

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



Scaled data based on original data using  
LM-79-08 Approved Method: Electrical and Photometric Measurements of Solid-State  
Lighting Products

Test Report Prepared for

Cooper Lighting Solutions

(formerly Eaton)

Brand: METALUX

Report Number: P830630

Luminaire Tested: **OHBL-60HE-MFL-UNV-L950-CD**

Issue Date: 5/3/2024



**Test Information**

Test Method: LM-79-08  
Report Number: P830630  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-2106-285-1)  
Test Lab: INNOVATION CENTER  
Issue Date: 5/3/2024  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: METALUX  
Catalog Number: OHBL-60HE-MFL-UNV-L950-CD  
Description: 60000 LUMEN OHBL HE LED LUMINAIRE WITH 90CRI, 5000K LEDS AND MEDIUM FROSTED LENS  
Light Source: -  
Ballast/Driver: -

**Summary**

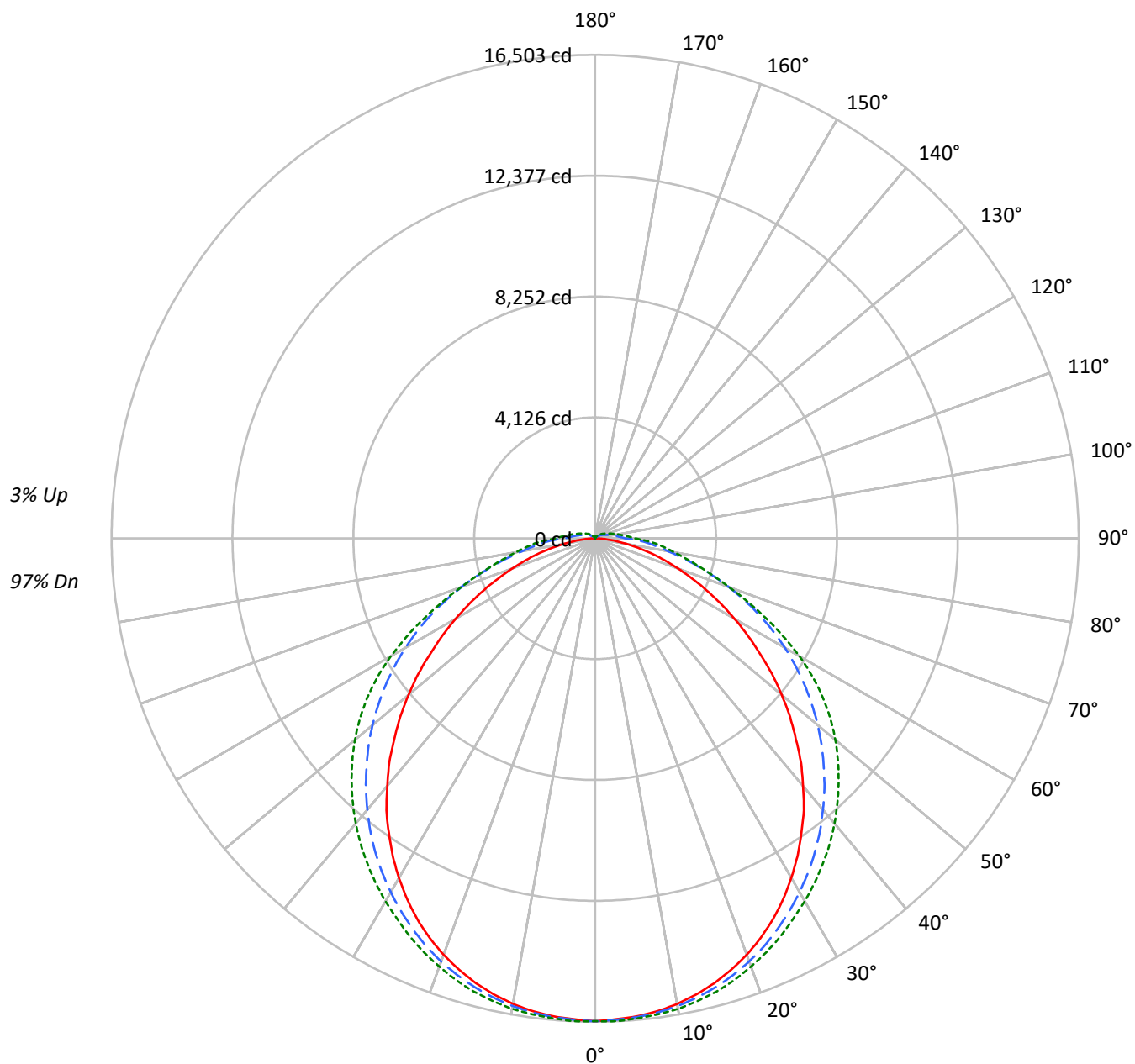
Lumens per Lamp: N/A  
Luminaire Lumens: 49343.0 lumens  
Efficiency: N/A  
Efficacy: 146.0 lumens/watt  
Spacing Criteria (0/90/45): 1.21 / 1.29 / 1.38  
Luminous Opening: Rectangular w/ Sides (W: 1.8' x L: 3.78' x H: 0.17')  
CIE Type: Direct

Input Watts (W): 338  
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: 25 FT

