



# Spectra Lux

2750 Sabourin, Saint-Laurent (Quebec) H4S 1M2 Canada  
Tel.: (514) 332-0082 Fax: (514) 332-3590 [www.spectralux.ca](http://www.spectralux.ca)



Lab Code: 200899-0

## Moving Mirror Goniophotometer Test Report

**Standard(s):** IES LM-63, IES LM-79, ANSI C82.77

**Customer** ANDlight, 1951 Franklin St., Vancouver, British Columbia , Canada, V5L 0C7

General Information		Lamp Details: CY4457		Driver Details: CY2029	
<b>DUT Lab ID</b>	SRIS 2831-4	<b>Seasoning</b>	0 Hour	<b>Type</b>	LED Power Supply
<b>Lamp Type</b>	LED/SSL	<b>Test Product</b>	BUT-90-P-41	<b>Manufacturer</b>	Meanwell
<b>Current Mode</b>	AC	<b>Manufacturer</b>	EPISTAR	<b>Catalog No.</b>	IDLV-45-12
<b>Test Report</b>	S2008177-R1	<b>Lamp Catalog No.</b>	OMNICHIP ( 320404-xx-300-12-4.4)	<b>Maximum Power</b>	45 W
<b>Test Date</b>	17 August 2020	<b>Drive Current</b>	30 mA	<b>Input Voltage</b>	120.00 V
<b>Report Date</b>	20 November 2020	<b>Nominal Color</b>	4100K	<b>Operating Frequency</b>	60 Hz
<b>Ambient</b>	24.3 °C	<b>Burning Position</b>	Junction Axial	<b>Input Power</b>	26.48 W

### Luminaire Data

General Information		Optics		Aperture (feet)	
<b>Manufacturer</b>	ANDlight	<b>Reflector</b>	None	<b>X</b>	-2.9583
<b>Name</b>	BUTTON	<b>Housing</b>	Aluminum Body c/w Nylon Rope	<b>Y</b>	-2.9583
<b>Catalog No.</b>	BUT-90-P-41	<b>Lens</b>	Opalin Acrylic Diffuser	<b>Z</b>	0.0000

Stabilization Time: 1 hour

**Approved Signatory: Chrisnel Blot**

**Signature:**



### Luminaire Test Method

Precise installation and alignment of the luminaire to the rotation axis of the photometer is governed by a servomotor controlled via a microcontroller. A laser is used to validate the luminaire positioning. Before photometric measurements are taken, luminaire is operated long enough to reach stabilization and temperature equilibrium.

All movement commands issued to the photometer axes are mediated by the software to ensure the motion is within the limits of operation. The photometric detector used is a silicon detector corrected to closely match the spectral luminous efficiency photopic curve with a quality index less than 1.5%. Proper shielding is incorporated to the photometric test bench such that only the light from the unit under test is measured.

Luminous intensity measurements are performed at a distance great enough so that the inverse-square law applies. During each measurement the computer records the luminous intensity associated to the corresponding angles of radiation, as well as input electrical operational parameters and temperature measurements. Candela values are reported in IES format as per LM-63.

Equipment, reference standards are traceable to National Institute of Standards and Technology (NIST) and National Research Council of Canada (NRC).





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### Electrical Equipment

Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due Date
Power Supply	iRDC	CIF-3000A	974998	N.P.C.R.	N.P.C.R.
Input Power Meter	Yokogawa	WT210	27E116584	2020/07/22	2021/09/22
Output Power Meter	N/A	N/A	N/A	N.P.C.R.	N.P.C.R.

### Photometric Equipment

Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due Date
Photometer	N/A	N/A	N/A	N.P.C.R.	N.P.C.R.
Photodetector	INPHORA	IPR-PDET 19	110802	2019/09/05	2020/09/05

### Environment Equipment

Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due Date
Temperature Humidity Sensor	Omega	HH311	120504176	2020/07/16	2021/07/16

