



# 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: CY2393	Driver Details: CY963	
<b>Test Report</b>	L1512022-C1	<b>Description</b>	Clusters of 48 Cree XPE2 LED's	<b>Type</b> Commercial
<b>Test Date</b>	2 December 2015	<b>Manufacturer</b>	Cree	<b>Description</b> 61W
<b>Report Date</b>	2 December 2015	<b>Catalog No.</b>	LOGI-HO-120/277-48-30K-10x60-SI-NO	<b>Manufacturer</b> Mean Well
<b>Sphere Temperature</b>	23.8 °C	<b>Serial No.</b>	SRIS 2218	<b>Catalog No.</b> LPF-60-24
<b>Humidity</b>	21.8 %	<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:** 10 min

**Tested By:** AFWJk cbc i GYbU

**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.

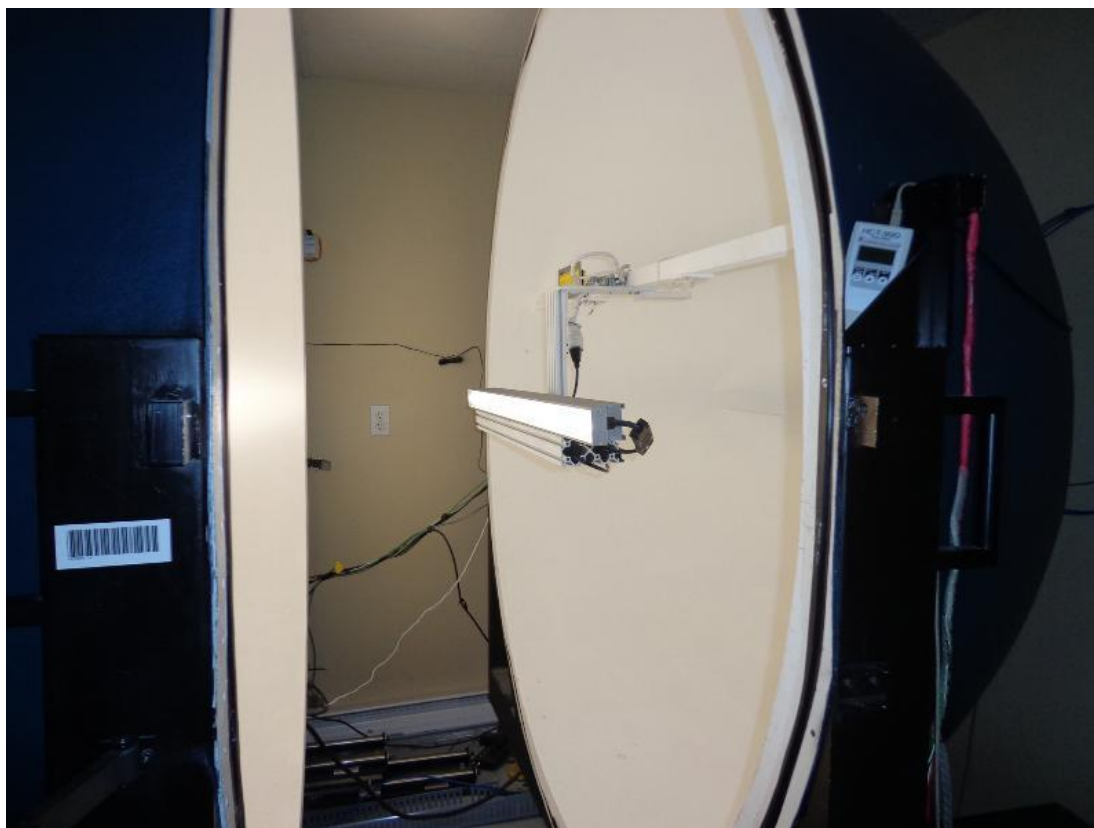


## Realization of Sphere Test

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).