TEST NUMBER: P830630

CATALOG NUMBER: OHBL-60HE-MFL-UNV-L950-CD

### Luminous Intensity Polar Plot





TEST NUMBER: P830630

CATALOG NUMBER: OHBL-60HE-MFL-UNV-L950-CD

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

|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |    |    |    |    |    |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|----|----|----|----|----|----|
| RF  | 20  |     |     |     | 20  |     |     |     |     | 20  |     |     |     |     | 20 |    |    |    |    | 20 |
| RC  | 80  |     |     |     | 70  |     |     |     |     | 50  |     |     |     |     | 30 |    |    |    |    | 10 |
| RW  | 70  | 50  | 30  | 10  | 70  | 50  | 30  | 10  | 50  | 30  | 10  | 50  | 30  | 10  | 50 | 30 | 10 | 50 | 30 | 10 |
| RCR |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |    |    |    |    |    |
| 0   | 118 | 118 | 118 | 118 | 115 | 115 | 115 | 115 | 109 | 109 | 109 | 104 | 104 | 104 | 99 | 99 | 99 | 99 | 99 | 97 |
| 1   | 107 | 102 | 98  | 94  | 104 | 100 | 96  | 92  | 95  | 91  | 88  | 90  | 88  | 85  | 86 | 84 | 82 | 82 | 82 | 80 |
| 2   | 98  | 89  | 82  | 76  | 95  | 87  | 80  | 75  | 83  | 77  | 73  | 79  | 74  | 71  | 75 | 72 | 68 | 68 | 68 | 66 |
| 3   | 89  | 78  | 70  | 63  | 86  | 76  | 69  | 62  | 73  | 66  | 61  | 70  | 64  | 59  | 67 | 62 | 58 | 58 | 58 | 56 |
| 4   | 81  | 69  | 60  | 53  | 79  | 68  | 59  | 53  | 65  | 57  | 52  | 62  | 56  | 51  | 59 | 54 | 50 | 50 | 50 | 47 |
| 5   | 75  | 62  | 53  | 46  | 72  | 60  | 52  | 46  | 58  | 50  | 45  | 56  | 49  | 44  | 53 | 48 | 43 | 43 | 43 | 41 |
| 6   | 69  | 56  | 47  | 40  | 67  | 54  | 46  | 40  | 52  | 45  | 39  | 50  | 44  | 39  | 48 | 43 | 38 | 38 | 38 | 36 |
| 7   | 64  | 50  | 42  | 35  | 62  | 49  | 41  | 35  | 48  | 40  | 35  | 46  | 39  | 34  | 44 | 38 | 34 | 34 | 34 | 32 |
| 8   | 60  | 46  | 37  | 31  | 58  | 45  | 37  | 31  | 43  | 36  | 31  | 42  | 35  | 31  | 41 | 35 | 30 | 30 | 30 | 28 |
| 9   | 56  | 42  | 34  | 28  | 54  | 41  | 34  | 28  | 40  | 33  | 28  | 39  | 32  | 28  | 37 | 32 | 27 | 27 | 27 | 25 |
| 10  | 52  | 39  | 31  | 26  | 51  | 38  | 31  | 26  | 37  | 30  | 25  | 36  | 29  | 25  | 35 | 29 | 25 | 25 | 25 | 23 |

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

|     | 0°    | 45°   | 90°   |
|-----|-------|-------|-------|
| 0°  | 26074 | 26074 | 26074 |
| 5°  | 25907 | 25827 | 25906 |
| 10° | 25725 | 25599 | 25770 |
| 15° | 25438 | 25327 | 25592 |
| 20° | 25057 | 24994 | 25331 |
| 25° | 24547 | 24578 | 25067 |
| 30° | 23842 | 24126 | 24802 |
| 35° | 22988 | 23647 | 24573 |
| 40° | 21962 | 23092 | 24348 |
| 45° | 20753 | 22490 | 24060 |
| 50° | 19430 | 21881 | 23711 |
| 55° | 17804 | 21136 | 23120 |
| 60° | 16138 | 20258 | 21942 |
| 65° | 14319 | 19136 | 20005 |
| 70° | 12348 | 17706 | 17907 |
| 75° | 10353 | 16053 | 16490 |
| 80° | 7849  | 14859 | 16360 |
| 85° | 4966  | 15444 | 18282 |



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CATALOG NUMBER: OHBL-60HE-MFL-UNV-L950-CD

**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 1562.2  | 3.2       |
| 10°-20°   | 4481.8  | 9.1       |
| 20°-30°   | 6778.0  | 13.7      |
| 30°-40°   | 8137.0  | 16.5      |
| 40°-50°   | 8404.2  | 17.0      |
| 50°-60°   | 7561.2  | 15.3      |
| 60°-70°   | 5695.7  | 11.5      |
| 70°-80°   | 3439.3  | 7.0       |
| 80°-90°   | 1682.1  | 3.4       |
| 90°-100°  | 708.0   | 1.4       |
| 100°-110° | 404.2   | 0.8       |
| 110°-120° | 237.3   | 0.5       |
| 120°-130° | 134.2   | 0.3       |
| 130°-140° | 70.6    | 0.1       |
| 140°-150° | 34.4    | 0.1       |
| 150°-160° | 12.8    | 0.0       |
| 160°-170° | 0.0     | 0.0       |
| 170°-180° | 0.0     | 0.0       |
| <hr/>     |         |           |
| 0°-30°    | 12822.0 | 26.0      |
| 0°-40°    | 20959.1 | 42.5      |
| 0°-60°    | 36924.5 | 74.8      |
| 0°-90°    | 47741.6 | 96.8      |
| 90°-120°  | 1349.4  | 2.7       |
| 90°-150°  | 1588.6  | 3.2       |
| 90°-180°  | 1601.0  | 3.2       |
| 0°-180°   | 49343.0 | 100.0     |

