



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: CY2040	Driver Details: CY828	
Test Report	L1504223-C1	Description	CREE XPE2 LED's	Type Commercial
Test Date	22 April 2015	Manufacturer	Cree	Description 46W
Report Date	24 April 2015	Catalog No.	LOG-HO-120-36-40K- WWLF-SI-NO	Manufacturer MEAN WELL USA inc.
Sphere Temperature	25.8 °C	Serial No.	SRIS 1900	Catalog No. LPF-60-24
Humidity	23.2 %	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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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.
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	2015/04/16	2016/04/16

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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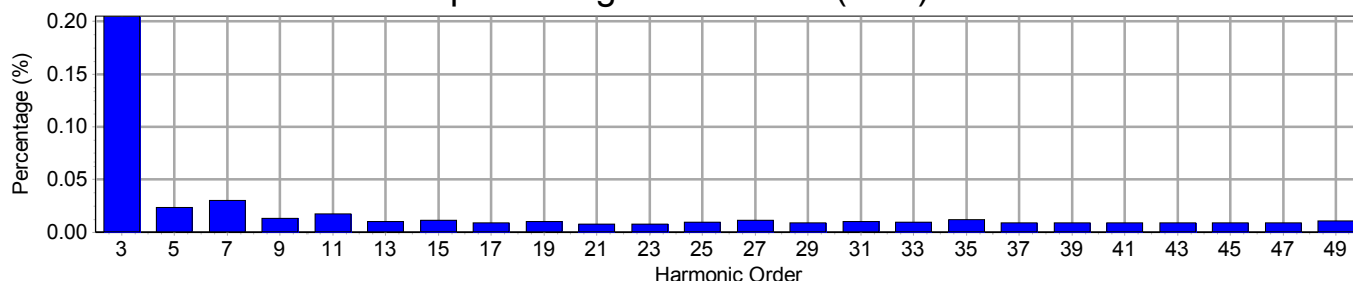
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Electrical Measurements

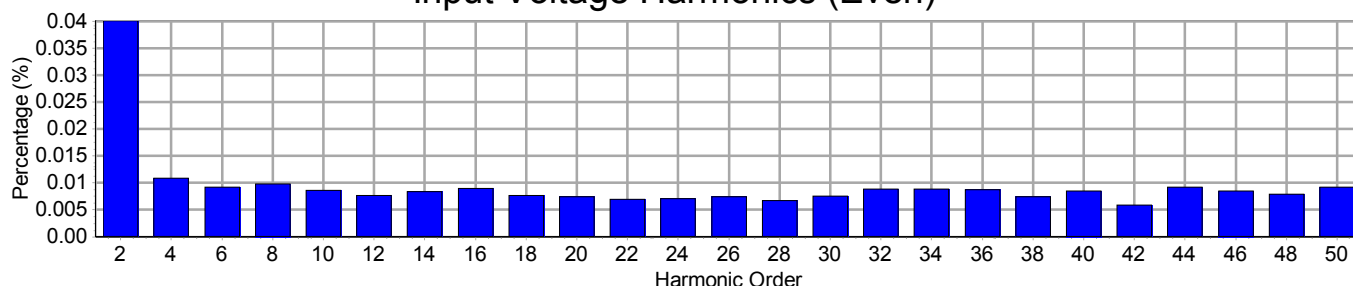
Input

Frequency	60 Hz	Active Power	45.95 W	THDV [ANSI]	0.22 %
Voltage	119.9 V(rms)	Apparent Power	46.34 VA	THDA [ANSI]	6.74 %
Current	0.3864 A(rms)	Power Factor	0.992	Max. Harmonic At	5th order

