

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: P832737

Luminaire Tested: **HLBT609FS5\*-930**

Issue Date: 05/14/2024



**Test Information**

Test Method: LM-79-08  
Report Number: P832737  
Test Lab: ETA Testing Technology  
Issue Date: 05/14/2024  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: HALO  
Catalog Number: HLBT609FS5\*-930  
Description: HALO SLIM RETROFIT 6 inch 90 CRI COLOR SELECTABLE FIXTURE  
Light Source: 3000K CCT, 90 CRI LEDS  
Ballast/Driver: ELECTRONIC DRIVER

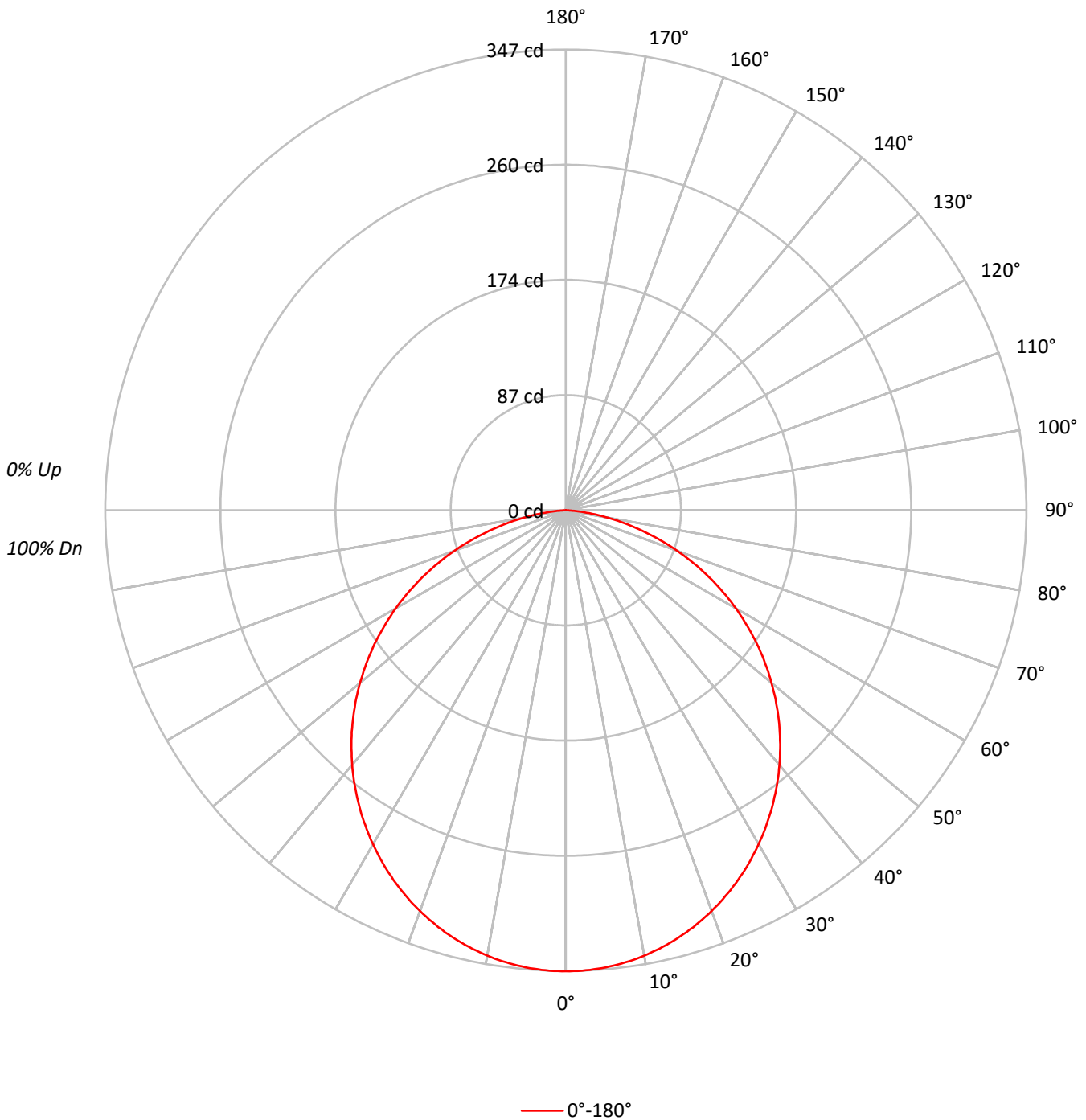
**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 965.0 lumens  
Efficiency: N/A  
Efficacy: 99.5 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): 9.7  
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

TEST NUMBER: P832737  
CATALOG NUMBER: HLBT609FS5\*-930

### Luminous Intensity Polar Plot





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CATALOG NUMBER: HLBT609FS5\*-930

**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



TEST NUMBER: P832737  
 CATALOG NUMBER: HLBT609FS5\*-930

**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	



TEST NUMBER: P832737  
CATALOG NUMBER: HLBT609FS5\*-930

**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



TEST NUMBER: P832737  
CATALOG NUMBER: HLBT609FS5\*-930

**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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CATALOG NUMBER: HLBT609FS5\*-930

**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





TEST NUMBER: P832737  
CATALOG NUMBER: HLBT609FS5\*-930

**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: SP1-2403-328-17

Test Date: 05/03/2024

Luminaire Tested: HLT609FS5-3000K

Data in this report applies to families of products HLT609FS5-3000K.

**Test Information**

Test Method: LM-79-2019  
 Report Number: SP1-2403-328-17  
 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-3000K**  
 Description: HLBSL RETROFIT 6 INCH SAMPLE #2.

