

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: P828061

Luminaire Tested: **OHBL-24SE-W-UNV-L935-CD-UPL24**

Issue Date: 5/3/2024



**Test Information**

Test Method: LM-79-08  
Report Number: P828061  
REPORT IS A COMBINATION OF REPORTS P826250 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: OHBL-24SE-W-UNV-L935-CD-UPL24  
Description:  
Light Source: -  
Ballast/Driver: -

**Summary**

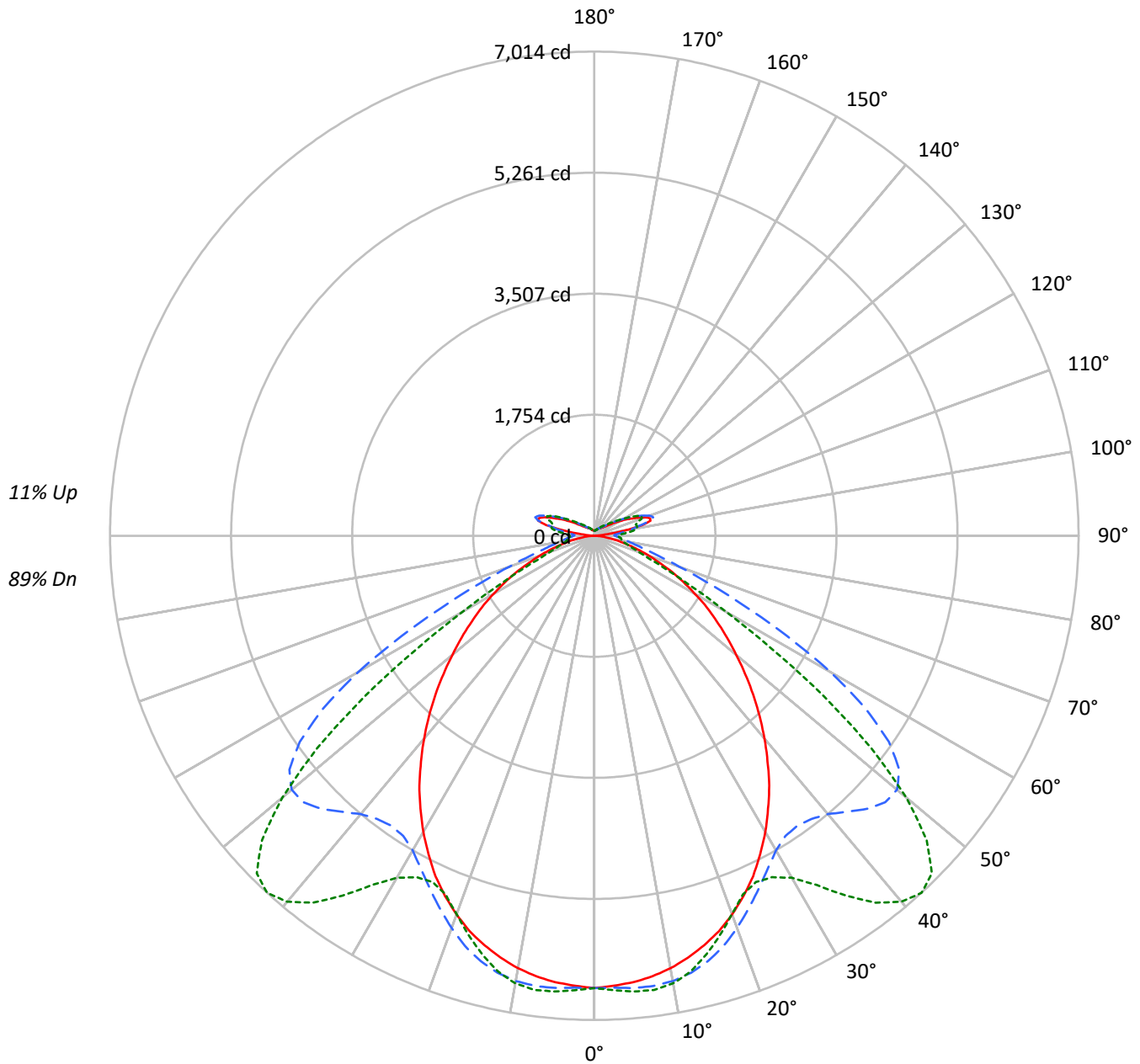
Lumens per Lamp: N/A  
Luminaire Lumens: 21634.5 lumens  
Efficiency: N/A  
Efficacy: 139.2 lumens/watt  
Spacing Criteria (0/90/45): 1.14 / 1.58 / 1.62  
Luminous Opening: Rectangular w/ Sides (W: 3.78' x L: 1.67' x H: 0.17')  
CIE Type: Semi-Direct

