

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: P830664

Luminaire Tested: **OHBL-60HE-W-UNV-L935-CD**

Issue Date: 5/3/2024



**Test Information**

Test Method: LM-79-08  
Report Number: P830664  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-2106-285-4)  
Test Lab: INNOVATION CENTER  
Issue Date: 5/3/2024  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: METALUX  
Catalog Number: OHBL-60HE-W-UNV-L935-CD  
Description: 60000 LUMEN OHBL HE LED LUMINAIRE WITH 90CRI, 3500K LEDS AND WIDE LENS  
Light Source: -  
Ballast/Driver: -

**Summary**

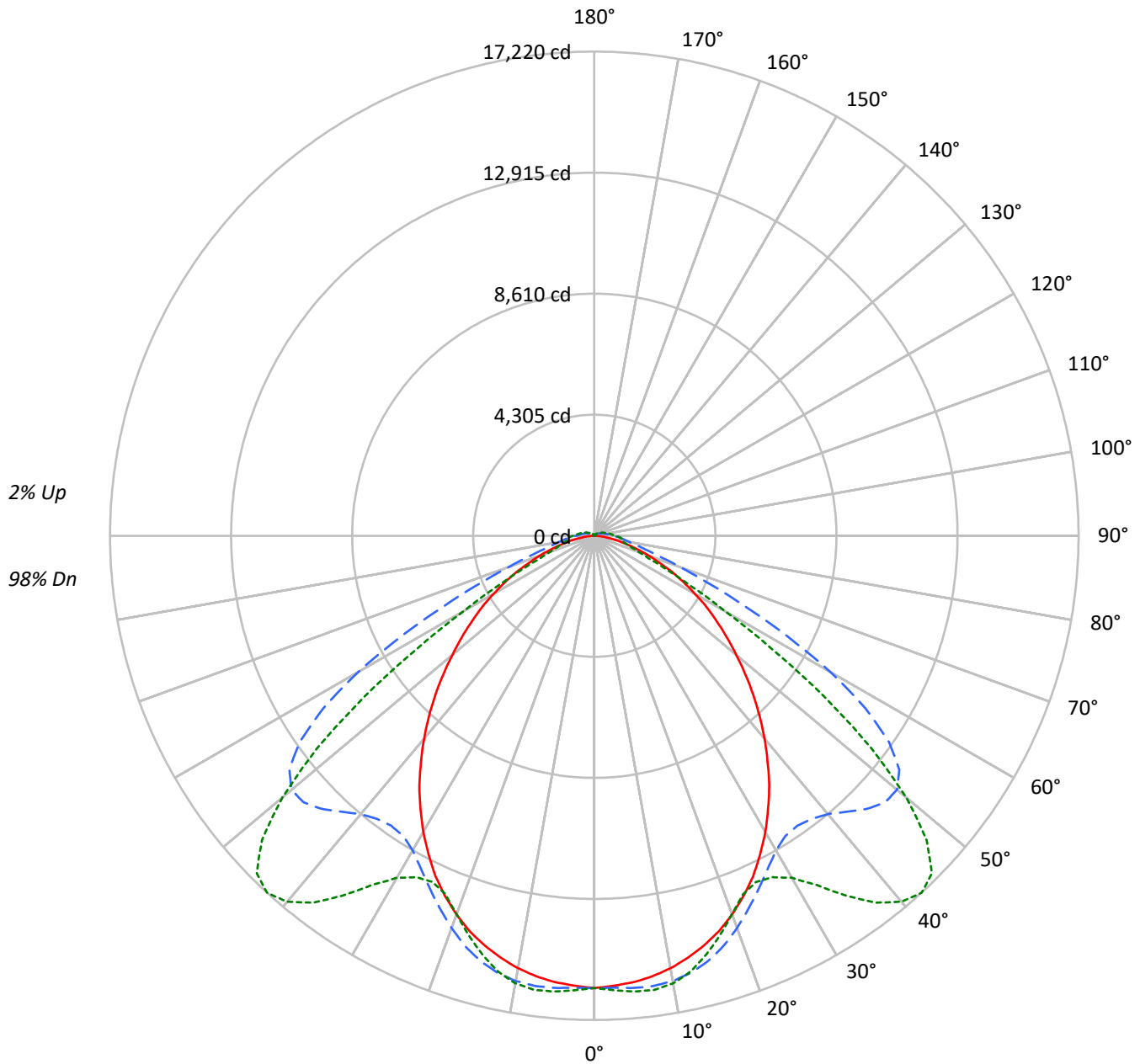
Lumens per Lamp: N/A  
Luminaire Lumens: 48163.0 lumens  
Efficiency: N/A  
Efficacy: 142.5 lumens/watt  
Spacing Criteria (0/90/45): 1.14 / 1.58 / 1.62  
Luminous Opening: Rectangular w/ Sides (W: 1.8' x L: 3.78' x H: 0.17')  
CIE Type: Direct