**Spectral Parameters**

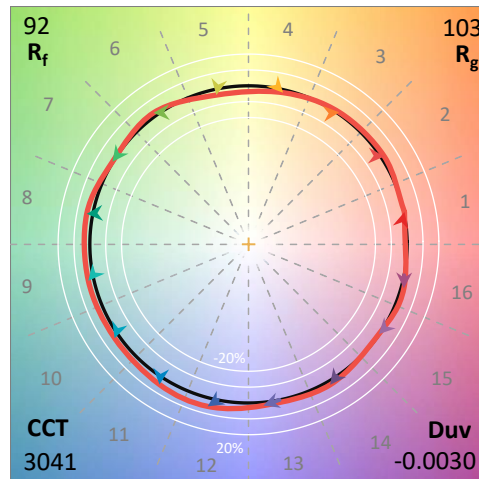
CCT (K): 3041  
 CIE u': 0.2502  
 CIE v': 0.5163  
 Duv: -0.0030  
 CIE x: 0.4298  
 CIE y: 0.3942  
 CIE z: 0.1761  
 Peak Wavelength (nm): 632  
 Dominant Wavelength (nm): 583  
 Purity: 47.7

CRI (Ra):	93.3		
R1:	90.2	R9:	90.4
R2:	95.2	R10:	93.3
R3:	95.9	R11:	86.2
R4:	90.9	R12:	85.2
R5:	91.3	R13:	91.2
R6:	89.6	R14:	95.5
R7:	98.4		
R8:	94.8		

Rf: 92.4  
 Rg: 102.7

**Test Conditions**

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

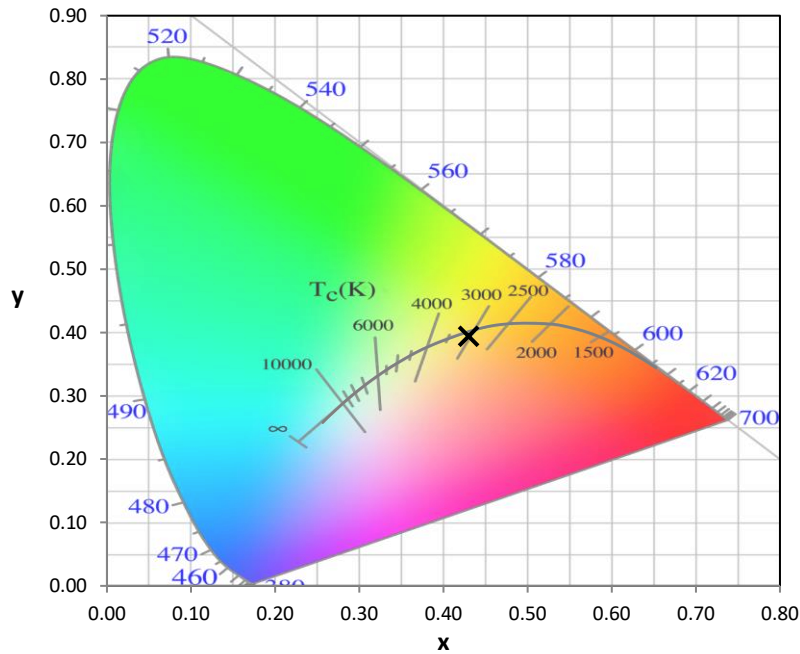


REPORT NUMBER: SP1-2403-328-17

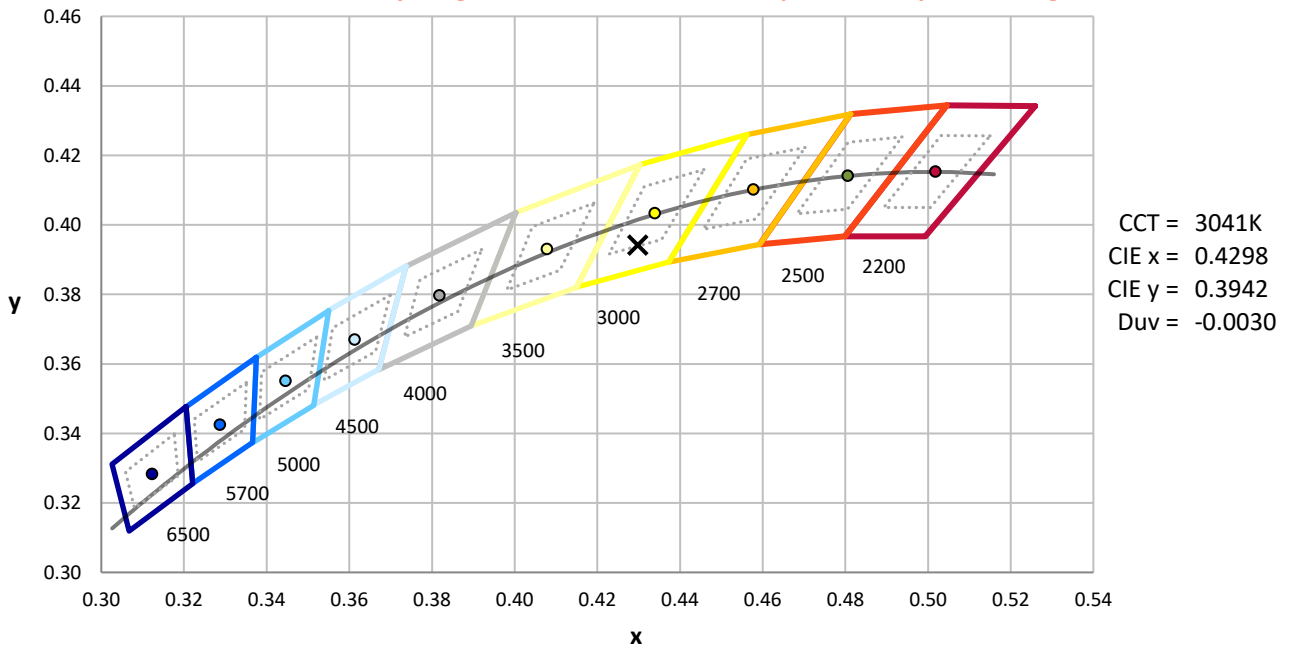
Measurement and Test Equipment			
Instrument	Identification Number	Calibration Date	Calibration Due Date
Photometer	76INCH SPHERE IN0058	2/12/2024	8/12/2024
Power Meter	XITRON 2801 IN0071	10/23/2023	10/23/2024
AC Power Source	CHROMA 61603 IN0063	10/24/2023	10/24/2024
DC Power Source	AGILENT E3634A IN0208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

