



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: CY2613	Driver Details: CY1101	
Test Report	L1606274-C1	Description	Clusters of CREE XPE2 LED's	Type Commercial
Test Date	27 June 2016	Manufacturer	Cree	Description 71W
Report Date	7 July 2016	Catalog No.	LOG-HO-120-48-40K-80x80-SI-NO	Manufacturer Mean Well
Sphere Temperature	25.3°C	Serial No.	SRIS 2440	Catalog No. LPF-60-24
Humidity	45.7 %	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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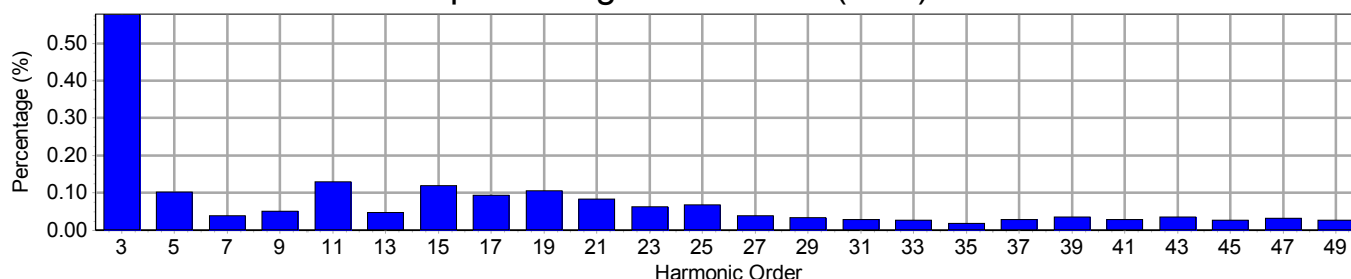
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Electrical Measurements

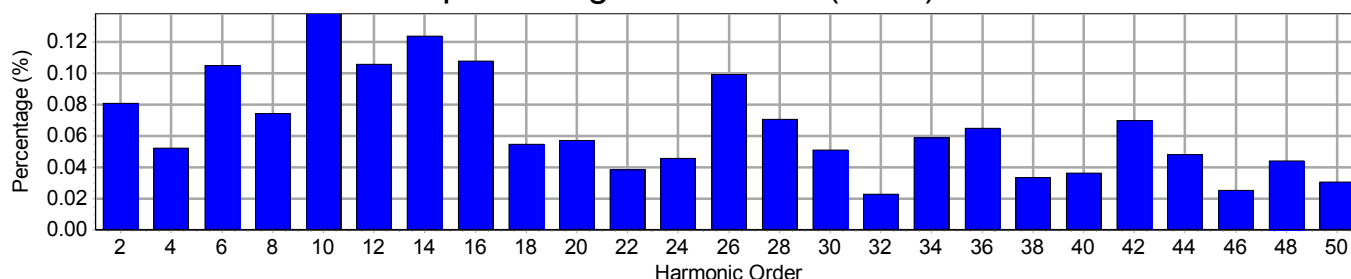
Input

Frequency	60 Hz	Active Power	61.85 W	THDV [ANSI]	0.74 %
Voltage	120.1 V(rms)	Apparent Power	62.25 VA	THDA [ANSI]	5.19 %
Current	0.5185 A(rms)	Power Factor	0.994	Max. Harmonic At	5th order

