

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:

Luminaire Tested: EHBR1-12-UNV-N-L840-UPL36

Issue Date: 3/20/2026

**Test Information**

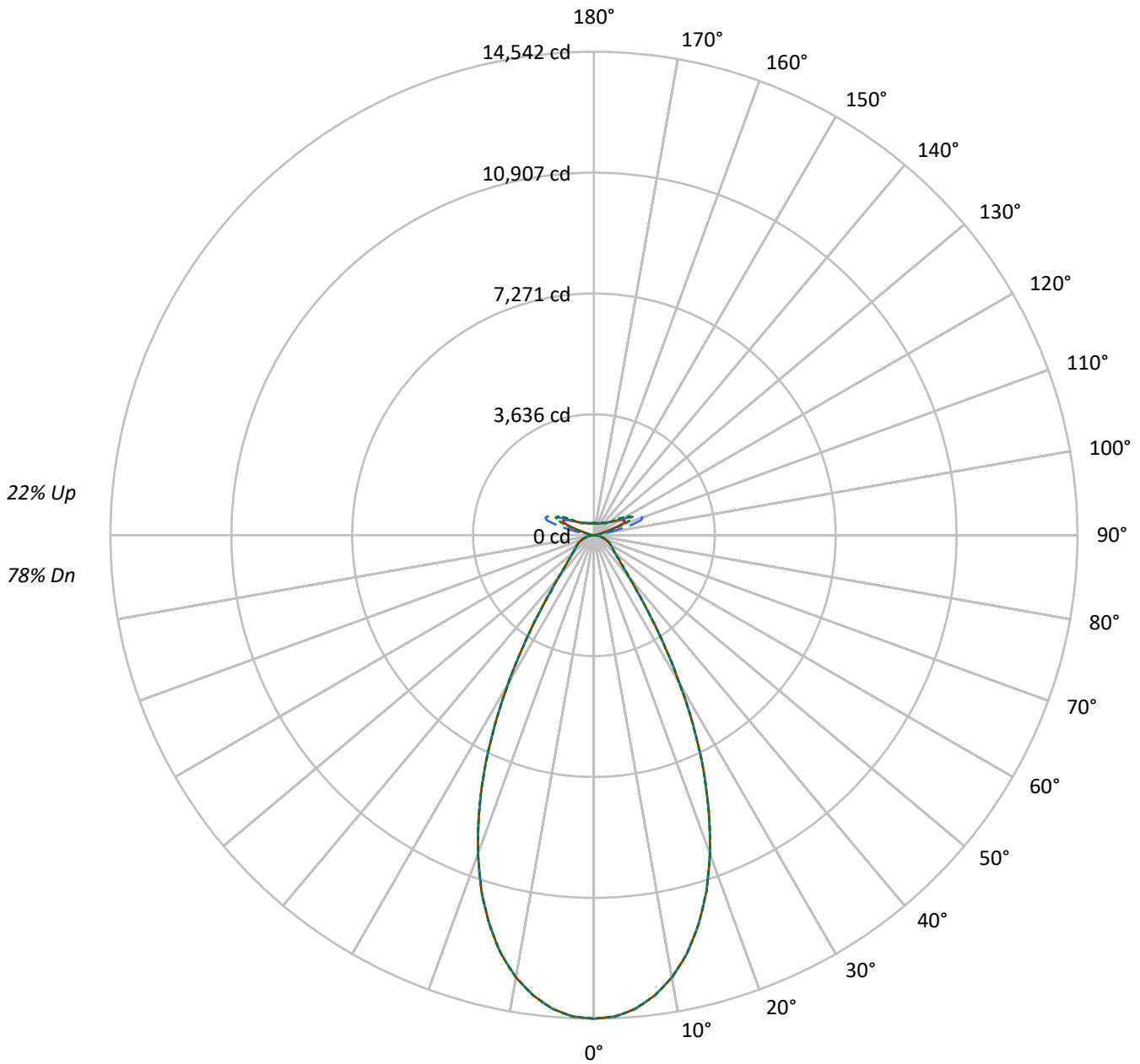
Test Method: LM-79-2019  
Report Number: REPORT IS A COMBINATION OF REPORTS P1431657 AND P1431635  
Test Lab: INNOVATION CENTER  
Issue Date: 3/20/2026  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: METALUX  
Catalog Number: EHBR1-12-UNV-N-L840-UPL36  
Description: Elevate Round Highbay at, 12000 lumens, 4000K 80CRI LEDs with N lens  
Light Source: -  
Ballast/Driver: -

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 16040.7 lumens  
Efficiency: N/A  
Efficacy: 172.3 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: Semi-Direct  
  
Input Watts (W): 93.1  
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:  
CATALOG NUMBER: EHBR1-12-UNV-N-L840-UPL36

### Luminous Intensity Polar Plot



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



TEST NUMBER:

