

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: P829825

Luminaire Tested: **OHBL-15SE-MCL-UNV-L940-CD**

Issue Date: 5/3/2024



**Test Information**

Test Method: LM-79-08  
Report Number: P829825  
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-15SE-MCL-UNV-L940-CD  
Description: 15000 LUMEN OHBL SE LED LUMINAIRE WITH 90CRI, 4000K LEDS AND MEDIUM CLEAR LENS  
Light Source: -  
Ballast/Driver: -

**Summary**

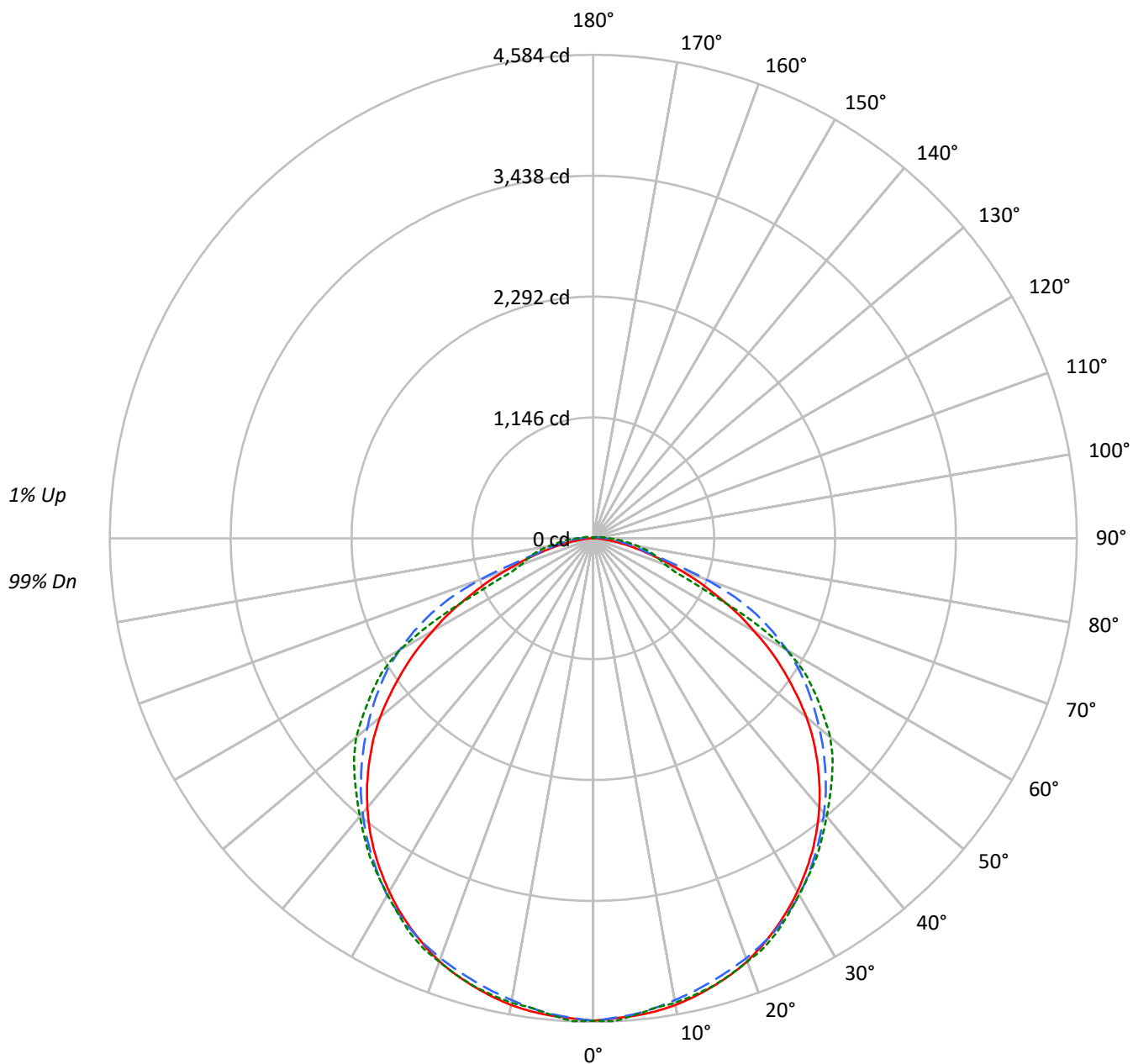
Lumens per Lamp: N/A  
Luminaire Lumens: 12931.0 lumens  
Efficiency: N/A  
Efficacy: 148.6 lumens/watt  
Spacing Criteria (0/90/45): 1.26 / 1.27 / 1.39  
Luminous Opening: Rectangular w/ Sides (W: 0.88' x L: 3.78' x H: 0.17')  
CIE Type: Direct

