

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: P828196

Luminaire Tested: **OHB-24HE-NL-UNV-L940-CD-UPL24**

Issue Date: 5/3/2024



**Test Information**

Test Method: LM-79-08  
Report Number: P828196  
REPORT IS A COMBINATION OF REPORTS P826207 AND G3-2310-221-6  
Test Lab: INNOVATION CENTER  
Issue Date: 5/3/2024  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: METALUX  
Catalog Number: OHB-24HE-NL-UNV-L940-CD-UPL24  
Description:  
Light Source: -  
Ballast/Driver: -

**Summary**

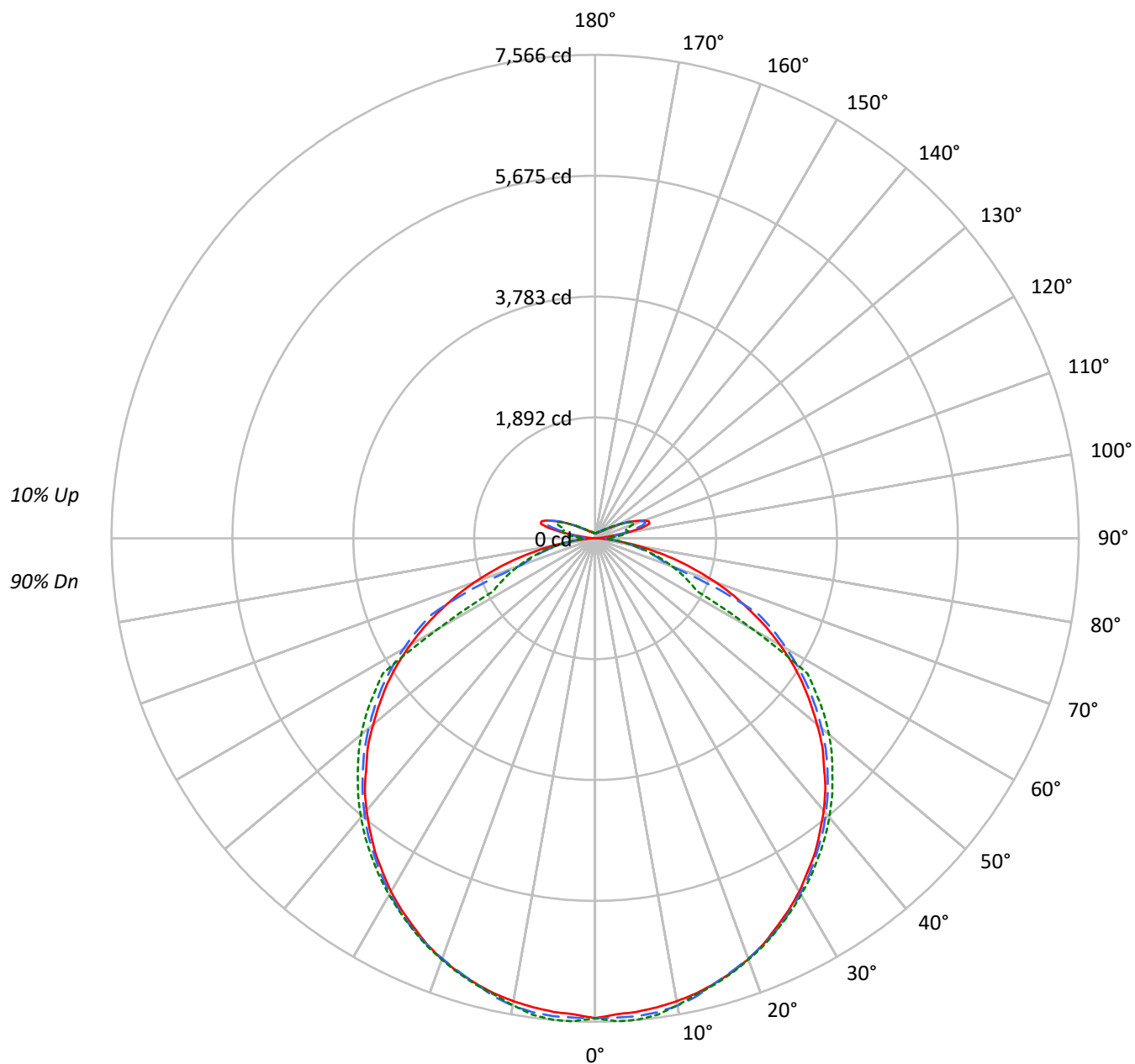
Lumens per Lamp: N/A  
Luminaire Lumens: 23190.9 lumens  
Efficiency: N/A  
Efficacy: 157.3 lumens/watt  
Spacing Criteria (0/90/45): 1.26 / 1.28 / 1.39  
Luminous Opening: Rectangular w/ Sides (W: 1.93' x L: 1.8' x H: 0.1')  
CIE Type: Direct

