

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: P1436393

Luminaire Tested: EHBR1-48-UNV-M-L850-UPL40

Issue Date: 3/25/2026

**Test Information**

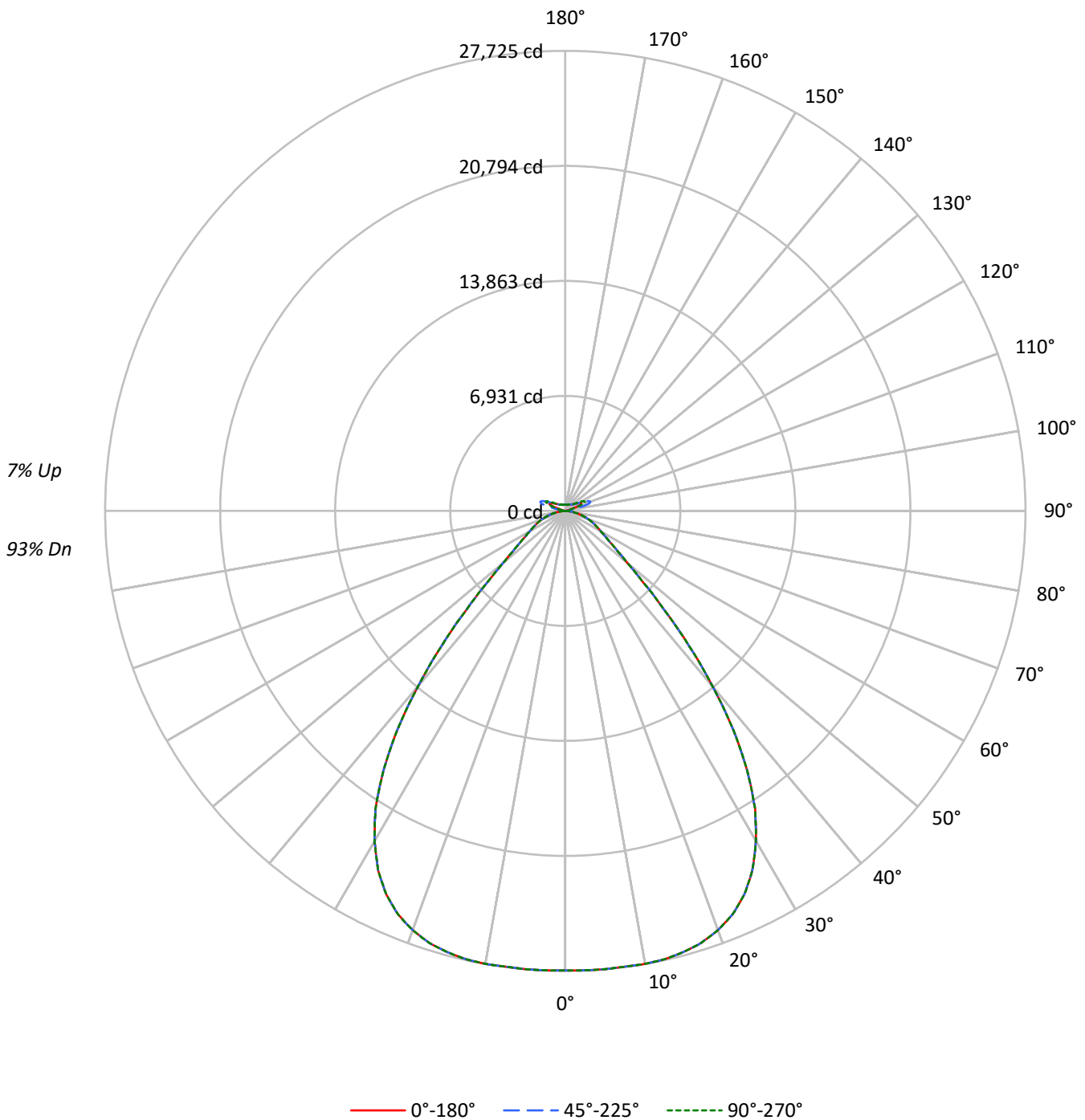
Test Method: LM-79-2019  
Report Number: P1436393  
REPORT IS A COMBINATION OF REPORTS P1436105 AND P1431635  
Test Lab: INNOVATION CENTER  
Issue Date: 3/25/2026  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: METALUX  
Catalog Number: EHBR1-48-UNV-M-L850-UPL40  
Description: Elevate Round Highbay at, 48000 lumens, 5000K 80CRI LEDs with M lens  
Light Source: -  
Ballast/Driver: -

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 50584.7 lumens  
Efficiency: N/A  
Efficacy: 174.9 lumens/watt  
Spacing Criteria (0/90/45): 1.21 / 1.21 / 1.15  
Luminous Opening: Vertical Cylinder (Dia: 1.71' x H: 0.1')  
CIE Type: Direct  
  