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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 |
| RCR |     |     |     |     |     |     |     |     |    |    |    |    |    |    |    |    |    |    |    |    |
| 0   | 114 | 114 | 114 | 114 | 109 | 109 | 109 | 109 | 99 | 99 | 99 | 90 | 90 | 90 | 82 | 82 | 82 | 78 |    |    |
| 1   | 107 | 103 | 100 | 97  | 102 | 99  | 96  | 94  | 91 | 89 | 87 | 83 | 82 | 80 | 76 | 75 | 74 | 71 |    |    |
| 2   | 100 | 94  | 89  | 85  | 95  | 90  | 86  | 82  | 83 | 80 | 77 | 77 | 74 | 72 | 71 | 69 | 67 | 64 |    |    |
| 3   | 94  | 86  | 80  | 75  | 90  | 83  | 78  | 73  | 77 | 73 | 69 | 71 | 68 | 65 | 66 | 64 | 62 | 59 |    |    |
| 4   | 88  | 79  | 73  | 68  | 84  | 76  | 71  | 66  | 71 | 67 | 63 | 67 | 63 | 60 | 62 | 59 | 57 | 54 |    |    |
| 5   | 83  | 73  | 66  | 62  | 79  | 71  | 65  | 60  | 66 | 61 | 58 | 62 | 58 | 55 | 59 | 55 | 53 | 51 |    |    |
| 6   | 78  | 68  | 61  | 56  | 75  | 66  | 60  | 55  | 62 | 57 | 53 | 59 | 54 | 51 | 55 | 52 | 49 | 47 |    |    |
| 7   | 74  | 63  | 57  | 52  | 71  | 62  | 55  | 51  | 58 | 53 | 49 | 55 | 51 | 48 | 52 | 49 | 46 | 44 |    |    |
| 8   | 70  | 59  | 53  | 48  | 67  | 58  | 52  | 47  | 55 | 50 | 46 | 52 | 48 | 44 | 49 | 46 | 43 | 41 |    |    |
| 9   | 66  | 56  | 49  | 45  | 64  | 54  | 48  | 44  | 52 | 47 | 43 | 49 | 45 | 42 | 47 | 43 | 40 | 39 |    |    |
| 10  | 63  | 52  | 46  | 42  | 61  | 51  | 45  | 41  | 49 | 44 | 40 | 47 | 42 | 39 | 44 | 41 | 38 | 37 |    |    |

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

|     | 0°    | 45°   | 90°   |
|-----|-------|-------|-------|
| 0°  | 68288 | 68288 | 68288 |
| 5°  | 66963 | 66963 | 66963 |
| 10° | 63556 | 63556 | 63556 |
| 15° | 57827 | 57827 | 57827 |
| 20° | 49603 | 49603 | 49603 |
| 25° | 39021 | 39021 | 39021 |
| 30° | 26778 | 26778 | 26778 |
| 35° | 15907 | 15907 | 15907 |
| 40° | 9412  | 9412  | 9412  |
| 45° | 6756  | 6756  | 6756  |
| 50° | 5554  | 5554  | 5554  |
| 55° | 5047  | 5047  | 5047  |
| 60° | 4831  | 4831  | 4831  |
| 65° | 4608  | 4608  | 4608  |
| 70° | 4285  | 4285  | 4285  |
| 75° | 3874  | 3874  | 3874  |
| 80° | 3216  | 3216  | 3216  |
| 85° | 2037  | 2037  | 2037  |

**MAXIMUM LUMINANCE 45°-90°:**

Horizontal Angle: 0°  
 Vertical Angle: 45°  
 Luminance: 6756 cd/sqm



TEST NUMBER:

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**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 1339.5  | 8.4       |
| 10°-20°   | 3362.4  | 21.0      |
| 20°-30°   | 3515.7  | 21.9      |
| 30°-40°   | 1904.9  | 11.9      |
| 40°-50°   | 876.4   | 5.5       |
| 50°-60°   | 617.6   | 3.9       |
| 60°-70°   | 475.3   | 3.0       |
| 70°-80°   | 288.1   | 1.8       |
| 80°-90°   | 87.6    | 0.5       |
| 90°-100°  | 101.9   | 0.6       |
| 100°-110° | 638.4   | 4.0       |
| 110°-120° | 1141.6  | 7.1       |
| 120°-130° | 669.9   | 4.2       |
| 130°-140° | 410.9   | 2.6       |
| 140°-150° | 285.0   | 1.8       |
| 150°-160° | 185.2   | 1.2       |
| 160°-170° | 105.5   | 0.7       |
| 170°-180° | 34.9    | 0.2       |
| 0°-30°    | 8217.6  | 51.2      |
| 0°-40°    | 10122.5 | 63.1      |
| 0°-60°    | 11616.4 | 72.4      |
| 0°-90°    | 12467.5 | 77.7      |
| 90°-120°  | 1882.0  | 11.7      |
| 90°-150°  | 3247.7  | 20.2      |
| 90°-180°  | 3573.0  | 22.3      |
| 0°-180°   | 16040.7 | 100.0     |

**CANDELA DISTRIBUTION:**

|      | 0°    | 22.5° | 45°   | 67.5° | 90°   | Flux |
|------|-------|-------|-------|-------|-------|------|
| 0°   | 14542 | 14542 | 14542 | 14542 | 14542 |      |
| 5°   | 14298 | 14298 | 14298 | 14298 | 14298 | 1340 |
| 15°  | 12132 | 12132 | 12132 | 12132 | 12132 | 3362 |
| 25°  | 7792  | 7792  | 7792  | 7792  | 7792  | 3516 |
| 35°  | 2920  | 2920  | 2920  | 2920  | 2920  | 1905 |
| 45°  | 1093  | 1093  | 1093  | 1093  | 1093  | 876  |
| 55°  | 682   | 682   | 682   | 682   | 682   | 618  |
| 65°  | 481   | 481   | 481   | 481   | 481   | 475  |
| 75°  | 273   | 273   | 273   | 273   | 273   | 288  |
| 85°  | 70    | 70    | 70    | 70    | 70    | 78   |
| 90°  | 27    | 43    | 74    | 47    | 27    | 16   |
| 95°  | 45    | 76    | 166   | 82    | 51    | 43   |
| 105° | 223   | 440   | 1123  | 485   | 294   | 298  |
| 115° | 1027  | 1080  | 1328  | 1272  | 1264  | 946  |
| 125° | 740   | 691   | 710   | 720   | 808   | 675  |
| 135° | 540   | 524   | 542   | 509   | 507   | 422  |
| 145° | 444   | 438   | 464   | 458   | 456   | 281  |
| 155° | 389   | 384   | 403   | 403   | 403   | 181  |
| 165° | 364   | 364   | 374   | 374   | 372   | 104  |
| 175° | 360   | 360   | 366   | 366   | 366   | 35   |
| 180° | 364   | 364   | 364   | 364   | 364   |      |



