701.6 | 1701.6 | 1701.6 |
| 72.5° | 1469.2 | 1469.2 | 1469.2 | 1469.2 | 1469.2 |
| 75° | 1235.0 | 1235.0 | 1235.0 | 1235.0 | 1235.0 |
| 77.5° | 1005.4 | 1005.4 | 1005.4 | 1005.4 | 1005.4 |
| 80° | 765.6 | 765.6 | 765.6 | 765.6 | 765.6 |
| 82.5° | 536.0 | 536.0 | 536.0 | 536.0 | 536.0 |
| 85° | 316.7 | 316.7 | 316.7 | 316.7 | 316.7 |
| 87.5° | 113.3 | 113.3 | 113.3 | 113.3 | 113.3 |
| 90° | 18.4 | 28.5 | 47.5 | 31.0 | 18.4 |
| 92.5° | 24.1 | 40.6 | 73.4 | 37.9 | 21.5 |
| 95° | 27.8 | 46.8 | 102.6 | 50.7 | 31.7 |
| 97.5° | 35.4 | 51.9 | 117.7 | 62.0 | 49.4 |
| 100° | 46.8 | 60.8 | 183.6 | 76.0 | 65.9 |
| 102.5° | 79.7 | 129.2 | 390.0 | 143.0 | 100.0 |
| 105° | 138.0 | 272.2 | 695.0 | 300.0 | 182.3 |
| 107.5° | 239.2 | 487.5 | 916.6 | 531.8 | 345.6 |
| 110° | 446.9 | 646.9 | 960.9 | 730.5 | 553.2 |

TEST NUMBER: P1432534
CATALOG NUMBER: EHBR1-60-UNV-N-L830-UPL24

**CANDELA DISTRIBUTION (continued):**

| | 0° | 22.5° | 45° | 67.5° | 90° |
|---|---|---|---|---|---|
| 112.5° | *603.9* | 695.0 | 920.4 | 806.4 | 720.3 |
| 115° | *635.6* | 668.4 | 821.7 | 787.5 | 782.4 |
| 117.5° | *614.0* | 610.3 | 697.6 | 707.7 | 755.8 |
| 120° | *568.5* | 543.1 | 582.4 | 617.9 | 682.4 |
| 122.5° | *511.4* | 481.1 | 498.8 | 525.4 | 589.9 |
| 125° | *458.3* | 427.9 | 439.3 | 445.7 | 500.1 |
| 127.5° | *411.5* | 391.2 | 397.5 | 390.0 | 424.1 |
| 130° | *379.8* | 362.0 | 370.9 | 353.2 | 369.7 |
| 132.5° | *353.2* | 341.8 | 351.9 | 330.5 | 335.5 |
| 135° | *334.2* | 324.1 | 335.5 | 315.2 | 314.0 |
| 137.5° | *317.7* | 308.9 | 320.3 | 305.1 | 301.3 |
| 140° | *302.6* | 295.0 | 307.6 | 296.3 | 293.8 |
| 142.5° | *286.2* | 281.0 | 296.3 | 288.7 | 286.2 |
| 145° | *274.7* | 270.9 | 287.4 | 283.6 | 282.3 |
| 147.5° | *264.6* | 262.1 | 277.3 | 276.0 | 276.0 |
| 150° | *255.7* | 253.2 | 268.4 | 267.1 | 268.4 |
| 152.5° | *246.9* | 244.4 | 258.3 | 257.0 | 258.3 |
| 155° | *240.5* | 238.0 | 249.4 | 249.4 | 249.4 |
| 157.5° | *235.5* | 234.2 | 243.1 | 243.1 | 243.1 |
| 160° | *231.6* | 230.4 | 238.0 | 238.0 | 236.7 |
| 162.5° | *227.9* | 226.6 | 235.5 | 234.2 | 234.2 |
| 165° | *225.4* | 225.4 | 231.6 | 231.6 | 230.4 |
| 167.5° | *225.4* | 224.1 | 230.4 | 230.4 | 229.1 |
| 170° | *224.1* | 224.1 | 229.1 | 227.9 | 226.6 |
| 172.5° | *224.1* | 224.1 | 229.1 | 227.9 | 226.6 |
| 175° | *222.8* | 222.8 | 226.6 | 226.6 | 226.6 |
| 177.5° | *224.1* | 224.1 | 226.6 | 226.6 | 225.4 |
| 180° | *225.4* | 225.4 | 225.4 | 225.4 | 225.4 |