# 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

## 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



# 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



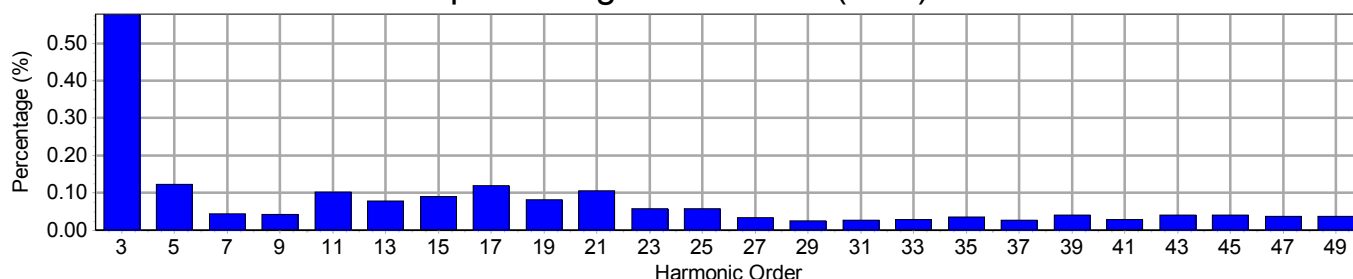
NVLAP LAB CODE: 200899-0

## Electrical Measurements

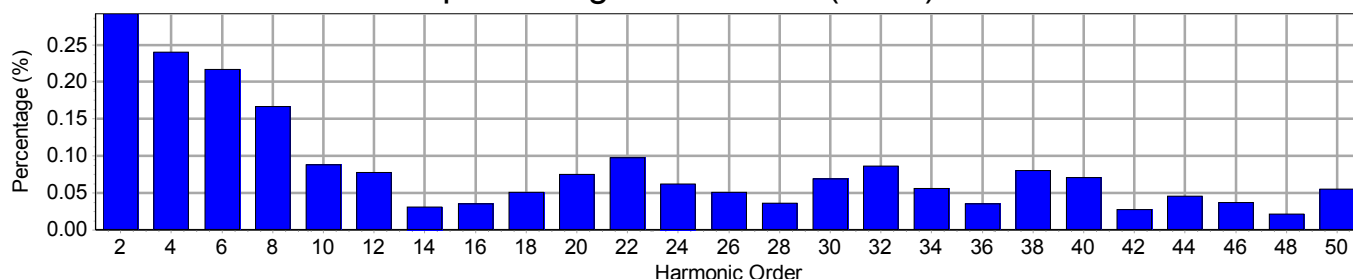
### Input

Frequency	60 Hz	Active Power	60.91 W	THDV [ANSI]	0.84 %
Voltage	119.8 V(rms)	Apparent Power	61.41 VA	THDA [ANSI]	5.58 %
Current	0.5128 A(rms)	Power Factor	0.992	Max. Harmonic At	5th order

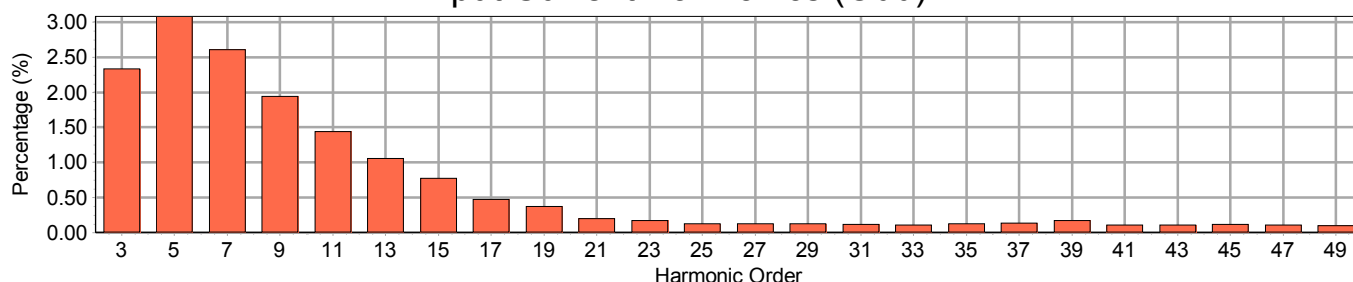
### Input Voltage Harmonics (Odd)