**CANDELA DISTRIBUTION:**

|      | 0°    | 22.5° | 45°   | 67.5° | 90°   | Flux |
|------|-------|-------|-------|-------|-------|------|
| 0°   | 16487 | 16487 | 16487 | 16487 | 16487 |      |
| 5°   | 16382 | 16426 | 16406 | 16471 | 16451 | ###  |
| 15°  | 15720 | 15797 | 15870 | 16003 | 16019 | 4432 |
| 25°  | 14357 | 14514 | 14720 | 14950 | 14986 | 6604 |
| 35°  | 12274 | 12561 | 13078 | 13473 | 13554 | 7673 |
| 45°  | 9688  | 10176 | 11028 | 11629 | 11754 | 7479 |
| 55°  | 6864  | 7574  | 8724  | 9381  | 9494  | 6154 |
| 65°  | 4188  | 5044  | 6174  | 6480  | 6408  | 4161 |
| 75°  | 1973  | 2833  | 3575  | 3668  | 3632  | 2105 |
| 85°  | 412   | 1085  | 1792  | 2038  | 2074  | 476  |
| 90°  | 0     | 424   | 1025  | 1291  | 1344  | 26   |
| 95°  | 20    | 286   | 767   | 976   | 1013  | 17   |
| 105° | 28    | 165   | 444   | 581   | 605   | 28   |
| 115° | 32    | 93    | 274   | 367   | 383   | 33   |
| 125° | 32    | 44    | 165   | 238   | 250   | 29   |
| 135° | 28    | 36    | 85    | 145   | 161   | 22   |
| 145° | 40    | 36    | 40    | 73    | 85    | 24   |
| 155° | 40    | 44    | 40    | 36    | 40    | 12   |
| 165° | 0     | 0     | 0     | 0     | 0     | 0    |
| 175° | 0     | 0     | 0     | 0     | 0     | 0    |
| 180° | 0     | 0     | 0     | 0     | 0     |      |



TEST NUMBER: P830630

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**CANDELA DISTRIBUTION (FULL):**

|        | 0°      | 22.5°   | 45°     | 67.5°   | 90°     |
|--------|---------|---------|---------|---------|---------|
| 0°     | 16487.1 | 16487.1 | 16487.1 | 16487.1 | 16487.1 |
| 2.5°   | 16438.6 | 16479.0 | 16454.8 | 16507.2 | 16503.2 |
| 5°     | 16382.2 | 16426.5 | 16406.4 | 16470.9 | 16450.8 |
| 7.5°   | 16285.3 | 16333.7 | 16329.7 | 16402.3 | 16394.3 |
| 10°    | 16144.1 | 16196.5 | 16212.7 | 16309.5 | 16309.5 |
| 12.5°  | 15950.4 | 16019.0 | 16059.4 | 16176.4 | 16180.4 |
| 15°    | 15720.4 | 15797.1 | 15869.7 | 16002.9 | 16019.0 |
| 17.5°  | 15442.0 | 15538.8 | 15639.7 | 15793.0 | 15813.2 |
| 20°    | 15127.3 | 15236.2 | 15373.4 | 15534.8 | 15559.0 |
| 22.5°  | 14764.1 | 14893.2 | 15070.8 | 15260.4 | 15288.7 |
| 25°    | 14356.6 | 14513.9 | 14719.7 | 14949.7 | 14986.0 |
| 27.5°  | 13892.6 | 14074.1 | 14352.5 | 14610.8 | 14643.1 |
| 30°    | 13388.2 | 13602.0 | 13949.0 | 14255.7 | 14308.2 |
| 32.5°  | 12855.6 | 13101.7 | 13529.4 | 13872.4 | 13945.0 |
| 35°    | 12274.5 | 12561.0 | 13077.5 | 13472.9 | 13553.6 |
| 37.5°  | 11701.5 | 12016.3 | 12601.3 | 13053.3 | 13150.1 |
| 40°    | 11031.7 | 11423.1 | 12092.9 | 12593.3 | 12710.3 |
| 42.5°  | 10402.3 | 10825.9 | 11584.5 | 12129.3 | 12242.2 |
| 45°    | 9688.1  | 10176.3 | 11027.7 | 11628.9 | 11754.0 |
| 47.5°  | 9018.3  | 9546.8  | 10491.0 | 11112.4 | 11241.5 |
| 50°    | 8312.1  | 8893.2  | 9918.1  | 10567.7 | 10700.9 |
| 52.5°  | 7606.0  | 8231.4  | 9324.9  | 9998.8  | 10123.8 |
| 55°    | 6863.6  | 7573.7  | 8723.7  | 9381.4  | 9494.4  |
| 57.5°  | 6173.6  | 6924.1  | 8106.3  | 8731.8  | 8800.4  |
| 60°    | 5491.7  | 6270.4  | 7476.9  | 8025.6  | 8049.9  |
| 62.5°  | 4825.9  | 5645.0  | 6831.3  | 7267.1  | 7234.8  |
| 65°    | 4188.3  | 5043.8  | 6173.6  | 6480.2  | 6407.6  |
| 67.5°  | 3575.0  | 4458.7  | 5499.7  | 5697.4  | 5600.6  |
| 70°    | 2994.0  | 3889.8  | 4846.1  | 4946.9  | 4858.2  |
| 72.5°  | 2481.5  | 3349.1  | 4184.3  | 4269.0  | 4204.5  |
| 75°    | 1973.1  | 2832.6  | 3575.0  | 3667.8  | 3631.5  |
| 77.5°  | 1497.0  | 2332.2  | 3014.2  | 3135.2  | 3143.3  |
| 80°    | 1077.3  | 1876.3  | 2525.9  | 2715.6  | 2739.8  |
| 82.5°  | 710.2   | 1456.6  | 2118.4  | 2360.5  | 2396.8  |
| 85°    | 411.6   | 1085.4  | 1791.5  | 2037.7  | 2074.0  |
| 87.5°  | 177.5   | 782.8   | 1440.5  | 1662.4  | 1706.8  |
| 90°    | 0.0     | 423.7   | 1024.9  | 1291.2  | 1343.7  |
| 92.5°  | 12.1    | 351.0   | 879.6   | 1121.7  | 1166.1  |
| 95°    | 20.2    | 286.5   | 766.7   | 976.5   | 1012.8  |
| 97.5°  | 24.2    | 242.1   | 665.8   | 851.4   | 887.7   |
| 100°   | 24.2    | 209.8   | 577.0   | 746.5   | 778.8   |
| 102.5° | 24.2    | 185.6   | 504.4   | 653.7   | 681.9   |
| 105°   | 28.2    | 165.4   | 443.9   | 581.0   | 605.3   |



