



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: CY1399	Driver Details: CY524	
Test Report	L1403054-C1	Description	4 Clusters of 12 Cree XPE LED's	Type Commercial
Test Date	5 March 2014	Manufacturer	Cree	Description 60W
Report Date	5 March 2014	Catalog No.	LOG HO-120-48-40K-10X60 XPE2-NO_R&D	Manufacturer MeanWell
Sphere Temperature	25.9 °C	Serial No.	LOG HO-120-48-40K-10X60 XPE2-NO_R&D	Catalog No. LPF-60-24
Humidity	9.0 %	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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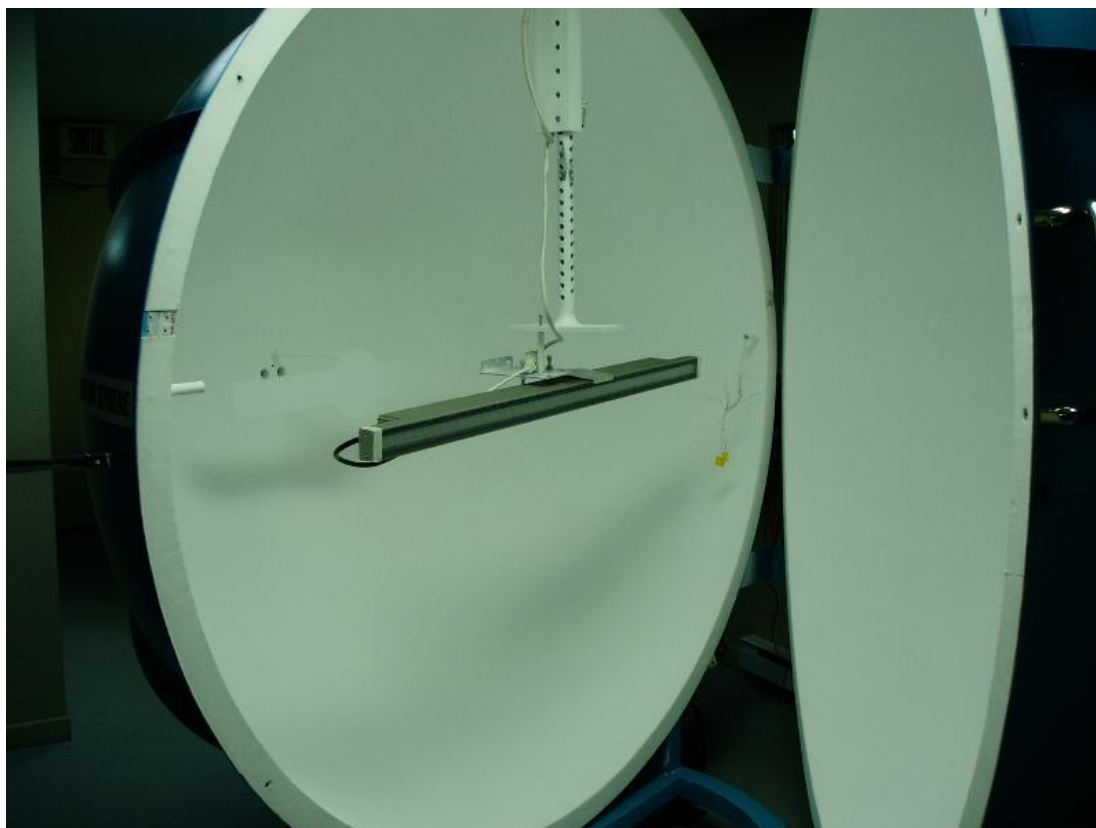
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Realization of Sphere Test

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.
Input Power Meter	Yokogawa	WT210	27E224420	2013/09/16	2014/09/16
Output Power Meter	N/A	N/A	N/A	N.P.C.R.	N.P.C.R.
Shunt Resistor	Fluke	Y5020	5675014	2013/06/26	2014/06/26
Current Multimeter	HP	HP3458A	25B746	2013/01/06	2015/01/06
Voltage Multimeter	Fluke	Fluke8842A	4282317	2013/10/23	2014/10/23

