



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: CY2396	Driver Details: CY963	
Test Report	L1512023-C1	Description	Clusters of 48 Cree XPE2 LED's	Type Commercial
Test Date	2 December 2015	Manufacturer	Cree	Description 61W
Report Date	8 December 2015	Catalog No.	LOGI-HO-120/277-48-40K-30x60-SI-NO	Manufacturer Mean Well
Sphere Temperature	25.4°C	Serial No.	SRIS 2219	Catalog No. LPF-60-24
Humidity	19.8 %	Diameter	N/A mm	Voltage 120.00 V
Lamp Type	SSL	Color	White	Power Factor 0.9900

Stabilization Time: 1 heure 15 minutes

Tested By: Marc Viwonou Sena

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.

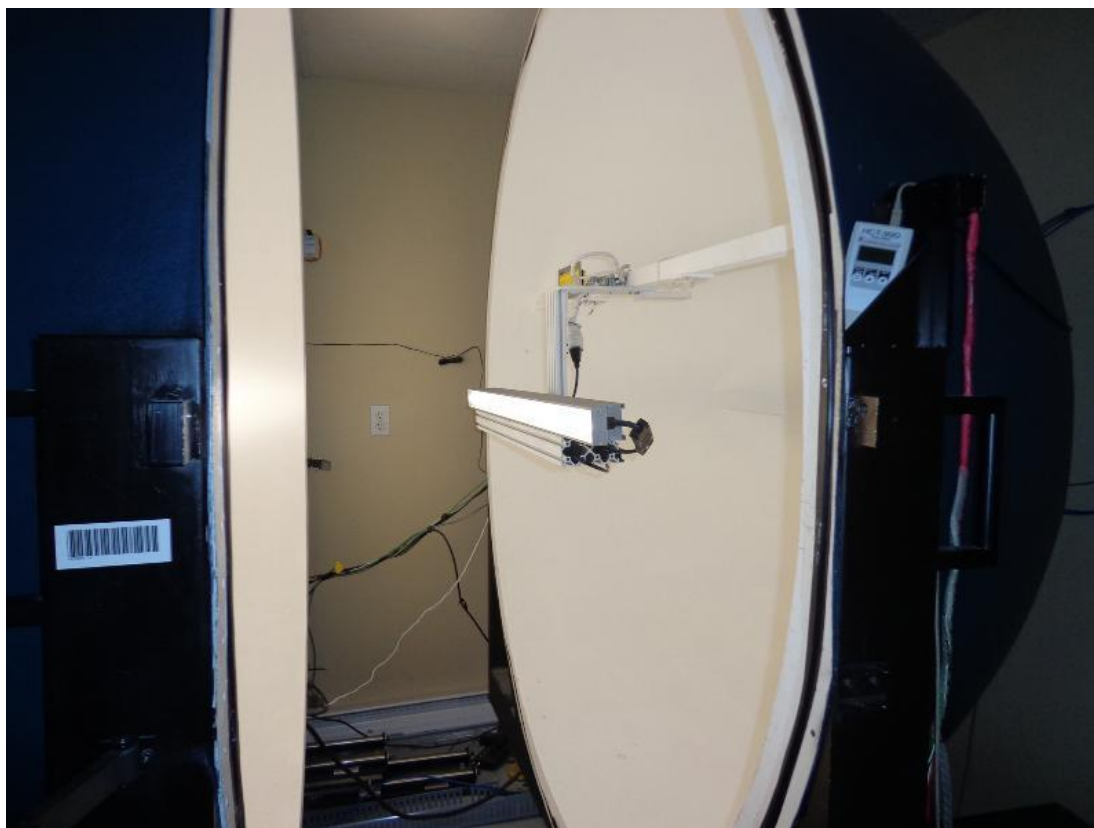


Realization of Sphere Test

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	974997	N.P.C.R.	N.P.C.R.
Input Power Meter	Yokogawa	WT210	91L236540	2015/10/22	2016/10/22
Output Power Meter	N/A	N/A	N/A	N.P.C.R.	N.P.C.R.
Shunt Resistor	Fluke	Y5020	5675014	2015/08/06	2016/08/06
Current Multimeter	HP Agilent	HP34401A	US36121202	2015/08/06	2016/08/06
Voltage Multimeter	Fluke	Fluke8842A	4282317	2014/10/31	2016/10/31

