

Cooper Lighting Solutions Photometric Lab  
1121 Highway 74 South  
Peachtree City, GA 30269



Scaled data based on original data using  
LM-79-2019 Approved Method: Electrical and Photometric Measurements of Solid-  
State Lighting Products

Test Report Prepared for  
Cooper Lighting Solutions

Brand: FAIL-SAFE

Report Number: P1357101

Luminaire Tested: 4ASL4-10-1-65-UNV

Issue Date: 2/17/2026

**Test Information**

Test Method: LM-79-2019  
Report Number: P1357101  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-2511-597-6)  
Test Lab: INNOVATION CENTER  
Issue Date: 2/17/2026  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: FAIL-SAFE  
Catalog Number: 4ASL4-10-1-65-UNV  
Description: 4FT 1000 LUMEN PER FOOT 4ASL LED LUMINAIRE WITH OPL LENS AND 6500K LEDS 1 ROW  
Light Source: -  
Ballast/Driver: -

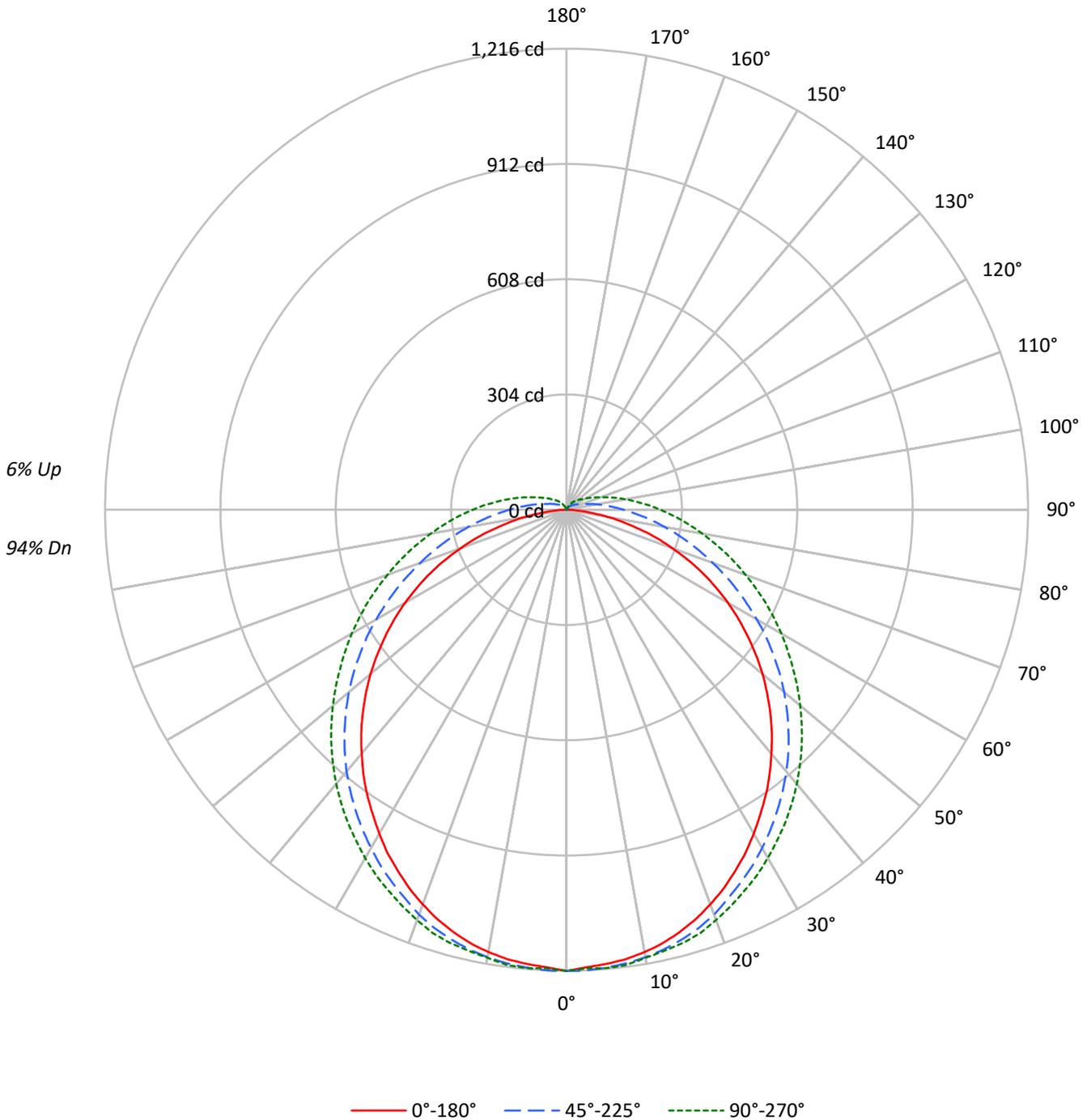
**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 4072.0 lumens  
Efficiency: N/A  
Efficacy: 115.7 lumens/watt  
Spacing Criteria (0/90/45): 1.21 / 1.3 / 1.39  
Luminous Opening: Rectangular w/ Sides (W: 0.33' x L: 3.98' x H: 0.1')  
CIE Type: Direct

Input Watts (W): 35.2  
Input Voltage (V): NR  
Input Current (A<sub>in</sub>): 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: 24 FT

TEST NUMBER: P1357101  
CATALOG NUMBER: 4ASL4-10-1-65-UNV

### Luminous Intensity Polar Plot







TEST NUMBER: P1357101  
 CATALOG NUMBER: 4ASL4-10-1-65-UNV

**ZONAL LUMENS:**

Zone	Lumens	% Fixture
0°-10°	115.2	2.8
10°-20°	330.6	8.1
20°-30°	499.9	12.3
30°-40°	604.3	14.8
40°-50°	635.3	15.6
50°-60°	591.8	14.5
60°-70°	486.2	11.9
70°-80°	345.2	8.5
80°-90°	208.1	5.1
90°-100°	116.6	2.9
100°-110°	64.6	1.6
110°-120°	36.0	0.9
120°-130°	20.7	0.5
130°-140°	11.3	0.3
140°-150°	5.0	0.1
150°-160°	1.2	0.0
160°-170°	0.0	0.0
170°-180°	0.0	0.0
0°-30°	945.7	23.2
0°-40°	1550.0	38.1
0°-60°	2777.1	68.2
0°-90°	3816.6	93.7
90°-120°	217.1	5.3
90°-150°	254.2	6.2
90°-180°	255.0	6.3
0°-180°	4072.0	100.0