TEST NUMBER:

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**CANDELA DISTRIBUTION (FULL):**

|        | 0°      | 22.5°   | 45°     | 67.5°   | 90°     |
|--------|---------|---------|---------|---------|---------|
| 0°     | 14541.5 | 14541.5 | 14541.5 | 14541.5 | 14541.5 |
| 2.5°   | 14490.0 | 14490.0 | 14490.0 | 14490.0 | 14490.0 |
| 5°     | 14297.6 | 14297.6 | 14297.6 | 14297.6 | 14297.6 |
| 7.5°   | 13969.2 | 13969.2 | 13969.2 | 13969.2 | 13969.2 |
| 10°    | 13503.3 | 13503.3 | 13503.3 | 13503.3 | 13503.3 |
| 12.5°  | 12901.1 | 12901.1 | 12901.1 | 12901.1 | 12901.1 |
| 15°    | 12131.8 | 12131.8 | 12131.8 | 12131.8 | 12131.8 |
| 17.5°  | 11239.3 | 11239.3 | 11239.3 | 11239.3 | 11239.3 |
| 20°    | 10194.8 | 10194.8 | 10194.8 | 10194.8 | 10194.8 |
| 22.5°  | 9031.9  | 9031.9  | 9031.9  | 9031.9  | 9031.9  |
| 25°    | 7792.4  | 7792.4  | 7792.4  | 7792.4  | 7792.4  |
| 27.5°  | 6478.3  | 6478.3  | 6478.3  | 6478.3  | 6478.3  |
| 30°    | 5150.7  | 5150.7  | 5150.7  | 5150.7  | 5150.7  |
| 32.5°  | 3953.0  | 3953.0  | 3953.0  | 3953.0  | 3953.0  |
| 35°    | 2919.5  | 2919.5  | 2919.5  | 2919.5  | 2919.5  |
| 37.5°  | 2143.6  | 2143.6  | 2143.6  | 2143.6  | 2143.6  |
| 40°    | 1631.3  | 1631.3  | 1631.3  | 1631.3  | 1631.3  |
| 42.5°  | 1308.1  | 1308.1  | 1308.1  | 1308.1  | 1308.1  |
| 45°    | 1093.1  | 1093.1  | 1093.1  | 1093.1  | 1093.1  |
| 47.5°  | 938.3   | 938.3   | 938.3   | 938.3   | 938.3   |
| 50°    | 827.7   | 827.7   | 827.7   | 827.7   | 827.7   |
| 52.5°  | 746.9   | 746.9   | 746.9   | 746.9   | 746.9   |
| 55°    | 682.1   | 682.1   | 682.1   | 682.1   | 682.1   |
| 57.5°  | 629.5   | 629.5   | 629.5   | 629.5   | 629.5   |
| 60°    | 580.8   | 580.8   | 580.8   | 580.8   | 580.8   |
| 62.5°  | 532.2   | 532.2   | 532.2   | 532.2   | 532.2   |
| 65°    | 481.0   | 481.0   | 481.0   | 481.0   | 481.0   |
| 67.5°  | 428.8   | 428.8   | 428.8   | 428.8   | 428.8   |
| 70°    | 376.0   | 376.0   | 376.0   | 376.0   | 376.0   |
| 72.5°  | 324.7   | 324.7   | 324.7   | 324.7   | 324.7   |
| 75°    | 272.9   | 272.9   | 272.9   | 272.9   | 272.9   |
| 77.5°  | 222.2   | 222.2   | 222.2   | 222.2   | 222.2   |
| 80°    | 169.2   | 169.2   | 169.2   | 169.2   | 169.2   |
| 82.5°  | 118.4   | 118.4   | 118.4   | 118.4   | 118.4   |
| 85°    | 70.0    | 70.0    | 70.0    | 70.0    | 70.0    |
| 87.5°  | 25.1    | 25.1    | 25.1    | 25.1    | 25.1    |
| 90°    | 27.0    | 43.4    | 74.0    | 47.4    | 27.0    |
| 92.5°  | 38.9    | 65.5    | 118.6   | 61.4    | 34.8    |
| 95°    | 45.0    | 75.7    | 165.7   | 81.8    | 51.1    |
| 97.5°  | 57.3    | 83.9    | 190.2   | 100.2   | 79.8    |
| 100°   | 75.7    | 98.2    | 296.6   | 122.7   | 106.4   |
| 102.5° | 128.9   | 208.6   | 630.0   | 231.1   | 161.6   |
| 105°   | 222.9   | 439.8   | 1122.9  | 484.8   | 294.5   |
| 107.5° | 386.6   | 787.5   | 1480.9  | 859.1   | 558.4   |
| 110°   | 722.0   | 1045.2  | 1552.5  | 1180.2  | 893.8   |



