

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: P830760

Luminaire Tested: **OHBL-72SE-MCL-UNV-L935-CD**

Issue Date: 5/3/2024



**Test Information**

Test Method: LM-79-08  
Report Number: P830760  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-2103-200-1)  
Test Lab: INNOVATION CENTER  
Issue Date: 5/3/2024  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: METALUX  
Catalog Number: OHBL-72SE-MCL-UNV-L935-CD  
Description: 72000 LUMEN OHBL SE LED LUMINAIRE WITH 90CRI, 3500K LEDS AND MEDIUM CLEAR LENS  
Light Source: -  
Ballast/Driver: -

**Summary**

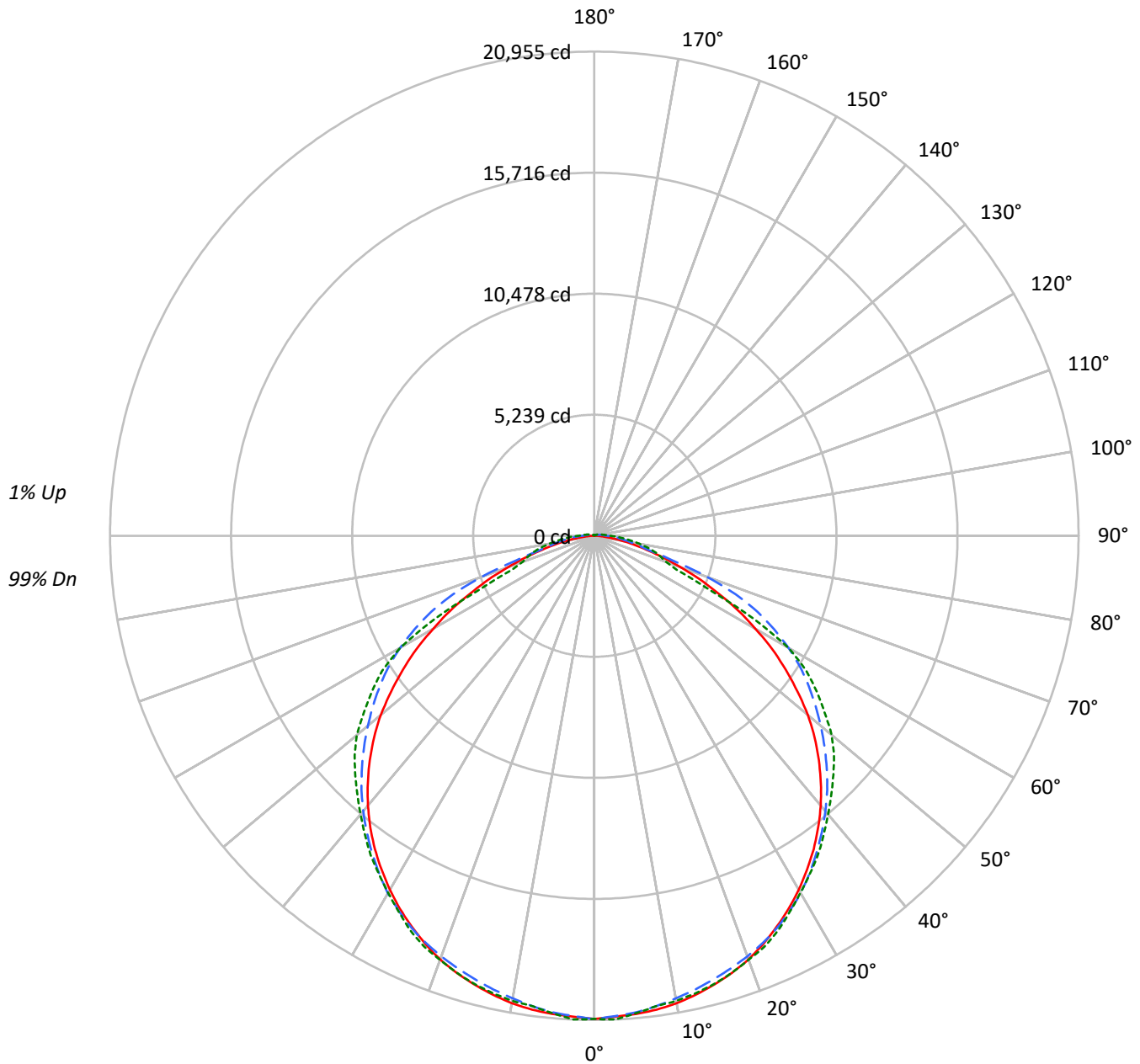
Lumens per Lamp: N/A  
Luminaire Lumens: 59108.0 lumens  
Efficiency: N/A  
Efficacy: 142.9 lumens/watt  
Spacing Criteria (0/90/45): 1.26 / 1.27 / 1.39  
Luminous Opening: Rectangular w/ Sides (W: 1.8' x L: 3.78' x H: 0.17')  
CIE Type: Direct

Input Watts (W): 413.7  
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: P830760