Input Watts (W): 147.4  
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: P828196

CATALOG NUMBER: OHB-24HE-NL-UNV-L940-CD-UPL24

### Luminous Intensity Polar Plot





TEST NUMBER: P828196

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**COEFFICIENT OF UTILIZATION - ZONAL CAVITY METHOD:**

|     |     |     |     |     |     |     |     |     |     |     |     |    |    |    |    |    |    |    |    |    |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|----|----|----|----|----|----|----|----|----|
| RF  | 20  |     |     |     | 20  |     |     |     |     | 20  |     |    |    |    | 20 |    |    |    |    | 20 |
| RC  | 80  |     |     |     | 70  |     |     |     |     | 50  |     |    |    |    | 30 |    |    |    |    | 10 |
| RW  | 70  | 50  | 30  | 10  | 70  | 50  | 30  | 10  | 50  | 30  | 10  | 50 | 30 | 10 | 50 | 30 | 10 | 50 | 30 | 10 |
| RCR |     |     |     |     |     |     |     |     |     |     |     |    |    |    |    |    |    |    |    |    |
| 0   | 117 | 117 | 117 | 117 | 113 | 113 | 113 | 113 | 106 | 106 | 106 | 99 | 99 | 99 | 93 | 93 | 93 | 90 |    |    |
| 1   | 107 | 103 | 98  | 95  | 103 | 99  | 96  | 92  | 93  | 90  | 88  | 88 | 86 | 83 | 83 | 81 | 79 | 77 |    |    |
| 2   | 98  | 90  | 83  | 78  | 94  | 87  | 81  | 76  | 82  | 77  | 73  | 77 | 73 | 70 | 73 | 70 | 67 | 64 |    |    |
| 3   | 89  | 79  | 71  | 65  | 86  | 77  | 69  | 64  | 72  | 66  | 61  | 68 | 63 | 59 | 65 | 61 | 57 | 54 |    |    |
| 4   | 82  | 70  | 61  | 55  | 79  | 68  | 60  | 54  | 64  | 58  | 52  | 61 | 55 | 51 | 58 | 53 | 49 | 47 |    |    |
| 5   | 75  | 62  | 54  | 47  | 72  | 61  | 53  | 47  | 58  | 51  | 45  | 55 | 49 | 44 | 52 | 47 | 43 | 40 |    |    |
| 6   | 69  | 56  | 47  | 41  | 67  | 55  | 47  | 41  | 52  | 45  | 40  | 49 | 43 | 38 | 47 | 42 | 37 | 35 |    |    |
| 7   | 64  | 51  | 42  | 36  | 62  | 50  | 42  | 36  | 47  | 40  | 35  | 45 | 39 | 34 | 43 | 37 | 33 | 31 |    |    |
| 8   | 60  | 46  | 38  | 32  | 57  | 45  | 37  | 32  | 43  | 36  | 31  | 41 | 35 | 30 | 39 | 34 | 30 | 28 |    |    |
| 9   | 56  | 42  | 34  | 29  | 54  | 41  | 34  | 29  | 40  | 33  | 28  | 38 | 32 | 27 | 36 | 31 | 27 | 25 |    |    |
| 10  | 52  | 39  | 31  | 26  | 50  | 38  | 31  | 26  | 37  | 30  | 25  | 35 | 29 | 25 | 34 | 28 | 24 | 22 |    |    |

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

|     | 0°    | 45°   | 90°   |
|-----|-------|-------|-------|
| 0°  | 23231 | 23231 | 23231 |
| 5°  | 22991 | 23157 | 23381 |
| 10° | 22885 | 23020 | 23089 |
| 15° | 22766 | 22640 | 22835 |
| 20° | 22616 | 22419 | 22668 |
| 25° | 22337 | 22245 | 22507 |
| 30° | 22100 | 21965 | 22349 |
| 35° | 21813 | 21637 | 22196 |
| 40° | 21465 | 21322 | 22057 |
| 45° | 20976 | 20892 | 21837 |
| 50° | 20454 | 20408 | 21653 |
| 55° | 19818 | 19800 | 21171 |
| 60° | 18860 | 18922 | 16244 |
| 65° | 17478 | 17802 | 10723 |
| 70° | 15696 | 9093  | 10122 |
| 75° | 13071 | 8138  | 9254  |
| 80° | 9228  | 6698  | 7823  |
| 85° | 3746  | 5183  | 6232  |



