



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

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

Sphere Test Report

Standard(s) CIE 84-1989, IESNA LM-16-93, IESNA LM-58-94, IES LM-79-08, ANSI C82.77-2002

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

General Information		Lamp Details: CY2815	Driver Details: CY810	
Test Report	L1611155-C1	Description	4 Rows of 12 CREE XPE2 LED's	Type Commercial
Test Date	15 November 2016	Manufacturer	Cree	Description 61W
Report Date	15 November 2016	Catalog No.	LOGi HO-120/277-48-30K-WW-NO	Manufacturer MEAN WELL
Sphere Temperature	24.6°C	Serial No.	SRIS-2591	Catalog No. LPF-60-24
Humidity	41.0 %	Drive Current	300 mA	Voltage 120.00 V
Lamp Type	SSL	Color	3000K	Power Factor 0.9900

Stabilization Time: 1 hour 10 minutes

Tested By: George Hedrei

Approved Signatory: Chrisnel Blot

Signature:

Notes

- 1) Field performance may differ from laboratory measurements. Results are valid for tested material only.
- 2) The original electronic file or paper report cannot be edited in whole or in part without written consent of Spectra Lux Industries Inc.
- 3) This test report describes the performance of a single product and does not necessarily represent the average performance of a group of the same SSL product.



Realization of Sphere Test

A 4π sphere-spectroradiometer equipped with auxiliary lamp to correct self-absorption was used during the measurements of electrical, photometric and colorimetric properties of the sample under test. The size of the integrating sphere used is large enough to ensure that the measurement errors due to effects of baffle and self-absorption by the sample test are not significant.

During the test, a commercial driver was used and adjusted to nominal electrical characteristics specified by the driver manufacturer or the client. Good electrical contacts have been used to ensure the control of electrical parameters of the commercial driver and an adequate stabilization period prior to collecting data. The self-absorbance was measured and a geometrical correction factor was applied to the luminous flux value to take into account the sphere configuration.

Results of the measurements are traceable to reference standards developed and maintained by the 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
Auxiliary Power Supply	American Reliance	SPS150-7	B10155	N.P.C.R.	N.P.C.R.
Test Power Supply	iRDC	CIF-3000A	974997	N.P.C.R.	N.P.C.R.
Input Power Meter	Yokogawa	WT210	27E224420	2016/05/06	2017/05/06
Output Power Meter	N/A	N/A	N/A	N.P.C.R.	N.P.C.R.
Shunt Resistor	Fluke	Y5020	5675014	2016/05/05	2017/05/05
Current Multimeter	HP Agilent	HP34401A	MY41025831	2016/05/05	2017/05/05
Voltage Multimeter	HP Agilent	HP34401A	US36010444	2016/05/05	2017/05/05

Spectrometer Equipment

Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due Date
Spectrometer	Ocean Optics	USB2000N	USB2E3364	2016/05/30	2017/05/30

Environment Equipment

Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due Date
Temperature Humidity Sensor	Omega	HH311	091203915	2014/10/30	2016/11/30



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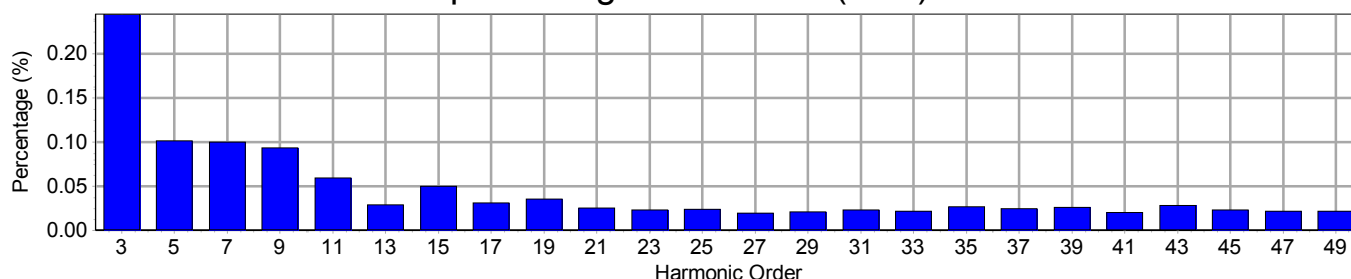
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Electrical Measurements

