

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: P827956

Luminaire Tested: **OHBL-12SE-A-UNV-L935-CD-UPL18**

Issue Date: 5/3/2024



Test Information

Test Method: LM-79-08
Report Number: P827956
REPORT IS A COMBINATION OF REPORTS P826149 AND G3-2310-221-8
Test Lab: INNOVATION CENTER
Issue Date: 5/3/2024
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)
Product Line: METALUX
Catalog Number: OHBL-12SE-A-UNV-L935-CD-UPL18
Description:
Light Source: -
Ballast/Driver: -

Summary

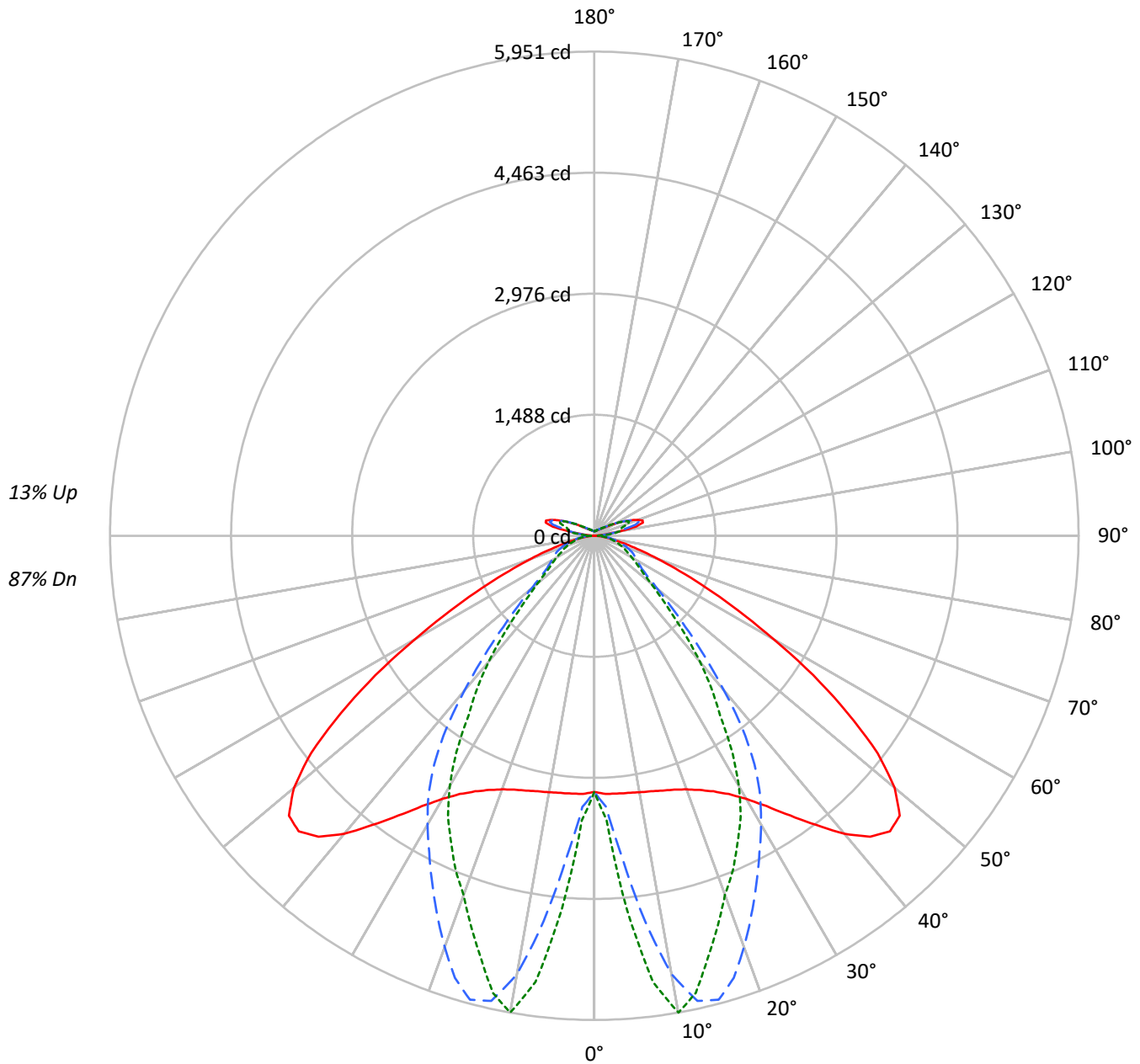
Lumens per Lamp: N/A
Luminaire Lumens: 11597.4 lumens
Efficiency: N/A
Efficacy: 140.9 lumens/watt
Spacing Criteria (0/90/45): 2.18 / 1.37 / 1.3
Luminous Opening: Rectangular w/ Sides (W: 3.78' x L: 0.88' x H: 0.17')
CIE Type: Semi-Direct

Input Watts (W): 82.3
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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CATALOG NUMBER: OHBL-12SE-A-UNV-L935-CD-UPL18

Luminous Intensity Polar Plot





TEST NUMBER: P827956

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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	30	10	50	30	10
RCR																				
0	116	116	116	116	112	112	112	112	104	104	104	97	97	97	90	90	90	87		
1	108	104	100	97	104	100	97	94	94	91	89	88	86	84	82	81	79	76		
2	99	92	87	82	96	89	84	80	84	80	76	79	76	73	74	72	69	67		
3	92	83	76	70	88	80	74	69	76	70	66	71	67	63	67	64	61	58		
4	85	75	67	61	82	72	65	60	68	63	58	65	60	56	61	57	54	52		
5	79	68	60	54	76	66	58	53	62	56	51	59	54	50	56	52	48	46		
6	73	61	54	48	71	60	53	47	57	51	46	54	49	44	51	47	43	41		
7	68	56	48	43	66	55	48	42	52	46	41	50	44	40	47	43	39	37		
8	64	52	44	39	62	50	43	38	48	42	37	46	40	36	44	39	35	34		
9	60	48	40	35	58	47	40	35	45	38	34	43	37	33	41	36	32	31		
10	56	44	37	32	54	43	36	32	41	35	31	40	34	30	38	33	30	28		

