



# Les Industries Spectralux Inc. Spectralux Industries Inc.

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

ISO/IEC 17025  
**NVLAP**  
NVLAP LAB CODE: 200899-0

## Moving Mirror Goniophotometer Test Report

**Standard(s):** IESNA LM-35-02, IES LM-79-08, ANSI C82.77-2002

**Customer** Lumenpulse, 1751 Richardson, suite 1505, Montréal, Québec, Canada, H3K 1G6

General Information		SSL Details	Driver Details	
<b>Test Report</b>	S1603105-R1	<b>Description</b>	61W White 2700K SSL	<b>Type</b> Commercial
<b>Test Date</b>	10 March 2016	<b>Serial Number</b>	SRIS 2256	<b>Description</b> 61SSL-CY963
<b>Report Date</b>	29 March 2016	<b>Photometric Method</b>	Absolute	<b>Manufacturer</b> Mean Well
<b>Ambient</b>	21.6 °C	<b>Lamp Lumens</b>	-1	<b>Catalog No.</b> LPF-60-24
<b>Humidity</b>	25.8 %	<b>Test Position</b>	Axial	<b>Voltage Tap</b> 120.00 V
<b>Lamp Type</b>	SSL	<b>Comments</b>	Clusters of 48 Cree XPE2 LED's	<b>Power Factor</b> 0.9900

### Floodlight Data

General Information		Optics	Aperture (feet)	
<b>Manufacturer</b>	Lumenpulse	<b>Reflector</b>	48 Collimators	<b>X</b> 4.0000
<b>Name</b>	LUMENFACADE	<b>Housing</b>	Extruded Aluminum	<b>Y</b> 0.1667
<b>Catalog No.</b>	LOG-HO-120-48-27K-WWLF-WH-NO	<b>Lens</b>	Polycarbonate	<b>Z</b> 0.0000

Lamp Stabilization Time: 10 minutes

**Tested By :** Ycf[Y<YXfY].....

**Approved Signatory:** Chrisnel Blot

**Signature:**



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## 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	Elgar	CW801	30527	N.P.C.R.	N.P.C.R.
Input Power Meter	Yokogawa	WT210	27E116584	2014/10/30	2016/10/30
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	2015/10/05	2016/10/05

## Environment Equipment

Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due Date
Temperature Humidity Sensor	Omega	HH311	120504178	2014/04/16	2016/04/16



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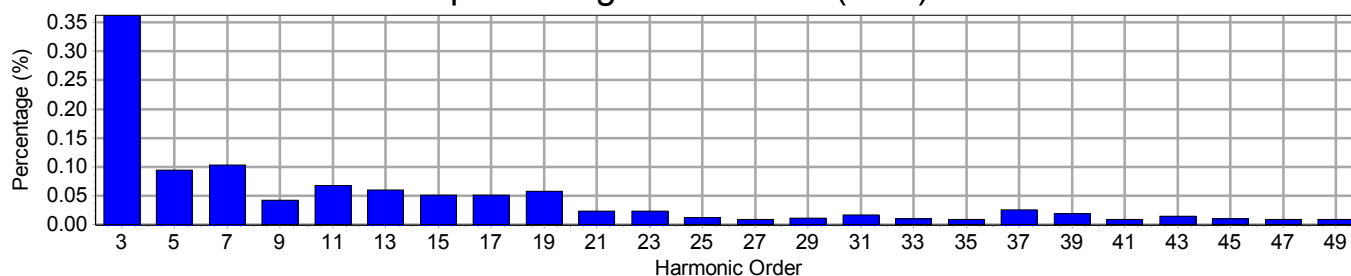
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## Electrical Measurements

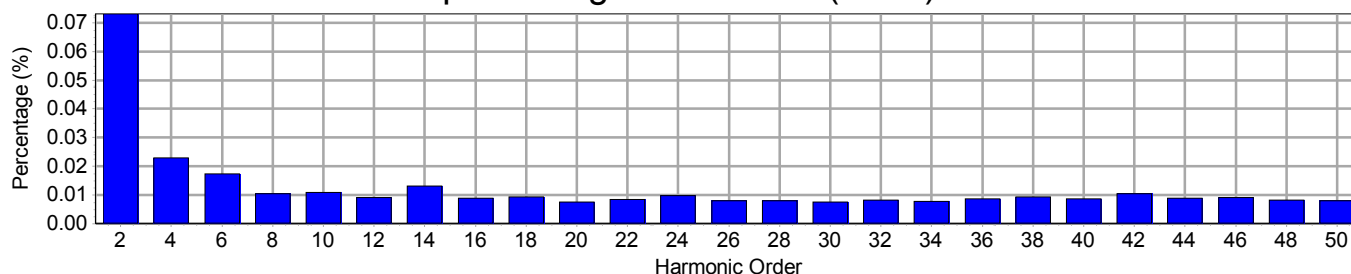
### Input

Frequency	60 Hz	Active Power	60.82 W	THDV [ANSI]	0.43 %
Voltage	120.1 V(rms)	Apparent Power	61.12 VA	THDA [ANSI]	5.09 %
Current	0.5089 A(rms)	Power Factor	0.995	Max. Harmonic At	5th order

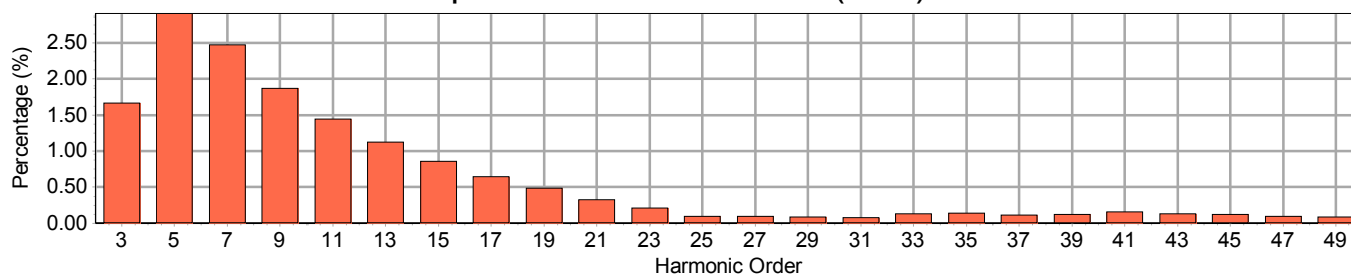
### Input Voltage Harmonics (Odd)



