



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: CY2870	Driver Details: CY825	
Test Report	L1612145-C1	Description	1 Row of 24 CREE XPE2 LED's	Type Commercial
Test Date	14 December 2016	Manufacturer	Cree	Description 34W
Report Date	14 December 2016	Catalog No.	LOGi RO-120-48-40K-WW-SI-NO	Manufacturer MEAN WELL USA inc.
Sphere Temperature	25.4° C	Serial No.	SRIS-2647	Catalog No. LPF-40-24
Humidity	1.2 %	Drive Current	300 mA	Voltage 120.00 V
Lamp Type	SSL	Color	4000K	Power Factor 0.9000

Stabilization Time: 1 hour

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 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	iRDC	CIF-3000A	974998	N.P.C.R.	N.P.C.R.
Input Power Meter	Yokogawa	WT210	91L236540	2016/05/18	2017/05/18
Output Power Meter	N/A	N/A	N/A	N.P.C.R.	N.P.C.R.
Shunt Resistor	Fluke	Y5020	5675013	2016/05/18	2017/05/18
Current Multimeter	HP Agilent	HP34401A	US36106747	2016/05/17	2017/05/17
Voltage Multimeter	HP Agilent	HP34401A	US36112752	2016/05/17	2017/05/17

Spectrometer Equipment

Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due Date
Spectrometer	Ocean Optics	USB2000N	USB2E4034	2016/07/08	2017/07/08

Environment Equipment

Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due Date
Temperature Humidity Sensor	Omega	HH311	120504178	2016/04/20	2018/04/20



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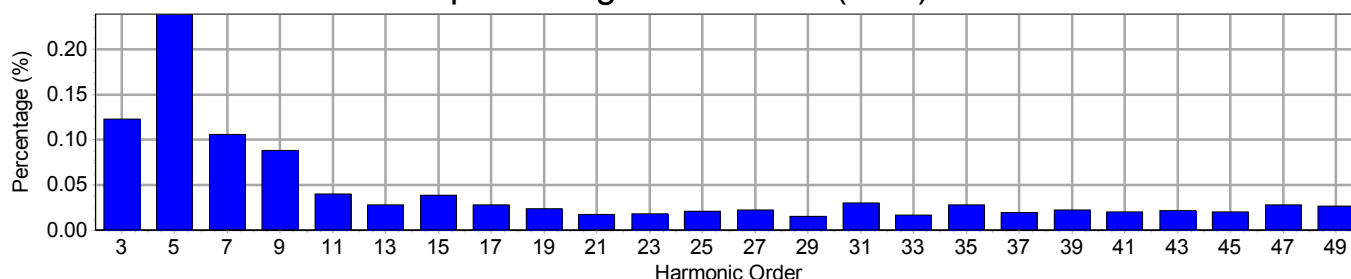
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Electrical Measurements

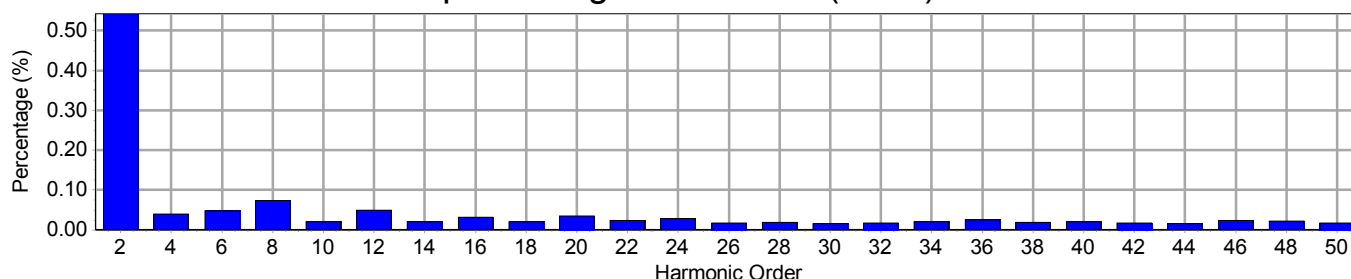
Input

Frequency	60 Hz	Active Power	31.13 W	THDV [ANSI]	0.64 %
Voltage	120.1 V(rms)	Apparent Power	31.87 VA	THDA [ANSI]	7.31 %
Current	0.2654 A(rms)	Power Factor	0.977	Max. Harmonic At	3rd order

