

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: P1436513

Luminaire Tested: EHBR1-30-UNV-M-L935-UPL40

Issue Date: 3/25/2026

**Test Information**

Test Method: LM-79-2019  
Report Number: P1436513  
REPORT IS A COMBINATION OF REPORTS P1436081 AND P1431635  
Test Lab: INNOVATION CENTER  
Issue Date: 3/25/2026  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: METALUX  
Catalog Number: EHBR1-30-UNV-M-L935-UPL40  
Description: Elevate Round Highbay at, 30000 lumens, 3500K 90CRI LEDs with M lens  
Light Source: -  
Ballast/Driver: -

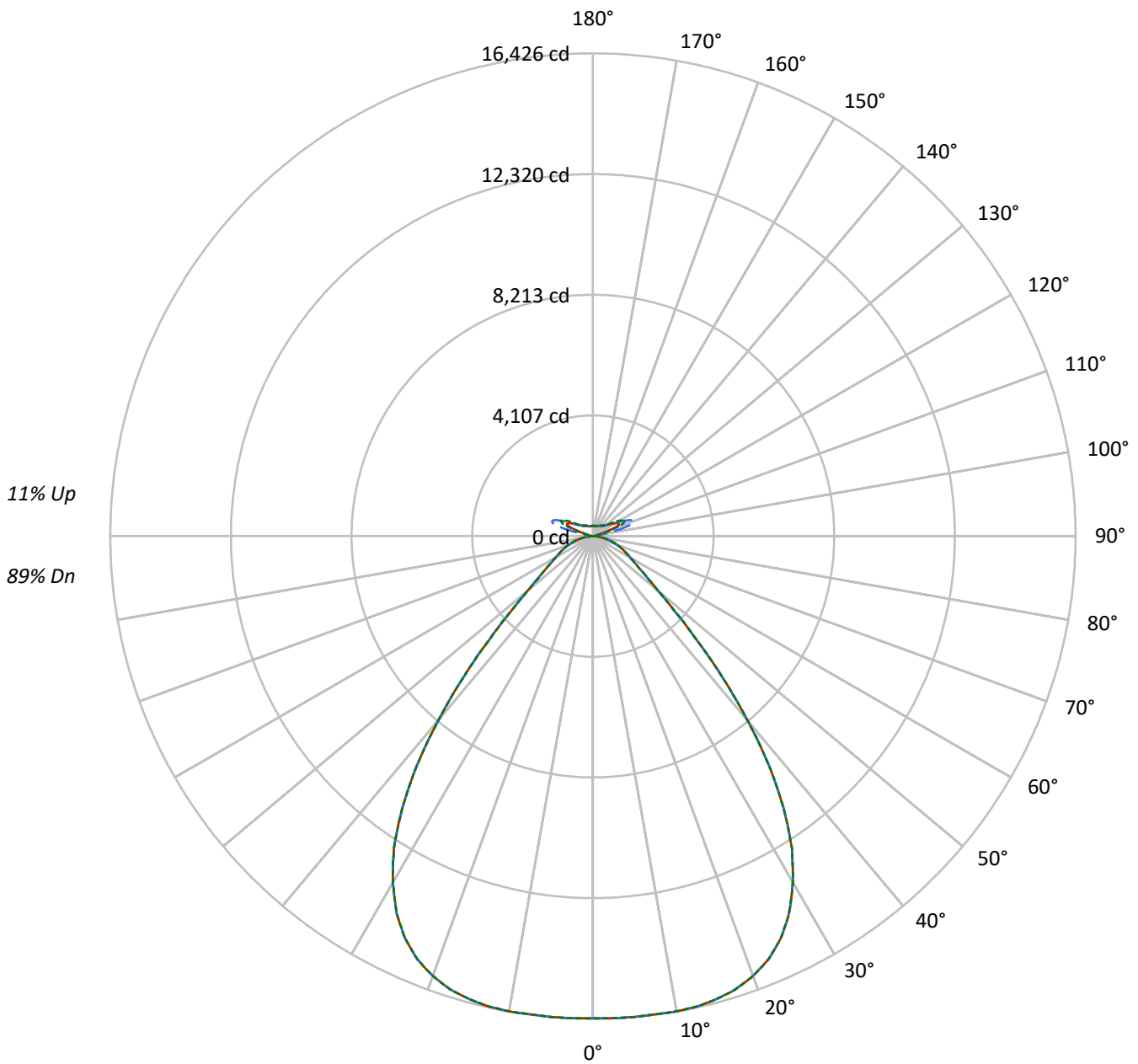
**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 31192.5 lumens  
Efficiency: N/A  
Efficacy: 163.8 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: Semi-Direct

