



# 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](http://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: CY2012	Driver Details: CY809	
<b>Test Report</b>	L1504095-C2	<b>Description</b>	CREE XPE2 LED's	<b>Type</b> Commercial
<b>Test Date</b>	9 April 2015	<b>Manufacturer</b>	Cree	<b>Description</b> 61W
<b>Report Date</b>	9 April 2015	<b>Catalog No.</b>	LOG HO-120-48-35K 12XPE2-10x60-SI-NO	<b>Manufacturer</b> MEAN WELL USA inc.
<b>Sphere Temperature</b>	25.8 °C	<b>Serial No.</b>	SRIS 1881	<b>Catalog No.</b> LPF-60-24
<b>Humidity</b>	17.9 %	<b>Diameter</b>	N/A mm	<b>Voltage</b> 120.00 V
<b>Lamp Type</b>	SSL	<b>Color</b>	White	<b>Power Factor</b> 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.



## Realization of Sphere Test

A  $4\pi$  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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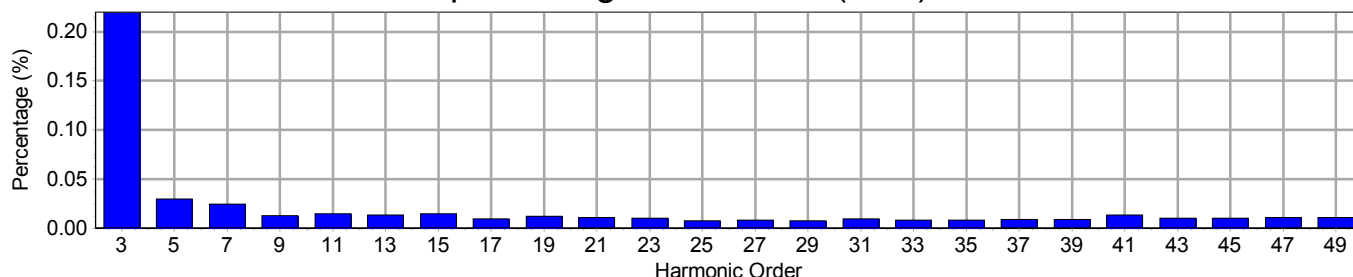
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## Electrical Measurements

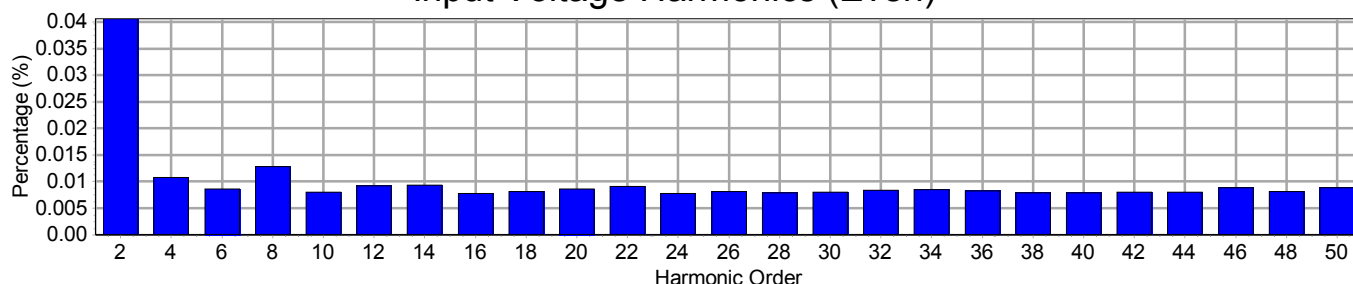
### Input

Frequency	60 Hz	Active Power	61.31 W	THDV [ANSI]	0.23 %
Voltage	120.1 V(rms)	Apparent Power	61.61 VA	THDA [ANSI]	4.85 %
Current	0.5129 A(rms)	Power Factor	0.995	Max. Harmonic At	5th order