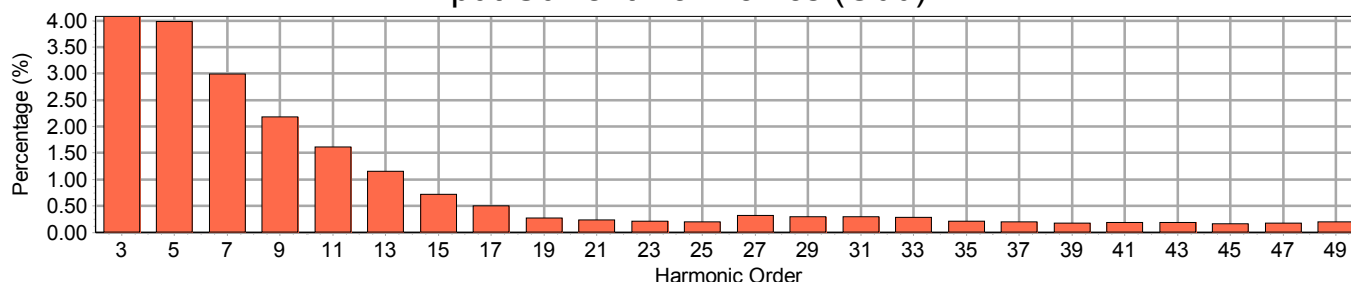
Input Voltage Harmonics (Odd)



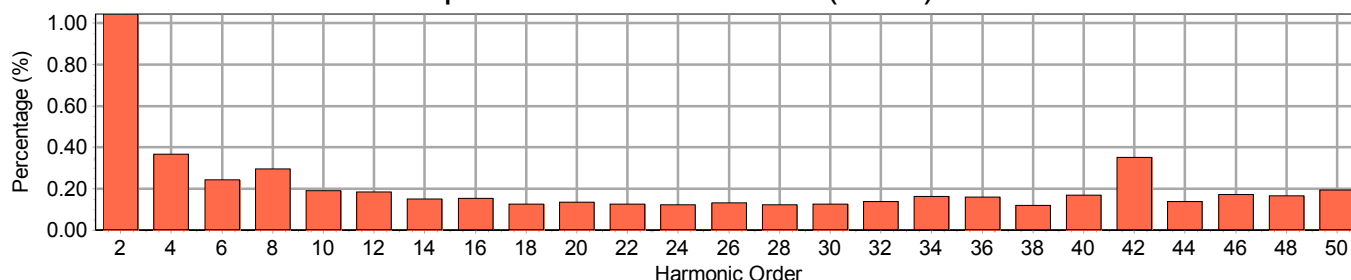
Input Voltage Harmonics (Even)



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	0.543	1.046
3	180	0.123	4.087	4	240	0.039	0.367
5	300	0.239	3.990	6	360	0.047	0.243
7	420	0.106	2.987	8	480	0.072	0.296
9	540	0.088	2.189	10	600	0.021	0.189
11	660	0.040	1.617	12	720	0.050	0.183
13	780	0.028	1.150	14	840	0.020	0.150
15	900	0.038	0.717	16	960	0.031	0.153
17	1020	0.028	0.496	18	1080	0.020	0.127
19	1140	0.024	0.273	20	1200	0.035	0.135
21	1260	0.017	0.239	22	1320	0.023	0.126
23	1380	0.018	0.207	24	1440	0.027	0.123
25	1500	0.021	0.203	26	1560	0.018	0.131
27	1620	0.022	0.318	28	1680	0.018	0.122
29	1740	0.015	0.298	30	1800	0.015	0.125
31	1860	0.030	0.301	32	1920	0.017	0.137
33	1980	0.017	0.280	34	2040	0.020	0.162
35	2100	0.028	0.216	36	2160	0.024	0.159
37	2220	0.020	0.198	38	2280	0.019	0.118
39	2340	0.022	0.177	40	2400	0.021	0.168
41	2460	0.020	0.183	42	2520	0.016	0.352
43	2580	0.022	0.191	44	2640	0.016	0.137
45	2700	0.020	0.165	46	2760	0.023	0.173
47	2820	0.028	0.178	48	2880	0.022	0.166
49	2940	0.026	0.200	50	3000	0.017	0.194