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**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 713.5   | 3.1       |
| 10°-20°   | 2043.0  | 8.8       |
| 20°-30°   | 3108.6  | 13.4      |
| 30°-40°   | 3779.7  | 16.3      |
| 40°-50°   | 3974.1  | 17.1      |
| 50°-60°   | 3628.9  | 15.6      |
| 60°-70°   | 2326.3  | 10.0      |
| 70°-80°   | 1098.9  | 4.7       |
| 80°-90°   | 310.1   | 1.3       |
| 90°-100°  | 282.3   | 1.2       |
| 100°-110° | 721.9   | 3.1       |
| 110°-120° | 606.5   | 2.6       |
| 120°-130° | 288.0   | 1.2       |
| 130°-140° | 144.1   | 0.6       |
| 140°-150° | 83.5    | 0.4       |
| 150°-160° | 48.7    | 0.2       |
| 160°-170° | 25.2    | 0.1       |
| 170°-180° | 7.7     | 0.0       |
| <hr/>     |         |           |
| 0°-30°    | 5865.2  | 25.3      |
| 0°-40°    | 9644.8  | 41.6      |
| 0°-60°    | 17247.8 | 74.4      |
| 0°-90°    | 20983.1 | 90.5      |
| 90°-120°  | 1610.7  | 6.9       |
| 90°-150°  | 2126.3  | 9.2       |
| 90°-180°  | 2208.0  | 9.5       |
| 0°-180°   | 23190.9 | 100.0     |

**CANDELA DISTRIBUTION:**

|      | 0°   | 22.5° | 45°  | 67.5° | 90°  | Flux |
|------|------|-------|------|-------|------|------|
| 0°   | 7510 | 7510  | 7510 | 7510  | 7510 |      |
| 5°   | 7441 | 7470  | 7508 | 7549  | 7564 | 708  |
| 15°  | 7215 | 7269  | 7214 | 7224  | 7230 | 2037 |
| 25°  | 6714 | 6725  | 6749 | 6759  | 6754 | 3098 |
| 35°  | 6002 | 5966  | 6034 | 6108  | 6091 | 3751 |
| 45°  | 5062 | 5053  | 5138 | 5260  | 5250 | 3913 |
| 55°  | 3967 | 3936  | 4070 | 4205  | 4216 | 3538 |
| 65°  | 2673 | 2673  | 2828 | 1622  | 1628 | 2650 |
| 75°  | 1320 | 1346  | 874  | 920   | 924  | 1392 |
| 85°  | 173  | 219   | 273  | 295   | 279  | 255  |
| 90°  | 4    | 103   | 162  | 198   | 201  | 11   |
| 95°  | 50   | 135   | 237  | 316   | 342  | 145  |
| 105° | 879  | 877   | 755  | 544   | 500  | 834  |
| 115° | 608  | 617   | 621  | 615   | 602  | 611  |
| 125° | 294  | 310   | 316  | 315   | 312  | 276  |
| 135° | 174  | 177   | 184  | 185   | 187  | 137  |
| 145° | 126  | 130   | 132  | 133   | 134  | 80   |
| 155° | 101  | 103   | 104  | 105   | 105  | 47   |
| 165° | 87   | 88    | 89   | 89    | 89   | 25   |
| 175° | 78   | 79    | 79   | 80    | 80   | 8    |
| 180° | 78   | 78    | 78   | 78    | 78   |      |



