

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: P826938

Luminaire Tested: **OHB-15SE-MCL-UNV-L840-CD-UPL24**

Issue Date: 5/3/2024



**Test Information**

Test Method: LM-79-08  
Report Number: P826938  
REPORT IS A COMBINATION OF REPORTS P826186 AND G3-2310-221-6  
Test Lab: INNOVATION CENTER  
Issue Date: 5/3/2024  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: METALUX  
Catalog Number: OHB-15SE-MCL-UNV-L840-CD-UPL24  
Description: 15000 LUMEN OHB SE LED LUMINAIRE WITH 80CRI, 4000K LEDS AND MEDIUM CLEAR LENS AND 2400 LUMEN UPLIGHT MODULE  
Light Source: -  
Ballast/Driver: -

**Summary**

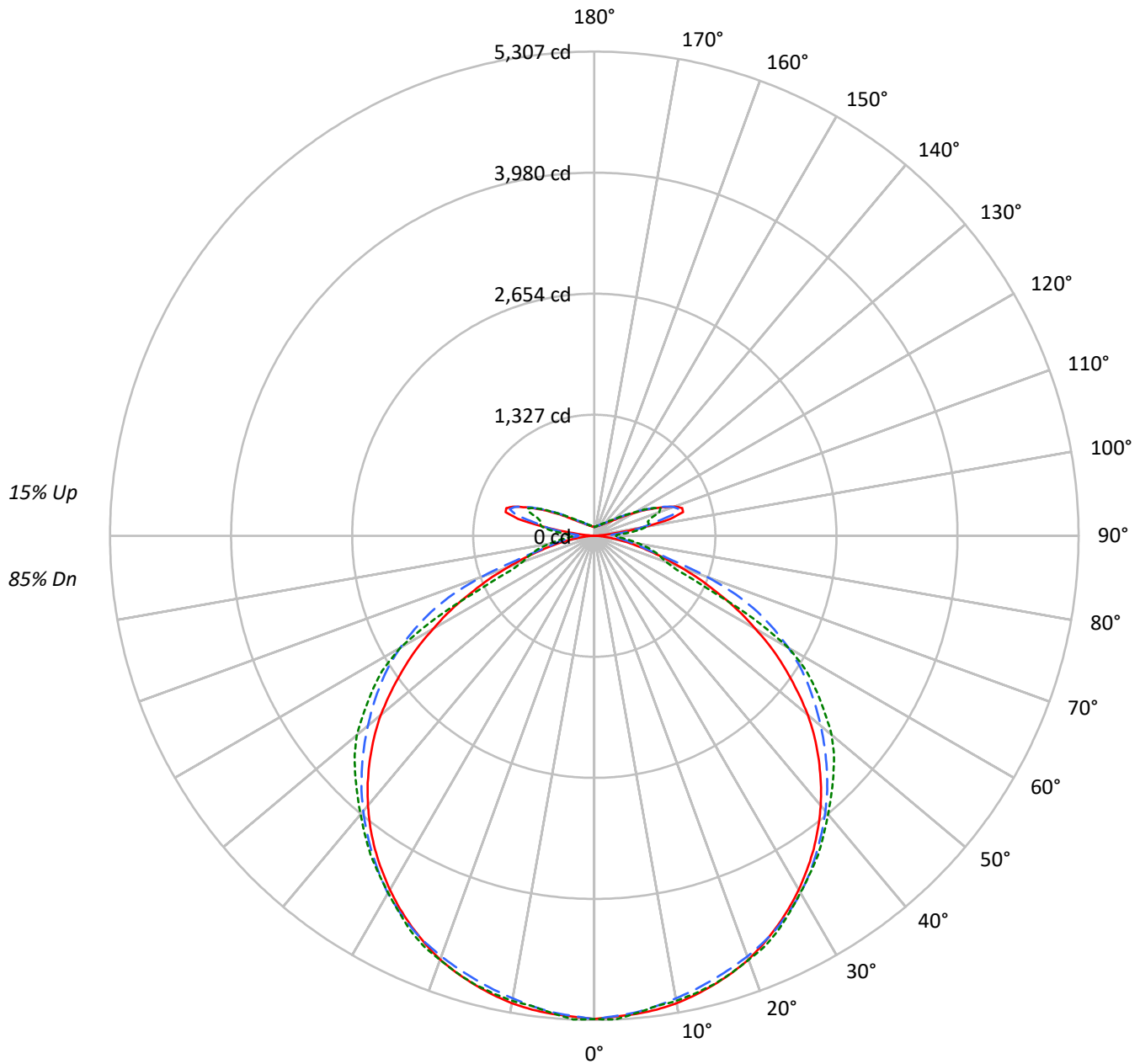
Lumens per Lamp: N/A  
Luminaire Lumens: 17390.3 lumens  
Efficiency: N/A  
Efficacy: 151.9 lumens/watt  
Spacing Criteria (0/90/45): 1.26 / 1.27 / 1.39  
Luminous Opening: Rectangular w/ Sides (W: 1.93' x L: 0.88' x H: 0.17')  
CIE Type: Semi-Direct