Spectrometer Equipment

Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due Date
Spectrometer	Ocean Optics	USB2000PlusN	WA00126	2014/01/12	2015/02/12

Environment Equipment

Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due Date
Temperature Humidity Sensor	Omega	HH311	051202970	2013/08/09	2014/08/09



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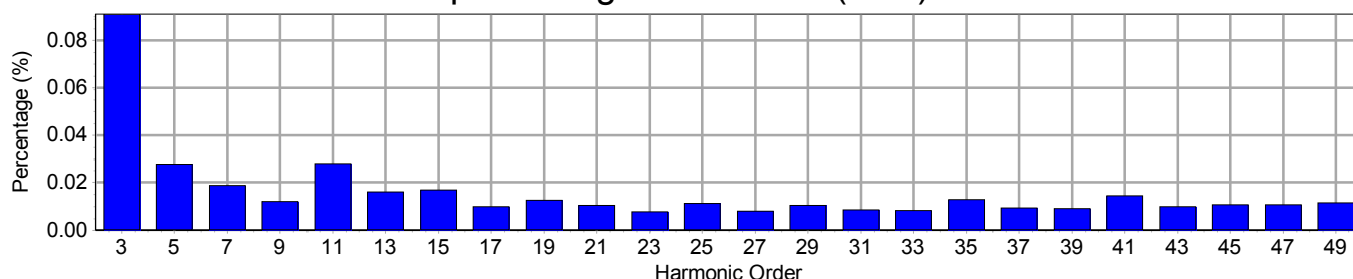
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Electrical Measurements

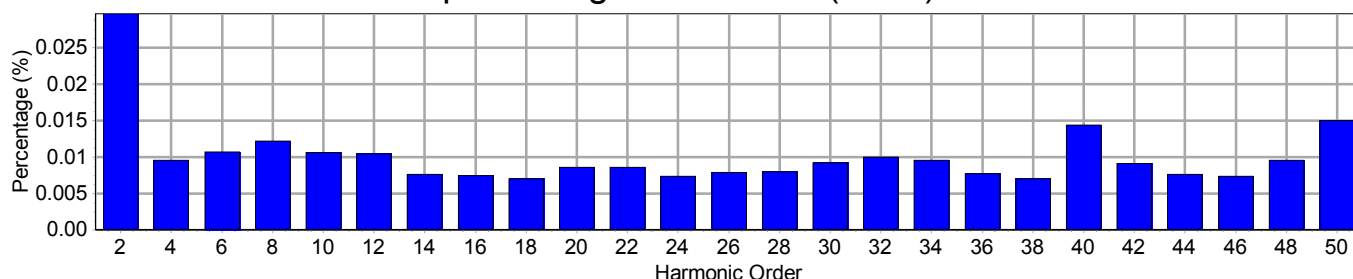
Input

Frequency	60 Hz	Active Power	65.99 W	THDV [ANSI]	0.12 %
Voltage	120.1 V(rms)	Apparent Power	66.19 VA	THDA [ANSI]	4.67 %
Current	0.5512 A(rms)	Power Factor	0.997	Max. Harmonic At	5th order

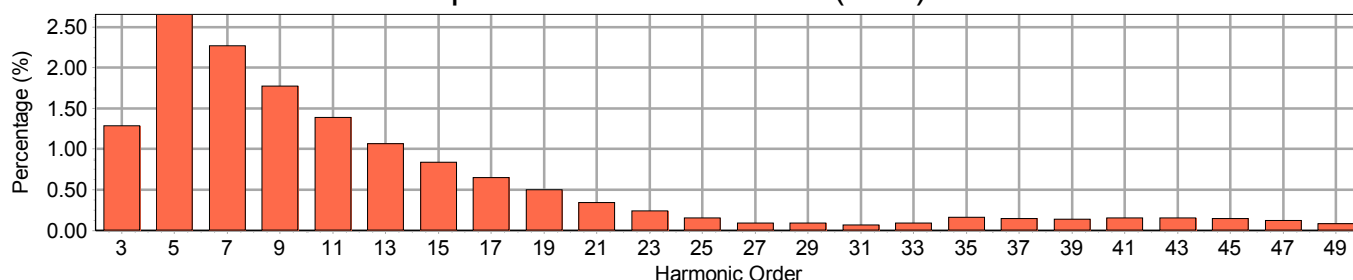
Input Voltage Harmonics (Odd)



