

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: P1432540

Luminaire Tested: EHBR1-60-UNV-W-L830-UPL15

Issue Date: 3/20/2026

**Test Information**

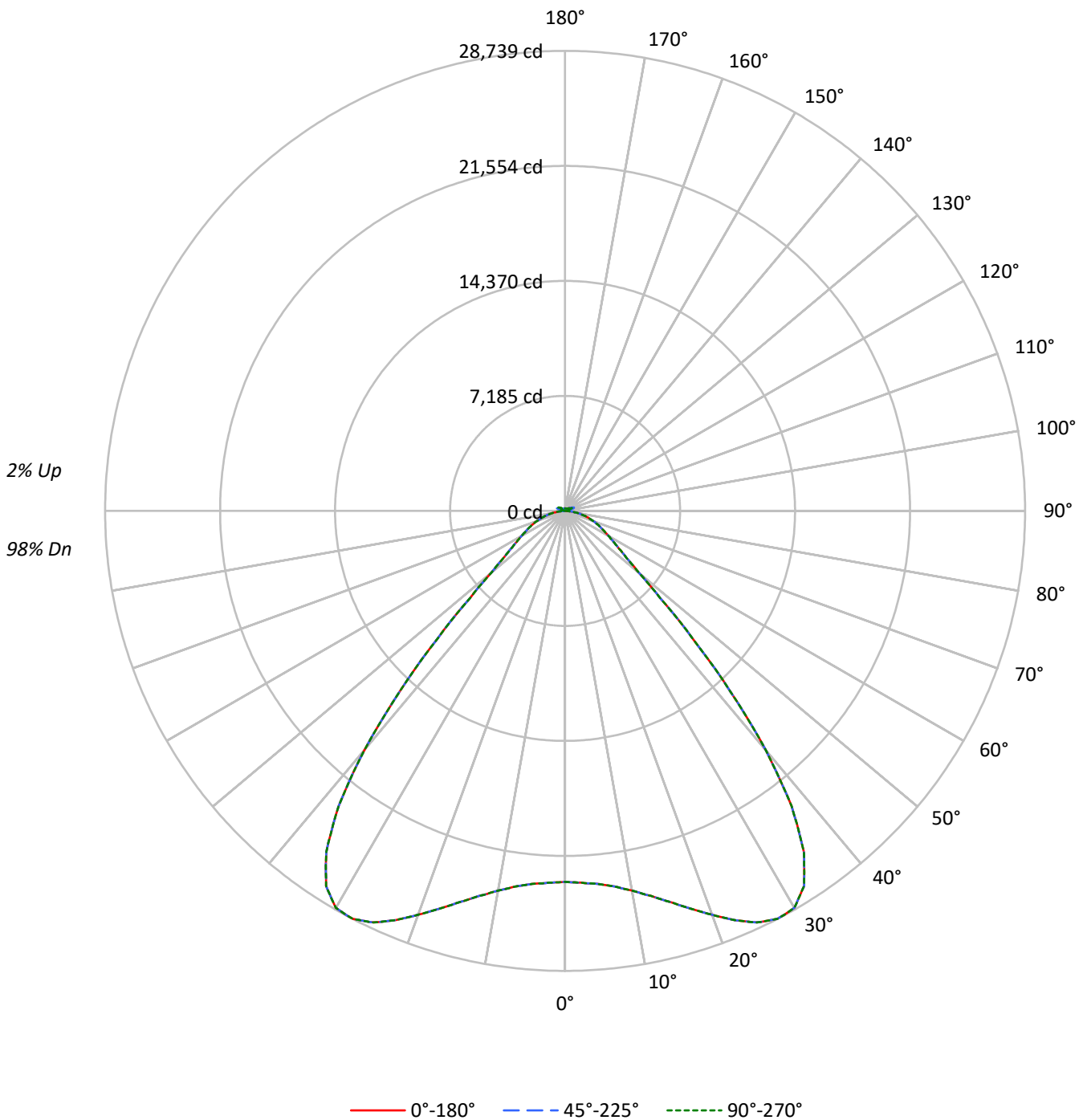
Test Method: LM-79-2019  
Report Number: P1432540  
REPORT IS A COMBINATION OF REPORTS P1431917 AND P1431635  
Test Lab: INNOVATION CENTER  
Issue Date: 3/20/2026  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: METALUX  
Catalog Number: EHBR1-60-UNV-W-L830-UPL15  
Description: Elevate Round Highbay at, 60000 lumens, 3000K 80CRI LEDs with W lens  
Light Source: -  
Ballast/Driver: -