Spectrometer Equipment

Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due Date
Spectrometer	Ocean Optics	USB2000N	USB2E3864	2015/08/24	2016/08/24

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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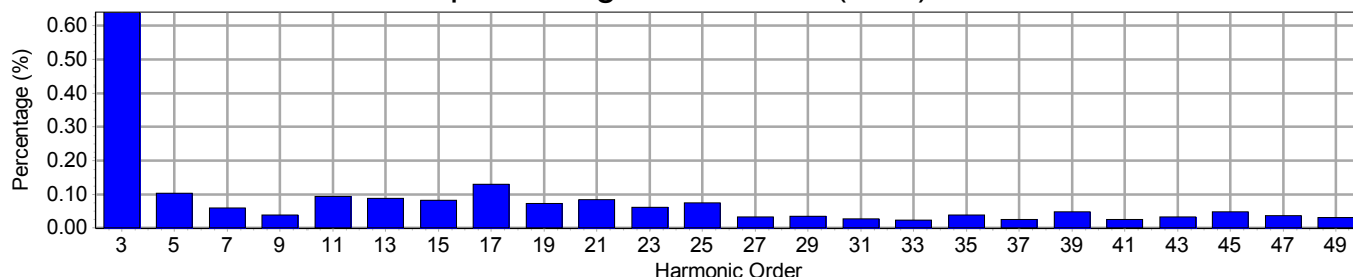
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Electrical Measurements

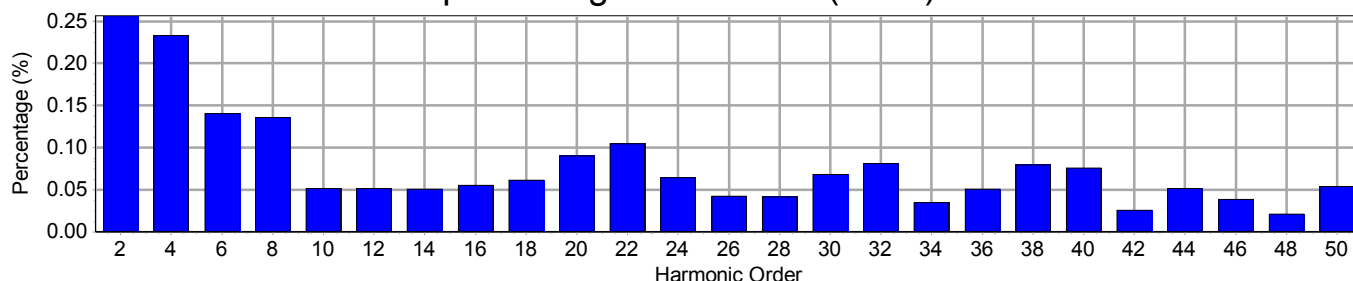
Input

Frequency	60 Hz	Active Power	61.09 W	THDV [ANSI]	0.85 %
Voltage	120.1 V(rms)	Apparent Power	61.56 VA	THDA [ANSI]	5.27 %
Current	0.5128 A(rms)	Power Factor	0.992	Max. Harmonic At	5th order

