

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: P1433132

Luminaire Tested: EHBR1-18-UNV-N-L930-UPL18

Issue Date: 3/20/2026

**Test Information**

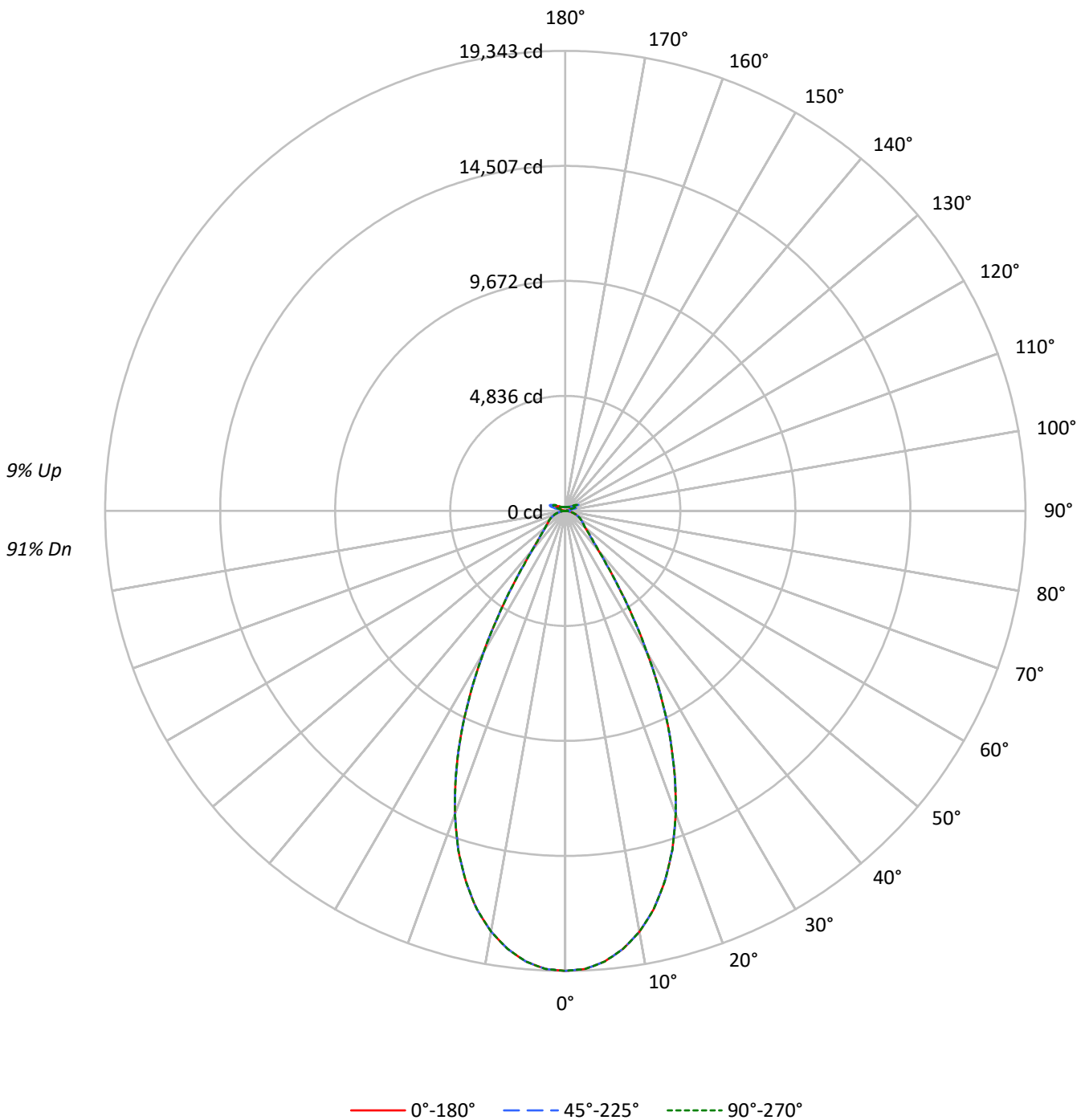
Test Method: LM-79-2019  
Report Number: P1433132  
REPORT IS A COMBINATION OF REPORTS P1431686 AND P1431635  
Test Lab: INNOVATION CENTER  
Issue Date: 3/20/2026  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: METALUX  
Catalog Number: EHBR1-18-UNV-N-L930-UPL18  
Description: Elevate Round Highbay at, 19000 lumens, 3000K 90CRI LEDs with N lens  
Light Source: -  
Ballast/Driver: -

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 18173.7 lumens  
Efficiency: N/A  
Efficacy: 170.5 lumens/watt  
Spacing Criteria (0/90/45): 0.82 / 0.82 / 0.8  
Luminous Opening: Vertical Cylinder (Dia: 1.71' x H: 0.1')  
CIE Type: Direct  
  
Input Watts (W): 106.6  
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: P1433132  
CATALOG NUMBER: EHBR1-18-UNV-N-L930-UPL18