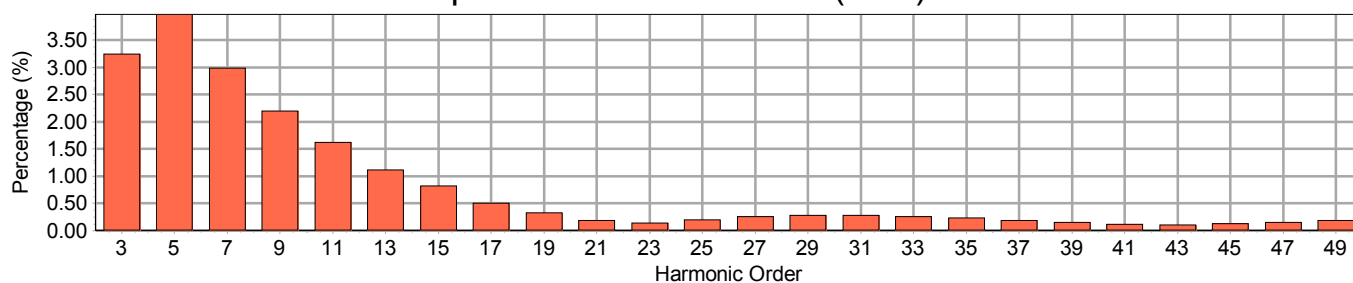
Input Voltage Harmonics (Odd)



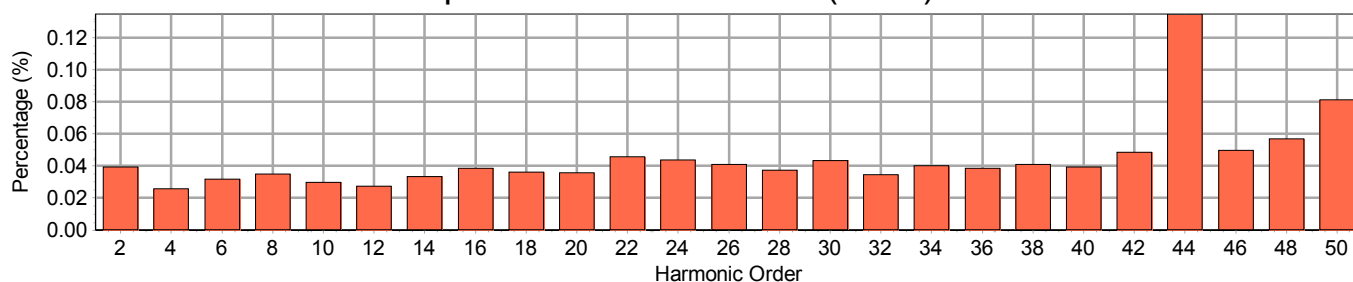
Input Voltage Harmonics (Even)



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	0.039
3	180	0.205	3.243	4	240	0.011	0.026
5	300	0.023	3.981	6	360	0.009	0.032
7	420	0.030	2.988	8	480	0.010	0.035
9	540	0.013	2.195	10	600	0.009	0.030
11	660	0.017	1.614	12	720	0.008	0.027
13	780	0.010	1.111	14	840	0.008	0.034
15	900	0.011	0.823	16	960	0.009	0.038
17	1020	0.009	0.498	18	1080	0.008	0.036
19	1140	0.010	0.323	20	1200	0.007	0.036
21	1260	0.008	0.183	22	1320	0.007	0.046
23	1380	0.008	0.135	24	1440	0.007	0.044
25	1500	0.010	0.200	26	1560	0.007	0.041
27	1620	0.011	0.249	28	1680	0.007	0.037
29	1740	0.009	0.273	30	1800	0.008	0.043
31	1860	0.010	0.281	32	1920	0.009	0.035
33	1980	0.010	0.256	34	2040	0.009	0.040
35	2100	0.012	0.231	36	2160	0.009	0.038
37	2220	0.009	0.180	38	2280	0.007	0.041
39	2340	0.009	0.148	40	2400	0.008	0.039
41	2460	0.009	0.116	42	2520	0.006	0.048
43	2580	0.009	0.101	44	2640	0.009	0.135
45	2700	0.009	0.118	46	2760	0.009	0.050
47	2820	0.009	0.143	48	2880	0.008	0.057
49	2940	0.010	0.178	50	3000	0.009	0.081



