

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: P860286

Luminaire Tested: **SPHB-9SE-M-L735-CD**

Issue Date: 7/11/2024



Test Information

Test Method: LM-79-08
Report Number: P860286
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G3-2404-343-1)
Test Lab: INNOVATION CENTER
Issue Date: 7/11/2024
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)
Product Line: METALUX
Catalog Number: SPHB-9SE-M-L735-CD
Description: 9000 Lumen Standard Efficacy Select Pro High Bay with Medium Lens
and, 3500K 70CRI LEDs
Light Source: -
Ballast/Driver: -

Luminaire Equipment: Sample No. Condition Description

Summary

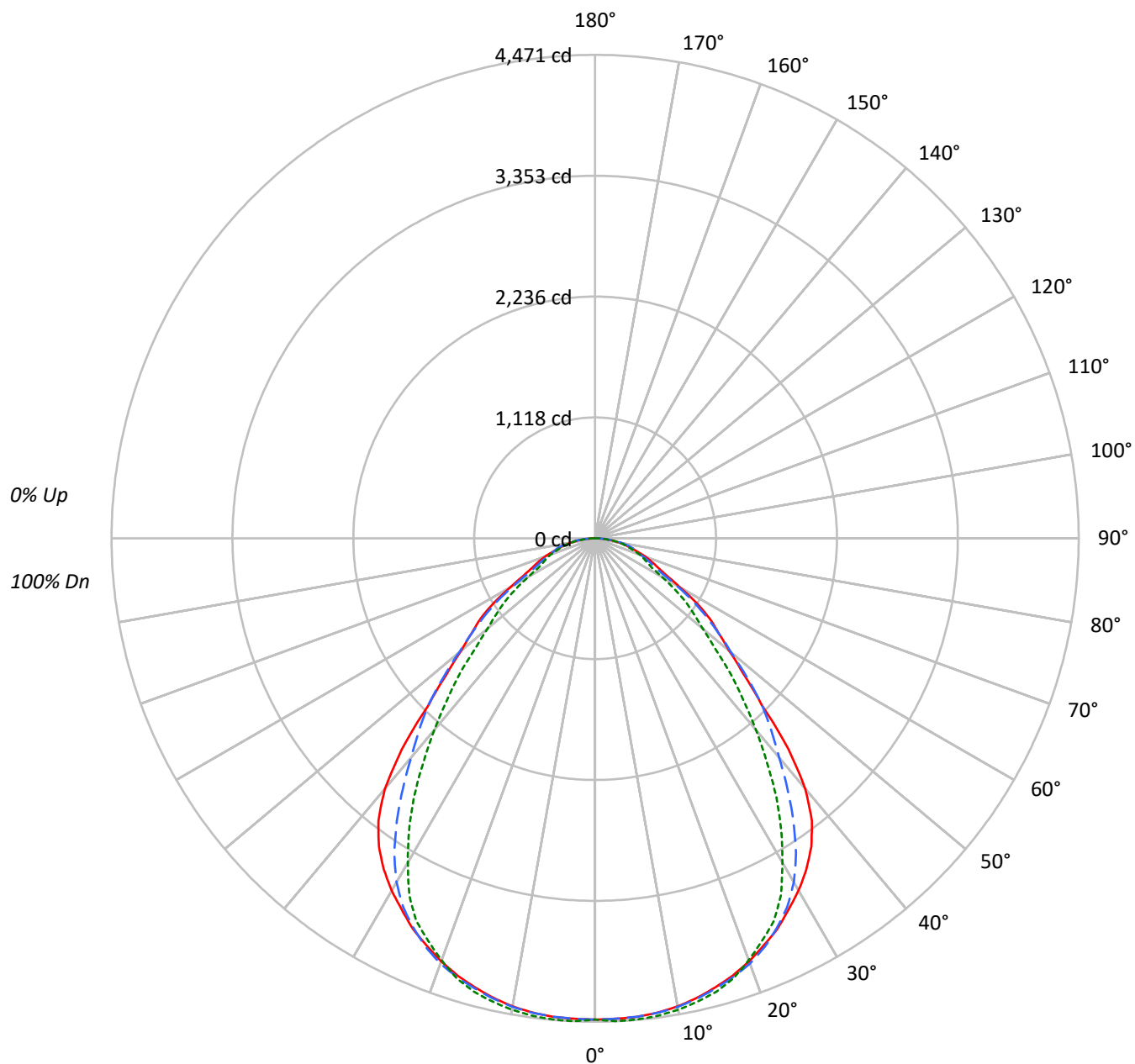
Lumens per Lamp: N/A
Luminaire Lumens: 9239.0 lumens
Efficiency: N/A
Efficacy: 168.6 lumens/watt
Spacing Criteria (0/90/45): 1.25 / 1.16 / 1.22
Luminous Opening: Rectangular (W 1' x L: 1.38' x H: 0')
CIE Type: Direct

Input Watts (W): 54.8
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

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Luminous Intensity Polar Plot





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COEFFICIENT OF UTILIZATION - ZONAL CAVITY METHOD:

RF	20				20				20				20				20
RC	80				70				50				30				10
RW	70	50	30	10	70	50	30	10	50	30	10		50	30	10		50
RCR																	
0	119	119	119	119	116	116	116	116	111	111	111		106	106	106		102
1	110	106	103	99	108	104	101	98	100	97	95		96	94	92		92
2	102	95	89	84	99	93	87	83	89	85	81		86	82	79		83
3	94	85	78	72	92	83	77	71	80	75	70		78	73	69		75
4	87	76	69	63	85	75	68	62	73	66	61		70	65	61		68
5	81	69	61	55	79	68	61	55	66	59	54		64	58	54		62
6	75	63	55	49	73	62	54	49	60	54	48		59	53	48		57
7	70	58	50	44	68	57	49	44	55	49	44		54	48	43		53
8	66	53	45	40	64	52	45	40	51	44	39		50	44	39		49
9	61	49	41	36	60	48	41	36	47	41	36		46	40	36		45
10	58	45	38	33	57	45	38	33	44	37	33		43	37	33		42

AVERAGE LUMINANCE (cd/sqm):

	0°	45°	90°
0°	34719	34719	34719
5°	34788	34778	34975
10°	34817	34855	35069
15°	34716	34806	35048
20°	34564	34739	34462
25°	34312	34215	33634
30°	33877	33079	31191
35°	33166	30432	27799
40°	30778	26935	23546
45°	24013	24077	19486
50°	19612	19890	15736
55°	17571	16909	13827
60°	14066	13316	11063
65°	11788	10791	9784
70°	11193	10283	9961
75°	10156	10915	9608
80°	10205	11153	10125
85°	8878	10399	8457