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: P830664

CATALOG NUMBER: OHBL-60HE-W-UNV-L935-CD

### Luminous Intensity Polar Plot





TEST NUMBER: P830664

CATALOG NUMBER: OHBL-60HE-W-UNV-L935-CD

**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   | 119 | 119 | 119 | 119 | 116 | 116 | 116 | 116 | 110 | 110 | 110 | 105 | 105 | 105 | 100 | 100 | 100 |    |    |    | 98 |
| 1   | 109 | 104 | 100 | 96  | 106 | 102 | 98  | 95  | 97  | 94  | 91  | 93  | 90  | 88  | 89  | 87  | 85  |    |    |    | 83 |
| 2   | 99  | 91  | 85  | 79  | 96  | 89  | 83  | 78  | 85  | 80  | 76  | 82  | 77  | 74  | 78  | 75  | 72  |    |    |    | 70 |
| 3   | 90  | 80  | 72  | 66  | 88  | 78  | 71  | 65  | 75  | 69  | 64  | 72  | 67  | 62  | 69  | 65  | 61  |    |    |    | 59 |
| 4   | 83  | 71  | 62  | 56  | 80  | 69  | 61  | 55  | 67  | 60  | 54  | 64  | 58  | 53  | 62  | 57  | 52  |    |    |    | 50 |
| 5   | 76  | 63  | 54  | 48  | 74  | 62  | 54  | 47  | 60  | 52  | 47  | 57  | 51  | 46  | 55  | 50  | 45  |    |    |    | 43 |
| 6   | 70  | 57  | 48  | 41  | 68  | 56  | 47  | 41  | 54  | 46  | 41  | 52  | 45  | 40  | 50  | 44  | 40  |    |    |    | 38 |
| 7   | 65  | 51  | 43  | 36  | 63  | 50  | 42  | 36  | 49  | 41  | 36  | 47  | 40  | 35  | 45  | 40  | 35  |    |    |    | 33 |
| 8   | 60  | 47  | 38  | 32  | 58  | 46  | 38  | 32  | 44  | 37  | 32  | 43  | 36  | 31  | 42  | 36  | 31  |    |    |    | 29 |
| 9   | 56  | 43  | 34  | 29  | 55  | 42  | 34  | 29  | 41  | 34  | 28  | 39  | 33  | 28  | 38  | 32  | 28  |    |    |    | 26 |
| 10  | 52  | 39  | 31  | 26  | 51  | 39  | 31  | 26  | 38  | 31  | 26  | 36  | 30  | 26  | 35  | 30  | 25  |    |    |    | 24 |

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

|     | 0°    | 45°   | 90°   |
|-----|-------|-------|-------|
| 0°  | 25439 | 25439 | 25439 |
| 5°  | 25202 | 25415 | 25621 |
| 10° | 24886 | 25387 | 25542 |
| 15° | 24400 | 24979 | 24617 |
| 20° | 23735 | 24132 | 23307 |
| 25° | 22845 | 23103 | 22733 |
| 30° | 21662 | 22341 | 24340 |
| 35° | 20311 | 22767 | 28327 |
| 40° | 18744 | 24673 | 32549 |
| 45° | 17106 | 28006 | 34745 |
| 50° | 15397 | 30994 | 32074 |
| 55° | 13791 | 30984 | 24271 |
| 60° | 12156 | 26243 | 14662 |
| 65° | 10429 | 18147 | 8744  |
| 70° | 8473  | 11754 | 6179  |
| 75° | 6446  | 8447  | 5547  |
| 80° | 4627  | 7451  | 5927  |
| 85° | 3141  | 8257  | 8351  |



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**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 1537.2  | 3.2       |
| 10°-20°   | 4352.8  | 9.0       |
| 20°-30°   | 6369.5  | 13.2      |
| 30°-40°   | 8272.2  | 17.2      |
| 40°-50°   | 10101.4 | 21.0      |
| 50°-60°   | 8895.8  | 18.5      |
| 60°-70°   | 4635.7  | 9.6       |
| 70°-80°   | 1987.9  | 4.1       |
| 80°-90°   | 954.7   | 2.0       |
| 90°-100°  | 448.5   | 0.9       |
| 100°-110° | 278.8   | 0.6       |
| 110°-120° | 164.8   | 0.3       |
| 120°-130° | 89.6    | 0.2       |
| 130°-140° | 45.0    | 0.1       |
| 140°-150° | 21.6    | 0.0       |
| 150°-160° | 7.6     | 0.0       |
| 160°-170° | 0.0     | 0.0       |
| 170°-180° | 0.0     | 0.0       |
| <hr/>     |         |           |
| 0°-30°    | 12259.5 | 25.5      |
| 0°-40°    | 20531.6 | 42.6      |
| 0°-60°    | 39528.8 | 82.1      |
| 0°-90°    | 47107.1 | 97.8      |
| 90°-120°  | 892.2   | 1.9       |
| 90°-150°  | 1048.3  | 2.2       |
| 90°-180°  | 1056.0  | 2.2       |
| 0°-180°   | 48163.0 | 100.0     |