Input Watts (W): 114.5  
Input Voltage (V): NR  
Input Current (A<sub>in</sub>): 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: P826938

CATALOG NUMBER: OHB-15SE-MCL-UNV-L840-CD-UPL24

### Luminous Intensity Polar Plot





TEST NUMBER: P826938

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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   | 116 | 116 | 116 | 116 | 111 | 111 | 111 | 111 | 103 | 103 | 103 | 95 | 95 | 95 | 88 | 88 | 88 | 85 |    |    |
| 1   | 106 | 101 | 97  | 93  | 102 | 97  | 94  | 91  | 91  | 88  | 85  | 84 | 82 | 80 | 78 | 77 | 75 | 72 |    |    |
| 2   | 96  | 88  | 82  | 76  | 92  | 85  | 79  | 74  | 79  | 75  | 70  | 74 | 70 | 67 | 69 | 66 | 63 | 60 |    |    |
| 3   | 88  | 78  | 70  | 64  | 84  | 75  | 68  | 62  | 70  | 64  | 59  | 65 | 61 | 56 | 61 | 57 | 54 | 51 |    |    |
| 4   | 80  | 69  | 60  | 54  | 77  | 67  | 59  | 53  | 62  | 56  | 51  | 58 | 53 | 48 | 54 | 50 | 46 | 44 |    |    |
| 5   | 74  | 62  | 53  | 46  | 71  | 60  | 51  | 45  | 56  | 49  | 44  | 52 | 46 | 42 | 49 | 44 | 40 | 38 |    |    |
| 6   | 68  | 55  | 47  | 40  | 65  | 54  | 45  | 40  | 50  | 43  | 38  | 47 | 41 | 37 | 44 | 39 | 35 | 33 |    |    |
| 7   | 63  | 50  | 42  | 36  | 61  | 49  | 41  | 35  | 46  | 39  | 34  | 43 | 37 | 32 | 40 | 35 | 31 | 29 |    |    |
| 8   | 59  | 46  | 37  | 32  | 56  | 44  | 36  | 31  | 42  | 35  | 30  | 39 | 33 | 29 | 37 | 32 | 28 | 26 |    |    |
| 9   | 55  | 42  | 34  | 28  | 53  | 41  | 33  | 28  | 38  | 32  | 27  | 36 | 30 | 26 | 34 | 29 | 25 | 23 |    |    |
| 10  | 51  | 38  | 31  | 26  | 49  | 37  | 30  | 25  | 35  | 29  | 24  | 33 | 28 | 24 | 32 | 27 | 23 | 21 |    |    |

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

|     | 0°    | 45°   | 90°   |
|-----|-------|-------|-------|
| 0°  | 33700 | 33700 | 33700 |
| 5°  | 33058 | 32928 | 33299 |
| 10° | 32524 | 32156 | 32947 |
| 15° | 31909 | 31517 | 32745 |
| 20° | 31292 | 31015 | 32474 |
| 25° | 30496 | 30508 | 32206 |
| 30° | 29659 | 29863 | 31618 |
| 35° | 28730 | 29000 | 31304 |
| 40° | 27641 | 28106 | 30869 |
| 45° | 26297 | 27105 | 30693 |
| 50° | 24638 | 25991 | 30481 |
| 55° | 22326 | 24854 | 29378 |
| 60° | 19499 | 23343 | 27201 |
| 65° | 16060 | 20921 | 17272 |
| 70° | 12251 | 15807 | 12555 |
| 75° | 8495  | 8965  | 12791 |
| 80° | 5220  | 6956  | 12287 |
| 85° | 2341  | 5648  | 11656 |



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**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 499.4   | 2.9       |
| 10°-20°   | 1432.0  | 8.2       |
| 20°-30°   | 2187.2  | 12.6      |
| 30°-40°   | 2653.8  | 15.3      |
| 40°-50°   | 2781.4  | 16.0      |
| 50°-60°   | 2520.4  | 14.5      |
| 60°-70°   | 1689.8  | 9.7       |
| 70°-80°   | 758.8   | 4.4       |
| 80°-90°   | 281.5   | 1.6       |
| 90°-100°  | 314.7   | 1.8       |
| 100°-110° | 844.0   | 4.9       |
| 110°-120° | 710.1   | 4.1       |
| 120°-130° | 342.1   | 2.0       |
| 130°-140° | 173.2   | 1.0       |
| 140°-150° | 101.1   | 0.6       |
| 150°-160° | 59.7    | 0.3       |
| 160°-170° | 31.4    | 0.2       |
| 170°-180° | 9.6     | 0.1       |
| 0°-30°    | 4118.6  | 23.7      |
| 0°-40°    | 6772.4  | 38.9      |
| 0°-60°    | 12074.3 | 69.4      |
| 0°-90°    | 14804.4 | 85.1      |
| 90°-120°  | 1868.8  | 10.7      |
| 90°-150°  | 2485.1  | 14.3      |
| 90°-180°  | 2586.0  | 14.9      |
| 0°-180°   | 17390.3 | 100.0     |