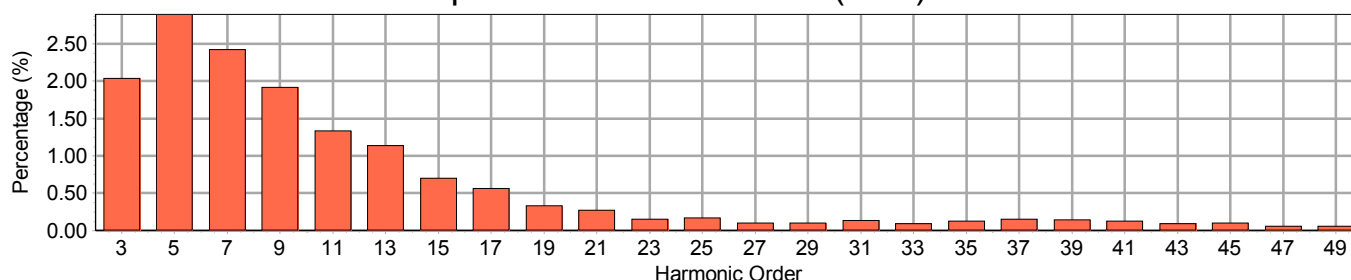
Input Voltage Harmonics (Odd)



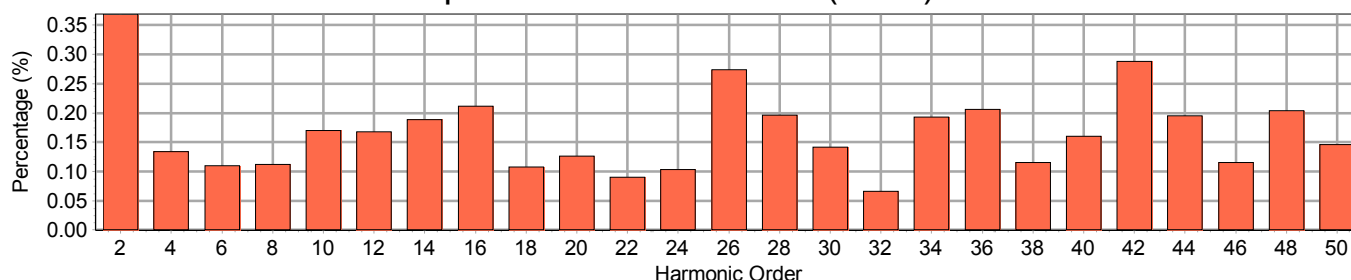
Input Voltage Harmonics (Even)



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	0.081	0.370
3	180	0.579	2.036	4	240	0.052	0.134
5	300	0.102	2.897	6	360	0.105	0.110
7	420	0.039	2.424	8	480	0.074	0.112
9	540	0.050	1.914	10	600	0.138	0.170
11	660	0.129	1.333	12	720	0.106	0.168
13	780	0.046	1.135	14	840	0.124	0.188
15	900	0.118	0.699	16	960	0.108	0.211
17	1020	0.093	0.561	18	1080	0.055	0.108
19	1140	0.105	0.330	20	1200	0.057	0.126
21	1260	0.084	0.266	22	1320	0.038	0.090
23	1380	0.062	0.152	24	1440	0.045	0.103
25	1500	0.067	0.168	26	1560	0.099	0.274
27	1620	0.038	0.099	28	1680	0.071	0.196
29	1740	0.034	0.096	30	1800	0.051	0.141
31	1860	0.028	0.135	32	1920	0.023	0.066
33	1980	0.026	0.088	34	2040	0.059	0.193
35	2100	0.018	0.122	36	2160	0.065	0.206
37	2220	0.028	0.149	38	2280	0.033	0.116
39	2340	0.035	0.138	40	2400	0.036	0.160
41	2460	0.029	0.122	42	2520	0.070	0.288
43	2580	0.034	0.092	44	2640	0.048	0.196
45	2700	0.026	0.096	46	2760	0.025	0.115
47	2820	0.031	0.056	48	2880	0.044	0.204
49	2940	0.027	0.058	50	3000	0.031	0.146



