

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: P828082

Luminaire Tested: **OHBL-30SE-N-UNV-L935-CD-UPL30**

Issue Date: 5/3/2024



**Test Information**

Test Method: LM-79-08  
Report Number: P828082  
REPORT IS A COMBINATION OF REPORTS P826284 AND G3-2310-221-4  
Test Lab: INNOVATION CENTER  
Issue Date: 5/3/2024  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: METALUX  
Catalog Number: OHBL-30SE-N-UNV-L935-CD-UPL30  
Description:  
Light Source: -  
Ballast/Driver: -

**Summary**

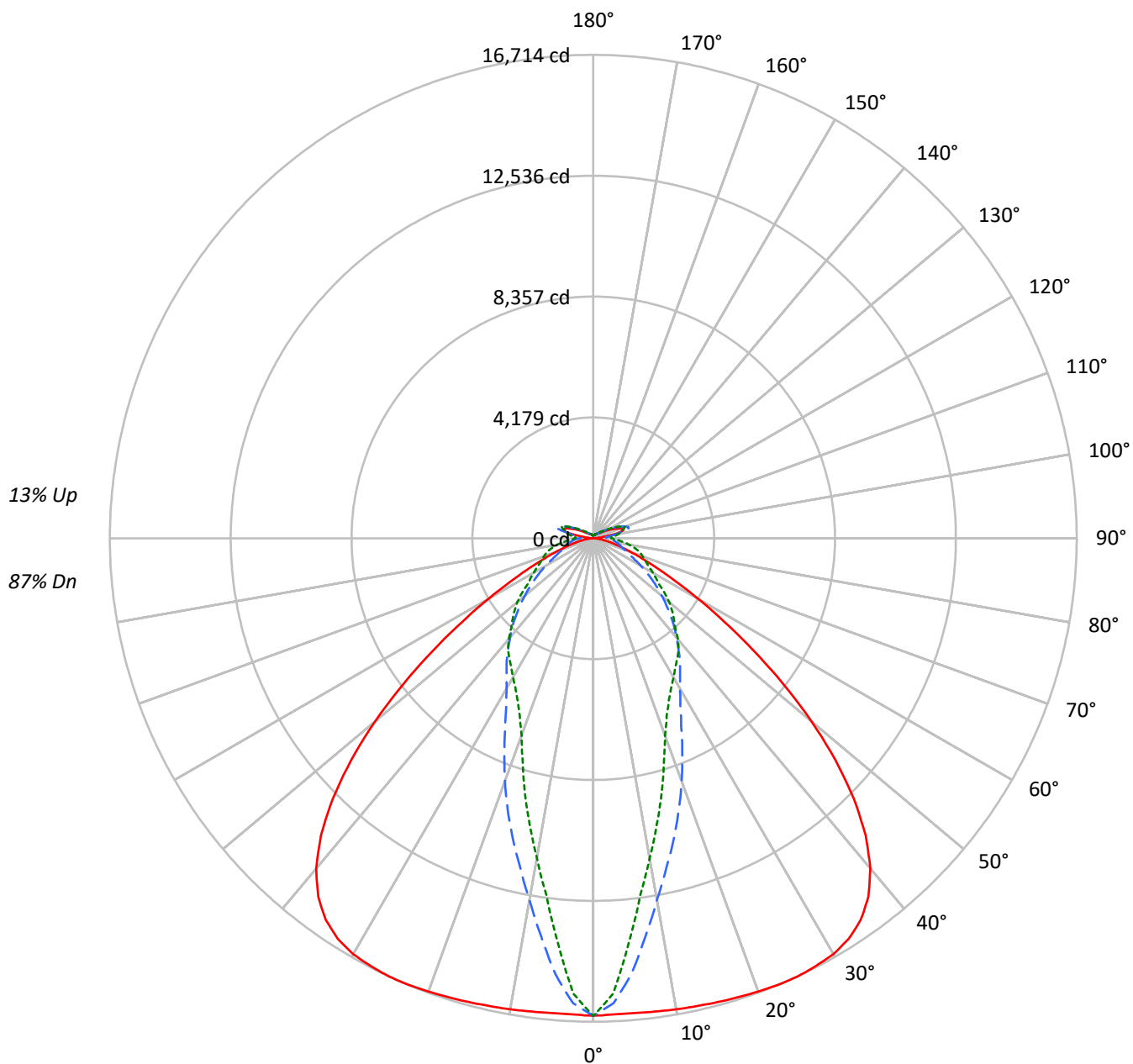
Lumens per Lamp: N/A  
Luminaire Lumens: 26920.8 lumens  
Efficiency: N/A  
Efficacy: 136.5 lumens/watt  
Spacing Criteria (0/90/45): 1.47 / 0.53 / 0.78  
Luminous Opening: Rectangular w/ Sides (W: 3.78' x L: 1.67' x H: 0.17')  
CIE Type: Semi-Direct