**CANDELA DISTRIBUTION:**

|      | 0°   | 22.5° | 45°  | 67.5° | 90°  | Flux |
|------|------|-------|------|-------|------|------|
| 0°   | 5296 | 5296  | 5296 | 5296  | 5296 |      |
| 5°   | 5262 | 5280  | 5244 | 5260  | 5253 | 500  |
| 15°  | 5091 | 5071  | 5035 | 5080  | 5086 | 1437 |
| 25°  | 4730 | 4709  | 4742 | 4786  | 4772 | 2180 |
| 35°  | 4192 | 4202  | 4245 | 4290  | 4273 | 2620 |
| 45°  | 3479 | 3536  | 3602 | 3694  | 3705 | 2680 |
| 55°  | 2560 | 2683  | 2866 | 2981  | 2974 | 2285 |
| 65°  | 1502 | 1738  | 1973 | 1665  | 1359 | 1497 |
| 75°  | 591  | 858   | 631  | 646   | 688  | 646  |
| 85°  | 102  | 195   | 250  | 302   | 317  | 124  |
| 90°  | 6    | 99    | 176  | 224   | 239  | 10   |
| 95°  | 54   | 152   | 261  | 336   | 369  | 166  |
| 105° | 1006 | 1010  | 888  | 654   | 607  | 955  |
| 115° | 698  | 708   | 721  | 725   | 721  | 704  |
| 125° | 343  | 362   | 377  | 378   | 376  | 322  |
| 135° | 207  | 212   | 219  | 225   | 228  | 164  |
| 145° | 152  | 157   | 160  | 161   | 163  | 97   |
| 155° | 124  | 126   | 128  | 129   | 129  | 58   |
| 165° | 108  | 109   | 110  | 110   | 110  | 31   |
| 175° | 98   | 99    | 99   | 99    | 99   | 10   |
| 180° | 98   | 98    | 98   | 98    | 98   |      |



