



# 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: CY2764	Driver Details: CY825	
<b>Test Report</b>	L1609152-C1	<b>Description</b>	Cluster of 24 CREE XPE2 LED's	<b>Type</b> Commercial
<b>Test Date</b>	15 September 2016	<b>Manufacturer</b>	Cree	<b>Description</b> 34W
<b>Report Date</b>	15 September 2016	<b>Catalog No.</b>	LOG-RO-120-48-40K-10x10-SI-NO	<b>Manufacturer</b> MEAN WELL USA inc.
<b>Sphere Temperature</b>	24.7°C	<b>Serial No.</b>	SRIS-2567	<b>Catalog No.</b> LPF-40-24
<b>Humidity</b>	34.2 %	<b>Dfj Y7 i ffYbh''HCEÁnCE</b>		<b>Voltage</b> 120.00 V
<b>Lamp Type</b>	SSL	<b>Color</b>	I €€€SÁ	<b>Power Factor</b> 0.9900

**Stabilization Time: 55 minutes**

**Tested By: George Hedrei**

**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	iRDC	CIF-3000A	974997	N.P.C.R.	N.P.C.R.
Input Power Meter	Yokogawa	WT210	27E224420	2016/05/06	2017/05/06
Output Power Meter	N/A	N/A	N/A	N.P.C.R.	N.P.C.R.
Shunt Resistor	Fluke	Y5020	5675014	2016/05/05	2017/05/05
Current Multimeter	HP Agilent	HP34401A	MY41025831	2016/05/05	2017/05/05
Voltage Multimeter	HP Agilent	HP34401A	US36010444	2016/05/05	2017/05/05

## Spectrometer Equipment

Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due Date
Spectrometer	Ocean Optics	USB2000N	USB2E3364	2016/05/30	2017/05/30

## Environment Equipment

Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due Date
Temperature Humidity Sensor	Omega	HH311	091203915	2014/10/30	2016/10/30



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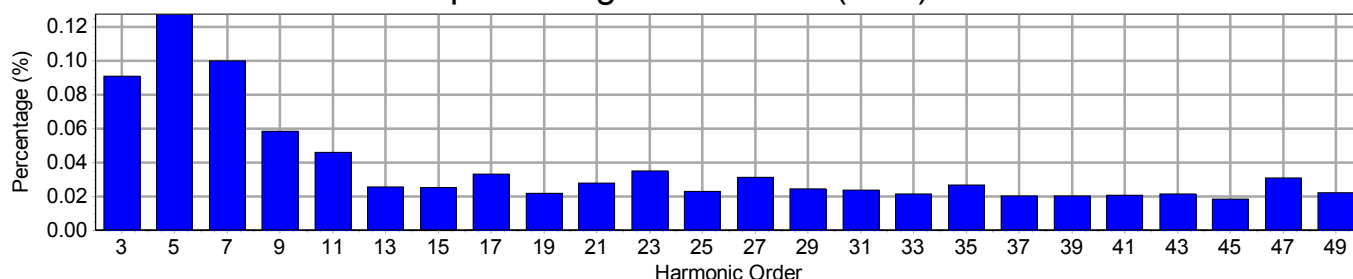
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## Electrical Measurements

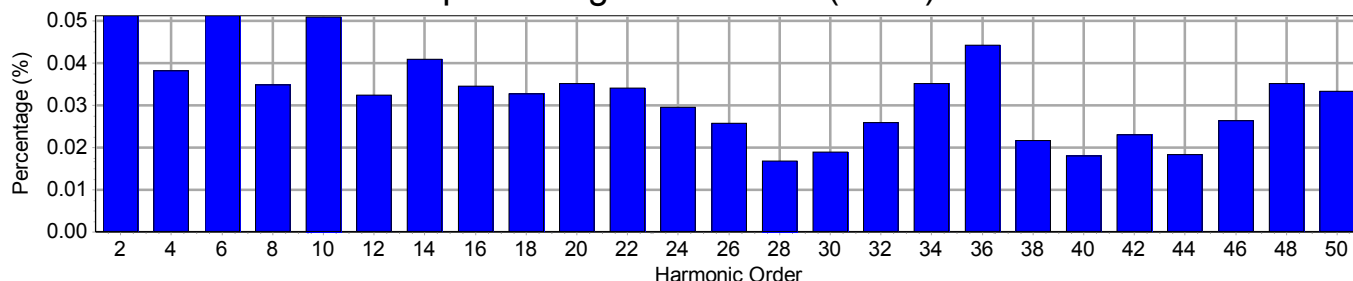
### Input

Frequency	60 Hz	Active Power	31.26 W	THDV [ANSI]	0.27 %
Voltage	120.6 V(rms)	Apparent Power	32.04 VA	THDA [ANSI]	6.45 %
Current	0.2657 A(rms)	Power Factor	0.976	Max. Harmonic At	5th order