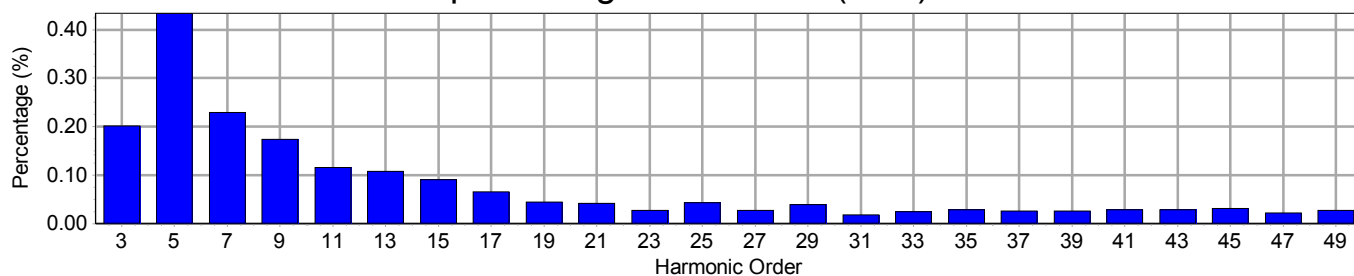


## Electrical Measurements

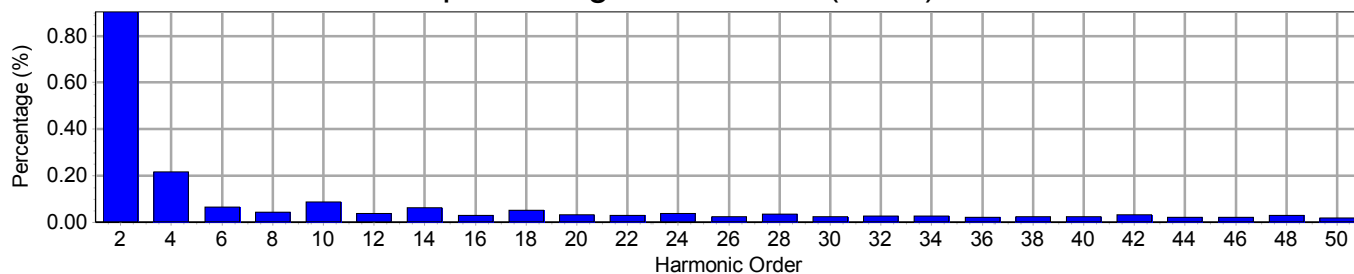
### Input

Frequency	60 Hz	Active Power	26.48 W	THDV [ANSI]	1.12 %
Voltage	120.0 V(rms)	Apparent Power	27.11 VA	THDA [ANSI]	6.43 %
Current	0.2259 A(rms)	Power Factor	0.977	Max. Harmonic At	3rd order

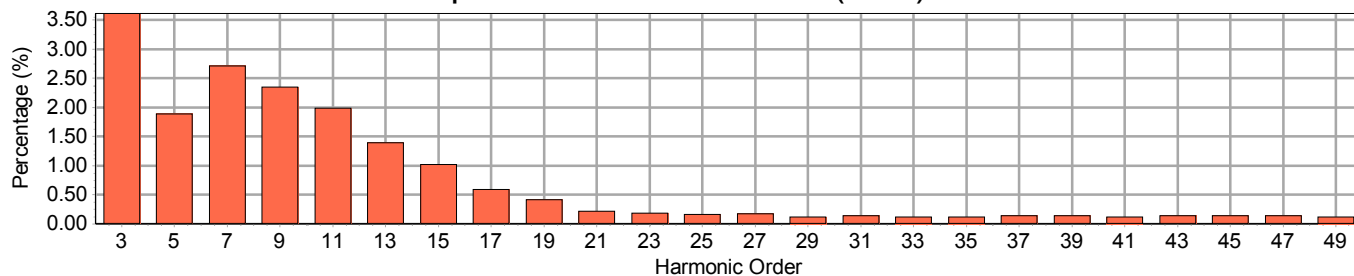
### Input Voltage Harmonics (Odd)



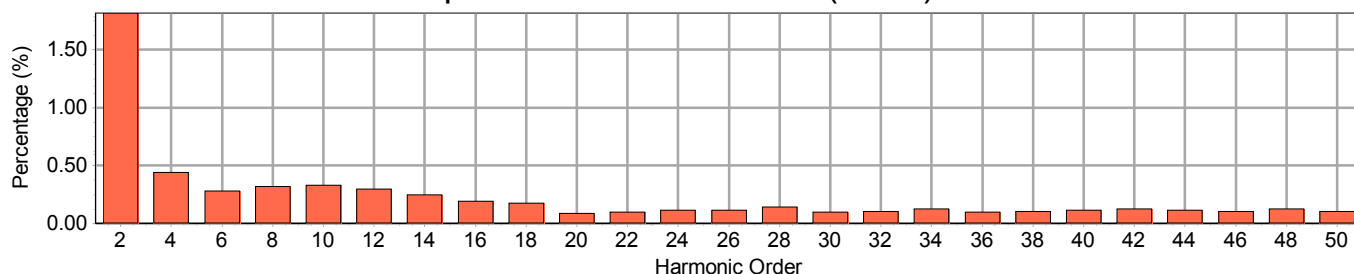
### Input Voltage Harmonics (Even)



