

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: P1433568

Luminaire Tested: EHBR1-36-UNV-W-L935-UPL36

Issue Date: 3/20/2026

**Test Information**

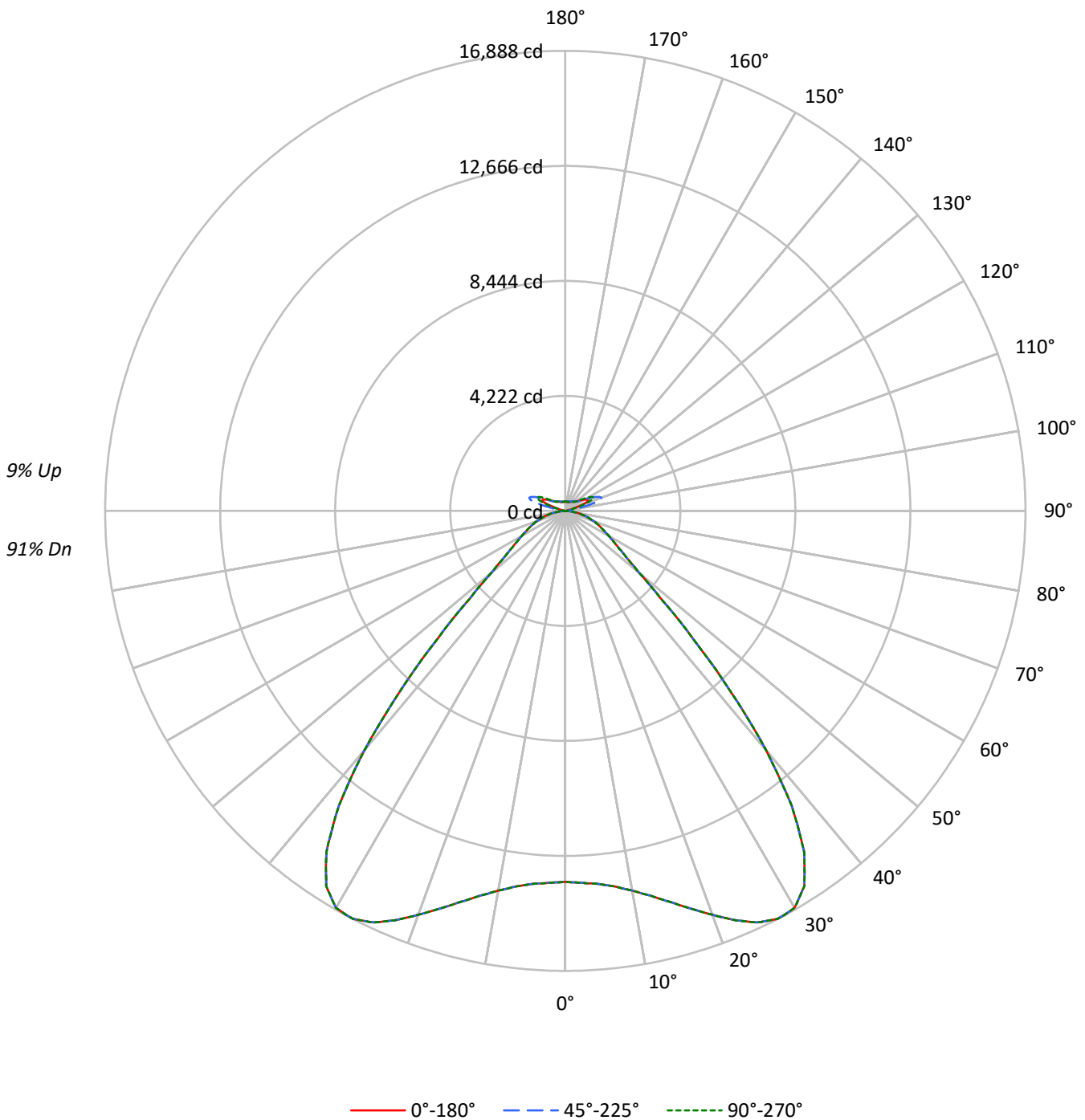
Test Method: LM-79-2019  
Report Number: P1433568  
REPORT IS A COMBINATION OF REPORTS P1431793 AND P1431635  
Test Lab: INNOVATION CENTER  
Issue Date: 3/20/2026  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: METALUX  
Catalog Number: EHBR1-36-UNV-W-L935-UPL36  
Description: Elevate Round Highbay at, 36000 lumens, 3500K 90CRI LEDs with W lens  
Light Source: -  
Ballast/Driver: -