Input Watts (W): 197.2  
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: P828082

CATALOG NUMBER: OHBL-30SE-N-UNV-L935-CD-UPL30

### Luminous Intensity Polar Plot





TEST NUMBER: P828082

CATALOG NUMBER: OHBL-30SE-N-UNV-L935-CD-UPL30

**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 | 112 | 112 | 112 | 112 | 104 | 104 | 104 | 97 | 97 | 97 | 91 | 91 | 91 | 87 |    |    |
| 1   | 107 | 102 | 98  | 95  | 103 | 99  | 95  | 92  | 92  | 89  | 87  | 86 | 84 | 82 | 81 | 79 | 77 | 75 |    |    |
| 2   | 98  | 91  | 84  | 79  | 94  | 88  | 82  | 77  | 82  | 78  | 74  | 77 | 73 | 70 | 72 | 70 | 67 | 64 |    |    |
| 3   | 90  | 81  | 74  | 68  | 87  | 78  | 72  | 66  | 74  | 68  | 64  | 69 | 65 | 61 | 65 | 62 | 58 | 56 |    |    |
| 4   | 83  | 73  | 65  | 59  | 80  | 71  | 63  | 58  | 67  | 60  | 56  | 63 | 58 | 54 | 59 | 55 | 52 | 49 |    |    |
| 5   | 77  | 66  | 58  | 52  | 75  | 64  | 56  | 51  | 60  | 54  | 49  | 57 | 52 | 47 | 54 | 50 | 46 | 44 |    |    |
| 6   | 72  | 60  | 52  | 46  | 69  | 58  | 51  | 45  | 55  | 49  | 44  | 52 | 47 | 43 | 50 | 45 | 41 | 39 |    |    |
| 7   | 67  | 55  | 47  | 41  | 65  | 53  | 46  | 41  | 51  | 44  | 40  | 48 | 43 | 38 | 46 | 41 | 37 | 35 |    |    |
| 8   | 63  | 50  | 43  | 37  | 61  | 49  | 42  | 37  | 47  | 40  | 36  | 45 | 39 | 35 | 43 | 38 | 34 | 32 |    |    |
| 9   | 59  | 47  | 39  | 34  | 57  | 46  | 38  | 34  | 44  | 37  | 33  | 42 | 36 | 32 | 40 | 35 | 31 | 29 |    |    |
| 10  | 55  | 43  | 36  | 31  | 54  | 42  | 35  | 31  | 41  | 34  | 30  | 39 | 33 | 29 | 37 | 32 | 29 | 27 |    |    |

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

|     | 0°    | 45°   | 90°   |
|-----|-------|-------|-------|
| 0°  | 28200 | 28200 | 28200 |
| 5°  | 28006 | 25681 | 23994 |
| 10° | 28185 | 21632 | 19333 |
| 15° | 28593 | 18501 | 15947 |
| 20° | 29245 | 15643 | 12965 |
| 25° | 30094 | 12948 | 11421 |
| 30° | 30955 | 11155 | 10672 |
| 35° | 31401 | 10166 | 10231 |
| 40° | 30650 | 9183  | 9775  |
| 45° | 27974 | 8298  | 9121  |
| 50° | 23385 | 7331  | 8640  |
| 55° | 17573 | 6422  | 7774  |
| 60° | 12147 | 5507  | 7546  |
| 65° | 8027  | 4743  | 7520  |
| 70° | 5350  | 4451  | 8085  |
| 75° | 3579  | 4591  | 8958  |
| 80° | 2318  | 5084  | 9806  |
| 85° | 1192  | 6359  | 11692 |



