

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: P1433301

Luminaire Tested: EHBR1-48-UNV-W-L930-UPL24

Issue Date: 3/20/2026

**Test Information**

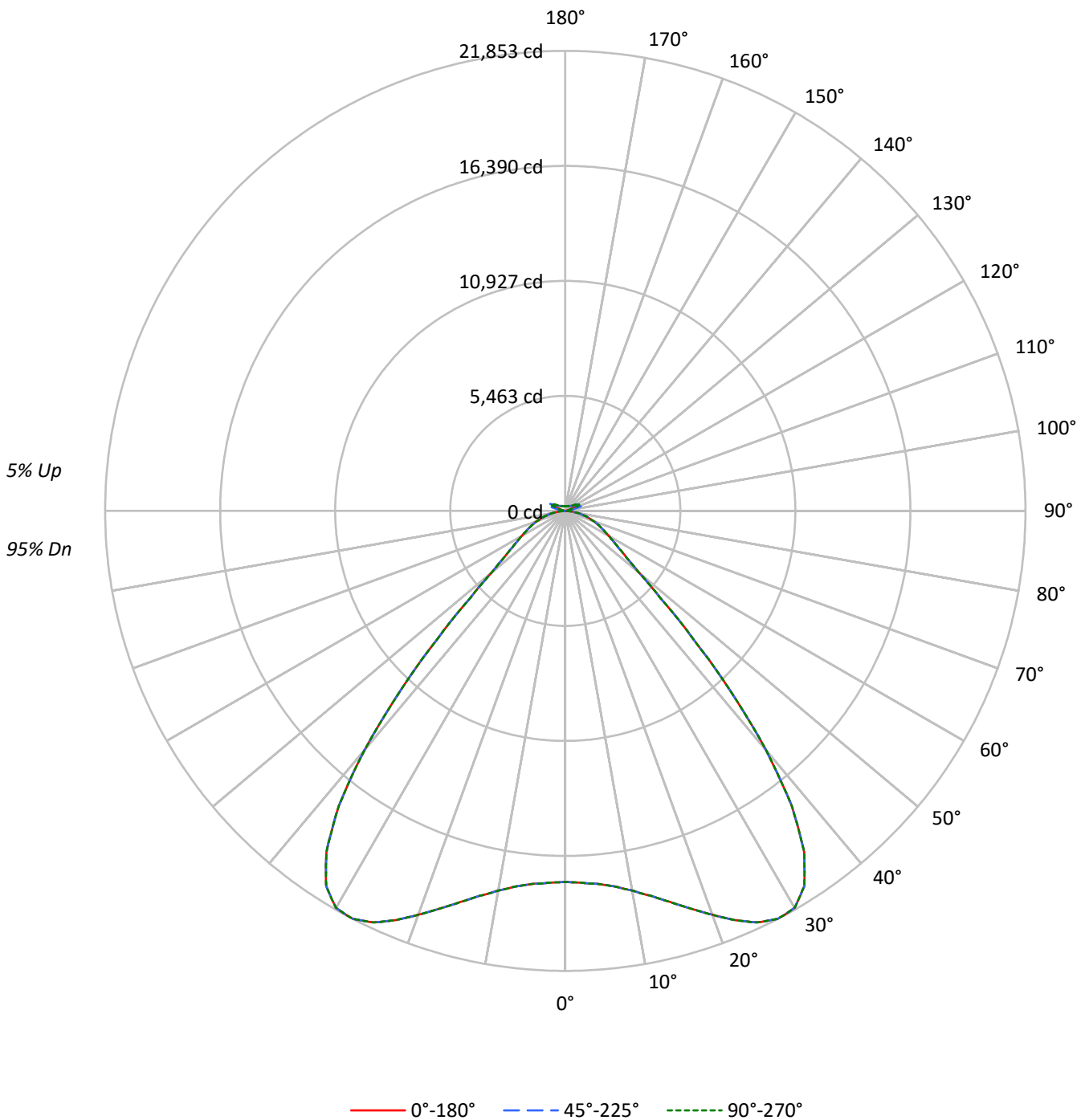
Test Method: LM-79-2019  
Report Number: P1433301  
REPORT IS A COMBINATION OF REPORTS P1431855 AND P1431635  
Test Lab: INNOVATION CENTER  
Issue Date: 3/20/2026  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: METALUX  
Catalog Number: EHBR1-48-UNV-W-L930-UPL24  
Description: Elevate Round Highbay at, 49000 lumens, 3000K 90CRI LEDs with W lens  
Light Source: -  
Ballast/Driver: -