Input Watts (W): 155.4  
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: P828061

CATALOG NUMBER: OHBL-24SE-W-UNV-L935-CD-UPL24

### Luminous Intensity Polar Plot





TEST NUMBER: P828061

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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   | 116 | 116 | 116 | 116 | 112 | 112 | 112 | 112 | 105 | 105 | 105 | 98 | 98 | 98 | 92 | 92 | 92 |
| 1   | 107 | 102 | 98  | 94  | 103 | 99  | 95  | 92  | 92  | 90  | 87  | 87 | 84 | 82 | 81 | 80 | 78 |
| 2   | 97  | 89  | 83  | 77  | 94  | 87  | 81  | 76  | 81  | 76  | 72  | 76 | 72 | 69 | 72 | 69 | 66 |
| 3   | 89  | 79  | 71  | 64  | 85  | 76  | 69  | 63  | 72  | 66  | 61  | 67 | 62 | 58 | 63 | 59 | 56 |
| 4   | 81  | 70  | 61  | 55  | 78  | 67  | 60  | 54  | 64  | 57  | 52  | 60 | 54 | 50 | 57 | 52 | 48 |
| 5   | 74  | 62  | 53  | 47  | 72  | 60  | 52  | 46  | 57  | 50  | 44  | 54 | 48 | 43 | 51 | 46 | 41 |
| 6   | 69  | 56  | 47  | 41  | 66  | 54  | 46  | 40  | 51  | 44  | 39  | 48 | 42 | 37 | 46 | 40 | 36 |
| 7   | 63  | 50  | 42  | 36  | 61  | 49  | 41  | 35  | 46  | 39  | 34  | 44 | 38 | 33 | 42 | 36 | 32 |
| 8   | 59  | 46  | 37  | 31  | 57  | 44  | 37  | 31  | 42  | 35  | 30  | 40 | 34 | 29 | 38 | 33 | 29 |
| 9   | 55  | 42  | 34  | 28  | 53  | 41  | 33  | 28  | 39  | 32  | 27  | 37 | 31 | 26 | 35 | 30 | 26 |
| 10  | 51  | 38  | 30  | 25  | 50  | 37  | 30  | 25  | 36  | 29  | 24  | 34 | 28 | 24 | 32 | 27 | 23 |

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

|     | 0°    | 45°   | 90°   |
|-----|-------|-------|-------|
| 0°  | 11191 | 11191 | 11191 |
| 5°  | 11033 | 11175 | 11318 |
| 10° | 10841 | 11158 | 11331 |
| 15° | 10577 | 10973 | 10968 |
| 20° | 10236 | 10596 | 10431 |
| 25° | 9799  | 10139 | 10222 |
| 30° | 9238  | 9800  | 11000 |
| 35° | 8608  | 9981  | 12872 |
| 40° | 7889  | 10810 | 14880 |
| 45° | 7142  | 12261 | 15995 |
| 50° | 6370  | 13558 | 14885 |
| 55° | 5643  | 13541 | 11373 |
| 60° | 4906  | 11455 | 6953  |
| 65° | 4135  | 7909  | 4212  |
| 70° | 3278  | 5113  | 3041  |
| 75° | 2405  | 3663  | 2820  |
| 80° | 1624  | 3216  | 3181  |
| 85° | 969   | 3532  | 5029  |



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**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 626.1   | 2.9       |
| 10°-20°   | 1772.9  | 8.2       |
| 20°-30°   | 2594.4  | 12.0      |
| 30°-40°   | 3369.4  | 15.6      |
| 40°-50°   | 4114.4  | 19.0      |
| 50°-60°   | 3623.4  | 16.7      |
| 60°-70°   | 1888.2  | 8.7       |
| 70°-80°   | 809.7   | 3.7       |
| 80°-90°   | 394.0   | 1.8       |
| 90°-100°  | 375.9   | 1.7       |
| 100°-110° | 784.3   | 3.6       |
| 110°-120° | 642.5   | 3.0       |
| 120°-130° | 312.5   | 1.4       |
| 130°-140° | 156.4   | 0.7       |
| 140°-150° | 88.9    | 0.4       |
| 150°-160° | 49.7    | 0.2       |
| 160°-170° | 24.2    | 0.1       |
| 170°-180° | 7.4     | 0.0       |
| 0°-30°    | 4993.5  | 23.1      |
| 0°-40°    | 8362.8  | 38.7      |
| 0°-60°    | 16100.7 | 74.4      |
| 0°-90°    | 19192.6 | 88.7      |
| 90°-120°  | 1802.7  | 8.3       |
| 90°-150°  | 2360.6  | 10.9      |
| 90°-180°  | 2442.0  | 11.3      |
| 0°-180°   | 21634.5 | 100.0     |