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 35813.4 lumens  
Efficiency: N/A  
Efficacy: 162.9 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): 219.8  
Input Voltage (V): NR  
Input Current (A<sub>in</sub>): 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: P1433568  
CATALOG NUMBER: EHBR1-36-UNV-W-L935-UPL36

### Luminous Intensity Polar Plot





TEST NUMBER: P1433568  
 CATALOG NUMBER: EHBR1-36-UNV-W-L935-UPL36

**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   | 109 | 105 | 102 | 99  | 105 | 102 | 99  | 96  | 96  | 94  | 92  | 91  | 89  | 87  | 86 | 85 | 83 | 86 | 85 | 83 | 81 |
| 2   | 101 | 95  | 89  | 85  | 98  | 92  | 87  | 83  | 87  | 83  | 80  | 83  | 79  | 77  | 79 | 76 | 74 | 79 | 76 | 74 | 71 |
| 3   | 94  | 85  | 79  | 73  | 91  | 83  | 77  | 72  | 79  | 74  | 70  | 75  | 71  | 68  | 72 | 68 | 65 | 72 | 68 | 65 | 63 |
| 4   | 87  | 77  | 70  | 64  | 84  | 75  | 69  | 64  | 72  | 66  | 62  | 69  | 64  | 60  | 66 | 62 | 58 | 66 | 62 | 58 | 56 |
| 5   | 81  | 70  | 63  | 57  | 79  | 69  | 62  | 56  | 66  | 60  | 55  | 63  | 58  | 54  | 60 | 56 | 52 | 60 | 56 | 52 | 50 |
| 6   | 75  | 64  | 56  | 51  | 73  | 63  | 56  | 50  | 60  | 54  | 49  | 58  | 52  | 48  | 55 | 51 | 47 | 55 | 51 | 47 | 45 |
| 7   | 70  | 59  | 51  | 46  | 68  | 57  | 50  | 45  | 55  | 49  | 44  | 53  | 48  | 43  | 51 | 46 | 43 | 51 | 46 | 43 | 41 |
| 8   | 66  | 54  | 46  | 41  | 64  | 53  | 46  | 41  | 51  | 45  | 40  | 49  | 44  | 39  | 47 | 42 | 39 | 47 | 42 | 39 | 37 |
| 9   | 62  | 50  | 42  | 37  | 60  | 49  | 42  | 37  | 47  | 41  | 37  | 45  | 40  | 36  | 44 | 39 | 35 | 44 | 39 | 35 | 34 |
| 10  | 58  | 46  | 39  | 34  | 56  | 45  | 38  | 34  | 44  | 38  | 33  | 42  | 37  | 33  | 41 | 36 | 32 | 41 | 36 | 32 | 31 |

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

|     | 0°    | 45°   | 90°   |
|-----|-------|-------|-------|
| 0°  | 63949 | 63949 | 63949 |
| 5°  | 64374 | 64374 | 64374 |
| 10° | 66610 | 66610 | 66610 |
| 15° | 70831 | 70831 | 70831 |
| 20° | 76782 | 76782 | 76782 |
| 25° | 83470 | 83470 | 83470 |
| 30° | 87491 | 87491 | 87491 |
| 35° | 83277 | 83277 | 83277 |
| 40° | 66080 | 66080 | 66080 |
| 45° | 40843 | 40843 | 40843 |
| 50° | 23650 | 23650 | 23650 |
| 55° | 17894 | 17894 | 17894 |
| 60° | 15350 | 15350 | 15350 |
| 65° | 13864 | 13864 | 13864 |
| 70° | 12753 | 12753 | 12753 |
| 75° | 11269 | 11269 | 11269 |
| 80° | 9183  | 9183  | 9183  |
| 85° | 5415  | 5415  | 5415  |