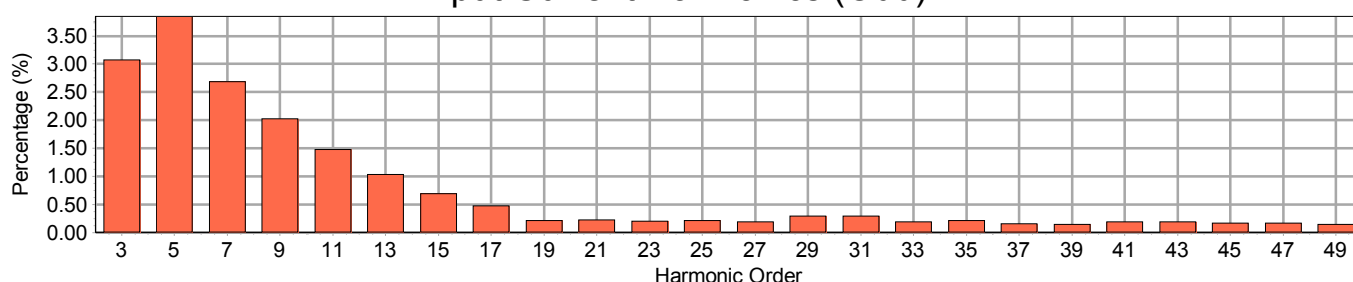
### Input Voltage Harmonics (Odd)



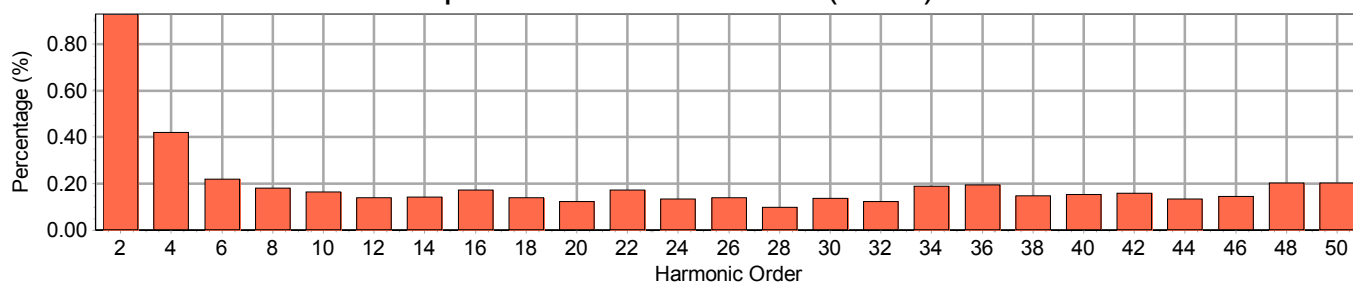
### Input Voltage Harmonics (Even)



### 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	0.051	0.931
3	180	0.091	3.077	4	240	0.038	0.419
5	300	0.128	3.854	6	360	0.051	0.218
7	420	0.100	2.683	8	480	0.035	0.181
9	540	0.058	2.028	10	600	0.051	0.163
11	660	0.046	1.472	12	720	0.032	0.139
13	780	0.026	1.033	14	840	0.041	0.142
15	900	0.025	0.689	16	960	0.035	0.173
17	1020	0.033	0.479	18	1080	0.033	0.139
19	1140	0.022	0.213	20	1200	0.035	0.122
21	1260	0.028	0.219	22	1320	0.034	0.172
23	1380	0.035	0.204	24	1440	0.029	0.134
25	1500	0.023	0.211	26	1560	0.026	0.140
27	1620	0.031	0.188	28	1680	0.017	0.097
29	1740	0.024	0.293	30	1800	0.019	0.136
31	1860	0.024	0.287	32	1920	0.026	0.123
33	1980	0.021	0.191	34	2040	0.035	0.188
35	2100	0.027	0.216	36	2160	0.044	0.194
37	2220	0.020	0.149	38	2280	0.022	0.147
39	2340	0.020	0.139	40	2400	0.018	0.154
41	2460	0.021	0.190	42	2520	0.023	0.159
43	2580	0.021	0.183	44	2640	0.018	0.132
45	2700	0.018	0.169	46	2760	0.026	0.143
47	2820	0.031	0.161	48	2880	0.035	0.202
49	2940	0.022	0.146	50	3000	0.033	0.203