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Scaled Data Report

TEST NUMBER: P1432534
CATALOG NUMBER: EHBR1-60-UNV-N-L830-UPL24

**CIE UGR TABLE:**

| Reflectances: | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Ceiling | 0.7 | 0.7 | 0.5 | 0.5 | 0.3 | 0.7 | 0.7 | 0.5 | 0.5 | 0.3 |
| | Wall | 0.5 | 0.3 | 0.5 | 0.3 | 0.3 | 0.5 | 0.3 | 0.5 | 0.3 | 0.3 |
| | Reference plane | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 |
| Room dimensions | | Viewed crosswise | | | | | Viewed endwise | | | | |
| X=2H | Y=2H | 19.04 | 20.15 | 19.48 | 20.54 | 20.95 | 19.04 | 20.15 | 19.48 | 20.54 | 20.95 |
| | 3H | 20.82 | 21.80 | 21.27 | 22.22 | 22.68 | 20.82 | 21.80 | 21.27 | 22.22 | 22.68 |
| | 4H | 21.48 | 22.40 | 21.95 | 22.83 | 23.31 | 21.48 | 22.40 | 21.95 | 22.83 | 23.31 |
| | 6H | 21.94 | 22.78 | 22.42 | 23.23 | 23.72 | 21.94 | 22.78 | 22.42 | 23.23 | 23.72 |
| | 8H | 22.06 | 22.86 | 22.56 | 23.33 | 23.83 | 22.06 | 22.86 | 22.56 | 23.33 | 23.83 |
| | 12H | 22.12 | 22.88 | 22.62 | 23.34 | 23.86 | 22.12 | 22.88 | 22.62 | 23.34 | 23.86 |
| 4H | 2H | 19.58 | 20.50 | 20.06 | 20.93 | 21.41 | 19.58 | 20.50 | 20.06 | 20.93 | 21.41 |
| | 3H | 21.56 | 22.31 | 22.04 | 22.79 | 23.29 | 21.56 | 22.31 | 22.04 | 22.79 | 23.29 |
| | 4H | 22.33 | 23.01 | 22.83 | 23.50 | 24.04 | 22.33 | 23.01 | 22.83 | 23.50 | 24.04 |
| | 6H | 22.90 | 23.49 | 23.43 | 24.00 | 24.56 | 22.90 | 23.49 | 23.43 | 24.00 | 24.56 |
| | 8H | 23.06 | 23.60 | 23.60 | 24.12 | 24.68 | 23.06 | 23.60 | 23.60 | 24.12 | 24.68 |
| | 12H | 23.14 | 23.62 | 23.69 | 24.17 | 24.74 | 23.14 | 23.62 | 23.69 | 24.17 | 24.74 |
| 8H | 4H | 22.56 | 23.10 | 23.10 | 23.62 | 24.18 | 22.56 | 23.10 | 23.10 | 23.62 | 24.18 |
| | 6H | 23.24 | 23.68 | 23.81 | 24.25 | 24.82 | 23.24 | 23.68 | 23.81 | 24.25 | 24.82 |
| | 8H | 23.46 | 23.85 | 24.05 | 24.44 | 25.02 | 23.46 | 23.85 | 24.05 | 24.44 | 25.02 |
| | 12H | 23.60 | 23.94 | 24.19 | 24.51 | 25.17 | 23.60 | 23.94 | 24.19 | 24.51 | 25.17 |
| 12H | 4H | 22.56 | 23.04 | 23.11 | 23.59 | 24.15 | 22.56 | 23.04 | 23.11 | 23.59 | 24.15 |
| | 6H | 23.27 | 23.66 | 23.85 | 24.24 | 24.82 | 23.27 | 23.66 | 23.85 | 24.24 | 24.82 |
| | 8H | 23.53 | 23.87 | 24.11 | 24.43 | 25.09 | 23.53 | 23.87 | 24.11 | 24.43 | 25.09 |

