

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: P828523

Luminaire Tested: **OHB-30HE-MFL-UNV-L950-CD-UPL15**

Issue Date: 5/3/2024



**Test Information**

Test Method: LM-79-08  
Report Number: P828523  
REPORT IS A COMBINATION OF REPORTS P826097 AND G3-2310-221-10  
Test Lab: INNOVATION CENTER  
Issue Date: 5/3/2024  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: METALUX  
Catalog Number: OHB-30HE-MFL-UNV-L950-CD-UPL15  
Description:  
Light Source: -  
Ballast/Driver: -

**Summary**

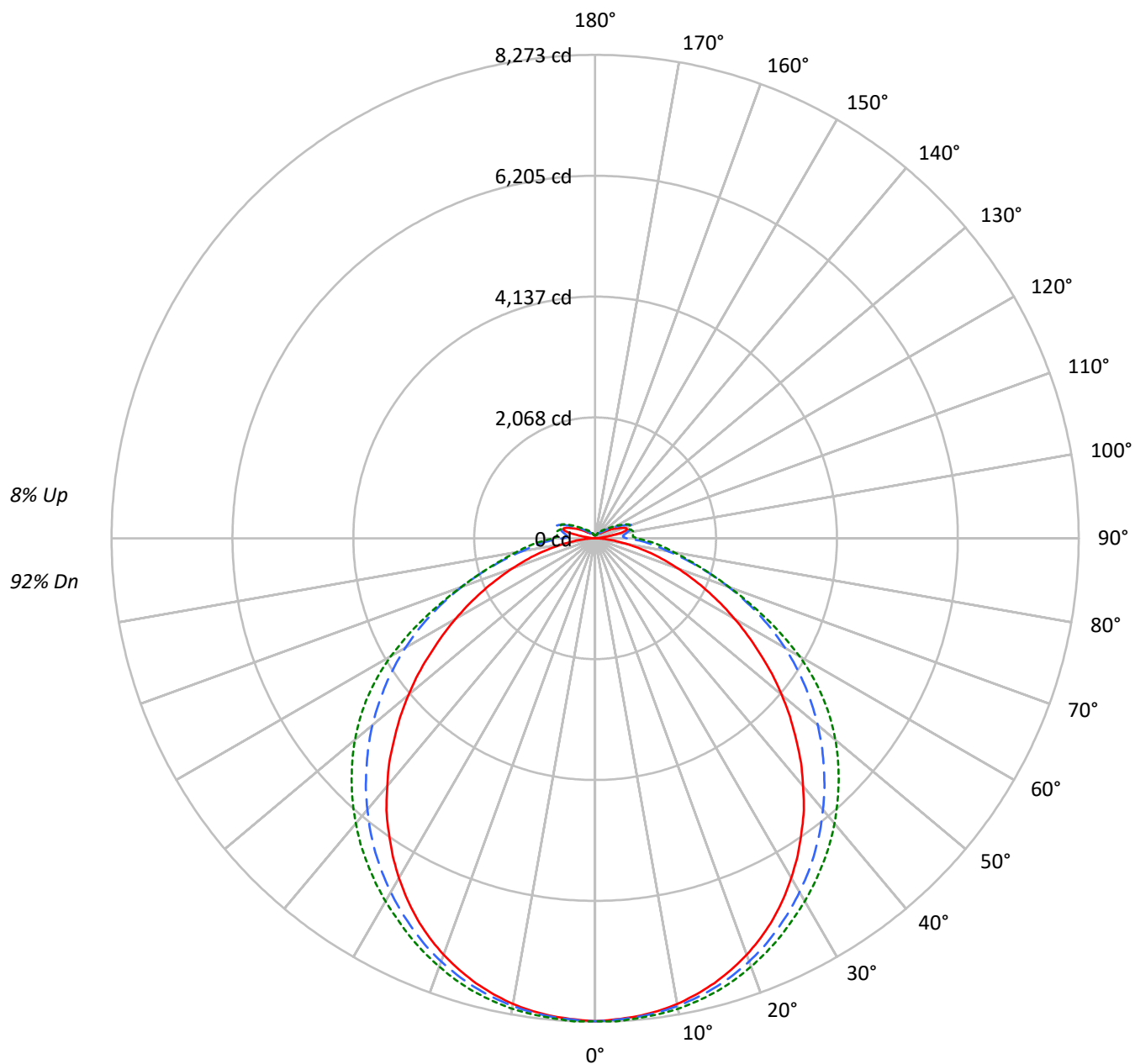
Lumens per Lamp: N/A  
Luminaire Lumens: 26057.4 lumens  
Efficiency: N/A  
Efficacy: 145.3 lumens/watt  
Spacing Criteria (0/90/45): 1.21 / 1.29 / 1.38  
Luminous Opening: Rectangular w/ Sides (W: 1.93' x L: 1.8' x H: 0.17')  
CIE Type: Direct

