

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: P827712

Luminaire Tested: **OHBL-18SE-MCL-UNV-L930-CD-UPL12**

Issue Date: 5/3/2024



**Test Information**

Test Method: LM-79-08  
Report Number: P827712  
REPORT IS A COMBINATION OF REPORTS P826066 AND G3-2310-221-12  
Test Lab: INNOVATION CENTER  
Issue Date: 5/3/2024  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: METALUX  
Catalog Number: OHBL-18SE-MCL-UNV-L930-CD-UPL12  
Description:  
Light Source: -  
Ballast/Driver: -

**Summary**

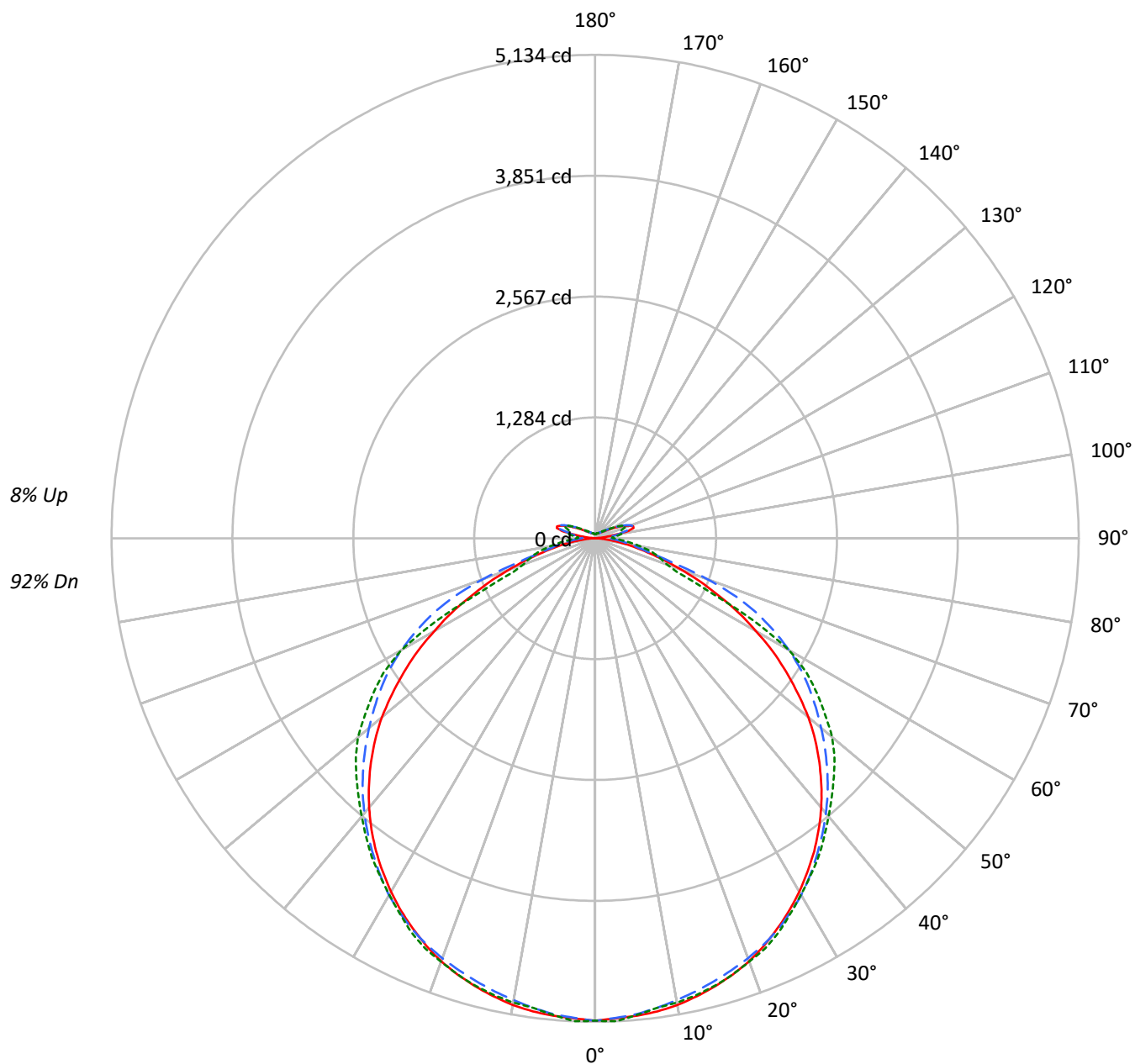
Lumens per Lamp: N/A  
Luminaire Lumens: 15487.9 lumens  
Efficiency: N/A  
Efficacy: 136.6 lumens/watt  
Spacing Criteria (0/90/45): 1.26 / 1.27 / 1.39  
Luminous Opening: Rectangular w/ Sides (W: 3.78' x L: 1.67' x H: 0.17')  
CIE Type: Direct

