



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: CY2021	Driver Details: CY810	
Test Report	L1504133-C1	Description	CREE XPE2 LED's	Type Commercial
Test Date	13 April 2015	Manufacturer	Cree	Description 61W
Report Date	13 April 2015	Catalog No.	LOG-HO-120-48-40K- WWLF-SI-NO	Manufacturer MEAN WELL USA inc.
Sphere Temperature	26.€ °C	Serial No.	SRIS 1894	Catalog No. LPF-60-24
Humidity	24.2 %	Diameter	N/A mm	Voltage 120.00 V
Lamp Type	SSL	Color	White	Power Factor 0.9900

Stabilization Time: 60 minutes

Tested By: Jean-Paul Ojeil

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.



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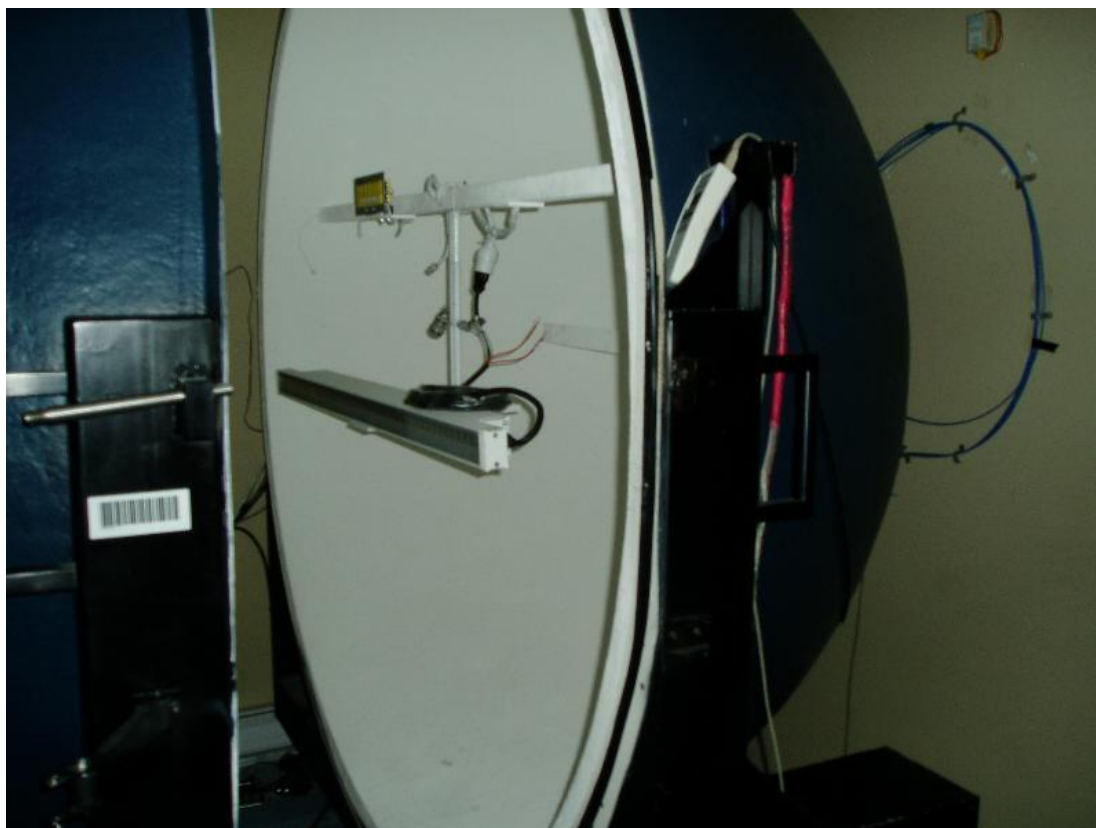
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Realization of Sphere Test