TEST NUMBER:

CATALOG NUMBER: EHBR1-12-UNV-N-L840-UPL36

**CANDELA DISTRIBUTION (continued):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 112.5° | 975.7  | 1122.9 | 1487.0 | 1302.9 | 1163.8 |
| 115°   | 1026.8 | 1080.0 | 1327.5 | 1272.2 | 1264.1 |
| 117.5° | 992.0  | 985.9  | 1127.0 | 1143.4 | 1221.1 |
| 120°   | 918.4  | 877.5  | 940.9  | 998.2  | 1102.5 |
| 122.5° | 826.3  | 777.3  | 805.9  | 848.8  | 953.2  |
| 125°   | 740.4  | 691.3  | 709.8  | 720.0  | 807.9  |
| 127.5° | 664.8  | 632.0  | 642.3  | 630.0  | 685.2  |
| 130°   | 613.6  | 585.0  | 599.3  | 570.7  | 597.3  |
| 132.5° | 570.7  | 552.3  | 568.6  | 533.8  | 542.0  |
| 135°   | 540.0  | 523.6  | 542.0  | 509.3  | 507.3  |
| 137.5° | 513.4  | 499.1  | 517.5  | 492.9  | 486.8  |
| 140°   | 488.9  | 476.6  | 497.0  | 478.6  | 474.5  |
| 142.5° | 462.3  | 454.1  | 478.6  | 466.4  | 462.3  |
| 145°   | 443.9  | 437.7  | 464.3  | 458.2  | 456.1  |
| 147.5° | 427.5  | 423.4  | 447.9  | 445.9  | 445.9  |
| 150°   | 413.2  | 409.1  | 433.6  | 431.6  | 433.6  |
| 152.5° | 398.9  | 394.8  | 417.3  | 415.2  | 417.3  |
| 155°   | 388.6  | 384.5  | 402.9  | 402.9  | 402.9  |
| 157.5° | 380.4  | 378.4  | 392.7  | 392.7  | 392.7  |
| 160°   | 374.3  | 372.3  | 384.5  | 384.5  | 382.5  |
| 162.5° | 368.2  | 366.1  | 380.4  | 378.4  | 378.4  |
| 165°   | 364.1  | 364.1  | 374.3  | 374.3  | 372.3  |
| 167.5° | 364.1  | 362.0  | 372.3  | 372.3  | 370.2  |
| 170°   | 362.0  | 362.0  | 370.2  | 368.2  | 366.1  |
| 172.5° | 362.0  | 362.0  | 370.2  | 368.2  | 366.1  |
| 175°   | 360.0  | 360.0  | 366.1  | 366.1  | 366.1  |
| 177.5° | 362.0  | 362.0  | 366.1  | 366.1  | 364.1  |
| 180°   | 364.1  | 364.1  | 364.1  | 364.1  | 364.1  |



TEST NUMBER: CATALOG  
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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 | 12.31            | 13.20 | 13.02 | 13.90 | 14.73 | 12.31          | 13.20 | 13.02 | 13.90 | 14.73 |
|                 | 3H   | 14.08            | 14.88 | 14.80 | 15.59 | 16.45 | 14.08          | 14.88 | 14.80 | 15.59 | 16.45 |
|                 | 4H   | 14.73            | 15.48 | 15.47 | 16.20 | 17.07 | 14.73          | 15.48 | 15.47 | 16.20 | 17.07 |
|                 | 6H   | 15.18            | 15.87 | 15.94 | 16.61 | 17.49 | 15.18          | 15.87 | 15.94 | 16.61 | 17.49 |
|                 | 8H   | 15.30            | 15.96 | 16.07 | 16.71 | 17.59 | 15.30          | 15.96 | 16.07 | 16.71 | 17.59 |
|                 | 12H  | 15.35            | 15.97 | 16.12 | 16.72 | 17.63 | 15.35          | 15.97 | 16.12 | 16.72 | 17.63 |
| 4H              | 2H   | 12.83            | 13.58 | 13.58 | 14.31 | 15.18 | 12.83          | 13.58 | 13.58 | 14.31 | 15.18 |
|                 | 3H   | 14.80            | 15.42 | 15.55 | 16.18 | 17.07 | 14.80          | 15.42 | 15.55 | 16.18 | 17.07 |
|                 | 4H   | 15.57            | 16.13 | 16.34 | 16.89 | 17.81 | 15.57          | 16.13 | 16.34 | 16.89 | 17.81 |
|                 | 6H   | 16.14            | 16.62 | 16.92 | 17.40 | 18.33 | 16.14          | 16.62 | 16.92 | 17.40 | 18.33 |
|                 | 8H   | 16.29            | 16.74 | 17.08 | 17.52 | 18.46 | 16.29          | 16.74 | 17.08 | 17.52 | 18.46 |
|                 | 12H  | 16.37            | 16.77 | 17.17 | 17.57 | 18.51 | 16.37          | 16.77 | 17.17 | 17.57 | 18.51 |
| 8H              | 4H   | 15.79            | 16.24 | 16.58 | 17.02 | 17.96 | 15.79          | 16.24 | 16.58 | 17.02 | 17.96 |
|                 | 6H   | 16.47            | 16.84 | 17.29 | 17.66 | 18.60 | 16.47          | 16.84 | 17.29 | 17.66 | 18.60 |
|                 | 8H   | 16.70            | 17.02 | 17.53 | 17.85 | 18.80 | 16.70          | 17.02 | 17.53 | 17.85 | 18.80 |
|                 | 12H  | 16.83            | 17.11 | 17.66 | 17.92 | 18.94 | 16.83          | 17.11 | 17.66 | 17.92 | 18.94 |
| 12H             | 4H   | 15.78            | 16.18 | 16.59 | 16.99 | 17.93 | 15.78          | 16.18 | 16.59 | 16.99 | 17.93 |
|                 | 6H   | 16.50            | 16.82 | 17.33 | 17.65 | 18.60 | 16.50          | 16.82 | 17.33 | 17.65 | 18.60 |
|                 | 8H   | 16.76            | 17.04 | 17.58 | 17.85 | 18.87 | 16.76          | 17.04 | 17.58 | 17.85 | 18.87 |