Input Watts (W): 87  
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: P829825

CATALOG NUMBER: OHBL-15SE-MCL-UNV-L940-CD

### Luminous Intensity Polar Plot





TEST NUMBER: P829825

CATALOG NUMBER: OHBL-15SE-MCL-UNV-L940-CD

**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   | 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°  | 14884 | 14884 | 14884 |
| 5°  | 14786 | 14580 | 14575 |
| 10° | 14732 | 14274 | 14293 |
| 15° | 14639 | 14026 | 14078 |
| 20° | 14545 | 13838 | 13833 |
| 25° | 14370 | 13648 | 13589 |
| 30° | 14179 | 13396 | 13206 |
| 35° | 13951 | 13047 | 12934 |
| 40° | 13654 | 12686 | 12605 |
| 45° | 13243 | 12277 | 12368 |
| 50° | 12686 | 11819 | 12098 |
| 55° | 11800 | 11354 | 11456 |
| 60° | 10641 | 10723 | 10382 |
| 65° | 9128  | 9675  | 6417  |
| 70° | 7353  | 7374  | 4502  |
| 75° | 5512  | 4232  | 4364  |
| 80° | 3837  | 3340  | 3884  |
| 85° | 2184  | 2788  | 3218  |



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**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 431.4   | 3.3       |
| 10°-20°   | 1237.0  | 9.6       |
| 20°-30°   | 1889.3  | 14.6      |
| 30°-40°   | 2292.3  | 17.7      |
| 40°-50°   | 2402.6  | 18.6      |
| 50°-60°   | 2177.1  | 16.8      |
| 60°-70°   | 1459.7  | 11.3      |
| 70°-80°   | 655.5   | 5.1       |
| 80°-90°   | 237.9   | 1.8       |
| 90°-100°  | 71.6    | 0.6       |
| 100°-110° | 33.8    | 0.3       |
| 110°-120° | 16.9    | 0.1       |
| 120°-130° | 9.4     | 0.1       |
| 130°-140° | 6.4     | 0.0       |
| 140°-150° | 4.3     | 0.0       |
| 150°-160° | 3.2     | 0.0       |
| 160°-170° | 2.1     | 0.0       |
| 170°-180° | 0.7     | 0.0       |
| <hr/>     |         |           |
| 0°-30°    | 3557.7  | 27.5      |
| 0°-40°    | 5850.0  | 45.2      |
| 0°-60°    | 10429.7 | 80.7      |
| 0°-90°    | 12782.7 | 98.9      |
| 90°-120°  | 122.3   | 0.9       |
| 90°-150°  | 142.4   | 1.1       |
| 90°-180°  | 148.0   | 1.1       |
| 0°-180°   | 12931.0 | 100.0     |

**CANDELA DISTRIBUTION:**

|      | 0°   | 22.5° | 45°  | 67.5° | 90°  | Flux |
|------|------|-------|------|-------|------|------|
| 0°   | 4575 | 4575  | 4575 | 4575  | 4575 |      |
| 5°   | 4545 | 4561  | 4529 | 4543  | 4537 | 432  |
| 15°  | 4398 | 4380  | 4349 | 4388  | 4393 | 1242 |
| 25°  | 4086 | 4068  | 4096 | 4134  | 4122 | 1883 |
| 35°  | 3621 | 3630  | 3667 | 3706  | 3691 | 2263 |
| 45°  | 3005 | 3054  | 3111 | 3190  | 3200 | 2315 |
| 55°  | 2211 | 2318  | 2476 | 2575  | 2569 | 1974 |
| 65°  | 1298 | 1501  | 1704 | 1438  | 1174 | 1293 |
| 75°  | 511  | 741   | 545  | 558   | 594  | 558  |
| 85°  | 88   | 169   | 216  | 261   | 274  | 107  |
| 90°  | 1    | 56    | 112  | 140   | 147  | 5    |
| 95°  | 1    | 35    | 77   | 93    | 96   | 1    |
| 105° | 3    | 15    | 38   | 46    | 48   | 3    |
| 115° | 5    | 8     | 19   | 24    | 26   | 5    |
| 125° | 5    | 5     | 12   | 14    | 15   | 5    |
| 135° | 6    | 7     | 7    | 11    | 11   | 5    |
| 145° | 6    | 7     | 7    | 7     | 8    | 4    |
| 155° | 7    | 7     | 7    | 7     | 7    | 3    |
| 165° | 7    | 7     | 7    | 7     | 7    | 2    |
| 175° | 7    | 7     | 7    | 6     | 6    | 1    |
| 180° | 7    | 7     | 7    | 7     | 7    |      |