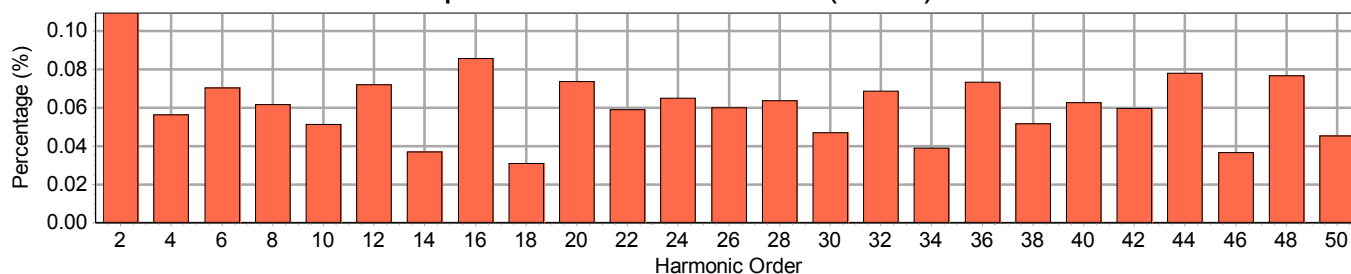
### Input Voltage Harmonics (Even)



### 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	0.073	0.109
3	180	0.363	1.668	4	240	0.023	0.056
5	300	0.095	2.913	6	360	0.017	0.070
7	420	0.104	2.476	8	480	0.010	0.061
9	540	0.042	1.868	10	600	0.011	0.051
11	660	0.068	1.439	12	720	0.009	0.072
13	780	0.061	1.124	14	840	0.013	0.037
15	900	0.051	0.860	16	960	0.009	0.086
17	1020	0.051	0.640	18	1080	0.009	0.031
19	1140	0.058	0.486	20	1200	0.008	0.074
21	1260	0.023	0.320	22	1320	0.008	0.059
23	1380	0.024	0.212	24	1440	0.010	0.065
25	1500	0.013	0.093	26	1560	0.008	0.060
27	1620	0.009	0.095	28	1680	0.008	0.063
29	1740	0.012	0.081	30	1800	0.008	0.047
31	1860	0.017	0.079	32	1920	0.008	0.068
33	1980	0.011	0.125	34	2040	0.008	0.039
35	2100	0.010	0.139	36	2160	0.009	0.073
37	2220	0.026	0.109	38	2280	0.009	0.052
39	2340	0.019	0.120	40	2400	0.009	0.063
41	2460	0.010	0.154	42	2520	0.010	0.059
43	2580	0.014	0.124	44	2640	0.009	0.078
45	2700	0.011	0.117	46	2760	0.009	0.037
47	2820	0.010	0.089	48	2880	0.008	0.077
49	2940	0.009	0.084	50	3000	0.008	0.045



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**NVLAP**<sup>®</sup>  
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## Photometric Report: S1603105-R1

Prepared for: Lumenpulse · Test Date: 10 March 2016

Floodlight: LUMENFACADE · Lumcat: LOG-HO-120-48-27K-WWLF-WH-NO

### Photometric Floodlight Characteristics

Nominal SSL Power	61.00 W	
Measured Input Voltage	120.10 V	<b>Notes</b>
Test SSL Current	0.2500 A	1) Floodlight tested in accordance to IES LM-35-1989 at a distance great enough so that the inverse-square law applies.
Floodlight Luminous Flux	2855	
Measured Input Power	60.82 W	
Floodlight Luminous Efficacy	46.9 lm/W	2) Field performance may differ from laboratory measurements.
Maximum Candela Value	5046	
Maximum Candela Location	0.0 H, -2.5 V	3) Results are valid for the tested material only.
Horizontal Beam Angle (50%)	84.0 °	
Vertical Beam Angle (50%)	16.5 °	4) All data published in this report are based on absolute photometry.
Horizontal Field Angle (10%)	132.0 °	
Vertical Field Angle (10%)	50.0 °	5) The original electronic file or paper report cannot be edited in whole or in part without written consent of Spectralux Industries Inc.
IES/NEMA Type Classification	7Hx4V	
Beam Lumens (50%)	1162	
Beam Efficiency (50%)	N/A	
Field Lumens (10%)	2284	
Field Efficiency (10%)	N/A	
Spill Lumens	571	
Total Floodlight Lumens	2855	
Total Floodlight Efficiency	N/A	