### Input Current Harmonics (Odd)



### Input Current Harmonics (Even)





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### Harmonic Measurements

Odd Harmonics				Even Harmonics			
Harmonic Order	Frequency (HZ)	Voltage Harmonics (%)	Current Harmonics (%)	Harmonic Order	Frequency (HZ)	Voltage Harmonics (%)	Current Harmonics (%)
1	60	100.000	100.000	2	120	0.905	1.820
3	180	0.201	3.621	4	240	0.216	0.441
5	300	0.435	1.890	6	360	0.064	0.282
7	420	0.230	2.716	8	480	0.042	0.317
9	540	0.174	2.345	10	600	0.085	0.327
11	660	0.116	1.986	12	720	0.037	0.296
13	780	0.107	1.397	14	840	0.062	0.245
15	900	0.090	1.020	16	960	0.030	0.190
17	1020	0.065	0.591	18	1080	0.050	0.172
19	1140	0.044	0.413	20	1200	0.031	0.087
21	1260	0.041	0.214	22	1320	0.028	0.094
23	1380	0.027	0.185	24	1440	0.036	0.114
25	1500	0.043	0.164	26	1560	0.024	0.115
27	1620	0.027	0.173	28	1680	0.033	0.140
29	1740	0.039	0.119	30	1800	0.023	0.096
31	1860	0.018	0.133	32	1920	0.026	0.101
33	1980	0.025	0.120	34	2040	0.026	0.123
35	2100	0.029	0.110	36	2160	0.022	0.097
37	2220	0.026	0.133	38	2280	0.023	0.100
39	2340	0.026	0.141	40	2400	0.024	0.114
41	2460	0.028	0.112	42	2520	0.031	0.124
43	2580	0.028	0.133	44	2640	0.022	0.113
45	2700	0.031	0.132	46	2760	0.021	0.102
47	2820	0.022	0.134	48	2880	0.029	0.126
49	2940	0.027	0.121	50	3000	0.019	0.100



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## Photometric Report: S2008177-R1

Prepared for: ANDlight · Test Date: 17 August 2020

Luminaire: BUTTON · Lumcat: BUT-90-P-41

### Coefficients of Utilization - Zonal Cavity Method

RCR	RC				0.9				0.8				0.7				0.5			0.1			0
	RW	0.7	0.5	0.3	0.1	0.7	0.5	0.3	0.1	0.7	0.5	0.3	0.1	0.5	0.3	0.1	0.5	0.3	0.1	0.5	0.3	0.1	0
0		121	121	121	121	118	118	118	118	114	114	114	114	108	108	108	96	96	96	96	96	96	94
1		111	106	101	97	107	103	98	95	104	100	96	92	94	91	88	85	83	81	85	83	81	78
2		101	92	84	78	98	89	83	77	94	87	81	75	82	77	73	74	71	68	74	71	68	65
3		92	80	72	65	89	78	70	64	86	76	69	63	72	66	61	65	61	57	65	61	57	55
4		84	71	62	54	81	69	60	54	78	67	59	53	64	57	52	58	53	49	58	53	49	46
5		77	63	54	47	75	62	53	46	72	60	52	46	57	50	44	52	47	42	52	47	42	40
6		71	57	47	40	69	55	46	40	66	54	46	40	52	44	39	47	42	37	47	42	37	35
7		66	51	42	36	64	50	41	35	62	49	41	35	47	40	34	43	37	33	43	37	33	31
8		61	47	38	32	59	46	37	31	57	45	37	31	43	36	30	39	34	29	39	34	29	27
9		57	43	34	28	55	42	34	28	53	41	33	28	39	32	27	36	31	26	36	31	26	25
10		53	39	31	26	52	39	31	25	50	38	30	25	36	30	25	34	28	24	34	28	24	22

### Zonal Lumen Summary

Zone	Lumens	% Lamp	% Luminaire
0 - 10	54	3.00	3.00
10 - 20	155	8.66	8.66
20 - 30	236	13.22	13.22
30 - 40	290	16.22	16.22
40 - 50	306	17.13	17.13
50 - 60	279	15.63	15.63
60 - 70	213	11.90	11.90
70 - 80	115	6.46	6.46
80 - 90	25	1.43	1.43
90 - 120	37	2.05	2.05
90 - 130	56	3.12	3.12
90 - 150	92	5.17	5.17
90 - 180	113	6.35	6.35
0 - 180	1786	100.00	100.00

### Average Luminance (Cd/m<sup>2</sup>)

Angle	0 Degree	45 Degree	90 Degree
45.0	910	764	760
55.0	837	911	925
65.0	783	854	862
75.0	678	574	574
85.0	334	365	350