Input Watts (W): 190.4  
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

TEST NUMBER: P1436513  
CATALOG NUMBER: EHBR1-30-UNV-M-L935-UPL40

### Luminous Intensity Polar Plot



— 0°-180°    - - 45°-225°    - - - 90°-270°



TEST NUMBER: P1436513

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**COEFFICIENT OF UTILIZATION - ZONAL CAVITY METHOD:**

|     |     |     |     |     |     |     |     |     |     |     |     |    |    |    |    |    |    |    |    |    |   |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|----|----|----|----|----|----|----|----|----|---|
| RF  | 20  |     |     |     | 20  |     |     |     | 20  |     |     |    | 20 |    |    |    | 20 |    |    |    |   |
| RC  | 80  |     |     |     | 70  |     |     |     | 50  |     |     |    | 30 |    |    |    | 10 |    |    | 0  |   |
| RW  | 70  | 50  | 30  | 10  | 70  | 50  | 30  | 10  | 50  | 30  | 10  | 50 | 30 | 10 | 50 | 30 | 10 | 50 | 30 | 10 | 0 |
| RCR |     |     |     |     |     |     |     |     |     |     |     |    |    |    |    |    |    |    |    |    |   |
| 0   | 116 | 116 | 116 | 116 | 112 | 112 | 112 | 112 | 105 | 105 | 105 | 98 | 98 | 98 | 92 | 92 | 92 | 89 |    |    |   |
| 1   | 109 | 105 | 102 | 99  | 105 | 102 | 99  | 96  | 96  | 94  | 91  | 90 | 88 | 87 | 85 | 84 | 82 | 80 |    |    |   |
| 2   | 101 | 95  | 90  | 85  | 98  | 92  | 88  | 84  | 87  | 83  | 80  | 82 | 79 | 77 | 78 | 76 | 73 | 71 |    |    |   |
| 3   | 94  | 86  | 80  | 75  | 91  | 84  | 78  | 73  | 79  | 75  | 71  | 75 | 72 | 68 | 72 | 69 | 66 | 63 |    |    |   |
| 4   | 88  | 78  | 71  | 66  | 85  | 76  | 70  | 65  | 73  | 67  | 63  | 69 | 65 | 61 | 66 | 62 | 59 | 57 |    |    |   |
| 5   | 82  | 72  | 64  | 59  | 79  | 70  | 63  | 58  | 67  | 61  | 57  | 64 | 59 | 55 | 61 | 57 | 54 | 51 |    |    |   |
| 6   | 77  | 66  | 58  | 53  | 74  | 64  | 57  | 52  | 61  | 56  | 51  | 59 | 54 | 50 | 57 | 52 | 49 | 47 |    |    |   |
| 7   | 72  | 60  | 53  | 48  | 70  | 59  | 52  | 47  | 57  | 51  | 46  | 55 | 49 | 45 | 52 | 48 | 44 | 43 |    |    |   |
| 8   | 67  | 56  | 49  | 44  | 65  | 55  | 48  | 43  | 53  | 47  | 42  | 51 | 45 | 42 | 49 | 44 | 41 | 39 |    |    |   |
| 9   | 63  | 52  | 45  | 40  | 62  | 51  | 44  | 40  | 49  | 43  | 39  | 47 | 42 | 38 | 46 | 41 | 38 | 36 |    |    |   |
| 10  | 60  | 48  | 41  | 37  | 58  | 47  | 41  | 36  | 46  | 40  | 36  | 44 | 39 | 35 | 43 | 38 | 35 | 33 |    |    |   |

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

|     | 0°    | 45°   | 90°   |
|-----|-------|-------|-------|
| 0°  | 77062 | 77062 | 77062 |
| 5°  | 76931 | 76931 | 76931 |
| 10° | 77291 | 77291 | 77291 |
| 15° | 77736 | 77736 | 77736 |
| 20° | 77500 | 77500 | 77500 |
| 25° | 75691 | 75691 | 75691 |
| 30° | 70776 | 70776 | 70776 |
| 35° | 61640 | 61640 | 61640 |
| 40° | 47239 | 47239 | 47239 |
| 45° | 30861 | 30861 | 30861 |
| 50° | 19455 | 19455 | 19455 |
| 55° | 14502 | 14502 | 14502 |
| 60° | 12210 | 12210 | 12210 |
| 65° | 11102 | 11102 | 11102 |
| 70° | 10113 | 10113 | 10113 |
| 75° | 8659  | 8659  | 8659  |
| 80° | 6666  | 6666  | 6666  |
| 85° | 3497  | 3497  | 3497  |

**MAXIMUM LUMINANCE 45°-90°:**

Horizontal Angle: 0°  
 Vertical Angle: 45°  
 Luminance: 30861 cd/sqm



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**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 1567.3  | 5.0       |
| 10°-20°   | 4602.7  | 14.8      |
| 20°-30°   | 6906.1  | 22.1      |
| 30°-40°   | 6948.3  | 22.3      |
| 40°-50°   | 3977.4  | 12.8      |
| 50°-60°   | 1819.2  | 5.8       |
| 60°-70°   | 1154.2  | 3.7       |
| 70°-80°   | 647.5   | 2.1       |
| 80°-90°   | 158.1   | 0.5       |
| 90°-100°  | 97.3    | 0.3       |
| 100°-110° | 609.6   | 2.0       |
| 110°-120° | 1090.0  | 3.5       |
| 120°-130° | 639.6   | 2.1       |
| 130°-140° | 392.3   | 1.3       |
| 140°-150° | 272.1   | 0.9       |
| 150°-160° | 176.8   | 0.6       |
| 160°-170° | 100.8   | 0.3       |
| 170°-180° | 33.3    | 0.1       |
| 0°-30°    | 13076.1 | 41.9      |
| 0°-40°    | 20024.4 | 64.2      |
| 0°-60°    | 25821.0 | 82.8      |
| 0°-90°    | 27780.8 | 89.1      |
| 90°-120°  | 1796.9  | 5.8       |
| 90°-150°  | 3100.9  | 9.9       |
| 90°-180°  | 3412.0  | 10.9      |
| 0°-180°   | 31192.5 | 100.0     |

