



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: CY2411	Driver Details: CY963	
Test Report	L1603104-C1	Description	Clusters of 48 Cree XPE2 LED's	Type Commercial
Test Date	10 March 2016	Manufacturer	Cree	Description 61W
Report Date	10 March 2016	Catalog No.	LOG-HO-120-48-27K-WWLF-WH-NO	Manufacturer Mean Well
Sphere Temperature	25.2 °C	Serial No.	SRIS 2256	Catalog No. LPF-60-24
Humidity	30.3 %	Diameter	N/A mm	Voltage 120.00 V
Lamp Type	SSL	Color	White	Power Factor 0.9900

Stabilization Time: %\ c i f '

Tested By: ; Ycf[Y< YXfY].....**5 pproved 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	91L236540	2015/10/22	2016/10/22
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	US36121202	2015/08/06	2016/08/06
Voltage Multimeter	Fluke	Fluke8842A	4282317	2014/10/31	2016/10/31

Spectrometer Equipment

Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due Date
Spectrometer	Ocean Optics	USB2000N	USB2E3864	2015/08/24	2016/08/24

Environment Equipment

Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due Date
Temperature Humidity Sensor	Omega	HH311	120504176	2014/04/16	2016/04/16



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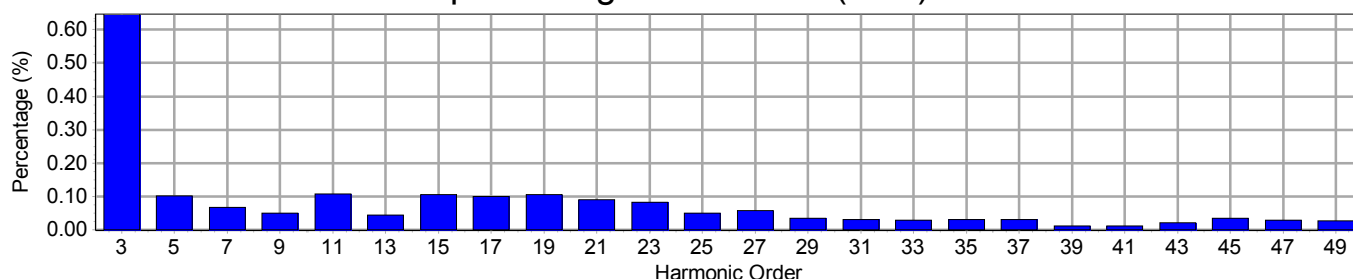
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Electrical Measurements

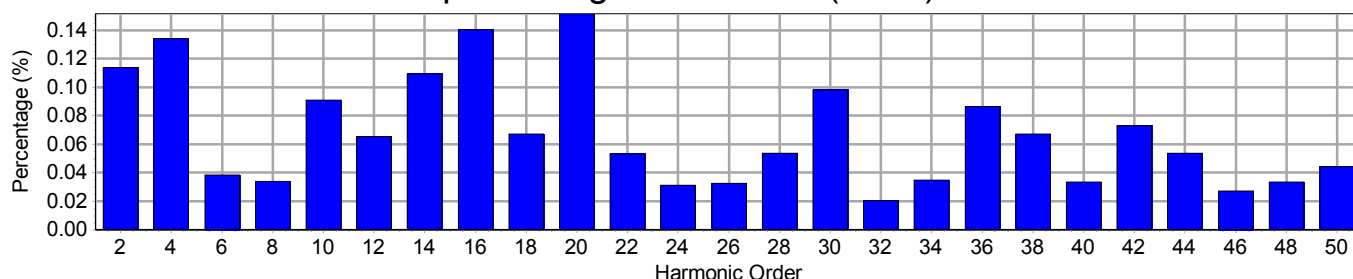
Input

Frequency	60 Hz	Active Power	60.88 W	THDV [ANSI]	0.80 %
Voltage	120.1 V(rms)	Apparent Power	61.28 VA	THDA [ANSI]	5.24 %
Current	0.5101 A(rms)	Power Factor	0.994	Max. Harmonic At	5th order

