

Classified  
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: HALO

Report Number: P832738

Luminaire Tested: **HLBT609FS5\*-935**

Issue Date: 05/14/2024



**Test Information**

Test Method: LM-79-08  
Report Number: P832738  
Test Lab: ETA Testing Technology  
Issue Date: 05/14/2024  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: HALO  
Catalog Number: HLBT609FS5\*-935  
Description: HALO SLIM RETROFIT 6 inch 90 CRI COLOR SELECTABLE FIXTURE  
Light Source: 3500K CCT, 90 CRI LEDS  
Ballast/Driver: ELECTRONIC DRIVER

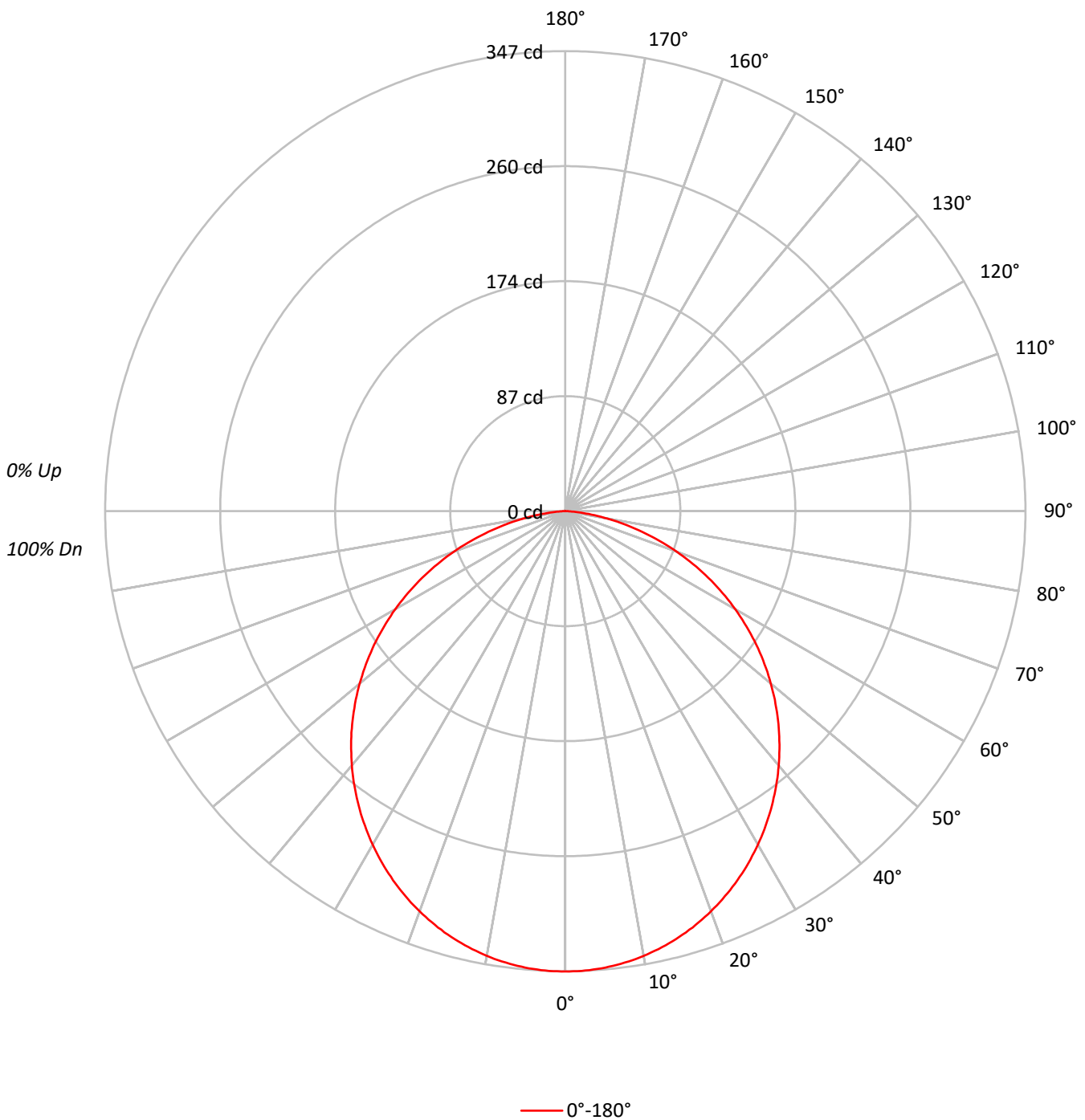
**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 965.0 lumens  
Efficiency: N/A  
Efficacy: 96.5 lumens/watt  
Spacing Criteria (0/90/45): 1.24 / 1.24 / 1.36  
Luminous Opening: Circular (Dia: 0.5' x H: 0')  
CIE Type: Direct

Input Watts (W): 10  
Input Voltage (V): 120  
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

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CATALOG NUMBER: HLBT609FS5\*-935

### Luminous Intensity Polar Plot





TEST NUMBER: P832738

CATALOG NUMBER: HLBT609FS5\*-935

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

RF	20				20				20				20				20				20
RC	80				70				50				30				10				0
RW	70	50	30	10	70	50	30	10	50	30	10	50	30	10	50	30	10	50	30	10	0
RCR																					
0	119	119	119	119	116	116	116	116	111	111	111	106	106	106	102	102	102	100	100	100	100
1	109	104	100	96	106	102	98	95	98	95	92	94	91	89	90	88	86	84	84	84	84
2	99	91	84	78	97	89	83	78	86	80	76	82	78	74	79	76	72	70	70	70	70
3	90	80	72	65	88	78	71	65	75	69	64	73	67	62	70	65	61	59	59	59	59
4	83	71	62	55	80	69	61	55	67	60	54	65	58	53	62	57	53	51	51	51	51
5	76	63	54	48	74	62	54	47	60	53	47	58	51	46	56	50	46	44	44	44	44
6	70	57	48	42	68	56	48	41	54	47	41	52	46	41	51	45	40	38	38	38	38
7	65	52	43	37	63	51	42	37	49	42	36	48	41	36	46	40	36	34	34	34	34
8	61	47	39	33	59	46	38	33	45	38	32	44	37	32	43	37	32	30	30	30	30
9	57	43	35	29	55	43	35	29	41	34	29	40	34	29	39	33	29	27	27	27	27
10	53	40	32	27	52	39	32	27	38	31	27	37	31	26	37	31	26	25	25	25	25