CATALOG NUMBER: OHBL-72SE-MCL-UNV-L935-CD

### Luminous Intensity Polar Plot





TEST NUMBER: P830760

CATALOG NUMBER: OHBL-72SE-MCL-UNV-L935-CD

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

|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |    |    |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|----|----|----|
| RF  | 20  |     |     |     | 20  |     |     |     |     | 20  |     |     |     |     | 20  |     |     |    |    | 20 |
| RC  | 80  |     |     |     | 70  |     |     |     |     | 50  |     |     |     |     | 30  |     |     |    |    | 0  |
| RW  | 70  | 50  | 30  | 10  | 70  | 50  | 30  | 10  | 50  | 30  | 10  | 50  | 30  | 10  | 50  | 30  | 10  | 50 | 30 | 10 |
| RCR |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |    |    |
| 0   | 119 | 119 | 119 | 119 | 116 | 116 | 116 | 116 | 110 | 110 | 110 | 106 | 106 | 106 | 101 | 101 | 101 |    |    | 99 |
| 1   | 109 | 104 | 100 | 96  | 106 | 102 | 98  | 95  | 97  | 94  | 91  | 93  | 91  | 88  | 90  | 87  | 86  |    |    | 83 |
| 2   | 99  | 91  | 84  | 79  | 96  | 89  | 83  | 78  | 85  | 80  | 76  | 82  | 78  | 74  | 79  | 75  | 72  |    |    | 70 |
| 3   | 91  | 80  | 72  | 66  | 88  | 79  | 71  | 65  | 75  | 69  | 64  | 72  | 67  | 63  | 70  | 65  | 61  |    |    | 59 |
| 4   | 83  | 71  | 62  | 56  | 81  | 70  | 62  | 55  | 67  | 60  | 54  | 65  | 59  | 54  | 62  | 57  | 53  |    |    | 51 |
| 5   | 76  | 64  | 55  | 48  | 74  | 62  | 54  | 48  | 60  | 53  | 47  | 58  | 52  | 46  | 56  | 50  | 46  |    |    | 44 |
| 6   | 70  | 57  | 48  | 42  | 68  | 56  | 48  | 42  | 54  | 47  | 41  | 52  | 46  | 41  | 51  | 45  | 40  |    |    | 38 |
| 7   | 65  | 52  | 43  | 37  | 63  | 51  | 43  | 37  | 49  | 42  | 36  | 48  | 41  | 36  | 46  | 40  | 36  |    |    | 34 |
| 8   | 61  | 47  | 39  | 33  | 59  | 46  | 38  | 33  | 45  | 38  | 33  | 44  | 37  | 32  | 42  | 36  | 32  |    |    | 30 |
| 9   | 57  | 43  | 35  | 30  | 55  | 43  | 35  | 29  | 41  | 34  | 29  | 40  | 34  | 29  | 39  | 33  | 29  |    |    | 27 |
| 10  | 53  | 40  | 32  | 27  | 52  | 39  | 32  | 27  | 38  | 31  | 27  | 37  | 31  | 26  | 36  | 30  | 26  |    |    | 24 |

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

|     | 0°    | 45°   | 90°   |
|-----|-------|-------|-------|
| 0°  | 33073 | 33073 | 33073 |
| 5°  | 32856 | 32592 | 32661 |
| 10° | 32736 | 32099 | 32298 |
| 15° | 32528 | 31729 | 32082 |
| 20° | 32320 | 31497 | 31798 |
| 25° | 31931 | 31262 | 31516 |
| 30° | 31506 | 30893 | 30920 |
| 35° | 30999 | 30308 | 30591 |
| 40° | 30340 | 29702 | 30143 |
| 45° | 29426 | 29002 | 29945 |
| 50° | 28188 | 28205 | 29708 |
| 55° | 26220 | 27421 | 28599 |
| 60° | 23645 | 26273 | 26440 |
| 65° | 20283 | 24144 | 16757 |
| 70° | 16337 | 18848 | 12149 |
| 75° | 12249 | 11188 | 12330 |
| 80° | 8526  | 9303  | 11772 |
| 85° | 4853  | 8524  | 11034 |



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**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 1971.9  | 3.3       |
| 10°-20°   | 5654.3  | 9.6       |
| 20°-30°   | 8636.0  | 14.6      |
| 30°-40°   | 10478.4 | 17.7      |
| 40°-50°   | 10982.3 | 18.6      |
| 50°-60°   | 9951.6  | 16.8      |
| 60°-70°   | 6672.2  | 11.3      |
| 70°-80°   | 2996.1  | 5.1       |
| 80°-90°   | 1087.3  | 1.8       |
| 90°-100°  | 327.3   | 0.6       |
| 100°-110° | 154.4   | 0.3       |
| 110°-120° | 77.4    | 0.1       |
| 120°-130° | 42.7    | 0.1       |
| 130°-140° | 29.3    | 0.0       |
| 140°-150° | 19.7    | 0.0       |
| 150°-160° | 14.7    | 0.0       |
| 160°-170° | 9.4     | 0.0       |
| 170°-180° | 3.0     | 0.0       |
| <hr/>     |         |           |
| 0°-30°    | 16262.2 | 27.5      |
| 0°-40°    | 26740.5 | 45.2      |
| 0°-60°    | 47674.5 | 80.7      |
| 0°-90°    | 58430.1 | 98.9      |
| 90°-120°  | 559.1   | 0.9       |
| 90°-150°  | 650.8   | 1.1       |
| 90°-180°  | 678.0   | 1.1       |
| 0°-180°   | 59108.0 | 100.0     |