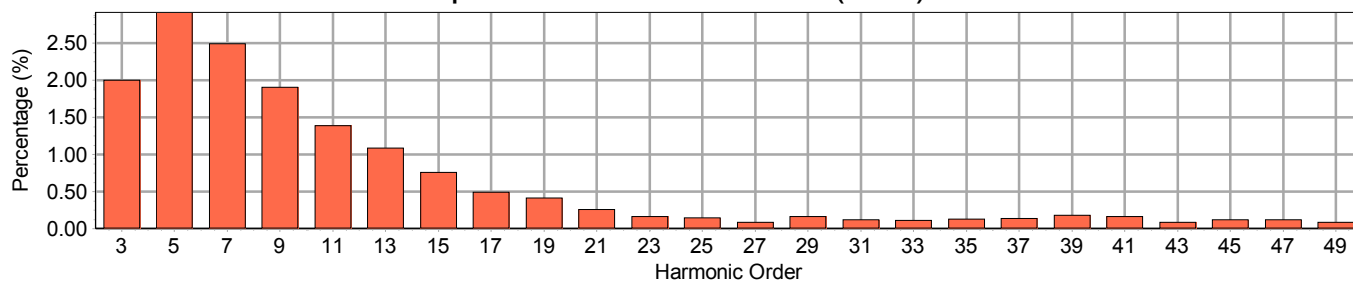
Input Voltage Harmonics (Odd)



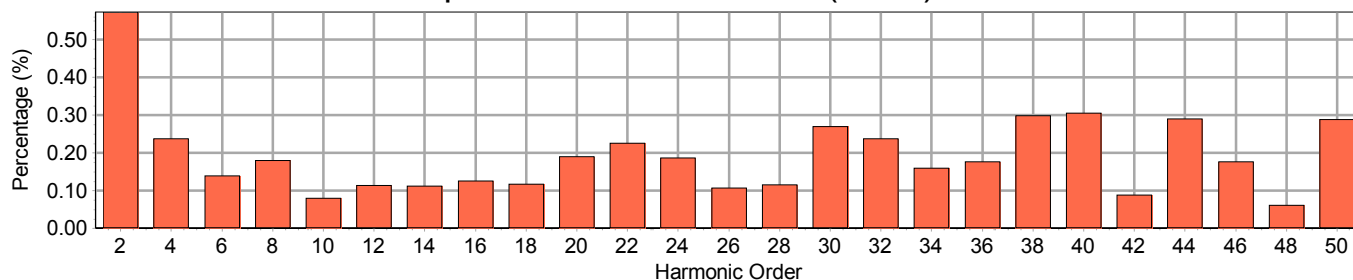
Input Voltage Harmonics (Even)



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	0.257	0.573
3	180	0.641	2.005	4	240	0.233	0.237
5	300	0.104	2.923	6	360	0.140	0.138
7	420	0.059	2.499	8	480	0.136	0.179
9	540	0.039	1.906	10	600	0.051	0.079
11	660	0.094	1.388	12	720	0.051	0.113
13	780	0.088	1.087	14	840	0.051	0.111
15	900	0.083	0.753	16	960	0.055	0.125
17	1020	0.130	0.488	18	1080	0.061	0.116
19	1140	0.073	0.411	20	1200	0.090	0.189
21	1260	0.085	0.252	22	1320	0.104	0.225
23	1380	0.061	0.158	24	1440	0.065	0.186
25	1500	0.074	0.145	26	1560	0.042	0.106
27	1620	0.033	0.085	28	1680	0.041	0.115
29	1740	0.036	0.161	30	1800	0.068	0.269
31	1860	0.028	0.116	32	1920	0.081	0.237
33	1980	0.023	0.105	34	2040	0.035	0.158
35	2100	0.038	0.129	36	2160	0.051	0.175
37	2220	0.025	0.132	38	2280	0.079	0.299
39	2340	0.048	0.178	40	2400	0.076	0.304
41	2460	0.026	0.158	42	2520	0.025	0.087
43	2580	0.033	0.083	44	2640	0.051	0.290
45	2700	0.049	0.117	46	2760	0.038	0.176
47	2820	0.038	0.118	48	2880	0.021	0.061
49	2940	0.032	0.083	50	3000	0.053	0.287