### Luminous Intensity Polar Plot





TEST NUMBER: P1433132  
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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   | 117 | 117 | 117 | 117 | 113 | 113 | 113 | 113 | 106 | 106 | 106 | 100 | 100 | 100 | 94 | 94 | 94 | 94 | 94 | 94 | 91 |
| 1   | 110 | 107 | 104 | 101 | 107 | 104 | 101 | 99  | 98  | 96  | 94  | 93  | 91  | 90  | 88 | 87 | 86 | 86 | 86 | 86 | 83 |
| 2   | 103 | 98  | 93  | 89  | 100 | 95  | 91  | 87  | 90  | 87  | 84  | 86  | 83  | 81  | 82 | 80 | 78 | 78 | 78 | 78 | 76 |
| 3   | 97  | 90  | 84  | 80  | 94  | 88  | 83  | 78  | 84  | 80  | 76  | 80  | 77  | 74  | 77 | 74 | 71 | 71 | 71 | 71 | 69 |
| 4   | 92  | 83  | 77  | 72  | 89  | 81  | 76  | 71  | 78  | 73  | 69  | 75  | 71  | 68  | 72 | 69 | 66 | 66 | 66 | 66 | 64 |
| 5   | 87  | 77  | 71  | 66  | 84  | 76  | 70  | 65  | 73  | 68  | 64  | 70  | 66  | 62  | 68 | 64 | 61 | 61 | 61 | 61 | 59 |
| 6   | 82  | 72  | 66  | 61  | 80  | 71  | 65  | 60  | 68  | 63  | 59  | 66  | 62  | 58  | 64 | 60 | 57 | 57 | 57 | 57 | 55 |
| 7   | 78  | 68  | 61  | 56  | 76  | 66  | 60  | 56  | 64  | 59  | 55  | 62  | 58  | 54  | 60 | 56 | 53 | 53 | 53 | 53 | 52 |
| 8   | 74  | 63  | 57  | 53  | 72  | 62  | 56  | 52  | 61  | 55  | 51  | 59  | 54  | 51  | 57 | 53 | 50 | 50 | 50 | 50 | 48 |
| 9   | 70  | 60  | 53  | 49  | 68  | 59  | 53  | 49  | 57  | 52  | 48  | 56  | 51  | 48  | 54 | 50 | 47 | 47 | 47 | 47 | 46 |
| 10  | 67  | 56  | 50  | 46  | 65  | 56  | 50  | 46  | 54  | 49  | 45  | 53  | 48  | 45  | 52 | 47 | 44 | 44 | 44 | 44 | 43 |

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

|     | 0°    | 45°   | 90°   |
|-----|-------|-------|-------|
| 0°  | 90835 | 90835 | 90835 |
| 5°  | 89072 | 89072 | 89072 |
| 10° | 84540 | 84540 | 84540 |
| 15° | 76919 | 76919 | 76919 |
| 20° | 65980 | 65980 | 65980 |
| 25° | 51904 | 51904 | 51904 |
| 30° | 35620 | 35620 | 35620 |
| 35° | 21159 | 21159 | 21159 |
| 40° | 12519 | 12519 | 12519 |
| 45° | 8987  | 8987  | 8987  |
| 50° | 7387  | 7387  | 7387  |
| 55° | 6714  | 6714  | 6714  |
| 60° | 6427  | 6427  | 6427  |
| 65° | 6130  | 6130  | 6130  |
| 70° | 5701  | 5701  | 5701  |
| 75° | 5154  | 5154  | 5154  |
| 80° | 4277  | 4277  | 4277  |
| 85° | 2709  | 2709  | 2709  |

**MAXIMUM LUMINANCE 45°-90°:**

Horizontal Angle: 0°  
 Vertical Angle: 45°  
 Luminance: 8987 cd/sqm



TEST NUMBER: P1433132  
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**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 1781.8  | 9.8       |
| 10°-20°   | 4472.5  | 24.6      |
| 20°-30°   | 4676.5  | 25.7      |
| 30°-40°   | 2533.9  | 13.9      |
| 40°-50°   | 1165.7  | 6.4       |
| 50°-60°   | 821.5   | 4.5       |
| 60°-70°   | 632.2   | 3.5       |
| 70°-80°   | 383.3   | 2.1       |
| 80°-90°   | 110.8   | 0.6       |
| 90°-100°  | 45.5    | 0.3       |
| 100°-110° | 285.1   | 1.6       |
| 110°-120° | 509.8   | 2.8       |
| 120°-130° | 299.1   | 1.6       |
| 130°-140° | 183.5   | 1.0       |
| 140°-150° | 127.3   | 0.7       |
| 150°-160° | 82.7    | 0.5       |
| 160°-170° | 47.1    | 0.3       |
| 170°-180° | 15.6    | 0.1       |
| 0°-30°    | 10930.8 | 60.1      |
| 0°-40°    | 13464.7 | 74.1      |
| 0°-60°    | 15451.8 | 85.0      |
| 0°-90°    | 16578.1 | 91.2      |
| 90°-120°  | 840.4   | 4.6       |
| 90°-150°  | 1450.2  | 8.0       |
| 90°-180°  | 1596.0  | 8.8       |
| 0°-180°   | 18173.7 | 100.0     |