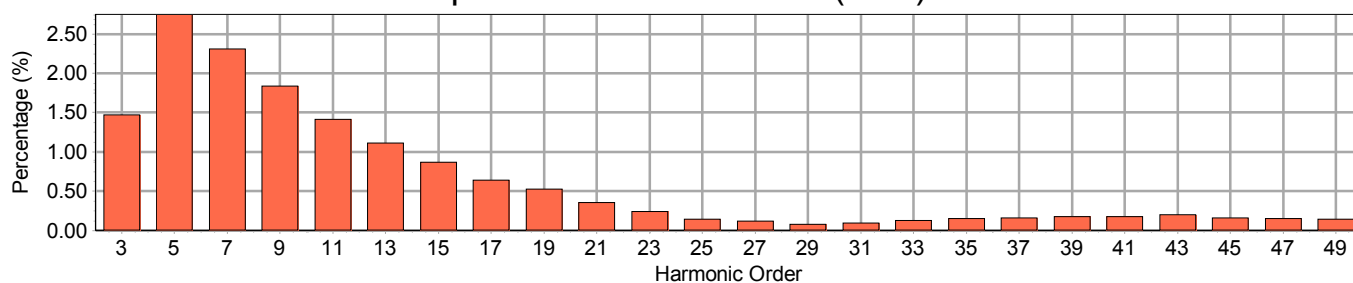
### Input Voltage Harmonics (Odd)



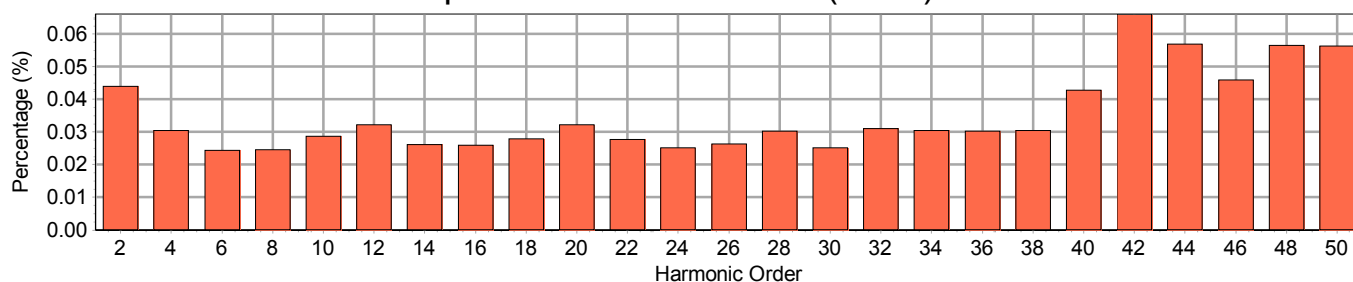
### Input Voltage Harmonics (Even)



### 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	0.041	0.044
3	180	0.220	1.467	4	240	0.011	0.030
5	300	0.030	2.753	6	360	0.009	0.024
7	420	0.024	2.311	8	480	0.013	0.025
9	540	0.013	1.839	10	600	0.008	0.029
11	660	0.015	1.416	12	720	0.009	0.032
13	780	0.013	1.110	14	840	0.009	0.026
15	900	0.015	0.865	16	960	0.008	0.026
17	1020	0.010	0.641	18	1080	0.008	0.028
19	1140	0.012	0.527	20	1200	0.009	0.032
21	1260	0.011	0.358	22	1320	0.009	0.028
23	1380	0.010	0.244	24	1440	0.008	0.025
25	1500	0.008	0.145	26	1560	0.008	0.026
27	1620	0.008	0.119	28	1680	0.008	0.030
29	1740	0.007	0.074	30	1800	0.008	0.025
31	1860	0.009	0.094	32	1920	0.008	0.031
33	1980	0.008	0.129	34	2040	0.009	0.031
35	2100	0.008	0.153	36	2160	0.008	0.030
37	2220	0.009	0.155	38	2280	0.008	0.031
39	2340	0.009	0.178	40	2400	0.008	0.043
41	2460	0.013	0.172	42	2520	0.008	0.066
43	2580	0.010	0.203	44	2640	0.008	0.057
45	2700	0.010	0.162	46	2760	0.009	0.046
47	2820	0.011	0.149	48	2880	0.008	0.057
49	2940	0.011	0.147	50	3000	0.009	0.056