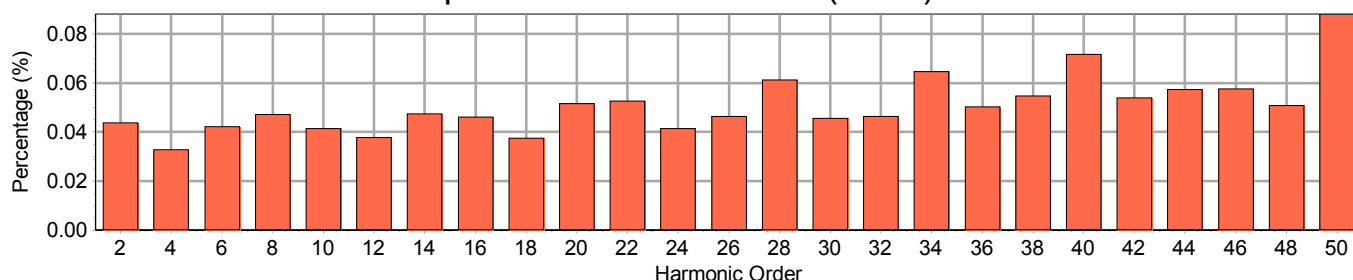
Input Voltage Harmonics (Even)



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	0.030	0.044
3	180	0.091	1.286	4	240	0.010	0.033
5	300	0.028	2.660	6	360	0.011	0.042
7	420	0.019	2.267	8	480	0.012	0.047
9	540	0.012	1.772	10	600	0.011	0.041
11	660	0.028	1.387	12	720	0.010	0.038
13	780	0.016	1.063	14	840	0.008	0.047
15	900	0.017	0.834	16	960	0.007	0.046
17	1020	0.010	0.646	18	1080	0.007	0.038
19	1140	0.013	0.498	20	1200	0.009	0.051
21	1260	0.010	0.344	22	1320	0.009	0.053
23	1380	0.008	0.244	24	1440	0.007	0.041
25	1500	0.011	0.157	26	1560	0.008	0.046
27	1620	0.008	0.093	28	1680	0.008	0.061
29	1740	0.010	0.088	30	1800	0.009	0.046
31	1860	0.008	0.066	32	1920	0.010	0.046
33	1980	0.008	0.088	34	2040	0.010	0.065
35	2100	0.013	0.159	36	2160	0.008	0.050
37	2220	0.009	0.146	38	2280	0.007	0.055
39	2340	0.009	0.136	40	2400	0.014	0.072
41	2460	0.014	0.153	42	2520	0.009	0.054
43	2580	0.010	0.155	44	2640	0.008	0.057
45	2700	0.011	0.149	46	2760	0.007	0.058
47	2820	0.011	0.122	48	2880	0.010	0.051
49	2940	0.012	0.083	50	3000	0.015	0.088