Input Watts (W): 179.3  
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: P828523

CATALOG NUMBER: OHB-30HE-MFL-UNV-L950-CD-UPL15

### Luminous Intensity Polar Plot





TEST NUMBER: P828523

CATALOG NUMBER: OHB-30HE-MFL-UNV-L950-CD-UPL15

**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   | 117 | 117 | 117 | 117 | 113 | 113 | 113 | 113 | 107 | 107 | 107 | 100 | 100 | 100 | 95 | 95 | 95 | 92 |    |    |
| 1   | 106 | 101 | 97  | 93  | 103 | 98  | 94  | 91  | 93  | 89  | 86  | 87  | 85  | 82  | 82 | 80 | 78 | 76 |    |    |
| 2   | 97  | 88  | 81  | 75  | 93  | 86  | 79  | 74  | 81  | 75  | 71  | 76  | 72  | 68  | 72 | 68 | 65 | 63 |    |    |
| 3   | 88  | 77  | 69  | 63  | 85  | 75  | 68  | 61  | 71  | 65  | 59  | 67  | 62  | 57  | 64 | 59 | 55 | 53 |    |    |
| 4   | 80  | 68  | 60  | 53  | 78  | 67  | 58  | 52  | 63  | 56  | 50  | 60  | 54  | 49  | 57 | 52 | 47 | 45 |    |    |
| 5   | 74  | 61  | 52  | 45  | 71  | 59  | 51  | 45  | 56  | 49  | 44  | 54  | 47  | 42  | 51 | 46 | 41 | 39 |    |    |
| 6   | 68  | 55  | 46  | 40  | 66  | 54  | 45  | 39  | 51  | 44  | 38  | 48  | 42  | 37  | 46 | 41 | 36 | 34 |    |    |
| 7   | 63  | 50  | 41  | 35  | 61  | 49  | 40  | 34  | 46  | 39  | 34  | 44  | 38  | 33  | 42 | 36 | 32 | 30 |    |    |
| 8   | 59  | 45  | 37  | 31  | 57  | 44  | 36  | 31  | 42  | 35  | 30  | 40  | 34  | 29  | 39 | 33 | 29 | 27 |    |    |
| 9   | 55  | 42  | 33  | 28  | 53  | 41  | 33  | 28  | 39  | 32  | 27  | 37  | 31  | 26  | 36 | 30 | 26 | 24 |    |    |
| 10  | 51  | 38  | 30  | 25  | 50  | 38  | 30  | 25  | 36  | 29  | 25  | 35  | 28  | 24  | 33 | 28 | 24 | 22 |    |    |

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

|     | 0°    | 45°   | 90°   |
|-----|-------|-------|-------|
| 0°  | 25565 | 25565 | 25565 |
| 5°  | 25295 | 25258 | 25414 |
| 10° | 25011 | 24971 | 25295 |
| 15° | 24625 | 24641 | 25135 |
| 20° | 24148 | 24252 | 24893 |
| 25° | 23546 | 23782 | 24649 |
| 30° | 22755 | 23276 | 24404 |
| 35° | 21820 | 22741 | 24196 |
| 40° | 20720 | 22130 | 23992 |
| 45° | 19444 | 21468 | 23729 |
| 50° | 18058 | 20792 | 23409 |
| 55° | 16387 | 19976 | 22853 |
| 60° | 14677 | 19021 | 21720 |
| 65° | 12821 | 17819 | 19841 |
| 70° | 10820 | 16305 | 17807 |
| 75° | 8785  | 14551 | 16460 |
| 80° | 6308  | 13135 | 16431 |
| 85° | 3557  | 13034 | 18585 |



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**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 783.2   | 3.0       |
| 10°-20°   | 2246.8  | 8.6       |
| 20°-30°   | 3397.9  | 13.0      |
| 30°-40°   | 4079.2  | 15.7      |
| 40°-50°   | 4213.2  | 16.2      |
| 50°-60°   | 3790.6  | 14.5      |
| 60°-70°   | 2855.4  | 11.0      |
| 70°-80°   | 1724.2  | 6.6       |
| 80°-90°   | 846.6   | 3.2       |
| 90°-100°  | 481.6   | 1.8       |
| 100°-110° | 641.3   | 2.5       |
| 110°-120° | 495.9   | 1.9       |
| 120°-130° | 248.2   | 1.0       |
| 130°-140° | 125.9   | 0.5       |
| 140°-150° | 69.7    | 0.3       |
| 150°-160° | 37.0    | 0.1       |
| 160°-170° | 15.9    | 0.1       |
| 170°-180° | 4.8     | 0.0       |
| 0°-30°    | 6427.9  | 24.7      |
| 0°-40°    | 10507.2 | 40.3      |
| 0°-60°    | 18511.0 | 71.0      |
| 0°-90°    | 23937.1 | 91.9      |
| 90°-120°  | 1618.8  | 6.2       |
| 90°-150°  | 2062.6  | 7.9       |
| 90°-180°  | 2120.0  | 8.1       |
| 0°-180°   | 26057.4 | 100.0     |