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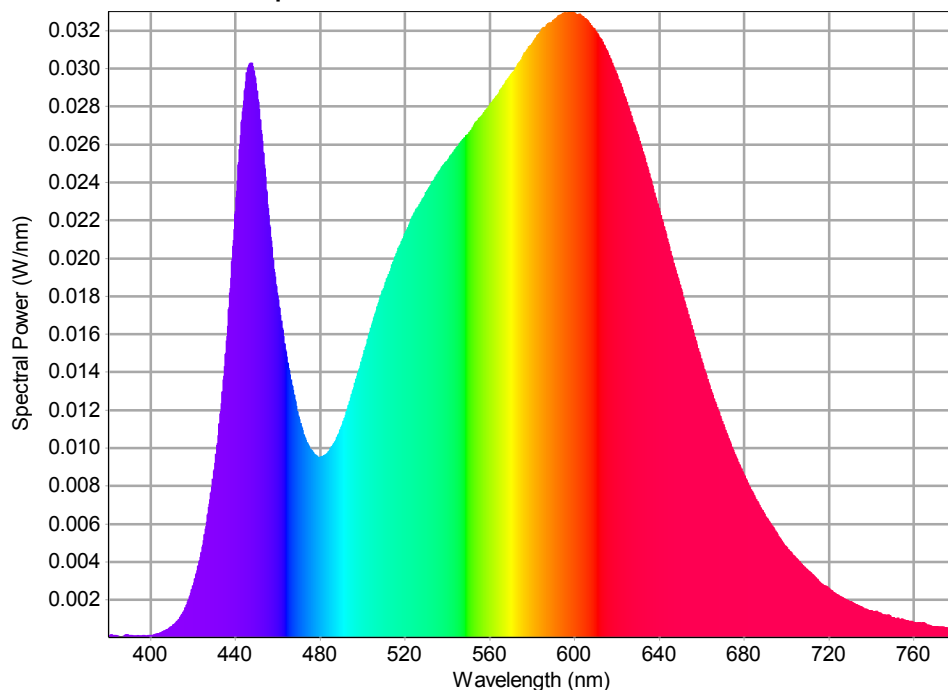
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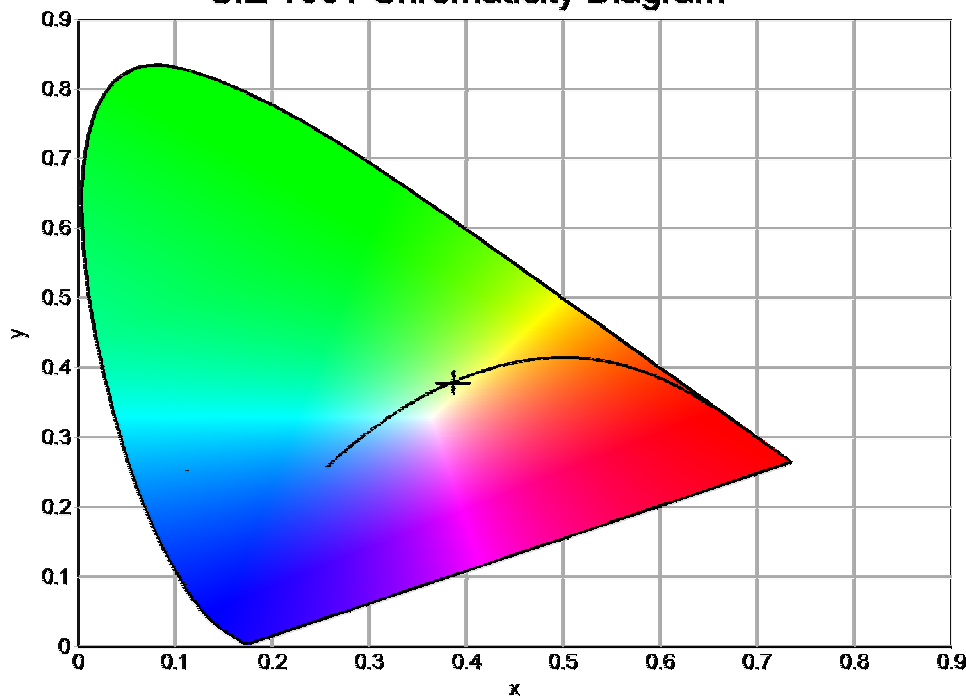
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Spectral Power Distribution