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

	0°
0°	19034
5°	19018
10°	18960
15°	18865
20°	18738
25°	18582
30°	18389
35°	18170
40°	17919
45°	17622
50°	17262
55°	16821
60°	16238
65°	15449
70°	14329
75°	12666
80°	10165
85°	6542



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**ZONAL LUMENS:**

Zone	Lumens	% Fixture
0°-10°	32.8	3.4
10°-20°	93.8	9.7
20°-30°	141.5	14.7
30°-40°	169.8	17.6
40°-50°	175.2	18.2
50°-60°	157.1	16.3
60°-70°	117.7	12.2
70°-80°	63.3	6.6
80°-90°	13.7	1.4
90°-100°	0.0	0.0
100°-110°	0.0	0.0
110°-120°	0.0	0.0
120°-130°	0.0	0.0
130°-140°	0.0	0.0
140°-150°	0.0	0.0
150°-160°	0.0	0.0
160°-170°	0.0	0.0
170°-180°	0.0	0.0
0°-30°	268.2	27.8
0°-40°	438.0	45.4
0°-60°	770.3	79.8
0°-90°	965.0	100.0
90°-120°	0.0	0.0
90°-150°	0.0	0.0
90°-180°	0.0	0.0
0°-180°	965.0	100.0

**CANDELA DISTRIBUTION:**

	0°	Flux
0°	347	
5°	346	33
15°	332	94
25°	307	142
35°	272	170
45°	227	175
55°	176	157
65°	119	118
75°	60	63
85°	10	14
90°	1	



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**CANDELA DISTRIBUTION (FULL):**

	0°
0°	347.2
0.5°	347.2
1°	347.2
1.5°	347.1
2°	347.0
2.5°	346.8
3°	346.7
3.5°	346.4
4°	346.2
4.5°	345.9
5°	345.6
5.5°	345.2
6°	344.8
6.5°	344.4
7°	344.0
7.5°	343.5
8°	343.0
8.5°	342.4
9°	341.9
9.5°	341.2
10°	340.6
10.5°	339.9
11°	339.2
11.5°	338.4
12°	337.7
12.5°	336.9
13°	336.1
13.5°	335.2
14°	334.4
14.5°	333.4
15°	332.4
15.5°	331.4
16°	330.5
16.5°	329.3
17°	328.4
17.5°	327.2
18°	326.0
18.5°	324.9
19°	323.7
19.5°	322.5
20°	321.2
20.5°	319.9
21°	318.6
21.5°	317.3
22°	315.9



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**CANDELA DISTRIBUTION (continued):**

	0°
22.5°	314.5
23°	313.1
23.5°	311.7
24°	310.2
24.5°	308.7
25°	307.2
25.5°	305.6
26°	304.1
26.5°	302.4
27°	300.9
27.5°	299.2
28°	297.5
28.5°	295.7
29°	294.1
29.5°	292.3
30°	290.5
30.5°	288.7
31°	286.9
31.5°	285.0
32°	283.2
32.5°	281.3
33°	279.3
33.5°	277.4
34°	275.5
34.5°	273.5
35°	271.5
35.5°	269.5
36°	267.4
36.5°	265.4
37°	263.3
37.5°	261.2
38°	259.1
38.5°	256.9
39°	254.8
39.5°	252.6
40°	250.4
40.5°	248.1
41°	245.9
41.5°	243.6
42°	241.4
42.5°	239.0
43°	236.7
43.5°	234.4
44°	232.1
44.5°	229.7



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**CANDELA DISTRIBUTION (continued):**

	0°
45°	227.3
45.5°	224.8
46°	222.4
46.5°	220.0
47°	217.5
47.5°	215.0
48°	212.6
48.5°	210.0
49°	207.5
49.5°	204.9
50°	202.4
50.5°	199.8
51°	197.2
51.5°	194.7
52°	192.0
52.5°	189.3
53°	186.7
53.5°	184.0
54°	181.3
54.5°	178.6
55°	176.0
55.5°	173.2
56°	170.4
56.5°	167.7
57°	164.9
57.5°	162.1
58°	159.3
58.5°	156.5
59°	153.7
59.5°	150.9
60°	148.1
60.5°	145.2
61°	142.3
61.5°	139.5
62°	136.6
62.5°	133.7
63°	130.8
63.5°	127.9
64°	124.9
64.5°	122.0
65°	119.1
65.5°	116.1
66°	113.1
66.5°	110.2
67°	107.2





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**CANDELA DISTRIBUTION (continued):**

	0°
67.5°	104.2
68°	101.3
68.5°	98.3
69°	95.3
69.5°	92.3
70°	89.4
70.5°	86.4
71°	83.4
71.5°	80.4
72°	77.5
72.5°	74.5
73°	71.5
73.5°	68.6
74°	65.6
74.5°	62.7
75°	59.8
75.5°	56.9
76°	54.0
76.5°	51.1
77°	48.3
77.5°	45.5
78°	42.8
78.5°	40.0
79°	37.4
79.5°	34.8
80°	32.2
80.5°	29.7
81°	27.2
81.5°	24.7
82°	22.4
82.5°	20.1
83°	17.9
83.5°	15.9
84°	13.9
84.5°	12.0
85°	10.4
85.5°	8.9
86°	7.5
86.5°	6.2
87°	5.0
87.5°	3.9
88°	3.2
88.5°	2.6
89°	2.0
89.5°	1.5

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Scaled Data Report



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**CANDELA DISTRIBUTION (continued):**

90° |  $\frac{0^\circ}{1.0}$

Signify Classified - Internal  
Cooper Lighting Solutions Photometric Lab  
1121 Highway 74 South  
Peachtree City, GA 30269



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

Report Prepared for

Cooper Lighting Solutions

HALO

Report Number: SP1-2403-328-18

Test Date: 05/03/2024

Luminaire Tested: HLT609FS5-3500K

Data in this report applies to families of products HLT609FS5-3500K.

**Test Information**

Test Method: LM-79-2019  
 Report Number: SP1-2403-328-18  
 Test Lab: COOPER LIGHTING SOLUTIONS  
 Photometer: SP1 - 76IN SPHERE  
 Measurement Geometry: 4π  
 Issue Date: 05/03/2024  
 Manufacturer: COOPER LIGHTING SOLUTIONS  
 Product Line: HALO  
 Catalog Number: **HLT609FSS-3500K**  
 Description: HLBSL RETROFIT 6 INCH SAMPLE #2.