Luminaire Luminous Flux: 1786

Measured Input Power: 26.48 W

Total Luminaire Efficiency: N/A

Luminaire Luminous Efficacy: 67.4 lm/W

Luminaire Spacing Criterion (0 Degree): 1.2842

Luminaire Spacing Criterion (90 Degree): 1.1504

Category: Up and Down

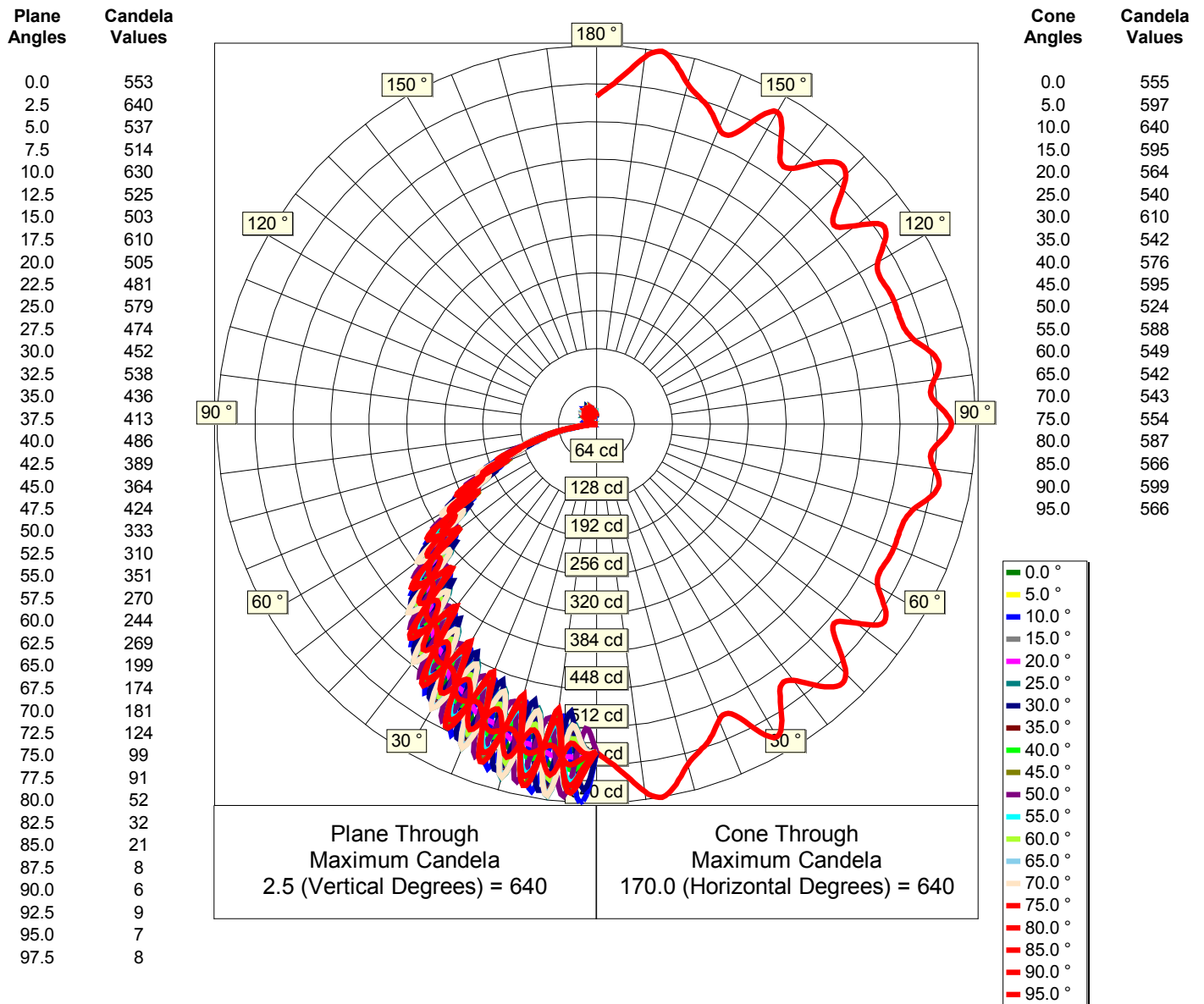


## Photometric Report: S2008177-R1

Prepared for: ANDlight · Test Date: 17 August 2020

Luminaire: BUTTON · Lumcat: BUT-90-P-41

### Luminous Intensity - Polar Curve for each Plane(1)





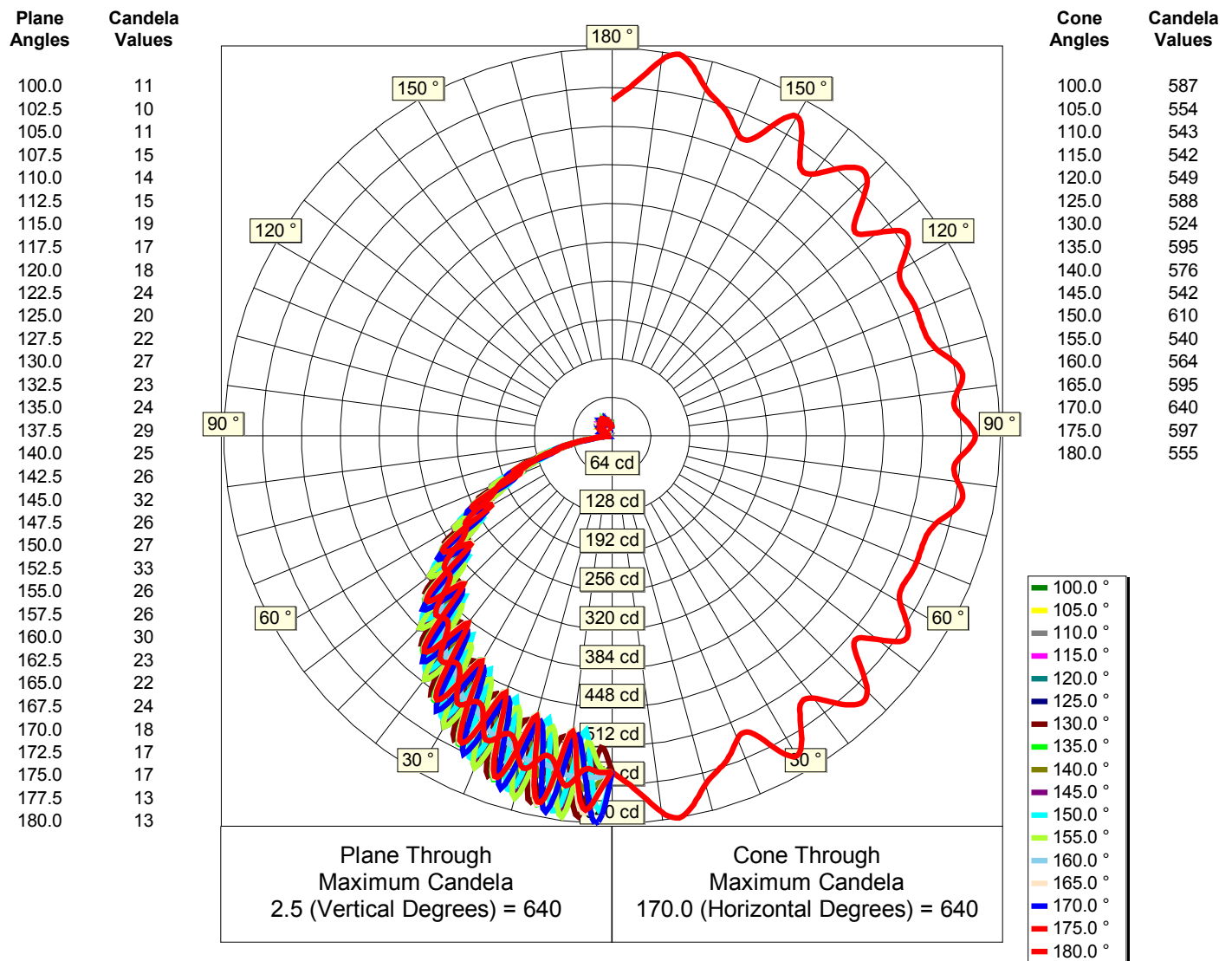


## Photometric Report: S2008177-R1

Prepared for: ANDlight · Test Date: 17 August 2020

Luminaire: BUTTON · Lumcat: BUT-90-P-30

### Luminous Intensity - Polar Curve for each Plane(2)







## IES File Headers

IESNA:LM-63  
 [ISSUEDATE] 17 August 2020  
 [TESTLAB] Spectra Lux  
 [TEST] S2008177-R1  
 [MANUFAC] ANDlight  
 [LUMCAT] BUT-90-P-41  
 [LUMINAIRE] BUTTON  
 [LAMP] Clusters of EPISTAR OMNICHIP (320404-xx-300-12-4.4) LEDs c/w Meanwell Driver IDLV-45-12 @ 120.00V  
 [\_BURNING] Axial (1,786 Luminaire Lumens)  
 [\_REFLECTOR] None  
 [\_LENS] Opalin Acrylic Diffuser  
 [\_HOUSING] Aluminum Body c/w Nylon Rope  
 [\_NOMINAL COLOR] 4100K  
 [\_DRIVE CURRENT] 30 mA

## Candela Table

## Lateral Angles

	0.0	5.0	10.0	15.0	20.0	25.0	30.0	35.0	40.0	45.0
V e r t i c a l	0.0	553	553	553	553	553	553	553	553	553
	2.5	555	597	640	595	564	540	610	542	576
