



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: CY2039	Driver Details: CY827	
Test Report	L1504212-C1	Description	CREE XPE2 LED's	Type Commercial
Test Date	21 April 2015	Manufacturer	Cree	Description 15W
Report Date	24 April 2015	Catalog No.	LOG-HO-120-12-40K-WWLF-SI-NO	Manufacturer LOG-HO-120-12-40K-WWLF-SI-NO
Sphere Temperature	25.1 °C	Serial No.	SRIS 1898	Catalog No. 20-3871
Humidity	25.8 %	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 Spectralux 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	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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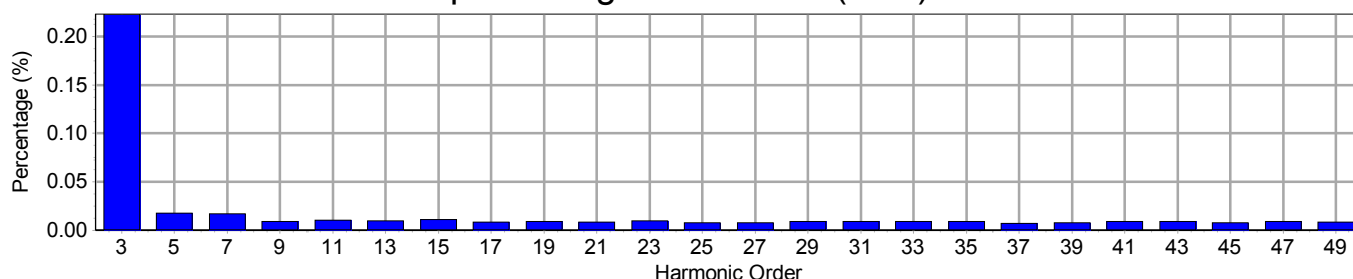
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Electrical Measurements

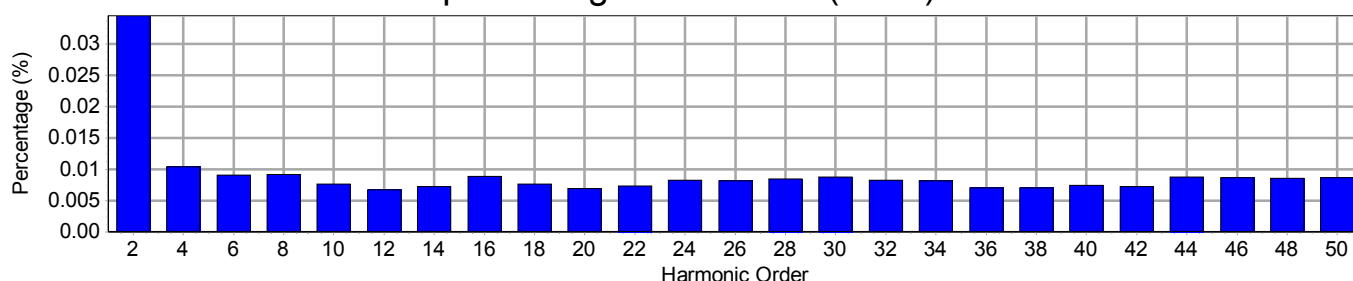
Input

Frequency	60 Hz	Active Power	16.26 W	THDV [ANSI]	0.23 %
Voltage	120.0 V(rms)	Apparent Power	16.37 VA	THDA [ANSI]	7.15 %
Current	0.1364 A(rms)	Power Factor	0.994	Max. Harmonic At	3rd order