**Spectral Parameters**

CCT (K): 3413  
 CIE u': 0.2396  
 CIE v': 0.5080  
 Duv: -0.0037  
 CIE x: 0.4061  
 CIE y: 0.3827  
 CIE z: 0.2112  
 Peak Wavelength (nm): 632  
 Dominant Wavelength (nm): 582  
 Purity: 37.1

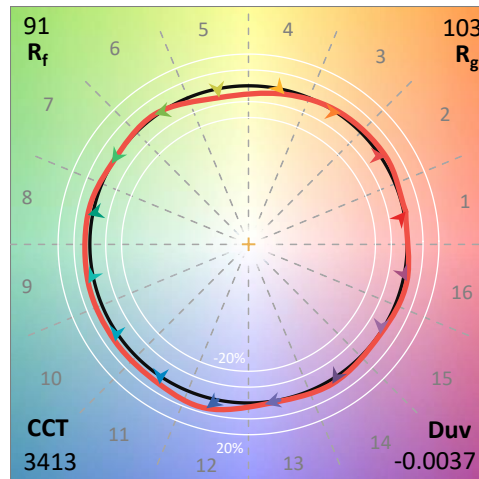
CRI (Ra): 92.0  
 R1: 88.4  
 R2: 94.1  
 R3: 96.0  
 R4: 90.3  
 R5: 90.1  
 R6: 89.2  
 R7: 97.6  
 R8: 90.4

R9: 79.5  
 R10: 91.1  
 R11: 86.0  
 R12: 81.9  
 R13: 89.6  
 R14: 95.6

Rf: 91.5  
 Rg: 102.6

**Test Conditions**

Stabilization Time: 27M  
 Operation Time: 12H  
 Room Temperature (°C) / RH%: 25.1/43%  
 Sphere Temperature (°C): 24.9

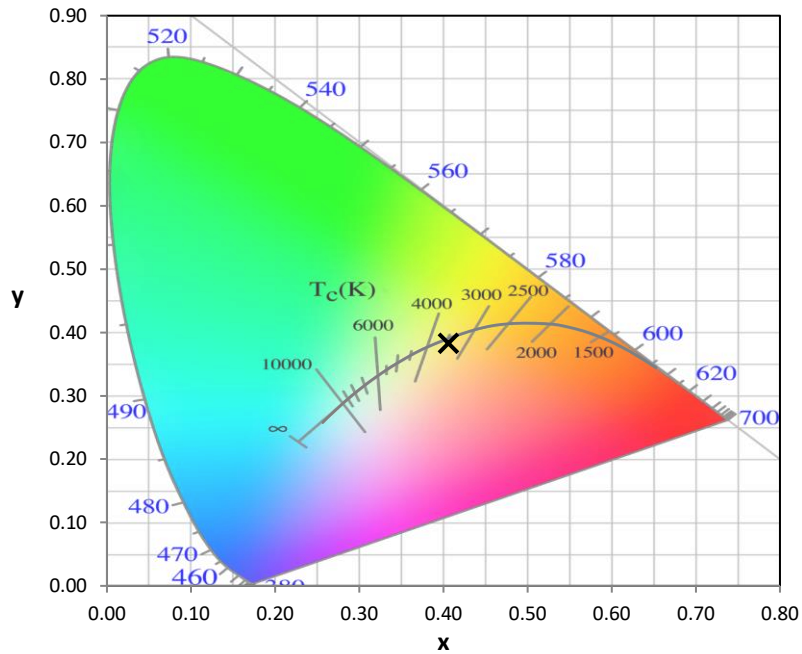


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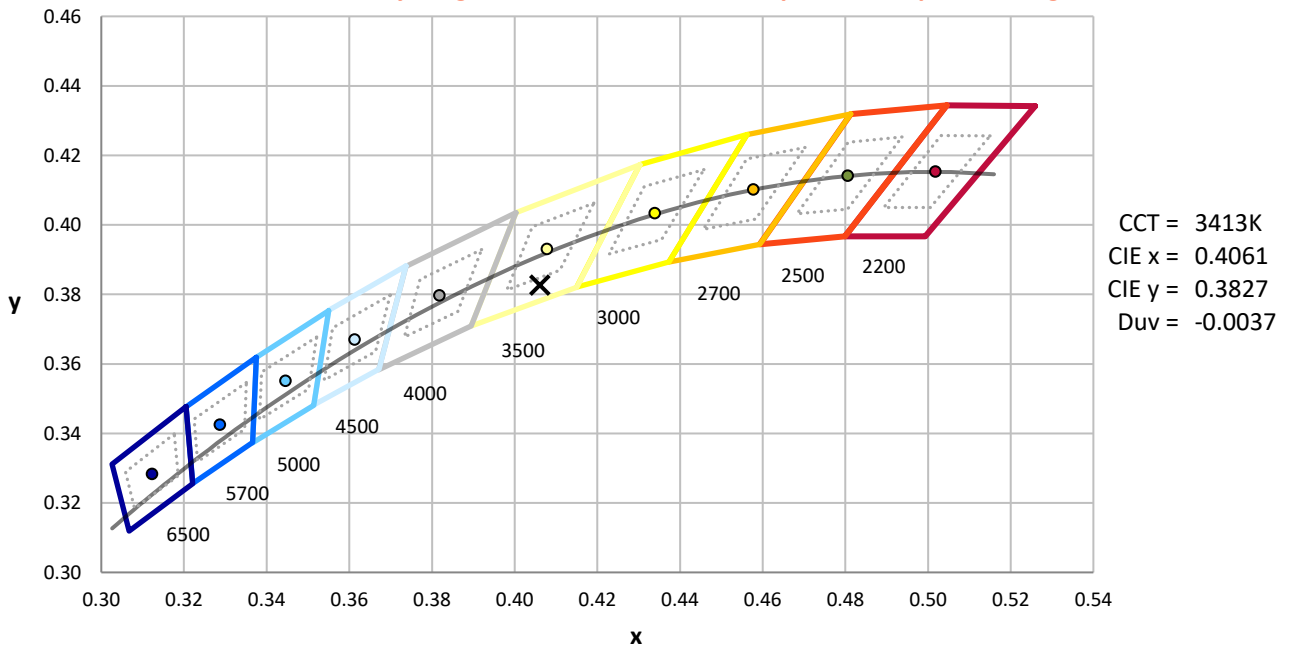
Measurement and Test Equipment			
Instrument	Identification Number	Calibration Date	Calibration Due Date
Photometer	76INCH SPHERE IN0058	2/12/2024	8/12/2024
Power Meter	XITRON 2801 IN0071	10/23/2023	10/23/2024
AC Power Source	CHROMA 61603 IN0063	10/24/2023	10/24/2024
DC Power Source	AGILENT E3634A IN0208	10/24/2023	10/24/2024
Sphere Thermometer	ONSET IN0085	10/24/2023	10/24/2024
Room Thermometer	ONSET IN0046	10/24/2023	10/24/2024