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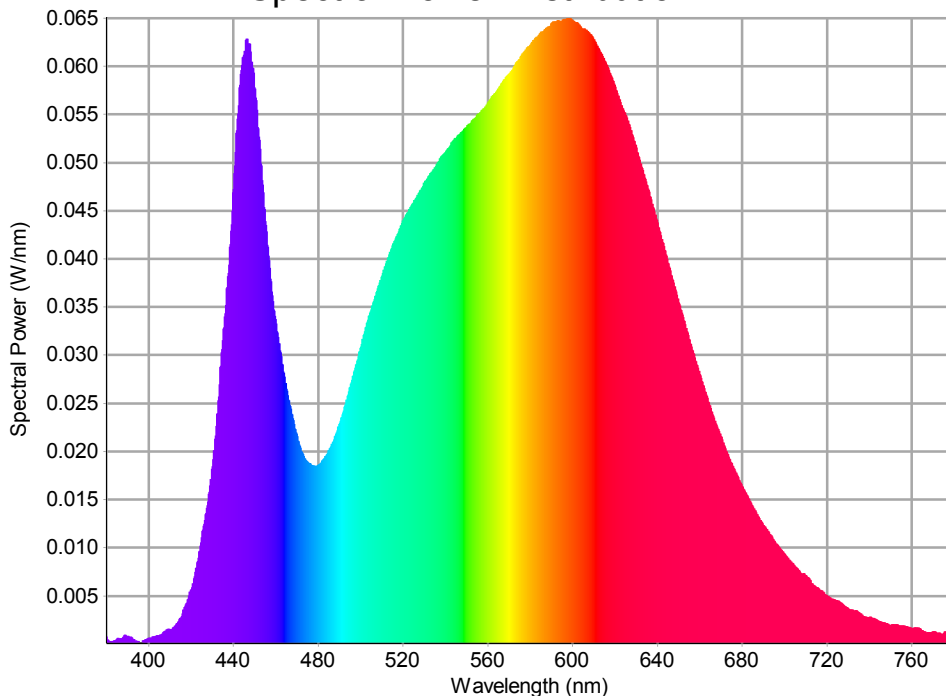
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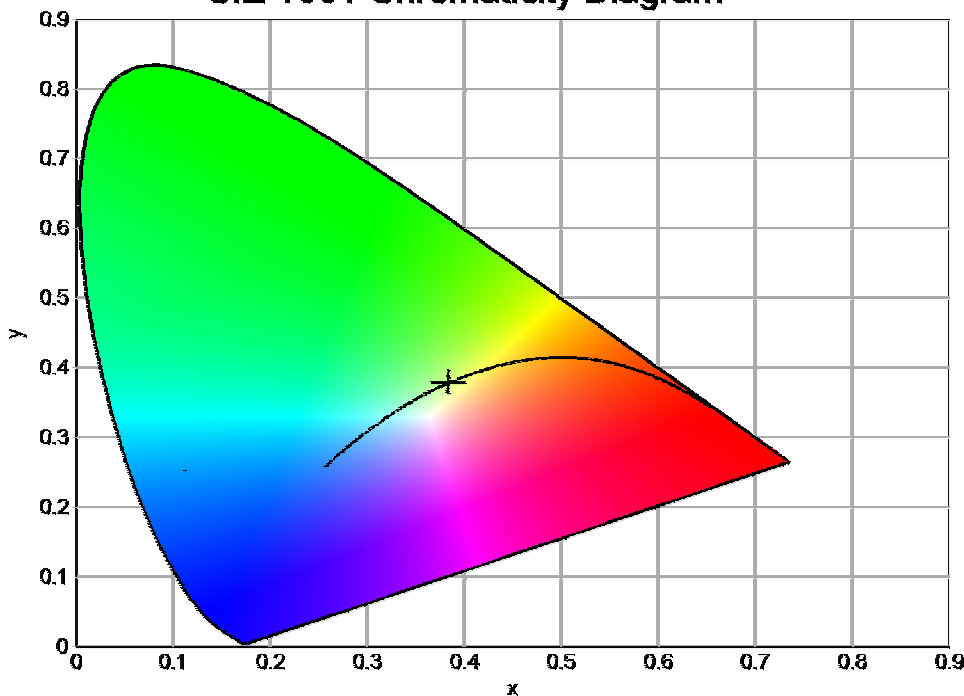
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Spectral Power Distribution