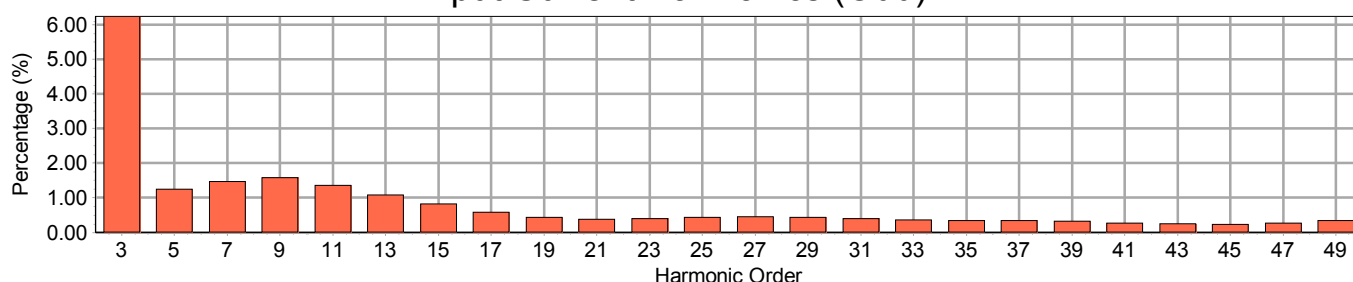
Input Voltage Harmonics (Odd)



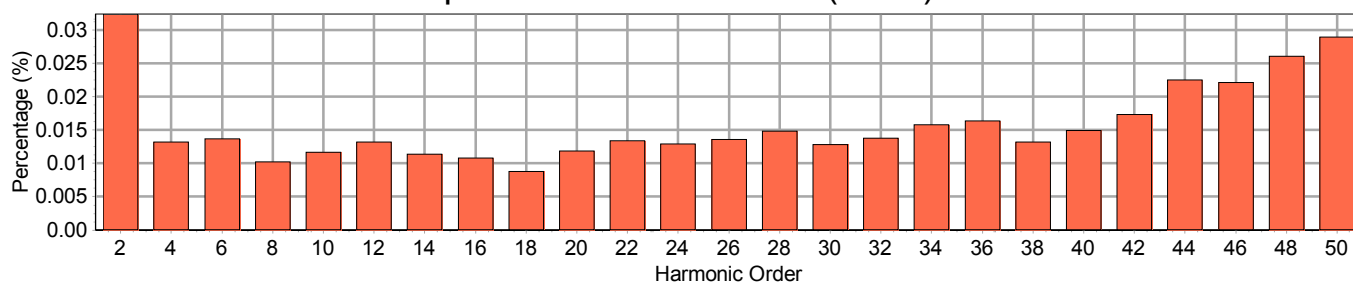
Input Voltage Harmonics (Even)



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	0.035	0.032
3	180	0.224	6.259	4	240	0.010	0.013
5	300	0.017	1.255	6	360	0.009	0.014
7	420	0.017	1.474	8	480	0.009	0.010
9	540	0.009	1.574	10	600	0.008	0.012
11	660	0.010	1.365	12	720	0.007	0.013
13	780	0.010	1.084	14	840	0.007	0.011
15	900	0.011	0.818	16	960	0.009	0.011
17	1020	0.009	0.581	18	1080	0.008	0.009
19	1140	0.009	0.441	20	1200	0.007	0.012
21	1260	0.008	0.380	22	1320	0.007	0.013
23	1380	0.009	0.405	24	1440	0.008	0.013
25	1500	0.008	0.431	26	1560	0.008	0.014
27	1620	0.008	0.453	28	1680	0.008	0.015
29	1740	0.009	0.435	30	1800	0.009	0.013
31	1860	0.009	0.394	32	1920	0.008	0.014
33	1980	0.009	0.363	34	2040	0.008	0.016
35	2100	0.009	0.347	36	2160	0.007	0.016
37	2220	0.007	0.345	38	2280	0.007	0.013
39	2340	0.008	0.315	40	2400	0.007	0.015
41	2460	0.009	0.277	42	2520	0.007	0.017
43	2580	0.009	0.255	44	2640	0.009	0.022
45	2700	0.008	0.233	46	2760	0.009	0.022
47	2820	0.009	0.274	48	2880	0.009	0.026
49	2940	0.008	0.341	50	3000	0.009	0.029



