



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: CY2616	Driver Details: CY1101	
Test Report	L1606283-C1	Description	Clusters of CREE XPE2 LED's	Type Commercial
Test Date	28 June 2016	Manufacturer	Cree	Description 71W
Report Date	7 July 2016	Catalog No.	LOG-HO-120-48-40K-10x30-SI-NO	Manufacturer Mean Well
Sphere Temperature	25.4°C	Serial No.	SRIS 2434	Catalog No. LPF-60-24
Humidity	44.6 %	Drive Current	300 mA	Voltage 120.00 V
Lamp Type	SSL	Color	White	Power Factor 0.9900

Stabilization Time: 55 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	6010009	2015/07/08	2016/07/08
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	2016/10/30



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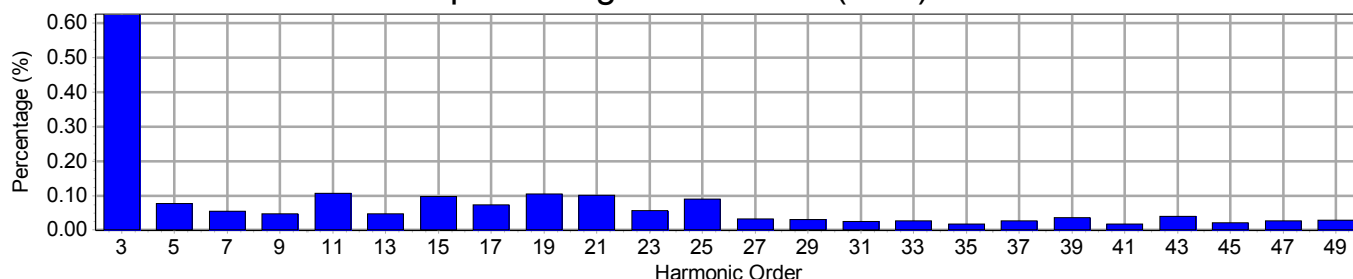
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Electrical Measurements

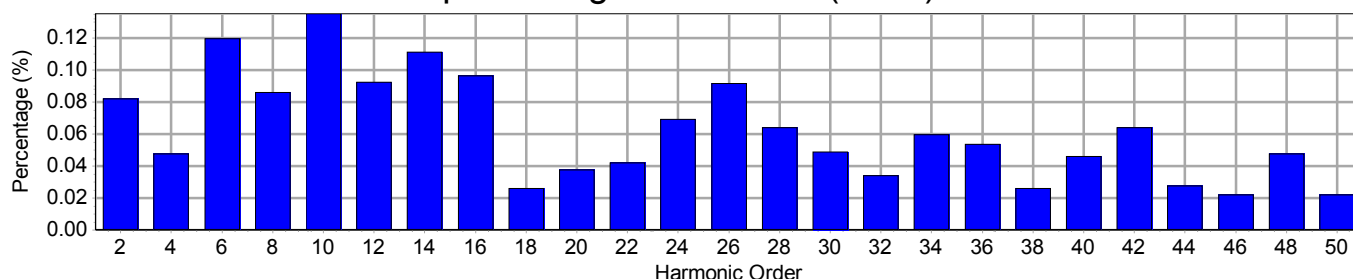
Input

Frequency	60 Hz	Active Power	62.15 W	THDV [ANSI]	0.76 %
Voltage	120.1 V(rms)	Apparent Power	62.56 VA	THDA [ANSI]	5.09 %
Current	0.5208 A(rms)	Power Factor	0.993	Max. Harmonic At	5th order