**CANDELA DISTRIBUTION:**

|      | 0°    | 22.5° | 45°   | 67.5° | 90°   | Flux |
|------|-------|-------|-------|-------|-------|------|
| 0°   | 16086 | 16086 | 16086 | 16086 | 16086 |      |
| 5°   | 15936 | 16058 | 16145 | 16287 | 16270 | ###  |
| 15°  | 15079 | 15502 | 15652 | 15534 | 15409 | 4246 |
| 25°  | 13361 | 14076 | 13837 | 13576 | 13590 | 6132 |
| 35°  | 10845 | 11990 | 12591 | 14684 | 15624 | 6760 |
| 45°  | 7986  | 10047 | 13733 | 16627 | 16974 | 6157 |
| 55°  | 5317  | 8801  | 12789 | 11213 | 9967  | 4772 |
| 65°  | 3050  | 6098  | 5855  | 3255  | 2801  | 3018 |
| 75°  | 1228  | 2853  | 1881  | 1288  | 1222  | 1340 |
| 85°  | 260   | 1017  | 958   | 937   | 947   | 290  |
| 90°  | 4     | 368   | 632   | 722   | 739   | 18   |
| 95°  | 7     | 215   | 503   | 590   | 607   | 5    |
| 105° | 14    | 122   | 326   | 392   | 399   | 15   |
| 115° | 21    | 69    | 201   | 246   | 253   | 21   |
| 125° | 24    | 35    | 118   | 153   | 156   | 21   |
| 135° | 21    | 21    | 56    | 94    | 97    | 16   |
| 145° | 28    | 21    | 24    | 45    | 52    | 16   |
| 155° | 28    | 28    | 21    | 21    | 21    | 9    |
| 165° | 0     | 0     | 0     | 0     | 0     | 0    |
| 175° | 0     | 0     | 0     | 0     | 0     | 0    |
| 180° | 0     | 0     | 0     | 0     | 0     |      |