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

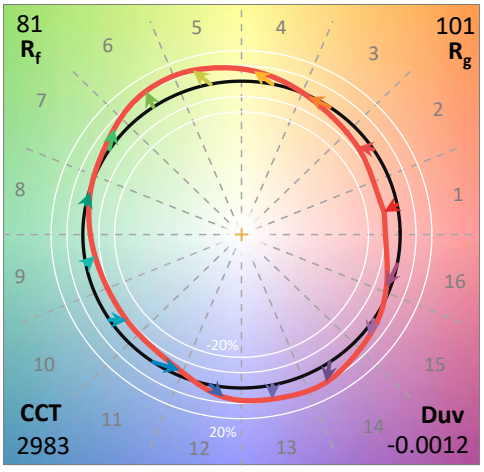
## Test Information

| | |
|---|---|
| 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

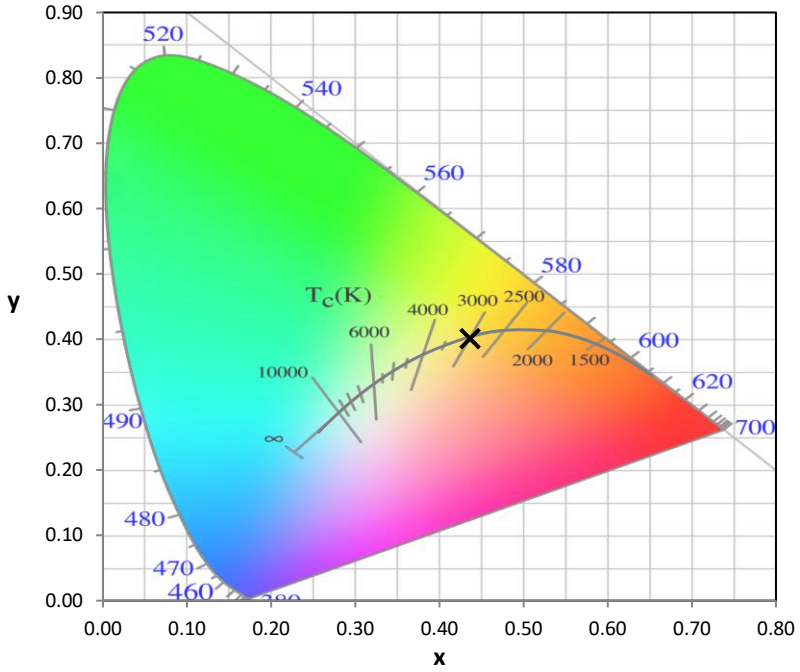
| | |
|---|---|
| Stabilization Time: | 38M |
| Operation Time: | 1H 38M |
| Sphere Temperature (°C): | 25.0 |

REPORT NUMBER: SP1-2506-472-2

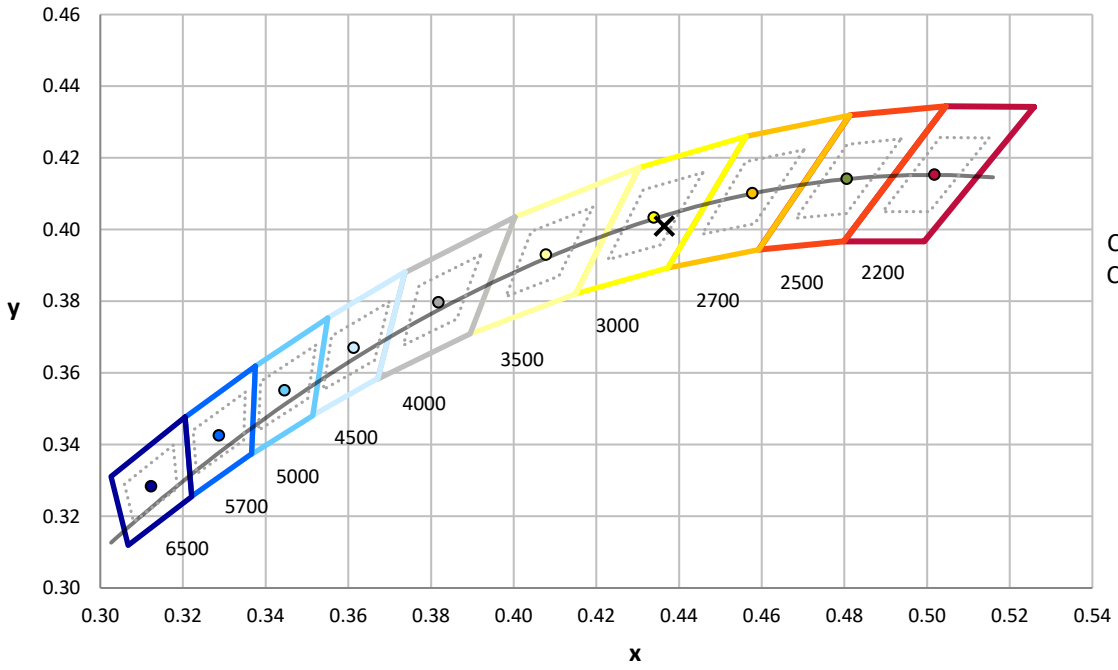
| Measurement and Test Equipment | | | |
|---|---|---|---|
| Instrument | Identification Number | Calibration Date | Calibration Due Date |
| Photometer | 76INCH SPHERE IN0058 | 6/16/2025 | 12/16/2025 |
| Power Meter | XITRON INXT2011004 | 1/21/2025 | 1/21/2026 |
| AC Power Source | CHROMA 61603 IN0063 | 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