Peak Wavelength	598 nm
Luminous Flux	1900 lm
Input Power	31.13 W
Lumens/Watt	61.0
Full Width/Half Maximum	150.48
Center Wavelength	580 nm
Centroid Wavelength	371 nm
Dominant Wavelength	487 nm
Excitation Purity	0.1591
Colorimetric Purity	0.0952

CIE 1931 Chromaticity Diagram



x	0.3862	CCT	3861 K
y	0.3787	CRI	84
u	0.2281	L*	25.67
v	0.3355	a*	-4.40
u'	0.2281	b*	-14.65
v'	0.5033	Duv	0.0007
R1	82.5	R9	15.8
R2	88.7	R10	72.7
R3	93.2	R11	82.4
R4	83.6	R12	67.0
R5	82.5	R13	83.8
R6	84.5	R14	96.0
R7	86.8		
R8	67.4		



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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	0.00013	405	0.00029	430	0.00880	455	0.02287
381	0.00015	406	0.00035	431	0.00969	456	0.02176
382	0.00015	407	0.00039	432	0.01069	457	0.02058
383	0.00015	408	0.00046	433	0.01181	458	0.01945
384	0.00012	409	0.00055	434	0.01295	459	0.01862
385	0.00008	410	0.00062	435	0.01431	460	0.01781
386	0.00008	411	0.00071	436	0.01567	461	0.01702
387	0.00008	412	0.00083	437	0.01732	462	0.01633
388	0.00016	413	0.00092	438	0.01898	463	0.01552
389	0.00017	414	0.00109	439	0.02067	464	0.01482
390	0.00015	415	0.00127	440	0.02236	465	0.01421
391	0.00014	416	0.00147	441	0.02410	466	0.01362
392	0.00012	417	0.00174	442	0.02574	467	0.01306
393	0.00010	418	0.00201	443	0.02721	468	0.01255
394	0.00013	419	0.00237	444	0.02832	469	0.01196
395	0.00011	420	0.00273	445	0.02932	470	0.01152
396	0.00013	421	0.00313	446	0.03005	471	0.01116
397	0.00014	422	0.00357	447	0.03029	472	0.01074
398	0.00012	423	0.00401	448	0.03015	473	0.01044
399	0.00014	424	0.00449	449	0.02962	474	0.01023
400	0.00013	425	0.00512	450	0.02886	475	0.00998
401	0.00016	426	0.00576	451	0.02788	476	0.00985
402	0.00019	427	0.00649	452	0.02675	477	0.00971
403	0.00022	428	0.00728	453	0.02562	478	0.00961
404	0.00024	429	0.00797	454	0.02429	479	0.00954



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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	0.00954	505	0.01671	530	0.02348	555	0.02740
481	0.00956	506	0.01710	531	0.02365	556	0.02751
482	0.00962	507	0.01745	532	0.02384	557	0.02764
483	0.00969	508	0.01781	533	0.02405	558	0.02781
484	0.00981	509	0.01814	534	0.02420	559	0.02792
485	0.00999	510	0.01839	535	0.02440	560	0.02808
486	0.01018	511	0.01875	536	0.02457	561	0.02823
487	0.01033	512	0.01905	537	0.02473	562	0.02838
488	0.01057	513	0.01931	538	0.02492	563	0.02856
489	0.01081	514	0.01968	539	0.02506	564	0.02867
490	0.01111	515	0.01996	540	0.02515	565	0.02889
491	0.01142	516	0.02025	541	0.02532	566	0.02904
492	0.01174	517	0.02055	542	0.02547	567	0.02920
493	0.01208	518	0.02076	543	0.02562	568	0.02938
494	0.01246	519	0.02103	544	0.02580	569	0.02954
495	0.01284	520	0.02131	545	0.02592	570	0.02969
496	0.01321	521	0.02153	546	0.02609	571	0.02982
497	0.01364	522	0.02177	547	0.02623	572	0.03000
498	0.01398	523	0.02207	548	0.02635	573	0.03019
499	0.01436	524	0.02231	549	0.02648	574	0.03035
500	0.01475	525	0.02250	550	0.02657	575	0.03046
501	0.01515	526	0.02268	551	0.02673	576	0.03076
502	0.01550	527	0.02286	552	0.02690	577	0.03089
503	0.01597	528	0.02307	553	0.02712	578	0.03104
504	0.01632	529	0.02324	554	0.02725	579	0.03123



