



# 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: CY2611	Driver Details: CY1101	
<b>Test Report</b>	L1606272-C1	<b>Description</b>	Clusters of CREE XPE2 LED's	<b>Type</b> Commercial
<b>Test Date</b>	27 June 2016	<b>Manufacturer</b>	Cree	<b>Description</b> 71W
<b>Report Date</b>	15 September 2016	<b>Catalog No.</b>	LOG-HO-120-48-40K-35x35-SI-NO	<b>Manufacturer</b> Mean Well
<b>Sphere Temperature</b>	25.3°C	<b>Serial No.</b>	SRIS 2438	<b>Catalog No.</b> LPF-60-24
<b>Humidity</b>	40.7 %	<b>Drive Current</b>	300 mA	<b>Voltage</b> 120.00 V
<b>Lamp Type</b>	SSL	<b>Color</b>	White	<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	6010009	2015/07/08	2016/07/08
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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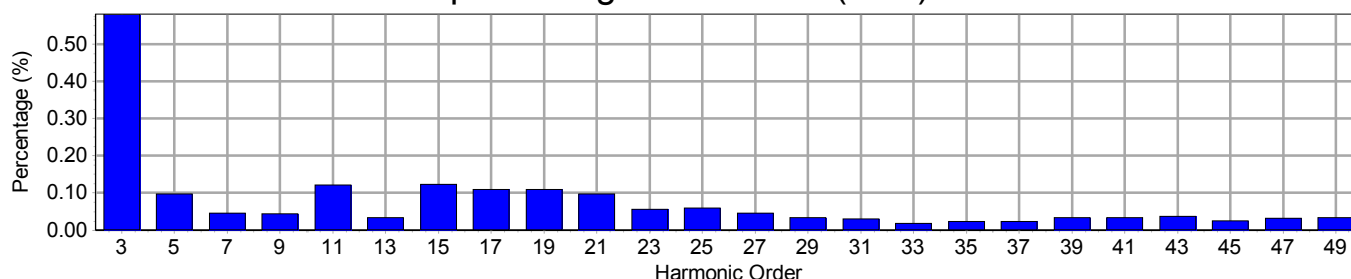
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## Electrical Measurements

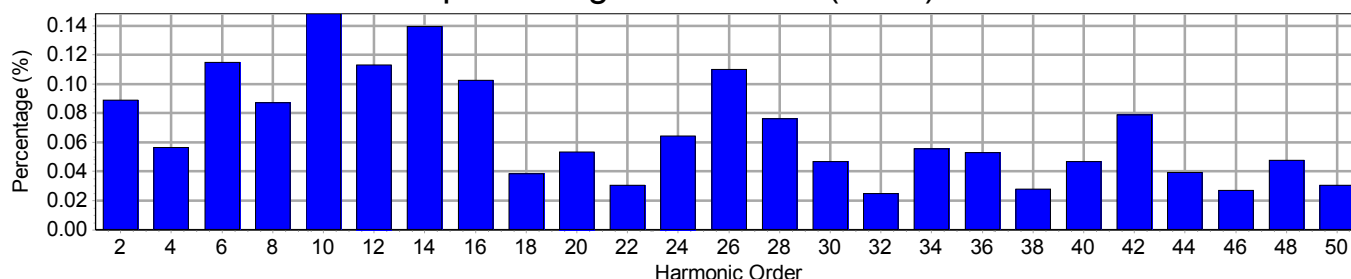
### Input

Frequency	60 Hz	Active Power	62.14 W	THDV [ANSI]	0.75 %
Voltage	120.0 V(rms)	Apparent Power	62.54 VA	THDA [ANSI]	5.25 %
Current	0.5213 A(rms)	Power Factor	0.994	Max. Harmonic At	5th order

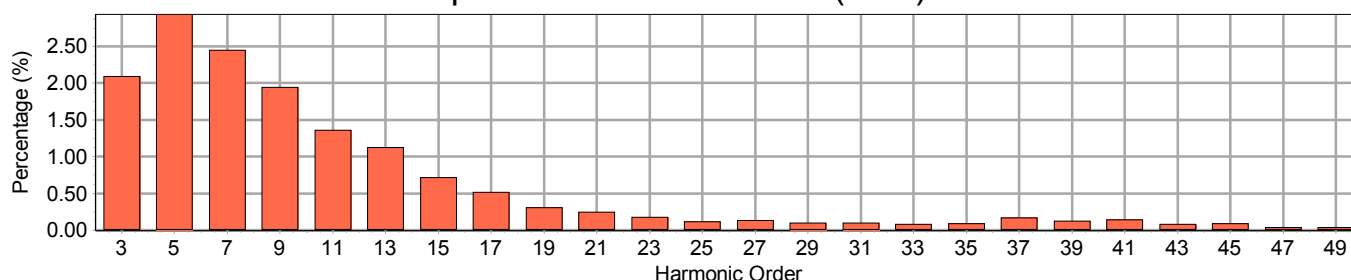
### Input Voltage Harmonics (Odd)