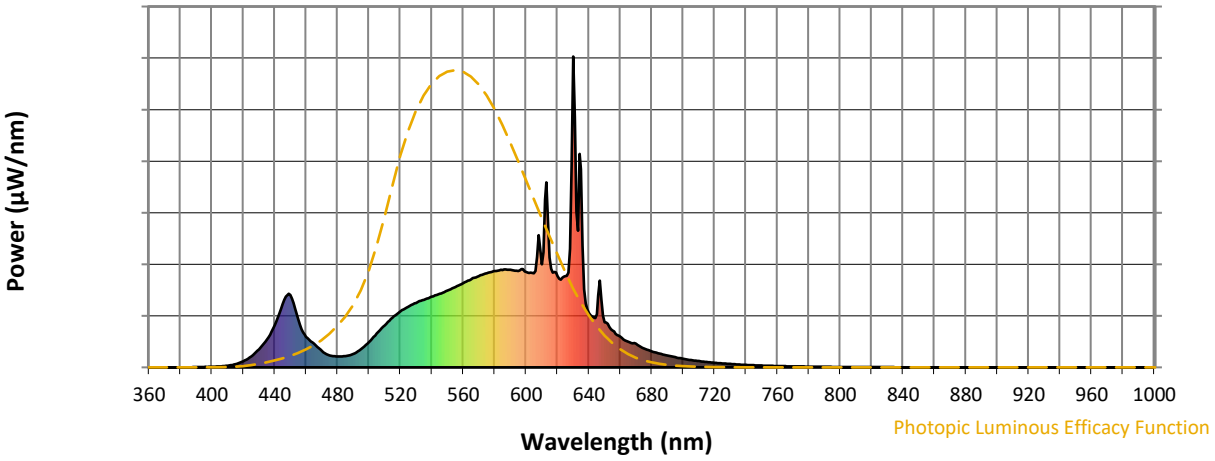



CCT = 2983K
CIE x = 0.4364
CIE y = 0.4010
Duv = -0.0012

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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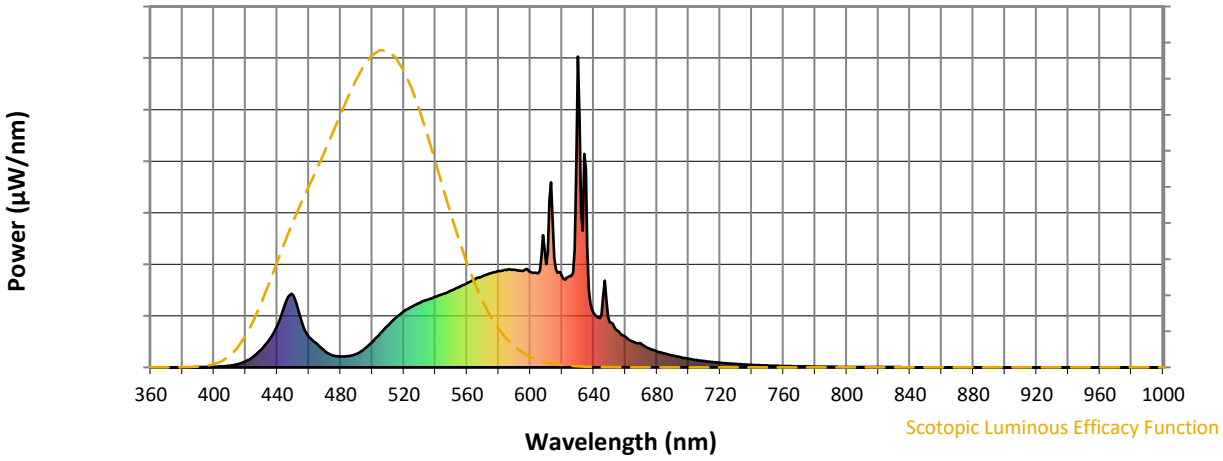
## Scotopic Flux vs. Wavelength