**CANDELA DISTRIBUTION:**

|      | 0°   | 22.5° | 45°  | 67.5° | 90°  | Flux |
|------|------|-------|------|-------|------|------|
| 0°   | 8265 | 8265  | 8265 | 8265  | 8265 |      |
| 5°   | 8213 | 8235  | 8225 | 8257  | 8247 | 780  |
| 15°  | 7881 | 7919  | 7956 | 8022  | 8031 | 2222 |
| 25°  | 7197 | 7276  | 7379 | 7495  | 7513 | 3311 |
| 35°  | 6153 | 6297  | 6556 | 6754  | 6795 | 3847 |
| 45°  | 4857 | 5102  | 5528 | 5830  | 5892 | 3750 |
| 55°  | 3441 | 3797  | 4373 | 4703  | 4760 | 3085 |
| 65°  | 2100 | 2528  | 3095 | 3249  | 3212 | 2086 |
| 75°  | 989  | 1420  | 1792 | 1839  | 1820 | 1055 |
| 85°  | 206  | 544   | 898  | 1022  | 1040 | 238  |
| 90°  | 3    | 232   | 539  | 680   | 711  | 15   |
| 95°  | 34   | 206   | 477  | 613   | 651  | 95   |
| 105° | 564  | 626   | 685  | 618   | 603  | 535  |
| 115° | 395  | 426   | 520  | 565   | 565  | 399  |
| 125° | 200  | 216   | 282  | 317   | 322  | 188  |
| 135° | 123  | 130   | 157  | 189   | 198  | 97   |
| 145° | 99   | 99    | 103  | 121   | 127  | 63   |
| 155° | 84   | 87    | 86   | 84    | 87   | 36   |
| 165° | 55   | 55    | 56   | 56    | 56   | 16   |
| 175° | 50   | 50    | 50   | 50    | 50   | 5    |
| 180° | 50   | 50    | 50   | 50    | 50   |      |



TEST NUMBER: P828523

CATALOG NUMBER: OHB-30HE-MFL-UNV-L950-CD-UPL15

**CANDELA DISTRIBUTION (FULL):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 0°     | 8265.3 | 8265.3 | 8265.3 | 8265.3 | 8265.3 |
| 2.5°   | 8241.0 | 8261.2 | 8249.1 | 8275.4 | 8273.4 |
| 5°     | 8212.7 | 8234.9 | 8224.9 | 8257.2 | 8247.0 |
| 7.5°   | 8164.2 | 8188.4 | 8186.3 | 8222.8 | 8218.8 |
| 10°    | 8093.3 | 8119.7 | 8127.7 | 8176.3 | 8176.3 |
| 12.5°  | 7996.2 | 8030.6 | 8050.9 | 8109.5 | 8111.6 |
| 15°    | 7880.9 | 7919.3 | 7955.8 | 8022.5 | 8030.6 |
| 17.5°  | 7741.4 | 7789.9 | 7840.5 | 7917.3 | 7927.4 |
| 20°    | 7583.6 | 7638.2 | 7706.9 | 7787.9 | 7800.0 |
| 22.5°  | 7401.5 | 7466.3 | 7555.3 | 7650.3 | 7664.5 |
| 25°    | 7197.3 | 7276.1 | 7379.2 | 7494.6 | 7512.8 |
| 27.5°  | 6964.6 | 7055.6 | 7195.2 | 7324.6 | 7340.8 |
| 30°    | 6711.8 | 6819.0 | 6992.9 | 7146.7 | 7172.9 |
| 32.5°  | 6444.8 | 6568.1 | 6782.5 | 6954.5 | 6990.9 |
| 35°    | 6153.4 | 6297.0 | 6556.0 | 6754.2 | 6794.7 |
| 37.5°  | 5866.2 | 6023.9 | 6317.3 | 6543.9 | 6592.4 |
| 40°    | 5530.4 | 5726.6 | 6062.4 | 6313.2 | 6371.9 |
| 42.5°  | 5214.8 | 5427.2 | 5807.5 | 6080.6 | 6137.2 |
| 45°    | 4856.8 | 5101.6 | 5528.4 | 5829.8 | 5892.5 |
| 47.5°  | 4521.0 | 4786.0 | 5259.4 | 5570.9 | 5635.6 |
| 50°    | 4167.0 | 4458.3 | 4972.1 | 5297.8 | 5364.6 |
| 52.5°  | 3813.0 | 4126.6 | 4674.7 | 5012.6 | 5075.3 |
| 55°    | 3440.8 | 3796.9 | 4373.4 | 4703.1 | 4759.7 |
| 57.5°  | 3095.0 | 3471.2 | 4063.9 | 4377.4 | 4411.8 |
| 60°    | 2753.1 | 3143.5 | 3748.3 | 4023.4 | 4035.5 |
| 62.5°  | 2419.3 | 2830.0 | 3424.7 | 3643.1 | 3626.9 |
| 65°    | 2099.7 | 2528.5 | 3095.0 | 3248.7 | 3212.2 |
| 67.5°  | 1792.2 | 2235.3 | 2757.1 | 2856.2 | 2807.7 |
| 70°    | 1500.9 | 1950.0 | 2429.4 | 2480.0 | 2435.5 |
| 72.5°  | 1244.0 | 1679.0 | 2097.7 | 2140.1 | 2107.8 |
| 75°    | 989.2  | 1420.1 | 1792.2 | 1838.8 | 1820.5 |
| 77.5°  | 750.5  | 1169.2 | 1511.1 | 1571.7 | 1575.8 |
| 80°    | 540.1  | 940.7  | 1266.3 | 1361.4 | 1373.5 |
| 82.5°  | 356.0  | 730.2  | 1062.0 | 1183.3 | 1201.6 |
| 85°    | 206.3  | 544.1  | 898.1  | 1021.5 | 1039.8 |
| 87.5°  | 89.0   | 392.5  | 722.2  | 833.4  | 855.6  |
| 90°    | 2.6    | 231.5  | 539.0  | 680.3  | 710.9  |
| 92.5°  | 14.8   | 200.3  | 481.0  | 618.0  | 649.0  |
| 95°    | 34.4   | 206.2  | 477.3  | 613.0  | 651.2  |
| 97.5°  | 156.5  | 284.0  | 511.1  | 631.1  | 665.0  |
| 100°   | 305.2  | 421.7  | 549.2  | 647.2  | 669.5  |
| 102.5° | 483.4  | 548.6  | 589.3  | 630.3  | 639.2  |
| 105°   | 564.5  | 625.5  | 685.0  | 618.2  | 603.4  |



