

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: EHBR1-18-UNV-N-L950-UPL15

Issue Date: 3/20/2026

**Test Information**

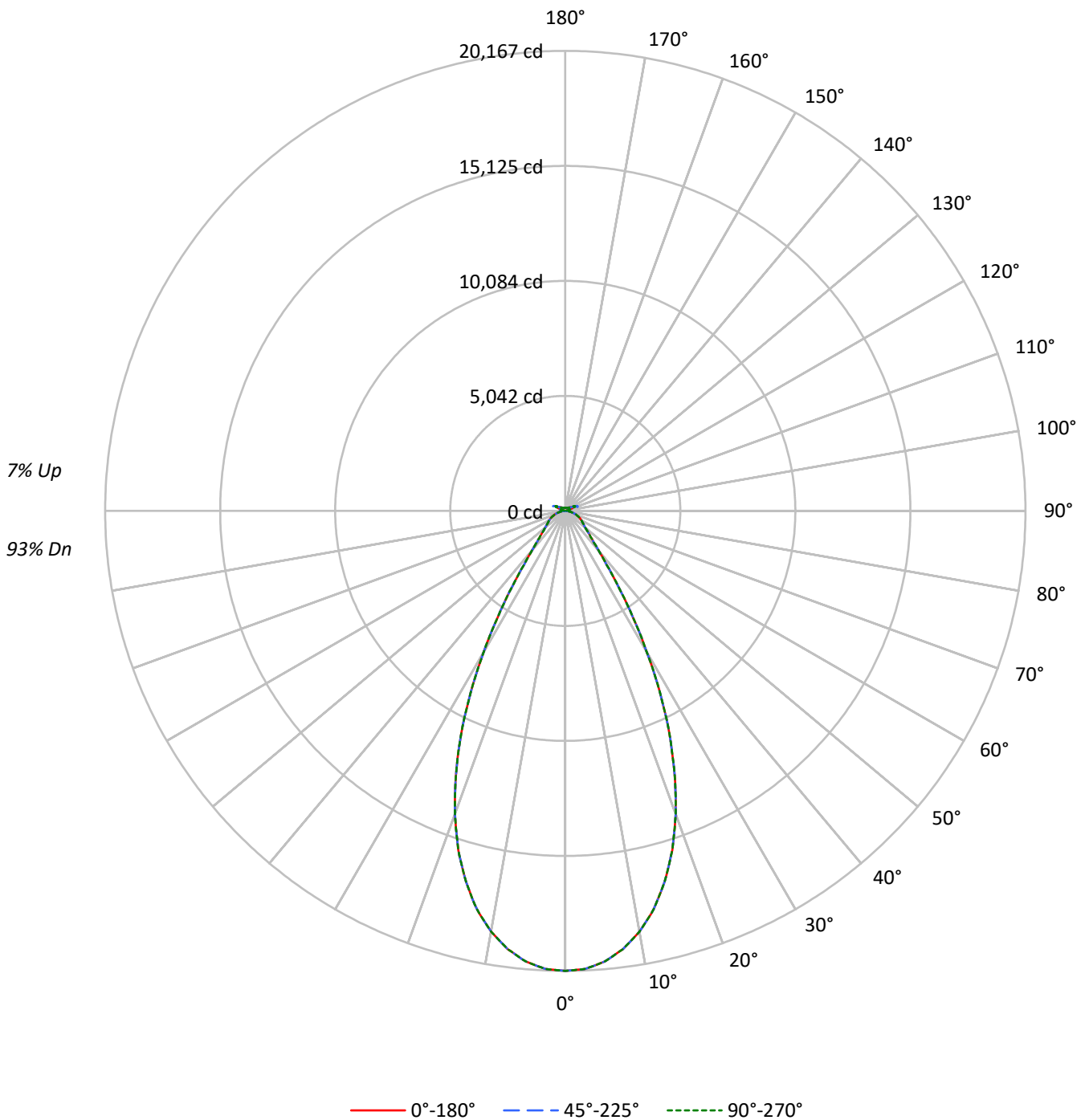
Test Method: LM-79-2019  
Report Number:  
REPORT IS A COMBINATION OF REPORTS P1431685 AND P1431635  
Test Lab: INNOVATION CENTER  
Issue Date: 3/20/2026  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: METALUX  
Catalog Number: EHBR1-18-UNV-N-L950-UPL15  
Description: Elevate Round Highbay at, 19000 lumens, 5000K 90CRI LEDs with N lens  
Light Source: -  
Ballast/Driver: -

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 18625.7 lumens  
Efficiency: N/A  
Efficacy: 179.1 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): 104  
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: EHBR1-18-UNV-N-L950-UPL15

### Luminous Intensity Polar Plot





TEST NUMBER:

CATALOG NUMBER: EHBR1-18-UNV-N-L950-UPL15

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

|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |    |    |    |    |    |    |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|----|----|----|----|----|----|----|
| RF  | 20  |     |     |     | 20  |     |     |     | 20  |     |     |     | 20  |     |    |    | 20 |    |    |    | 20 |
| RC  | 80  |     |     |     | 70  |     |     |     | 50  |     |     |     | 30  |     |    |    | 10 |    |    |    | 0  |
| RW  | 70  | 50  | 30  | 10  | 70  | 50  | 30  | 10  | 50  | 30  | 10  | 50  | 30  | 10  | 50 | 30 | 10 | 50 | 30 | 10 | 0  |
| RCR |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |    |    |    |    |    |    |
| 0   | 117 | 117 | 117 | 117 | 114 | 114 | 114 | 114 | 107 | 107 | 107 | 101 | 101 | 101 | 95 | 95 | 95 | 95 | 95 | 95 | 93 |
| 1   | 110 | 107 | 104 | 102 | 107 | 104 | 102 | 99  | 99  | 97  | 95  | 94  | 92  | 91  | 89 | 88 | 87 | 87 | 87 | 87 | 85 |
| 2   | 104 | 98  | 93  | 89  | 101 | 96  | 91  | 88  | 91  | 88  | 85  | 87  | 84  | 82  | 83 | 81 | 79 | 79 | 79 | 79 | 77 |
| 3   | 98  | 90  | 85  | 80  | 95  | 88  | 83  | 79  | 85  | 80  | 77  | 81  | 78  | 75  | 78 | 75 | 73 | 73 | 73 | 73 | 71 |
| 4   | 92  | 84  | 77  | 73  | 90  | 82  | 76  | 72  | 79  | 74  | 70  | 76  | 72  | 69  | 73 | 70 | 67 | 67 | 67 | 67 | 65 |
| 5   | 87  | 78  | 71  | 66  | 85  | 76  | 70  | 66  | 74  | 69  | 65  | 71  | 67  | 63  | 69 | 65 | 62 | 62 | 62 | 62 | 60 |
| 6   | 82  | 73  | 66  | 61  | 80  | 71  | 65  | 61  | 69  | 64  | 60  | 67  | 62  | 59  | 65 | 61 | 58 | 58 | 58 | 58 | 56 |
| 7   | 78  | 68  | 61  | 57  | 76  | 67  | 61  | 56  | 65  | 60  | 56  | 63  | 58  | 55  | 61 | 57 | 54 | 54 | 54 | 54 | 52 |
| 8   | 74  | 64  | 57  | 53  | 72  | 63  | 57  | 53  | 61  | 56  | 52  | 60  | 55  | 51  | 58 | 54 | 51 | 51 | 51 | 51 | 49 |
| 9   | 71  | 60  | 54  | 50  | 69  | 59  | 54  | 49  | 58  | 53  | 49  | 57  | 52  | 48  | 55 | 51 | 48 | 48 | 48 | 48 | 46 |
| 10  | 67  | 57  | 51  | 47  | 66  | 56  | 50  | 47  | 55  | 50  | 46  | 54  | 49  | 46  | 52 | 48 | 45 | 45 | 45 | 45 | 44 |

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

|     | 0°    | 45°   | 90°   |
|-----|-------|-------|-------|
| 0°  | 94706 | 94706 | 94706 |
| 5°  | 92867 | 92867 | 92867 |
| 10° | 88142 | 88142 | 88142 |
| 15° | 80197 | 80197 | 80197 |
| 20° | 68792 | 68792 | 68792 |
| 25° | 54116 | 54116 | 54116 |
| 30° | 37137 | 37137 | 37137 |
| 35° | 22061 | 22061 | 22061 |
| 40° | 13053 | 13053 | 13053 |
| 45° | 9370  | 9370  | 9370  |
| 50° | 7702  | 7702  | 7702  |
| 55° | 6999  | 6999  | 6999  |
| 60° | 6700  | 6700  | 6700  |
| 65° | 6391  | 6391  | 6391  |
| 70° | 5943  | 5943  | 5943  |
| 75° | 5373  | 5373  | 5373  |
| 80° | 4459  | 4459  | 4459  |
| 85° | 2825  | 2825  | 2825  |

**MAXIMUM LUMINANCE 45°-90°:**

Horizontal Angle: 0°  
 Vertical Angle: 45°  
 Luminance: 9370 cd/sqm



TEST NUMBER:

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**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 1857.7  | 10.0      |
| 10°-20°   | 4663.1  | 25.0      |
| 20°-30°   | 4875.8  | 26.2      |
| 30°-40°   | 2641.8  | 14.2      |
| 40°-50°   | 1215.4  | 6.5       |
| 50°-60°   | 856.5   | 4.6       |
| 60°-70°   | 659.1   | 3.5       |
| 70°-80°   | 399.6   | 2.1       |
| 80°-90°   | 115.0   | 0.6       |
| 90°-100°  | 38.3    | 0.2       |
| 100°-110° | 239.7   | 1.3       |
| 110°-120° | 428.6   | 2.3       |
| 120°-130° | 251.5   | 1.4       |
| 130°-140° | 154.3   | 0.8       |
| 140°-150° | 107.0   | 0.6       |
| 150°-160° | 69.5    | 0.4       |
| 160°-170° | 39.6    | 0.2       |
| 170°-180° | 13.1    | 0.1       |
| 0°-30°    | 11396.6 | 61.2      |
| 0°-40°    | 14038.4 | 75.4      |
| 0°-60°    | 16110.2 | 86.5      |
| 0°-90°    | 17283.9 | 92.8      |
| 90°-120°  | 706.7   | 3.8       |
| 90°-150°  | 1219.5  | 6.5       |
| 90°-180°  | 1342.0  | 7.2       |
| 0°-180°   | 18625.7 | 100.0     |