Peak Wavelength	599 nm
Luminous Flux	3800 lm
Input Power	61.09 W
Lumens/Watt	62.2
Full Width/Half Maximum	151.77
Center Wavelength	578 nm
Centroid Wavelength	368 nm
Dominant Wavelength	487 nm
Excitation Purity	0.1652
Colorimetric Purity	0.1044

CIE 1931 Chromaticity Diagram



x	0.3832	CCT	3947 K
y	0.3797	CRI	83
u	0.2257	L*	25.67
v	0.3355	a*	-5.01
u'	0.2257	b*	-14.80
v'	0.5033	Duv	0.0006
R1	82.0	R9	13.8
R2	87.9	R10	71.2
R3	92.6	R11	82.7
R4	83.7	R12	66.1
R5	82.0	R13	83.1
R6	83.7	R14	95.7
R7	87.0		
R8	67.3		



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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	0.00078	405	0.00088	430	0.01821	455	0.04391
381	0.00038	406	0.00100	431	0.02012	456	0.04146
382	0.00017	407	0.00128	432	0.02262	457	0.03904
383	0.00031	408	0.00138	433	0.02529	458	0.03660
384	0.00036	409	0.00159	434	0.02878	459	0.03475
385	0.00052	410	0.00152	435	0.03154	460	0.03330
386	0.00056	411	0.00155	436	0.03403	461	0.03190
387	0.00058	412	0.00181	437	0.03691	462	0.03047
388	0.00072	413	0.00202	438	0.03938	463	0.02908
389	0.00096	414	0.00231	439	0.04292	464	0.02775
390	0.00084	415	0.00269	440	0.04692	465	0.02650
391	0.00068	416	0.00321	441	0.05112	466	0.02538
392	0.00069	417	0.00383	442	0.05457	467	0.02446
393	0.00053	418	0.00427	443	0.05778	468	0.02344
394	0.00037	419	0.00505	444	0.06012	469	0.02240
395	0.00031	420	0.00565	445	0.06119	470	0.02159
396	0.00015	421	0.00628	446	0.06273	471	0.02073
397	0.00018	422	0.00751	447	0.06213	472	0.02001
398	0.00039	423	0.00847	448	0.06156	473	0.01954
399	0.00055	424	0.00961	449	0.05988	474	0.01913
400	0.00063	425	0.01106	450	0.05780	475	0.01891
401	0.00064	426	0.01228	451	0.05549	476	0.01878
402	0.00076	427	0.01350	452	0.05272	477	0.01860
403	0.00076	428	0.01479	453	0.04992	478	0.01852
404	0.00090	429	0.01647	454	0.04692	479	0.01846