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CIE 1931 Chromaticity Diagram



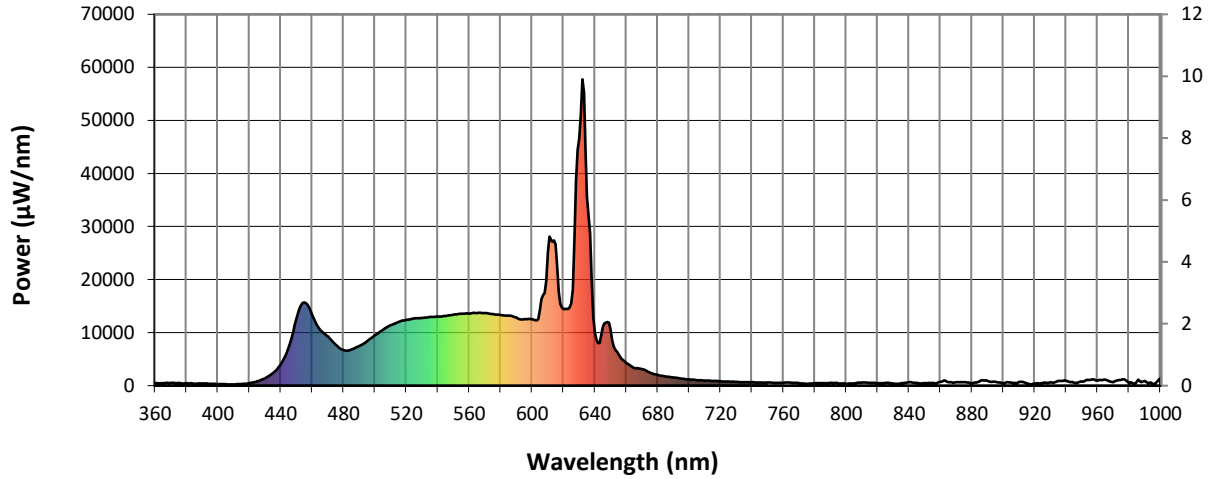
CIE 1931 Chromaticity Diagram with 2017 ANSI 7-Step and 4-Step Quadrangles



Point lies inside the ANSI 3500K 7-step quadrangle

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**Photopic Flux vs. Wavelength**

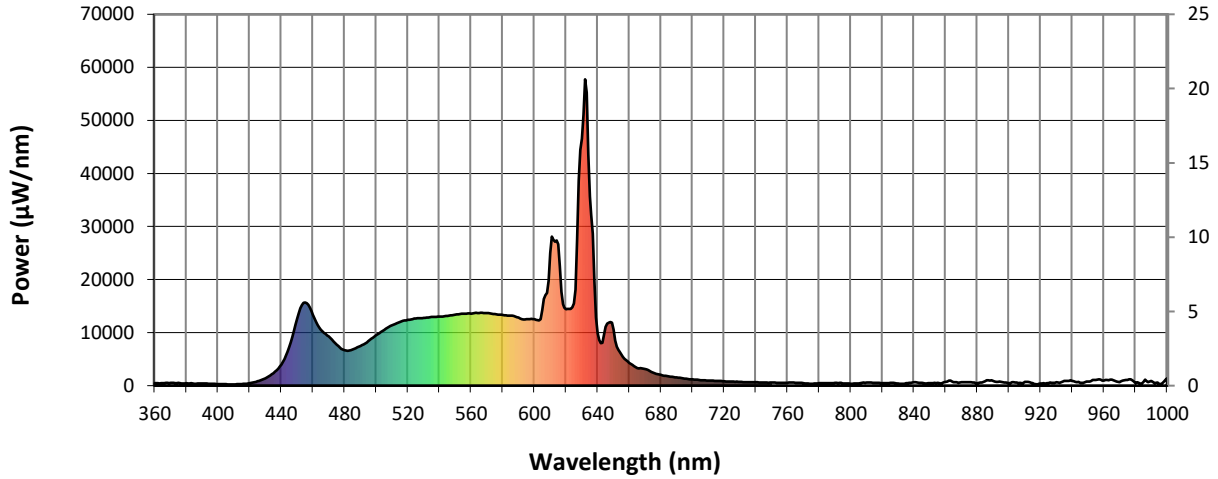


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$\lambda$ (nm)	Power ( $\mu\text{W}/\text{nm}$ )	Lumens ( $\phi/\text{nm}$ )	$\lambda$ (nm)	Power ( $\mu\text{W}/\text{nm}$ )	Lumens ( $\phi/\text{nm}$ )	$\lambda$ (nm)	Power ( $\mu\text{W}/\text{nm}$ )	Lumens ( $\phi/\text{nm}$ )	$\lambda$ (nm)	Power ( $\mu\text{W}/\text{nm}$ )	Lumens ( $\phi/\text{nm}$ )	$\lambda$ (nm)	Power ( $\mu\text{W}/\text{nm}$ )	Lumens ( $\phi/\text{nm}$ )
360	483	NR	490	7493	NR	620	14435	NR	750	589	NR	880	461	NR
365	458	NR	495	8376	NR	625	15462	NR	755	523	NR	885	849	NR
370	532	NR	500	9495	NR	630	46565	NR	760	545	NR	890	868	NR
375	504	NR	505	10488	NR	635	35623	NR	765	540	NR	895	706	NR
380	443	NR	510	11376	NR	640	9922	NR	770	451	NR	900	456	NR
385	377	NR	515	11982	NR	645	11092	NR	775	341	NR	905	562	NR
390	392	NR	520	12409	NR	650	10550	NR	780	459	NR	910	682	NR
395	347	NR	525	12667	NR	655	5883	NR	785	477	NR	915	491	NR
400	309	NR	530	12768	NR	660	4295	NR	790	505	NR	920	411	NR
405	270	NR	535	12956	NR	665	3328	NR	795	437	NR	925	500	NR
410	243	NR	540	13024	NR	670	3153	NR	800	369	NR	930	634	NR
415	297	NR	545	13163	NR	675	2470	NR	805	392	NR	935	917	NR
420	450	NR	550	13376	NR	680	2013	NR	810	603	NR	940	881	NR
425	805	NR	555	13575	NR	685	1735	NR	815	518	NR	945	550	NR
430	1380	NR	560	13557	NR	690	1532	NR	820	471	NR	950	767	NR
435	2365	NR	565	13691	NR	695	1343	NR	825	501	NR	955	1062	NR
440	3999	NR	570	13665	NR	700	1173	NR	830	417	NR	960	968	NR
445	7203	NR	575	13485	NR	705	1042	NR	835	452	NR	965	1120	NR
450	12601	NR	580	13294	NR	710	960	NR	840	636	NR	970	655	NR
455	15686	NR	585	13220	NR	715	918	NR	845	551	NR	975	1084	NR
460	13382	NR	590	12826	NR	720	824	NR	850	443	NR	980	488	NR
465	10547	NR	595	12544	NR	725	754	NR	855	514	NR	985	693	NR
470	9248	NR	600	12544	NR	730	711	NR	860	704	NR	990	885	NR
475	7736	NR	605	14253	NR	735	665	NR	865	659	NR	995	301	NR
480	6690	NR	610	24994	NR	740	633	NR	870	632	NR	1000	1357	NR
485	6823	NR	615	26627	NR	745	595	NR	875	638	NR			