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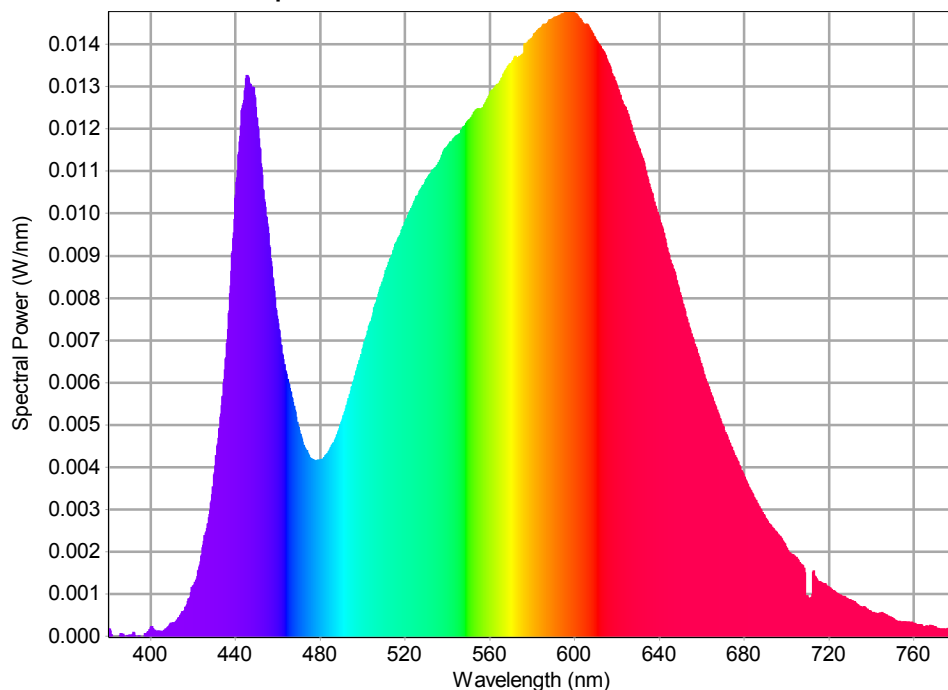
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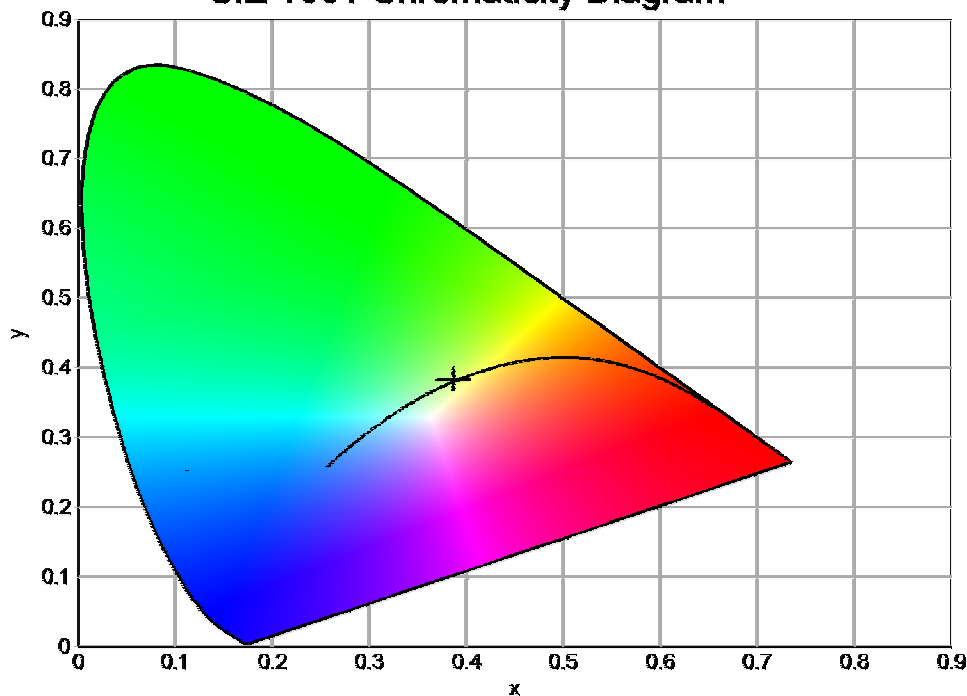
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Spectral Power Distribution