TEST NUMBER: P829825

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**CANDELA DISTRIBUTION (FULL):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 0°     | 4575.0 | 4575.0 | 4575.0 | 4575.0 | 4575.0 |
| 2.5°   | 4556.5 | 4575.7 | 4551.8 | 4577.6 | 4584.3 |
| 5°     | 4545.2 | 4561.1 | 4529.4 | 4543.2 | 4537.3 |
| 7.5°   | 4524.7 | 4530.0 | 4492.3 | 4503.6 | 4491.6 |
| 10°    | 4494.3 | 4491.6 | 4447.3 | 4469.2 | 4471.8 |
| 12.5°  | 4449.3 | 4441.4 | 4401.7 | 4434.8 | 4435.4 |
| 15°    | 4397.7 | 4380.5 | 4349.4 | 4387.8 | 4393.1 |
| 17.5°  | 4338.2 | 4315.7 | 4295.2 | 4344.8 | 4336.9 |
| 20°    | 4268.7 | 4242.3 | 4238.3 | 4292.5 | 4272.7 |
| 22.5°  | 4182.7 | 4162.2 | 4171.5 | 4223.1 | 4210.5 |
| 25°    | 4085.5 | 4067.6 | 4096.1 | 4133.8 | 4121.9 |
| 27.5°  | 3982.9 | 3972.4 | 4004.8 | 4033.9 | 4010.7 |
| 30°    | 3870.5 | 3864.5 | 3907.5 | 3931.4 | 3902.2 |
| 32.5°  | 3748.1 | 3750.1 | 3791.1 | 3823.5 | 3796.4 |
| 35°    | 3621.1 | 3629.7 | 3666.7 | 3705.8 | 3691.2 |
| 37.5°  | 3481.5 | 3500.7 | 3537.8 | 3582.1 | 3566.9 |
| 40°    | 3334.0 | 3361.8 | 3402.8 | 3456.4 | 3442.5 |
| 42.5°  | 3174.6 | 3209.6 | 3262.6 | 3322.1 | 3320.8 |
| 45°    | 3005.2 | 3054.2 | 3111.1 | 3190.5 | 3200.4 |
| 47.5°  | 2829.3 | 2884.2 | 2956.3 | 3062.1 | 3077.3 |
| 50°    | 2638.1 | 2706.9 | 2796.9 | 2923.9 | 2933.1 |
| 52.5°  | 2425.1 | 2519.0 | 2638.1 | 2759.8 | 2748.6 |
| 55°    | 2211.4 | 2317.9 | 2476.0 | 2575.3 | 2569.3 |
| 57.5°  | 1998.4 | 2118.2 | 2310.0 | 2380.8 | 2380.1 |
| 60°    | 1760.3 | 1911.8 | 2121.5 | 2175.0 | 2122.1 |
| 62.5°  | 1540.0 | 1702.7 | 1920.4 | 1881.3 | 1700.1 |
| 65°    | 1297.9 | 1501.0 | 1704.0 | 1438.1 | 1174.2 |
| 67.5°  | 1082.9 | 1294.6 | 1447.4 | 985.0  | 843.4  |
| 70°    | 866.6  | 1100.1 | 1128.5 | 731.0  | 721.0  |
| 72.5°  | 674.7  | 923.5  | 778.6  | 625.8  | 657.5  |
| 75°    | 510.7  | 740.9  | 545.1  | 557.7  | 594.0  |
| 77.5°  | 372.4  | 568.9  | 424.0  | 488.9  | 518.6  |
| 80°    | 256.0  | 402.9  | 346.0  | 410.8  | 431.3  |
| 82.5°  | 160.7  | 265.9  | 277.2  | 330.8  | 351.9  |
| 85°    | 88.0   | 168.7  | 216.3  | 261.3  | 273.9  |
| 87.5°  | 36.4   | 101.9  | 165.4  | 201.8  | 212.3  |
| 90°    | 0.7    | 56.2   | 111.8  | 140.2  | 146.9  |
| 92.5°  | 0.7    | 43.0   | 91.3   | 113.1  | 117.7  |
| 95°    | 0.7    | 35.1   | 76.7   | 93.3   | 95.9   |
| 97.5°  | 1.3    | 27.8   | 64.2   | 77.4   | 80.0   |
| 100°   | 2.0    | 23.2   | 53.6   | 64.8   | 66.8   |
| 102.5° | 2.6    | 18.5   | 45.0   | 54.2   | 56.2   |
| 105°   | 2.6    | 15.2   | 37.7   | 45.6   | 47.6   |



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CATALOG NUMBER: OHBL-15SE-MCL-UNV-L940-CD