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CATALOG NUMBER: OHBL-30SE-N-UNV-L935-CD-UPL30

**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 1389.9  | 5.2       |
| 10°-20°   | 3269.6  | 12.1      |
| 20°-30°   | 4098.4  | 15.2      |
| 30°-40°   | 4348.8  | 16.2      |
| 40°-50°   | 3932.0  | 14.6      |
| 50°-60°   | 2851.0  | 10.6      |
| 60°-70°   | 1789.1  | 6.6       |
| 70°-80°   | 1184.0  | 4.4       |
| 80°-90°   | 687.5   | 2.6       |
| 90°-100°  | 527.7   | 2.0       |
| 100°-110° | 1120.0  | 4.2       |
| 110°-120° | 875.0   | 3.3       |
| 120°-130° | 414.7   | 1.5       |
| 130°-140° | 206.0   | 0.8       |
| 140°-150° | 119.2   | 0.4       |
| 150°-160° | 67.3    | 0.3       |
| 160°-170° | 31.1    | 0.1       |
| 170°-180° | 9.5     | 0.0       |
| 0°-30°    | 8757.8  | 32.5      |
| 0°-40°    | 13106.7 | 48.7      |
| 0°-60°    | 19889.7 | 73.9      |
| 0°-90°    | 23550.4 | 87.5      |
| 90°-120°  | 2522.7  | 9.4       |
| 90°-150°  | 3262.6  | 12.1      |
| 90°-180°  | 3370.0  | 12.5      |
| 0°-180°   | 26920.8 | 100.0     |

**CANDELA DISTRIBUTION:**

|      | 0°    | 22.5° | 45°   | 67.5° | 90°   | Flux  |
|------|-------|-------|-------|-------|-------|-------|
| 0°   | 16511 | 16511 | 16511 | 16511 | 16511 |       |
| 5°   | 16478 | 16055 | 15112 | 14411 | 14048 | ###   |
| 15°  | 16604 | 13533 | 10748 | 9559  | 9125  | 4709  |
| 25°  | 16714 | 10464 | 7197  | 6388  | 6185  | 7721  |
| 35°  | 16115 | 6957  | 5223  | 5060  | 5058  | 10018 |
| 45°  | 12739 | 4406  | 3786  | 3877  | 3943  | 9705  |
| 55°  | 6744  | 2731  | 2470  | 2679  | 2775  | 6094  |
| 65°  | 2412  | 1584  | 1430  | 1832  | 2037  | 2510  |
| 75°  | 745   | 853   | 960   | 1491  | 1581  | 830   |
| 85°  | 130   | 354   | 702   | 977   | 897   | 156   |
| 90°  | 6     | 182   | 452   | 624   | 629   | 12    |
| 95°  | 54    | 200   | 475   | 635   | 668   | 177   |
| 105° | 1077  | 1142  | 1251  | 1089  | 1009  | 1018  |
| 115° | 752   | 784   | 910   | 958   | 947   | 754   |
| 125° | 380   | 398   | 472   | 486   | 479   | 354   |
| 135° | 228   | 236   | 261   | 287   | 287   | 180   |
| 145° | 174   | 178   | 185   | 200   | 198   | 110   |
| 155° | 143   | 150   | 154   | 157   | 154   | 64    |
| 165° | 107   | 108   | 108   | 110   | 110   | 31    |
| 175° | 97    | 98    | 98    | 98    | 98    | 9     |
| 180° | 96    | 96    | 96    | 96    | 96    |       |