**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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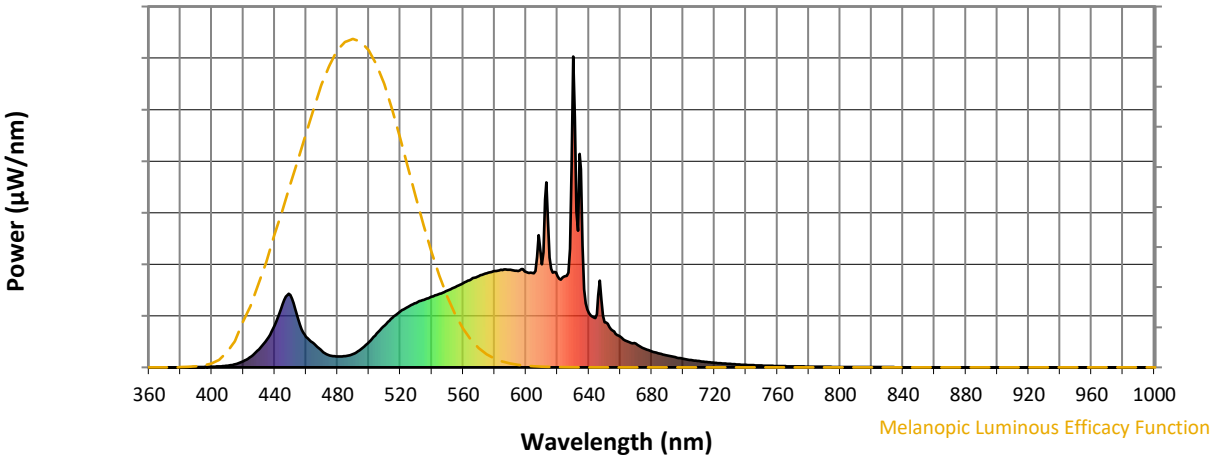
## Melanopic Flux vs. Wavelength




**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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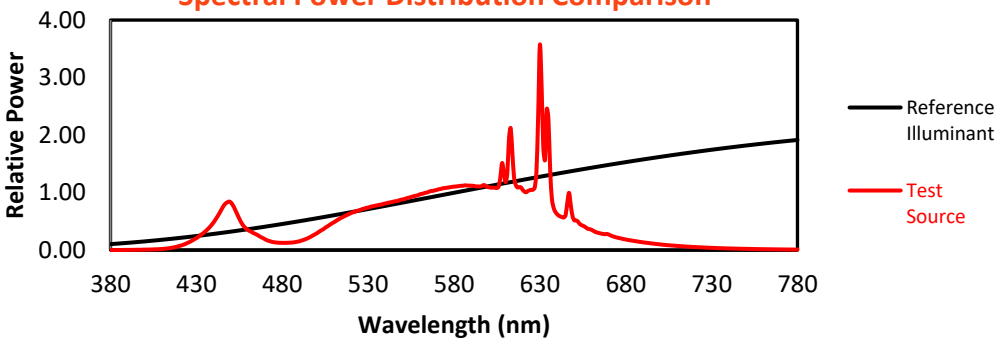
# TM-30-18

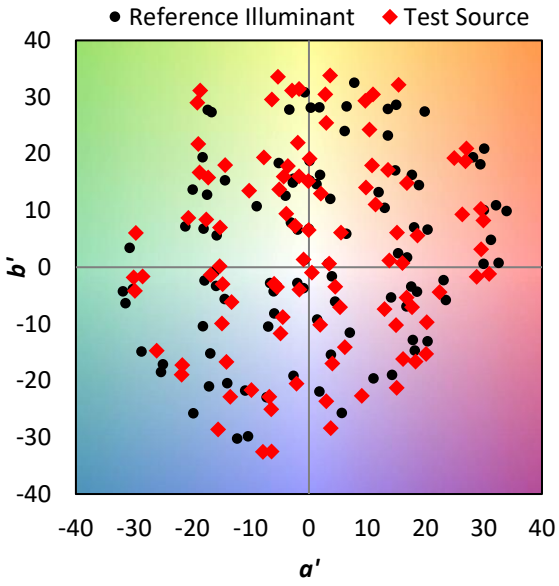
## Summary

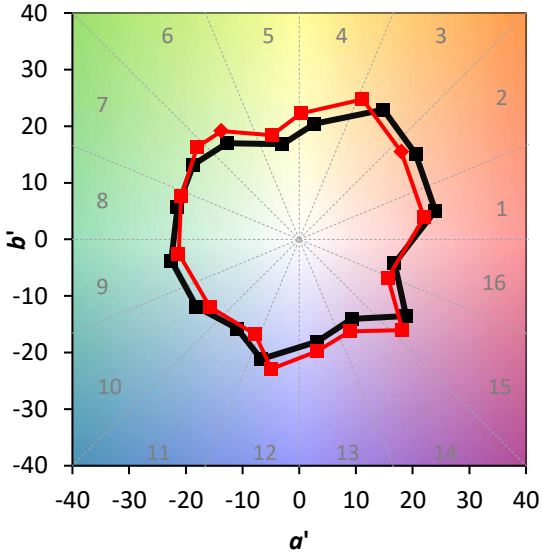
$R_f$ = 81.2
$R_g$ = 101.5
CIE $R_a$ = 83.4
$R_9$ = 29.4