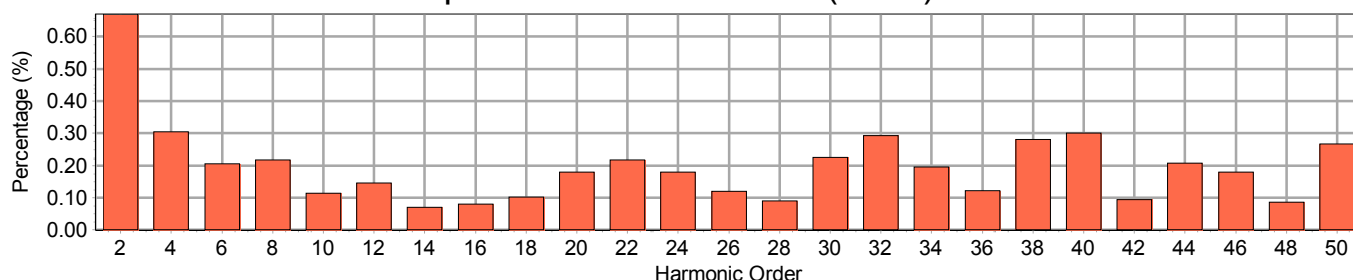
### Input Voltage Harmonics (Even)



### Input Current Harmonics (Odd)



### Input Current Harmonics (Even)





**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 LAB CODE: 200899-0

**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	0.292	0.671
3	180	0.579	2.340	4	240	0.240	0.306
5	300	0.123	3.090	6	360	0.216	0.206
7	420	0.044	2.613	8	480	0.167	0.218
9	540	0.042	1.939	10	600	0.088	0.114
11	660	0.101	1.436	12	720	0.078	0.146
13	780	0.078	1.057	14	840	0.031	0.071
15	900	0.090	0.772	16	960	0.035	0.081
17	1020	0.118	0.469	18	1080	0.051	0.102
19	1140	0.082	0.366	20	1200	0.075	0.180
21	1260	0.106	0.196	22	1320	0.097	0.218
23	1380	0.058	0.168	24	1440	0.062	0.180
25	1500	0.058	0.120	26	1560	0.051	0.119
27	1620	0.034	0.124	28	1680	0.036	0.091
29	1740	0.024	0.126	30	1800	0.069	0.225
31	1860	0.026	0.117	32	1920	0.086	0.292
33	1980	0.029	0.104	34	2040	0.056	0.195
35	2100	0.036	0.127	36	2160	0.035	0.122
37	2220	0.027	0.131	38	2280	0.080	0.282
39	2340	0.040	0.168	40	2400	0.071	0.301
41	2460	0.029	0.107	42	2520	0.027	0.095
43	2580	0.040	0.106	44	2640	0.046	0.207
45	2700	0.041	0.118	46	2760	0.037	0.179
47	2820	0.036	0.110	48	2880	0.021	0.086
49	2940	0.037	0.092	50	3000	0.055	0.267