**CANDELA DISTRIBUTION (continued):**

|        | 0°  | 22.5° | 45°  | 67.5° | 90°  |
|--------|-----|-------|------|-------|------|
| 112.5° | 4.6 | 9.3   | 22.5 | 28.4  | 29.8 |
| 115°   | 5.3 | 7.9   | 19.2 | 24.5  | 25.8 |
| 117.5° | 5.3 | 6.6   | 16.5 | 20.5  | 21.8 |
| 120°   | 5.3 | 6.0   | 14.6 | 17.9  | 18.5 |
| 122.5° | 5.3 | 5.3   | 12.6 | 15.9  | 16.5 |
| 125°   | 4.6 | 5.3   | 11.9 | 13.9  | 14.6 |
| 127.5° | 5.3 | 5.3   | 10.6 | 12.6  | 13.2 |
| 130°   | 5.3 | 6.0   | 9.3  | 11.9  | 11.9 |
| 132.5° | 6.0 | 6.6   | 8.6  | 11.2  | 11.2 |
| 135°   | 6.0 | 6.6   | 7.3  | 10.6  | 11.2 |
| 137.5° | 6.6 | 6.6   | 6.6  | 9.9   | 10.6 |
| 140°   | 6.6 | 6.6   | 6.0  | 8.6   | 9.3  |
| 142.5° | 6.0 | 6.6   | 6.0  | 7.9   | 8.6  |
| 145°   | 6.0 | 6.6   | 6.6  | 7.3   | 7.9  |
| 147.5° | 6.6 | 6.6   | 6.6  | 6.6   | 7.3  |
| 150°   | 6.6 | 6.6   | 6.6  | 6.6   | 6.6  |
| 152.5° | 6.6 | 6.6   | 6.6  | 6.6   | 6.6  |
| 155°   | 6.6 | 7.3   | 7.3  | 7.3   | 6.6  |
| 157.5° | 6.6 | 7.3   | 7.3  | 7.3   | 7.3  |
| 160°   | 6.6 | 7.3   | 7.3  | 7.3   | 7.3  |
| 162.5° | 7.3 | 7.3   | 7.3  | 7.3   | 7.3  |
| 165°   | 7.3 | 7.3   | 7.3  | 7.3   | 7.3  |
| 167.5° | 7.3 | 7.9   | 7.3  | 7.3   | 7.3  |
| 170°   | 7.3 | 7.3   | 7.3  | 6.6   | 6.6  |
| 172.5° | 7.3 | 7.3   | 7.3  | 6.6   | 6.6  |
| 175°   | 7.3 | 7.3   | 6.6  | 6.0   | 6.0  |
| 177.5° | 7.9 | 7.3   | 6.6  | 6.0   | 5.3  |
| 180°   | 6.6 | 6.6   | 6.6  | 6.6   | 6.6  |



Report Generated By 670246072 / DESKTOP-50001EG





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







|        |     |      |      |      |      |
|--------|-----|------|------|------|------|
| 107.5° | 3.3 | 12.6 | 32.4 | 39.0 | 40.4 |
| 110°   | 4.0 | 10.6 | 27.1 | 33.1 | 34.4 |



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

Report Prepared for

Cooper Lighting Solutions

METALUX

Report Number: SP1-2307-100-8

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.

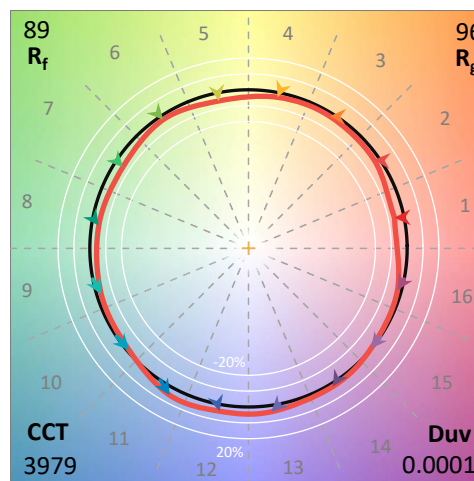
### Test Information

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   | CRI (Ra): | 91.5 |      |      |
| CIE u':                   | 0.2254 | R1:       | 91.7 | R9:  | 57.0 |
| CIE v':                   | 0.5020 | R2:       | 96.4 | R10: | 89.6 |
| Duv:                      | 0.0001 | R3:       | 97.6 | R11: | 89.1 |
| CIE x:                    | 0.3813 | R4:       | 89.2 | R12: | 69.6 |
| CIE y:                    | 0.3773 | R5:       | 90.3 | R13: | 93.4 |
| CIE z:                    | 0.2414 | R6:       | 93.0 | R14: | 98.9 |
| Peak Wavelength (nm):     | 455    | R7:       | 91.6 |      |      |
| Dominant Wavelength (nm): | 579    | R8:       | 81.9 |      |      |
| Purity:                   | 27.8   |           |      |      |      |
| Rf:                       | 88.6   |           |      |      |      |
| Rg:                       | 96.2   |           |      |      |      |