**MAXIMUM LUMINANCE 45°-90°:**

Horizontal Angle: 0°  
 Vertical Angle: 45°  
 Luminance: 40843 cd/sqm



TEST NUMBER: P1433568  
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**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 1324.9  | 3.7       |
| 10°-20°   | 4247.5  | 11.9      |
| 20°-30°   | 7666.9  | 21.4      |
| 30°-40°   | 9264.7  | 25.9      |
| 40°-50°   | 5293.2  | 14.8      |
| 50°-60°   | 2241.8  | 6.3       |
| 60°-70°   | 1446.0  | 4.0       |
| 70°-80°   | 840.8   | 2.3       |
| 80°-90°   | 228.4   | 0.6       |
| 90°-100°  | 93.4    | 0.3       |
| 100°-110° | 579.8   | 1.6       |
| 110°-120° | 1036.3  | 2.9       |
| 120°-130° | 608.9   | 1.7       |
| 130°-140° | 375.7   | 1.0       |
| 140°-150° | 262.7   | 0.7       |
| 150°-160° | 171.5   | 0.5       |
| 160°-170° | 98.2    | 0.3       |
| 170°-180° | 32.5    | 0.1       |
| 0°-30°    | 13239.3 | 37.0      |
| 0°-40°    | 22504.0 | 62.8      |
| 0°-60°    | 30039.1 | 83.9      |
| 0°-90°    | 32554.2 | 90.9      |
| 90°-120°  | 1709.5  | 4.8       |
| 90°-150°  | 2956.8  | 8.3       |
| 90°-180°  | 3259.0  | 9.1       |
| 0°-180°   | 35813.4 | 100.0     |

**CANDELA DISTRIBUTION:**

|      | 0°    | 22.5° | 45°   | 67.5° | 90°   | Flux |
|------|-------|-------|-------|-------|-------|------|
| 0°   | 13617 | 13617 | 13617 | 13617 | 13617 |      |
| 5°   | 13745 | 13745 | 13745 | 13745 | 13745 | 1325 |
| 15°  | 14860 | 14860 | 14860 | 14860 | 14860 | 4248 |
| 25°  | 16669 | 16669 | 16669 | 16669 | 16669 | 7667 |
| 35°  | 15284 | 15284 | 15284 | 15284 | 15284 | 9265 |
| 45°  | 6608  | 6608  | 6608  | 6608  | 6608  | 5293 |
| 55°  | 2418  | 2418  | 2418  | 2418  | 2418  | 2242 |
| 65°  | 1447  | 1447  | 1447  | 1447  | 1447  | 1446 |
| 75°  | 794   | 794   | 794   | 794   | 794   | 841  |
| 85°  | 186   | 186   | 186   | 186   | 186   | 214  |
| 90°  | 25    | 40    | 68    | 44    | 25    | 20   |
| 95°  | 42    | 70    | 151   | 75    | 47    | 40   |
| 105° | 203   | 400   | 1019  | 440   | 268   | 272  |
| 115° | 932   | 980   | 1205  | 1155  | 1147  | 859  |
| 125° | 673   | 629   | 646   | 655   | 734   | 614  |
| 135° | 494   | 479   | 496   | 466   | 464   | 386  |
| 145° | 409   | 404   | 428   | 422   | 420   | 259  |
| 155° | 360   | 357   | 373   | 373   | 373   | 168  |
| 165° | 339   | 339   | 348   | 348   | 347   | 97   |
| 175° | 337   | 337   | 342   | 342   | 342   | 32   |
| 180° | 341   | 341   | 341   | 341   | 341   |      |



TEST NUMBER: P1433568

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**CANDELA DISTRIBUTION (FULL):**

