

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: P859969

Luminaire Tested: **SPHB-18SE-M-L940-CD**

Issue Date: 7/11/2024



Test Information

Test Method: LM-79-08
Report Number: P859969
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-18SE-M-L940-CD
Description: 18000 Lumen Standard Efficacy Select Pro High Bay with Medium Lens
and, 4000K 90CRI LEDs
Light Source: -
Ballast/Driver: -

Luminaire Equipment: Sample No. Condition Description

Summary

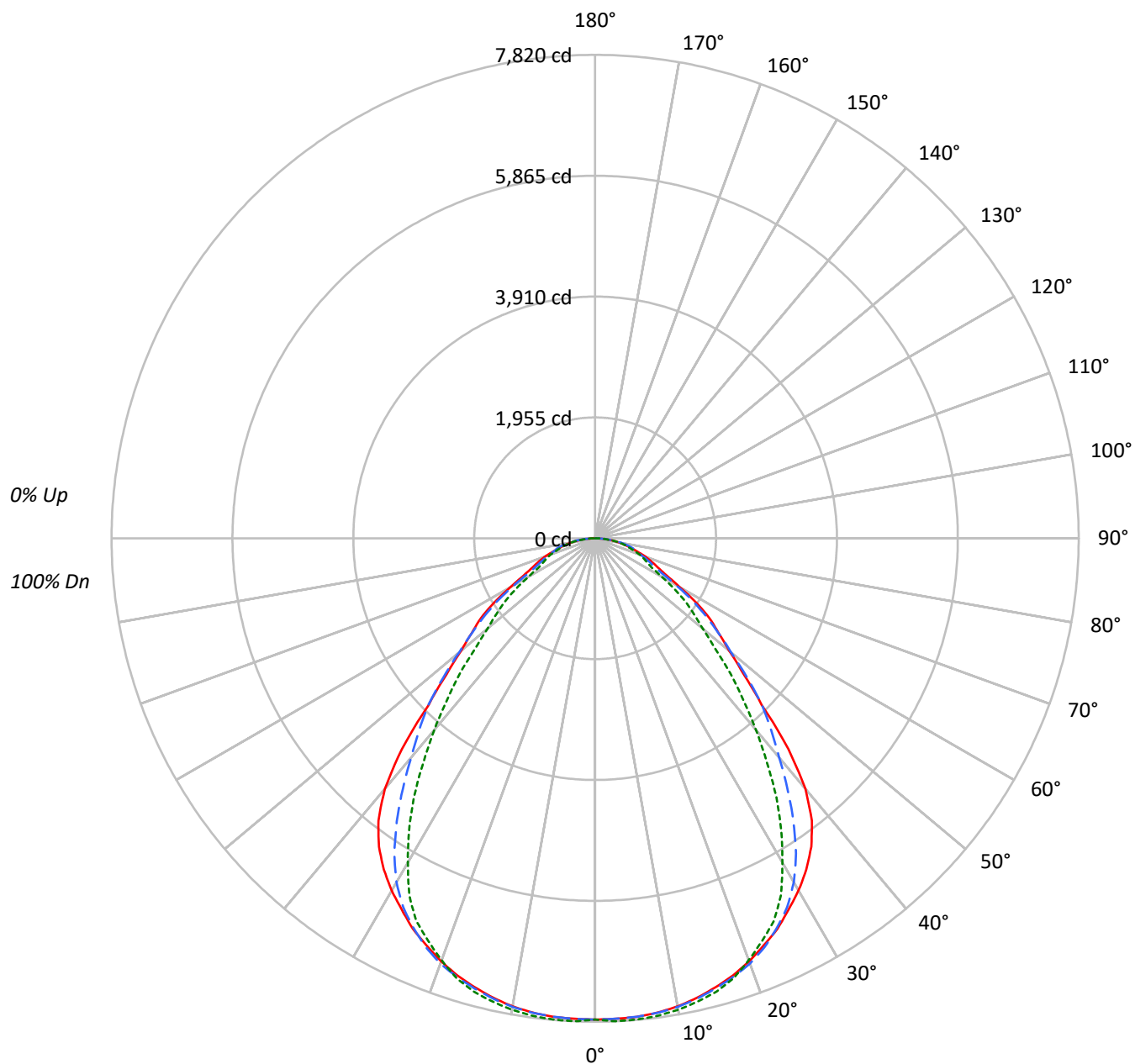
Lumens per Lamp: N/A
Luminaire Lumens: 16160.0 lumens
Efficiency: N/A
Efficacy: 137.6 lumens/watt
Spacing Criteria (0/90/45): 1.25 / 1.16 / 1.22
Luminous Opening: Rectangular (W 1' x L: 1.38' x H: 0')
CIE Type: Direct

Input Watts (W): 117.4
Input Voltage (V): NR
Input Current (Ain): NR
Voltage Rise (V): NR
Power Factor: NR
Total Harmonic Distortion (THDi): NR
Frequency (hertz): 60
Stabilization Time: NR
Operation Time: NR
Ambient Temperature (°C): NR
Test Distance: 25 FT

TEST NUMBER: P859969

CATALOG NUMBER: SPHB-18SE-M-L940-CD

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					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	111	111	111	106	106	106	102	102	102	100		
1	110	106	103	99	108	104	101	98	100	97	95	96	94	92	92	91	89	87		
2	102	95	89	84	99	93	87	83	89	85	81	86	82	79	83	80	77	75		
3	94	85	78	72	92	83	77	71	80	75	70	78	73	69	75	71	68	66		
4	87	76	69	63	85	75	68	62	73	66	61	70	65	61	68	64	60	58		
5	81	69	61	55	79	68	61	55	66	59	54	64	58	54	62	57	53	51		
6	75	63	55	49	73	62	54	49	60	54	48	59	53	48	57	52	48	46		
7	70	58	50	44	68	57	49	44	55	49	44	54	48	43	53	47	43	41		
8	66	53	45	40	64	52	45	40	51	44	39	50	44	39	49	43	39	37		
9	61	49	41	36	60	48	41	36	47	41	36	46	40	36	45	40	36	34		
10	58	45	38	33	57	45	38	33	44	37	33	43	37	33	42	37	33	31		

AVERAGE LUMINANCE (cd/sqm):

