

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: P832736

Luminaire Tested: **HLBT609FS5\*-927**

Issue Date: 05/14/2024

**Test Information**

Test Method: LM-79-08  
Report Number: P832736  
Test Lab: ETA Testing Technology  
Issue Date: 05/14/2024  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: HALO  
Catalog Number: HLBT609FS5\*-927  
Description: HALO SLIM RETROFIT 6 inch 90 CRI COLOR SELECTABLE FIXTURE  
Light Source: 2700K CCT, 90 CRI LEDS  
Ballast/Driver: ELECTRONIC DRIVER

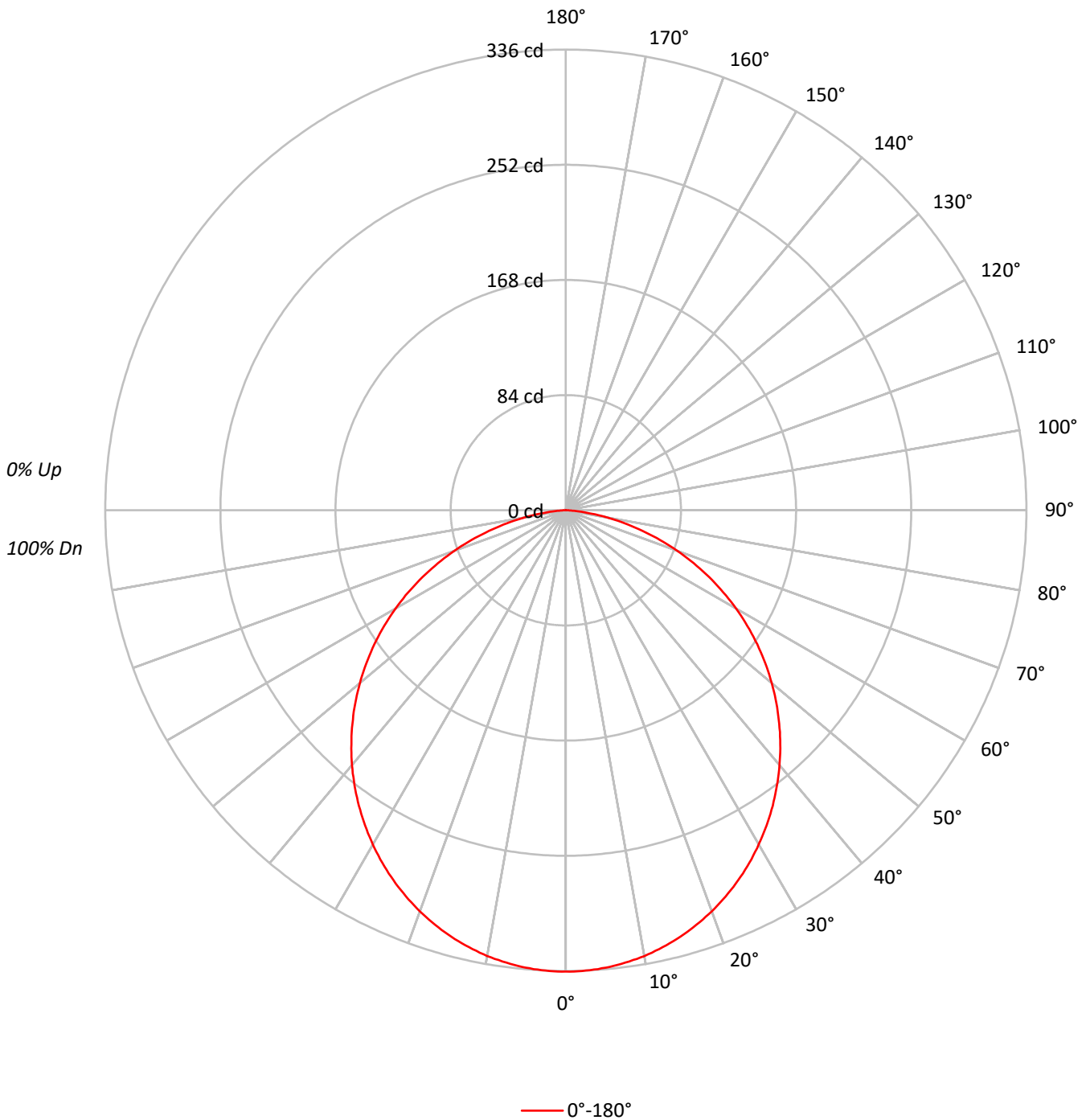
**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 935.0 lumens  
Efficiency: N/A  
Efficacy: 95.4 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): 9.8  
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\*-927

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

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

	0°
0°	18442
5°	18424
10°	18375
15°	18280
20°	18155
25°	18001
30°	17819
35°	17607
40°	17361
45°	17072
50°	16724
55°	16296
60°	15733
65°	14969
70°	13881
75°	12264
80°	9850
85°	6353



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**ZONAL LUMENS:**

Zone	Lumens	% Fixture
0°-10°	31.8	3.4
10°-20°	90.9	9.7
20°-30°	137.1	14.7
30°-40°	164.5	17.6
40°-50°	169.8	18.2
50°-60°	152.2	16.3
60°-70°	114.0	12.2
70°-80°	61.4	6.6
80°-90°	13.2	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°	259.8	27.8
0°-40°	424.4	45.4
0°-60°	746.4	79.8
0°-90°	935.0	100.0
90°-120°	0.0	0.0
90°-150°	0.0	0.0
90°-180°	0.0	0.0
0°-180°	935.0	100.0

**CANDELA DISTRIBUTION:**

	0°	Flux
0°	336	
5°	335	32
15°	322	91
25°	298	137
35°	263	165
45°	220	170
55°	170	152
65°	115	114
75°	58	61
85°	10	13
90°	1	



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**CANDELA DISTRIBUTION (FULL):**