REPORT NUMBER: SP1-2403-328-17

CIE 1931 Chromaticity Diagram



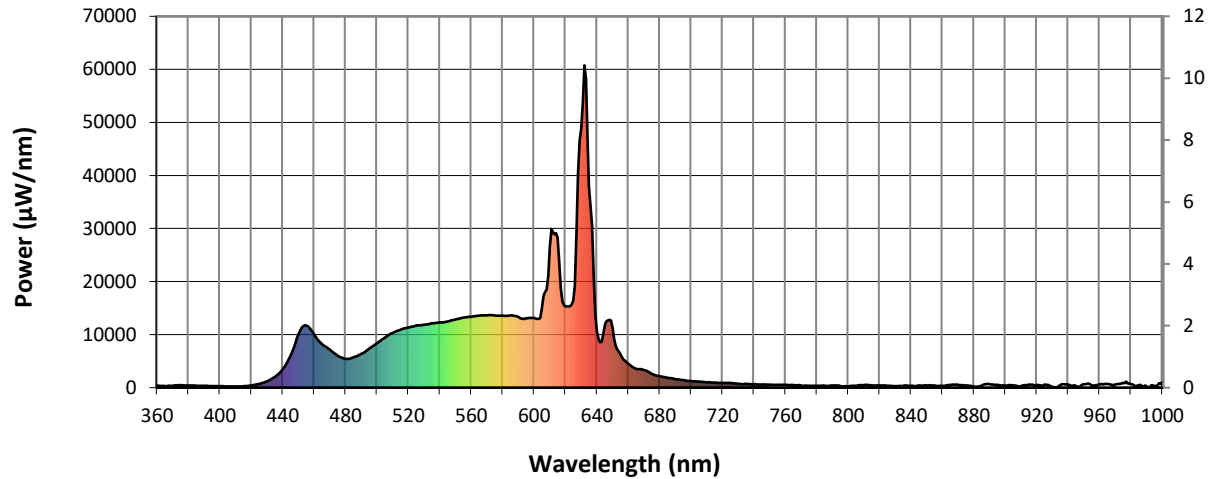
CIE 1931 Chromaticity Diagram with 2017 ANSI 7-Step and 4-Step Quadrangles