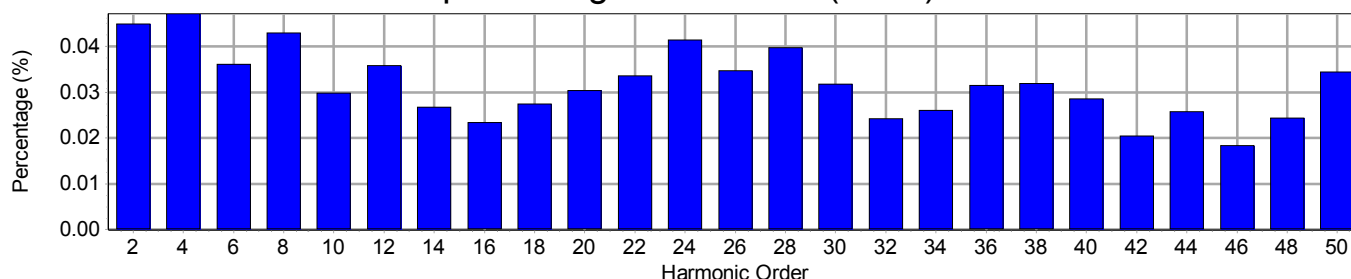
Input

Frequency	60 Hz	Active Power	60.81 W	THDV [ANSI]	0.36 %
Voltage	120.0 V(rms)	Apparent Power	61.19 VA	THDA [ANSI]	4.68 %
Current	0.5097 A(rms)	Power Factor	0.994	Max. Harmonic At	5th order

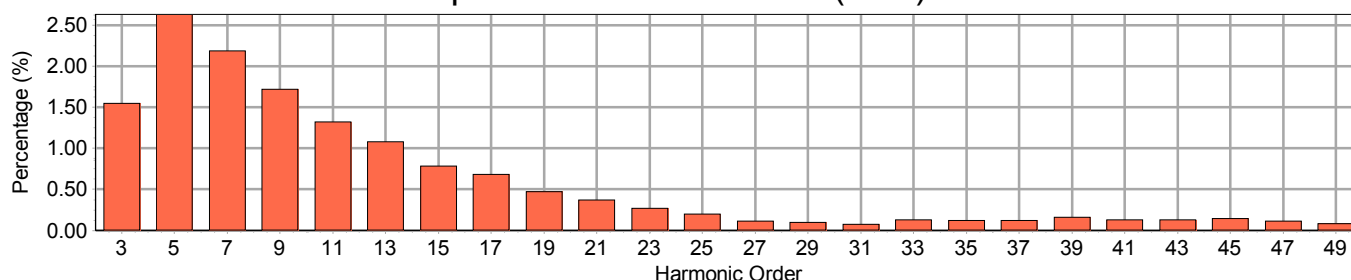
Input Voltage Harmonics (Odd)



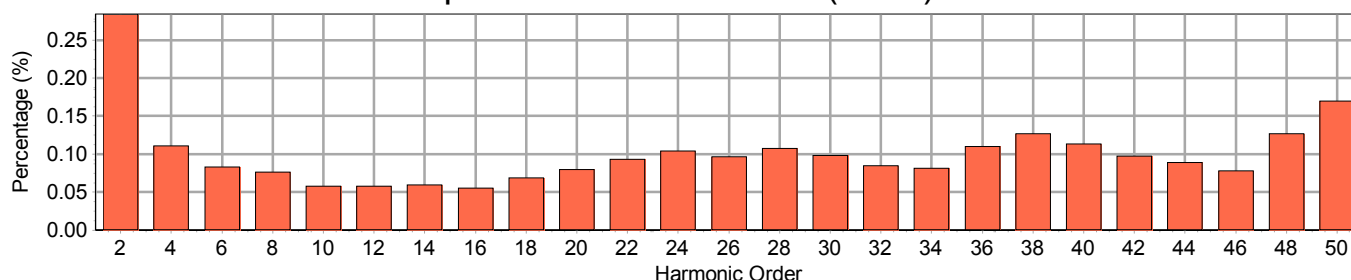
Input Voltage Harmonics (Even)