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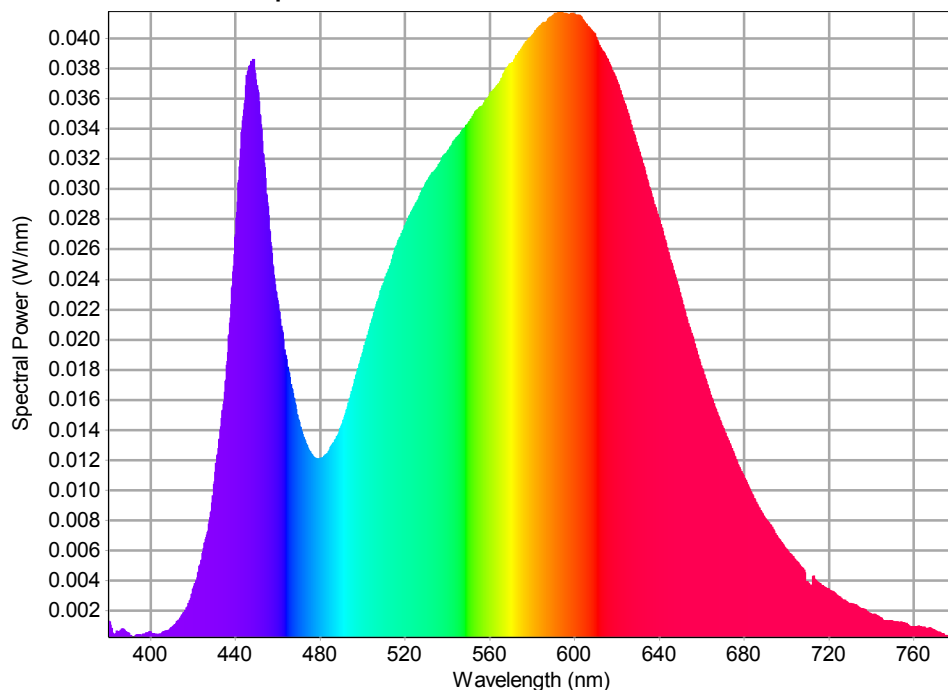
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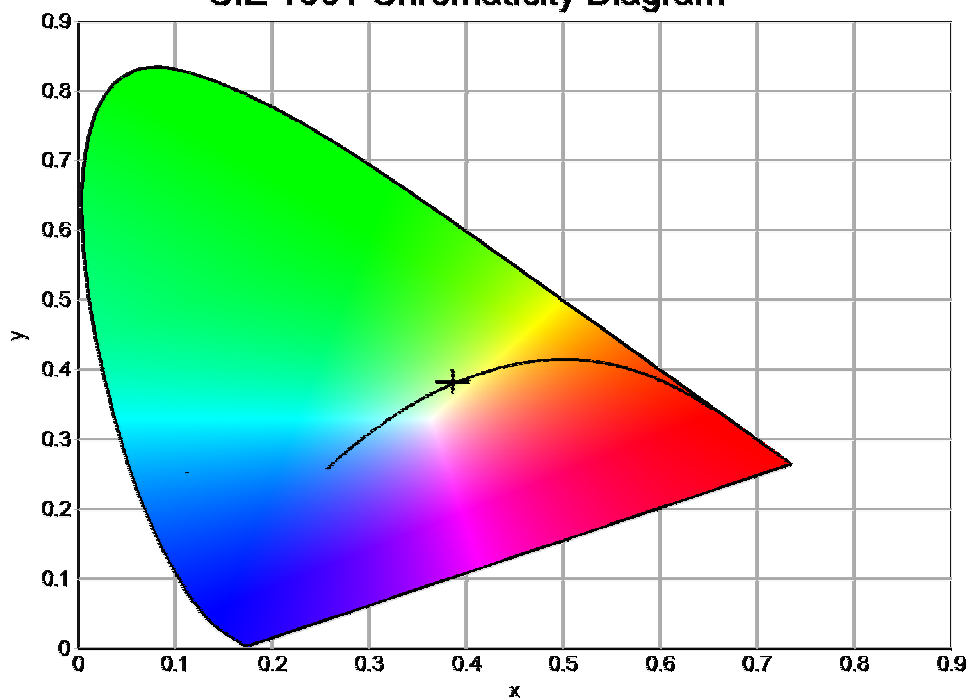
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Spectral Power Distribution