**CANDELA DISTRIBUTION:**

|      | 0°    | 22.5° | 45°   | 67.5° | 90°   | Flux |
|------|-------|-------|-------|-------|-------|------|
| 0°   | 16410 | 16410 | 16410 | 16410 | 16410 |      |
| 5°   | 16426 | 16426 | 16426 | 16426 | 16426 | 1567 |
| 15°  | 16308 | 16308 | 16308 | 16308 | 16308 | 4603 |
| 25°  | 15115 | 15115 | 15115 | 15115 | 15115 | 6906 |
| 35°  | 11313 | 11313 | 11313 | 11313 | 11313 | 6948 |
| 45°  | 4993  | 4993  | 4993  | 4993  | 4993  | 3977 |
| 55°  | 1960  | 1960  | 1960  | 1960  | 1960  | 1819 |
| 65°  | 1159  | 1159  | 1159  | 1159  | 1159  | 1154 |
| 75°  | 610   | 610   | 610   | 610   | 610   | 647  |
| 85°  | 120   | 120   | 120   | 120   | 120   | 147  |
| 90°  | 25    | 41    | 70    | 45    | 25    | 17   |
| 95°  | 43    | 72    | 158   | 78    | 49    | 41   |
| 105° | 213   | 420   | 1072  | 463   | 281   | 285  |
| 115° | 980   | 1031  | 1268  | 1215  | 1207  | 903  |
| 125° | 707   | 660   | 678   | 688   | 772   | 644  |
| 135° | 516   | 500   | 518   | 486   | 484   | 403  |
| 145° | 424   | 418   | 443   | 438   | 436   | 268  |
| 155° | 371   | 367   | 385   | 385   | 385   | 173  |
| 165° | 348   | 348   | 357   | 357   | 356   | 99   |
| 175° | 344   | 344   | 350   | 350   | 350   | 33   |
| 180° | 348   | 348   | 348   | 348   | 348   |      |



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**CANDELA DISTRIBUTION (FULL):**

|        | 0°      | 22.5°   | 45°     | 67.5°   | 90°     |
|--------|---------|---------|---------|---------|---------|
| 0°     | 16409.9 | 16409.9 | 16409.9 | 16409.9 | 16409.9 |
| 2.5°   | 16417.9 | 16417.9 | 16417.9 | 16417.9 | 16417.9 |
| 5°     | 16425.9 | 16425.9 | 16425.9 | 16425.9 | 16425.9 |
| 7.5°   | 16414.6 | 16414.6 | 16414.6 | 16414.6 | 16414.6 |
| 10°    | 16421.6 | 16421.6 | 16421.6 | 16421.6 | 16421.6 |
| 12.5°  | 16393.4 | 16393.4 | 16393.4 | 16393.4 | 16393.4 |
| 15°    | 16308.5 | 16308.5 | 16308.5 | 16308.5 | 16308.5 |
| 17.5°  | 16168.1 | 16168.1 | 16168.1 | 16168.1 | 16168.1 |
| 20°    | 15928.6 | 15928.6 | 15928.6 | 15928.6 | 15928.6 |
| 22.5°  | 15599.5 | 15599.5 | 15599.5 | 15599.5 | 15599.5 |
| 25°    | 15115.4 | 15115.4 | 15115.4 | 15115.4 | 15115.4 |
| 27.5°  | 14464.1 | 14464.1 | 14464.1 | 14464.1 | 14464.1 |
| 30°    | 13613.8 | 13613.8 | 13613.8 | 13613.8 | 13613.8 |
| 32.5°  | 12607.1 | 12607.1 | 12607.1 | 12607.1 | 12607.1 |
| 35°    | 11313.1 | 11313.1 | 11313.1 | 11313.1 | 11313.1 |
| 37.5°  | 9847.2  | 9847.2  | 9847.2  | 9847.2  | 9847.2  |
| 40°    | 8187.8  | 8187.8  | 8187.8  | 8187.8  | 8187.8  |
| 42.5°  | 6543.0  | 6543.0  | 6543.0  | 6543.0  | 6543.0  |
| 45°    | 4993.1  | 4993.1  | 4993.1  | 4993.1  | 4993.1  |
| 47.5°  | 3758.6  | 3758.6  | 3758.6  | 3758.6  | 3758.6  |
| 50°    | 2899.4  | 2899.4  | 2899.4  | 2899.4  | 2899.4  |
| 52.5°  | 2342.5  | 2342.5  | 2342.5  | 2342.5  | 2342.5  |
| 55°    | 1959.8  | 1959.8  | 1959.8  | 1959.8  | 1959.8  |
| 57.5°  | 1678.2  | 1678.2  | 1678.2  | 1678.2  | 1678.2  |
| 60°    | 1467.8  | 1467.8  | 1467.8  | 1467.8  | 1467.8  |
| 62.5°  | 1305.3  | 1305.3  | 1305.3  | 1305.3  | 1305.3  |
| 65°    | 1158.8  | 1158.8  | 1158.8  | 1158.8  | 1158.8  |
| 67.5°  | 1024.1  | 1024.1  | 1024.1  | 1024.1  | 1024.1  |
| 70°    | 887.4   | 887.4   | 887.4   | 887.4   | 887.4   |
| 72.5°  | 749.9   | 749.9   | 749.9   | 749.9   | 749.9   |
| 75°    | 610.0   | 610.0   | 610.0   | 610.0   | 610.0   |
| 77.5°  | 477.1   | 477.1   | 477.1   | 477.1   | 477.1   |
| 80°    | 350.7   | 350.7   | 350.7   | 350.7   | 350.7   |
| 82.5°  | 228.7   | 228.7   | 228.7   | 228.7   | 228.7   |
| 85°    | 120.2   | 120.2   | 120.2   | 120.2   | 120.2   |
| 87.5°  | 34.3    | 34.3    | 34.3    | 34.3    | 34.3    |
| 90°    | 25.4    | 41.1    | 70.3    | 45.0    | 25.4    |
| 92.5°  | 37.1    | 62.5    | 113.3   | 58.5    | 33.2    |
| 95°    | 43.0    | 72.2    | 158.2   | 78.1    | 48.9    |
| 97.5°  | 54.7    | 80.0    | 181.6   | 95.7    | 76.1    |
| 100°   | 72.2    | 93.7    | 283.2   | 117.2   | 101.6   |
| 102.5° | 123.1   | 199.2   | 601.5   | 220.7   | 154.3   |
| 105°   | 212.9   | 419.9   | 1072.2  | 462.9   | 281.2   |
| 107.5° | 369.1   | 751.9   | 1414.0  | 820.2   | 533.2   |
| 110°   | 689.4   | 998.0   | 1482.3  | 1126.8  | 853.5   |