AVERAGE LUMINANCE (cd/sqm):

	0°	45°	90°
0°	10245	10245	10245
5°	10217	12815	15019
10°	10229	17571	19508
15°	10392	19035	17905
20°	10736	17563	16002
25°	11424	15702	14636
30°	12628	14051	13015
35°	14709	12216	10371
40°	17507	9236	8254
45°	19855	6241	5875
50°	19870	4241	4345
55°	16940	3301	3550
60°	12425	3048	3194
65°	8325	3008	3025
70°	5166	2838	2930
75°	2979	2546	2803
80°	1646	2134	2893
85°	708	1686	2681



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ZONAL LUMENS:

Zone	Lumens	% Fixture
0°-10°	411.1	3.5
10°-20°	1451.1	12.5
20°-30°	2138.3	18.4
30°-40°	2247.0	19.4
40°-50°	1719.4	14.8
50°-60°	1038.2	9.0
60°-70°	633.6	5.5
70°-80°	345.8	3.0
80°-90°	125.1	1.1
90°-100°	142.7	1.2
100°-110°	495.5	4.3
110°-120°	425.7	3.7
120°-130°	204.5	1.8
130°-140°	102.1	0.9
140°-150°	59.3	0.5
150°-160°	34.6	0.3
160°-170°	17.9	0.2
170°-180°	5.5	0.0
0°-30°	4000.5	34.5
0°-40°	6247.5	53.9
0°-60°	9005.1	77.6
0°-90°	10109.6	87.2
90°-120°	1063.9	9.2
90°-150°	1429.8	12.3
90°-180°	1488.0	12.8
0°-180°	11597.4	100.0

CANDELA DISTRIBUTION:

	0°	22.5°	45°	67.5°	90°	Flux
0°	3149	3149	3149	3149	3149	
5°	3181	3413	3981	4445	4617	304
15°	3243	5051	5903	5508	5379	922
25°	3465	5862	4713	4267	4161	1620
35°	4198	4694	3433	2859	2692	2663
45°	5138	2679	1582	1392	1333	3882
55°	3799	908	720	667	665	3357
65°	1523	575	530	453	430	1561
75°	406	358	328	271	260	467
85°	60	111	131	119	108	75
90°	3	21	28	38	42	6
95°	32	68	108	139	159	100
105°	618	612	522	368	339	586
115°	428	432	432	427	426	431
125°	208	218	224	223	222	196
135°	123	126	130	132	132	98
145°	90	92	94	95	95	57
155°	72	73	74	75	75	34
165°	62	62	62	63	63	18
175°	56	56	57	57	57	5
180°	56	56	56	56	56	



TEST NUMBER: P827956

CATALOG NUMBER: OHBL-12SE-A-UNV-L935-CD-UPL18

CANDELA DISTRIBUTION (FULL):

	0°	22.5°	45°	67.5°	90°
0°	3149.2	3149.2	3149.2	3149.2	3149.2
2.5°	3175.1	3207.4	3335.3	3467.8	3500.1
5°	3180.8	3412.6	3981.0	4445.2	4616.7
7.5°	3187.6	3744.9	4781.2	5349.4	5531.3
10°	3200.4	4165.2	5474.5	5882.4	5951.2
12.5°	3216.3	4610.4	5856.0	5841.1	5754.4
15°	3242.8	5050.8	5902.9	5508.3	5378.8
17.5°	3270.7	5423.4	5698.0	5146.2	5033.4
20°	3315.9	5700.0	5379.1	4824.3	4696.1
22.5°	3381.1	5852.1	5044.8	4533.1	4449.5
25°	3465.3	5861.9	4712.7	4266.6	4161.2
27.5°	3578.0	5725.9	4394.3	4005.6	3894.3
30°	3731.4	5465.6	4098.6	3690.8	3552.8
32.5°	3939.8	5090.8	3793.7	3310.8	3156.0
35°	4197.5	4694.3	3433.2	2859.2	2692.0
37.5°	4478.7	4254.1	2995.8	2459.3	2361.9
40°	4781.2	3800.4	2477.4	2085.1	2015.4
42.5°	5017.2	3307.2	1995.8	1732.8	1658.6
45°	5137.5	2678.6	1581.5	1391.7	1333.2
47.5°	5090.7	2079.2	1253.8	1105.8	1088.2
50°	4817.2	1535.3	1003.7	910.9	903.6
52.5°	4389.7	1144.3	829.1	771.7	759.1
55°	3799.3	908.3	719.9	667.3	665.2
57.5°	3189.9	771.7	653.5	612.7	598.5
60°	2539.8	688.1	603.1	557.1	528.3
62.5°	1990.8	629.6	566.1	503.6	476.8
65°	1523.2	575.0	529.7	453.2	430.1
67.5°	1135.5	523.0	485.1	400.2	386.8
70°	827.3	469.7	434.3	356.0	345.3
72.5°	589.6	416.5	383.5	314.4	302.7
75°	405.5	357.6	328.0	270.7	259.7
77.5°	273.6	297.5	273.3	231.1	226.5
80°	182.8	235.9	221.1	195.8	193.0
82.5°	110.8	171.2	174.5	159.2	151.5
85°	60.3	110.8	130.8	119.1	108.0
87.5°	23.7	61.4	90.1	80.9	76.2
90°	3.3	20.8	28.3	37.5	41.7
92.5°	10.8	27.5	45.8	63.3	70.0
95°	31.7	68.3	107.5	139.2	159.2
97.5°	162.5	177.5	198.3	235.0	248.3
100°	335.0	351.7	295.0	309.2	314.2
102.5°	524.2	523.3	378.3	341.7	336.7
105°	617.5	611.7	521.7	367.5	339.2