Input Watts (W): 289.2  
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

TEST NUMBER: P1436393  
CATALOG NUMBER: EHBR1-48-UNV-M-L850-UPL40

### Luminous Intensity Polar Plot





TEST NUMBER: P1436393

CATALOG NUMBER: EHBR1-48-UNV-M-L850-UPL40

**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 | 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   | 110 | 106 | 103 | 100 | 106 | 103 | 100 | 98  | 98  | 95  | 93  | 93  | 91  | 89  | 88 | 87 | 85 | 88 | 87 | 85 | 83 |
| 2   | 102 | 96  | 91  | 86  | 99  | 94  | 89  | 85  | 89  | 85  | 82  | 85  | 82  | 79  | 81 | 78 | 76 | 81 | 78 | 76 | 74 |
| 3   | 95  | 87  | 81  | 76  | 92  | 85  | 79  | 74  | 81  | 76  | 72  | 78  | 74  | 70  | 74 | 71 | 68 | 74 | 71 | 68 | 66 |
| 4   | 89  | 79  | 72  | 67  | 86  | 78  | 71  | 66  | 74  | 69  | 64  | 71  | 67  | 63  | 69 | 65 | 61 | 69 | 65 | 61 | 59 |
| 5   | 83  | 72  | 65  | 60  | 81  | 71  | 64  | 59  | 68  | 62  | 58  | 66  | 61  | 57  | 63 | 59 | 56 | 63 | 59 | 56 | 54 |
| 6   | 78  | 67  | 59  | 54  | 75  | 65  | 58  | 53  | 63  | 57  | 52  | 61  | 55  | 51  | 59 | 54 | 51 | 59 | 54 | 51 | 49 |
| 7   | 73  | 61  | 54  | 49  | 71  | 60  | 53  | 48  | 58  | 52  | 48  | 56  | 51  | 47  | 54 | 50 | 46 | 54 | 50 | 46 | 44 |
| 8   | 68  | 57  | 50  | 45  | 66  | 56  | 49  | 44  | 54  | 48  | 44  | 52  | 47  | 43  | 51 | 46 | 42 | 51 | 46 | 42 | 41 |
| 9   | 64  | 53  | 46  | 41  | 63  | 52  | 45  | 41  | 50  | 44  | 40  | 49  | 43  | 39  | 47 | 42 | 39 | 47 | 42 | 39 | 37 |
| 10  | 61  | 49  | 42  | 38  | 59  | 48  | 42  | 37  | 47  | 41  | 37  | 46  | 40  | 36  | 44 | 39 | 36 | 44 | 39 | 36 | 34 |

**AVERAGE LUMINANCE (cd/sqm):**

|     | 0°     | 45°    | 90°    |
|-----|--------|--------|--------|
| 0°  | 130073 | 130073 | 130073 |
| 5°  | 129850 | 129850 | 129850 |
| 10° | 130460 | 130460 | 130460 |
| 15° | 131209 | 131209 | 131209 |
| 20° | 130813 | 130813 | 130813 |
| 25° | 127758 | 127758 | 127758 |
| 30° | 119463 | 119463 | 119463 |
| 35° | 104041 | 104041 | 104041 |
| 40° | 79735  | 79735  | 79735  |
| 45° | 52089  | 52089  | 52089  |
| 50° | 32837  | 32837  | 32837  |
| 55° | 24478  | 24478  | 24478  |
| 60° | 20608  | 20608  | 20608  |
| 65° | 18739  | 18739  | 18739  |
| 70° | 17071  | 17071  | 17071  |
| 75° | 14614  | 14614  | 14614  |
| 80° | 11253  | 11253  | 11253  |
| 85° | 5901   | 5901   | 5901   |

**MAXIMUM LUMINANCE 45°-90°:**

Horizontal Angle: 0°  
 Vertical Angle: 45°  
 Luminance: 52089 cd/sqm



TEST NUMBER: P1436393  
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**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 2645.4  | 5.2       |
| 10°-20°   | 7768.8  | 15.4      |
| 20°-30°   | 11656.8 | 23.0      |
| 30°-40°   | 11728.0 | 23.2      |
| 40°-50°   | 6713.4  | 13.3      |
| 50°-60°   | 3070.6  | 6.1       |
| 60°-70°   | 1948.2  | 3.9       |
| 70°-80°   | 1092.8  | 2.2       |
| 80°-90°   | 263.0   | 0.5       |
| 90°-100°  | 105.4   | 0.2       |
| 100°-110° | 660.6   | 1.3       |
| 110°-120° | 1181.4  | 2.3       |
| 120°-130° | 693.2   | 1.4       |
| 130°-140° | 425.2   | 0.8       |
| 140°-150° | 294.9   | 0.6       |
| 150°-160° | 191.6   | 0.4       |
| 160°-170° | 109.2   | 0.2       |
| 170°-180° | 36.1    | 0.1       |
| 0°-30°    | 22071.1 | 43.6      |
| 0°-40°    | 33799.1 | 66.8      |
| 0°-60°    | 43583.0 | 86.2      |
| 0°-90°    | 46887.0 | 92.7      |
| 90°-120°  | 1947.4  | 3.8       |
| 90°-150°  | 3360.8  | 6.6       |
| 90°-180°  | 3698.0  | 7.3       |
| 0°-180°   | 50584.7 | 100.0     |