TEST NUMBER: P830630

CATALOG NUMBER: OHBL-60HE-MFL-UNV-L950-CD

**CANDELA DISTRIBUTION (continued):**

|        | 0°   | 22.5° | 45°   | 67.5° | 90°   |
|--------|------|-------|-------|-------|-------|
| 112.5° | 32.3 | 108.9 | 306.7 | 411.6 | 427.7 |
| 115°   | 32.3 | 92.8  | 274.4 | 367.2 | 383.3 |
| 117.5° | 36.3 | 80.7  | 242.1 | 330.9 | 343.0 |
| 120°   | 36.3 | 68.6  | 213.9 | 294.6 | 310.7 |
| 122.5° | 36.3 | 56.5  | 189.6 | 266.3 | 278.4 |
| 125°   | 32.3 | 44.4  | 165.4 | 238.1 | 250.2 |
| 127.5° | 28.2 | 36.3  | 141.2 | 213.9 | 226.0 |
| 130°   | 28.2 | 32.3  | 121.1 | 189.6 | 201.8 |
| 132.5° | 28.2 | 36.3  | 100.9 | 165.4 | 181.6 |
| 135°   | 28.2 | 36.3  | 84.7  | 145.3 | 161.4 |
| 137.5° | 28.2 | 36.3  | 68.6  | 125.1 | 141.2 |
| 140°   | 32.3 | 36.3  | 56.5  | 104.9 | 121.1 |
| 142.5° | 36.3 | 36.3  | 44.4  | 88.8  | 100.9 |
| 145°   | 40.4 | 36.3  | 40.4  | 72.6  | 84.7  |
| 147.5° | 40.4 | 40.4  | 40.4  | 56.5  | 68.6  |
| 150°   | 40.4 | 44.4  | 40.4  | 44.4  | 56.5  |
| 152.5° | 40.4 | 44.4  | 40.4  | 36.3  | 44.4  |
| 155°   | 40.4 | 44.4  | 40.4  | 36.3  | 40.4  |
| 157.5° | 0.0  | 0.0   | 0.0   | 0.0   | 0.0   |
| 160°   | 0.0  | 0.0   | 0.0   | 0.0   | 0.0   |
| 162.5° | 0.0  | 0.0   | 0.0   | 0.0   | 0.0   |
| 165°   | 0.0  | 0.0   | 0.0   | 0.0   | 0.0   |
| 167.5° | 0.0  | 0.0   | 0.0   | 0.0   | 0.0   |
| 170°   | 0.0  | 0.0   | 0.0   | 0.0   | 0.0   |
| 172.5° | 0.0  | 0.0   | 0.0   | 0.0   | 0.0   |
| 175°   | 0.0  | 0.0   | 0.0   | 0.0   | 0.0   |
| 177.5° | 0.0  | 0.0   | 0.0   | 0.0   | 0.0   |
| 180°   | 0.0  | 0.0   | 0.0   | 0.0   | 0.0   |



Report Generated By 670246072 / DESKTOP-50001EG





— 0°-180°    - - 45°-225°    - - - 90°-270°







|        |      |       |       |       |       |
|--------|------|-------|-------|-------|-------|
| 107.5° | 28.2 | 145.3 | 391.4 | 516.5 | 536.7 |
| 110°   | 28.2 | 129.1 | 347.0 | 460.0 | 480.2 |



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

Report Prepared for

Cooper Lighting Solutions

METALUX

Report Number: SP1-2307-100-9

Test Date: 08/01/2023

Luminaire Tested: OHB-15SE-N-UNV-L950-CD

Data in this report applies to families of products including OHB-15SE-N-UNV-L950-CD.