Input Watts (W): 113.4  
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: P827712

CATALOG NUMBER: OHBL-18SE-MCL-UNV-L930-CD-UPL12

### Luminous Intensity Polar Plot





TEST NUMBER: P827712

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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 | 114 | 114 | 114 | 114 |  | 107 | 107 | 107 |  | 101 | 101 | 101 |  | 95 | 95 | 95 |
| 1   | 107 | 103 | 99  | 95  | 104 | 100 | 96  | 93  |  | 94  | 91  | 88  |  | 89  | 87  | 84  |  | 84 | 82 | 81 |
| 2   | 98  | 90  | 83  | 78  | 95  | 87  | 81  | 76  |  | 83  | 78  | 73  |  | 78  | 74  | 71  |  | 74 | 71 | 68 |
| 3   | 89  | 79  | 71  | 65  | 86  | 77  | 70  | 64  |  | 73  | 67  | 62  |  | 69  | 64  | 60  |  | 66 | 61 | 58 |
| 4   | 82  | 70  | 62  | 55  | 79  | 68  | 60  | 54  |  | 65  | 58  | 53  |  | 62  | 56  | 51  |  | 59 | 54 | 50 |
| 5   | 75  | 63  | 54  | 47  | 73  | 61  | 53  | 47  |  | 58  | 51  | 45  |  | 55  | 49  | 44  |  | 53 | 47 | 43 |
| 6   | 69  | 56  | 47  | 41  | 67  | 55  | 47  | 41  |  | 52  | 45  | 40  |  | 50  | 44  | 39  |  | 48 | 42 | 38 |
| 7   | 64  | 51  | 42  | 36  | 62  | 50  | 42  | 36  |  | 48  | 40  | 35  |  | 46  | 39  | 34  |  | 44 | 38 | 34 |
| 8   | 60  | 46  | 38  | 32  | 58  | 45  | 37  | 32  |  | 43  | 36  | 31  |  | 42  | 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  | 51  | 38  | 31  | 26  |  | 37  | 30  | 26  |  | 36  | 29  | 25  |  | 34 | 29 | 25 |

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

|     | 0°   | 45°  | 90°  |
|-----|------|------|------|
| 0°  | 8751 | 8751 | 8751 |
| 5°  | 8652 | 8620 | 8678 |
| 10° | 8578 | 8485 | 8618 |
| 15° | 8481 | 8384 | 8598 |
| 20° | 8384 | 8319 | 8560 |
| 25° | 8238 | 8253 | 8524 |
| 30° | 8082 | 8151 | 8405 |
| 35° | 7902 | 7992 | 8361 |
| 40° | 7680 | 7827 | 8289 |
| 45° | 7390 | 7637 | 8292 |
| 50° | 7014 | 7422 | 8293 |
| 55° | 6453 | 7208 | 8060 |
| 60° | 5740 | 6898 | 7542 |
| 65° | 4837 | 6329 | 4855 |
| 70° | 3802 | 4931 | 3597 |
| 75° | 2748 | 2919 | 3770 |
| 80° | 1799 | 2415 | 3801 |
| 85° | 901  | 2194 | 3997 |



