

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: P827578

Luminaire Tested: **OHB-18SE-NL-UNV-L930-CD-UPL18**

Issue Date: 5/3/2024



**Test Information**

Test Method: LM-79-08  
Report Number: P827578  
REPORT IS A COMBINATION OF REPORTS P826141 AND G3-2310-221-8  
Test Lab: INNOVATION CENTER  
Issue Date: 5/3/2024  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: METALUX  
Catalog Number: OHB-18SE-NL-UNV-L930-CD-UPL18  
Description:  
Light Source: -  
Ballast/Driver: -

**Summary**

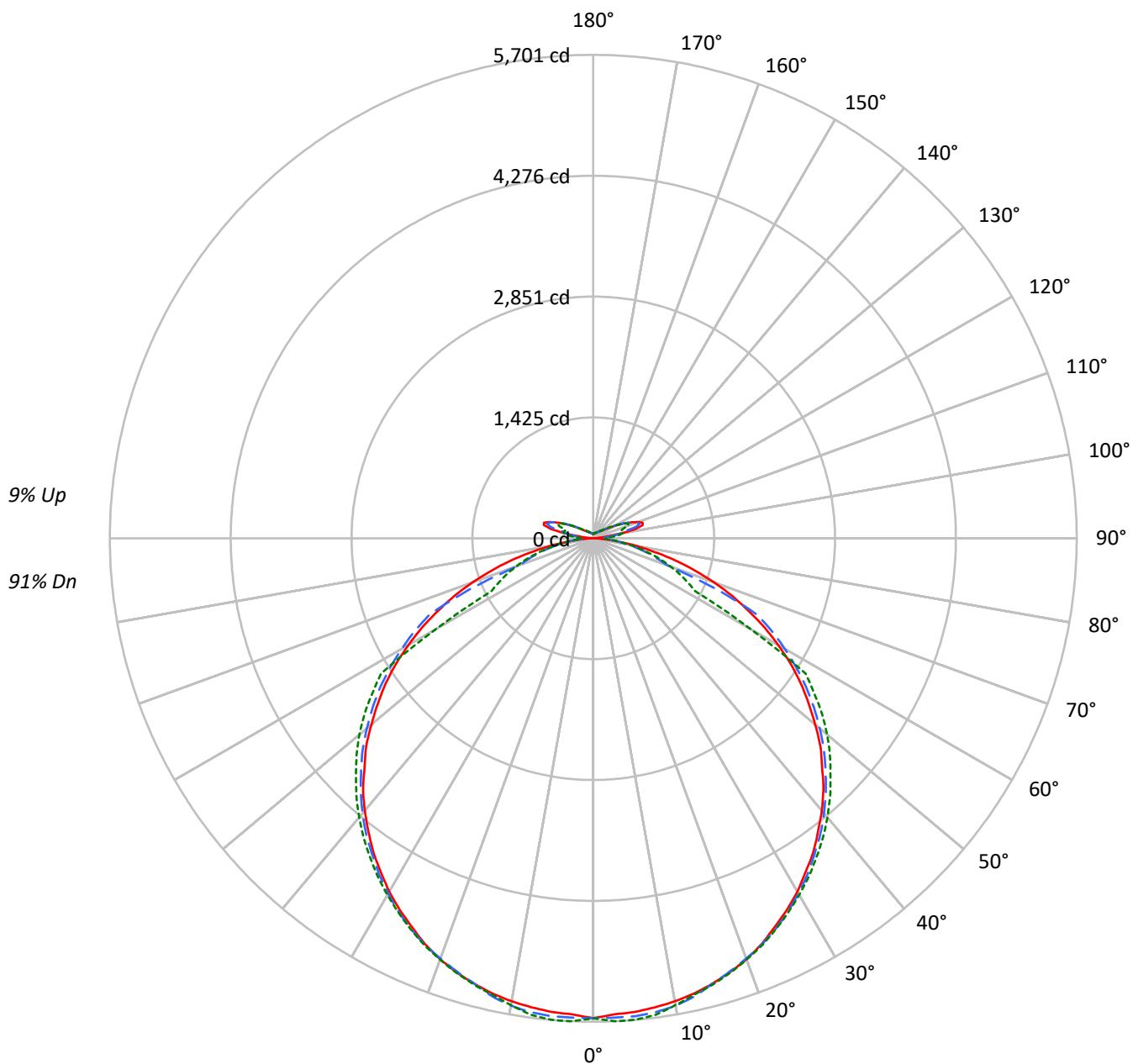
Lumens per Lamp: N/A  
Luminaire Lumens: 17336.2 lumens  
Efficiency: N/A  
Efficacy: 144.6 lumens/watt  
Spacing Criteria (0/90/45): 1.26 / 1.28 / 1.39  
Luminous Opening: Rectangular w/ Sides (W: 1.93' x L: 1.67' x H: 0.1')  
CIE Type: Direct

Input Watts (W): 119.9  
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: P827578