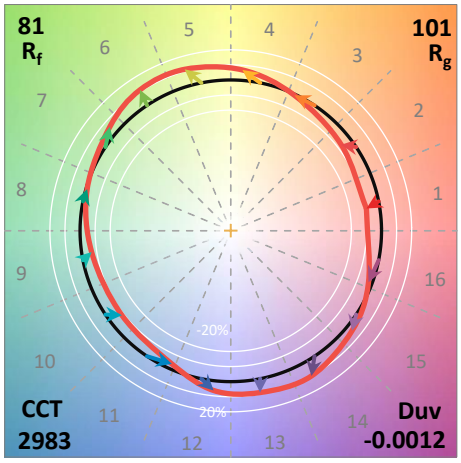
## Spectral Power Distribution Comparison

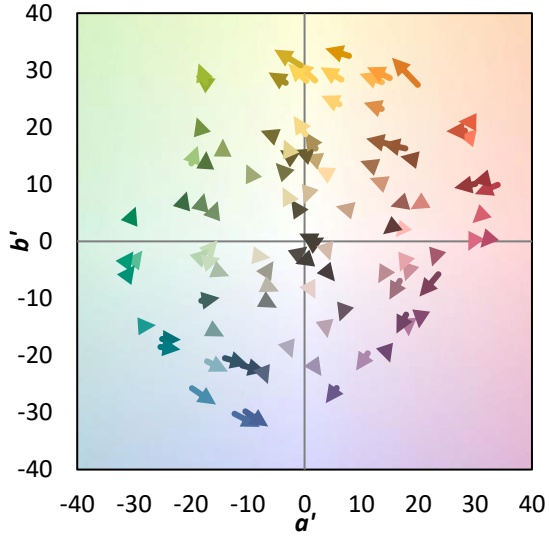



## Color Vector Graphics



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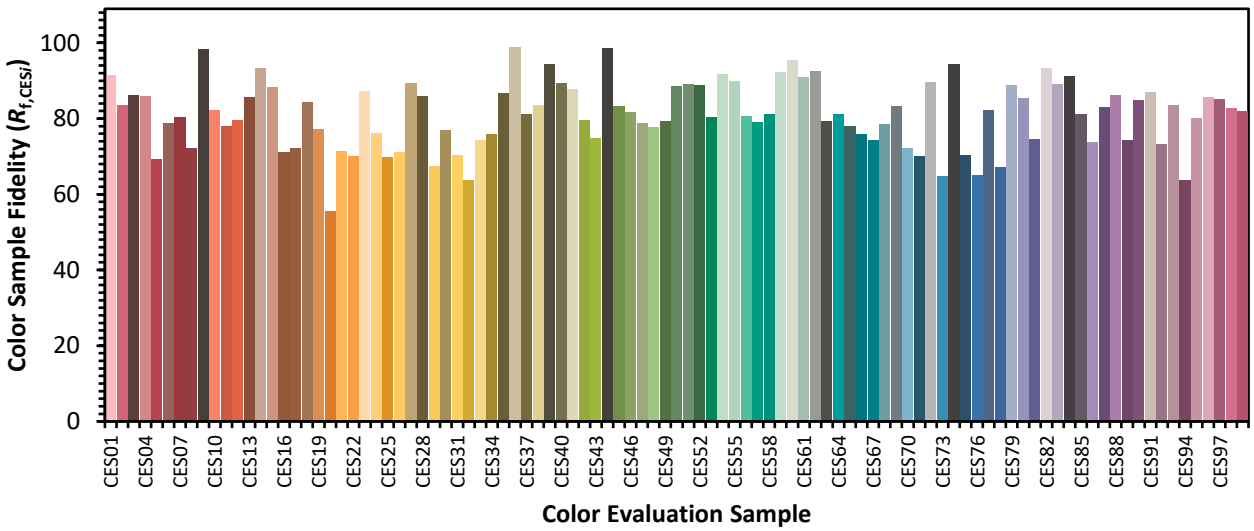
**Individual Sample Fidelity Index ($R_{f,i}$)**