**CANDELA DISTRIBUTION:**

|      | 0°    | 22.5° | 45°   | 67.5° | 90°   | Flux |
|------|-------|-------|-------|-------|-------|------|
| 0°   | 20167 | 20167 | 20167 | 20167 | 20167 |      |
| 5°   | 19829 | 19829 | 19829 | 19829 | 19829 | 1858 |
| 15°  | 16825 | 16825 | 16825 | 16825 | 16825 | 4663 |
| 25°  | 10807 | 10807 | 10807 | 10807 | 10807 | 4876 |
| 35°  | 4049  | 4049  | 4049  | 4049  | 4049  | 2642 |
| 45°  | 1516  | 1516  | 1516  | 1516  | 1516  | 1215 |
| 55°  | 946   | 946   | 946   | 946   | 946   | 856  |
| 65°  | 667   | 667   | 667   | 667   | 667   | 659  |
| 75°  | 378   | 378   | 378   | 378   | 378   | 400  |
| 85°  | 97    | 97    | 97    | 97    | 97    | 108  |
| 90°  | 10    | 17    | 28    | 18    | 10    | 10   |
| 95°  | 17    | 28    | 62    | 31    | 19    | 16   |
| 105° | 84    | 165   | 422   | 182   | 111   | 112  |
| 115° | 386   | 406   | 498   | 478   | 475   | 355  |
| 125° | 278   | 260   | 266   | 270   | 303   | 253  |
| 135° | 203   | 197   | 204   | 191   | 190   | 159  |
| 145° | 167   | 164   | 174   | 172   | 171   | 106  |
| 155° | 146   | 144   | 151   | 151   | 151   | 68   |
| 165° | 137   | 137   | 141   | 141   | 140   | 39   |
| 175° | 135   | 135   | 138   | 138   | 138   | 13   |
| 180° | 137   | 137   | 137   | 137   | 137   |      |



TEST NUMBER:

CATALOG NUMBER: EHBR1-18-UNV-N-L950-UPL15

**CANDELA DISTRIBUTION (FULL):**

|        | 0°      | 22.5°   | 45°     | 67.5°   | 90°     |
|--------|---------|---------|---------|---------|---------|
| 0°     | 20166.9 | 20166.9 | 20166.9 | 20166.9 | 20166.9 |
| 2.5°   | 20095.4 | 20095.4 | 20095.4 | 20095.4 | 20095.4 |
| 5°     | 19828.6 | 19828.6 | 19828.6 | 19828.6 | 19828.6 |
| 7.5°   | 19373.1 | 19373.1 | 19373.1 | 19373.1 | 19373.1 |
| 10°    | 18726.9 | 18726.9 | 18726.9 | 18726.9 | 18726.9 |
| 12.5°  | 17891.9 | 17891.9 | 17891.9 | 17891.9 | 17891.9 |
| 15°    | 16825.0 | 16825.0 | 16825.0 | 16825.0 | 16825.0 |
| 17.5°  | 15587.3 | 15587.3 | 15587.3 | 15587.3 | 15587.3 |
| 20°    | 14138.7 | 14138.7 | 14138.7 | 14138.7 | 14138.7 |
| 22.5°  | 12525.9 | 12525.9 | 12525.9 | 12525.9 | 12525.9 |
| 25°    | 10806.9 | 10806.9 | 10806.9 | 10806.9 | 10806.9 |
| 27.5°  | 8984.4  | 8984.4  | 8984.4  | 8984.4  | 8984.4  |
| 30°    | 7143.3  | 7143.3  | 7143.3  | 7143.3  | 7143.3  |
| 32.5°  | 5482.2  | 5482.2  | 5482.2  | 5482.2  | 5482.2  |
| 35°    | 4049.0  | 4049.0  | 4049.0  | 4049.0  | 4049.0  |
| 37.5°  | 2972.9  | 2972.9  | 2972.9  | 2972.9  | 2972.9  |
| 40°    | 2262.4  | 2262.4  | 2262.4  | 2262.4  | 2262.4  |
| 42.5°  | 1814.1  | 1814.1  | 1814.1  | 1814.1  | 1814.1  |
| 45°    | 1516.0  | 1516.0  | 1516.0  | 1516.0  | 1516.0  |
| 47.5°  | 1301.2  | 1301.2  | 1301.2  | 1301.2  | 1301.2  |
| 50°    | 1147.8  | 1147.8  | 1147.8  | 1147.8  | 1147.8  |
| 52.5°  | 1035.9  | 1035.9  | 1035.9  | 1035.9  | 1035.9  |
| 55°    | 945.9   | 945.9   | 945.9   | 945.9   | 945.9   |
| 57.5°  | 873.0   | 873.0   | 873.0   | 873.0   | 873.0   |
| 60°    | 805.5   | 805.5   | 805.5   | 805.5   | 805.5   |
| 62.5°  | 738.1   | 738.1   | 738.1   | 738.1   | 738.1   |
| 65°    | 667.1   | 667.1   | 667.1   | 667.1   | 667.1   |
| 67.5°  | 594.7   | 594.7   | 594.7   | 594.7   | 594.7   |
| 70°    | 521.5   | 521.5   | 521.5   | 521.5   | 521.5   |
| 72.5°  | 450.3   | 450.3   | 450.3   | 450.3   | 450.3   |
| 75°    | 378.5   | 378.5   | 378.5   | 378.5   | 378.5   |
| 77.5°  | 308.2   | 308.2   | 308.2   | 308.2   | 308.2   |
| 80°    | 234.6   | 234.6   | 234.6   | 234.6   | 234.6   |
| 82.5°  | 164.3   | 164.3   | 164.3   | 164.3   | 164.3   |
| 85°    | 97.1    | 97.1    | 97.1    | 97.1    | 97.1    |
| 87.5°  | 34.7    | 34.7    | 34.7    | 34.7    | 34.7    |
| 90°    | 10.5    | 16.7    | 28.2    | 18.2    | 10.5    |
| 92.5°  | 14.6    | 24.6    | 44.5    | 23.0    | 13.1    |
| 95°    | 16.9    | 28.4    | 62.3    | 30.8    | 19.2    |
| 97.5°  | 21.5    | 31.5    | 71.4    | 37.6    | 29.9    |
| 100°   | 28.4    | 36.9    | 111.4   | 46.1    | 40.0    |
| 102.5° | 48.4    | 78.3    | 236.6   | 86.8    | 60.7    |
| 105°   | 83.7    | 165.1   | 421.6   | 182.0   | 110.6   |
| 107.5° | 145.1   | 295.6   | 556.1   | 322.6   | 209.7   |
| 110°   | 271.1   | 392.5   | 582.9   | 443.1   | 335.6   |