TEST NUMBER: P828082

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**CANDELA DISTRIBUTION (FULL):**

|        | 0°      | 22.5°   | 45°     | 67.5°   | 90°     |
|--------|---------|---------|---------|---------|---------|
| 0°     | 16510.8 | 16510.8 | 16510.8 | 16510.8 | 16510.8 |
| 2.5°   | 16476.2 | 16382.0 | 16088.2 | 15909.0 | 15758.2 |
| 5°     | 16477.8 | 16055.2 | 15112.3 | 14411.4 | 14048.4 |
| 7.5°   | 16501.4 | 15561.8 | 13863.0 | 12840.0 | 12440.9 |
| 10°    | 16537.6 | 14950.4 | 12697.0 | 11606.5 | 11234.0 |
| 12.5°  | 16564.2 | 14262.2 | 11670.9 | 10550.5 | 10141.9 |
| 15°    | 16603.6 | 13533.0 | 10748.5 | 9558.9  | 9125.2  |
| 17.5°  | 16639.7 | 12846.3 | 9837.1  | 8594.1  | 8111.7  |
| 20°    | 16675.8 | 12106.2 | 8925.7  | 7644.9  | 7247.3  |
| 22.5°  | 16710.4 | 11325.2 | 8036.2  | 6907.9  | 6636.1  |
| 25°    | 16713.6 | 10464.1 | 7197.1  | 6387.8  | 6185.1  |
| 27.5°  | 16672.7 | 9571.5  | 6516.7  | 5952.5  | 5826.8  |
| 30°    | 16602.0 | 8705.7  | 5988.7  | 5638.2  | 5548.7  |
| 32.5°  | 16426.0 | 7822.5  | 5580.1  | 5334.9  | 5283.1  |
| 35°    | 16114.8 | 6956.7  | 5223.4  | 5059.9  | 5058.4  |
| 37.5°  | 15624.6 | 6188.2  | 4836.8  | 4808.5  | 4843.1  |
| 40°    | 14900.2 | 5515.7  | 4470.7  | 4546.1  | 4546.1  |
| 42.5°  | 13933.8 | 4931.1  | 4139.1  | 4216.1  | 4195.7  |
| 45°    | 12739.4 | 4406.2  | 3785.5  | 3876.7  | 3942.7  |
| 47.5°  | 11355.0 | 3944.3  | 3424.1  | 3600.1  | 3691.2  |
| 50°    | 9849.6  | 3504.3  | 3094.1  | 3318.8  | 3422.5  |
| 52.5°  | 8271.9  | 3097.2  | 2772.0  | 3029.7  | 3113.0  |
| 55°    | 6744.5  | 2731.1  | 2470.3  | 2679.2  | 2775.1  |
| 57.5°  | 5361.7  | 2382.2  | 2174.8  | 2372.8  | 2570.8  |
| 60°    | 4172.1  | 2082.1  | 1896.7  | 2179.6  | 2377.6  |
| 62.5°  | 3186.8  | 1815.0  | 1635.8  | 1998.8  | 2196.8  |
| 65°    | 2412.1  | 1584.0  | 1430.0  | 1832.2  | 2036.6  |
| 67.5°  | 1818.2  | 1384.4  | 1269.7  | 1711.2  | 1910.8  |
| 70°    | 1365.6  | 1191.2  | 1140.8  | 1635.8  | 1815.0  |
| 72.5°  | 1008.8  | 1013.6  | 1038.7  | 1569.8  | 1706.6  |
| 75°    | 744.8   | 853.2   | 960.2   | 1491.2  | 1580.8  |
| 77.5°  | 532.8   | 707.2   | 889.4   | 1397.0  | 1428.4  |
| 80°    | 369.3   | 576.8   | 815.6   | 1272.8  | 1246.2  |
| 82.5°  | 231.0   | 462.0   | 749.6   | 1136.2  | 1062.2  |
| 85°    | 130.4   | 353.6   | 702.4   | 977.4   | 897.3   |
| 87.5°  | 58.2    | 264.0   | 614.4   | 762.2   | 711.8   |
| 90°    | 5.8     | 181.9   | 452.0   | 624.4   | 629.1   |
| 92.5°  | 20.7    | 165.1   | 430.6   | 592.3   | 609.8   |
| 95°    | 53.8    | 199.6   | 474.9   | 634.7   | 667.5   |
| 97.5°  | 297.8   | 379.5   | 586.2   | 743.4   | 794.8   |
| 100°   | 581.9   | 686.8   | 760.4   | 874.8   | 894.7   |
| 102.5° | 914.3   | 995.4   | 1002.8  | 973.8   | 961.2   |
| 105°   | 1076.8  | 1141.7  | 1250.8  | 1089.1  | 1009.3  |