**CANDELA DISTRIBUTION:**

|      | 0°   | 22.5° | 45°  | 67.5° | 90°  | Flux |
|------|------|-------|------|-------|------|------|
| 0°   | 6552 | 6552  | 6552 | 6552  | 6552 |      |
| 5°   | 6491 | 6541  | 6576 | 6634  | 6627 | 616  |
| 15°  | 6142 | 6314  | 6375 | 6327  | 6276 | 1729 |
| 25°  | 5442 | 5733  | 5636 | 5530  | 5536 | 2498 |
| 35°  | 4417 | 4884  | 5128 | 5981  | 6364 | 2753 |
| 45°  | 3253 | 4092  | 5594 | 6772  | 6914 | 2508 |
| 55°  | 2166 | 3585  | 5209 | 4567  | 4060 | 1944 |
| 65°  | 1242 | 2484  | 2385 | 1326  | 1141 | 1229 |
| 75°  | 500  | 1162  | 766  | 524   | 498  | 546  |
| 85°  | 106  | 414   | 390  | 382   | 386  | 118  |
| 90°  | 6    | 178   | 296  | 346   | 359  | 10   |
| 95°  | 47   | 180   | 348  | 430   | 462  | 139  |
| 105° | 842  | 876   | 836  | 661   | 623  | 799  |
| 115° | 585  | 611   | 664  | 681   | 679  | 590  |
| 125° | 292  | 311   | 351  | 364   | 363  | 273  |
| 135° | 175  | 178   | 198  | 216   | 219  | 138  |
| 145° | 132  | 133   | 137  | 146   | 150  | 84   |
| 155° | 108  | 110   | 108  | 109   | 109  | 49   |
| 165° | 83   | 84    | 85   | 85    | 85   | 24   |
| 175° | 75   | 76    | 76   | 77    | 77   | 7    |
| 180° | 75   | 75    | 75   | 75    | 75   |      |