**CANDELA DISTRIBUTION:**

|      | 0°    | 22.5° | 45°   | 67.5° | 90°   | Flux  |
|------|-------|-------|-------|-------|-------|-------|
| 0°   | 20912 | 20912 | 20912 | 20912 | 20912 |       |
| 5°   | 20776 | 20849 | 20704 | 20767 | 20740 | ###   |
| 15°  | 20102 | 20024 | 19881 | 20057 | 20081 | 5676  |
| 25°  | 18675 | 18593 | 18723 | 18896 | 18841 | 8608  |
| 35°  | 16552 | 16592 | 16761 | 16939 | 16873 | 10346 |
| 45°  | 13737 | 13961 | 14221 | 14584 | 14629 | 10582 |
| 55°  | 10108 | 10595 | 11318 | 11772 | 11744 | 9023  |
| 65°  | 5933  | 6861  | 7789  | 6574  | 5367  | 5911  |
| 75°  | 2334  | 3387  | 2492  | 2549  | 2715  | 2551  |
| 85°  | 402   | 771   | 989   | 1194  | 1252  | 491   |
| 90°  | 3     | 257   | 511   | 641   | 671   | 24    |
| 95°  | 3     | 160   | 351   | 426   | 438   | 4     |
| 105° | 12    | 70    | 172   | 209   | 218   | 14    |
| 115° | 24    | 36    | 88    | 112   | 118   | 22    |
| 125° | 21    | 24    | 54    | 64    | 66    | 21    |
| 135° | 27    | 30    | 33    | 48    | 51    | 22    |
| 145° | 27    | 30    | 30    | 33    | 36    | 18    |
| 155° | 30    | 33    | 33    | 33    | 30    | 14    |
| 165° | 33    | 33    | 33    | 33    | 33    | 9     |
| 175° | 33    | 33    | 30    | 27    | 27    | 3     |
| 180° | 30    | 30    | 30    | 30    | 30    |       |



TEST NUMBER: P830760

CATALOG NUMBER: OHBL-72SE-MCL-UNV-L935-CD

**CANDELA DISTRIBUTION (FULL):**

|        | 0°      | 22.5°   | 45°     | 67.5°   | 90°     |
|--------|---------|---------|---------|---------|---------|
| 0°     | 20912.5 | 20912.5 | 20912.5 | 20912.5 | 20912.5 |
| 2.5°   | 20827.8 | 20915.5 | 20806.6 | 20924.6 | 20954.8 |
| 5°     | 20776.4 | 20849.0 | 20703.8 | 20767.3 | 20740.1 |
| 7.5°   | 20682.7 | 20706.8 | 20534.5 | 20585.9 | 20531.5 |
| 10°    | 20543.6 | 20531.5 | 20328.9 | 20428.7 | 20440.8 |
| 12.5°  | 20337.9 | 20301.7 | 20120.2 | 20271.4 | 20274.4 |
| 15°    | 20102.1 | 20023.5 | 19881.4 | 20056.7 | 20080.9 |
| 17.5°  | 19829.9 | 19727.1 | 19633.4 | 19860.2 | 19823.9 |
| 20°    | 19512.5 | 19391.5 | 19373.4 | 19621.3 | 19530.6 |
| 22.5°  | 19119.4 | 19025.6 | 19068.0 | 19303.8 | 19246.4 |
| 25°    | 18674.9 | 18593.2 | 18723.2 | 18895.6 | 18841.2 |
| 27.5°  | 18206.2 | 18157.8 | 18306.0 | 18439.0 | 18333.2 |
| 30°    | 17692.1 | 17664.9 | 17861.5 | 17970.3 | 17837.3 |
| 32.5°  | 17132.7 | 17141.8 | 17329.3 | 17477.4 | 17353.5 |
| 35°    | 16552.2 | 16591.5 | 16760.8 | 16939.2 | 16872.7 |
| 37.5°  | 15914.2 | 16001.8 | 16171.2 | 16373.8 | 16304.2 |
| 40°    | 15239.8 | 15366.8 | 15554.3 | 15799.2 | 15735.7 |
| 42.5°  | 14511.1 | 14671.4 | 14913.3 | 15185.4 | 15179.4 |
| 45°    | 13737.0 | 13960.8 | 14220.8 | 14583.7 | 14629.0 |
| 47.5°  | 12932.7 | 13183.7 | 13513.3 | 13997.1 | 14066.6 |
| 50°    | 12058.8 | 12373.3 | 12784.5 | 13365.1 | 13407.4 |
| 52.5°  | 11085.2 | 11514.6 | 12058.8 | 12615.2 | 12563.8 |
| 55°    | 10108.5 | 10595.3 | 11318.0 | 11771.6 | 11744.4 |
| 57.5°  | 9134.8  | 9682.1  | 10559.0 | 10882.6 | 10879.6 |
| 60°    | 8046.3  | 8738.7  | 9697.3  | 9942.2  | 9700.3  |
| 62.5°  | 7039.4  | 7783.2  | 8778.0  | 8599.6  | 7771.1  |
| 65°    | 5932.7  | 6861.0  | 7789.3  | 6573.7  | 5367.2  |
| 67.5°  | 4949.9  | 5917.5  | 6616.0  | 4502.4  | 3855.3  |
| 70°    | 3961.2  | 5028.5  | 5158.6  | 3341.3  | 3295.9  |
| 72.5°  | 3084.3  | 4221.2  | 3559.0  | 2860.5  | 3005.6  |
| 75°    | 2334.4  | 3386.6  | 2491.6  | 2549.0  | 2715.4  |
| 77.5°  | 1702.4  | 2600.5  | 1938.2  | 2234.6  | 2370.6  |
| 80°    | 1170.2  | 1841.5  | 1581.4  | 1877.8  | 1971.5  |
| 82.5°  | 734.8   | 1215.6  | 1267.0  | 1511.9  | 1608.7  |
| 85°    | 402.2   | 771.1   | 988.8   | 1194.4  | 1251.8  |
| 87.5°  | 166.3   | 465.7   | 755.9   | 922.3   | 970.6   |
| 90°    | 3.0     | 257.0   | 511.0   | 641.0   | 671.3   |
| 92.5°  | 3.0     | 196.5   | 417.3   | 517.1   | 538.2   |
| 95°    | 3.0     | 160.3   | 350.8   | 426.4   | 438.4   |
| 97.5°  | 6.0     | 127.0   | 293.3   | 353.8   | 365.9   |
| 100°   | 9.1     | 105.8   | 244.9   | 296.3   | 305.4   |
| 102.5° | 12.1    | 84.7    | 205.6   | 247.9   | 257.0   |
| 105°   | 12.1    | 69.5    | 172.4   | 208.6   | 217.7   |