	5.0	554	604	537	611	564	517	488	523	581
	7.5	582	491	514	490	565	634	596	627	539
	10.0	547	590	630	588	556	530	600	533	568
	12.5	544	591	525	597	552	508	478	513	568
	15.0	568	478	503	477	551	618	581	611	525
	17.5	530	572	610	569	539	513	581	517	551
	20.0	524	568	505	573	532	490	460	495	547
	22.5	543	458	481	456	528	592	557	585	503
	25.0	503	545	579	542	511	487	551	490	523
	27.5	494	534	474	540	502	463	434	468	515
	30.0	509	428	452	427	494	554	523	548	470
	32.5	467	506	538	504	475	451	512	454	487
	35.0	455	493	436	497	462	428	400	432	475
	37.5	464	390	413	389	451	506	479	500	430
	40.0	423	460	486	456	429	407	463	410	441
	42.5	408	439	389	444	414	384	358	387	425
	45.0	411	346	364	344	399	448	423	443	381
A n g l e s	47.5	369	402	424	400	374	355	404	358	386
	50.0	351	377	333	382	356	331	309	333	365
	52.5	348	294	310	291	337	379	360	375	322
	55.0	307	333	351	332	311	294	335	297	321
	57.5	285	307	270	309	289	269	250	271	296
	60.0	275	230	244	230	266	299	285	296	255
	62.5	235	258	269	255	238	225	257	228	246
	65.0	211	226	199	228	214	200	186	201	220
	67.5	195	165	174	163	189	212	202	210	181
	70.0	158	173	181	172	160	152	173	153	166
	72.5	133	143	124	143	135	126	117	127	139
	75.0	112	94	99	94	109	122	118	121	104
	77.5	81	89	91	88	82	77	89	78	85
	80.0	58	61	52	62	58	54	51	55	60
	82.5	37	32	32	31	36	41	40	40	35
	85.0	19	21	21	21	19	18	21	18	20
	87.5	10	10	8	10	10	9	9	9	10
	90.0	7	6	6	6	7	8	8	8	7