	0°	45°	90°
0°	60727	60727	60727
5°	60846	60831	61176
10°	60900	60965	61338
15°	60721	60879	61302
20°	60457	60763	60278
25°	60014	59846	58830
30°	59254	57858	54557
35°	58011	53230	48624
40°	53836	47113	41185
45°	42001	42113	34083
50°	34303	34790	27525
55°	30735	29576	24185
60°	24604	23291	19350
65°	20619	18875	17113
70°	19576	17984	17423
75°	17763	19095	16804
80°	17850	19512	17711
85°	15527	18194	14793



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ZONAL LUMENS:

Zone	Lumens	% Fixture
0°-10°	740.3	4.6
10°-20°	2129.0	13.2
20°-30°	3178.3	19.7
30°-40°	3468.0	21.5
40°-50°	2837.0	17.6
50°-60°	1865.3	11.5
60°-70°	1070.2	6.6
70°-80°	648.5	4.0
80°-90°	217.8	1.3
90°-100°	5.7	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°	6047.5	37.4
0°-40°	9515.6	58.9
0°-60°	14217.9	88.0
0°-90°	16154.3	100.0
90°-120°	5.7	0.0
90°-150°	5.7	0.0
90°-180°	6.0	0.0
0°-180°	16160.0	100.0

CANDELA DISTRIBUTION:

	0°	22.5°	45°	67.5°	90°	Flux
0°	7786	7786	7786	7786	7786	
5°	7771	7759	7769	7801	7813	739
15°	7520	7519	7539	7587	7592	2122
25°	6973	6990	6954	6870	6836	3208
35°	6092	5955	5590	5209	5106	3776
45°	3808	4092	3818	3370	3090	3022
55°	2260	2198	2175	1869	1778	1991
65°	1117	1101	1023	995	927	1142
75°	589	638	634	608	558	638
85°	174	197	203	178	165	188
90°	1	14	29	34	36	8
95°	1	2	3	3	2	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°	7785.6	7785.6	7785.6	7785.6	7785.6
2.5°	7780.4	7769.2	7779.4	7811.3	7820.5
5°	7771.2	7758.9	7769.2	7801.0	7813.3
7.5°	7739.4	7732.2	7742.5	7774.3	7789.7
10°	7689.1	7680.8	7697.3	7725.0	7744.5
12.5°	7614.1	7611.0	7626.4	7666.5	7674.7
15°	7519.6	7518.6	7539.1	7587.4	7591.5
17.5°	7412.8	7411.8	7437.5	7469.3	7458.0
20°	7283.5	7290.6	7320.4	7290.6	7261.9
22.5°	7128.4	7151.0	7158.2	7064.7	7050.4
25°	6973.3	6989.8	6953.8	6869.6	6835.7
27.5°	6773.1	6792.6	6725.9	6605.7	6509.2
30°	6579.0	6560.5	6424.0	6191.9	6057.4
32.5°	6356.2	6290.5	6045.1	5724.7	5602.5
35°	6092.3	5954.7	5590.2	5209.2	5106.5
37.5°	5758.6	5507.0	5108.6	4711.2	4556.1
40°	5287.3	4996.7	4627.0	4216.2	4044.8
42.5°	4627.0	4519.2	4213.2	3751.1	3546.7
45°	3807.6	4092.0	3817.8	3370.1	3089.8
47.5°	3259.2	3654.6	3324.9	3001.5	2615.4
50°	2826.9	3099.0	2867.0	2575.3	2268.3
52.5°	2514.8	2596.9	2503.5	2183.1	2008.5
55°	2260.1	2198.5	2174.9	1868.9	1778.5
57.5°	1943.8	1909.9	1849.4	1629.6	1510.5
60°	1577.2	1649.1	1493.0	1430.4	1240.4
62.5°	1295.9	1366.7	1199.4	1195.3	1037.1
65°	1117.2	1100.8	1022.7	995.0	927.2
67.5°	988.9	937.5	910.8	874.9	851.3
70°	858.4	836.9	788.6	795.8	764.0
72.5°	715.7	743.4	695.2	708.5	651.0
75°	589.4	637.7	633.6	607.9	557.6
77.5°	485.7	537.0	546.3	522.7	481.6
80°	397.4	432.3	434.4	420.0	394.3
82.5°	291.6	312.2	327.6	302.9	286.5
85°	173.5	197.2	203.3	177.6	165.3
87.5°	56.5	79.1	88.3	91.4	92.4
90°	1.0	14.4	28.8	33.9	35.9
92.5°	1.0	4.1	6.2	9.2	10.3
95°	1.0	2.1	3.1	3.1	2.1
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: SP1-2404-343-7

Test Date: 05/20/2024

Luminaire Tested: SPHB-24SE-M-UNV-L940-CD

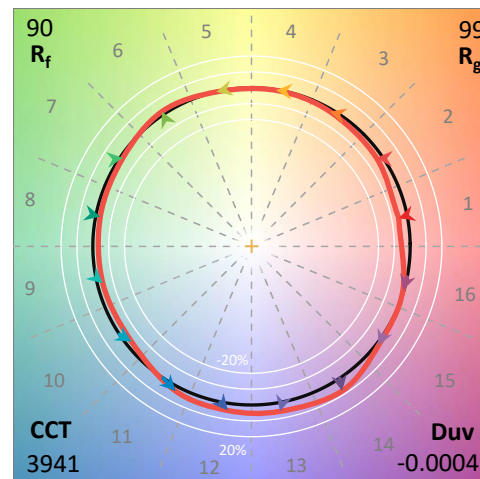
Data in this report applies to families of products SPHB-24SE-M-UNV-L940-CD.