Point lies inside the ANSI 3000K 4-step quadrangle

REPORT NUMBER: SP1-2403-328-17

**Photopic Flux vs. Wavelength**

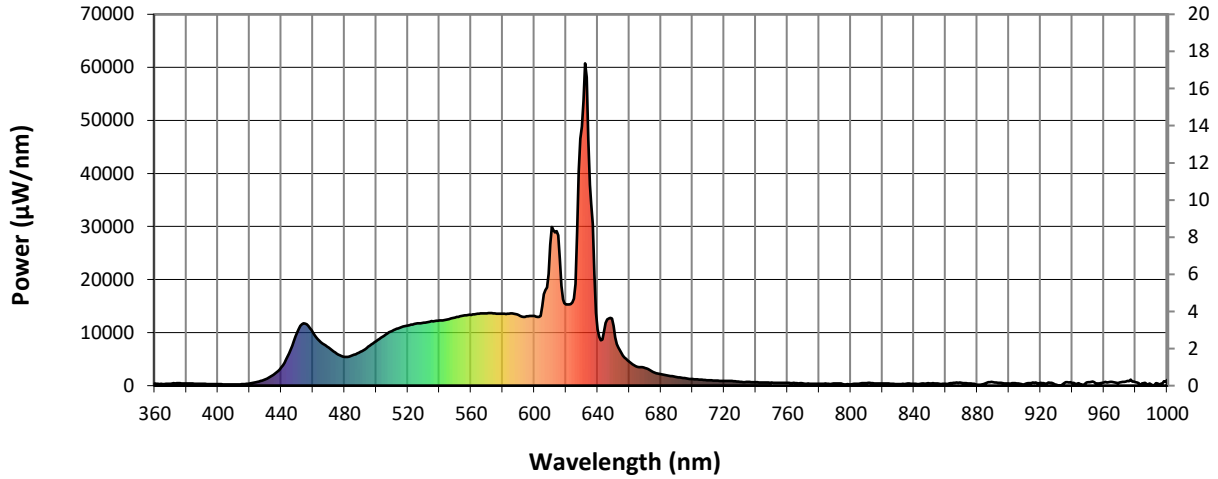


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λ (nm)	Power (µW/nm)	Lumens (φ/nm)	λ (nm)	Power (µW/nm)	Lumens (φ/nm)	λ (nm)	Power (µW/nm)	Lumens (φ/nm)	λ (nm)	Power (µW/nm)	Lumens (φ/nm)	λ (nm)	Power (µW/nm)	Lumens (φ/nm)
360	407	NR	490	6378	NR	620	15300	NR	750	573	NR	880	158	NR
365	318	NR	495	7319	NR	625	16403	NR	755	555	NR	885	402	NR
370	378	NR	500	8401	NR	630	48869	NR	760	531	NR	890	641	NR
375	474	NR	505	9418	NR	635	37896	NR	765	459	NR	895	532	NR
380	421	NR	510	10299	NR	640	10603	NR	770	407	NR	900	407	NR
385	365	NR	515	10902	NR	645	11834	NR	775	350	NR	905	413	NR
390	329	NR	520	11329	NR	650	11239	NR	780	357	NR	910	312	NR
395	296	NR	525	11680	NR	655	6197	NR	785	334	NR	915	571	NR
400	286	NR	530	11873	NR	660	4484	NR	790	430	NR	920	508	NR
405	224	NR	535	12148	NR	665	3535	NR	795	284	NR	925	568	NR
410	231	NR	540	12264	NR	670	3334	NR	800	257	NR	930	181	NR
415	276	NR	545	12489	NR	675	2592	NR	805	363	NR	935	494	NR
420	424	NR	550	12851	NR	680	2155	NR	810	493	NR	940	492	NR
425	722	NR	555	13193	NR	685	1857	NR	815	396	NR	945	315	NR
430	1213	NR	560	13349	NR	690	1626	NR	820	383	NR	950	678	NR
435	2050	NR	565	13540	NR	695	1412	NR	825	349	NR	955	439	NR
440	3460	NR	570	13644	NR	700	1244	NR	830	296	NR	960	601	NR
445	6090	NR	575	13596	NR	705	1133	NR	835	364	NR	965	695	NR
450	10011	NR	580	13539	NR	710	1020	NR	840	371	NR	970	580	NR
455	11714	NR	585	13621	NR	715	945	NR	845	425	NR	975	906	NR
460	10035	NR	590	13297	NR	720	884	NR	850	404	NR	980	642	NR
465	8185	NR	595	13051	NR	725	863	NR	855	402	NR	985	472	NR
470	7150	NR	600	13130	NR	730	741	NR	860	376	NR	990	252	NR
475	6041	NR	605	14978	NR	735	689	NR	865	503	NR	995	214	NR
480	5445	NR	610	26575	NR	740	667	NR	870	534	NR	1000	1059	NR
485	5695	NR	615	28312	NR	745	585	NR	875	386	NR			

