

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: P1433467

Luminaire Tested: EHBR1-18-UNV-W-L935-UPL12

Issue Date: 3/20/2026

**Test Information**

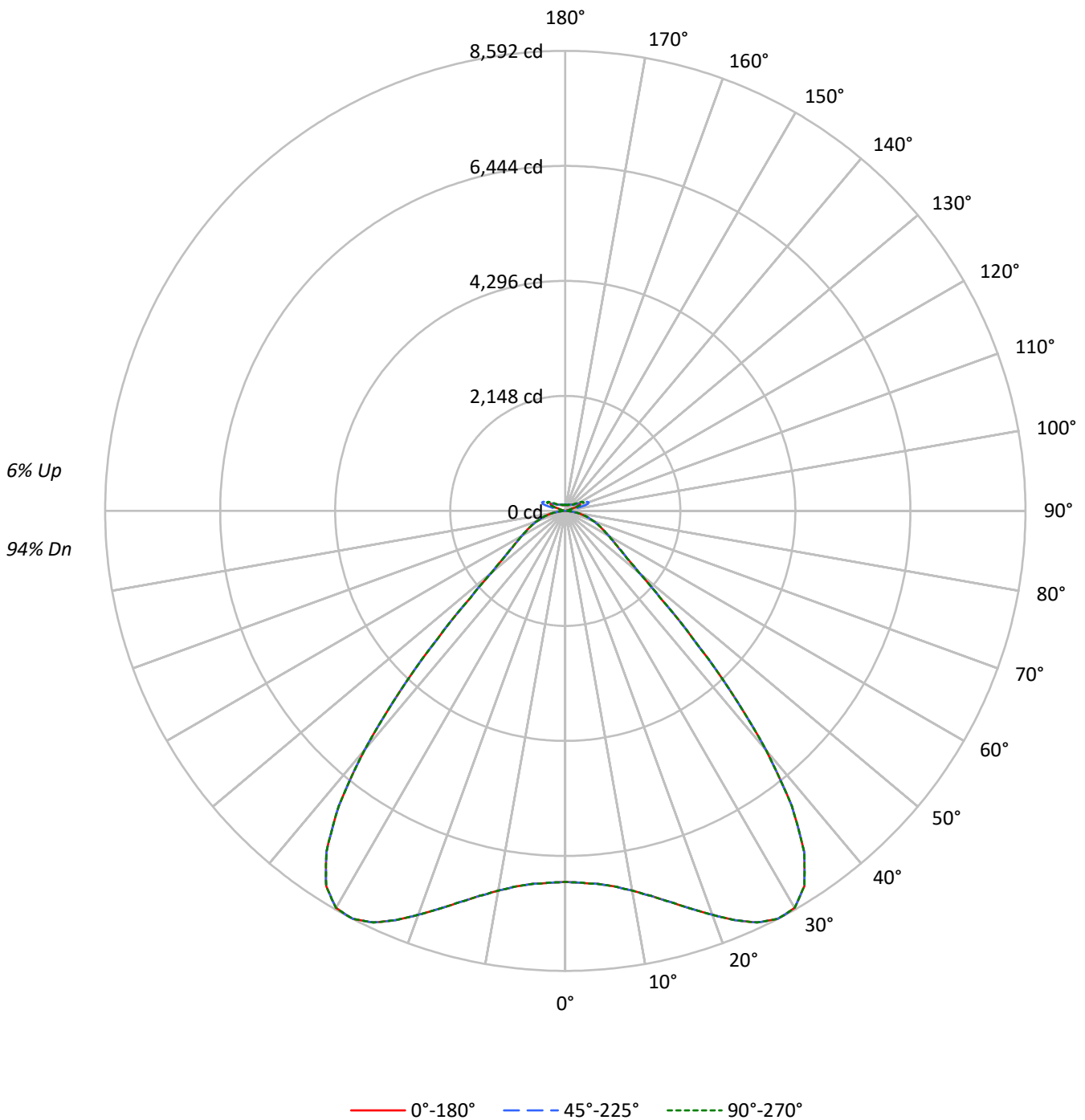
Test Method: LM-79-2019  
Report Number: P1433467  
REPORT IS A COMBINATION OF REPORTS P1431692 AND P1431635  
Test Lab: INNOVATION CENTER  
Issue Date: 3/20/2026  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: METALUX  
Catalog Number: EHBR1-18-UNV-W-L935-UPL12  
Description: Elevate Round Highbay at, 19000 lumens, 3500K 90CRI LEDs with W lens  
Light Source: -  
Ballast/Driver: -