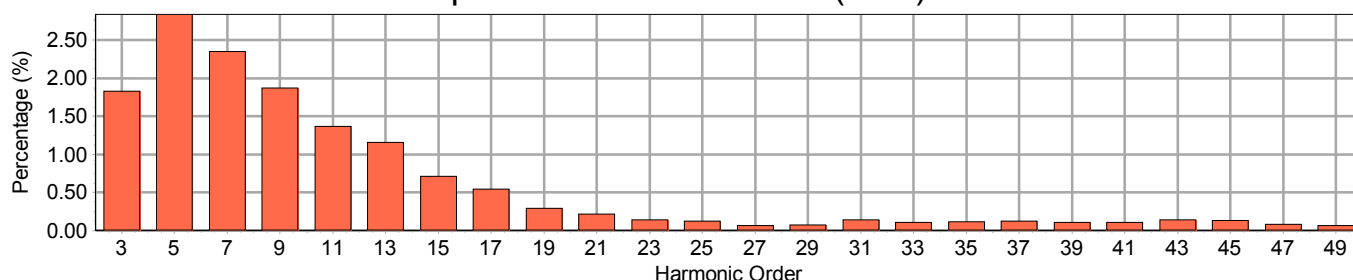
Input Voltage Harmonics (Odd)



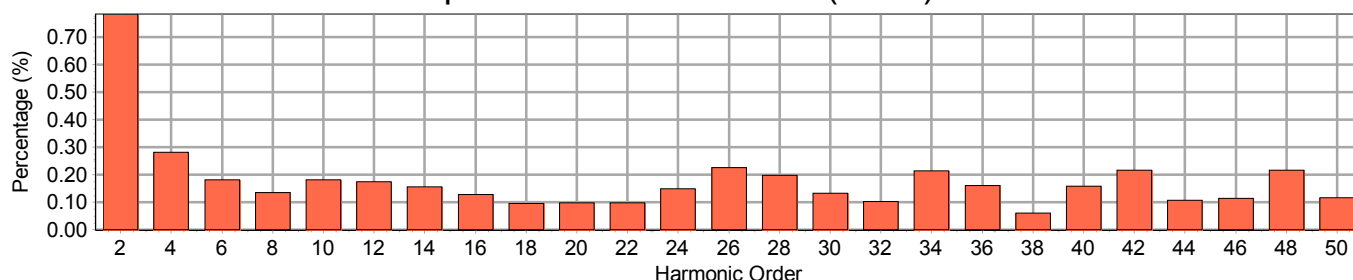
Input Voltage Harmonics (Even)



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	0.082	0.786
3	180	0.626	1.827	4	240	0.047	0.283
5	300	0.077	2.845	6	360	0.119	0.182
7	420	0.055	2.356	8	480	0.086	0.137
9	540	0.047	1.876	10	600	0.135	0.183
11	660	0.107	1.369	12	720	0.092	0.176
13	780	0.048	1.157	14	840	0.111	0.157
15	900	0.098	0.708	16	960	0.096	0.128
17	1020	0.074	0.546	18	1080	0.026	0.097
19	1140	0.105	0.294	20	1200	0.038	0.099
21	1260	0.101	0.215	22	1320	0.042	0.100
23	1380	0.057	0.141	24	1440	0.069	0.149
25	1500	0.089	0.125	26	1560	0.092	0.226
27	1620	0.032	0.059	28	1680	0.064	0.199
29	1740	0.031	0.070	30	1800	0.049	0.134
31	1860	0.026	0.142	32	1920	0.034	0.104
33	1980	0.027	0.109	34	2040	0.059	0.215
35	2100	0.018	0.110	36	2160	0.053	0.161
37	2220	0.028	0.124	38	2280	0.026	0.062
39	2340	0.037	0.106	40	2400	0.046	0.158
41	2460	0.017	0.104	42	2520	0.064	0.218
43	2580	0.039	0.141	44	2640	0.027	0.108
45	2700	0.022	0.133	46	2760	0.022	0.116
47	2820	0.027	0.079	48	2880	0.047	0.217
49	2940	0.028	0.067	50	3000	0.022	0.117