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CANDELA DISTRIBUTION (continued):

	0°	22.5°	45°	67.5°	90°
112.5°	501.7	505.0	495.0	481.7	460.8
115°	427.5	432.5	431.7	426.7	425.8
117.5°	364.2	366.7	368.3	366.7	367.5
120°	304.2	310.0	313.3	310.8	309.2
122.5°	254.2	261.7	265.8	263.3	261.7
125°	208.3	218.3	224.2	223.3	221.7
127.5°	176.7	184.2	191.7	190.8	189.2
130°	153.3	159.2	164.2	165.0	165.8
132.5°	137.5	140.0	145.0	145.8	147.5
135°	123.3	125.8	130.0	131.7	132.5
137.5°	112.5	115.0	118.3	120.0	120.8
140°	103.3	105.8	108.3	110.0	110.8
142.5°	95.8	98.3	100.8	101.7	102.5
145°	90.0	91.7	94.2	95.0	95.0
147.5°	84.2	85.8	87.5	89.2	89.2
150°	79.2	80.8	82.5	83.3	84.2
152.5°	75.8	76.7	78.3	79.2	79.2
155°	71.7	73.3	74.2	75.0	75.0
157.5°	69.2	70.0	70.8	71.7	71.7
160°	66.7	66.7	67.5	68.3	68.3
162.5°	64.2	64.2	65.0	65.8	65.8
165°	61.7	62.5	62.5	63.3	63.3
167.5°	60.0	60.0	60.8	60.8	61.7
170°	58.3	58.3	59.2	59.2	59.2
172.5°	56.7	57.5	57.5	57.5	57.5
175°	55.8	55.8	56.7	56.7	56.7
177.5°	55.0	55.8	55.8	55.8	55.8
180°	55.8	55.8	55.8	55.8	55.8



Report Generated By 670246072 / DESKTOP-50001EG





— 0°-180° - - 45°-225° - - - 90°-270°







107.5°	623.3	623.3	575.0	446.7	374.2
110°	570.8	577.5	552.5	502.5	445.0



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

Report Prepared for

Cooper Lighting Solutions

METALUX

Report Number: SP1-2307-100-7

Test Date: 07/28/2023

Luminaire Tested: OHB-15SE-N-UNV-L935-CD

Data in this report applies to families of products including OHB-15SE-N-UNV-L935-CD.

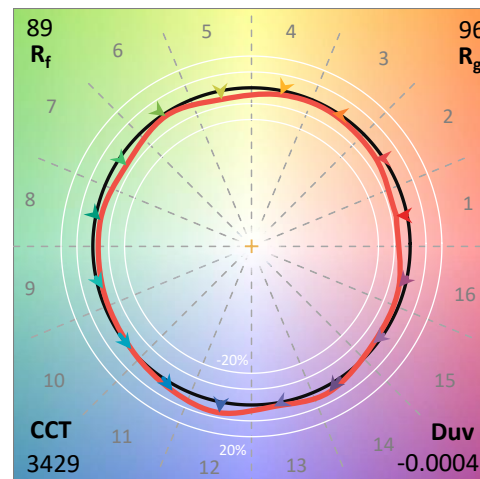
Test Information

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

LENS

Spectral Parameters

CCT (K):	3429	CRI (Ra):	90.9		
CIE u':	0.2376	R1:	91.1	R9:	50.7
CIE v':	0.5121	R2:	96.7	R10:	90.8
Duv:	-0.0004	R3:	97.7	R11:	88.9
CIE x:	0.4088	R4:	88.8	R12:	74.6
CIE y:	0.3916	R5:	90.3	R13:	92.9
CIE z:	0.1997	R6:	94.5	R14:	99.5
Peak Wavelength (nm):	609	R7:	89.8		
Dominant Wavelength (nm):	581	R8:	78.2		
Purity:	40.4				
Rf:	88.9				
Rg:	96.3				