**CANDELA DISTRIBUTION:**

|      | 0°    | 22.5° | 45°   | 67.5° | 90°   | Flux  |
|------|-------|-------|-------|-------|-------|-------|
| 0°   | 27698 | 27698 | 27698 | 27698 | 27698 |       |
| 5°   | 27725 | 27725 | 27725 | 27725 | 27725 | 2645  |
| 15°  | 27527 | 27527 | 27527 | 27527 | 27527 | 7769  |
| 25°  | 25513 | 25513 | 25513 | 25513 | 25513 | 11657 |
| 35°  | 19095 | 19095 | 19095 | 19095 | 19095 | 11728 |
| 45°  | 8428  | 8428  | 8428  | 8428  | 8428  | 6713  |
| 55°  | 3308  | 3308  | 3308  | 3308  | 3308  | 3071  |
| 65°  | 1956  | 1956  | 1956  | 1956  | 1956  | 1948  |
| 75°  | 1030  | 1030  | 1030  | 1030  | 1030  | 1093  |
| 85°  | 203   | 203   | 203   | 203   | 203   | 248   |
| 90°  | 28    | 44    | 76    | 49    | 28    | 21    |
| 95°  | 47    | 78    | 171   | 85    | 53    | 45    |
| 105° | 231   | 455   | 1162  | 502   | 305   | 309   |
| 115° | 1062  | 1118  | 1374  | 1316  | 1308  | 979   |
| 125° | 766   | 715   | 734   | 745   | 836   | 699   |
| 135° | 559   | 542   | 561   | 527   | 525   | 437   |
| 145° | 459   | 453   | 480   | 474   | 472   | 291   |
| 155° | 402   | 398   | 417   | 417   | 417   | 188   |
| 165° | 377   | 377   | 387   | 387   | 385   | 108   |
| 175° | 373   | 373   | 379   | 379   | 379   | 36    |
| 180° | 377   | 377   | 377   | 377   | 377   |       |



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**CANDELA DISTRIBUTION (FULL):**

|        | 0°      | 22.5°   | 45°     | 67.5°   | 90°     |
|--------|---------|---------|---------|---------|---------|
| 0°     | 27698.1 | 27698.1 | 27698.1 | 27698.1 | 27698.1 |
| 2.5°   | 27711.6 | 27711.6 | 27711.6 | 27711.6 | 27711.6 |
| 5°     | 27725.0 | 27725.0 | 27725.0 | 27725.0 | 27725.0 |
| 7.5°   | 27706.1 | 27706.1 | 27706.1 | 27706.1 | 27706.1 |
| 10°    | 27718.0 | 27718.0 | 27718.0 | 27718.0 | 27718.0 |
| 12.5°  | 27670.3 | 27670.3 | 27670.3 | 27670.3 | 27670.3 |
| 15°    | 27526.9 | 27526.9 | 27526.9 | 27526.9 | 27526.9 |
| 17.5°  | 27290.0 | 27290.0 | 27290.0 | 27290.0 | 27290.0 |
| 20°    | 26885.8 | 26885.8 | 26885.8 | 26885.8 | 26885.8 |
| 22.5°  | 26330.2 | 26330.2 | 26330.2 | 26330.2 | 26330.2 |
| 25°    | 25513.2 | 25513.2 | 25513.2 | 25513.2 | 25513.2 |
| 27.5°  | 24413.9 | 24413.9 | 24413.9 | 24413.9 | 24413.9 |
| 30°    | 22978.6 | 22978.6 | 22978.6 | 22978.6 | 22978.6 |
| 32.5°  | 21279.4 | 21279.4 | 21279.4 | 21279.4 | 21279.4 |
| 35°    | 19095.2 | 19095.2 | 19095.2 | 19095.2 | 19095.2 |
| 37.5°  | 16621.0 | 16621.0 | 16621.0 | 16621.0 | 16621.0 |
| 40°    | 13820.1 | 13820.1 | 13820.1 | 13820.1 | 13820.1 |
| 42.5°  | 11043.9 | 11043.9 | 11043.9 | 11043.9 | 11043.9 |
| 45°    | 8427.8  | 8427.8  | 8427.8  | 8427.8  | 8427.8  |
| 47.5°  | 6344.2  | 6344.2  | 6344.2  | 6344.2  | 6344.2  |
| 50°    | 4893.9  | 4893.9  | 4893.9  | 4893.9  | 4893.9  |
| 52.5°  | 3954.0  | 3954.0  | 3954.0  | 3954.0  | 3954.0  |
| 55°    | 3308.0  | 3308.0  | 3308.0  | 3308.0  | 3308.0  |
| 57.5°  | 2832.5  | 2832.5  | 2832.5  | 2832.5  | 2832.5  |
| 60°    | 2477.4  | 2477.4  | 2477.4  | 2477.4  | 2477.4  |
| 62.5°  | 2203.3  | 2203.3  | 2203.3  | 2203.3  | 2203.3  |
| 65°    | 1955.9  | 1955.9  | 1955.9  | 1955.9  | 1955.9  |
| 67.5°  | 1728.5  | 1728.5  | 1728.5  | 1728.5  | 1728.5  |
| 70°    | 1497.9  | 1497.9  | 1497.9  | 1497.9  | 1497.9  |
| 72.5°  | 1265.7  | 1265.7  | 1265.7  | 1265.7  | 1265.7  |
| 75°    | 1029.5  | 1029.5  | 1029.5  | 1029.5  | 1029.5  |
| 77.5°  | 805.2   | 805.2   | 805.2   | 805.2   | 805.2   |
| 80°    | 592.0   | 592.0   | 592.0   | 592.0   | 592.0   |
| 82.5°  | 385.9   | 385.9   | 385.9   | 385.9   | 385.9   |
| 85°    | 202.8   | 202.8   | 202.8   | 202.8   | 202.8   |
| 87.5°  | 57.9    | 57.9    | 57.9    | 57.9    | 57.9    |
| 90°    | 27.5    | 44.5    | 76.2    | 48.7    | 27.5    |
| 92.5°  | 40.2    | 67.8    | 122.8   | 63.5    | 36.0    |
| 95°    | 46.6    | 78.3    | 171.4   | 84.7    | 52.9    |
| 97.5°  | 59.2    | 86.7    | 196.8   | 103.7   | 82.5    |
| 100°   | 78.3    | 101.6   | 307.0   | 127.0   | 110.1   |
| 102.5° | 133.4   | 215.9   | 651.9   | 239.2   | 167.2   |
| 105°   | 230.7   | 455.1   | 1162.0  | 501.7   | 304.8   |
| 107.5° | 400.1   | 814.9   | 1532.5  | 889.0   | 577.9   |
| 110°   | 747.2   | 1081.6  | 1606.5  | 1221.3  | 925.0   |