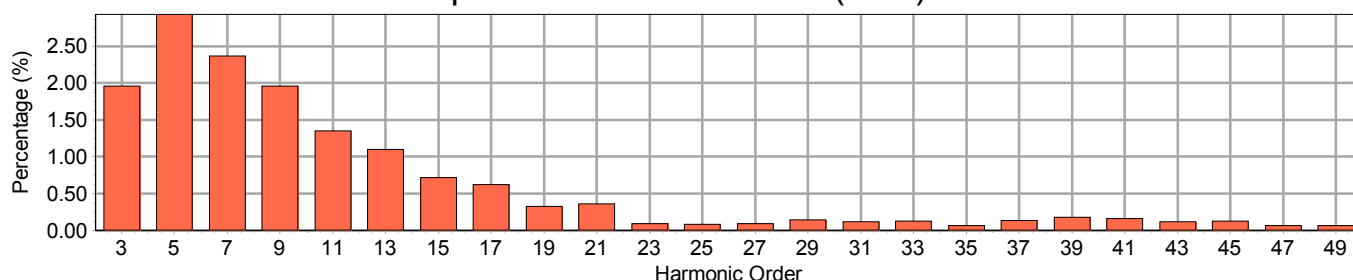
Input Voltage Harmonics (Odd)



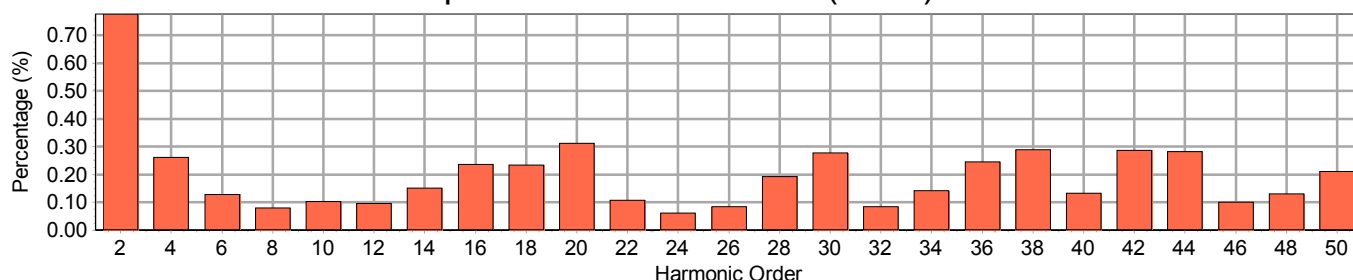
Input Voltage Harmonics (Even)



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	0.114	0.778
3	180	0.647	1.964	4	240	0.134	0.261
5	300	0.103	2.937	6	360	0.039	0.127
7	420	0.068	2.367	8	480	0.034	0.080
9	540	0.052	1.962	10	600	0.091	0.102
11	660	0.108	1.350	12	720	0.065	0.096
13	780	0.045	1.097	14	840	0.110	0.150
15	900	0.106	0.714	16	960	0.140	0.237
17	1020	0.100	0.619	18	1080	0.067	0.234
19	1140	0.107	0.324	20	1200	0.152	0.311
21	1260	0.091	0.364	22	1320	0.053	0.107
23	1380	0.083	0.092	24	1440	0.031	0.062
25	1500	0.051	0.083	26	1560	0.033	0.084
27	1620	0.058	0.088	28	1680	0.054	0.192
29	1740	0.036	0.139	30	1800	0.098	0.278
31	1860	0.031	0.121	32	1920	0.020	0.085
33	1980	0.030	0.127	34	2040	0.035	0.142
35	2100	0.033	0.065	36	2160	0.087	0.246
37	2220	0.033	0.136	38	2280	0.067	0.289
39	2340	0.013	0.179	40	2400	0.034	0.134
41	2460	0.013	0.161	42	2520	0.073	0.287
43	2580	0.021	0.119	44	2640	0.054	0.282
45	2700	0.035	0.123	46	2760	0.027	0.100
47	2820	0.030	0.069	48	2880	0.033	0.130
49	2940	0.027	0.062	50	3000	0.044	0.212