TEST NUMBER: P826938

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**CANDELA DISTRIBUTION (FULL):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 0°     | 5296.4 | 5296.4 | 5296.4 | 5296.4 | 5296.4 |
| 2.5°   | 5275.0 | 5297.2 | 5269.6 | 5299.5 | 5307.1 |
| 5°     | 5261.9 | 5280.3 | 5243.6 | 5259.6 | 5252.7 |
| 7.5°   | 5238.2 | 5244.3 | 5200.7 | 5213.7 | 5199.9 |
| 10°    | 5203.0 | 5199.9 | 5148.6 | 5173.9 | 5176.9 |
| 12.5°  | 5150.9 | 5141.7 | 5095.8 | 5134.0 | 5134.8 |
| 15°    | 5091.2 | 5071.2 | 5035.3 | 5079.7 | 5085.8 |
| 17.5°  | 5022.2 | 4996.2 | 4972.5 | 5029.9 | 5020.7 |
| 20°    | 4941.8 | 4911.2 | 4906.6 | 4969.4 | 4946.4 |
| 22.5°  | 4842.3 | 4818.5 | 4829.2 | 4889.0 | 4874.4 |
| 25°    | 4729.7 | 4709.0 | 4741.9 | 4785.6 | 4771.8 |
| 27.5°  | 4611.0 | 4598.7 | 4636.3 | 4670.0 | 4643.2 |
| 30°    | 4480.8 | 4473.9 | 4523.7 | 4551.3 | 4517.6 |
| 32.5°  | 4339.1 | 4341.4 | 4388.9 | 4426.4 | 4395.0 |
| 35°    | 4192.1 | 4202.0 | 4244.9 | 4290.1 | 4273.3 |
| 37.5°  | 4030.5 | 4052.7 | 4095.6 | 4146.9 | 4129.3 |
| 40°    | 3859.7 | 3891.9 | 3939.4 | 4001.4 | 3985.3 |
| 42.5°  | 3675.2 | 3715.7 | 3777.0 | 3845.9 | 3844.4 |
| 45°    | 3479.1 | 3535.8 | 3601.6 | 3693.5 | 3705.0 |
| 47.5°  | 3275.4 | 3339.0 | 3422.4 | 3545.0 | 3562.6 |
| 50°    | 3054.1 | 3133.7 | 3237.9 | 3384.9 | 3395.6 |
| 52.5°  | 2807.5 | 2916.2 | 3054.1 | 3195.0 | 3182.0 |
| 55°    | 2560.1 | 2683.4 | 2866.5 | 2981.3 | 2974.4 |
| 57.5°  | 2313.5 | 2452.1 | 2674.2 | 2756.2 | 2755.4 |
| 60°    | 2037.8 | 2213.2 | 2456.0 | 2518.0 | 2456.7 |
| 62.5°  | 1782.8 | 1971.2 | 2223.2 | 2178.0 | 1968.2 |
| 65°    | 1502.5 | 1737.6 | 1972.7 | 1664.9 | 1359.3 |
| 67.5°  | 1253.6 | 1498.7 | 1675.6 | 1140.3 | 976.4  |
| 70°    | 1003.2 | 1273.6 | 1306.5 | 846.2  | 834.7  |
| 72.5°  | 781.1  | 1069.1 | 901.4  | 724.5  | 761.2  |
| 75°    | 591.2  | 857.7  | 631.0  | 645.6  | 687.7  |
| 77.5°  | 431.2  | 658.6  | 490.9  | 565.9  | 600.4  |
| 80°    | 296.4  | 466.4  | 400.5  | 475.6  | 499.3  |
| 82.5°  | 186.1  | 307.9  | 320.9  | 382.9  | 407.4  |
| 85°    | 101.9  | 195.3  | 250.4  | 302.5  | 317.0  |
| 87.5°  | 42.1   | 117.9  | 191.5  | 233.6  | 245.8  |
| 90°    | 5.8    | 99.1   | 176.4  | 224.4  | 239.0  |
| 92.5°  | 17.8   | 94.8   | 177.7  | 233.0  | 251.3  |
| 95°    | 53.8   | 151.6  | 260.8  | 336.0  | 369.0  |
| 97.5°  | 270.5  | 323.2  | 387.3  | 468.6  | 504.7  |
| 100°   | 554.3  | 612.8  | 535.0  | 575.1  | 586.3  |
| 102.5° | 856.1  | 869.4  | 670.1  | 616.8  | 611.1  |
| 105°   | 1006.1 | 1009.6 | 887.7  | 653.8  | 607.1  |



TEST NUMBER: P826938

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**CANDELA DISTRIBUTION (continued):**

|        | 0°    | 22.5° | 45°   | 67.5° | 90°   |
|--------|-------|-------|-------|-------|-------|
| 112.5° | 813.4 | 830.7 | 830.0 | 813.9 | 783.5 |
| 115°   | 698.1 | 708.2 | 721.2 | 725.3 | 720.9 |
| 117.5° | 598.1 | 600.7 | 616.1 | 619.7 | 622.3 |
| 120°   | 496.1 | 507.9 | 526.8 | 525.7 | 520.4 |
| 122.5° | 417.1 | 429.1 | 443.6 | 445.4 | 440.1 |
| 125°   | 343.4 | 362.1 | 376.8 | 378.1 | 375.8 |
| 127.5° | 292.1 | 305.1 | 321.3 | 324.6 | 324.3 |
| 130°   | 255.1 | 263.9 | 277.7 | 281.8 | 282.8 |
| 132.5° | 227.9 | 235.7 | 245.0 | 252.0 | 251.0 |
| 135°   | 206.9 | 211.7 | 219.4 | 225.3 | 228.0 |
| 137.5° | 190.7 | 193.7 | 199.7 | 206.5 | 207.3 |
| 140°   | 175.7 | 179.7 | 183.9 | 189.0 | 190.7 |
| 142.5° | 161.9 | 166.7 | 169.9 | 174.2 | 175.0 |
| 145°   | 151.9 | 156.7 | 159.7 | 161.4 | 163.2 |
| 147.5° | 143.7 | 147.7 | 149.7 | 151.7 | 152.4 |
| 150°   | 136.7 | 138.7 | 141.7 | 142.7 | 143.7 |
| 152.5° | 129.7 | 131.7 | 134.7 | 135.7 | 135.7 |
| 155°   | 123.7 | 126.4 | 128.4 | 129.4 | 128.7 |
| 157.5° | 118.7 | 121.4 | 123.4 | 124.4 | 124.4 |
| 160°   | 114.7 | 116.4 | 118.4 | 119.4 | 119.4 |
| 162.5° | 111.4 | 112.4 | 113.4 | 114.4 | 114.4 |
| 165°   | 108.4 | 109.4 | 110.4 | 110.4 | 110.4 |
| 167.5° | 105.4 | 106.2 | 106.4 | 107.4 | 107.4 |
| 170°   | 102.4 | 103.4 | 103.4 | 103.7 | 103.7 |
| 172.5° | 100.4 | 101.4 | 101.4 | 100.7 | 101.7 |
| 175°   | 98.4  | 99.4  | 98.7  | 98.9  | 98.9  |
| 177.5° | 99.2  | 98.4  | 97.7  | 96.9  | 96.1  |
| 180°   | 97.7  | 97.7  | 97.7  | 97.7  | 97.7  |