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CATALOG NUMBER: OHBL-72SE-MCL-UNV-L935-CD

**CANDELA DISTRIBUTION (continued):**

|        | 0°   | 22.5° | 45°   | 67.5° | 90°   |
|--------|------|-------|-------|-------|-------|
| 112.5° | 21.2 | 42.3  | 102.8 | 130.0 | 136.1 |
| 115°   | 24.2 | 36.3  | 87.7  | 111.9 | 117.9 |
| 117.5° | 24.2 | 30.2  | 75.6  | 93.7  | 99.8  |
| 120°   | 24.2 | 27.2  | 66.5  | 81.6  | 84.7  |
| 122.5° | 24.2 | 24.2  | 57.5  | 72.6  | 75.6  |
| 125°   | 21.2 | 24.2  | 54.4  | 63.5  | 66.5  |
| 127.5° | 24.2 | 24.2  | 48.4  | 57.5  | 60.5  |
| 130°   | 24.2 | 27.2  | 42.3  | 54.4  | 54.4  |
| 132.5° | 27.2 | 30.2  | 39.3  | 51.4  | 51.4  |
| 135°   | 27.2 | 30.2  | 33.3  | 48.4  | 51.4  |
| 137.5° | 30.2 | 30.2  | 30.2  | 45.4  | 48.4  |
| 140°   | 30.2 | 30.2  | 27.2  | 39.3  | 42.3  |
| 142.5° | 27.2 | 30.2  | 27.2  | 36.3  | 39.3  |
| 145°   | 27.2 | 30.2  | 30.2  | 33.3  | 36.3  |
| 147.5° | 30.2 | 30.2  | 30.2  | 30.2  | 33.3  |
| 150°   | 30.2 | 30.2  | 30.2  | 30.2  | 30.2  |
| 152.5° | 30.2 | 30.2  | 30.2  | 30.2  | 30.2  |
| 155°   | 30.2 | 33.3  | 33.3  | 33.3  | 30.2  |
| 157.5° | 30.2 | 33.3  | 33.3  | 33.3  | 33.3  |
| 160°   | 30.2 | 33.3  | 33.3  | 33.3  | 33.3  |
| 162.5° | 33.3 | 33.3  | 33.3  | 33.3  | 33.3  |
| 165°   | 33.3 | 33.3  | 33.3  | 33.3  | 33.3  |
| 167.5° | 33.3 | 36.3  | 33.3  | 33.3  | 33.3  |
| 170°   | 33.3 | 33.3  | 33.3  | 30.2  | 30.2  |
| 172.5° | 33.3 | 33.3  | 33.3  | 30.2  | 30.2  |
| 175°   | 33.3 | 33.3  | 30.2  | 27.2  | 27.2  |
| 177.5° | 36.3 | 33.3  | 30.2  | 27.2  | 24.2  |
| 180°   | 30.2 | 30.2  | 30.2  | 30.2  | 30.2  |



Report Generated By 670246072 / DESKTOP-50001EG





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







|        |      |      |       |       |       |
|--------|------|------|-------|-------|-------|
| 107.5° | 15.1 | 57.5 | 148.2 | 178.4 | 184.5 |
| 110°   | 18.1 | 48.4 | 124.0 | 151.2 | 157.2 |



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

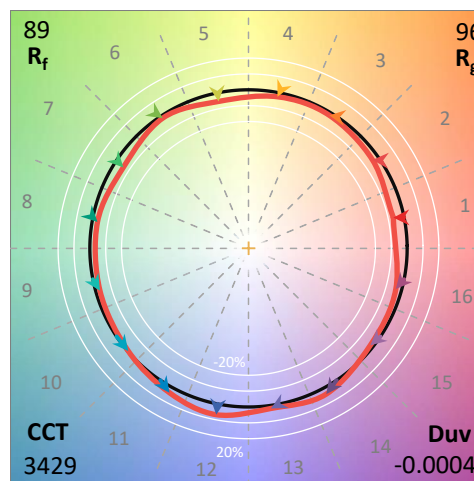
Test Method: LM-79-2019  
 Report Number: SP1-2307-100-7  
 Test Lab: COOPER LIGHTING SOLUTIONS  
 Photometer: SP1 - 76IN SPHERE  
 Measurement Geometry:  $4\pi$   
 Issue Date: 08/04/2023  
 Manufacturer: COOPER LIGHTING SOLUTIONS  
 Product Line: METALUX  
 Catalog Number: **OHB-15SE-N-UNV-L935-CD**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