Test Information

Test Method: LM-79-2019
 Report Number: SP1-2404-343-7
 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-L940-CD**
 Description: 18IN SPHB WITH MEDIUM LENS, 4000K/90CRI, 24K LUMENS, SE

Spectral Parameters

CCT (K):	3941	CRI (Ra):	91.2		
CIE u':	0.2264	R1:	91.4	R9:	57.5
CIE v':	0.5022	R2:	93.9	R10:	84.4
Duv:	-0.0004	R3:	94.6	R11:	91.3
CIE x:	0.3827	R4:	91.6	R12:	71.8
CIE y:	0.3773	R5:	90.6	R13:	92.0
CIE z:	0.2400	R6:	90.6	R14:	96.7
Peak Wavelength (nm):	450	R7:	93.3		
Dominant Wavelength (nm):	579	R8:	83.5		
Purity:	28.3				
Rf:	90.1				
Rg:	99.4				



Test Conditions

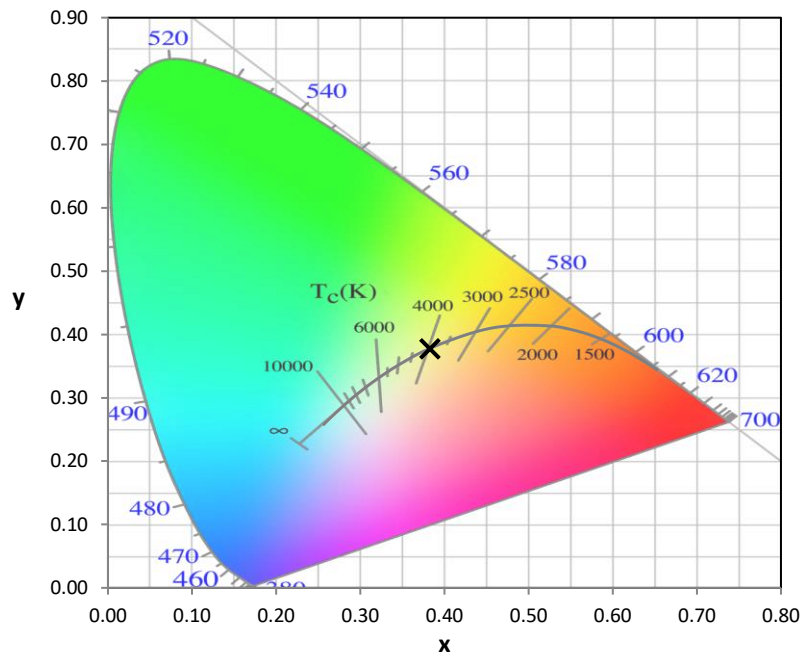
Stabilization Time: 24M
 Operation Time: 12H
 Room Temperature (°C) / RH%: 25.0/41%
 Sphere Temperature (°C): 25.2

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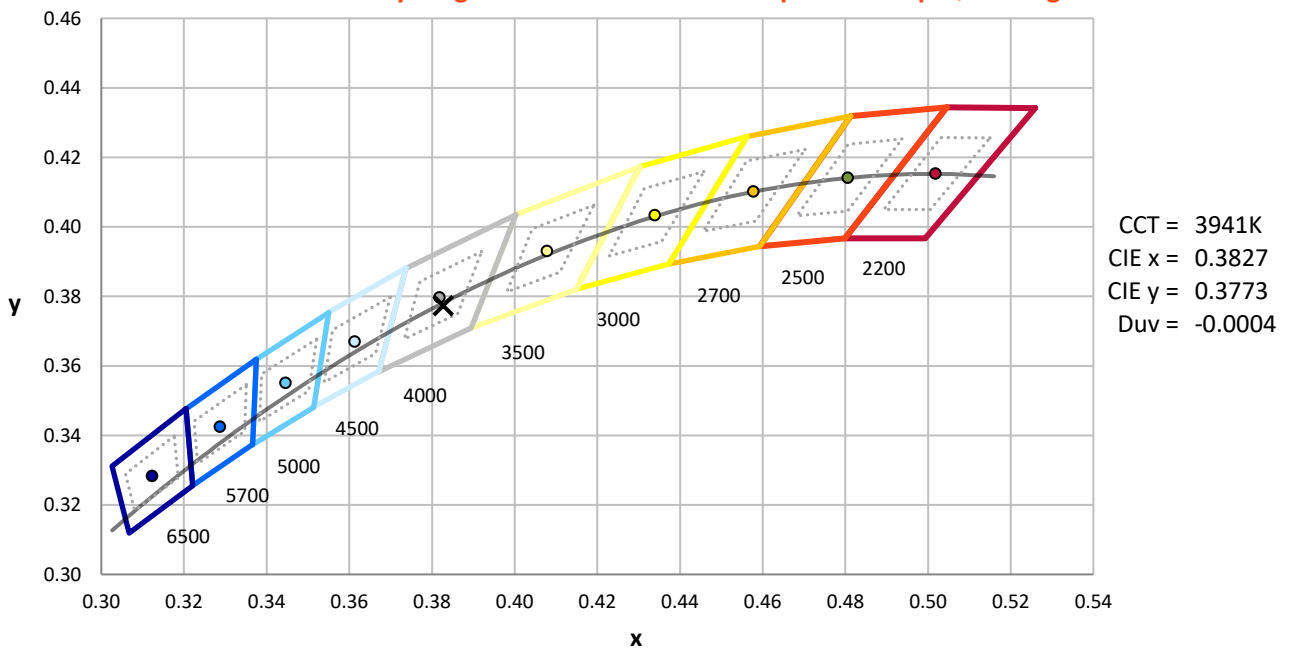
Measurement and Test Equipment			
Instrument	Identification Number	Calibration Date	Calibration Due Date
Photometer	76INCH SPHERE IN0058	2/12/2024	8/12/2024
Power Meter	XITRON 2801 IN0071	10/23/2023	10/23/2024
AC Power Source	CHROMA 61603 IN0063	10/24/2023	10/24/2024
DC Power Source	AGILENT E3634A IN0208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