Report Generated By 670246072 / DESKTOP-50001EG





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







|        |        |        |       |       |       |
|--------|--------|--------|-------|-------|-------|
| 107.5° | 1010.8 | 1025.6 | 970.5 | 774.2 | 653.7 |
| 110°   | 933.6  | 950.3  | 924.4 | 854.3 | 757.8 |



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

Report Prepared for

Cooper Lighting Solutions

METALUX

Report Number: SP1-2304-001-1

Test Date: 05/31/2023

Luminaire Tested: OHB-15SE-N-UNV-L840

Data in this report applies to families of products including OHB-15SE-N-UNV-L840.

### Test Information

Test Method: LM-79-2019  
 Report Number: SP1-2304-001-1  
 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-L840**  
 Description: 15SE OHB WITH APT LEDS, NARROW LENS, 80CRI 4000K

### Spectral Parameters

|                           |        |           |      |      |      |
|---------------------------|--------|-----------|------|------|------|
| CCT (K):                  | 4018   | CRI (Ra): | 84.0 |      |      |
| CIE u':                   | 0.2242 | R1:       | 82.5 | R9:  | 11.5 |
| CIE v':                   | 0.5025 | R2:       | 91.6 | R10: | 79.8 |
| Duv:                      | 0.0010 | R3:       | 96.1 | R11: | 80.5 |
| CIE x:                    | 0.3803 | R4:       | 81.4 | R12: | 64.0 |
| CIE y:                    | 0.3788 | R5:       | 82.4 | R13: | 85.1 |
| CIE z:                    | 0.2410 | R6:       | 88.0 | R14: | 98.4 |
| Peak Wavelength (nm):     | 454    | R7:       | 85.5 |      |      |
| Dominant Wavelength (nm): | 578    | R8:       | 64.7 |      |      |
| Purity:                   | 27.9   |           |      |      |      |
| Rf:                       | 84.5   |           |      |      |      |
| Rg:                       | 93.7   |           |      |      |      |



### Test Conditions

Stabilization Time: 23M  
 Operation Time: 12H  
 Room Temperature (°C) / RH%: 25.7/44%  
 Sphere Temperature (°C): 25.3