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 56780.1 lumens  
Efficiency: N/A  
Efficacy: 167.1 lumens/watt  
Spacing Criteria (0/90/45): 1.54 / 1.54 / 1.31  
Luminous Opening: Vertical Cylinder (Dia: 1.71' x H: 0.1')  
CIE Type: Direct  
  
Input Watts (W): 339.7  
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: P1432540  
CATALOG NUMBER: EHBR1-60-UNV-W-L830-UPL15

### Luminous Intensity Polar Plot





TEST NUMBER: P1432540

CATALOG NUMBER: EHBR1-60-UNV-W-L830-UPL15

**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   | 118 | 118 | 118 | 118 | 115 | 115 | 115 | 115 | 110 | 110 | 110 | 105 | 105 | 105 | 100 | 100 | 100 | 100 | 100 | 100 | 98 |
| 1   | 111 | 107 | 104 | 101 | 108 | 104 | 101 | 99  | 100 | 97  | 95  | 96  | 94  | 92  | 92  | 90  | 89  | 89  | 89  | 89  | 87 |
| 2   | 103 | 96  | 91  | 86  | 100 | 94  | 89  | 85  | 90  | 86  | 83  | 87  | 84  | 81  | 84  | 81  | 79  | 79  | 79  | 79  | 77 |
| 3   | 96  | 87  | 80  | 75  | 93  | 85  | 79  | 74  | 82  | 77  | 73  | 79  | 75  | 71  | 76  | 73  | 70  | 70  | 70  | 70  | 68 |
| 4   | 89  | 79  | 72  | 66  | 87  | 77  | 71  | 65  | 75  | 69  | 64  | 72  | 67  | 63  | 70  | 66  | 62  | 62  | 62  | 62  | 60 |
| 5   | 83  | 72  | 64  | 59  | 81  | 71  | 63  | 58  | 68  | 62  | 57  | 66  | 61  | 57  | 64  | 60  | 56  | 56  | 56  | 56  | 54 |
| 6   | 77  | 66  | 58  | 52  | 75  | 65  | 57  | 52  | 63  | 56  | 51  | 61  | 55  | 51  | 59  | 54  | 50  | 50  | 50  | 50  | 48 |
| 7   | 72  | 60  | 52  | 47  | 70  | 59  | 52  | 47  | 58  | 51  | 46  | 56  | 50  | 46  | 55  | 49  | 46  | 46  | 46  | 46  | 44 |
| 8   | 67  | 55  | 48  | 43  | 66  | 55  | 47  | 42  | 53  | 47  | 42  | 52  | 46  | 42  | 50  | 45  | 41  | 41  | 41  | 41  | 40 |
| 9   | 63  | 51  | 44  | 39  | 62  | 50  | 43  | 39  | 49  | 43  | 38  | 48  | 42  | 38  | 47  | 42  | 38  | 38  | 38  | 38  | 36 |
| 10  | 59  | 47  | 40  | 35  | 58  | 47  | 40  | 35  | 46  | 39  | 35  | 45  | 39  | 35  | 44  | 38  | 35  | 35  | 35  | 35  | 33 |

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

|     | 0°     | 45°    | 90°    |
|-----|--------|--------|--------|
| 0°  | 108826 | 108826 | 108826 |
| 5°  | 109549 | 109549 | 109549 |
| 10° | 113355 | 113355 | 113355 |
| 15° | 120538 | 120538 | 120538 |
| 20° | 130666 | 130666 | 130666 |
| 25° | 142047 | 142047 | 142047 |
| 30° | 148889 | 148889 | 148889 |
| 35° | 141718 | 141718 | 141718 |
| 40° | 112453 | 112453 | 112453 |
| 45° | 69506  | 69506  | 69506  |
| 50° | 40248  | 40248  | 40248  |
| 55° | 30451  | 30451  | 30451  |
| 60° | 26122  | 26122  | 26122  |
| 65° | 23593  | 23593  | 23593  |
| 70° | 21704  | 21704  | 21704  |
| 75° | 19174  | 19174  | 19174  |
| 80° | 15627  | 15627  | 15627  |
| 85° | 9212   | 9212   | 9212   |