	0°
0°	336.4
0.5°	336.5
1°	336.4
1.5°	336.3
2°	336.2
2.5°	336.0
3°	335.9
3.5°	335.6
4°	335.5
4.5°	335.1
5°	334.8
5.5°	334.5
6°	334.1
6.5°	333.7
7°	333.3
7.5°	332.8
8°	332.3
8.5°	331.7
9°	331.3
9.5°	330.6
10°	330.1
10.5°	329.4
11°	328.7
11.5°	327.9
12°	327.2
12.5°	326.4
13°	325.7
13.5°	324.8
14°	324.0
14.5°	323.0
15°	322.1
15.5°	321.1
16°	320.2
16.5°	319.1
17°	318.1
17.5°	317.0
18°	315.9
18.5°	314.8
19°	313.6
19.5°	312.5
20°	311.2
20.5°	310.0
21°	308.7
21.5°	307.4
22°	306.1



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**CANDELA DISTRIBUTION (continued):**

	0°
22.5°	304.8
23°	303.4
23.5°	302.0
24°	300.6
24.5°	299.1
25°	297.6
25.5°	296.1
26°	294.7
26.5°	293.0
27°	291.5
27.5°	289.9
28°	288.3
28.5°	286.5
29°	284.9
29.5°	283.2
30°	281.5
30.5°	279.7
31°	277.9
31.5°	276.2
32°	274.4
32.5°	272.6
33°	270.7
33.5°	268.8
34°	267.0
34.5°	265.0
35°	263.1
35.5°	261.1
36°	259.1
36.5°	257.1
37°	255.1
37.5°	253.1
38°	251.0
38.5°	248.9
39°	246.9
39.5°	244.7
40°	242.6
40.5°	240.4
41°	238.3
41.5°	236.0
42°	233.9
42.5°	231.6
43°	229.4
43.5°	227.1
44°	224.9
44.5°	222.5



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**CANDELA DISTRIBUTION (continued):**

	0°
45°	220.2
45.5°	217.8
46°	215.5
46.5°	213.2
47°	210.7
47.5°	208.3
48°	206.0
48.5°	203.5
49°	201.0
49.5°	198.6
50°	196.1
50.5°	193.6
51°	191.1
51.5°	188.6
52°	186.1
52.5°	183.4
53°	180.9
53.5°	178.3
54°	175.7
54.5°	173.1
55°	170.5
55.5°	167.8
56°	165.1
56.5°	162.5
57°	159.8
57.5°	157.1
58°	154.4
58.5°	151.7
59°	149.0
59.5°	146.2
60°	143.5
60.5°	140.7
61°	137.9
61.5°	135.1
62°	132.4
62.5°	129.5
63°	126.7
63.5°	123.9
64°	121.0
64.5°	118.2
65°	115.4
65.5°	112.5
66°	109.6
66.5°	106.7
67°	103.9





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**CANDELA DISTRIBUTION (continued):**

	0°
67.5°	101.0
68°	98.1
68.5°	95.2
69°	92.4
69.5°	89.5
70°	86.6
70.5°	83.7
71°	80.8
71.5°	77.9
72°	75.1
72.5°	72.2
73°	69.3
73.5°	66.4
74°	63.6
74.5°	60.7
75°	57.9
75.5°	55.1
76°	52.3
76.5°	49.5
77°	46.8
77.5°	44.1
78°	41.5
78.5°	38.8
79°	36.2
79.5°	33.7
80°	31.2
80.5°	28.7
81°	26.3
81.5°	23.9
82°	21.7
82.5°	19.5
83°	17.4
83.5°	15.4
84°	13.5
84.5°	11.7
85°	10.1
85.5°	8.6
86°	7.3
86.5°	6.0
87°	4.8
87.5°	3.8
88°	3.1
88.5°	2.5
89°	1.9
89.5°	1.4

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Scaled Data Report



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**CANDELA DISTRIBUTION (continued):**

90° |  $\frac{0^\circ}{0.9}$

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: SP1-2403-328-16

Test Date: 05/03/2024

Luminaire Tested: HLT609FS5-2700K

Data in this report applies to families of products HLT609FS5-2700K.

**Test Information**

Test Method: LM-79-2019  
 Report Number: SP1-2403-328-16  
 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: **HLT609F55-2700K**  
 Description: HLBSL RETROFIT 6 INCH SAMPLE #2.

**Spectral Parameters**

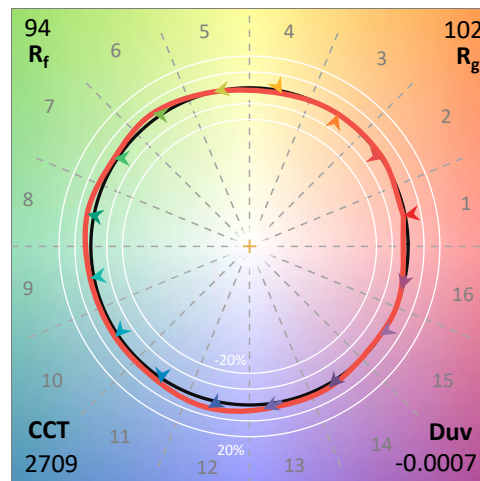
CCT (K): 2709  
 CIE u': 0.2622  
 CIE v': 0.5261  
 Duv: -0.0007  
 CIE x: 0.4577  
 CIE y: 0.4082  
 CIE z: 0.1341  
 Peak Wavelength (nm): 632  
 Dominant Wavelength (nm): 584  
 Purity: 60.2

CRI (Ra):	95.1		
R1:	93.5	R9:	93.2
R2:	97.7	R10:	98.6
R3:	94.7	R11:	87.3
R4:	92.2	R12:	91.2
R5:	94.3	R13:	94.5
R6:	92.1	R14:	94.8
R7:	97.8		
R8:	98.6		