# Les Industries Spectralux Inc. Spectralux Industries Inc.

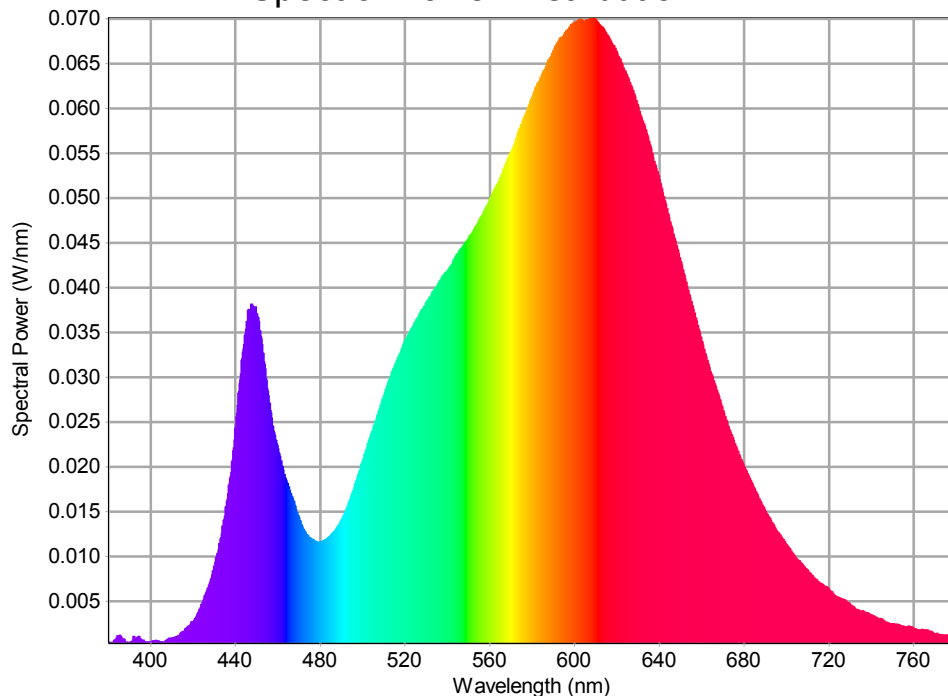
2750 Sabourin, Saint-Laurent (Quebec) H4S 1M2 Canada  
Tel.: (514) 332-0082 Fax: (514) 332-3590 [www.spectralux.ca](http://www.spectralux.ca)

ISO/IEC 17025



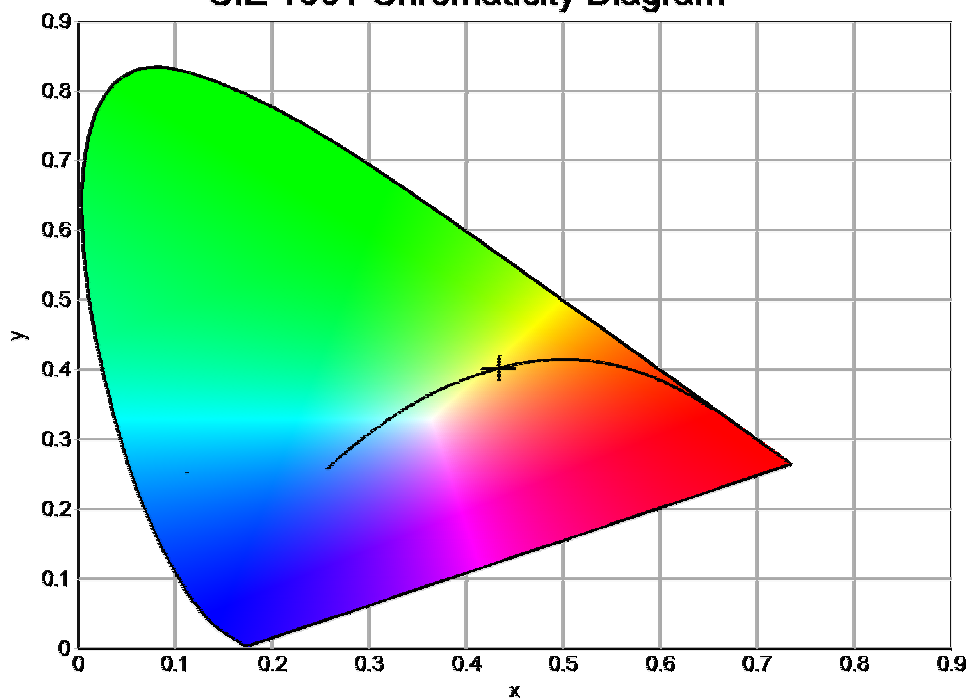
NVLAP LAB CODE: 200899-0

## Spectral Power Distribution



Peak Wavelength	609 nm
Luminous Flux	3523 lm
Input Power	60.91 W
Lumens/Watt	57.8
Full Width/Half Maximum	136.80
Center Wavelength	590 nm
Centroid Wavelength	402 nm
Dominant Wavelength	489 nm
Excitation Purity	0.0357
Colorimetric Purity	0.0235