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	California Instruments	801RP	05816	N.P.C.R.	N.P.C.R.
Input Power Meter	Yokogawa	WT210	91L236540	2014/10/22	2015/10/22
Output Power Meter	N/A	N/A	N/A	N.P.C.R.	N.P.C.R.
Shunt Resistor	Fluke	Y5020	5675014	2014/08/06	2015/08/06
Current Multimeter	HP Agilent	HP34401A	US36121202	2014/08/06	2015/08/06
Voltage Multimeter	Fluke	Fluke8842A	5750288	2014/04/16	2015/04/16

Spectrometer Equipment

Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due Date
Spectrometer	Ocean Optics	USB2000N	USB2E3864	2014/08/24	2015/08/24

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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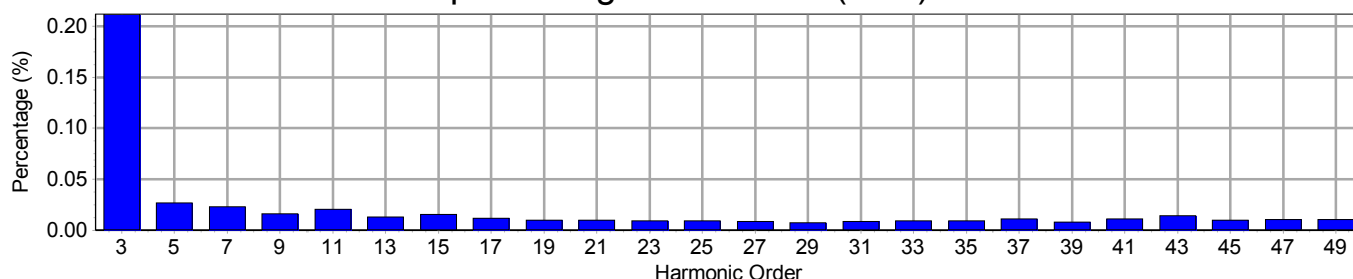
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Electrical Measurements

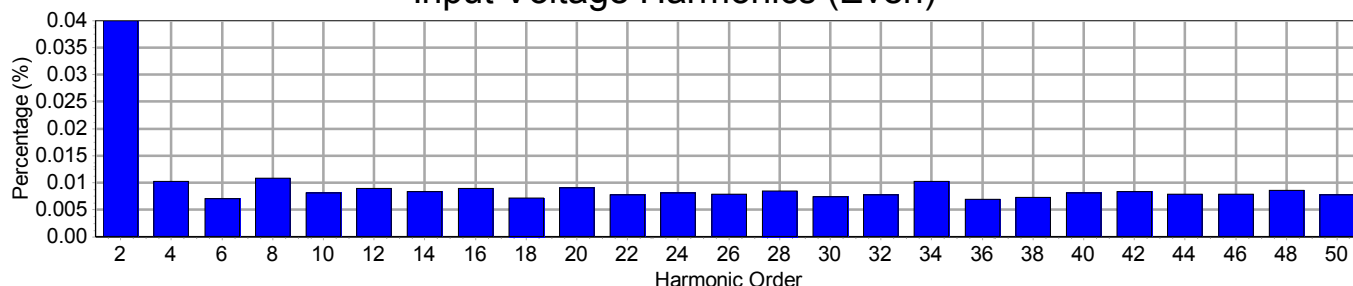
Input

Frequency	60 Hz	Active Power	61.67 W	THDV [ANSI]	0.23 %
Voltage	120.0 V(rms)	Apparent Power	61.97 VA	THDA [ANSI]	4.82 %
Current	0.5163 A(rms)	Power Factor	0.995	Max. Harmonic At	5th order

