

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: P827091

Luminaire Tested: **OHBL-18HE-A-UNV-L840-CD-UPL12**

Issue Date: 5/3/2024



Test Information

Test Method: LM-79-08
Report Number: P827091
REPORT IS A COMBINATION OF REPORTS P826059 AND G3-2310-221-12
Test Lab: INNOVATION CENTER
Issue Date: 5/3/2024
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)
Product Line: METALUX
Catalog Number: OHBL-18HE-A-UNV-L840-CD-UPL12
Description: 18000 LUMEN OHBL HE LED LUMINAIRE WITH 80CRI, 4000K LEDS AND AISLE LENS AND 1200 LUMEN UPLIGHT MODULE
Light Source: -
Ballast/Driver: -

Summary

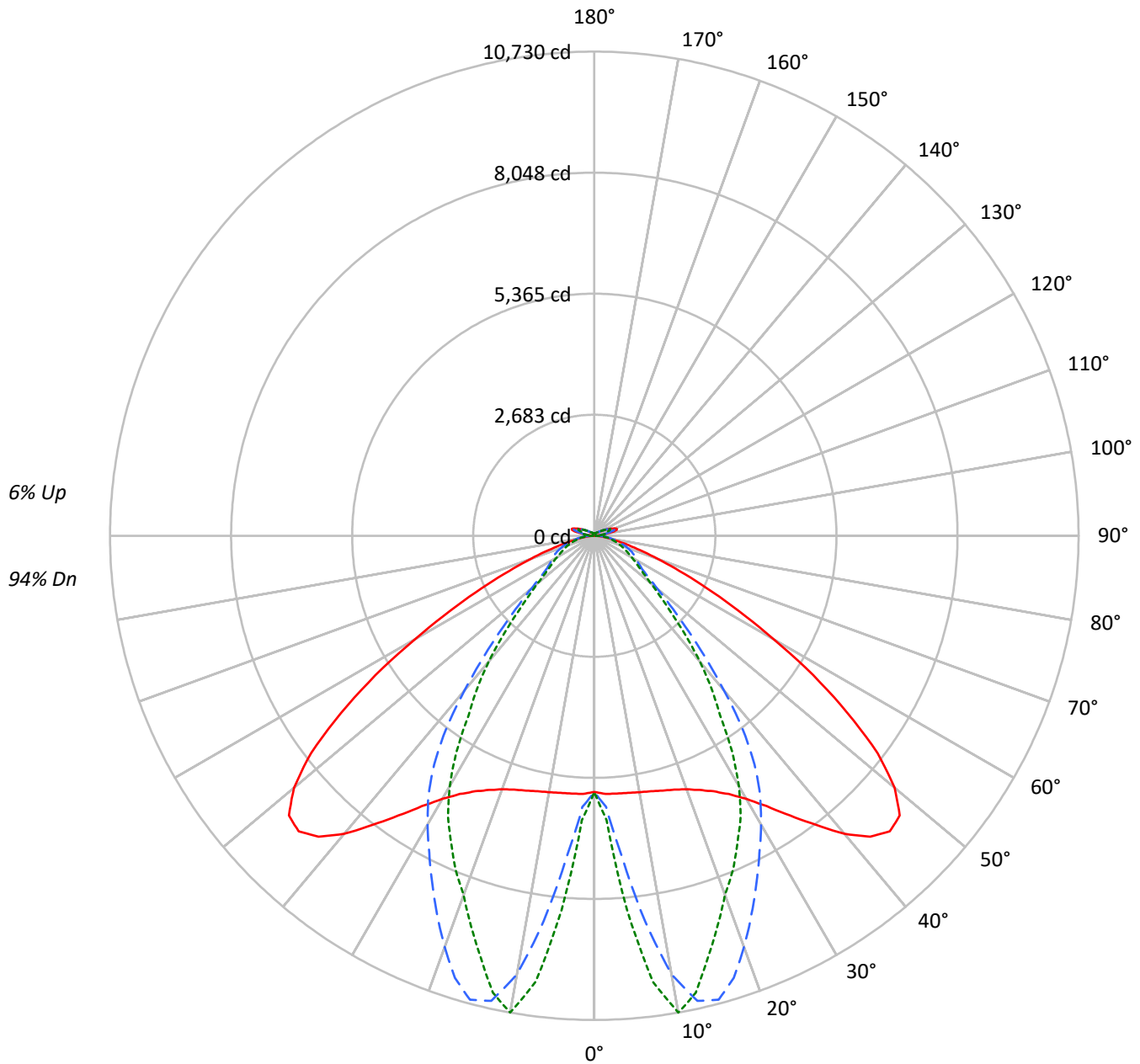
Lumens per Lamp: N/A
Luminaire Lumens: 19465.3 lumens
Efficiency: N/A
Efficacy: 174.7 lumens/watt
Spacing Criteria (0/90/45): 2.18 / 1.37 / 1.3
Luminous Opening: Rectangular w/ Sides (W: 3.78' x L: 1.67' x H: 0.17')
CIE Type: Direct

Input Watts (W): 111.4
Input Voltage (V): NR
Input Current (A_{in}): 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: P827091