**CANDELA DISTRIBUTION:**

|      | 0°    | 22.5° | 45°   | 67.5° | 90°   | Flux |
|------|-------|-------|-------|-------|-------|------|
| 0°   | 19343 | 19343 | 19343 | 19343 | 19343 |      |
| 5°   | 19018 | 19018 | 19018 | 19018 | 19018 | 1782 |
| 15°  | 16137 | 16137 | 16137 | 16137 | 16137 | 4473 |
| 25°  | 10365 | 10365 | 10365 | 10365 | 10365 | 4676 |
| 35°  | 3884  | 3884  | 3884  | 3884  | 3884  | 2534 |
| 45°  | 1454  | 1454  | 1454  | 1454  | 1454  | 1166 |
| 55°  | 907   | 907   | 907   | 907   | 907   | 821  |
| 65°  | 640   | 640   | 640   | 640   | 640   | 632  |
| 75°  | 363   | 363   | 363   | 363   | 363   | 383  |
| 85°  | 93    | 93    | 93    | 93    | 93    | 103  |
| 90°  | 12    | 20    | 33    | 22    | 12    | 10   |
| 95°  | 20    | 34    | 74    | 36    | 23    | 19   |
| 105° | 100   | 196   | 501   | 216   | 132   | 133  |
| 115° | 458   | 482   | 593   | 568   | 564   | 422  |
| 125° | 331   | 309   | 317   | 322   | 361   | 301  |
| 135° | 241   | 234   | 242   | 227   | 226   | 189  |
| 145° | 198   | 195   | 207   | 205   | 204   | 126  |
| 155° | 174   | 172   | 180   | 180   | 180   | 81   |
| 165° | 162   | 162   | 167   | 167   | 166   | 46   |
| 175° | 161   | 161   | 164   | 164   | 164   | 15   |
| 180° | 162   | 162   | 162   | 162   | 162   |      |



TEST NUMBER: P1433132

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**CANDELA DISTRIBUTION (FULL):**

|        | 0°      | 22.5°   | 45°     | 67.5°   | 90°     |
|--------|---------|---------|---------|---------|---------|
| 0°     | 19342.6 | 19342.6 | 19342.6 | 19342.6 | 19342.6 |
| 2.5°   | 19274.1 | 19274.1 | 19274.1 | 19274.1 | 19274.1 |
| 5°     | 19018.2 | 19018.2 | 19018.2 | 19018.2 | 19018.2 |
| 7.5°   | 18581.3 | 18581.3 | 18581.3 | 18581.3 | 18581.3 |
| 10°    | 17961.6 | 17961.6 | 17961.6 | 17961.6 | 17961.6 |
| 12.5°  | 17160.6 | 17160.6 | 17160.6 | 17160.6 | 17160.6 |
| 15°    | 16137.3 | 16137.3 | 16137.3 | 16137.3 | 16137.3 |
| 17.5°  | 14950.2 | 14950.2 | 14950.2 | 14950.2 | 14950.2 |
| 20°    | 13560.8 | 13560.8 | 13560.8 | 13560.8 | 13560.8 |
| 22.5°  | 12014.0 | 12014.0 | 12014.0 | 12014.0 | 12014.0 |
| 25°    | 10365.2 | 10365.2 | 10365.2 | 10365.2 | 10365.2 |
| 27.5°  | 8617.2  | 8617.2  | 8617.2  | 8617.2  | 8617.2  |
| 30°    | 6851.4  | 6851.4  | 6851.4  | 6851.4  | 6851.4  |
| 32.5°  | 5258.2  | 5258.2  | 5258.2  | 5258.2  | 5258.2  |
| 35°    | 3883.5  | 3883.5  | 3883.5  | 3883.5  | 3883.5  |
| 37.5°  | 2851.4  | 2851.4  | 2851.4  | 2851.4  | 2851.4  |
| 40°    | 2169.9  | 2169.9  | 2169.9  | 2169.9  | 2169.9  |
| 42.5°  | 1740.0  | 1740.0  | 1740.0  | 1740.0  | 1740.0  |
| 45°    | 1454.1  | 1454.1  | 1454.1  | 1454.1  | 1454.1  |
| 47.5°  | 1248.0  | 1248.0  | 1248.0  | 1248.0  | 1248.0  |
| 50°    | 1100.9  | 1100.9  | 1100.9  | 1100.9  | 1100.9  |
| 52.5°  | 993.5   | 993.5   | 993.5   | 993.5   | 993.5   |
| 55°    | 907.3   | 907.3   | 907.3   | 907.3   | 907.3   |
| 57.5°  | 837.3   | 837.3   | 837.3   | 837.3   | 837.3   |
| 60°    | 772.6   | 772.6   | 772.6   | 772.6   | 772.6   |
| 62.5°  | 707.9   | 707.9   | 707.9   | 707.9   | 707.9   |
| 65°    | 639.8   | 639.8   | 639.8   | 639.8   | 639.8   |
| 67.5°  | 570.4   | 570.4   | 570.4   | 570.4   | 570.4   |
| 70°    | 500.2   | 500.2   | 500.2   | 500.2   | 500.2   |
| 72.5°  | 431.9   | 431.9   | 431.9   | 431.9   | 431.9   |
| 75°    | 363.1   | 363.1   | 363.1   | 363.1   | 363.1   |
| 77.5°  | 295.6   | 295.6   | 295.6   | 295.6   | 295.6   |
| 80°    | 225.0   | 225.0   | 225.0   | 225.0   | 225.0   |
| 82.5°  | 157.6   | 157.6   | 157.6   | 157.6   | 157.6   |
| 85°    | 93.1    | 93.1    | 93.1    | 93.1    | 93.1    |
| 87.5°  | 33.3    | 33.3    | 33.3    | 33.3    | 33.3    |
| 90°    | 12.4    | 19.7    | 33.4    | 21.6    | 12.4    |
| 92.5°  | 17.4    | 29.2    | 52.9    | 27.4    | 15.5    |
| 95°    | 20.1    | 33.8    | 74.0    | 36.5    | 22.8    |
| 97.5°  | 25.6    | 37.4    | 84.9    | 44.7    | 35.6    |
| 100°   | 33.8    | 43.8    | 132.4   | 54.8    | 47.5    |
| 102.5° | 57.6    | 93.1    | 281.3   | 103.2   | 72.2    |
| 105°   | 99.5    | 196.4   | 501.4   | 216.5   | 131.5   |
| 107.5° | 172.6   | 351.6   | 661.2   | 383.6   | 249.3   |
| 110°   | 322.4   | 466.7   | 693.2   | 527.0   | 399.1   |