TEST NUMBER: P1436513

CATALOG NUMBER: EHBR1-30-UNV-M-L935-UPL40

**CANDELA DISTRIBUTION (continued):**

|        | 0°    | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|-------|--------|--------|--------|--------|
| 112.5° | 931.6 | 1072.2 | 1419.9 | 1244.0 | 1111.2 |
| 115°   | 980.4 | 1031.2 | 1267.5 | 1214.8 | 1207.0 |
| 117.5° | 947.2 | 941.3  | 1076.1 | 1091.8 | 1165.9 |
| 120°   | 876.9 | 837.8  | 898.4  | 953.1  | 1052.7 |
| 122.5° | 789.1 | 742.1  | 769.5  | 810.5  | 910.1  |
| 125°   | 706.9 | 660.1  | 677.7  | 687.5  | 771.5  |
| 127.5° | 634.7 | 603.4  | 613.2  | 601.5  | 654.3  |
| 130°   | 585.9 | 558.6  | 572.3  | 544.9  | 570.3  |
| 132.5° | 544.9 | 527.3  | 542.9  | 509.7  | 517.5  |
| 135°   | 515.6 | 499.9  | 517.5  | 486.3  | 484.3  |
| 137.5° | 490.2 | 476.5  | 494.1  | 470.7  | 464.9  |
| 140°   | 466.8 | 455.1  | 474.6  | 457.0  | 453.1  |
| 142.5° | 441.4 | 433.6  | 457.0  | 445.3  | 441.4  |
| 145°   | 423.8 | 417.9  | 443.3  | 437.5  | 435.5  |
| 147.5° | 408.2 | 404.3  | 427.7  | 425.8  | 425.8  |
| 150°   | 394.5 | 390.6  | 414.0  | 412.1  | 414.0  |
| 152.5° | 380.8 | 376.9  | 398.4  | 396.4  | 398.4  |
| 155°   | 371.1 | 367.2  | 384.7  | 384.7  | 384.7  |
| 157.5° | 363.3 | 361.3  | 374.9  | 374.9  | 374.9  |
| 160°   | 357.4 | 355.5  | 367.2  | 367.2  | 365.3  |
| 162.5° | 351.6 | 349.6  | 363.3  | 361.3  | 361.3  |
| 165°   | 347.7 | 347.7  | 357.4  | 357.4  | 355.5  |
| 167.5° | 347.7 | 345.7  | 355.5  | 355.5  | 353.5  |
| 170°   | 345.7 | 345.7  | 353.5  | 351.6  | 349.6  |
| 172.5° | 345.7 | 345.7  | 353.5  | 351.6  | 349.6  |
| 175°   | 343.8 | 343.8  | 349.6  | 349.6  | 349.6  |
| 177.5° | 345.7 | 345.7  | 349.6  | 349.6  | 347.7  |
| 180°   | 347.7 | 347.7  | 347.7  | 347.7  | 347.7  |