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Scotopic Flux vs. Wavelength



Scotopic Lumens: 1728.9

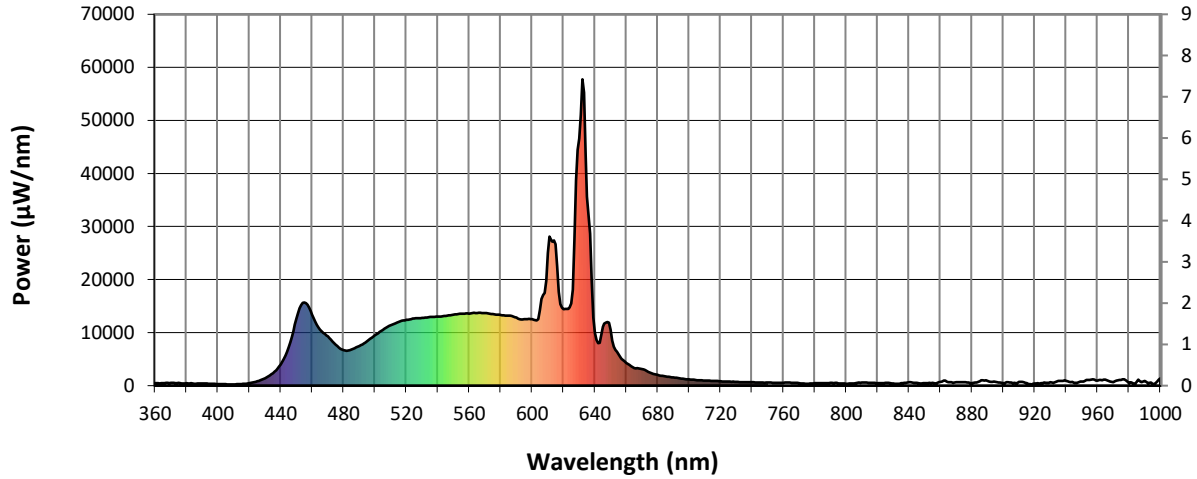
S/P: 1.72

λ (nm)	Power (µW/nm)	Lumens (φ/nm)	λ (nm)	Power (µW/nm)	Lumens (φ/nm)	λ (nm)	Power (µW/nm)	Lumens (φ/nm)	λ (nm)	Power (µW/nm)	Lumens (φ/nm)	λ (nm)	Power (µW/nm)	Lumens (φ/nm)
360	483	NR	490	7493	NR	620	14435	NR	750	589	NR	880	461	NR
365	458	NR	495	8376	NR	625	15462	NR	755	523	NR	885	849	NR
370	532	NR	500	9495	NR	630	46565	NR	760	545	NR	890	868	NR
375	504	NR	505	10488	NR	635	35623	NR	765	540	NR	895	706	NR
380	443	NR	510	11376	NR	640	9922	NR	770	451	NR	900	456	NR
385	377	NR	515	11982	NR	645	11092	NR	775	341	NR	905	562	NR
390	392	NR	520	12409	NR	650	10550	NR	780	459	NR	910	682	NR
395	347	NR	525	12667	NR	655	5883	NR	785	477	NR	915	491	NR
400	309	NR	530	12768	NR	660	4295	NR	790	505	NR	920	411	NR
405	270	NR	535	12956	NR	665	3328	NR	795	437	NR	925	500	NR
410	243	NR	540	13024	NR	670	3153	NR	800	369	NR	930	634	NR
415	297	NR	545	13163	NR	675	2470	NR	805	392	NR	935	917	NR
420	450	NR	550	13376	NR	680	2013	NR	810	603	NR	940	881	NR
425	805	NR	555	13575	NR	685	1735	NR	815	518	NR	945	550	NR
430	1380	NR	560	13557	NR	690	1532	NR	820	471	NR	950	767	NR
435	2365	NR	565	13691	NR	695	1343	NR	825	501	NR	955	1062	NR
440	3999	NR	570	13665	NR	700	1173	NR	830	417	NR	960	968	NR
445	7203	NR	575	13485	NR	705	1042	NR	835	452	NR	965	1120	NR
450	12601	NR	580	13294	NR	710	960	NR	840	636	NR	970	655	NR
455	15686	NR	585	13220	NR	715	918	NR	845	551	NR	975	1084	NR
460	13382	NR	590	12826	NR	720	824	NR	850	443	NR	980	488	NR
465	10547	NR	595	12544	NR	725	754	NR	855	514	NR	985	693	NR
470	9248	NR	600	12544	NR	730	711	NR	860	704	NR	990	885	NR
475	7736	NR	605	14253	NR	735	665	NR	865	659	NR	995	301	NR
480	6690	NR	610	24994	NR	740	633	NR	870	632	NR	1000	1357	NR
485	6823	NR	615	26627	NR	745	595	NR	875	638	NR			



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**Melanopic Flux vs. Wavelength**