Peak Wavelength	599 nm
Luminous Flux	860 lm
Input Power	16.26 W
Lumens/Watt	52.8
Full Width/Half Maximum	150.48
Center Wavelength	578 nm
Centroid Wavelength	370 nm
Dominant Wavelength	488 nm
Excitation Purity	0.1554
Colorimetric Purity	0.1042

CIE 1931 Chromaticity Diagram



x	0.3864	CCT	3898 K
y	0.3842	CRI	83
u	0.2260	L*	25.67
v	0.3371	a*	-5.20
u'	0.2260	b*	-13.54
v'	0.5057	Duv	0.0017
R1	80.8	R9	10.4
R2	87.4	R10	69.9
R3	92.7	R11	81.3
R4	82.7	R12	64.4
R5	80.8	R13	82.0
R6	82.9	R14	95.8
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	0.00019	405	0.00012	430	0.00383	455	0.00976
381	0.00014	406	0.00014	431	0.00429	456	0.00925
382	0.00000	407	0.00019	432	0.00470	457	0.00875
383	0.00000	408	0.00022	433	0.00519	458	0.00828
384	0.00000	409	0.00030	434	0.00568	459	0.00777
385	0.00000	410	0.00032	435	0.00631	460	0.00740
386	0.00008	411	0.00033	436	0.00693	461	0.00707
387	0.00006	412	0.00037	437	0.00765	462	0.00670
388	0.00000	413	0.00044	438	0.00865	463	0.00643
389	0.00003	414	0.00051	439	0.00941	464	0.00620
390	0.00005	415	0.00059	440	0.01037	465	0.00600
391	0.00004	416	0.00063	441	0.01102	466	0.00579
392	0.00011	417	0.00074	442	0.01170	467	0.00555
393	0.00001	418	0.00090	443	0.01245	468	0.00536
394	0.00002	419	0.00105	444	0.01268	469	0.00508
395	0.00001	420	0.00121	445	0.01319	470	0.00488
396	0.00000	421	0.00129	446	0.01324	471	0.00472
397	0.00001	422	0.00144	447	0.01306	472	0.00453
398	0.00006	423	0.00166	448	0.01301	473	0.00442
399	0.00013	424	0.00192	449	0.01281	474	0.00435
400	0.00021	425	0.00227	450	0.01228	475	0.00424
401	0.00021	426	0.00246	451	0.01178	476	0.00420
402	0.00015	427	0.00266	452	0.01118	477	0.00417
403	0.00013	428	0.00301	453	0.01059	478	0.00417
404	0.00013	429	0.00336	454	0.01015	479	0.00418



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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	0.00419	505	0.00766	530	0.01080	555	0.01248
481	0.00419	506	0.00786	531	0.01088	556	0.01248
482	0.00424	507	0.00801	532	0.01095	557	0.01252
483	0.00431	508	0.00820	533	0.01103	558	0.01262
484	0.00438	509	0.00832	534	0.01108	559	0.01272
485	0.00447	510	0.00847	535	0.01113	560	0.01282
486	0.00457	511	0.00866	536	0.01121	561	0.01293
487	0.00465	512	0.00878	537	0.01132	562	0.01296
488	0.00477	513	0.00893	538	0.01146	563	0.01303
489	0.00492	514	0.00903	539	0.01154	564	0.01307
490	0.00508	515	0.00920	540	0.01159	565	0.01313
491	0.00523	516	0.00932	541	0.01167	566	0.01323
492	0.00539	517	0.00944	542	0.01170	567	0.01336
493	0.00556	518	0.00954	543	0.01177	568	0.01343
494	0.00572	519	0.00969	544	0.01183	569	0.01352
495	0.00591	520	0.00980	545	0.01186	570	0.01355
496	0.00608	521	0.00990	546	0.01190	571	0.01362
497	0.00627	522	0.01003	547	0.01201	572	0.01373
498	0.00643	523	0.01012	548	0.01207	573	0.01365
499	0.00660	524	0.01025	549	0.01215	574	0.01372
500	0.00680	525	0.01035	550	0.01222	575	0.01375
501	0.00698	526	0.01043	551	0.01226	576	0.01381
502	0.00713	527	0.01054	552	0.01233	577	0.01403
503	0.00735	528	0.01063	553	0.01243	578	0.01406
504	0.00745	529	0.01069	554	0.01248	579	0.01411