Rf: 93.5  
 Rg: 102.5

**Test Conditions**

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

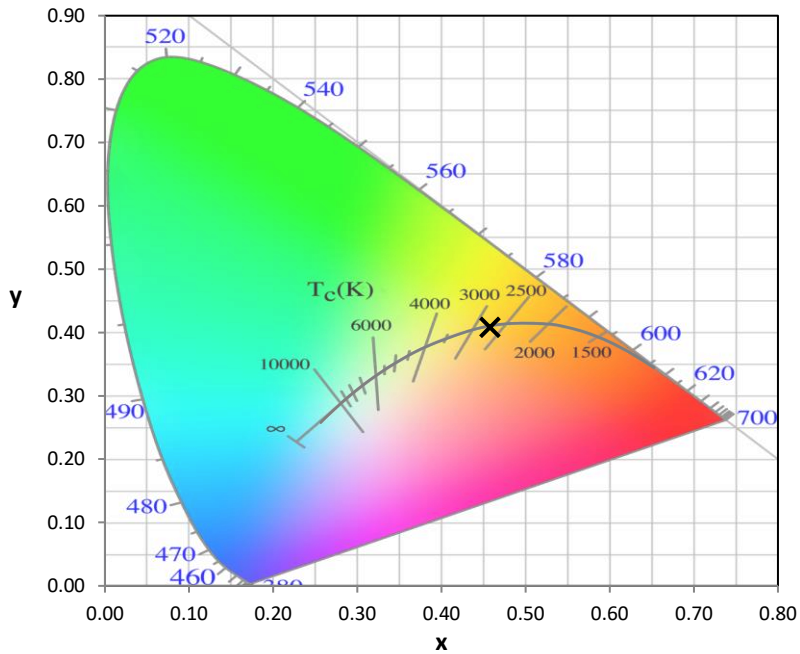


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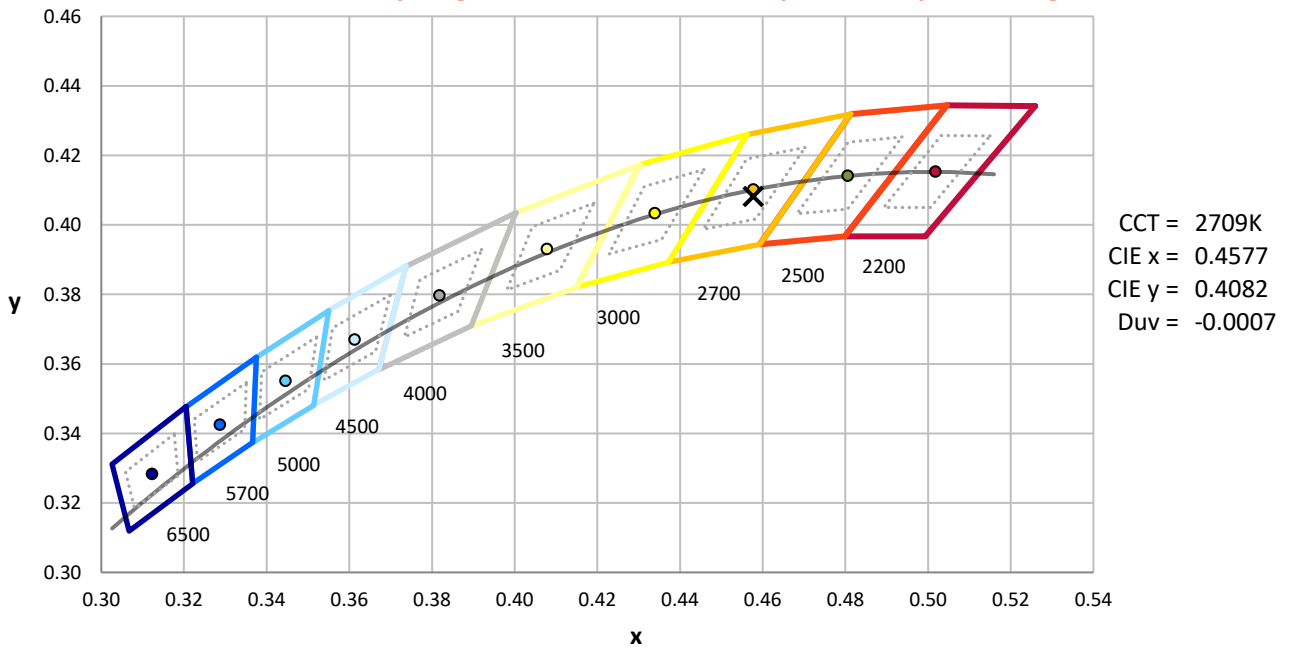
Measurement and Test Equipment			
Instrument	Identification Number	Calibration Date	Calibration Due Date
Photometer	76INCH SPHERE IN0058	2/12/2024	8/12/2024
Power Meter	XITRON 2801 IN0071	10/23/2023	10/23/2024
AC Power Source	CHROMA 61603 IN0063	10/24/2023	10/24/2024
DC Power Source	AGILENT E3634A IN0208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



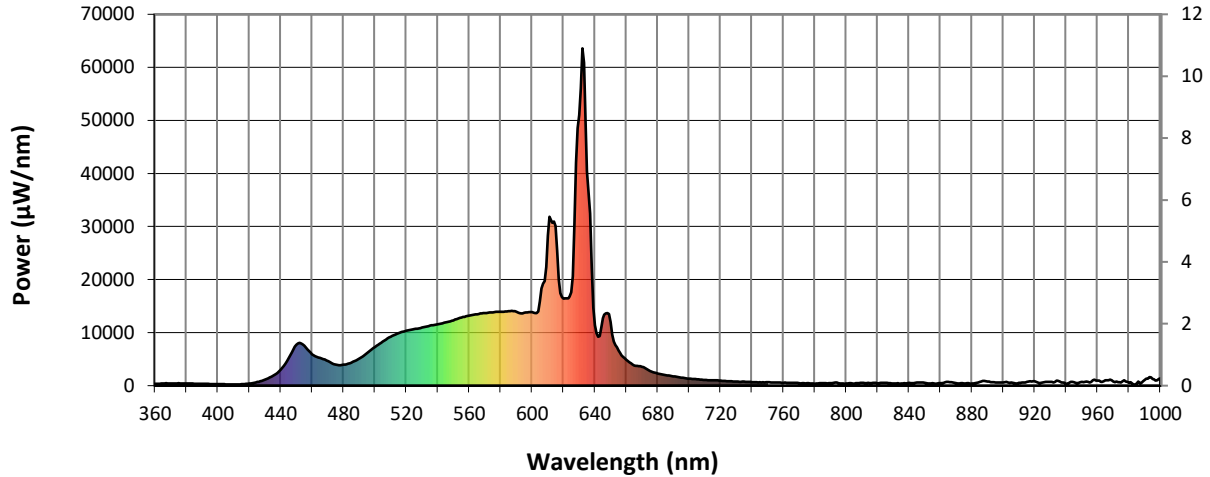
CIE 1931 Chromaticity Diagram with 2017 ANSI 7-Step and 4-Step Quadrangles