**MAXIMUM LUMINANCE 45°-90°:**

Horizontal Angle: 0°  
 Vertical Angle: 45°  
 Luminance: 69506 cd/sqm



TEST NUMBER: P1432540  
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**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 2254.7  | 4.0       |
| 10°-20°   | 7228.3  | 12.7      |
| 20°-30°   | 13047.4 | 23.0      |
| 30°-40°   | 15766.4 | 27.8      |
| 40°-50°   | 9007.8  | 15.9      |
| 50°-60°   | 3815.1  | 6.7       |
| 60°-70°   | 2460.7  | 4.3       |
| 70°-80°   | 1430.8  | 2.5       |
| 80°-90°   | 381.1   | 0.7       |
| 90°-100°  | 40.4    | 0.1       |
| 100°-110° | 243.8   | 0.4       |
| 110°-120° | 434.9   | 0.8       |
| 120°-130° | 256.7   | 0.5       |
| 130°-140° | 161.2   | 0.3       |
| 140°-150° | 115.3   | 0.2       |
| 150°-160° | 76.4    | 0.1       |
| 160°-170° | 44.4    | 0.1       |
| 170°-180° | 14.8    | 0.0       |
| 0°-30°    | 22530.3 | 39.7      |
| 0°-40°    | 38296.7 | 67.4      |
| 0°-60°    | 51119.7 | 90.0      |
| 0°-90°    | 55392.3 | 97.6      |
| 90°-120°  | 719.1   | 1.3       |
| 90°-150°  | 1252.3  | 2.2       |
| 90°-180°  | 1388.0  | 2.4       |
| 0°-180°   | 56780.1 | 100.0     |

**CANDELA DISTRIBUTION:**

|      | 0°    | 22.5° | 45°   | 67.5° | 90°   | Flux  |
|------|-------|-------|-------|-------|-------|-------|
| 0°   | 23174 | 23174 | 23174 | 23174 | 23174 |       |
| 5°   | 23390 | 23390 | 23390 | 23390 | 23390 | 2255  |
| 15°  | 25288 | 25288 | 25288 | 25288 | 25288 | 7228  |
| 25°  | 28367 | 28367 | 28367 | 28367 | 28367 | 13047 |
| 35°  | 26010 | 26010 | 26010 | 26010 | 26010 | 15766 |
| 45°  | 11246 | 11246 | 11246 | 11246 | 11246 | 9008  |
| 55°  | 4115  | 4115  | 4115  | 4115  | 4115  | 3815  |
| 65°  | 2463  | 2463  | 2463  | 2463  | 2463  | 2461  |
| 75°  | 1351  | 1351  | 1351  | 1351  | 1351  | 1431  |
| 85°  | 317   | 317   | 317   | 317   | 317   | 365   |
| 90°  | 12    | 18    | 30    | 20    | 12    | 19    |
| 95°  | 19    | 30    | 65    | 33    | 21    | 18    |
| 105° | 86    | 168   | 427   | 185   | 113   | 115   |
| 115° | 392   | 412   | 505   | 484   | 481   | 361   |
| 125° | 284   | 266   | 272   | 276   | 310   | 259   |
| 135° | 212   | 206   | 212   | 200   | 199   | 166   |
| 145° | 180   | 178   | 188   | 186   | 185   | 114   |
| 155° | 161   | 159   | 166   | 166   | 166   | 75    |
| 165° | 154   | 154   | 158   | 158   | 157   | 44    |
| 175° | 154   | 154   | 156   | 156   | 156   | 15    |
| 180° | 156   | 156   | 156   | 156   | 156   |       |



TEST NUMBER: P1432540

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**CANDELA DISTRIBUTION (FULL):**