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ZONAL LUMENS:

Zone	Lumens	% Fixture
0°-10°	423.2	4.6
10°-20°	1217.2	13.2
20°-30°	1817.1	19.7
30°-40°	1982.7	21.5
40°-50°	1622.0	17.6
50°-60°	1066.4	11.5
60°-70°	611.8	6.6
70°-80°	370.8	4.0
80°-90°	124.5	1.3
90°-100°	3.2	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°	3457.5	37.4
0°-40°	5440.2	58.9
0°-60°	8128.7	88.0
0°-90°	9235.7	100.0
90°-120°	3.2	0.0
90°-150°	3.2	0.0
90°-180°	3.0	0.0
0°-180°	9239.0	100.0

CANDELA DISTRIBUTION:

	0°	22.5°	45°	67.5°	90°	Flux
0°	4451	4451	4451	4451	4451	
5°	4443	4436	4442	4460	4467	423
15°	4299	4298	4310	4338	4340	1213
25°	3987	3996	3976	3928	3908	1834
35°	3483	3404	3196	2978	2920	2159
45°	2177	2340	2183	1927	1766	1728
55°	1292	1257	1243	1068	1017	1138
65°	639	629	585	569	530	653
75°	337	365	362	348	319	365
85°	99	113	116	102	94	108
90°	1	8	16	19	20	5
95°	1	1	2	2	1	0
105°	0	0	0	0	0	0
115°	0	0	0	0	0	0
125°	0	0	0	0	0	0
135°	0	0	0	0	0	0
145°	0	0	0	0	0	0
155°	0	0	0	0	0	0
165°	0	0	0	0	0	0
175°	0	0	0	0	0	0
180°	0	0	0	0	0	



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CANDELA DISTRIBUTION (FULL):

	0°	22.5°	45°	67.5°	90°
0°	4451.2	4451.2	4451.2	4451.2	4451.2
2.5°	4448.2	4441.8	4447.7	4465.9	4471.1
5°	4443.0	4435.9	4441.8	4460.0	4467.0
7.5°	4424.8	4420.6	4426.5	4444.7	4453.5
10°	4396.0	4391.3	4400.7	4416.5	4427.7
12.5°	4353.1	4351.4	4360.2	4383.1	4387.8
15°	4299.1	4298.5	4310.3	4337.9	4340.2
17.5°	4238.1	4237.5	4252.2	4270.4	4263.9
20°	4164.1	4168.2	4185.2	4168.2	4151.8
22.5°	4075.4	4088.4	4092.5	4039.1	4030.8
25°	3986.8	3996.2	3975.6	3927.5	3908.1
27.5°	3872.3	3883.5	3845.3	3776.6	3721.4
30°	3761.4	3750.8	3672.7	3540.0	3463.1
32.5°	3634.0	3596.4	3456.1	3272.9	3203.1
35°	3483.1	3404.4	3196.0	2978.2	2919.5
37.5°	3292.3	3148.5	2920.7	2693.5	2604.8
40°	3022.8	2856.7	2645.3	2410.5	2312.5
42.5°	2645.3	2583.7	2408.8	2144.6	2027.7
45°	2176.9	2339.5	2182.7	1926.8	1766.5
47.5°	1863.4	2089.4	1900.9	1716.0	1495.3
50°	1616.2	1771.8	1639.1	1472.4	1296.8
52.5°	1437.7	1484.7	1431.3	1248.1	1148.3
55°	1292.1	1256.9	1243.4	1068.5	1016.8
57.5°	1111.3	1092.0	1057.3	931.7	863.6
60°	901.7	942.8	853.6	817.8	709.2
62.5°	740.9	781.4	685.7	683.4	592.9
65°	638.7	629.3	584.7	568.9	530.1
67.5°	565.3	536.0	520.7	500.2	486.7
70°	490.8	478.5	450.9	455.0	436.8
72.5°	409.2	425.0	397.4	405.1	372.2
75°	337.0	364.6	362.2	347.5	318.8
77.5°	277.7	307.0	312.3	298.8	275.3
80°	227.2	247.2	248.3	240.1	225.4
82.5°	166.7	178.5	187.3	173.2	163.8
85°	99.2	112.7	116.2	101.6	94.5
87.5°	32.3	45.2	50.5	52.2	52.8
90°	0.6	8.2	16.4	19.4	20.5
92.5°	0.6	2.3	3.5	5.3	5.9
95°	0.6	1.2	1.8	1.8	1.2
97.5°	0.0	0.0	0.0	0.0	0.0
100°	0.0	0.0	0.0	0.0	0.0
102.5°	0.0	0.0	0.0	0.0	0.0
105°	0.0	0.0	0.0	0.0	0.0



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CANDELA DISTRIBUTION (continued):

	0°	22.5°	45°	67.5°	90°
112.5°	0.0	0.0	0.0	0.0	0.0
115°	0.0	0.0	0.0	0.0	0.0
117.5°	0.0	0.0	0.0	0.0	0.0
120°	0.0	0.0	0.0	0.0	0.0
122.5°	0.0	0.0	0.0	0.0	0.0
125°	0.0	0.0	0.0	0.0	0.0
127.5°	0.0	0.0	0.0	0.0	0.0
130°	0.0	0.0	0.0	0.0	0.0
132.5°	0.0	0.0	0.0	0.0	0.0
135°	0.0	0.0	0.0	0.0	0.0
137.5°	0.0	0.0	0.0	0.0	0.0
140°	0.0	0.0	0.0	0.0	0.0
142.5°	0.0	0.0	0.0	0.0	0.0
145°	0.0	0.0	0.0	0.0	0.0
147.5°	0.0	0.0	0.0	0.0	0.0
150°	0.0	0.0	0.0	0.0	0.0
152.5°	0.0	0.0	0.0	0.0	0.0
155°	0.0	0.0	0.0	0.0	0.0
157.5°	0.0	0.0	0.0	0.0	0.0
160°	0.0	0.0	0.0	0.0	0.0
162.5°	0.0	0.0	0.0	0.0	0.0
165°	0.0	0.0	0.0	0.0	0.0
167.5°	0.0	0.0	0.0	0.0	0.0
170°	0.0	0.0	0.0	0.0	0.0
172.5°	0.0	0.0	0.0	0.0	0.0
175°	0.0	0.0	0.0	0.0	0.0
177.5°	0.0	0.0	0.0	0.0	0.0
180°	0.0	0.0	0.0	0.0	0.0