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CATALOG NUMBER: OHB-30HE-MFL-UNV-L950-CD-UPL15

**CANDELA DISTRIBUTION (continued):**

|        | 0°    | 22.5° | 45°   | 67.5° | 90°   |
|--------|-------|-------|-------|-------|-------|
| 112.5° | 458.7 | 503.2 | 594.5 | 631.5 | 623.9 |
| 115°   | 395.2 | 425.6 | 520.1 | 564.9 | 565.1 |
| 117.5° | 343.3 | 363.9 | 448.3 | 491.1 | 495.4 |
| 120°   | 289.4 | 309.2 | 382.8 | 421.5 | 428.7 |
| 122.5° | 242.5 | 259.6 | 330.6 | 366.6 | 371.7 |
| 125°   | 199.6 | 216.1 | 282.0 | 316.7 | 321.9 |
| 127.5° | 170.7 | 180.8 | 240.3 | 276.7 | 281.1 |
| 130°   | 149.8 | 156.2 | 205.9 | 241.1 | 247.2 |
| 132.5° | 135.0 | 142.5 | 179.3 | 212.5 | 221.4 |
| 135°   | 122.9 | 130.3 | 157.3 | 189.4 | 198.3 |
| 137.5° | 114.2 | 119.9 | 139.6 | 168.8 | 177.7 |
| 140°   | 107.5 | 112.1 | 124.9 | 150.0 | 158.9 |
| 142.5° | 103.4 | 105.1 | 110.9 | 134.9 | 141.0 |
| 145°   | 99.4  | 99.0  | 102.9 | 120.8 | 126.9 |
| 147.5° | 95.0  | 96.8  | 98.5  | 106.6 | 113.5 |
| 150°   | 90.7  | 94.4  | 93.3  | 96.2  | 102.2 |
| 152.5° | 87.2  | 90.1  | 89.8  | 87.7  | 92.7  |
| 155°   | 83.7  | 86.6  | 86.3  | 84.2  | 87.2  |
| 157.5° | 60.9  | 61.7  | 62.6  | 63.5  | 63.5  |
| 160°   | 58.3  | 59.1  | 60.0  | 60.0  | 60.9  |
| 162.5° | 56.5  | 57.4  | 57.4  | 58.3  | 58.3  |
| 165°   | 54.8  | 54.8  | 55.6  | 55.6  | 55.6  |
| 167.5° | 53.0  | 53.0  | 53.9  | 53.9  | 54.8  |
| 170°   | 51.3  | 52.2  | 52.2  | 52.2  | 53.0  |
| 172.5° | 50.4  | 50.4  | 51.3  | 51.3  | 51.3  |
| 175°   | 49.6  | 49.6  | 49.6  | 50.4  | 50.4  |
| 177.5° | 48.7  | 49.6  | 49.6  | 49.6  | 49.6  |
| 180°   | 49.6  | 49.6  | 49.6  | 49.6  | 49.6  |



Report Generated By 670246072 / DESKTOP-50001EG





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







|        |       |       |       |       |       |
|--------|-------|-------|-------|-------|-------|
| 107.5° | 564.5 | 624.1 | 706.6 | 651.9 | 598.5 |
| 110°   | 521.9 | 576.9 | 663.5 | 675.7 | 632.0 |



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

Report Prepared for

Cooper Lighting Solutions

METALUX

Report Number: SP1-2307-100-9

Test Date: 08/01/2023

Luminaire Tested: OHB-15SE-N-UNV-L950-CD

Data in this report applies to families of products including OHB-15SE-N-UNV-L950-CD.