Point lies inside the ANSI 2700K 4-step quadrangle

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**Photopic Flux vs. Wavelength**

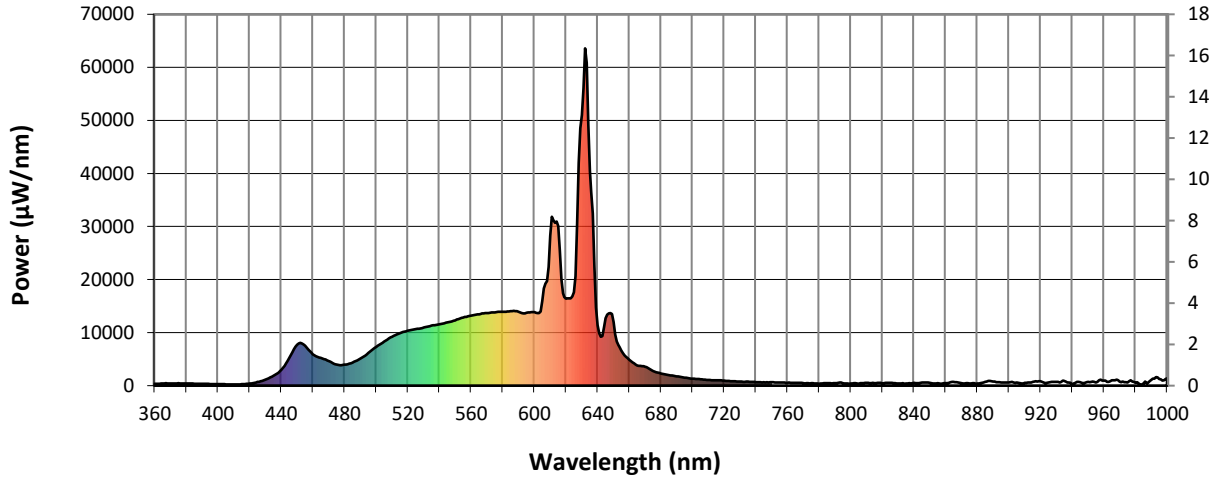


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λ (nm)	Power (µW/nm)	Lumens (φ/nm)	λ (nm)	Power (µW/nm)	Lumens (φ/nm)	λ (nm)	Power (µW/nm)	Lumens (φ/nm)	λ (nm)	Power (µW/nm)	Lumens (φ/nm)	λ (nm)	Power (µW/nm)	Lumens (φ/nm)
360	363	NR	490	5091	NR	620	16420	NR	750	640	NR	880	418	NR
365	383	NR	495	6149	NR	625	17597	NR	755	580	NR	885	721	NR
370	407	NR	500	7317	NR	630	51025	NR	760	561	NR	890	764	NR
375	451	NR	505	8305	NR	635	40443	NR	765	541	NR	895	601	NR
380	419	NR	510	9212	NR	640	11372	NR	770	465	NR	900	566	NR
385	344	NR	515	9885	NR	645	12725	NR	775	441	NR	905	565	NR
390	359	NR	520	10370	NR	650	11995	NR	780	362	NR	910	504	NR
395	318	NR	525	10662	NR	655	6648	NR	785	484	NR	915	727	NR
400	283	NR	530	10939	NR	660	4860	NR	790	470	NR	920	814	NR
405	259	NR	535	11339	NR	665	3804	NR	795	483	NR	925	618	NR
410	227	NR	540	11586	NR	670	3560	NR	800	383	NR	930	721	NR
415	278	NR	545	11925	NR	675	2780	NR	805	379	NR	935	900	NR
420	382	NR	550	12303	NR	680	2306	NR	810	505	NR	940	258	NR
425	687	NR	555	12849	NR	685	1984	NR	815	466	NR	945	635	NR
430	1142	NR	560	13178	NR	690	1755	NR	820	426	NR	950	712	NR
435	1843	NR	565	13465	NR	695	1521	NR	825	524	NR	955	600	NR
440	2998	NR	570	13676	NR	700	1310	NR	830	424	NR	960	976	NR
445	5166	NR	575	13816	NR	705	1213	NR	835	395	NR	965	989	NR
450	7704	NR	580	13926	NR	710	1066	NR	840	533	NR	970	755	NR
455	7505	NR	585	14060	NR	715	1022	NR	845	577	NR	975	587	NR
460	5930	NR	590	13940	NR	720	932	NR	850	510	NR	980	549	NR
465	5208	NR	595	13744	NR	725	853	NR	855	451	NR	985	429	NR
470	4628	NR	600	13855	NR	730	764	NR	860	499	NR	990	1086	NR
475	3958	NR	605	15930	NR	735	748	NR	865	693	NR	995	1246	NR
480	3939	NR	610	28256	NR	740	666	NR	870	443	NR	1000	1354	NR
485	4355	NR	615	30063	NR	745	622	NR	875	419	NR			

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**Scotopic Flux vs. Wavelength**