|        | 0°      | 22.5°   | 45°     | 67.5°   | 90°     |
|--------|---------|---------|---------|---------|---------|
| 0°     | 23173.8 | 23173.8 | 23173.8 | 23173.8 | 23173.8 |
| 2.5°   | 23251.6 | 23251.6 | 23251.6 | 23251.6 | 23251.6 |
| 5°     | 23390.5 | 23390.5 | 23390.5 | 23390.5 | 23390.5 |
| 7.5°   | 23663.5 | 23663.5 | 23663.5 | 23663.5 | 23663.5 |
| 10°    | 24083.9 | 24083.9 | 24083.9 | 24083.9 | 24083.9 |
| 12.5°  | 24630.1 | 24630.1 | 24630.1 | 24630.1 | 24630.1 |
| 15°    | 25288.3 | 25288.3 | 25288.3 | 25288.3 | 25288.3 |
| 17.5°  | 26041.9 | 26041.9 | 26041.9 | 26041.9 | 26041.9 |
| 20°    | 26855.7 | 26855.7 | 26855.7 | 26855.7 | 26855.7 |
| 22.5°  | 27675.1 | 27675.1 | 27675.1 | 27675.1 | 27675.1 |
| 25°    | 28366.6 | 28366.6 | 28366.6 | 28366.6 | 28366.6 |
| 27.5°  | 28738.8 | 28738.8 | 28738.8 | 28738.8 | 28738.8 |
| 30°    | 28638.8 | 28638.8 | 28638.8 | 28638.8 | 28638.8 |
| 32.5°  | 27789.9 | 27789.9 | 27789.9 | 27789.9 | 27789.9 |
| 35°    | 26010.4 | 26010.4 | 26010.4 | 26010.4 | 26010.4 |
| 37.5°  | 23235.8 | 23235.8 | 23235.8 | 23235.8 | 23235.8 |
| 40°    | 19490.9 | 19490.9 | 19490.9 | 19490.9 | 19490.9 |
| 42.5°  | 15255.4 | 15255.4 | 15255.4 | 15255.4 | 15255.4 |
| 45°    | 11245.8 | 11245.8 | 11245.8 | 11245.8 | 11245.8 |
| 47.5°  | 8037.8  | 8037.8  | 8037.8  | 8037.8  | 8037.8  |
| 50°    | 5998.3  | 5998.3  | 5998.3  | 5998.3  | 5998.3  |
| 52.5°  | 4856.7  | 4856.7  | 4856.7  | 4856.7  | 4856.7  |
| 55°    | 4115.2  | 4115.2  | 4115.2  | 4115.2  | 4115.2  |
| 57.5°  | 3573.6  | 3573.6  | 3573.6  | 3573.6  | 3573.6  |
| 60°    | 3140.3  | 3140.3  | 3140.3  | 3140.3  | 3140.3  |
| 62.5°  | 2779.3  | 2779.3  | 2779.3  | 2779.3  | 2779.3  |
| 65°    | 2462.6  | 2462.6  | 2462.6  | 2462.6  | 2462.6  |
| 67.5°  | 2183.0  | 2183.0  | 2183.0  | 2183.0  | 2183.0  |
| 70°    | 1904.4  | 1904.4  | 1904.4  | 1904.4  | 1904.4  |
| 72.5°  | 1626.6  | 1626.6  | 1626.6  | 1626.6  | 1626.6  |
| 75°    | 1350.7  | 1350.7  | 1350.7  | 1350.7  | 1350.7  |
| 77.5°  | 1085.1  | 1085.1  | 1085.1  | 1085.1  | 1085.1  |
| 80°    | 822.1   | 822.1   | 822.1   | 822.1   | 822.1   |
| 82.5°  | 563.8   | 563.8   | 563.8   | 563.8   | 563.8   |
| 85°    | 316.6   | 316.6   | 316.6   | 316.6   | 316.6   |
| 87.5°  | 99.9    | 99.9    | 99.9    | 99.9    | 99.9    |
| 90°    | 11.9    | 18.2    | 29.8    | 19.7    | 11.9    |
| 92.5°  | 15.6    | 25.8    | 45.8    | 24.2    | 14.1    |
| 95°    | 18.9    | 30.5    | 64.6    | 32.9    | 21.3    |
| 97.5°  | 23.5    | 33.6    | 73.9    | 39.8    | 32.0    |
| 100°   | 30.5    | 39.1    | 114.2   | 48.3    | 42.2    |
| 102.5° | 50.7    | 80.8    | 240.4   | 89.4    | 63.0    |
| 105°   | 86.3    | 168.3   | 427.0   | 185.4   | 113.3   |
| 107.5° | 148.2   | 299.9   | 562.5   | 327.1   | 213.3   |
| 110°   | 276.1   | 398.5   | 590.5   | 449.5   | 341.1   |