**CANDELA DISTRIBUTION:**

	0°	22.5°	45°	67.5°	90°	Flux
0°	1216	1216	1216	1216	1216	
5°	1202	1214	1212	1211	1214	114
15°	1153	1168	1174	1179	1183	325
25°	1051	1070	1086	1101	1109	484
35°	916	940	969	993	1006	573
45°	760	787	827	861	876	586
55°	583	616	664	709	728	522
65°	396	432	494	552	578	391
75°	200	250	333	402	431	213
85°	37	107	201	275	303	46
90°	0	63	150	220	246	2
95°	0	37	110	173	198	0
105°	0	14	58	105	124	0
115°	0	7	36	63	76	0
125°	0	4	22	41	48	0
135°	0	1	14	26	33	0
145°	1	0	6	15	19	1
155°	1	1	0	4	6	1
165°	0	0	0	0	0	0
175°	0	0	0	0	0	0
180°	0	0	0	0	0	0



TEST NUMBER: P1357101  
 CATALOG NUMBER: 4ASL4-10-1-65-UNV

**CANDELA DISTRIBUTION (FULL):**

	0°	22.5°	45°	67.5°	90°
0°	1216.3	1216.3	1216.3	1216.3	1216.3
2.5°	1208.0	1219.0	1216.3	1210.8	1210.8
5°	1202.5	1213.5	1212.1	1210.8	1213.5
7.5°	1195.6	1206.6	1206.6	1208.0	1210.8
10°	1184.6	1198.4	1198.4	1198.4	1199.8
12.5°	1170.9	1184.6	1187.4	1188.8	1191.5
15°	1153.0	1168.1	1173.6	1179.1	1183.3
17.5°	1132.3	1147.5	1157.1	1164.0	1170.9
20°	1107.6	1124.1	1136.5	1144.7	1151.6
22.5°	1081.4	1097.9	1110.3	1122.7	1131.0
25°	1051.2	1070.4	1085.6	1100.7	1109.0
27.5°	1020.9	1040.2	1059.4	1077.3	1086.9
30°	986.5	1008.5	1030.5	1051.2	1060.8
32.5°	950.7	974.1	1000.3	1022.3	1033.3
35°	916.3	939.7	968.6	993.4	1005.8
37.5°	879.2	902.6	935.6	963.1	975.5
40°	839.3	865.4	901.2	930.1	943.8
42.5°	800.8	826.9	865.4	897.1	910.8
45°	759.5	787.0	826.9	861.3	876.4
47.5°	716.8	745.7	788.4	824.1	840.7
50°	674.2	704.4	748.5	787.0	803.5
52.5°	628.8	660.4	707.2	748.5	766.4
55°	583.4	616.4	664.5	708.6	727.8
57.5°	538.0	571.0	623.3	670.1	690.7
60°	491.2	525.6	579.2	630.2	653.5
62.5°	443.0	478.8	535.2	590.2	615.0
65°	396.3	432.0	493.9	551.7	577.9
67.5°	346.7	385.2	451.3	511.8	539.3
70°	295.8	339.8	410.0	474.7	502.2
72.5°	250.4	295.8	371.5	437.5	466.4
75°	199.5	250.4	333.0	401.8	430.6
77.5°	155.5	210.5	297.2	367.4	396.3
80°	111.4	172.0	262.8	334.3	363.2
82.5°	71.5	137.6	231.1	304.1	331.6
85°	37.1	107.3	200.9	275.2	302.7
87.5°	11.0	82.6	173.4	246.3	273.8
90°	0.0	63.3	150.0	220.1	246.3
92.5°	0.0	48.2	129.3	196.7	222.9
95°	0.0	37.1	110.1	173.4	198.1
97.5°	0.0	28.9	94.9	152.7	177.5
100°	0.0	23.4	81.2	134.8	158.2
102.5°	0.0	19.3	70.2	119.7	140.3
105°	0.0	13.8	57.8	104.6	123.8
107.5°	0.0	9.6	50.9	92.2	108.7
110°	0.0	8.3	45.4	79.8	96.3



TEST NUMBER: P1357101  
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**CANDELA DISTRIBUTION (continued):**

	0°	22.5°	45°	67.5°	90°
112.5°	0.0	6.9	39.9	71.5	85.3
115°	0.0	6.9	35.8	63.3	75.7
117.5°	0.0	5.5	30.3	56.4	67.4
120°	0.0	5.5	27.5	50.9	60.5
122.5°	0.0	4.1	24.8	45.4	55.0
125°	0.0	4.1	22.0	41.3	48.2
127.5°	0.0	2.8	19.3	37.1	44.0
130°	0.0	2.8	17.9	33.0	39.9
132.5°	0.0	1.4	16.5	30.3	35.8
135°	0.0	1.4	13.8	26.1	33.0
137.5°	0.0	0.0	12.4	23.4	28.9
140°	0.0	0.0	9.6	20.6	26.1
142.5°	1.4	0.0	8.3	17.9	22.0
145°	1.4	0.0	5.5	15.1	19.3
147.5°	1.4	1.4	4.1	12.4	15.1
150°	1.4	1.4	2.8	8.3	12.4
152.5°	1.4	1.4	1.4	5.5	8.3
155°	1.4	1.4	0.0	4.1	5.5
157.5°	1.4	1.4	0.0	1.4	2.8
160°	1.4	1.4	0.0	0.0	1.4
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