TEST NUMBER: P1436393

CATALOG NUMBER: EHBR1-48-UNV-M-L850-UPL40

**CANDELA DISTRIBUTION (continued):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 112.5° | 1009.7 | 1162.0 | 1538.8 | 1348.3 | 1204.4 |
| 115°   | 1062.5 | 1117.6 | 1373.7 | 1316.5 | 1308.1 |
| 117.5° | 1026.6 | 1020.2 | 1166.3 | 1183.3 | 1263.6 |
| 120°   | 950.4  | 908.0  | 973.6  | 1033.0 | 1140.9 |
| 122.5° | 855.2  | 804.3  | 834.0  | 878.5  | 986.4  |
| 125°   | 766.2  | 715.4  | 734.5  | 745.1  | 836.1  |
| 127.5° | 687.9  | 654.0  | 664.6  | 651.9  | 709.1  |
| 130°   | 635.0  | 605.4  | 620.2  | 590.5  | 618.1  |
| 132.5° | 590.5  | 571.5  | 588.4  | 552.4  | 560.9  |
| 135°   | 558.8  | 541.8  | 560.9  | 527.1  | 524.9  |
| 137.5° | 531.3  | 516.5  | 535.5  | 510.1  | 503.8  |
| 140°   | 505.9  | 493.2  | 514.3  | 495.3  | 491.0  |
| 142.5° | 478.4  | 469.9  | 495.3  | 482.6  | 478.4  |
| 145°   | 459.3  | 452.9  | 480.4  | 474.1  | 472.0  |
| 147.5° | 442.4  | 438.2  | 463.5  | 461.5  | 461.5  |
| 150°   | 427.6  | 423.4  | 448.7  | 446.6  | 448.7  |
| 152.5° | 412.8  | 408.5  | 431.8  | 429.6  | 431.8  |
| 155°   | 402.1  | 397.9  | 417.0  | 417.0  | 417.0  |
| 157.5° | 393.7  | 391.5  | 406.4  | 406.4  | 406.4  |
| 160°   | 387.3  | 385.3  | 397.9  | 397.9  | 395.9  |
| 162.5° | 381.0  | 378.9  | 393.7  | 391.5  | 391.5  |
| 165°   | 376.8  | 376.8  | 387.3  | 387.3  | 385.3  |
| 167.5° | 376.8  | 374.6  | 385.3  | 385.3  | 383.1  |
| 170°   | 374.6  | 374.6  | 383.1  | 381.0  | 378.9  |
| 172.5° | 374.6  | 374.6  | 383.1  | 381.0  | 378.9  |
| 175°   | 372.6  | 372.6  | 378.9  | 378.9  | 378.9  |
| 177.5° | 374.6  | 374.6  | 378.9  | 378.9  | 376.8  |
| 180°   | 376.8  | 376.8  | 376.8  | 376.8  | 376.8  |