TEST NUMBER: P830664

CATALOG NUMBER: OHBL-60HE-W-UNV-L935-CD

**CANDELA DISTRIBUTION (FULL):**

|        | 0°      | 22.5°   | 45°     | 67.5°   | 90°     |
|--------|---------|---------|---------|---------|---------|
| 0°     | 16085.6 | 16085.6 | 16085.6 | 16085.6 | 16085.6 |
| 2.5°   | 16016.2 | 16085.6 | 16089.0 | 16186.2 | 16175.8 |
| 5°     | 15936.3 | 16057.8 | 16144.6 | 16286.8 | 16269.5 |
| 7.5°   | 15804.5 | 15995.3 | 16148.0 | 16304.2 | 16290.3 |
| 10°    | 15617.1 | 15877.3 | 16078.6 | 16207.0 | 16165.4 |
| 12.5°  | 15374.1 | 15717.7 | 15915.5 | 15943.3 | 15863.5 |
| 15°    | 15079.1 | 15502.5 | 15651.8 | 15533.8 | 15408.8 |
| 17.5°  | 14746.0 | 15242.2 | 15294.3 | 15037.5 | 14881.3 |
| 20°    | 14329.5 | 14895.2 | 14843.1 | 14489.2 | 14315.6 |
| 22.5°  | 13867.9 | 14513.4 | 14346.9 | 13975.5 | 13808.9 |
| 25°    | 13361.3 | 14076.2 | 13836.7 | 13576.4 | 13590.3 |
| 27.5°  | 12767.8 | 13579.9 | 13347.4 | 13465.4 | 13687.5 |
| 30°    | 12163.9 | 13059.3 | 12917.0 | 13604.2 | 14041.5 |
| 32.5°  | 11501.1 | 12524.9 | 12653.3 | 14010.2 | 14725.1 |
| 35°    | 10845.2 | 11990.4 | 12590.8 | 14683.5 | 15624.0 |
| 37.5°  | 10119.8 | 11449.0 | 12691.5 | 15460.9 | 16446.5 |
| 40°    | 9415.3  | 10921.5 | 12920.5 | 16158.4 | 16991.4 |
| 42.5°  | 8697.0  | 10449.5 | 13305.7 | 16571.4 | 17220.4 |
| 45°    | 7985.5  | 10047.0 | 13732.6 | 16627.0 | 16974.0 |
| 47.5°  | 7274.1  | 9706.9  | 14027.6 | 16186.2 | 16026.6 |
| 50°    | 6586.9  | 9404.9  | 14048.4 | 15127.7 | 14475.3 |
| 52.5°  | 5944.9  | 9127.3  | 13666.7 | 13441.1 | 12427.7 |
| 55°    | 5316.7  | 8801.1  | 12788.6 | 11213.0 | 9967.1  |
| 57.5°  | 4744.1  | 8349.9  | 11435.2 | 8818.4  | 7458.0  |
| 60°    | 4136.8  | 7739.1  | 9686.0  | 6451.6  | 5379.2  |
| 62.5°  | 3578.0  | 6979.1  | 7725.2  | 4490.8  | 3866.1  |
| 65°    | 3050.5  | 6097.6  | 5854.7  | 3255.3  | 2800.7  |
| 67.5°  | 2491.8  | 5184.9  | 4320.7  | 2373.8  | 2082.3  |
| 70°    | 2054.5  | 4338.1  | 3217.1  | 1846.3  | 1676.2  |
| 72.5°  | 1606.8  | 3532.9  | 2405.0  | 1499.2  | 1405.5  |
| 75°    | 1228.5  | 2852.7  | 1881.0  | 1287.5  | 1221.6  |
| 77.5°  | 905.8   | 2255.8  | 1513.1  | 1138.3  | 1075.8  |
| 80°    | 635.1   | 1776.9  | 1266.7  | 1016.8  | 992.6   |
| 82.5°  | 426.9   | 1374.3  | 1079.3  | 968.3   | 971.7   |
| 85°    | 260.3   | 1016.8  | 957.8   | 937.0   | 947.4   |
| 87.5°  | 124.9   | 721.9   | 822.5   | 853.7   | 864.1   |
| 90°    | 3.5     | 367.9   | 631.6   | 721.9   | 739.2   |
| 92.5°  | 0.0     | 281.1   | 555.3   | 645.5   | 662.9   |
| 95°    | 6.9     | 215.2   | 503.2   | 590.0   | 607.3   |
| 97.5°  | 6.9     | 177.0   | 451.2   | 541.4   | 551.8   |
| 100°   | 10.4    | 152.7   | 402.6   | 489.3   | 499.7   |
| 102.5° | 10.4    | 135.3   | 360.9   | 437.3   | 444.2   |
| 105°   | 13.9    | 121.5   | 326.2   | 392.2   | 399.1   |



TEST NUMBER: P830664

CATALOG NUMBER: OHBL-60HE-W-UNV-L935-CD

**CANDELA DISTRIBUTION (continued):**

|        | 0°   | 22.5° | 45°   | 67.5° | 90°   |
|--------|------|-------|-------|-------|-------|
| 112.5° | 20.8 | 83.3  | 229.1 | 277.6 | 284.6 |
| 115°   | 20.8 | 69.4  | 201.3 | 246.4 | 253.3 |
| 117.5° | 24.3 | 62.5  | 177.0 | 218.6 | 222.1 |
| 120°   | 24.3 | 52.1  | 152.7 | 194.3 | 197.8 |
| 122.5° | 24.3 | 41.6  | 135.3 | 173.5 | 177.0 |
| 125°   | 24.3 | 34.7  | 118.0 | 152.7 | 156.2 |
| 127.5° | 20.8 | 24.3  | 100.6 | 135.3 | 138.8 |
| 130°   | 20.8 | 20.8  | 83.3  | 118.0 | 124.9 |
| 132.5° | 20.8 | 20.8  | 69.4  | 104.1 | 111.1 |
| 135°   | 20.8 | 20.8  | 55.5  | 93.7  | 97.2  |
| 137.5° | 20.8 | 20.8  | 45.1  | 79.8  | 86.8  |
| 140°   | 20.8 | 20.8  | 34.7  | 69.4  | 72.9  |
| 142.5° | 24.3 | 20.8  | 31.2  | 59.0  | 62.5  |
| 145°   | 27.8 | 20.8  | 24.3  | 45.1  | 52.1  |
| 147.5° | 27.8 | 24.3  | 24.3  | 38.2  | 41.6  |
| 150°   | 27.8 | 27.8  | 20.8  | 27.8  | 34.7  |
| 152.5° | 27.8 | 27.8  | 20.8  | 20.8  | 27.8  |
| 155°   | 27.8 | 27.8  | 20.8  | 20.8  | 20.8  |
| 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° | 17.4 | 107.6 | 291.5 | 350.5 | 357.5 |
| 110°   | 17.4 | 93.7  | 256.8 | 312.3 | 319.3 |



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

Report Prepared for

Cooper Lighting Solutions

METALUX

Report Number: SP1-2307-100-7

Test Date: 07/28/2023

Luminaire Tested: OHB-15SE-N-UNV-L935-CD

Data in this report applies to families of products including OHB-15SE-N-UNV-L935-CD.