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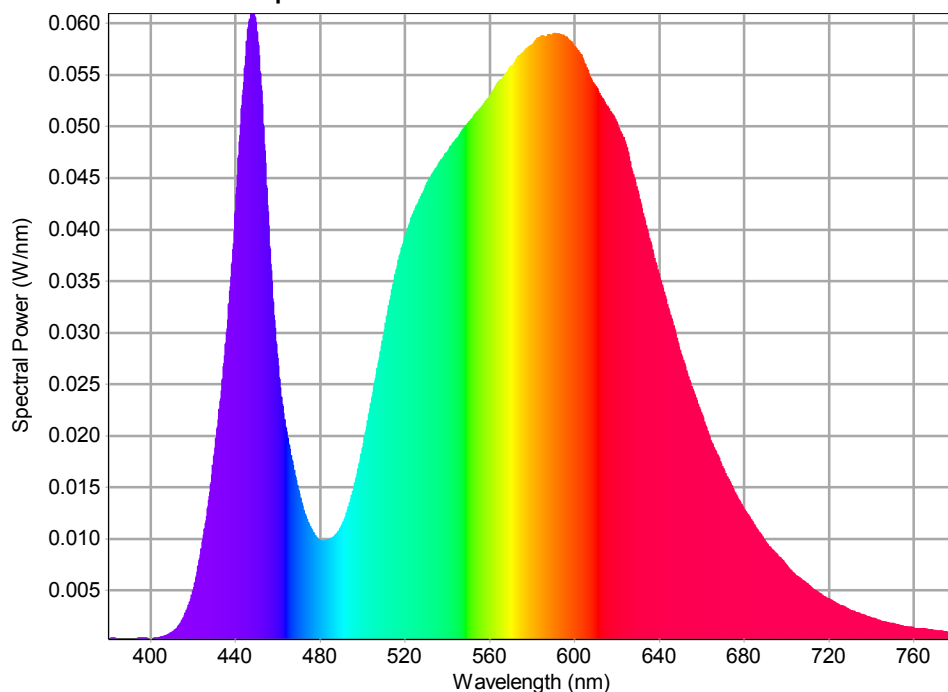
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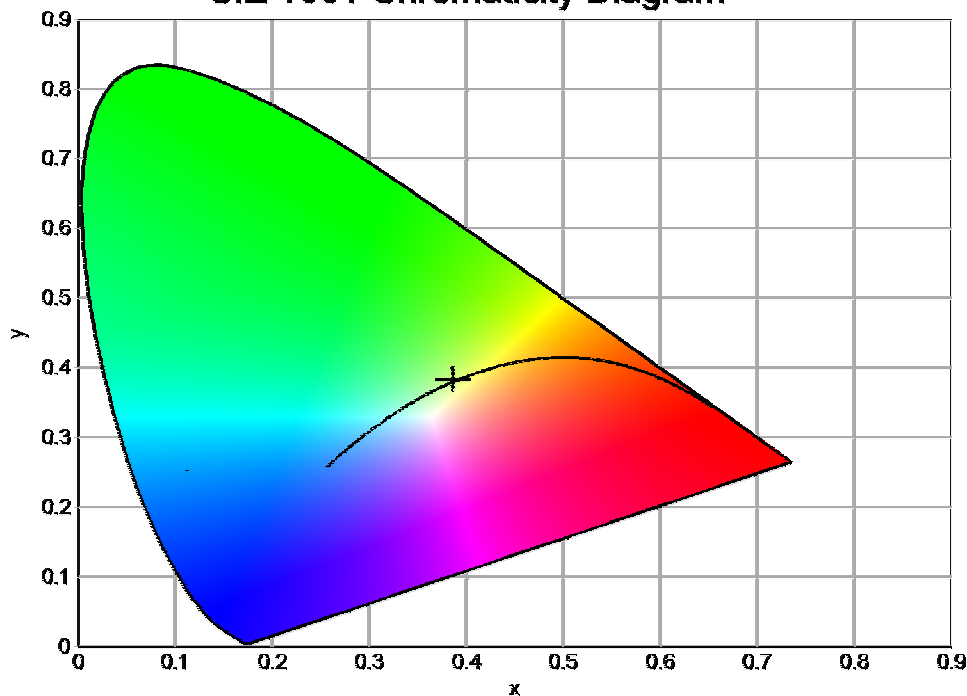
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Spectral Power Distribution



Peak Wavelength	448 nm
Luminous Flux	3412 lm
Input Power	65.99 W
Lumens/Watt	51.7
Full Width/Half Maximum	22.16
Center Wavelength	447 nm
Centroid Wavelength	368 nm
Dominant Wavelength	488 nm
Excitation Purity	0.1565
Colorimetric Purity	0.1051