**Scotopic Lumens: 1331.6**

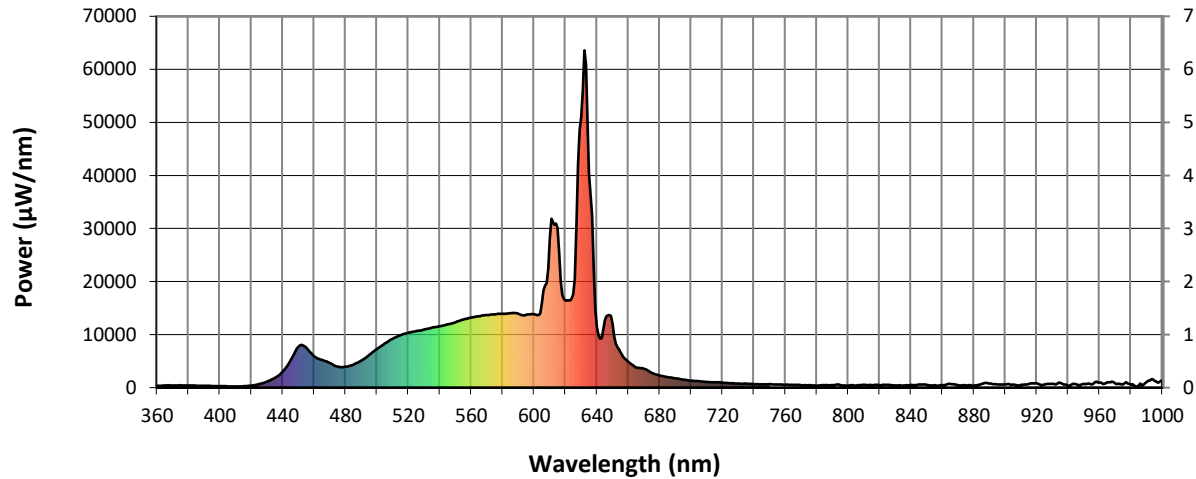
**S/P: 1.35**

$\lambda$ (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	363	NR	490	5091	NR	620	16420	NR	750	640	NR	880	418	NR
365	383	NR	495	6149	NR	625	17597	NR	755	580	NR	885	721	NR
370	407	NR	500	7317	NR	630	51025	NR	760	561	NR	890	764	NR
375	451	NR	505	8305	NR	635	40443	NR	765	541	NR	895	601	NR
380	419	NR	510	9212	NR	640	11372	NR	770	465	NR	900	566	NR
385	344	NR	515	9885	NR	645	12725	NR	775	441	NR	905	565	NR
390	359	NR	520	10370	NR	650	11995	NR	780	362	NR	910	504	NR
395	318	NR	525	10662	NR	655	6648	NR	785	484	NR	915	727	NR
400	283	NR	530	10939	NR	660	4860	NR	790	470	NR	920	814	NR
405	259	NR	535	11339	NR	665	3804	NR	795	483	NR	925	618	NR
410	227	NR	540	11586	NR	670	3560	NR	800	383	NR	930	721	NR
415	278	NR	545	11925	NR	675	2780	NR	805	379	NR	935	900	NR
420	382	NR	550	12303	NR	680	2306	NR	810	505	NR	940	258	NR
425	687	NR	555	12849	NR	685	1984	NR	815	466	NR	945	635	NR
430	1142	NR	560	13178	NR	690	1755	NR	820	426	NR	950	712	NR
435	1843	NR	565	13465	NR	695	1521	NR	825	524	NR	955	600	NR
440	2998	NR	570	13676	NR	700	1310	NR	830	424	NR	960	976	NR
445	5166	NR	575	13816	NR	705	1213	NR	835	395	NR	965	989	NR
450	7704	NR	580	13926	NR	710	1066	NR	840	533	NR	970	755	NR
455	7505	NR	585	14060	NR	715	1022	NR	845	577	NR	975	587	NR
460	5930	NR	590	13940	NR	720	932	NR	850	510	NR	980	549	NR
465	5208	NR	595	13744	NR	725	853	NR	855	451	NR	985	429	NR
470	4628	NR	600	13855	NR	730	764	NR	860	499	NR	990	1086	NR
475	3958	NR	605	15930	NR	735	748	NR	865	693	NR	995	1246	NR
480	3939	NR	610	28256	NR	740	666	NR	870	443	NR	1000	1354	NR
485	4355	NR	615	30063	NR	745	622	NR	875	419	NR			



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**Melanopic Flux vs. Wavelength**



**Melanopic Lumens: 503.8**

**M/P: 0.51**

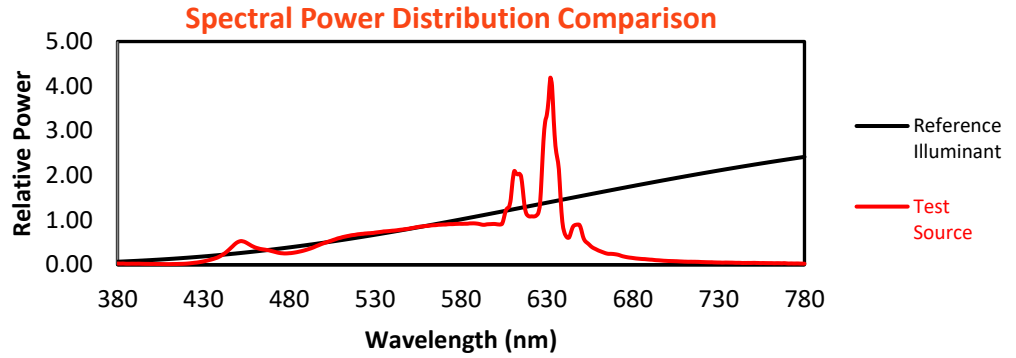
λ (nm)	Power (µW/nm)	Lumens (φ/nm)	λ (nm)	Power (µW/nm)	Lumens (φ/nm)	λ (nm)	Power (µW/nm)	Lumens (φ/nm)	λ (nm)	Power (µW/nm)	Lumens (φ/nm)	λ (nm)	Power (µW/nm)	Lumens (φ/nm)
360	363	NR	490	5091	NR	620	16420	NR	750	640	NR	880	418	NR
365	383	NR	495	6149	NR	625	17597	NR	755	580	NR	885	721	NR
370	407	NR	500	7317	NR	630	51025	NR	760	561	NR	890	764	NR
375	451	NR	505	8305	NR	635	40443	NR	765	541	NR	895	601	NR
380	419	NR	510	9212	NR	640	11372	NR	770	465	NR	900	566	NR
385	344	NR	515	9885	NR	645	12725	NR	775	441	NR	905	565	NR
390	359	NR	520	10370	NR	650	11995	NR	780	362	NR	910	504	NR
395	318	NR	525	10662	NR	655	6648	NR	785	484	NR	915	727	NR
400	283	NR	530	10939	NR	660	4860	NR	790	470	NR	920	814	NR
405	259	NR	535	11339	NR	665	3804	NR	795	483	NR	925	618	NR
410	227	NR	540	11586	NR	670	3560	NR	800	383	NR	930	721	NR
415	278	NR	545	11925	NR	675	2780	NR	805	379	NR	935	900	NR
420	382	NR	550	12303	NR	680	2306	NR	810	505	NR	940	258	NR
425	687	NR	555	12849	NR	685	1984	NR	815	466	NR	945	635	NR
430	1142	NR	560	13178	NR	690	1755	NR	820	426	NR	950	712	NR
435	1843	NR	565	13465	NR	695	1521	NR	825	524	NR	955	600	NR
440	2998	NR	570	13676	NR	700	1310	NR	830	424	NR	960	976	NR
445	5166	NR	575	13816	NR	705	1213	NR	835	395	NR	965	989	NR
450	7704	NR	580	13926	NR	710	1066	NR	840	533	NR	970	755	NR
455	7505	NR	585	14060	NR	715	1022	NR	845	577	NR	975	587	NR
460	5930	NR	590	13940	NR	720	932	NR	850	510	NR	980	549	NR
465	5208	NR	595	13744	NR	725	853	NR	855	451	NR	985	429	NR
470	4628	NR	600	13855	NR	730	764	NR	860	499	NR	990	1086	NR
475	3958	NR	605	15930	NR	735	748	NR	865	693	NR	995	1246	NR
480	3939	NR	610	28256	NR	740	666	NR	870	443	NR	1000	1354	NR
485	4355	NR	615	30063	NR	745	622	NR	875	419	NR			

