

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: P827994

Luminaire Tested: **OHBL-18HE-MCL-UNV-L935-CD-UPL12**

Issue Date: 5/3/2024



**Test Information**

Test Method: LM-79-08  
Report Number: P827994  
REPORT IS A COMBINATION OF REPORTS P826060 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-18HE-MCL-UNV-L935-CD-UPL12  
Description:  
Light Source: -  
Ballast/Driver: -

**Summary**

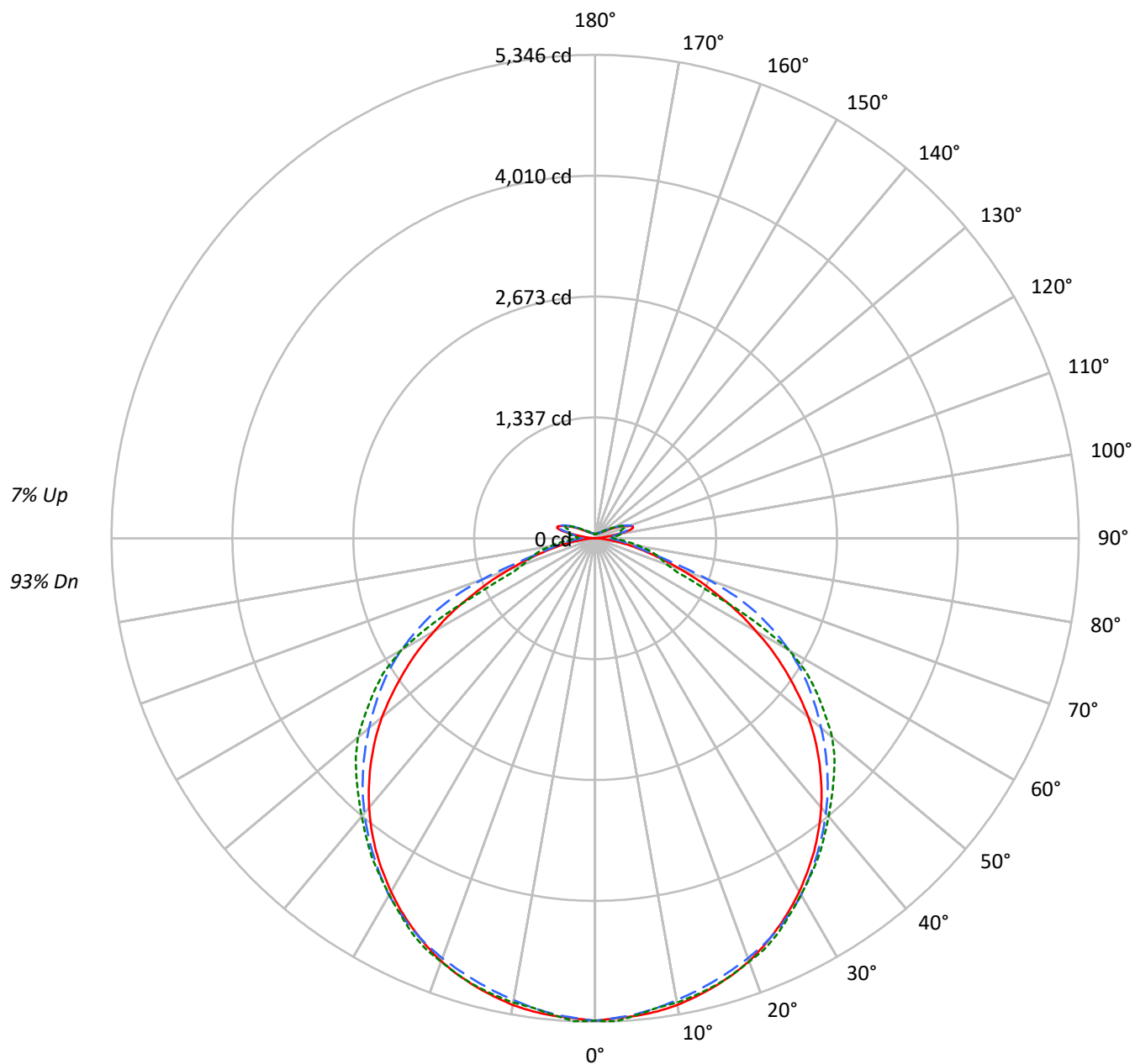
Lumens per Lamp: N/A  
Luminaire Lumens: 16117.0 lumens  
Efficiency: N/A  
Efficacy: 144.7 lumens/watt  
Spacing Criteria (0/90/45): 1.26 / 1.27 / 1.39  
Luminous Opening: Rectangular w/ Sides (W: 3.78' x L: 1.67' x H: 0.17')  
CIE Type: Direct