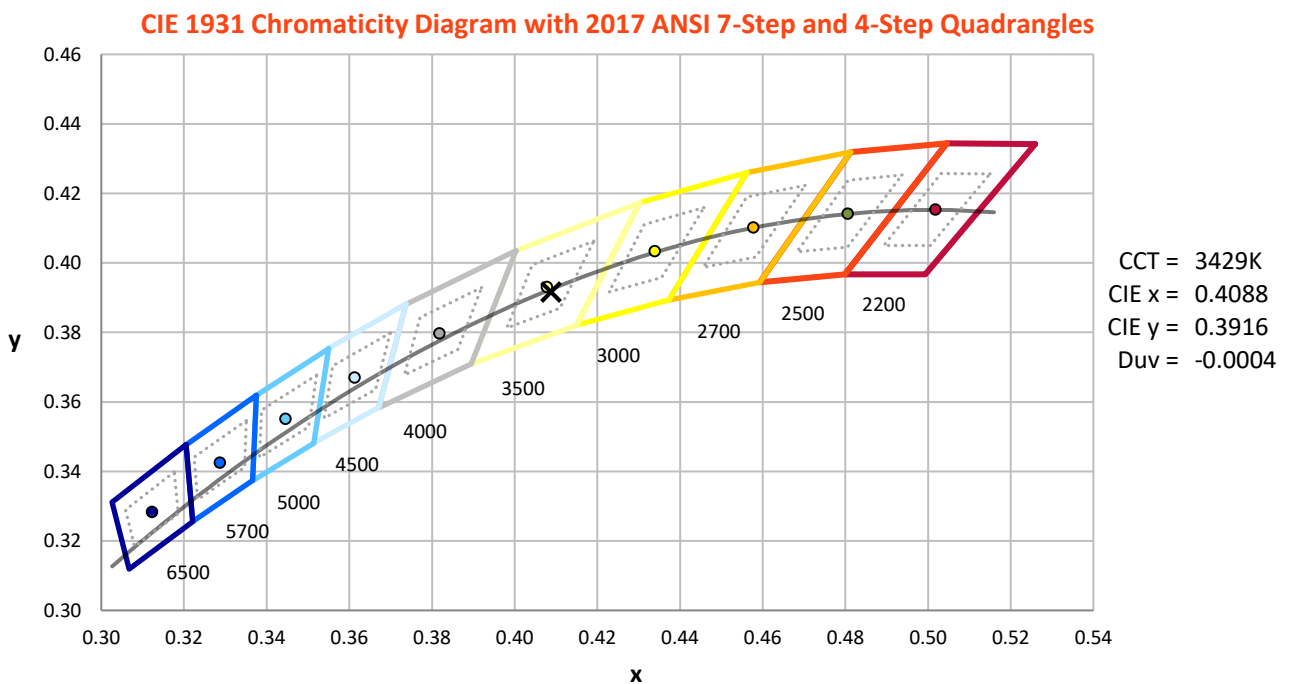
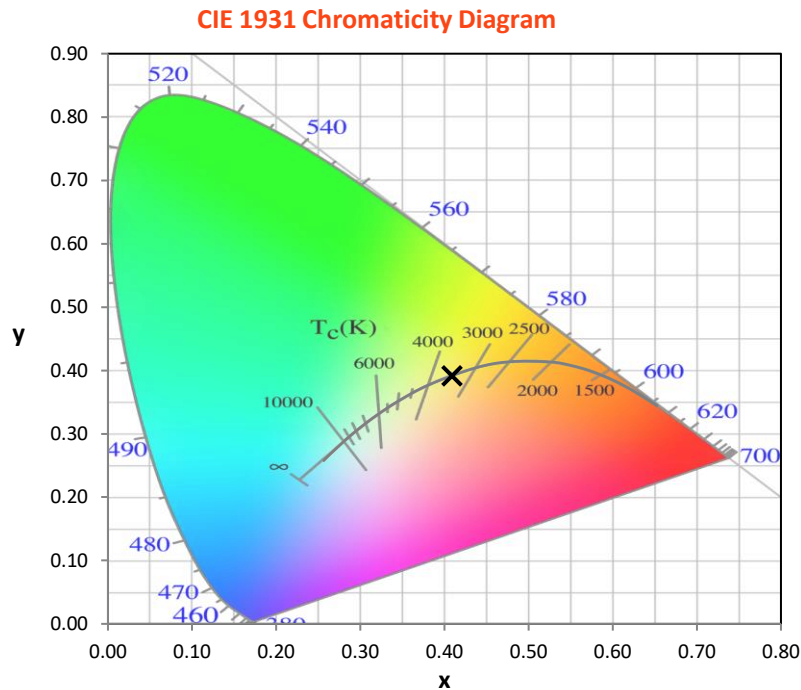
Test Conditions

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

REPORT NUMBER: SP1-2307-100-7

Measurement and Test Equipment			
Instrument	Identification Number	Calibration Date	Calibration Due Date
Photometer	76INCH SPHERE IN0058	2/9/2023	8/9/2023
Power Meter	XITRON 2801 IN0071	11/29/2022	11/29/2023
AC Power Source	CHROMA 61603 IN0063	11/28/2022	11/28/2023
DC Power Source	AGILENT E3634A IN0208	11/28/2022	11/28/2023
Sphere Thermometer	ONSET IN0085	11/28/2022	11/28/2023
Room Thermometer	ONSET IN0046	11/28/2022	11/28/2023