### Test Information

Test Method: LM-79-2019  
 Report Number: SP1-2307-100-9  
 Test Lab: COOPER LIGHTING SOLUTIONS  
 Photometer: SP1 - 76IN SPHERE  
 Measurement Geometry: 4π  
 Issue Date: 08/04/2023  
 Manufacturer: COOPER LIGHTING SOLUTIONS  
 Product Line: METALUX  
 Catalog Number: **OHB-15SE-N-UNV-L950-CD**  
 Description: 15000 LUMEN OHB SE LED LUMINAIRE WITH 90CRI, 5000K LEDS AND NARROW LENS

LENS

### Spectral Parameters

|                           |        |           |      |      |      |
|---------------------------|--------|-----------|------|------|------|
| CCT (K):                  | 5013   | CRI (Ra): | 92.0 |      |      |
| CIE u':                   | 0.2111 | R1:       | 92.6 | R9:  | 62.7 |
| CIE v':                   | 0.4847 | R2:       | 96.7 | R10: | 90.0 |
| Duv:                      | 0.0002 | R3:       | 96.5 | R11: | 89.8 |
| CIE x:                    | 0.3447 | R4:       | 90.1 | R12: | 69.9 |
| CIE y:                    | 0.3517 | R5:       | 91.1 | R13: | 94.5 |
| CIE z:                    | 0.3036 | R6:       | 92.0 | R14: | 98.3 |
| Peak Wavelength (nm):     | 455    | R7:       | 92.4 |      |      |
| Dominant Wavelength (nm): | 572    | R8:       | 84.9 |      |      |
| Purity:                   | 9.1    |           |      |      |      |
| Rf:                       | 88.9   |           |      |      |      |
| Rg:                       | 97.2   |           |      |      |      |



### Test Conditions

Stabilization Time: 26M  
 Operation Time: 12H  
 Room Temperature (°C) / RH%: 25.7/57%  
 Sphere Temperature (°C): 25.2

REPORT NUMBER: SP1-2307-100-9

| 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 5000K 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       | 6694             | NR               | 490       | 112019           | NR               | 620       | 173132           | NR               | 750       | 14981            | NR               | 880       | 5536             | NR               |
| 365       | 5354             | NR               | 495       | 119136           | NR               | 625       | 169860           | NR               | 755       | 13480            | NR               | 885       | 6938             | NR               |
| 370       | 5722             | NR               | 500       | 127627           | NR               | 630       | 163982           | NR               | 760       | 11900            | NR               | 890       | 5411             | NR               |
| 375       | 6251             | NR               | 505       | 139687           | NR               | 635       | 158304           | NR               | 765       | 10671            | NR               | 895       | 4784             | NR               |
| 380       | 6177             | NR               | 510       | 148127           | NR               | 640       | 151433           | NR               | 770       | 9643             | NR               | 900       | 5872             | NR               |
| 385       | 5889             | NR               | 515       | 155327           | NR               | 645       | 144044           | NR               | 775       | 8310             | NR               | 905       | 5214             | NR               |
| 390       | 5252             | NR               | 520       | 161724           | NR               | 650       | 134971           | NR               | 780       | 7378             | NR               | 910       | 5425             | NR               |
| 395       | 5012             | NR               | 525       | 166350           | NR               | 655       | 126523           | NR               | 785       | 7348             | NR               | 915       | 5372             | NR               |
| 400       | 4505             | NR               | 530       | 170827           | NR               | 660       | 117624           | NR               | 790       | 6731             | NR               | 920       | 5263             | NR               |
| 405       | 4163             | NR               | 535       | 174287           | NR               | 665       | 107737           | NR               | 795       | 6603             | NR               | 925       | 5581             | NR               |
| 410       | 4931             | NR               | 540       | 177402           | NR               | 670       | 97796            | NR               | 800       | 6333             | NR               | 930       | 7934             | NR               |
| 415       | 6887             | NR               | 545       | 179468           | NR               | 675       | 88146            | NR               | 805       | 5919             | NR               | 935       | 6835             | NR               |
| 420       | 10750            | NR               | 550       | 180621           | NR               | 680       | 80008            | NR               | 810       | 5757             | NR               | 940       | 4871             | NR               |
| 425       | 18574            | NR               | 555       | 182239           | NR               | 685       | 71588            | NR               | 815       | 6226             | NR               | 945       | 6554             | NR               |
| 430       | 31943            | NR               | 560       | 184077           | NR               | 690       | 63388            | NR               | 820       | 5694             | NR               | 950       | 6239             | NR               |
| 435       | 54504            | NR               | 565       | 184113           | NR               | 695       | 56106            | NR               | 825       | 5621             | NR               | 955       | 4562             | NR               |
| 440       | 91570            | NR               | 570       | 183843           | NR               | 700       | 49976            | NR               | 830       | 5832             | NR               | 960       | 3863             | NR               |
| 445       | 155007           | NR               | 575       | 183242           | NR               | 705       | 44326            | NR               | 835       | 5478             | NR               | 965       | 4898             | NR               |
| 450       | 253466           | NR               | 580       | 182759           | NR               | 710       | 39116            | NR               | 840       | 5675             | NR               | 970       | 7576             | NR               |
| 455       | 316705           | NR               | 585       | 182781           | NR               | 715       | 34755            | NR               | 845       | 4960             | NR               | 975       | 6056             | NR               |
| 460       | 273954           | NR               | 590       | 181075           | NR               | 720       | 30900            | NR               | 850       | 5274             | NR               | 980       | 3439             | NR               |
| 465       | 214019           | NR               | 595       | 181315           | NR               | 725       | 27349            | NR               | 855       | 5470             | NR               | 985       | 3623             | NR               |
| 470       | 175153           | NR               | 600       | 181289           | NR               | 730       | 23954            | NR               | 860       | 6539             | NR               | 990       | 4301             | NR               |
| 475       | 140894           | NR               | 605       | 180053           | NR               | 735       | 21526            | NR               | 865       | 6378             | NR               | 995       | 7368             | NR               |
| 480       | 115223           | NR               | 610       | 177907           | NR               | 740       | 18965            | NR               | 870       | 5702             | NR               | 1000      | 10668            | NR               |
| 485       | 108577           | NR               | 615       | 175575           | NR               | 745       | 17153            | NR               | 875       | 4933             | NR               |           |                  |                  |