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**CIE UGR TABLE:**

| Reflectances:   |      |                  |       |       |       |       |                |       |       |       |       |
|-----------------|------|------------------|-------|-------|-------|-------|----------------|-------|-------|-------|-------|
| Ceiling         |      | 0.7              | 0.7   | 0.5   | 0.5   | 0.3   | 0.7            | 0.7   | 0.5   | 0.5   | 0.3   |
| Wall            |      | 0.5              | 0.3   | 0.5   | 0.3   | 0.3   | 0.5            | 0.3   | 0.5   | 0.3   | 0.3   |
| Reference plane |      | 0.2              | 0.2   | 0.2   | 0.2   | 0.2   | 0.2            | 0.2   | 0.2   | 0.2   | 0.2   |
| Room dimensions |      | Viewed crosswise |       |       |       |       | Viewed endwise |       |       |       |       |
| X=2H            | Y=2H | 17.11            | 18.21 | 17.66 | 18.74 | 19.32 | 17.11          | 18.21 | 17.66 | 18.74 | 19.32 |
|                 | 3H   | 18.59            | 19.57 | 19.15 | 20.11 | 20.74 | 18.59          | 19.57 | 19.15 | 20.11 | 20.74 |
|                 | 4H   | 19.11            | 20.03 | 19.70 | 20.58 | 21.23 | 19.11          | 20.03 | 19.70 | 20.58 | 21.23 |
|                 | 6H   | 19.44            | 20.27 | 20.03 | 20.85 | 21.50 | 19.44          | 20.27 | 20.03 | 20.85 | 21.50 |
|                 | 8H   | 19.50            | 20.30 | 20.11 | 20.89 | 21.55 | 19.50          | 20.30 | 20.11 | 20.89 | 21.55 |
|                 | 12H  | 19.51            | 20.27 | 20.13 | 20.86 | 21.54 | 19.51          | 20.27 | 20.13 | 20.86 | 21.54 |
| 4H              | 2H   | 17.54            | 18.46 | 18.13 | 19.01 | 19.66 | 17.54          | 18.46 | 18.13 | 19.01 | 19.66 |
|                 | 3H   | 19.23            | 19.99 | 19.83 | 20.59 | 21.25 | 19.23          | 19.99 | 19.83 | 20.59 | 21.25 |
|                 | 4H   | 19.86            | 20.54 | 20.48 | 21.15 | 21.84 | 19.86          | 20.54 | 20.48 | 21.15 | 21.84 |
|                 | 6H   | 20.29            | 20.87 | 20.92 | 21.50 | 22.21 | 20.29          | 20.87 | 20.92 | 21.50 | 22.21 |
|                 | 8H   | 20.38            | 20.92 | 21.02 | 21.55 | 22.27 | 20.38          | 20.92 | 21.02 | 21.55 | 22.27 |
|                 | 12H  | 20.41            | 20.89 | 21.07 | 21.55 | 22.27 | 20.41          | 20.89 | 21.07 | 21.55 | 22.27 |
| 8H              | 4H   | 20.04            | 20.58 | 20.68 | 21.21 | 21.93 | 20.04          | 20.58 | 20.68 | 21.21 | 21.93 |
|                 | 6H   | 20.55            | 20.99 | 21.22 | 21.67 | 22.39 | 20.55          | 20.99 | 21.22 | 21.67 | 22.39 |
|                 | 8H   | 20.69            | 21.08 | 21.37 | 21.77 | 22.50 | 20.69          | 21.08 | 21.37 | 21.77 | 22.50 |
|                 | 12H  | 20.75            | 21.10 | 21.43 | 21.77 | 22.57 | 20.75          | 21.10 | 21.43 | 21.77 | 22.57 |
| 12H             | 4H   | 20.02            | 20.50 | 20.68 | 21.17 | 21.88 | 20.02          | 20.50 | 20.68 | 21.17 | 21.88 |
|                 | 6H   | 20.55            | 20.95 | 21.24 | 21.63 | 22.37 | 20.55          | 20.95 | 21.24 | 21.63 | 22.37 |
|                 | 8H   | 20.72            | 21.07 | 21.40 | 21.74 | 22.54 | 20.72          | 21.07 | 21.40 | 21.74 | 22.54 |

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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: SP1-2506-472-6

Test Date: 08/01/2025

Luminaire Tested: EHBR-60-L935-N

Data in this report applies to families of products including EHBR-60-L935-N

**Test Information**

Test Method: LM-79-2019  
 Report Number: SP1-2506-472-6  
 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-L935-N**  
 Description: Elevate Round Highbay at, 60000 lumens, 3500K 90CRI LEDs with N lens

**Spectral Parameters**

CCT (K): 3406  
 CIE u': 0.2394  
 CIE v': 0.5094  
 Duv: -0.0028  
 CIE x: 0.4076  
 CIE y: 0.3856  
 CIE z: 0.2068  
 Peak Wavelength (nm): 630  
 Dominant Wavelength (nm): 582  
 Purity: 38.0517  
 Rf: 91.3  
 Rg: 100

CRI (Ra): 94.6  
 R1: 96.6  
 R2: 98.4  
 R3: 98.1  
 R4: 95.8  
 R5: 96.2  
 R6: 95.4  
 R7: 91.8  
 R8: 84.4  
 R9: 63.8  
 R10: 94.7  
 R11: 96.6  
 R12: 80.9  
 R13: 97.4  
 R14: 98.3  
 R15: 93.1



**Test Conditions**

Stabilization Time: 35M  
 Operation Time: 1H 35M  
 Sphere Temperature (°C): 25.0

REPORT NUMBER: SP1-2506-472-6

| Measurement and Test Equipment |                       |                  |                      |
|--------------------------------|-----------------------|------------------|----------------------|
| Instrument                     | Identification Number | Calibration Date | Calibration Due Date |
| Photometer                     | 76INCH SPHERE IN0058  | 6/16/2025        | 12/16/2025           |
| Power Meter                    | XITRON INXT2011004    | 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: SP1-2506-472-6