Report Generated By 670246072 / DESKTOP-50001EG





— 0°-180° - - 45°-225° - - - 90°-270°







107.5°	0.0	0.0	0.0	0.0	0.0
110°	0.0	0.0	0.0	0.0	0.0



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

Report Prepared for

Cooper Lighting Solutions

METALUX

Report Number: SP1-2404-343-1

Test Date: 05/18/2024

Luminaire Tested: SPHB-24SE-M-UNV-L735-CD

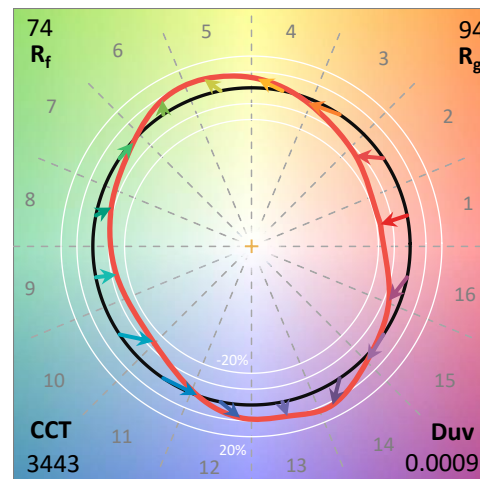
Data in this report applies to families of products SPHB-24SE-M-UNV-L735-CD.

Test Information

Test Method: LM-79-2019
 Report Number: SP1-2404-343-1
 Test Lab: COOPER LIGHTING SOLUTIONS
 Photometer: SP1 - 76IN SPHERE
 Measurement Geometry: 4π
 Issue Date: 05/21/2024
 Manufacturer: COOPER LIGHTING SOLUTIONS
 Product Line: METALUX
 Catalog Number: **SPHB-24SE-M-UNV-L735-CD**
 Description: 18IN SPHB WITH MEDIUM LENS, 3500K/70CRI, 24K LUMENS, SE

Spectral Parameters

CCT (K):	3443	CRI (Ra):	71.3		
CIE u':	0.2367	R1:	67.5	R9:	-34.0
CIE v':	0.5135	R2:	79.7	R10:	52.8
Duv:	0.0009	R3:	90.1	R11:	63.2
CIE x:	0.4094	R4:	68.5	R12:	44.0
CIE y:	0.3948	R5:	66.9	R13:	69.5
CIE z:	0.1959	R6:	71.2	R14:	94.3
Peak Wavelength (nm):	588	R7:	79.3		
Dominant Wavelength (nm):	580	R8:	47.0		
Purity:	41.6				
Rf:	74.2				
Rg:	93.7				



Test Conditions

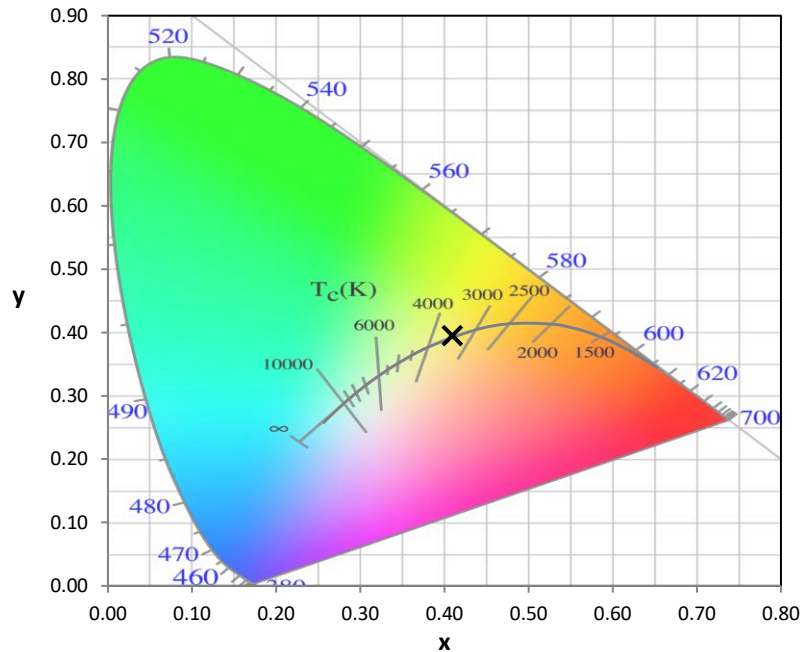
Stabilization Time: 23M
 Operation Time: 12H
 Room Temperature (°C) / RH%: 25.0/42%
 Sphere Temperature (°C): 25.2

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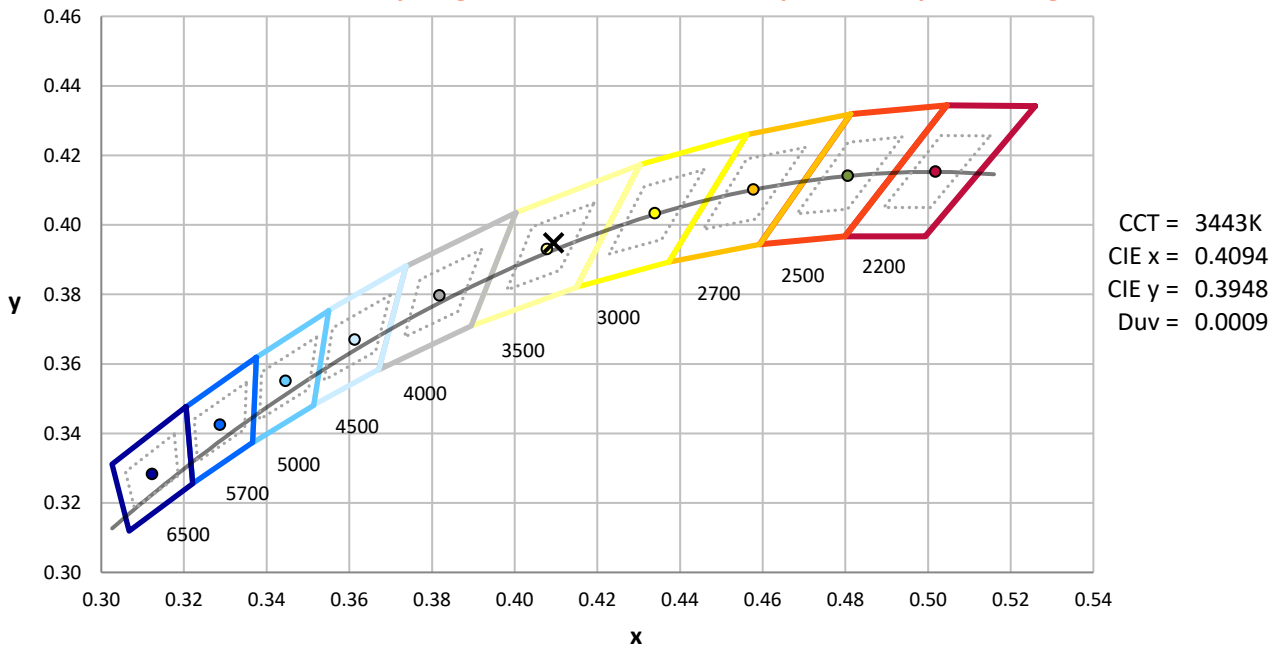
Measurement and Test Equipment			
Instrument	Identification Number	Calibration Date	Calibration Due Date
Photometer	76INCH SPHERE IN0058	2/12/2024	8/12/2024
Power Meter	XITRON 2801 IN0071	10/23/2023	10/23/2024
AC Power Source	CHROMA 61603 IN0063	10/24/2023	10/24/2024
DC Power Source	AGILENT E3634A IN0208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