REPORT NUMBER: SP1-2304-001-1

| 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: SP1-2304-001-1

CIE 1931 Chromaticity Diagram



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



Point lies inside the ANSI 4000K 4-step quadrangle

REPORT NUMBER: SP1-2304-001-1

**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       | 6853             | NR               | 490       | 98921            | NR               | 620       | 217813           | NR               | 750       | 11077            | NR               | 880       | 7212             | NR               |
| 365       | 5941             | NR               | 495       | 111249           | NR               | 625       | 204757           | NR               | 755       | 10374            | NR               | 885       | 8336             | NR               |
| 370       | 6345             | NR               | 500       | 125186           | NR               | 630       | 189812           | NR               | 760       | 9527             | NR               | 890       | 8299             | NR               |
| 375       | 7044             | NR               | 505       | 139782           | NR               | 635       | 174714           | NR               | 765       | 9227             | NR               | 895       | 8295             | NR               |
| 380       | 6587             | NR               | 510       | 150374           | NR               | 640       | 160641           | NR               | 770       | 8071             | NR               | 900       | 5725             | NR               |
| 385       | 6443             | NR               | 515       | 158837           | NR               | 645       | 146146           | NR               | 775       | 7303             | NR               | 905       | 5085             | NR               |
| 390       | 5977             | NR               | 520       | 167163           | NR               | 650       | 132087           | NR               | 780       | 6839             | NR               | 910       | 6133             | NR               |
| 395       | 5473             | NR               | 525       | 171514           | NR               | 655       | 118817           | NR               | 785       | 5988             | NR               | 915       | 6429             | NR               |
| 400       | 4874             | NR               | 530       | 176783           | NR               | 660       | 105411           | NR               | 790       | 5761             | NR               | 920       | 7354             | NR               |
| 405       | 4470             | NR               | 535       | 182412           | NR               | 665       | 92911            | NR               | 795       | 6396             | NR               | 925       | 6889             | NR               |
| 410       | 5232             | NR               | 540       | 187578           | NR               | 670       | 81240            | NR               | 800       | 6049             | NR               | 930       | 7465             | NR               |
| 415       | 7030             | NR               | 545       | 192635           | NR               | 675       | 70762            | NR               | 805       | 5748             | NR               | 935       | 9430             | NR               |
| 420       | 11074            | NR               | 550       | 198282           | NR               | 680       | 61913            | NR               | 810       | 5571             | NR               | 940       | 6867             | NR               |
| 425       | 19121            | NR               | 555       | 206255           | NR               | 685       | 53742            | NR               | 815       | 5977             | NR               | 945       | 7026             | NR               |
| 430       | 32148            | NR               | 560       | 213621           | NR               | 690       | 46348            | NR               | 820       | 6580             | NR               | 950       | 9476             | NR               |
| 435       | 54073            | NR               | 565       | 222021           | NR               | 695       | 40313            | NR               | 825       | 6610             | NR               | 955       | 8237             | NR               |
| 440       | 89242            | NR               | 570       | 230974           | NR               | 700       | 35240            | NR               | 830       | 6652             | NR               | 960       | 7127             | NR               |
| 445       | 153497           | NR               | 575       | 237268           | NR               | 705       | 30635            | NR               | 835       | 5919             | NR               | 965       | 5614             | NR               |
| 450       | 236793           | NR               | 580       | 244317           | NR               | 710       | 27359            | NR               | 840       | 5707             | NR               | 970       | 9396             | NR               |
| 455       | 259282           | NR               | 585       | 250340           | NR               | 715       | 24401            | NR               | 845       | 5548             | NR               | 975       | 9700             | NR               |
| 460       | 209272           | NR               | 590       | 252316           | NR               | 720       | 21810            | NR               | 850       | 5560             | NR               | 980       | 8916             | NR               |
| 465       | 162456           | NR               | 595       | 253019           | NR               | 725       | 19005            | NR               | 855       | 6972             | NR               | 985       | 9548             | NR               |
| 470       | 132627           | NR               | 600       | 252244           | NR               | 730       | 17009            | NR               | 860       | 8311             | NR               | 990       | 10271            | NR               |
| 475       | 106283           | NR               | 605       | 246798           | NR               | 735       | 14940            | NR               | 865       | 6330             | NR               | 995       | 7323             | NR               |
| 480       | 91347            | NR               | 610       | 238764           | NR               | 740       | 13159            | NR               | 870       | 8019             | NR               | 1000      | 8719             | NR               |
| 485       | 91575            | NR               | 615       | 229100           | NR               | 745       | 12000            | NR               | 875       | 7419             | NR               |           |                  |                  |

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Scotopic Flux vs. Wavelength