TEST NUMBER: P1432540  
 CATALOG NUMBER: EHBR1-60-UNV-W-L830-UPL15

**CANDELA DISTRIBUTION (continued):**

|        | 0°    | 22.5° | 45°   | 67.5° | 90°   |
|--------|-------|-------|-------|-------|-------|
| 112.5° | 372.2 | 427.9 | 565.7 | 496.0 | 443.3 |
| 115°   | 391.5 | 411.6 | 505.4 | 484.4 | 481.3 |
| 117.5° | 378.3 | 376.0 | 429.5 | 435.7 | 465.1 |
| 120°   | 350.4 | 335.0 | 358.9 | 380.7 | 420.1 |
| 122.5° | 315.6 | 297.0 | 307.9 | 324.1 | 363.6 |
| 125°   | 284.0 | 265.5 | 272.4 | 276.3 | 309.6 |
| 127.5° | 255.3 | 243.0 | 246.9 | 242.2 | 263.1 |
| 130°   | 236.9 | 226.0 | 231.5 | 220.6 | 230.7 |
| 132.5° | 222.5 | 215.5 | 221.7 | 208.5 | 211.6 |
| 135°   | 211.8 | 205.6 | 212.5 | 200.2 | 199.4 |
| 137.5° | 202.7 | 197.3 | 204.2 | 194.9 | 192.6 |
| 140°   | 195.3 | 190.6 | 198.4 | 191.4 | 189.9 |
| 142.5° | 186.1 | 183.0 | 192.3 | 187.7 | 186.1 |
| 145°   | 180.0 | 177.7 | 187.7 | 185.5 | 184.6 |
| 147.5° | 174.8 | 173.2 | 182.5 | 181.7 | 181.7 |
| 150°   | 169.4 | 167.8 | 177.0 | 176.3 | 177.0 |
| 152.5° | 163.9 | 162.3 | 170.9 | 170.1 | 170.9 |
| 155°   | 161.0 | 159.4 | 166.4 | 166.4 | 166.4 |
| 157.5° | 157.8 | 157.1 | 162.5 | 162.5 | 162.5 |
| 160°   | 156.5 | 155.7 | 160.4 | 160.4 | 159.6 |
| 162.5° | 155.1 | 154.4 | 159.7 | 159.0 | 159.0 |
| 165°   | 153.5 | 153.5 | 157.5 | 157.5 | 156.6 |
| 167.5° | 153.5 | 152.8 | 156.6 | 156.6 | 155.9 |
| 170°   | 152.8 | 152.8 | 155.9 | 155.1 | 154.4 |
| 172.5° | 153.7 | 153.7 | 156.8 | 156.1 | 155.3 |
| 175°   | 153.9 | 153.9 | 156.2 | 156.2 | 156.2 |
| 177.5° | 154.7 | 154.7 | 156.2 | 156.2 | 155.4 |
| 180°   | 156.3 | 156.3 | 156.3 | 156.3 | 156.3 |



TEST NUMBER: P1432540  
 CATALOG NUMBER: EHBR1-60-UNV-W-L830-UPL15

**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 | 20.58            | 21.85 | 20.99 | 22.22 | 22.60 | 20.58          | 21.85 | 20.99 | 22.22 | 22.60 |
|                 | 3H   | 22.09            | 23.21 | 22.51 | 23.60 | 24.02 | 22.09          | 23.21 | 22.51 | 23.60 | 24.02 |
|                 | 4H   | 22.65            | 23.70 | 23.10 | 24.10 | 24.55 | 22.65          | 23.70 | 23.10 | 24.10 | 24.55 |
|                 | 6H   | 23.04            | 24.00 | 23.50 | 24.42 | 24.88 | 23.04          | 24.00 | 23.50 | 24.42 | 24.88 |
|                 | 8H   | 23.14            | 24.05 | 23.61 | 24.49 | 24.96 | 23.14          | 24.05 | 23.61 | 24.49 | 24.96 |
|                 | 12H  | 23.18            | 24.05 | 23.65 | 24.48 | 24.97 | 23.18          | 24.05 | 23.65 | 24.48 | 24.97 |
| 4H              | 2H   | 21.03            | 22.08 | 21.48 | 22.49 | 22.93 | 21.03          | 22.08 | 21.48 | 22.49 | 22.93 |
|                 | 3H   | 22.76            | 23.62 | 23.21 | 24.07 | 24.54 | 22.76          | 23.62 | 23.21 | 24.07 | 24.54 |
|                 | 4H   | 23.44            | 24.21 | 23.92 | 24.68 | 25.18 | 23.44          | 24.21 | 23.92 | 24.68 | 25.18 |
|                 | 6H   | 23.94            | 24.60 | 24.44 | 25.10 | 25.62 | 23.94          | 24.60 | 24.44 | 25.10 | 25.62 |
|                 | 8H   | 24.07            | 24.69 | 24.58 | 25.19 | 25.71 | 24.07          | 24.69 | 24.58 | 25.19 | 25.71 |
|                 | 12H  | 24.13            | 24.68 | 24.66 | 25.21 | 25.74 | 24.13          | 24.68 | 24.66 | 25.21 | 25.74 |
| 8H              | 4H   | 23.64            | 24.27 | 24.15 | 24.76 | 25.29 | 23.64          | 24.27 | 24.15 | 24.76 | 25.29 |
|                 | 6H   | 24.24            | 24.75 | 24.78 | 25.29 | 25.83 | 24.24          | 24.75 | 24.78 | 25.29 | 25.83 |
|                 | 8H   | 24.43            | 24.88 | 24.99 | 25.44 | 25.99 | 24.43          | 24.88 | 24.99 | 25.44 | 25.99 |
|                 | 12H  | 24.54            | 24.94 | 25.09 | 25.48 | 26.10 | 24.54          | 24.94 | 25.09 | 25.48 | 26.10 |
| 12H             | 4H   | 23.64            | 24.19 | 24.17 | 24.72 | 25.25 | 23.64          | 24.19 | 24.17 | 24.72 | 25.25 |
|                 | 6H   | 24.26            | 24.71 | 24.82 | 25.27 | 25.82 | 24.26          | 24.71 | 24.82 | 25.27 | 25.82 |
|                 | 8H   | 24.48            | 24.89 | 25.04 | 25.42 | 26.05 | 24.48          | 24.89 | 25.04 | 25.42 | 26.05 |