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## Lateral Angles

	0.0	5.0	10.0	15.0	20.0	25.0	30.0	35.0	40.0	45.0
<b>V e r t i c a l</b>	92.5	7	8	9	8	8	7	8	7	8
	95.0	8	9	7	9	8	8	7	7	8
	97.5	9	8	8	8	9	10	10	10	9
	100.0	9	10	11	11	10	9	10	9	10
	102.5	10	11	10	11	11	10	9	10	11
	105.0	12	10	11	10	12	13	13	13	11
	107.5	13	14	15	14	13	12	14	13	13
	110.0	14	15	14	15	14	13	12	13	14
	112.5	16	13	15	13	16	17	17	17	15
	115.0	16	18	19	18	17	16	18	16	17
	117.5	18	19	17	19	18	17	15	17	18
	120.0	20	17	18	17	19	22	21	22	19
	122.5	20	22	24	22	20	19	21	19	21
	125.0	21	23	20	23	21	20	18	21	22
	127.5	24	20	22	20	23	26	24	26	22
	130.0	23	26	27	26	24	22	25	22	25
	132.5	24	26	23	26	24	23	21	24	25
	135.0	27	22	24	22	25	28	27	28	25
	137.5	26	29	29	28	25	24	27	24	27
	140.0	27	28	25	28	26	25	23	26	27
<b>A n g l e s</b>	142.5	29	24	26	23	27	30	29	30	26
	145.0	28	31	32	30	27	25	29	25	29
	147.5	28	30	26	29	28	26	24	26	28
	150.0	30	25	27	25	29	32	30	31	27
	152.5	29	32	33	31	28	26	30	26	29
	155.0	28	29	26	29	28	27	24	27	28
	157.5	29	24	26	24	28	31	30	30	26
	160.0	25	29	30	28	26	24	27	24	27
	162.5	25	26	23	26	25	24	22	24	25
	165.0	24	20	22	20	23	26	26	26	22
	167.5	21	23	24	23	21	19	22	20	22
	170.0	19	20	18	20	19	19	17	19	20
	172.5	18	15	17	15	18	20	20	20	17
	175.0	15	17	17	17	16	15	16	14	16
	177.5	13	14	13	15	14	14	12	13	14
	180.0	13	13	13	13	13	13	13	13	13



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## Lateral Angles

	50.0	55.0	60.0	65.0	70.0	75.0	80.0	85.0	90.0	95.0
V e r t i c a l	0.0	553	553	553	553	553	553	553	553	553
	2.5	524	588	549	542	543	554	587	566	599
	5.0	631	596	538	520	518	545	603	576	609
	7.5	539	509	605	630	633	598	505	549	485
	10.0	516	580	540	534	534	547	579	559	592
	12.5	619	584	529	511	510	535	591	565	597
	15.0	526	496	592	614	618	583	493	537	473
	17.5	502	563	524	517	517	530	563	543	575
	20.0	597	562	509	493	492	515	569	544	576
	22.5	502	475	566	588	592	559	471	513	452
	25.0	479	536	497	490	492	503	537	517	548
	27.5	564	530	482	467	465	488	538	514	542
	30.0	471	445	531	551	554	524	442	482	424
	32.5	446	499	461	455	456	468	499	480	510
	35.0	520	488	445	430	430	450	495	473	500
	37.5	429	407	486	504	507	479	404	440	387
	40.0	404	452	417	411	412	424	453	435	464
	42.5	465	437	399	386	386	403	443	424	447
	45.0	380	360	430	446	449	424	357	390	343
	47.5	354	395	364	359	359	370	397	381	406
A n g l e s	50.0	401	376	344	334	333	348	381	366	385
	52.5	321	305	364	378	381	360	303	331	291
	55.0	295	329	302	298	298	308	331	317	339
	57.5	327	306	279	272	272	283	310	298	314
	60.0	254	241	288	300	302	285	240	262	231
	62.5	227	253	232	229	229	237	255	244	261
	65.0	242	227	208	202	202	211	230	221	233
	67.5	181	172	206	213	215	204	171	188	164
	70.0	154	171	157	155	155	160	173	165	177
	72.5	154	142	131	128	128	134	145	140	146
	75.0	105	99	119	123	124	118	99	108	95
	77.5	79	87	80	78	79	82	88	84	91
	80.0	67	61	56	55	55	58	62	60	62
	82.5	35	33	39	41	41	39	33	35	31
	85.0	18	20	18	17	17	18	19	18	19
	87.5	10	9	8	7	7	7	6	6	6
	90.0	6	6	6	6	6	5	4	3	3
	92.5	6	7	6	6	5	5	5	5	5
	95.0	8	7	7	6	6	6	6	6	6
	97.5	8	7	8	8	8	8	6	7	6
	100.0	9	9	9	8	8	8	8	8	9
	102.5	11	10	10	9	9	9	10	9	9
	105.0	11	10	12	12	12	11	10	10	9
	107.5	12	13	12	12	11	12	13	12	13
	110.0	16	14	13	13	13	13	14	14	14
	112.5	14	14	16	17	17	16	13	14	13
	115.0	16	18	16	15	15	16	17	16	18
	117.5	20	19	17	17	17	17	19	18	18
	120.0	18	17	21	21	21	20	17	19	16
	122.5	19	22	19	19	19	19	21	20	22
	125.0	24	22	21	20	20	21	22	22	22
	127.5	21	21	24	25	25	24	20	22	19
	130.0	22	25	22	22	22	22	25	24	26
	132.5	28	26	24	23	23	24	26	25	26