### Test Information

Test Method: LM-79-2019  
 Report Number: SP1-2307-100-7  
 Test Lab: COOPER LIGHTING SOLUTIONS  
 Photometer: SP1 - 76IN SPHERE  
 Measurement Geometry:  $4\pi$   
 Issue Date: 08/04/2023  
 Manufacturer: COOPER LIGHTING SOLUTIONS  
 Product Line: METALUX  
 Catalog Number: **OHB-15SE-N-UNV-L935-CD**  
 Description: 15000 LUMEN OHB SE LED LUMINAIRE WITH 90CRI, 3500K LEDS AND NARROW LENS

LENS

### Spectral Parameters

|                           |         |           |      |      |      |
|---------------------------|---------|-----------|------|------|------|
| CCT (K):                  | 3429    | CRI (Ra): | 90.9 |      |      |
| CIE u':                   | 0.2376  | R1:       | 91.1 | R9:  | 50.7 |
| CIE v':                   | 0.5121  | R2:       | 96.7 | R10: | 90.8 |
| Duv:                      | -0.0004 | R3:       | 97.7 | R11: | 88.9 |
| CIE x:                    | 0.4088  | R4:       | 88.8 | R12: | 74.6 |
| CIE y:                    | 0.3916  | R5:       | 90.3 | R13: | 92.9 |
| CIE z:                    | 0.1997  | R6:       | 94.5 | R14: | 99.5 |
| Peak Wavelength (nm):     | 609     | R7:       | 89.8 |      |      |
| Dominant Wavelength (nm): | 581     | R8:       | 78.2 |      |      |
| Purity:                   | 40.4    |           |      |      |      |
| Rf:                       | 88.9    |           |      |      |      |
| Rg:                       | 96.3    |           |      |      |      |



### Test Conditions

Stabilization Time: 23M  
 Operation Time: 12H  
 Room Temperature (°C) / RH%: 25.7/55%  
 Sphere Temperature (°C): 25.2

REPORT NUMBER: SP1-2307-100-7

| 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 3500K 4-step quadrangle

REPORT NUMBER: SP1-2307-100-7

**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       | 5498             | NR               | 490       | 81900            | NR               | 620       | 217907           | NR               | 750       | 17550            | NR               | 880       | 6189             | NR               |
| 365       | 4903             | NR               | 495       | 90120            | NR               | 625       | 213734           | NR               | 755       | 15662            | NR               | 885       | 6187             | NR               |
| 370       | 4767             | NR               | 500       | 98453            | NR               | 630       | 206250           | NR               | 760       | 13792            | NR               | 890       | 3830             | NR               |
| 375       | 5225             | NR               | 505       | 109244           | NR               | 635       | 198796           | NR               | 765       | 12765            | NR               | 895       | 4688             | NR               |
| 380       | 5499             | NR               | 510       | 117784           | NR               | 640       | 189406           | NR               | 770       | 11372            | NR               | 900       | 4680             | NR               |
| 385       | 5081             | NR               | 515       | 125000           | NR               | 645       | 180677           | NR               | 775       | 9965             | NR               | 905       | 4599             | NR               |
| 390       | 4739             | NR               | 520       | 131786           | NR               | 650       | 168402           | NR               | 780       | 9154             | NR               | 910       | 4495             | NR               |
| 395       | 4255             | NR               | 525       | 136796           | NR               | 655       | 157693           | NR               | 785       | 8847             | NR               | 915       | 3983             | NR               |
| 400       | 3864             | NR               | 530       | 142357           | NR               | 660       | 145357           | NR               | 790       | 7937             | NR               | 920       | 4675             | NR               |
| 405       | 3583             | NR               | 535       | 147243           | NR               | 665       | 132743           | NR               | 795       | 6956             | NR               | 925       | 4952             | NR               |
| 410       | 3994             | NR               | 540       | 152273           | NR               | 670       | 120757           | NR               | 800       | 6970             | NR               | 930       | 6097             | NR               |
| 415       | 5055             | NR               | 545       | 157222           | NR               | 675       | 108421           | NR               | 805       | 6299             | NR               | 935       | 5657             | NR               |
| 420       | 7131             | NR               | 550       | 161271           | NR               | 680       | 97325            | NR               | 810       | 6023             | NR               | 940       | 4574             | NR               |
| 425       | 11311            | NR               | 555       | 167038           | NR               | 685       | 86839            | NR               | 815       | 6343             | NR               | 945       | 5252             | NR               |
| 430       | 17754            | NR               | 560       | 173115           | NR               | 690       | 76248            | NR               | 820       | 6462             | NR               | 950       | 5635             | NR               |
| 435       | 28634            | NR               | 565       | 178502           | NR               | 695       | 67406            | NR               | 825       | 5476             | NR               | 955       | 4501             | NR               |
| 440       | 46392            | NR               | 570       | 184331           | NR               | 700       | 60039            | NR               | 830       | 5786             | NR               | 960       | 2938             | NR               |
| 445       | 78344            | NR               | 575       | 189666           | NR               | 705       | 53650            | NR               | 835       | 5884             | NR               | 965       | 5544             | NR               |
| 450       | 131219           | NR               | 580       | 196488           | NR               | 710       | 47273            | NR               | 840       | 4862             | NR               | 970       | 5050             | NR               |
| 455       | 170311           | NR               | 585       | 202769           | NR               | 715       | 41664            | NR               | 845       | 5651             | NR               | 975       | 5575             | NR               |
| 460       | 154269           | NR               | 590       | 207213           | NR               | 720       | 37083            | NR               | 850       | 5178             | NR               | 980       | 2973             | NR               |
| 465       | 126622           | NR               | 595       | 213472           | NR               | 725       | 32494            | NR               | 855       | 5510             | NR               | 985       | 4912             | NR               |
| 470       | 109065           | NR               | 600       | 218473           | NR               | 730       | 28665            | NR               | 860       | 5438             | NR               | 990       | 5454             | NR               |
| 475       | 91762            | NR               | 605       | 220737           | NR               | 735       | 25540            | NR               | 865       | 5848             | NR               | 995       | 6068             | NR               |
| 480       | 78213            | NR               | 610       | 221090           | NR               | 740       | 22878            | NR               | 870       | 4969             | NR               | 1000      | 9406             | NR               |
| 485       | 77035            | NR               | 615       | 220059           | NR               | 745       | 20304            | NR               | 875       | 5438             | NR               |           |                  |                  |