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

Report Prepared for

Cooper Lighting Solutions

Metalux

Report Number: SP1-2506-472-1

Test Date: 07/30/2025

Luminaire Tested: EHBR-60-L840-N

Data in this report applies to families of products including EHBR-60-L840-N

**Test Information**

Test Method: LM-79-2019  
 Report Number: SP1-2506-472-1  
 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-L840-N**  
 Description: Elevate Round Highbay at, 60000 lumens, 4000K 80CRI LEDs with N lens

**Spectral Parameters**

CCT (K): 3898  
 CIE u': 0.2263  
 CIE v': 0.5052  
 Duv: 0.0013  
 CIE x: 0.3861  
 CIE y: 0.3831  
 CIE z: 0.2308  
 Peak Wavelength (nm): 630  
 Dominant Wavelength (nm): 578  
 Purity: 30.85729  
 Rf: 80.7  
 Rg: 102.1

|           |      |      |      |
|-----------|------|------|------|
| CRI (Ra): | 82.1 |      |      |
| R1:       | 84.4 | R9:  | 38.5 |
| R2:       | 83.5 | R10: | 58.9 |
| R3:       | 80.8 | R11: | 83.6 |
| R4:       | 83.9 | R12: | 54.2 |
| R5:       | 82.1 | R13: | 82.8 |
| R6:       | 77.3 | R14: | 88.2 |
| R7:       | 86.4 | R15: | 81.2 |
| R8:       | 78.3 |      |      |



**Test Conditions**  
 Stabilization Time: 42M  
 Operation Time: 1H 42M  
 Sphere Temperature (°C): 25.0

REPORT NUMBER: SP1-2506-472-1

| 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           |

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CIE 1931 Chromaticity Diagram



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



CCT = 3898K  
 CIE x = 0.3861  
 CIE y = 0.3831  
 Duv = 0.0013

Point lies inside the ANSI 4000K 4-step quadrangle

REPORT NUMBER: SP1-2506-472-1

**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    | 60                       | NR            | 620    | 277                      | NR            | 750    | 6                        | NR            | 880    | 0                        | NR            |
| 365    | 0                        | NR            | 495    | 87                       | NR            | 625    | 278                      | NR            | 755    | 5                        | NR            | 885    | 0                        | NR            |
| 370    | 0                        | NR            | 500    | 124                      | NR            | 630    | 1000                     | NR            | 760    | 4                        | NR            | 890    | 0                        | NR            |
| 375    | 0                        | NR            | 505    | 168                      | NR            | 635    | 623                      | NR            | 765    | 4                        | NR            | 895    | 0                        | NR            |
| 380    | 1                        | NR            | 510    | 209                      | NR            | 640    | 162                      | NR            | 770    | 3                        | NR            | 900    | 0                        | NR            |
| 385    | 1                        | NR            | 515    | 246                      | NR            | 645    | 158                      | NR            | 775    | 3                        | NR            | 905    | 0                        | NR            |
| 390    | 2                        | NR            | 520    | 273                      | NR            | 650    | 134                      | NR            | 780    | 2                        | NR            | 910    | 0                        | NR            |
| 395    | 4                        | NR            | 525    | 292                      | NR            | 655    | 109                      | NR            | 785    | 2                        | NR            | 915    | 0                        | NR            |
| 400    | 5                        | NR            | 530    | 305                      | NR            | 660    | 91                       | NR            | 790    | 2                        | NR            | 920    | 0                        | NR            |
| 405    | 7                        | NR            | 535    | 313                      | NR            | 665    | 75                       | NR            | 795    | 2                        | NR            | 925    | 0                        | NR            |
| 410    | 11                       | NR            | 540    | 319                      | NR            | 670    | 70                       | NR            | 800    | 1                        | NR            | 930    | 0                        | NR            |
| 415    | 21                       | NR            | 545    | 323                      | NR            | 675    | 56                       | NR            | 805    | 1                        | NR            | 935    | 0                        | NR            |
| 420    | 42                       | NR            | 550    | 326                      | NR            | 680    | 47                       | NR            | 810    | 1                        | NR            | 940    | 0                        | NR            |
| 425    | 76                       | NR            | 555    | 330                      | NR            | 685    | 41                       | NR            | 815    | 1                        | NR            | 945    | 0                        | NR            |
| 430    | 125                      | NR            | 560    | 333                      | NR            | 690    | 35                       | NR            | 820    | 1                        | NR            | 950    | 0                        | NR            |
| 435    | 193                      | NR            | 565    | 336                      | NR            | 695    | 30                       | NR            | 825    | 1                        | NR            | 955    | 0                        | NR            |
| 440    | 302                      | NR            | 570    | 336                      | NR            | 700    | 26                       | NR            | 830    | 1                        | NR            | 960    | 0                        | NR            |
| 445    | 432                      | NR            | 575    | 335                      | NR            | 705    | 22                       | NR            | 835    | 1                        | NR            | 965    | 0                        | NR            |
| 450    | 380                      | NR            | 580    | 332                      | NR            | 710    | 19                       | NR            | 840    | 0                        | NR            | 970    | 0                        | NR            |
| 455    | 213                      | NR            | 585    | 326                      | NR            | 715    | 16                       | NR            | 845    | 0                        | NR            | 975    | 0                        | NR            |
| 460    | 147                      | NR            | 590    | 319                      | NR            | 720    | 14                       | NR            | 850    | 0                        | NR            | 980    | 0                        | NR            |
| 465    | 104                      | NR            | 595    | 307                      | NR            | 725    | 12                       | NR            | 855    | 0                        | NR            | 985    | 0                        | NR            |
| 470    | 65                       | NR            | 600    | 299                      | NR            | 730    | 10                       | NR            | 860    | 0                        | NR            | 990    | 0                        | NR            |
| 475    | 50                       | NR            | 605    | 291                      | NR            | 735    | 9                        | NR            | 865    | 0                        | NR            | 995    | 0                        | NR            |
| 480    | 46                       | NR            | 610    | 317                      | NR            | 740    | 8                        | NR            | 870    | 0                        | NR            | 1000   | 0                        | NR            |
| 485    | 47                       | NR            | 615    | 336                      | NR            | 745    | 7                        | NR            | 875    | 0                        | NR            |        |                          |               |