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 17635.6 lumens  
Efficiency: N/A  
Efficacy: 172.7 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): 102.1  
Input Voltage (V): NR  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: NR  
Total Harmonic Distortion (THDi): NR  
Frequency (hertz): 60  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 24 FT

TEST NUMBER: P1433467  
CATALOG NUMBER: EHBR1-18-UNV-W-L935-UPL12

### Luminous Intensity Polar Plot





TEST NUMBER: P1433467

CATALOG NUMBER: EHBR1-18-UNV-W-L935-UPL12

**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 | 114 | 114 | 114 | 114 | 108 | 108 | 108 | 102 | 102 | 102 | 96 | 96 | 96 | 96 | 96 | 96 | 94 |
| 1   | 110 | 106 | 103 | 100 | 107 | 103 | 100 | 97  | 98  | 96  | 93  | 93  | 91  | 89  | 89 | 87 | 86 | 86 | 86 | 86 | 83 |
| 2   | 102 | 95  | 90  | 85  | 99  | 93  | 88  | 84  | 89  | 85  | 81  | 85  | 81  | 78  | 81 | 78 | 76 | 76 | 76 | 76 | 74 |
| 3   | 95  | 86  | 79  | 74  | 92  | 84  | 78  | 73  | 80  | 75  | 71  | 77  | 73  | 69  | 74 | 70 | 67 | 67 | 67 | 67 | 65 |
| 4   | 88  | 78  | 71  | 65  | 85  | 76  | 70  | 64  | 73  | 67  | 63  | 70  | 65  | 61  | 68 | 64 | 60 | 60 | 60 | 60 | 58 |
| 5   | 82  | 71  | 63  | 58  | 79  | 70  | 62  | 57  | 67  | 61  | 56  | 64  | 59  | 55  | 62 | 58 | 54 | 54 | 54 | 54 | 52 |
| 6   | 76  | 65  | 57  | 52  | 74  | 64  | 56  | 51  | 61  | 55  | 50  | 59  | 54  | 49  | 57 | 52 | 49 | 49 | 49 | 49 | 47 |
| 7   | 71  | 59  | 52  | 46  | 69  | 58  | 51  | 46  | 56  | 50  | 45  | 54  | 49  | 45  | 53 | 48 | 44 | 44 | 44 | 44 | 42 |
| 8   | 67  | 55  | 47  | 42  | 65  | 54  | 47  | 42  | 52  | 46  | 41  | 50  | 45  | 40  | 49 | 44 | 40 | 40 | 40 | 40 | 38 |
| 9   | 62  | 50  | 43  | 38  | 61  | 50  | 43  | 38  | 48  | 42  | 37  | 47  | 41  | 37  | 45 | 40 | 36 | 36 | 36 | 36 | 35 |
| 10  | 59  | 47  | 39  | 35  | 57  | 46  | 39  | 35  | 45  | 38  | 34  | 43  | 38  | 34  | 42 | 37 | 33 | 33 | 33 | 33 | 32 |

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

|     | 0°    | 45°   | 90°   |
|-----|-------|-------|-------|
| 0°  | 32536 | 32536 | 32536 |
| 5°  | 32752 | 32752 | 32752 |
| 10° | 33890 | 33890 | 33890 |
| 15° | 36037 | 36037 | 36037 |
| 20° | 39066 | 39066 | 39066 |
| 25° | 42468 | 42468 | 42468 |
| 30° | 44514 | 44514 | 44514 |
| 35° | 42369 | 42369 | 42369 |
| 40° | 33620 | 33620 | 33620 |
| 45° | 20780 | 20780 | 20780 |
| 50° | 12033 | 12033 | 12033 |
| 55° | 9104  | 9104  | 9104  |
| 60° | 7810  | 7810  | 7810  |
| 65° | 7053  | 7053  | 7053  |
| 70° | 6489  | 6489  | 6489  |
| 75° | 5734  | 5734  | 5734  |
| 80° | 4672  | 4672  | 4672  |
| 85° | 2752  | 2752  | 2752  |