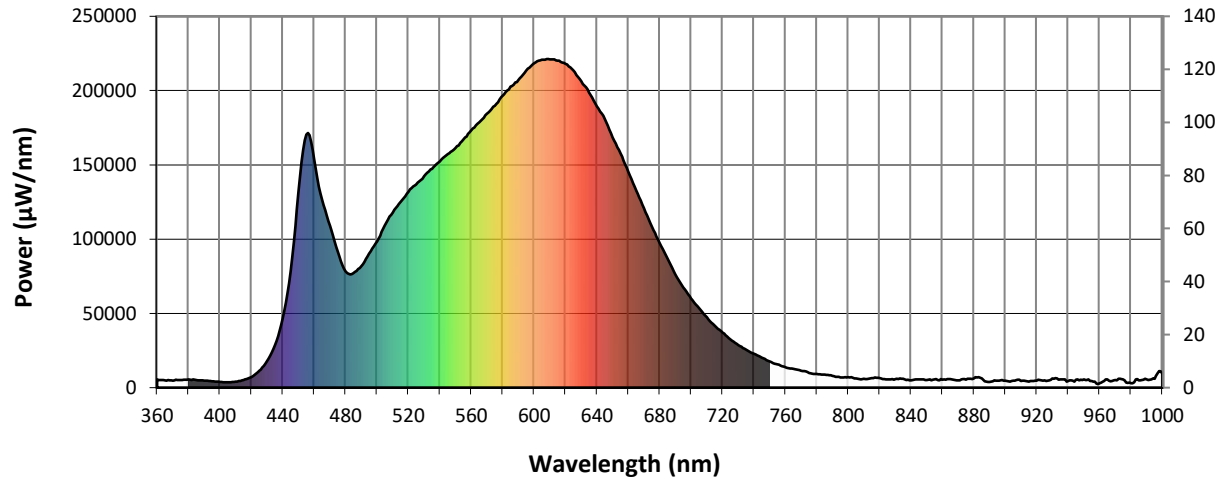
REPORT NUMBER: SP1-2307-100-7



Point lies inside the ANSI 3500K 4-step quadrangle

REPORT NUMBER: SP1-2307-100-7

Photopic Flux vs. Wavelength

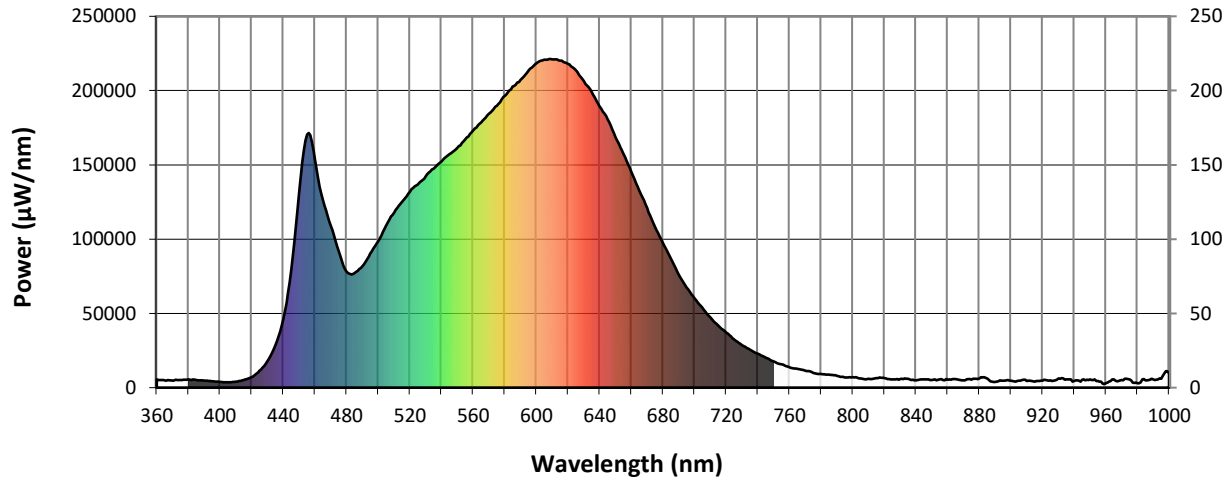


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λ (nm)	Power (μW/nm)	Lumens (φ/nm)	λ (nm)	Power (μW/nm)	Lumens (φ/nm)	λ (nm)	Power (μW/nm)	Lumens (φ/nm)	λ (nm)	Power (μW/nm)	Lumens (φ/nm)	λ (nm)	Power (μW/nm)	Lumens (φ/nm)
360	5498	NR	490	81900	NR	620	217907	NR	750	17550	NR	880	6189	NR
365	4903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

REPORT NUMBER: SP1-2307-100-7

Scotopic Flux vs. Wavelength



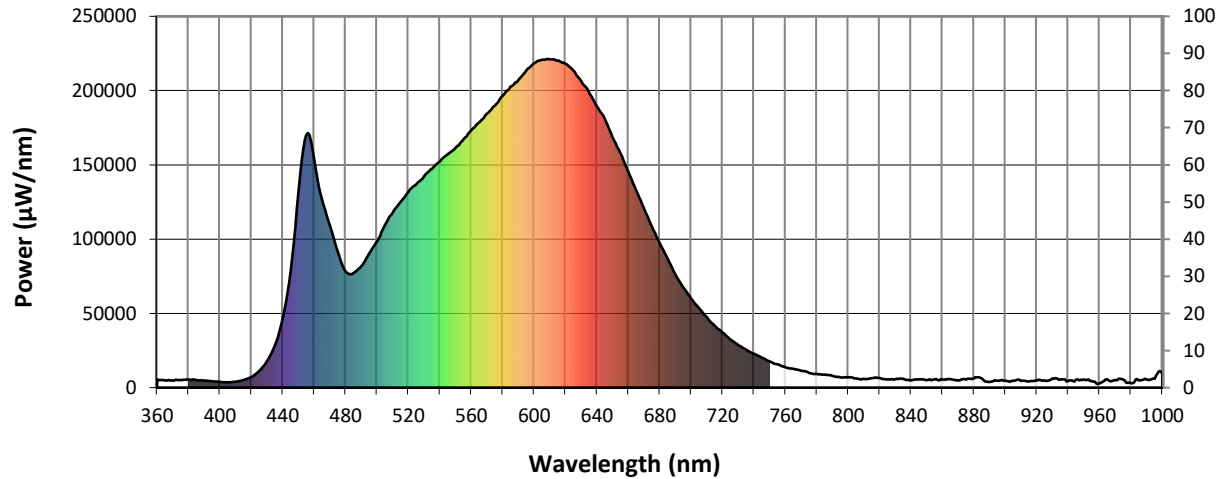
Scotopic Lumens: 19629.6

S/P: 1.6

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

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Melanopic Flux vs. Wavelength