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Scotopic Flux vs. Wavelength



Scotopic Lumens: 19629.6

S/P: 1.6

| 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       | 5498             | NR               | 490       | 81900            | NR               | 620       | 217907           | NR               | 750       | 17550            | NR               | 880       | 6189             | NR               |
| 365       | 4903             | NR               | 495       | 90120            | NR               | 625       | 213734           | NR               | 755       | 15662            | NR               | 885       | 6187             | NR               |
| 370       | 4767             | NR               | 500       | 98453            | NR               | 630       | 206250           | NR               | 760       | 13792            | NR               | 890       | 3830             | NR               |
| 375       | 5225             | NR               | 505       | 109244           | NR               | 635       | 198796           | NR               | 765       | 12765            | NR               | 895       | 4688             | NR               |
| 380       | 5499             | NR               | 510       | 117784           | NR               | 640       | 189406           | NR               | 770       | 11372            | NR               | 900       | 4680             | NR               |
| 385       | 5081             | NR               | 515       | 125000           | NR               | 645       | 180677           | NR               | 775       | 9965             | NR               | 905       | 4599             | NR               |
| 390       | 4739             | NR               | 520       | 131786           | NR               | 650       | 168402           | NR               | 780       | 9154             | NR               | 910       | 4495             | NR               |
| 395       | 4255             | NR               | 525       | 136796           | NR               | 655       | 157693           | NR               | 785       | 8847             | NR               | 915       | 3983             | NR               |
| 400       | 3864             | NR               | 530       | 142357           | NR               | 660       | 145357           | NR               | 790       | 7937             | NR               | 920       | 4675             | NR               |
| 405       | 3583             | NR               | 535       | 147243           | NR               | 665       | 132743           | NR               | 795       | 6956             | NR               | 925       | 4952             | NR               |
| 410       | 3994             | NR               | 540       | 152273           | NR               | 670       | 120757           | NR               | 800       | 6970             | NR               | 930       | 6097             | NR               |
| 415       | 5055             | NR               | 545       | 157222           | NR               | 675       | 108421           | NR               | 805       | 6299             | NR               | 935       | 5657             | NR               |
| 420       | 7131             | NR               | 550       | 161271           | NR               | 680       | 97325            | NR               | 810       | 6023             | NR               | 940       | 4574             | NR               |
| 425       | 11311            | NR               | 555       | 167038           | NR               | 685       | 86839            | NR               | 815       | 6343             | NR               | 945       | 5252             | NR               |
| 430       | 17754            | NR               | 560       | 173115           | NR               | 690       | 76248            | NR               | 820       | 6462             | NR               | 950       | 5635             | NR               |
| 435       | 28634            | NR               | 565       | 178502           | NR               | 695       | 67406            | NR               | 825       | 5476             | NR               | 955       | 4501             | NR               |
| 440       | 46392            | NR               | 570       | 184331           | NR               | 700       | 60039            | NR               | 830       | 5786             | NR               | 960       | 2938             | NR               |
| 445       | 78344            | NR               | 575       | 189666           | NR               | 705       | 53650            | NR               | 835       | 5884             | NR               | 965       | 5544             | NR               |
| 450       | 131219           | NR               | 580       | 196488           | NR               | 710       | 47273            | NR               | 840       | 4862             | NR               | 970       | 5050             | NR               |
| 455       | 170311           | NR               | 585       | 202769           | NR               | 715       | 41664            | NR               | 845       | 5651             | NR               | 975       | 5575             | NR               |
| 460       | 154269           | NR               | 590       | 207213           | NR               | 720       | 37083            | NR               | 850       | 5178             | NR               | 980       | 2973             | NR               |
| 465       | 126622           | NR               | 595       | 213472           | NR               | 725       | 32494            | NR               | 855       | 5510             | NR               | 985       | 4912             | NR               |
| 470       | 109065           | NR               | 600       | 218473           | NR               | 730       | 28665            | NR               | 860       | 5438             | NR               | 990       | 5454             | NR               |
| 475       | 91762            | NR               | 605       | 220737           | NR               | 735       | 25540            | NR               | 865       | 5848             | NR               | 995       | 6068             | NR               |
| 480       | 78213            | NR               | 610       | 221090           | NR               | 740       | 22878            | NR               | 870       | 4969             | NR               | 1000      | 9406             | NR               |
| 485       | 77035            | NR               | 615       | 220059           | NR               | 745       | 20304            | NR               | 875       | 5438             | NR               |           |                  |                  |