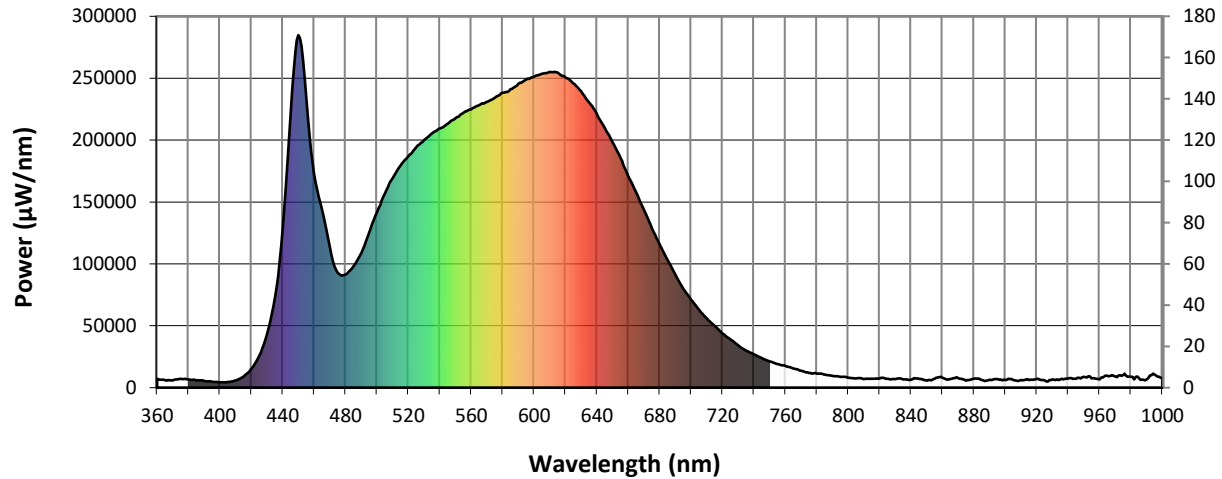
CIE 1931 Chromaticity Diagram with 2017 ANSI 7-Step and 4-Step Quadrangles



Point lies inside the ANSI 4000K 4-step quadrangle

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Photopic Flux vs. Wavelength

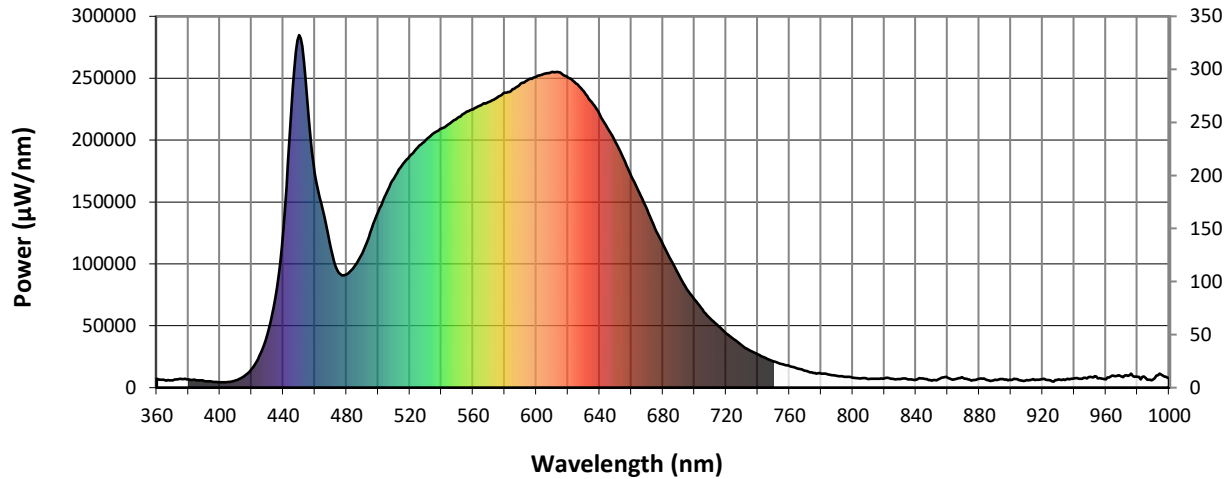


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λ (nm)	Power (μW/nm)	Lumens (φ/nm)	λ (nm)	Power (μW/nm)	Lumens (φ/nm)	λ (nm)	Power (μW/nm)	Lumens (φ/nm)	λ (nm)	Power (μW/nm)	Lumens (φ/nm)	λ (nm)	Power (μW/nm)	Lumens (φ/nm)
360	7212	NR	490	108829	NR	620	250576	NR	750	21248	NR	880	7254	NR
365	6095	NR	495	125088	NR	625	245705	NR	755	19109	NR	885	6272	NR
370	6022	NR	500	141971	NR	630	239404	NR	760	17593	NR	890	6410	NR
375	7076	NR	505	156633	NR	635	230449	NR	765	15401	NR	895	7000	NR
380	6674	NR	510	169197	NR	640	221008	NR	770	13743	NR	900	6176	NR
385	6019	NR	515	179365	NR	645	209690	NR	775	11948	NR	905	6118	NR
390	5440	NR	520	187018	NR	650	198297	NR	780	11421	NR	910	6132	NR
395	4835	NR	525	194159	NR	655	185669	NR	785	10432	NR	915	6202	NR
400	4236	NR	530	200071	NR	660	170891	NR	790	9515	NR	920	7026	NR
405	4501	NR	535	205570	NR	665	157591	NR	795	8800	NR	925	5915	NR
410	5834	NR	540	209259	NR	670	143731	NR	800	7939	NR	930	6549	NR
415	8990	NR	545	213260	NR	675	128798	NR	805	7431	NR	935	6547	NR
420	15076	NR	550	217506	NR	680	115773	NR	810	7034	NR	940	7527	NR
425	25851	NR	555	222032	NR	685	103063	NR	815	7070	NR	945	7157	NR
430	43228	NR	560	224902	NR	690	91359	NR	820	7449	NR	950	8630	NR
435	72792	NR	565	228152	NR	695	79831	NR	825	7107	NR	955	7432	NR
440	127912	NR	570	230769	NR	700	71164	NR	830	6871	NR	960	6594	NR
445	221467	NR	575	234150	NR	705	62968	NR	835	6778	NR	965	9518	NR
450	284796	NR	580	238181	NR	710	55738	NR	840	6431	NR	970	8910	NR
455	233729	NR	585	241075	NR	715	49805	NR	845	7189	NR	975	10074	NR
460	172720	NR	590	245594	NR	720	43740	NR	850	5642	NR	980	8847	NR
465	143757	NR	595	248900	NR	725	39092	NR	855	7250	NR	985	7969	NR
470	112827	NR	600	251233	NR	730	34044	NR	860	8091	NR	990	6557	NR
475	92779	NR	605	253490	NR	735	30057	NR	865	6978	NR	995	10421	NR
480	91420	NR	610	255123	NR	740	26868	NR	870	7631	NR	1000	7659	NR
485	97972	NR	615	254469	NR	745	23967	NR	875	5622	NR			

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Scotopic Flux vs. Wavelength