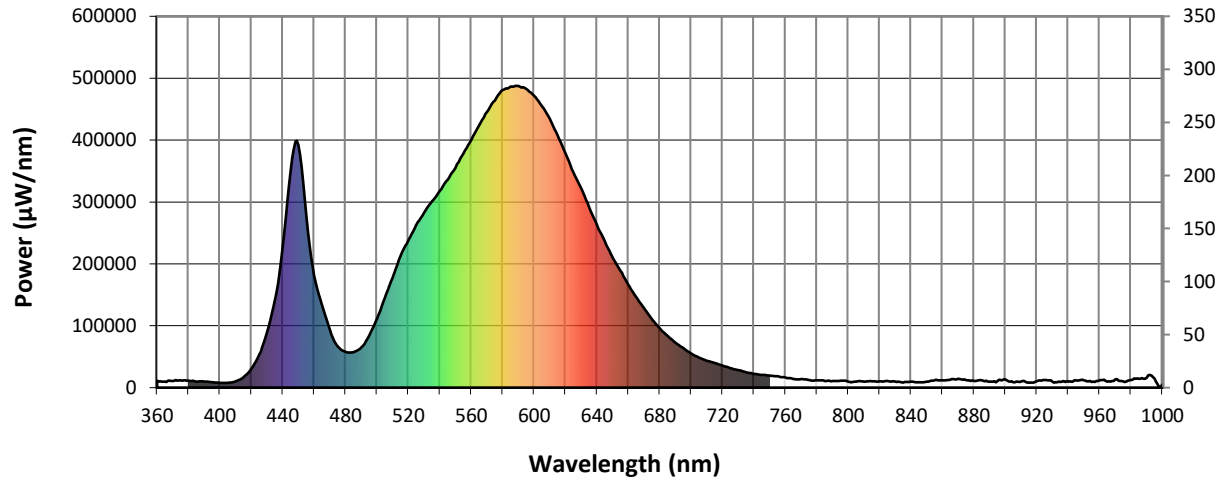
CIE 1931 Chromaticity Diagram with 2017 ANSI 7-Step and 4-Step Quadrangles



Point lies inside the ANSI 3500K 4-step quadrangle

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Photopic Flux vs. Wavelength

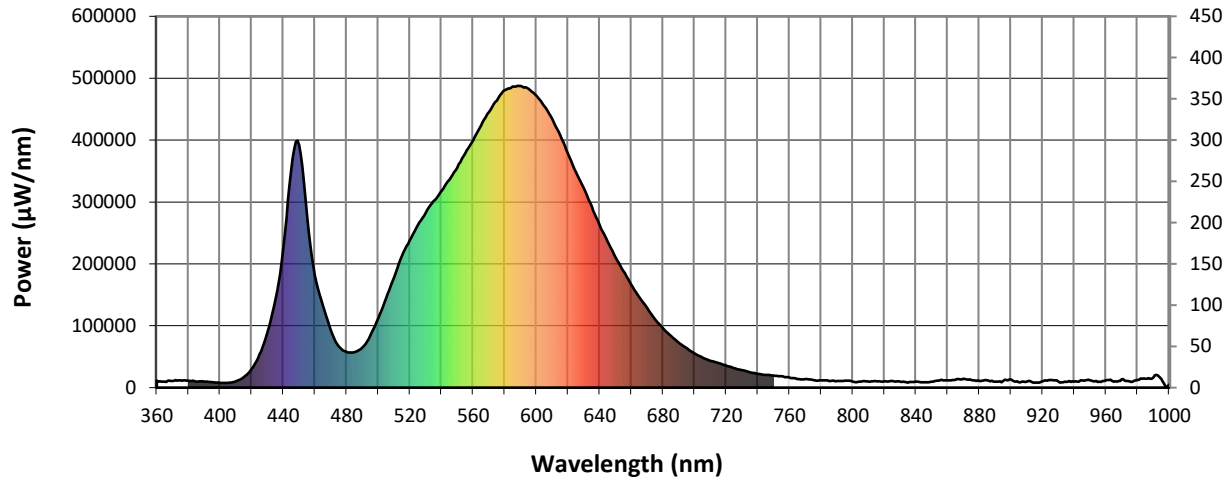


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λ (nm)	Power (μW/nm)	Lumens (φ/nm)	λ (nm)	Power (μW/nm)	Lumens (φ/nm)	λ (nm)	Power (μW/nm)	Lumens (φ/nm)	λ (nm)	Power (μW/nm)	Lumens (φ/nm)	λ (nm)	Power (μW/nm)	Lumens (φ/nm)
360	11069	NR	490	64826	NR	620	378287	NR	750	19405	NR	880	10598	NR
365	9532	NR	495	83788	NR	625	348295	NR	755	18362	NR	885	11768	NR
370	10973	NR	500	111516	NR	630	321786	NR	760	16477	NR	890	9466	NR
375	11762	NR	505	144674	NR	635	292338	NR	765	14099	NR	895	10985	NR
380	11270	NR	510	178210	NR	640	263074	NR	770	13754	NR	900	13336	NR
385	9763	NR	515	212444	NR	645	236032	NR	775	12358	NR	905	8557	NR
390	9964	NR	520	238043	NR	650	210183	NR	780	11829	NR	910	9683	NR
395	8870	NR	525	262630	NR	655	188533	NR	785	10905	NR	915	8102	NR
400	7833	NR	530	282711	NR	660	166359	NR	790	10518	NR	920	10188	NR
405	7894	NR	535	301137	NR	665	146164	NR	795	11147	NR	925	12355	NR
410	10280	NR	540	317875	NR	670	128599	NR	800	9675	NR	930	9904	NR
415	16727	NR	545	336094	NR	675	110738	NR	805	9859	NR	935	9277	NR
420	30410	NR	550	355114	NR	680	95972	NR	810	9869	NR	940	9862	NR
425	53420	NR	555	378403	NR	685	83465	NR	815	10276	NR	945	11594	NR
430	89156	NR	560	399679	NR	690	72721	NR	820	10232	NR	950	11887	NR
435	142197	NR	565	423645	NR	695	63911	NR	825	10857	NR	955	8965	NR
440	226845	NR	570	445147	NR	700	55055	NR	830	9619	NR	960	11572	NR
445	350540	NR	575	463862	NR	705	48705	NR	835	8389	NR	965	9869	NR
450	392129	NR	580	480777	NR	710	43400	NR	840	9682	NR	970	13235	NR
455	277676	NR	585	486479	NR	715	39918	NR	845	8871	NR	975	10310	NR
460	181452	NR	590	487337	NR	720	35595	NR	850	9686	NR	980	12444	NR
465	133159	NR	595	482847	NR	725	31639	NR	855	11822	NR	985	14597	NR
470	92882	NR	600	471286	NR	730	28555	NR	860	11731	NR	990	16092	NR
475	66501	NR	605	455024	NR	735	24821	NR	865	12816	NR	995	14551	NR
480	57816	NR	610	434209	NR	740	22145	NR	870	14159	NR	1000	5319	NR
485	57380	NR	615	407697	NR	745	20684	NR	875	12561	NR			