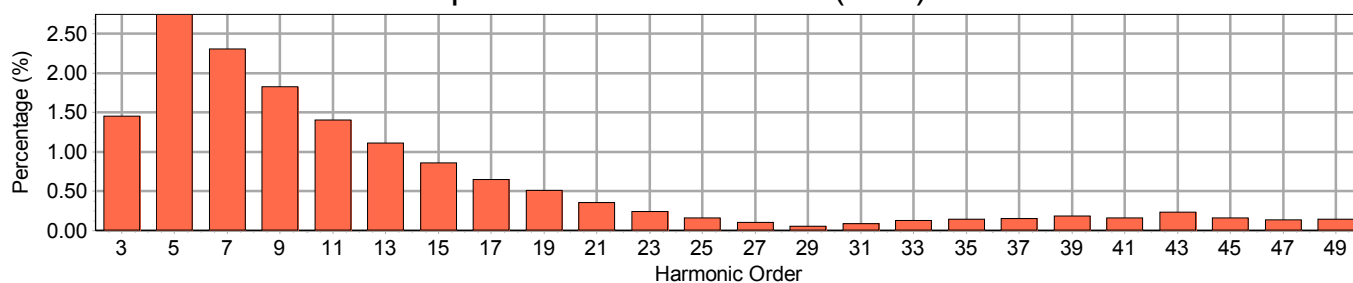
Input Voltage Harmonics (Odd)



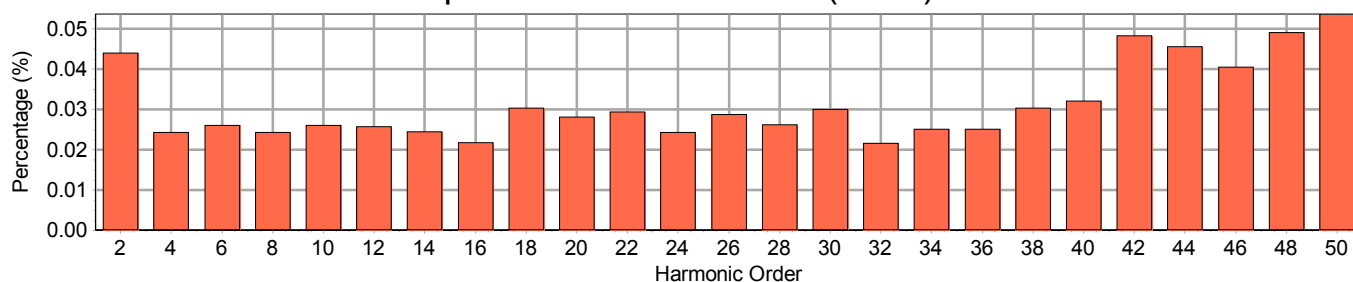
Input Voltage Harmonics (Even)



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	0.040	0.044
3	180	0.212	1.451	4	240	0.010	0.024
5	300	0.027	2.749	6	360	0.007	0.026
7	420	0.023	2.303	8	480	0.011	0.024
9	540	0.016	1.825	10	600	0.008	0.026
11	660	0.021	1.401	12	720	0.009	0.026
13	780	0.013	1.109	14	840	0.008	0.025
15	900	0.015	0.856	16	960	0.009	0.022
17	1020	0.012	0.648	18	1080	0.007	0.030
19	1140	0.010	0.510	20	1200	0.009	0.028
21	1260	0.010	0.355	22	1320	0.008	0.029
23	1380	0.009	0.240	24	1440	0.008	0.024
25	1500	0.009	0.162	26	1560	0.008	0.029
27	1620	0.008	0.100	28	1680	0.008	0.026
29	1740	0.008	0.055	30	1800	0.007	0.030
31	1860	0.008	0.087	32	1920	0.008	0.022
33	1980	0.009	0.128	34	2040	0.010	0.025
35	2100	0.009	0.141	36	2160	0.007	0.025
37	2220	0.011	0.152	38	2280	0.007	0.030
39	2340	0.008	0.183	40	2400	0.008	0.032
41	2460	0.011	0.160	42	2520	0.008	0.048
43	2580	0.014	0.234	44	2640	0.008	0.046
45	2700	0.010	0.161	46	2760	0.008	0.040
47	2820	0.010	0.135	48	2880	0.009	0.049
49	2940	0.011	0.143	50	3000	0.008	0.054