REPORT NUMBER: SP1-2403-328-17

Scotopic Flux vs. Wavelength



Scotopic Lumens: 1537.1

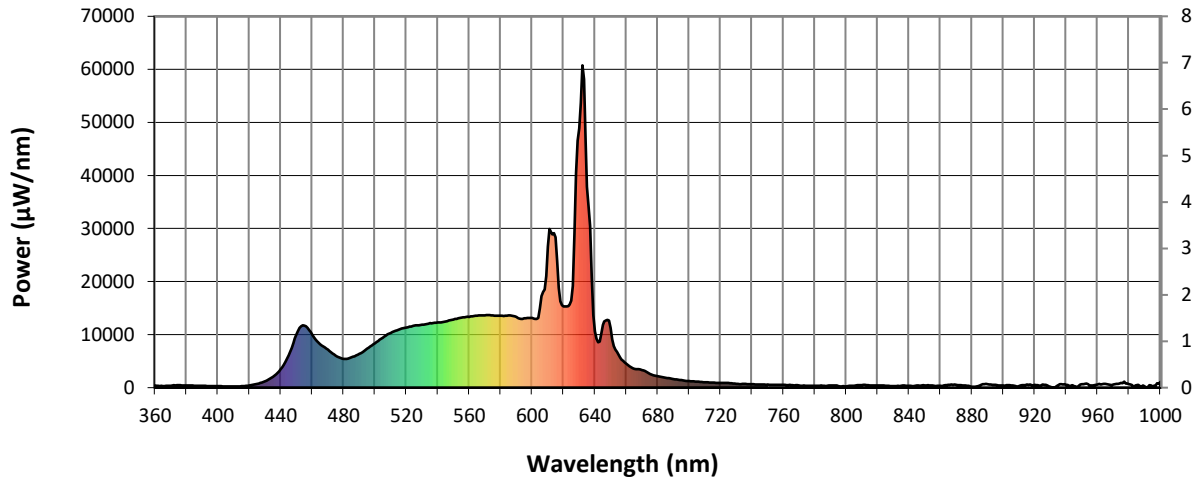
S/P: 1.55

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	407	NR	490	6378	NR	620	15300	NR	750	573	NR	880	158	NR
365	318	NR	495	7319	NR	625	16403	NR	755	555	NR	885	402	NR
370	378	NR	500	8401	NR	630	48869	NR	760	531	NR	890	641	NR
375	474	NR	505	9418	NR	635	37896	NR	765	459	NR	895	532	NR
380	421	NR	510	10299	NR	640	10603	NR	770	407	NR	900	407	NR
385	365	NR	515	10902	NR	645	11834	NR	775	350	NR	905	413	NR
390	329	NR	520	11329	NR	650	11239	NR	780	357	NR	910	312	NR
395	296	NR	525	11680	NR	655	6197	NR	785	334	NR	915	571	NR
400	286	NR	530	11873	NR	660	4484	NR	790	430	NR	920	508	NR
405	224	NR	535	12148	NR	665	3535	NR	795	284	NR	925	568	NR
410	231	NR	540	12264	NR	670	3334	NR	800	257	NR	930	181	NR
415	276	NR	545	12489	NR	675	2592	NR	805	363	NR	935	494	NR
420	424	NR	550	12851	NR	680	2155	NR	810	493	NR	940	492	NR
425	722	NR	555	13193	NR	685	1857	NR	815	396	NR	945	315	NR
430	1213	NR	560	13349	NR	690	1626	NR	820	383	NR	950	678	NR
435	2050	NR	565	13540	NR	695	1412	NR	825	349	NR	955	439	NR
440	3460	NR	570	13644	NR	700	1244	NR	830	296	NR	960	601	NR
445	6090	NR	575	13596	NR	705	1133	NR	835	364	NR	965	695	NR
450	10011	NR	580	13539	NR	710	1020	NR	840	371	NR	970	580	NR
455	11714	NR	585	13621	NR	715	945	NR	845	425	NR	975	906	NR
460	10035	NR	590	13297	NR	720	884	NR	850	404	NR	980	642	NR
465	8185	NR	595	13051	NR	725	863	NR	855	402	NR	985	472	NR
470	7150	NR	600	13130	NR	730	741	NR	860	376	NR	990	252	NR
475	6041	NR	605	14978	NR	735	689	NR	865	503	NR	995	214	NR
480	5445	NR	610	26575	NR	740	667	NR	870	534	NR	1000	1059	NR
485	5695	NR	615	28312	NR	745	585	NR	875	386	NR			



REPORT NUMBER: SP1-2403-328-17

**Melanopic Flux vs. Wavelength**



**Melanopic Lumens: 610.6**

**M/P: 0.61**

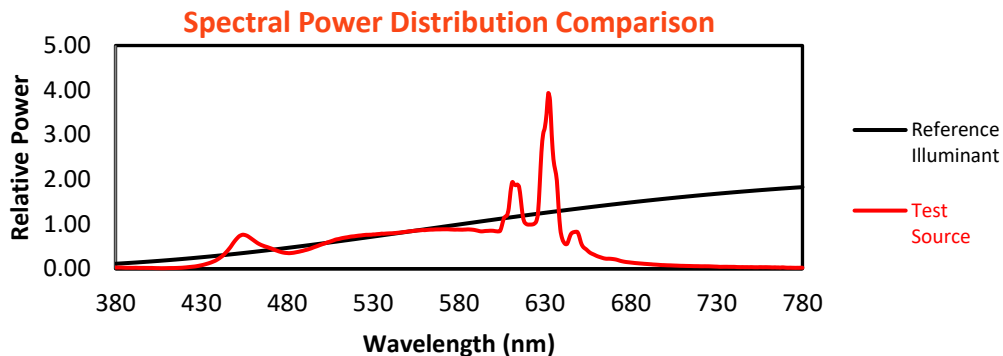
λ (nm)	Power (µW/nm)	Lumens (φ/nm)	λ (nm)	Power (µW/nm)	Lumens (φ/nm)	λ (nm)	Power (µW/nm)	Lumens (φ/nm)	λ (nm)	Power (µW/nm)	Lumens (φ/nm)	λ (nm)	Power (µW/nm)	Lumens (φ/nm)
360	407	NR	490	6378	NR	620	15300	NR	750	573	NR	880	158	NR
365	318	NR	495	7319	NR	625	16403	NR	755	555	NR	885	402	NR
370	378	NR	500	8401	NR	630	48869	NR	760	531	NR	890	641	NR
375	474	NR	505	9418	NR	635	37896	NR	765	459	NR	895	532	NR
380	421	NR	510	10299	NR	640	10603	NR	770	407	NR	900	407	NR
385	365	NR	515	10902	NR	645	11834	NR	775	350	NR	905	413	NR
390	329	NR	520	11329	NR	650	11239	NR	780	357	NR	910	312	NR
395	296	NR	525	11680	NR	655	6197	NR	785	334	NR	915	571	NR
400	286	NR	530	11873	NR	660	4484	NR	790	430	NR	920	508	NR
405	224	NR	535	12148	NR	665	3535	NR	795	284	NR	925	568	NR
410	231	NR	540	12264	NR	670	3334	NR	800	257	NR	930	181	NR
415	276	NR	545	12489	NR	675	2592	NR	805	363	NR	935	494	NR
420	424	NR	550	12851	NR	680	2155	NR	810	493	NR	940	492	NR
425	722	NR	555	13193	NR	685	1857	NR	815	396	NR	945	315	NR
430	1213	NR	560	13349	NR	690	1626	NR	820	383	NR	950	678	NR
435	2050	NR	565	13540	NR	695	1412	NR	825	349	NR	955	439	NR
440	3460	NR	570	13644	NR	700	1244	NR	830	296	NR	960	601	NR
445	6090	NR	575	13596	NR	705	1133	NR	835	364	NR	965	695	NR
450	10011	NR	580	13539	NR	710	1020	NR	840	371	NR	970	580	NR
455	11714	NR	585	13621	NR	715	945	NR	845	425	NR	975	906	NR
460	10035	NR	590	13297	NR	720	884	NR	850	404	NR	980	642	NR
465	8185	NR	595	13051	NR	725	863	NR	855	402	NR	985	472	NR
470	7150	NR	600	13130	NR	730	741	NR	860	376	NR	990	252	NR
475	6041	NR	605	14978	NR	735	689	NR	865	503	NR	995	214	NR
480	5445	NR	610	26575	NR	740	667	NR	870	534	NR	1000	1059	NR
485	5695	NR	615	28312	NR	745	585	NR	875	386	NR			