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**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 483.1   | 3.1       |
| 10°-20°   | 1385.3  | 8.9       |
| 20°-30°   | 2115.8  | 13.7      |
| 30°-40°   | 2567.2  | 16.6      |
| 40°-50°   | 2690.6  | 17.4      |
| 50°-60°   | 2438.1  | 15.7      |
| 60°-70°   | 1634.7  | 10.6      |
| 70°-80°   | 734.0   | 4.7       |
| 80°-90°   | 268.9   | 1.7       |
| 90°-100°  | 176.3   | 1.1       |
| 100°-110° | 372.4   | 2.4       |
| 110°-120° | 306.3   | 2.0       |
| 120°-130° | 148.2   | 1.0       |
| 130°-140° | 76.1    | 0.5       |
| 140°-150° | 44.9    | 0.3       |
| 150°-160° | 27.0    | 0.2       |
| 160°-170° | 14.5    | 0.1       |
| 170°-180° | 4.4     | 0.0       |
| 0°-30°    | 3984.2  | 25.7      |
| 0°-40°    | 6551.4  | 42.3      |
| 0°-60°    | 11680.1 | 75.4      |
| 0°-90°    | 14317.7 | 92.4      |
| 90°-120°  | 855.1   | 5.5       |
| 90°-150°  | 1124.3  | 7.3       |
| 90°-180°  | 1170.0  | 7.6       |
| 0°-180°   | 15487.9 | 100.0     |

**CANDELA DISTRIBUTION:**

|      | 0°   | 22.5° | 45°  | 67.5° | 90°  | Flux |
|------|------|-------|------|-------|------|------|
| 0°   | 5124 | 5124  | 5124 | 5124  | 5124 |      |
| 5°   | 5090 | 5108  | 5072 | 5088  | 5081 | 484  |
| 15°  | 4925 | 4906  | 4871 | 4914  | 4920 | 1391 |
| 25°  | 4575 | 4555  | 4587 | 4629  | 4616 | 2109 |
| 35°  | 4055 | 4065  | 4106 | 4150  | 4134 | 2535 |
| 45°  | 3366 | 3420  | 3484 | 3573  | 3584 | 2593 |
| 55°  | 2477 | 2596  | 2773 | 2884  | 2877 | 2211 |
| 65°  | 1454 | 1681  | 1908 | 1610  | 1315 | 1448 |
| 75°  | 572  | 830   | 610  | 624   | 665  | 625  |
| 85°  | 98   | 189   | 242  | 293   | 307  | 120  |
| 90°  | 3    | 78    | 145  | 182   | 193  | 8    |
| 95°  | 21   | 86    | 155  | 198   | 216  | 67   |
| 105° | 421  | 430   | 395  | 301   | 283  | 399  |
| 115° | 297  | 300   | 313  | 317   | 313  | 296  |
| 125° | 147  | 154   | 164  | 165   | 167  | 138  |
| 135° | 89   | 92    | 96   | 101   | 102  | 71   |
| 145° | 67   | 70    | 70   | 72    | 74   | 43   |
| 155° | 56   | 58    | 58   | 59    | 58   | 26   |
| 165° | 50   | 50    | 51   | 51    | 51   | 14   |
| 175° | 46   | 46    | 45   | 45    | 45   | 4    |
| 180° | 45   | 45    | 45   | 45    | 45   |      |