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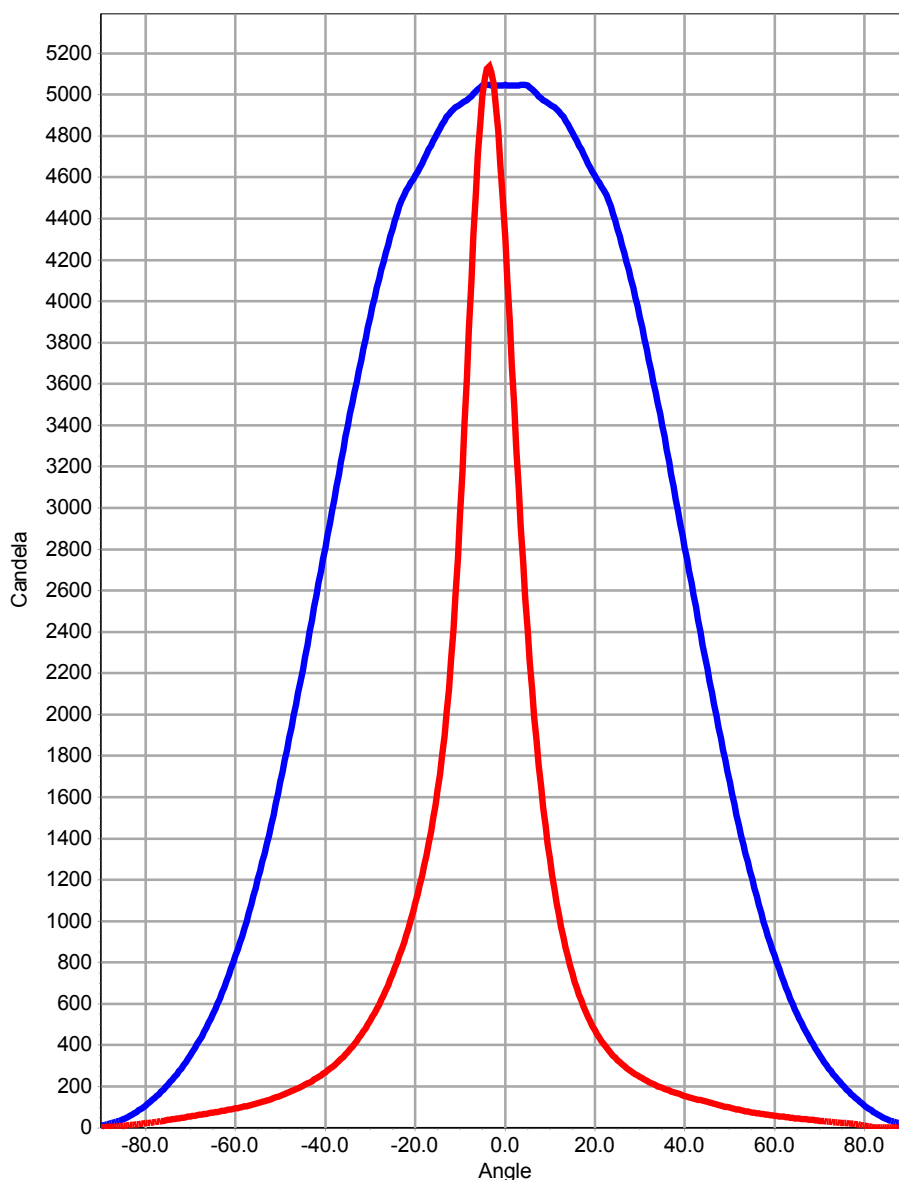
## Photometric Report: S1603105-R1

Prepared for: Lumenpulse · Test Date: 10 March 2016

Floodlight: LUMENFACADE · Lumcat: LOG-HO-120-48-27K-WWLF-WH-NO

### Maximum Candela Trace (Max. Location: 0.0 H, -2.5 V)

Horizontal Angles	Candela
-90.0	10
-85.0	41
-80.0	107
-75.0	208
-70.0	351
-65.0	550
-60.0	831
-55.0	1203
-50.0	1670
-45.0	2218
-40.0	2809
-35.0	3399
-30.0	3923
-25.0	4351
-20.0	4606
-15.0	4816
-10.0	4952
-5.0	5043
0.0	5046
5.0	5043
10.0	4952
15.0	4816
20.0	4606
25.0	4351
30.0	3923
35.0	3399
40.0	2809
45.0	2218
50.0	1670
55.0	1203
60.0	831
65.0	550
70.0	351
75.0	208
80.0	107
85.0	41
90.0	10



Vertical Angles	Candela
-90.0	3
-85.0	10
-80.0	22
-75.0	37
-70.0	55
-65.0	73
-60.0	93
-55.0	119
-50.0	154
-45.0	202
-40.0	269
-35.0	367
-30.0	517
-25.0	744
-20.0	1085
-15.0	1634
-10.0	2959
-5.0	4991
0.0	4304
5.0	2405
10.0	1295
15.0	745
20.0	472
25.0	327
30.0	245
35.0	192
40.0	154
45.0	125
50.0	97
55.0	74
60.0	58
65.0	45
70.0	34
75.0	23
80.0	10
85.0	1
90.0	1

— Horizontal — Vertical



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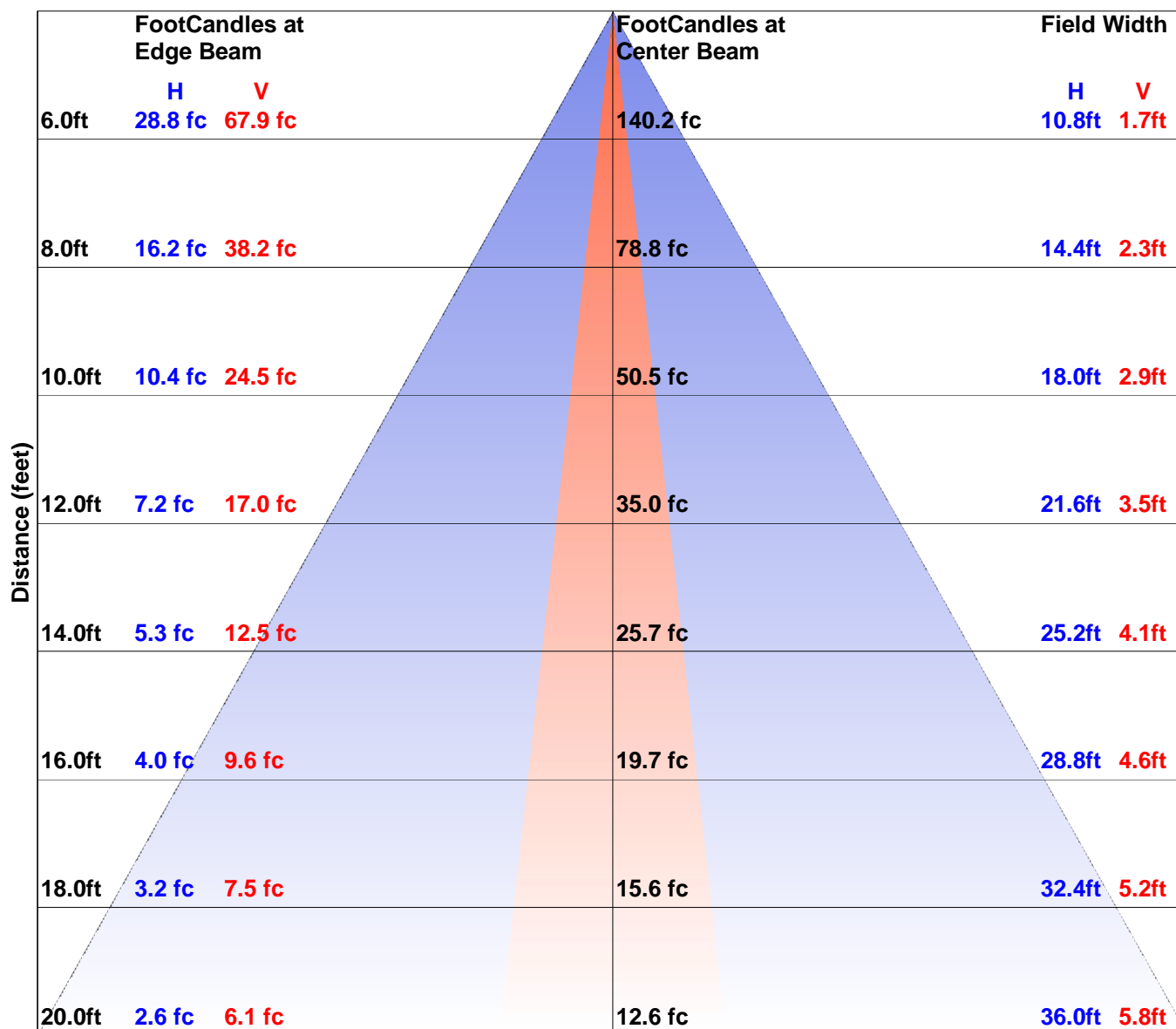
NVLAP LAB CODE: 200899-0