REPORT NUMBER: SP1-2403-328-17

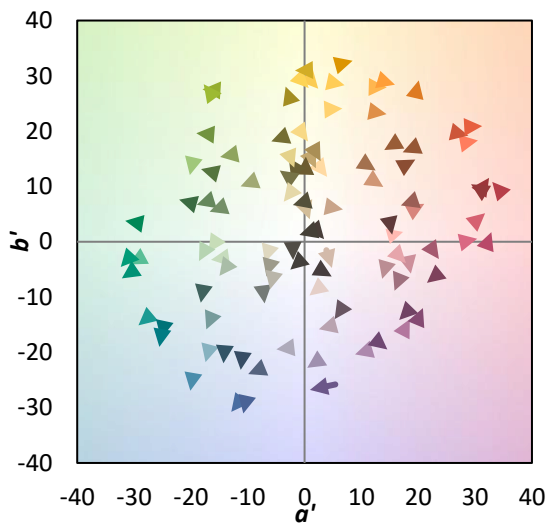
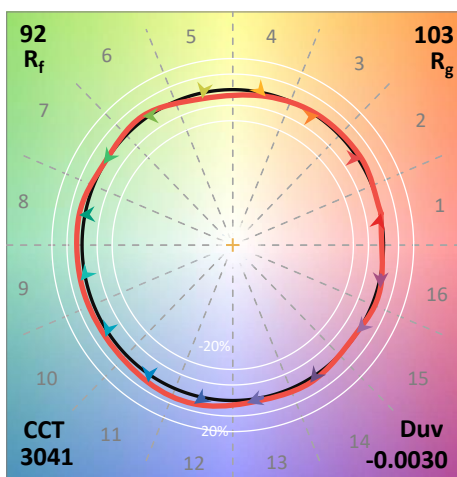
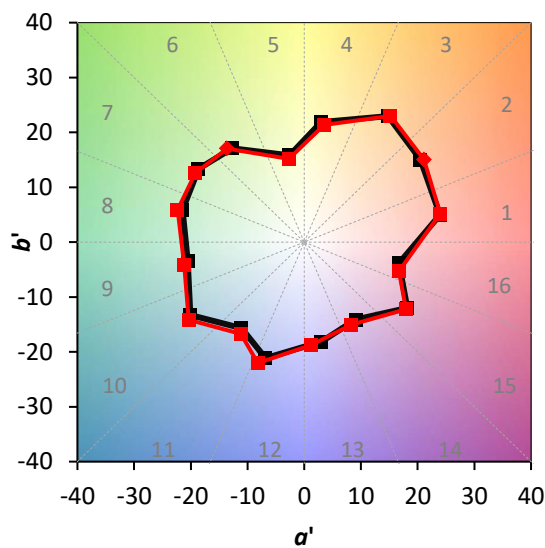
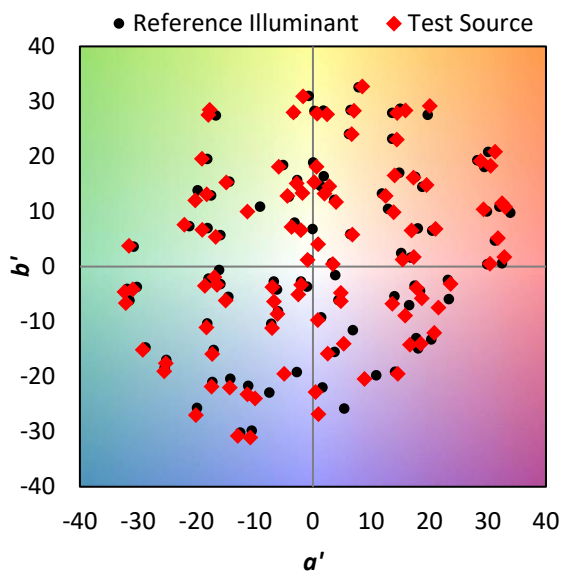
TM-30-18

