

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: P830148

Luminaire Tested: **OHBL-24SE-NL-UNV-L935-CD**

Issue Date: 5/3/2024



**Test Information**

Test Method: LM-79-08  
Report Number: P830148  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (P472951)  
Test Lab: INNOVATION CENTER  
Issue Date: 5/3/2024  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: METALUX  
Catalog Number: OHBL-24SE-NL-UNV-L935-CD  
Description: 24000 LUMEN OHBL SE LED LUMINAIRE WITH 90CRI, 3500K LEDS AND NO LENS  
Light Source: -  
Ballast/Driver: -

**Summary**

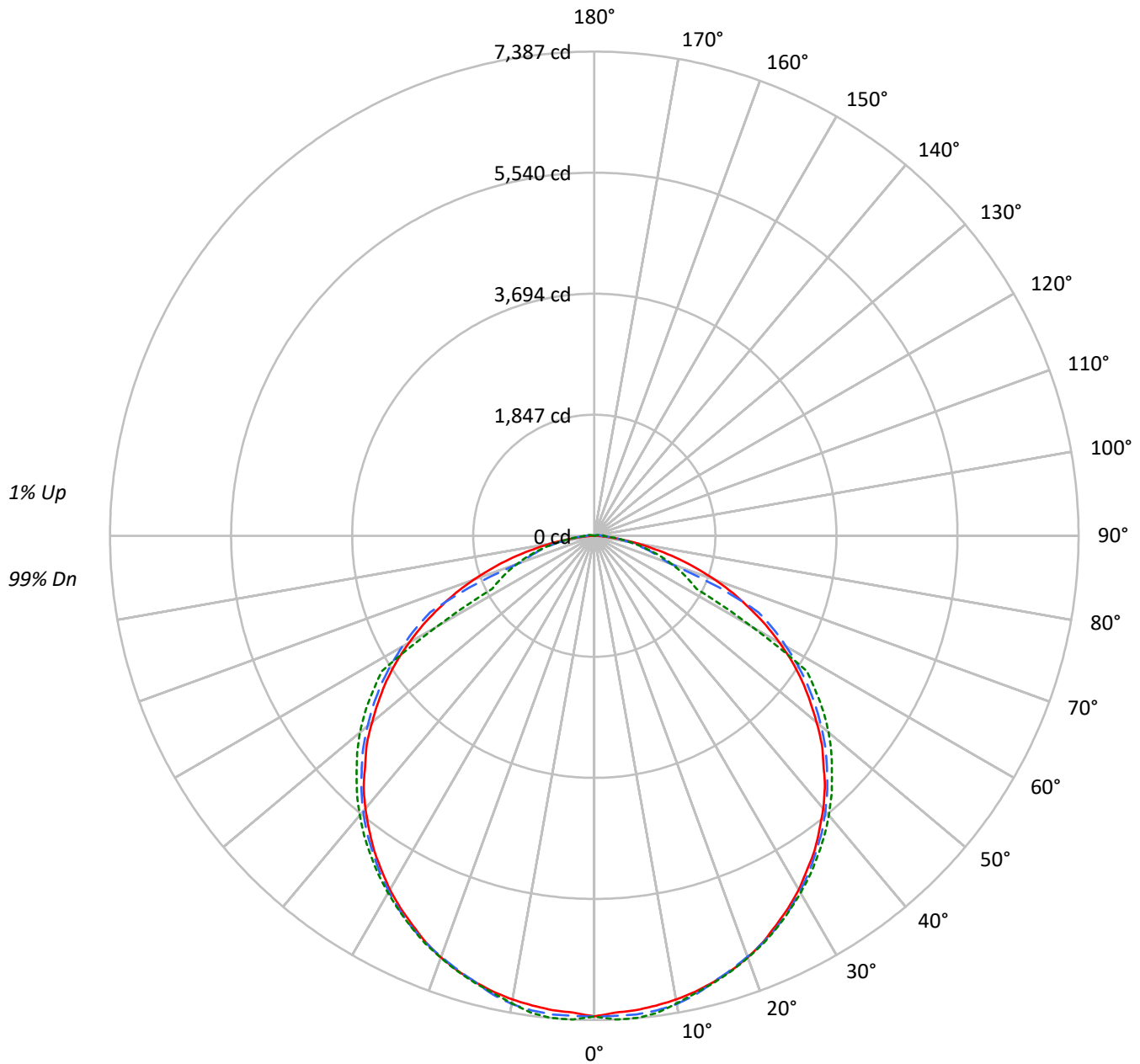
Lumens per Lamp: N/A  
Luminaire Lumens: 20589.0 lumens  
Efficiency: N/A  
Efficacy: 149.2 lumens/watt  
Spacing Criteria (0/90/45): 1.26 / 1.28 / 1.39  
Luminous Opening: Rectangular (W 1.67' x L: 3.78' x H: 0')  
CIE Type: Direct