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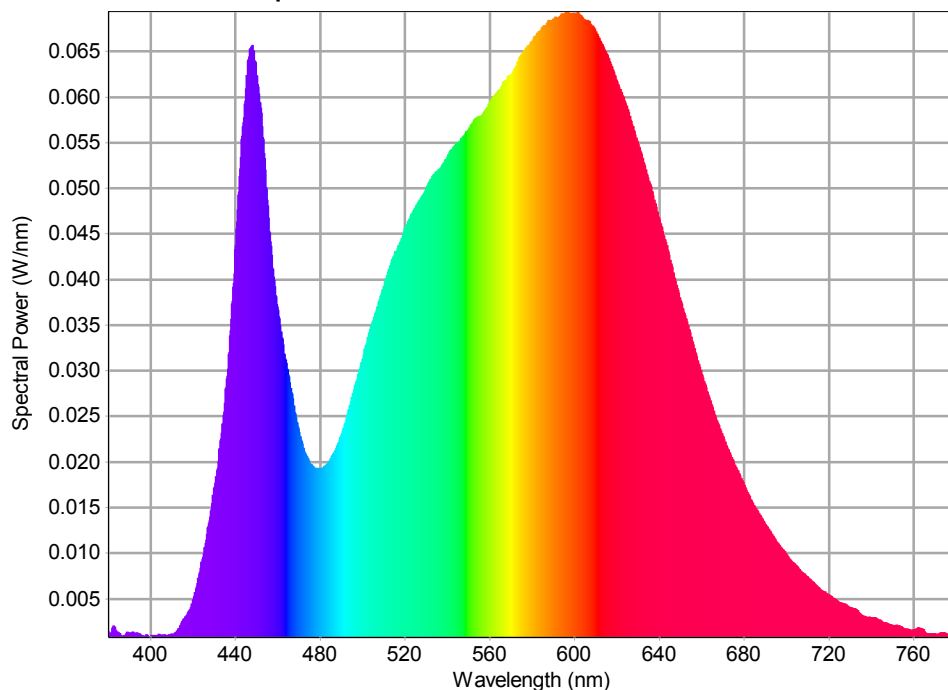
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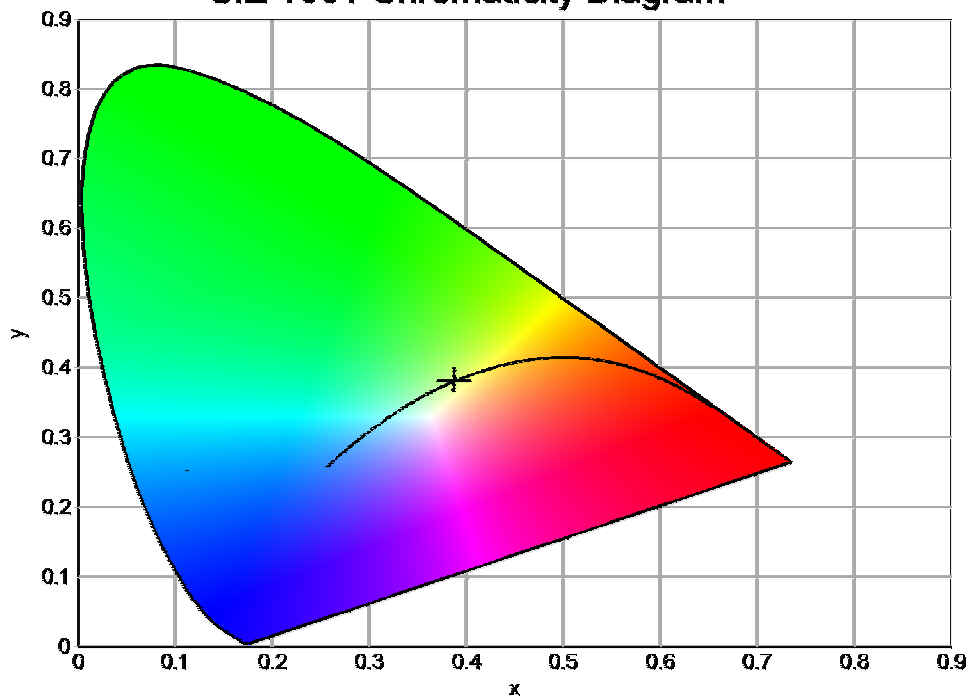
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Spectral Power Distribution