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 44253.6 lumens  
Efficiency: N/A  
Efficacy: 160.9 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): 275.1  
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: P1433301  
CATALOG NUMBER: EHBR1-48-UNV-W-L930-UPL24

### Luminous Intensity Polar Plot





TEST NUMBER: P1433301  
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**COEFFICIENT OF UTILIZATION - ZONAL CAVITY METHOD:**

|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |    |    |    |    |    |    |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|----|----|----|----|----|----|----|
| RF  | 20  |     |     |     | 20  |     |     |     | 20  |     |     |     | 20  |     |    |    | 20 |    |    |    | 20 |
| RC  | 80  |     |     |     | 70  |     |     |     | 50  |     |     |     | 30  |     |    |    | 10 |    |    |    | 0  |
| RW  | 70  | 50  | 30  | 10  | 70  | 50  | 30  | 10  | 50  | 30  | 10  | 50  | 30  | 10  | 50 | 30 | 10 | 50 | 30 | 10 | 0  |
| RCR |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |    |    |    |    |    |    |
| 0   | 118 | 118 | 118 | 118 | 115 | 115 | 115 | 115 | 108 | 108 | 108 | 103 | 103 | 103 | 98 | 98 | 98 | 98 | 98 | 98 | 95 |
| 1   | 110 | 106 | 103 | 100 | 107 | 104 | 101 | 98  | 99  | 96  | 94  | 94  | 92  | 90  | 90 | 88 | 87 | 87 | 87 | 87 | 85 |
| 2   | 102 | 96  | 90  | 86  | 99  | 93  | 89  | 84  | 89  | 85  | 82  | 85  | 82  | 79  | 82 | 79 | 77 | 77 | 77 | 77 | 75 |
| 3   | 95  | 86  | 80  | 74  | 92  | 85  | 78  | 74  | 81  | 76  | 72  | 78  | 74  | 70  | 75 | 71 | 68 | 68 | 68 | 68 | 66 |
| 4   | 88  | 78  | 71  | 65  | 86  | 77  | 70  | 65  | 74  | 68  | 63  | 71  | 66  | 62  | 68 | 64 | 61 | 61 | 61 | 61 | 59 |
| 5   | 82  | 71  | 64  | 58  | 80  | 70  | 63  | 58  | 67  | 61  | 57  | 65  | 60  | 56  | 63 | 58 | 55 | 55 | 55 | 55 | 53 |
| 6   | 76  | 65  | 57  | 52  | 74  | 64  | 57  | 51  | 62  | 55  | 51  | 60  | 54  | 50  | 58 | 53 | 49 | 49 | 49 | 49 | 47 |
| 7   | 71  | 60  | 52  | 47  | 70  | 59  | 51  | 46  | 57  | 50  | 46  | 55  | 49  | 45  | 53 | 48 | 44 | 44 | 44 | 44 | 43 |
| 8   | 67  | 55  | 47  | 42  | 65  | 54  | 47  | 42  | 52  | 46  | 41  | 51  | 45  | 41  | 49 | 44 | 40 | 40 | 40 | 40 | 39 |
| 9   | 63  | 51  | 43  | 38  | 61  | 50  | 43  | 38  | 48  | 42  | 38  | 47  | 41  | 37  | 46 | 41 | 37 | 37 | 37 | 37 | 35 |
| 10  | 59  | 47  | 40  | 35  | 57  | 46  | 39  | 35  | 45  | 39  | 34  | 44  | 38  | 34  | 43 | 37 | 34 | 34 | 34 | 34 | 32 |