Melanopic Lumens: 7912.5

M/P: 0.65

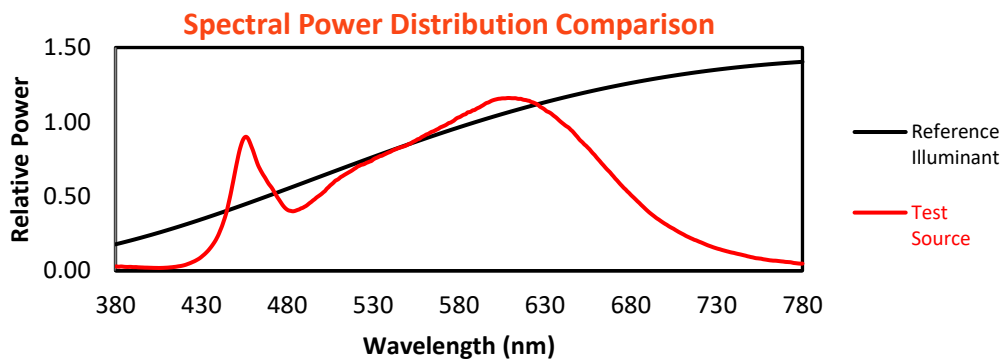
λ (nm)	Power (μW/nm)	Lumens (φ/nm)	λ (nm)	Power (μW/nm)	Lumens (φ/nm)	λ (nm)	Power (μW/nm)	Lumens (φ/nm)	λ (nm)	Power (μW/nm)	Lumens (φ/nm)	λ (nm)	Power (μW/nm)	Lumens (φ/nm)
360	5498	NR	490	81900	NR	620	217907	NR	750	17550	NR	880	6189	NR
365	4903	NR	495	90120	NR	625	213734	NR	755	15662	NR	885	6187	NR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

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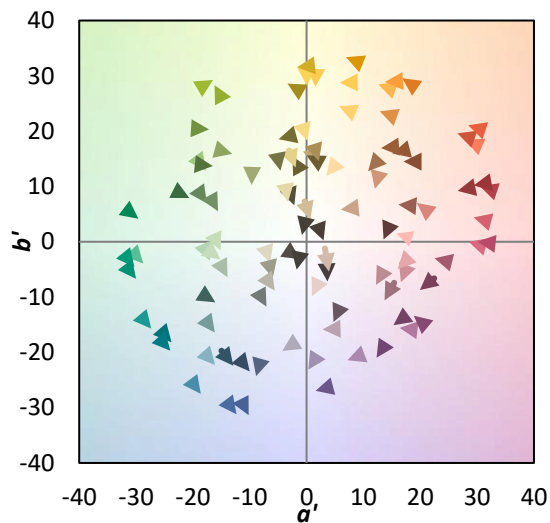
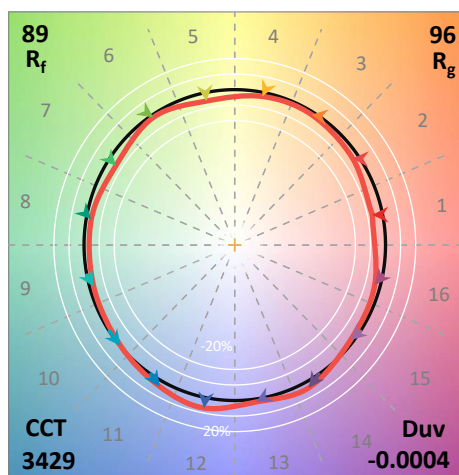
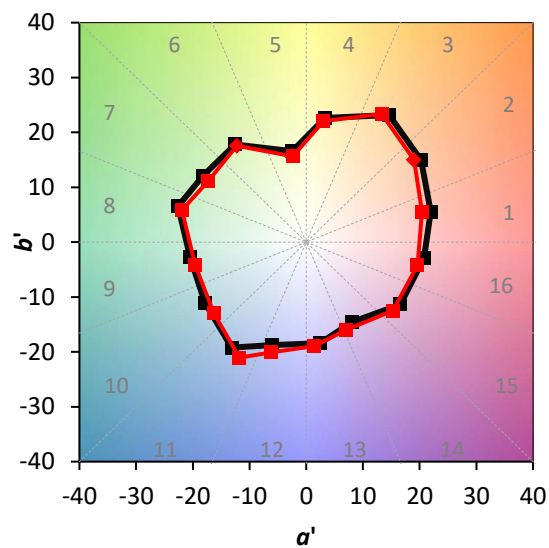
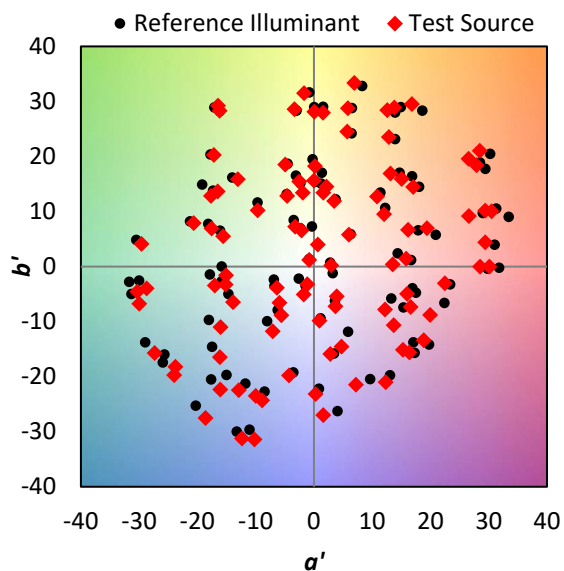
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Summary