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Scotopic Flux vs. Wavelength



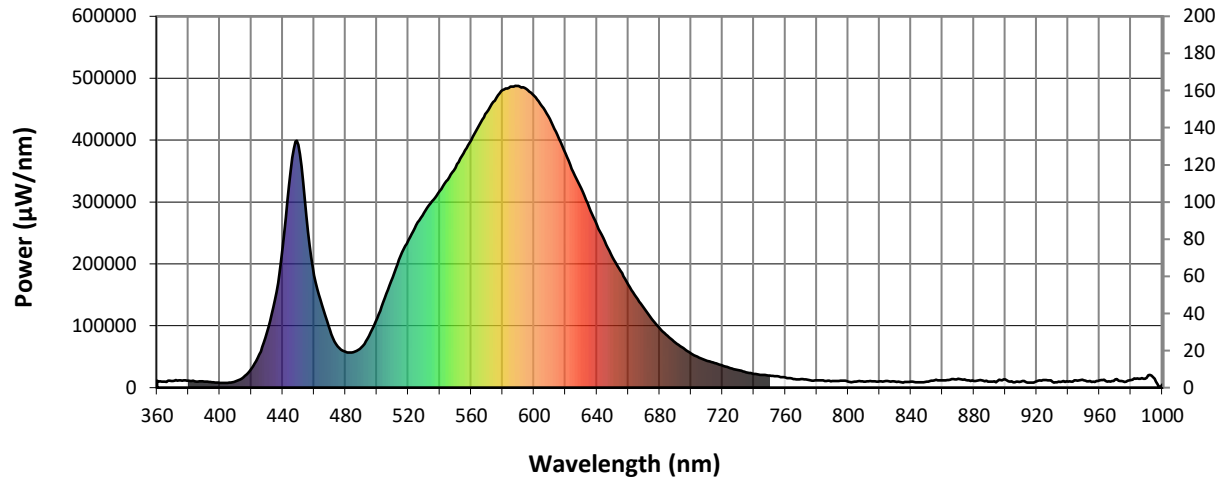
Scotopic Lumens: 34063.8

S/P: 1.35

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	11069	NR	490	64826	NR	620	378287	NR	750	19405	NR	880	10598	NR
365	9532	NR	495	83788	NR	625	348295	NR	755	18362	NR	885	11768	NR
370	10973	NR	500	111516	NR	630	321786	NR	760	16477	NR	890	9466	NR
375	11762	NR	505	144674	NR	635	292338	NR	765	14099	NR	895	10985	NR
380	11270	NR	510	178210	NR	640	263074	NR	770	13754	NR	900	13336	NR
385	9763	NR	515	212444	NR	645	236032	NR	775	12358	NR	905	8557	NR
390	9964	NR	520	238043	NR	650	210183	NR	780	11829	NR	910	9683	NR
395	8870	NR	525	262630	NR	655	188533	NR	785	10905	NR	915	8102	NR
400	7833	NR	530	282711	NR	660	166359	NR	790	10518	NR	920	10188	NR
405	7894	NR	535	301137	NR	665	146164	NR	795	11147	NR	925	12355	NR
410	10280	NR	540	317875	NR	670	128599	NR	800	9675	NR	930	9904	NR
415	16727	NR	545	336094	NR	675	110738	NR	805	9859	NR	935	9277	NR
420	30410	NR	550	355114	NR	680	95972	NR	810	9869	NR	940	9862	NR
425	53420	NR	555	378403	NR	685	83465	NR	815	10276	NR	945	11594	NR
430	89156	NR	560	399679	NR	690	72721	NR	820	10232	NR	950	11887	NR
435	142197	NR	565	423645	NR	695	63911	NR	825	10857	NR	955	8965	NR
440	226845	NR	570	445147	NR	700	55055	NR	830	9619	NR	960	11572	NR
445	350540	NR	575	463862	NR	705	48705	NR	835	8389	NR	965	9869	NR
450	392129	NR	580	480777	NR	710	43400	NR	840	9682	NR	970	13235	NR
455	277676	NR	585	486479	NR	715	39918	NR	845	8871	NR	975	10310	NR
460	181452	NR	590	487337	NR	720	35595	NR	850	9686	NR	980	12444	NR
465	133159	NR	595	482847	NR	725	31639	NR	855	11822	NR	985	14597	NR
470	92882	NR	600	471286	NR	730	28555	NR	860	11731	NR	990	16092	NR
475	66501	NR	605	455024	NR	735	24821	NR	865	12816	NR	995	14551	NR
480	57816	NR	610	434209	NR	740	22145	NR	870	14159	NR	1000	5319	NR
485	57380	NR	615	407697	NR	745	20684	NR	875	12561	NR			

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Melanopic Flux vs. Wavelength