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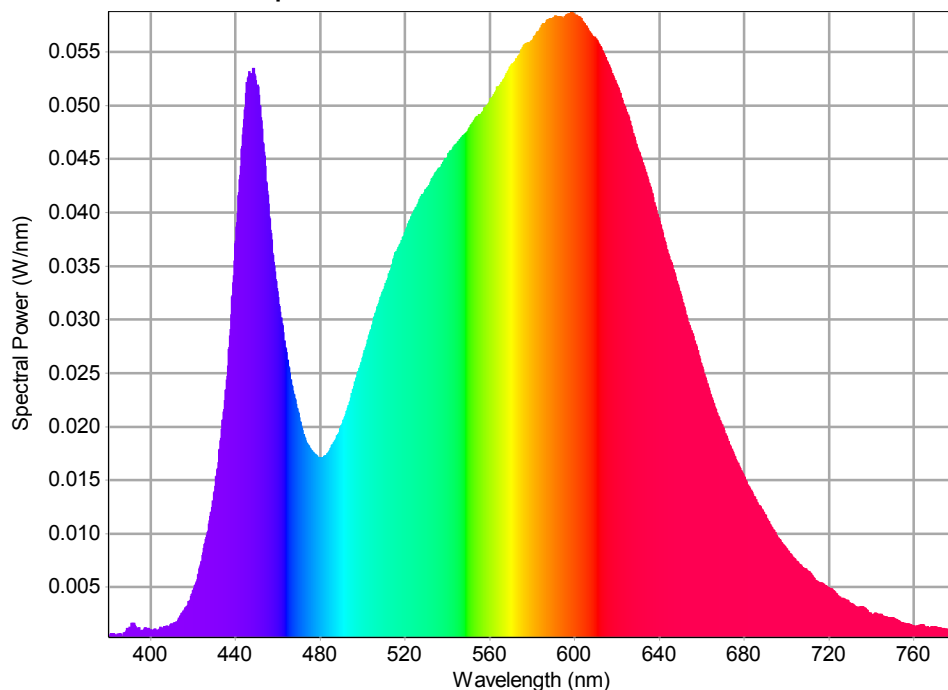
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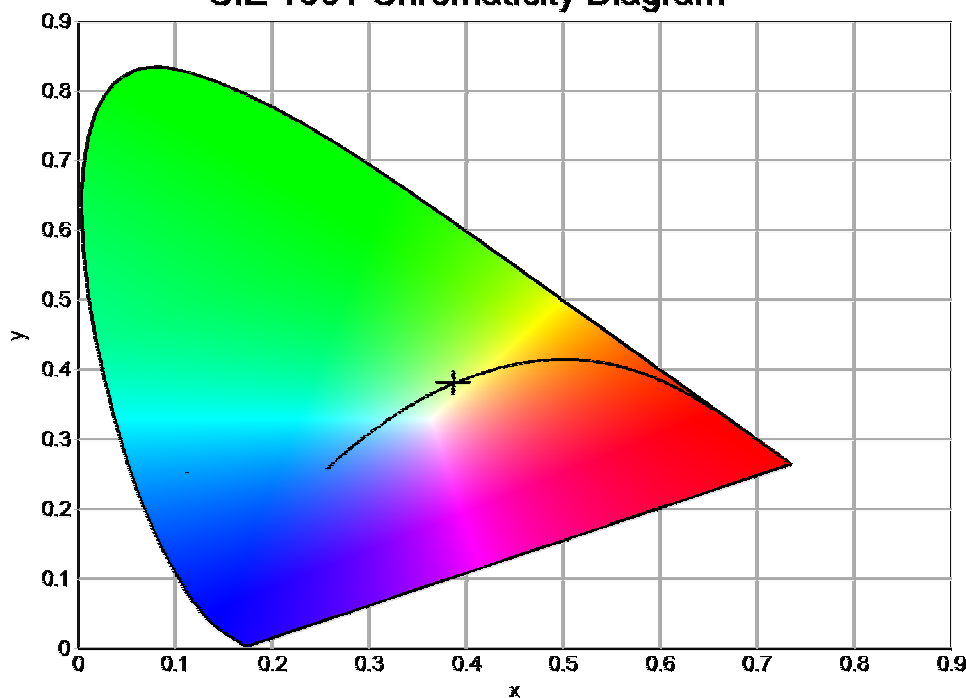
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Spectral Power Distribution