CATALOG NUMBER: OHBL-18HE-A-UNV-L840-CD-UPL12

Luminous Intensity Polar Plot





TEST NUMBER: P827091

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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
RCR																				
0	118	118	118	118	114	114	114	114		108	108	108		102	102	102		96	96	96
1	109	105	102	98	106	102	99	96		97	94	92		92	90	88		87	86	84
2	101	94	88	83	98	92	86	82		87	83	79		83	79	76		79	76	74
3	93	84	77	72	90	82	76	71		78	73	69		75	71	67		72	68	65
4	86	76	68	63	84	74	67	62		71	65	60		68	63	59		65	61	57
5	80	69	61	55	78	67	60	55		65	58	53		62	57	52		60	55	51
6	75	63	55	49	72	62	54	49		59	53	48		57	51	47		55	50	46
7	70	57	50	44	68	56	49	44		54	48	43		52	47	42		51	46	42
8	65	53	45	40	63	52	45	40		50	44	39		48	43	38		47	42	38
9	61	49	41	36	59	48	41	36		46	40	36		45	39	35		44	38	35
10	57	45	38	33	56	45	38	33		43	37	33		42	36	32		41	35	32

AVERAGE LUMINANCE (cd/sqm):

	0°	45°	90°
0°	9698	9698	9698
5°	9747	12197	14216
10°	9834	16816	18465
15°	10068	18319	16947
20°	10485	16997	15146
25°	11249	15286	13854
30°	12544	13764	12319
35°	14746	12047	9817
40°	17731	9174	7813
45°	20339	6250	5561
50°	20620	4287	4113
55°	17848	3374	3360
60°	13332	3157	3023
65°	9138	3167	2863
70°	5843	3055	2773
75°	3514	2827	2653
80°	2067	2485	2737
85°	995	2134	2538



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ZONAL LUMENS:

Zone	Lumens	% Fixture
0°-10°	741.2	3.8
10°-20°	2616.2	13.4
20°-30°	3855.2	19.8
30°-40°	4051.2	20.8
40°-50°	3099.9	15.9
50°-60°	1871.8	9.6
60°-70°	1142.2	5.9
70°-80°	623.5	3.2
80°-90°	222.0	1.1
90°-100°	119.0	0.6
100°-110°	413.9	2.1
110°-120°	355.5	1.8
120°-130°	170.4	0.9
130°-140°	85.2	0.4
140°-150°	49.6	0.3
150°-160°	28.9	0.1
160°-170°	15.0	0.1
170°-180°	4.6	0.0
0°-30°	7212.6	37.1
0°-40°	11263.8	57.9
0°-60°	16235.5	83.4
0°-90°	18223.1	93.6
90°-120°	888.4	4.6
90°-150°	1193.7	6.1
90°-180°	1242.0	6.4
0°-180°	19465.3	100.0

CANDELA DISTRIBUTION:

	0°	22.5°	45°	67.5°	90°	Flux
0°	5678	5678	5678	5678	5678	
5°	5735	6153	7177	8014	8324	548
15°	5847	9106	10643	9931	9698	1662
25°	6248	10568	8497	7692	7502	2920
35°	7568	8463	6190	5155	4853	4801
45°	9262	4829	2851	2509	2404	6998
55°	6850	1638	1298	1203	1199	6053
65°	2746	1037	955	817	776	2814
75°	731	645	591	488	468	841
85°	109	200	236	215	195	134
90°	3	18	24	31	35	8
95°	25	58	86	116	134	82
105°	517	511	436	309	284	489
115°	360	360	361	358	352	360
125°	176	183	187	185	186	164
135°	102	105	109	110	110	81
145°	75	77	78	79	80	48
155°	60	61	62	63	63	28
165°	52	52	53	53	53	15
175°	47	47	47	47	47	5
180°	46	46	46	46	46	



TEST NUMBER: P827091

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CANDELA DISTRIBUTION (FULL):

	0°	22.5°	45°	67.5°	90°
0°	5677.8	5677.8	5677.8	5677.8	5677.8
2.5°	5724.4	5782.8	6013.1	6252.2	6310.4
5°	5734.8	6152.6	7177.4	8014.2	8323.5
7.5°	5747.0	6751.8	8620.0	9644.5	9972.5
10°	5770.1	7509.5	9870.0	10605.5	10729.5
12.5°	5798.9	8312.3	10557.8	10531.0	10374.7
15°	5846.6	9106.2	10642.6	9931.1	9697.6
17.5°	5896.7	9778.0	10273.0	9278.1	9074.8
20°	5978.3	10276.6	9698.1	8697.7	8466.6
22.5°	6095.9	10550.8	9095.3	8172.7	8022.0
25°	6247.6	10568.5	8496.6	7692.4	7502.5
27.5°	6450.9	10323.4	7922.7	7221.7	7021.1
30°	6727.5	9853.9	7389.5	6654.2	6405.4
32.5°	7103.2	9178.3	6839.7	5969.0	5690.0
35°	7567.7	8463.4	6189.9	5154.9	4853.4
37.5°	8074.6	7669.7	5401.3	4433.9	4258.4
40°	8620.0	6851.9	4466.6	3759.3	3633.6
42.5°	9045.6	5962.7	3598.3	3124.0	2990.4
45°	9262.5	4829.3	2851.3	2509.0	2403.6
47.5°	9178.0	3748.8	2260.4	1993.6	1961.9
50°	8685.0	2768.1	1809.5	1642.2	1629.1
52.5°	7914.2	2063.2	1494.7	1391.2	1368.6
55°	6849.9	1637.6	1298.0	1203.0	1199.4
57.5°	5751.1	1391.2	1178.2	1104.6	1079.1
60°	4579.0	1240.5	1087.4	1004.3	952.5
62.5°	3589.3	1135.1	1020.6	907.9	859.5
65°	2746.2	1036.7	954.9	817.1	775.5
67.5°	2047.1	943.0	874.6	721.7	697.3
70°	1491.5	846.8	783.0	641.8	622.6
72.5°	1063.0	750.9	691.5	566.8	545.6
75°	731.2	644.7	591.4	487.9	468.2
77.5°	493.3	536.4	492.8	416.6	408.3
80°	329.4	425.4	398.6	353.0	347.9
82.5°	199.9	308.7	314.6	287.1	273.2
85°	108.8	199.9	235.7	214.7	194.8
87.5°	42.6	110.8	162.4	145.8	137.3
90°	3.0	18.0	24.0	31.0	35.0
92.5°	9.0	23.0	38.0	54.0	59.0
95°	25.0	58.0	86.0	116.0	134.0
97.5°	135.0	147.0	166.0	196.0	206.0
100°	276.0	297.0	247.0	258.0	263.0
102.5°	439.0	433.0	316.0	286.0	281.0
105°	517.0	511.0	436.0	309.0	284.0