CATALOG NUMBER: OHB-18SE-NL-UNV-L930-CD-UPL18

### Luminous Intensity Polar Plot





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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 |
| RCR |     |     |     |     |     |     |     |     |  |     |     |     |  |     |     |     |  |    |    |    |
| 0   | 117 | 117 | 117 | 117 | 113 | 113 | 113 | 113 |  | 106 | 106 | 106 |  | 100 | 100 | 100 |  | 94 | 94 | 94 |
| 1   | 107 | 103 | 99  | 95  | 104 | 100 | 96  | 93  |  | 94  | 91  | 88  |  | 88  | 86  | 84  |  | 83 | 82 | 80 |
| 2   | 98  | 90  | 83  | 78  | 94  | 87  | 81  | 76  |  | 82  | 77  | 73  |  | 78  | 74  | 70  |  | 74 | 70 | 67 |
| 3   | 89  | 79  | 71  | 65  | 86  | 77  | 70  | 64  |  | 73  | 67  | 62  |  | 69  | 64  | 59  |  | 65 | 61 | 57 |
| 4   | 82  | 70  | 62  | 55  | 79  | 68  | 60  | 54  |  | 65  | 58  | 53  |  | 61  | 56  | 51  |  | 58 | 53 | 49 |
| 5   | 75  | 63  | 54  | 47  | 72  | 61  | 53  | 47  |  | 58  | 51  | 45  |  | 55  | 49  | 44  |  | 52 | 47 | 43 |
| 6   | 69  | 56  | 48  | 41  | 67  | 55  | 47  | 41  |  | 52  | 45  | 40  |  | 50  | 43  | 39  |  | 47 | 42 | 38 |
| 7   | 64  | 51  | 42  | 36  | 62  | 50  | 42  | 36  |  | 47  | 40  | 35  |  | 45  | 39  | 34  |  | 43 | 38 | 33 |
| 8   | 60  | 46  | 38  | 32  | 58  | 45  | 37  | 32  |  | 43  | 36  | 31  |  | 41  | 35  | 31  |  | 40 | 34 | 30 |
| 9   | 56  | 43  | 34  | 29  | 54  | 42  | 34  | 29  |  | 40  | 33  | 28  |  | 38  | 32  | 28  |  | 37 | 31 | 27 |
| 10  | 52  | 39  | 31  | 26  | 50  | 38  | 31  | 26  |  | 37  | 30  | 25  |  | 35  | 29  | 25  |  | 34 | 28 | 24 |

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

|     | 0°    | 45°   | 90°   |
|-----|-------|-------|-------|
| 0°  | 18905 | 18905 | 18905 |
| 5°  | 18703 | 18841 | 19028 |
| 10° | 18609 | 18724 | 18790 |
| 15° | 18505 | 18410 | 18583 |
| 20° | 18376 | 18225 | 18447 |
| 25° | 18141 | 18078 | 18317 |
| 30° | 17941 | 17844 | 18188 |
| 35° | 17699 | 17572 | 18063 |
| 40° | 17407 | 17309 | 17950 |
| 45° | 17000 | 16952 | 17771 |
| 50° | 16563 | 16551 | 17622 |
| 55° | 16035 | 16049 | 17229 |
| 60° | 15242 | 15325 | 13219 |
| 65° | 14104 | 14404 | 8726  |
| 70° | 12640 | 7347  | 8238  |
| 75° | 10493 | 6563  | 7531  |
| 80° | 7369  | 5383  | 6366  |
| 85° | 2958  | 4141  | 5070  |



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**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 537.7   | 3.1       |
| 10°-20°   | 1539.5  | 8.9       |
| 20°-30°   | 2342.4  | 13.5      |
| 30°-40°   | 2848.1  | 16.4      |
| 40°-50°   | 2994.6  | 17.3      |
| 50°-60°   | 2734.5  | 15.8      |
| 60°-70°   | 1752.9  | 10.1      |
| 70°-80°   | 828.0   | 4.8       |
| 80°-90°   | 233.2   | 1.3       |
| 90°-100°  | 199.2   | 1.1       |
| 100°-110° | 497.3   | 2.9       |
| 110°-120° | 417.6   | 2.4       |
| 120°-130° | 198.3   | 1.1       |
| 130°-140° | 99.1    | 0.6       |
| 140°-150° | 57.5    | 0.3       |
| 150°-160° | 33.6    | 0.2       |
| 160°-170° | 17.4    | 0.1       |
| 170°-180° | 5.3     | 0.0       |
| <hr/>     |         |           |
| 0°-30°    | 4419.6  | 25.5      |
| 0°-40°    | 7267.7  | 41.9      |
| 0°-60°    | 12996.8 | 75.0      |
| 0°-90°    | 15811.0 | 91.2      |
| 90°-120°  | 1114.1  | 6.4       |
| 90°-150°  | 1469.0  | 8.5       |
| 90°-180°  | 1525.0  | 8.8       |
| 0°-180°   | 17336.2 | 100.0     |