CIE 1931 Chromaticity Diagram



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



Point lies inside the ANSI 3500K 4-step quadrangle

REPORT NUMBER: SP1-2506-472-6

**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    | 140                      | NR            | 620    | 338                      | NR            | 750    | 8                        | NR            | 880    | 0                        | NR            |
| 365    | 0                        | NR            | 495    | 159                      | NR            | 625    | 339                      | NR            | 755    | 7                        | NR            | 885    | 0                        | NR            |
| 370    | 0                        | NR            | 500    | 182                      | NR            | 630    | 1000                     | NR            | 760    | 5                        | NR            | 890    | 0                        | NR            |
| 375    | 0                        | NR            | 505    | 202                      | NR            | 635    | 653                      | NR            | 765    | 5                        | NR            | 895    | 0                        | NR            |
| 380    | 0                        | NR            | 510    | 216                      | NR            | 640    | 222                      | NR            | 770    | 4                        | NR            | 900    | 0                        | NR            |
| 385    | 0                        | NR            | 515    | 228                      | NR            | 645    | 214                      | NR            | 775    | 3                        | NR            | 905    | 0                        | NR            |
| 390    | 0                        | NR            | 520    | 236                      | NR            | 650    | 185                      | NR            | 780    | 3                        | NR            | 910    | 0                        | NR            |
| 395    | 1                        | NR            | 525    | 242                      | NR            | 655    | 157                      | NR            | 785    | 3                        | NR            | 915    | 0                        | NR            |
| 400    | 2                        | NR            | 530    | 248                      | NR            | 660    | 133                      | NR            | 790    | 2                        | NR            | 920    | 0                        | NR            |
| 405    | 3                        | NR            | 535    | 253                      | NR            | 665    | 113                      | NR            | 795    | 2                        | NR            | 925    | 0                        | NR            |
| 410    | 4                        | NR            | 540    | 258                      | NR            | 670    | 103                      | NR            | 800    | 2                        | NR            | 930    | 0                        | NR            |
| 415    | 7                        | NR            | 545    | 264                      | NR            | 675    | 85                       | NR            | 805    | 1                        | NR            | 935    | 0                        | NR            |
| 420    | 13                       | NR            | 550    | 270                      | NR            | 680    | 72                       | NR            | 810    | 1                        | NR            | 940    | 0                        | NR            |
| 425    | 22                       | NR            | 555    | 278                      | NR            | 685    | 62                       | NR            | 815    | 1                        | NR            | 945    | 0                        | NR            |
| 430    | 38                       | NR            | 560    | 286                      | NR            | 690    | 53                       | NR            | 820    | 1                        | NR            | 950    | 0                        | NR            |
| 435    | 65                       | NR            | 565    | 295                      | NR            | 695    | 45                       | NR            | 825    | 1                        | NR            | 955    | 0                        | NR            |
| 440    | 108                      | NR            | 570    | 303                      | NR            | 700    | 39                       | NR            | 830    | 1                        | NR            | 960    | 0                        | NR            |
| 445    | 193                      | NR            | 575    | 311                      | NR            | 705    | 33                       | NR            | 835    | 1                        | NR            | 965    | 0                        | NR            |
| 450    | 312                      | NR            | 580    | 319                      | NR            | 710    | 28                       | NR            | 840    | 1                        | NR            | 970    | 0                        | NR            |
| 455    | 300                      | NR            | 585    | 326                      | NR            | 715    | 24                       | NR            | 845    | 0                        | NR            | 975    | 0                        | NR            |
| 460    | 214                      | NR            | 590    | 332                      | NR            | 720    | 20                       | NR            | 850    | 0                        | NR            | 980    | 0                        | NR            |
| 465    | 184                      | NR            | 595    | 333                      | NR            | 725    | 17                       | NR            | 855    | 0                        | NR            | 985    | 0                        | NR            |
| 470    | 153                      | NR            | 600    | 336                      | NR            | 730    | 15                       | NR            | 860    | 0                        | NR            | 990    | 0                        | NR            |
| 475    | 122                      | NR            | 605    | 337                      | NR            | 735    | 12                       | NR            | 865    | 0                        | NR            | 995    | 0                        | NR            |
| 480    | 115                      | NR            | 610    | 367                      | NR            | 740    | 10                       | NR            | 870    | 0                        | NR            | 1000   | 0                        | NR            |
| 485    | 125                      | NR            | 615    | 390                      | NR            | 745    | 9                        | NR            | 875    | 0                        | NR            |        |                          |               |