**MAXIMUM LUMINANCE 45°-90°:**

Horizontal Angle: 0°  
 Vertical Angle: 45°  
 Luminance: 20780 cd/sqm



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**ZONAL LUMENS:**

| Zone            | Lumens         | % Fixture    |
|-----------------|----------------|--------------|
| 0°-10°          | 674.1          | 3.8          |
| 10°-20°         | 2161.0         | 12.3         |
| 20°-30°         | 3900.8         | 22.1         |
| 30°-40°         | 4713.7         | 26.7         |
| 40°-50°         | 2693.0         | 15.3         |
| 50°-60°         | 1140.6         | 6.5          |
| 60°-70°         | 735.7          | 4.2          |
| 70°-80°         | 427.8          | 2.4          |
| 80°-90°         | 115.1          | 0.7          |
| 90°-100°        | 30.8           | 0.2          |
| 100°-110°       | 190.6          | 1.1          |
| 110°-120°       | 340.6          | 1.9          |
| 120°-130°       | 200.2          | 1.1          |
| 130°-140°       | 124.0          | 0.7          |
| 140°-150°       | 87.1           | 0.5          |
| 150°-160°       | 57.0           | 0.3          |
| 160°-170°       | 32.7           | 0.2          |
| 170°-180°       | 10.9           | 0.1          |
| <b>0°-30°</b>   | <b>6735.9</b>  | <b>38.2</b>  |
| <b>0°-40°</b>   | <b>11449.6</b> | <b>64.9</b>  |
| <b>0°-60°</b>   | <b>15283.2</b> | <b>86.7</b>  |
| <b>0°-90°</b>   | <b>16561.8</b> | <b>93.9</b>  |
| <b>90°-120°</b> | <b>562.0</b>   | <b>3.2</b>   |
| <b>90°-150°</b> | <b>973.3</b>   | <b>5.5</b>   |
| <b>90°-180°</b> | <b>1074.0</b>  | <b>6.1</b>   |
| <b>0°-180°</b>  | <b>17635.6</b> | <b>100.0</b> |

**CANDELA DISTRIBUTION:**

|      | 0°   | 22.5° | 45°  | 67.5° | 90°  | Flux |
|------|------|-------|------|-------|------|------|
| 0°   | 6928 | 6928  | 6928 | 6928  | 6928 |      |
| 5°   | 6993 | 6993  | 6993 | 6993  | 6993 | 674  |
| 15°  | 7560 | 7560  | 7560 | 7560  | 7560 | 2161 |
| 25°  | 8481 | 8481  | 8481 | 8481  | 8481 | 3901 |
| 35°  | 7776 | 7776  | 7776 | 7776  | 7776 | 4714 |
| 45°  | 3362 | 3362  | 3362 | 3362  | 3362 | 2693 |
| 55°  | 1230 | 1230  | 1230 | 1230  | 1230 | 1141 |
| 65°  | 736  | 736   | 736  | 736   | 736  | 736  |
| 75°  | 404  | 404   | 404  | 404   | 404  | 428  |
| 85°  | 95   | 95    | 95   | 95    | 95   | 109  |
| 90°  | 8    | 13    | 22   | 14    | 8    | 8    |
| 95°  | 14   | 23    | 50   | 25    | 16   | 13   |
| 105° | 67   | 131   | 335  | 145   | 88   | 89   |
| 115° | 306  | 322   | 396  | 379   | 377  | 282  |
| 125° | 221  | 207   | 212  | 215   | 242  | 202  |
| 135° | 163  | 158   | 164  | 154   | 153  | 127  |
| 145° | 136  | 134   | 142  | 140   | 139  | 86   |
| 155° | 120  | 119   | 124  | 124   | 124  | 56   |
| 165° | 113  | 113   | 116  | 116   | 116  | 32   |
| 175° | 112  | 112   | 114  | 114   | 114  | 11   |
| 180° | 114  | 114   | 114  | 114   | 114  |      |