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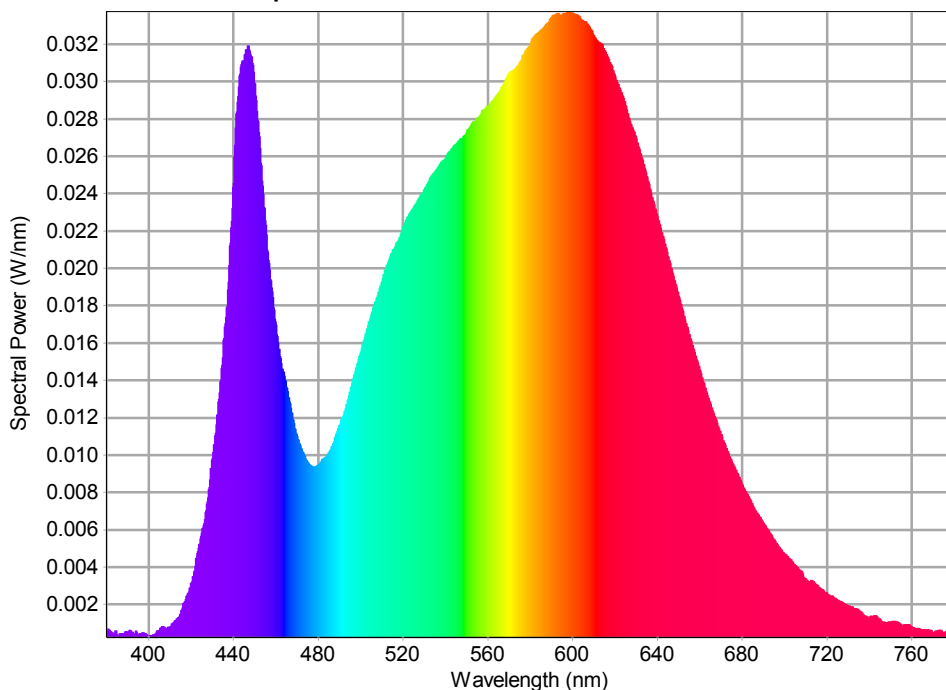
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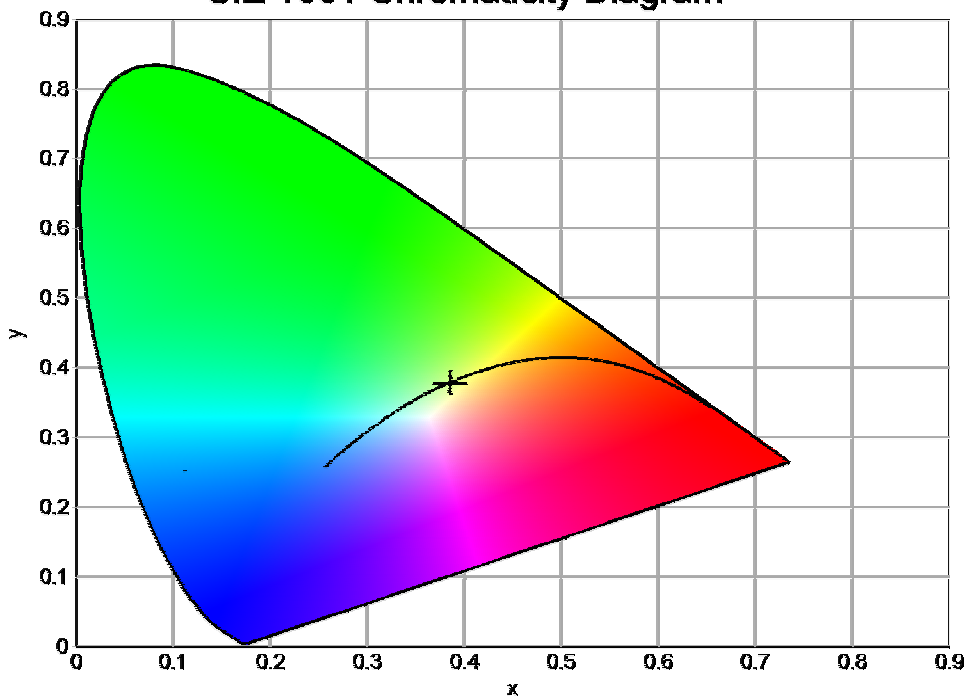
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## Spectral Power Distribution