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**Scotopic Flux vs. Wavelength**



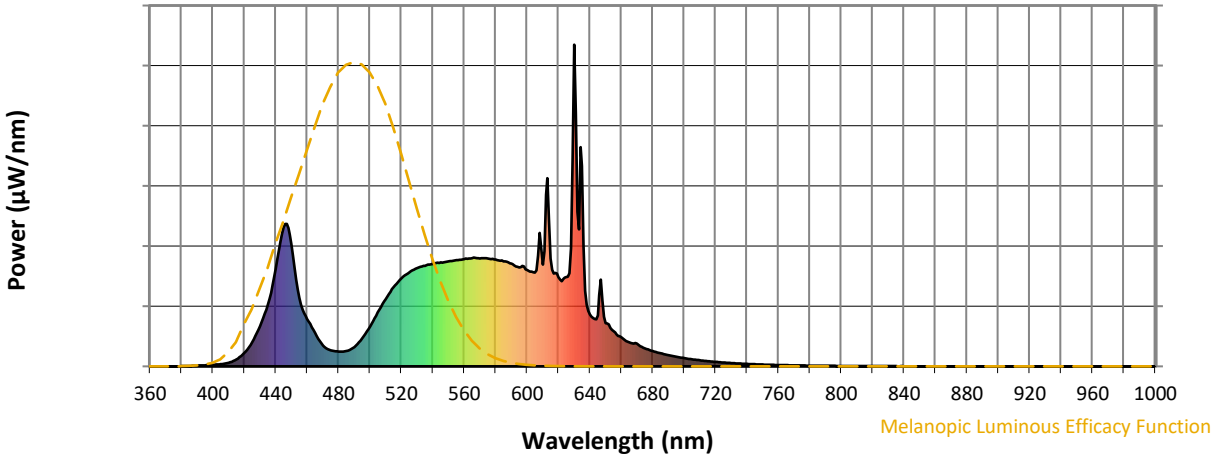
**Scotopic Lumens: NR**

**S/P: 1.55**

| 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    | 60                       | NR            | 620    | 277                      | NR            | 750    | 6                        | NR            | 880    | 0                        | NR            |
| 365    | 0                        | NR            | 495    | 87                       | NR            | 625    | 278                      | NR            | 755    | 5                        | NR            | 885    | 0                        | NR            |
| 370    | 0                        | NR            | 500    | 124                      | NR            | 630    | 1000                     | NR            | 760    | 4                        | NR            | 890    | 0                        | NR            |
| 375    | 0                        | NR            | 505    | 168                      | NR            | 635    | 623                      | NR            | 765    | 4                        | NR            | 895    | 0                        | NR            |
| 380    | 1                        | NR            | 510    | 209                      | NR            | 640    | 162                      | NR            | 770    | 3                        | NR            | 900    | 0                        | NR            |
| 385    | 1                        | NR            | 515    | 246                      | NR            | 645    | 158                      | NR            | 775    | 3                        | NR            | 905    | 0                        | NR            |
| 390    | 2                        | NR            | 520    | 273                      | NR            | 650    | 134                      | NR            | 780    | 2                        | NR            | 910    | 0                        | NR            |
| 395    | 4                        | NR            | 525    | 292                      | NR            | 655    | 109                      | NR            | 785    | 2                        | NR            | 915    | 0                        | NR            |
| 400    | 5                        | NR            | 530    | 305                      | NR            | 660    | 91                       | NR            | 790    | 2                        | NR            | 920    | 0                        | NR            |
| 405    | 7                        | NR            | 535    | 313                      | NR            | 665    | 75                       | NR            | 795    | 2                        | NR            | 925    | 0                        | NR            |
| 410    | 11                       | NR            | 540    | 319                      | NR            | 670    | 70                       | NR            | 800    | 1                        | NR            | 930    | 0                        | NR            |
| 415    | 21                       | NR            | 545    | 323                      | NR            | 675    | 56                       | NR            | 805    | 1                        | NR            | 935    | 0                        | NR            |
| 420    | 42                       | NR            | 550    | 326                      | NR            | 680    | 47                       | NR            | 810    | 1                        | NR            | 940    | 0                        | NR            |
| 425    | 76                       | NR            | 555    | 330                      | NR            | 685    | 41                       | NR            | 815    | 1                        | NR            | 945    | 0                        | NR            |
| 430    | 125                      | NR            | 560    | 333                      | NR            | 690    | 35                       | NR            | 820    | 1                        | NR            | 950    | 0                        | NR            |
| 435    | 193                      | NR            | 565    | 336                      | NR            | 695    | 30                       | NR            | 825    | 1                        | NR            | 955    | 0                        | NR            |
| 440    | 302                      | NR            | 570    | 336                      | NR            | 700    | 26                       | NR            | 830    | 1                        | NR            | 960    | 0                        | NR            |
| 445    | 432                      | NR            | 575    | 335                      | NR            | 705    | 22                       | NR            | 835    | 1                        | NR            | 965    | 0                        | NR            |
| 450    | 380                      | NR            | 580    | 332                      | NR            | 710    | 19                       | NR            | 840    | 0                        | NR            | 970    | 0                        | NR            |
| 455    | 213                      | NR            | 585    | 326                      | NR            | 715    | 16                       | NR            | 845    | 0                        | NR            | 975    | 0                        | NR            |
| 460    | 147                      | NR            | 590    | 319                      | NR            | 720    | 14                       | NR            | 850    | 0                        | NR            | 980    | 0                        | NR            |
| 465    | 104                      | NR            | 595    | 307                      | NR            | 725    | 12                       | NR            | 855    | 0                        | NR            | 985    | 0                        | NR            |
| 470    | 65                       | NR            | 600    | 299                      | NR            | 730    | 10                       | NR            | 860    | 0                        | NR            | 990    | 0                        | NR            |
| 475    | 50                       | NR            | 605    | 291                      | NR            | 735    | 9                        | NR            | 865    | 0                        | NR            | 995    | 0                        | NR            |
| 480    | 46                       | NR            | 610    | 317                      | NR            | 740    | 8                        | NR            | 870    | 0                        | NR            | 1000   | 0                        | NR            |
| 485    | 47                       | NR            | 615    | 336                      | NR            | 745    | 7                        | NR            | 875    | 0                        | NR            |        |                          |               |

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Melanopic Flux vs. Wavelength



Melanopic Lumens: NR

M/P: 2.99

| $\lambda$ (nm) | Power $\text{W}^{\wedge}/\text{nm}$ | Lumens ( $\phi/\text{nm}$ ) | $\lambda$ (nm) | Power $\text{W}^{\wedge}/\text{nm}$ | Lumens ( $\phi/\text{nm}$ ) | $\lambda$ (nm) | Power $\text{W}^{\wedge}/\text{nm}$ | Lumens ( $\phi/\text{nm}$ ) | $\lambda$ (nm) | Power $\text{W}^{\wedge}/\text{nm}$ | Lumens ( $\phi/\text{nm}$ ) | $\lambda$ (nm) | Power $\text{W}^{\wedge}/\text{nm}$ | Lumens ( $\phi/\text{nm}$ ) |
|----------------|-------------------------------------|-----------------------------|----------------|-------------------------------------|-----------------------------|----------------|-------------------------------------|-----------------------------|----------------|-------------------------------------|-----------------------------|----------------|-------------------------------------|-----------------------------|
| 360            | 0                                   | NR                          | 490            | 60                                  | NR                          | 620            | 277                                 | NR                          | 750            | 6                                   | NR                          | 880            | 0                                   | NR                          |
| 365            | 0                                   | NR                          | 495            | 87                                  | NR                          | 625            | 278                                 | NR                          | 755            | 5                                   | NR                          | 885            | 0                                   | NR                          |
| 370            | 0                                   | NR                          | 500            | 124                                 | NR                          | 630            | 1000                                | NR                          | 760            | 4                                   | NR                          | 890            | 0                                   | NR                          |
| 375            | 0                                   | NR                          | 505            | 168                                 | NR                          | 635            | 623                                 | NR                          | 765            | 4                                   | NR                          | 895            | 0                                   | NR                          |