TEST NUMBER: P827091

CATALOG NUMBER: OHBL-18HE-A-UNV-L840-CD-UPL12

CANDELA DISTRIBUTION (continued):

	0°	22.5°	45°	67.5°	90°
112.5°	418.0	421.0	418.0	402.0	385.0
115°	360.0	360.0	361.0	358.0	352.0
117.5°	302.0	306.0	309.0	306.0	304.0
120°	253.0	259.0	261.0	257.0	257.0
122.5°	213.0	218.0	221.0	218.0	219.0
125°	176.0	183.0	187.0	185.0	186.0
127.5°	147.0	153.0	160.0	159.0	159.0
130°	128.0	132.0	137.0	138.0	138.0
132.5°	114.0	117.0	121.0	122.0	123.0
135°	102.0	105.0	109.0	110.0	110.0
137.5°	94.0	96.0	99.0	100.0	101.0
140°	86.0	89.0	91.0	92.0	92.0
142.5°	80.0	82.0	84.0	85.0	86.0
145°	75.0	77.0	78.0	79.0	80.0
147.5°	70.0	72.0	74.0	74.0	75.0
150°	67.0	68.0	69.0	70.0	70.0
152.5°	63.0	64.0	65.0	66.0	66.0
155°	60.0	61.0	62.0	63.0	63.0
157.5°	57.0	59.0	59.0	60.0	60.0
160°	55.0	56.0	57.0	57.0	57.0
162.5°	53.0	54.0	54.0	55.0	55.0
165°	52.0	52.0	53.0	53.0	53.0
167.5°	50.0	50.0	51.0	51.0	51.0
170°	49.0	49.0	49.0	50.0	50.0
172.5°	48.0	48.0	48.0	48.0	48.0
175°	47.0	47.0	47.0	47.0	47.0
177.5°	46.0	47.0	47.0	47.0	47.0
180°	46.0	46.0	46.0	46.0	46.0



Report Generated By 670246072 / DESKTOP-50001EG





— 0°-180° - - 45°-225° - - - 90°-270°







107.5°	520.0	522.0	481.0	373.0	309.0
110°	476.0	483.0	461.0	420.0	369.0



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

Report Prepared for

Cooper Lighting Solutions

METALUX

Report Number: SP1-2304-001-1

Test Date: 05/31/2023

Luminaire Tested: OHB-15SE-N-UNV-L840

Data in this report applies to families of products including OHB-15SE-N-UNV-L840.

Test Information

Test Method: LM-79-2019
 Report Number: SP1-2304-001-1
 Test Lab: COOPER LIGHTING SOLUTIONS
 Photometer: SP1 - 76IN SPHERE
 Measurement Geometry: 4π
 Issue Date: 05/31/2023
 Manufacturer: COOPER LIGHTING SOLUTIONS
 Product Line: METALUX
 Catalog Number: **OHB-15SE-N-UNV-L840**
 Description: 15SE OHB WITH APT LEDS, NARROW LENS, 80CRI 4000K

Spectral Parameters

CCT (K):	4018	CRI (Ra):	84.0		
CIE u':	0.2242	R1:	82.5	R9:	11.5
CIE v':	0.5025	R2:	91.6	R10:	79.8
Duv:	0.0010	R3:	96.1	R11:	80.5
CIE x:	0.3803	R4:	81.4	R12:	64.0
CIE y:	0.3788	R5:	82.4	R13:	85.1
CIE z:	0.2410	R6:	88.0	R14:	98.4
Peak Wavelength (nm):	454	R7:	85.5		
Dominant Wavelength (nm):	578	R8:	64.7		
Purity:	27.9				
Rf:	84.5				
Rg:	93.7				



Test Conditions

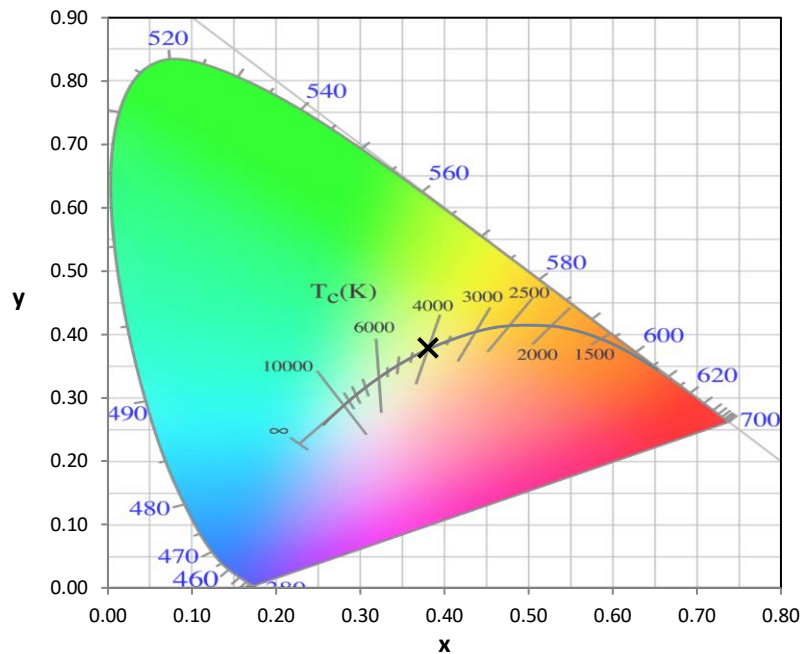
Stabilization Time: 23M
 Operation Time: 12H
 Room Temperature (°C) / RH%: 25.7/44%
 Sphere Temperature (°C): 25.3