**Melanopic Lumens: 708.5**

**M/P: 0.7**

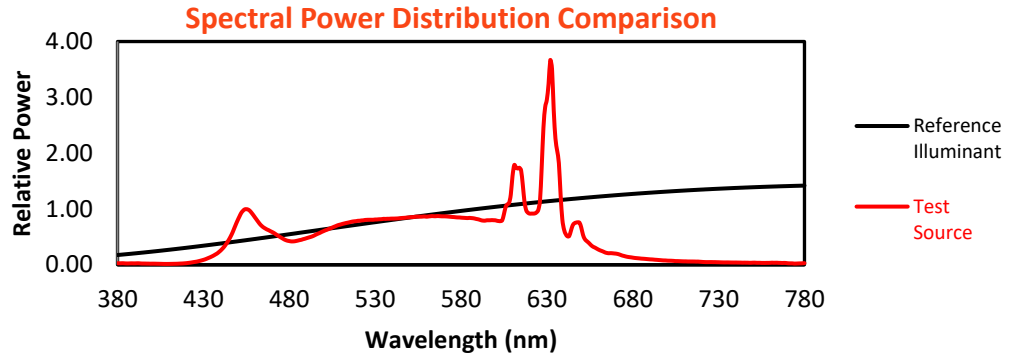
λ (nm)	Power (µW/nm)	Lumens (φ/nm)	λ (nm)	Power (µW/nm)	Lumens (φ/nm)	λ (nm)	Power (µW/nm)	Lumens (φ/nm)	λ (nm)	Power (µW/nm)	Lumens (φ/nm)	λ (nm)	Power (µW/nm)	Lumens (φ/nm)
360	483	NR	490	7493	NR	620	14435	NR	750	589	NR	880	461	NR
365	458	NR	495	8376	NR	625	15462	NR	755	523	NR	885	849	NR
370	532	NR	500	9495	NR	630	46565	NR	760	545	NR	890	868	NR
375	504	NR	505	10488	NR	635	35623	NR	765	540	NR	895	706	NR
380	443	NR	510	11376	NR	640	9922	NR	770	451	NR	900	456	NR
385	377	NR	515	11982	NR	645	11092	NR	775	341	NR	905	562	NR
390	392	NR	520	12409	NR	650	10550	NR	780	459	NR	910	682	NR
395	347	NR	525	12667	NR	655	5883	NR	785	477	NR	915	491	NR
400	309	NR	530	12768	NR	660	4295	NR	790	505	NR	920	411	NR
405	270	NR	535	12956	NR	665	3328	NR	795	437	NR	925	500	NR
410	243	NR	540	13024	NR	670	3153	NR	800	369	NR	930	634	NR
415	297	NR	545	13163	NR	675	2470	NR	805	392	NR	935	917	NR
420	450	NR	550	13376	NR	680	2013	NR	810	603	NR	940	881	NR
425	805	NR	555	13575	NR	685	1735	NR	815	518	NR	945	550	NR
430	1380	NR	560	13557	NR	690	1532	NR	820	471	NR	950	767	NR
435	2365	NR	565	13691	NR	695	1343	NR	825	501	NR	955	1062	NR
440	3999	NR	570	13665	NR	700	1173	NR	830	417	NR	960	968	NR
445	7203	NR	575	13485	NR	705	1042	NR	835	452	NR	965	1120	NR
450	12601	NR	580	13294	NR	710	960	NR	840	636	NR	970	655	NR
455	15686	NR	585	13220	NR	715	918	NR	845	551	NR	975	1084	NR
460	13382	NR	590	12826	NR	720	824	NR	850	443	NR	980	488	NR
465	10547	NR	595	12544	NR	725	754	NR	855	514	NR	985	693	NR
470	9248	NR	600	12544	NR	730	711	NR	860	704	NR	990	885	NR
475	7736	NR	605	14253	NR	735	665	NR	865	659	NR	995	301	NR
480	6690	NR	610	24994	NR	740	633	NR	870	632	NR	1000	1357	NR
485	6823	NR	615	26627	NR	745	595	NR	875	638	NR			

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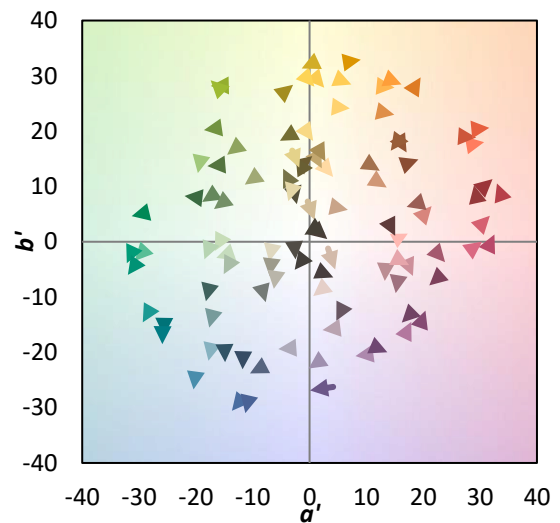
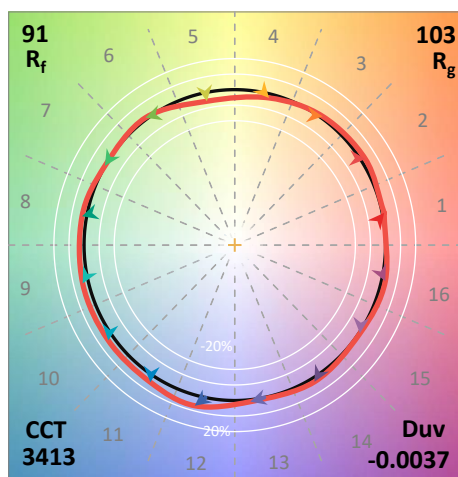
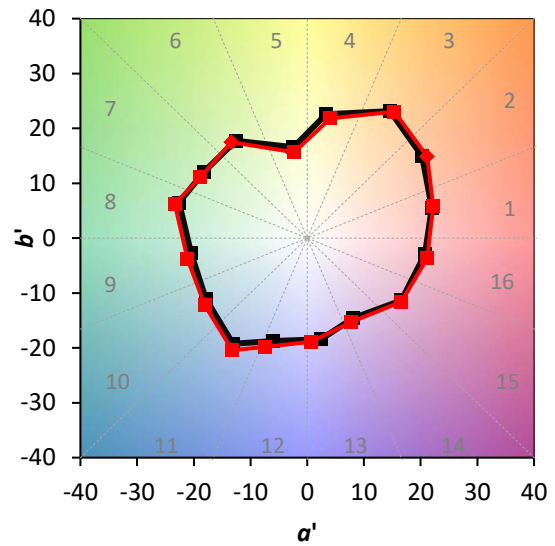
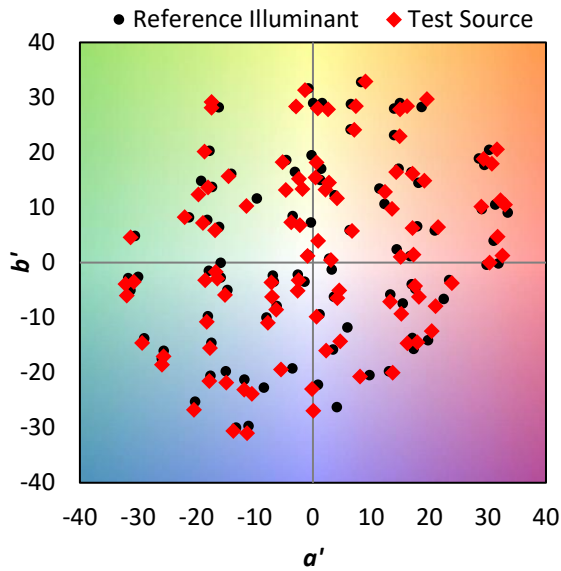
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**Summary**