REPORT NUMBER: SP1-2506-472-6

**Scotopic Flux vs. Wavelength**



**Scotopic Lumens: NR**

**S/P: 1.62**

| 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    | 140                      | NR            | 620    | 338                      | NR            | 750    | 8                        | NR            | 880    | 0                        | NR            |
| 365    | 0                        | NR            | 495    | 159                      | NR            | 625    | 339                      | NR            | 755    | 7                        | NR            | 885    | 0                        | NR            |
| 370    | 0                        | NR            | 500    | 182                      | NR            | 630    | 1000                     | NR            | 760    | 5                        | NR            | 890    | 0                        | NR            |
| 375    | 0                        | NR            | 505    | 202                      | NR            | 635    | 653                      | NR            | 765    | 5                        | NR            | 895    | 0                        | NR            |
| 380    | 0                        | NR            | 510    | 216                      | NR            | 640    | 222                      | NR            | 770    | 4                        | NR            | 900    | 0                        | NR            |
| 385    | 0                        | NR            | 515    | 228                      | NR            | 645    | 214                      | NR            | 775    | 3                        | NR            | 905    | 0                        | NR            |
| 390    | 0                        | NR            | 520    | 236                      | NR            | 650    | 185                      | NR            | 780    | 3                        | NR            | 910    | 0                        | NR            |
| 395    | 1                        | NR            | 525    | 242                      | NR            | 655    | 157                      | NR            | 785    | 3                        | NR            | 915    | 0                        | NR            |
| 400    | 2                        | NR            | 530    | 248                      | NR            | 660    | 133                      | NR            | 790    | 2                        | NR            | 920    | 0                        | NR            |
| 405    | 3                        | NR            | 535    | 253                      | NR            | 665    | 113                      | NR            | 795    | 2                        | NR            | 925    | 0                        | NR            |
| 410    | 4                        | NR            | 540    | 258                      | NR            | 670    | 103                      | NR            | 800    | 2                        | NR            | 930    | 0                        | NR            |
| 415    | 7                        | NR            | 545    | 264                      | NR            | 675    | 85                       | NR            | 805    | 1                        | NR            | 935    | 0                        | NR            |
| 420    | 13                       | NR            | 550    | 270                      | NR            | 680    | 72                       | NR            | 810    | 1                        | NR            | 940    | 0                        | NR            |
| 425    | 22                       | NR            | 555    | 278                      | NR            | 685    | 62                       | NR            | 815    | 1                        | NR            | 945    | 0                        | NR            |
| 430    | 38                       | NR            | 560    | 286                      | NR            | 690    | 53                       | NR            | 820    | 1                        | NR            | 950    | 0                        | NR            |
| 435    | 65                       | NR            | 565    | 295                      | NR            | 695    | 45                       | NR            | 825    | 1                        | NR            | 955    | 0                        | NR            |
| 440    | 108                      | NR            | 570    | 303                      | NR            | 700    | 39                       | NR            | 830    | 1                        | NR            | 960    | 0                        | NR            |
| 445    | 193                      | NR            | 575    | 311                      | NR            | 705    | 33                       | NR            | 835    | 1                        | NR            | 965    | 0                        | NR            |
| 450    | 312                      | NR            | 580    | 319                      | NR            | 710    | 28                       | NR            | 840    | 1                        | NR            | 970    | 0                        | NR            |
| 455    | 300                      | NR            | 585    | 326                      | NR            | 715    | 24                       | NR            | 845    | 0                        | NR            | 975    | 0                        | NR            |
| 460    | 214                      | NR            | 590    | 332                      | NR            | 720    | 20                       | NR            | 850    | 0                        | NR            | 980    | 0                        | NR            |
| 465    | 184                      | NR            | 595    | 333                      | NR            | 725    | 17                       | NR            | 855    | 0                        | NR            | 985    | 0                        | NR            |
| 470    | 153                      | NR            | 600    | 336                      | NR            | 730    | 15                       | NR            | 860    | 0                        | NR            | 990    | 0                        | NR            |
| 475    | 122                      | NR            | 605    | 337                      | NR            | 735    | 12                       | NR            | 865    | 0                        | NR            | 995    | 0                        | NR            |
| 480    | 115                      | NR            | 610    | 367                      | NR            | 740    | 10                       | NR            | 870    | 0                        | NR            | 1000   | 0                        | NR            |
| 485    | 125                      | NR            | 615    | 390                      | NR            | 745    | 9                        | NR            | 875    | 0                        | NR            |        |                          |               |