### Test Information

Test Method: LM-79-2019  
 Report Number: SP1-2307-100-9  
 Test Lab: COOPER LIGHTING SOLUTIONS  
 Photometer: SP1 - 76IN SPHERE  
 Measurement Geometry: 4π  
 Issue Date: 08/04/2023  
 Manufacturer: COOPER LIGHTING SOLUTIONS  
 Product Line: METALUX  
 Catalog Number: **OHB-15SE-N-UNV-L950-CD**  
 Description: 15000 LUMEN OHB SE LED LUMINAIRE WITH 90CRI, 5000K LEDS AND NARROW LENS

LENS

### Spectral Parameters

|                           |        |           |      |      |      |
|---------------------------|--------|-----------|------|------|------|
| CCT (K):                  | 5013   | CRI (Ra): | 92.0 |      |      |
| CIE u':                   | 0.2111 | R1:       | 92.6 | R9:  | 62.7 |
| CIE v':                   | 0.4847 | R2:       | 96.7 | R10: | 90.0 |
| Duv:                      | 0.0002 | R3:       | 96.5 | R11: | 89.8 |
| CIE x:                    | 0.3447 | R4:       | 90.1 | R12: | 69.9 |
| CIE y:                    | 0.3517 | R5:       | 91.1 | R13: | 94.5 |
| CIE z:                    | 0.3036 | R6:       | 92.0 | R14: | 98.3 |
| Peak Wavelength (nm):     | 455    | R7:       | 92.4 |      |      |
| Dominant Wavelength (nm): | 572    | R8:       | 84.9 |      |      |
| Purity:                   | 9.1    |           |      |      |      |
| Rf:                       | 88.9   |           |      |      |      |
| Rg:                       | 97.2   |           |      |      |      |



### Test Conditions

Stabilization Time: 26M  
 Operation Time: 12H  
 Room Temperature (°C) / RH%: 25.7/57%  
 Sphere Temperature (°C): 25.2

REPORT NUMBER: SP1-2307-100-9

| Measurement and Test Equipment |                       |                  |                      |
|--------------------------------|-----------------------|------------------|----------------------|
| Instrument                     | Identification Number | Calibration Date | Calibration Due Date |
| Photometer                     | 76INCH SPHERE IN0058  | 2/9/2023         | 8/9/2023             |
| Power Meter                    | XITRON 2801 IN0071    | 11/29/2022       | 11/29/2023           |
| AC Power Source                | CHROMA 61603 IN0063   | 11/28/2022       | 11/28/2023           |
| DC Power Source                | AGILENT E3634A IN0208 | 11/28/2022       | 11/28/2023           |
| Sphere Thermometer             | ONSET IN0085          | 11/28/2022       | 11/28/2023           |
| Room Thermometer               | ONSET IN0046          | 11/28/2022       | 11/28/2023           |

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CIE 1931 Chromaticity Diagram



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



Point lies inside the ANSI 5000K 4-step quadrangle

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**Photopic Flux vs. Wavelength**



#####

| λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) |
|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|
| 360       | 6694             | NR               | 490       | 112019           | NR               | 620       | 173132           | NR               | 750       | 14981            | NR               | 880       | 5536             | NR               |
| 365       | 5354             | NR               | 495       | 119136           | NR               | 625       | 169860           | NR               | 755       | 13480            | NR               | 885       | 6938             | NR               |
| 370       | 5722             | NR               | 500       | 127627           | NR               | 630       | 163982           | NR               | 760       | 11900            | NR               | 890       | 5411             | NR               |
| 375       | 6251             | NR               | 505       | 139687           | NR               | 635       | 158304           | NR               | 765       | 10671            | NR               | 895       | 4784             | NR               |
| 380       | 6177             | NR               | 510       | 148127           | NR               | 640       | 151433           | NR               | 770       | 9643             | NR               | 900       | 5872             | NR               |
| 385       | 5889             | NR               | 515       | 155327           | NR               | 645       | 144044           | NR               | 775       | 8310             | NR               | 905       | 5214             | NR               |
| 390       | 5252             | NR               | 520       | 161724           | NR               | 650       | 134971           | NR               | 780       | 7378             | NR               | 910       | 5425             | NR               |
| 395       | 5012             | NR               | 525       | 166350           | NR               | 655       | 126523           | NR               | 785       | 7348             | NR               | 915       | 5372             | NR               |
| 400       | 4505             | NR               | 530       | 170827           | NR               | 660       | 117624           | NR               | 790       | 6731             | NR               | 920       | 5263             | NR               |
| 405       | 4163             | NR               | 535       | 174287           | NR               | 665       | 107737           | NR               | 795       | 6603             | NR               | 925       | 5581             | NR               |
| 410       | 4931             | NR               | 540       | 177402           | NR               | 670       | 97796            | NR               | 800       | 6333             | NR               | 930       | 7934             | NR               |
| 415       | 6887             | NR               | 545       | 179468           | NR               | 675       | 88146            | NR               | 805       | 5919             | NR               | 935       | 6835             | NR               |
| 420       | 10750            | NR               | 550       | 180621           | NR               | 680       | 80008            | NR               | 810       | 5757             | NR               | 940       | 4871             | NR               |
| 425       | 18574            | NR               | 555       | 182239           | NR               | 685       | 71588            | NR               | 815       | 6226             | NR               | 945       | 6554             | NR               |
| 430       | 31943            | NR               | 560       | 184077           | NR               | 690       | 63388            | NR               | 820       | 5694             | NR               | 950       | 6239             | NR               |
| 435       | 54504            | NR               | 565       | 184113           | NR               | 695       | 56106            | NR               | 825       | 5621             | NR               | 955       | 4562             | NR               |
| 440       | 91570            | NR               | 570       | 183843           | NR               | 700       | 49976            | NR               | 830       | 5832             | NR               | 960       | 3863             | NR               |
| 445       | 155007           | NR               | 575       | 183242           | NR               | 705       | 44326            | NR               | 835       | 5478             | NR               | 965       | 4898             | NR               |
| 450       | 253466           | NR               | 580       | 182759           | NR               | 710       | 39116            | NR               | 840       | 5675             | NR               | 970       | 7576             | NR               |
| 455       | 316705           | NR               | 585       | 182781           | NR               | 715       | 34755            | NR               | 845       | 4960             | NR               | 975       | 6056             | NR               |
| 460       | 273954           | NR               | 590       | 181075           | NR               | 720       | 30900            | NR               | 850       | 5274             | NR               | 980       | 3439             | NR               |
| 465       | 214019           | NR               | 595       | 181315           | NR               | 725       | 27349            | NR               | 855       | 5470             | NR               | 985       | 3623             | NR               |
| 470       | 175153           | NR               | 600       | 181289           | NR               | 730       | 23954            | NR               | 860       | 6539             | NR               | 990       | 4301             | NR               |
| 475       | 140894           | NR               | 605       | 180053           | NR               | 735       | 21526            | NR               | 865       | 6378             | NR               | 995       | 7368             | NR               |
| 480       | 115223           | NR               | 610       | 177907           | NR               | 740       | 18965            | NR               | 870       | 5702             | NR               | 1000      | 10668            | NR               |
| 485       | 108577           | NR               | 615       | 175575           | NR               | 745       | 17153            | NR               | 875       | 4933             | NR               |           |                  |                  |