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## Lateral Angles

	50.0	55.0	60.0	65.0	70.0	75.0	80.0	85.0	90.0	95.0	
V e r t i c a l	135.0	24	23	27	28	28	27	23	25	22	25
	137.5	24	28	25	24	24	25	28	26	29	26
	140.0	30	27	26	25	25	26	28	27	28	27
	142.5	25	24	29	30	30	29	24	27	23	27
	145.0	26	29	26	25	25	26	29	27	30	27
	147.5	31	28	27	26	26	27	29	28	28	28
	150.0	26	25	30	31	31	29	25	27	23	27
	152.5	27	30	27	26	26	26	29	28	31	28
	155.0	31	29	27	26	26	27	29	28	29	28
	157.5	25	24	29	30	30	29	24	26	23	26
	160.0	25	28	25	24	24	25	28	26	28	26
	162.5	28	26	24	24	24	24	26	25	26	25
	165.0	22	21	25	26	26	25	21	23	20	23
	167.5	21	23	20	20	20	21	23	22	24	22
	170.0	22	21	19	19	19	20	21	20	21	20
172.5	17	17	20	20	20	20	17	18	16	18	
175.0	15	17	15	15	15	15	17	16	17	16	
177.5	15	14	14	13	13	13	14	13	14	13	
180.0	13	13	13	13	13	13	13	13	13	13	
A n g l e s											



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Lab Code: 200899-0

## Lateral Angles

	100.0	105.0	110.0	115.0	120.0	125.0	130.0	135.0	140.0	145.0
<b>V e r t i c a l</b>	0.0	553	553	553	553	553	553	553	553	553
	2.5	587	554	543	542	549	588	524	595	576
	5.0	603	545	518	520	538	596	631	612	581
	7.5	505	598	633	630	605	509	539	490	539
	10.0	579	547	534	534	540	580	516	588	568
	12.5	591	535	510	511	529	584	619	599	568
	15.0	493	583	618	614	592	496	526	476	525
	17.5	563	530	517	517	524	563	502	571	551
	20.0	569	515	492	493	509	562	597	576	547
	22.5	471	559	592	588	566	475	502	456	503
	25.0	537	503	492	490	497	536	479	543	523
	27.5	538	488	465	467	482	530	564	543	515
	30.0	442	524	554	551	531	445	471	427	470
	32.5	499	468	456	455	461	499	446	506	487
	35.0	495	450	430	430	445	488	520	500	475
	37.5	404	479	507	504	486	407	429	390	430
	40.0	453	424	412	411	417	452	404	459	441
	42.5	443	403	386	386	399	437	465	447	425
	45.0	357	424	449	446	430	360	380	345	381
	47.5	397	370	359	359	364	395	354	401	386
<b>A n g l e s</b>	50.0	381	348	333	334	344	376	401	385	365
	52.5	303	360	381	378	364	305	321	292	322
	55.0	331	308	298	298	302	329	295	334	321
	57.5	310	283	272	272	279	306	327	312	296
	60.0	240	285	302	300	288	241	254	231	255
	62.5	255	237	229	229	232	253	227	256	246
	65.0	230	211	202	202	208	227	242	230	220
	67.5	171	204	215	213	206	172	181	164	181
	70.0	173	160	155	155	157	171	154	173	166
	72.5	145	134	128	128	131	142	154	145	139
	75.0	99	118	124	123	119	99	105	95	104
	77.5	88	82	79	78	80	87	79	88	85
	80.0	62	58	55	55	56	61	67	62	60
	82.5	33	39	41	41	39	33	35	32	35
	85.0	19	18	17	17	18	20	18	20	20
	87.5	7	7	7	7	8	9	10	10	10
	90.0	4	5	6	6	6	6	6	6	7
	92.5	5	5	5	6	6	7	6	8	7
	95.0	6	6	6	6	7	7	8	8	8
	97.5	6	8	8	8	8	7	8	7	9
	100.0	8	8	8	8	9	9	9	10	10
	102.5	10	9	9	9	10	10	11	11	11
	105.0	10	11	12	12	12	10	11	10	11
	107.5	13	12	11	12	12	13	12	14	13
	110.0	14	13	13	13	13	14	16	15	14
	112.5	13	16	17	17	16	14	14	14	15
	115.0	17	16	15	15	16	18	16	18	17
	117.5	19	17	17	17	17	19	20	19	18
	120.0	17	20	21	21	21	17	18	17	19
	122.5	21	19	19	19	19	22	19	22	21
	125.0	22	21	20	20	21	22	24	23	22
	127.5	20	24	25	25	24	21	21	20	22
	130.0	25	22	22	22	22	25	22	26	25
	132.5	26	24	23	23	24	26	28	26	25