Scotopic Lumens: 25258.1

S/P: 1.73

| 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       | 6853             | NR               | 490       | 98921            | NR               | 620       | 217813           | NR               | 750       | 11077            | NR               | 880       | 7212             | NR               |
| 365       | 5941             | NR               | 495       | 111249           | NR               | 625       | 204757           | NR               | 755       | 10374            | NR               | 885       | 8336             | NR               |
| 370       | 6345             | NR               | 500       | 125186           | NR               | 630       | 189812           | NR               | 760       | 9527             | NR               | 890       | 8299             | NR               |
| 375       | 7044             | NR               | 505       | 139782           | NR               | 635       | 174714           | NR               | 765       | 9227             | NR               | 895       | 8295             | NR               |
| 380       | 6587             | NR               | 510       | 150374           | NR               | 640       | 160641           | NR               | 770       | 8071             | NR               | 900       | 5725             | NR               |
| 385       | 6443             | NR               | 515       | 158837           | NR               | 645       | 146146           | NR               | 775       | 7303             | NR               | 905       | 5085             | NR               |
| 390       | 5977             | NR               | 520       | 167163           | NR               | 650       | 132087           | NR               | 780       | 6839             | NR               | 910       | 6133             | NR               |
| 395       | 5473             | NR               | 525       | 171514           | NR               | 655       | 118817           | NR               | 785       | 5988             | NR               | 915       | 6429             | NR               |
| 400       | 4874             | NR               | 530       | 176783           | NR               | 660       | 105411           | NR               | 790       | 5761             | NR               | 920       | 7354             | NR               |
| 405       | 4470             | NR               | 535       | 182412           | NR               | 665       | 92911            | NR               | 795       | 6396             | NR               | 925       | 6889             | NR               |
| 410       | 5232             | NR               | 540       | 187578           | NR               | 670       | 81240            | NR               | 800       | 6049             | NR               | 930       | 7465             | NR               |
| 415       | 7030             | NR               | 545       | 192635           | NR               | 675       | 70762            | NR               | 805       | 5748             | NR               | 935       | 9430             | NR               |
| 420       | 11074            | NR               | 550       | 198282           | NR               | 680       | 61913            | NR               | 810       | 5571             | NR               | 940       | 6867             | NR               |
| 425       | 19121            | NR               | 555       | 206255           | NR               | 685       | 53742            | NR               | 815       | 5977             | NR               | 945       | 7026             | NR               |
| 430       | 32148            | NR               | 560       | 213621           | NR               | 690       | 46348            | NR               | 820       | 6580             | NR               | 950       | 9476             | NR               |
| 435       | 54073            | NR               | 565       | 222021           | NR               | 695       | 40313            | NR               | 825       | 6610             | NR               | 955       | 8237             | NR               |
| 440       | 89242            | NR               | 570       | 230974           | NR               | 700       | 35240            | NR               | 830       | 6652             | NR               | 960       | 7127             | NR               |
| 445       | 153497           | NR               | 575       | 237268           | NR               | 705       | 30635            | NR               | 835       | 5919             | NR               | 965       | 5614             | NR               |
| 450       | 236793           | NR               | 580       | 244317           | NR               | 710       | 27359            | NR               | 840       | 5707             | NR               | 970       | 9396             | NR               |
| 455       | 259282           | NR               | 585       | 250340           | NR               | 715       | 24401            | NR               | 845       | 5548             | NR               | 975       | 9700             | NR               |
| 460       | 209272           | NR               | 590       | 252316           | NR               | 720       | 21810            | NR               | 850       | 5560             | NR               | 980       | 8916             | NR               |
| 465       | 162456           | NR               | 595       | 253019           | NR               | 725       | 19005            | NR               | 855       | 6972             | NR               | 985       | 9548             | NR               |
| 470       | 132627           | NR               | 600       | 252244           | NR               | 730       | 17009            | NR               | 860       | 8311             | NR               | 990       | 10271            | NR               |
| 475       | 106283           | NR               | 605       | 246798           | NR               | 735       | 14940            | NR               | 865       | 6330             | NR               | 995       | 7323             | NR               |
| 480       | 91347            | NR               | 610       | 238764           | NR               | 740       | 13159            | NR               | 870       | 8019             | NR               | 1000      | 8719             | NR               |
| 485       | 91575            | NR               | 615       | 229100           | NR               | 745       | 12000            | NR               | 875       | 7419             | NR               |           |                  |                  |

REPORT NUMBER: SP1-2304-001-1

**Melanopic Flux vs. Wavelength**



**Melanopic Lumens: 10357.9 M/P: 0.71**

| 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       | 6853             | NR               | 490       | 98921            | NR               | 620       | 217813           | NR               | 750       | 11077            | NR               | 880       | 7212             | NR               |
| 365       | 5941             | NR               | 495       | 111249           | NR               | 625       | 204757           | NR               | 755       | 10374            | NR               | 885       | 8336             | NR               |
| 370       | 6345             | NR               | 500       | 125186           | NR               | 630       | 189812           | NR               | 760       | 9527             | NR               | 890       | 8299             | NR               |
| 375       | 7044             | NR               | 505       | 139782           | NR               | 635       | 174714           | NR               | 765       | 9227             | NR               | 895       | 8295             | NR               |
| 380       | 6587             | NR               | 510       | 150374           | NR               | 640       | 160641           | NR               | 770       | 8071             | NR               | 900       | 5725             | NR               |
| 385       | 6443             | NR               | 515       | 158837           | NR               | 645       | 146146           | NR               | 775       | 7303             | NR               | 905       | 5085             | NR               |
| 390       | 5977             | NR               | 520       | 167163           | NR               | 650       | 132087           | NR               | 780       | 6839             | NR               | 910       | 6133             | NR               |
| 395       | 5473             | NR               | 525       | 171514           | NR               | 655       | 118817           | NR               | 785       | 5988             | NR               | 915       | 6429             | NR               |
| 400       | 4874             | NR               | 530       | 176783           | NR               | 660       | 105411           | NR               | 790       | 5761             | NR               | 920       | 7354             | NR               |
| 405       | 4470             | NR               | 535       | 182412           | NR               | 665       | 92911            | NR               | 795       | 6396             | NR               | 925       | 6889             | NR               |
| 410       | 5232             | NR               | 540       | 187578           | NR               | 670       | 81240            | NR               | 800       | 6049             | NR               | 930       | 7465             | NR               |
| 415       | 7030             | NR               | 545       | 192635           | NR               | 675       | 70762            | NR               | 805       | 5748             | NR               | 935       | 9430             | NR               |
| 420       | 11074            | NR               | 550       | 198282           | NR               | 680       | 61913            | NR               | 810       | 5571             | NR               | 940       | 6867             | NR               |
| 425       | 19121            | NR               | 555       | 206255           | NR               | 685       | 53742            | NR               | 815       | 5977             | NR               | 945       | 7026             | NR               |
| 430       | 32148            | NR               | 560       | 213621           | NR               | 690       | 46348            | NR               | 820       | 6580             | NR               | 950       | 9476             | NR               |
| 435       | 54073            | NR               | 565       | 222021           | NR               | 695       | 40313            | NR               | 825       | 6610             | NR               | 955       | 8237             | NR               |
| 440       | 89242            | NR               | 570       | 230974           | NR               | 700       | 35240            | NR               | 830       | 6652             | NR               | 960       | 7127             | NR               |
| 445       | 153497           | NR               | 575       | 237268           | NR               | 705       | 30635            | NR               | 835       | 5919             | NR               | 965       | 5614             | NR               |
| 450       | 236793           | NR               | 580       | 244317           | NR               | 710       | 27359            | NR               | 840       | 5707             | NR               | 970       | 9396             | NR               |
| 455       | 259282           | NR               | 585       | 250340           | NR               | 715       | 24401            | NR               | 845       | 5548             | NR               | 975       | 9700             | NR               |
| 460       | 209272           | NR               | 590       | 252316           | NR               | 720       | 21810            | NR               | 850       | 5560             | NR               | 980       | 8916             | NR               |
| 465       | 162456           | NR               | 595       | 253019           | NR               | 725       | 19005            | NR               | 855       | 6972             | NR               | 985       | 9548             | NR               |
| 470       | 132627           | NR               | 600       | 252244           | NR               | 730       | 17009            | NR               | 860       | 8311             | NR               | 990       | 10271            | NR               |
| 475       | 106283           | NR               | 605       | 246798           | NR               | 735       | 14940            | NR               | 865       | 6330             | NR               | 995       | 7323             | NR               |
| 480       | 91347            | NR               | 610       | 238764           | NR               | 740       | 13159            | NR               | 870       | 8019             | NR               | 1000      | 8719             | NR               |
| 485       | 91575            | NR               | 615       | 229100           | NR               | 745       | 12000            | NR               | 875       | 7419             | NR               |           |                  |                  |