TEST NUMBER:

CATALOG NUMBER: EHBR1-18-UNV-N-L950-UPL15

**CANDELA DISTRIBUTION (continued):**

|        | 0°    | 22.5° | 45°   | 67.5° | 90°   |
|--------|-------|-------|-------|-------|-------|
| 112.5° | 366.3 | 421.6 | 558.3 | 489.2 | 437.0 |
| 115°   | 385.6 | 405.5 | 498.5 | 477.7 | 474.6 |
| 117.5° | 372.5 | 370.2 | 423.2 | 429.3 | 458.5 |
| 120°   | 344.8 | 329.5 | 353.2 | 374.8 | 413.9 |
| 122.5° | 310.2 | 291.8 | 302.6 | 318.7 | 357.9 |
| 125°   | 278.0 | 259.6 | 266.5 | 270.4 | 303.4 |
| 127.5° | 249.6 | 237.3 | 241.2 | 236.6 | 257.3 |
| 130°   | 230.4 | 219.6 | 225.0 | 214.3 | 224.3 |
| 132.5° | 214.3 | 207.4 | 213.5 | 200.4 | 203.5 |
| 135°   | 202.7 | 196.6 | 203.5 | 191.2 | 190.5 |
| 137.5° | 192.8 | 187.4 | 194.3 | 185.1 | 182.8 |
| 140°   | 183.6 | 178.9 | 186.7 | 179.7 | 178.2 |
| 142.5° | 173.6 | 170.5 | 179.7 | 175.1 | 173.6 |
| 145°   | 166.7 | 164.4 | 174.3 | 172.1 | 171.2 |
| 147.5° | 160.6 | 159.0 | 168.2 | 167.4 | 167.4 |
| 150°   | 155.2 | 153.6 | 162.8 | 162.0 | 162.8 |
| 152.5° | 149.8 | 148.2 | 156.6 | 155.9 | 156.6 |
| 155°   | 146.0 | 144.4 | 151.3 | 151.3 | 151.3 |
| 157.5° | 142.8 | 142.1 | 147.5 | 147.5 | 147.5 |
| 160°   | 140.6 | 139.7 | 144.4 | 144.4 | 143.6 |
| 162.5° | 138.3 | 137.5 | 142.8 | 142.1 | 142.1 |
| 165°   | 136.7 | 136.7 | 140.6 | 140.6 | 139.7 |
| 167.5° | 136.7 | 135.9 | 139.7 | 139.7 | 139.0 |
| 170°   | 135.9 | 135.9 | 139.0 | 138.3 | 137.5 |
| 172.5° | 135.9 | 135.9 | 139.0 | 138.3 | 137.5 |
| 175°   | 135.2 | 135.2 | 137.5 | 137.5 | 137.5 |
| 177.5° | 135.9 | 135.9 | 137.5 | 137.5 | 136.7 |
| 180°   | 136.7 | 136.7 | 136.7 | 136.7 | 136.7 |



TEST NUMBER: CATALOG  
 CATALOG NUMBER: EHBR1-18-UNV-N-L950-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 | 14.65            | 15.71 | 15.15 | 16.18 | 16.67 | 14.65          | 15.71 | 15.15 | 16.18 | 16.67 |
|                 | 3H   | 16.43            | 17.37 | 16.94 | 17.85 | 18.40 | 16.43          | 17.37 | 16.94 | 17.85 | 18.40 |
|                 | 4H   | 17.09            | 17.97 | 17.62 | 18.46 | 19.02 | 17.09          | 17.97 | 17.62 | 18.46 | 19.02 |
|                 | 6H   | 17.55            | 18.36 | 18.09 | 18.87 | 19.44 | 17.55          | 18.36 | 18.09 | 18.87 | 19.44 |
|                 | 8H   | 17.67            | 18.44 | 18.23 | 18.97 | 19.54 | 17.67          | 18.44 | 18.23 | 18.97 | 19.54 |
|                 | 12H  | 17.73            | 18.45 | 18.28 | 18.98 | 19.58 | 17.73          | 18.45 | 18.28 | 18.98 | 19.58 |
| 4H              | 2H   | 15.19            | 16.07 | 15.73 | 16.57 | 17.13 | 15.19          | 16.07 | 15.73 | 16.57 | 17.13 |
|                 | 3H   | 17.16            | 17.89 | 17.71 | 18.43 | 19.01 | 17.16          | 17.89 | 17.71 | 18.43 | 19.01 |
|                 | 4H   | 17.94            | 18.59 | 18.50 | 19.14 | 19.76 | 17.94          | 18.59 | 18.50 | 19.14 | 19.76 |
|                 | 6H   | 18.51            | 19.07 | 19.09 | 19.65 | 20.28 | 18.51          | 19.07 | 19.09 | 19.65 | 20.28 |
|                 | 8H   | 18.67            | 19.19 | 19.26 | 19.77 | 20.40 | 18.67          | 19.19 | 19.26 | 19.77 | 20.40 |
|                 | 12H  | 18.75            | 19.21 | 19.35 | 19.81 | 20.46 | 18.75          | 19.21 | 19.35 | 19.81 | 20.46 |
| 8H              | 4H   | 18.17            | 18.69 | 18.76 | 19.27 | 19.90 | 18.17          | 18.69 | 18.76 | 19.27 | 19.90 |
|                 | 6H   | 18.85            | 19.27 | 19.47 | 19.90 | 20.54 | 18.85          | 19.27 | 19.47 | 19.90 | 20.54 |
|                 | 8H   | 19.07            | 19.45 | 19.71 | 20.08 | 20.74 | 19.07          | 19.45 | 19.71 | 20.08 | 20.74 |
|                 | 12H  | 19.21            | 19.54 | 19.84 | 20.15 | 20.89 | 19.21          | 19.54 | 19.84 | 20.15 | 20.89 |
| 12H             | 4H   | 18.16            | 18.62 | 18.77 | 19.23 | 19.87 | 18.16          | 18.62 | 18.77 | 19.23 | 19.87 |
|                 | 6H   | 18.87            | 19.25 | 19.51 | 19.89 | 20.54 | 18.87          | 19.25 | 19.51 | 19.89 | 20.54 |
|                 | 8H   | 19.14            | 19.46 | 19.77 | 20.08 | 20.81 | 19.14          | 19.46 | 19.77 | 20.08 | 20.81 |