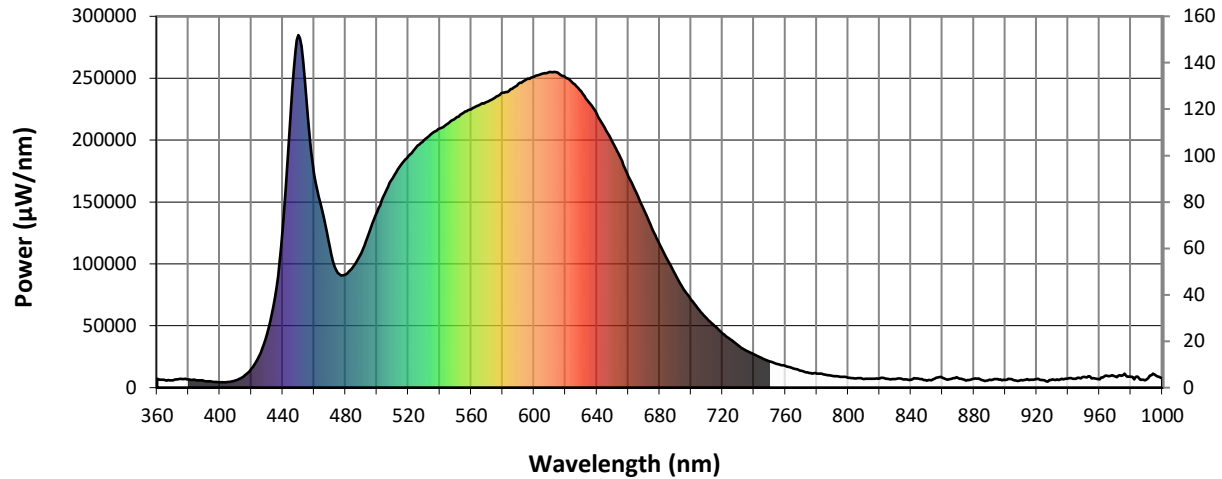
Scotopic Lumens: 27133.5

S/P: 1.74

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	7212	NR	490	108829	NR	620	250576	NR	750	21248	NR	880	7254	NR
365	6095	NR	495	125088	NR	625	245705	NR	755	19109	NR	885	6272	NR
370	6022	NR	500	141971	NR	630	239404	NR	760	17593	NR	890	6410	NR
375	7076	NR	505	156633	NR	635	230449	NR	765	15401	NR	895	7000	NR
380	6674	NR	510	169197	NR	640	221008	NR	770	13743	NR	900	6176	NR
385	6019	NR	515	179365	NR	645	209690	NR	775	11948	NR	905	6118	NR
390	5440	NR	520	187018	NR	650	198297	NR	780	11421	NR	910	6132	NR
395	4835	NR	525	194159	NR	655	185669	NR	785	10432	NR	915	6202	NR
400	4236	NR	530	200071	NR	660	170891	NR	790	9515	NR	920	7026	NR
405	4501	NR	535	205570	NR	665	157591	NR	795	8800	NR	925	5915	NR
410	5834	NR	540	209259	NR	670	143731	NR	800	7939	NR	930	6549	NR
415	8990	NR	545	213260	NR	675	128798	NR	805	7431	NR	935	6547	NR
420	15076	NR	550	217506	NR	680	115773	NR	810	7034	NR	940	7527	NR
425	25851	NR	555	222032	NR	685	103063	NR	815	7070	NR	945	7157	NR
430	43228	NR	560	224902	NR	690	91359	NR	820	7449	NR	950	8630	NR
435	72792	NR	565	228152	NR	695	79831	NR	825	7107	NR	955	7432	NR
440	127912	NR	570	230769	NR	700	71164	NR	830	6871	NR	960	6594	NR
445	221467	NR	575	234150	NR	705	62968	NR	835	6778	NR	965	9518	NR
450	284796	NR	580	238181	NR	710	55738	NR	840	6431	NR	970	8910	NR
455	233729	NR	585	241075	NR	715	49805	NR	845	7189	NR	975	10074	NR
460	172720	NR	590	245594	NR	720	43740	NR	850	5642	NR	980	8847	NR
465	143757	NR	595	248900	NR	725	39092	NR	855	7250	NR	985	7969	NR
470	112827	NR	600	251233	NR	730	34044	NR	860	8091	NR	990	6557	NR
475	92779	NR	605	253490	NR	735	30057	NR	865	6978	NR	995	10421	NR
480	91420	NR	610	255123	NR	740	26868	NR	870	7631	NR	1000	7659	NR
485	97972	NR	615	254469	NR	745	23967	NR	875	5622	NR			

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Melanopic Flux vs. Wavelength