CIE 1931 Chromaticity Diagram



x	0.3859	CCT	3908 K
y	0.3841	CRI	76
u	0.2258	L*	25.67
v	0.3370	a*	-5.25
u'	0.2258	b*	-13.61
v'	0.5056	Duv	0.0018
R1	74.5	R9	-8.9
R2	81.3	R10	55.4
R3	86.7	R11	74.0
R4	76.9	R12	49.4
R5	73.9	R13	75.4
R6	74.0	R14	92.2
R7	83.7		
R8	59.8		



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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	0.00039	405	0.00053	430	0.01805	455	0.04242
381	0.00039	406	0.00058	431	0.01983	456	0.03843
382	0.00040	407	0.00066	432	0.02161	457	0.03499
383	0.00042	408	0.00074	433	0.02341	458	0.03173
384	0.00037	409	0.00085	434	0.02548	459	0.02917
385	0.00036	410	0.00097	435	0.02781	460	0.02682
386	0.00037	411	0.00110	436	0.03007	461	0.02468
387	0.00038	412	0.00130	437	0.03275	462	0.02310
388	0.00039	413	0.00153	438	0.03547	463	0.02160
389	0.00039	414	0.00182	439	0.03812	464	0.02040
390	0.00034	415	0.00217	440	0.04156	465	0.01923
391	0.00035	416	0.00260	441	0.04534	466	0.01815
392	0.00038	417	0.00308	442	0.04853	467	0.01716
393	0.00040	418	0.00361	443	0.05180	468	0.01620
394	0.00042	419	0.00424	444	0.05431	469	0.01528
395	0.00041	420	0.00496	445	0.05687	470	0.01441
396	0.00042	421	0.00580	446	0.05944	471	0.01361
397	0.00041	422	0.00685	447	0.06045	472	0.01285
398	0.00042	423	0.00794	448	0.06099	473	0.01221
399	0.00038	424	0.00904	449	0.06072	474	0.01168
400	0.00036	425	0.01040	450	0.05926	475	0.01126
401	0.00038	426	0.01156	451	0.05691	476	0.01085
402	0.00040	427	0.01299	452	0.05400	477	0.01052
403	0.00045	428	0.01461	453	0.05026	478	0.01023
404	0.00048	429	0.01624	454	0.04647	479	0.00997



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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	0.00988	505	0.02426	530	0.04434	555	0.05166
481	0.00981	506	0.02539	531	0.04473	556	0.05189
482	0.00984	507	0.02655	532	0.04510	557	0.05217
483	0.00987	508	0.02765	533	0.04543	558	0.05245
484	0.00996	509	0.02871	534	0.04580	559	0.05268
485	0.01004	510	0.02973	535	0.04607	560	0.05291
486	0.01020	511	0.03095	536	0.04644	561	0.05332
487	0.01035	512	0.03214	537	0.04678	562	0.05361
488	0.01057	513	0.03314	538	0.04698	563	0.05401
489	0.01087	514	0.03422	539	0.04737	564	0.05437
490	0.01126	515	0.03522	540	0.04754	565	0.05459
491	0.01166	516	0.03614	541	0.04793	566	0.05467
492	0.01222	517	0.03708	542	0.04819	567	0.05503
493	0.01284	518	0.03782	543	0.04846	568	0.05523
494	0.01351	519	0.03856	544	0.04878	569	0.05559
495	0.01425	520	0.03928	545	0.04896	570	0.05586
496	0.01501	521	0.03987	546	0.04926	571	0.05599
497	0.01591	522	0.04046	547	0.04966	572	0.05637
498	0.01681	523	0.04114	548	0.04990	573	0.05668
499	0.01779	524	0.04165	549	0.05015	574	0.05693
500	0.01879	525	0.04209	550	0.05040	575	0.05707
501	0.01989	526	0.04249	551	0.05065	576	0.05725
502	0.02090	527	0.04294	552	0.05085	577	0.05754
503	0.02207	528	0.04342	553	0.05122	578	0.05768
504	0.02314	529	0.04379	554	0.05145	579	0.05781