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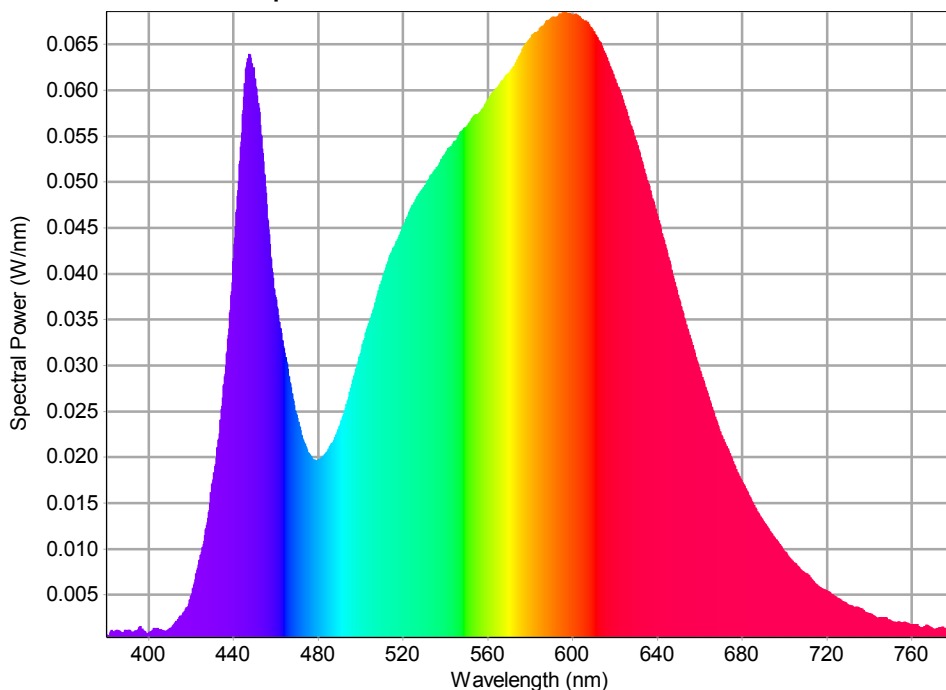
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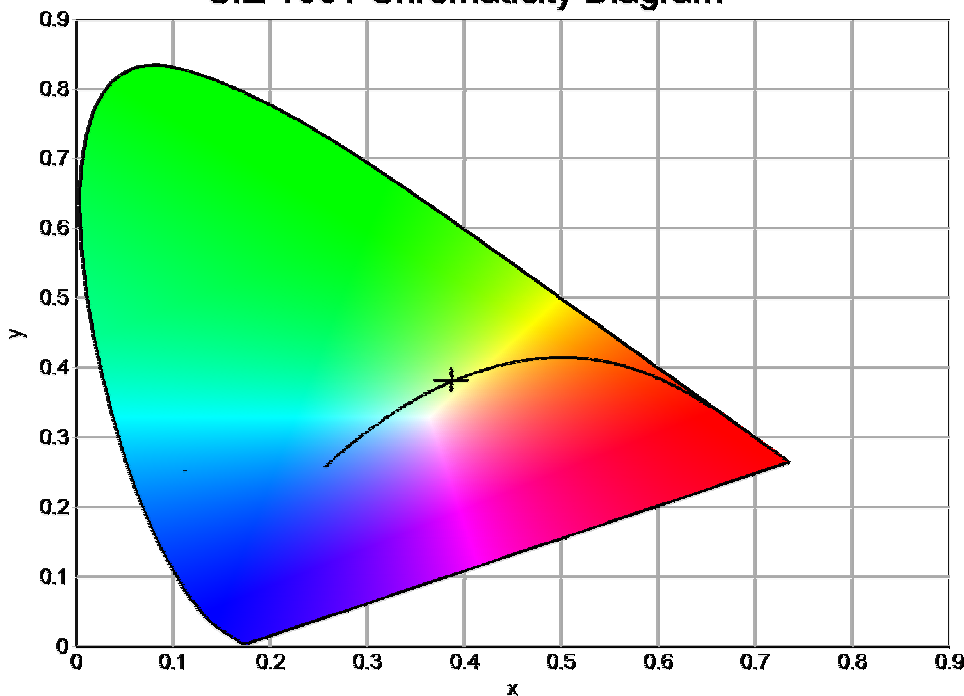
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Spectral Power Distribution