TEST NUMBER: P828061

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**CANDELA DISTRIBUTION (FULL):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 0°     | 6551.9 | 6551.9 | 6551.9 | 6551.9 | 6551.9 |
| 2.5°   | 6523.6 | 6551.9 | 6553.3 | 6592.9 | 6588.7 |
| 5°     | 6491.1 | 6540.6 | 6575.9 | 6633.8 | 6626.8 |
| 7.5°   | 6437.4 | 6515.2 | 6577.3 | 6640.9 | 6635.2 |
| 10°    | 6361.1 | 6467.1 | 6549.1 | 6601.3 | 6584.4 |
| 12.5°  | 6262.1 | 6402.1 | 6482.6 | 6493.9 | 6461.4 |
| 15°    | 6141.9 | 6314.4 | 6375.2 | 6327.2 | 6276.2 |
| 17.5°  | 6006.2 | 6208.4 | 6229.6 | 6125.0 | 6061.4 |
| 20°    | 5836.6 | 6067.0 | 6045.8 | 5901.7 | 5831.0 |
| 22.5°  | 5648.6 | 5911.5 | 5843.7 | 5692.4 | 5624.6 |
| 25°    | 5442.2 | 5733.4 | 5635.9 | 5529.9 | 5535.5 |
| 27.5°  | 5200.5 | 5531.2 | 5436.6 | 5484.7 | 5575.1 |
| 30°    | 4954.6 | 5319.3 | 5261.3 | 5541.2 | 5719.3 |
| 32.5°  | 4684.6 | 5101.6 | 5153.8 | 5706.6 | 5997.8 |
| 35°    | 4417.4 | 4883.9 | 5128.4 | 5980.8 | 6363.9 |
| 37.5°  | 4122.0 | 4663.3 | 5169.4 | 6297.4 | 6698.9 |
| 40°    | 3835.0 | 4448.5 | 5262.8 | 6581.6 | 6920.8 |
| 42.5°  | 3542.4 | 4256.2 | 5419.6 | 6749.8 | 7014.1 |
| 45°    | 3252.6 | 4092.2 | 5593.5 | 6772.4 | 6913.8 |
| 47.5°  | 2962.8 | 3953.8 | 5713.7 | 6592.9 | 6527.8 |
| 50°    | 2682.9 | 3830.8 | 5722.1 | 6161.8 | 5896.0 |
| 52.5°  | 2421.4 | 3717.7 | 5566.7 | 5474.8 | 5062.0 |
| 55°    | 2165.6 | 3584.8 | 5209.0 | 4567.2 | 4059.8 |
| 57.5°  | 1932.3 | 3401.1 | 4657.7 | 3591.9 | 3037.8 |
| 60°    | 1685.0 | 3152.2 | 3945.3 | 2627.8 | 2191.0 |
| 62.5°  | 1457.4 | 2842.7 | 3146.6 | 1829.2 | 1574.8 |
| 65°    | 1242.5 | 2483.7 | 2384.7 | 1325.9 | 1140.8 |
| 67.5°  | 1014.9 | 2111.8 | 1759.9 | 966.9  | 848.2  |
| 70°    | 836.8  | 1767.0 | 1310.4 | 752.0  | 682.8  |
| 72.5°  | 654.5  | 1439.0 | 979.6  | 610.7  | 572.5  |
| 75°    | 500.4  | 1161.9 | 766.2  | 524.4  | 497.6  |
| 77.5°  | 368.9  | 918.8  | 616.3  | 463.7  | 438.2  |
| 80°    | 258.7  | 723.8  | 515.9  | 414.2  | 404.3  |
| 82.5°  | 173.8  | 559.8  | 439.6  | 394.4  | 395.8  |
| 85°    | 106.0  | 414.2  | 390.2  | 381.7  | 385.9  |
| 87.5°  | 50.9   | 294.0  | 335.0  | 347.8  | 352.0  |
| 90°    | 5.6    | 178.2  | 296.4  | 345.7  | 358.6  |
| 92.5°  | 14.2   | 152.0  | 286.2  | 347.9  | 365.8  |
| 95°    | 47.0   | 180.2  | 348.3  | 430.3  | 462.3  |
| 97.5°  | 227.0  | 314.6  | 444.6  | 536.3  | 568.1  |
| 100°   | 464.3  | 550.5  | 558.2  | 616.0  | 627.8  |
| 102.5° | 715.1  | 761.8  | 662.0  | 639.8  | 635.9  |
| 105°   | 841.5  | 876.2  | 836.2  | 660.6  | 622.6  |



TEST NUMBER: P828061

CATALOG NUMBER: OHBL-24SE-W-UNV-L935-CD-UPL24

**CANDELA DISTRIBUTION (continued):**

|        | 0°    | 22.5° | 45°   | 67.5° | 90°   |
|--------|-------|-------|-------|-------|-------|
| 112.5° | 681.8 | 717.3 | 763.3 | 763.9 | 740.1 |
| 115°   | 585.2 | 610.8 | 664.5 | 681.2 | 679.0 |
| 117.5° | 503.2 | 519.6 | 569.6 | 585.8 | 588.0 |
| 120°   | 418.2 | 438.7 | 487.2 | 500.0 | 496.4 |
| 122.5° | 352.4 | 369.5 | 412.7 | 426.5 | 422.9 |
| 125°   | 291.6 | 310.8 | 350.6 | 363.8 | 362.8 |
| 127.5° | 246.8 | 259.1 | 298.5 | 313.5 | 314.1 |
| 130°   | 216.0 | 222.7 | 256.4 | 271.4 | 275.1 |
| 132.5° | 192.7 | 198.5 | 224.1 | 241.6 | 243.6 |
| 135°   | 175.2 | 178.5 | 198.4 | 215.7 | 218.8 |
| 137.5° | 161.0 | 163.5 | 178.4 | 195.0 | 197.8 |
| 140°   | 148.5 | 151.8 | 161.7 | 177.4 | 179.7 |
| 142.5° | 139.1 | 141.0 | 148.6 | 161.5 | 162.9 |
| 145°   | 132.2 | 132.7 | 136.6 | 145.9 | 149.5 |
| 147.5° | 124.7 | 126.6 | 128.2 | 135.6 | 137.0 |
| 150°   | 118.8 | 120.5 | 120.2 | 123.8 | 127.5 |
| 152.5° | 113.0 | 114.7 | 114.3 | 115.2 | 118.0 |
| 155°   | 108.0 | 109.7 | 108.5 | 109.3 | 109.3 |
| 157.5° | 92.5  | 94.2  | 95.8  | 96.7  | 96.7  |
| 160°   | 89.2  | 90.0  | 91.7  | 92.5  | 92.5  |
| 162.5° | 85.8  | 86.7  | 87.5  | 88.3  | 88.3  |
| 165°   | 83.3  | 84.2  | 85.0  | 85.0  | 85.0  |
| 167.5° | 80.8  | 80.8  | 81.7  | 82.5  | 82.5  |
| 170°   | 78.3  | 79.2  | 79.2  | 80.0  | 80.0  |
| 172.5° | 76.7  | 77.5  | 77.5  | 77.5  | 78.3  |
| 175°   | 75.0  | 75.8  | 75.8  | 76.7  | 76.7  |
| 177.5° | 75.0  | 75.0  | 75.0  | 75.0  | 75.0  |
| 180°   | 75.0  | 75.0  | 75.0  | 75.0  | 75.0  |