Melanopic Lumens: 12664.2 M/P: 0.5

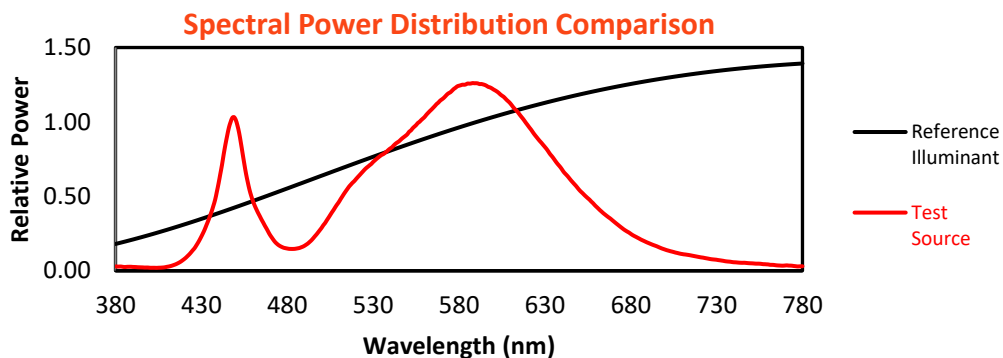
λ (nm)	Power (μW/nm)	Lumens (φ/nm)	λ (nm)	Power (μW/nm)	Lumens (φ/nm)	λ (nm)	Power (μW/nm)	Lumens (φ/nm)	λ (nm)	Power (μW/nm)	Lumens (φ/nm)	λ (nm)	Power (μW/nm)	Lumens (φ/nm)
360	11069	NR	490	64826	NR	620	378287	NR	750	19405	NR	880	10598	NR
365	9532	NR	495	83788	NR	625	348295	NR	755	18362	NR	885	11768	NR
370	10973	NR	500	111516	NR	630	321786	NR	760	16477	NR	890	9466	NR
375	11762	NR	505	144674	NR	635	292338	NR	765	14099	NR	895	10985	NR
380	11270	NR	510	178210	NR	640	263074	NR	770	13754	NR	900	13336	NR
385	9763	NR	515	212444	NR	645	236032	NR	775	12358	NR	905	8557	NR
390	9964	NR	520	238043	NR	650	210183	NR	780	11829	NR	910	9683	NR
395	8870	NR	525	262630	NR	655	188533	NR	785	10905	NR	915	8102	NR
400	7833	NR	530	282711	NR	660	166359	NR	790	10518	NR	920	10188	NR
405	7894	NR	535	301137	NR	665	146164	NR	795	11147	NR	925	12355	NR
410	10280	NR	540	317875	NR	670	128599	NR	800	9675	NR	930	9904	NR
415	16727	NR	545	336094	NR	675	110738	NR	805	9859	NR	935	9277	NR
420	30410	NR	550	355114	NR	680	95972	NR	810	9869	NR	940	9862	NR
425	53420	NR	555	378403	NR	685	83465	NR	815	10276	NR	945	11594	NR
430	89156	NR	560	399679	NR	690	72721	NR	820	10232	NR	950	11887	NR
435	142197	NR	565	423645	NR	695	63911	NR	825	10857	NR	955	8965	NR
440	226845	NR	570	445147	NR	700	55055	NR	830	9619	NR	960	11572	NR
445	350540	NR	575	463862	NR	705	48705	NR	835	8389	NR	965	9869	NR
450	392129	NR	580	480777	NR	710	43400	NR	840	9682	NR	970	13235	NR
455	277676	NR	585	486479	NR	715	39918	NR	845	8871	NR	975	10310	NR
460	181452	NR	590	487337	NR	720	35595	NR	850	9686	NR	980	12444	NR
465	133159	NR	595	482847	NR	725	31639	NR	855	11822	NR	985	14597	NR
470	92882	NR	600	471286	NR	730	28555	NR	860	11731	NR	990	16092	NR
475	66501	NR	605	455024	NR	735	24821	NR	865	12816	NR	995	14551	NR
480	57816	NR	610	434209	NR	740	22145	NR	870	14159	NR	1000	5319	NR
485	57380	NR	615	407697	NR	745	20684	NR	875	12561	NR			

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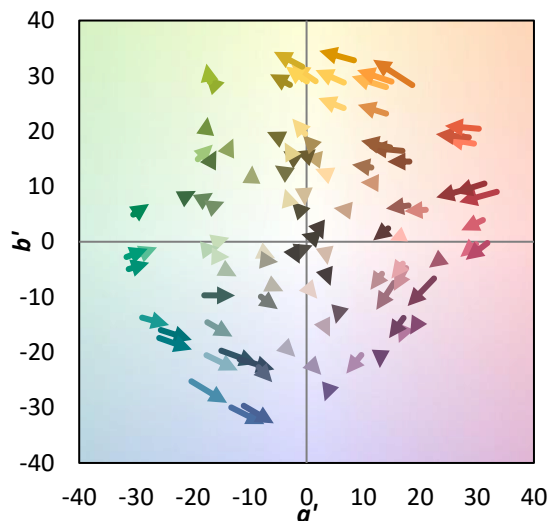
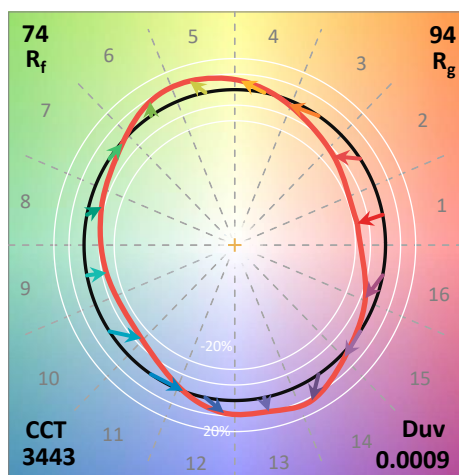
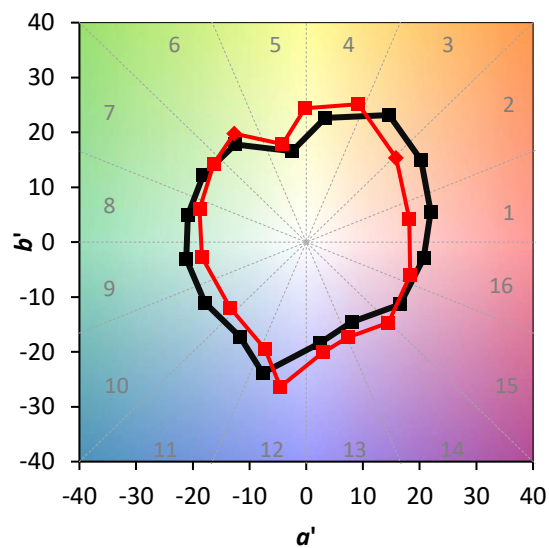
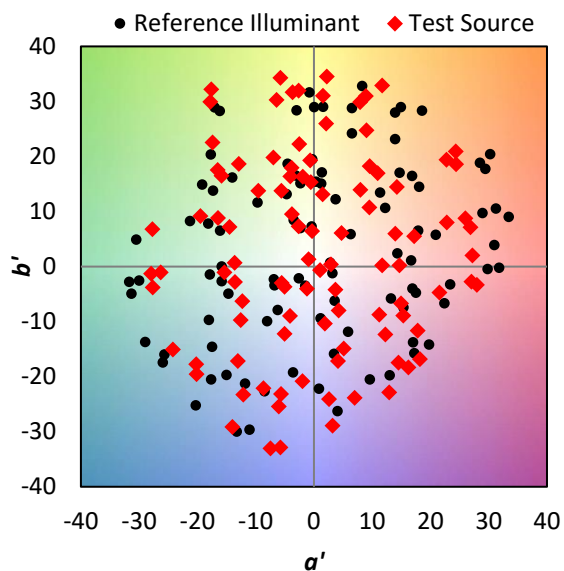
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Summary