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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	0.01415	605	0.01447	630	0.01158	655	0.00716
581	0.01426	606	0.01448	631	0.01144	656	0.00702
582	0.01430	607	0.01439	632	0.01132	657	0.00686
583	0.01437	608	0.01430	633	0.01112	658	0.00670
584	0.01439	609	0.01420	634	0.01091	659	0.00653
585	0.01448	610	0.01412	635	0.01072	660	0.00640
586	0.01447	611	0.01403	636	0.01052	661	0.00621
587	0.01449	612	0.01397	637	0.01037	662	0.00604
588	0.01458	613	0.01388	638	0.01019	663	0.00593
589	0.01459	614	0.01381	639	0.01004	664	0.00578
590	0.01462	615	0.01367	640	0.00986	665	0.00564
591	0.01465	616	0.01356	641	0.00971	666	0.00550
592	0.01466	617	0.01341	642	0.00955	667	0.00537
593	0.01470	618	0.01326	643	0.00931	668	0.00523
594	0.01472	619	0.01316	644	0.00909	669	0.00509
595	0.01473	620	0.01300	645	0.00891	670	0.00498
596	0.01476	621	0.01287	646	0.00877	671	0.00483
597	0.01474	622	0.01270	647	0.00864	672	0.00472
598	0.01477	623	0.01257	648	0.00844	673	0.00459
599	0.01477	624	0.01251	649	0.00825	674	0.00448
600	0.01474	625	0.01237	650	0.00806	675	0.00434
601	0.01471	626	0.01221	651	0.00788	676	0.00424
602	0.01463	627	0.01202	652	0.00769	677	0.00415
603	0.01458	628	0.01186	653	0.00752	678	0.00401
604	0.01450	629	0.01172	654	0.00732	679	0.00390



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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	0.00378	706	0.00176	732	0.00083	758	0.00034
681	0.00367	707	0.00171	733	0.00077	759	0.00035
682	0.00355	708	0.00162	734	0.00074	760	0.00030
683	0.00346	709	0.00094	735	0.00071	761	0.00030
684	0.00337	710	0.00093	736	0.00069	762	0.00029
685	0.00326	711	0.00090	737	0.00070	763	0.00029
686	0.00317	712	0.00094	738	0.00065	764	0.00025
687	0.00308	713	0.00145	739	0.00063	765	0.00025
688	0.00299	714	0.00138	740	0.00058	766	0.00026
689	0.00290	715	0.00130	741	0.00057	767	0.00024
690	0.00281	716	0.00129	742	0.00056	768	0.00027
691	0.00273	717	0.00125	743	0.00055	769	0.00026
692	0.00265	718	0.00126	744	0.00057	770	0.00024
693	0.00260	719	0.00120	745	0.00058	771	0.00021
694	0.00253	720	0.00116	746	0.00054	772	0.00019
695	0.00249	721	0.00113	747	0.00053	773	0.00019
696	0.00242	722	0.00110	748	0.00050	774	0.00018
697	0.00236	723	0.00105	749	0.00047	775	0.00017
698	0.00228	724	0.00102	750	0.00044	776	0.00020
699	0.00221	725	0.00099	751	0.00040	777	0.00021
700	0.00209	726	0.00096	752	0.00037	778	0.00018
701	0.00199	727	0.00096	753	0.00037	779	0.00013
702	0.00196	728	0.00091	754	0.00034	780	0.00014
703	0.00194	729	0.00089	755	0.00035		
704	0.00189	730	0.00088	756	0.00035		
705	0.00184	731	0.00086	757	0.00034		