Report Generated By 670246072 / DESKTOP-50001EG





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







|        |       |       |       |       |       |
|--------|-------|-------|-------|-------|-------|
| 107.5° | 846.2 | 886.3 | 896.2 | 750.2 | 651.4 |
| 110°   | 781.2 | 819.8 | 848.8 | 807.3 | 728.4 |



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

Report Prepared for

Cooper Lighting Solutions

METALUX

Report Number: SP1-2307-100-7

Test Date: 07/28/2023

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

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

### Test Information

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

LENS

### Spectral Parameters

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



### Test Conditions

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

REPORT NUMBER: SP1-2307-100-7

| Measurement and Test Equipment |                       |                  |                      |
|--------------------------------|-----------------------|------------------|----------------------|
| Instrument                     | Identification Number | Calibration Date | Calibration Due Date |
| Photometer                     | 76INCH SPHERE IN0058  | 2/9/2023         | 8/9/2023             |
| Power Meter                    | XITRON 2801 IN0071    | 11/29/2022       | 11/29/2023           |
| AC Power Source                | CHROMA 61603 IN0063   | 11/28/2022       | 11/28/2023           |
| DC Power Source                | AGILENT E3634A IN0208 | 11/28/2022       | 11/28/2023           |
| Sphere Thermometer             | ONSET IN0085          | 11/28/2022       | 11/28/2023           |
| Room Thermometer               | ONSET IN0046          | 11/28/2022       | 11/28/2023           |