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**CANDELA DISTRIBUTION (FULL):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 0°     | 6928.3 | 6928.3 | 6928.3 | 6928.3 | 6928.3 |
| 2.5°   | 6951.6 | 6951.6 | 6951.6 | 6951.6 | 6951.6 |
| 5°     | 6993.1 | 6993.1 | 6993.1 | 6993.1 | 6993.1 |
| 7.5°   | 7074.7 | 7074.7 | 7074.7 | 7074.7 | 7074.7 |
| 10°    | 7200.3 | 7200.3 | 7200.3 | 7200.3 | 7200.3 |
| 12.5°  | 7363.7 | 7363.7 | 7363.7 | 7363.7 | 7363.7 |
| 15°    | 7560.4 | 7560.4 | 7560.4 | 7560.4 | 7560.4 |
| 17.5°  | 7785.7 | 7785.7 | 7785.7 | 7785.7 | 7785.7 |
| 20°    | 8029.1 | 8029.1 | 8029.1 | 8029.1 | 8029.1 |
| 22.5°  | 8274.0 | 8274.0 | 8274.0 | 8274.0 | 8274.0 |
| 25°    | 8480.8 | 8480.8 | 8480.8 | 8480.8 | 8480.8 |
| 27.5°  | 8592.0 | 8592.0 | 8592.0 | 8592.0 | 8592.0 |
| 30°    | 8562.2 | 8562.2 | 8562.2 | 8562.2 | 8562.2 |
| 32.5°  | 8308.3 | 8308.3 | 8308.3 | 8308.3 | 8308.3 |
| 35°    | 7776.3 | 7776.3 | 7776.3 | 7776.3 | 7776.3 |
| 37.5°  | 6946.8 | 6946.8 | 6946.8 | 6946.8 | 6946.8 |
| 40°    | 5827.2 | 5827.2 | 5827.2 | 5827.2 | 5827.2 |
| 42.5°  | 4560.9 | 4560.9 | 4560.9 | 4560.9 | 4560.9 |
| 45°    | 3362.1 | 3362.1 | 3362.1 | 3362.1 | 3362.1 |
| 47.5°  | 2403.0 | 2403.0 | 2403.0 | 2403.0 | 2403.0 |
| 50°    | 1793.3 | 1793.3 | 1793.3 | 1793.3 | 1793.3 |
| 52.5°  | 1452.0 | 1452.0 | 1452.0 | 1452.0 | 1452.0 |
| 55°    | 1230.3 | 1230.3 | 1230.3 | 1230.3 | 1230.3 |
| 57.5°  | 1068.4 | 1068.4 | 1068.4 | 1068.4 | 1068.4 |
| 60°    | 938.9  | 938.9  | 938.9  | 938.9  | 938.9  |
| 62.5°  | 830.9  | 830.9  | 830.9  | 830.9  | 830.9  |
| 65°    | 736.2  | 736.2  | 736.2  | 736.2  | 736.2  |
| 67.5°  | 652.6  | 652.6  | 652.6  | 652.6  | 652.6  |
| 70°    | 569.4  | 569.4  | 569.4  | 569.4  | 569.4  |
| 72.5°  | 486.3  | 486.3  | 486.3  | 486.3  | 486.3  |
| 75°    | 403.9  | 403.9  | 403.9  | 403.9  | 403.9  |
| 77.5°  | 324.4  | 324.4  | 324.4  | 324.4  | 324.4  |
| 80°    | 245.8  | 245.8  | 245.8  | 245.8  | 245.8  |
| 82.5°  | 168.6  | 168.6  | 168.6  | 168.6  | 168.6  |
| 85°    | 94.6   | 94.6   | 94.6   | 94.6   | 94.6   |
| 87.5°  | 29.9   | 29.9   | 29.9   | 29.9   | 29.9   |
| 90°    | 8.4    | 13.3   | 22.5   | 14.5   | 8.4    |
| 92.5°  | 11.9   | 19.8   | 35.6   | 18.5   | 10.6   |
| 95°    | 14.0   | 23.0   | 49.8   | 24.9   | 15.8   |
| 97.5°  | 17.6   | 25.5   | 57.2   | 30.4   | 24.3   |
| 100°   | 23.0   | 29.7   | 88.8   | 37.1   | 32.2   |
| 102.5° | 38.9   | 62.6   | 188.1  | 69.3   | 48.7   |
| 105°   | 66.9   | 131.4  | 334.7  | 144.8  | 88.2   |
| 107.5° | 115.6  | 234.9  | 441.2  | 256.2  | 166.8  |
| 110°   | 215.7  | 311.9  | 462.9  | 352.0  | 266.8  |