Peak Wavelength	596 nm
Luminous Flux	3975 lm
Input Power	61.85 W
Lumens/Watt	64.3
Full Width/Half Maximum	150.19
Center Wavelength	579 nm
Centroid Wavelength	370 nm
Dominant Wavelength	488 nm
Excitation Purity	0.1563
Colorimetric Purity	0.1012

CIE 1931 Chromaticity Diagram



x	0.3864	CCT	3884 K
y	0.3825	CRI	83
u	0.2267	L*	25.67
v	0.3366	a*	-4.94
u'	0.2267	b*	-13.87
v'	0.5050	Duv	0.0010
R1	81.8	R9	12.8
R2	88.3	R10	71.9
R3	93.4	R11	81.9
R4	83.2	R12	64.9
R5	81.7	R13	83.1
R6	84.1	R14	96.1
R7	87.0		
R8	66.6		



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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	0.00071	405	0.00119	430	0.01712	455	0.04951
381	0.00045	406	0.00118	431	0.01833	456	0.04604
382	0.00093	407	0.00114	432	0.01998	457	0.04323
383	0.00107	408	0.00104	433	0.02188	458	0.04059
384	0.00092	409	0.00115	434	0.02406	459	0.03845
385	0.00119	410	0.00137	435	0.02653	460	0.03717
386	0.00110	411	0.00148	436	0.02879	461	0.03552
387	0.00085	412	0.00179	437	0.03134	462	0.03415
388	0.00090	413	0.00218	438	0.03406	463	0.03278
389	0.00116	414	0.00234	439	0.03766	464	0.03142
390	0.00101	415	0.00273	440	0.04140	465	0.03039
391	0.00115	416	0.00286	441	0.04523	466	0.02889
392	0.00098	417	0.00322	442	0.04851	467	0.02764
393	0.00083	418	0.00364	443	0.05198	468	0.02638
394	0.00113	419	0.00406	444	0.05541	469	0.02509
395	0.00120	420	0.00490	445	0.05929	470	0.02427
396	0.00158	421	0.00571	446	0.06236	471	0.02347
397	0.00132	422	0.00673	447	0.06346	472	0.02244
398	0.00104	423	0.00773	448	0.06357	473	0.02173
399	0.00086	424	0.00878	449	0.06237	474	0.02120
400	0.00075	425	0.00966	450	0.06132	475	0.02059
401	0.00101	426	0.01056	451	0.05944	476	0.02027
402	0.00115	427	0.01216	452	0.05813	477	0.01988
403	0.00133	428	0.01342	453	0.05519	478	0.01973
404	0.00138	429	0.01502	454	0.05229	479	0.01962



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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	0.01974	505	0.03529	530	0.04948	555	0.05741
481	0.01984	506	0.03609	531	0.04984	556	0.05753
482	0.02005	507	0.03682	532	0.05025	557	0.05784
483	0.02033	508	0.03780	533	0.05070	558	0.05810
484	0.02056	509	0.03860	534	0.05095	559	0.05853
485	0.02093	510	0.03919	535	0.05133	560	0.05897
486	0.02140	511	0.04000	536	0.05162	561	0.05934
487	0.02164	512	0.04069	537	0.05194	562	0.05971
488	0.02217	513	0.04133	538	0.05245	563	0.05999
489	0.02273	514	0.04207	539	0.05279	564	0.06022
490	0.02335	515	0.04255	540	0.05309	565	0.06041
491	0.02403	516	0.04295	541	0.05351	566	0.06083
492	0.02472	517	0.04351	542	0.05377	567	0.06112
493	0.02538	518	0.04401	543	0.05396	568	0.06138
494	0.02619	519	0.04456	544	0.05440	569	0.06173
495	0.02711	520	0.04519	545	0.05452	570	0.06190
496	0.02796	521	0.04560	546	0.05491	571	0.06221
497	0.02889	522	0.04620	547	0.05546	572	0.06256
498	0.02965	523	0.04677	548	0.05561	573	0.06288
499	0.03050	524	0.04730	549	0.05592	574	0.06337
500	0.03129	525	0.04761	550	0.05602	575	0.06374
501	0.03228	526	0.04805	551	0.05635	576	0.06422
502	0.03302	527	0.04851	552	0.05669	577	0.06476
503	0.03398	528	0.04887	553	0.05708	578	0.06508
504	0.03463	529	0.04916	554	0.05734	579	0.06540