REPORT NUMBER: SP1-2307-100-7

**Melanopic Flux vs. Wavelength**



**Melanopic Lumens: 7912.5**

**M/P: 0.65**

| 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       | 5498             | NR               | 490       | 81900            | NR               | 620       | 217907           | NR               | 750       | 17550            | NR               | 880       | 6189             | NR               |
| 365       | 4903             | NR               | 495       | 90120            | NR               | 625       | 213734           | NR               | 755       | 15662            | NR               | 885       | 6187             | NR               |
| 370       | 4767             | NR               | 500       | 98453            | NR               | 630       | 206250           | NR               | 760       | 13792            | NR               | 890       | 3830             | NR               |
| 375       | 5225             | NR               | 505       | 109244           | NR               | 635       | 198796           | NR               | 765       | 12765            | NR               | 895       | 4688             | NR               |
| 380       | 5499             | NR               | 510       | 117784           | NR               | 640       | 189406           | NR               | 770       | 11372            | NR               | 900       | 4680             | NR               |
| 385       | 5081             | NR               | 515       | 125000           | NR               | 645       | 180677           | NR               | 775       | 9965             | NR               | 905       | 4599             | NR               |
| 390       | 4739             | NR               | 520       | 131786           | NR               | 650       | 168402           | NR               | 780       | 9154             | NR               | 910       | 4495             | NR               |
| 395       | 4255             | NR               | 525       | 136796           | NR               | 655       | 157693           | NR               | 785       | 8847             | NR               | 915       | 3983             | NR               |
| 400       | 3864             | NR               | 530       | 142357           | NR               | 660       | 145357           | NR               | 790       | 7937             | NR               | 920       | 4675             | NR               |
| 405       | 3583             | NR               | 535       | 147243           | NR               | 665       | 132743           | NR               | 795       | 6956             | NR               | 925       | 4952             | NR               |
| 410       | 3994             | NR               | 540       | 152273           | NR               | 670       | 120757           | NR               | 800       | 6970             | NR               | 930       | 6097             | NR               |
| 415       | 5055             | NR               | 545       | 157222           | NR               | 675       | 108421           | NR               | 805       | 6299             | NR               | 935       | 5657             | NR               |
| 420       | 7131             | NR               | 550       | 161271           | NR               | 680       | 97325            | NR               | 810       | 6023             | NR               | 940       | 4574             | NR               |
| 425       | 11311            | NR               | 555       | 167038           | NR               | 685       | 86839            | NR               | 815       | 6343             | NR               | 945       | 5252             | NR               |
| 430       | 17754            | NR               | 560       | 173115           | NR               | 690       | 76248            | NR               | 820       | 6462             | NR               | 950       | 5635             | NR               |
| 435       | 28634            | NR               | 565       | 178502           | NR               | 695       | 67406            | NR               | 825       | 5476             | NR               | 955       | 4501             | NR               |
| 440       | 46392            | NR               | 570       | 184331           | NR               | 700       | 60039            | NR               | 830       | 5786             | NR               | 960       | 2938             | NR               |
| 445       | 78344            | NR               | 575       | 189666           | NR               | 705       | 53650            | NR               | 835       | 5884             | NR               | 965       | 5544             | NR               |
| 450       | 131219           | NR               | 580       | 196488           | NR               | 710       | 47273            | NR               | 840       | 4862             | NR               | 970       | 5050             | NR               |
| 455       | 170311           | NR               | 585       | 202769           | NR               | 715       | 41664            | NR               | 845       | 5651             | NR               | 975       | 5575             | NR               |
| 460       | 154269           | NR               | 590       | 207213           | NR               | 720       | 37083            | NR               | 850       | 5178             | NR               | 980       | 2973             | NR               |
| 465       | 126622           | NR               | 595       | 213472           | NR               | 725       | 32494            | NR               | 855       | 5510             | NR               | 985       | 4912             | NR               |
| 470       | 109065           | NR               | 600       | 218473           | NR               | 730       | 28665            | NR               | 860       | 5438             | NR               | 990       | 5454             | NR               |
| 475       | 91762            | NR               | 605       | 220737           | NR               | 735       | 25540            | NR               | 865       | 5848             | NR               | 995       | 6068             | NR               |
| 480       | 78213            | NR               | 610       | 221090           | NR               | 740       | 22878            | NR               | 870       | 4969             | NR               | 1000      | 9406             | NR               |
| 485       | 77035            | NR               | 615       | 220059           | NR               | 745       | 20304            | NR               | 875       | 5438             | NR               |           |                  |                  |