Input Watts (W): 111.4  
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: P827994

CATALOG NUMBER: OHBL-18HE-MCL-UNV-L935-CD-UPL12

### Luminous Intensity Polar Plot





TEST NUMBER: P827994

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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  | 48  | 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°  | 9112 | 9112 | 9112 |
| 5°  | 9009 | 8976 | 9037 |
| 10° | 8932 | 8836 | 8974 |
| 15° | 8831 | 8730 | 8953 |
| 20° | 8730 | 8662 | 8913 |
| 25° | 8578 | 8593 | 8876 |
| 30° | 8416 | 8487 | 8752 |
| 35° | 8228 | 8322 | 8706 |
| 40° | 7997 | 8150 | 8631 |
| 45° | 7695 | 7953 | 8634 |
| 50° | 7304 | 7728 | 8635 |
| 55° | 6719 | 7506 | 8394 |
| 60° | 5977 | 7183 | 7854 |
| 65° | 5036 | 6591 | 5056 |
| 70° | 3958 | 5134 | 3745 |
| 75° | 2862 | 3039 | 3926 |
| 80° | 1873 | 2515 | 3957 |
| 85° | 938  | 2283 | 4161 |



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**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 503.0   | 3.1       |
| 10°-20°   | 1442.5  | 9.0       |
| 20°-30°   | 2203.1  | 13.7      |
| 30°-40°   | 2673.2  | 16.6      |
| 40°-50°   | 2801.7  | 17.4      |
| 50°-60°   | 2538.8  | 15.8      |
| 60°-70°   | 1702.1  | 10.6      |
| 70°-80°   | 764.4   | 4.7       |
| 80°-90°   | 280.0   | 1.7       |
| 90°-100°  | 182.6   | 1.1       |
| 100°-110° | 384.3   | 2.4       |
| 110°-120° | 316.0   | 2.0       |
| 120°-130° | 152.9   | 0.9       |
| 130°-140° | 78.5    | 0.5       |
| 140°-150° | 46.4    | 0.3       |
| 150°-160° | 27.9    | 0.2       |
| 160°-170° | 14.9    | 0.1       |
| 170°-180° | 4.6     | 0.0       |
| <hr/>     |         |           |
| 0°-30°    | 4148.7  | 25.7      |
| 0°-40°    | 6821.8  | 42.3      |
| 0°-60°    | 12162.3 | 75.5      |
| 0°-90°    | 14908.8 | 92.5      |
| 90°-120°  | 883.0   | 5.5       |
| 90°-150°  | 1160.8  | 7.2       |
| 90°-180°  | 1208.0  | 7.5       |
| 0°-180°   | 16117.0 | 100.0     |

**CANDELA DISTRIBUTION:**

|      | 0°   | 22.5° | 45°  | 67.5° | 90°  | Flux |
|------|------|-------|------|-------|------|------|
| 0°   | 5335 | 5335  | 5335 | 5335  | 5335 |      |
| 5°   | 5300 | 5319  | 5282 | 5298  | 5291 | 504  |
| 15°  | 5128 | 5108  | 5072 | 5117  | 5123 | 1448 |
| 25°  | 4764 | 4743  | 4776 | 4820  | 4807 | 2196 |
| 35°  | 4223 | 4233  | 4276 | 4321  | 4304 | 2639 |
| 45°  | 3504 | 3562  | 3628 | 3720  | 3732 | 2700 |
| 55°  | 2579 | 2703  | 2887 | 3003  | 2996 | 2302 |
| 65°  | 1514 | 1750  | 1987 | 1677  | 1369 | 1508 |
| 75°  | 596  | 864   | 636  | 650   | 693  | 651  |
| 85°  | 103  | 197   | 252  | 305   | 319  | 125  |
| 90°  | 3    | 81    | 150  | 189   | 200  | 8    |
| 95°  | 22   | 89    | 161  | 205   | 224  | 69   |
| 105° | 434  | 444   | 407  | 311   | 292  | 411  |
| 115° | 306  | 309   | 323  | 327   | 323  | 306  |
| 125° | 152  | 159   | 170  | 170   | 172  | 142  |
| 135° | 92   | 95    | 99   | 104   | 105  | 73   |
| 145° | 69   | 72    | 73   | 74    | 76   | 44   |
| 155° | 58   | 59    | 60   | 61    | 60   | 27   |
| 165° | 52   | 52    | 53   | 53    | 53   | 15   |
| 175° | 48   | 48    | 47   | 46    | 46   | 5    |
| 180° | 46   | 46    | 46   | 46    | 46   |      |