## Photometric Report: S1603105-R1

Prepared for: Lumenpulse · Test Date: 10 March 2016

Floodlight: LUMENFACADE · Lumcat: LOG-HO-120-48-27K-WWLF-WH-NO

### Downlight Beam



— Horizontal (84.0 °) — Vertical (16.5 °)





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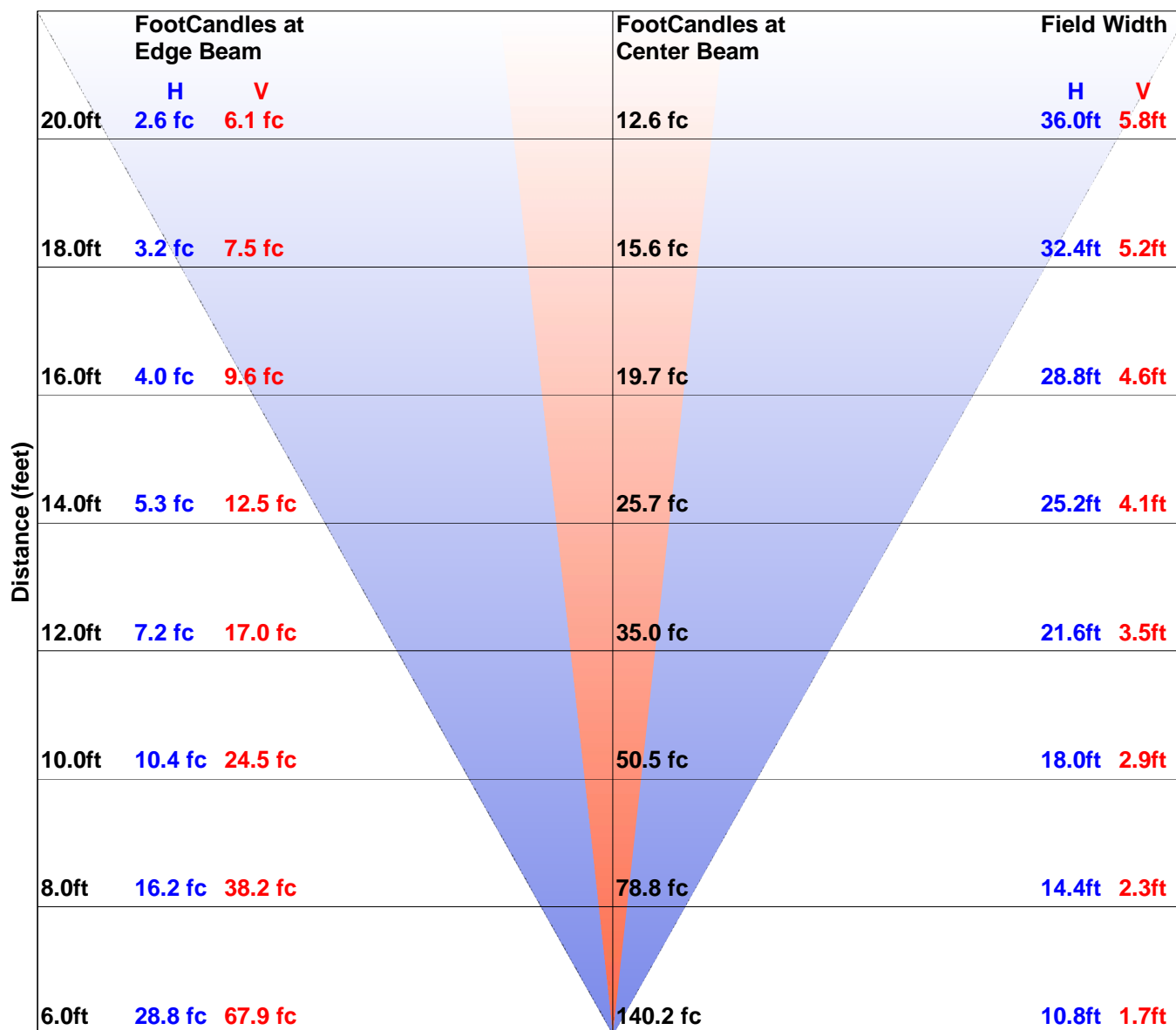
NVLAP LAB CODE: 200899-0

## Photometric Report: S1603105-R1

Prepared for: Lumenpulse · Test Date: 10 March 2016

Floodlight: LUMENFACADE · Lumcat: LOG-HO-120-48-27K-WWLF-WH-NO

### Uplight Beam



— Horizontal (84.0 °) — Vertical (16.5 °)