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



Color Vector Graphics

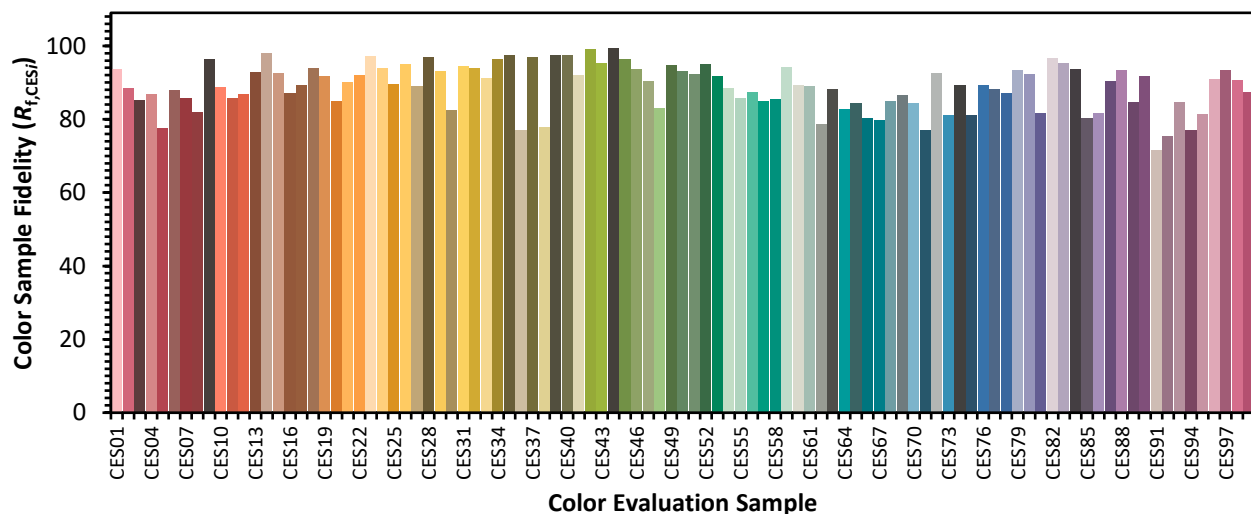


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Individual Sample Fidelity Index ($R_{f,i}$)

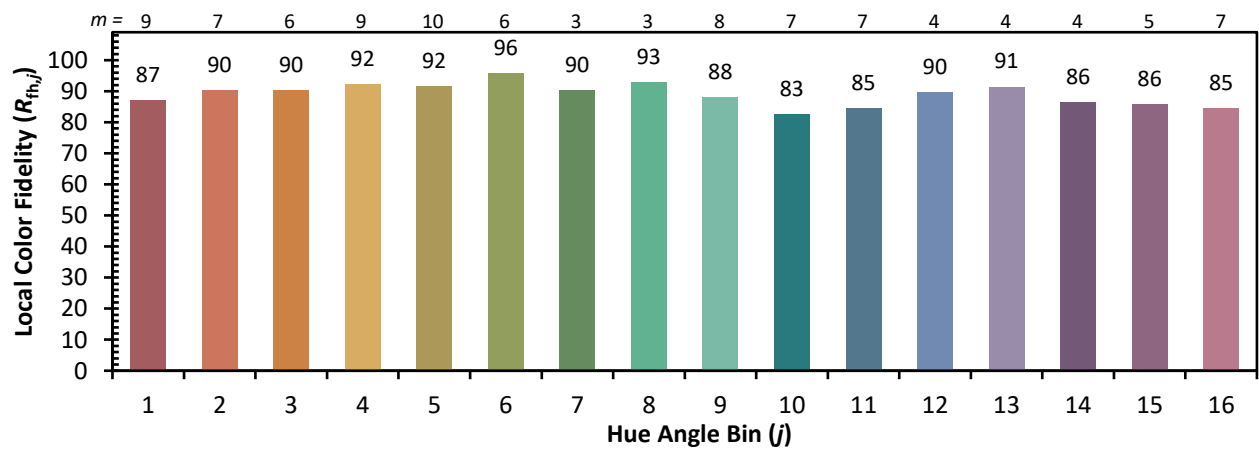
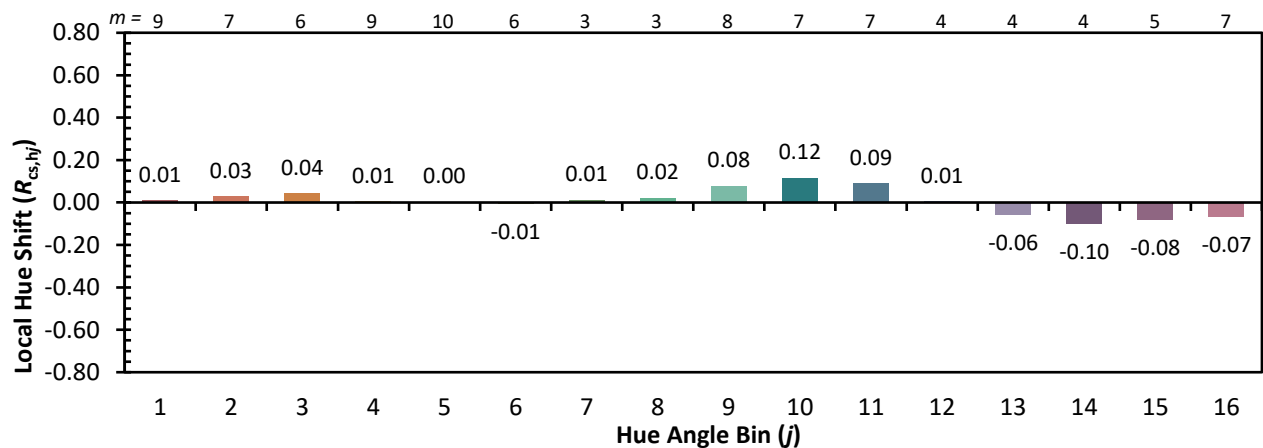
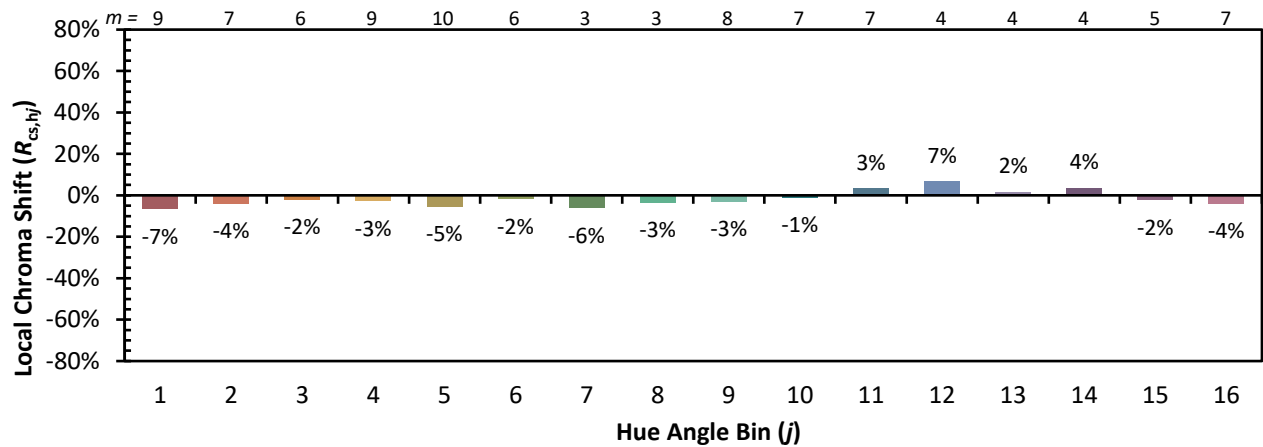
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CES02 = 62	CES27 = 89	CES52 = 95	CES77 = 88
CES03 = 31	CES28 = 97	CES53 = 92	CES78 = 87
CES04 = 70	CES29 = 93	CES54 = 89	CES79 = 93
CES05 = 49	CES30 = 82	CES55 = 86	CES80 = 92
CES06 = 51	CES31 = 95	CES56 = 87	CES81 = 82
CES07 = 42	CES32 = 94	CES57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