$R_f = 91.5$   
 $R_g = 102.6$   
 CIE  $R_a = 92.0$   
 $R_9 = 79.5$



**Color Vector Graphics**

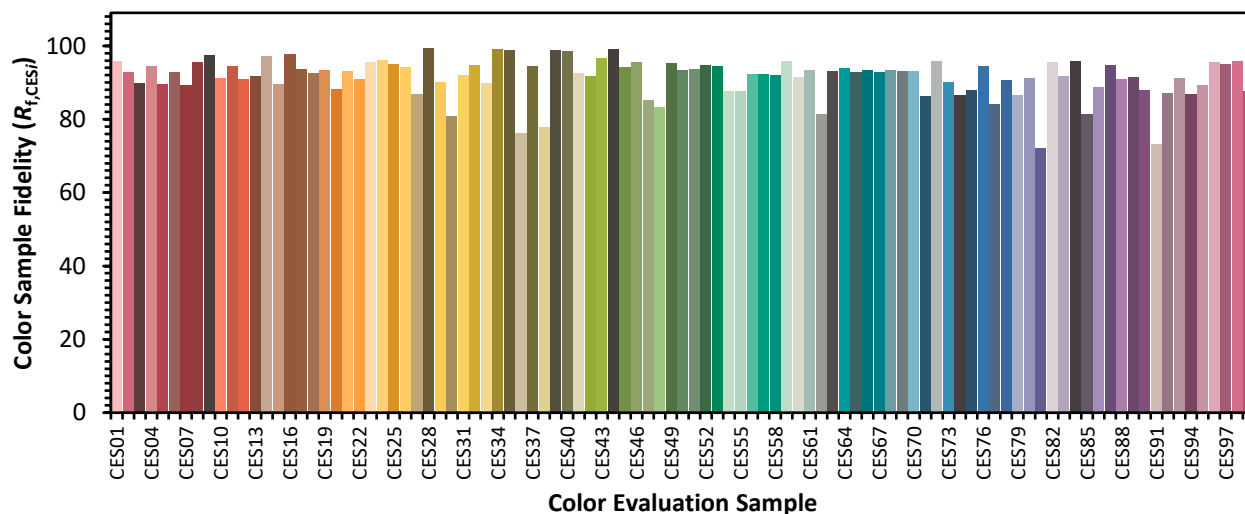


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**Individual Sample Fidelity Index ( $R_{f,i}$ )**

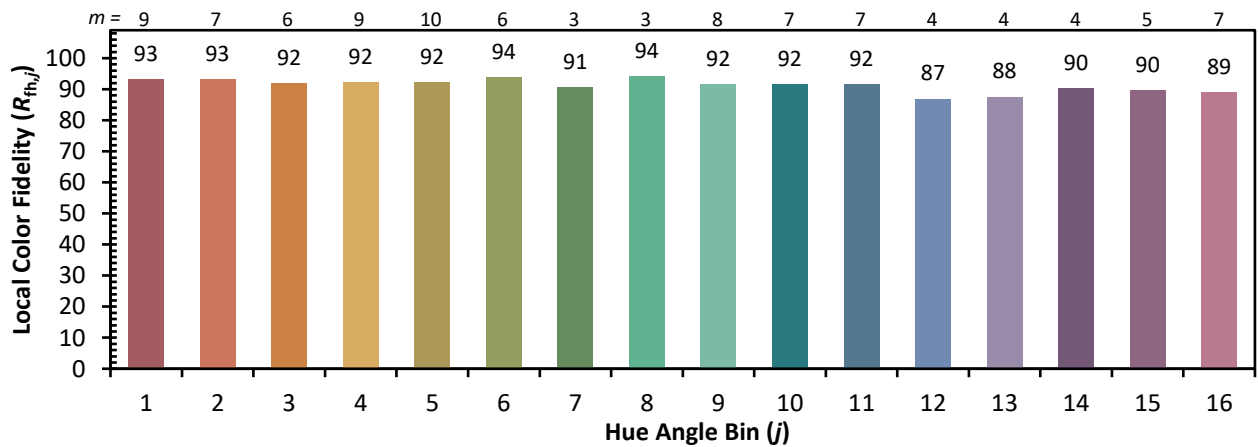
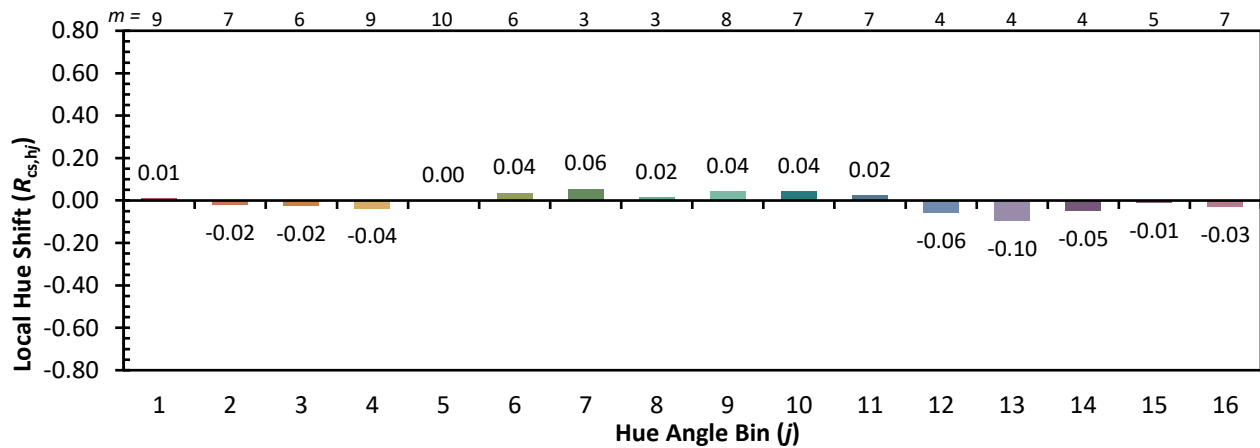
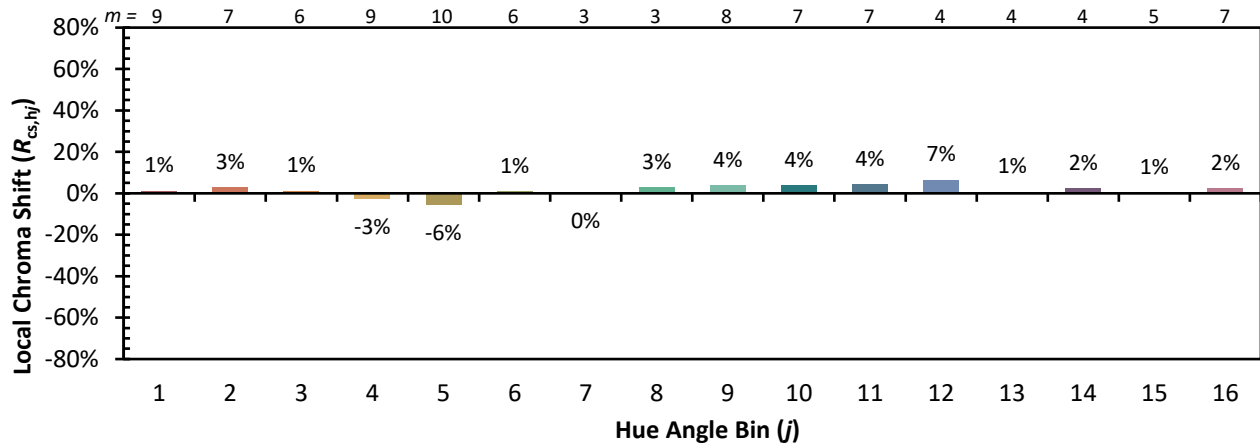
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CES02 = 63	CES27 = 87	CES52 = 95	CES77 = 84
CES03 = 32	CES28 = 99	CES53 = 94	CES78 = 91
CES04 = 69	CES29 = 90	CES54 = 88	CES79 = 86
CES05 = 51	CES30 = 81	CES55 = 88	CES80 = 91
CES06 = 51	CES31 = 92	CES56 = 92	CES81 = 72
CES07 = 44	CES32 = 95	CES57 = 92	CES82 = 95
CES08 = 43	CES33 = 90	CES58 = 92	CES83 = 92
CES09 = 29	CES34 = 99	CES59 = 96	CES84 = 96
CES10 = 75	CES35 = 99	CES60 = 92	CES85 = 81
CES11 = 58	CES36 = 76	CES61 = 93	CES86 = 89
CES12 = 64	CES37 = 94	CES62 = 81	CES87 = 95
CES13 = 44	CES38 = 78	CES63 = 93	CES88 = 91
CES14 = 74	CES39 = 99	CES64 = 94	CES89 = 91
CES15 = 72	CES40 = 98	CES65 = 93	CES90 = 88
CES16 = 48	CES41 = 92	CES66 = 93	CES91 = 73
CES17 = 49	CES42 = 92	CES67 = 93	CES92 = 87
CES18 = 57	CES43 = 97	CES68 = 93	CES93 = 91
CES19 = 71	CES44 = 99	CES69 = 93	CES94 = 87
CES20 = 67	CES45 = 94	CES70 = 93	CES95 = 89
CES21 = 85	CES46 = 96	CES71 = 86	CES96 = 96
CES22 = 78	CES47 = 85	CES72 = 96	CES97 = 95
CES23 = 91	CES48 = 83	CES73 = 90	CES98 = 96
CES24 = 90	CES49 = 95	CES74 = 87	CES99 = 88
CES25 = 71	CES50 = 93	CES75 = 88	