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**TM-30-18**

**Summary**

$R_f = 84.5$   
 $R_g = 93.7$   
 CIE  $R_a = 84.0$   
 $R_9 = 11.5$



**Color Vector Graphics**



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

|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 85 | CES26 = 88 | CES51 = 91 | CES76 = 81 |
| CES02 = 61 | CES27 = 90 | CES52 = 93 | CES77 = 85 |
| CES03 = 31 | CES28 = 94 | CES53 = 89 | CES78 = 80 |
| CES04 = 69 | CES29 = 93 | CES54 = 88 | CES79 = 93 |
| CES05 = 48 | CES30 = 87 | CES55 = 85 | CES80 = 91 |
| CES06 = 50 | CES31 = 95 | CES56 = 84 | CES81 = 78 |
| CES07 = 41 | CES32 = 88 | CES57 = 82 | CES82 = 96 |
| CES08 = 40 | CES33 = 96 | CES58 = 82 | CES83 = 96 |
| CES09 = 29 | CES34 = 92 | CES59 = 91 | CES84 = 91 |
| CES10 = 74 | CES35 = 95 | CES60 = 88 | CES85 = 77 |
| CES11 = 57 | CES36 = 77 | CES61 = 86 | CES86 = 74 |
| CES12 = 63 | CES37 = 95 | CES62 = 78 | CES87 = 84 |
| CES13 = 42 | CES38 = 81 | CES63 = 85 | CES88 = 88 |
| CES14 = 74 | CES39 = 98 | CES64 = 77 | CES89 = 78 |
| CES15 = 71 | CES40 = 97 | CES65 = 77 | CES90 = 89 |
| CES16 = 47 | CES41 = 94 | CES66 = 74 | CES91 = 68 |
| CES17 = 49 | CES42 = 97 | CES67 = 73 | CES92 = 64 |
| CES18 = 56 | CES43 = 93 | CES68 = 79 | CES93 = 78 |
| CES19 = 71 | CES44 = 99 | CES69 = 82 | CES94 = 65 |
| CES20 = 65 | CES45 = 94 | CES70 = 77 | CES95 = 73 |
| CES21 = 86 | CES46 = 91 | CES71 = 69 | CES96 = 84 |
| CES22 = 78 | CES47 = 93 | CES72 = 90 | CES97 = 90 |
| CES23 = 91 | CES48 = 82 | CES73 = 72 | CES98 = 86 |
| CES24 = 90 | CES49 = 92 | CES74 = 90 | CES99 = 77 |
| CES25 = 71 | CES50 = 92 | CES75 = 74 |            |



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**Color Rendition by Hue-Angle Bin**



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**Measure Comparisons**



(END OF REPORT)