TEST NUMBER: P1436393  
 CATALOG NUMBER: EHBR1-48-UNV-M-L850-UPL40

**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 | 19.21            | 20.36 | 19.70 | 20.83 | 21.33 | 19.21          | 20.36 | 19.70 | 20.83 | 21.33 |
|                 | 3H   | 20.70            | 21.72 | 21.20 | 22.20 | 22.74 | 20.70          | 21.72 | 21.20 | 22.20 | 22.74 |
|                 | 4H   | 21.22            | 22.17 | 21.75 | 22.67 | 23.23 | 21.22          | 22.17 | 21.75 | 22.67 | 23.23 |
|                 | 6H   | 21.54            | 22.42 | 22.08 | 22.93 | 23.50 | 21.54          | 22.42 | 22.08 | 22.93 | 23.50 |
|                 | 8H   | 21.61            | 22.44 | 22.17 | 22.97 | 23.55 | 21.61          | 22.44 | 22.17 | 22.97 | 23.55 |
|                 | 12H  | 21.62            | 22.42 | 22.18 | 22.94 | 23.54 | 21.62          | 22.42 | 22.18 | 22.94 | 23.54 |
| 4H              | 2H   | 19.65            | 20.60 | 20.18 | 21.10 | 21.66 | 19.65          | 20.60 | 20.18 | 21.10 | 21.66 |
|                 | 3H   | 21.34            | 22.13 | 21.88 | 22.67 | 23.25 | 21.34          | 22.13 | 21.88 | 22.67 | 23.25 |
|                 | 4H   | 21.97            | 22.68 | 22.53 | 23.23 | 23.85 | 21.97          | 22.68 | 22.53 | 23.23 | 23.85 |
|                 | 6H   | 22.40            | 23.01 | 22.98 | 23.58 | 24.22 | 22.40          | 23.01 | 22.98 | 23.58 | 24.22 |
|                 | 8H   | 22.49            | 23.06 | 23.08 | 23.64 | 24.27 | 22.49          | 23.06 | 23.08 | 23.64 | 24.27 |
|                 | 12H  | 22.52            | 23.02 | 23.13 | 23.63 | 24.27 | 22.52          | 23.02 | 23.13 | 23.63 | 24.27 |
| 8H              | 4H   | 22.15            | 22.72 | 22.74 | 23.29 | 23.93 | 22.15          | 22.72 | 22.74 | 23.29 | 23.93 |
|                 | 6H   | 22.66            | 23.12 | 23.28 | 23.75 | 24.39 | 22.66          | 23.12 | 23.28 | 23.75 | 24.39 |
|                 | 8H   | 22.80            | 23.21 | 23.44 | 23.85 | 24.51 | 22.80          | 23.21 | 23.44 | 23.85 | 24.51 |
|                 | 12H  | 22.86            | 23.23 | 23.50 | 23.85 | 24.58 | 22.86          | 23.23 | 23.50 | 23.85 | 24.58 |
| 12H             | 4H   | 22.14            | 22.64 | 22.74 | 23.25 | 23.89 | 22.14          | 22.64 | 22.74 | 23.25 | 23.89 |
|                 | 6H   | 22.66            | 23.08 | 23.30 | 23.71 | 24.37 | 22.66          | 23.08 | 23.30 | 23.71 | 24.37 |
|                 | 8H   | 22.83            | 23.20 | 23.47 | 23.81 | 24.55 | 22.83          | 23.20 | 23.47 | 23.81 | 24.55 |

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

Report Prepared for

Cooper Lighting Solutions

Metalux

Report Number: SP1-2506-472-4

Test Date: 07/31/2025

Luminaire Tested: EHBR-60-L850-N

Data in this report applies to families of products including EHBR-60-L850-N

**Test Information**

Test Method: LM-79-2019  
 Report Number: SP1-2506-472-4  
 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-L850-N**  
 Description: Elevate Round Highbay at, 60000 lumens, 5000K 80CRI LEDs with N lens

**Spectral Parameters**

CCT (K): 4875  
 CIE u': 0.2124  
 CIE v': 0.4871  
 Duv: 0.0005  
 CIE x: 0.3488  
 CIE y: 0.3555  
 CIE z: 0.2957  
 Peak Wavelength (nm): 630  
 Dominant Wavelength (nm): 573  
 Purity: 11.33556  
 Rf: 80  
 Rg: 102.3

|           |      |      |      |
|-----------|------|------|------|
| CRI (Ra): | 82.3 |      |      |
| R1:       | 85.0 | R9:  | 43.9 |
| R2:       | 83.1 | R10: | 57.4 |
| R3:       | 78.8 | R11: | 83.1 |
| R4:       | 84.0 | R12: | 51.0 |
| R5:       | 83.0 | R13: | 83.4 |
| R6:       | 76.3 | R14: | 87.4 |
| R7:       | 86.8 | R15: | 83.4 |
| R8:       | 81.7 |      |      |



**Test Conditions**

Stabilization Time: 39M  
 Operation Time: 1H 39M  
 Sphere Temperature (°C): 25.0