**Summary**

$R_f = 92.4$   
 $R_g = 102.7$   
 CIE  $R_a = 93.3$   
 $R_9 = 90.4$



**Color Vector Graphics**

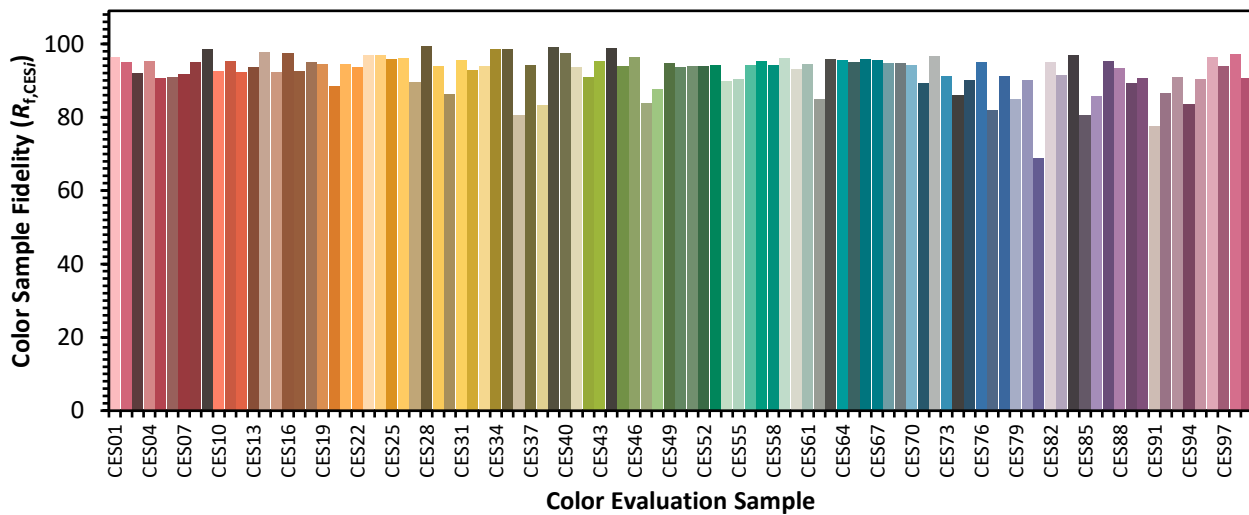


REPORT NUMBER: SP1-2403-328-17

TM-30-18

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

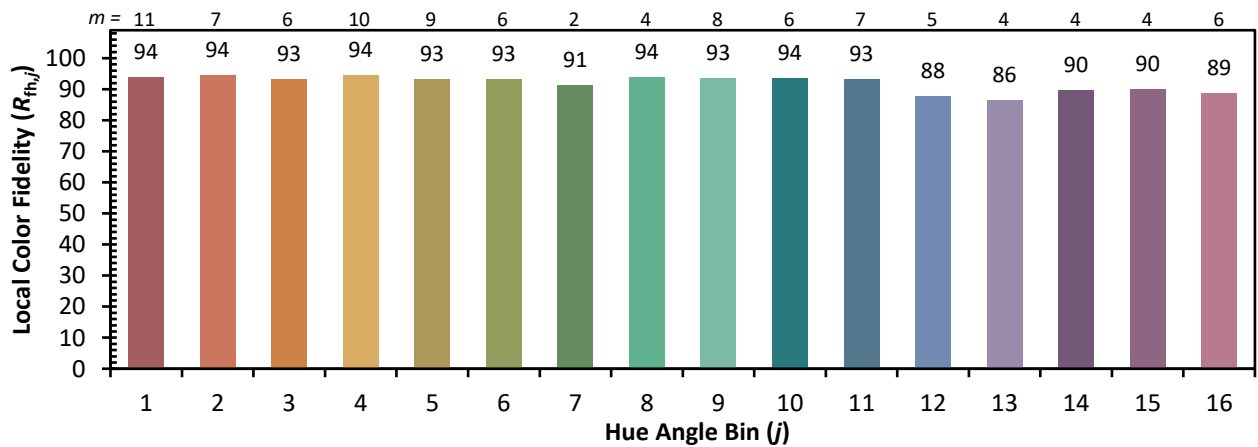
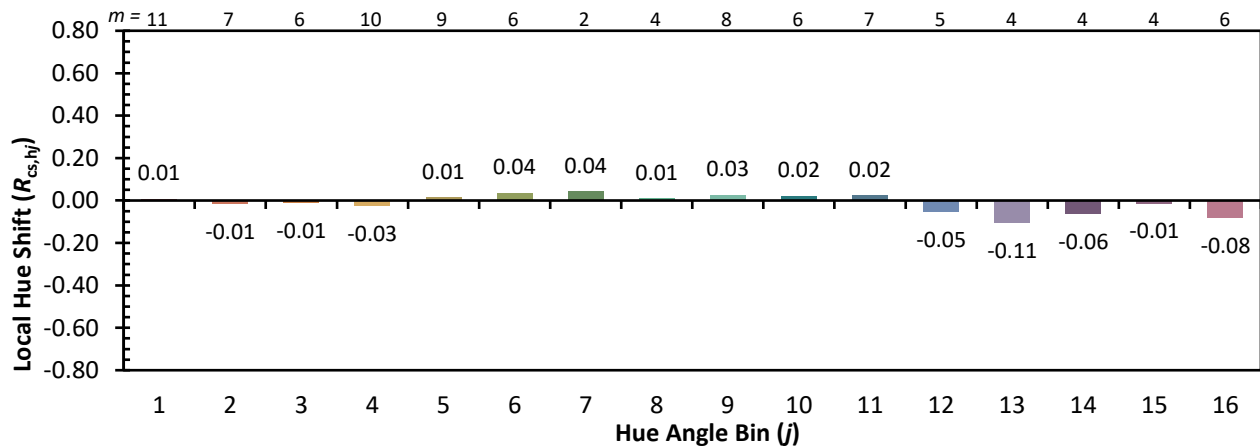
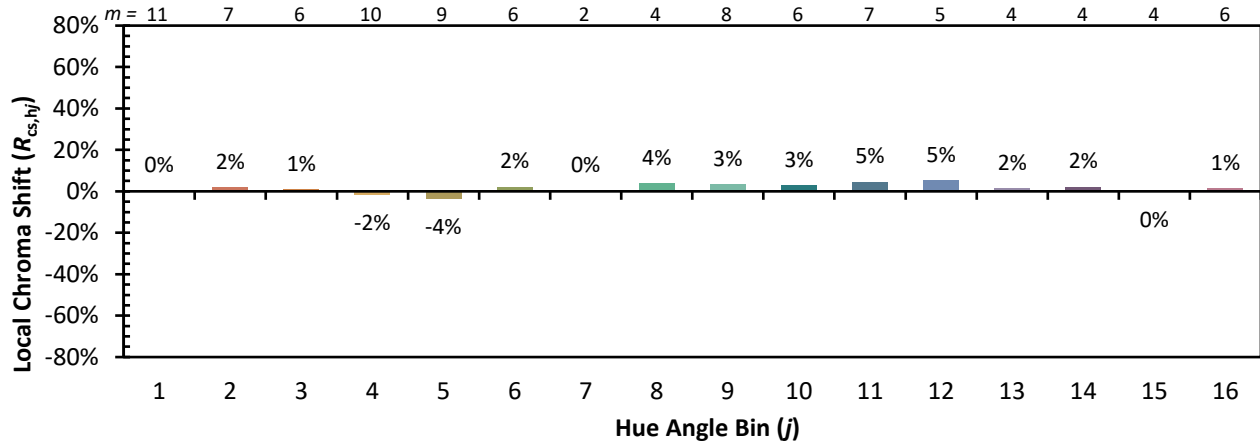
CES01 = 86	CES26 = 96	CES51 = 94	CES76 = 95
CES02 = 63	CES27 = 90	CES52 = 94	CES77 = 82
CES03 = 32	CES28 = 99	CES53 = 94	CES78 = 91
CES04 = 70	CES29 = 94	CES54 = 90	CES79 = 85
CES05 = 51	CES30 = 86	CES55 = 90	CES80 = 90
CES06 = 51	CES31 = 96	CES56 = 94	CES81 = 69
CES07 = 45	CES32 = 93	CES57 = 95	CES82 = 95
CES08 = 43	CES33 = 94	CES58 = 94	CES83 = 91
CES09 = 29	CES34 = 99	CES59 = 96	CES84 = 97
CES10 = 76	CES35 = 98	CES60 = 93	CES85 = 80
CES11 = 58	CES36 = 80	CES61 = 94	CES86 = 86
CES12 = 65	CES37 = 94	CES62 = 85	CES87 = 95
CES13 = 44	CES38 = 83	CES63 = 96	CES88 = 93
CES14 = 74	CES39 = 99	CES64 = 96	CES89 = 89
CES15 = 72	CES40 = 97	CES65 = 95	CES90 = 91
CES16 = 48	CES41 = 94	CES66 = 96	CES91 = 78
CES17 = 49	CES42 = 91	CES67 = 95	CES92 = 87
CES18 = 57	CES43 = 95	CES68 = 95	CES93 = 91
CES19 = 71	CES44 = 99	CES69 = 95	CES94 = 83
CES20 = 68	CES45 = 94	CES70 = 94	CES95 = 90
CES21 = 86	CES46 = 96	CES71 = 89	CES96 = 96
CES22 = 79	CES47 = 84	CES72 = 97	CES97 = 94
CES23 = 91	CES48 = 88	CES73 = 91	CES98 = 97
CES24 = 90	CES49 = 95	CES74 = 86	CES99 = 91
CES25 = 71	CES50 = 94	CES75 = 90	