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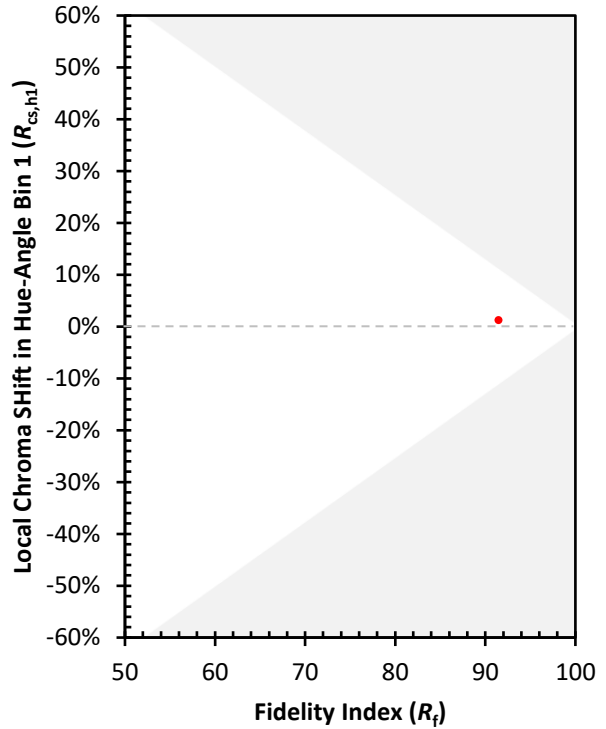
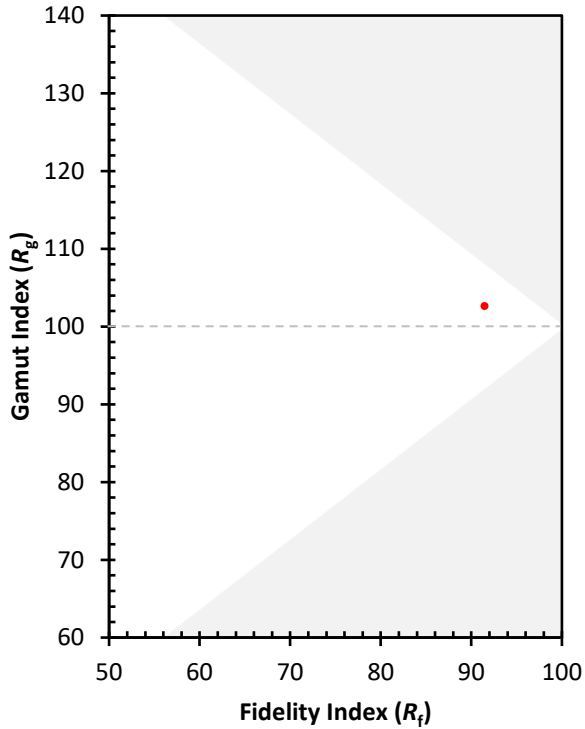
Color Rendition by Hue-Angle Bin



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Measure Comparisons



(END OF REPORT)