TEST NUMBER: P1433467

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**CANDELA DISTRIBUTION (continued):**

|        | 0°    | 22.5° | 45°   | 67.5° | 90°   |
|--------|-------|-------|-------|-------|-------|
| 112.5° | 291.2 | 335.0 | 443.4 | 388.5 | 347.1 |
| 115°   | 306.4 | 322.2 | 395.9 | 379.4 | 377.0 |
| 117.5° | 296.0 | 294.2 | 336.2 | 341.1 | 364.3 |
| 120°   | 274.2 | 261.9 | 280.8 | 297.8 | 328.9 |
| 122.5° | 246.7 | 232.1 | 240.6 | 253.4 | 284.5 |
| 125°   | 221.4 | 206.8 | 212.4 | 215.3 | 241.5 |
| 127.5° | 198.9 | 189.2 | 192.2 | 188.6 | 205.0 |
| 130°   | 184.0 | 175.5 | 179.7 | 171.2 | 179.1 |
| 132.5° | 171.7 | 166.2 | 171.1 | 160.8 | 163.2 |
| 135°   | 162.9 | 158.0 | 163.5 | 153.7 | 153.2 |
| 137.5° | 155.3 | 151.0 | 156.4 | 149.2 | 147.3 |
| 140°   | 148.5 | 144.9 | 151.0 | 145.6 | 144.3 |
| 142.5° | 140.9 | 138.5 | 145.8 | 142.1 | 140.9 |
| 145°   | 135.7 | 133.9 | 141.8 | 139.9 | 139.4 |
| 147.5° | 131.1 | 129.9 | 137.2 | 136.6 | 136.6 |
| 150°   | 126.9 | 125.6 | 133.0 | 132.3 | 133.0 |
| 152.5° | 122.6 | 121.4 | 128.1 | 127.4 | 128.1 |
| 155°   | 119.8 | 118.6 | 124.1 | 124.1 | 124.1 |
| 157.5° | 117.4 | 116.7 | 121.1 | 121.1 | 121.1 |
| 160°   | 115.8 | 115.2 | 118.9 | 118.9 | 118.3 |
| 162.5° | 114.3 | 113.7 | 117.9 | 117.3 | 117.3 |
| 165°   | 113.0 | 113.0 | 116.1 | 116.1 | 115.5 |
| 167.5° | 113.0 | 112.5 | 115.5 | 115.5 | 114.9 |
| 170°   | 112.5 | 112.5 | 114.9 | 114.3 | 113.7 |
| 172.5° | 112.7 | 112.7 | 115.2 | 114.6 | 113.9 |
| 175°   | 112.4 | 112.4 | 114.2 | 114.2 | 114.2 |
| 177.5° | 113.0 | 113.0 | 114.2 | 114.2 | 113.6 |
| 180°   | 113.8 | 113.8 | 113.8 | 113.8 | 113.8 |