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

Report Prepared for

Cooper Lighting Solutions

Metalux

Report Number: SP1-2506-472-8

Test Date: 08/04/2025

Luminaire Tested: EHBR-60-L950-N

Data in this report applies to families of products including EHBR-60-L950-N

**Test Information**

Test Method: LM-79-2019  
 Report Number: SP1-2506-472-8  
 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-L950-N**  
 Description: Elevate Round Highbay at, 60000 lumens, 5000K 90CRI LEDs with N lens

**Spectral Parameters**

CCT (K): 4901  
 CIE u': 0.2131  
 CIE v': 0.4853  
 Duv: -0.0008  
 CIE x: 0.3477  
 CIE y: 0.3520  
 CIE z: 0.3003  
 Peak Wavelength (nm): 630  
 Dominant Wavelength (nm): 574  
 Purity: 9.953987  
 Rf: 90.7  
 Rg: 100.5

|           |      |      |      |
|-----------|------|------|------|
| CRI (Ra): | 94.3 |      |      |
| R1:       | 95.8 | R9:  | 72.3 |
| R2:       | 96.5 | R10: | 89.1 |
| R3:       | 94.4 | R11: | 94.9 |
| R4:       | 95.3 | R12: | 68.4 |
| R5:       | 94.1 | R13: | 96.4 |
| R6:       | 92.5 | R14: | 96.4 |
| R7:       | 95.5 | R15: | 93.9 |
| R8:       | 90.1 |      |      |



**Test Conditions**

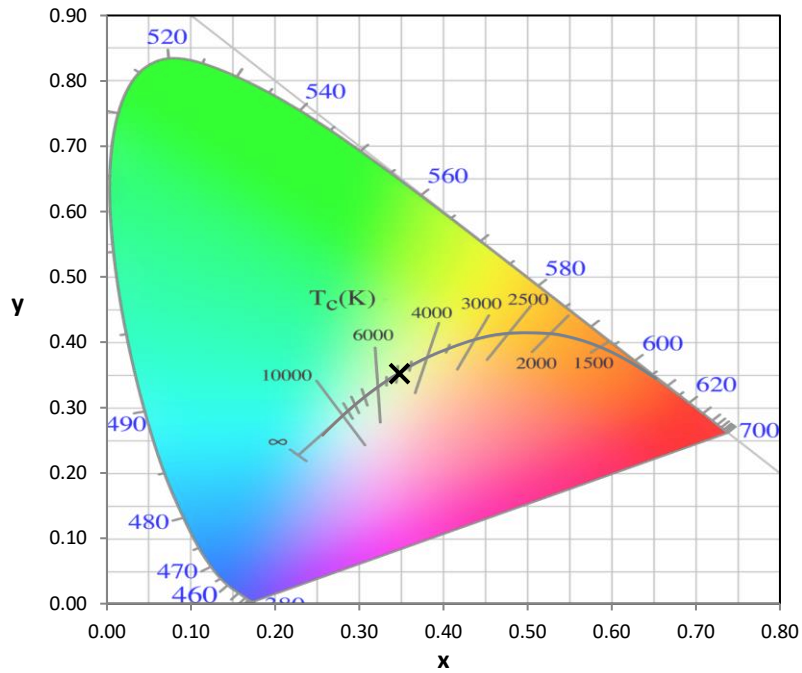
Stabilization Time: 35M  
 Operation Time: 1H 35M  
 Sphere Temperature (°C): 25.0