**CANDELA DISTRIBUTION:**

|      | 0°   | 22.5° | 45°  | 67.5° | 90°  | Flux |
|------|------|-------|------|-------|------|------|
| 0°   | 5659 | 5659  | 5659 | 5659  | 5659 |      |
| 5°   | 5607 | 5629  | 5657 | 5688  | 5700 | 533  |
| 15°  | 5437 | 5478  | 5436 | 5444  | 5448 | 1535 |
| 25°  | 5060 | 5067  | 5085 | 5093  | 5089 | 2335 |
| 35°  | 4522 | 4496  | 4547 | 4603  | 4590 | 2826 |
| 45°  | 3814 | 3807  | 3872 | 3963  | 3956 | 2948 |
| 55°  | 2989 | 2966  | 3066 | 3169  | 3177 | 2666 |
| 65°  | 2014 | 2014  | 2131 | 1222  | 1226 | 1997 |
| 75°  | 995  | 1014  | 658  | 693   | 696  | 1049 |
| 85°  | 130  | 165   | 206  | 222   | 210  | 192  |
| 90°  | 3    | 76    | 119  | 144   | 147  | 8    |
| 95°  | 34   | 95    | 170  | 223   | 243  | 98   |
| 105° | 604  | 604   | 522  | 372   | 344  | 573  |
| 115° | 420  | 426   | 429  | 421   | 414  | 422  |
| 125° | 202  | 212   | 217  | 217   | 215  | 190  |
| 135° | 120  | 122   | 126  | 128   | 128  | 95   |
| 145° | 87   | 89    | 91   | 92    | 92   | 55   |
| 155° | 70   | 71    | 72   | 73    | 73   | 33   |
| 165° | 60   | 61    | 61   | 61    | 61   | 17   |
| 175° | 54   | 54    | 55   | 55    | 55   | 5    |
| 180° | 54   | 54    | 54   | 54    | 54   |      |



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**CANDELA DISTRIBUTION (FULL):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 0°     | 5659.4 | 5659.4 | 5659.4 | 5659.4 | 5659.4 |
| 2.5°   | 5619.7 | 5638.6 | 5659.4 | 5686.2 | 5701.0 |
| 5°     | 5606.8 | 5628.6 | 5657.4 | 5688.2 | 5700.1 |
| 7.5°   | 5579.0 | 5609.7 | 5637.6 | 5659.4 | 5666.3 |
| 10°    | 5544.2 | 5581.0 | 5596.8 | 5594.9 | 5589.9 |
| 12.5°  | 5497.5 | 5536.3 | 5531.3 | 5508.4 | 5512.4 |
| 15°    | 5436.9 | 5477.6 | 5436.0 | 5443.9 | 5447.8 |
| 17.5°  | 5365.5 | 5405.2 | 5356.5 | 5372.3 | 5373.4 |
| 20°    | 5282.1 | 5311.8 | 5274.1 | 5287.0 | 5287.0 |
| 22.5°  | 5181.7 | 5202.6 | 5186.7 | 5195.6 | 5197.7 |
| 25°    | 5059.6 | 5067.4 | 5085.4 | 5093.3 | 5089.3 |
| 27.5°  | 4942.5 | 4932.4 | 4967.3 | 4986.1 | 4976.1 |
| 30°    | 4812.3 | 4796.4 | 4837.1 | 4867.9 | 4856.1 |
| 32.5°  | 4663.4 | 4653.4 | 4700.1 | 4736.8 | 4729.9 |
| 35°    | 4522.4 | 4495.5 | 4547.2 | 4602.8 | 4589.9 |
| 37.5°  | 4355.5 | 4339.6 | 4398.1 | 4456.8 | 4449.9 |
| 40°    | 4192.7 | 4165.8 | 4232.4 | 4301.9 | 4294.9 |
| 42.5°  | 4017.9 | 3986.1 | 4058.6 | 4142.1 | 4134.1 |
| 45°    | 3814.3 | 3807.3 | 3871.8 | 3963.3 | 3956.3 |
| 47.5°  | 3633.6 | 3598.9 | 3689.2 | 3777.6 | 3785.6 |
| 50°    | 3415.0 | 3402.2 | 3484.6 | 3591.9 | 3599.8 |
| 52.5°  | 3201.6 | 3192.7 | 3279.0 | 3387.3 | 3401.1 |
| 55°    | 2989.1 | 2966.2 | 3066.5 | 3168.8 | 3176.8 |
| 57.5°  | 2761.8 | 2737.8 | 2840.2 | 2951.4 | 2968.2 |
| 60°    | 2518.4 | 2495.5 | 2607.7 | 2711.1 | 2155.9 |
| 62.5°  | 2275.1 | 2259.2 | 2376.4 | 1683.3 | 1356.5 |
| 65°    | 2013.9 | 2013.9 | 2131.0 | 1222.4 | 1226.4 |
| 67.5°  | 1769.7 | 1753.8 | 1588.9 | 1098.3 | 1098.3 |
| 70°    | 1507.5 | 1513.4 | 915.5  | 962.3  | 963.3  |
| 72.5°  | 1244.3 | 1266.2 | 790.6  | 828.1  | 830.2  |
| 75°    | 995.0  | 1014.0 | 658.4  | 693.1  | 696.1  |
| 77.5°  | 730.9  | 562.0  | 529.3  | 556.1  | 557.1  |
| 80°    | 513.4  | 354.5  | 405.2  | 430.9  | 428.0  |
| 82.5°  | 299.8  | 248.2  | 296.9  | 315.8  | 314.8  |
| 85°    | 130.1  | 164.8  | 205.6  | 222.5  | 210.5  |
| 87.5°  | 41.6   | 102.3  | 128.0  | 138.1  | 137.0  |
| 90°    | 3.2    | 75.8   | 118.8  | 144.5  | 146.7  |
| 92.5°  | 10.5   | 70.3   | 123.9  | 160.8  | 168.2  |
| 95°    | 33.6   | 95.1   | 169.9  | 223.4  | 242.8  |
| 97.5°  | 159.6  | 193.0  | 239.0  | 297.5  | 312.3  |
| 100°   | 327.0  | 357.9  | 316.9  | 349.5  | 355.4  |
| 102.5° | 513.4  | 521.5  | 385.8  | 363.2  | 359.4  |
| 105°   | 603.9  | 604.2  | 521.9  | 372.3  | 343.9  |