### Test Conditions

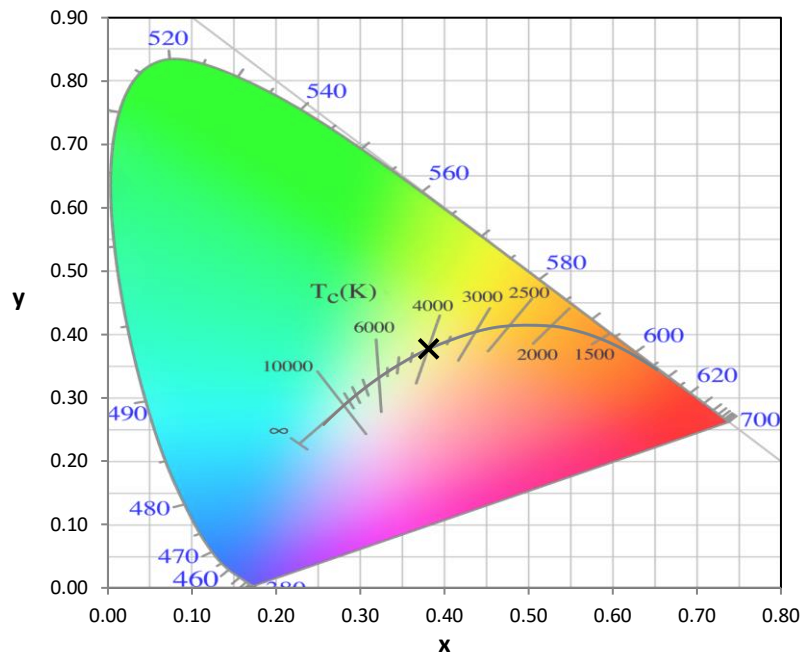
Stabilization Time: 23M  
 Operation Time: 12H  
 Room Temperature (°C) / RH%: 25.7/57%  
 Sphere Temperature (°C): 25.2

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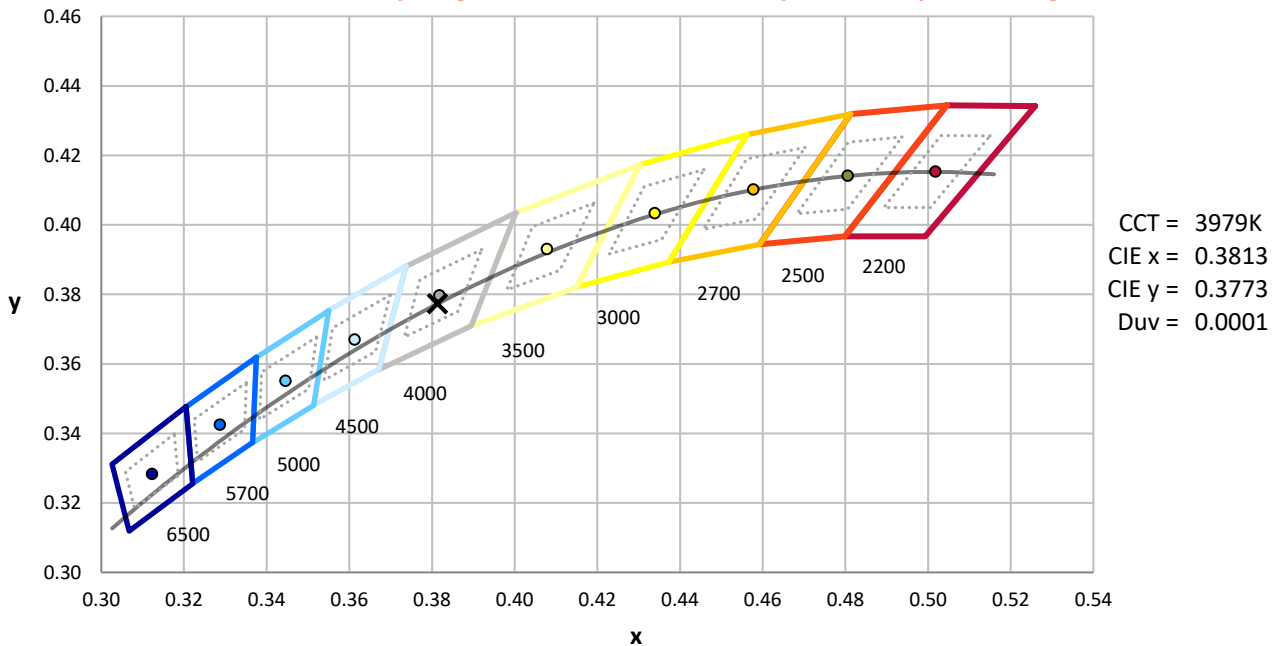
| Measurement and Test Equipment |                       |                  |                      |
|--------------------------------|-----------------------|------------------|----------------------|
| Instrument                     | Identification Number | Calibration Date | Calibration Due Date |
| 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 4000K 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       | 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               |           |                  |                  |