Peak Wavelength	594 nm
Luminous Flux	2432 lm
Input Power	45.95 W
Lumens/Watt	52.9
Full Width/Half Maximum	150.40
Center Wavelength	579 nm
Centroid Wavelength	370 nm
Dominant Wavelength	488 nm
Excitation Purity	0.1577
Colorimetric Purity	0.1031

CIE 1931 Chromaticity Diagram



x	0.3858	CCT	3902 K
y	0.3826	CRI	83
u	0.2263	L*	25.67
v	0.3366	a*	-5.06
u'	0.2263	b*	-13.91
v'	0.5049	Duv	0.0012
R1	81.0	R9	11.0
R2	87.8	R10	70.7
R3	93.1	R11	81.0
R4	82.5	R12	64.3
R5	81.0	R13	82.3
R6	83.3	R14	96.0
R7	86.9		
R8	66.0		



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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	0.00135	405	0.00048	430	0.01041	455	0.02914
381	0.00109	406	0.00066	431	0.01181	456	0.02734
382	0.00057	407	0.00070	432	0.01280	457	0.02578
383	0.00044	408	0.00070	433	0.01404	458	0.02434
384	0.00069	409	0.00079	434	0.01533	459	0.02328
385	0.00065	410	0.00092	435	0.01656	460	0.02237
386	0.00074	411	0.00106	436	0.01833	461	0.02141
387	0.00082	412	0.00120	437	0.02028	462	0.02062
388	0.00066	413	0.00137	438	0.02237	463	0.01935
389	0.00058	414	0.00153	439	0.02454	464	0.01869
390	0.00042	415	0.00177	440	0.02683	465	0.01789
391	0.00033	416	0.00195	441	0.02918	466	0.01707
392	0.00033	417	0.00222	442	0.03149	467	0.01647
393	0.00040	418	0.00252	443	0.03380	468	0.01583
394	0.00045	419	0.00288	444	0.03527	469	0.01504
395	0.00045	420	0.00346	445	0.03691	470	0.01454
396	0.00032	421	0.00384	446	0.03782	471	0.01400
397	0.00046	422	0.00423	447	0.03822	472	0.01355
398	0.00055	423	0.00498	448	0.03816	473	0.01316
399	0.00056	424	0.00536	449	0.03792	474	0.01284
400	0.00062	425	0.00618	450	0.03690	475	0.01261
401	0.00055	426	0.00676	451	0.03583	476	0.01238
402	0.00043	427	0.00723	452	0.03431	477	0.01223
403	0.00043	428	0.00824	453	0.03238	478	0.01212
404	0.00047	429	0.00920	454	0.03075	479	0.01208



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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	0.01214	505	0.02157	530	0.03045	555	0.03542
481	0.01216	506	0.02207	531	0.03067	556	0.03550
482	0.01229	507	0.02254	532	0.03090	557	0.03564
483	0.01241	508	0.02298	533	0.03110	558	0.03590
484	0.01257	509	0.02342	534	0.03123	559	0.03604
485	0.01291	510	0.02376	535	0.03142	560	0.03629
486	0.01313	511	0.02418	536	0.03165	561	0.03650
487	0.01335	512	0.02454	537	0.03190	562	0.03665
488	0.01360	513	0.02490	538	0.03221	563	0.03682
489	0.01392	514	0.02534	539	0.03236	564	0.03699
490	0.01430	515	0.02589	540	0.03250	565	0.03716
491	0.01469	516	0.02622	541	0.03270	566	0.03745
492	0.01516	517	0.02662	542	0.03292	567	0.03781
493	0.01559	518	0.02688	543	0.03321	568	0.03802
494	0.01611	519	0.02727	544	0.03336	569	0.03824
495	0.01659	520	0.02757	545	0.03353	570	0.03833
496	0.01711	521	0.02787	546	0.03367	571	0.03842
497	0.01764	522	0.02822	547	0.03390	572	0.03873
498	0.01810	523	0.02848	548	0.03403	573	0.03891
499	0.01865	524	0.02876	549	0.03425	574	0.03916
500	0.01911	525	0.02901	550	0.03443	575	0.03931
501	0.01964	526	0.02926	551	0.03464	576	0.03959
502	0.02012	527	0.02957	552	0.03483	577	0.03980
503	0.02059	528	0.02992	553	0.03513	578	0.03990
504	0.02110	529	0.03014	554	0.03529	579	0.04005