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**CANDELA DISTRIBUTION (continued):**

|        | 0°    | 22.5° | 45°   | 67.5° | 90°   |
|--------|-------|-------|-------|-------|-------|
| 112.5° | 492.6 | 497.9 | 491.1 | 475.2 | 448.0 |
| 115°   | 419.6 | 426.5 | 428.6 | 420.8 | 414.0 |
| 117.5° | 353.2 | 355.7 | 357.3 | 355.7 | 356.5 |
| 120°   | 295.0 | 300.7 | 303.9 | 301.5 | 299.9 |
| 122.5° | 246.5 | 253.8 | 257.9 | 255.4 | 253.8 |
| 125°   | 202.1 | 211.8 | 217.4 | 216.6 | 215.0 |
| 127.5° | 171.4 | 178.6 | 185.9 | 185.1 | 183.5 |
| 130°   | 148.7 | 154.4 | 159.2 | 160.0 | 160.9 |
| 132.5° | 133.4 | 135.8 | 140.6 | 141.5 | 143.1 |
| 135°   | 119.6 | 122.1 | 126.1 | 127.7 | 128.5 |
| 137.5° | 109.1 | 111.6 | 114.8 | 116.4 | 117.2 |
| 140°   | 100.2 | 102.7 | 105.1 | 106.7 | 107.5 |
| 142.5° | 93.0  | 95.4  | 97.8  | 98.6  | 99.4  |
| 145°   | 87.3  | 88.9  | 91.3  | 92.2  | 92.2  |
| 147.5° | 81.6  | 83.3  | 84.9  | 86.5  | 86.5  |
| 150°   | 76.8  | 78.4  | 80.0  | 80.8  | 81.6  |
| 152.5° | 73.6  | 74.4  | 76.0  | 76.8  | 76.8  |
| 155°   | 69.5  | 71.1  | 71.9  | 72.8  | 72.8  |
| 157.5° | 67.1  | 67.9  | 68.7  | 69.5  | 69.5  |
| 160°   | 64.7  | 64.7  | 65.5  | 66.3  | 66.3  |
| 162.5° | 62.2  | 62.2  | 63.0  | 63.9  | 63.9  |
| 165°   | 59.8  | 60.6  | 60.6  | 61.4  | 61.4  |
| 167.5° | 58.2  | 58.2  | 59.0  | 59.0  | 59.8  |
| 170°   | 56.6  | 56.6  | 57.4  | 57.4  | 57.4  |
| 172.5° | 55.0  | 55.8  | 55.8  | 55.8  | 55.8  |
| 175°   | 54.2  | 54.2  | 55.0  | 55.0  | 55.0  |
| 177.5° | 53.4  | 54.2  | 54.2  | 54.2  | 54.2  |
| 180°   | 54.2  | 54.2  | 54.2  | 54.2  | 54.2  |



Report Generated By 670246072 / DESKTOP-50001EG





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







|        |       |       |       |       |       |
|--------|-------|-------|-------|-------|-------|
| 107.5° | 609.6 | 614.5 | 571.7 | 442.2 | 365.9 |
| 110°   | 559.7 | 569.1 | 547.8 | 495.4 | 432.6 |



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

Report Prepared for

Cooper Lighting Solutions

METALUX

Report Number: SP1-2304-001-2

Test Date: 05/31/2023

Luminaire Tested: OHB-15SE-N-UNV-L930

Data in this report applies to families of products including OHB-15SE-N-UNV-L930.