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

|     | 0°     | 45°    | 90°    |
|-----|--------|--------|--------|
| 0°  | 82752  | 82752  | 82752  |
| 5°  | 83302  | 83302  | 83302  |
| 10° | 86196  | 86196  | 86196  |
| 15° | 91659  | 91659  | 91659  |
| 20° | 99360  | 99360  | 99360  |
| 25° | 108013 | 108013 | 108013 |
| 30° | 113216 | 113216 | 113216 |
| 35° | 107764 | 107764 | 107764 |
| 40° | 85510  | 85510  | 85510  |
| 45° | 52853  | 52853  | 52853  |
| 50° | 30604  | 30604  | 30604  |
| 55° | 23155  | 23155  | 23155  |
| 60° | 19863  | 19863  | 19863  |
| 65° | 17941  | 17941  | 17941  |
| 70° | 16504  | 16504  | 16504  |
| 75° | 14580  | 14580  | 14580  |
| 80° | 11882  | 11882  | 11882  |
| 85° | 7006   | 7006   | 7006   |

**MAXIMUM LUMINANCE 45°-90°:**

Horizontal Angle: 0°  
 Vertical Angle: 45°  
 Luminance: 52853 cd/sqm



TEST NUMBER: P1433301  
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**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 1714.5  | 3.9       |
| 10°-20°   | 5496.5  | 12.4      |
| 20°-30°   | 9921.3  | 22.4      |
| 30°-40°   | 11988.9 | 27.1      |
| 40°-50°   | 6849.6  | 15.5      |
| 50°-60°   | 2901.0  | 6.6       |
| 60°-70°   | 1871.2  | 4.2       |
| 70°-80°   | 1088.0  | 2.5       |
| 80°-90°   | 291.8   | 0.7       |
| 90°-100°  | 61.3    | 0.1       |
| 100°-110° | 377.5   | 0.9       |
| 110°-120° | 674.4   | 1.5       |
| 120°-130° | 396.8   | 0.9       |
| 130°-140° | 246.3   | 0.6       |
| 140°-150° | 173.5   | 0.4       |
| 150°-160° | 113.8   | 0.3       |
| 160°-170° | 65.5    | 0.1       |
| 170°-180° | 21.8    | 0.0       |
| 0°-30°    | 17132.2 | 38.7      |
| 0°-40°    | 29121.1 | 65.8      |
| 0°-60°    | 38871.8 | 87.8      |
| 0°-90°    | 42122.7 | 95.2      |
| 90°-120°  | 1113.2  | 2.5       |
| 90°-150°  | 1929.8  | 4.4       |
| 90°-180°  | 2131.0  | 4.8       |
| 0°-180°   | 44253.6 | 100.0     |

**CANDELA DISTRIBUTION:**

|      | 0°    | 22.5° | 45°   | 67.5° | 90°   | Flux  |
|------|-------|-------|-------|-------|-------|-------|
| 0°   | 17622 | 17622 | 17622 | 17622 | 17622 |       |
| 5°   | 17786 | 17786 | 17786 | 17786 | 17786 | 1714  |
| 15°  | 19230 | 19230 | 19230 | 19230 | 19230 | 5496  |
| 25°  | 21570 | 21570 | 21570 | 21570 | 21570 | 9921  |
| 35°  | 19778 | 19778 | 19778 | 19778 | 19778 | 11989 |
| 45°  | 8551  | 8551  | 8551  | 8551  | 8551  | 6850  |
| 55°  | 3129  | 3129  | 3129  | 3129  | 3129  | 2901  |
| 65°  | 1873  | 1873  | 1873  | 1873  | 1873  | 1871  |
| 75°  | 1027  | 1027  | 1027  | 1027  | 1027  | 1088  |
| 85°  | 241   | 241   | 241   | 241   | 241   | 277   |
| 90°  | 17    | 27    | 45    | 29    | 17    | 18    |
| 95°  | 28    | 46    | 99    | 50    | 32    | 27    |
| 105° | 133   | 260   | 663   | 287   | 175   | 177   |
| 115° | 607   | 638   | 784   | 751   | 746   | 559   |
| 125° | 439   | 410   | 421   | 427   | 479   | 400   |
| 135° | 324   | 314   | 325   | 306   | 304   | 253   |
| 145° | 271   | 267   | 283   | 279   | 278   | 171   |
| 155° | 239   | 237   | 248   | 248   | 248   | 112   |
| 165° | 226   | 226   | 232   | 232   | 231   | 65    |
| 175° | 225   | 225   | 229   | 229   | 229   | 22    |
| 180° | 228   | 228   | 228   | 228   | 228   |       |