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

Report Prepared for

Cooper Lighting Solutions

Metalux

Report Number: SP1-2506-472-2

Test Date: 07/31/2025

Luminaire Tested: EHBR-60-L830-N

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

**Test Information**

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

**Spectral Parameters**

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

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



**Test Conditions**

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

REPORT NUMBER: SP1-2506-472-2

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

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CIE 1931 Chromaticity Diagram



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



Point lies inside the ANSI 3000K 4-step quadrangle

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

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**Scotopic Flux vs. Wavelength**



**Scotopic Lumens: NR**

**S/P: 1.27**

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

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**Melanopic Flux vs. Wavelength**



**Melanopic Lumens: NR**

**M/P: 2.34**

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

**Summary**

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



**Color Vector Graphics**

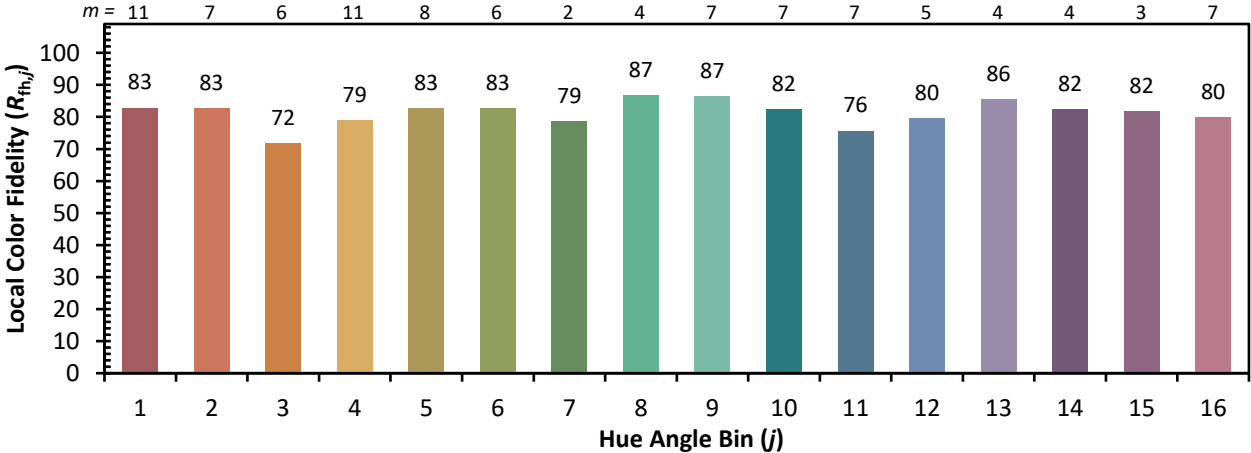


**Individual Sample Fidelity Index ( $R_{f,i}$ )**

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



Color Rendition by Hue-Angle Bin



Measure Comparisons



(END OF REPORT)