REPORT NUMBER: SP1-2304-001-1

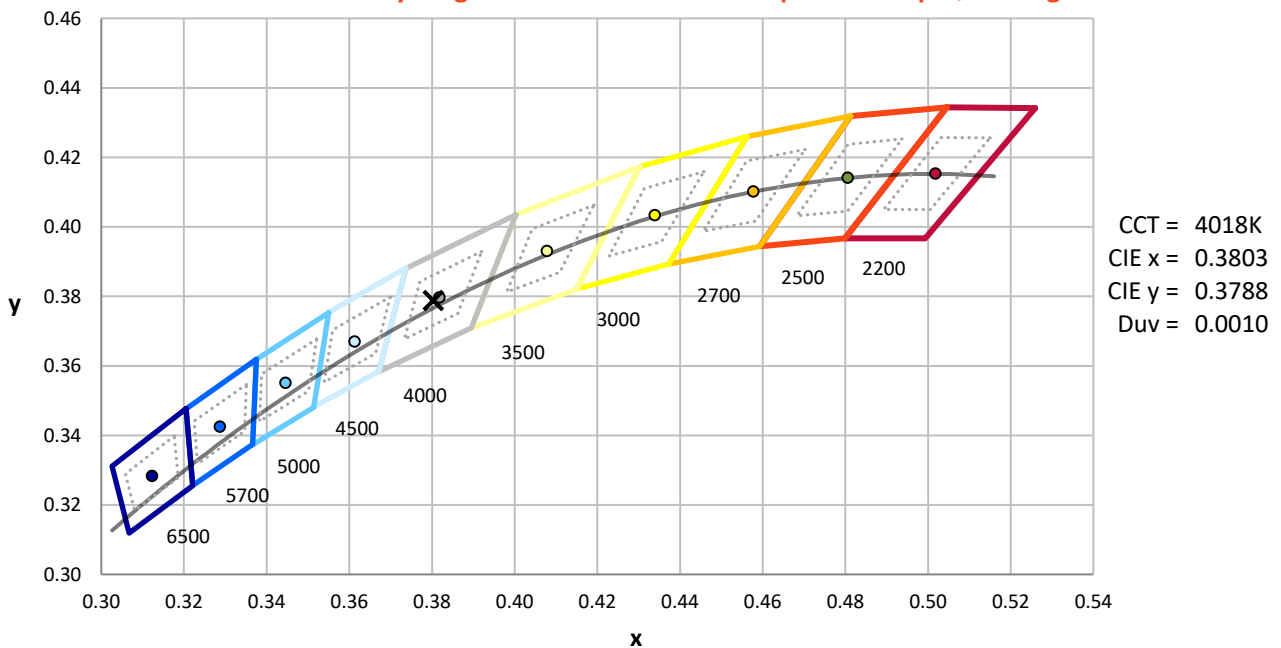
Measurement and Test Equipment			
Instrument	Identification Number	Calibration Date	Calibration Due Date
Photometer	76INCH SPHERE IN0058	2/9/2023	8/9/2023
Power Meter	XITRON 2801 IN0071	11/29/2022	11/29/2023
AC Power Source	CHROMA 61603 IN0063	11/28/2022	11/28/2023
DC Power Source	AGILENT E3634A IN0208	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: SP1-2304-001-1

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	6853	NR	490	98921	NR	620	217813	NR	750	11077	NR	880	7212	NR
365	5941	NR	495	111249	NR	625	204757	NR	755	10374	NR	885	8336	NR
370	6345	NR	500	125186	NR	630	189812	NR	760	9527	NR	890	8299	NR
375	7044	NR	505	139782	NR	635	174714	NR	765	9227	NR	895	8295	NR
380	6587	NR	510	150374	NR	640	160641	NR	770	8071	NR	900	5725	NR
385	6443	NR	515	158837	NR	645	146146	NR	775	7303	NR	905	5085	NR
390	5977	NR	520	167163	NR	650	132087	NR	780	6839	NR	910	6133	NR
395	5473	NR	525	171514	NR	655	118817	NR	785	5988	NR	915	6429	NR
400	4874	NR	530	176783	NR	660	105411	NR	790	5761	NR	920	7354	NR
405	4470	NR	535	182412	NR	665	92911	NR	795	6396	NR	925	6889	NR
410	5232	NR	540	187578	NR	670	81240	NR	800	6049	NR	930	7465	NR
415	7030	NR	545	192635	NR	675	70762	NR	805	5748	NR	935	9430	NR
420	11074	NR	550	198282	NR	680	61913	NR	810	5571	NR	940	6867	NR
425	19121	NR	555	206255	NR	685	53742	NR	815	5977	NR	945	7026	NR
430	32148	NR	560	213621	NR	690	46348	NR	820	6580	NR	950	9476	NR
435	54073	NR	565	222021	NR	695	40313	NR	825	6610	NR	955	8237	NR
440	89242	NR	570	230974	NR	700	35240	NR	830	6652	NR	960	7127	NR
445	153497	NR	575	237268	NR	705	30635	NR	835	5919	NR	965	5614	NR
450	236793	NR	580	244317	NR	710	27359	NR	840	5707	NR	970	9396	NR
455	259282	NR	585	250340	NR	715	24401	NR	845	5548	NR	975	9700	NR
460	209272	NR	590	252316	NR	720	21810	NR	850	5560	NR	980	8916	NR
465	162456	NR	595	253019	NR	725	19005	NR	855	6972	NR	985	9548	NR
470	132627	NR	600	252244	NR	730	17009	NR	860	8311	NR	990	10271	NR
475	106283	NR	605	246798	NR	735	14940	NR	865	6330	NR	995	7323	NR
480	91347	NR	610	238764	NR	740	13159	NR	870	8019	NR	1000	8719	NR
485	91575	NR	615	229100	NR	745	12000	NR	875	7419	NR			