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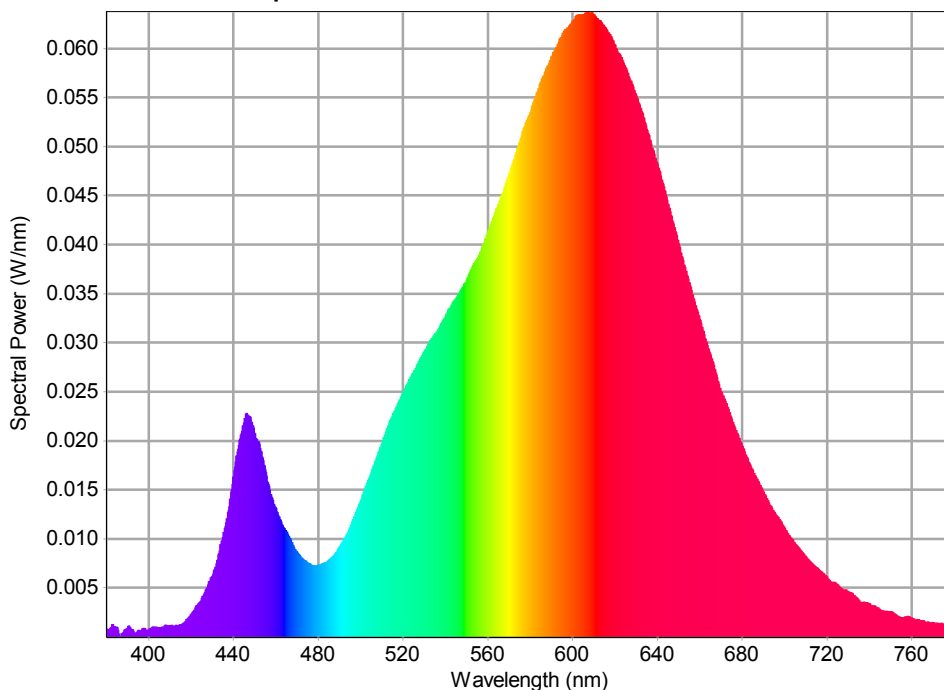
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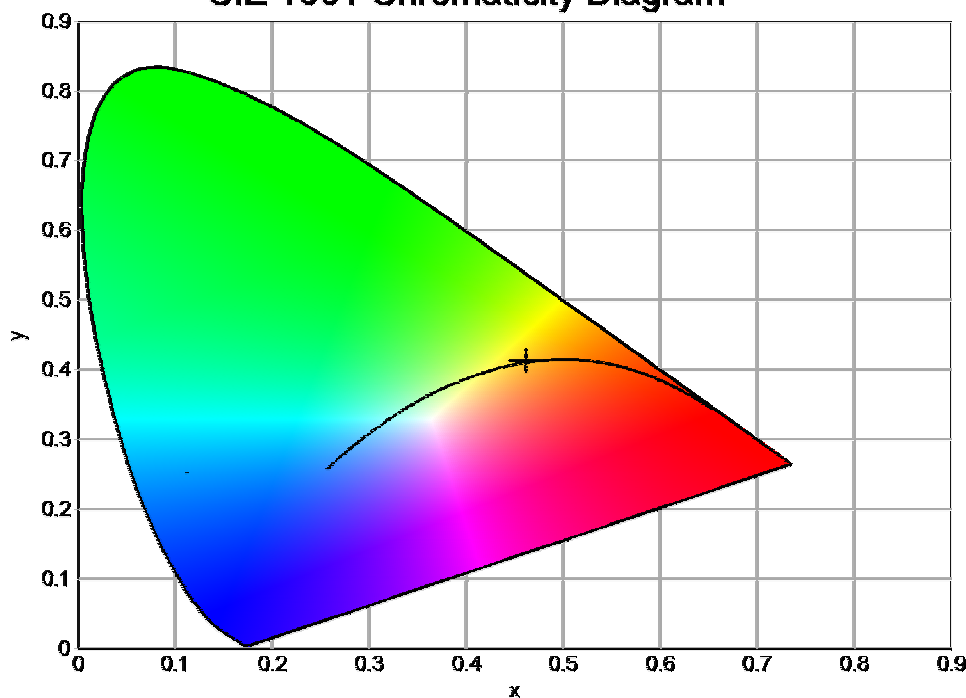
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Spectral Power Distribution