TEST NUMBER: P1433132

CATALOG NUMBER: EHBR1-18-UNV-N-L930-UPL18

**CANDELA DISTRIBUTION (continued):**

|        | 0°    | 22.5° | 45°   | 67.5° | 90°   |
|--------|-------|-------|-------|-------|-------|
| 112.5° | 435.7 | 501.4 | 664.0 | 581.8 | 519.7 |
| 115°   | 458.5 | 482.3 | 592.8 | 568.1 | 564.4 |
| 117.5° | 443.0 | 440.2 | 503.2 | 510.5 | 545.3 |
| 120°   | 410.1 | 391.8 | 420.2 | 445.7 | 492.3 |
| 122.5° | 369.0 | 347.1 | 359.8 | 379.0 | 425.6 |
| 125°   | 330.6 | 308.7 | 316.9 | 321.5 | 360.7 |
| 127.5° | 296.8 | 282.2 | 286.8 | 281.3 | 305.9 |
| 130°   | 274.0 | 261.2 | 267.6 | 254.9 | 266.7 |
| 132.5° | 254.9 | 246.6 | 253.9 | 238.4 | 242.0 |
| 135°   | 241.1 | 233.8 | 242.0 | 227.4 | 226.5 |
| 137.5° | 229.3 | 222.9 | 231.1 | 220.1 | 217.3 |
| 140°   | 218.3 | 212.8 | 222.0 | 213.7 | 211.9 |
| 142.5° | 206.4 | 202.7 | 213.7 | 208.3 | 206.4 |
| 145°   | 198.2 | 195.4 | 207.4 | 204.6 | 203.7 |
| 147.5° | 190.9 | 189.1 | 200.1 | 199.1 | 199.1 |
| 150°   | 184.5 | 182.7 | 193.6 | 192.8 | 193.6 |
| 152.5° | 178.1 | 176.3 | 186.3 | 185.4 | 186.3 |
| 155°   | 173.5 | 171.7 | 179.9 | 179.9 | 179.9 |
| 157.5° | 169.9 | 169.0 | 175.4 | 175.4 | 175.4 |
| 160°   | 167.2 | 166.2 | 171.7 | 171.7 | 170.8 |
| 162.5° | 164.4 | 163.5 | 169.9 | 169.0 | 169.0 |
| 165°   | 162.5 | 162.5 | 167.2 | 167.2 | 166.2 |
| 167.5° | 162.5 | 161.7 | 166.2 | 166.2 | 165.3 |
| 170°   | 161.7 | 161.7 | 165.3 | 164.4 | 163.5 |
| 172.5° | 161.7 | 161.7 | 165.3 | 164.4 | 163.5 |
| 175°   | 160.8 | 160.8 | 163.5 | 163.5 | 163.5 |
| 177.5° | 161.7 | 161.7 | 163.5 | 163.5 | 162.5 |
| 180°   | 162.5 | 162.5 | 162.5 | 162.5 | 162.5 |



TEST NUMBER: P1433132  
 CATALOG NUMBER: EHBR1-18-UNV-N-L930-UPL18

**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 | 14.38            | 15.42 | 14.90 | 15.91 | 16.45 | 14.38          | 15.42 | 14.90 | 15.91 | 16.45 |
|                 | 3H   | 16.16            | 17.08 | 16.69 | 17.59 | 18.17 | 16.16          | 17.08 | 16.69 | 17.59 | 18.17 |
|                 | 4H   | 16.82            | 17.68 | 17.37 | 18.20 | 18.80 | 16.82          | 17.68 | 17.37 | 18.20 | 18.80 |
|                 | 6H   | 17.28            | 18.07 | 17.84 | 18.61 | 19.21 | 17.28          | 18.07 | 17.84 | 18.61 | 19.21 |
|                 | 8H   | 17.40            | 18.15 | 17.98 | 18.70 | 19.32 | 17.40          | 18.15 | 17.98 | 18.70 | 19.32 |
|                 | 12H  | 17.45            | 18.17 | 18.03 | 18.71 | 19.35 | 17.45          | 18.17 | 18.03 | 18.71 | 19.35 |
| 4H              | 2H   | 14.92            | 15.78 | 15.48 | 16.31 | 16.90 | 14.92          | 15.78 | 15.48 | 16.31 | 16.90 |
|                 | 3H   | 16.89            | 17.60 | 17.46 | 18.17 | 18.78 | 16.89          | 17.60 | 17.46 | 18.17 | 18.78 |
|                 | 4H   | 17.66            | 18.30 | 18.25 | 18.88 | 19.53 | 17.66          | 18.30 | 18.25 | 18.88 | 19.53 |
|                 | 6H   | 18.23            | 18.79 | 18.84 | 19.39 | 20.06 | 18.23          | 18.79 | 18.84 | 19.39 | 20.06 |
|                 | 8H   | 18.39            | 18.91 | 19.01 | 19.51 | 20.18 | 18.39          | 18.91 | 19.01 | 19.51 | 20.18 |
|                 | 12H  | 18.47            | 18.92 | 19.10 | 19.56 | 20.23 | 18.47          | 18.92 | 19.10 | 19.56 | 20.23 |
| 8H              | 4H   | 17.89            | 18.41 | 18.51 | 19.01 | 19.68 | 17.89          | 18.41 | 18.51 | 19.01 | 19.68 |
|                 | 6H   | 18.57            | 18.99 | 19.22 | 19.64 | 20.32 | 18.57          | 18.99 | 19.22 | 19.64 | 20.32 |
|                 | 8H   | 18.80            | 19.17 | 19.46 | 19.82 | 20.52 | 18.80          | 19.17 | 19.46 | 19.82 | 20.52 |
|                 | 12H  | 18.93            | 19.26 | 19.59 | 19.90 | 20.66 | 18.93          | 19.26 | 19.59 | 19.90 | 20.66 |
| 12H             | 4H   | 17.89            | 18.34 | 18.52 | 18.97 | 19.65 | 17.89          | 18.34 | 18.52 | 18.97 | 19.65 |
|                 | 6H   | 18.60            | 18.97 | 19.26 | 19.63 | 20.32 | 18.60          | 18.97 | 19.26 | 19.63 | 20.32 |
|                 | 8H   | 18.86            | 19.18 | 19.52 | 19.82 | 20.59 | 18.86          | 19.18 | 19.52 | 19.82 | 20.59 |