## CIE 1931 Chromaticity Diagram



x	0.4335	CCT	3045 K
y	0.4023	CRI	83
u	0.2491	L*	25.67
v	0.3468	a*	-1.16
u'	0.2491	b*	-3.36
v'	0.5202	Duv	0.0002
R1	81.3	R9	11.9
R2	89.1	R10	74.3
R3	95.5	R11	80.7
R4	81.8	R12	68.1
R5	80.9	R13	82.9
R6	86.0	R14	97.2
R7	84.7		
R8	62.4		



# 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 LAB CODE: 200899-0

## 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	0.00049	405	0.00053	430	0.00895	455	0.02880
381	0.00048	406	0.00052	431	0.00995	456	0.02723
382	0.00043	407	0.00063	432	0.01082	457	0.02552
383	0.00071	408	0.00080	433	0.01198	458	0.02406
384	0.00102	409	0.00089	434	0.01343	459	0.02309
385	0.00106	410	0.00090	435	0.01455	460	0.02205
386	0.00112	411	0.00099	436	0.01620	461	0.02119
387	0.00080	412	0.00110	437	0.01801	462	0.02015
388	0.00045	413	0.00119	438	0.01940	463	0.01921
389	0.00049	414	0.00143	439	0.02182	464	0.01850
390	0.00044	415	0.00163	440	0.02433	465	0.01786
391	0.00057	416	0.00176	441	0.02693	466	0.01711
392	0.00112	417	0.00208	442	0.02938	467	0.01652
393	0.00092	418	0.00229	443	0.03192	468	0.01581
394	0.00109	419	0.00266	444	0.03369	469	0.01496
395	0.00092	420	0.00281	445	0.03544	470	0.01437
396	0.00067	421	0.00316	446	0.03748	471	0.01367
397	0.00054	422	0.00362	447	0.03751	472	0.01312
398	0.00054	423	0.00412	448	0.03807	473	0.01271
399	0.00050	424	0.00469	449	0.03772	474	0.01240
400	0.00040	425	0.00530	450	0.03716	475	0.01217
401	0.00062	426	0.00593	451	0.03631	476	0.01198
402	0.00065	427	0.00649	452	0.03460	477	0.01184
403	0.00060	428	0.00725	453	0.03279	478	0.01172
404	0.00061	429	0.00798	454	0.03101	479	0.01164



**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 LAB CODE: 200899-0

**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	0.01168	505	0.02441	530	0.03837	555	0.04756
481	0.01174	506	0.02508	531	0.03872	556	0.04799
482	0.01186	507	0.02581	532	0.03909	557	0.04843
483	0.01198	508	0.02659	533	0.03956	558	0.04892
484	0.01219	509	0.02730	534	0.03989	559	0.04926
485	0.01244	510	0.02795	535	0.04020	560	0.04991
486	0.01268	511	0.02870	536	0.04063	561	0.05039
487	0.01296	512	0.02940	537	0.04101	562	0.05089
488	0.01330	513	0.03001	538	0.04143	563	0.05139
489	0.01366	514	0.03068	539	0.04168	564	0.05174
490	0.01411	515	0.03131	540	0.04193	565	0.05230
491	0.01456	516	0.03181	541	0.04225	566	0.05293
492	0.01512	517	0.03237	542	0.04257	567	0.05354
493	0.01571	518	0.03294	543	0.04310	568	0.05409
494	0.01635	519	0.03357	544	0.04353	569	0.05471
495	0.01702	520	0.03416	545	0.04386	570	0.05516
496	0.01775	521	0.03457	546	0.04427	571	0.05567
497	0.01850	522	0.03499	547	0.04453	572	0.05638
498	0.01921	523	0.03541	548	0.04484	573	0.05707
499	0.01995	524	0.03584	549	0.04519	574	0.05774
500	0.02072	525	0.03627	550	0.04552	575	0.05828
501	0.02149	526	0.03668	551	0.04596	576	0.05895
502	0.02224	527	0.03716	552	0.04624	577	0.05947
503	0.02300	528	0.03762	553	0.04674	578	0.06002
504	0.02369	529	0.03791	554	0.04709	579	0.06075