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**CANDELA DISTRIBUTION (FULL):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 0°     | 5123.5 | 5123.5 | 5123.5 | 5123.5 | 5123.5 |
| 2.5°   | 5102.8 | 5124.3 | 5097.6 | 5126.4 | 5133.9 |
| 5°     | 5090.2 | 5107.9 | 5072.4 | 5088.0 | 5081.3 |
| 7.5°   | 5067.2 | 5073.1 | 5030.9 | 5043.5 | 5030.2 |
| 10°    | 5033.1 | 5030.2 | 4980.5 | 5005.0 | 5007.9 |
| 12.5°  | 4982.7 | 4973.8 | 4929.4 | 4966.4 | 4967.2 |
| 15°    | 4924.9 | 4905.7 | 4870.9 | 4913.9 | 4919.8 |
| 17.5°  | 4858.2 | 4833.1 | 4810.1 | 4865.7 | 4856.8 |
| 20°    | 4780.5 | 4750.9 | 4746.5 | 4807.2 | 4784.9 |
| 22.5°  | 4684.2 | 4661.3 | 4671.6 | 4729.4 | 4715.3 |
| 25°    | 4575.3 | 4555.3 | 4587.1 | 4629.4 | 4616.1 |
| 27.5°  | 4460.5 | 4448.6 | 4484.9 | 4517.5 | 4491.6 |
| 30°    | 4334.5 | 4327.8 | 4376.0 | 4402.7 | 4370.1 |
| 32.5°  | 4197.4 | 4199.7 | 4245.6 | 4281.9 | 4251.6 |
| 35°    | 4055.2 | 4064.9 | 4106.3 | 4150.1 | 4133.7 |
| 37.5°  | 3898.9 | 3920.4 | 3961.9 | 4011.5 | 3994.5 |
| 40°    | 3733.7 | 3764.8 | 3810.7 | 3870.8 | 3855.2 |
| 42.5°  | 3555.2 | 3594.4 | 3653.7 | 3720.4 | 3718.9 |
| 45°    | 3365.5 | 3420.4 | 3484.1 | 3573.0 | 3584.1 |
| 47.5°  | 3168.5 | 3229.9 | 3310.7 | 3429.3 | 3446.2 |
| 50°    | 2954.4 | 3031.4 | 3132.2 | 3274.4 | 3284.8 |
| 52.5°  | 2715.8 | 2821.0 | 2954.4 | 3090.7 | 3078.1 |
| 55°    | 2476.6 | 2595.8 | 2772.9 | 2884.0 | 2877.3 |
| 57.5°  | 2238.0 | 2372.1 | 2586.9 | 2666.2 | 2665.5 |
| 60°    | 1971.3 | 2141.0 | 2375.8 | 2435.8 | 2376.6 |
| 62.5°  | 1724.7 | 1906.9 | 2150.6 | 2106.9 | 1903.9 |
| 65°    | 1453.5 | 1680.9 | 1908.3 | 1610.5 | 1314.9 |
| 67.5°  | 1212.7 | 1449.7 | 1620.9 | 1103.1 | 944.5  |
| 70°    | 970.5  | 1232.0 | 1263.8 | 818.6  | 807.5  |
| 72.5°  | 755.6  | 1034.2 | 871.9  | 700.8  | 736.4  |
| 75°    | 571.9  | 829.8  | 610.5  | 624.5  | 665.3  |
| 77.5°  | 417.1  | 637.1  | 474.9  | 547.5  | 580.8  |
| 80°    | 286.7  | 451.1  | 387.4  | 460.0  | 483.0  |
| 82.5°  | 180.0  | 297.8  | 310.4  | 370.4  | 394.1  |
| 85°    | 98.5   | 188.9  | 242.3  | 292.6  | 306.7  |
| 87.5°  | 40.7   | 114.1  | 185.2  | 225.9  | 237.8  |
| 90°    | 3.2    | 77.5   | 144.6  | 182.1  | 192.8  |
| 92.5°  | 8.0    | 66.8   | 133.0  | 170.3  | 179.5  |
| 95°    | 20.9   | 86.2   | 155.4  | 198.2  | 215.7  |
| 97.5°  | 110.6  | 149.9  | 206.0  | 245.1  | 256.2  |
| 100°   | 225.3  | 266.0  | 259.6  | 281.1  | 287.4  |
| 102.5° | 357.8  | 370.8  | 305.8  | 292.0  | 290.1  |
| 105°   | 420.9  | 430.1  | 394.6  | 300.9  | 282.9  |



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**CANDELA DISTRIBUTION (continued):**