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Scotopic Flux vs. Wavelength



Scotopic Lumens: 25258.1

S/P: 1.73

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	6853	NR	490	98921	NR	620	217813	NR	750	11077	NR	880	7212	NR
365	5941	NR	495	111249	NR	625	204757	NR	755	10374	NR	885	8336	NR
370	6345	NR	500	125186	NR	630	189812	NR	760	9527	NR	890	8299	NR
375	7044	NR	505	139782	NR	635	174714	NR	765	9227	NR	895	8295	NR
380	6587	NR	510	150374	NR	640	160641	NR	770	8071	NR	900	5725	NR
385	6443	NR	515	158837	NR	645	146146	NR	775	7303	NR	905	5085	NR
390	5977	NR	520	167163	NR	650	132087	NR	780	6839	NR	910	6133	NR
395	5473	NR	525	171514	NR	655	118817	NR	785	5988	NR	915	6429	NR
400	4874	NR	530	176783	NR	660	105411	NR	790	5761	NR	920	7354	NR
405	4470	NR	535	182412	NR	665	92911	NR	795	6396	NR	925	6889	NR
410	5232	NR	540	187578	NR	670	81240	NR	800	6049	NR	930	7465	NR
415	7030	NR	545	192635	NR	675	70762	NR	805	5748	NR	935	9430	NR
420	11074	NR	550	198282	NR	680	61913	NR	810	5571	NR	940	6867	NR
425	19121	NR	555	206255	NR	685	53742	NR	815	5977	NR	945	7026	NR
430	32148	NR	560	213621	NR	690	46348	NR	820	6580	NR	950	9476	NR
435	54073	NR	565	222021	NR	695	40313	NR	825	6610	NR	955	8237	NR
440	89242	NR	570	230974	NR	700	35240	NR	830	6652	NR	960	7127	NR
445	153497	NR	575	237268	NR	705	30635	NR	835	5919	NR	965	5614	NR
450	236793	NR	580	244317	NR	710	27359	NR	840	5707	NR	970	9396	NR
455	259282	NR	585	250340	NR	715	24401	NR	845	5548	NR	975	9700	NR
460	209272	NR	590	252316	NR	720	21810	NR	850	5560	NR	980	8916	NR
465	162456	NR	595	253019	NR	725	19005	NR	855	6972	NR	985	9548	NR
470	132627	NR	600	252244	NR	730	17009	NR	860	8311	NR	990	10271	NR
475	106283	NR	605	246798	NR	735	14940	NR	865	6330	NR	995	7323	NR
480	91347	NR	610	238764	NR	740	13159	NR	870	8019	NR	1000	8719	NR
485	91575	NR	615	229100	NR	745	12000	NR	875	7419	NR			

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Melanopic Flux vs. Wavelength