TEST NUMBER: P828082

CATALOG NUMBER: OHBL-30SE-N-UNV-L935-CD-UPL30

**CANDELA DISTRIBUTION (continued):**

|        | 0°    | 22.5° | 45°    | 67.5°  | 90°    |
|--------|-------|-------|--------|--------|--------|
| 112.5° | 869.1 | 913.4 | 1057.2 | 1098.3 | 1086.2 |
| 115°   | 752.3 | 783.8 | 910.2  | 957.5  | 947.3  |
| 117.5° | 638.8 | 666.6 | 779.8  | 812.4  | 807.3  |
| 120°   | 540.5 | 566.9 | 659.5  | 687.5  | 680.8  |
| 122.5° | 454.7 | 479.8 | 562.5  | 580.1  | 571.0  |
| 125°   | 380.5 | 397.7 | 472.1  | 485.7  | 479.1  |
| 127.5° | 323.9 | 334.6 | 393.9  | 415.1  | 409.4  |
| 130°   | 281.4 | 291.2 | 337.3  | 361.0  | 360.2  |
| 132.5° | 250.8 | 259.7 | 293.8  | 318.3  | 317.5  |
| 135°   | 228.2 | 235.5 | 260.9  | 287.1  | 287.1  |
| 137.5° | 208.2 | 218.8 | 235.5  | 259.3  | 259.3  |
| 140°   | 194.1 | 201.3 | 214.9  | 235.5  | 236.3  |
| 142.5° | 183.1 | 188.0 | 198.5  | 215.8  | 216.7  |
| 145°   | 173.8 | 177.9 | 185.3  | 199.5  | 197.9  |
| 147.5° | 163.8 | 170.3 | 175.3  | 184.8  | 183.2  |
| 150°   | 156.3 | 163.6 | 166.9  | 172.4  | 171.8  |
| 152.5° | 149.7 | 156.1 | 158.6  | 163.4  | 161.8  |
| 155°   | 143.0 | 150.3 | 153.5  | 156.8  | 153.6  |
| 157.5° | 119.2 | 120.8 | 122.5  | 123.3  | 124.2  |
| 160°   | 115.0 | 115.8 | 117.5  | 118.3  | 119.2  |
| 162.5° | 110.0 | 111.7 | 112.5  | 113.3  | 114.2  |
| 165°   | 106.7 | 107.5 | 108.3  | 110.0  | 110.0  |
| 167.5° | 103.3 | 104.2 | 105.0  | 105.8  | 105.8  |
| 170°   | 100.8 | 101.7 | 102.5  | 102.5  | 102.5  |
| 172.5° | 98.3  | 99.2  | 100.0  | 100.0  | 100.0  |
| 175°   | 96.7  | 97.5  | 97.5   | 98.3   | 98.3   |
| 177.5° | 95.8  | 96.7  | 96.7   | 96.7   | 97.5   |
| 180°   | 95.8  | 95.8  | 95.8   | 95.8   | 95.8   |



Report Generated By 670246072 / DESKTOP-50001EG





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







|        |        |        |        |        |        |
|--------|--------|--------|--------|--------|--------|
| 107.5° | 1075.9 | 1142.8 | 1278.0 | 1219.6 | 1113.9 |
| 110°   | 989.2  | 1050.7 | 1190.1 | 1205.8 | 1158.4 |



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           |

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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               |           |                  |                  |

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)