Peak Wavelength	599 nm
Luminous Flux	3397 lm
Input Power	61.67 W
Lumens/Watt	55.1
Full Width/Half Maximum	149.84
Center Wavelength	579 nm
Centroid Wavelength	371 nm
Dominant Wavelength	487 nm
Excitation Purity	0.1575
Colorimetric Purity	0.1009

CIE 1931 Chromaticity Diagram



x	0.3861	CCT	3888 K
y	0.3818	CRI	83
u	0.2268	L*	25.67
v	0.3364	a*	-4.89
u'	0.2268	b*	-14.05
v'	0.5046	Duv	0.0007
R1	81.3	R9	11.8
R2	88.1	R10	71.4
R3	93.3	R11	81.0
R4	82.6	R12	64.6
R5	81.2	R13	82.7
R6	83.7	R14	96.1
R7	86.8		
R8	66.2		



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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	0.00046	405	0.00123	430	0.01387	455	0.04203
381	0.00059	406	0.00127	431	0.01540	456	0.03967
382	0.00060	407	0.00132	432	0.01667	457	0.03749
383	0.00063	408	0.00129	433	0.01871	458	0.03537
384	0.00055	409	0.00146	434	0.02065	459	0.03376
385	0.00066	410	0.00159	435	0.02248	460	0.03214
386	0.00065	411	0.00170	436	0.02443	461	0.03074
387	0.00044	412	0.00178	437	0.02728	462	0.02965
388	0.00081	413	0.00197	438	0.03050	463	0.02806
389	0.00119	414	0.00231	439	0.03349	464	0.02697
390	0.00130	415	0.00266	440	0.03713	465	0.02567
391	0.00167	416	0.00292	441	0.03994	466	0.02445
392	0.00169	417	0.00321	442	0.04309	467	0.02339
393	0.00126	418	0.00373	443	0.04598	468	0.02268
394	0.00118	419	0.00418	444	0.04876	469	0.02177
395	0.00094	420	0.00472	445	0.05121	470	0.02090
396	0.00100	421	0.00522	446	0.05260	471	0.02008
397	0.00117	422	0.00576	447	0.05303	472	0.01933
398	0.00113	423	0.00678	448	0.05298	473	0.01870
399	0.00121	424	0.00743	449	0.05300	474	0.01835
400	0.00109	425	0.00869	450	0.05190	475	0.01806
401	0.00098	426	0.00952	451	0.05102	476	0.01777
402	0.00112	427	0.01019	452	0.04891	477	0.01754
403	0.00101	428	0.01168	453	0.04660	478	0.01738
404	0.00108	429	0.01249	454	0.04440	479	0.01719



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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	0.01706	505	0.02989	530	0.04222	555	0.04922
481	0.01717	506	0.03059	531	0.04248	556	0.04929
482	0.01726	507	0.03120	532	0.04281	557	0.04951
483	0.01735	508	0.03180	533	0.04326	558	0.04985
484	0.01763	509	0.03235	534	0.04367	559	0.05008
485	0.01803	510	0.03285	535	0.04389	560	0.05038
486	0.01837	511	0.03341	536	0.04419	561	0.05077
487	0.01872	512	0.03392	537	0.04433	562	0.05105
488	0.01917	513	0.03455	538	0.04471	563	0.05144
489	0.01949	514	0.03517	539	0.04507	564	0.05177
490	0.02014	515	0.03601	540	0.04521	565	0.05194
491	0.02061	516	0.03639	541	0.04568	566	0.05225
492	0.02115	517	0.03679	542	0.04581	567	0.05259
493	0.02176	518	0.03720	543	0.04616	568	0.05301
494	0.02232	519	0.03770	544	0.04639	569	0.05340
495	0.02313	520	0.03815	545	0.04666	570	0.05378
496	0.02381	521	0.03868	546	0.04688	571	0.05392
497	0.02451	522	0.03921	547	0.04713	572	0.05418
498	0.02517	523	0.03967	548	0.04731	573	0.05441
499	0.02576	524	0.04008	549	0.04749	574	0.05475
500	0.02641	525	0.04046	550	0.04781	575	0.05524
501	0.02713	526	0.04079	551	0.04819	576	0.05567
502	0.02775	527	0.04129	552	0.04845	577	0.05586
503	0.02853	528	0.04171	553	0.04880	578	0.05592
504	0.02908	529	0.04181	554	0.04903	579	0.05588