|        | 0°      | 22.5°   | 45°     | 67.5°   | 90°     |
|--------|---------|---------|---------|---------|---------|
| 0°     | 13617.4 | 13617.4 | 13617.4 | 13617.4 | 13617.4 |
| 2.5°   | 13663.1 | 13663.1 | 13663.1 | 13663.1 | 13663.1 |
| 5°     | 13744.8 | 13744.8 | 13744.8 | 13744.8 | 13744.8 |
| 7.5°   | 13905.2 | 13905.2 | 13905.2 | 13905.2 | 13905.2 |
| 10°    | 14152.2 | 14152.2 | 14152.2 | 14152.2 | 14152.2 |
| 12.5°  | 14473.2 | 14473.2 | 14473.2 | 14473.2 | 14473.2 |
| 15°    | 14860.0 | 14860.0 | 14860.0 | 14860.0 | 14860.0 |
| 17.5°  | 15302.8 | 15302.8 | 15302.8 | 15302.8 | 15302.8 |
| 20°    | 15781.0 | 15781.0 | 15781.0 | 15781.0 | 15781.0 |
| 22.5°  | 16262.5 | 16262.5 | 16262.5 | 16262.5 | 16262.5 |
| 25°    | 16668.9 | 16668.9 | 16668.9 | 16668.9 | 16668.9 |
| 27.5°  | 16887.6 | 16887.6 | 16887.6 | 16887.6 | 16887.6 |
| 30°    | 16828.8 | 16828.8 | 16828.8 | 16828.8 | 16828.8 |
| 32.5°  | 16329.9 | 16329.9 | 16329.9 | 16329.9 | 16329.9 |
| 35°    | 15284.3 | 15284.3 | 15284.3 | 15284.3 | 15284.3 |
| 37.5°  | 13653.9 | 13653.9 | 13653.9 | 13653.9 | 13653.9 |
| 40°    | 11453.3 | 11453.3 | 11453.3 | 11453.3 | 11453.3 |
| 42.5°  | 8964.4  | 8964.4  | 8964.4  | 8964.4  | 8964.4  |
| 45°    | 6608.2  | 6608.2  | 6608.2  | 6608.2  | 6608.2  |
| 47.5°  | 4723.2  | 4723.2  | 4723.2  | 4723.2  | 4723.2  |
| 50°    | 3524.7  | 3524.7  | 3524.7  | 3524.7  | 3524.7  |
| 52.5°  | 2853.9  | 2853.9  | 2853.9  | 2853.9  | 2853.9  |
| 55°    | 2418.2  | 2418.2  | 2418.2  | 2418.2  | 2418.2  |
| 57.5°  | 2100.0  | 2100.0  | 2100.0  | 2100.0  | 2100.0  |
| 60°    | 1845.3  | 1845.3  | 1845.3  | 1845.3  | 1845.3  |
| 62.5°  | 1633.1  | 1633.1  | 1633.1  | 1633.1  | 1633.1  |
| 65°    | 1447.1  | 1447.1  | 1447.1  | 1447.1  | 1447.1  |
| 67.5°  | 1282.8  | 1282.8  | 1282.8  | 1282.8  | 1282.8  |
| 70°    | 1119.0  | 1119.0  | 1119.0  | 1119.0  | 1119.0  |
| 72.5°  | 955.8   | 955.8   | 955.8   | 955.8   | 955.8   |
| 75°    | 793.8   | 793.8   | 793.8   | 793.8   | 793.8   |
| 77.5°  | 637.6   | 637.6   | 637.6   | 637.6   | 637.6   |
| 80°    | 483.1   | 483.1   | 483.1   | 483.1   | 483.1   |
| 82.5°  | 331.4   | 331.4   | 331.4   | 331.4   | 331.4   |
| 85°    | 186.1   | 186.1   | 186.1   | 186.1   | 186.1   |
| 87.5°  | 58.7    | 58.7    | 58.7    | 58.7    | 58.7    |
| 90°    | 25.2    | 40.1    | 67.8    | 43.7    | 25.2    |
| 92.5°  | 35.8    | 59.9    | 108.0   | 56.2    | 32.1    |
| 95°    | 41.9    | 69.7    | 151.3   | 75.2    | 47.4    |
| 97.5°  | 53.0    | 77.1    | 173.5   | 91.9    | 73.4    |
| 100°   | 69.7    | 90.1    | 269.9   | 112.3   | 97.5    |
| 102.5° | 117.9   | 190.1   | 572.1   | 210.5   | 147.6   |
| 105°   | 203.1   | 399.7   | 1018.8  | 440.5   | 268.0   |
| 107.5° | 351.5   | 714.8   | 1343.3  | 779.7   | 507.2   |
| 110°   | 656.0   | 948.9   | 1408.7  | 1071.3  | 811.7   |