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

Report Prepared for

Cooper Lighting Solutions

Metalux

Report Number: SP1-2506-472-5

Test Date: 08/01/2025

Luminaire Tested: EHBR-60-L930-N

Data in this report applies to families of products including EHBR-60-L930-N

**Test Information**

Test Method: LM-79-2019  
 Report Number: SP1-2506-472-5  
 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-L930-N**  
 Description: Elevate Round Highbay at, 60000 lumens, 3000K 90CRI LEDs with N lens

**Spectral Parameters**

CCT (K): 2996  
 CIE u': 0.2519  
 CIE v': 0.5169  
 Duv: -0.0033  
 CIE x: 0.4325  
 CIE y: 0.3945  
 CIE z: 0.1730  
 Peak Wavelength (nm): 630  
 Dominant Wavelength (nm): 584  
 Purity: 48.21818  
 Rf: 91.3  
 Rg: 102

|           |      |      |      |
|-----------|------|------|------|
| CRI (Ra): | 94.4 |      |      |
| R1:       | 96.8 | R9:  | 61.4 |
| R2:       | 98.1 | R10: | 94.4 |
| R3:       | 97.8 | R11: | 95.7 |
| R4:       | 95.6 | R12: | 88.5 |
| R5:       | 96.9 | R13: | 97.3 |
| R6:       | 95.7 | R14: | 97.8 |
| R7:       | 90.9 | R15: | 92.3 |
| R8:       | 83.0 |      |      |



**Test Conditions**

Stabilization Time: 40M  
 Operation Time: 1H 40M  
 Sphere Temperature (°C): 25.0

REPORT NUMBER: SP1-2506-472-5

| 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 7-step quadrangle

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**Photopic Flux vs. Wavelength**