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**CIE UGR TABLE:**

| Reflectances:   |      |                  |       |       |       |       |                |       |       |       |       |
|-----------------|------|------------------|-------|-------|-------|-------|----------------|-------|-------|-------|-------|
| Ceiling         |      | 0.7              | 0.7   | 0.5   | 0.5   | 0.3   | 0.7            | 0.7   | 0.5   | 0.5   | 0.3   |
| Wall            |      | 0.5              | 0.3   | 0.5   | 0.3   | 0.3   | 0.5            | 0.3   | 0.5   | 0.3   | 0.3   |
| Reference plane |      | 0.2              | 0.2   | 0.2   | 0.2   | 0.2   | 0.2            | 0.2   | 0.2   | 0.2   | 0.2   |
| Room dimensions |      | Viewed crosswise |       |       |       |       | Viewed endwise |       |       |       |       |
| X=2H            | Y=2H | 16.11            | 17.31 | 16.58 | 17.75 | 18.22 | 16.11          | 17.31 | 16.58 | 17.75 | 18.22 |
|                 | 3H   | 17.61            | 18.68 | 18.09 | 19.13 | 19.65 | 17.61          | 18.68 | 18.09 | 19.13 | 19.65 |
|                 | 4H   | 18.17            | 19.17 | 18.67 | 19.64 | 20.17 | 18.17          | 19.17 | 18.67 | 19.64 | 20.17 |
|                 | 6H   | 18.55            | 19.47 | 19.07 | 19.96 | 20.50 | 18.55          | 19.47 | 19.07 | 19.96 | 20.50 |
|                 | 8H   | 18.65            | 19.52 | 19.18 | 20.03 | 20.58 | 18.65          | 19.52 | 19.18 | 20.03 | 20.58 |
|                 | 12H  | 18.69            | 19.52 | 19.22 | 20.02 | 20.60 | 18.69          | 19.52 | 19.22 | 20.02 | 20.60 |
| 4H              | 2H   | 16.55            | 17.55 | 17.06 | 18.02 | 18.56 | 16.55          | 17.55 | 17.06 | 18.02 | 18.56 |
|                 | 3H   | 18.27            | 19.09 | 18.79 | 19.61 | 20.16 | 18.27          | 19.09 | 18.79 | 19.61 | 20.16 |
|                 | 4H   | 18.95            | 19.69 | 19.49 | 20.22 | 20.80 | 18.95          | 19.69 | 19.49 | 20.22 | 20.80 |
|                 | 6H   | 19.45            | 20.08 | 20.01 | 20.64 | 21.25 | 19.45          | 20.08 | 20.01 | 20.64 | 21.25 |
|                 | 8H   | 19.58            | 20.17 | 20.15 | 20.73 | 21.34 | 19.58          | 20.17 | 20.15 | 20.73 | 21.34 |
|                 | 12H  | 19.64            | 20.16 | 20.22 | 20.75 | 21.37 | 19.64          | 20.16 | 20.22 | 20.75 | 21.37 |
| 8H              | 4H   | 19.15            | 19.75 | 19.72 | 20.30 | 20.91 | 19.15          | 19.75 | 19.72 | 20.30 | 20.91 |
|                 | 6H   | 19.75            | 20.23 | 20.35 | 20.84 | 21.46 | 19.75          | 20.23 | 20.35 | 20.84 | 21.46 |
|                 | 8H   | 19.93            | 20.37 | 20.55 | 20.99 | 21.62 | 19.93          | 20.37 | 20.55 | 20.99 | 21.62 |
|                 | 12H  | 20.04            | 20.43 | 20.66 | 21.02 | 21.73 | 20.04          | 20.43 | 20.66 | 21.02 | 21.73 |
| 12H             | 4H   | 19.15            | 19.68 | 19.73 | 20.26 | 20.88 | 19.15          | 19.68 | 19.73 | 20.26 | 20.88 |
|                 | 6H   | 19.76            | 20.20 | 20.38 | 20.82 | 21.45 | 19.76          | 20.20 | 20.38 | 20.82 | 21.45 |
|                 | 8H   | 19.99            | 20.37 | 20.60 | 20.97 | 21.68 | 19.99          | 20.37 | 20.60 | 20.97 | 21.68 |

Cooper Lighting Solutions Photometric Lab  
1121 Highway 74 South  
Peachtree City, GA 30269



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

Report Prepared for

Cooper Lighting Solutions

Metalux

Report Number: SP1-2506-472-6

Test Date: 08/01/2025

Luminaire Tested: EHBR-60-L935-N

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

**Test Information**

Test Method: LM-79-2019  
 Report Number: SP1-2506-472-6  
 Test Lab: COOPER LIGHTING SOLUTIONS  
 Photometer: SP1 - 76IN SPHERE  
 Measurement Geometry: 4π  
 Issue Date: 08/05/2025  
 Manufacturer: COOPER LIGHTING SOLUTIONS  
 Product Line: Metalux  
 Catalog Number: **EHBR-60-L935-N**  
 Description: Elevate Round Highbay at, 60000 lumens, 3500K 90CRI LEDs with N lens

**Spectral Parameters**

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

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



**Test Conditions**

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

REPORT NUMBER: SP1-2506-472-6

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

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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 3500K 4-step quadrangle

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**Photopic Flux vs. Wavelength**