Input Watts (W): 138  
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: P830148

CATALOG NUMBER: OHBL-24SE-NL-UNV-L935-CD

### Luminous Intensity Polar Plot





TEST NUMBER: P830148

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**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   | 119 | 119 | 119 | 119 | 116 | 116 | 116 | 116 | 111 | 111 | 111 | 106 | 106 | 106 | 102 | 102 | 102 |    |    | 99 |
| 1   | 109 | 105 | 100 | 97  | 106 | 102 | 99  | 95  | 98  | 95  | 92  | 94  | 91  | 89  | 90  | 88  | 86  |    |    | 84 |
| 2   | 99  | 92  | 85  | 79  | 97  | 90  | 84  | 78  | 86  | 81  | 76  | 83  | 78  | 75  | 80  | 76  | 73  |    |    | 71 |
| 3   | 91  | 81  | 73  | 66  | 88  | 79  | 72  | 66  | 76  | 70  | 64  | 73  | 68  | 63  | 70  | 66  | 62  |    |    | 60 |
| 4   | 83  | 71  | 63  | 56  | 81  | 70  | 62  | 56  | 67  | 60  | 55  | 65  | 59  | 54  | 63  | 58  | 53  |    |    | 51 |
| 5   | 76  | 64  | 55  | 48  | 74  | 63  | 54  | 48  | 60  | 53  | 47  | 58  | 52  | 47  | 57  | 51  | 46  |    |    | 44 |
| 6   | 71  | 57  | 49  | 42  | 69  | 56  | 48  | 42  | 55  | 47  | 42  | 53  | 46  | 41  | 51  | 45  | 41  |    |    | 39 |
| 7   | 65  | 52  | 43  | 37  | 64  | 51  | 43  | 37  | 50  | 42  | 37  | 48  | 41  | 36  | 47  | 41  | 36  |    |    | 34 |
| 8   | 61  | 47  | 39  | 33  | 59  | 47  | 39  | 33  | 45  | 38  | 33  | 44  | 37  | 33  | 43  | 37  | 32  |    |    | 30 |
| 9   | 57  | 43  | 35  | 30  | 55  | 43  | 35  | 30  | 42  | 35  | 30  | 41  | 34  | 29  | 40  | 34  | 29  |    |    | 27 |
| 10  | 53  | 40  | 32  | 27  | 52  | 40  | 32  | 27  | 39  | 32  | 27  | 38  | 31  | 27  | 37  | 31  | 26  |    |    | 25 |

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

|     | 0°    | 45°   | 90°   |
|-----|-------|-------|-------|
| 0°  | 12525 | 12525 | 12525 |
| 5°  | 12456 | 12569 | 12663 |
| 10° | 12459 | 12578 | 12562 |
| 15° | 12457 | 12455 | 12482 |
| 20° | 12440 | 12422 | 12452 |
| 25° | 12355 | 12418 | 12428 |
| 30° | 12298 | 12361 | 12410 |
| 35° | 12218 | 12285 | 12401 |
| 40° | 12113 | 12228 | 12408 |
| 45° | 11938 | 12118 | 12383 |
| 50° | 11758 | 11998 | 12394 |
| 55° | 11533 | 11832 | 12258 |
| 60° | 11147 | 11543 | 9543  |
| 65° | 10546 | 11160 | 6423  |
| 70° | 9754  | 5924  | 6233  |
| 75° | 8508  | 5630  | 5952  |
| 80° | 6543  | 5164  | 5455  |
| 85° | 3302  | 5219  | 5344  |