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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	0.04020	605	0.04103	630	0.03269	655	0.02046
581	0.04037	606	0.04083	631	0.03224	656	0.02005
582	0.04057	607	0.04071	632	0.03175	657	0.01950
583	0.04076	608	0.04053	633	0.03126	658	0.01903
584	0.04087	609	0.04039	634	0.03069	659	0.01855
585	0.04105	610	0.04011	635	0.03018	660	0.01813
586	0.04104	611	0.03976	636	0.02973	661	0.01771
587	0.04115	612	0.03941	637	0.02926	662	0.01728
588	0.04140	613	0.03920	638	0.02882	663	0.01681
589	0.04144	614	0.03902	639	0.02835	664	0.01636
590	0.04155	615	0.03872	640	0.02794	665	0.01598
591	0.04169	616	0.03846	641	0.02747	666	0.01556
592	0.04170	617	0.03812	642	0.02692	667	0.01522
593	0.04180	618	0.03777	643	0.02643	668	0.01483
594	0.04178	619	0.03753	644	0.02587	669	0.01449
595	0.04164	620	0.03710	645	0.02532	670	0.01415
596	0.04166	621	0.03672	646	0.02491	671	0.01382
597	0.04160	622	0.03631	647	0.02440	672	0.01348
598	0.04165	623	0.03588	648	0.02392	673	0.01316
599	0.04169	624	0.03554	649	0.02342	674	0.01282
600	0.04162	625	0.03508	650	0.02289	675	0.01247
601	0.04157	626	0.03460	651	0.02236	676	0.01208
602	0.04157	627	0.03406	652	0.02182	677	0.01174
603	0.04148	628	0.03365	653	0.02133	678	0.01140
604	0.04124	629	0.03314	654	0.02090	679	0.01114



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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	0.01084	706	0.00508	732	0.00240	758	0.00101
681	0.01056	707	0.00491	733	0.00237	759	0.00098
682	0.01024	708	0.00475	734	0.00226	760	0.00098
683	0.00995	709	0.00391	735	0.00219	761	0.00098
684	0.00965	710	0.00389	736	0.00215	762	0.00101
685	0.00939	711	0.00373	737	0.00211	763	0.00100
686	0.00910	712	0.00368	738	0.00199	764	0.00091
687	0.00884	713	0.00415	739	0.00189	765	0.00094
688	0.00862	714	0.00399	740	0.00181	766	0.00087
689	0.00834	715	0.00390	741	0.00180	767	0.00087
690	0.00814	716	0.00377	742	0.00178	768	0.00085
691	0.00798	717	0.00370	743	0.00168	769	0.00080
692	0.00775	718	0.00358	744	0.00158	770	0.00071
693	0.00758	719	0.00351	745	0.00147	771	0.00063
694	0.00732	720	0.00344	746	0.00140	772	0.00060
695	0.00705	721	0.00334	747	0.00137	773	0.00050
696	0.00685	722	0.00328	748	0.00132	774	0.00048
697	0.00665	723	0.00314	749	0.00139	775	0.00040
698	0.00650	724	0.00302	750	0.00133	776	0.00036
699	0.00626	725	0.00295	751	0.00131	777	0.00038
700	0.00609	726	0.00278	752	0.00128	778	0.00052
701	0.00590	727	0.00272	753	0.00122	779	0.00049
702	0.00577	728	0.00267	754	0.00130	780	0.00053
703	0.00562	729	0.00253	755	0.00127		
704	0.00541	730	0.00254	756	0.00115		
705	0.00527	731	0.00246	757	0.00114		