Peak Wavelength	607 nm
Luminous Flux	2958 lm
Input Power	60.88 W
Lumens/Watt	48.6
Full Width/Half Maximum	122.84
Center Wavelength	599 nm
Centroid Wavelength	419 nm
Dominant Wavelength	586 nm
Excitation Purity	0.1335
Colorimetric Purity	0.1456

CIE 1931 Chromaticity Diagram



x	0.4611	CCT	2703 K
y	0.4132	CRI	80
u	0.2621	L*	25.67
v	0.3523	a*	0.94
u'	0.2621	b*	3.65
v'	0.5285	Duv	0.0009
R1	78.0	R9	3.1
R2	87.7	R10	71.6
R3	96.2	R11	76.0
R4	78.1	R12	65.8
R5	77.2	R13	79.8
R6	84.3	R14	97.6
R7	82.7		
R8	56.8		



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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	0.00068	405	0.00099	430	0.00622	455	0.01708
381	0.00061	406	0.00098	431	0.00686	456	0.01585
382	0.00093	407	0.00098	432	0.00750	457	0.01503
383	0.00133	408	0.00123	433	0.00843	458	0.01429
384	0.00109	409	0.00108	434	0.00944	459	0.01357
385	0.00102	410	0.00117	435	0.01020	460	0.01309
386	0.00033	411	0.00121	436	0.01110	461	0.01244
387	0.00003	412	0.00113	437	0.01208	462	0.01203
388	0.00044	413	0.00125	438	0.01330	463	0.01146
389	0.00078	414	0.00116	439	0.01484	464	0.01107
390	0.00091	415	0.00128	440	0.01631	465	0.01076
391	0.00106	416	0.00138	441	0.01789	466	0.01030
392	0.00080	417	0.00152	442	0.01894	467	0.00991
393	0.00045	418	0.00180	443	0.02010	468	0.00940
394	0.00029	419	0.00200	444	0.02099	469	0.00896
395	0.00068	420	0.00233	445	0.02189	470	0.00865
396	0.00063	421	0.00259	446	0.02279	471	0.00839
397	0.00083	422	0.00298	447	0.02261	472	0.00810
398	0.00093	423	0.00329	448	0.02236	473	0.00791
399	0.00073	424	0.00354	449	0.02158	474	0.00779
400	0.00069	425	0.00396	450	0.02081	475	0.00760
401	0.00092	426	0.00434	451	0.02016	476	0.00747
402	0.00105	427	0.00483	452	0.01989	477	0.00732
403	0.00098	428	0.00535	453	0.01897	478	0.00731
404	0.00099	429	0.00575	454	0.01801	479	0.00724



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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	0.00733	505	0.01680	530	0.02910	555	0.03858
481	0.00739	506	0.01742	531	0.02945	556	0.03901
482	0.00749	507	0.01795	532	0.02988	557	0.03949
483	0.00757	508	0.01860	533	0.03026	558	0.04005
484	0.00766	509	0.01913	534	0.03055	559	0.04062
485	0.00786	510	0.01966	535	0.03090	560	0.04123
486	0.00803	511	0.02034	536	0.03116	561	0.04186
487	0.00825	512	0.02097	537	0.03150	562	0.04243
488	0.00852	513	0.02152	538	0.03196	563	0.04303
489	0.00880	514	0.02211	539	0.03234	564	0.04362
490	0.00918	515	0.02259	540	0.03270	565	0.04408
491	0.00953	516	0.02302	541	0.03313	566	0.04474
492	0.00990	517	0.02350	542	0.03354	567	0.04523
493	0.01026	518	0.02403	543	0.03388	568	0.04586
494	0.01067	519	0.02446	544	0.03428	569	0.04660
495	0.01115	520	0.02495	545	0.03455	570	0.04719
496	0.01173	521	0.02536	546	0.03487	571	0.04786
497	0.01226	522	0.02579	547	0.03528	572	0.04852
498	0.01278	523	0.02629	548	0.03563	573	0.04912
499	0.01335	524	0.02671	549	0.03602	574	0.04983
500	0.01386	525	0.02702	550	0.03639	575	0.05043
501	0.01451	526	0.02741	551	0.03695	576	0.05117
502	0.01501	527	0.02787	552	0.03740	577	0.05194
503	0.01568	528	0.02834	553	0.03794	578	0.05244
504	0.01621	529	0.02869	554	0.03826	579	0.05298