REPORT NUMBER: SP1-2403-328-17

TM-30-18

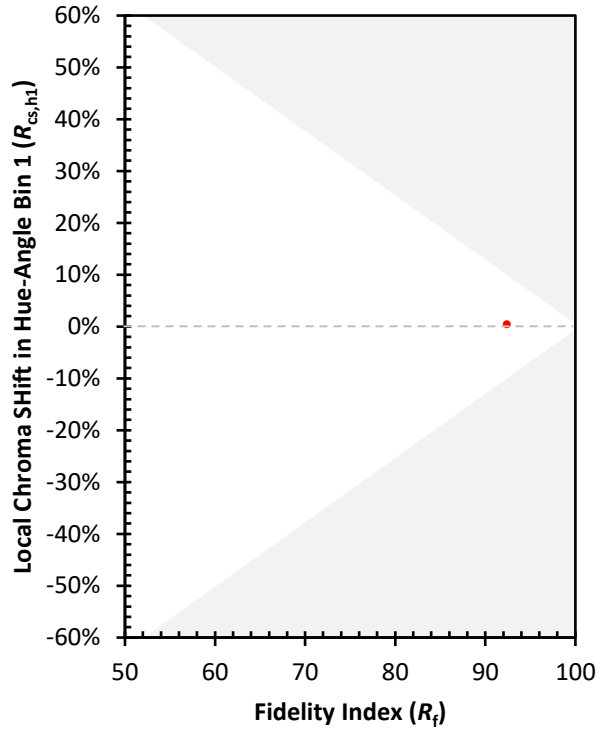
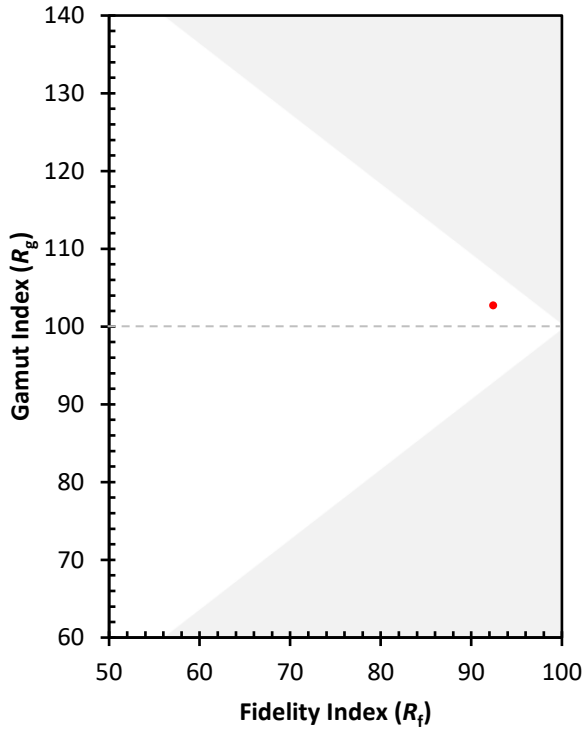
Color Rendition by Hue-Angle Bin



REPORT NUMBER: SP1-2403-328-17

TM-30-18

Measure Comparisons



(END OF REPORT)