REPORT NUMBER: SP1-2506-472-6

Melanopic Flux vs. Wavelength



Melanopic Lumens: NR

M/P: 3.3

| 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    | 140                      | NR            | 620    | 338                      | NR            | 750    | 8                        | NR            | 880    | 0                        | NR            |
| 365    | 0                        | NR            | 495    | 159                      | NR            | 625    | 339                      | NR            | 755    | 7                        | NR            | 885    | 0                        | NR            |
| 370    | 0                        | NR            | 500    | 182                      | NR            | 630    | 1000                     | NR            | 760    | 5                        | NR            | 890    | 0                        | NR            |
| 375    | 0                        | NR            | 505    | 202                      | NR            | 635    | 653                      | NR            | 765    | 5                        | NR            | 895    | 0                        | NR            |
| 380    | 0                        | NR            | 510    | 216                      | NR            | 640    | 222                      | NR            | 770    | 4                        | NR            | 900    | 0                        | NR            |
| 385    | 0                        | NR            | 515    | 228                      | NR            | 645    | 214                      | NR            | 775    | 3                        | NR            | 905    | 0                        | NR            |
| 390    | 0                        | NR            | 520    | 236                      | NR            | 650    | 185                      | NR            | 780    | 3                        | NR            | 910    | 0                        | NR            |
| 395    | 1                        | NR            | 525    | 242                      | NR            | 655    | 157                      | NR            | 785    | 3                        | NR            | 915    | 0                        | NR            |
| 400    | 2                        | NR            | 530    | 248                      | NR            | 660    | 133                      | NR            | 790    | 2                        | NR            | 920    | 0                        | NR            |
| 405    | 3                        | NR            | 535    | 253                      | NR            | 665    | 113                      | NR            | 795    | 2                        | NR            | 925    | 0                        | NR            |
| 410    | 4                        | NR            | 540    | 258                      | NR            | 670    | 103                      | NR            | 800    | 2                        | NR            | 930    | 0                        | NR            |
| 415    | 7                        | NR            | 545    | 264                      | NR            | 675    | 85                       | NR            | 805    | 1                        | NR            | 935    | 0                        | NR            |
| 420    | 13                       | NR            | 550    | 270                      | NR            | 680    | 72                       | NR            | 810    | 1                        | NR            | 940    | 0                        | NR            |
| 425    | 22                       | NR            | 555    | 278                      | NR            | 685    | 62                       | NR            | 815    | 1                        | NR            | 945    | 0                        | NR            |
| 430    | 38                       | NR            | 560    | 286                      | NR            | 690    | 53                       | NR            | 820    | 1                        | NR            | 950    | 0                        | NR            |
| 435    | 65                       | NR            | 565    | 295                      | NR            | 695    | 45                       | NR            | 825    | 1                        | NR            | 955    | 0                        | NR            |
| 440    | 108                      | NR            | 570    | 303                      | NR            | 700    | 39                       | NR            | 830    | 1                        | NR            | 960    | 0                        | NR            |
| 445    | 193                      | NR            | 575    | 311                      | NR            | 705    | 33                       | NR            | 835    | 1                        | NR            | 965    | 0                        | NR            |
| 450    | 312                      | NR            | 580    | 319                      | NR            | 710    | 28                       | NR            | 840    | 1                        | NR            | 970    | 0                        | NR            |
| 455    | 300                      | NR            | 585    | 326                      | NR            | 715    | 24                       | NR            | 845    | 0                        | NR            | 975    | 0                        | NR            |
| 460    | 214                      | NR            | 590    | 332                      | NR            | 720    | 20                       | NR            | 850    | 0                        | NR            | 980    | 0                        | NR            |
| 465    | 184                      | NR            | 595    | 333                      | NR            | 725    | 17                       | NR            | 855    | 0                        | NR            | 985    | 0                        | NR            |
| 470    | 153                      | NR            | 600    | 336                      | NR            | 730    | 15                       | NR            | 860    | 0                        | NR            | 990    | 0                        | NR            |
| 475    | 122                      | NR            | 605    | 337                      | NR            | 735    | 12                       | NR            | 865    | 0                        | NR            | 995    | 0                        | NR            |
| 480    | 115                      | NR            | 610    | 367                      | NR            | 740    | 10                       | NR            | 870    | 0                        | NR            | 1000   | 0                        | NR            |
| 485    | 125                      | NR            | 615    | 390                      | NR            | 745    | 9                        | NR            | 875    | 0                        | NR            |        |                          |               |

**Summary**

$R_f = 91.3$   
 $R_g = 100$   
 $CIE R_a = 94.6$   
 $R_9 = 63.8$



**Color Vector Graphics**



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

|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 86 | CES26 = 94 | CES51 = 97 | CES76 = 90 |
| CES02 = 63 | CES27 = 92 | CES52 = 98 | CES77 = 86 |
| CES03 = 31 | CES28 = 97 | CES53 = 98 | CES78 = 86 |
| CES04 = 70 | CES29 = 97 | CES54 = 93 | CES79 = 90 |
| CES05 = 50 | CES30 = 92 | CES55 = 92 | CES80 = 91 |
| CES06 = 51 | CES31 = 97 | CES56 = 96 | CES81 = 74 |
| CES07 = 43 | CES32 = 89 | CES57 = 94 | CES82 = 96 |
| CES08 = 41 | CES33 = 99 | CES58 = 95 | CES83 = 94 |
| CES09 = 29 | CES34 = 94 | CES59 = 98 | CES84 = 95 |
| CES10 = 75 | CES35 = 97 | CES60 = 92 | CES85 = 79 |
| CES11 = 58 | CES36 = 81 | CES61 = 93 | CES86 = 79 |
| CES12 = 64 | CES37 = 96 | CES62 = 86 | CES87 = 92 |
| CES13 = 44 | CES38 = 87 | CES63 = 94 | CES88 = 98 |
| CES14 = 74 | CES39 = 99 | CES64 = 91 | CES89 = 84 |
| CES15 = 72 | CES40 = 97 | CES65 = 90 | CES90 = 96 |
| CES16 = 48 | CES41 = 96 | CES66 = 89 | CES91 = 75 |
| CES17 = 49 | CES42 = 94 | CES67 = 88 | CES92 = 76 |
| CES18 = 56 | CES43 = 93 | CES68 = 89 | CES93 = 86 |
| CES19 = 71 | CES44 = 99 | CES69 = 90 | CES94 = 74 |
| CES20 = 67 | CES45 = 97 | CES70 = 88 | CES95 = 83 |
| CES21 = 86 | CES46 = 97 | CES71 = 83 | CES96 = 92 |
| CES22 = 78 | CES47 = 91 | CES72 = 94 | CES97 = 96 |
| CES23 = 91 | CES48 = 91 | CES73 = 83 | CES98 = 95 |
| CES24 = 90 | CES49 = 96 | CES74 = 90 | CES99 = 92 |
| CES25 = 71 | CES50 = 98 | CES75 = 85 |            |



Color Rendition by Hue-Angle Bin



Measure Comparisons



(END OF REPORT)