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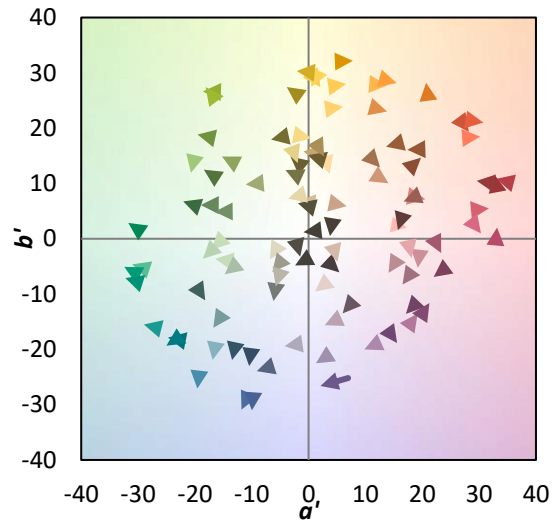
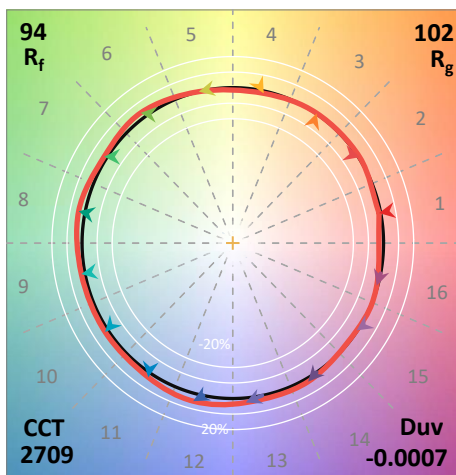
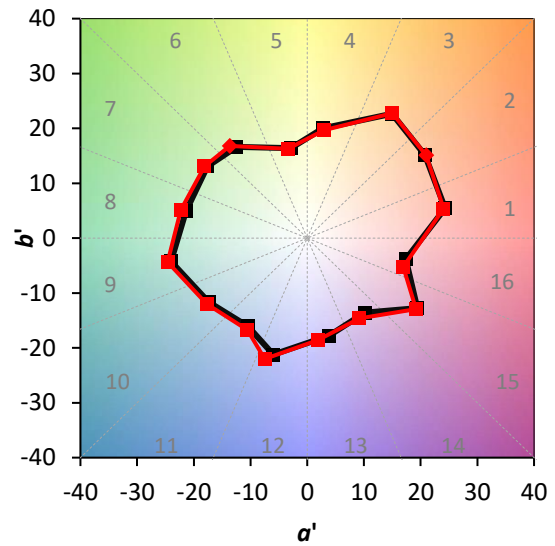
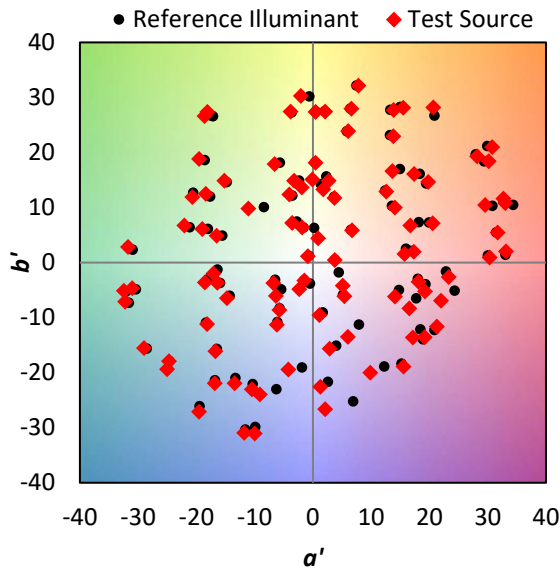
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**Summary**