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	0.045	0.285
3	180	0.245	1.551	4	240	0.047	0.111
5	300	0.101	2.639	6	360	0.036	0.083
7	420	0.099	2.193	8	480	0.043	0.077
9	540	0.093	1.720	10	600	0.030	0.058
11	660	0.059	1.326	12	720	0.036	0.058
13	780	0.028	1.079	14	840	0.027	0.059
15	900	0.049	0.784	16	960	0.023	0.055
17	1020	0.031	0.683	18	1080	0.027	0.069
19	1140	0.035	0.471	20	1200	0.030	0.080
21	1260	0.025	0.372	22	1320	0.034	0.093
23	1380	0.023	0.272	24	1440	0.042	0.104
25	1500	0.024	0.198	26	1560	0.035	0.096
27	1620	0.019	0.115	28	1680	0.040	0.107
29	1740	0.021	0.095	30	1800	0.032	0.098
31	1860	0.023	0.076	32	1920	0.024	0.085
33	1980	0.022	0.126	34	2040	0.026	0.082
35	2100	0.026	0.121	36	2160	0.032	0.110
37	2220	0.024	0.119	38	2280	0.032	0.127
39	2340	0.026	0.157	40	2400	0.029	0.114
41	2460	0.020	0.127	42	2520	0.020	0.097
43	2580	0.028	0.130	44	2640	0.026	0.089
45	2700	0.023	0.147	46	2760	0.018	0.078
47	2820	0.022	0.114	48	2880	0.024	0.126
49	2940	0.021	0.084	50	3000	0.034	0.170