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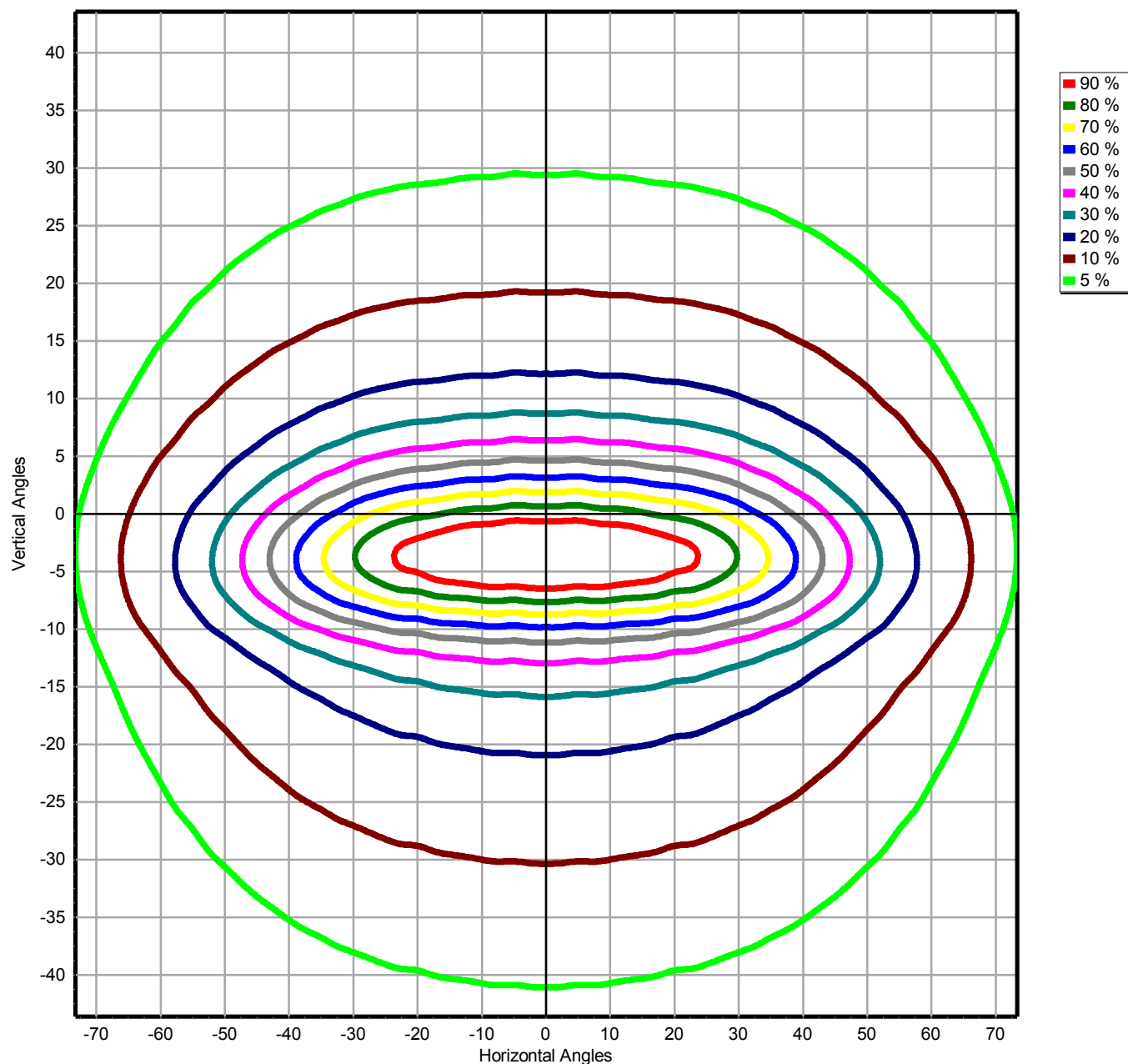
NVLAP LAB CODE: 200899-0

## Photometric Report: S1603105-R1

Prepared for: Lumenpulse · Test Date: 10 March 2016

Floodlight: LUMENFACADE · Lumcat: LOG-HO-120-48-27K-WWLF-WH-NO

### ISO Candela Diagram





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## IES File Headers

IESNA:LM-63-2002  
[ISSUEDATE] 10 March 2016  
[TESTLAB] Spectra Lux Industries Inc.  
[TEST] S1603105-R1  
[MANUFAC] Lumenpulse  
[LUMCAT] LOG-HO-120-48-27K-WWLF-WH-NO  
[LUMINAIRE] LUMENFACADE  
[LAMP] (Clusters of 48 Cree XPE2 LED's) White 61W SSL c/w Mean Well Driver LPF-60-24 @ 120.00V  
[\_BURNING] Axial (2,855 Luminaire Lumens)  
[\_REFLECTOR] 48 Collimators  
[\_LENS] Polycarbonate  
[\_HOUSING] Extruded Aluminum  
[DISTRIBUTION] NEMA 7Hx4V (Max. CP at 0.0H, -2.5V)  
[MORE] (Based on IES LM-35-1989)

## Candela Table

### Horizontal Angles

	0.0	2.5	5.0	7.5	10.0	12.5	15.0	17.5	20.0
V e r t i c a l	-90.0	3	2	2	2	3	3	3	3
	-87.5	5	5	5	5	5	5	5	5
	-85.0	10	9	9	10	9	9	9	9
	-82.5	15	15	15	15	15	15	15	14
	-80.0	22	22	21	22	21	21	21	20
	-77.5	29	29	29	29	28	28	28	27
	-75.0	37	37	37	37	36	36	36	35
	-72.5	45	45	45	45	44	44	43	42
	-70.0	55	55	54	55	53	53	53	51
	-67.5	64	64	64	64	63	62	61	60
A n g l e s	-65.0	73	73	73	72	72	71	70	69
	-62.5	83	83	82	82	81	80	80	78
	-60.0	93	93	92	93	91	90	90	88
	-57.5	105	105	104	104	102	102	101	99
	-55.0	119	119	118	118	116	115	114	112
	-52.5	135	135	134	134	132	131	129	127
	-50.0	154	154	153	153	150	149	147	144
	-47.5	177	176	175	175	173	170	168	164
	-45.0	202	202	200	200	199	196	194	187
	-42.5	232	232	230	230	228	225	223	214
	-40.0	269	268	265	266	263	259	257	247
	-37.5	313	312	308	309	306	301	298	285
	-35.0	367	366	362	362	359	353	349	333
	-32.5	434	433	428	429	424	417	412	392
	-30.0	517	515	509	510	505	496	489	464
	-27.5	619	617	609	610	603	592	584	553
	-25.0	744	740	731	733	724	710	700	661
	-22.5	897	893	882	884	873	856	843	795
	-20.0	1085	1081	1067	1069	1056	1035	1019	960
	-17.5	1320	1315	1297	1301	1285	1259	1240	1167
	-15.0	1634	1627	1603	1611	1592	1560	1538	1446
	-12.5	2124	2115	2078	2098	2075	2032	2008	1889
	-10.0	2959	2947	2890	2930	2901	2843	2819	2657
	-7.5	4097	4085	4020	4063	4029	3960	3924	3721
	-5.0	4991	4981	4941	4947	4908	4844	4781	4557