Melanopic Lumens: 10357.9 M/P: 0.71

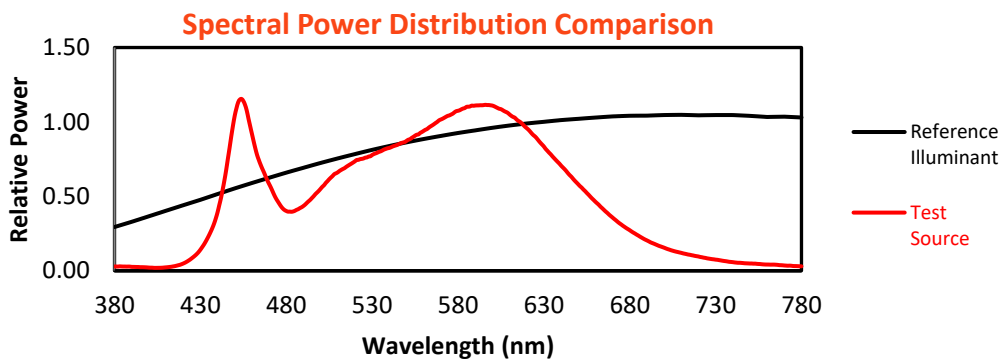
λ (nm)	Power (μW/nm)	Lumens (φ/nm)	λ (nm)	Power (μW/nm)	Lumens (φ/nm)	λ (nm)	Power (μW/nm)	Lumens (φ/nm)	λ (nm)	Power (μW/nm)	Lumens (φ/nm)	λ (nm)	Power (μW/nm)	Lumens (φ/nm)
360	6853	NR	490	98921	NR	620	217813	NR	750	11077	NR	880	7212	NR
365	5941	NR	495	111249	NR	625	204757	NR	755	10374	NR	885	8336	NR
370	6345	NR	500	125186	NR	630	189812	NR	760	9527	NR	890	8299	NR
375	7044	NR	505	139782	NR	635	174714	NR	765	9227	NR	895	8295	NR
380	6587	NR	510	150374	NR	640	160641	NR	770	8071	NR	900	5725	NR
385	6443	NR	515	158837	NR	645	146146	NR	775	7303	NR	905	5085	NR
390	5977	NR	520	167163	NR	650	132087	NR	780	6839	NR	910	6133	NR
395	5473	NR	525	171514	NR	655	118817	NR	785	5988	NR	915	6429	NR
400	4874	NR	530	176783	NR	660	105411	NR	790	5761	NR	920	7354	NR
405	4470	NR	535	182412	NR	665	92911	NR	795	6396	NR	925	6889	NR
410	5232	NR	540	187578	NR	670	81240	NR	800	6049	NR	930	7465	NR
415	7030	NR	545	192635	NR	675	70762	NR	805	5748	NR	935	9430	NR
420	11074	NR	550	198282	NR	680	61913	NR	810	5571	NR	940	6867	NR
425	19121	NR	555	206255	NR	685	53742	NR	815	5977	NR	945	7026	NR
430	32148	NR	560	213621	NR	690	46348	NR	820	6580	NR	950	9476	NR
435	54073	NR	565	222021	NR	695	40313	NR	825	6610	NR	955	8237	NR
440	89242	NR	570	230974	NR	700	35240	NR	830	6652	NR	960	7127	NR
445	153497	NR	575	237268	NR	705	30635	NR	835	5919	NR	965	5614	NR
450	236793	NR	580	244317	NR	710	27359	NR	840	5707	NR	970	9396	NR
455	259282	NR	585	250340	NR	715	24401	NR	845	5548	NR	975	9700	NR
460	209272	NR	590	252316	NR	720	21810	NR	850	5560	NR	980	8916	NR
465	162456	NR	595	253019	NR	725	19005	NR	855	6972	NR	985	9548	NR
470	132627	NR	600	252244	NR	730	17009	NR	860	8311	NR	990	10271	NR
475	106283	NR	605	246798	NR	735	14940	NR	865	6330	NR	995	7323	NR
480	91347	NR	610	238764	NR	740	13159	NR	870	8019	NR	1000	8719	NR
485	91575	NR	615	229100	NR	745	12000	NR	875	7419	NR			

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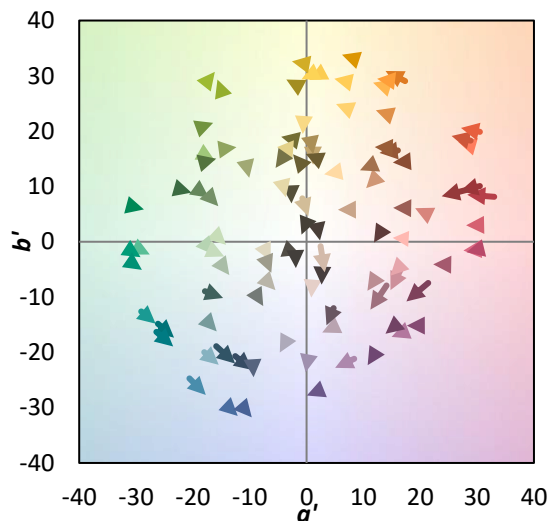
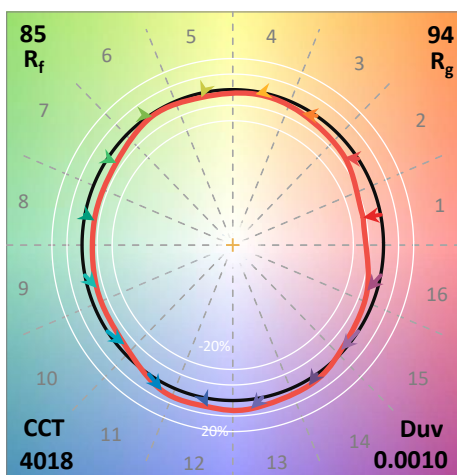
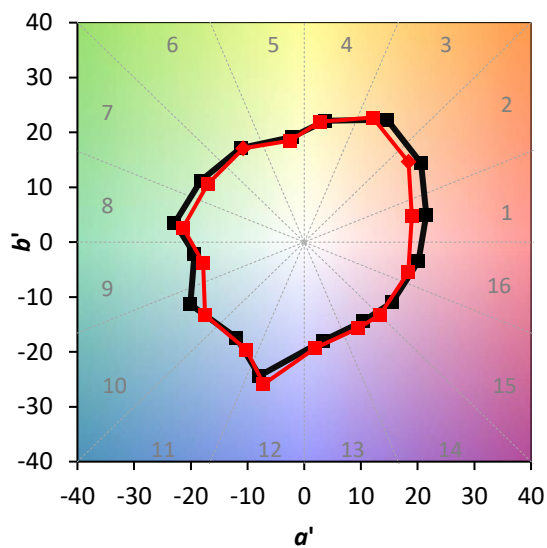
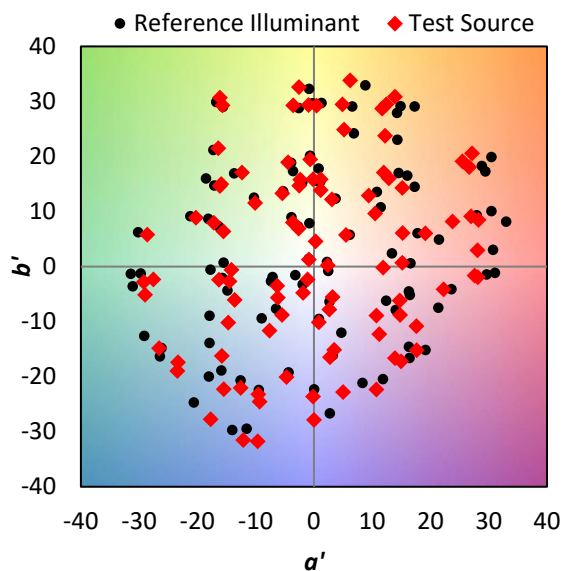
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Summary