| | | | |
|---|---|---|---|
| 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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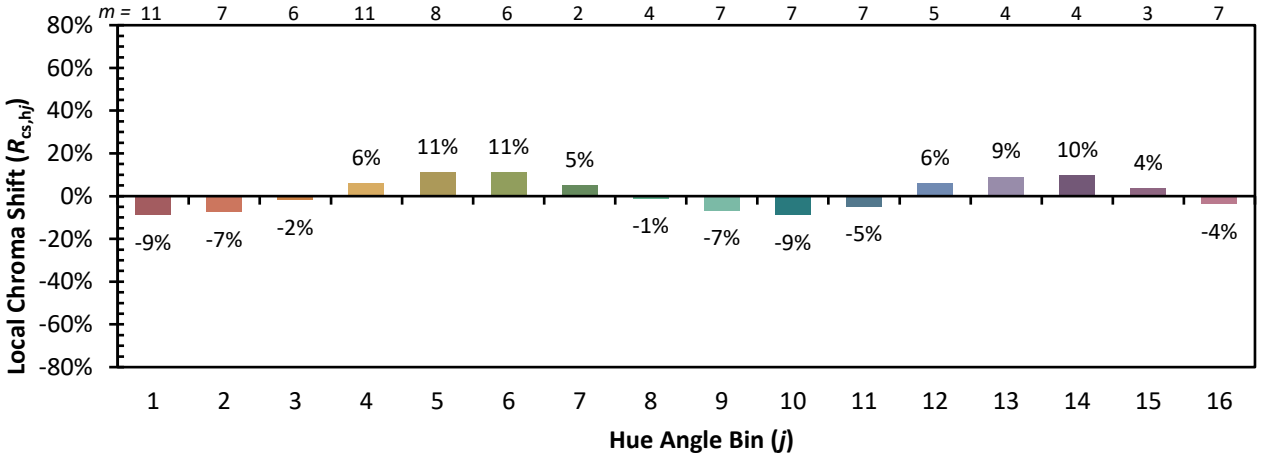
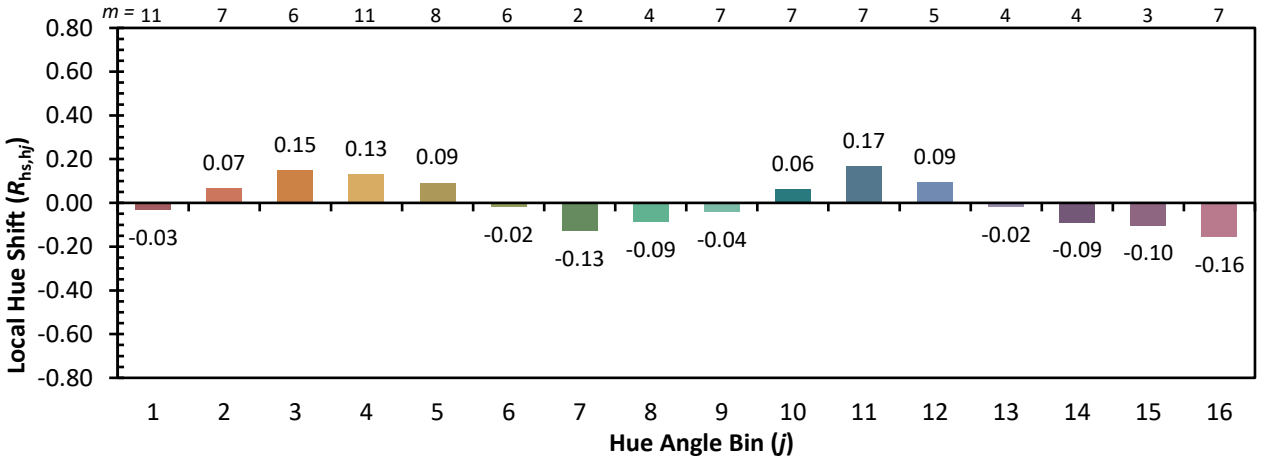
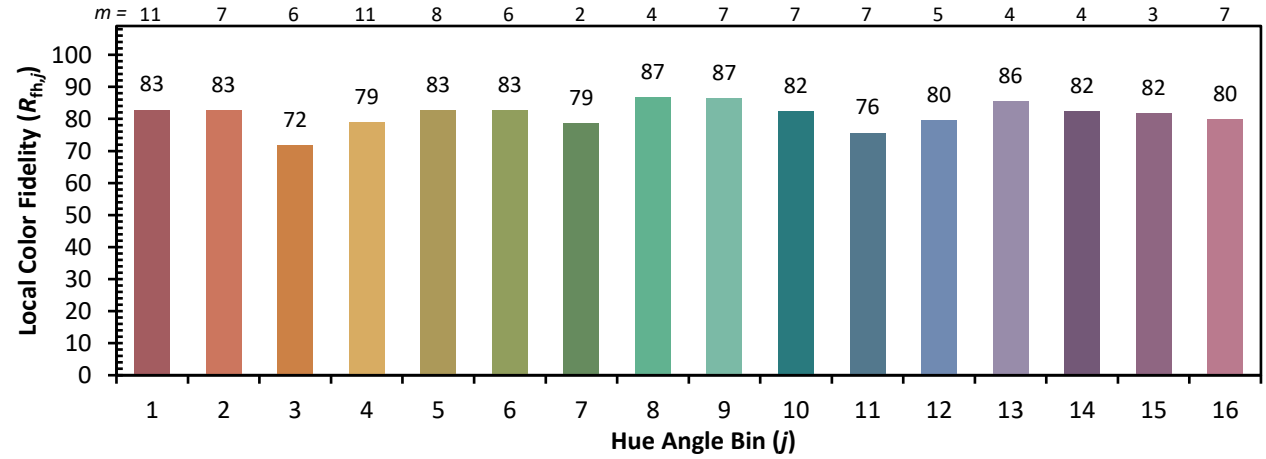
**TM-30-18**