TEST NUMBER: P1433301

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**CANDELA DISTRIBUTION (FULL):**

|        | 0°      | 22.5°   | 45°     | 67.5°   | 90°     |
|--------|---------|---------|---------|---------|---------|
| 0°     | 17621.5 | 17621.5 | 17621.5 | 17621.5 | 17621.5 |
| 2.5°   | 17680.7 | 17680.7 | 17680.7 | 17680.7 | 17680.7 |
| 5°     | 17786.3 | 17786.3 | 17786.3 | 17786.3 | 17786.3 |
| 7.5°   | 17993.9 | 17993.9 | 17993.9 | 17993.9 | 17993.9 |
| 10°    | 18313.6 | 18313.6 | 18313.6 | 18313.6 | 18313.6 |
| 12.5°  | 18728.9 | 18728.9 | 18728.9 | 18728.9 | 18728.9 |
| 15°    | 19229.5 | 19229.5 | 19229.5 | 19229.5 | 19229.5 |
| 17.5°  | 19802.5 | 19802.5 | 19802.5 | 19802.5 | 19802.5 |
| 20°    | 20421.3 | 20421.3 | 20421.3 | 20421.3 | 20421.3 |
| 22.5°  | 21044.3 | 21044.3 | 21044.3 | 21044.3 | 21044.3 |
| 25°    | 21570.2 | 21570.2 | 21570.2 | 21570.2 | 21570.2 |
| 27.5°  | 21853.2 | 21853.2 | 21853.2 | 21853.2 | 21853.2 |
| 30°    | 21777.1 | 21777.1 | 21777.1 | 21777.1 | 21777.1 |
| 32.5°  | 21131.6 | 21131.6 | 21131.6 | 21131.6 | 21131.6 |
| 35°    | 19778.5 | 19778.5 | 19778.5 | 19778.5 | 19778.5 |
| 37.5°  | 17668.7 | 17668.7 | 17668.7 | 17668.7 | 17668.7 |
| 40°    | 14821.1 | 14821.1 | 14821.1 | 14821.1 | 14821.1 |
| 42.5°  | 11600.3 | 11600.3 | 11600.3 | 11600.3 | 11600.3 |
| 45°    | 8551.4  | 8551.4  | 8551.4  | 8551.4  | 8551.4  |
| 47.5°  | 6112.1  | 6112.1  | 6112.1  | 6112.1  | 6112.1  |
| 50°    | 4561.1  | 4561.1  | 4561.1  | 4561.1  | 4561.1  |
| 52.5°  | 3693.2  | 3693.2  | 3693.2  | 3693.2  | 3693.2  |
| 55°    | 3129.2  | 3129.2  | 3129.2  | 3129.2  | 3129.2  |
| 57.5°  | 2717.4  | 2717.4  | 2717.4  | 2717.4  | 2717.4  |
| 60°    | 2387.9  | 2387.9  | 2387.9  | 2387.9  | 2387.9  |
| 62.5°  | 2113.3  | 2113.3  | 2113.3  | 2113.3  | 2113.3  |
| 65°    | 1872.6  | 1872.6  | 1872.6  | 1872.6  | 1872.6  |
| 67.5°  | 1660.0  | 1660.0  | 1660.0  | 1660.0  | 1660.0  |
| 70°    | 1448.1  | 1448.1  | 1448.1  | 1448.1  | 1448.1  |
| 72.5°  | 1236.9  | 1236.9  | 1236.9  | 1236.9  | 1236.9  |
| 75°    | 1027.1  | 1027.1  | 1027.1  | 1027.1  | 1027.1  |
| 77.5°  | 825.1   | 825.1   | 825.1   | 825.1   | 825.1   |
| 80°    | 625.1   | 625.1   | 625.1   | 625.1   | 625.1   |
| 82.5°  | 428.7   | 428.7   | 428.7   | 428.7   | 428.7   |
| 85°    | 240.8   | 240.8   | 240.8   | 240.8   | 240.8   |
| 87.5°  | 76.0    | 76.0    | 76.0    | 76.0    | 76.0    |
| 90°    | 17.1    | 26.7    | 44.8    | 29.1    | 17.1    |
| 92.5°  | 23.6    | 39.3    | 70.6    | 36.8    | 21.2    |
| 95°    | 27.9    | 46.0    | 99.0    | 49.6    | 31.5    |
| 97.5°  | 35.1    | 50.8    | 113.4   | 60.4    | 48.4    |
| 100°   | 46.0    | 59.3    | 176.1   | 73.7    | 64.1    |
| 102.5° | 77.3    | 124.3   | 372.4   | 137.5   | 96.6    |
| 105°   | 132.7   | 260.4   | 662.7   | 286.9   | 174.8   |
| 107.5° | 229.0   | 465.2   | 873.4   | 507.3   | 330.3   |
| 110°   | 427.3   | 617.6   | 916.3   | 697.1   | 528.4   |