$R_f = 84.5$
 $R_g = 93.7$
 CIE $R_a = 84.0$
 $R_9 = 11.5$



Color Vector Graphics



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

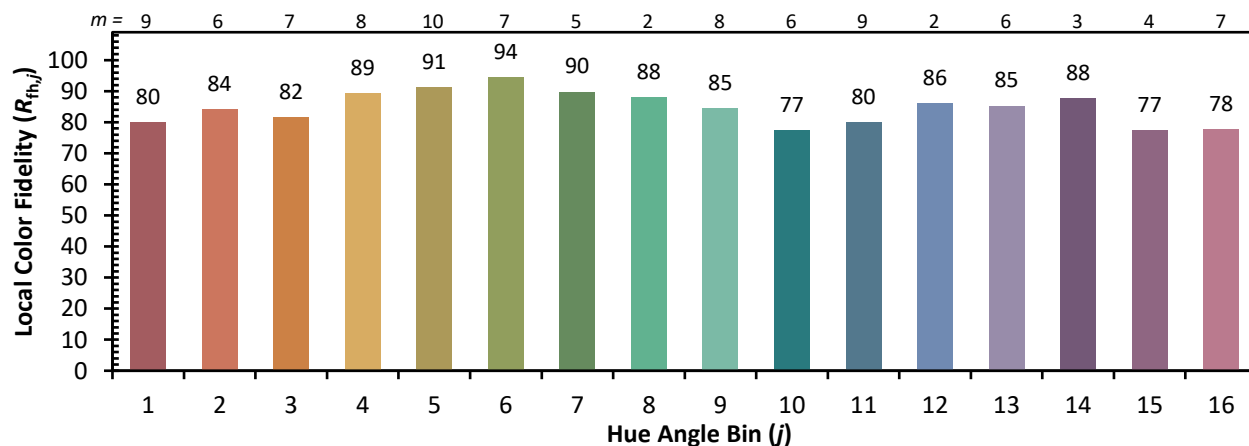
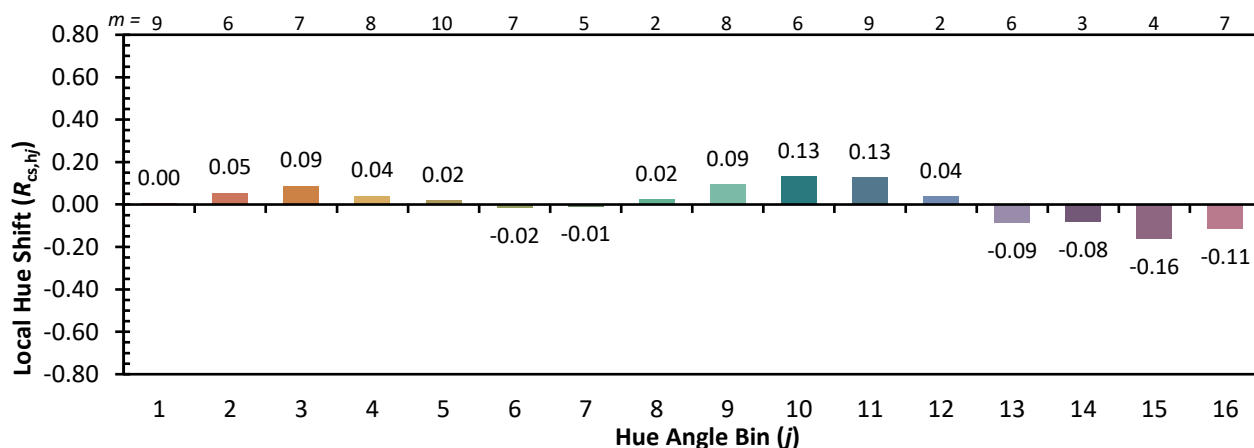
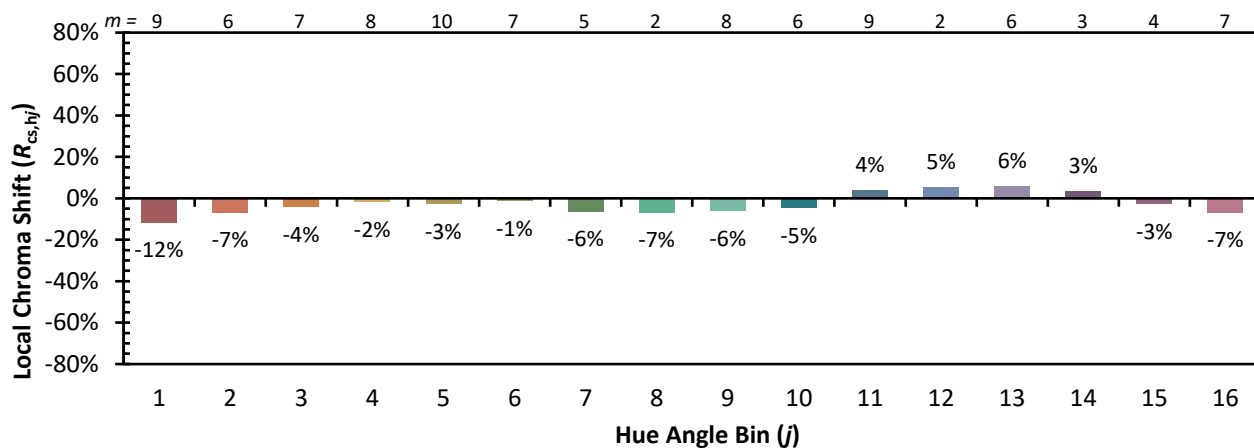
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CES02 = 61	CES27 = 90	CES52 = 93	CES77 = 85
CES03 = 31	CES28 = 94	CES53 = 89	CES78 = 80
CES04 = 69	CES29 = 93	CES54 = 88	CES79 = 93
CES05 = 48	CES30 = 87	CES55 = 85	CES80 = 91
CES06 = 50	CES31 = 95	CES56 = 84	CES81 = 78
CES07 = 41	CES32 = 88	CES57 = 82	CES82 = 96
CES08 = 40	CES33 = 96	CES58 = 82	CES83 = 96
CES09 = 29	CES34 = 92	CES59 = 91	CES84 = 91
CES10 = 74	CES35 = 95	CES60 = 88	CES85 = 77
CES11 = 57	CES36 = 77	CES61 = 86	CES86 = 74
CES12 = 63	CES37 = 95	CES62 = 78	CES87 = 84
CES13 = 42	CES38 = 81	CES63 = 85	CES88 = 88
CES14 = 74	CES39 = 98	CES64 = 77	CES89 = 78
CES15 = 71	CES40 = 97	CES65 = 77	CES90 = 89
CES16 = 47	CES41 = 94	CES66 = 74	CES91 = 68
CES17 = 49	CES42 = 97	CES67 = 73	CES92 = 64
CES18 = 56	CES43 = 93	CES68 = 79	CES93 = 78
CES19 = 71	CES44 = 99	CES69 = 82	CES94 = 65
CES20 = 65	CES45 = 94	CES70 = 77	CES95 = 73
CES21 = 86	CES46 = 91	CES71 = 69	CES96 = 84
CES22 = 78	CES47 = 93	CES72 = 90	CES97 = 90
CES23 = 91	CES48 = 82	CES73 = 72	CES98 = 86
CES24 = 90	CES49 = 92	CES74 = 90	CES99 = 77
CES25 = 71	CES50 = 92	CES75 = 74	