Peak Wavelength	598 nm
Luminous Flux	1948 lm
Input Power	31.26 W
Lumens/Watt	62.3
Full Width/Half Maximum	150.67
Center Wavelength	579 nm
Centroid Wavelength	369 nm
Dominant Wavelength	487 nm
Excitation Purity	0.1617
Colorimetric Purity	0.0978

## CIE 1931 Chromaticity Diagram



x	0.3851	CCT	3889 K
y	0.3786	CRI	84
u	0.2274	L*	25.67
v	0.3354	a*	-4.55
u'	0.2274	b*	-14.81
v'	0.5031	Duv	0.0005
R1	82.5	R9	15.2
R2	88.4	R10	72.1
R3	92.8	R11	83.1
R4	83.9	R12	67.3
R5	82.6	R13	83.7
R6	84.3	R14	95.8
R7	86.8		
R8	67.5		



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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	0.00070	405	0.00062	430	0.00977	455	0.02259
381	0.00071	406	0.00075	431	0.01058	456	0.02100
382	0.00058	407	0.00082	432	0.01163	457	0.01992
383	0.00049	408	0.00073	433	0.01286	458	0.01897
384	0.00048	409	0.00080	434	0.01395	459	0.01791
385	0.00044	410	0.00082	435	0.01525	460	0.01699
386	0.00031	411	0.00098	436	0.01688	461	0.01602
387	0.00039	412	0.00109	437	0.01790	462	0.01531
388	0.00048	413	0.00117	438	0.02016	463	0.01463
389	0.00054	414	0.00133	439	0.02219	464	0.01425
390	0.00047	415	0.00149	440	0.02436	465	0.01367
391	0.00064	416	0.00182	441	0.02754	466	0.01310
392	0.00054	417	0.00216	442	0.02893	467	0.01252
393	0.00041	418	0.00246	443	0.03033	468	0.01197
394	0.00060	419	0.00269	444	0.03109	469	0.01144
395	0.00038	420	0.00315	445	0.03107	470	0.01101
396	0.00047	421	0.00350	446	0.03173	471	0.01066
397	0.00051	422	0.00407	447	0.03192	472	0.01036
398	0.00046	423	0.00475	448	0.03146	473	0.01008
399	0.00041	424	0.00522	449	0.03101	474	0.00981
400	0.00028	425	0.00585	450	0.02995	475	0.00964
401	0.00035	426	0.00627	451	0.02843	476	0.00950
402	0.00038	427	0.00696	452	0.02732	477	0.00937
403	0.00040	428	0.00773	453	0.02564	478	0.00938
404	0.00061	429	0.00868	454	0.02398	479	0.00939