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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	0.03133	605	0.03266	630	0.02640	655	0.01648
581	0.03150	606	0.03256	631	0.02601	656	0.01608
582	0.03167	607	0.03239	632	0.02564	657	0.01568
583	0.03183	608	0.03223	633	0.02530	658	0.01527
584	0.03195	609	0.03213	634	0.02488	659	0.01492
585	0.03217	610	0.03195	635	0.02449	660	0.01455
586	0.03220	611	0.03178	636	0.02409	661	0.01417
587	0.03233	612	0.03160	637	0.02367	662	0.01383
588	0.03242	613	0.03143	638	0.02325	663	0.01347
589	0.03241	614	0.03121	639	0.02289	664	0.01311
590	0.03255	615	0.03098	640	0.02249	665	0.01281
591	0.03263	616	0.03073	641	0.02208	666	0.01246
592	0.03273	617	0.03047	642	0.02169	667	0.01217
593	0.03283	618	0.03017	643	0.02129	668	0.01187
594	0.03288	619	0.02991	644	0.02085	669	0.01156
595	0.03293	620	0.02962	645	0.02040	670	0.01126
596	0.03294	621	0.02935	646	0.01998	671	0.01096
597	0.03296	622	0.02905	647	0.01958	672	0.01068
598	0.03302	623	0.02868	648	0.01920	673	0.01039
599	0.03300	624	0.02842	649	0.01882	674	0.01008
600	0.03293	625	0.02806	650	0.01842	675	0.00981
601	0.03286	626	0.02774	651	0.01800	676	0.00955
602	0.03289	627	0.02737	652	0.01760	677	0.00928
603	0.03282	628	0.02706	653	0.01724	678	0.00903
604	0.03274	629	0.02672	654	0.01686	679	0.00879



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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	0.00855	706	0.00402	732	0.00182	758	0.00087
681	0.00831	707	0.00388	733	0.00177	759	0.00088
682	0.00805	708	0.00377	734	0.00170	760	0.00082
683	0.00783	709	0.00367	735	0.00167	761	0.00080
684	0.00764	710	0.00356	736	0.00159	762	0.00082
685	0.00741	711	0.00347	737	0.00154	763	0.00081
686	0.00720	712	0.00336	738	0.00149	764	0.00081
687	0.00702	713	0.00326	739	0.00145	765	0.00078
688	0.00681	714	0.00312	740	0.00145	766	0.00068
689	0.00663	715	0.00301	741	0.00138	767	0.00068
690	0.00640	716	0.00289	742	0.00141	768	0.00064
691	0.00625	717	0.00283	743	0.00134	769	0.00061
692	0.00607	718	0.00274	744	0.00133	770	0.00061
693	0.00591	719	0.00270	745	0.00124	771	0.00061
694	0.00574	720	0.00259	746	0.00121	772	0.00060
695	0.00557	721	0.00251	747	0.00120	773	0.00060
696	0.00537	722	0.00241	748	0.00123	774	0.00059
697	0.00522	723	0.00234	749	0.00112	775	0.00054
698	0.00504	724	0.00228	750	0.00107	776	0.00051
699	0.00488	725	0.00221	751	0.00104	777	0.00055
700	0.00476	726	0.00215	752	0.00099	778	0.00051
701	0.00462	727	0.00206	753	0.00100	779	0.00049
702	0.00452	728	0.00202	754	0.00100	780	0.00048
703	0.00437	729	0.00198	755	0.00097		
704	0.00425	730	0.00193	756	0.00094		
705	0.00414	731	0.00186	757	0.00092		