TEST NUMBER: P828196

CATALOG NUMBER: OHB-24HE-NL-UNV-L940-CD-UPL24

**CANDELA DISTRIBUTION (FULL):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 0°     | 7510.5 | 7510.5 | 7510.5 | 7510.5 | 7510.5 |
| 2.5°   | 7457.7 | 7482.9 | 7510.5 | 7546.1 | 7565.7 |
| 5°     | 7440.6 | 7469.7 | 7507.8 | 7548.8 | 7564.5 |
| 7.5°   | 7403.8 | 7444.5 | 7481.5 | 7510.5 | 7519.7 |
| 10°    | 7357.6 | 7406.4 | 7427.5 | 7424.9 | 7418.3 |
| 12.5°  | 7295.7 | 7347.2 | 7340.5 | 7310.1 | 7315.4 |
| 15°    | 7215.3 | 7269.3 | 7214.0 | 7224.5 | 7229.8 |
| 17.5°  | 7120.4 | 7173.2 | 7108.6 | 7129.6 | 7131.0 |
| 20°    | 7009.7 | 7049.3 | 6999.1 | 7016.3 | 7016.3 |
| 22.5°  | 6876.6 | 6904.3 | 6883.2 | 6895.0 | 6897.7 |
| 25°    | 6714.5 | 6725.0 | 6748.7 | 6759.3 | 6754.0 |
| 27.5°  | 6559.1 | 6545.9 | 6592.0 | 6617.0 | 6603.8 |
| 30°    | 6386.3 | 6365.3 | 6419.3 | 6460.1 | 6444.4 |
| 32.5°  | 6188.6 | 6175.6 | 6237.5 | 6286.2 | 6277.0 |
| 35°    | 6001.5 | 5966.0 | 6034.5 | 6108.3 | 6091.2 |
| 37.5°  | 5780.2 | 5759.0 | 5836.8 | 5914.7 | 5905.4 |
| 40°    | 5564.0 | 5528.4 | 5616.7 | 5708.9 | 5699.7 |
| 42.5°  | 5332.1 | 5289.8 | 5386.1 | 5496.9 | 5486.3 |
| 45°    | 5061.8 | 5052.6 | 5138.3 | 5259.5 | 5250.3 |
| 47.5°  | 4822.1 | 4775.9 | 4895.8 | 5013.1 | 5023.7 |
| 50°    | 4532.1 | 4515.0 | 4624.4 | 4766.7 | 4777.2 |
| 52.5°  | 4248.8 | 4237.0 | 4351.5 | 4495.2 | 4513.6 |
| 55°    | 3966.7 | 3936.4 | 4069.5 | 4205.3 | 4215.9 |
| 57.5°  | 3665.1 | 3633.4 | 3769.1 | 3916.8 | 3939.1 |
| 60°    | 3342.1 | 3311.8 | 3460.6 | 3597.8 | 2861.1 |
| 62.5°  | 3019.2 | 2998.1 | 3153.7 | 2233.8 | 1800.3 |
| 65°    | 2672.6 | 2672.6 | 2828.0 | 1622.3 | 1627.6 |
| 67.5°  | 2348.5 | 2327.4 | 2108.7 | 1457.4 | 1457.4 |
| 70°    | 2000.5 | 2008.5 | 1215.0 | 1277.0 | 1278.3 |
| 72.5°  | 1651.2 | 1680.3 | 1049.1 | 1099.1 | 1101.7 |
| 75°    | 1320.5 | 1345.6 | 873.7  | 919.9  | 923.8  |
| 77.5°  | 970.0  | 745.9  | 702.3  | 738.1  | 739.4  |
| 80°    | 681.3  | 470.5  | 537.8  | 571.9  | 568.0  |
| 82.5°  | 397.9  | 329.4  | 394.0  | 419.2  | 417.8  |
| 85°    | 172.6  | 218.8  | 272.7  | 295.3  | 279.4  |
| 87.5°  | 55.2   | 135.7  | 170.0  | 183.2  | 181.8  |
| 90°    | 4.3    | 103.4  | 162.2  | 197.5  | 201.0  |
| 92.5°  | 14.8   | 97.0   | 168.1  | 220.6  | 233.1  |
| 95°    | 50.0   | 134.8  | 236.6  | 315.6  | 341.7  |
| 97.5°  | 236.5  | 280.7  | 334.1  | 421.8  | 453.1  |
| 100°   | 482.5  | 531.8  | 452.1  | 500.5  | 509.8  |
| 102.5° | 748.2  | 755.7  | 562.3  | 523.8  | 518.3  |
| 105°   | 878.6  | 877.0  | 754.9  | 543.6  | 499.8  |



TEST NUMBER: P828196

CATALOG NUMBER: OHB-24HE-NL-UNV-L940-CD-UPL24

**CANDELA DISTRIBUTION (continued):**

|        | 0°    | 22.5° | 45°   | 67.5° | 90°   |
|--------|-------|-------|-------|-------|-------|
| 112.5° | 710.4 | 723.6 | 713.6 | 689.6 | 652.4 |
| 115°   | 608.2 | 617.0 | 620.9 | 615.2 | 602.0 |
| 117.5° | 514.7 | 515.6 | 519.1 | 518.2 | 519.1 |
| 120°   | 426.0 | 435.6 | 443.4 | 439.1 | 433.9 |
| 122.5° | 357.3 | 367.8 | 373.0 | 371.3 | 366.0 |
| 125°   | 293.9 | 309.5 | 315.6 | 314.7 | 312.1 |
| 127.5° | 248.7 | 260.0 | 268.7 | 269.5 | 268.7 |
| 130°   | 216.5 | 223.4 | 232.1 | 233.0 | 233.9 |
| 132.5° | 192.1 | 198.2 | 204.3 | 207.8 | 206.9 |
| 135°   | 173.9 | 177.4 | 183.5 | 185.2 | 186.9 |
| 137.5° | 159.1 | 161.7 | 166.9 | 169.5 | 169.5 |
| 140°   | 146.1 | 149.5 | 153.9 | 155.6 | 156.5 |
| 142.5° | 134.8 | 138.2 | 141.7 | 143.5 | 143.5 |
| 145°   | 126.1 | 129.5 | 132.2 | 133.0 | 133.9 |
| 147.5° | 118.2 | 121.7 | 123.5 | 125.2 | 125.2 |
| 150°   | 112.2 | 113.9 | 116.5 | 117.4 | 118.2 |
| 152.5° | 106.1 | 107.8 | 110.4 | 111.3 | 111.3 |
| 155°   | 100.9 | 102.6 | 104.3 | 105.2 | 105.2 |
| 157.5° | 96.5  | 98.2  | 100.0 | 100.9 | 100.9 |
| 160°   | 93.0  | 93.9  | 95.6  | 96.5  | 96.5  |
| 162.5° | 89.6  | 90.4  | 91.3  | 92.2  | 92.2  |
| 165°   | 86.9  | 87.8  | 88.7  | 88.7  | 88.7  |
| 167.5° | 84.3  | 84.3  | 85.2  | 86.1  | 86.1  |
| 170°   | 81.7  | 82.6  | 82.6  | 83.5  | 83.5  |
| 172.5° | 80.0  | 80.9  | 80.9  | 80.9  | 81.7  |
| 175°   | 78.2  | 79.1  | 79.1  | 80.0  | 80.0  |
| 177.5° | 78.2  | 78.2  | 78.2  | 78.2  | 78.2  |
| 180°   | 78.2  | 78.2  | 78.2  | 78.2  | 78.2  |