### Test Information

Test Method: LM-79-2019  
 Report Number: SP1-2304-001-2  
 Test Lab: COOPER LIGHTING SOLUTIONS  
 Photometer: SP1 - 76IN SPHERE  
 Measurement Geometry:  $4\pi$   
 Issue Date: 05/31/2023  
 Manufacturer: COOPER LIGHTING SOLUTIONS  
 Product Line: METALUX  
 Catalog Number: **OHB-15SE-N-UNV-L930**  
 Description: 15SE OHB WITH APT LEDS, NARROW LENS, 90CRI 3000K

### Spectral Parameters

|                           |         |           |      |      |      |
|---------------------------|---------|-----------|------|------|------|
| CCT (K):                  | 3051    | CRI (Ra): | 92.2 |      |      |
| CIE u':                   | 0.2497  | R1:       | 92.8 | R9:  | 60.2 |
| CIE v':                   | 0.5166  | R2:       | 95.6 | R10: | 88.6 |
| Duv:                      | -0.0027 | R3:       | 96.4 | R11: | 92.7 |
| CIE x:                    | 0.4295  | R4:       | 92.2 | R12: | 82.3 |
| CIE y:                    | 0.3950  | R5:       | 92.5 | R13: | 93.6 |
| CIE z:                    | 0.1755  | R6:       | 94.0 | R14: | 97.4 |
| Peak Wavelength (nm):     | 621     | R7:       | 91.7 |      |      |
| Dominant Wavelength (nm): | 583     | R8:       | 82.4 |      |      |
| Purity:                   | 47.8    |           |      |      |      |
| Rf:                       | 90.7    |           |      |      |      |
| Rg:                       | 101.5   |           |      |      |      |



### Test Conditions

Stabilization Time: 22M  
 Operation Time: 12H  
 Room Temperature (°C) / RH%: 25.2/44%  
 Sphere Temperature (°C): 25.3

REPORT NUMBER: SP1-2304-001-2

| 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: SP1-2304-001-2

CIE 1931 Chromaticity Diagram



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



Point lies inside the ANSI 3000K 4-step quadrangle

REPORT NUMBER: SP1-2304-001-2

**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       | 5142             | NR               | 490       | 62439            | NR               | 620       | 231386           | NR               | 750       | 21976            | NR               | 880       | 7157             | NR               |
| 365       | 4540             | NR               | 495       | 73651            | NR               | 625       | 230941           | NR               | 755       | 19435            | NR               | 885       | 7445             | NR               |
| 370       | 4803             | NR               | 500       | 84837            | NR               | 630       | 226625           | NR               | 760       | 17457            | NR               | 890       | 5651             | NR               |
| 375       | 5429             | NR               | 505       | 96138            | NR               | 635       | 221573           | NR               | 765       | 15928            | NR               | 895       | 5663             | NR               |
| 380       | 5059             | NR               | 510       | 104675           | NR               | 640       | 214183           | NR               | 770       | 13612            | NR               | 900       | 4391             | NR               |
| 385       | 5164             | NR               | 515       | 112374           | NR               | 645       | 206197           | NR               | 775       | 12383            | NR               | 905       | 4718             | NR               |
| 390       | 4787             | NR               | 520       | 120074           | NR               | 650       | 195149           | NR               | 780       | 11099            | NR               | 910       | 4205             | NR               |
| 395       | 4429             | NR               | 525       | 125393           | NR               | 655       | 184048           | NR               | 785       | 9818             | NR               | 915       | 4466             | NR               |
| 400       | 3966             | NR               | 530       | 131080           | NR               | 660       | 171890           | NR               | 790       | 8853             | NR               | 920       | 4608             | NR               |
| 405       | 4026             | NR               | 535       | 137166           | NR               | 665       | 158117           | NR               | 795       | 8815             | NR               | 925       | 6506             | NR               |
| 410       | 4947             | NR               | 540       | 141770           | NR               | 670       | 144601           | NR               | 800       | 7747             | NR               | 930       | 6091             | NR               |
| 415       | 6735             | NR               | 545       | 146789           | NR               | 675       | 131155           | NR               | 805       | 7317             | NR               | 935       | 6242             | NR               |
| 420       | 10542            | NR               | 550       | 151664           | NR               | 680       | 119765           | NR               | 810       | 7417             | NR               | 940       | 5908             | NR               |
| 425       | 16995            | NR               | 555       | 157152           | NR               | 685       | 106544           | NR               | 815       | 7400             | NR               | 945       | 4377             | NR               |
| 430       | 27239            | NR               | 560       | 162379           | NR               | 690       | 94952            | NR               | 820       | 6832             | NR               | 950       | 6170             | NR               |
| 435       | 43016            | NR               | 565       | 167867           | NR               | 695       | 83928            | NR               | 825       | 6514             | NR               | 955       | 6143             | NR               |
| 440       | 69527            | NR               | 570       | 174214           | NR               | 700       | 74959            | NR               | 830       | 6419             | NR               | 960       | 5227             | NR               |
| 445       | 113795           | NR               | 575       | 179459           | NR               | 705       | 66186            | NR               | 835       | 6702             | NR               | 965       | 4363             | NR               |
| 450       | 137556           | NR               | 580       | 186493           | NR               | 710       | 58632            | NR               | 840       | 6224             | NR               | 970       | 9654             | NR               |
| 455       | 112457           | NR               | 585       | 194218           | NR               | 715       | 52023            | NR               | 845       | 5410             | NR               | 975       | 7378             | NR               |
| 460       | 88709            | NR               | 590       | 201759           | NR               | 720       | 46022            | NR               | 850       | 5183             | NR               | 980       | 8170             | NR               |
| 465       | 74548            | NR               | 595       | 208902           | NR               | 725       | 40235            | NR               | 855       | 6469             | NR               | 985       | 7350             | NR               |
| 470       | 58681            | NR               | 600       | 217002           | NR               | 730       | 35330            | NR               | 860       | 7161             | NR               | 990       | 8712             | NR               |
| 475       | 50369            | NR               | 605       | 222691           | NR               | 735       | 31141            | NR               | 865       | 5351             | NR               | 995       | 7670             | NR               |
| 480       | 50005            | NR               | 610       | 226497           | NR               | 740       | 27444            | NR               | 870       | 5943             | NR               | 1000      | 8916             | NR               |
| 485       | 54326            | NR               | 615       | 229506           | NR               | 745       | 24768            | NR               | 875       | 6650             | NR               |           |                  |                  |