REPORT NUMBER: SP1-2506-472-8

| 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 5000K 4-step quadrangle

REPORT NUMBER: SP1-2506-472-8

**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    | 221                      | NR            | 620    | 326                      | NR            | 750    | 7                        | NR            | 880    | 0                        | NR            |
| 365    | 0                        | NR            | 495    | 250                      | NR            | 625    | 325                      | NR            | 755    | 6                        | NR            | 885    | 0                        | NR            |
| 370    | 0                        | NR            | 500    | 284                      | NR            | 630    | 1000                     | NR            | 760    | 5                        | NR            | 890    | 0                        | NR            |
| 375    | 0                        | NR            | 505    | 311                      | NR            | 635    | 643                      | NR            | 765    | 4                        | NR            | 895    | 0                        | NR            |
| 380    | 0                        | NR            | 510    | 329                      | NR            | 640    | 206                      | NR            | 770    | 4                        | NR            | 900    | 0                        | NR            |
| 385    | 1                        | NR            | 515    | 344                      | NR            | 645    | 199                      | NR            | 775    | 3                        | NR            | 905    | 0                        | NR            |
| 390    | 2                        | NR            | 520    | 353                      | NR            | 650    | 172                      | NR            | 780    | 3                        | NR            | 910    | 0                        | NR            |
| 395    | 3                        | NR            | 525    | 357                      | NR            | 655    | 143                      | NR            | 785    | 2                        | NR            | 915    | 0                        | NR            |
| 400    | 5                        | NR            | 530    | 362                      | NR            | 660    | 122                      | NR            | 790    | 2                        | NR            | 920    | 0                        | NR            |
| 405    | 6                        | NR            | 535    | 365                      | NR            | 665    | 102                      | NR            | 795    | 2                        | NR            | 925    | 0                        | NR            |
| 410    | 9                        | NR            | 540    | 367                      | NR            | 670    | 94                       | NR            | 800    | 2                        | NR            | 930    | 0                        | NR            |
| 415    | 15                       | NR            | 545    | 369                      | NR            | 675    | 76                       | NR            | 805    | 1                        | NR            | 935    | 0                        | NR            |
| 420    | 26                       | NR            | 550    | 370                      | NR            | 680    | 65                       | NR            | 810    | 1                        | NR            | 940    | 0                        | NR            |
| 425    | 47                       | NR            | 555    | 372                      | NR            | 685    | 56                       | NR            | 815    | 1                        | NR            | 945    | 0                        | NR            |
| 430    | 81                       | NR            | 560    | 372                      | NR            | 690    | 48                       | NR            | 820    | 1                        | NR            | 950    | 0                        | NR            |
| 435    | 143                      | NR            | 565    | 371                      | NR            | 695    | 41                       | NR            | 825    | 1                        | NR            | 955    | 0                        | NR            |
| 440    | 243                      | NR            | 570    | 370                      | NR            | 700    | 35                       | NR            | 830    | 1                        | NR            | 960    | 0                        | NR            |
| 445    | 434                      | NR            | 575    | 367                      | NR            | 705    | 30                       | NR            | 835    | 1                        | NR            | 965    | 0                        | NR            |
| 450    | 675                      | NR            | 580    | 365                      | NR            | 710    | 25                       | NR            | 840    | 1                        | NR            | 970    | 0                        | NR            |
| 455    | 615                      | NR            | 585    | 361                      | NR            | 715    | 22                       | NR            | 845    | 0                        | NR            | 975    | 0                        | NR            |
| 460    | 418                      | NR            | 590    | 356                      | NR            | 720    | 19                       | NR            | 850    | 0                        | NR            | 980    | 0                        | NR            |
| 465    | 344                      | NR            | 595    | 348                      | NR            | 725    | 16                       | NR            | 855    | 0                        | NR            | 985    | 0                        | NR            |
| 470    | 272                      | NR            | 600    | 343                      | NR            | 730    | 13                       | NR            | 860    | 0                        | NR            | 990    | 0                        | NR            |
| 475    | 206                      | NR            | 605    | 337                      | NR            | 735    | 11                       | NR            | 865    | 0                        | NR            | 995    | 0                        | NR            |
| 480    | 190                      | NR            | 610    | 362                      | NR            | 740    | 10                       | NR            | 870    | 0                        | NR            | 1000   | 0                        | NR            |
| 485    | 202                      | NR            | 615    | 381                      | NR            | 745    | 8                        | NR            | 875    | 0                        | NR            |        |                          |               |

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**Scotopic Flux vs. Wavelength**