TEST NUMBER: P827994

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**CANDELA DISTRIBUTION (FULL):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 0°     | 5335.0 | 5335.0 | 5335.0 | 5335.0 | 5335.0 |
| 2.5°   | 5313.4 | 5335.8 | 5308.0 | 5338.1 | 5345.8 |
| 5°     | 5300.3 | 5318.8 | 5281.8 | 5298.0 | 5291.1 |
| 7.5°   | 5276.4 | 5282.6 | 5238.6 | 5251.8 | 5237.8 |
| 10°    | 5240.9 | 5237.8 | 5186.2 | 5211.6 | 5214.7 |
| 12.5°  | 5188.4 | 5179.2 | 5132.9 | 5171.5 | 5172.2 |
| 15°    | 5128.2 | 5108.2 | 5072.0 | 5116.8 | 5122.9 |
| 17.5°  | 5058.8 | 5032.7 | 5008.8 | 5066.6 | 5057.3 |
| 20°    | 4977.8 | 4947.0 | 4942.4 | 5005.7 | 4982.5 |
| 22.5°  | 4877.6 | 4853.7 | 4864.5 | 4924.7 | 4910.0 |
| 25°    | 4764.2 | 4743.3 | 4776.5 | 4820.5 | 4806.6 |
| 27.5°  | 4644.6 | 4632.2 | 4670.1 | 4704.0 | 4677.0 |
| 30°    | 4513.5 | 4506.5 | 4556.7 | 4584.4 | 4550.5 |
| 32.5°  | 4370.8 | 4373.1 | 4420.9 | 4458.7 | 4427.1 |
| 35°    | 4222.7 | 4232.7 | 4275.9 | 4321.4 | 4304.4 |
| 37.5°  | 4059.9 | 4082.2 | 4125.5 | 4177.2 | 4159.4 |
| 40°    | 3887.8 | 3920.3 | 3968.1 | 4030.6 | 4014.4 |
| 42.5°  | 3702.0 | 3742.8 | 3804.6 | 3874.0 | 3872.4 |
| 45°    | 3504.5 | 3561.6 | 3627.9 | 3720.5 | 3732.1 |
| 47.5°  | 3299.2 | 3363.3 | 3447.4 | 3570.8 | 3588.6 |
| 50°    | 3076.3 | 3156.6 | 3261.5 | 3409.6 | 3420.4 |
| 52.5°  | 2828.0 | 2937.5 | 3076.3 | 3218.3 | 3205.2 |
| 55°    | 2578.8 | 2703.0 | 2887.3 | 3003.1 | 2996.2 |
| 57.5°  | 2330.4 | 2470.0 | 2693.8 | 2776.2 | 2775.5 |
| 60°    | 2052.7 | 2229.3 | 2473.9 | 2536.3 | 2474.7 |
| 62.5°  | 1795.8 | 1985.6 | 2239.4 | 2193.8 | 1982.5 |
| 65°    | 1513.5 | 1750.3 | 1987.2 | 1677.0 | 1369.2 |
| 67.5°  | 1262.8 | 1509.7 | 1687.8 | 1148.6 | 983.5  |
| 70°    | 1010.5 | 1282.8 | 1316.0 | 852.4  | 840.8  |
| 72.5°  | 786.8  | 1076.9 | 907.9  | 729.8  | 766.8  |
| 75°    | 595.5  | 864.0  | 635.7  | 650.3  | 692.8  |
| 77.5°  | 434.3  | 663.4  | 494.5  | 570.1  | 604.8  |
| 80°    | 298.5  | 469.8  | 403.4  | 479.0  | 502.9  |
| 82.5°  | 187.4  | 310.1  | 323.2  | 385.7  | 410.4  |
| 85°    | 102.6  | 196.7  | 252.2  | 304.7  | 319.3  |
| 87.5°  | 42.4   | 118.8  | 192.8  | 235.3  | 247.6  |
| 90°    | 3.2    | 80.6   | 150.3  | 189.3  | 200.4  |
| 92.5°  | 8.2    | 69.3   | 138.1  | 176.9  | 186.5  |
| 95°    | 21.6   | 89.2   | 161.2  | 205.4  | 223.5  |
| 97.5°  | 114.1  | 154.9  | 213.2  | 253.6  | 265.0  |
| 100°   | 232.3  | 274.5  | 268.3  | 290.6  | 297.1  |
| 102.5° | 368.9  | 382.4  | 315.8  | 301.6  | 299.8  |
| 105°   | 433.9  | 443.6  | 407.3  | 310.8  | 292.2  |