REPORT NUMBER: SP1-2307-100-9

Scotopic Flux vs. Wavelength



Scotopic Lumens: 26039.5

S/P: 2.08

| λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) |
|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|
| 360       | 6694             | NR               | 490       | 112019           | NR               | 620       | 173132           | NR               | 750       | 14981            | NR               | 880       | 5536             | NR               |
| 365       | 5354             | NR               | 495       | 119136           | NR               | 625       | 169860           | NR               | 755       | 13480            | NR               | 885       | 6938             | NR               |
| 370       | 5722             | NR               | 500       | 127627           | NR               | 630       | 163982           | NR               | 760       | 11900            | NR               | 890       | 5411             | NR               |
| 375       | 6251             | NR               | 505       | 139687           | NR               | 635       | 158304           | NR               | 765       | 10671            | NR               | 895       | 4784             | NR               |
| 380       | 6177             | NR               | 510       | 148127           | NR               | 640       | 151433           | NR               | 770       | 9643             | NR               | 900       | 5872             | NR               |
| 385       | 5889             | NR               | 515       | 155327           | NR               | 645       | 144044           | NR               | 775       | 8310             | NR               | 905       | 5214             | NR               |
| 390       | 5252             | NR               | 520       | 161724           | NR               | 650       | 134971           | NR               | 780       | 7378             | NR               | 910       | 5425             | NR               |
| 395       | 5012             | NR               | 525       | 166350           | NR               | 655       | 126523           | NR               | 785       | 7348             | NR               | 915       | 5372             | NR               |
| 400       | 4505             | NR               | 530       | 170827           | NR               | 660       | 117624           | NR               | 790       | 6731             | NR               | 920       | 5263             | NR               |
| 405       | 4163             | NR               | 535       | 174287           | NR               | 665       | 107737           | NR               | 795       | 6603             | NR               | 925       | 5581             | NR               |
| 410       | 4931             | NR               | 540       | 177402           | NR               | 670       | 97796            | NR               | 800       | 6333             | NR               | 930       | 7934             | NR               |
| 415       | 6887             | NR               | 545       | 179468           | NR               | 675       | 88146            | NR               | 805       | 5919             | NR               | 935       | 6835             | NR               |
| 420       | 10750            | NR               | 550       | 180621           | NR               | 680       | 80008            | NR               | 810       | 5757             | NR               | 940       | 4871             | NR               |
| 425       | 18574            | NR               | 555       | 182239           | NR               | 685       | 71588            | NR               | 815       | 6226             | NR               | 945       | 6554             | NR               |
| 430       | 31943            | NR               | 560       | 184077           | NR               | 690       | 63388            | NR               | 820       | 5694             | NR               | 950       | 6239             | NR               |
| 435       | 54504            | NR               | 565       | 184113           | NR               | 695       | 56106            | NR               | 825       | 5621             | NR               | 955       | 4562             | NR               |
| 440       | 91570            | NR               | 570       | 183843           | NR               | 700       | 49976            | NR               | 830       | 5832             | NR               | 960       | 3863             | NR               |
| 445       | 155007           | NR               | 575       | 183242           | NR               | 705       | 44326            | NR               | 835       | 5478             | NR               | 965       | 4898             | NR               |
| 450       | 253466           | NR               | 580       | 182759           | NR               | 710       | 39116            | NR               | 840       | 5675             | NR               | 970       | 7576             | NR               |
| 455       | 316705           | NR               | 585       | 182781           | NR               | 715       | 34755            | NR               | 845       | 4960             | NR               | 975       | 6056             | NR               |
| 460       | 273954           | NR               | 590       | 181075           | NR               | 720       | 30900            | NR               | 850       | 5274             | NR               | 980       | 3439             | NR               |
| 465       | 214019           | NR               | 595       | 181315           | NR               | 725       | 27349            | NR               | 855       | 5470             | NR               | 985       | 3623             | NR               |
| 470       | 175153           | NR               | 600       | 181289           | NR               | 730       | 23954            | NR               | 860       | 6539             | NR               | 990       | 4301             | NR               |
| 475       | 140894           | NR               | 605       | 180053           | NR               | 735       | 21526            | NR               | 865       | 6378             | NR               | 995       | 7368             | NR               |
| 480       | 115223           | NR               | 610       | 177907           | NR               | 740       | 18965            | NR               | 870       | 5702             | NR               | 1000      | 10668            | NR               |
| 485       | 108577           | NR               | 615       | 175575           | NR               | 745       | 17153            | NR               | 875       | 4933             | NR               |           |                  |                  |