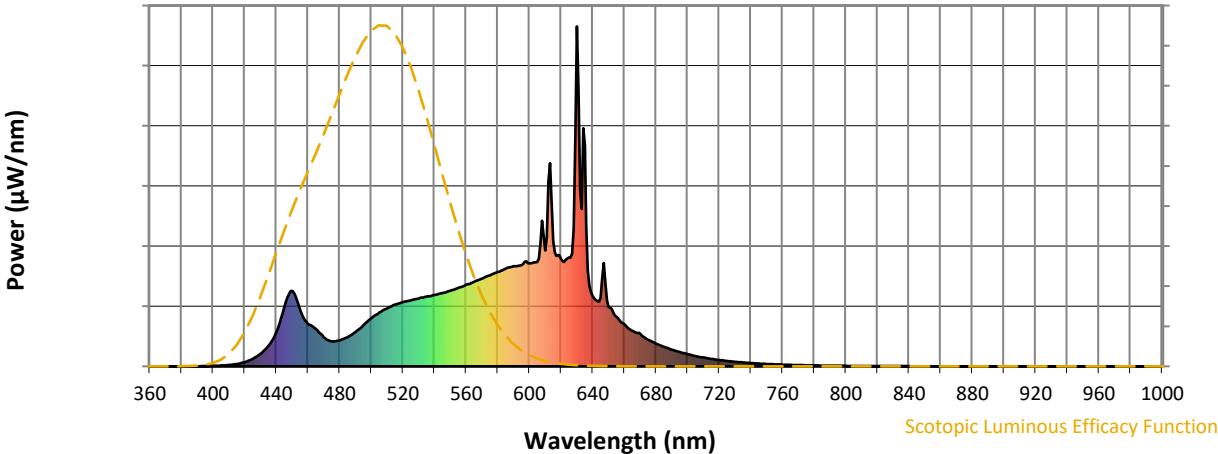


**Photopic Lumens: NR**

| 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    | 101                      | NR            | 620    | 317                      | NR            | 750    | 7                        | NR            | 880    | 0                        | NR            |
| 365    | 0                        | NR            | 495    | 121                      | NR            | 625    | 320                      | NR            | 755    | 6                        | NR            | 885    | 0                        | NR            |
| 370    | 0                        | NR            | 500    | 141                      | NR            | 630    | 1000                     | NR            | 760    | 5                        | NR            | 890    | 0                        | NR            |
| 375    | 0                        | NR            | 505    | 158                      | NR            | 635    | 651                      | NR            | 765    | 4                        | NR            | 895    | 0                        | NR            |
| 380    | 0                        | NR            | 510    | 171                      | NR            | 640    | 207                      | NR            | 770    | 4                        | NR            | 900    | 0                        | NR            |
| 385    | 0                        | NR            | 515    | 182                      | NR            | 645    | 201                      | NR            | 775    | 3                        | NR            | 905    | 0                        | NR            |
| 390    | 0                        | NR            | 520    | 189                      | NR            | 650    | 174                      | NR            | 780    | 3                        | NR            | 910    | 0                        | NR            |
| 395    | 1                        | NR            | 525    | 194                      | NR            | 655    | 146                      | NR            | 785    | 2                        | NR            | 915    | 0                        | NR            |
| 400    | 1                        | NR            | 530    | 199                      | NR            | 660    | 124                      | NR            | 790    | 2                        | NR            | 920    | 0                        | NR            |
| 405    | 3                        | NR            | 535    | 205                      | NR            | 665    | 105                      | NR            | 795    | 2                        | NR            | 925    | 0                        | NR            |
| 410    | 4                        | NR            | 540    | 210                      | NR            | 670    | 96                       | NR            | 800    | 1                        | NR            | 930    | 0                        | NR            |
| 415    | 7                        | NR            | 545    | 216                      | NR            | 675    | 79                       | NR            | 805    | 1                        | NR            | 935    | 0                        | NR            |
| 420    | 13                       | NR            | 550    | 222                      | NR            | 680    | 67                       | NR            | 810    | 1                        | NR            | 940    | 0                        | NR            |
| 425    | 22                       | NR            | 555    | 230                      | NR            | 685    | 58                       | NR            | 815    | 1                        | NR            | 945    | 0                        | NR            |
| 430    | 37                       | NR            | 560    | 240                      | NR            | 690    | 49                       | NR            | 820    | 1                        | NR            | 950    | 0                        | NR            |
| 435    | 60                       | NR            | 565    | 248                      | NR            | 695    | 42                       | NR            | 825    | 1                        | NR            | 955    | 0                        | NR            |
| 440    | 101                      | NR            | 570    | 258                      | NR            | 700    | 36                       | NR            | 830    | 1                        | NR            | 960    | 0                        | NR            |
| 445    | 172                      | NR            | 575    | 268                      | NR            | 705    | 30                       | NR            | 835    | 1                        | NR            | 965    | 0                        | NR            |
| 450    | 223                      | NR            | 580    | 278                      | NR            | 710    | 26                       | NR            | 840    | 1                        | NR            | 970    | 0                        | NR            |
| 455    | 167                      | NR            | 585    | 287                      | NR            | 715    | 22                       | NR            | 845    | 0                        | NR            | 975    | 0                        | NR            |
| 460    | 126                      | NR            | 590    | 295                      | NR            | 720    | 19                       | NR            | 850    | 0                        | NR            | 980    | 0                        | NR            |
| 465    | 111                      | NR            | 595    | 298                      | NR            | 725    | 16                       | NR            | 855    | 0                        | NR            | 985    | 0                        | NR            |
| 470    | 86                       | NR            | 600    | 303                      | NR            | 730    | 14                       | NR            | 860    | 0                        | NR            | 990    | 0                        | NR            |
| 475    | 74                       | NR            | 605    | 307                      | NR            | 735    | 12                       | NR            | 865    | 0                        | NR            | 995    | 0                        | NR            |
| 480    | 77                       | NR            | 610    | 341                      | NR            | 740    | 10                       | NR            | 870    | 0                        | NR            | 1000   | 0                        | NR            |
| 485    | 86                       | NR            | 615    | 368                      | NR            | 745    | 8                        | NR            | 875    | 0                        | NR            |        |                          |               |