REPORT NUMBER: SP1-2307-100-7

CIE 1931 Chromaticity Diagram



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



Point lies inside the ANSI 3500K 4-step quadrangle

REPORT NUMBER: SP1-2307-100-7

**Photopic Flux vs. Wavelength**



#####

| λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) |
|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|
| 360       | 5498             | NR               | 490       | 81900            | NR               | 620       | 217907           | NR               | 750       | 17550            | NR               | 880       | 6189             | NR               |
| 365       | 4903             | NR               | 495       | 90120            | NR               | 625       | 213734           | NR               | 755       | 15662            | NR               | 885       | 6187             | NR               |
| 370       | 4767             | NR               | 500       | 98453            | NR               | 630       | 206250           | NR               | 760       | 13792            | NR               | 890       | 3830             | NR               |
| 375       | 5225             | NR               | 505       | 109244           | NR               | 635       | 198796           | NR               | 765       | 12765            | NR               | 895       | 4688             | NR               |
| 380       | 5499             | NR               | 510       | 117784           | NR               | 640       | 189406           | NR               | 770       | 11372            | NR               | 900       | 4680             | NR               |
| 385       | 5081             | NR               | 515       | 125000           | NR               | 645       | 180677           | NR               | 775       | 9965             | NR               | 905       | 4599             | NR               |
| 390       | 4739             | NR               | 520       | 131786           | NR               | 650       | 168402           | NR               | 780       | 9154             | NR               | 910       | 4495             | NR               |
| 395       | 4255             | NR               | 525       | 136796           | NR               | 655       | 157693           | NR               | 785       | 8847             | NR               | 915       | 3983             | NR               |
| 400       | 3864             | NR               | 530       | 142357           | NR               | 660       | 145357           | NR               | 790       | 7937             | NR               | 920       | 4675             | NR               |
| 405       | 3583             | NR               | 535       | 147243           | NR               | 665       | 132743           | NR               | 795       | 6956             | NR               | 925       | 4952             | NR               |
| 410       | 3994             | NR               | 540       | 152273           | NR               | 670       | 120757           | NR               | 800       | 6970             | NR               | 930       | 6097             | NR               |
| 415       | 5055             | NR               | 545       | 157222           | NR               | 675       | 108421           | NR               | 805       | 6299             | NR               | 935       | 5657             | NR               |
| 420       | 7131             | NR               | 550       | 161271           | NR               | 680       | 97325            | NR               | 810       | 6023             | NR               | 940       | 4574             | NR               |
| 425       | 11311            | NR               | 555       | 167038           | NR               | 685       | 86839            | NR               | 815       | 6343             | NR               | 945       | 5252             | NR               |
| 430       | 17754            | NR               | 560       | 173115           | NR               | 690       | 76248            | NR               | 820       | 6462             | NR               | 950       | 5635             | NR               |
| 435       | 28634            | NR               | 565       | 178502           | NR               | 695       | 67406            | NR               | 825       | 5476             | NR               | 955       | 4501             | NR               |
| 440       | 46392            | NR               | 570       | 184331           | NR               | 700       | 60039            | NR               | 830       | 5786             | NR               | 960       | 2938             | NR               |
| 445       | 78344            | NR               | 575       | 189666           | NR               | 705       | 53650            | NR               | 835       | 5884             | NR               | 965       | 5544             | NR               |
| 450       | 131219           | NR               | 580       | 196488           | NR               | 710       | 47273            | NR               | 840       | 4862             | NR               | 970       | 5050             | NR               |
| 455       | 170311           | NR               | 585       | 202769           | NR               | 715       | 41664            | NR               | 845       | 5651             | NR               | 975       | 5575             | NR               |
| 460       | 154269           | NR               | 590       | 207213           | NR               | 720       | 37083            | NR               | 850       | 5178             | NR               | 980       | 2973             | NR               |
| 465       | 126622           | NR               | 595       | 213472           | NR               | 725       | 32494            | NR               | 855       | 5510             | NR               | 985       | 4912             | NR               |
| 470       | 109065           | NR               | 600       | 218473           | NR               | 730       | 28665            | NR               | 860       | 5438             | NR               | 990       | 5454             | NR               |
| 475       | 91762            | NR               | 605       | 220737           | NR               | 735       | 25540            | NR               | 865       | 5848             | NR               | 995       | 6068             | NR               |
| 480       | 78213            | NR               | 610       | 221090           | NR               | 740       | 22878            | NR               | 870       | 4969             | NR               | 1000      | 9406             | NR               |
| 485       | 77035            | NR               | 615       | 220059           | NR               | 745       | 20304            | NR               | 875       | 5438             | NR               |           |                  |                  |

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Scotopic Flux vs. Wavelength