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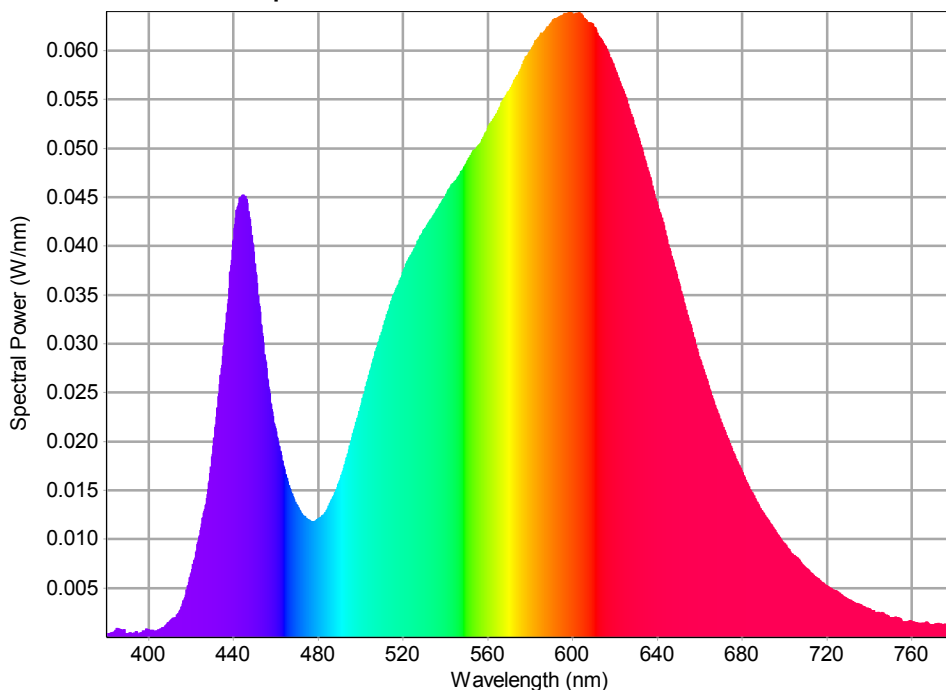
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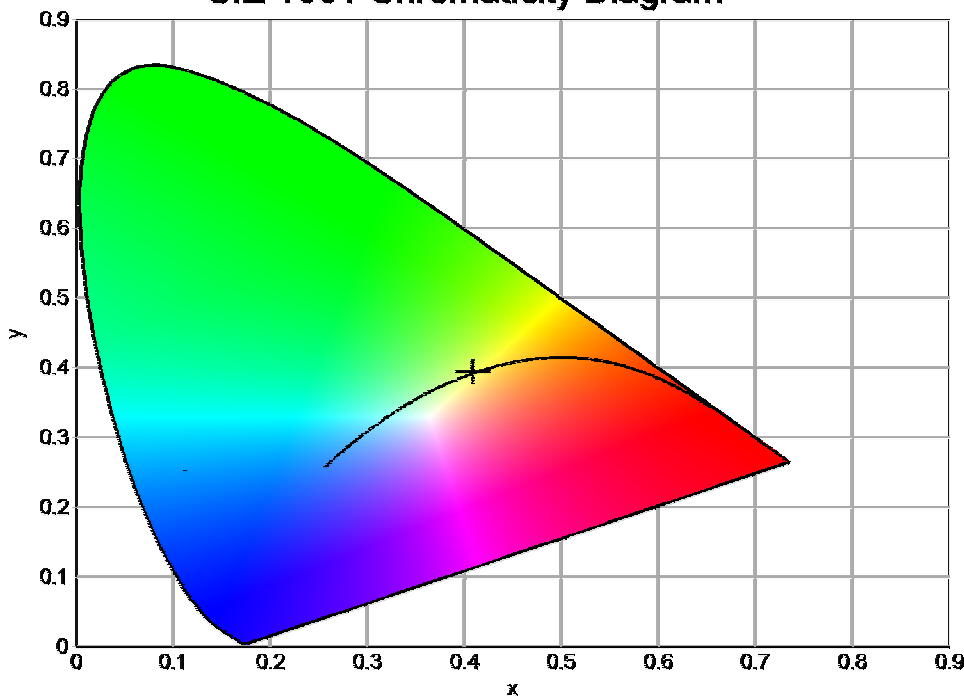
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## Spectral Power Distribution