TEST NUMBER: P1433301

CATALOG NUMBER: EHBR1-48-UNV-W-L930-UPL24

**CANDELA DISTRIBUTION (continued):**

|        | 0°    | 22.5° | 45°   | 67.5° | 90°   |
|--------|-------|-------|-------|-------|-------|
| 112.5° | 576.7 | 663.4 | 877.8 | 769.3 | 687.4 |
| 115°   | 606.8 | 638.1 | 783.8 | 751.3 | 746.5 |
| 117.5° | 586.3 | 582.7 | 665.8 | 675.4 | 721.2 |
| 120°   | 543.0 | 518.8 | 556.2 | 589.9 | 651.3 |
| 122.5° | 488.7 | 459.8 | 476.7 | 502.0 | 563.4 |
| 125°   | 438.9 | 409.9 | 420.8 | 426.9 | 478.6 |
| 127.5° | 394.3 | 375.0 | 381.1 | 373.8 | 406.4 |
| 130°   | 364.8 | 347.9 | 356.4 | 339.5 | 355.2 |
| 132.5° | 341.0 | 330.1 | 339.7 | 319.3 | 324.1 |
| 135°   | 323.6 | 313.9 | 324.8 | 305.5 | 304.3 |
| 137.5° | 308.6 | 300.2 | 311.0 | 296.6 | 293.0 |
| 140°   | 295.6 | 288.4 | 300.4 | 289.6 | 287.2 |
| 142.5° | 280.7 | 275.8 | 290.3 | 283.1 | 280.7 |
| 145°   | 270.6 | 266.9 | 282.6 | 279.0 | 277.8 |
| 147.5° | 261.6 | 259.2 | 273.7 | 272.4 | 272.4 |
| 150°   | 253.2 | 250.8 | 265.2 | 264.0 | 265.2 |
| 152.5° | 244.8 | 242.4 | 255.6 | 254.4 | 255.6 |
| 155°   | 239.4 | 237.0 | 247.8 | 247.8 | 247.8 |
| 157.5° | 234.5 | 233.3 | 241.8 | 241.8 | 241.8 |
| 160°   | 231.6 | 230.4 | 237.7 | 237.7 | 236.4 |
| 162.5° | 228.8 | 227.5 | 236.0 | 234.7 | 234.7 |
| 165°   | 226.3 | 226.3 | 232.3 | 232.3 | 231.2 |
| 167.5° | 226.3 | 225.1 | 231.2 | 231.2 | 229.9 |
| 170°   | 225.1 | 225.1 | 229.9 | 228.8 | 227.5 |
| 172.5° | 225.8 | 225.8 | 230.6 | 229.5 | 228.2 |
| 175°   | 225.4 | 225.4 | 228.9 | 228.9 | 228.9 |
| 177.5° | 226.5 | 226.5 | 228.9 | 228.9 | 227.8 |
| 180°   | 228.5 | 228.5 | 228.5 | 228.5 | 228.5 |