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## Horizontal Angles

	0.0	2.5	5.0	7.5	10.0	12.5	15.0	17.5	20.0	
V e r t i c a l	-2.5	5046	5044	5043	4993	4952	4906	4816	4712	4606
	0.0	4304	4307	4333	4251	4214	4185	4090	3989	3919
	2.5	3287	3293	3322	3244	3215	3197	3117	3037	2992
	5.0	2405	2410	2433	2373	2352	2341	2282	2224	2194
	7.5	1755	1758	1775	1732	1717	1709	1668	1627	1607
	10.0	1295	1298	1309	1279	1269	1263	1234	1206	1192
	12.5	972	974	982	961	953	949	929	909	899
	15.0	745	747	752	737	731	729	715	701	694
	17.5	586	588	591	581	576	575	564	554	550
	20.0	472	473	476	468	464	463	456	448	445
	22.5	389	389	391	385	383	382	376	371	368
	25.0	327	328	329	325	323	322	318	313	311
	27.5	281	281	282	279	277	277	273	270	268
	30.0	245	245	246	243	242	241	238	236	234
	32.5	216	216	217	215	214	213	210	208	207
	35.0	192	192	193	191	190	190	187	186	184
	37.5	172	172	173	171	170	170	168	166	165
	40.0	154	155	155	154	153	152	151	149	149
	42.5	139	139	139	138	138	137	136	135	134
	45.0	125	125	125	124	123	123	121	120	119
A n g l e s	47.5	110	110	111	110	109	108	107	105	105
	50.0	97	97	97	96	95	95	93	92	91
	52.5	84	84	85	84	83	83	82	80	80
	55.0	74	74	74	73	73	72	72	71	70
	57.5	65	65	65	65	65	64	64	63	63
	60.0	58	58	59	58	58	58	57	56	56
	62.5	51	52	52	51	50	50	49	48	48
	65.0	45	45	45	44	44	43	43	42	42
	67.5	39	39	39	39	39	38	37	37	36
	70.0	34	34	34	34	33	33	32	30	27
	72.5	29	28	29	28	28	26	24	22	21
	75.0	23	23	23	23	20	18	17	17	17
	77.5	19	19	17	15	14	14	13	13	12
	80.0	10	10	10	10	9	9	8	8	8
	82.5	2	2	3	4	4	5	5	5	5
85.0	1	2	2	2	2	2	3	3	4	
87.5	1	1	1	1	2	2	2	2	2	
90.0	1	1	1	1	1	2	2	2	2	



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## Horizontal Angles

	22.5	25.0	27.5	30.0	32.5	35.0	37.5	40.0	42.5
V e r t i c a l	-90.0	3	3	3	3	3	3	3	3
	-87.5	5	5	5	5	5	5	5	5
	-85.0	9	9	9	9	9	8	8	8
	-82.5	14	14	14	13	14	13	12	12
	-80.0	20	20	20	19	19	18	17	17
	-77.5	27	27	26	26	25	24	23	22
	-75.0	34	34	33	32	32	31	29	28
	-72.5	42	42	41	40	39	38	37	34
	-70.0	51	50	49	47	46	45	44	40
	-67.5	60	59	57	56	55	53	51	47
	-65.0	69	67	66	65	63	61	60	55
	-62.5	78	77	75	73	72	70	68	63
	-60.0	87	86	84	83	81	79	77	72
	-57.5	98	97	95	93	91	89	87	81
	-55.0	111	109	107	105	103	100	97	91
	-52.5	126	124	121	118	116	112	110	102
	-50.0	143	141	137	134	131	127	124	114
	-47.5	163	160	156	152	148	144	139	128
	-45.0	186	182	177	173	169	163	158	145
	-42.5	213	208	203	197	192	185	179	164
A n g l e s	-40.0	245	240	232	226	219	211	204	185
	-37.5	283	277	268	260	252	242	233	211
	-35.0	331	322	312	302	292	280	269	242
	-32.5	389	378	365	353	341	325	311	278
	-30.0	460	447	430	414	399	380	363	321
	-27.5	547	531	510	490	471	446	425	374
	-25.0	654	634	607	582	559	528	501	437
	-22.5	786	760	727	696	666	627	594	514
	-20.0	948	915	875	835	797	749	707	607
	-17.5	1152	1111	1060	1010	963	901	849	722
	-15.0	1429	1377	1312	1249	1191	1111	1044	880
	-12.5	1871	1803	1716	1635	1560	1450	1362	1134
	-10.0	2637	2543	2422	2308	2204	2040	1912	1568
	-7.5	3686	3559	3391	3225	3066	2834	2636	2139
	-5.0	4492	4334	4134	3919	3691	3417	3145	2545
	-2.5	4515	4351	4152	3923	3662	3399	3102	2519
	0.0	3827	3682	3518	3318	3079	2869	2606	2134
	2.5	2918	2807	2687	2536	2351	2200	2001	1658
	5.0	2141	2062	1978	1871	1739	1635	1494	1253
	7.5	1569	1514	1456	1382	1291	1219	1120	952
	10.0	1166	1127	1087	1036	972	922	853	736
	12.5	881	854	826	791	746	712	663	580
	15.0	682	663	643	619	588	563	529	469
	17.5	541	527	513	496	473	456	430	386
	20.0	438	428	418	405	389	376	357	324
	22.5	363	356	348	339	326	317	302	277
	25.0	308	302	296	289	279	272	261	241
	27.5	265	260	256	250	242	236	227	212
	30.0	232	228	224	219	213	208	201	188
	32.5	205	202	199	194	190	185	179	168
	35.0	183	180	178	174	170	166	161	151
	37.5	164	162	160	157	153	150	145	136
	40.0	148	146	144	141	137	134	130	121
	42.5	133	131	129	126	122	119	115	106