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**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 696.7   | 3.4       |
| 10°-20°   | 1994.8  | 9.7       |
| 20°-30°   | 3035.3  | 14.7      |
| 30°-40°   | 3690.5  | 17.9      |
| 40°-50°   | 3880.3  | 18.8      |
| 50°-60°   | 3543.2  | 17.2      |
| 60°-70°   | 2271.4  | 11.0      |
| 70°-80°   | 1073.0  | 5.2       |
| 80°-90°   | 297.5   | 1.4       |
| 90°-100°  | 78.8    | 0.4       |
| 100°-110° | 21.6    | 0.1       |
| 110°-120° | 6.0     | 0.0       |
| 120°-130° | 0.0     | 0.0       |
| 130°-140° | 0.0     | 0.0       |
| 140°-150° | 0.0     | 0.0       |
| 150°-160° | 0.0     | 0.0       |
| 160°-170° | 0.0     | 0.0       |
| 170°-180° | 0.0     | 0.0       |
| 0°-30°    | 5726.8  | 27.8      |
| 0°-40°    | 9417.2  | 45.7      |
| 0°-60°    | 16840.8 | 81.8      |
| 0°-90°    | 20482.6 | 99.5      |
| 90°-120°  | 106.4   | 0.5       |
| 90°-150°  | 106.4   | 0.5       |
| 90°-180°  | 106.0   | 0.5       |
| 0°-180°   | 20589.0 | 100.0     |

**CANDELA DISTRIBUTION:**

|      | 0°   | 22.5° | 45°  | 67.5° | 90°  | Flux |
|------|------|-------|------|-------|------|------|
| 0°   | 7333 | 7333  | 7333 | 7333  | 7333 |      |
| 5°   | 7265 | 7293  | 7331 | 7371  | 7386 | 691  |
| 15°  | 7045 | 7098  | 7044 | 7054  | 7059 | 1989 |
| 25°  | 6556 | 6566  | 6589 | 6600  | 6595 | 3025 |
| 35°  | 5860 | 5825  | 5892 | 5964  | 5947 | 3662 |
| 45°  | 4942 | 4933  | 5017 | 5135  | 5126 | 3820 |
| 55°  | 3873 | 3844  | 3974 | 4106  | 4116 | 3454 |
| 65°  | 2610 | 2610  | 2761 | 1584  | 1589 | 2587 |
| 75°  | 1289 | 1314  | 853  | 898   | 902  | 1359 |
| 85°  | 168  | 214   | 266  | 288   | 273  | 249  |
| 90°  | 0    | 72    | 118  | 140   | 138  | 7    |
| 95°  | 4    | 37    | 85   | 115   | 115  | 2    |
| 105° | 6    | 14    | 21   | 21    | 19   | 6    |
| 115° | 6    | 9     | 13   | 9     | 1    | 5    |
| 125° | 0    | 0     | 0    | 0     | 0    | 0    |
| 135° | 0    | 0     | 0    | 0     | 0    | 0    |
| 145° | 0    | 0     | 0    | 0     | 0    | 0    |
| 155° | 0    | 0     | 0    | 0     | 0    | 0    |
| 165° | 0    | 0     | 0    | 0     | 0    | 0    |
| 175° | 0    | 0     | 0    | 0     | 0    | 0    |
| 180° | 0    | 0     | 0    | 0     | 0    |      |