LENS

### Spectral Parameters

CCT (K): 3429  
 CIE u': 0.2376  
 CIE v': 0.5121  
 Duv: -0.0004  
 CIE x: 0.4088  
 CIE y: 0.3916  
 CIE z: 0.1997  
 Peak Wavelength (nm): 609  
 Dominant Wavelength (nm): 581  
 Purity: 40.4  
 Rf: 88.9  
 Rg: 96.3

CRI (Ra): 90.9  
 R1: 91.1  
 R2: 96.7  
 R3: 97.7  
 R4: 88.8  
 R5: 90.3  
 R6: 94.5  
 R7: 89.8  
 R8: 78.2  
 R9: 50.7  
 R10: 90.8  
 R11: 88.9  
 R12: 74.6  
 R13: 92.9  
 R14: 99.5



### Test Conditions

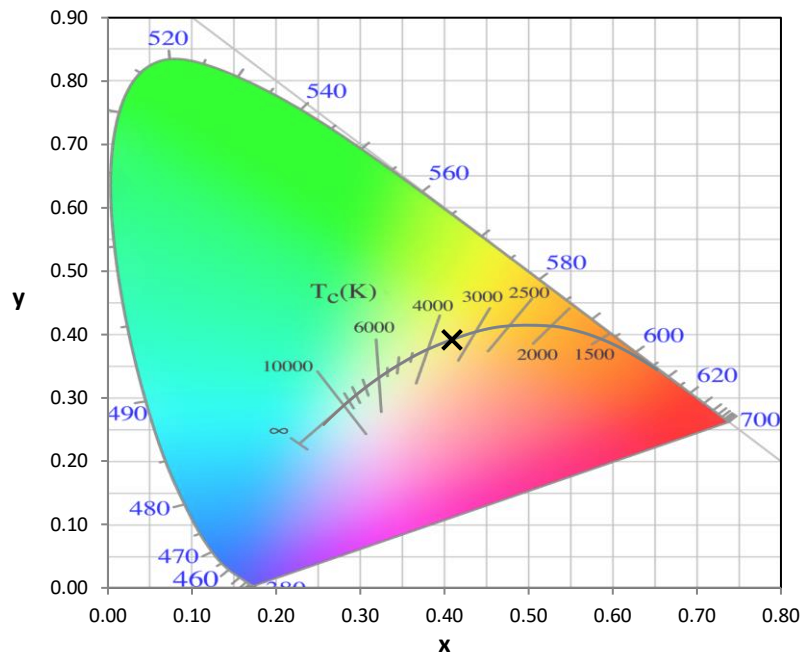
Stabilization Time: 23M  
 Operation Time: 12H  
 Room Temperature (°C) / RH%: 25.7/55%  
 Sphere Temperature (°C): 25.2

REPORT NUMBER: SP1-2307-100-7

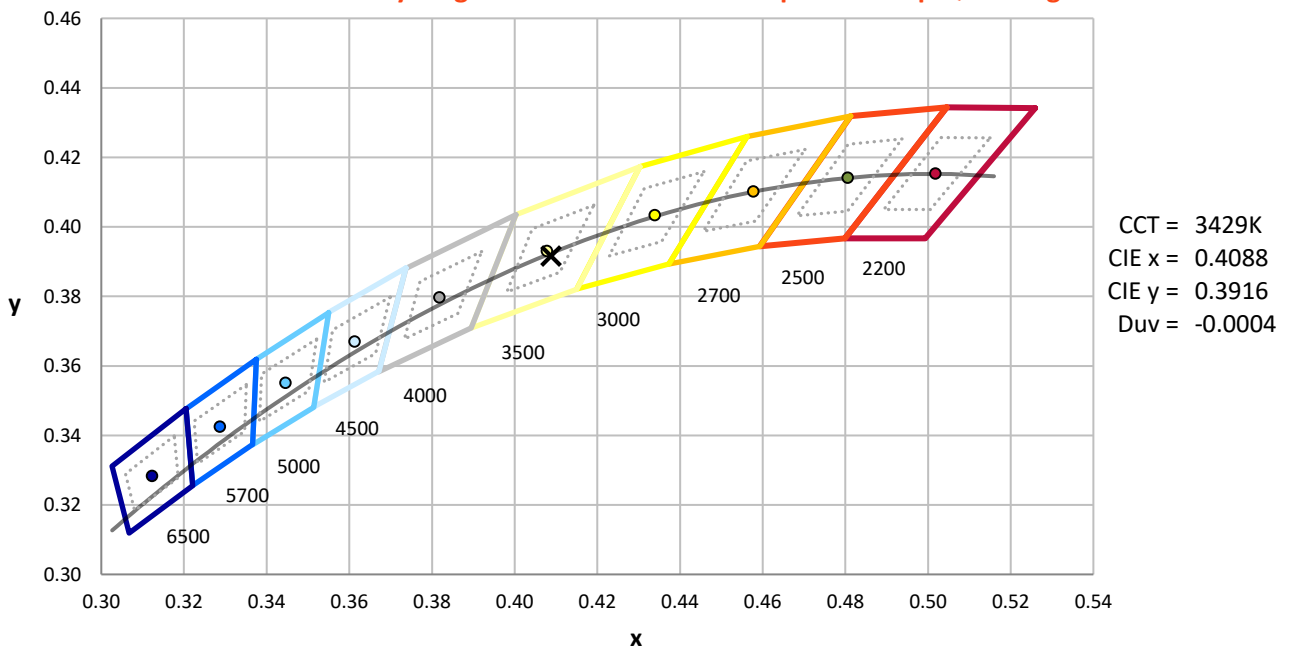
| Measurement and Test Equipment |                       |                  |                      |
|--------------------------------|-----------------------|------------------|----------------------|
| Instrument                     | Identification Number | Calibration Date | Calibration Due Date |
| 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