$R_f = 93.5$   
 $R_g = 102.5$   
 CIE  $R_a = 95.1$   
 $R_9 = 93.2$



**Color Vector Graphics**

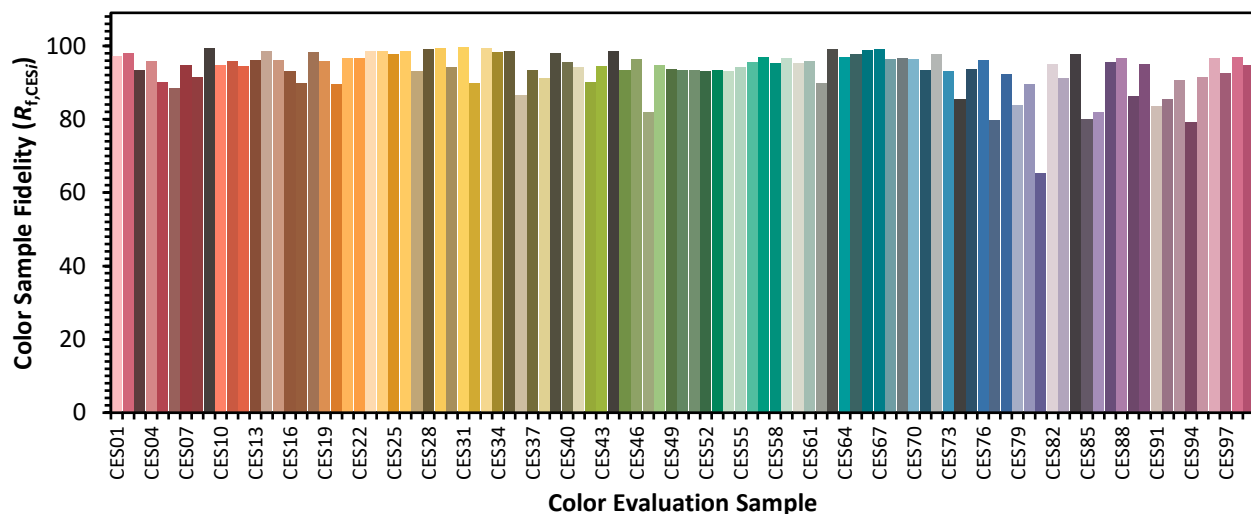


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**Individual Sample Fidelity Index ( $R_{f,i}$ )**

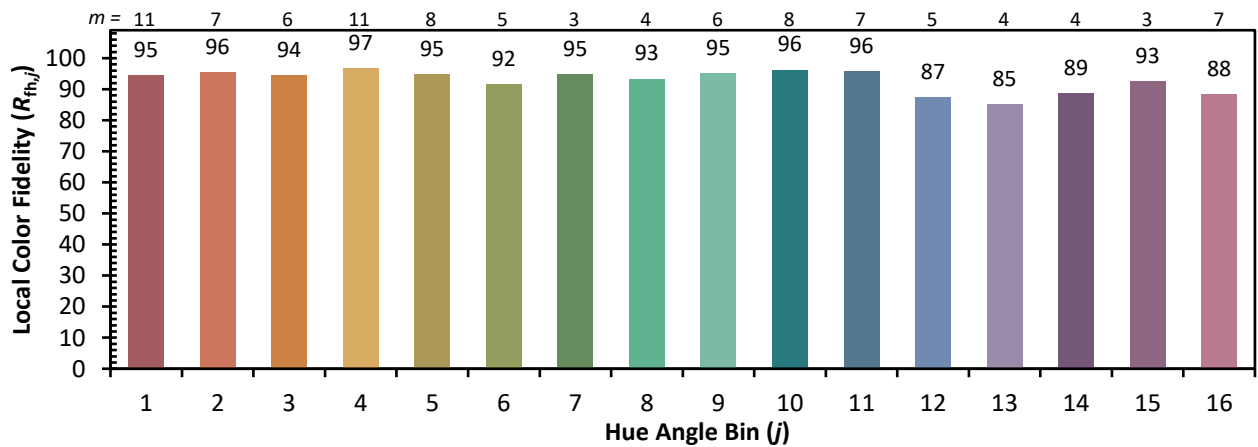
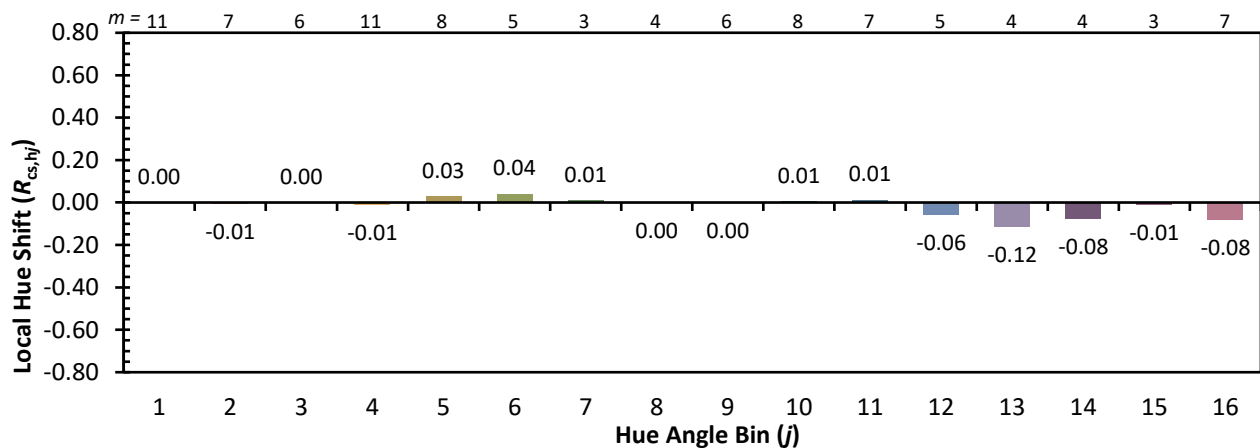
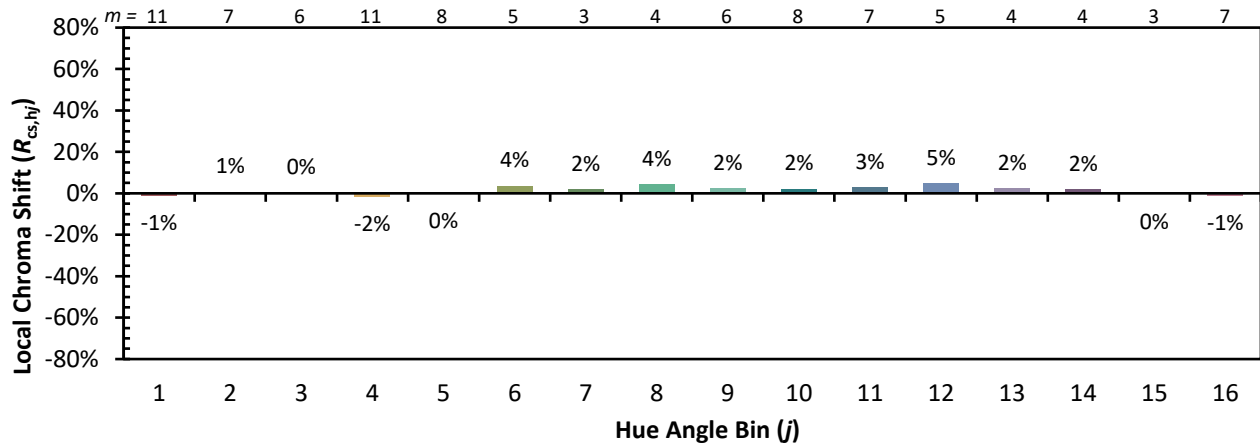
CES01 = 86	CES26 = 99	CES51 = 93	CES76 = 96
CES02 = 64	CES27 = 93	CES52 = 93	CES77 = 80
CES03 = 32	CES28 = 99	CES53 = 93	CES78 = 92
CES04 = 70	CES29 = 99	CES54 = 93	CES79 = 84
CES05 = 52	CES30 = 94	CES55 = 94	CES80 = 90
CES06 = 51	CES31 = 100	CES56 = 95	CES81 = 65
CES07 = 45	CES32 = 90	CES57 = 97	CES82 = 95
CES08 = 44	CES33 = 99	CES58 = 95	CES83 = 91
CES09 = 29	CES34 = 98	CES59 = 97	CES84 = 98
CES10 = 77	CES35 = 98	CES60 = 95	CES85 = 80
CES11 = 59	CES36 = 87	CES61 = 96	CES86 = 82
CES12 = 66	CES37 = 93	CES62 = 90	CES87 = 95
CES13 = 45	CES38 = 91	CES63 = 99	CES88 = 97
CES14 = 74	CES39 = 98	CES64 = 97	CES89 = 86
CES15 = 72	CES40 = 96	CES65 = 98	CES90 = 95
CES16 = 49	CES41 = 94	CES66 = 99	CES91 = 83
CES17 = 50	CES42 = 90	CES67 = 99	CES92 = 85
CES18 = 57	CES43 = 94	CES68 = 96	CES93 = 91
CES19 = 72	CES44 = 99	CES69 = 97	CES94 = 79
CES20 = 68	CES45 = 93	CES70 = 96	CES95 = 91
CES21 = 86	CES46 = 96	CES71 = 93	CES96 = 97
CES22 = 79	CES47 = 82	CES72 = 98	CES97 = 92
CES23 = 92	CES48 = 95	CES73 = 93	CES98 = 97
CES24 = 91	CES49 = 94	CES74 = 85	CES99 = 95
CES25 = 72	CES50 = 93	CES75 = 94	