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 CATALOG NUMBER: EHBR1-48-UNV-W-L930-UPL24

**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 | 19.45            | 20.68 | 19.90 | 21.09 | 21.53 | 19.45          | 20.68 | 19.90 | 21.09 | 21.53 |
|                 | 3H   | 20.95            | 22.04 | 21.41 | 22.47 | 22.95 | 20.95          | 22.04 | 21.41 | 22.47 | 22.95 |
|                 | 4H   | 21.51            | 22.53 | 22.00 | 22.98 | 23.48 | 21.51          | 22.53 | 22.00 | 22.98 | 23.48 |
|                 | 6H   | 21.90            | 22.83 | 22.39 | 23.30 | 23.81 | 21.90          | 22.83 | 22.39 | 23.30 | 23.81 |
|                 | 8H   | 22.00            | 22.88 | 22.51 | 23.37 | 23.89 | 22.00          | 22.88 | 22.51 | 23.37 | 23.89 |
|                 | 12H  | 22.03            | 22.88 | 22.55 | 23.36 | 23.90 | 22.03          | 22.88 | 22.55 | 23.36 | 23.90 |
| 4H              | 2H   | 19.89            | 20.91 | 20.38 | 21.36 | 21.86 | 19.89          | 20.91 | 20.38 | 21.36 | 21.86 |
|                 | 3H   | 21.62            | 22.45 | 22.11 | 22.95 | 23.47 | 21.62          | 22.45 | 22.11 | 22.95 | 23.47 |
|                 | 4H   | 22.29            | 23.04 | 22.81 | 23.55 | 24.11 | 22.29          | 23.04 | 22.81 | 23.55 | 24.11 |
|                 | 6H   | 22.79            | 23.44 | 23.34 | 23.97 | 24.55 | 22.79          | 23.44 | 23.34 | 23.97 | 24.55 |
|                 | 8H   | 22.92            | 23.53 | 23.47 | 24.06 | 24.65 | 22.92          | 23.53 | 23.47 | 24.06 | 24.65 |
|                 | 12H  | 22.99            | 23.52 | 23.55 | 24.09 | 24.67 | 22.99          | 23.52 | 23.55 | 24.09 | 24.67 |
| 8H              | 4H   | 22.50            | 23.10 | 23.05 | 23.64 | 24.22 | 22.50          | 23.10 | 23.05 | 23.64 | 24.22 |
|                 | 6H   | 23.09            | 23.59 | 23.68 | 24.17 | 24.76 | 23.09          | 23.59 | 23.68 | 24.17 | 24.76 |
|                 | 8H   | 23.28            | 23.72 | 23.88 | 24.32 | 24.92 | 23.28          | 23.72 | 23.88 | 24.32 | 24.92 |
|                 | 12H  | 23.39            | 23.78 | 23.98 | 24.36 | 25.04 | 23.39          | 23.78 | 23.98 | 24.36 | 25.04 |
| 12H             | 4H   | 22.50            | 23.03 | 23.06 | 23.60 | 24.18 | 22.50          | 23.03 | 23.06 | 23.60 | 24.18 |
|                 | 6H   | 23.11            | 23.55 | 23.71 | 24.15 | 24.75 | 23.11          | 23.55 | 23.71 | 24.15 | 24.75 |
|                 | 8H   | 23.34            | 23.73 | 23.93 | 24.30 | 24.98 | 23.34          | 23.73 | 23.93 | 24.30 | 24.98 |

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

Report Prepared for

Cooper Lighting Solutions

Metalux

Report Number: SP1-2506-472-5

Test Date: 08/01/2025

Luminaire Tested: EHBR-60-L930-N

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

**Test Information**

Test Method: LM-79-2019  
 Report Number: SP1-2506-472-5  
 Test Lab: COOPER LIGHTING SOLUTIONS  
 Photometer: SP1 - 76IN SPHERE  
 Measurement Geometry: 4π  
 Issue Date: 08/05/2025  
 Manufacturer: COOPER LIGHTING SOLUTIONS  
 Product Line: Metalux  
 Catalog Number: **EHBR-60-L930-N**  
 Description: Elevate Round Highbay at, 60000 lumens, 3000K 90CRI LEDs with N lens