REPORT NUMBER: SP1-2307-100-9

**Melanopic Flux vs. Wavelength**



**Melanopic Lumens: 11248.3 M/P: 0.9**

| λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) |
|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|
| 360       | 6694             | NR               | 490       | 112019           | NR               | 620       | 173132           | NR               | 750       | 14981            | NR               | 880       | 5536             | NR               |
| 365       | 5354             | NR               | 495       | 119136           | NR               | 625       | 169860           | NR               | 755       | 13480            | NR               | 885       | 6938             | NR               |
| 370       | 5722             | NR               | 500       | 127627           | NR               | 630       | 163982           | NR               | 760       | 11900            | NR               | 890       | 5411             | NR               |
| 375       | 6251             | NR               | 505       | 139687           | NR               | 635       | 158304           | NR               | 765       | 10671            | NR               | 895       | 4784             | NR               |
| 380       | 6177             | NR               | 510       | 148127           | NR               | 640       | 151433           | NR               | 770       | 9643             | NR               | 900       | 5872             | NR               |
| 385       | 5889             | NR               | 515       | 155327           | NR               | 645       | 144044           | NR               | 775       | 8310             | NR               | 905       | 5214             | NR               |
| 390       | 5252             | NR               | 520       | 161724           | NR               | 650       | 134971           | NR               | 780       | 7378             | NR               | 910       | 5425             | NR               |
| 395       | 5012             | NR               | 525       | 166350           | NR               | 655       | 126523           | NR               | 785       | 7348             | NR               | 915       | 5372             | NR               |
| 400       | 4505             | NR               | 530       | 170827           | NR               | 660       | 117624           | NR               | 790       | 6731             | NR               | 920       | 5263             | NR               |
| 405       | 4163             | NR               | 535       | 174287           | NR               | 665       | 107737           | NR               | 795       | 6603             | NR               | 925       | 5581             | NR               |
| 410       | 4931             | NR               | 540       | 177402           | NR               | 670       | 97796            | NR               | 800       | 6333             | NR               | 930       | 7934             | NR               |
| 415       | 6887             | NR               | 545       | 179468           | NR               | 675       | 88146            | NR               | 805       | 5919             | NR               | 935       | 6835             | NR               |
| 420       | 10750            | NR               | 550       | 180621           | NR               | 680       | 80008            | NR               | 810       | 5757             | NR               | 940       | 4871             | NR               |
| 425       | 18574            | NR               | 555       | 182239           | NR               | 685       | 71588            | NR               | 815       | 6226             | NR               | 945       | 6554             | NR               |
| 430       | 31943            | NR               | 560       | 184077           | NR               | 690       | 63388            | NR               | 820       | 5694             | NR               | 950       | 6239             | NR               |
| 435       | 54504            | NR               | 565       | 184113           | NR               | 695       | 56106            | NR               | 825       | 5621             | NR               | 955       | 4562             | NR               |
| 440       | 91570            | NR               | 570       | 183843           | NR               | 700       | 49976            | NR               | 830       | 5832             | NR               | 960       | 3863             | NR               |
| 445       | 155007           | NR               | 575       | 183242           | NR               | 705       | 44326            | NR               | 835       | 5478             | NR               | 965       | 4898             | NR               |
| 450       | 253466           | NR               | 580       | 182759           | NR               | 710       | 39116            | NR               | 840       | 5675             | NR               | 970       | 7576             | NR               |
| 455       | 316705           | NR               | 585       | 182781           | NR               | 715       | 34755            | NR               | 845       | 4960             | NR               | 975       | 6056             | NR               |
| 460       | 273954           | NR               | 590       | 181075           | NR               | 720       | 30900            | NR               | 850       | 5274             | NR               | 980       | 3439             | NR               |
| 465       | 214019           | NR               | 595       | 181315           | NR               | 725       | 27349            | NR               | 855       | 5470             | NR               | 985       | 3623             | NR               |
| 470       | 175153           | NR               | 600       | 181289           | NR               | 730       | 23954            | NR               | 860       | 6539             | NR               | 990       | 4301             | NR               |
| 475       | 140894           | NR               | 605       | 180053           | NR               | 735       | 21526            | NR               | 865       | 6378             | NR               | 995       | 7368             | NR               |
| 480       | 115223           | NR               | 610       | 177907           | NR               | 740       | 18965            | NR               | 870       | 5702             | NR               | 1000      | 10668            | NR               |
| 485       | 108577           | NR               | 615       | 175575           | NR               | 745       | 17153            | NR               | 875       | 4933             | NR               |           |                  |                  |