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**CANDELA DISTRIBUTION (FULL):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 0°     | 7333.3 | 7333.3 | 7333.3 | 7333.3 | 7333.3 |
| 2.5°   | 7281.8 | 7306.3 | 7333.3 | 7368.0 | 7387.2 |
| 5°     | 7265.0 | 7293.4 | 7330.7 | 7370.6 | 7386.0 |
| 7.5°   | 7229.1 | 7268.8 | 7304.9 | 7333.3 | 7342.3 |
| 10°    | 7184.0 | 7231.6 | 7252.2 | 7249.6 | 7243.2 |
| 12.5°  | 7123.5 | 7173.7 | 7167.3 | 7137.6 | 7142.8 |
| 15°    | 7045.0 | 7097.7 | 7043.8 | 7054.0 | 7059.2 |
| 17.5°  | 6952.4 | 7003.9 | 6940.8 | 6961.4 | 6962.7 |
| 20°    | 6844.3 | 6882.9 | 6834.0 | 6850.7 | 6850.7 |
| 22.5°  | 6714.4 | 6741.3 | 6720.8 | 6732.3 | 6734.9 |
| 25°    | 6556.1 | 6566.3 | 6589.4 | 6599.8 | 6594.6 |
| 27.5°  | 6404.3 | 6391.4 | 6436.5 | 6460.8 | 6447.9 |
| 30°    | 6235.6 | 6215.1 | 6267.8 | 6307.7 | 6292.3 |
| 32.5°  | 6042.6 | 6029.8 | 6090.3 | 6137.8 | 6128.8 |
| 35°    | 5859.9 | 5825.2 | 5892.1 | 5964.1 | 5947.4 |
| 37.5°  | 5643.7 | 5623.1 | 5699.0 | 5775.0 | 5766.1 |
| 40°    | 5432.7 | 5397.9 | 5484.2 | 5574.2 | 5565.2 |
| 42.5°  | 5206.3 | 5165.0 | 5259.0 | 5367.2 | 5356.8 |
| 45°    | 4942.4 | 4933.4 | 5017.0 | 5135.4 | 5126.4 |
| 47.5°  | 4708.3 | 4663.2 | 4780.3 | 4894.8 | 4905.2 |
| 50°    | 4425.1 | 4408.5 | 4515.3 | 4654.3 | 4664.5 |
| 52.5°  | 4148.6 | 4137.0 | 4248.8 | 4389.1 | 4407.1 |
| 55°    | 3873.1 | 3843.5 | 3973.5 | 4106.1 | 4116.4 |
| 57.5°  | 3578.6 | 3547.6 | 3680.2 | 3824.3 | 3846.1 |
| 60°    | 3263.2 | 3233.6 | 3379.0 | 3512.9 | 2793.6 |
| 62.5°  | 2947.9 | 2927.4 | 3079.3 | 2181.1 | 1757.8 |
| 65°    | 2609.5 | 2609.5 | 2761.3 | 1584.0 | 1589.2 |
| 67.5°  | 2293.1 | 2272.5 | 2058.9 | 1423.1 | 1423.1 |
| 70°    | 1953.3 | 1961.1 | 1186.3 | 1246.9 | 1248.2 |
| 72.5°  | 1612.3 | 1640.7 | 1024.3 | 1073.1 | 1075.7 |
| 75°    | 1289.3 | 1313.8 | 853.1  | 898.2  | 902.0  |
| 77.5°  | 947.1  | 728.3  | 685.8  | 720.7  | 721.9  |
| 80°    | 665.2  | 459.4  | 525.0  | 558.4  | 554.6  |
| 82.5°  | 388.5  | 321.6  | 384.7  | 409.2  | 407.9  |
| 85°    | 168.5  | 213.6  | 266.3  | 288.3  | 272.7  |
| 87.5°  | 53.9   | 132.6  | 165.9  | 178.9  | 177.5  |
| 90°    | 0.0    | 72.1   | 118.4  | 140.2  | 137.7  |
| 92.5°  | 0.0    | 56.5   | 103.0  | 128.7  | 130.0  |
| 95°    | 3.8    | 37.3   | 85.0   | 114.6  | 114.6  |
| 97.5°  | 2.6    | 27.0   | 60.5   | 90.0   | 92.6   |
| 100°   | 2.6    | 21.8   | 39.9   | 64.3   | 65.7   |
| 102.5° | 6.4    | 18.0   | 24.4   | 41.1   | 42.5   |
| 105°   | 6.4    | 14.2   | 20.6   | 20.6   | 19.3   |