Peak Wavelength	596 nm
Luminous Flux	4011 lm
Input Power	62.15 W
Lumens/Watt	64.5
Full Width/Half Maximum	149.94
Center Wavelength	579 nm
Centroid Wavelength	370 nm
Dominant Wavelength	488 nm
Excitation Purity	0.1554
Colorimetric Purity	0.0997

CIE 1931 Chromaticity Diagram



x	0.3869	CCT	3871 K
y	0.3823	CRI	83
u	0.2271	L*	25.67
v	0.3366	a*	-4.84
u'	0.2271	b*	-13.86
v'	0.5049	Duv	0.0007
R1	81.6	R9	12.4
R2	88.1	R10	71.4
R3	93.1	R11	81.9
R4	83.1	R12	64.7
R5	81.6	R13	83.0
R6	83.8	R14	96.0
R7	86.9		
R8	66.4		



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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	0.00144	405	0.00106	430	0.01717	455	0.04874
381	0.00127	406	0.00104	431	0.01844	456	0.04532
382	0.00182	407	0.00104	432	0.02010	457	0.04270
383	0.00196	408	0.00096	433	0.02237	458	0.04035
384	0.00140	409	0.00106	434	0.02421	459	0.03831
385	0.00129	410	0.00118	435	0.02653	460	0.03670
386	0.00102	411	0.00118	436	0.02915	461	0.03496
387	0.00091	412	0.00141	437	0.03181	462	0.03366
388	0.00106	413	0.00171	438	0.03569	463	0.03188
389	0.00138	414	0.00207	439	0.03918	464	0.03084
390	0.00130	415	0.00260	440	0.04337	465	0.02957
391	0.00131	416	0.00289	441	0.04767	466	0.02815
392	0.00137	417	0.00324	442	0.05135	467	0.02698
393	0.00123	418	0.00367	443	0.05544	468	0.02548
394	0.00119	419	0.00412	444	0.05780	469	0.02437
395	0.00115	420	0.00492	445	0.06097	470	0.02328
396	0.00105	421	0.00571	446	0.06402	471	0.02245
397	0.00090	422	0.00671	447	0.06534	472	0.02159
398	0.00109	423	0.00780	448	0.06573	473	0.02092
399	0.00090	424	0.00905	449	0.06407	474	0.02047
400	0.00089	425	0.00998	450	0.06244	475	0.01989
401	0.00104	426	0.01113	451	0.06042	476	0.01972
402	0.00107	427	0.01284	452	0.05884	477	0.01940
403	0.00106	428	0.01402	453	0.05559	478	0.01935
404	0.00118	429	0.01552	454	0.05205	479	0.01932



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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	0.01930	505	0.03559	530	0.05001	555	0.05794
481	0.01936	506	0.03636	531	0.05055	556	0.05799
482	0.01957	507	0.03703	532	0.05096	557	0.05825
483	0.01976	508	0.03787	533	0.05136	558	0.05862
484	0.01996	509	0.03861	534	0.05161	559	0.05894
485	0.02040	510	0.03925	535	0.05190	560	0.05939
486	0.02087	511	0.04013	536	0.05212	561	0.05983
487	0.02122	512	0.04089	537	0.05234	562	0.06015
488	0.02184	513	0.04149	538	0.05273	563	0.06044
489	0.02238	514	0.04224	539	0.05315	564	0.06073
490	0.02300	515	0.04279	540	0.05353	565	0.06089
491	0.02372	516	0.04310	541	0.05399	566	0.06145
492	0.02449	517	0.04375	542	0.05430	567	0.06179
493	0.02532	518	0.04429	543	0.05454	568	0.06196
494	0.02622	519	0.04485	544	0.05487	569	0.06239
495	0.02714	520	0.04565	545	0.05504	570	0.06249
496	0.02801	521	0.04610	546	0.05521	571	0.06282
497	0.02883	522	0.04664	547	0.05563	572	0.06329
498	0.02963	523	0.04718	548	0.05583	573	0.06381
499	0.03052	524	0.04765	549	0.05624	574	0.06437
500	0.03128	525	0.04797	550	0.05648	575	0.06466
501	0.03237	526	0.04840	551	0.05692	576	0.06499
502	0.03309	527	0.04876	552	0.05720	577	0.06538
503	0.03414	528	0.04919	553	0.05767	578	0.06562
504	0.03484	529	0.04950	554	0.05783	579	0.06589