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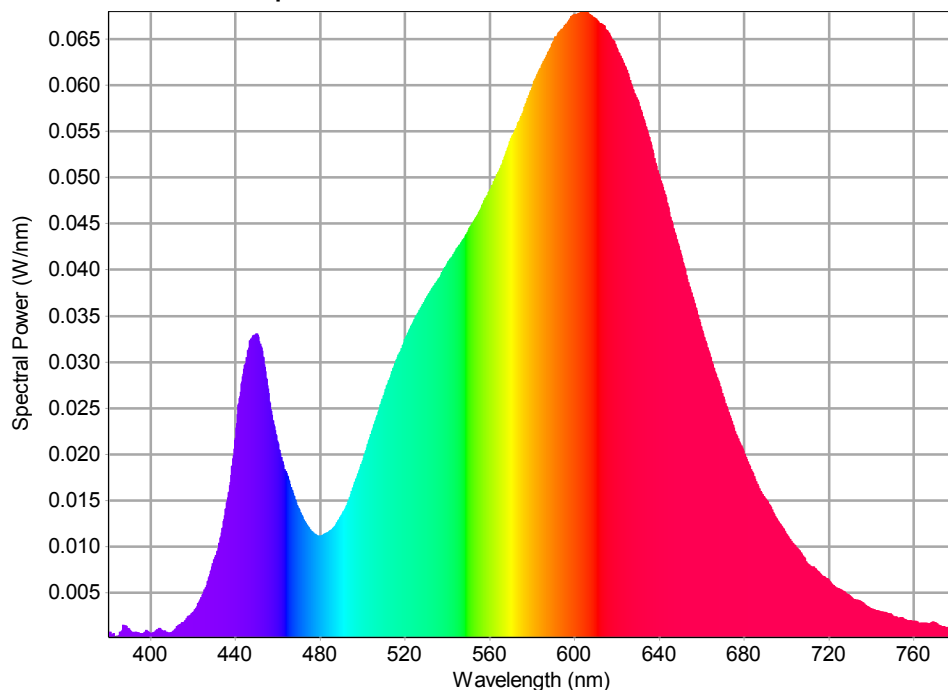
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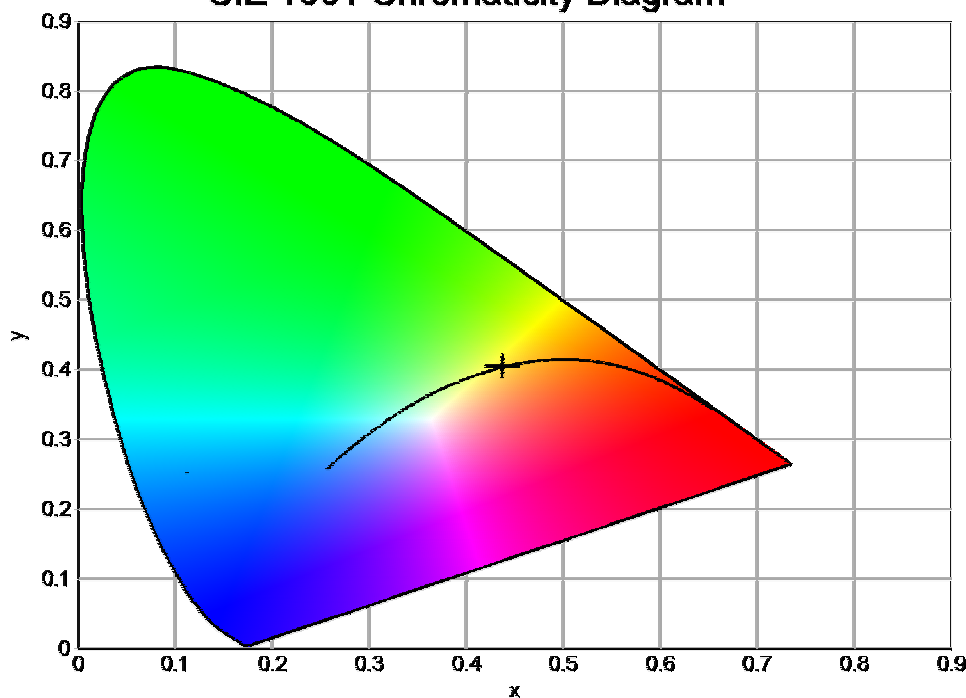
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Spectral Power Distribution



Peak Wavelength	605 nm
Luminous Flux	3412 lm
Input Power	60.81 W
Lumens/Watt	56.1
Full Width/Half Maximum	136.10
Center Wavelength	591 nm
Centroid Wavelength	404 nm
Dominant Wavelength	492 nm
Excitation Purity	0.0263
Colorimetric Purity	0.0227

CIE 1931 Chromaticity Diagram



x	0.4367	CCT	3019 K
y	0.4059	CRI	82
u	0.2496	L*	25.67
v	0.3480	a*	-1.24
u'	0.2496	b*	-2.09
v'	0.5221	Duv	0.0008
R1	80.2	R9	9.3
R2	88.5	R10	72.8
R3	95.4	R11	79.1
R4	80.8	R12	66.2
R5	79.7	R13	81.9
R6	85.0	R14	97.1
R7	84.7		
R8	61.3		



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Spectral Power Distribution Table (1/4)