Report Generated By 670246072 / DESKTOP-50001EG





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







|        |       |       |       |       |       |
|--------|-------|-------|-------|-------|-------|
| 107.5° | 882.1 | 892.1 | 829.6 | 645.6 | 531.7 |
| 110°   | 815.6 | 827.4 | 792.2 | 720.1 | 625.5 |



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

Report Prepared for

Cooper Lighting Solutions

METALUX

Report Number: SP1-2307-100-8

Test Date: 08/01/2023

Luminaire Tested: OHB-15SE-N-UNV-L940-CD

Data in this report applies to families of products including OHB-15SE-N-UNV-L940-CD.

### Test Information

Test Method: LM-79-2019  
 Report Number: SP1-2307-100-8  
 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-L940-CD**  
 Description: 15000 LUMEN OHB SE LED LUMINAIRE WITH 90CRI, 4000K LEDS AND NARROW LENS

LENS

### Spectral Parameters

CCT (K): 3979  
 CIE u': 0.2254  
 CIE v': 0.5020  
 Duv: 0.0001  
 CIE x: 0.3813  
 CIE y: 0.3773  
 CIE z: 0.2414  
 Peak Wavelength (nm): 455  
 Dominant Wavelength (nm): 579  
 Purity: 27.8  
 Rf: 88.6  
 Rg: 96.2

CRI (Ra): 91.5  
 R1: 91.7  
 R2: 96.4  
 R3: 97.6  
 R4: 89.2  
 R5: 90.3  
 R6: 93.0  
 R7: 91.6  
 R8: 81.9  
 R9: 57.0  
 R10: 89.6  
 R11: 89.1  
 R12: 69.6  
 R13: 93.4  
 R14: 98.9



### Test Conditions

Stabilization Time: 23M  
 Operation Time: 12H  
 Room Temperature (°C) / RH%: 25.7/57%  
 Sphere Temperature (°C): 25.2