**Scotopic Lumens: NR**

**S/P: 2.04**

| $\lambda$ (nm) | Power $W^{\wedge}/nm$ | Lumens ( $\phi/nm$ ) | $\lambda$ (nm) | Power $W^{\wedge}/nm$ | Lumens ( $\phi/nm$ ) | $\lambda$ (nm) | Power $W^{\wedge}/nm$ | Lumens ( $\phi/nm$ ) | $\lambda$ (nm) | Power $W^{\wedge}/nm$ | Lumens ( $\phi/nm$ ) | $\lambda$ (nm) | Power $W^{\wedge}/nm$ | Lumens ( $\phi/nm$ ) |
|----------------|-----------------------|----------------------|----------------|-----------------------|----------------------|----------------|-----------------------|----------------------|----------------|-----------------------|----------------------|----------------|-----------------------|----------------------|
| 360            | 0                     | NR                   | 490            | 221                   | NR                   | 620            | 326                   | NR                   | 750            | 7                     | NR                   | 880            | 0                     | NR                   |
| 365            | 0                     | NR                   | 495            | 250                   | NR                   | 625            | 325                   | NR                   | 755            | 6                     | NR                   | 885            | 0                     | NR                   |
| 370            | 0                     | NR                   | 500            | 284                   | NR                   | 630            | 1000                  | NR                   | 760            | 5                     | NR                   | 890            | 0                     | NR                   |
| 375            | 0                     | NR                   | 505            | 311                   | NR                   | 635            | 643                   | NR                   | 765            | 4                     | NR                   | 895            | 0                     | NR                   |
| 380            | 0                     | NR                   | 510            | 329                   | NR                   | 640            | 206                   | NR                   | 770            | 4                     | NR                   | 900            | 0                     | NR                   |
| 385            | 1                     | NR                   | 515            | 344                   | NR                   | 645            | 199                   | NR                   | 775            | 3                     | NR                   | 905            | 0                     | NR                   |
| 390            | 2                     | NR                   | 520            | 353                   | NR                   | 650            | 172                   | NR                   | 780            | 3                     | NR                   | 910            | 0                     | NR                   |
| 395            | 3                     | NR                   | 525            | 357                   | NR                   | 655            | 143                   | NR                   | 785            | 2                     | NR                   | 915            | 0                     | NR                   |
| 400            | 5                     | NR                   | 530            | 362                   | NR                   | 660            | 122                   | NR                   | 790            | 2                     | NR                   | 920            | 0                     | NR                   |
| 405            | 6                     | NR                   | 535            | 365                   | NR                   | 665            | 102                   | NR                   | 795            | 2                     | NR                   | 925            | 0                     | NR                   |
| 410            | 9                     | NR                   | 540            | 367                   | NR                   | 670            | 94                    | NR                   | 800            | 2                     | NR                   | 930            | 0                     | NR                   |
| 415            | 15                    | NR                   | 545            | 369                   | NR                   | 675            | 76                    | NR                   | 805            | 1                     | NR                   | 935            | 0                     | NR                   |
| 420            | 26                    | NR                   | 550            | 370                   | NR                   | 680            | 65                    | NR                   | 810            | 1                     | NR                   | 940            | 0                     | NR                   |
| 425            | 47                    | NR                   | 555            | 372                   | NR                   | 685            | 56                    | NR                   | 815            | 1                     | NR                   | 945            | 0                     | NR                   |
| 430            | 81                    | NR                   | 560            | 372                   | NR                   | 690            | 48                    | NR                   | 820            | 1                     | NR                   | 950            | 0                     | NR                   |
| 435            | 143                   | NR                   | 565            | 371                   | NR                   | 695            | 41                    | NR                   | 825            | 1                     | NR                   | 955            | 0                     | NR                   |
| 440            | 243                   | NR                   | 570            | 370                   | NR                   | 700            | 35                    | NR                   | 830            | 1                     | NR                   | 960            | 0                     | NR                   |
| 445            | 434                   | NR                   | 575            | 367                   | NR                   | 705            | 30                    | NR                   | 835            | 1                     | NR                   | 965            | 0                     | NR                   |
| 450            | 675                   | NR                   | 580            | 365                   | NR                   | 710            | 25                    | NR                   | 840            | 1                     | NR                   | 970            | 0                     | NR                   |
| 455            | 615                   | NR                   | 585            | 361                   | NR                   | 715            | 22                    | NR                   | 845            | 0                     | NR                   | 975            | 0                     | NR                   |
| 460            | 418                   | NR                   | 590            | 356                   | NR                   | 720            | 19                    | NR                   | 850            | 0                     | NR                   | 980            | 0                     | NR                   |
| 465            | 344                   | NR                   | 595            | 348                   | NR                   | 725            | 16                    | NR                   | 855            | 0                     | NR                   | 985            | 0                     | NR                   |
| 470            | 272                   | NR                   | 600            | 343                   | NR                   | 730            | 13                    | NR                   | 860            | 0                     | NR                   | 990            | 0                     | NR                   |
| 475            | 206                   | NR                   | 605            | 337                   | NR                   | 735            | 11                    | NR                   | 865            | 0                     | NR                   | 995            | 0                     | NR                   |
| 480            | 190                   | NR                   | 610            | 362                   | NR                   | 740            | 10                    | NR                   | 870            | 0                     | NR                   | 1000           | 0                     | NR                   |
| 485            | 202                   | NR                   | 615            | 381                   | NR                   | 745            | 8                     | NR                   | 875            | 0                     | NR                   |                |                       |                      |