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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	0.01859	505	0.03476	530	0.04789	555	0.05497
481	0.01875	506	0.03547	531	0.04821	556	0.05512
482	0.01905	507	0.03616	532	0.04856	557	0.05540
483	0.01931	508	0.03691	533	0.04891	558	0.05563
484	0.01966	509	0.03754	534	0.04914	559	0.05580
485	0.02010	510	0.03816	535	0.04948	560	0.05621
486	0.02054	511	0.03885	536	0.04984	561	0.05653
487	0.02098	512	0.03950	537	0.05017	562	0.05688
488	0.02159	513	0.04011	538	0.05062	563	0.05715
489	0.02219	514	0.04071	539	0.05086	564	0.05733
490	0.02284	515	0.04141	540	0.05109	565	0.05768
491	0.02350	516	0.04189	541	0.05143	566	0.05800
492	0.02424	517	0.04236	542	0.05164	567	0.05837
493	0.02499	518	0.04287	543	0.05209	568	0.05867
494	0.02580	519	0.04343	544	0.05237	569	0.05902
495	0.02666	520	0.04396	545	0.05255	570	0.05923
496	0.02744	521	0.04440	546	0.05286	571	0.05946
497	0.02831	522	0.04478	547	0.05304	572	0.05982
498	0.02906	523	0.04516	548	0.05323	573	0.06021
499	0.02991	524	0.04556	549	0.05352	574	0.06053
500	0.03077	525	0.04586	550	0.05372	575	0.06075
501	0.03167	526	0.04625	551	0.05400	576	0.06123
502	0.03248	527	0.04667	552	0.05411	577	0.06146
503	0.03334	528	0.04710	553	0.05447	578	0.06175
504	0.03407	529	0.04739	554	0.05465	579	0.06206



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Customer Lumenpulse, 1751 Richardson, suite 1505, Montréal, Québec, Canada, H3K 1G6

General Information		Lamp Details: CY2396	Driver Details: CY963	
Test Report	L1512023-C1	Description	Clusters of 48 Cree XPE2 LED's	Type Commercial
Test Date	2 December 2015	Manufacturer	Cree	Description 61W
Report Date	8 December 2015	Catalog No.	LOGI-HO-120/277-48-40K-30x60-SI-NO	Manufacturer Mean Well
Sphere Temperature	25.4°C	Serial No.	SRIS 2219	Catalog No. LPF-60-24
Humidity	19.8 %	Diameter	N/A mm	Voltage 120.00 V
Lamp Type	SSL	Color	White	Power Factor 0.9900

Stabilization Time: 1 heure 15 minutes

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Approved Signatory: Chrisnel Blot

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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	0.01637	706	0.00786	732	0.00360	758	0.00181
681	0.01595	707	0.00757	733	0.00347	759	0.00174
682	0.01552	708	0.00731	734	0.00348	760	0.00163
683	0.01512	709	0.00734	735	0.00330	761	0.00171
684	0.01469	710	0.00715	736	0.00318	762	0.00173
685	0.01428	711	0.00694	737	0.00292	763	0.00169
686	0.01390	712	0.00670	738	0.00284	764	0.00155
687	0.01347	713	0.00630	739	0.00279	765	0.00142
688	0.01308	714	0.00608	740	0.00281	766	0.00132
689	0.01272	715	0.00588	741	0.00276	767	0.00120
690	0.01238	716	0.00579	742	0.00269	768	0.00126
691	0.01209	717	0.00557	743	0.00258	769	0.00125
692	0.01177	718	0.00542	744	0.00244	770	0.00132
693	0.01142	719	0.00519	745	0.00237	771	0.00131
694	0.01113	720	0.00504	746	0.00228	772	0.00109
695	0.01075	721	0.00488	747	0.00223	773	0.00118
696	0.01041	722	0.00469	748	0.00217	774	0.00106
697	0.01017	723	0.00464	749	0.00207	775	0.00112
698	0.00991	724	0.00458	750	0.00200	776	0.00129
699	0.00964	725	0.00453	751	0.00201	777	0.00128
700	0.00935	726	0.00435	752	0.00200	778	0.00123
701	0.00908	727	0.00422	753	0.00205	779	0.00109
702	0.00878	728	0.00401	754	0.00192	780	0.00117
703	0.00856	729	0.00387	755	0.00193		
704	0.00834	730	0.00371	756	0.00190		
705	0.00802	731	0.00358	757	0.00187		