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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	0.05798	605	0.05606	630	0.04347	655	0.02483
581	0.05818	606	0.05555	631	0.04262	656	0.02435
582	0.05847	607	0.05490	632	0.04165	657	0.02376
583	0.05866	608	0.05450	633	0.04092	658	0.02314
584	0.05873	609	0.05419	634	0.04008	659	0.02261
585	0.05884	610	0.05391	635	0.03926	660	0.02207
586	0.05870	611	0.05346	636	0.03855	661	0.02142
587	0.05878	612	0.05304	637	0.03765	662	0.02083
588	0.05894	613	0.05279	638	0.03686	663	0.02022
589	0.05887	614	0.05238	639	0.03612	664	0.01961
590	0.05903	615	0.05204	640	0.03540	665	0.01919
591	0.05900	616	0.05180	641	0.03471	666	0.01867
592	0.05900	617	0.05145	642	0.03401	667	0.01826
593	0.05899	618	0.05117	643	0.03328	668	0.01785
594	0.05885	619	0.05076	644	0.03246	669	0.01733
595	0.05881	620	0.05029	645	0.03176	670	0.01687
596	0.05874	621	0.04976	646	0.03109	671	0.01639
597	0.05845	622	0.04934	647	0.03044	672	0.01598
598	0.05831	623	0.04899	648	0.02954	673	0.01563
599	0.05806	624	0.04827	649	0.02866	674	0.01520
600	0.05777	625	0.04759	650	0.02802	675	0.01474
601	0.05748	626	0.04666	651	0.02739	676	0.01432
602	0.05726	627	0.04569	652	0.02674	677	0.01393
603	0.05703	628	0.04505	653	0.02604	678	0.01357
604	0.05641	629	0.04422	654	0.02545	679	0.01324



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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	0.01287	706	0.00624	732	0.00298	758	0.00150
681	0.01256	707	0.00608	733	0.00293	759	0.00148
682	0.01228	708	0.00594	734	0.00284	760	0.00139
683	0.01194	709	0.00577	735	0.00273	761	0.00137
684	0.01159	710	0.00562	736	0.00269	762	0.00134
685	0.01128	711	0.00544	737	0.00261	763	0.00135
686	0.01096	712	0.00525	738	0.00247	764	0.00139
687	0.01069	713	0.00509	739	0.00245	765	0.00134
688	0.01042	714	0.00498	740	0.00234	766	0.00131
689	0.01005	715	0.00481	741	0.00233	767	0.00126
690	0.00976	716	0.00469	742	0.00227	768	0.00123
691	0.00948	717	0.00451	743	0.00219	769	0.00119
692	0.00925	718	0.00440	744	0.00209	770	0.00117
693	0.00902	719	0.00430	745	0.00204	771	0.00113
694	0.00880	720	0.00423	746	0.00200	772	0.00110
695	0.00862	721	0.00408	747	0.00195	773	0.00109
696	0.00833	722	0.00396	748	0.00191	774	0.00106
697	0.00819	723	0.00381	749	0.00182	775	0.00104
698	0.00797	724	0.00371	750	0.00183	776	0.00101
699	0.00769	725	0.00362	751	0.00178	777	0.00095
700	0.00747	726	0.00354	752	0.00174	778	0.00091
701	0.00718	727	0.00346	753	0.00169	779	0.00088
702	0.00695	728	0.00336	754	0.00161	780	0.00085
703	0.00676	729	0.00324	755	0.00157		
704	0.00654	730	0.00311	756	0.00151		
705	0.00639	731	0.00304	757	0.00151		