Melanopic Lumens: 11042.9 M/P: 0.71

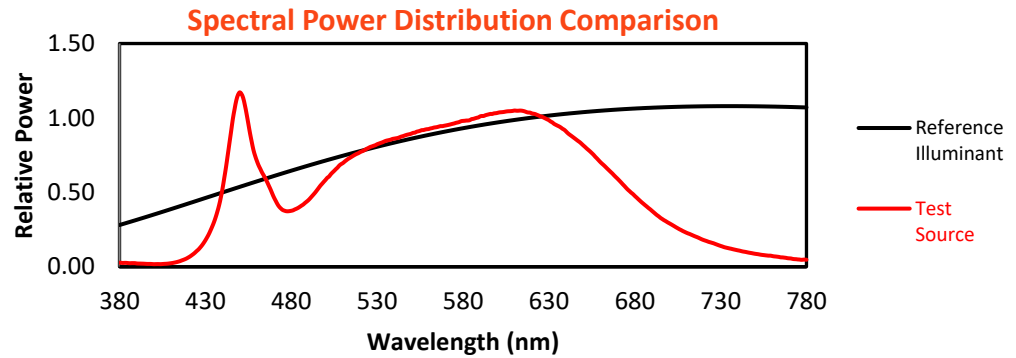
λ (nm)	Power (μW/nm)	Lumens (φ/nm)	λ (nm)	Power (μW/nm)	Lumens (φ/nm)	λ (nm)	Power (μW/nm)	Lumens (φ/nm)	λ (nm)	Power (μW/nm)	Lumens (φ/nm)	λ (nm)	Power (μW/nm)	Lumens (φ/nm)
360	7212	NR	490	108829	NR	620	250576	NR	750	21248	NR	880	7254	NR
365	6095	NR	495	125088	NR	625	245705	NR	755	19109	NR	885	6272	NR
370	6022	NR	500	141971	NR	630	239404	NR	760	17593	NR	890	6410	NR
375	7076	NR	505	156633	NR	635	230449	NR	765	15401	NR	895	7000	NR
380	6674	NR	510	169197	NR	640	221008	NR	770	13743	NR	900	6176	NR
385	6019	NR	515	179365	NR	645	209690	NR	775	11948	NR	905	6118	NR
390	5440	NR	520	187018	NR	650	198297	NR	780	11421	NR	910	6132	NR
395	4835	NR	525	194159	NR	655	185669	NR	785	10432	NR	915	6202	NR
400	4236	NR	530	200071	NR	660	170891	NR	790	9515	NR	920	7026	NR
405	4501	NR	535	205570	NR	665	157591	NR	795	8800	NR	925	5915	NR
410	5834	NR	540	209259	NR	670	143731	NR	800	7939	NR	930	6549	NR
415	8990	NR	545	213260	NR	675	128798	NR	805	7431	NR	935	6547	NR
420	15076	NR	550	217506	NR	680	115773	NR	810	7034	NR	940	7527	NR
425	25851	NR	555	222032	NR	685	103063	NR	815	7070	NR	945	7157	NR
430	43228	NR	560	224902	NR	690	91359	NR	820	7449	NR	950	8630	NR
435	72792	NR	565	228152	NR	695	79831	NR	825	7107	NR	955	7432	NR
440	127912	NR	570	230769	NR	700	71164	NR	830	6871	NR	960	6594	NR
445	221467	NR	575	234150	NR	705	62968	NR	835	6778	NR	965	9518	NR
450	284796	NR	580	238181	NR	710	55738	NR	840	6431	NR	970	8910	NR
455	233729	NR	585	241075	NR	715	49805	NR	845	7189	NR	975	10074	NR
460	172720	NR	590	245594	NR	720	43740	NR	850	5642	NR	980	8847	NR
465	143757	NR	595	248900	NR	725	39092	NR	855	7250	NR	985	7969	NR
470	112827	NR	600	251233	NR	730	34044	NR	860	8091	NR	990	6557	NR
475	92779	NR	605	253490	NR	735	30057	NR	865	6978	NR	995	10421	NR
480	91420	NR	610	255123	NR	740	26868	NR	870	7631	NR	1000	7659	NR
485	97972	NR	615	254469	NR	745	23967	NR	875	5622	NR			

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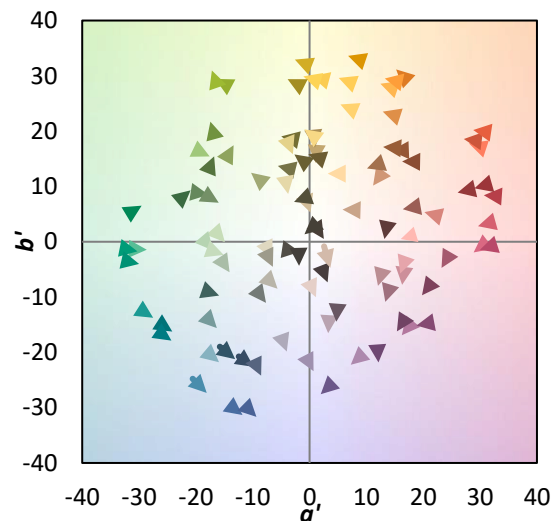
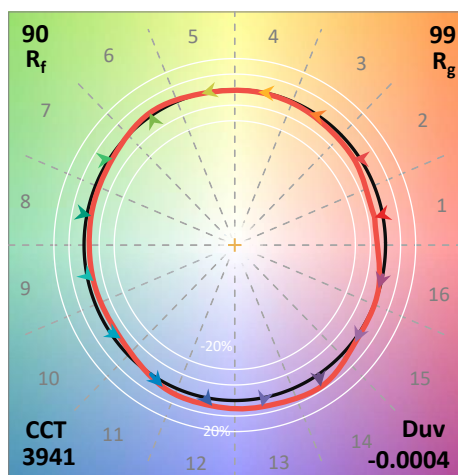
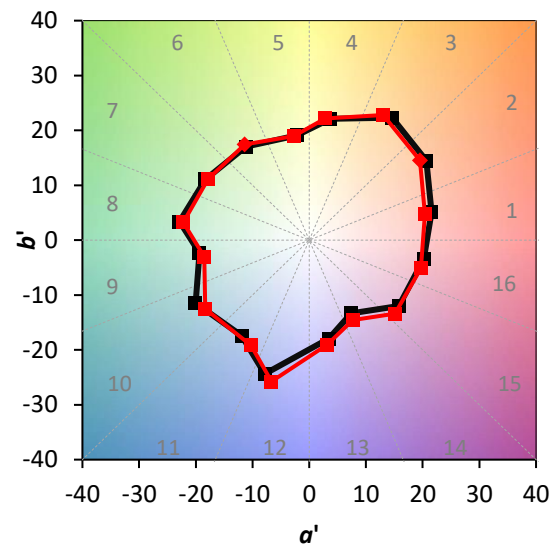
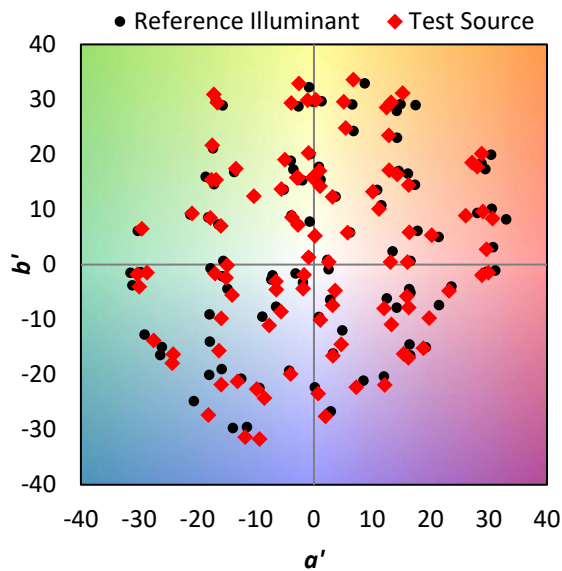
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Summary