Scotopic Lumens: 19629.6

S/P: 1.6

| λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) |
|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|
| 360       | 5498             | NR               | 490       | 81900            | NR               | 620       | 217907           | NR               | 750       | 17550            | NR               | 880       | 6189             | NR               |
| 365       | 4903             | NR               | 495       | 90120            | NR               | 625       | 213734           | NR               | 755       | 15662            | NR               | 885       | 6187             | NR               |
| 370       | 4767             | NR               | 500       | 98453            | NR               | 630       | 206250           | NR               | 760       | 13792            | NR               | 890       | 3830             | NR               |
| 375       | 5225             | NR               | 505       | 109244           | NR               | 635       | 198796           | NR               | 765       | 12765            | NR               | 895       | 4688             | NR               |
| 380       | 5499             | NR               | 510       | 117784           | NR               | 640       | 189406           | NR               | 770       | 11372            | NR               | 900       | 4680             | NR               |
| 385       | 5081             | NR               | 515       | 125000           | NR               | 645       | 180677           | NR               | 775       | 9965             | NR               | 905       | 4599             | NR               |
| 390       | 4739             | NR               | 520       | 131786           | NR               | 650       | 168402           | NR               | 780       | 9154             | NR               | 910       | 4495             | NR               |
| 395       | 4255             | NR               | 525       | 136796           | NR               | 655       | 157693           | NR               | 785       | 8847             | NR               | 915       | 3983             | NR               |
| 400       | 3864             | NR               | 530       | 142357           | NR               | 660       | 145357           | NR               | 790       | 7937             | NR               | 920       | 4675             | NR               |
| 405       | 3583             | NR               | 535       | 147243           | NR               | 665       | 132743           | NR               | 795       | 6956             | NR               | 925       | 4952             | NR               |
| 410       | 3994             | NR               | 540       | 152273           | NR               | 670       | 120757           | NR               | 800       | 6970             | NR               | 930       | 6097             | NR               |
| 415       | 5055             | NR               | 545       | 157222           | NR               | 675       | 108421           | NR               | 805       | 6299             | NR               | 935       | 5657             | NR               |
| 420       | 7131             | NR               | 550       | 161271           | NR               | 680       | 97325            | NR               | 810       | 6023             | NR               | 940       | 4574             | NR               |
| 425       | 11311            | NR               | 555       | 167038           | NR               | 685       | 86839            | NR               | 815       | 6343             | NR               | 945       | 5252             | NR               |
| 430       | 17754            | NR               | 560       | 173115           | NR               | 690       | 76248            | NR               | 820       | 6462             | NR               | 950       | 5635             | NR               |
| 435       | 28634            | NR               | 565       | 178502           | NR               | 695       | 67406            | NR               | 825       | 5476             | NR               | 955       | 4501             | NR               |
| 440       | 46392            | NR               | 570       | 184331           | NR               | 700       | 60039            | NR               | 830       | 5786             | NR               | 960       | 2938             | NR               |
| 445       | 78344            | NR               | 575       | 189666           | NR               | 705       | 53650            | NR               | 835       | 5884             | NR               | 965       | 5544             | NR               |
| 450       | 131219           | NR               | 580       | 196488           | NR               | 710       | 47273            | NR               | 840       | 4862             | NR               | 970       | 5050             | NR               |
| 455       | 170311           | NR               | 585       | 202769           | NR               | 715       | 41664            | NR               | 845       | 5651             | NR               | 975       | 5575             | NR               |
| 460       | 154269           | NR               | 590       | 207213           | NR               | 720       | 37083            | NR               | 850       | 5178             | NR               | 980       | 2973             | NR               |
| 465       | 126622           | NR               | 595       | 213472           | NR               | 725       | 32494            | NR               | 855       | 5510             | NR               | 985       | 4912             | NR               |
| 470       | 109065           | NR               | 600       | 218473           | NR               | 730       | 28665            | NR               | 860       | 5438             | NR               | 990       | 5454             | NR               |
| 475       | 91762            | NR               | 605       | 220737           | NR               | 735       | 25540            | NR               | 865       | 5848             | NR               | 995       | 6068             | NR               |
| 480       | 78213            | NR               | 610       | 221090           | NR               | 740       | 22878            | NR               | 870       | 4969             | NR               | 1000      | 9406             | NR               |
| 485       | 77035            | NR               | 615       | 220059           | NR               | 745       | 20304            | NR               | 875       | 5438             | NR               |           |                  |                  |

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**Melanopic Flux vs. Wavelength**