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Scotopic Flux vs. Wavelength



Scotopic Lumens: 26039.5

S/P: 2.08

| 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       | 6694             | NR               | 490       | 112019           | NR               | 620       | 173132           | NR               | 750       | 14981            | NR               | 880       | 5536             | NR               |
| 365       | 5354             | NR               | 495       | 119136           | NR               | 625       | 169860           | NR               | 755       | 13480            | NR               | 885       | 6938             | NR               |
| 370       | 5722             | NR               | 500       | 127627           | NR               | 630       | 163982           | NR               | 760       | 11900            | NR               | 890       | 5411             | NR               |
| 375       | 6251             | NR               | 505       | 139687           | NR               | 635       | 158304           | NR               | 765       | 10671            | NR               | 895       | 4784             | NR               |
| 380       | 6177             | NR               | 510       | 148127           | NR               | 640       | 151433           | NR               | 770       | 9643             | NR               | 900       | 5872             | NR               |
| 385       | 5889             | NR               | 515       | 155327           | NR               | 645       | 144044           | NR               | 775       | 8310             | NR               | 905       | 5214             | NR               |
| 390       | 5252             | NR               | 520       | 161724           | NR               | 650       | 134971           | NR               | 780       | 7378             | NR               | 910       | 5425             | NR               |
| 395       | 5012             | NR               | 525       | 166350           | NR               | 655       | 126523           | NR               | 785       | 7348             | NR               | 915       | 5372             | NR               |
| 400       | 4505             | NR               | 530       | 170827           | NR               | 660       | 117624           | NR               | 790       | 6731             | NR               | 920       | 5263             | NR               |
| 405       | 4163             | NR               | 535       | 174287           | NR               | 665       | 107737           | NR               | 795       | 6603             | NR               | 925       | 5581             | NR               |
| 410       | 4931             | NR               | 540       | 177402           | NR               | 670       | 97796            | NR               | 800       | 6333             | NR               | 930       | 7934             | NR               |
| 415       | 6887             | NR               | 545       | 179468           | NR               | 675       | 88146            | NR               | 805       | 5919             | NR               | 935       | 6835             | NR               |
| 420       | 10750            | NR               | 550       | 180621           | NR               | 680       | 80008            | NR               | 810       | 5757             | NR               | 940       | 4871             | NR               |
| 425       | 18574            | NR               | 555       | 182239           | NR               | 685       | 71588            | NR               | 815       | 6226             | NR               | 945       | 6554             | NR               |
| 430       | 31943            | NR               | 560       | 184077           | NR               | 690       | 63388            | NR               | 820       | 5694             | NR               | 950       | 6239             | NR               |
| 435       | 54504            | NR               | 565       | 184113           | NR               | 695       | 56106            | NR               | 825       | 5621             | NR               | 955       | 4562             | NR               |
| 440       | 91570            | NR               | 570       | 183843           | NR               | 700       | 49976            | NR               | 830       | 5832             | NR               | 960       | 3863             | NR               |
| 445       | 155007           | NR               | 575       | 183242           | NR               | 705       | 44326            | NR               | 835       | 5478             | NR               | 965       | 4898             | NR               |
| 450       | 253466           | NR               | 580       | 182759           | NR               | 710       | 39116            | NR               | 840       | 5675             | NR               | 970       | 7576             | NR               |
| 455       | 316705           | NR               | 585       | 182781           | NR               | 715       | 34755            | NR               | 845       | 4960             | NR               | 975       | 6056             | NR               |
| 460       | 273954           | NR               | 590       | 181075           | NR               | 720       | 30900            | NR               | 850       | 5274             | NR               | 980       | 3439             | NR               |
| 465       | 214019           | NR               | 595       | 181315           | NR               | 725       | 27349            | NR               | 855       | 5470             | NR               | 985       | 3623             | NR               |
| 470       | 175153           | NR               | 600       | 181289           | NR               | 730       | 23954            | NR               | 860       | 6539             | NR               | 990       | 4301             | NR               |
| 475       | 140894           | NR               | 605       | 180053           | NR               | 735       | 21526            | NR               | 865       | 6378             | NR               | 995       | 7368             | NR               |
| 480       | 115223           | NR               | 610       | 177907           | NR               | 740       | 18965            | NR               | 870       | 5702             | NR               | 1000      | 10668            | NR               |
| 485       | 108577           | NR               | 615       | 175575           | NR               | 745       | 17153            | NR               | 875       | 4933             | NR               |           |                  |                  |