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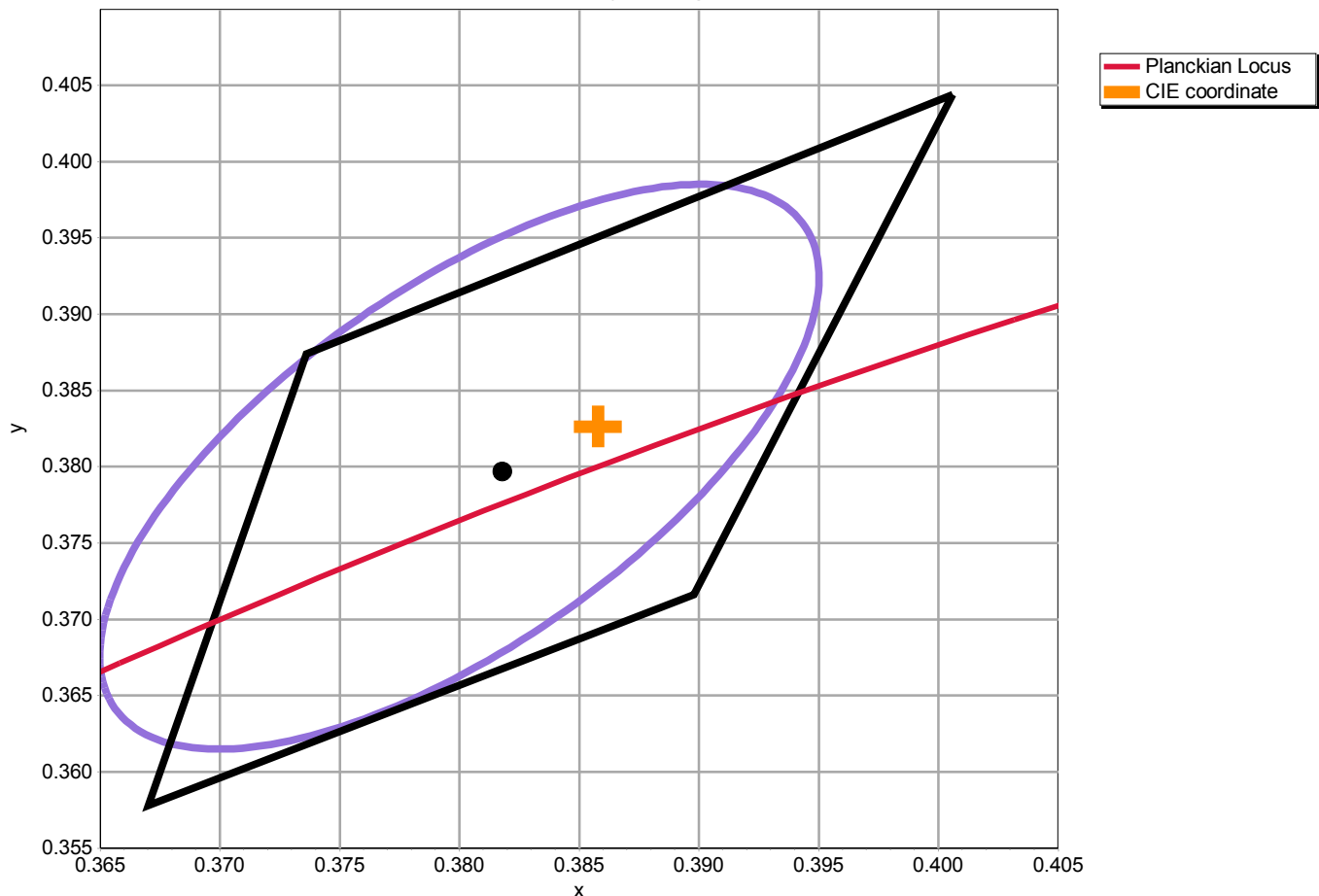
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CIE Chromaticity Diagram for Indoor SSL products

CIE 1931 Chromaticity Diagram



Chromaticity tolerance for 4000K nominal CCT

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