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Scotopic Flux vs. Wavelength



Scotopic Lumens: 16819.9

S/P: 1.43

| 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       | 5142             | NR               | 490       | 62439            | NR               | 620       | 231386           | NR               | 750       | 21976            | NR               | 880       | 7157             | NR               |
| 365       | 4540             | NR               | 495       | 73651            | NR               | 625       | 230941           | NR               | 755       | 19435            | NR               | 885       | 7445             | NR               |
| 370       | 4803             | NR               | 500       | 84837            | NR               | 630       | 226625           | NR               | 760       | 17457            | NR               | 890       | 5651             | NR               |
| 375       | 5429             | NR               | 505       | 96138            | NR               | 635       | 221573           | NR               | 765       | 15928            | NR               | 895       | 5663             | NR               |
| 380       | 5059             | NR               | 510       | 104675           | NR               | 640       | 214183           | NR               | 770       | 13612            | NR               | 900       | 4391             | NR               |
| 385       | 5164             | NR               | 515       | 112374           | NR               | 645       | 206197           | NR               | 775       | 12383            | NR               | 905       | 4718             | NR               |
| 390       | 4787             | NR               | 520       | 120074           | NR               | 650       | 195149           | NR               | 780       | 11099            | NR               | 910       | 4205             | NR               |
| 395       | 4429             | NR               | 525       | 125393           | NR               | 655       | 184048           | NR               | 785       | 9818             | NR               | 915       | 4466             | NR               |
| 400       | 3966             | NR               | 530       | 131080           | NR               | 660       | 171890           | NR               | 790       | 8853             | NR               | 920       | 4608             | NR               |
| 405       | 4026             | NR               | 535       | 137166           | NR               | 665       | 158117           | NR               | 795       | 8815             | NR               | 925       | 6506             | NR               |
| 410       | 4947             | NR               | 540       | 141770           | NR               | 670       | 144601           | NR               | 800       | 7747             | NR               | 930       | 6091             | NR               |
| 415       | 6735             | NR               | 545       | 146789           | NR               | 675       | 131155           | NR               | 805       | 7317             | NR               | 935       | 6242             | NR               |
| 420       | 10542            | NR               | 550       | 151664           | NR               | 680       | 119765           | NR               | 810       | 7417             | NR               | 940       | 5908             | NR               |
| 425       | 16995            | NR               | 555       | 157152           | NR               | 685       | 106544           | NR               | 815       | 7400             | NR               | 945       | 4377             | NR               |
| 430       | 27239            | NR               | 560       | 162379           | NR               | 690       | 94952            | NR               | 820       | 6832             | NR               | 950       | 6170             | NR               |
| 435       | 43016            | NR               | 565       | 167867           | NR               | 695       | 83928            | NR               | 825       | 6514             | NR               | 955       | 6143             | NR               |
| 440       | 69527            | NR               | 570       | 174214           | NR               | 700       | 74959            | NR               | 830       | 6419             | NR               | 960       | 5227             | NR               |
| 445       | 113795           | NR               | 575       | 179459           | NR               | 705       | 66186            | NR               | 835       | 6702             | NR               | 965       | 4363             | NR               |
| 450       | 137556           | NR               | 580       | 186493           | NR               | 710       | 58632            | NR               | 840       | 6224             | NR               | 970       | 9654             | NR               |
| 455       | 112457           | NR               | 585       | 194218           | NR               | 715       | 52023            | NR               | 845       | 5410             | NR               | 975       | 7378             | NR               |
| 460       | 88709            | NR               | 590       | 201759           | NR               | 720       | 46022            | NR               | 850       | 5183             | NR               | 980       | 8170             | NR               |
| 465       | 74548            | NR               | 595       | 208902           | NR               | 725       | 40235            | NR               | 855       | 6469             | NR               | 985       | 7350             | NR               |
| 470       | 58681            | NR               | 600       | 217002           | NR               | 730       | 35330            | NR               | 860       | 7161             | NR               | 990       | 8712             | NR               |
| 475       | 50369            | NR               | 605       | 222691           | NR               | 735       | 31141            | NR               | 865       | 5351             | NR               | 995       | 7670             | NR               |
| 480       | 50005            | NR               | 610       | 226497           | NR               | 740       | 27444            | NR               | 870       | 5943             | NR               | 1000      | 8916             | NR               |
| 485       | 54326            | NR               | 615       | 229506           | NR               | 745       | 24768            | NR               | 875       | 6650             | NR               |           |                  |                  |