REPORT NUMBER: SP1-2307-100-9

**Melanopic Flux vs. Wavelength**



**Melanopic Lumens: 11248.3 M/P: 0.9**

| 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       | 6694             | NR               | 490       | 112019           | NR               | 620       | 173132           | NR               | 750       | 14981            | NR               | 880       | 5536             | NR               |
| 365       | 5354             | NR               | 495       | 119136           | NR               | 625       | 169860           | NR               | 755       | 13480            | NR               | 885       | 6938             | NR               |
| 370       | 5722             | NR               | 500       | 127627           | NR               | 630       | 163982           | NR               | 760       | 11900            | NR               | 890       | 5411             | NR               |
| 375       | 6251             | NR               | 505       | 139687           | NR               | 635       | 158304           | NR               | 765       | 10671            | NR               | 895       | 4784             | NR               |
| 380       | 6177             | NR               | 510       | 148127           | NR               | 640       | 151433           | NR               | 770       | 9643             | NR               | 900       | 5872             | NR               |
| 385       | 5889             | NR               | 515       | 155327           | NR               | 645       | 144044           | NR               | 775       | 8310             | NR               | 905       | 5214             | NR               |
| 390       | 5252             | NR               | 520       | 161724           | NR               | 650       | 134971           | NR               | 780       | 7378             | NR               | 910       | 5425             | NR               |
| 395       | 5012             | NR               | 525       | 166350           | NR               | 655       | 126523           | NR               | 785       | 7348             | NR               | 915       | 5372             | NR               |
| 400       | 4505             | NR               | 530       | 170827           | NR               | 660       | 117624           | NR               | 790       | 6731             | NR               | 920       | 5263             | NR               |
| 405       | 4163             | NR               | 535       | 174287           | NR               | 665       | 107737           | NR               | 795       | 6603             | NR               | 925       | 5581             | NR               |
| 410       | 4931             | NR               | 540       | 177402           | NR               | 670       | 97796            | NR               | 800       | 6333             | NR               | 930       | 7934             | NR               |
| 415       | 6887             | NR               | 545       | 179468           | NR               | 675       | 88146            | NR               | 805       | 5919             | NR               | 935       | 6835             | NR               |
| 420       | 10750            | NR               | 550       | 180621           | NR               | 680       | 80008            | NR               | 810       | 5757             | NR               | 940       | 4871             | NR               |
| 425       | 18574            | NR               | 555       | 182239           | NR               | 685       | 71588            | NR               | 815       | 6226             | NR               | 945       | 6554             | NR               |
| 430       | 31943            | NR               | 560       | 184077           | NR               | 690       | 63388            | NR               | 820       | 5694             | NR               | 950       | 6239             | NR               |
| 435       | 54504            | NR               | 565       | 184113           | NR               | 695       | 56106            | NR               | 825       | 5621             | NR               | 955       | 4562             | NR               |
| 440       | 91570            | NR               | 570       | 183843           | NR               | 700       | 49976            | NR               | 830       | 5832             | NR               | 960       | 3863             | NR               |
| 445       | 155007           | NR               | 575       | 183242           | NR               | 705       | 44326            | NR               | 835       | 5478             | NR               | 965       | 4898             | NR               |
| 450       | 253466           | NR               | 580       | 182759           | NR               | 710       | 39116            | NR               | 840       | 5675             | NR               | 970       | 7576             | NR               |
| 455       | 316705           | NR               | 585       | 182781           | NR               | 715       | 34755            | NR               | 845       | 4960             | NR               | 975       | 6056             | NR               |
| 460       | 273954           | NR               | 590       | 181075           | NR               | 720       | 30900            | NR               | 850       | 5274             | NR               | 980       | 3439             | NR               |
| 465       | 214019           | NR               | 595       | 181315           | NR               | 725       | 27349            | NR               | 855       | 5470             | NR               | 985       | 3623             | NR               |
| 470       | 175153           | NR               | 600       | 181289           | NR               | 730       | 23954            | NR               | 860       | 6539             | NR               | 990       | 4301             | NR               |
| 475       | 140894           | NR               | 605       | 180053           | NR               | 735       | 21526            | NR               | 865       | 6378             | NR               | 995       | 7368             | NR               |
| 480       | 115223           | NR               | 610       | 177907           | NR               | 740       | 18965            | NR               | 870       | 5702             | NR               | 1000      | 10668            | NR               |
| 485       | 108577           | NR               | 615       | 175575           | NR               | 745       | 17153            | NR               | 875       | 4933             | NR               |           |                  |                  |