REPORT NUMBER: SP1-2506-472-5

Scotopic Flux vs. Wavelength



Scotopic Lumens: NR S/P: 1.44

| 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    | 101                      | NR            | 620    | 317                      | NR            | 750    | 7                        | NR            | 880    | 0                        | NR            |
| 365    | 0                        | NR            | 495    | 121                      | NR            | 625    | 320                      | NR            | 755    | 6                        | NR            | 885    | 0                        | NR            |
| 370    | 0                        | NR            | 500    | 141                      | NR            | 630    | 1000                     | NR            | 760    | 5                        | NR            | 890    | 0                        | NR            |
| 375    | 0                        | NR            | 505    | 158                      | NR            | 635    | 651                      | NR            | 765    | 4                        | NR            | 895    | 0                        | NR            |
| 380    | 0                        | NR            | 510    | 171                      | NR            | 640    | 207                      | NR            | 770    | 4                        | NR            | 900    | 0                        | NR            |
| 385    | 0                        | NR            | 515    | 182                      | NR            | 645    | 201                      | NR            | 775    | 3                        | NR            | 905    | 0                        | NR            |
| 390    | 0                        | NR            | 520    | 189                      | NR            | 650    | 174                      | NR            | 780    | 3                        | NR            | 910    | 0                        | NR            |
| 395    | 1                        | NR            | 525    | 194                      | NR            | 655    | 146                      | NR            | 785    | 2                        | NR            | 915    | 0                        | NR            |
| 400    | 1                        | NR            | 530    | 199                      | NR            | 660    | 124                      | NR            | 790    | 2                        | NR            | 920    | 0                        | NR            |
| 405    | 3                        | NR            | 535    | 205                      | NR            | 665    | 105                      | NR            | 795    | 2                        | NR            | 925    | 0                        | NR            |
| 410    | 4                        | NR            | 540    | 210                      | NR            | 670    | 96                       | NR            | 800    | 1                        | NR            | 930    | 0                        | NR            |
| 415    | 7                        | NR            | 545    | 216                      | NR            | 675    | 79                       | NR            | 805    | 1                        | NR            | 935    | 0                        | NR            |
| 420    | 13                       | NR            | 550    | 222                      | NR            | 680    | 67                       | NR            | 810    | 1                        | NR            | 940    | 0                        | NR            |
| 425    | 22                       | NR            | 555    | 230                      | NR            | 685    | 58                       | NR            | 815    | 1                        | NR            | 945    | 0                        | NR            |
| 430    | 37                       | NR            | 560    | 240                      | NR            | 690    | 49                       | NR            | 820    | 1                        | NR            | 950    | 0                        | NR            |
| 435    | 60                       | NR            | 565    | 248                      | NR            | 695    | 42                       | NR            | 825    | 1                        | NR            | 955    | 0                        | NR            |
| 440    | 101                      | NR            | 570    | 258                      | NR            | 700    | 36                       | NR            | 830    | 1                        | NR            | 960    | 0                        | NR            |
| 445    | 172                      | NR            | 575    | 268                      | NR            | 705    | 30                       | NR            | 835    | 1                        | NR            | 965    | 0                        | NR            |
| 450    | 223                      | NR            | 580    | 278                      | NR            | 710    | 26                       | NR            | 840    | 1                        | NR            | 970    | 0                        | NR            |
| 455    | 167                      | NR            | 585    | 287                      | NR            | 715    | 22                       | NR            | 845    | 0                        | NR            | 975    | 0                        | NR            |
| 460    | 126                      | NR            | 590    | 295                      | NR            | 720    | 19                       | NR            | 850    | 0                        | NR            | 980    | 0                        | NR            |
| 465    | 111                      | NR            | 595    | 298                      | NR            | 725    | 16                       | NR            | 855    | 0                        | NR            | 985    | 0                        | NR            |
| 470    | 86                       | NR            | 600    | 303                      | NR            | 730    | 14                       | NR            | 860    | 0                        | NR            | 990    | 0                        | NR            |
| 475    | 74                       | NR            | 605    | 307                      | NR            | 735    | 12                       | NR            | 865    | 0                        | NR            | 995    | 0                        | NR            |
| 480    | 77                       | NR            | 610    | 341                      | NR            | 740    | 10                       | NR            | 870    | 0                        | NR            | 1000   | 0                        | NR            |
| 485    | 86                       | NR            | 615    | 368                      | NR            | 745    | 8                        | NR            | 875    | 0                        | NR            |        |                          |               |