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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	0.06566	605	0.06759	630	0.05434	655	0.03335
581	0.06605	606	0.06762	631	0.05360	656	0.03261
582	0.06624	607	0.06747	632	0.05275	657	0.03182
583	0.06637	608	0.06699	633	0.05192	658	0.03095
584	0.06647	609	0.06680	634	0.05101	659	0.03019
585	0.06689	610	0.06644	635	0.05022	660	0.02946
586	0.06704	611	0.06600	636	0.04958	661	0.02877
587	0.06728	612	0.06554	637	0.04866	662	0.02807
588	0.06770	613	0.06526	638	0.04797	663	0.02733
589	0.06765	614	0.06459	639	0.04709	664	0.02665
590	0.06791	615	0.06411	640	0.04625	665	0.02588
591	0.06802	616	0.06361	641	0.04548	666	0.02518
592	0.06802	617	0.06293	642	0.04441	667	0.02445
593	0.06810	618	0.06237	643	0.04366	668	0.02382
594	0.06837	619	0.06180	644	0.04282	669	0.02311
595	0.06838	620	0.06116	645	0.04186	670	0.02247
596	0.06862	621	0.06052	646	0.04104	671	0.02197
597	0.06848	622	0.06007	647	0.03995	672	0.02143
598	0.06837	623	0.05942	648	0.03913	673	0.02098
599	0.06834	624	0.05863	649	0.03823	674	0.02047
600	0.06826	625	0.05798	650	0.03734	675	0.01986
601	0.06833	626	0.05723	651	0.03652	676	0.01928
602	0.06827	627	0.05628	652	0.03569	677	0.01871
603	0.06810	628	0.05579	653	0.03487	678	0.01821
604	0.06776	629	0.05504	654	0.03405	679	0.01773



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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	0.01728	706	0.00815	732	0.00375	758	0.00197
681	0.01689	707	0.00791	733	0.00366	759	0.00183
682	0.01641	708	0.00764	734	0.00370	760	0.00177
683	0.01590	709	0.00751	735	0.00365	761	0.00175
684	0.01544	710	0.00731	736	0.00354	762	0.00180
685	0.01502	711	0.00721	737	0.00336	763	0.00162
686	0.01454	712	0.00690	738	0.00317	764	0.00138
687	0.01412	713	0.00663	739	0.00304	765	0.00143
688	0.01375	714	0.00635	740	0.00301	766	0.00160
689	0.01338	715	0.00613	741	0.00290	767	0.00172
690	0.01301	716	0.00593	742	0.00271	768	0.00159
691	0.01267	717	0.00579	743	0.00259	769	0.00149
692	0.01233	718	0.00566	744	0.00250	770	0.00131
693	0.01193	719	0.00556	745	0.00258	771	0.00126
694	0.01163	720	0.00543	746	0.00256	772	0.00136
695	0.01127	721	0.00534	747	0.00261	773	0.00148
696	0.01104	722	0.00512	748	0.00249	774	0.00147
697	0.01066	723	0.00498	749	0.00230	775	0.00141
698	0.01037	724	0.00483	750	0.00221	776	0.00136
699	0.01005	725	0.00464	751	0.00206	777	0.00131
700	0.00973	726	0.00452	752	0.00211	778	0.00111
701	0.00947	727	0.00435	753	0.00198	779	0.00100
702	0.00913	728	0.00423	754	0.00209	780	0.00100
703	0.00889	729	0.00410	755	0.00203		
704	0.00857	730	0.00393	756	0.00199		
705	0.00843	731	0.00387	757	0.00200		