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**Melanopic Flux vs. Wavelength**



**Melanopic Lumens: 9423.4 M/P: 0.74**

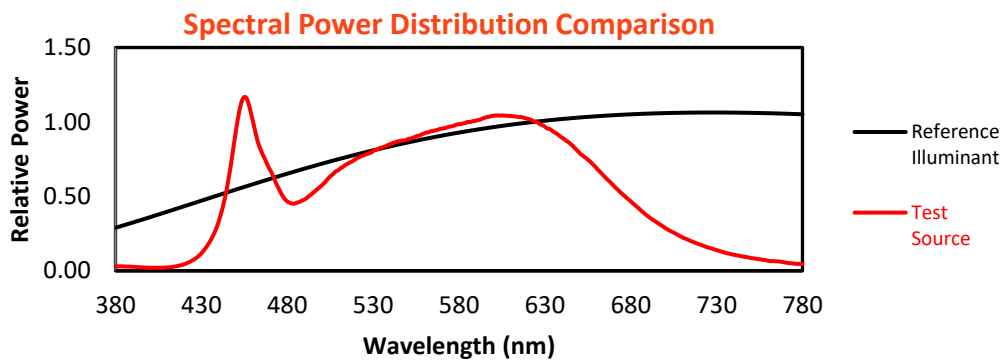
| λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) |
|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|
| 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               |           |                  |                  |

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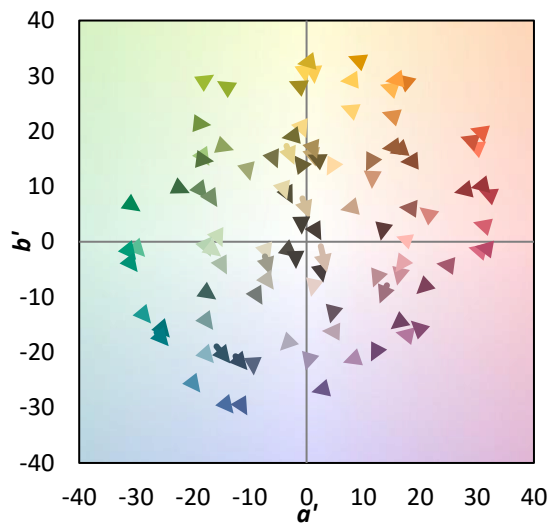
**TM-30-18**

**Summary**

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



**Color Vector Graphics**

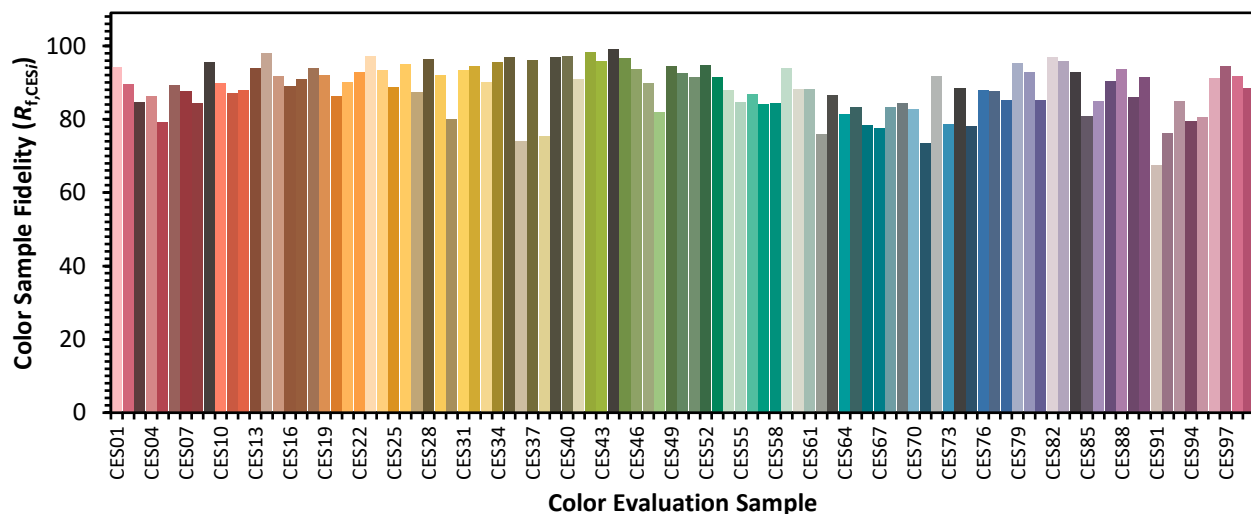


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**Individual Sample Fidelity Index ( $R_{f,i}$ )**