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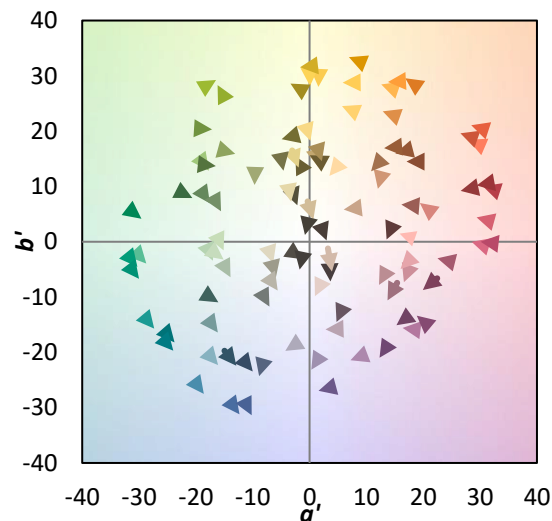
**TM-30-18**

**Summary**

$R_f = 88.9$   
 $R_g = 96.3$   
 CIE  $R_a = 90.9$   
 $R_9 = 50.7$



**Color Vector Graphics**



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

|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 86 | CES26 = 95 | CES51 = 92 | CES76 = 89 |
| CES02 = 62 | CES27 = 89 | CES52 = 95 | CES77 = 88 |
| CES03 = 31 | CES28 = 97 | CES53 = 92 | CES78 = 87 |
| CES04 = 70 | CES29 = 93 | CES54 = 89 | CES79 = 93 |
| CES05 = 49 | CES30 = 82 | CES55 = 86 | CES80 = 92 |
| CES06 = 51 | CES31 = 95 | CES56 = 87 | CES81 = 82 |
| CES07 = 42 | CES32 = 94 | CES57 = 85 | CES82 = 97 |
| CES08 = 41 | CES33 = 91 | CES58 = 85 | CES83 = 95 |
| CES09 = 29 | CES34 = 96 | CES59 = 94 | CES84 = 94 |
| CES10 = 75 | CES35 = 97 | CES60 = 89 | CES85 = 80 |
| CES11 = 58 | CES36 = 77 | CES61 = 89 | CES86 = 82 |
| CES12 = 64 | CES37 = 97 | CES62 = 79 | CES87 = 90 |
| CES13 = 43 | CES38 = 78 | CES63 = 88 | CES88 = 93 |
| CES14 = 74 | CES39 = 97 | CES64 = 83 | CES89 = 85 |
| CES15 = 71 | CES40 = 98 | CES65 = 84 | CES90 = 92 |
| CES16 = 47 | CES41 = 92 | CES66 = 80 | CES91 = 72 |
| CES17 = 50 | CES42 = 99 | CES67 = 80 | CES92 = 75 |
| CES18 = 56 | CES43 = 95 | CES68 = 85 | CES93 = 85 |
| CES19 = 71 | CES44 = 99 | CES69 = 86 | CES94 = 77 |
| CES20 = 66 | CES45 = 96 | CES70 = 84 | CES95 = 81 |
| CES21 = 86 | CES46 = 94 | CES71 = 77 | CES96 = 91 |
| CES22 = 78 | CES47 = 91 | CES72 = 93 | CES97 = 93 |
| CES23 = 91 | CES48 = 83 | CES73 = 81 | CES98 = 91 |
| CES24 = 90 | CES49 = 95 | CES74 = 89 | CES99 = 87 |
| CES25 = 71 | CES50 = 93 | CES75 = 81 |            |



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**Color Rendition by Hue-Angle Bin**



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**Measure Comparisons**



(END OF REPORT)