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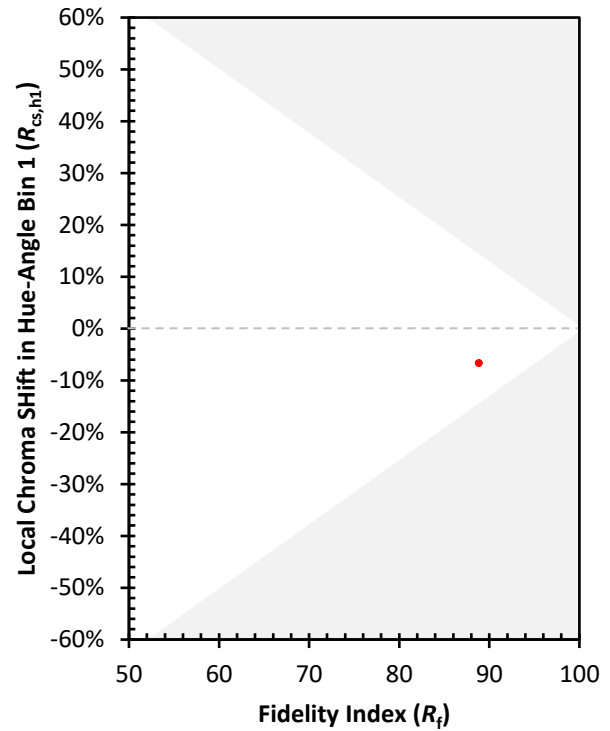
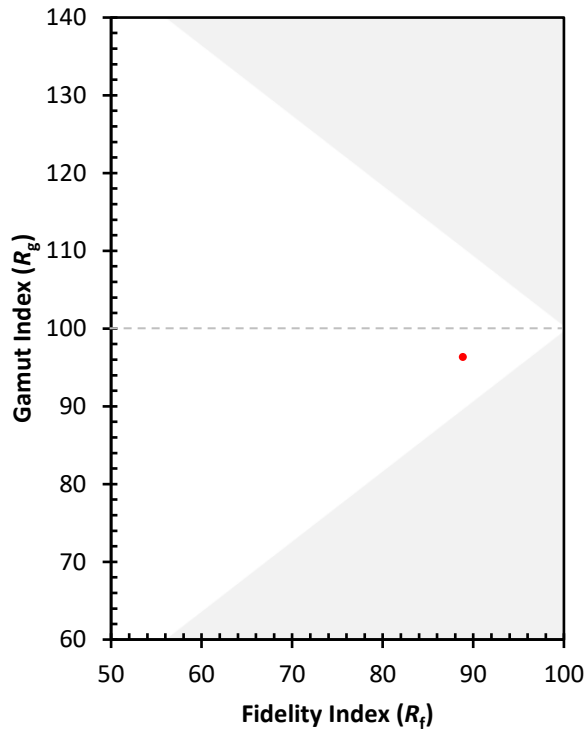
Color Rendition by Hue-Angle Bin



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Measure Comparisons



(END OF REPORT)