**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 LAB CODE: 200899-0

**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	0.06127	605	0.06979	630	0.06020	655	0.03850
581	0.06193	606	0.06987	631	0.05933	656	0.03763
582	0.06254	607	0.06998	632	0.05864	657	0.03673
583	0.06295	608	0.07007	633	0.05802	658	0.03588
584	0.06346	609	0.07009	634	0.05723	659	0.03498
585	0.06405	610	0.06994	635	0.05642	660	0.03409
586	0.06444	611	0.06958	636	0.05555	661	0.03317
587	0.06508	612	0.06928	637	0.05458	662	0.03234
588	0.06557	613	0.06913	638	0.05376	663	0.03153
589	0.06585	614	0.06873	639	0.05300	664	0.03071
590	0.06650	615	0.06834	640	0.05212	665	0.03004
591	0.06700	616	0.06803	641	0.05117	666	0.02932
592	0.06741	617	0.06753	642	0.05021	667	0.02862
593	0.06785	618	0.06711	643	0.04934	668	0.02790
594	0.06800	619	0.06678	644	0.04836	669	0.02716
595	0.06825	620	0.06619	645	0.04742	670	0.02637
596	0.06868	621	0.06572	646	0.04660	671	0.02562
597	0.06886	622	0.06520	647	0.04560	672	0.02491
598	0.06924	623	0.06455	648	0.04478	673	0.02420
599	0.06948	624	0.06411	649	0.04386	674	0.02364
600	0.06959	625	0.06352	650	0.04302	675	0.02301
601	0.06975	626	0.06294	651	0.04208	676	0.02235
602	0.06998	627	0.06234	652	0.04109	677	0.02181
603	0.06995	628	0.06166	653	0.04019	678	0.02114
604	0.06978	629	0.06094	654	0.03932	679	0.02061



**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 LAB CODE: 200899-0

**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	0.02006	706	0.00956	732	0.00431	758	0.00224
681	0.01953	707	0.00925	733	0.00418	759	0.00219
682	0.01905	708	0.00899	734	0.00406	760	0.00201
683	0.01855	709	0.00870	735	0.00391	761	0.00195
684	0.01801	710	0.00847	736	0.00399	762	0.00187
685	0.01755	711	0.00821	737	0.00384	763	0.00180
686	0.01705	712	0.00795	738	0.00378	764	0.00191
687	0.01653	713	0.00766	739	0.00363	765	0.00190
688	0.01609	714	0.00747	740	0.00356	766	0.00185
689	0.01561	715	0.00722	741	0.00342	767	0.00175
690	0.01512	716	0.00709	742	0.00329	768	0.00171
691	0.01473	717	0.00695	743	0.00317	769	0.00157
692	0.01437	718	0.00674	744	0.00313	770	0.00143
693	0.01386	719	0.00665	745	0.00310	771	0.00148
694	0.01353	720	0.00638	746	0.00287	772	0.00133
695	0.01303	721	0.00613	747	0.00272	773	0.00130
696	0.01272	722	0.00586	748	0.00264	774	0.00128
697	0.01241	723	0.00565	749	0.00256	775	0.00130
698	0.01204	724	0.00551	750	0.00255	776	0.00126
699	0.01173	725	0.00544	751	0.00254	777	0.00130
700	0.01135	726	0.00532	752	0.00249	778	0.00106
701	0.01105	727	0.00521	753	0.00242	779	0.00100
702	0.01068	728	0.00507	754	0.00229	780	0.00107
703	0.01037	729	0.00495	755	0.00231		
704	0.01002	730	0.00466	756	0.00223		
705	0.00969	731	0.00452	757	0.00215		