REPORT NUMBER: SP1-2307-100-8

| 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: SP1-2307-100-8

**CIE 1931 Chromaticity Diagram**



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



Point lies inside the ANSI 4000K 4-step quadrangle

REPORT NUMBER: SP1-2307-100-8

**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       | 6299             | NR               | 490       | 95290            | NR               | 620       | 202945           | NR               | 750       | 17048            | NR               | 880       | 6802             | NR               |
| 365       | 5178             | NR               | 495       | 104168           | NR               | 625       | 198934           | NR               | 755       | 15396            | NR               | 885       | 7389             | NR               |
| 370       | 5490             | NR               | 500       | 113725           | NR               | 630       | 192455           | NR               | 760       | 13359            | NR               | 890       | 5235             | NR               |
| 375       | 6104             | NR               | 505       | 126034           | NR               | 635       | 185651           | NR               | 765       | 12573            | NR               | 895       | 4778             | NR               |
| 380       | 6149             | NR               | 510       | 134848           | NR               | 640       | 177659           | NR               | 770       | 10940            | NR               | 900       | 5847             | NR               |
| 385       | 5688             | NR               | 515       | 142720           | NR               | 645       | 169230           | NR               | 775       | 9589             | NR               | 905       | 5969             | NR               |
| 390       | 5262             | NR               | 520       | 149276           | NR               | 650       | 157607           | NR               | 780       | 8802             | NR               | 910       | 6399             | NR               |
| 395       | 4581             | NR               | 525       | 154675           | NR               | 655       | 148474           | NR               | 785       | 8257             | NR               | 915       | 5912             | NR               |
| 400       | 4118             | NR               | 530       | 159852           | NR               | 660       | 137175           | NR               | 790       | 7397             | NR               | 920       | 6048             | NR               |
| 405       | 4084             | NR               | 535       | 164319           | NR               | 665       | 125124           | NR               | 795       | 7591             | NR               | 925       | 5552             | NR               |
| 410       | 4438             | NR               | 540       | 169099           | NR               | 670       | 113759           | NR               | 800       | 7116             | NR               | 930       | 7244             | NR               |
| 415       | 5782             | NR               | 545       | 173030           | NR               | 675       | 102656           | NR               | 805       | 6905             | NR               | 935       | 6076             | NR               |
| 420       | 8737             | NR               | 550       | 175415           | NR               | 680       | 92651            | NR               | 810       | 6711             | NR               | 940       | 6581             | NR               |
| 425       | 14203            | NR               | 555       | 179385           | NR               | 685       | 82728            | NR               | 815       | 6202             | NR               | 945       | 7094             | NR               |
| 430       | 23287            | NR               | 560       | 183651           | NR               | 690       | 72755            | NR               | 820       | 6421             | NR               | 950       | 6374             | NR               |
| 435       | 39198            | NR               | 565       | 186704           | NR               | 695       | 64864            | NR               | 825       | 6067             | NR               | 955       | 5408             | NR               |
| 440       | 65090            | NR               | 570       | 189735           | NR               | 700       | 57132            | NR               | 830       | 6507             | NR               | 960       | 5406             | NR               |
| 445       | 111800           | NR               | 575       | 192391           | NR               | 705       | 50899            | NR               | 835       | 6304             | NR               | 965       | 5676             | NR               |
| 450       | 185327           | NR               | 580       | 195587           | NR               | 710       | 44715            | NR               | 840       | 5605             | NR               | 970       | 6132             | NR               |
| 455       | 231910           | NR               | 585       | 198690           | NR               | 715       | 39661            | NR               | 845       | 5975             | NR               | 975       | 7732             | NR               |
| 460       | 199850           | NR               | 590       | 200528           | NR               | 720       | 35220            | NR               | 850       | 5252             | NR               | 980       | 4497             | NR               |
| 465       | 159032           | NR               | 595       | 204245           | NR               | 725       | 31033            | NR               | 855       | 6570             | NR               | 985       | 1796             | NR               |
| 470       | 134681           | NR               | 600       | 206961           | NR               | 730       | 27573            | NR               | 860       | 6167             | NR               | 990       | 6719             | NR               |
| 475       | 109873           | NR               | 605       | 207509           | NR               | 735       | 24077            | NR               | 865       | 5558             | NR               | 995       | 10730            | NR               |
| 480       | 92595            | NR               | 610       | 206751           | NR               | 740       | 21375            | NR               | 870       | 5280             | NR               | 1000      | 10317            | NR               |
| 485       | 90323            | NR               | 615       | 205233           | NR               | 745       | 19152            | NR               | 875       | 5889             | NR               |           |                  |                  |