|        | 0°    | 22.5° | 45°   | 67.5° | 90°   |
|--------|-------|-------|-------|-------|-------|
| 112.5° | 343.1 | 350.7 | 363.1 | 356.8 | 344.5 |
| 115°   | 296.9 | 299.9 | 313.3 | 316.8 | 313.4 |
| 117.5° | 250.0 | 254.8 | 268.3 | 270.3 | 270.1 |
| 120°   | 210.4 | 216.0 | 227.3 | 227.7 | 228.5 |
| 122.5° | 178.1 | 182.1 | 192.7 | 194.0 | 195.5 |
| 125°   | 147.4 | 153.8 | 164.5 | 165.1 | 166.7 |
| 127.5° | 124.7 | 129.6 | 141.2 | 142.6 | 143.3 |
| 130°   | 109.4 | 113.3 | 121.1 | 124.9 | 124.9 |
| 132.5° | 98.8  | 102.0 | 107.4 | 111.2 | 112.0 |
| 135°   | 89.1  | 92.3  | 96.3  | 100.8 | 101.5 |
| 137.5° | 83.4  | 85.0  | 87.5  | 91.9  | 93.5  |
| 140°   | 77.0  | 79.4  | 80.2  | 84.0  | 84.7  |
| 142.5° | 71.3  | 73.7  | 74.5  | 77.6  | 79.1  |
| 145°   | 67.3  | 69.7  | 70.5  | 72.0  | 73.6  |
| 147.5° | 64.0  | 65.6  | 67.3  | 67.3  | 68.8  |
| 150°   | 61.6  | 62.4  | 63.2  | 64.0  | 64.0  |
| 152.5° | 58.4  | 59.2  | 60.0  | 60.8  | 60.8  |
| 155°   | 55.9  | 57.5  | 58.3  | 59.1  | 58.4  |
| 157.5° | 53.5  | 55.9  | 55.9  | 56.7  | 56.7  |
| 160°   | 51.9  | 53.4  | 54.2  | 54.2  | 54.2  |
| 162.5° | 51.0  | 51.8  | 51.8  | 52.6  | 52.6  |
| 165°   | 50.2  | 50.2  | 51.0  | 51.0  | 51.0  |
| 167.5° | 48.6  | 49.3  | 49.4  | 49.4  | 49.4  |
| 170°   | 47.8  | 47.8  | 47.8  | 47.9  | 47.9  |
| 172.5° | 47.0  | 47.0  | 47.0  | 46.2  | 46.2  |
| 175°   | 46.2  | 46.2  | 45.4  | 44.6  | 44.6  |
| 177.5° | 46.1  | 46.2  | 45.4  | 44.6  | 43.9  |
| 180°   | 44.6  | 44.6  | 44.6  | 44.6  | 44.6  |



Report Generated By 670246072 / DESKTOP-50001EG





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







|        |       |       |       |       |       |
|--------|-------|-------|-------|-------|-------|
| 107.5° | 424.1 | 436.0 | 425.1 | 345.2 | 295.0 |
| 110°   | 389.2 | 402.3 | 403.0 | 376.5 | 336.8 |



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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**TM-30-18**

**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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**TM-30-18**

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

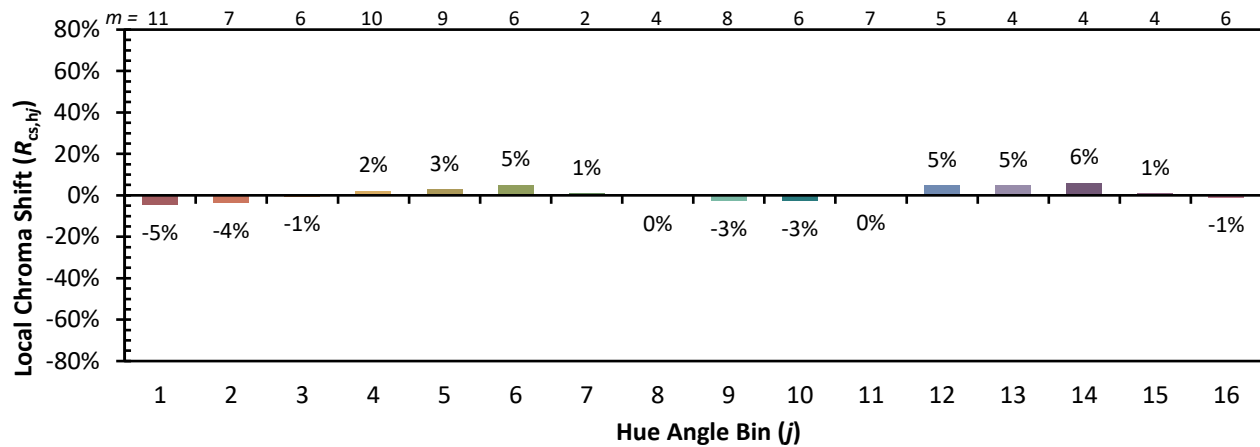
|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 86 | CES26 = 87 | CES51 = 97 | CES76 = 83 |
| CES02 = 63 | CES27 = 96 | CES52 = 95 | CES77 = 89 |
| CES03 = 32 | CES28 = 94 | CES53 = 92 | CES78 = 82 |
| CES04 = 70 | CES29 = 87 | CES54 = 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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**TM-30-18**

**Color Rendition by Hue-Angle Bin**



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**Measure Comparisons**



(END OF REPORT)