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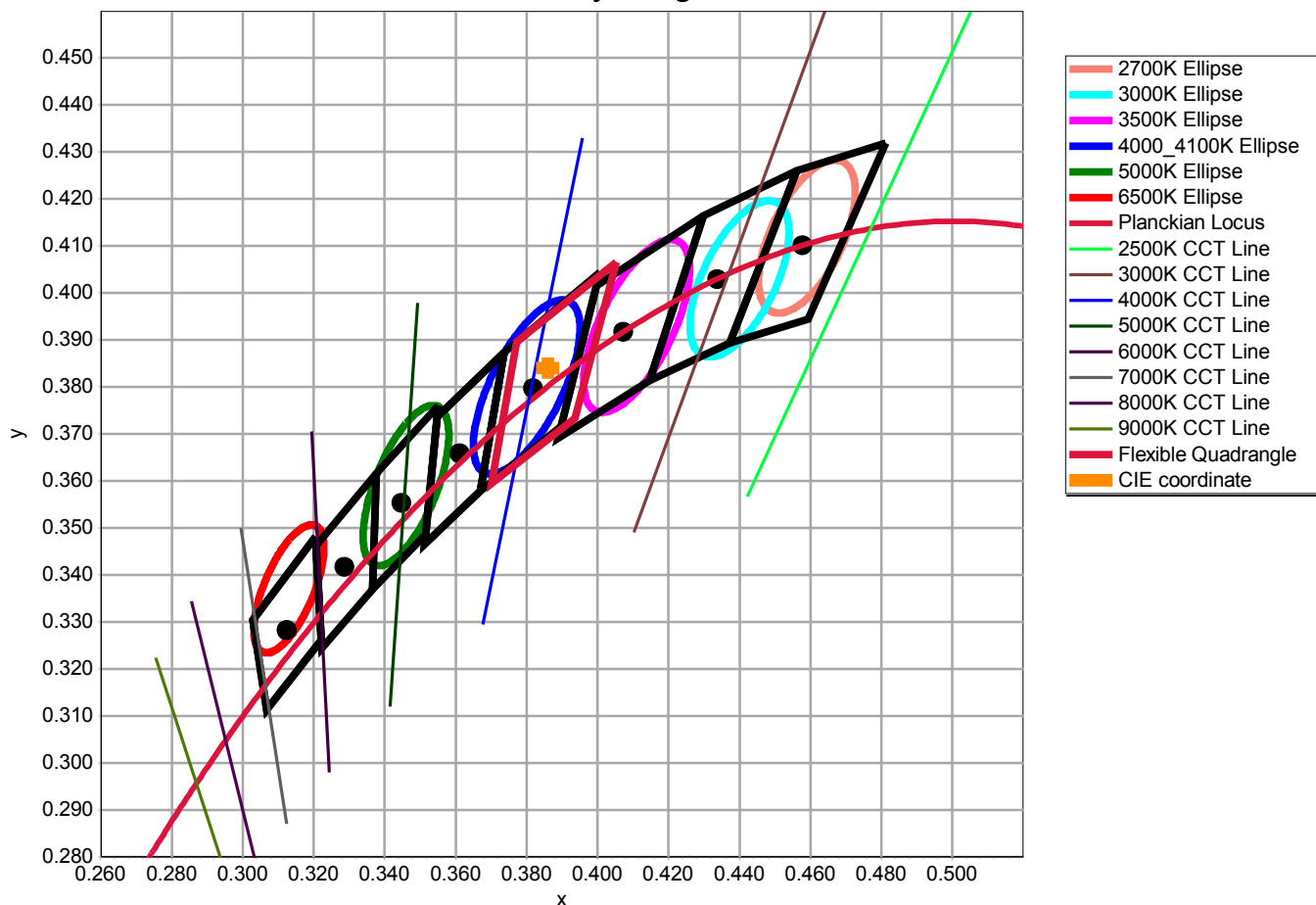
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CIE Chromaticity Diagram for Indoor SSL products

CIE 1931 Chromaticity Diagram



Chromaticity tolerance of Flexible CCT at nominal CCT of 3900K

			x	y
Center Point			0.3856	0.3818
Min CCT	3626	A	0.4052	0.4066
Max CCT	4174	Tolerance	0.3773	0.3896
Delta T	274	Quadrangle	0.3701	0.3595
Center Duv	0.0009	D	0.3937	0.3734