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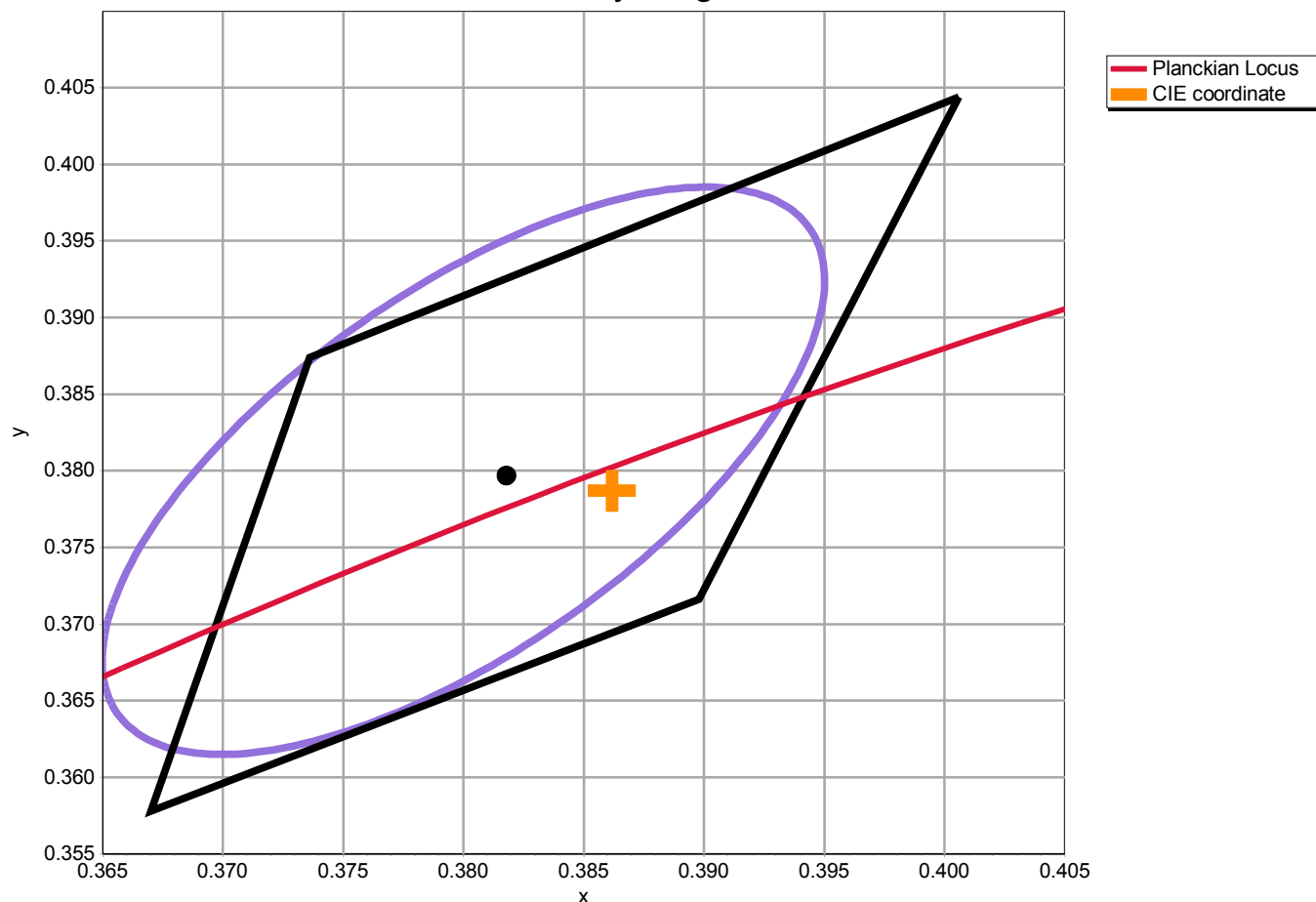
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CIE Chromaticity Diagram for Indoor SSL products

CIE 1931 Chromaticity Diagram



Chromaticity tolerance for 4000K nominal CCT

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