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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	0.06614	605	0.06837	630	0.05486	655	0.03375
581	0.06660	606	0.06844	631	0.05413	656	0.03287
582	0.06688	607	0.06832	632	0.05336	657	0.03204
583	0.06718	608	0.06783	633	0.05251	658	0.03114
584	0.06734	609	0.06770	634	0.05164	659	0.03046
585	0.06775	610	0.06720	635	0.05087	660	0.02967
586	0.06787	611	0.06674	636	0.05025	661	0.02888
587	0.06813	612	0.06624	637	0.04925	662	0.02820
588	0.06843	613	0.06578	638	0.04843	663	0.02742
589	0.06840	614	0.06520	639	0.04747	664	0.02676
590	0.06860	615	0.06481	640	0.04662	665	0.02600
591	0.06879	616	0.06429	641	0.04587	666	0.02527
592	0.06876	617	0.06361	642	0.04486	667	0.02460
593	0.06887	618	0.06304	643	0.04413	668	0.02405
594	0.06914	619	0.06245	644	0.04327	669	0.02340
595	0.06913	620	0.06172	645	0.04217	670	0.02283
596	0.06941	621	0.06109	646	0.04136	671	0.02220
597	0.06930	622	0.06062	647	0.04024	672	0.02162
598	0.06915	623	0.06003	648	0.03944	673	0.02110
599	0.06921	624	0.05934	649	0.03855	674	0.02054
600	0.06918	625	0.05872	650	0.03773	675	0.02004
601	0.06919	626	0.05796	651	0.03691	676	0.01947
602	0.06917	627	0.05705	652	0.03613	677	0.01906
603	0.06895	628	0.05639	653	0.03543	678	0.01850
604	0.06862	629	0.05558	654	0.03460	679	0.01798



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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	0.01751	706	0.00826	732	0.00396	758	0.00166
681	0.01692	707	0.00801	733	0.00382	759	0.00163
682	0.01648	708	0.00780	734	0.00355	760	0.00166
683	0.01594	709	0.00760	735	0.00337	761	0.00172
684	0.01548	710	0.00741	736	0.00318	762	0.00185
685	0.01513	711	0.00715	737	0.00308	763	0.00178
686	0.01477	712	0.00692	738	0.00303	764	0.00171
687	0.01435	713	0.00674	739	0.00305	765	0.00146
688	0.01399	714	0.00650	740	0.00295	766	0.00127
689	0.01362	715	0.00629	741	0.00298	767	0.00119
690	0.01320	716	0.00602	742	0.00295	768	0.00113
691	0.01287	717	0.00589	743	0.00273	769	0.00121
692	0.01250	718	0.00582	744	0.00274	770	0.00127
693	0.01214	719	0.00558	745	0.00252	771	0.00111
694	0.01180	720	0.00546	746	0.00244	772	0.00123
695	0.01137	721	0.00531	747	0.00242	773	0.00128
696	0.01108	722	0.00510	748	0.00226	774	0.00135
697	0.01072	723	0.00494	749	0.00220	775	0.00126
698	0.01046	724	0.00482	750	0.00213	776	0.00110
699	0.01025	725	0.00462	751	0.00209	777	0.00097
700	0.00985	726	0.00456	752	0.00217	778	0.00095
701	0.00951	727	0.00447	753	0.00211	779	0.00098
702	0.00922	728	0.00439	754	0.00200	780	0.00095
703	0.00905	729	0.00421	755	0.00180		
704	0.00881	730	0.00407	756	0.00176		
705	0.00857	731	0.00403	757	0.00171		