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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	0.05611	605	0.05755	630	0.04582	655	0.02903
581	0.05648	606	0.05726	631	0.04534	656	0.02846
582	0.05682	607	0.05692	632	0.04473	657	0.02777
583	0.05692	608	0.05665	633	0.04407	658	0.02716
584	0.05726	609	0.05640	634	0.04349	659	0.02635
585	0.05770	610	0.05630	635	0.04284	660	0.02571
586	0.05765	611	0.05592	636	0.04217	661	0.02498
587	0.05803	612	0.05557	637	0.04141	662	0.02434
588	0.05815	613	0.05517	638	0.04064	663	0.02373
589	0.05813	614	0.05472	639	0.03991	664	0.02310
590	0.05824	615	0.05423	640	0.03924	665	0.02247
591	0.05840	616	0.05387	641	0.03851	666	0.02189
592	0.05829	617	0.05336	642	0.03770	667	0.02133
593	0.05836	618	0.05287	643	0.03695	668	0.02084
594	0.05832	619	0.05240	644	0.03621	669	0.02040
595	0.05819	620	0.05192	645	0.03562	670	0.01995
596	0.05851	621	0.05141	646	0.03510	671	0.01940
597	0.05858	622	0.05079	647	0.03443	672	0.01888
598	0.05869	623	0.05019	648	0.03365	673	0.01836
599	0.05871	624	0.04968	649	0.03304	674	0.01796
600	0.05846	625	0.04918	650	0.03239	675	0.01745
601	0.05845	626	0.04859	651	0.03161	676	0.01697
602	0.05833	627	0.04777	652	0.03089	677	0.01663
603	0.05821	628	0.04716	653	0.03019	678	0.01613
604	0.05781	629	0.04644	654	0.02955	679	0.01576



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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	0.01536	706	0.00717	732	0.00326	758	0.00156
681	0.01488	707	0.00700	733	0.00320	759	0.00146
682	0.01447	708	0.00679	734	0.00320	760	0.00142
683	0.01414	709	0.00675	735	0.00326	761	0.00133
684	0.01371	710	0.00651	736	0.00322	762	0.00139
685	0.01347	711	0.00637	737	0.00309	763	0.00148
686	0.01299	712	0.00614	738	0.00291	764	0.00157
687	0.01271	713	0.00585	739	0.00262	765	0.00136
688	0.01239	714	0.00561	740	0.00249	766	0.00122
689	0.01207	715	0.00549	741	0.00247	767	0.00121
690	0.01177	716	0.00546	742	0.00261	768	0.00124
691	0.01129	717	0.00541	743	0.00245	769	0.00134
692	0.01097	718	0.00516	744	0.00252	770	0.00137
693	0.01064	719	0.00511	745	0.00241	771	0.00128
694	0.01033	720	0.00495	746	0.00230	772	0.00128
695	0.00994	721	0.00491	747	0.00229	773	0.00120
696	0.00966	722	0.00471	748	0.00221	774	0.00119
697	0.00939	723	0.00449	749	0.00219	775	0.00114
698	0.00910	724	0.00427	750	0.00221	776	0.00111
699	0.00889	725	0.00412	751	0.00212	777	0.00097
700	0.00860	726	0.00398	752	0.00201	778	0.00090
701	0.00837	727	0.00396	753	0.00190	779	0.00101
702	0.00811	728	0.00384	754	0.00173	780	0.00089
703	0.00783	729	0.00378	755	0.00166		
704	0.00765	730	0.00354	756	0.00164		
705	0.00742	731	0.00346	757	0.00161		