TEST NUMBER: P1433568

CATALOG NUMBER: EHBR1-36-UNV-W-L935-UPL36

**CANDELA DISTRIBUTION (continued):**

|        | 0°    | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|-------|--------|--------|--------|--------|
| 112.5° | 885.9 | 1019.3 | 1349.3 | 1182.5 | 1056.4 |
| 115°   | 932.3 | 980.5  | 1204.8 | 1154.7 | 1147.3 |
| 117.5° | 900.7 | 895.2  | 1023.1 | 1037.9 | 1108.4 |
| 120°   | 834.0 | 796.9  | 854.4  | 906.3  | 1000.9 |
| 122.5° | 750.5 | 706.1  | 732.0  | 770.9  | 865.5  |
| 125°   | 673.2 | 628.7  | 645.5  | 654.7  | 734.4  |
| 127.5° | 604.7 | 575.0  | 584.3  | 573.2  | 623.2  |
| 130°   | 558.8 | 532.9  | 545.9  | 520.0  | 544.1  |
| 132.5° | 521.0 | 504.4  | 519.1  | 487.6  | 495.0  |
| 135°   | 493.8 | 478.9  | 495.6  | 465.9  | 464.1  |
| 137.5° | 470.2 | 457.2  | 473.9  | 451.6  | 446.1  |
| 140°   | 449.1 | 437.9  | 456.4  | 439.8  | 436.0  |
| 142.5° | 425.5 | 418.1  | 440.3  | 429.2  | 425.5  |
| 145°   | 409.4 | 403.8  | 427.9  | 422.3  | 420.4  |
| 147.5° | 395.1 | 391.4  | 413.6  | 411.7  | 411.7  |
| 150°   | 382.1 | 378.4  | 400.6  | 398.8  | 400.6  |
| 152.5° | 369.1 | 365.4  | 385.8  | 383.9  | 385.8  |
| 155°   | 360.4 | 356.6  | 373.3  | 373.3  | 373.3  |
| 157.5° | 352.9 | 351.1  | 364.1  | 364.1  | 364.1  |
| 160°   | 347.9 | 346.1  | 357.2  | 357.2  | 355.4  |
| 162.5° | 343.0 | 341.1  | 354.0  | 352.2  | 352.2  |
| 165°   | 339.2 | 339.2  | 348.5  | 348.5  | 346.7  |
| 167.5° | 339.2 | 337.3  | 346.7  | 346.7  | 344.8  |
| 170°   | 337.3 | 337.3  | 344.8  | 343.0  | 341.1  |
| 172.5° | 337.9 | 337.9  | 345.3  | 343.5  | 341.6  |
| 175°   | 336.6 | 336.6  | 342.1  | 342.1  | 342.1  |
| 177.5° | 338.4 | 338.4  | 342.1  | 342.1  | 340.3  |
| 180°   | 340.9 | 340.9  | 340.9  | 340.9  | 340.9  |



TEST NUMBER: P1433568  
 CATALOG NUMBER: EHBR1-36-UNV-W-L935-UPL36

**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 | 18.22            | 19.38 | 18.74 | 19.88 | 20.42 | 18.22          | 19.38 | 18.74 | 19.88 | 20.42 |
|                 | 3H   | 19.72            | 20.75 | 20.25 | 21.26 | 21.84 | 19.72          | 20.75 | 20.25 | 21.26 | 21.84 |
|                 | 4H   | 20.28            | 21.24 | 20.83 | 21.77 | 22.37 | 20.28          | 21.24 | 20.83 | 21.77 | 22.37 |
|                 | 6H   | 20.66            | 21.55 | 21.23 | 22.09 | 22.70 | 20.66          | 21.55 | 21.23 | 22.09 | 22.70 |
|                 | 8H   | 20.76            | 21.60 | 21.34 | 22.16 | 22.78 | 20.76          | 21.60 | 21.34 | 22.16 | 22.78 |
|                 | 12H  | 20.80            | 21.60 | 21.38 | 22.15 | 22.79 | 20.80          | 21.60 | 21.38 | 22.15 | 22.79 |
| 4H              | 2H   | 18.66            | 19.62 | 19.22 | 20.15 | 20.75 | 18.66          | 19.62 | 19.22 | 20.15 | 20.75 |
|                 | 3H   | 20.38            | 21.17 | 20.94 | 21.74 | 22.36 | 20.38          | 21.17 | 20.94 | 21.74 | 22.36 |
|                 | 4H   | 21.06            | 21.77 | 21.64 | 22.35 | 23.00 | 21.06          | 21.77 | 21.64 | 22.35 | 23.00 |
|                 | 6H   | 21.55            | 22.16 | 22.16 | 22.77 | 23.44 | 21.55          | 22.16 | 22.16 | 22.77 | 23.44 |
|                 | 8H   | 21.68            | 22.26 | 22.30 | 22.86 | 23.54 | 21.68          | 22.26 | 22.30 | 22.86 | 23.54 |
|                 | 12H  | 21.74            | 22.25 | 22.37 | 22.88 | 23.56 | 21.74          | 22.25 | 22.37 | 22.88 | 23.56 |
| 8H              | 4H   | 21.26            | 21.83 | 21.87 | 22.43 | 23.11 | 21.26          | 21.83 | 21.87 | 22.43 | 23.11 |
|                 | 6H   | 21.85            | 22.32 | 22.50 | 22.97 | 23.65 | 21.85          | 22.32 | 22.50 | 22.97 | 23.65 |
|                 | 8H   | 22.04            | 22.46 | 22.70 | 23.12 | 23.81 | 22.04          | 22.46 | 22.70 | 23.12 | 23.81 |
|                 | 12H  | 22.14            | 22.51 | 22.80 | 23.16 | 23.92 | 22.14          | 22.51 | 22.80 | 23.16 | 23.92 |
| 12H             | 4H   | 21.25            | 21.76 | 21.88 | 22.39 | 23.07 | 21.25          | 21.76 | 21.88 | 22.39 | 23.07 |
|                 | 6H   | 21.87            | 22.29 | 22.53 | 22.95 | 23.64 | 21.87          | 22.29 | 22.53 | 22.95 | 23.64 |
|                 | 8H   | 22.09            | 22.46 | 22.75 | 23.10 | 23.87 | 22.09          | 22.46 | 22.75 | 23.10 | 23.87 |