**Melanopic Lumens: 7912.5**

**M/P: 0.65**

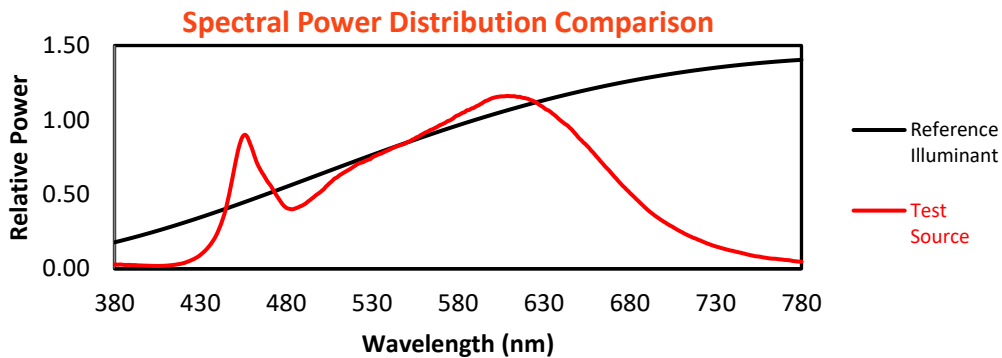
| λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) |
|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|
| 360       | 5498             | NR               | 490       | 81900            | NR               | 620       | 217907           | NR               | 750       | 17550            | NR               | 880       | 6189             | NR               |
| 365       | 4903             | NR               | 495       | 90120            | NR               | 625       | 213734           | NR               | 755       | 15662            | NR               | 885       | 6187             | NR               |
| 370       | 4767             | NR               | 500       | 98453            | NR               | 630       | 206250           | NR               | 760       | 13792            | NR               | 890       | 3830             | NR               |
| 375       | 5225             | NR               | 505       | 109244           | NR               | 635       | 198796           | NR               | 765       | 12765            | NR               | 895       | 4688             | NR               |
| 380       | 5499             | NR               | 510       | 117784           | NR               | 640       | 189406           | NR               | 770       | 11372            | NR               | 900       | 4680             | NR               |
| 385       | 5081             | NR               | 515       | 125000           | NR               | 645       | 180677           | NR               | 775       | 9965             | NR               | 905       | 4599             | NR               |
| 390       | 4739             | NR               | 520       | 131786           | NR               | 650       | 168402           | NR               | 780       | 9154             | NR               | 910       | 4495             | NR               |
| 395       | 4255             | NR               | 525       | 136796           | NR               | 655       | 157693           | NR               | 785       | 8847             | NR               | 915       | 3983             | NR               |
| 400       | 3864             | NR               | 530       | 142357           | NR               | 660       | 145357           | NR               | 790       | 7937             | NR               | 920       | 4675             | NR               |
| 405       | 3583             | NR               | 535       | 147243           | NR               | 665       | 132743           | NR               | 795       | 6956             | NR               | 925       | 4952             | NR               |
| 410       | 3994             | NR               | 540       | 152273           | NR               | 670       | 120757           | NR               | 800       | 6970             | NR               | 930       | 6097             | NR               |
| 415       | 5055             | NR               | 545       | 157222           | NR               | 675       | 108421           | NR               | 805       | 6299             | NR               | 935       | 5657             | NR               |
| 420       | 7131             | NR               | 550       | 161271           | NR               | 680       | 97325            | NR               | 810       | 6023             | NR               | 940       | 4574             | NR               |
| 425       | 11311            | NR               | 555       | 167038           | NR               | 685       | 86839            | NR               | 815       | 6343             | NR               | 945       | 5252             | NR               |
| 430       | 17754            | NR               | 560       | 173115           | NR               | 690       | 76248            | NR               | 820       | 6462             | NR               | 950       | 5635             | NR               |
| 435       | 28634            | NR               | 565       | 178502           | NR               | 695       | 67406            | NR               | 825       | 5476             | NR               | 955       | 4501             | NR               |
| 440       | 46392            | NR               | 570       | 184331           | NR               | 700       | 60039            | NR               | 830       | 5786             | NR               | 960       | 2938             | NR               |
| 445       | 78344            | NR               | 575       | 189666           | NR               | 705       | 53650            | NR               | 835       | 5884             | NR               | 965       | 5544             | NR               |
| 450       | 131219           | NR               | 580       | 196488           | NR               | 710       | 47273            | NR               | 840       | 4862             | NR               | 970       | 5050             | NR               |
| 455       | 170311           | NR               | 585       | 202769           | NR               | 715       | 41664            | NR               | 845       | 5651             | NR               | 975       | 5575             | NR               |
| 460       | 154269           | NR               | 590       | 207213           | NR               | 720       | 37083            | NR               | 850       | 5178             | NR               | 980       | 2973             | NR               |
| 465       | 126622           | NR               | 595       | 213472           | NR               | 725       | 32494            | NR               | 855       | 5510             | NR               | 985       | 4912             | NR               |
| 470       | 109065           | NR               | 600       | 218473           | NR               | 730       | 28665            | NR               | 860       | 5438             | NR               | 990       | 5454             | NR               |
| 475       | 91762            | NR               | 605       | 220737           | NR               | 735       | 25540            | NR               | 865       | 5848             | NR               | 995       | 6068             | NR               |
| 480       | 78213            | NR               | 610       | 221090           | NR               | 740       | 22878            | NR               | 870       | 4969             | NR               | 1000      | 9406             | NR               |
| 485       | 77035            | NR               | 615       | 220059           | NR               | 745       | 20304            | NR               | 875       | 5438             | NR               |           |                  |                  |

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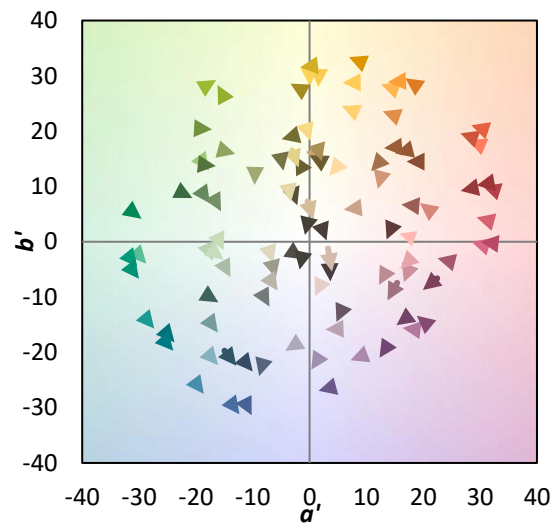
**TM-30-18**

**Summary**

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



**Color Vector Graphics**



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

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



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**TM-30-18**

**Color Rendition by Hue-Angle Bin**



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**Measure Comparisons**



(END OF REPORT)