Wavelength (nm)	Spectral Power (W/nm)	Wavelength (nm)	Spectral Power (W/nm)	Wavelength (nm)	Spectral Power (W/nm)	Wavelength (nm)	Spectral Power (W/nm)
380	0.00032	405	0.00098	430	0.00861	455	0.02744
381	0.00073	406	0.00085	431	0.00909	456	0.02570
382	0.00045	407	0.00072	432	0.00986	457	0.02427
383	0.00026	408	0.00069	433	0.01095	458	0.02325
384	0.00031	409	0.00067	434	0.01199	459	0.02221
385	0.00031	410	0.00071	435	0.01341	460	0.02115
386	0.00075	411	0.00089	436	0.01477	461	0.02011
387	0.00149	412	0.00112	437	0.01587	462	0.01928
388	0.00141	413	0.00142	438	0.01779	463	0.01840
389	0.00112	414	0.00158	439	0.01955	464	0.01798
390	0.00099	415	0.00178	440	0.02160	465	0.01725
391	0.00066	416	0.00189	441	0.02433	466	0.01643
392	0.00058	417	0.00218	442	0.02610	467	0.01579
393	0.00076	418	0.00247	443	0.02771	468	0.01514
394	0.00071	419	0.00265	444	0.02925	469	0.01447
395	0.00064	420	0.00290	445	0.02992	470	0.01397
396	0.00063	421	0.00315	446	0.03127	471	0.01347
397	0.00068	422	0.00355	447	0.03236	472	0.01296
398	0.00093	423	0.00403	448	0.03265	473	0.01253
399	0.00076	424	0.00450	449	0.03296	474	0.01220
400	0.00061	425	0.00505	450	0.03308	475	0.01187
401	0.00066	426	0.00554	451	0.03224	476	0.01162
402	0.00075	427	0.00623	452	0.03172	477	0.01139
403	0.00099	428	0.00697	453	0.03059	478	0.01129
404	0.00115	429	0.00786	454	0.02898	479	0.01116



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Spectral Power Distribution Table (2/4)

Wavelength (nm)	Spectral Power (W/nm)	Wavelength (nm)	Spectral Power (W/nm)	Wavelength (nm)	Spectral Power (W/nm)	Wavelength (nm)	Spectral Power (W/nm)
480	0.01117	505	0.02289	530	0.03692	555	0.04628
481	0.01121	506	0.02360	531	0.03733	556	0.04675
482	0.01135	507	0.02424	532	0.03770	557	0.04727
483	0.01148	508	0.02504	533	0.03805	558	0.04779
484	0.01159	509	0.02573	534	0.03837	559	0.04809
485	0.01175	510	0.02636	535	0.03873	560	0.04859
486	0.01197	511	0.02708	536	0.03903	561	0.04917
487	0.01218	512	0.02771	537	0.03947	562	0.04959
488	0.01258	513	0.02825	538	0.03992	563	0.05006
489	0.01299	514	0.02900	539	0.04032	564	0.05056
490	0.01337	515	0.02964	540	0.04070	565	0.05103
491	0.01378	516	0.03023	541	0.04105	566	0.05157
492	0.01420	517	0.03078	542	0.04132	567	0.05225
493	0.01469	518	0.03123	543	0.04169	568	0.05287
494	0.01532	519	0.03182	544	0.04213	569	0.05357
495	0.01599	520	0.03250	545	0.04246	570	0.05424
496	0.01669	521	0.03297	546	0.04273	571	0.05466
497	0.01734	522	0.03346	547	0.04313	572	0.05521
498	0.01791	523	0.03396	548	0.04343	573	0.05563
499	0.01863	524	0.03442	549	0.04385	574	0.05615
500	0.01922	525	0.03489	550	0.04431	575	0.05668
501	0.02000	526	0.03527	551	0.04475	576	0.05726
502	0.02070	527	0.03567	552	0.04507	577	0.05798
503	0.02150	528	0.03609	553	0.04554	578	0.05864
504	0.02217	529	0.03647	554	0.04585	579	0.05923



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Spectral Power Distribution Table (3/4)