REPORT NUMBER: SP1-2304-001-2

**Melanopic Flux vs. Wavelength**



**Melanopic Lumens: 6505.3 M/P: 0.55**

| 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       | 5142             | NR               | 490       | 62439            | NR               | 620       | 231386           | NR               | 750       | 21976            | NR               | 880       | 7157             | NR               |
| 365       | 4540             | NR               | 495       | 73651            | NR               | 625       | 230941           | NR               | 755       | 19435            | NR               | 885       | 7445             | NR               |
| 370       | 4803             | NR               | 500       | 84837            | NR               | 630       | 226625           | NR               | 760       | 17457            | NR               | 890       | 5651             | NR               |
| 375       | 5429             | NR               | 505       | 96138            | NR               | 635       | 221573           | NR               | 765       | 15928            | NR               | 895       | 5663             | NR               |
| 380       | 5059             | NR               | 510       | 104675           | NR               | 640       | 214183           | NR               | 770       | 13612            | NR               | 900       | 4391             | NR               |
| 385       | 5164             | NR               | 515       | 112374           | NR               | 645       | 206197           | NR               | 775       | 12383            | NR               | 905       | 4718             | NR               |
| 390       | 4787             | NR               | 520       | 120074           | NR               | 650       | 195149           | NR               | 780       | 11099            | NR               | 910       | 4205             | NR               |
| 395       | 4429             | NR               | 525       | 125393           | NR               | 655       | 184048           | NR               | 785       | 9818             | NR               | 915       | 4466             | NR               |
| 400       | 3966             | NR               | 530       | 131080           | NR               | 660       | 171890           | NR               | 790       | 8853             | NR               | 920       | 4608             | NR               |
| 405       | 4026             | NR               | 535       | 137166           | NR               | 665       | 158117           | NR               | 795       | 8815             | NR               | 925       | 6506             | NR               |
| 410       | 4947             | NR               | 540       | 141770           | NR               | 670       | 144601           | NR               | 800       | 7747             | NR               | 930       | 6091             | NR               |
| 415       | 6735             | NR               | 545       | 146789           | NR               | 675       | 131155           | NR               | 805       | 7317             | NR               | 935       | 6242             | NR               |
| 420       | 10542            | NR               | 550       | 151664           | NR               | 680       | 119765           | NR               | 810       | 7417             | NR               | 940       | 5908             | NR               |
| 425       | 16995            | NR               | 555       | 157152           | NR               | 685       | 106544           | NR               | 815       | 7400             | NR               | 945       | 4377             | NR               |
| 430       | 27239            | NR               | 560       | 162379           | NR               | 690       | 94952            | NR               | 820       | 6832             | NR               | 950       | 6170             | NR               |
| 435       | 43016            | NR               | 565       | 167867           | NR               | 695       | 83928            | NR               | 825       | 6514             | NR               | 955       | 6143             | NR               |
| 440       | 69527            | NR               | 570       | 174214           | NR               | 700       | 74959            | NR               | 830       | 6419             | NR               | 960       | 5227             | NR               |
| 445       | 113795           | NR               | 575       | 179459           | NR               | 705       | 66186            | NR               | 835       | 6702             | NR               | 965       | 4363             | NR               |
| 450       | 137556           | NR               | 580       | 186493           | NR               | 710       | 58632            | NR               | 840       | 6224             | NR               | 970       | 9654             | NR               |
| 455       | 112457           | NR               | 585       | 194218           | NR               | 715       | 52023            | NR               | 845       | 5410             | NR               | 975       | 7378             | NR               |
| 460       | 88709            | NR               | 590       | 201759           | NR               | 720       | 46022            | NR               | 850       | 5183             | NR               | 980       | 8170             | NR               |
| 465       | 74548            | NR               | 595       | 208902           | NR               | 725       | 40235            | NR               | 855       | 6469             | NR               | 985       | 7350             | NR               |
| 470       | 58681            | NR               | 600       | 217002           | NR               | 730       | 35330            | NR               | 860       | 7161             | NR               | 990       | 8712             | NR               |
| 475       | 50369            | NR               | 605       | 222691           | NR               | 735       | 31141            | NR               | 865       | 5351             | NR               | 995       | 7670             | NR               |
| 480       | 50005            | NR               | 610       | 226497           | NR               | 740       | 27444            | NR               | 870       | 5943             | NR               | 1000      | 8916             | NR               |
| 485       | 54326            | NR               | 615       | 229506           | NR               | 745       | 24768            | NR               | 875       | 6650             | NR               |           |                  |                  |