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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	0.00948	505	0.01753	530	0.02423	555	0.02806
481	0.00959	506	0.01790	531	0.02442	556	0.02814
482	0.00978	507	0.01823	532	0.02463	557	0.02835
483	0.00985	508	0.01858	533	0.02488	558	0.02851
484	0.00996	509	0.01893	534	0.02504	559	0.02856
485	0.01013	510	0.01927	535	0.02518	560	0.02870
486	0.01035	511	0.01970	536	0.02533	561	0.02880
487	0.01060	512	0.02004	537	0.02552	562	0.02896
488	0.01096	513	0.02032	538	0.02569	563	0.02910
489	0.01130	514	0.02064	539	0.02580	564	0.02925
490	0.01159	515	0.02090	540	0.02592	565	0.02939
491	0.01191	516	0.02109	541	0.02613	566	0.02958
492	0.01218	517	0.02139	542	0.02626	567	0.02979
493	0.01253	518	0.02153	543	0.02640	568	0.03001
494	0.01295	519	0.02185	544	0.02660	569	0.03025
495	0.01340	520	0.02225	545	0.02667	570	0.03047
496	0.01387	521	0.02246	546	0.02678	571	0.03058
497	0.01431	522	0.02273	547	0.02696	572	0.03064
498	0.01468	523	0.02293	548	0.02698	573	0.03069
499	0.01514	524	0.02312	549	0.02712	574	0.03085
500	0.01548	525	0.02327	550	0.02731	575	0.03101
501	0.01593	526	0.02345	551	0.02748	576	0.03120
502	0.01633	527	0.02365	552	0.02765	577	0.03147
503	0.01675	528	0.02387	553	0.02786	578	0.03169
504	0.01714	529	0.02401	554	0.02787	579	0.03185





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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	0.03199	605	0.03329	630	0.02696	655	0.01649
581	0.03229	606	0.03324	631	0.02657	656	0.01608
582	0.03244	607	0.03310	632	0.02619	657	0.01572
583	0.03257	608	0.03293	633	0.02580	658	0.01533
584	0.03266	609	0.03276	634	0.02538	659	0.01498
585	0.03278	610	0.03248	635	0.02494	660	0.01459
586	0.03285	611	0.03229	636	0.02452	661	0.01418
587	0.03301	612	0.03215	637	0.02405	662	0.01382
588	0.03315	613	0.03209	638	0.02362	663	0.01343
589	0.03323	614	0.03199	639	0.02320	664	0.01307
590	0.03345	615	0.03169	640	0.02279	665	0.01275
591	0.03359	616	0.03149	641	0.02239	666	0.01239
592	0.03362	617	0.03120	642	0.02193	667	0.01209
593	0.03368	618	0.03094	643	0.02157	668	0.01175
594	0.03357	619	0.03064	644	0.02112	669	0.01145
595	0.03358	620	0.03027	645	0.02066	670	0.01114
596	0.03368	621	0.02998	646	0.02027	671	0.01080
597	0.03364	622	0.02972	647	0.01983	672	0.01054
598	0.03377	623	0.02944	648	0.01940	673	0.01025
599	0.03374	624	0.02912	649	0.01899	674	0.00994
600	0.03368	625	0.02875	650	0.01854	675	0.00968
601	0.03362	626	0.02832	651	0.01812	676	0.00943
602	0.03361	627	0.02790	652	0.01770	677	0.00922
603	0.03353	628	0.02758	653	0.01726	678	0.00896
604	0.03334	629	0.02733	654	0.01689	679	0.00870



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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	0.00842	706	0.00400	732	0.00188	758	0.00093
681	0.00819	707	0.00387	733	0.00180	759	0.00090
682	0.00798	708	0.00378	734	0.00175	760	0.00081
683	0.00780	709	0.00347	735	0.00172	761	0.00078
684	0.00756	710	0.00337	736	0.00163	762	0.00071
685	0.00734	711	0.00325	737	0.00147	763	0.00073
686	0.00708	712	0.00323	738	0.00139	764	0.00067
687	0.00691	713	0.00327	739	0.00134	765	0.00069
688	0.00675	714	0.00317	740	0.00134	766	0.00068
689	0.00658	715	0.00307	741	0.00138	767	0.00065
690	0.00639	716	0.00294	742	0.00138	768	0.00064
691	0.00621	717	0.00286	743	0.00142	769	0.00065
692	0.00603	718	0.00281	744	0.00129	770	0.00052
693	0.00585	719	0.00266	745	0.00124	771	0.00056
694	0.00569	720	0.00260	746	0.00106	772	0.00058
695	0.00549	721	0.00251	747	0.00107	773	0.00064
696	0.00530	722	0.00247	748	0.00106	774	0.00060
697	0.00513	723	0.00238	749	0.00109	775	0.00050
698	0.00498	724	0.00233	750	0.00108	776	0.00055
699	0.00483	725	0.00225	751	0.00111	777	0.00064
700	0.00472	726	0.00217	752	0.00113	778	0.00066
701	0.00461	727	0.00214	753	0.00110	779	0.00056
702	0.00449	728	0.00205	754	0.00103	780	0.00061
703	0.00440	729	0.00199	755	0.00090		
704	0.00424	730	0.00194	756	0.00092		
705	0.00411	731	0.00189	757	0.00096		