| 380            | 1                                   | NR                          | 510            | 209                                 | NR                          | 640            | 162                                 | NR                          | 770            | 3                                   | NR                          | 900            | 0                                   | NR                          |
| 385            | 1                                   | NR                          | 515            | 246                                 | NR                          | 645            | 158                                 | NR                          | 775            | 3                                   | NR                          | 905            | 0                                   | NR                          |
| 390            | 2                                   | NR                          | 520            | 273                                 | NR                          | 650            | 134                                 | NR                          | 780            | 2                                   | NR                          | 910            | 0                                   | NR                          |
| 395            | 4                                   | NR                          | 525            | 292                                 | NR                          | 655            | 109                                 | NR                          | 785            | 2                                   | NR                          | 915            | 0                                   | NR                          |
| 400            | 5                                   | NR                          | 530            | 305                                 | NR                          | 660            | 91                                  | NR                          | 790            | 2                                   | NR                          | 920            | 0                                   | NR                          |
| 405            | 7                                   | NR                          | 535            | 313                                 | NR                          | 665            | 75                                  | NR                          | 795            | 2                                   | NR                          | 925            | 0                                   | NR                          |
| 410            | 11                                  | NR                          | 540            | 319                                 | NR                          | 670            | 70                                  | NR                          | 800            | 1                                   | NR                          | 930            | 0                                   | NR                          |
| 415            | 21                                  | NR                          | 545            | 323                                 | NR                          | 675            | 56                                  | NR                          | 805            | 1                                   | NR                          | 935            | 0                                   | NR                          |
| 420            | 42                                  | NR                          | 550            | 326                                 | NR                          | 680            | 47                                  | NR                          | 810            | 1                                   | NR                          | 940            | 0                                   | NR                          |
| 425            | 76                                  | NR                          | 555            | 330                                 | NR                          | 685            | 41                                  | NR                          | 815            | 1                                   | NR                          | 945            | 0                                   | NR                          |
| 430            | 125                                 | NR                          | 560            | 333                                 | NR                          | 690            | 35                                  | NR                          | 820            | 1                                   | NR                          | 950            | 0                                   | NR                          |
| 435            | 193                                 | NR                          | 565            | 336                                 | NR                          | 695            | 30                                  | NR                          | 825            | 1                                   | NR                          | 955            | 0                                   | NR                          |
| 440            | 302                                 | NR                          | 570            | 336                                 | NR                          | 700            | 26                                  | NR                          | 830            | 1                                   | NR                          | 960            | 0                                   | NR                          |
| 445            | 432                                 | NR                          | 575            | 335                                 | NR                          | 705            | 22                                  | NR                          | 835            | 1                                   | NR                          | 965            | 0                                   | NR                          |
| 450            | 380                                 | NR                          | 580            | 332                                 | NR                          | 710            | 19                                  | NR                          | 840            | 0                                   | NR                          | 970            | 0                                   | NR                          |
| 455            | 213                                 | NR                          | 585            | 326                                 | NR                          | 715            | 16                                  | NR                          | 845            | 0                                   | NR                          | 975            | 0                                   | NR                          |
| 460            | 147                                 | NR                          | 590            | 319                                 | NR                          | 720            | 14                                  | NR                          | 850            | 0                                   | NR                          | 980            | 0                                   | NR                          |
| 465            | 104                                 | NR                          | 595            | 307                                 | NR                          | 725            | 12                                  | NR                          | 855            | 0                                   | NR                          | 985            | 0                                   | NR                          |
| 470            | 65                                  | NR                          | 600            | 299                                 | NR                          | 730            | 10                                  | NR                          | 860            | 0                                   | NR                          | 990            | 0                                   | NR                          |
| 475            | 50                                  | NR                          | 605            | 291                                 | NR                          | 735            | 9                                   | NR                          | 865            | 0                                   | NR                          | 995            | 0                                   | NR                          |
| 480            | 46                                  | NR                          | 610            | 317                                 | NR                          | 740            | 8                                   | NR                          | 870            | 0                                   | NR                          | 1000           | 0                                   | NR                          |
| 485            | 47                                  | NR                          | 615            | 336                                 | NR                          | 745            | 7                                   | NR                          | 875            | 0                                   | NR                          |                |                                     |                             |