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           |

REPORT NUMBER: SP1-2506-472-6

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

REPORT NUMBER: SP1-2506-472-6

**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    | 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            |        |                          |               |

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**Scotopic Flux vs. Wavelength**



**Scotopic Lumens: NR**

**S/P: 1.62**

| $\lambda$ (nm) | Power W <sup>^</sup> /nm | Lumens ( $\phi$ /nm) | $\lambda$ (nm) | Power W <sup>^</sup> /nm | Lumens ( $\phi$ /nm) | $\lambda$ (nm) | Power W <sup>^</sup> /nm | Lumens ( $\phi$ /nm) | $\lambda$ (nm) | Power W <sup>^</sup> /nm | Lumens ( $\phi$ /nm) | $\lambda$ (nm) | Power W <sup>^</sup> /nm | Lumens ( $\phi$ /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                   |                |                          |                      |

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**Melanopic Flux vs. Wavelength**



**Melanopic Lumens: NR**

**M/P: 3.3**

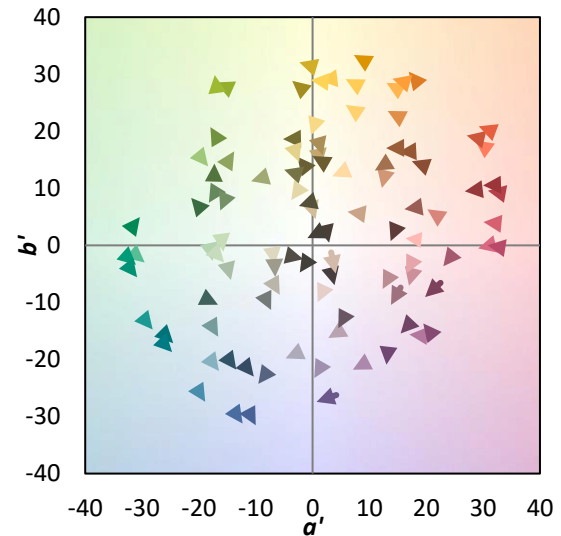
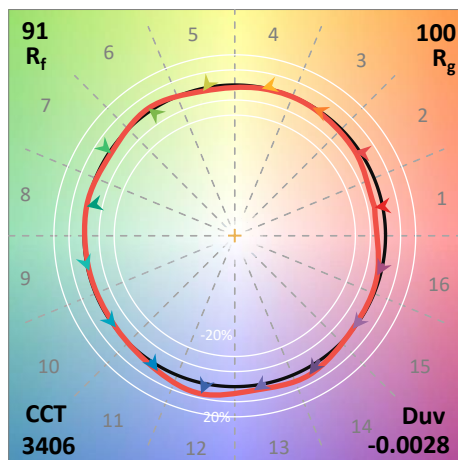
| $\lambda$<br>(nm) | Power<br>W <sup>^</sup> /nm | Lumens<br>( $\phi$ /nm) | $\lambda$<br>(nm) | Power<br>W <sup>^</sup> /nm | Lumens<br>( $\phi$ /nm) | $\lambda$<br>(nm) | Power<br>W <sup>^</sup> /nm | Lumens<br>( $\phi$ /nm) | $\lambda$<br>(nm) | Power<br>W <sup>^</sup> /nm | Lumens<br>( $\phi$ /nm) | $\lambda$<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                      |                   |                             |                         |

**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)