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ISO/IEC 17025



NVLAP LAB CODE: 200899-0

## Horizontal Angles

	22.5	25.0	27.5	30.0	32.5	35.0	37.5	40.0	42.5
45.0	118	116	114	111	108	105	101	97	93
47.5	103	101	99	97	94	91	88	84	81
50.0	90	89	87	85	82	80	77	75	72
52.5	79	77	76	75	73	71	69	67	64
55.0	70	69	68	66	65	63	61	59	57
57.5	62	61	60	59	58	56	53	50	47
60.0	55	54	53	52	49	47	44	41	39
62.5	47	46	45	44	41	38	37	35	33
65.0	42	40	39	36	34	32	30	29	28
67.5	35	33	31	29	27	26	25	24	23
70.0	27	25	24	23	22	22	21	20	19
72.5	21	20	19	19	18	18	17	17	17
75.0	16	16	16	15	15	14	14	14	14
77.5	12	12	11	11	11	11	11	11	11
80.0	8	8	8	8	9	9	9	9	9
82.5	5	6	6	6	6	7	7	7	7
85.0	4	4	4	4	5	5	5	5	5
87.5	2	3	3	3	3	3	3	3	3
90.0	2	2	2	2	2	2	2	2	3

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NVLAP LAB CODE: 200899-0

## Horizontal Angles

	45.0	47.5	50.0	52.5	55.0	57.5	60.0	62.5	65.0
V e r t i c a l	-90.0	3	3	3	4	4	4	4	4
	-87.5	5	5	5	5	5	5	5	5
	-85.0	8	8	7	7	7	7	6	6
	-82.5	12	11	11	11	10	9	9	8
	-80.0	16	15	15	14	13	12	11	10
	-77.5	21	20	19	18	17	16	15	13
	-75.0	27	25	24	23	21	20	19	16
	-72.5	33	31	29	28	26	25	23	19
	-70.0	39	37	35	33	31	29	27	23
	-67.5	45	43	41	39	36	34	31	26
	-65.0	53	50	47	45	42	39	36	30
	-62.5	61	58	55	52	48	45	41	35
	-60.0	69	66	62	59	55	51	47	39
	-57.5	78	74	71	67	62	58	53	44
	-55.0	88	84	79	75	70	66	60	50
	-52.5	98	93	89	85	79	74	68	56
	-50.0	110	105	99	95	88	83	75	62
	-47.5	123	117	111	105	98	92	84	70
	-45.0	139	131	125	118	110	103	94	77
	-42.5	156	148	140	132	122	114	104	86
A n g l e s	-40.0	177	167	157	148	137	128	116	96
	-37.5	201	189	177	167	153	143	130	106
	-35.0	229	215	201	188	173	160	145	118
	-32.5	262	245	228	213	195	180	162	131
	-30.0	302	281	261	243	220	203	182	146
	-27.5	350	324	299	277	250	230	205	163
	-25.0	408	376	345	319	286	261	232	182
	-22.5	478	438	401	368	328	298	263	204
	-20.0	561	512	466	425	378	341	299	230
	-17.5	665	604	546	496	437	393	343	259
	-15.0	808	728	655	592	516	461	398	297
	-12.5	1036	926	826	741	636	564	480	349
	-10.0	1422	1255	1105	980	825	722	601	423
	-7.5	1920	1678	1458	1270	1059	906	745	505
	-5.0	2258	1968	1697	1453	1217	1021	839	556
	-2.5	2218	1938	1670	1417	1203	999	831	550
	0.0	1876	1651	1430	1215	1049	872	738	498
	2.5	1465	1301	1137	974	854	717	616	426
	5.0	1116	1000	884	765	680	578	504	358
	7.5	856	774	691	606	544	469	413	301
	10.0	668	609	550	488	443	386	344	257
	12.5	532	489	446	401	367	324	291	222
	15.0	434	403	371	336	310	277	251	194
	17.5	360	337	313	286	265	239	218	171
	20.0	305	286	268	247	230	209	191	151
	22.5	262	248	233	216	202	184	169	135
	25.0	229	217	205	191	179	164	151	121
	27.5	202	192	182	170	160	146	135	108
	30.0	180	172	162	152	143	130	120	96
	32.5	161	153	145	136	127	116	107	85
	35.0	144	138	130	121	114	104	95	75
	37.5	129	123	116	108	101	92	84	67
	40.0	115	109	103	95	89	81	74	60
	42.5	101	96	90	84	78	72	66	54



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ISO/IEC 17025



NVLAP LAB CODE: 200899-0

## Horizontal Angles

	45.0	47.5	50.0	52.5	55.0	57.5	60.0	62.5	65.0
45.0	88	84	79	74	69	64	58	53	47
47.5	78	74	70	65	62	56	52	46	41
50.0	69	66	62	58	55	50	45	41	37
52.5	61	59	55	51	47	42	39	36	33
55.0	54	50	46	43	40	36	34	32	28
57.5	44	42	39	36	34	32	30	27	25
60.0	37	35	33	31	30	27	26	24	22
62.5	31	30	28	26	25	23	22	20	19
65.0	26	25	24	22	21	20	19	18	17
67.5	22	21	20	19	19	18	17	16	15
70.0	19	18	17	17	17	16	15	14	13
72.5	16	16	16	15	15	14	13	12	11
75.0	14	14	13	13	12	12	11	11	10
77.5	11	11	11	10	10	10	9	9	8
80.0	9	9	9	8	8	8	8	7	7
82.5	7	7	6	6	6	6	6	6	6
85.0	5	5	5	5	5	5	5	5	5
87.5	3	3	4	3	4	4	4	4	4
90.0	3	3	3	3	3	3	3	3	3