REPORT NUMBER: SP1-2506-472-4

| 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: SP1-2506-472-4

CIE 1931 Chromaticity Diagram



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



Point lies inside the ANSI 5000K 4-step quadrangle

REPORT NUMBER: SP1-2506-472-4

**Photopic Flux vs. Wavelength**



**Photopic Lumens: NR**

| λ (nm) | Power W <sup>^</sup> /nm | Lumens (φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (φ/nm) |
|--------|--------------------------|---------------|--------|--------------------------|---------------|--------|--------------------------|---------------|--------|--------------------------|---------------|--------|--------------------------|---------------|
| 360    | 0                        | NR            | 490    | 89                       | NR            | 620    | 280                      | NR            | 750    | 6                        | NR            | 880    | 0                        | NR            |
| 365    | 0                        | NR            | 495    | 121                      | NR            | 625    | 280                      | NR            | 755    | 5                        | NR            | 885    | 0                        | NR            |
| 370    | 0                        | NR            | 500    | 168                      | NR            | 630    | 1000                     | NR            | 760    | 5                        | NR            | 890    | 0                        | NR            |
| 375    | 0                        | NR            | 505    | 224                      | NR            | 635    | 626                      | NR            | 765    | 4                        | NR            | 895    | 0                        | NR            |
| 380    | 1                        | NR            | 510    | 275                      | NR            | 640    | 163                      | NR            | 770    | 4                        | NR            | 900    | 0                        | NR            |
| 385    | 2                        | NR            | 515    | 321                      | NR            | 645    | 160                      | NR            | 775    | 3                        | NR            | 905    | 0                        | NR            |
| 390    | 3                        | NR            | 520    | 354                      | NR            | 650    | 136                      | NR            | 780    | 3                        | NR            | 910    | 0                        | NR            |
| 395    | 5                        | NR            | 525    | 375                      | NR            | 655    | 111                      | NR            | 785    | 2                        | NR            | 915    | 0                        | NR            |
| 400    | 7                        | NR            | 530    | 388                      | NR            | 660    | 93                       | NR            | 790    | 2                        | NR            | 920    | 0                        | NR            |
| 405    | 10                       | NR            | 535    | 395                      | NR            | 665    | 76                       | NR            | 795    | 2                        | NR            | 925    | 0                        | NR            |
| 410    | 15                       | NR            | 540    | 397                      | NR            | 670    | 72                       | NR            | 800    | 2                        | NR            | 930    | 0                        | NR            |
| 415    | 28                       | NR            | 545    | 398                      | NR            | 675    | 57                       | NR            | 805    | 1                        | NR            | 935    | 0                        | NR            |
| 420    | 53                       | NR            | 550    | 396                      | NR            | 680    | 49                       | NR            | 810    | 1                        | NR            | 940    | 0                        | NR            |
| 425    | 97                       | NR            | 555    | 395                      | NR            | 685    | 42                       | NR            | 815    | 1                        | NR            | 945    | 0                        | NR            |
| 430    | 163                      | NR            | 560    | 392                      | NR            | 690    | 37                       | NR            | 820    | 1                        | NR            | 950    | 0                        | NR            |
| 435    | 261                      | NR            | 565    | 388                      | NR            | 695    | 32                       | NR            | 825    | 1                        | NR            | 955    | 0                        | NR            |
| 440    | 409                      | NR            | 570    | 381                      | NR            | 700    | 27                       | NR            | 830    | 1                        | NR            | 960    | 0                        | NR            |
| 445    | 637                      | NR            | 575    | 374                      | NR            | 705    | 23                       | NR            | 835    | 1                        | NR            | 965    | 0                        | NR            |
| 450    | 699                      | NR            | 580    | 365                      | NR            | 710    | 20                       | NR            | 840    | 1                        | NR            | 970    | 0                        | NR            |
| 455    | 436                      | NR            | 585    | 354                      | NR            | 715    | 17                       | NR            | 845    | 0                        | NR            | 975    | 0                        | NR            |
| 460    | 274                      | NR            | 590    | 342                      | NR            | 720    | 15                       | NR            | 850    | 0                        | NR            | 980    | 0                        | NR            |
| 465    | 205                      | NR            | 595    | 325                      | NR            | 725    | 13                       | NR            | 855    | 0                        | NR            | 985    | 0                        | NR            |
| 470    | 130                      | NR            | 600    | 313                      | NR            | 730    | 11                       | NR            | 860    | 0                        | NR            | 990    | 0                        | NR            |
| 475    | 90                       | NR            | 605    | 301                      | NR            | 735    | 10                       | NR            | 865    | 0                        | NR            | 995    | 0                        | NR            |
| 480    | 78                       | NR            | 610    | 323                      | NR            | 740    | 8                        | NR            | 870    | 0                        | NR            | 1000   | 0                        | NR            |
| 485    | 77                       | NR            | 615    | 340                      | NR            | 745    | 7                        | NR            | 875    | 0                        | NR            |        |                          |               |