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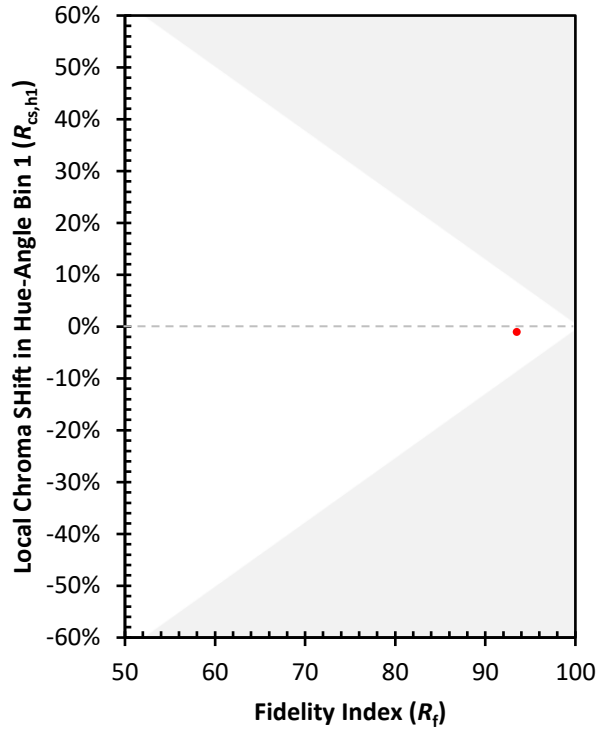
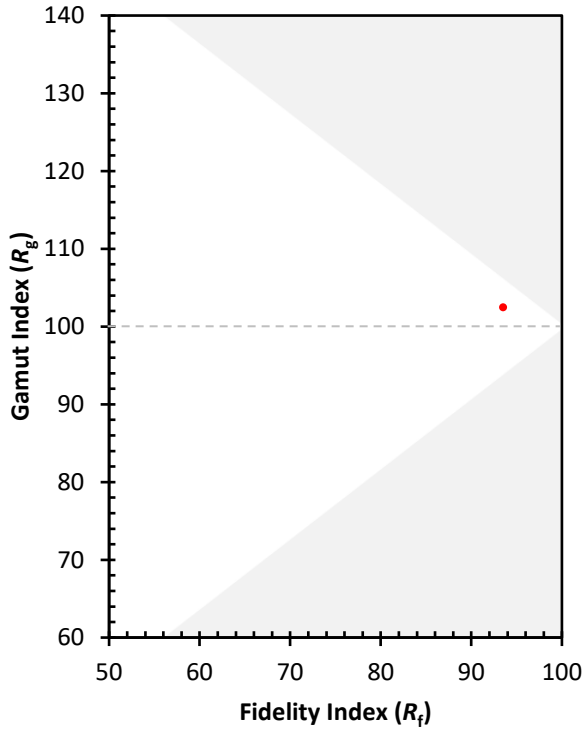
Color Rendition by Hue-Angle Bin



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Measure Comparisons



(END OF REPORT)