**Photopic Lumens: NR**

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

REPORT NUMBER: SP1-2506-472-6

**Scotopic Flux vs. Wavelength**



**Scotopic Lumens: NR**

**S/P: 1.62**

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

REPORT NUMBER: SP1-2506-472-6

**Melanopic Flux vs. Wavelength**



**Melanopic Lumens: NR**

**M/P: 3.3**

| λ (nm) | Power W <sup>^</sup> /nm | Lumens (φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (φ/nm) |
|--------|--------------------------|---------------|--------|--------------------------|---------------|--------|--------------------------|---------------|--------|--------------------------|---------------|--------|--------------------------|---------------|
| 360    | 0                        | NR            | 490    | 140                      | NR            | 620    | 338                      | NR            | 750    | 8                        | NR            | 880    | 0                        | NR            |
| 365    | 0                        | NR            | 495    | 159                      | NR            | 625    | 339                      | NR            | 755    | 7                        | NR            | 885    | 0                        | NR            |
| 370    | 0                        | NR            | 500    | 182                      | NR            | 630    | 1000                     | NR            | 760    | 5                        | NR            | 890    | 0                        | NR            |
| 375    | 0                        | NR            | 505    | 202                      | NR            | 635    | 653                      | NR            | 765    | 5                        | NR            | 895    | 0                        | NR            |
| 380    | 0                        | NR            | 510    | 216                      | NR            | 640    | 222                      | NR            | 770    | 4                        | NR            | 900    | 0                        | NR            |
| 385    | 0                        | NR            | 515    | 228                      | NR            | 645    | 214                      | NR            | 775    | 3                        | NR            | 905    | 0                        | NR            |
| 390    | 0                        | NR            | 520    | 236                      | NR            | 650    | 185                      | NR            | 780    | 3                        | NR            | 910    | 0                        | NR            |
| 395    | 1                        | NR            | 525    | 242                      | NR            | 655    | 157                      | NR            | 785    | 3                        | NR            | 915    | 0                        | NR            |
| 400    | 2                        | NR            | 530    | 248                      | NR            | 660    | 133                      | NR            | 790    | 2                        | NR            | 920    | 0                        | NR            |
| 405    | 3                        | NR            | 535    | 253                      | NR            | 665    | 113                      | NR            | 795    | 2                        | NR            | 925    | 0                        | NR            |
| 410    | 4                        | NR            | 540    | 258                      | NR            | 670    | 103                      | NR            | 800    | 2                        | NR            | 930    | 0                        | NR            |
| 415    | 7                        | NR            | 545    | 264                      | NR            | 675    | 85                       | NR            | 805    | 1                        | NR            | 935    | 0                        | NR            |
| 420    | 13                       | NR            | 550    | 270                      | NR            | 680    | 72                       | NR            | 810    | 1                        | NR            | 940    | 0                        | NR            |
| 425    | 22                       | NR            | 555    | 278                      | NR            | 685    | 62                       | NR            | 815    | 1                        | NR            | 945    | 0                        | NR            |
| 430    | 38                       | NR            | 560    | 286                      | NR            | 690    | 53                       | NR            | 820    | 1                        | NR            | 950    | 0                        | NR            |
| 435    | 65                       | NR            | 565    | 295                      | NR            | 695    | 45                       | NR            | 825    | 1                        | NR            | 955    | 0                        | NR            |
| 440    | 108                      | NR            | 570    | 303                      | NR            | 700    | 39                       | NR            | 830    | 1                        | NR            | 960    | 0                        | NR            |
| 445    | 193                      | NR            | 575    | 311                      | NR            | 705    | 33                       | NR            | 835    | 1                        | NR            | 965    | 0                        | NR            |
| 450    | 312                      | NR            | 580    | 319                      | NR            | 710    | 28                       | NR            | 840    | 1                        | NR            | 970    | 0                        | NR            |
| 455    | 300                      | NR            | 585    | 326                      | NR            | 715    | 24                       | NR            | 845    | 0                        | NR            | 975    | 0                        | NR            |
| 460    | 214                      | NR            | 590    | 332                      | NR            | 720    | 20                       | NR            | 850    | 0                        | NR            | 980    | 0                        | NR            |
| 465    | 184                      | NR            | 595    | 333                      | NR            | 725    | 17                       | NR            | 855    | 0                        | NR            | 985    | 0                        | NR            |
| 470    | 153                      | NR            | 600    | 336                      | NR            | 730    | 15                       | NR            | 860    | 0                        | NR            | 990    | 0                        | NR            |
| 475    | 122                      | NR            | 605    | 337                      | NR            | 735    | 12                       | NR            | 865    | 0                        | NR            | 995    | 0                        | NR            |
| 480    | 115                      | NR            | 610    | 367                      | NR            | 740    | 10                       | NR            | 870    | 0                        | NR            | 1000   | 0                        | NR            |
| 485    | 125                      | NR            | 615    | 390                      | NR            | 745    | 9                        | NR            | 875    | 0                        | NR            |        |                          |               |

**Summary**

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



**Color Vector Graphics**



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

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



Color Rendition by Hue-Angle Bin



Measure Comparisons



(END OF REPORT)