TEST NUMBER: P830148

CATALOG NUMBER: OHBL-24SE-NL-UNV-L935-CD

**CANDELA DISTRIBUTION (continued):**

|        | 0°  | 22.5° | 45°  | 67.5° | 90° |
|--------|-----|-------|------|-------|-----|
| 112.5° | 7.8 | 10.4  | 14.2 | 10.4  | 1.2 |
| 115°   | 6.4 | 9.0   | 12.8 | 9.0   | 1.2 |
| 117.5° | 0.0 | 0.0   | 0.0  | 0.0   | 0.0 |
| 120°   | 0.0 | 0.0   | 0.0  | 0.0   | 0.0 |
| 122.5° | 0.0 | 0.0   | 0.0  | 0.0   | 0.0 |
| 125°   | 0.0 | 0.0   | 0.0  | 0.0   | 0.0 |
| 127.5° | 0.0 | 0.0   | 0.0  | 0.0   | 0.0 |
| 130°   | 0.0 | 0.0   | 0.0  | 0.0   | 0.0 |
| 132.5° | 0.0 | 0.0   | 0.0  | 0.0   | 0.0 |
| 135°   | 0.0 | 0.0   | 0.0  | 0.0   | 0.0 |
| 137.5° | 0.0 | 0.0   | 0.0  | 0.0   | 0.0 |
| 140°   | 0.0 | 0.0   | 0.0  | 0.0   | 0.0 |
| 142.5° | 0.0 | 0.0   | 0.0  | 0.0   | 0.0 |
| 145°   | 0.0 | 0.0   | 0.0  | 0.0   | 0.0 |
| 147.5° | 0.0 | 0.0   | 0.0  | 0.0   | 0.0 |
| 150°   | 0.0 | 0.0   | 0.0  | 0.0   | 0.0 |
| 152.5° | 0.0 | 0.0   | 0.0  | 0.0   | 0.0 |
| 155°   | 0.0 | 0.0   | 0.0  | 0.0   | 0.0 |
| 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° | 6.4 | 12.8 | 18.0 | 11.6 | 3.8 |
| 110°   | 7.8 | 11.6 | 15.4 | 10.4 | 1.2 |



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

Report Prepared for

Cooper Lighting Solutions

METALUX

Report Number: SP1-2307-100-7

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           |

REPORT NUMBER: SP1-2307-100-7

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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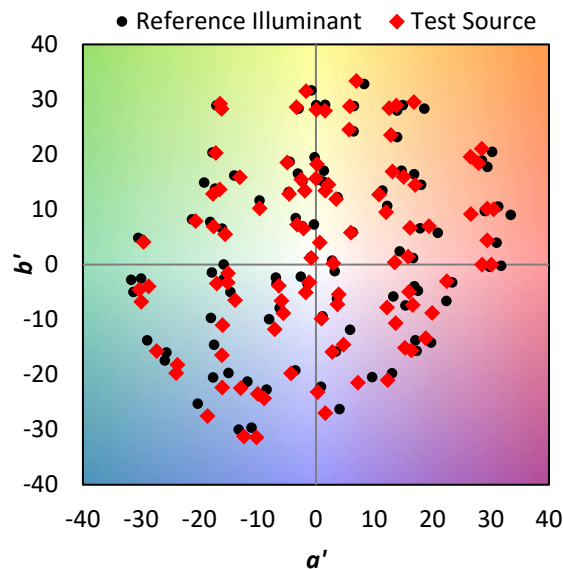
**TM-30-18**

**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)