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**CIE UGR TABLE:**

Reflectances:											
Ceiling		0.7	0.7	0.5	0.5	0.3	0.7	0.7	0.5	0.5	0.3
Wall		0.5	0.3	0.5	0.3	0.3	0.5	0.3	0.5	0.3	0.3
Reference plane		0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Room dimensions		Viewed crosswise					Viewed endwise				
X=2H	Y=2H	17.36	18.91	17.82	19.35	19.82	19.34	20.89	19.80	21.34	21.80
	3H	18.85	20.27	19.32	20.72	21.23	21.75	23.17	22.22	23.62	24.13
	4H	19.33	20.67	19.82	21.14	21.66	22.92	24.26	23.41	24.73	25.25
	6H	19.60	20.85	20.11	21.34	21.87	24.13	25.37	24.63	25.86	26.40
	8H	19.66	20.85	20.17	21.36	21.90	24.75	25.94	25.26	26.45	26.99
	12H	19.67	20.82	20.19	21.32	21.89	25.43	26.58	25.95	27.08	27.65
4H	2H	18.22	19.56	18.72	20.03	20.56	19.78	21.12	20.27	21.59	22.11
	3H	19.95	21.09	20.46	21.61	22.15	22.41	23.55	22.92	24.06	24.61
	4H	20.55	21.60	21.08	22.12	22.70	23.74	24.79	24.27	25.31	25.89
	6H	20.95	21.87	21.49	22.42	23.01	25.14	26.06	25.69	26.61	27.21
	8H	21.04	21.91	21.59	22.46	23.06	25.87	26.73	26.42	27.28	27.89
	12H	21.08	21.87	21.66	22.45	23.06	26.67	27.46	27.24	28.04	28.65
8H	4H	21.20	22.07	21.75	22.62	23.23	23.96	24.82	24.51	25.37	25.98
	6H	21.77	22.50	22.35	23.10	23.71	25.52	26.25	26.10	26.85	27.46
	8H	21.95	22.61	22.54	23.21	23.84	26.38	27.04	26.98	27.65	28.27
	12H	22.06	22.65	22.65	23.24	23.93	27.37	27.96	27.97	28.56	29.25
12H	4H	21.38	22.17	21.96	22.75	23.36	23.96	24.75	24.54	25.33	25.94
	6H	22.04	22.71	22.64	23.31	23.94	25.55	26.22	26.15	26.82	27.45
	8H	22.31	22.91	22.91	23.50	24.19	26.49	27.08	27.08	27.67	28.36

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

Report Prepared for

Cooper Lighting Solutions

Fail-Safe

Report Number: SP1-2511-597-6

Test Date: 11/18/2025

Luminaire Tested: 4ASL-2-65-UNV-OPL-1\_600mA

Data in this report applies to families of products including 4ASL

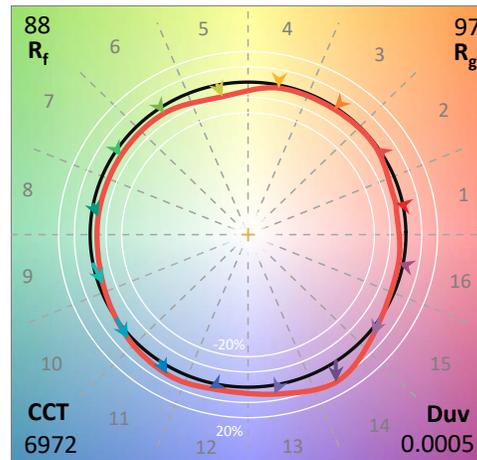
**Test Information**

Test Method: LM-79-2019  
 Report Number: SP1-2511-597-6  
 Test Lab: COOPER LIGHTING SOLUTIONS  
 Photometer: SP1 - 76IN SPHERE  
 Measurement Geometry:  $4\pi$   
 Issue Date: 11/18/2025  
 Manufacturer: COOPER LIGHTING SOLUTIONS  
 Product Line: Fail-Safe  
 Catalog Number: **4ASL-2-65-UNV-OPL-1\_600mA**  
 Description: 2foot 4ASL LED LUMINAIRE WITH OPL LENS AND 6500K LEDs with 1 rows at 600mA

**Spectral Parameters**

CCT (K): 6972  
 CIE u': 0.1979  
 CIE v': 0.4612  
 Duv: 0.0005  
 CIE x: 0.3066  
 CIE y: 0.3177  
 CIE z: 0.3758  
 Peak Wavelength (nm): 455  
 Dominant Wavelength (nm): 483  
 Purity: 10.33335  
 Rf: 88.2  
 Rg: 97.1

CRI (Ra):	94.3		
R1:	96.1	R9:	82.6
R2:	98.8	R10:	95.4
R3:	96.4	R11:	95.2
R4:	92.8	R12:	63.5
R5:	92.9	R13:	99.3
R6:	92.2	R14:	98.1
R7:	93.5	R15:	93.7
R8:	91.4		



**Test Conditions**

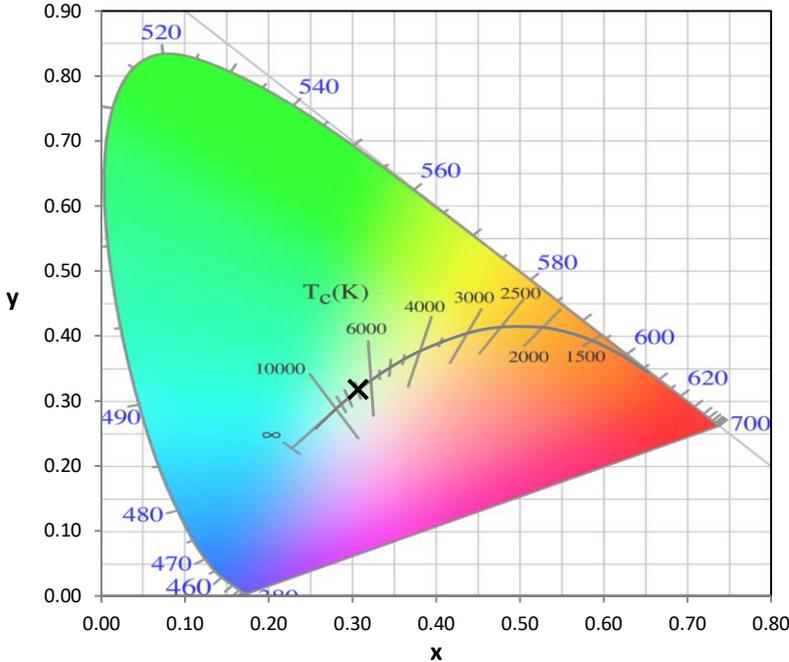
Stabilization Time: 20M  
 Operation Time: 1H 20M  
 Sphere Temperature (°C): 24.1