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**Summary**

$R_f = 90.7$   
 $R_g = 101.5$   
 CIE  $R_a = 92.2$   
 $R_9 = 60.2$



**Color Vector Graphics**



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

|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 86 | CES26 = 87 | CES51 = 97 | CES76 = 83 |
| CES02 = 63 | CES27 = 96 | CES52 = 95 | CES77 = 89 |
| CES03 = 32 | CES28 = 94 | CES53 = 92 | CES78 = 82 |
| CES04 = 70 | CES29 = 87 | CES54 = 97 | CES79 = 94 |
| CES05 = 51 | CES30 = 95 | CES55 = 96 | CES80 = 92 |
| CES06 = 51 | CES31 = 88 | CES56 = 93 | CES81 = 86 |
| CES07 = 43 | CES32 = 83 | CES57 = 93 | CES82 = 96 |
| CES08 = 42 | CES33 = 90 | CES58 = 94 | CES83 = 95 |
| CES09 = 29 | CES34 = 89 | CES59 = 97 | CES84 = 95 |
| CES10 = 76 | CES35 = 94 | CES60 = 96 | CES85 = 85 |
| CES11 = 59 | CES36 = 90 | CES61 = 94 | CES86 = 85 |
| CES12 = 65 | CES37 = 92 | CES62 = 95 | CES87 = 90 |
| CES13 = 44 | CES38 = 99 | CES63 = 92 | CES88 = 95 |
| CES14 = 74 | CES39 = 98 | CES64 = 91 | CES89 = 85 |
| CES15 = 72 | CES40 = 95 | CES65 = 89 | CES90 = 95 |
| CES16 = 48 | CES41 = 96 | CES66 = 89 | CES91 = 83 |
| CES17 = 50 | CES42 = 91 | CES67 = 88 | CES92 = 82 |
| CES18 = 57 | CES43 = 87 | CES68 = 88 | CES93 = 89 |
| CES19 = 72 | CES44 = 99 | CES69 = 90 | CES94 = 80 |
| CES20 = 67 | CES45 = 92 | CES70 = 85 | CES95 = 85 |
| CES21 = 86 | CES46 = 92 | CES71 = 84 | CES96 = 91 |
| CES22 = 79 | CES47 = 91 | CES72 = 94 | CES97 = 93 |
| CES23 = 92 | CES48 = 93 | CES73 = 80 | CES98 = 93 |
| CES24 = 91 | CES49 = 90 | CES74 = 94 | CES99 = 91 |
| CES25 = 72 | CES50 = 96 | CES75 = 84 |            |



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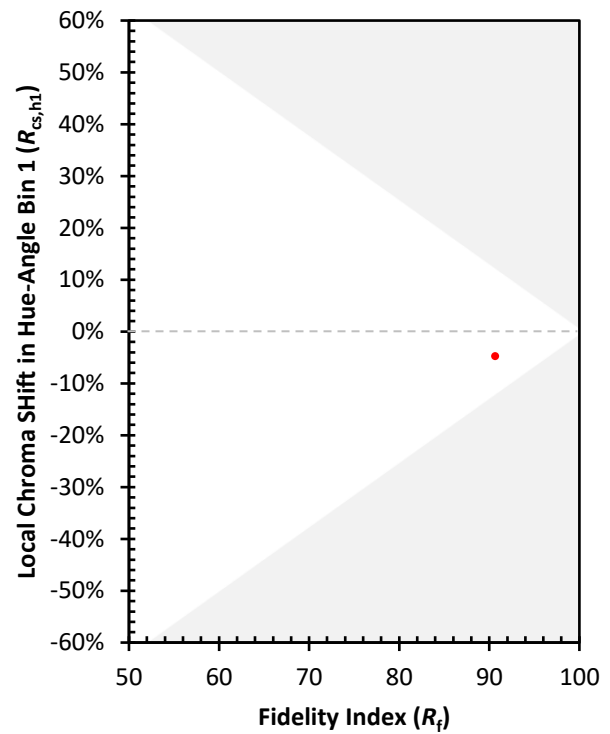
**Color Rendition by Hue-Angle Bin**



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**Measure Comparisons**



(END OF REPORT)