Peak Wavelength	599 nm
Luminous Flux	3511 lm
Input Power	61.31 W
Lumens/Watt	57.3
Full Width/Half Maximum	144.58
Center Wavelength	583 nm
Centroid Wavelength	383 nm
Dominant Wavelength	489 nm
Excitation Purity	0.0985
Colorimetric Purity	0.0693

## CIE 1931 Chromaticity Diagram



x	0.4083	CCT	3466 K
y	0.3946	CRI	81
u	0.2361	L*	25.67
v	0.3422	a*	-3.55
u'	0.2361	b*	-8.59
v'	0.5133	Duv	0.0011
R1	79.2	R9	6.1
R2	85.9	R10	67.0
R3	91.9	R11	80.0
R4	81.2	R12	64.2
R5	79.0	R13	80.2
R6	81.4	R14	95.1
R7	85.2		
R8	62.9		



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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	0.00038	405	0.00074	430	0.01846	455	0.02837
381	0.00005	406	0.00082	431	0.02040	456	0.02644
382	0.00042	407	0.00095	432	0.02251	457	0.02493
383	0.00048	408	0.00115	433	0.02462	458	0.02332
384	0.00057	409	0.00149	434	0.02678	459	0.02193
385	0.00094	410	0.00165	435	0.02875	460	0.02104
386	0.00085	411	0.00185	436	0.03104	461	0.01996
387	0.00081	412	0.00198	437	0.03315	462	0.01908
388	0.00072	413	0.00205	438	0.03567	463	0.01806
389	0.00038	414	0.00240	439	0.03806	464	0.01717
390	0.00016	415	0.00277	440	0.04051	465	0.01631
391	0.00047	416	0.00343	441	0.04287	466	0.01554
392	0.00042	417	0.00395	442	0.04398	467	0.01485
393	0.00045	418	0.00484	443	0.04495	468	0.01438
394	0.00061	419	0.00561	444	0.04518	469	0.01381
395	0.00029	420	0.00649	445	0.04512	470	0.01350
396	0.00045	421	0.00744	446	0.04484	471	0.01304
397	0.00045	422	0.00813	447	0.04357	472	0.01267
398	0.00054	423	0.00952	448	0.04204	473	0.01238
399	0.00082	424	0.01031	449	0.04037	474	0.01218
400	0.00077	425	0.01157	450	0.03826	475	0.01206
401	0.00069	426	0.01270	451	0.03624	476	0.01192
402	0.00073	427	0.01348	452	0.03409	477	0.01183
403	0.00054	428	0.01512	453	0.03204	478	0.01184
404	0.00060	429	0.01674	454	0.03010	479	0.01194



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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	0.01213	505	0.02759	530	0.04173	555	0.05015
481	0.01226	506	0.02842	531	0.04200	556	0.05044
482	0.01241	507	0.02919	532	0.04238	557	0.05070
483	0.01262	508	0.02985	533	0.04270	558	0.05114
484	0.01296	509	0.03053	534	0.04305	559	0.05158
485	0.01341	510	0.03116	535	0.04338	560	0.05204
486	0.01392	511	0.03191	536	0.04374	561	0.05252
487	0.01432	512	0.03264	537	0.04409	562	0.05280
488	0.01479	513	0.03331	538	0.04442	563	0.05314
489	0.01531	514	0.03400	539	0.04480	564	0.05352
490	0.01593	515	0.03469	540	0.04514	565	0.05390
491	0.01658	516	0.03518	541	0.04557	566	0.05436
492	0.01727	517	0.03572	542	0.04592	567	0.05489
493	0.01799	518	0.03613	543	0.04628	568	0.05522
494	0.01873	519	0.03676	544	0.04651	569	0.05563
495	0.01956	520	0.03735	545	0.04673	570	0.05589
496	0.02040	521	0.03786	546	0.04707	571	0.05624
497	0.02121	522	0.03842	547	0.04744	572	0.05674
498	0.02198	523	0.03882	548	0.04776	573	0.05709
499	0.02275	524	0.03920	549	0.04813	574	0.05751
500	0.02354	525	0.03956	550	0.04855	575	0.05785
501	0.02442	526	0.03997	551	0.04902	576	0.05833
502	0.02517	527	0.04052	552	0.04931	577	0.05895
503	0.02604	528	0.04097	553	0.04977	578	0.05938
504	0.02675	529	0.04129	554	0.04991	579	0.05958