REPORT NUMBER: SP1-2511-597-6

Measurement and Test Equipment			
Instrument	Identification Number	Calibration Date	Calibration Due Date
Photometer	76INCH SPHERE IN0058	6/16/2025	12/16/2025
Power Meter	XITRON INXT2011004	10/21/2025	10/21/2026
AC Power Source	CHROMA 61603 IN0063	10/21/2025	10/21/2026
DC Power Source	AGILENT E3634A IN0208	10/21/2025	10/21/2026
Sphere Thermometer	ONSET IN0085	10/21/2025	10/21/2026
Room Thermometer	ONSET IN0046	10/21/2025	10/21/2026

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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 6500K 7-step quadrangle

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**Photopic Flux vs. Wavelength**



**Photopic Lumens: NR**

λ (nm)	Power W <sup>^</sup> /nm	Lumens (φ/nm)	λ (nm)	Power W <sup>^</sup> /nm	Lumens (φ/nm)	λ (nm)	Power W <sup>^</sup> /nm	Lumens (φ/nm)	λ (nm)	Power W <sup>^</sup> /nm	Lumens (φ/nm)	λ (nm)	Power W <sup>^</sup> /nm	Lumens (φ/nm)
360	0	NR	490	260	NR	620	255	NR	750	6	NR	880	0	NR
365	0	NR	495	274	NR	625	252	NR	755	6	NR	885	0	NR
370	0	NR	500	297	NR	630	778	NR	760	5	NR	890	0	NR
375	0	NR	505	320	NR	635	431	NR	765	4	NR	895	0	NR
380	1	NR	510	337	NR	640	160	NR	770	4	NR	900	0	NR
385	2	NR	515	349	NR	645	165	NR	775	3	NR	905	0	NR
390	2	NR	520	354	NR	650	135	NR	780	3	NR	910	0	NR
395	3	NR	525	356	NR	655	115	NR	785	2	NR	915	0	NR
400	5	NR	530	356	NR	660	99	NR	790	2	NR	920	0	NR
405	6	NR	535	355	NR	665	84	NR	795	2	NR	925	0	NR
410	8	NR	540	354	NR	670	77	NR	800	2	NR	930	0	NR
415	12	NR	545	351	NR	675	64	NR	805	1	NR	935	0	NR
420	19	NR	550	350	NR	680	55	NR	810	1	NR	940	0	NR
425	33	NR	555	348	NR	685	47	NR	815	1	NR	945	0	NR
430	60	NR	560	344	NR	690	41	NR	820	1	NR	950	0	NR
435	113	NR	565	339	NR	695	35	NR	825	1	NR	955	0	NR
440	206	NR	570	331	NR	700	30	NR	830	1	NR	960	0	NR
445	392	NR	575	323	NR	705	26	NR	835	1	NR	965	0	NR
450	764	NR	580	315	NR	710	22	NR	840	1	NR	970	0	NR
455	1000	NR	585	307	NR	715	19	NR	845	0	NR	975	0	NR
460	736	NR	590	299	NR	720	16	NR	850	0	NR	980	0	NR
465	513	NR	595	290	NR	725	14	NR	855	0	NR	985	0	NR
470	430	NR	600	282	NR	730	12	NR	860	0	NR	990	0	NR
475	325	NR	605	276	NR	735	10	NR	865	0	NR	995	0	NR
480	256	NR	610	287	NR	740	9	NR	870	0	NR	1000	0	NR
485	250	NR	615	284	NR	745	7	NR	875	0	NR			

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**Scotopic Flux vs. Wavelength**