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**Photopic Flux vs. Wavelength**



#####

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

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Scotopic Flux vs. Wavelength



Scotopic Lumens: 19629.6

S/P: 1.6

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

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**Melanopic Flux vs. Wavelength**



**Melanopic Lumens: 7912.5**

**M/P: 0.65**

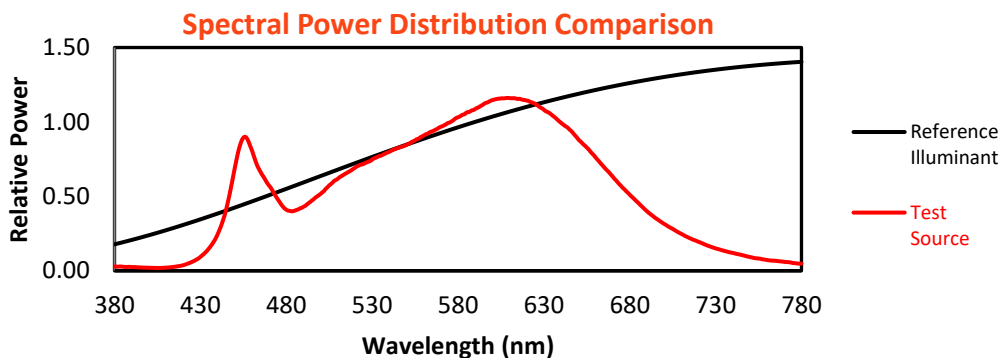
| λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) |
|-----------|------------------|------------------|-----------|------------------|------------------|-----------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

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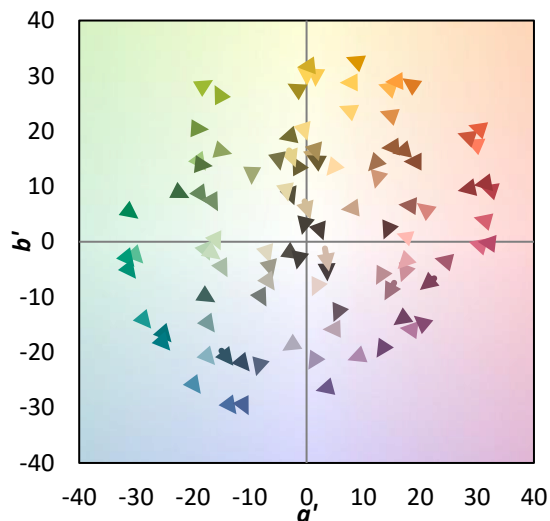
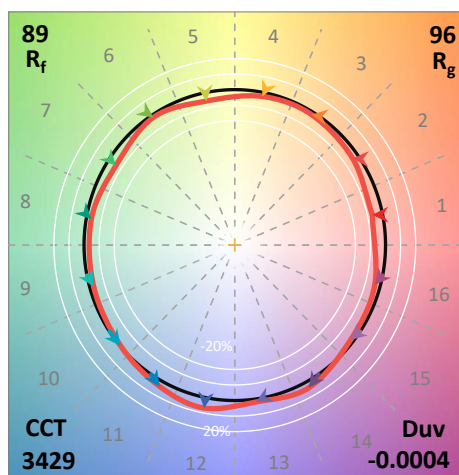
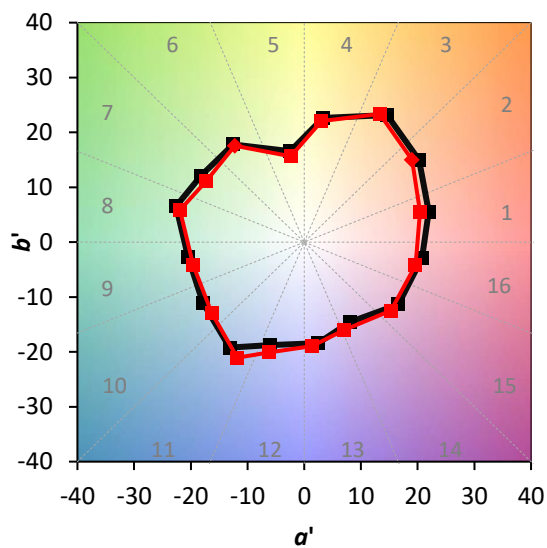
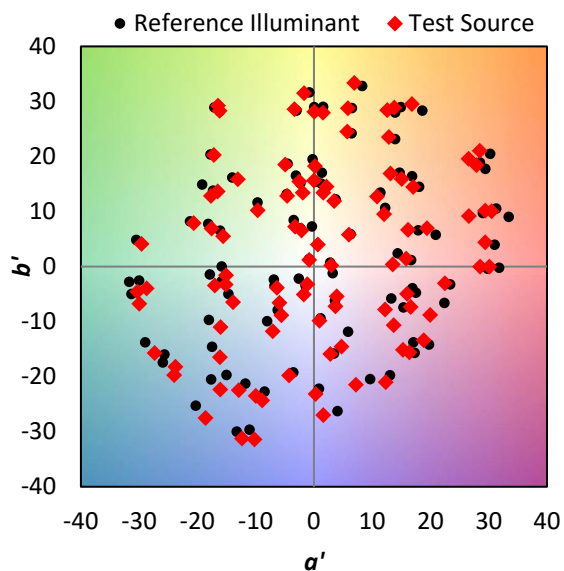
**TM-30-18**