**Summary**

$R_f = 80.7$   
 $R_g = 102.1$   
 CIE  $R_a = 82.1$   
 $R_9 = 38.5$



**Color Vector Graphics**



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

|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 85 | CES26 = 69 | CES51 = 90 | CES76 = 58 |
| CES02 = 61 | CES27 = 89 | CES52 = 90 | CES77 = 76 |
| CES03 = 31 | CES28 = 83 | CES53 = 80 | CES78 = 60 |
| CES04 = 69 | CES29 = 66 | CES54 = 91 | CES79 = 85 |
| CES05 = 48 | CES30 = 76 | CES55 = 89 | CES80 = 79 |
| CES06 = 50 | CES31 = 69 | CES56 = 79 | CES81 = 81 |
| CES07 = 41 | CES32 = 62 | CES57 = 77 | CES82 = 91 |
| CES08 = 40 | CES33 = 74 | CES58 = 79 | CES83 = 88 |
| CES09 = 29 | CES34 = 72 | CES59 = 93 | CES84 = 89 |
| CES10 = 74 | CES35 = 84 | CES60 = 95 | CES85 = 84 |
| CES11 = 57 | CES36 = 98 | CES61 = 92 | CES86 = 82 |
| CES12 = 63 | CES37 = 77 | CES62 = 89 | CES87 = 81 |
| CES13 = 43 | CES38 = 83 | CES63 = 80 | CES88 = 86 |
| CES14 = 74 | CES39 = 94 | CES64 = 80 | CES89 = 79 |
| CES15 = 71 | CES40 = 88 | CES65 = 77 | CES90 = 85 |
| CES16 = 47 | CES41 = 89 | CES66 = 74 | CES91 = 83 |
| CES17 = 49 | CES42 = 74 | CES67 = 72 | CES92 = 77 |
| CES18 = 56 | CES43 = 73 | CES68 = 78 | CES93 = 86 |
| CES19 = 71 | CES44 = 98 | CES69 = 83 | CES94 = 69 |
| CES20 = 65 | CES45 = 82 | CES70 = 69 | CES95 = 80 |
| CES21 = 86 | CES46 = 82 | CES71 = 64 | CES96 = 86 |
| CES22 = 78 | CES47 = 80 | CES72 = 88 | CES97 = 83 |
| CES23 = 91 | CES48 = 79 | CES73 = 60 | CES98 = 81 |
| CES24 = 90 | CES49 = 80 | CES74 = 98 | CES99 = 83 |
| CES25 = 71 | CES50 = 89 | CES75 = 62 |            |



Color Rendition by Hue-Angle Bin



Measure Comparisons



(END OF REPORT)