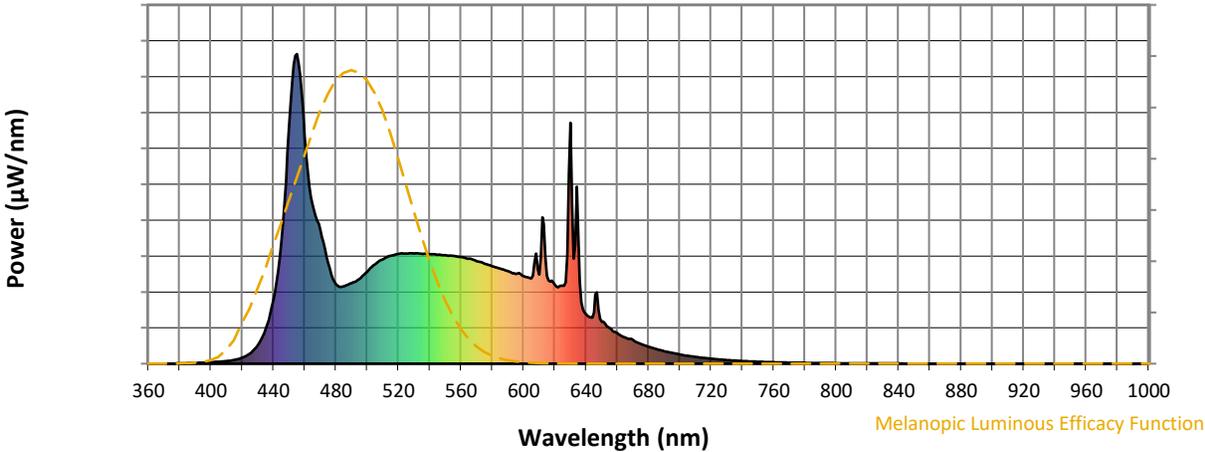
**Scotopic Lumens: NR**

**S/P: 2.48**

λ (nm)	Power W <sup>^</sup> /nm	Lumens (φ/nm)	λ (nm)	Power W <sup>^</sup> /nm	Lumens (φ/nm)	λ (nm)	Power W <sup>^</sup> /nm	Lumens (φ/nm)	λ (nm)	Power W <sup>^</sup> /nm	Lumens (φ/nm)	λ (nm)	Power W <sup>^</sup> /nm	Lumens (φ/nm)
360	0	NR	490	260	NR	620	255	NR	750	6	NR	880	0	NR
365	0	NR	495	274	NR	625	252	NR	755	6	NR	885	0	NR
370	0	NR	500	297	NR	630	778	NR	760	5	NR	890	0	NR
375	0	NR	505	320	NR	635	431	NR	765	4	NR	895	0	NR
380	1	NR	510	337	NR	640	160	NR	770	4	NR	900	0	NR
385	2	NR	515	349	NR	645	165	NR	775	3	NR	905	0	NR
390	2	NR	520	354	NR	650	135	NR	780	3	NR	910	0	NR
395	3	NR	525	356	NR	655	115	NR	785	2	NR	915	0	NR
400	5	NR	530	356	NR	660	99	NR	790	2	NR	920	0	NR
405	6	NR	535	355	NR	665	84	NR	795	2	NR	925	0	NR
410	8	NR	540	354	NR	670	77	NR	800	2	NR	930	0	NR
415	12	NR	545	351	NR	675	64	NR	805	1	NR	935	0	NR
420	19	NR	550	350	NR	680	55	NR	810	1	NR	940	0	NR
425	33	NR	555	348	NR	685	47	NR	815	1	NR	945	0	NR
430	60	NR	560	344	NR	690	41	NR	820	1	NR	950	0	NR
435	113	NR	565	339	NR	695	35	NR	825	1	NR	955	0	NR
440	206	NR	570	331	NR	700	30	NR	830	1	NR	960	0	NR
445	392	NR	575	323	NR	705	26	NR	835	1	NR	965	0	NR
450	764	NR	580	315	NR	710	22	NR	840	1	NR	970	0	NR
455	1000	NR	585	307	NR	715	19	NR	845	0	NR	975	0	NR
460	736	NR	590	299	NR	720	16	NR	850	0	NR	980	0	NR
465	513	NR	595	290	NR	725	14	NR	855	0	NR	985	0	NR
470	430	NR	600	282	NR	730	12	NR	860	0	NR	990	0	NR
475	325	NR	605	276	NR	735	10	NR	865	0	NR	995	0	NR
480	256	NR	610	287	NR	740	9	NR	870	0	NR	1000	0	NR
485	250	NR	615	284	NR	745	7	NR	875	0	NR			

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Melanopic Flux vs. Wavelength