REPORT NUMBER: SP1-2506-472-4

**Scotopic Flux vs. Wavelength**



**Scotopic Lumens: NR**

**S/P: 1.82**

| λ (nm) | Power W <sup>^</sup> /nm | Lumens (φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (φ/nm) |
|--------|--------------------------|---------------|--------|--------------------------|---------------|--------|--------------------------|---------------|--------|--------------------------|---------------|--------|--------------------------|---------------|
| 360    | 0                        | NR            | 490    | 89                       | NR            | 620    | 280                      | NR            | 750    | 6                        | NR            | 880    | 0                        | NR            |
| 365    | 0                        | NR            | 495    | 121                      | NR            | 625    | 280                      | NR            | 755    | 5                        | NR            | 885    | 0                        | NR            |
| 370    | 0                        | NR            | 500    | 168                      | NR            | 630    | 1000                     | NR            | 760    | 5                        | NR            | 890    | 0                        | NR            |
| 375    | 0                        | NR            | 505    | 224                      | NR            | 635    | 626                      | NR            | 765    | 4                        | NR            | 895    | 0                        | NR            |
| 380    | 1                        | NR            | 510    | 275                      | NR            | 640    | 163                      | NR            | 770    | 4                        | NR            | 900    | 0                        | NR            |
| 385    | 2                        | NR            | 515    | 321                      | NR            | 645    | 160                      | NR            | 775    | 3                        | NR            | 905    | 0                        | NR            |
| 390    | 3                        | NR            | 520    | 354                      | NR            | 650    | 136                      | NR            | 780    | 3                        | NR            | 910    | 0                        | NR            |
| 395    | 5                        | NR            | 525    | 375                      | NR            | 655    | 111                      | NR            | 785    | 2                        | NR            | 915    | 0                        | NR            |
| 400    | 7                        | NR            | 530    | 388                      | NR            | 660    | 93                       | NR            | 790    | 2                        | NR            | 920    | 0                        | NR            |
| 405    | 10                       | NR            | 535    | 395                      | NR            | 665    | 76                       | NR            | 795    | 2                        | NR            | 925    | 0                        | NR            |
| 410    | 15                       | NR            | 540    | 397                      | NR            | 670    | 72                       | NR            | 800    | 2                        | NR            | 930    | 0                        | NR            |
| 415    | 28                       | NR            | 545    | 398                      | NR            | 675    | 57                       | NR            | 805    | 1                        | NR            | 935    | 0                        | NR            |
| 420    | 53                       | NR            | 550    | 396                      | NR            | 680    | 49                       | NR            | 810    | 1                        | NR            | 940    | 0                        | NR            |
| 425    | 97                       | NR            | 555    | 395                      | NR            | 685    | 42                       | NR            | 815    | 1                        | NR            | 945    | 0                        | NR            |
| 430    | 163                      | NR            | 560    | 392                      | NR            | 690    | 37                       | NR            | 820    | 1                        | NR            | 950    | 0                        | NR            |
| 435    | 261                      | NR            | 565    | 388                      | NR            | 695    | 32                       | NR            | 825    | 1                        | NR            | 955    | 0                        | NR            |
| 440    | 409                      | NR            | 570    | 381                      | NR            | 700    | 27                       | NR            | 830    | 1                        | NR            | 960    | 0                        | NR            |
| 445    | 637                      | NR            | 575    | 374                      | NR            | 705    | 23                       | NR            | 835    | 1                        | NR            | 965    | 0                        | NR            |
| 450    | 699                      | NR            | 580    | 365                      | NR            | 710    | 20                       | NR            | 840    | 1                        | NR            | 970    | 0                        | NR            |
| 455    | 436                      | NR            | 585    | 354                      | NR            | 715    | 17                       | NR            | 845    | 0                        | NR            | 975    | 0                        | NR            |
| 460    | 274                      | NR            | 590    | 342                      | NR            | 720    | 15                       | NR            | 850    | 0                        | NR            | 980    | 0                        | NR            |
| 465    | 205                      | NR            | 595    | 325                      | NR            | 725    | 13                       | NR            | 855    | 0                        | NR            | 985    | 0                        | NR            |
| 470    | 130                      | NR            | 600    | 313                      | NR            | 730    | 11                       | NR            | 860    | 0                        | NR            | 990    | 0                        | NR            |
| 475    | 90                       | NR            | 605    | 301                      | NR            | 735    | 10                       | NR            | 865    | 0                        | NR            | 995    | 0                        | NR            |
| 480    | 78                       | NR            | 610    | 323                      | NR            | 740    | 8                        | NR            | 870    | 0                        | NR            | 1000   | 0                        | NR            |
| 485    | 77                       | NR            | 615    | 340                      | NR            | 745    | 7                        | NR            | 875    | 0                        | NR            |        |                          |               |