REPORT NUMBER: SP1-2506-472-5

**Melanopic Flux vs. Wavelength**



**Melanopic Lumens: NR**

**M/P: 2.85**

| $\lambda$<br>(nm) | Power<br>W <sup>^</sup> /nm | Lumens<br>( $\phi$ /nm) | $\lambda$<br>(nm) | Power<br>W <sup>^</sup> /nm | Lumens<br>( $\phi$ /nm) | $\lambda$<br>(nm) | Power<br>W <sup>^</sup> /nm | Lumens<br>( $\phi$ /nm) | $\lambda$<br>(nm) | Power<br>W <sup>^</sup> /nm | Lumens<br>( $\phi$ /nm) | $\lambda$<br>(nm) | Power<br>W <sup>^</sup> /nm | Lumens<br>( $\phi$ /nm) |
|-------------------|-----------------------------|-------------------------|-------------------|-----------------------------|-------------------------|-------------------|-----------------------------|-------------------------|-------------------|-----------------------------|-------------------------|-------------------|-----------------------------|-------------------------|
| 360               | 0                           | NR                      | 490               | 101                         | NR                      | 620               | 317                         | NR                      | 750               | 7                           | NR                      | 880               | 0                           | NR                      |
| 365               | 0                           | NR                      | 495               | 121                         | NR                      | 625               | 320                         | NR                      | 755               | 6                           | NR                      | 885               | 0                           | NR                      |
| 370               | 0                           | NR                      | 500               | 141                         | NR                      | 630               | 1000                        | NR                      | 760               | 5                           | NR                      | 890               | 0                           | NR                      |
| 375               | 0                           | NR                      | 505               | 158                         | NR                      | 635               | 651                         | NR                      | 765               | 4                           | NR                      | 895               | 0                           | NR                      |
| 380               | 0                           | NR                      | 510               | 171                         | NR                      | 640               | 207                         | NR                      | 770               | 4                           | NR                      | 900               | 0                           | NR                      |
| 385               | 0                           | NR                      | 515               | 182                         | NR                      | 645               | 201                         | NR                      | 775               | 3                           | NR                      | 905               | 0                           | NR                      |
| 390               | 0                           | NR                      | 520               | 189                         | NR                      | 650               | 174                         | NR                      | 780               | 3                           | NR                      | 910               | 0                           | NR                      |
| 395               | 1                           | NR                      | 525               | 194                         | NR                      | 655               | 146                         | NR                      | 785               | 2                           | NR                      | 915               | 0                           | NR                      |
| 400               | 1                           | NR                      | 530               | 199                         | NR                      | 660               | 124                         | NR                      | 790               | 2                           | NR                      | 920               | 0                           | NR                      |
| 405               | 3                           | NR                      | 535               | 205                         | NR                      | 665               | 105                         | NR                      | 795               | 2                           | NR                      | 925               | 0                           | NR                      |
| 410               | 4                           | NR                      | 540               | 210                         | NR                      | 670               | 96                          | NR                      | 800               | 1                           | NR                      | 930               | 0                           | NR                      |
| 415               | 7                           | NR                      | 545               | 216                         | NR                      | 675               | 79                          | NR                      | 805               | 1                           | NR                      | 935               | 0                           | NR                      |
| 420               | 13                          | NR                      | 550               | 222                         | NR                      | 680               | 67                          | NR                      | 810               | 1                           | NR                      | 940               | 0                           | NR                      |
| 425               | 22                          | NR                      | 555               | 230                         | NR                      | 685               | 58                          | NR                      | 815               | 1                           | NR                      | 945               | 0                           | NR                      |
| 430               | 37                          | NR                      | 560               | 240                         | NR                      | 690               | 49                          | NR                      | 820               | 1                           | NR                      | 950               | 0                           | NR                      |
| 435               | 60                          | NR                      | 565               | 248                         | NR                      | 695               | 42                          | NR                      | 825               | 1                           | NR                      | 955               | 0                           | NR                      |
| 440               | 101                         | NR                      | 570               | 258                         | NR                      | 700               | 36                          | NR                      | 830               | 1                           | NR                      | 960               | 0                           | NR                      |
| 445               | 172                         | NR                      | 575               | 268                         | NR                      | 705               | 30                          | NR                      | 835               | 1                           | NR                      | 965               | 0                           | NR                      |
| 450               | 223                         | NR                      | 580               | 278                         | NR                      | 710               | 26                          | NR                      | 840               | 1                           | NR                      | 970               | 0                           | NR                      |
| 455               | 167                         | NR                      | 585               | 287                         | NR                      | 715               | 22                          | NR                      | 845               | 0                           | NR                      | 975               | 0                           | NR                      |
| 460               | 126                         | NR                      | 590               | 295                         | NR                      | 720               | 19                          | NR                      | 850               | 0                           | NR                      | 980               | 0                           | NR                      |
| 465               | 111                         | NR                      | 595               | 298                         | NR                      | 725               | 16                          | NR                      | 855               | 0                           | NR                      | 985               | 0                           | NR                      |
| 470               | 86                          | NR                      | 600               | 303                         | NR                      | 730               | 14                          | NR                      | 860               | 0                           | NR                      | 990               | 0                           | NR                      |
| 475               | 74                          | NR                      | 605               | 307                         | NR                      | 735               | 12                          | NR                      | 865               | 0                           | NR                      | 995               | 0                           | NR                      |
| 480               | 77                          | NR                      | 610               | 341                         | NR                      | 740               | 10                          | NR                      | 870               | 0                           | NR                      | 1000              | 0                           | NR                      |
| 485               | 86                          | NR                      | 615               | 368                         | NR                      | 745               | 8                           | NR                      | 875               | 0                           | NR                      |                   |                             |                         |

**Summary**

$R_f = 91.3$   
 $R_g = 102$   
 $CIE R_a = 94.4$   
 $R_9 = 61.4$



**Color Vector Graphics**



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

|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 86 | CES26 = 91 | CES51 = 96 | CES76 = 89 |
| CES02 = 63 | CES27 = 96 | CES52 = 95 | CES77 = 85 |
| CES03 = 32 | CES28 = 96 | CES53 = 93 | CES78 = 86 |
| CES04 = 70 | CES29 = 90 | CES54 = 98 | CES79 = 89 |
| CES05 = 51 | CES30 = 96 | CES55 = 98 | CES80 = 91 |
| CES06 = 51 | CES31 = 90 | CES56 = 95 | CES81 = 72 |
| CES07 = 44 | CES32 = 84 | CES57 = 95 | CES82 = 95 |
| CES08 = 42 | CES33 = 91 | CES58 = 95 | CES83 = 93 |
| CES09 = 29 | CES34 = 92 | CES59 = 99 | CES84 = 96 |
| CES10 = 76 | CES35 = 96 | CES60 = 96 | CES85 = 80 |
| CES11 = 59 | CES36 = 90 | CES61 = 96 | CES86 = 77 |
| CES12 = 65 | CES37 = 94 | CES62 = 95 | CES87 = 91 |
| CES13 = 44 | CES38 = 99 | CES63 = 94 | CES88 = 96 |
| CES14 = 74 | CES39 = 97 | CES64 = 96 | CES89 = 82 |
| CES15 = 72 | CES40 = 94 | CES65 = 92 | CES90 = 97 |
| CES16 = 48 | CES41 = 94 | CES66 = 95 | CES91 = 82 |
| CES17 = 50 | CES42 = 91 | CES67 = 94 | CES92 = 78 |
| CES18 = 57 | CES43 = 88 | CES68 = 93 | CES93 = 87 |
| CES19 = 72 | CES44 = 99 | CES69 = 94 | CES94 = 73 |
| CES20 = 67 | CES45 = 93 | CES70 = 90 | CES95 = 85 |
| CES21 = 86 | CES46 = 93 | CES71 = 90 | CES96 = 92 |
| CES22 = 79 | CES47 = 86 | CES72 = 96 | CES97 = 93 |
| CES23 = 92 | CES48 = 95 | CES73 = 85 | CES98 = 94 |
| CES24 = 91 | CES49 = 91 | CES74 = 90 | CES99 = 93 |
| CES25 = 72 | CES50 = 96 | CES75 = 90 |            |



Color Rendition by Hue-Angle Bin



Measure Comparisons



(END OF REPORT)