# 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)

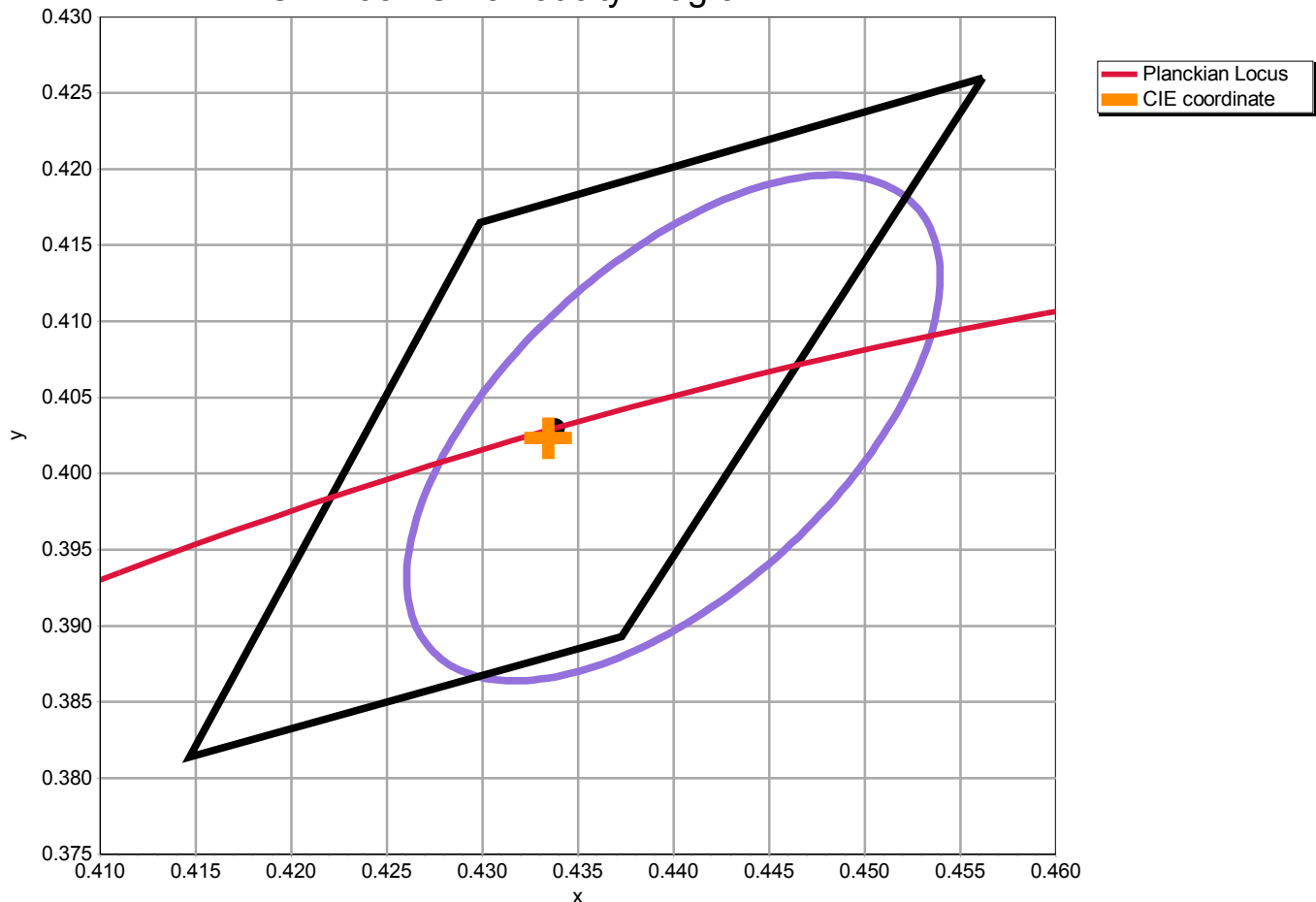
ISO/IEC 17025



NVLAP LAB CODE: 200899-0

## CIE Chromaticity Diagram for Indoor SSL products

### CIE 1931 Chromaticity Diagram



Chromaticity tolerance for 3000K nominal CCT

Min CCT	2800
Max CCT	3290
Delta T	245
Center Duv	0.0000