**Spectral Parameters**

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

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



**Test Conditions**

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

REPORT NUMBER: SP1-2506-472-5

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

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CIE 1931 Chromaticity Diagram



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



Point lies inside the ANSI 3000K 7-step quadrangle

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**Photopic Flux vs. Wavelength**



**Photopic Lumens: NR**

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

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**Scotopic Flux vs. Wavelength**



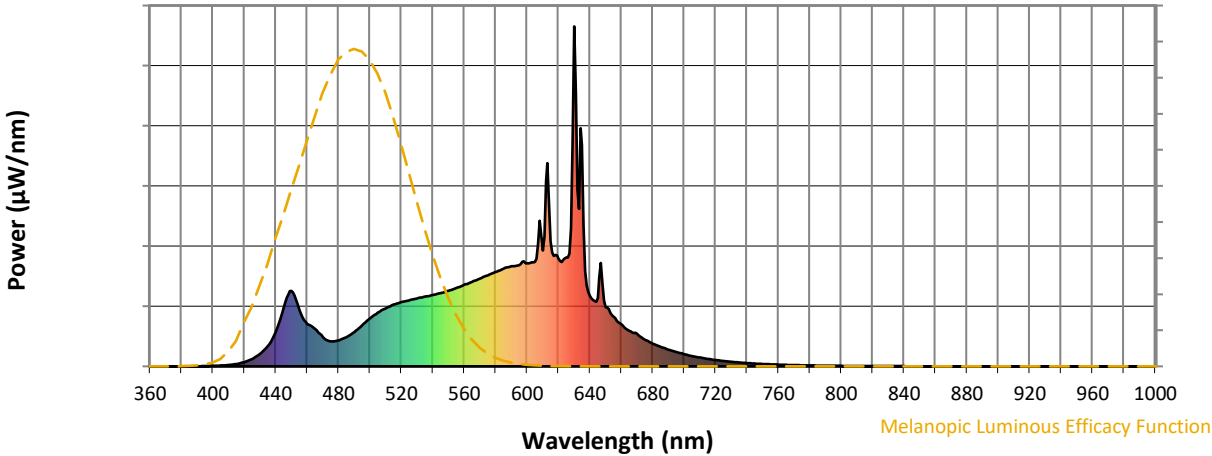
**Scotopic Lumens: NR**

**S/P: 1.44**

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

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Melanopic Flux vs. Wavelength