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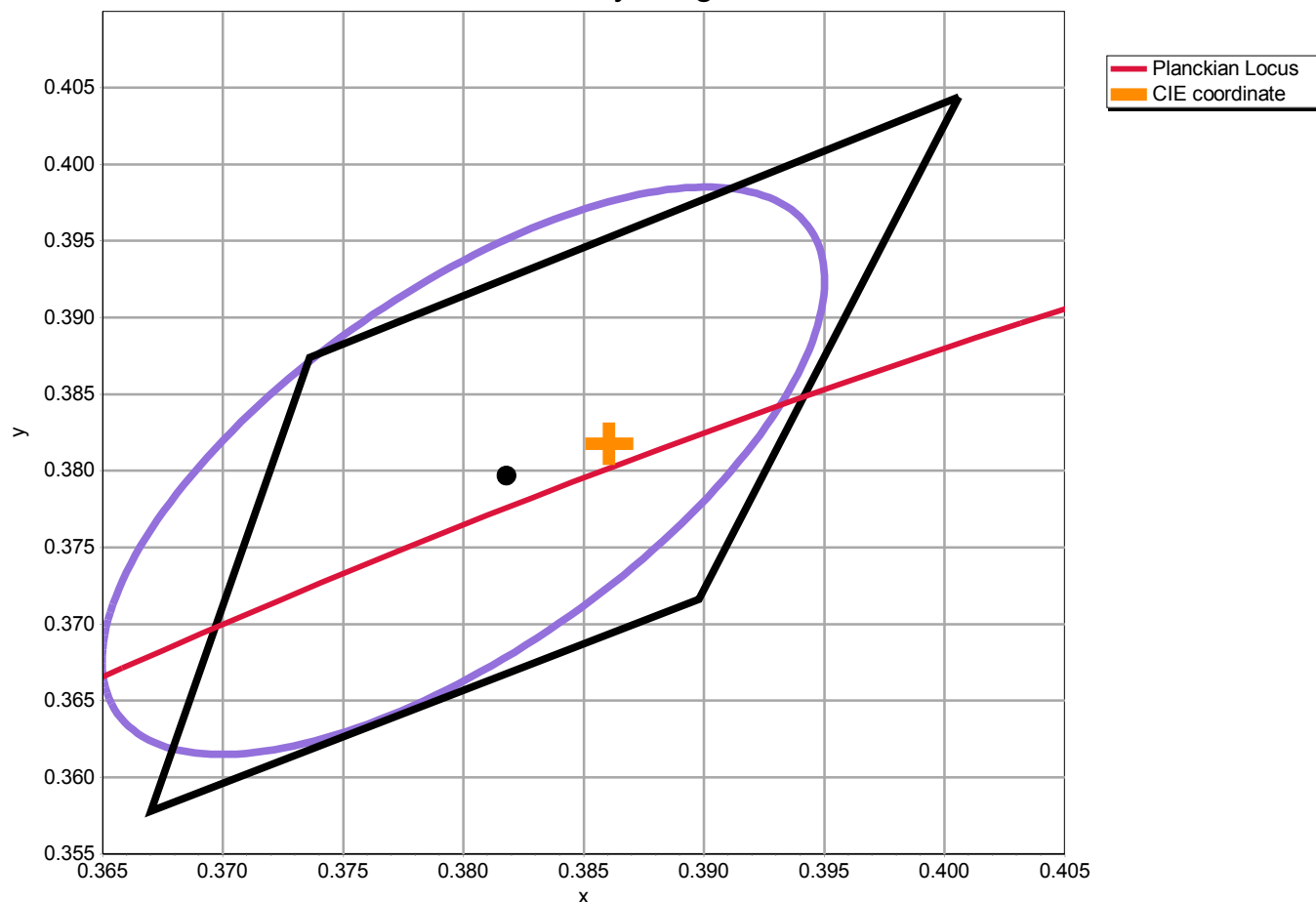
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CIE Chromaticity Diagram for Indoor SSL products

CIE 1931 Chromaticity Diagram



Chromaticity tolerance for 4000K nominal CCT

Min CCT	3710
Max CCT	4260
Delta T	275
Center Duv	0.0010