$R_f = 90.1$
 $R_g = 99.4$
 CIE $R_a = 91.2$
 $R_9 = 57.5$



Color Vector Graphics

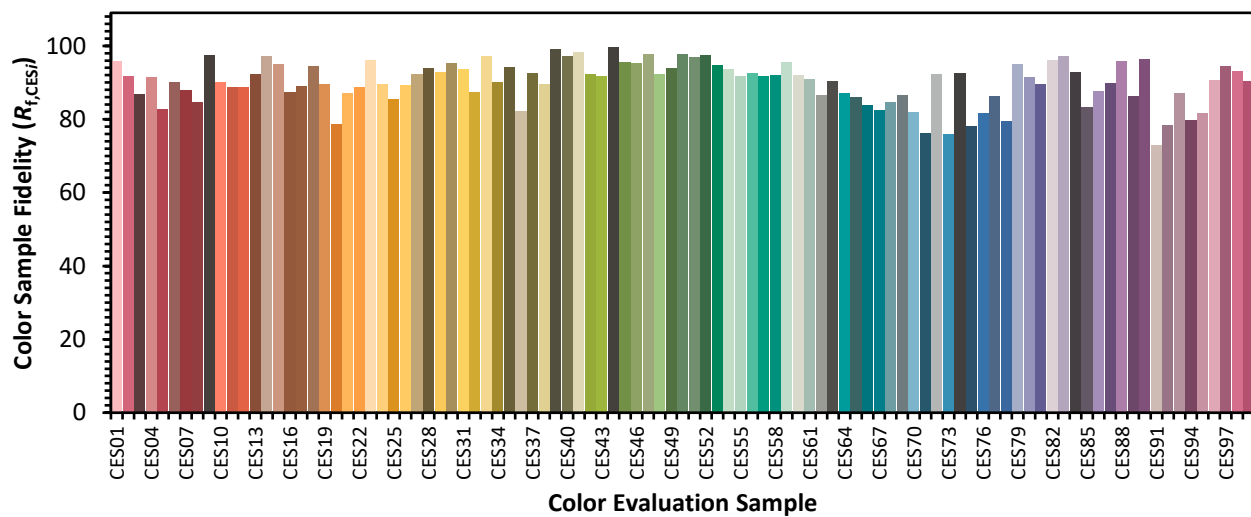


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Individual Sample Fidelity Index ($R_{f,i}$)

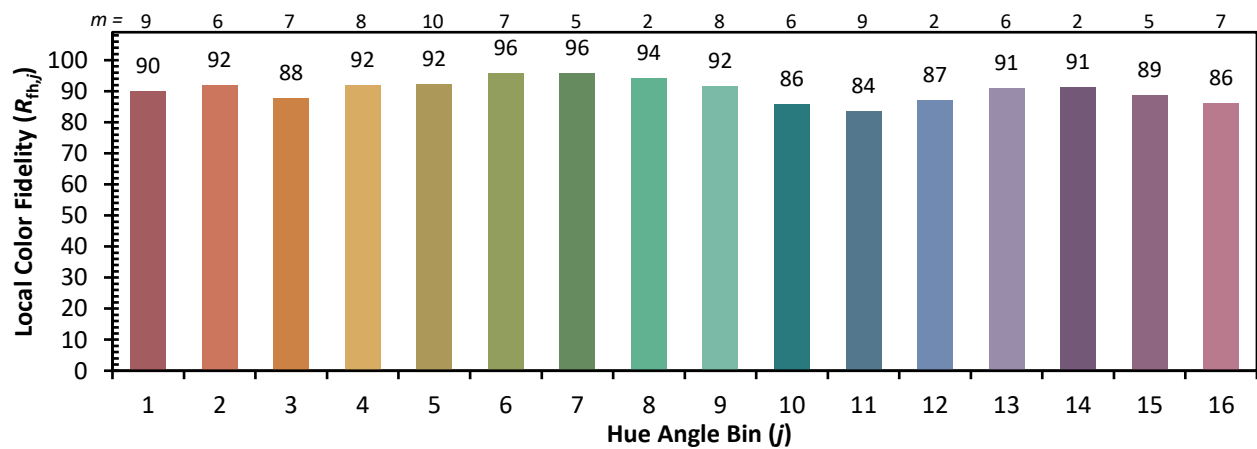
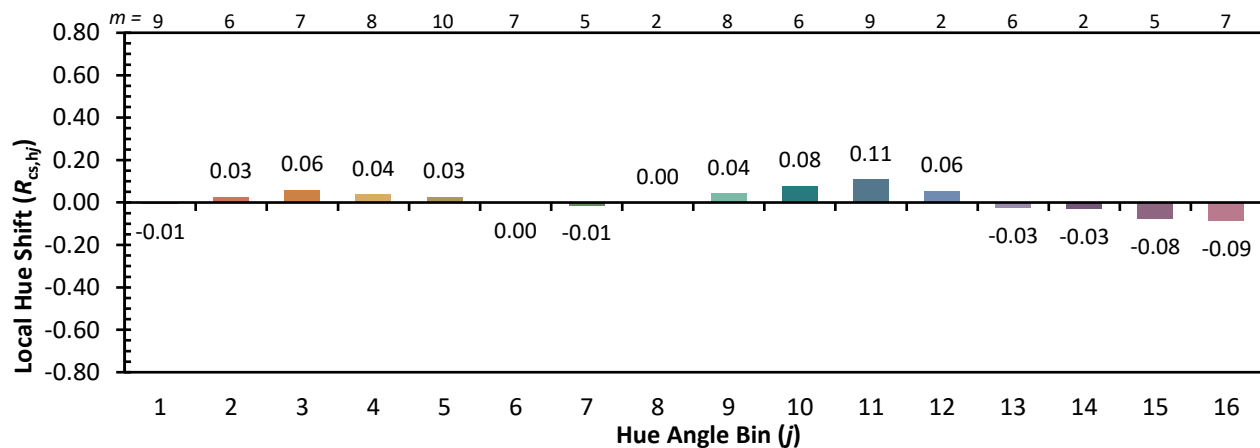
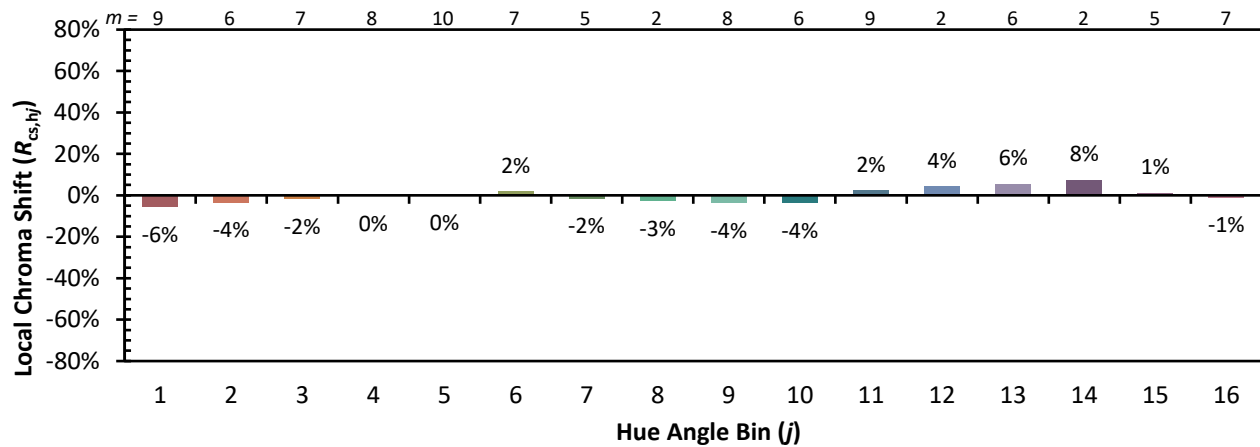
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CES02 = 62	CES27 = 92	CES52 = 97	CES77 = 86
CES03 = 31	CES28 = 94	CES53 = 95	CES78 = 79
CES04 = 69	CES29 = 93	CES54 = 94	CES79 = 95
CES05 = 49	CES30 = 95	CES55 = 92	CES80 = 91
CES06 = 50	CES31 = 94	CES56 = 93	CES81 = 89
CES07 = 42	CES32 = 87	CES57 = 92	CES82 = 96
CES08 = 41	CES33 = 97	CES58 = 92	CES83 = 97
CES09 = 29	CES34 = 90	CES59 = 96	CES84 = 93
CES10 = 74	CES35 = 94	CES60 = 92	CES85 = 83
CES11 = 57	CES36 = 82	CES61 = 91	CES86 = 88
CES12 = 63	CES37 = 93	CES62 = 86	CES87 = 90
CES13 = 43	CES38 = 90	CES63 = 90	CES88 = 96
CES14 = 74	CES39 = 99	CES64 = 87	CES89 = 86
CES15 = 71	CES40 = 97	CES65 = 86	CES90 = 96
CES16 = 47	CES41 = 98	CES66 = 84	CES91 = 73
CES17 = 49	CES42 = 92	CES67 = 83	CES92 = 78
CES18 = 56	CES43 = 92	CES68 = 85	CES93 = 87
CES19 = 71	CES44 = 99	CES69 = 87	CES94 = 80
CES20 = 66	CES45 = 96	CES70 = 82	CES95 = 82
CES21 = 85	CES46 = 95	CES71 = 76	CES96 = 91
CES22 = 78	CES47 = 98	CES72 = 92	CES97 = 94
CES23 = 91	CES48 = 92	CES73 = 76	CES98 = 93
CES24 = 90	CES49 = 94	CES74 = 93	CES99 = 90
CES25 = 71	CES50 = 98	CES75 = 78	