REPORT NUMBER: SP1-2307-100-8

Scotopic Flux vs. Wavelength



Scotopic Lumens: 22729.8

S/P: 1.79

| 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       | 6299             | NR               | 490       | 95290            | NR               | 620       | 202945           | NR               | 750       | 17048            | NR               | 880       | 6802             | NR               |
| 365       | 5178             | NR               | 495       | 104168           | NR               | 625       | 198934           | NR               | 755       | 15396            | NR               | 885       | 7389             | NR               |
| 370       | 5490             | NR               | 500       | 113725           | NR               | 630       | 192455           | NR               | 760       | 13359            | NR               | 890       | 5235             | NR               |
| 375       | 6104             | NR               | 505       | 126034           | NR               | 635       | 185651           | NR               | 765       | 12573            | NR               | 895       | 4778             | NR               |
| 380       | 6149             | NR               | 510       | 134848           | NR               | 640       | 177659           | NR               | 770       | 10940            | NR               | 900       | 5847             | NR               |
| 385       | 5688             | NR               | 515       | 142720           | NR               | 645       | 169230           | NR               | 775       | 9589             | NR               | 905       | 5969             | NR               |
| 390       | 5262             | NR               | 520       | 149276           | NR               | 650       | 157607           | NR               | 780       | 8802             | NR               | 910       | 6399             | NR               |
| 395       | 4581             | NR               | 525       | 154675           | NR               | 655       | 148474           | NR               | 785       | 8257             | NR               | 915       | 5912             | NR               |
| 400       | 4118             | NR               | 530       | 159852           | NR               | 660       | 137175           | NR               | 790       | 7397             | NR               | 920       | 6048             | NR               |
| 405       | 4084             | NR               | 535       | 164319           | NR               | 665       | 125124           | NR               | 795       | 7591             | NR               | 925       | 5552             | NR               |
| 410       | 4438             | NR               | 540       | 169099           | NR               | 670       | 113759           | NR               | 800       | 7116             | NR               | 930       | 7244             | NR               |
| 415       | 5782             | NR               | 545       | 173030           | NR               | 675       | 102656           | NR               | 805       | 6905             | NR               | 935       | 6076             | NR               |
| 420       | 8737             | NR               | 550       | 175415           | NR               | 680       | 92651            | NR               | 810       | 6711             | NR               | 940       | 6581             | NR               |
| 425       | 14203            | NR               | 555       | 179385           | NR               | 685       | 82728            | NR               | 815       | 6202             | NR               | 945       | 7094             | NR               |
| 430       | 23287            | NR               | 560       | 183651           | NR               | 690       | 72755            | NR               | 820       | 6421             | NR               | 950       | 6374             | NR               |
| 435       | 39198            | NR               | 565       | 186704           | NR               | 695       | 64864            | NR               | 825       | 6067             | NR               | 955       | 5408             | NR               |
| 440       | 65090            | NR               | 570       | 189735           | NR               | 700       | 57132            | NR               | 830       | 6507             | NR               | 960       | 5406             | NR               |
| 445       | 111800           | NR               | 575       | 192391           | NR               | 705       | 50899            | NR               | 835       | 6304             | NR               | 965       | 5676             | NR               |
| 450       | 185327           | NR               | 580       | 195587           | NR               | 710       | 44715            | NR               | 840       | 5605             | NR               | 970       | 6132             | NR               |
| 455       | 231910           | NR               | 585       | 198690           | NR               | 715       | 39661            | NR               | 845       | 5975             | NR               | 975       | 7732             | NR               |
| 460       | 199850           | NR               | 590       | 200528           | NR               | 720       | 35220            | NR               | 850       | 5252             | NR               | 980       | 4497             | NR               |
| 465       | 159032           | NR               | 595       | 204245           | NR               | 725       | 31033            | NR               | 855       | 6570             | NR               | 985       | 1796             | NR               |
| 470       | 134681           | NR               | 600       | 206961           | NR               | 730       | 27573            | NR               | 860       | 6167             | NR               | 990       | 6719             | NR               |
| 475       | 109873           | NR               | 605       | 207509           | NR               | 735       | 24077            | NR               | 865       | 5558             | NR               | 995       | 10730            | NR               |
| 480       | 92595            | NR               | 610       | 206751           | NR               | 740       | 21375            | NR               | 870       | 5280             | NR               | 1000      | 10317            | NR               |
| 485       | 90323            | NR               | 615       | 205233           | NR               | 745       | 19152            | NR               | 875       | 5889             | NR               |           |                  |                  |

REPORT NUMBER: SP1-2307-100-8

**Melanopic Flux vs. Wavelength**



**Melanopic Lumens: 9423.4**

**M/P: 0.74**

| 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       | 6299             | NR               | 490       | 95290            | NR               | 620       | 202945           | NR               | 750       | 17048            | NR               | 880       | 6802             | NR               |
| 365       | 5178             | NR               | 495       | 104168           | NR               | 625       | 198934           | NR               | 755       | 15396            | NR               | 885       | 7389             | NR               |
| 370       | 5490             | NR               | 500       | 113725           | NR               | 630       | 192455           | NR               | 760       | 13359            | NR               | 890       | 5235             | NR               |
| 375       | 6104             | NR               | 505       | 126034           | NR               | 635       | 185651           | NR               | 765       | 12573            | NR               | 895       | 4778             | NR               |
| 380       | 6149             | NR               | 510       | 134848           | NR               | 640       | 177659           | NR               | 770       | 10940            | NR               | 900       | 5847             | NR               |
| 385       | 5688             | NR               | 515       | 142720           | NR               | 645       | 169230           | NR               | 775       | 9589             | NR               | 905       | 5969             | NR               |
| 390       | 5262             | NR               | 520       | 149276           | NR               | 650       | 157607           | NR               | 780       | 8802             | NR               | 910       | 6399             | NR               |
| 395       | 4581             | NR               | 525       | 154675           | NR               | 655       | 148474           | NR               | 785       | 8257             | NR               | 915       | 5912             | NR               |
| 400       | 4118             | NR               | 530       | 159852           | NR               | 660       | 137175           | NR               | 790       | 7397             | NR               | 920       | 6048             | NR               |
| 405       | 4084             | NR               | 535       | 164319           | NR               | 665       | 125124           | NR               | 795       | 7591             | NR               | 925       | 5552             | NR               |
| 410       | 4438             | NR               | 540       | 169099           | NR               | 670       | 113759           | NR               | 800       | 7116             | NR               | 930       | 7244             | NR               |
| 415       | 5782             | NR               | 545       | 173030           | NR               | 675       | 102656           | NR               | 805       | 6905             | NR               | 935       | 6076             | NR               |
| 420       | 8737             | NR               | 550       | 175415           | NR               | 680       | 92651            | NR               | 810       | 6711             | NR               | 940       | 6581             | NR               |
| 425       | 14203            | NR               | 555       | 179385           | NR               | 685       | 82728            | NR               | 815       | 6202             | NR               | 945       | 7094             | NR               |
| 430       | 23287            | NR               | 560       | 183651           | NR               | 690       | 72755            | NR               | 820       | 6421             | NR               | 950       | 6374             | NR               |
| 435       | 39198            | NR               | 565       | 186704           | NR               | 695       | 64864            | NR               | 825       | 6067             | NR               | 955       | 5408             | NR               |
| 440       | 65090            | NR               | 570       | 189735           | NR               | 700       | 57132            | NR               | 830       | 6507             | NR               | 960       | 5406             | NR               |
| 445       | 111800           | NR               | 575       | 192391           | NR               | 705       | 50899            | NR               | 835       | 6304             | NR               | 965       | 5676             | NR               |
| 450       | 185327           | NR               | 580       | 195587           | NR               | 710       | 44715            | NR               | 840       | 5605             | NR               | 970       | 6132             | NR               |
| 455       | 231910           | NR               | 585       | 198690           | NR               | 715       | 39661            | NR               | 845       | 5975             | NR               | 975       | 7732             | NR               |
| 460       | 199850           | NR               | 590       | 200528           | NR               | 720       | 35220            | NR               | 850       | 5252             | NR               | 980       | 4497             | NR               |
| 465       | 159032           | NR               | 595       | 204245           | NR               | 725       | 31033            | NR               | 855       | 6570             | NR               | 985       | 1796             | NR               |
| 470       | 134681           | NR               | 600       | 206961           | NR               | 730       | 27573            | NR               | 860       | 6167             | NR               | 990       | 6719             | NR               |
| 475       | 109873           | NR               | 605       | 207509           | NR               | 735       | 24077            | NR               | 865       | 5558             | NR               | 995       | 10730            | NR               |
| 480       | 92595            | NR               | 610       | 206751           | NR               | 740       | 21375            | NR               | 870       | 5280             | NR               | 1000      | 10317            | NR               |
| 485       | 90323            | NR               | 615       | 205233           | NR               | 745       | 19152            | NR               | 875       | 5889             | NR               |           |                  |                  |