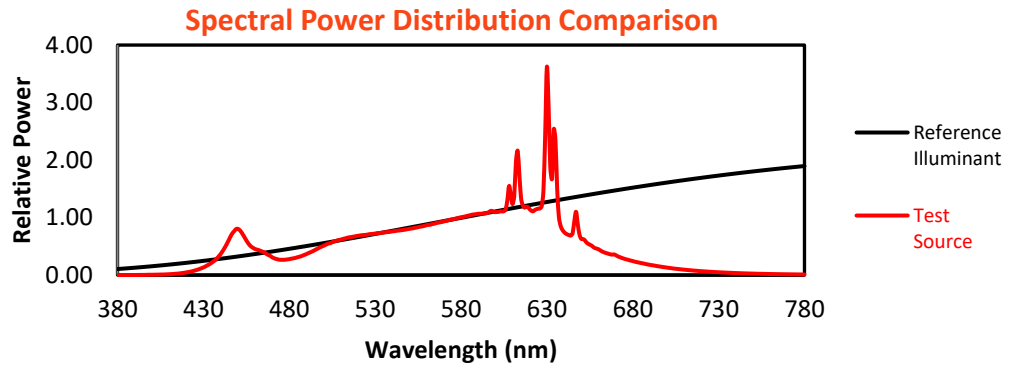
Melanopic Lumens: NR

M/P: 2.85

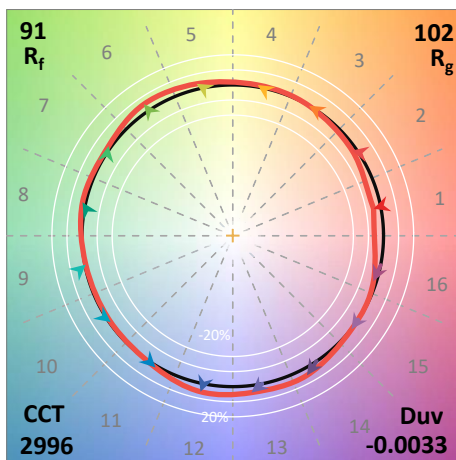
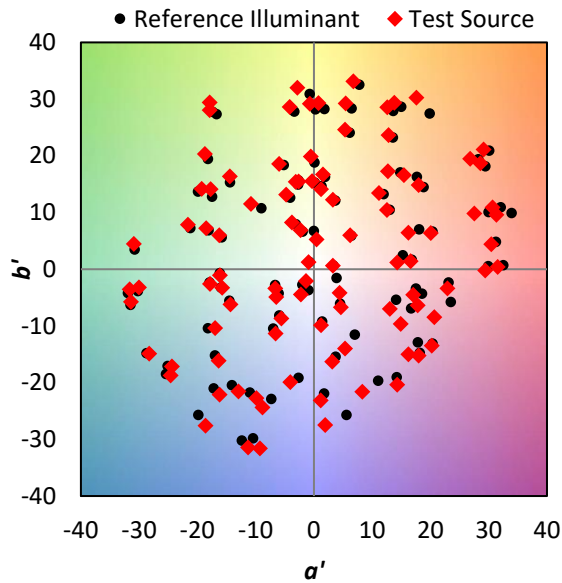
| λ (nm) | Power W <sup>^</sup> /nm | Lumens (φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (φ/nm) |
|--------|--------------------------|---------------|--------|--------------------------|-------------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

**Summary**

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



**Color Vector Graphics**

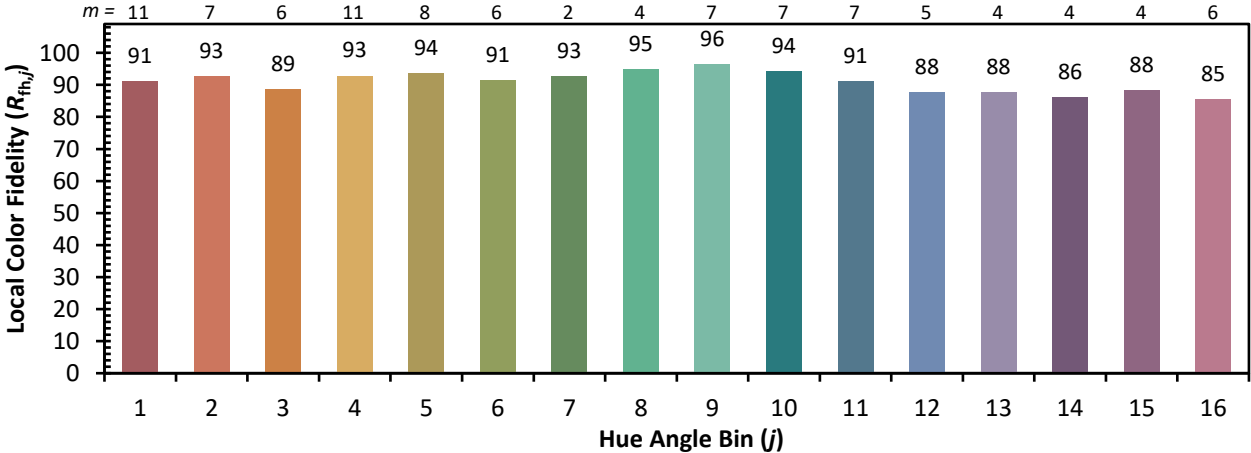


**Individual Sample Fidelity Index ( $R_{f,i}$ )**

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



Color Rendition by Hue-Angle Bin



Measure Comparisons



(END OF REPORT)