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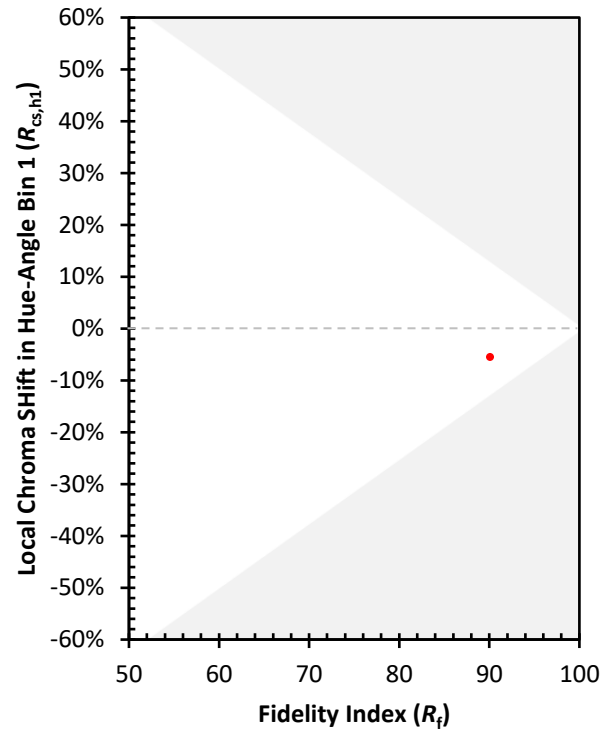
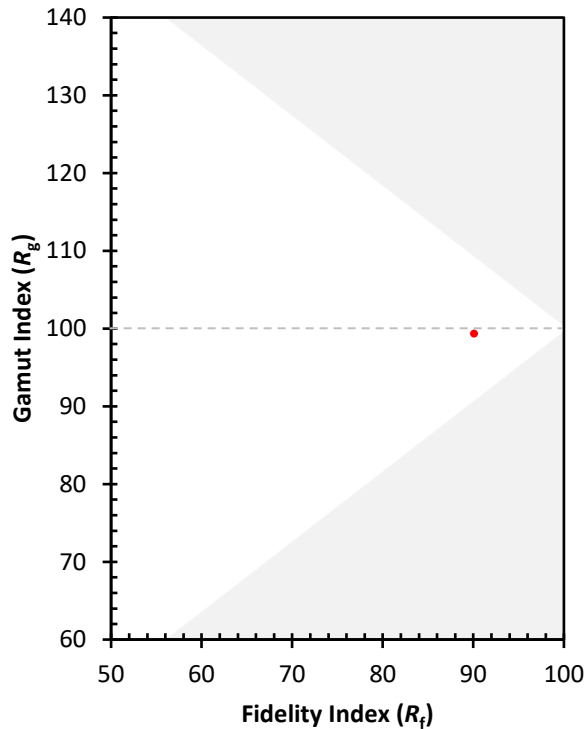
Color Rendition by Hue-Angle Bin



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Measure Comparisons



(END OF REPORT)