Wavelength (nm)	Spectral Power (W/nm)	Wavelength (nm)	Spectral Power (W/nm)	Wavelength (nm)	Spectral Power (W/nm)	Wavelength (nm)	Spectral Power (W/nm)
580	0.05976	605	0.06804	630	0.05819	655	0.03754
581	0.06049	606	0.06794	631	0.05740	656	0.03676
582	0.06098	607	0.06776	632	0.05668	657	0.03593
583	0.06149	608	0.06757	633	0.05593	658	0.03515
584	0.06189	609	0.06740	634	0.05522	659	0.03434
585	0.06242	610	0.06723	635	0.05445	660	0.03349
586	0.06286	611	0.06694	636	0.05357	661	0.03274
587	0.06330	612	0.06673	637	0.05264	662	0.03208
588	0.06377	613	0.06665	638	0.05165	663	0.03127
589	0.06418	614	0.06646	639	0.05082	664	0.03056
590	0.06477	615	0.06602	640	0.05012	665	0.02976
591	0.06529	616	0.06571	641	0.04938	666	0.02901
592	0.06551	617	0.06521	642	0.04863	667	0.02839
593	0.06586	618	0.06494	643	0.04790	668	0.02775
594	0.06611	619	0.06453	644	0.04690	669	0.02702
595	0.06631	620	0.06390	645	0.04578	670	0.02629
596	0.06667	621	0.06347	646	0.04501	671	0.02555
597	0.06691	622	0.06297	647	0.04415	672	0.02493
598	0.06729	623	0.06247	648	0.04339	673	0.02426
599	0.06761	624	0.06200	649	0.04261	674	0.02363
600	0.06774	625	0.06136	650	0.04176	675	0.02288
601	0.06775	626	0.06058	651	0.04084	676	0.02221
602	0.06787	627	0.05991	652	0.04003	677	0.02172
603	0.06798	628	0.05922	653	0.03899	678	0.02118
604	0.06799	629	0.05873	654	0.03825	679	0.02071



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Spectral Power Distribution Table (4/4)

Wavelength (nm)	Spectral Power (W/nm)	Wavelength (nm)	Spectral Power (W/nm)	Wavelength (nm)	Spectral Power (W/nm)	Wavelength (nm)	Spectral Power (W/nm)
680	0.02007	706	0.00959	732	0.00429	758	0.00197
681	0.01952	707	0.00920	733	0.00424	759	0.00195
682	0.01895	708	0.00889	734	0.00417	760	0.00195
683	0.01841	709	0.00838	735	0.00410	761	0.00190
684	0.01793	710	0.00811	736	0.00395	762	0.00173
685	0.01736	711	0.00793	737	0.00368	763	0.00173
686	0.01681	712	0.00770	738	0.00355	764	0.00173
687	0.01628	713	0.00771	739	0.00342	765	0.00169
688	0.01586	714	0.00750	740	0.00325	766	0.00172
689	0.01548	715	0.00729	741	0.00321	767	0.00165
690	0.01521	716	0.00697	742	0.00311	768	0.00174
691	0.01489	717	0.00677	743	0.00307	769	0.00184
692	0.01449	718	0.00671	744	0.00298	770	0.00182
693	0.01401	719	0.00657	745	0.00300	771	0.00163
694	0.01355	720	0.00633	746	0.00288	772	0.00147
695	0.01309	721	0.00602	747	0.00282	773	0.00137
696	0.01273	722	0.00581	748	0.00278	774	0.00135
697	0.01238	723	0.00556	749	0.00274	775	0.00123
698	0.01205	724	0.00548	750	0.00250	776	0.00125
699	0.01171	725	0.00539	751	0.00236	777	0.00125
700	0.01129	726	0.00524	752	0.00233	778	0.00114
701	0.01096	727	0.00513	753	0.00225	779	0.00099
702	0.01062	728	0.00493	754	0.00235	780	0.00091
703	0.01036	729	0.00481	755	0.00224		
704	0.01011	730	0.00462	756	0.00212		
705	0.00982	731	0.00441	757	0.00197		