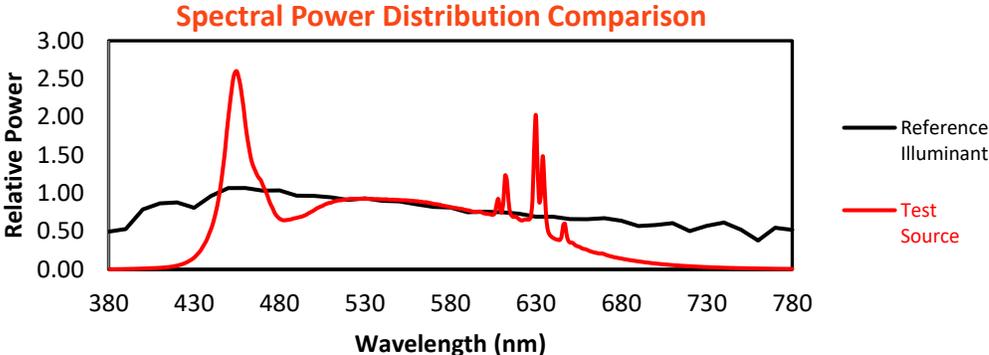
Melanopic Lumens: NR

M/P: 5.67

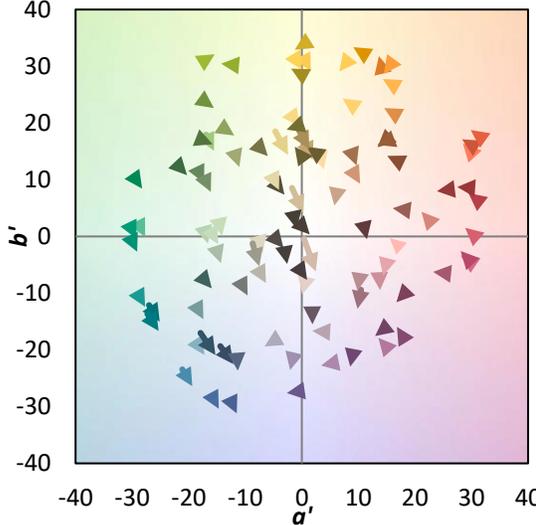
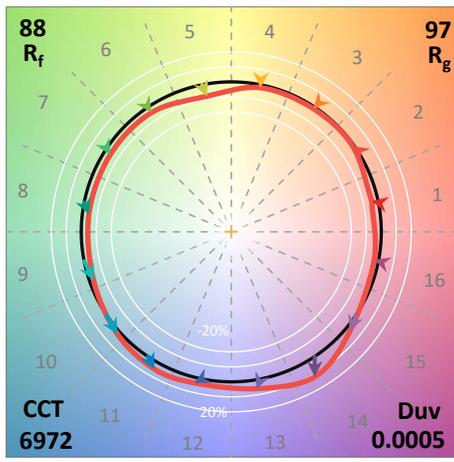
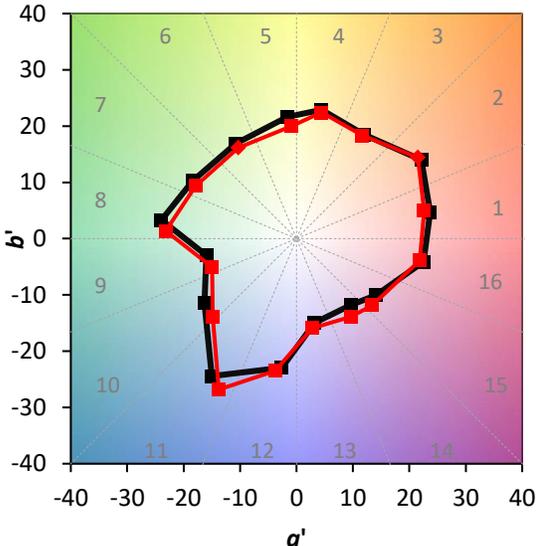
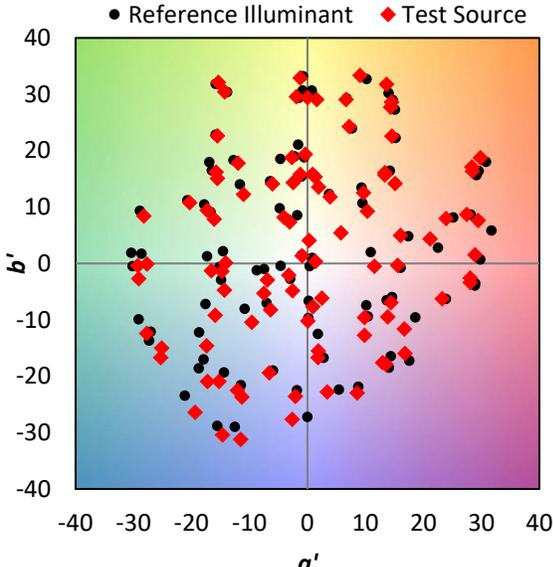
λ (nm)	Power W <sup>^</sup> /nm	Lumens (φ/nm)	λ (nm)	Power W <sup>^</sup> /nm	Lumens (φ/nm)	λ (nm)	Power W <sup>^</sup> /nm	Lumens (φ/nm)	λ (nm)	Power W <sup>^</sup> /nm	Lumens (φ/nm)	λ (nm)	Power W <sup>^</sup> /nm	Lumens (φ/nm)
360	0	NR	490	260	NR	620	255	NR	750	6	NR	880	0	NR
365	0	NR	495	274	NR	625	252	NR	755	6	NR	885	0	NR
370	0	NR	500	297	NR	630	778	NR	760	5	NR	890	0	NR
375	0	NR	505	320	NR	635	431	NR	765	4	NR	895	0	NR
380	1	NR	510	337	NR	640	160	NR	770	4	NR	900	0	NR
385	2	NR	515	349	NR	645	165	NR	775	3	NR	905	0	NR
390	2	NR	520	354	NR	650	135	NR	780	3	NR	910	0	NR
395	3	NR	525	356	NR	655	115	NR	785	2	NR	915	0	NR
400	5	NR	530	356	NR	660	99	NR	790	2	NR	920	0	NR
405	6	NR	535	355	NR	665	84	NR	795	2	NR	925	0	NR
410	8	NR	540	354	NR	670	77	NR	800	2	NR	930	0	NR
415	12	NR	545	351	NR	675	64	NR	805	1	NR	935	0	NR
420	19	NR	550	350	NR	680	55	NR	810	1	NR	940	0	NR
425	33	NR	555	348	NR	685	47	NR	815	1	NR	945	0	NR
430	60	NR	560	344	NR	690	41	NR	820	1	NR	950	0	NR
435	113	NR	565	339	NR	695	35	NR	825	1	NR	955	0	NR
440	206	NR	570	331	NR	700	30	NR	830	1	NR	960	0	NR
445	392	NR	575	323	NR	705	26	NR	835	1	NR	965	0	NR
450	764	NR	580	315	NR	710	22	NR	840	1	NR	970	0	NR
455	1000	NR	585	307	NR	715	19	NR	845	0	NR	975	0	NR
460	736	NR	590	299	NR	720	16	NR	850	0	NR	980	0	NR
465	513	NR	595	290	NR	725	14	NR	855	0	NR	985	0	NR
470	430	NR	600	282	NR	730	12	NR	860	0	NR	990	0	NR
475	325	NR	605	276	NR	735	10	NR	865	0	NR	995	0	NR
480	256	NR	610	287	NR	740	9	NR	870	0	NR	1000	0	NR
485	250	NR	615	284	NR	745	7	NR	875	0	NR			