TEST NUMBER: P827994

CATALOG NUMBER: OHBL-18HE-MCL-UNV-L935-CD-UPL12

**CANDELA DISTRIBUTION (continued):**

|        | 0°    | 22.5° | 45°   | 67.5° | 90°   |
|--------|-------|-------|-------|-------|-------|
| 112.5° | 353.8 | 361.7 | 374.6 | 368.2 | 355.6 |
| 115°   | 306.2 | 309.3 | 323.2 | 326.9 | 323.4 |
| 117.5° | 257.8 | 262.8 | 276.8 | 278.9 | 278.8 |
| 120°   | 217.0 | 222.8 | 234.5 | 235.0 | 235.8 |
| 122.5° | 183.7 | 187.8 | 198.8 | 200.2 | 201.8 |
| 125°   | 152.1 | 158.7 | 169.8 | 170.3 | 172.0 |
| 127.5° | 128.7 | 133.7 | 145.7 | 147.2 | 147.9 |
| 130°   | 112.8 | 116.9 | 125.0 | 128.9 | 128.9 |
| 132.5° | 101.9 | 105.2 | 110.8 | 114.8 | 115.6 |
| 135°   | 91.9  | 95.2  | 99.3  | 104.0 | 104.8 |
| 137.5° | 86.1  | 87.8  | 90.2  | 94.9  | 96.5  |
| 140°   | 79.4  | 81.9  | 82.8  | 86.7  | 87.5  |
| 142.5° | 73.6  | 76.1  | 76.9  | 80.1  | 81.7  |
| 145°   | 69.4  | 71.9  | 72.8  | 74.3  | 75.9  |
| 147.5° | 66.1  | 67.8  | 69.4  | 69.4  | 71.0  |
| 150°   | 63.6  | 64.4  | 65.2  | 66.1  | 66.1  |
| 152.5° | 60.2  | 61.1  | 61.9  | 62.8  | 62.8  |
| 155°   | 57.8  | 59.3  | 60.2  | 61.0  | 60.2  |
| 157.5° | 55.2  | 57.7  | 57.7  | 58.5  | 58.5  |
| 160°   | 53.6  | 55.2  | 56.0  | 56.0  | 56.0  |
| 162.5° | 52.7  | 53.5  | 53.5  | 54.3  | 54.3  |
| 165°   | 51.8  | 51.8  | 52.7  | 52.7  | 52.7  |
| 167.5° | 50.2  | 50.9  | 51.0  | 51.0  | 51.0  |
| 170°   | 49.3  | 49.3  | 49.3  | 49.4  | 49.4  |
| 172.5° | 48.5  | 48.5  | 48.5  | 47.8  | 47.8  |
| 175°   | 47.7  | 47.7  | 46.9  | 46.1  | 46.1  |
| 177.5° | 47.6  | 47.7  | 46.9  | 46.1  | 45.3  |
| 180°   | 46.1  | 46.1  | 46.1  | 46.1  | 46.1  |



Report Generated By 670246072 / DESKTOP-50001EG





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







|        |       |       |       |       |       |
|--------|-------|-------|-------|-------|-------|
| 107.5° | 437.2 | 449.7 | 438.7 | 356.3 | 304.6 |
| 110°   | 401.3 | 414.8 | 415.8 | 388.6 | 347.6 |



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

Report Prepared for

Cooper Lighting Solutions

METALUX

Report Number: SP1-2307-100-7

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



Point lies inside the ANSI 3500K 4-step quadrangle

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**Photopic Flux vs. Wavelength**



#####

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

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Scotopic Flux vs. Wavelength



Scotopic Lumens: 19629.6

S/P: 1.6

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

REPORT NUMBER: SP1-2307-100-7

**Melanopic Flux vs. Wavelength**



**Melanopic Lumens: 7912.5**

**M/P: 0.65**

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

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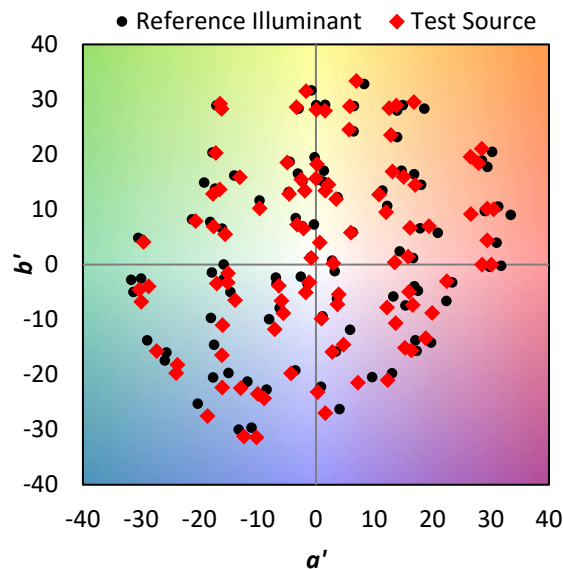
**TM-30-18**

**Summary**

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



**Color Vector Graphics**



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

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



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**Color Rendition by Hue-Angle Bin**



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**Measure Comparisons**



(END OF REPORT)