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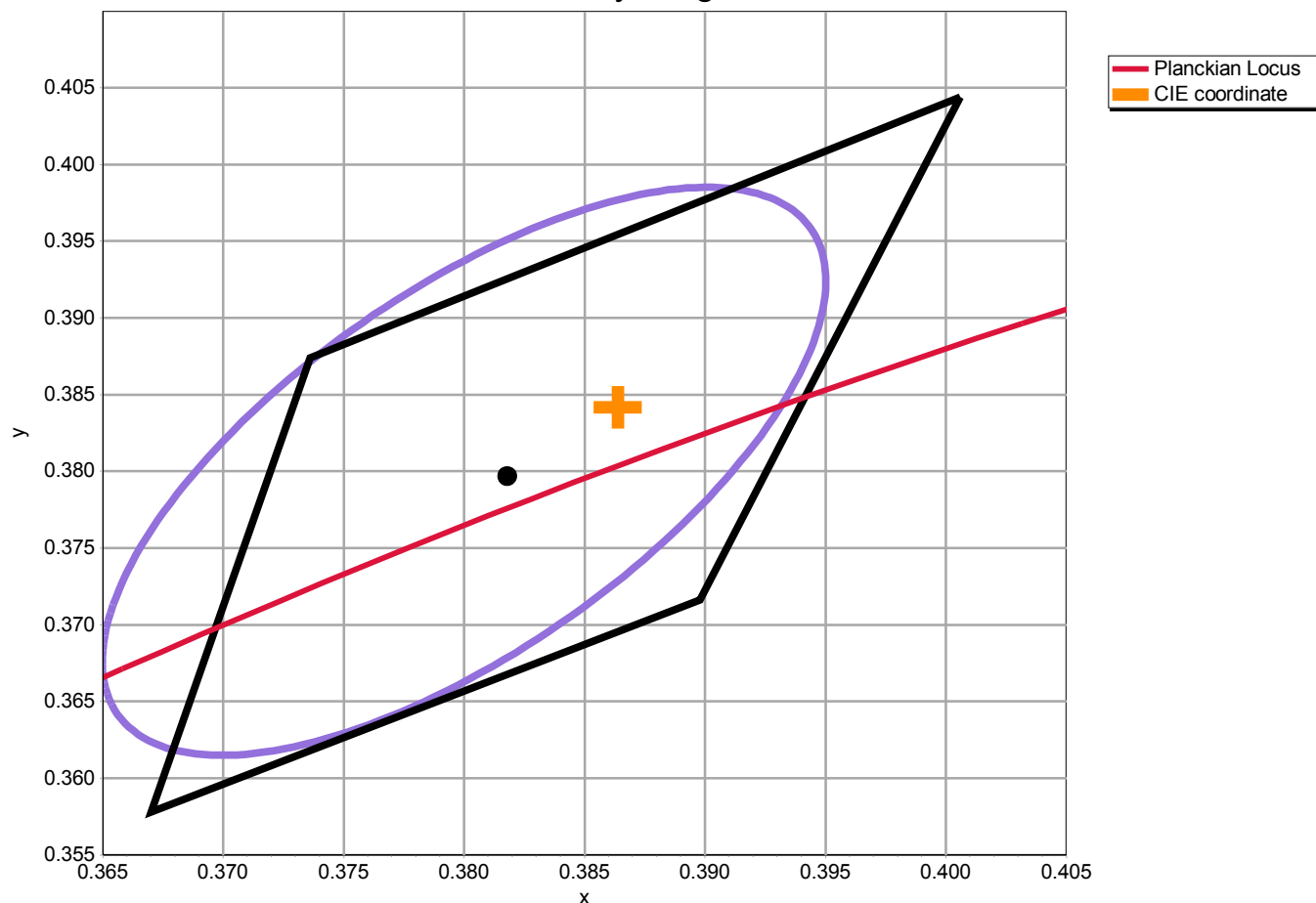
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CIE Chromaticity Diagram for Indoor SSL products

CIE 1931 Chromaticity Diagram



Chromaticity tolerance for 4000K nominal CCT

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