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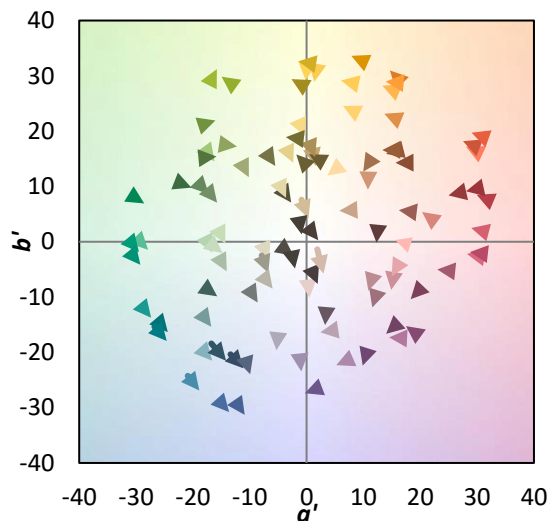
**TM-30-18**

**Summary**

$R_f = 88.9$   
 $R_g = 97.2$   
 $CIE R_a = 92.0$   
 $R_9 = 62.7$



**Color Vector Graphics**

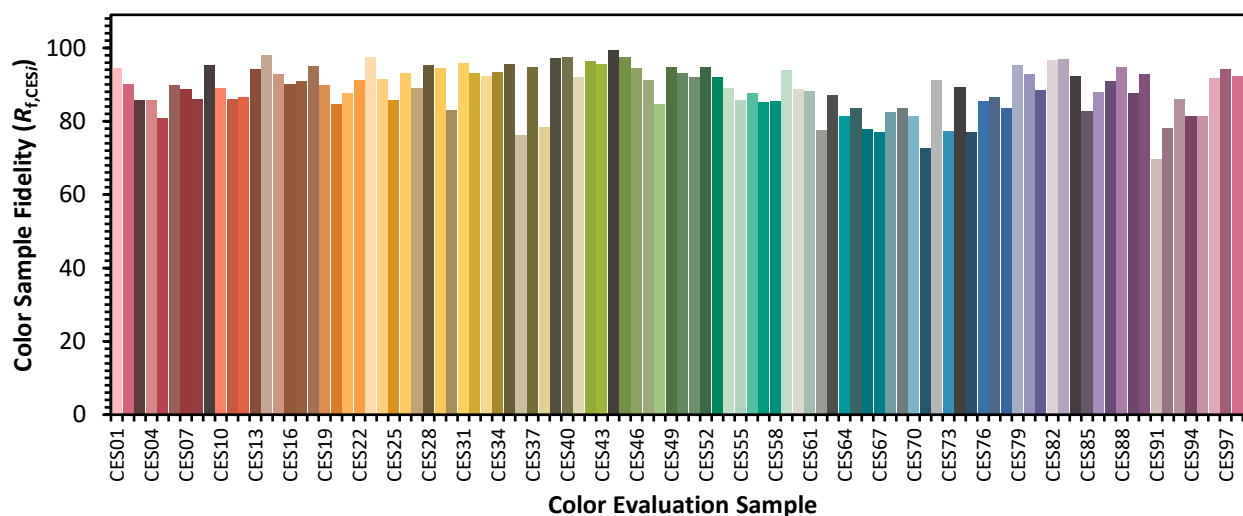


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Individual Sample Fidelity Index ( $R_{f,i}$ )

|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 85 | CES26 = 93 | CES51 = 92 | CES76 = 85 |
| CES02 = 61 | CES27 = 89 | CES52 = 95 | CES77 = 86 |
| CES03 = 31 | CES28 = 95 | CES53 = 92 | CES78 = 84 |
| CES04 = 69 | CES29 = 94 | CES54 = 89 | CES79 = 95 |
| CES05 = 48 | CES30 = 83 | CES55 = 86 | CES80 = 93 |
| CES06 = 50 | CES31 = 96 | CES56 = 88 | CES81 = 89 |
| CES07 = 41 | CES32 = 93 | CES57 = 85 | CES82 = 97 |
| CES08 = 40 | CES33 = 92 | CES58 = 85 | CES83 = 97 |
| CES09 = 29 | CES34 = 93 | CES59 = 94 | CES84 = 92 |
| CES10 = 73 | CES35 = 96 | CES60 = 89 | CES85 = 83 |
| CES11 = 56 | CES36 = 76 | CES61 = 88 | CES86 = 88 |
| CES12 = 62 | CES37 = 95 | CES62 = 78 | CES87 = 91 |
| CES13 = 42 | CES38 = 78 | CES63 = 87 | CES88 = 95 |
| CES14 = 74 | CES39 = 97 | CES64 = 81 | CES89 = 88 |
| CES15 = 71 | CES40 = 97 | CES65 = 84 | CES90 = 93 |
| CES16 = 46 | CES41 = 92 | CES66 = 78 | CES91 = 70 |
| CES17 = 49 | CES42 = 96 | CES67 = 77 | CES92 = 78 |
| CES18 = 56 | CES43 = 95 | CES68 = 82 | CES93 = 86 |
| CES19 = 70 | CES44 = 99 | CES69 = 84 | CES94 = 81 |
| CES20 = 65 | CES45 = 97 | CES70 = 81 | CES95 = 81 |
| CES21 = 85 | CES46 = 95 | CES71 = 73 | CES96 = 92 |
| CES22 = 77 | CES47 = 91 | CES72 = 91 | CES97 = 94 |
| CES23 = 91 | CES48 = 85 | CES73 = 77 | CES98 = 92 |
| CES24 = 90 | CES49 = 95 | CES74 = 89 | CES99 = 90 |
| CES25 = 70 | CES50 = 93 | CES75 = 77 |            |



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Color Rendition by Hue-Angle Bin



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**Measure Comparisons**



(END OF REPORT)