REPORT NUMBER: SP1-2506-472-4

**Melanopic Flux vs. Wavelength**



**Melanopic Lumens: NR**

**M/P: 3.71**

| λ (nm) | Power W <sup>^</sup> /nm | Lumens (φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (φ/nm) |
|--------|--------------------------|---------------|--------|--------------------------|---------------|--------|--------------------------|---------------|--------|--------------------------|---------------|--------|--------------------------|---------------|
| 360    | 0                        | NR            | 490    | 89                       | NR            | 620    | 280                      | NR            | 750    | 6                        | NR            | 880    | 0                        | NR            |
| 365    | 0                        | NR            | 495    | 121                      | NR            | 625    | 280                      | NR            | 755    | 5                        | NR            | 885    | 0                        | NR            |
| 370    | 0                        | NR            | 500    | 168                      | NR            | 630    | 1000                     | NR            | 760    | 5                        | NR            | 890    | 0                        | NR            |
| 375    | 0                        | NR            | 505    | 224                      | NR            | 635    | 626                      | NR            | 765    | 4                        | NR            | 895    | 0                        | NR            |
| 380    | 1                        | NR            | 510    | 275                      | NR            | 640    | 163                      | NR            | 770    | 4                        | NR            | 900    | 0                        | NR            |
| 385    | 2                        | NR            | 515    | 321                      | NR            | 645    | 160                      | NR            | 775    | 3                        | NR            | 905    | 0                        | NR            |
| 390    | 3                        | NR            | 520    | 354                      | NR            | 650    | 136                      | NR            | 780    | 3                        | NR            | 910    | 0                        | NR            |
| 395    | 5                        | NR            | 525    | 375                      | NR            | 655    | 111                      | NR            | 785    | 2                        | NR            | 915    | 0                        | NR            |
| 400    | 7                        | NR            | 530    | 388                      | NR            | 660    | 93                       | NR            | 790    | 2                        | NR            | 920    | 0                        | NR            |
| 405    | 10                       | NR            | 535    | 395                      | NR            | 665    | 76                       | NR            | 795    | 2                        | NR            | 925    | 0                        | NR            |
| 410    | 15                       | NR            | 540    | 397                      | NR            | 670    | 72                       | NR            | 800    | 2                        | NR            | 930    | 0                        | NR            |
| 415    | 28                       | NR            | 545    | 398                      | NR            | 675    | 57                       | NR            | 805    | 1                        | NR            | 935    | 0                        | NR            |
| 420    | 53                       | NR            | 550    | 396                      | NR            | 680    | 49                       | NR            | 810    | 1                        | NR            | 940    | 0                        | NR            |
| 425    | 97                       | NR            | 555    | 395                      | NR            | 685    | 42                       | NR            | 815    | 1                        | NR            | 945    | 0                        | NR            |
| 430    | 163                      | NR            | 560    | 392                      | NR            | 690    | 37                       | NR            | 820    | 1                        | NR            | 950    | 0                        | NR            |
| 435    | 261                      | NR            | 565    | 388                      | NR            | 695    | 32                       | NR            | 825    | 1                        | NR            | 955    | 0                        | NR            |
| 440    | 409                      | NR            | 570    | 381                      | NR            | 700    | 27                       | NR            | 830    | 1                        | NR            | 960    | 0                        | NR            |
| 445    | 637                      | NR            | 575    | 374                      | NR            | 705    | 23                       | NR            | 835    | 1                        | NR            | 965    | 0                        | NR            |
| 450    | 699                      | NR            | 580    | 365                      | NR            | 710    | 20                       | NR            | 840    | 1                        | NR            | 970    | 0                        | NR            |
| 455    | 436                      | NR            | 585    | 354                      | NR            | 715    | 17                       | NR            | 845    | 0                        | NR            | 975    | 0                        | NR            |
| 460    | 274                      | NR            | 590    | 342                      | NR            | 720    | 15                       | NR            | 850    | 0                        | NR            | 980    | 0                        | NR            |
| 465    | 205                      | NR            | 595    | 325                      | NR            | 725    | 13                       | NR            | 855    | 0                        | NR            | 985    | 0                        | NR            |
| 470    | 130                      | NR            | 600    | 313                      | NR            | 730    | 11                       | NR            | 860    | 0                        | NR            | 990    | 0                        | NR            |
| 475    | 90                       | NR            | 605    | 301                      | NR            | 735    | 10                       | NR            | 865    | 0                        | NR            | 995    | 0                        | NR            |
| 480    | 78                       | NR            | 610    | 323                      | NR            | 740    | 8                        | NR            | 870    | 0                        | NR            | 1000   | 0                        | NR            |
| 485    | 77                       | NR            | 615    | 340                      | NR            | 745    | 7                        | NR            | 875    | 0                        | NR            |        |                          |               |

**Summary**

$R_f = 80$   
 $R_g = 102.3$   
 CIE  $R_a = 82.3$   
 $R_9 = 43.9$



**Color Vector Graphics**



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

|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 85 | CES26 = 67 | CES51 = 92 | CES76 = 54 |
| CES02 = 60 | CES27 = 88 | CES52 = 91 | CES77 = 71 |
| CES03 = 31 | CES28 = 81 | CES53 = 82 | CES78 = 55 |
| CES04 = 69 | CES29 = 66 | CES54 = 92 | CES79 = 81 |
| CES05 = 47 | CES30 = 80 | CES55 = 90 | CES80 = 75 |
| CES06 = 50 | CES31 = 69 | CES56 = 81 | CES81 = 79 |
| CES07 = 40 | CES32 = 61 | CES57 = 80 | CES82 = 90 |
| CES08 = 39 | CES33 = 76 | CES58 = 81 | CES83 = 87 |
| CES09 = 29 | CES34 = 68 | CES59 = 93 | CES84 = 87 |
| CES10 = 73 | CES35 = 82 | CES60 = 94 | CES85 = 82 |
| CES11 = 56 | CES36 = 95 | CES61 = 91 | CES86 = 83 |
| CES12 = 62 | CES37 = 75 | CES62 = 89 | CES87 = 78 |
| CES13 = 42 | CES38 = 87 | CES63 = 80 | CES88 = 85 |
| CES14 = 74 | CES39 = 94 | CES64 = 79 | CES89 = 81 |
| CES15 = 71 | CES40 = 87 | CES65 = 75 | CES90 = 86 |
| CES16 = 46 | CES41 = 91 | CES66 = 72 | CES91 = 80 |
| CES17 = 48 | CES42 = 71 | CES67 = 69 | CES92 = 77 |
| CES18 = 56 | CES43 = 72 | CES68 = 75 | CES93 = 86 |
| CES19 = 70 | CES44 = 99 | CES69 = 80 | CES94 = 71 |
| CES20 = 65 | CES45 = 81 | CES70 = 66 | CES95 = 79 |
| CES21 = 85 | CES46 = 83 | CES71 = 59 | CES96 = 86 |
| CES22 = 77 | CES47 = 83 | CES72 = 87 | CES97 = 85 |
| CES23 = 91 | CES48 = 83 | CES73 = 56 | CES98 = 82 |
| CES24 = 90 | CES49 = 82 | CES74 = 95 | CES99 = 84 |
| CES25 = 71 | CES50 = 91 | CES75 = 58 |            |



Color Rendition by Hue-Angle Bin



Measure Comparisons



(END OF REPORT)