**Summary**

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



**Color Vector Graphics**

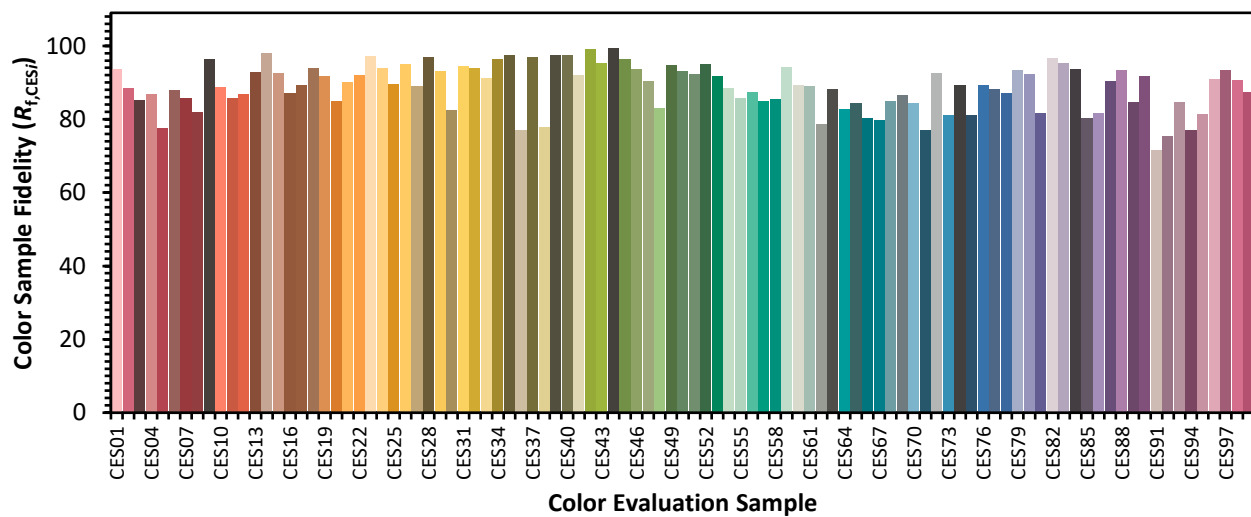


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**Individual Sample Fidelity Index ( $R_{f,i}$ )**