$R_f = 74.2$
 $R_g = 93.7$
 CIE $R_a = 71.3$
 $R_g = -34.0$



Color Vector Graphics

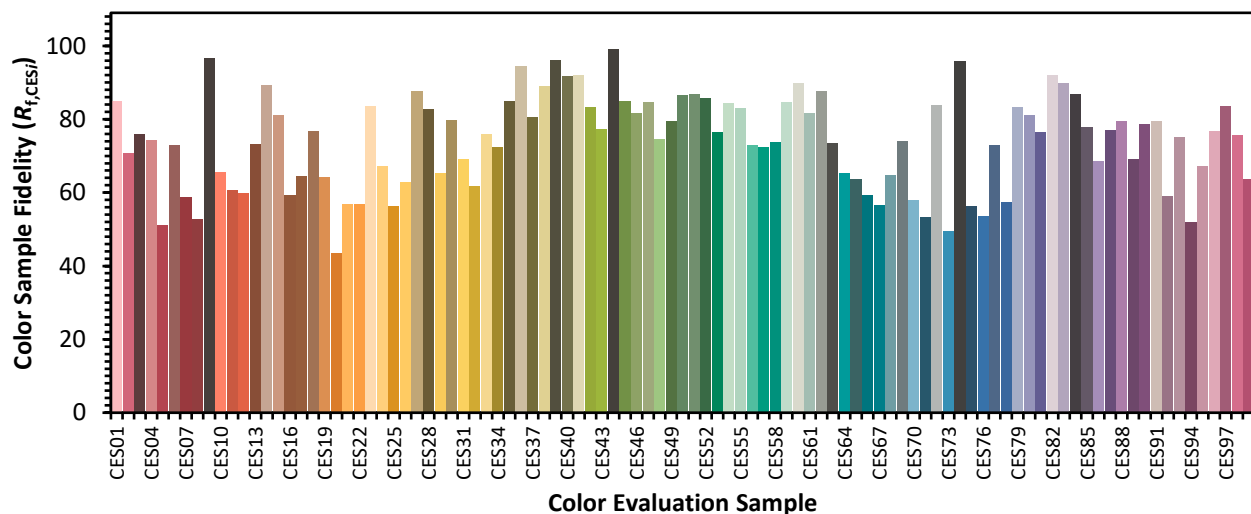


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Individual Sample Fidelity Index ($R_{f,i}$)