## Color Rendition by Hue-Angle Bin



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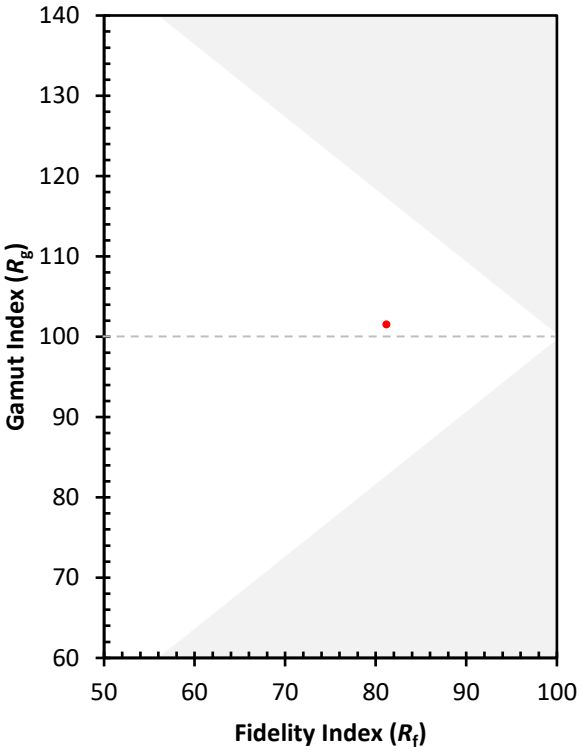
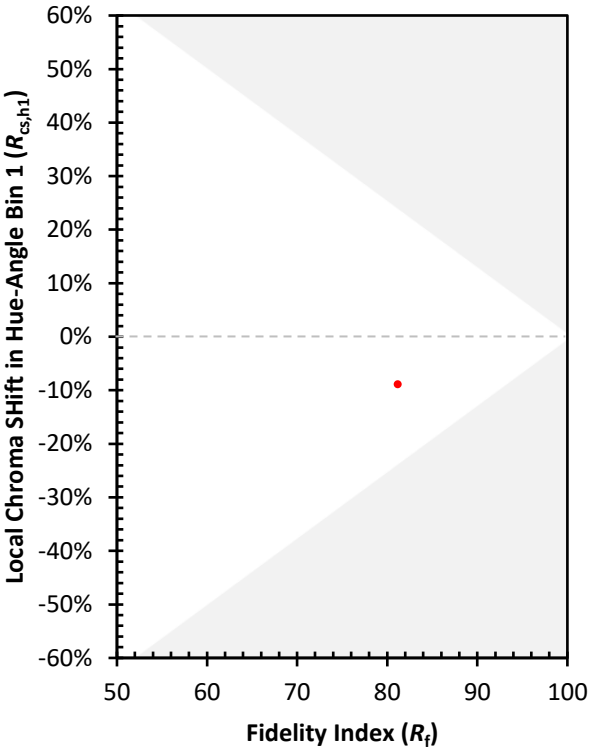
## Measure Comparisons




(END OF REPORT)