**Summary**

$R_f = 88.2$   
 $R_g = 97.1$   
 CIE  $R_a = 94.3$   
 $R_9 = 82.6$

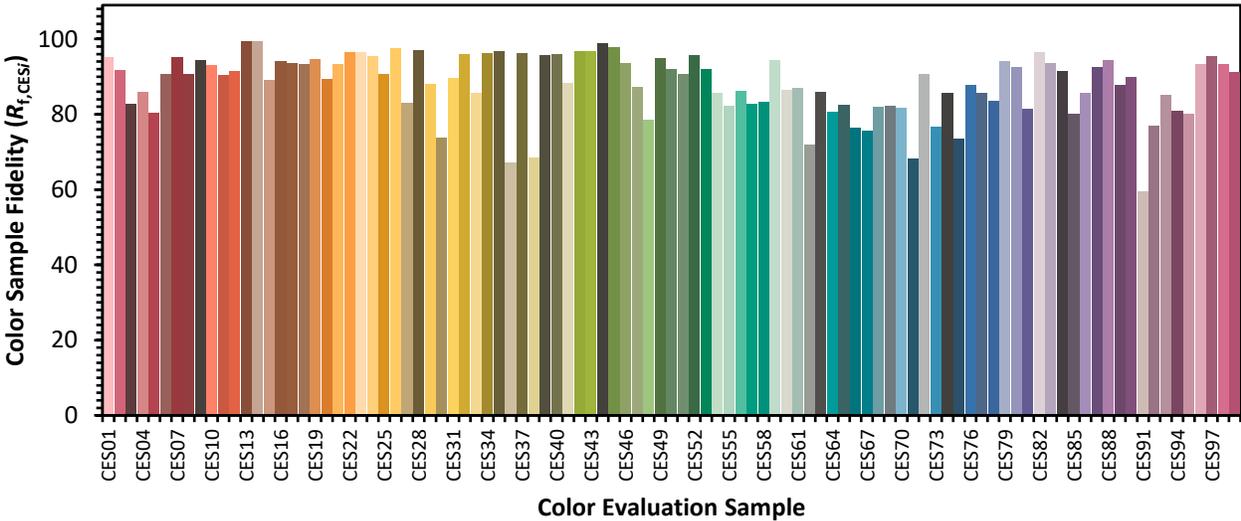


**Color Vector Graphics**

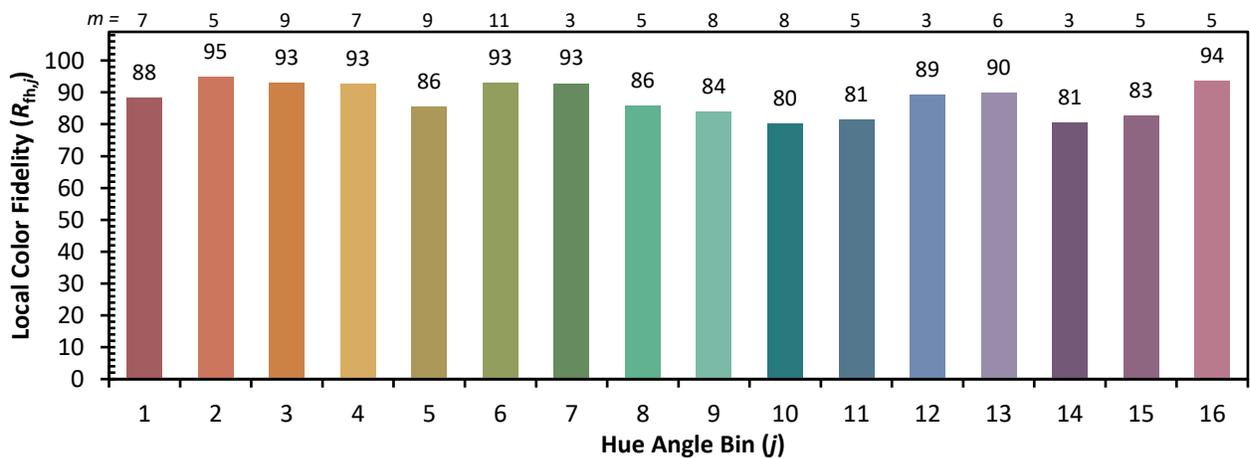
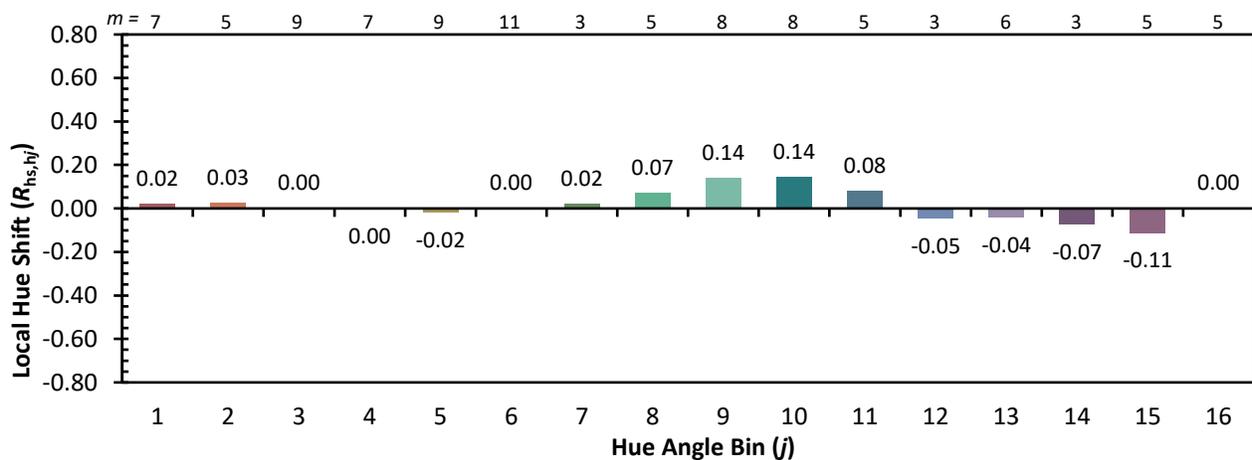
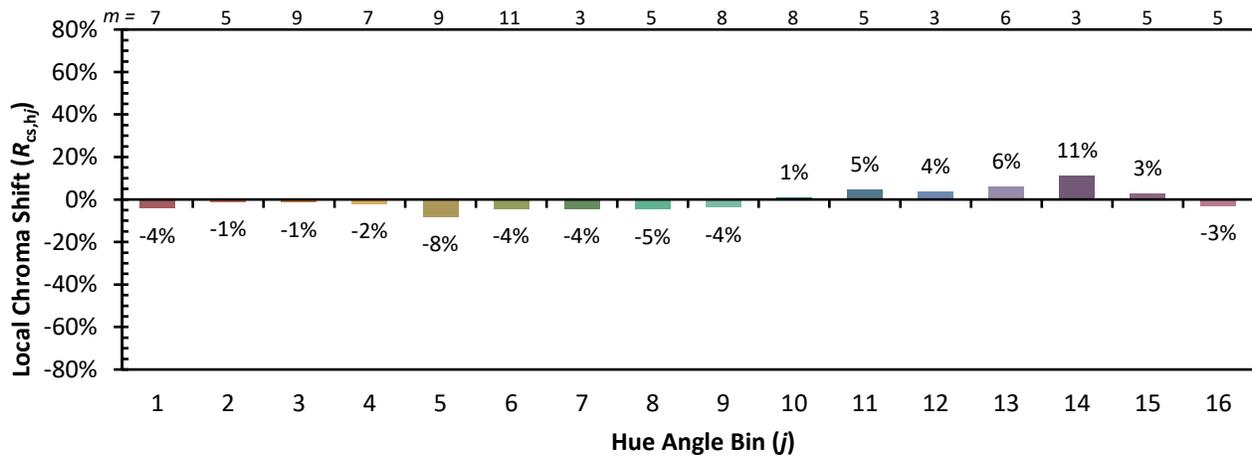