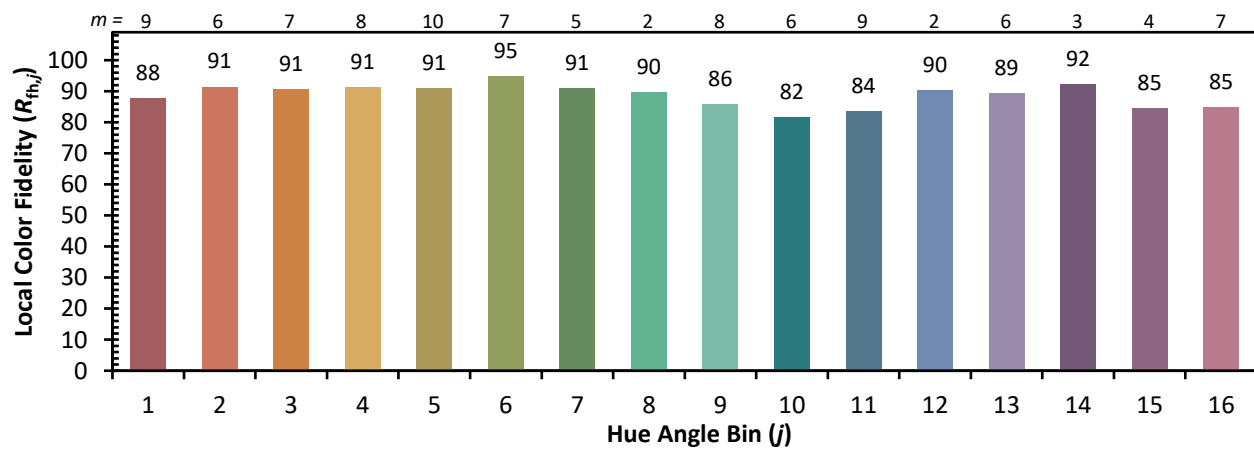
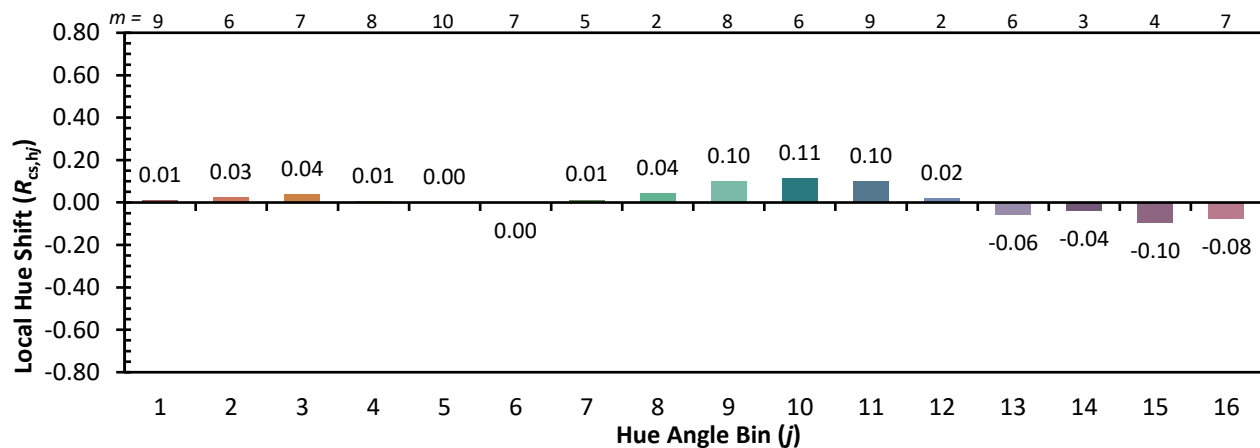
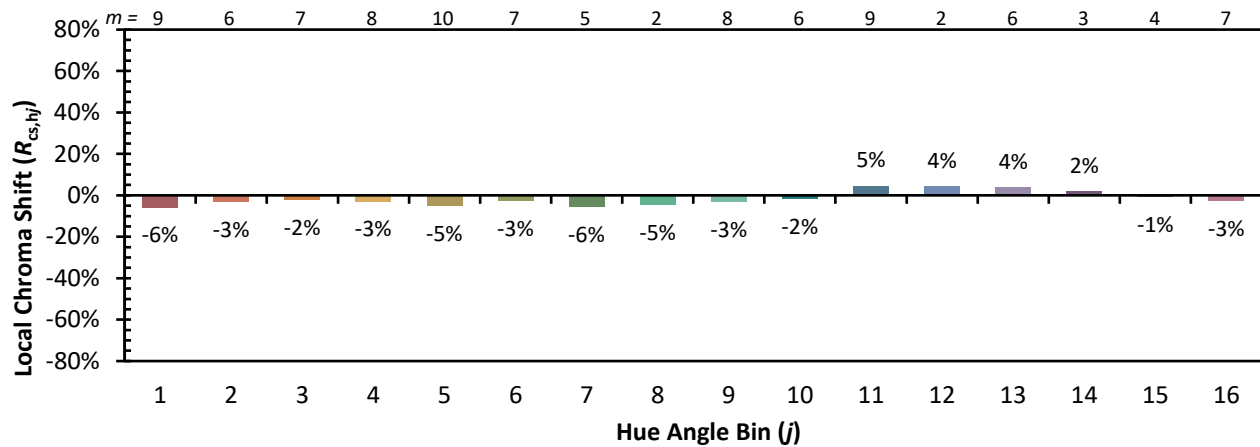
|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 86 | CES26 = 95 | CES51 = 92 | CES76 = 88 |
| CES02 = 62 | CES27 = 87 | CES52 = 95 | CES77 = 88 |
| CES03 = 31 | CES28 = 96 | CES53 = 92 | CES78 = 85 |
| CES04 = 69 | CES29 = 92 | CES54 = 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 |            |