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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	0.05998	605	0.06343	630	0.05182	655	0.03233
581	0.06035	606	0.06323	631	0.05113	656	0.03163
582	0.06078	607	0.06294	632	0.05038	657	0.03073
583	0.06112	608	0.06286	633	0.04965	658	0.02995
584	0.06134	609	0.06281	634	0.04886	659	0.02912
585	0.06179	610	0.06246	635	0.04810	660	0.02845
586	0.06176	611	0.06215	636	0.04735	661	0.02782
587	0.06204	612	0.06156	637	0.04667	662	0.02714
588	0.06245	613	0.06130	638	0.04575	663	0.02649
589	0.06258	614	0.06099	639	0.04490	664	0.02578
590	0.06285	615	0.06056	640	0.04420	665	0.02506
591	0.06320	616	0.06021	641	0.04349	666	0.02439
592	0.06332	617	0.05963	642	0.04290	667	0.02378
593	0.06341	618	0.05918	643	0.04210	668	0.02317
594	0.06354	619	0.05871	644	0.04113	669	0.02265
595	0.06354	620	0.05800	645	0.04019	670	0.02201
596	0.06381	621	0.05751	646	0.03947	671	0.02148
597	0.06381	622	0.05692	647	0.03872	672	0.02095
598	0.06389	623	0.05636	648	0.03790	673	0.02039
599	0.06400	624	0.05588	649	0.03712	674	0.01985
600	0.06376	625	0.05529	650	0.03633	675	0.01930
601	0.06379	626	0.05456	651	0.03545	676	0.01879
602	0.06386	627	0.05379	652	0.03466	677	0.01826
603	0.06394	628	0.05324	653	0.03384	678	0.01775
604	0.06379	629	0.05247	654	0.03299	679	0.01738



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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	0.01688	706	0.00810	732	0.00364	758	0.00158
681	0.01634	707	0.00784	733	0.00354	759	0.00171
682	0.01583	708	0.00751	734	0.00348	760	0.00158
683	0.01545	709	0.00730	735	0.00341	761	0.00154
684	0.01498	710	0.00710	736	0.00332	762	0.00151
685	0.01466	711	0.00691	737	0.00317	763	0.00143
686	0.01420	712	0.00666	738	0.00304	764	0.00135
687	0.01384	713	0.00649	739	0.00298	765	0.00146
688	0.01339	714	0.00624	740	0.00294	766	0.00144
689	0.01299	715	0.00606	741	0.00276	767	0.00156
690	0.01269	716	0.00595	742	0.00272	768	0.00137
691	0.01234	717	0.00569	743	0.00248	769	0.00133
692	0.01205	718	0.00559	744	0.00257	770	0.00119
693	0.01170	719	0.00538	745	0.00249	771	0.00137
694	0.01141	720	0.00525	746	0.00252	772	0.00137
695	0.01106	721	0.00510	747	0.00237	773	0.00132
696	0.01071	722	0.00499	748	0.00228	774	0.00130
697	0.01041	723	0.00485	749	0.00215	775	0.00130
698	0.01008	724	0.00477	750	0.00202	776	0.00125
699	0.00978	725	0.00463	751	0.00202	777	0.00123
700	0.00956	726	0.00449	752	0.00206	778	0.00118
701	0.00925	727	0.00430	753	0.00205	779	0.00115
702	0.00898	728	0.00412	754	0.00197	780	0.00105
703	0.00861	729	0.00400	755	0.00174		
704	0.00841	730	0.00388	756	0.00155		
705	0.00828	731	0.00378	757	0.00160		