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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	0.05343	605	0.06346	630	0.05519	655	0.03618
581	0.05417	606	0.06365	631	0.05454	656	0.03539
582	0.05479	607	0.06379	632	0.05398	657	0.03457
583	0.05544	608	0.06364	633	0.05336	658	0.03380
584	0.05595	609	0.06369	634	0.05254	659	0.03315
585	0.05666	610	0.06348	635	0.05179	660	0.03243
586	0.05716	611	0.06318	636	0.05118	661	0.03164
587	0.05764	612	0.06298	637	0.05030	662	0.03089
588	0.05819	613	0.06288	638	0.04965	663	0.03012
589	0.05852	614	0.06247	639	0.04885	664	0.02944
590	0.05917	615	0.06223	640	0.04821	665	0.02879
591	0.05964	616	0.06196	641	0.04755	666	0.02812
592	0.06003	617	0.06157	642	0.04663	667	0.02732
593	0.06040	618	0.06129	643	0.04594	668	0.02652
594	0.06101	619	0.06085	644	0.04508	669	0.02578
595	0.06133	620	0.06036	645	0.04416	670	0.02507
596	0.06178	621	0.05980	646	0.04342	671	0.02460
597	0.06200	622	0.05949	647	0.04250	672	0.02408
598	0.06221	623	0.05910	648	0.04179	673	0.02352
599	0.06251	624	0.05855	649	0.04099	674	0.02292
600	0.06280	625	0.05807	650	0.04011	675	0.02225
601	0.06304	626	0.05753	651	0.03925	676	0.02165
602	0.06340	627	0.05682	652	0.03844	677	0.02110
603	0.06350	628	0.05642	653	0.03773	678	0.02061
604	0.06335	629	0.05577	654	0.03692	679	0.02000



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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	0.01951	706	0.00931	732	0.00442	758	0.00214
681	0.01894	707	0.00902	733	0.00422	759	0.00207
682	0.01838	708	0.00874	734	0.00402	760	0.00195
683	0.01789	709	0.00849	735	0.00376	761	0.00184
684	0.01736	710	0.00820	736	0.00356	762	0.00173
685	0.01700	711	0.00795	737	0.00355	763	0.00180
686	0.01653	712	0.00769	738	0.00355	764	0.00172
687	0.01611	713	0.00748	739	0.00350	765	0.00170
688	0.01569	714	0.00731	740	0.00344	766	0.00157
689	0.01528	715	0.00712	741	0.00322	767	0.00150
690	0.01481	716	0.00695	742	0.00318	768	0.00149
691	0.01441	717	0.00673	743	0.00310	769	0.00149
692	0.01395	718	0.00656	744	0.00298	770	0.00148
693	0.01349	719	0.00635	745	0.00283	771	0.00135
694	0.01314	720	0.00610	746	0.00270	772	0.00147
695	0.01277	721	0.00584	747	0.00264	773	0.00134
696	0.01243	722	0.00564	748	0.00267	774	0.00141
697	0.01217	723	0.00558	749	0.00261	775	0.00124
698	0.01185	724	0.00554	750	0.00262	776	0.00126
699	0.01149	725	0.00536	751	0.00252	777	0.00121
700	0.01110	726	0.00511	752	0.00235	778	0.00138
701	0.01076	727	0.00493	753	0.00222	779	0.00144
702	0.01041	728	0.00478	754	0.00209	780	0.00127
703	0.01013	729	0.00480	755	0.00205		
704	0.00984	730	0.00466	756	0.00203		
705	0.00952	731	0.00456	757	0.00210		