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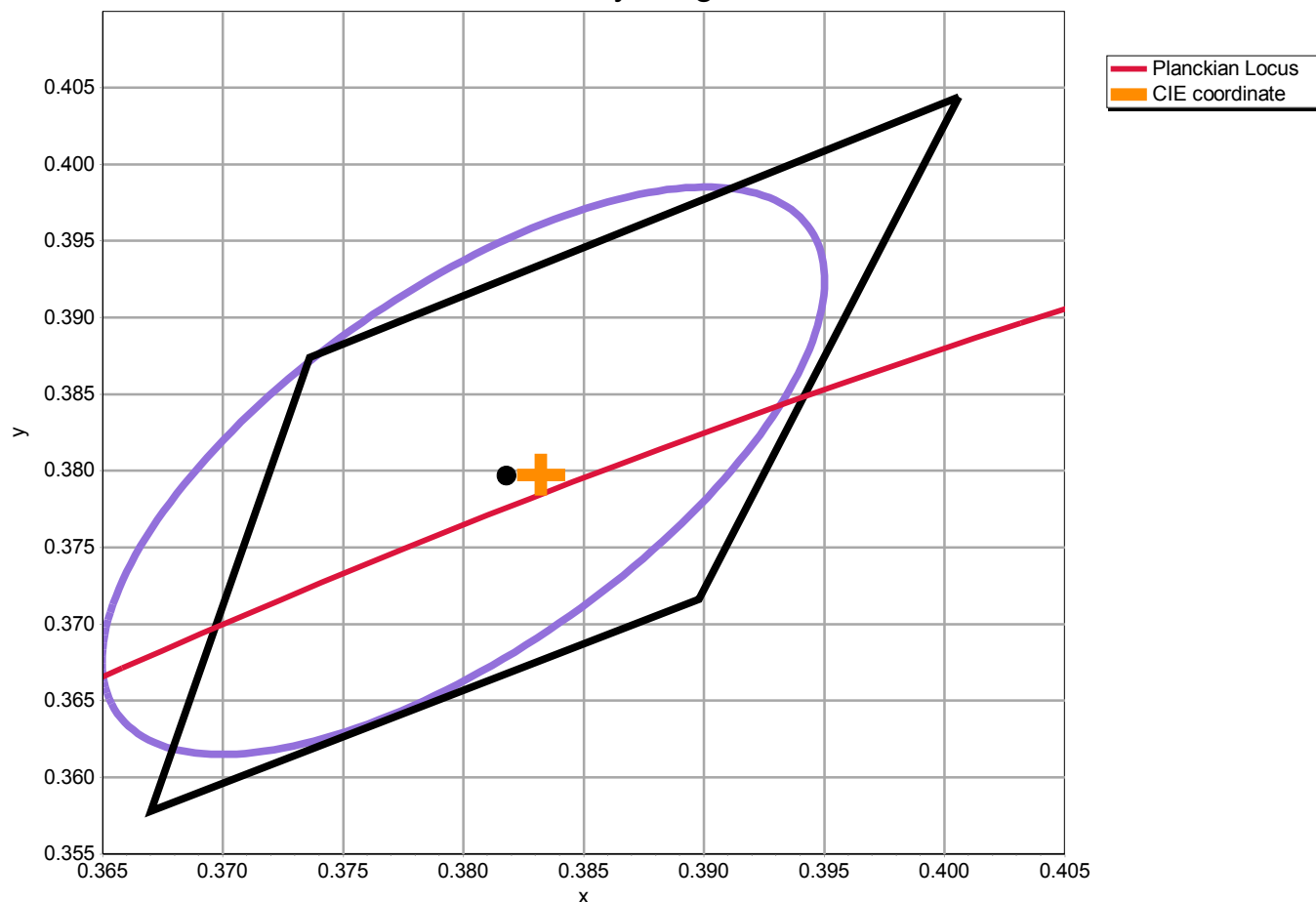
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CIE Chromaticity Diagram for Indoor SSL products

CIE 1931 Chromaticity Diagram



Chromaticity tolerance for 4000K nominal CCT

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