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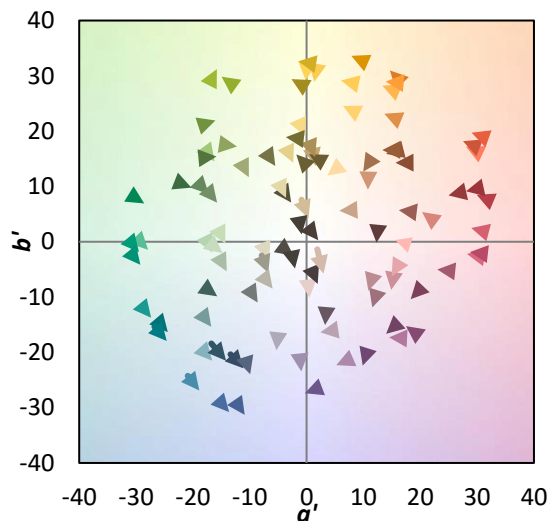
**TM-30-18**

**Summary**

$R_f = 88.9$   
 $R_g = 97.2$   
 $CIE R_a = 92.0$   
 $R_9 = 62.7$



**Color Vector Graphics**



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

|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 85 | CES26 = 93 | CES51 = 92 | CES76 = 85 |
| CES02 = 61 | CES27 = 89 | CES52 = 95 | CES77 = 86 |
| CES03 = 31 | CES28 = 95 | CES53 = 92 | CES78 = 84 |
| CES04 = 69 | CES29 = 94 | CES54 = 89 | CES79 = 95 |
| CES05 = 48 | CES30 = 83 | CES55 = 86 | CES80 = 93 |
| CES06 = 50 | CES31 = 96 | CES56 = 88 | CES81 = 89 |
| CES07 = 41 | CES32 = 93 | CES57 = 85 | CES82 = 97 |
| CES08 = 40 | CES33 = 92 | CES58 = 85 | CES83 = 97 |
| CES09 = 29 | CES34 = 93 | CES59 = 94 | CES84 = 92 |
| CES10 = 73 | CES35 = 96 | CES60 = 89 | CES85 = 83 |
| CES11 = 56 | CES36 = 76 | CES61 = 88 | CES86 = 88 |
| CES12 = 62 | CES37 = 95 | CES62 = 78 | CES87 = 91 |
| CES13 = 42 | CES38 = 78 | CES63 = 87 | CES88 = 95 |
| CES14 = 74 | CES39 = 97 | CES64 = 81 | CES89 = 88 |
| CES15 = 71 | CES40 = 97 | CES65 = 84 | CES90 = 93 |
| CES16 = 46 | CES41 = 92 | CES66 = 78 | CES91 = 70 |
| CES17 = 49 | CES42 = 96 | CES67 = 77 | CES92 = 78 |
| CES18 = 56 | CES43 = 95 | CES68 = 82 | CES93 = 86 |
| CES19 = 70 | CES44 = 99 | CES69 = 84 | CES94 = 81 |
| CES20 = 65 | CES45 = 97 | CES70 = 81 | CES95 = 81 |
| CES21 = 85 | CES46 = 95 | CES71 = 73 | CES96 = 92 |
| CES22 = 77 | CES47 = 91 | CES72 = 91 | CES97 = 94 |
| CES23 = 91 | CES48 = 85 | CES73 = 77 | CES98 = 92 |
| CES24 = 90 | CES49 = 95 | CES74 = 89 | CES99 = 90 |
| CES25 = 70 | CES50 = 93 | CES75 = 77 |            |



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**TM-30-18**

**Color Rendition by Hue-Angle Bin**



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**Measure Comparisons**



(END OF REPORT)