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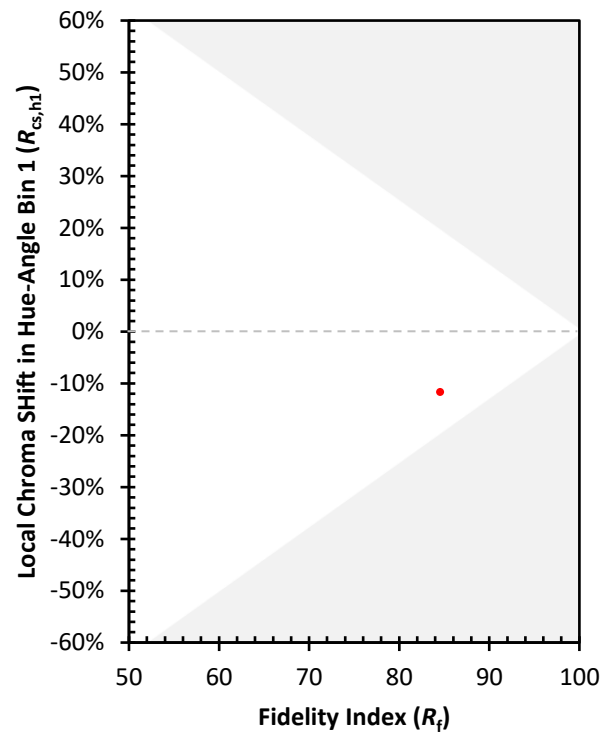
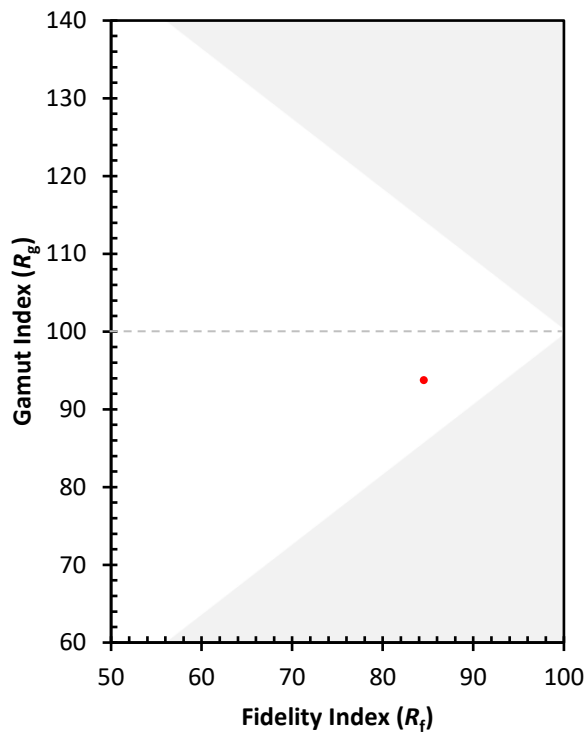
Color Rendition by Hue-Angle Bin



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Measure Comparisons



(END OF REPORT)