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## Lateral Angles

	100.0	105.0	110.0	115.0	120.0	125.0	130.0	135.0	140.0	145.0	
V e r t i c a l	135.0	23	27	28	28	27	23	24	22	25	28
	137.5	28	25	24	24	25	28	24	28	27	24
	140.0	28	26	25	25	26	27	30	28	27	26
	142.5	24	29	30	30	29	24	25	23	26	30
	145.0	29	26	25	25	26	29	26	30	29	25
	147.5	29	27	26	26	27	28	31	30	28	26
	150.0	25	29	31	31	30	25	26	24	27	31
	152.5	29	26	26	26	27	30	27	30	29	26
	155.0	29	27	26	26	27	29	31	29	28	27
	157.5	24	29	30	30	29	24	25	24	26	30
	160.0	28	25	24	24	25	28	25	28	27	24
	162.5	26	24	24	24	24	26	28	26	25	24
	165.0	21	25	26	26	25	21	22	20	22	26
	167.5	23	21	20	20	20	23	21	23	22	20
	170.0	21	20	19	19	19	21	22	21	20	19
	172.5	17	20	20	20	20	17	17	16	17	20
	175.0	17	15	15	15	15	17	15	17	16	14
	177.5	14	13	13	13	14	14	15	14	14	13
	180.0	13	13	13	13	13	13	13	13	13	13
A n g l e s											



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## Lateral Angles

	150.0	155.0	160.0	165.0	170.0	175.0	180.0
V e r t i c a l	0.0	553	553	553	553	553	553
	2.5	610	540	564	595	640	555
	5.0	488	517	564	611	537	554
	7.5	596	634	565	490	514	582
	10.0	600	530	556	588	630	547
	12.5	478	508	552	597	525	544
	15.0	581	618	551	477	503	568
	17.5	581	513	539	569	610	530
	20.0	460	490	532	573	505	524
	22.5	557	592	528	456	481	543
	25.0	551	487	511	542	579	503
	27.5	434	463	502	540	474	494
	30.0	523	554	494	427	452	509
	32.5	512	451	475	504	538	467
	35.0	400	428	462	497	436	455
	37.5	479	506	451	389	413	464
	40.0	463	407	429	456	486	423
	42.5	358	384	414	444	389	408
	45.0	423	448	399	344	364	411
	47.5	404	355	374	400	424	369
A n g l e s	50.0	309	331	356	382	333	351
	52.5	360	379	337	291	310	348
	55.0	335	294	311	332	351	307
	57.5	250	269	289	309	270	285
	60.0	285	299	266	230	244	275
	62.5	257	225	238	255	269	235
	65.0	186	200	214	228	199	211
	67.5	202	212	189	163	174	195
	70.0	173	152	160	172	181	158
	72.5	117	126	135	143	124	133
	75.0	118	122	109	94	99	112
	77.5	89	77	82	88	91	81
	80.0	51	54	58	62	52	58
	82.5	40	41	36	31	32	37
	85.0	21	18	19	21	21	19
	87.5	9	9	10	10	8	10
	90.0	8	8	7	6	6	7
	92.5	8	7	8	8	9	7
	95.0	7	8	8	9	7	8
	97.5	10	10	9	8	8	9
	100.0	10	9	10	11	11	9
	102.5	9	10	11	11	10	10
	105.0	13	13	12	10	11	12
	107.5	14	12	13	14	15	13
	110.0	12	13	14	15	14	14
	112.5	17	17	16	13	15	16
	115.0	18	16	17	18	19	16
	117.5	15	17	18	19	17	18
	120.0	21	22	19	17	18	20
	122.5	21	19	20	22	24	20
	125.0	18	20	21	23	20	21
	127.5	24	26	23	20	22	24
	130.0	25	22	24	26	27	23
	132.5	21	23	24	26	23	24





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## Lateral Angles

	150.0	155.0	160.0	165.0	170.0	175.0	180.0	
V e r t i c a l	135.0	27	28	25	22	24	22	27
	137.5	27	24	25	28	29	29	26
	140.0	23	25	26	28	25	28	27
	142.5	29	30	27	23	26	24	29
	145.0	29	25	27	30	32	31	28
	147.5	24	26	28	29	26	30	28
	150.0	30	32	29	25	27	25	30
	152.5	30	26	28	31	33	32	29
	155.0	24	27	28	29	26	29	28
	157.5	30	31	28	24	26	24	29
	160.0	27	24	26	28	30	29	25
	162.5	22	24	25	26	23	26	25
	165.0	26	26	23	20	22	20	24
	167.5	22	19	21	23	24	23	21
	170.0	17	19	19	20	18	20	19
	172.5	20	20	18	15	17	15	18
	175.0	16	15	16	17	17	17	15
	177.5	12	14	14	15	13	14	13
	180.0	13	13	13	13	13	13	13
A n g l e s								