REPORT NUMBER: SP1-2506-472-8

Melanopic Flux vs. Wavelength



Melanopic Lumens: NR

M/P: 4.41

| 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    | 221                      | NR            | 620    | 326                      | NR            | 750    | 7                        | NR            | 880    | 0                        | NR            |
| 365    | 0                        | NR            | 495    | 250                      | NR            | 625    | 325                      | NR            | 755    | 6                        | NR            | 885    | 0                        | NR            |
| 370    | 0                        | NR            | 500    | 284                      | NR            | 630    | 1000                     | NR            | 760    | 5                        | NR            | 890    | 0                        | NR            |
| 375    | 0                        | NR            | 505    | 311                      | NR            | 635    | 643                      | NR            | 765    | 4                        | NR            | 895    | 0                        | NR            |
| 380    | 0                        | NR            | 510    | 329                      | NR            | 640    | 206                      | NR            | 770    | 4                        | NR            | 900    | 0                        | NR            |
| 385    | 1                        | NR            | 515    | 344                      | NR            | 645    | 199                      | NR            | 775    | 3                        | NR            | 905    | 0                        | NR            |
| 390    | 2                        | NR            | 520    | 353                      | NR            | 650    | 172                      | NR            | 780    | 3                        | NR            | 910    | 0                        | NR            |
| 395    | 3                        | NR            | 525    | 357                      | NR            | 655    | 143                      | NR            | 785    | 2                        | NR            | 915    | 0                        | NR            |
| 400    | 5                        | NR            | 530    | 362                      | NR            | 660    | 122                      | NR            | 790    | 2                        | NR            | 920    | 0                        | NR            |
| 405    | 6                        | NR            | 535    | 365                      | NR            | 665    | 102                      | NR            | 795    | 2                        | NR            | 925    | 0                        | NR            |
| 410    | 9                        | NR            | 540    | 367                      | NR            | 670    | 94                       | NR            | 800    | 2                        | NR            | 930    | 0                        | NR            |
| 415    | 15                       | NR            | 545    | 369                      | NR            | 675    | 76                       | NR            | 805    | 1                        | NR            | 935    | 0                        | NR            |
| 420    | 26                       | NR            | 550    | 370                      | NR            | 680    | 65                       | NR            | 810    | 1                        | NR            | 940    | 0                        | NR            |
| 425    | 47                       | NR            | 555    | 372                      | NR            | 685    | 56                       | NR            | 815    | 1                        | NR            | 945    | 0                        | NR            |
| 430    | 81                       | NR            | 560    | 372                      | NR            | 690    | 48                       | NR            | 820    | 1                        | NR            | 950    | 0                        | NR            |
| 435    | 143                      | NR            | 565    | 371                      | NR            | 695    | 41                       | NR            | 825    | 1                        | NR            | 955    | 0                        | NR            |
| 440    | 243                      | NR            | 570    | 370                      | NR            | 700    | 35                       | NR            | 830    | 1                        | NR            | 960    | 0                        | NR            |
| 445    | 434                      | NR            | 575    | 367                      | NR            | 705    | 30                       | NR            | 835    | 1                        | NR            | 965    | 0                        | NR            |
| 450    | 675                      | NR            | 580    | 365                      | NR            | 710    | 25                       | NR            | 840    | 1                        | NR            | 970    | 0                        | NR            |
| 455    | 615                      | NR            | 585    | 361                      | NR            | 715    | 22                       | NR            | 845    | 0                        | NR            | 975    | 0                        | NR            |
| 460    | 418                      | NR            | 590    | 356                      | NR            | 720    | 19                       | NR            | 850    | 0                        | NR            | 980    | 0                        | NR            |
| 465    | 344                      | NR            | 595    | 348                      | NR            | 725    | 16                       | NR            | 855    | 0                        | NR            | 985    | 0                        | NR            |
| 470    | 272                      | NR            | 600    | 343                      | NR            | 730    | 13                       | NR            | 860    | 0                        | NR            | 990    | 0                        | NR            |
| 475    | 206                      | NR            | 605    | 337                      | NR            | 735    | 11                       | NR            | 865    | 0                        | NR            | 995    | 0                        | NR            |
| 480    | 190                      | NR            | 610    | 362                      | NR            | 740    | 10                       | NR            | 870    | 0                        | NR            | 1000   | 0                        | NR            |
| 485    | 202                      | NR            | 615    | 381                      | NR            | 745    | 8                        | NR            | 875    | 0                        | NR            |        |                          |               |

**Summary**

$R_f = 90.7$   
 $R_g = 100.5$   
 CIE  $R_a = 94.3$   
 $R_9 = 72.3$



**Color Vector Graphics**



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

|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 85 | CES26 = 91 | CES51 = 98 | CES76 = 83 |
| CES02 = 61 | CES27 = 92 | CES52 = 98 | CES77 = 87 |
| CES03 = 31 | CES28 = 94 | CES53 = 97 | CES78 = 80 |
| CES04 = 69 | CES29 = 94 | CES54 = 93 | CES79 = 94 |
| CES05 = 48 | CES30 = 93 | CES55 = 92 | CES80 = 91 |
| CES06 = 50 | CES31 = 95 | CES56 = 95 | CES81 = 84 |
| CES07 = 41 | CES32 = 86 | CES57 = 94 | CES82 = 96 |
| CES08 = 40 | CES33 = 99 | CES58 = 94 | CES83 = 96 |
| CES09 = 29 | CES34 = 90 | CES59 = 97 | CES84 = 93 |
| CES10 = 73 | CES35 = 94 | CES60 = 92 | CES85 = 83 |
| CES11 = 56 | CES36 = 81 | CES61 = 92 | CES86 = 86 |
| CES12 = 62 | CES37 = 92 | CES62 = 86 | CES87 = 91 |
| CES13 = 43 | CES38 = 88 | CES63 = 92 | CES88 = 98 |
| CES14 = 74 | CES39 = 99 | CES64 = 89 | CES89 = 87 |
| CES15 = 71 | CES40 = 97 | CES65 = 88 | CES90 = 98 |
| CES16 = 47 | CES41 = 97 | CES66 = 85 | CES91 = 73 |
| CES17 = 48 | CES42 = 90 | CES67 = 84 | CES92 = 79 |
| CES18 = 56 | CES43 = 91 | CES68 = 86 | CES93 = 87 |
| CES19 = 70 | CES44 = 99 | CES69 = 87 | CES94 = 78 |
| CES20 = 65 | CES45 = 95 | CES70 = 83 | CES95 = 83 |
| CES21 = 85 | CES46 = 97 | CES71 = 77 | CES96 = 92 |
| CES22 = 77 | CES47 = 95 | CES72 = 92 | CES97 = 95 |
| CES23 = 91 | CES48 = 93 | CES73 = 77 | CES98 = 95 |
| CES24 = 90 | CES49 = 95 | CES74 = 92 | CES99 = 94 |
| CES25 = 70 | CES50 = 98 | CES75 = 79 |            |



Color Rendition by Hue-Angle Bin



Measure Comparisons



(END OF REPORT)