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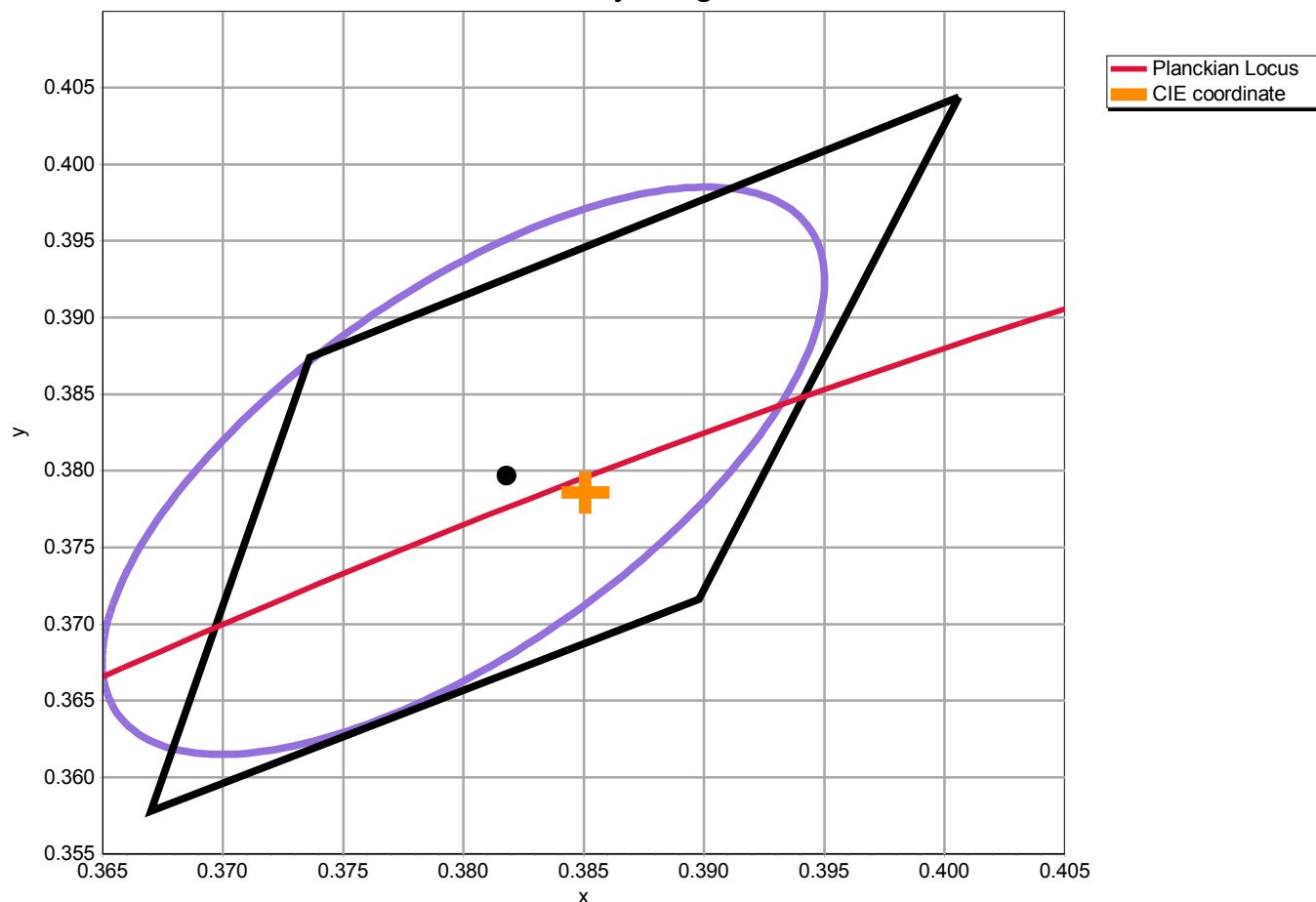
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## CIE Chromaticity Diagram for Indoor SSL products

### CIE 1931 Chromaticity Diagram



Chromaticity tolerance for 4000K nominal CCT

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