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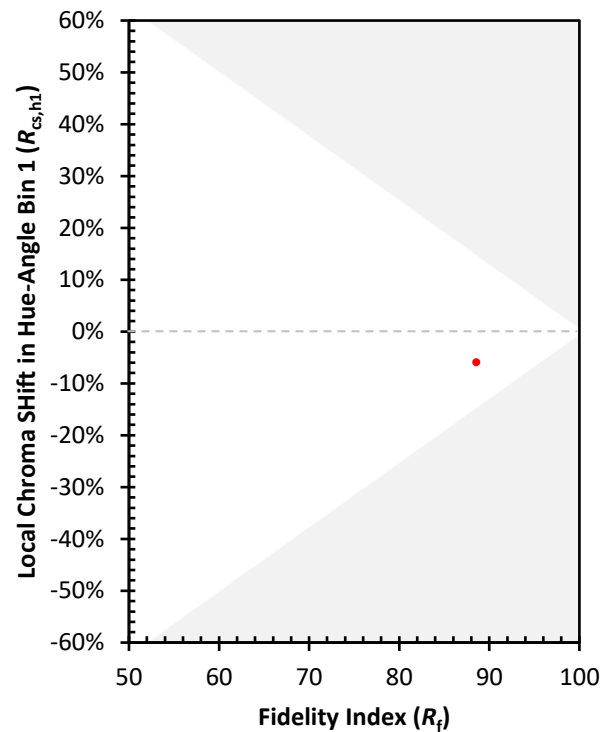
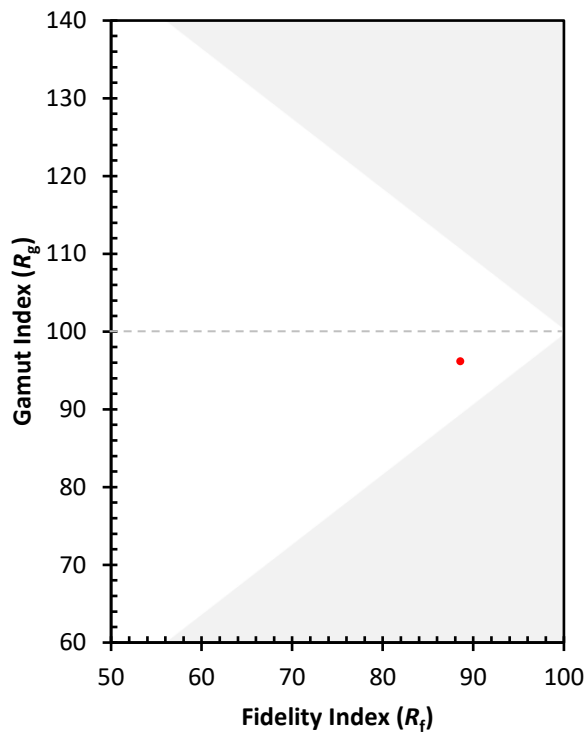
**Color Rendition by Hue-Angle Bin**



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**TM-30-18**

**Measure Comparisons**



(END OF REPORT)