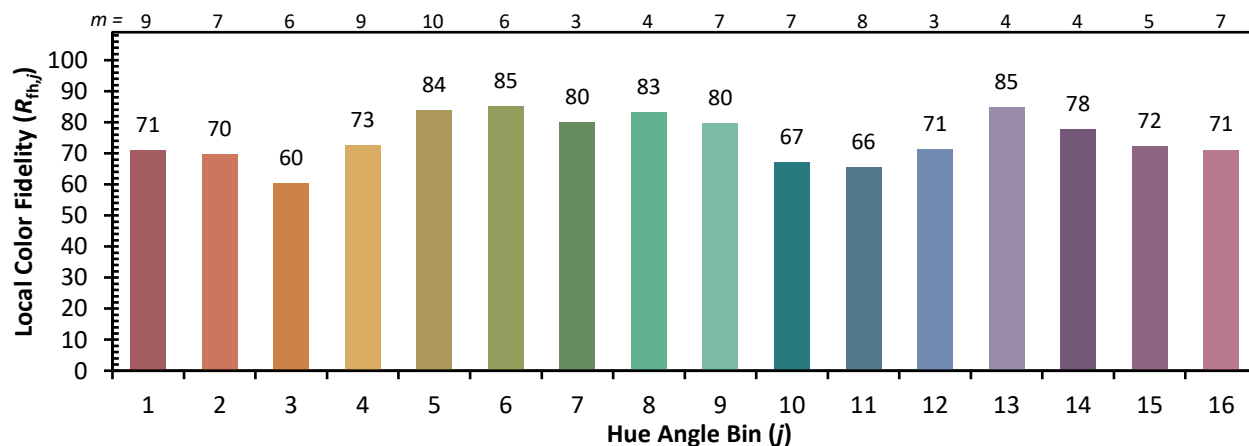
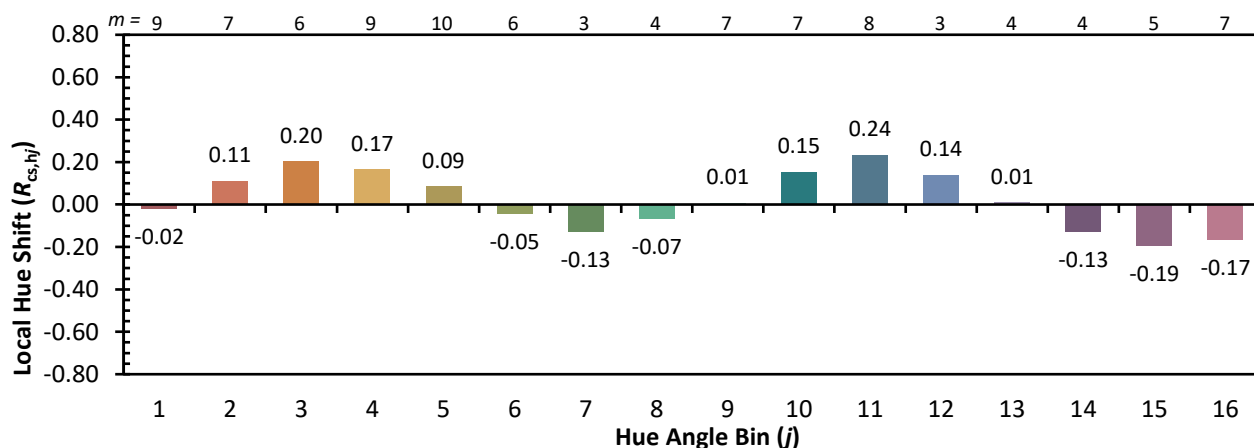
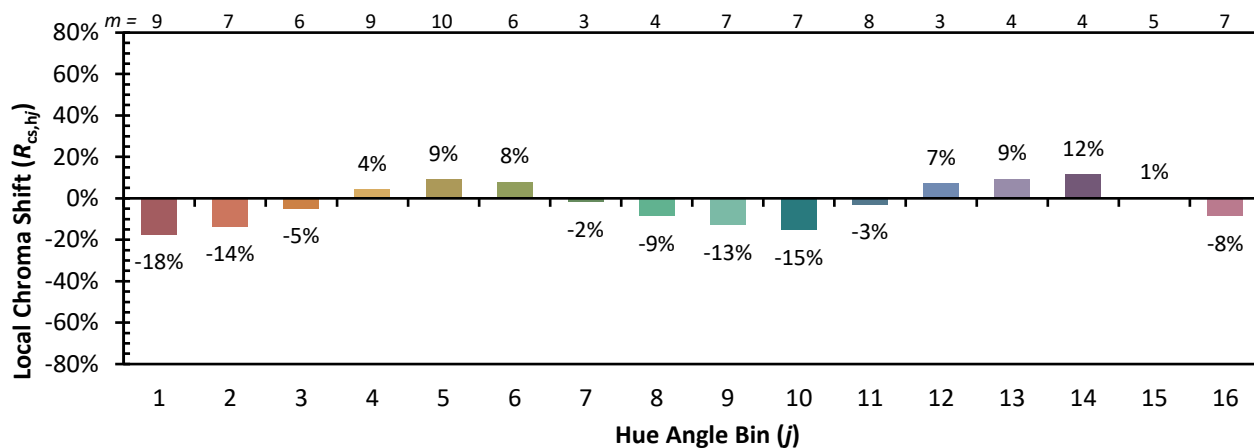
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CES02 = 62	CES27 = 88	CES52 = 86	CES77 = 73
CES03 = 31	CES28 = 83	CES53 = 76	CES78 = 57
CES04 = 70	CES29 = 65	CES54 = 84	CES79 = 83
CES05 = 48	CES30 = 80	CES55 = 83	CES80 = 81
CES06 = 51	CES31 = 69	CES56 = 73	CES81 = 76
CES07 = 40	CES32 = 62	CES57 = 72	CES82 = 92
CES08 = 39	CES33 = 76	CES58 = 74	CES83 = 90
CES09 = 29	CES34 = 72	CES59 = 85	CES84 = 87
CES10 = 75	CES35 = 85	CES60 = 90	CES85 = 78
CES11 = 58	CES36 = 94	CES61 = 82	CES86 = 69
CES12 = 64	CES37 = 81	CES62 = 88	CES87 = 77
CES13 = 42	CES38 = 89	CES63 = 73	CES88 = 79
CES14 = 74	CES39 = 96	CES64 = 65	CES89 = 69
CES15 = 71	CES40 = 92	CES65 = 64	CES90 = 79
CES16 = 47	CES41 = 92	CES66 = 59	CES91 = 80
CES17 = 50	CES42 = 83	CES67 = 57	CES92 = 59
CES18 = 56	CES43 = 77	CES68 = 65	CES93 = 75
CES19 = 72	CES44 = 99	CES69 = 74	CES94 = 52
CES20 = 65	CES45 = 85	CES70 = 58	CES95 = 67
CES21 = 87	CES46 = 82	CES71 = 53	CES96 = 77
CES22 = 79	CES47 = 85	CES72 = 84	CES97 = 84
CES23 = 92	CES48 = 75	CES73 = 49	CES98 = 76
CES24 = 91	CES49 = 79	CES74 = 96	CES99 = 64
CES25 = 72	CES50 = 86	CES75 = 56	



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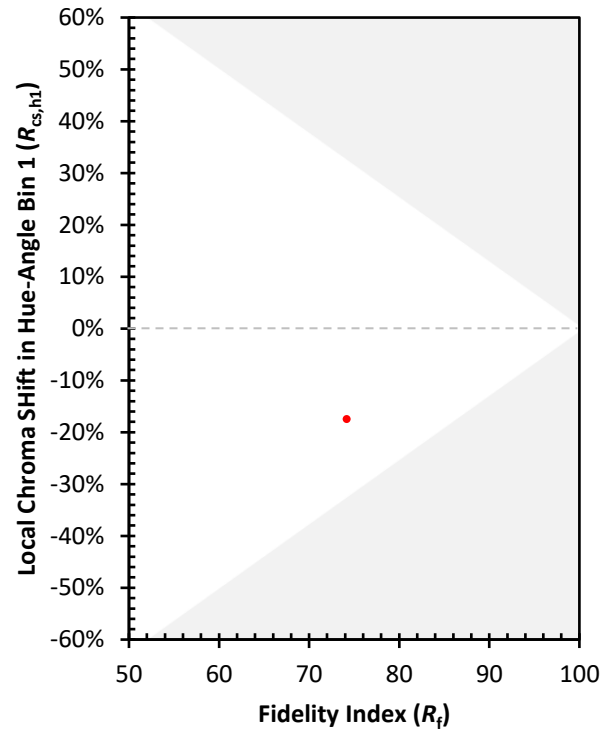
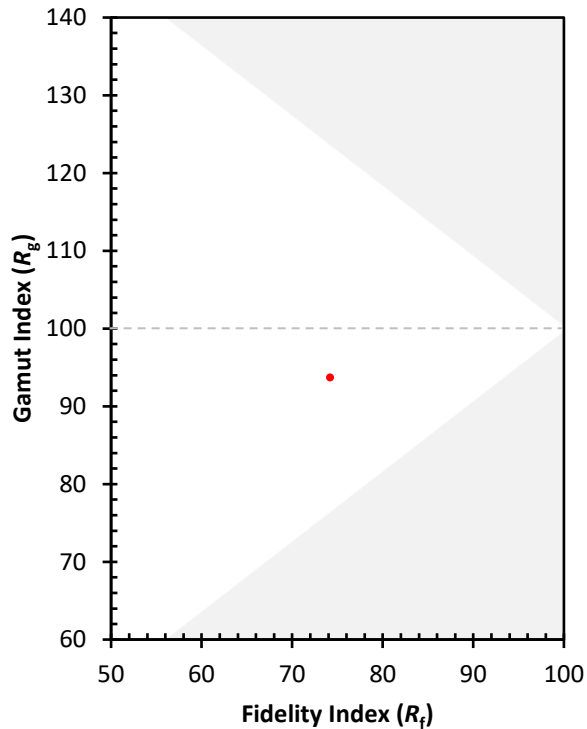
Color Rendition by Hue-Angle Bin



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Measure Comparisons



(END OF REPORT)