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NVLAP LAB CODE: 200899-0

## Horizontal Angles

	67.5	70.0	72.5	75.0	77.5	80.0	82.5	85.0	87.5
<b>V e r t i c a l</b>	-90.0	4	4	4	4	4	4	4	4
	-87.5	5	5	5	5	4	5	4	4
	-85.0	6	6	6	5	5	5	5	4
	-82.5	8	7	7	6	6	5	5	4
	-80.0	10	9	8	7	7	6	5	5
	-77.5	12	11	10	9	8	7	6	5
	-75.0	14	13	12	10	9	8	7	6
	-72.5	17	15	13	12	10	9	7	6
	-70.0	20	18	16	14	12	10	8	7
	-67.5	23	21	18	15	13	11	9	7
	-65.0	27	24	21	18	15	12	10	8
	-62.5	31	27	23	20	16	13	11	8
	-60.0	35	31	26	22	18	15	11	9
	-57.5	39	34	30	25	20	16	12	9
	-55.0	44	39	33	28	23	18	14	10
	-52.5	49	43	37	31	25	20	15	11
	-50.0	55	48	41	35	28	22	16	12
	-47.5	61	54	46	38	31	24	18	12
	-45.0	68	59	51	42	34	27	19	13
	-42.5	76	66	56	47	38	29	21	15
<b>A n g l e s</b>	-40.0	84	73	62	52	42	32	23	16
	-37.5	93	81	69	57	46	35	25	17
	-35.0	103	90	76	63	50	39	28	19
	-32.5	114	99	84	70	55	42	30	20
	-30.0	127	110	93	76	61	46	33	22
	-27.5	141	122	102	84	67	51	36	24
	-25.0	157	135	113	92	73	55	39	25
	-22.5	175	149	124	101	79	60	42	27
	-20.0	196	166	137	111	86	65	45	29
	-17.5	219	184	151	121	94	70	48	30
	-15.0	248	207	169	134	102	75	51	32
	-12.5	288	238	191	150	113	82	55	34
	-10.0	343	279	220	171	127	90	60	36
	-7.5	403	322	250	191	140	98	65	39
	-5.0	443	350	271	205	150	104	68	40
	-2.5	443	351	274	208	153	107	70	41
	0.0	407	325	258	198	148	105	70	42
	2.5	354	286	230	180	136	97	66	41
	5.0	301	247	201	159	122	89	61	38
	7.5	257	213	175	140	109	80	56	35
	10.0	221	185	154	125	98	72	50	32
	12.5	192	163	136	111	87	65	45	28
	15.0	169	144	122	99	78	58	40	26
	17.5	150	128	108	89	70	52	36	23
	20.0	133	115	97	79	62	46	32	20
	22.5	119	102	86	71	55	41	28	19
	25.0	106	91	77	63	50	37	26	17
	27.5	95	82	69	56	44	33	24	16
	30.0	84	72	61	50	39	29	21	15
	32.5	75	64	54	44	36	27	20	13
	35.0	66	57	48	40	32	25	18	12
	37.5	59	51	44	37	30	23	17	12
	40.0	54	47	40	34	27	21	16	11
	42.5	48	42	36	31	25	20	15	10



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ISO/IEC 17025



NVLAP LAB CODE: 200899-0

## Horizontal Angles

	67.5	70.0	72.5	75.0	77.5	80.0	82.5	85.0	87.5
45.0	42	37	33	27	23	18	13	10	7
47.5	37	33	29	25	20	16	12	9	7
50.0	33	30	26	22	18	14	11	8	6
52.5	30	26	23	19	16	13	10	8	6
55.0	26	23	20	17	14	12	9	7	6
57.5	22	20	17	15	12	10	8	7	5
60.0	20	18	15	13	11	9	8	6	5
62.5	17	15	14	12	11	9	7	6	5
65.0	15	14	12	11	9	8	7	6	5
67.5	14	13	11	10	9	7	6	5	5
70.0	12	11	10	9	8	7	6	5	5
72.5	11	10	9	8	7	6	6	5	4
75.0	9	9	8	7	7	6	5	5	4
77.5	8	7	7	6	6	5	5	5	4
80.0	7	6	6	6	5	5	5	4	4
82.5	6	5	5	5	5	5	4	4	4
85.0	5	4	4	4	4	4	4	4	4
87.5	4	4	4	4	4	4	4	4	4
90.0	3	4	4	4	4	4	4	4	4

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NVLAP LAB CODE: 200899-0

## Horizontal Angles

	90.0
V e r t i c a l	-90.0 4
	-87.5 4
	-85.0 4
	-82.5 4
	-80.0 4
	-77.5 5
	-75.0 5
	-72.5 5
	-70.0 5
	-67.5 5
	-65.0 5
	-62.5 5
	-60.0 5
	-57.5 5
	-55.0 5
	-52.5 5
	-50.0 6
	-47.5 6
	-45.0 6
	-42.5 6
A n g l e s	-40.0 6
	-37.5 7
	-35.0 7
	-32.5 7
	-30.0 8
	-27.5 8
	-25.0 9
	-22.5 9
	-20.0 9
	-17.5 10
	-15.0 10
	-12.5 10
	-10.0 10
	-7.5 10
	-5.0 10
	-2.5 10
	0.0 11
	2.5 11
	5.0 11
	7.5 10
	10.0 9
	12.5 8
	15.0 7
	17.5 7
	20.0 6
	22.5 6
	25.0 6
	27.5 6
	30.0 6
	32.5 5
	35.0 5
	37.5 5
	40.0 5
	42.5 5



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ISO/IEC 17025  
**NVLAP**<sup>®</sup>  
NVLAP LAB CODE: 200899-0

Horizontal Angles

	90.0
	45.0
	47.5
	50.0
	52.5
	55.0
	57.5
	60.0
	62.5
	65.0
V e r t i c a l	67.5
	70.0
	72.5
	75.0
	77.5
	80.0
	82.5
	85.0
	87.5
	90.0
A n g l e s	