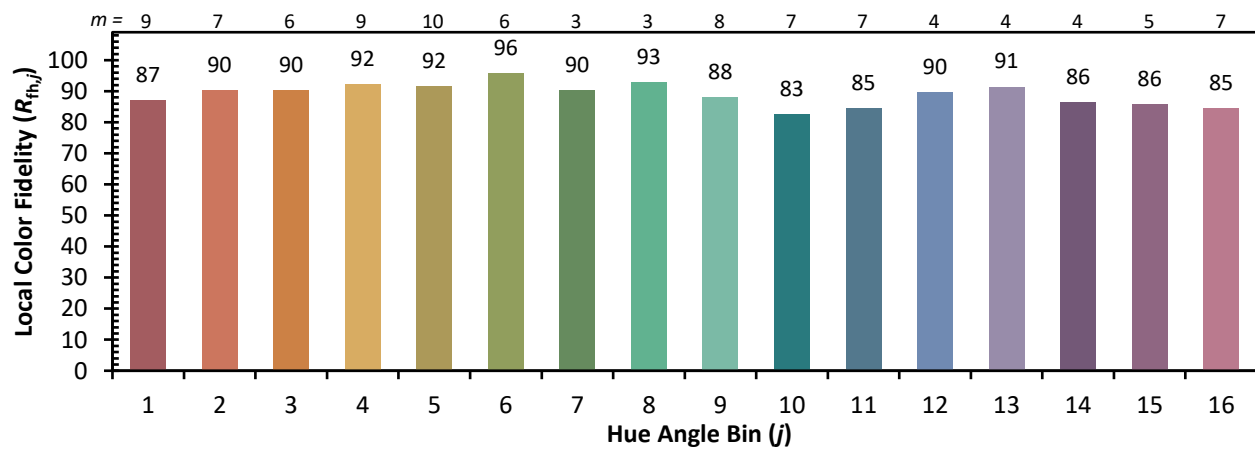
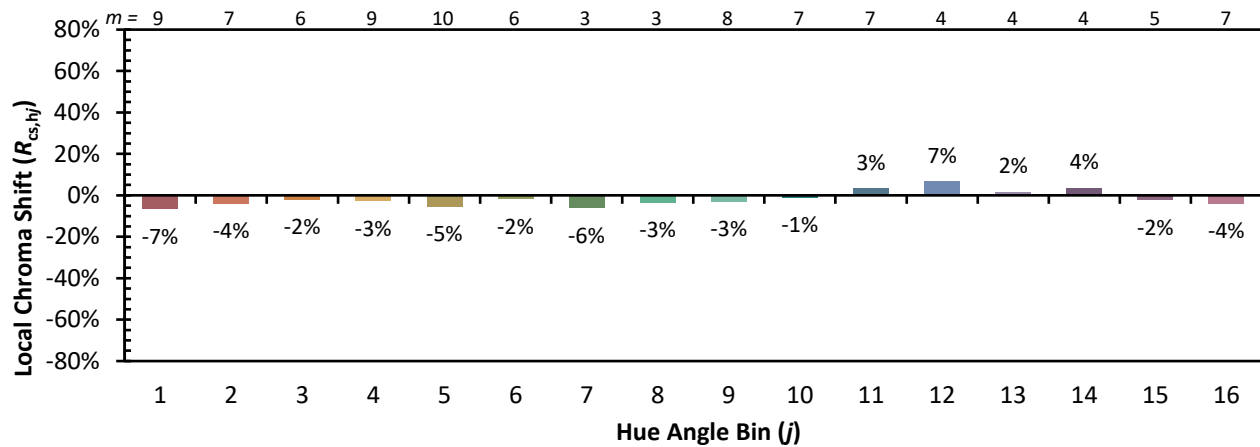
|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 86 | CES26 = 95 | CES51 = 92 | CES76 = 89 |
| CES02 = 62 | CES27 = 89 | CES52 = 95 | CES77 = 88 |
| CES03 = 31 | CES28 = 97 | CES53 = 92 | CES78 = 87 |
| CES04 = 70 | CES29 = 93 | CES54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



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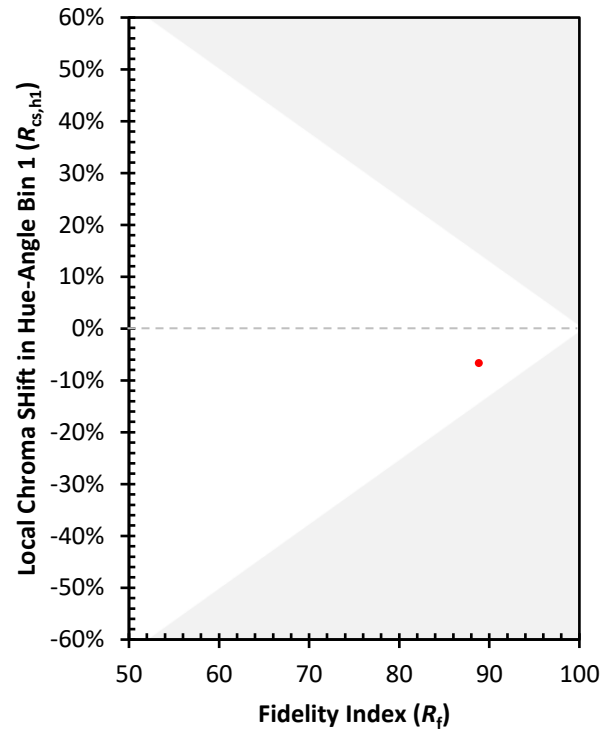
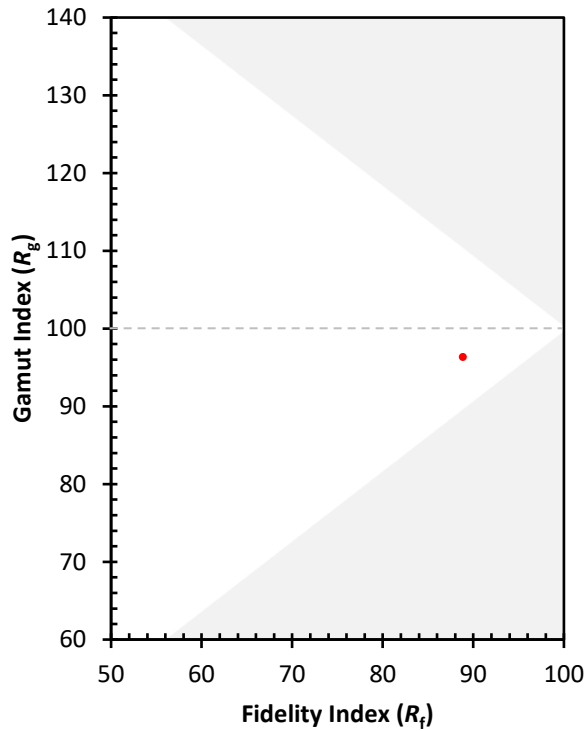
**Color Rendition by Hue-Angle Bin**



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**Measure Comparisons**



(END OF REPORT)