**Individual Sample Fidelity Index ( $R_{f,i}$ )**

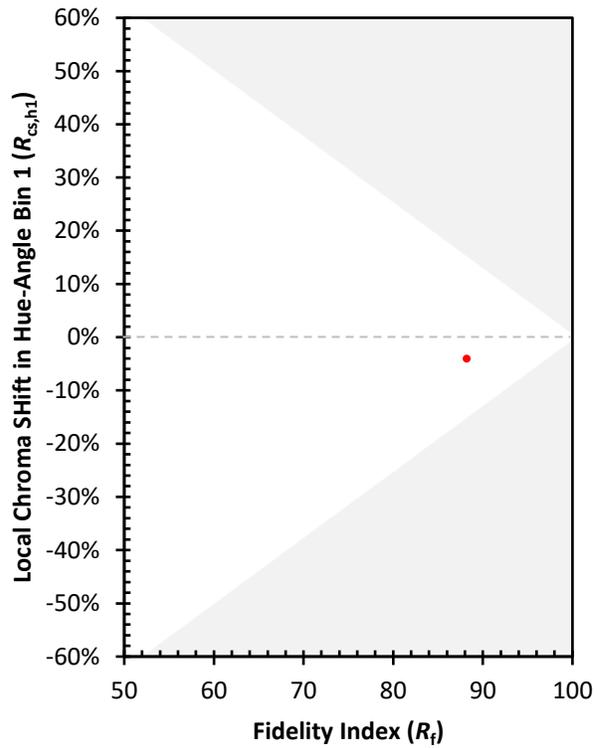
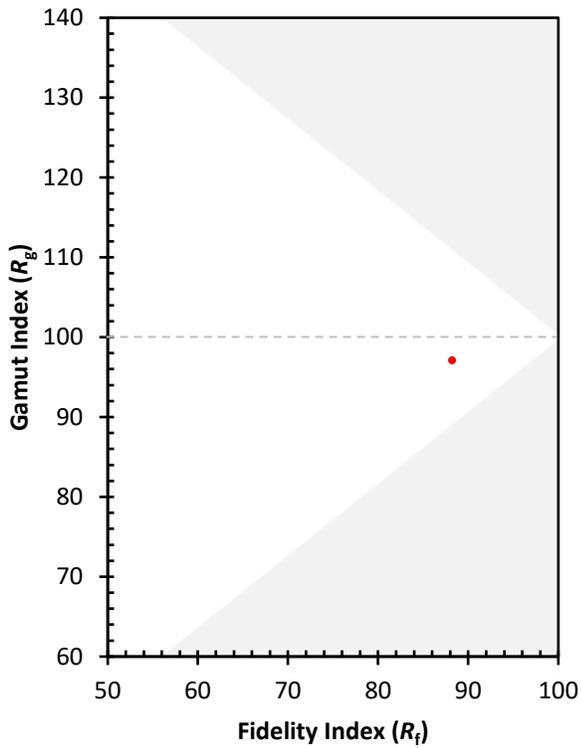
CES01 = 85	CES26 = 97	CES51 = 91	CES76 = 88
CES02 = 60	CES27 = 83	CES52 = 96	CES77 = 86
CES03 = 31	CES28 = 97	CES53 = 92	CES78 = 83
CES04 = 68	CES29 = 88	CES54 = 86	CES79 = 94
CES05 = 47	CES30 = 74	CES55 = 82	CES80 = 93
CES06 = 49	CES31 = 90	CES56 = 86	CES81 = 81
CES07 = 40	CES32 = 96	CES57 = 83	CES82 = 96
CES08 = 39	CES33 = 86	CES58 = 83	CES83 = 94
CES09 = 29	CES34 = 96	CES59 = 94	CES84 = 91
CES10 = 72	CES35 = 97	CES60 = 87	CES85 = 80
CES11 = 55	CES36 = 67	CES61 = 87	CES86 = 86
CES12 = 61	CES37 = 96	CES62 = 72	CES87 = 93
CES13 = 42	CES38 = 68	CES63 = 86	CES88 = 94
CES14 = 74	CES39 = 96	CES64 = 81	CES89 = 88
CES15 = 71	CES40 = 96	CES65 = 83	CES90 = 90
CES16 = 46	CES41 = 88	CES66 = 76	CES91 = 60
CES17 = 48	CES42 = 97	CES67 = 76	CES92 = 77
CES18 = 55	CES43 = 97	CES68 = 82	CES93 = 85
CES19 = 69	CES44 = 99	CES69 = 82	CES94 = 81
CES20 = 64	CES45 = 98	CES70 = 82	CES95 = 80
CES21 = 84	CES46 = 93	CES71 = 68	CES96 = 93
CES22 = 76	CES47 = 87	CES72 = 91	CES97 = 95
CES23 = 91	CES48 = 79	CES73 = 77	CES98 = 93
CES24 = 89	CES49 = 95	CES74 = 86	CES99 = 91
CES25 = 69	CES50 = 92	CES75 = 74	



Color Rendition by Hue-Angle Bin



Measure Comparisons



(END OF REPORT)