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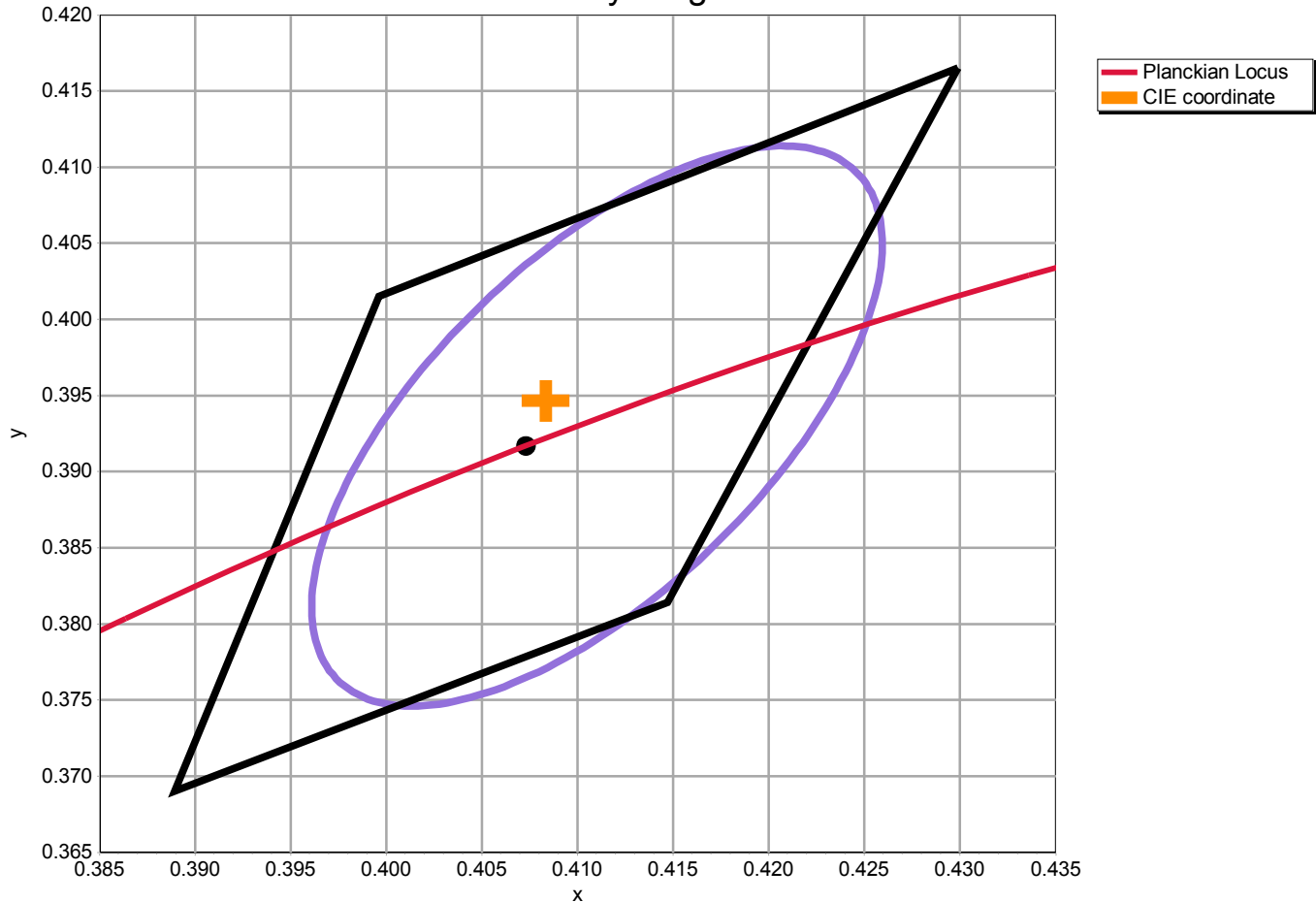
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## CIE Chromaticity Diagram for Indoor SSL products

### CIE 1931 Chromaticity Diagram



Chromaticity tolerance for 3500K nominal CCT

Min CCT	3220
Max CCT	3710
Delta T	245
Center Duv	0.0000