REPORT NUMBER: SP1-2307-100-8

**TM-30-18**

**Summary**

$R_f = 88.6$   
 $R_g = 96.2$   
 CIE  $R_a = 91.5$   
 $R_9 = 57.0$



**Color Vector Graphics**



REPORT NUMBER: SP1-2307-100-8

**TM-30-18**

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

|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 86 | CES26 = 95 | CES51 = 92 | CES76 = 88 |
| CES02 = 62 | CES27 = 87 | CES52 = 95 | CES77 = 88 |
| CES03 = 31 | CES28 = 96 | CES53 = 92 | CES78 = 85 |
| CES04 = 69 | CES29 = 92 | CES54 = 88 | CES79 = 95 |
| CES05 = 49 | CES30 = 80 | CES55 = 85 | CES80 = 93 |
| CES06 = 50 | CES31 = 93 | CES56 = 87 | CES81 = 85 |
| CES07 = 42 | CES32 = 94 | CES57 = 84 | CES82 = 97 |
| CES08 = 41 | CES33 = 90 | CES58 = 84 | CES83 = 96 |
| CES09 = 29 | CES34 = 96 | CES59 = 94 | CES84 = 93 |
| CES10 = 74 | CES35 = 97 | CES60 = 88 | CES85 = 81 |
| CES11 = 57 | CES36 = 74 | CES61 = 88 | CES86 = 85 |
| CES12 = 63 | CES37 = 96 | CES62 = 76 | CES87 = 90 |
| CES13 = 43 | CES38 = 75 | CES63 = 86 | CES88 = 94 |
| CES14 = 74 | CES39 = 97 | CES64 = 81 | CES89 = 86 |
| CES15 = 71 | CES40 = 97 | CES65 = 83 | CES90 = 91 |
| CES16 = 47 | CES41 = 91 | CES66 = 78 | CES91 = 67 |
| CES17 = 49 | CES42 = 98 | CES67 = 78 | CES92 = 76 |
| CES18 = 56 | CES43 = 96 | CES68 = 83 | CES93 = 85 |
| CES19 = 71 | CES44 = 99 | CES69 = 84 | CES94 = 79 |
| CES20 = 66 | CES45 = 97 | CES70 = 83 | CES95 = 81 |
| CES21 = 85 | CES46 = 94 | CES71 = 74 | CES96 = 91 |
| CES22 = 78 | CES47 = 90 | CES72 = 92 | CES97 = 94 |
| CES23 = 91 | CES48 = 82 | CES73 = 79 | CES98 = 92 |
| CES24 = 90 | CES49 = 94 | CES74 = 89 | CES99 = 89 |
| CES25 = 71 | CES50 = 93 | CES75 = 78 |            |



REPORT NUMBER: SP1-2307-100-8

**TM-30-18**

**Color Rendition by Hue-Angle Bin**



REPORT NUMBER: SP1-2307-100-8

**TM-30-18**

**Measure Comparisons**



(END OF REPORT)