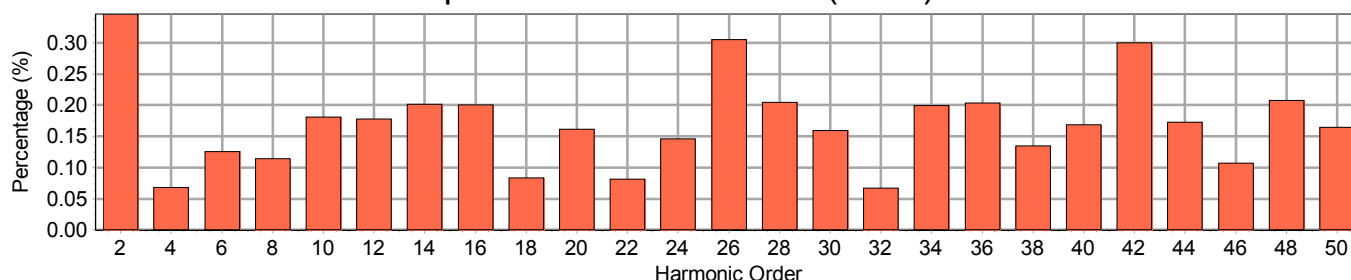
### Input Voltage Harmonics (Even)



### 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	0.089	0.347
3	180	0.582	2.084	4	240	0.056	0.069
5	300	0.098	2.934	6	360	0.115	0.126
7	420	0.046	2.442	8	480	0.087	0.115
9	540	0.043	1.943	10	600	0.149	0.181
11	660	0.121	1.359	12	720	0.113	0.178
13	780	0.033	1.128	14	840	0.140	0.201
15	900	0.123	0.715	16	960	0.103	0.200
17	1020	0.110	0.517	18	1080	0.038	0.084
19	1140	0.109	0.306	20	1200	0.054	0.161
21	1260	0.097	0.244	22	1320	0.031	0.081
23	1380	0.057	0.174	24	1440	0.064	0.147
25	1500	0.059	0.120	26	1560	0.110	0.305
27	1620	0.046	0.137	28	1680	0.076	0.205
29	1740	0.034	0.104	30	1800	0.047	0.159
31	1860	0.029	0.098	32	1920	0.025	0.067
33	1980	0.018	0.082	34	2040	0.056	0.199
35	2100	0.023	0.088	36	2160	0.053	0.204
37	2220	0.024	0.171	38	2280	0.028	0.135
39	2340	0.034	0.124	40	2400	0.047	0.169
41	2460	0.033	0.146	42	2520	0.079	0.299
43	2580	0.037	0.083	44	2640	0.040	0.172
45	2700	0.025	0.088	46	2760	0.027	0.108
47	2820	0.031	0.041	48	2880	0.048	0.208
49	2940	0.033	0.039	50	3000	0.031	0.165



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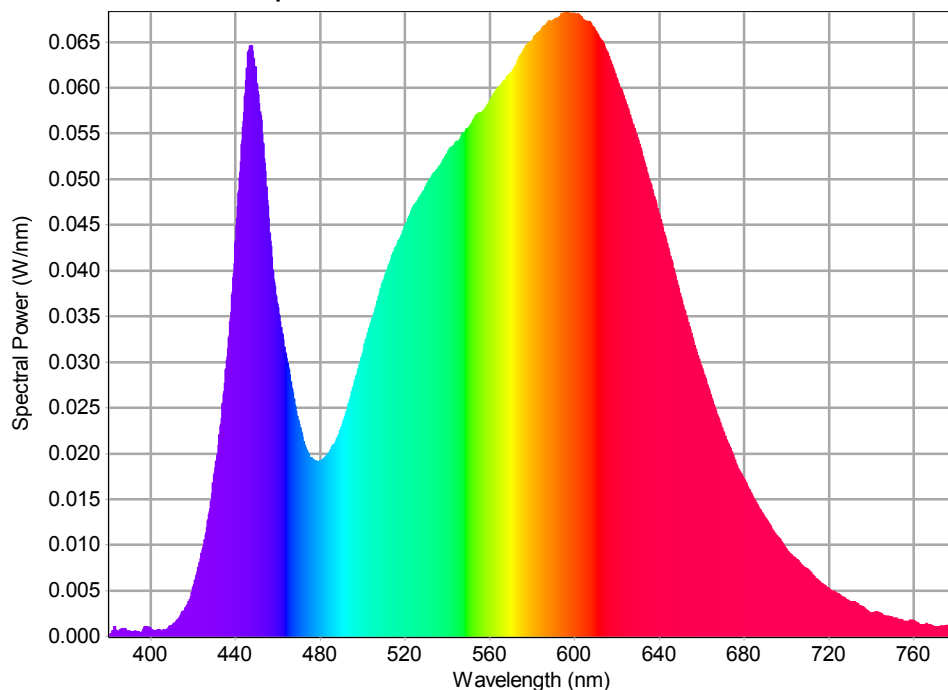
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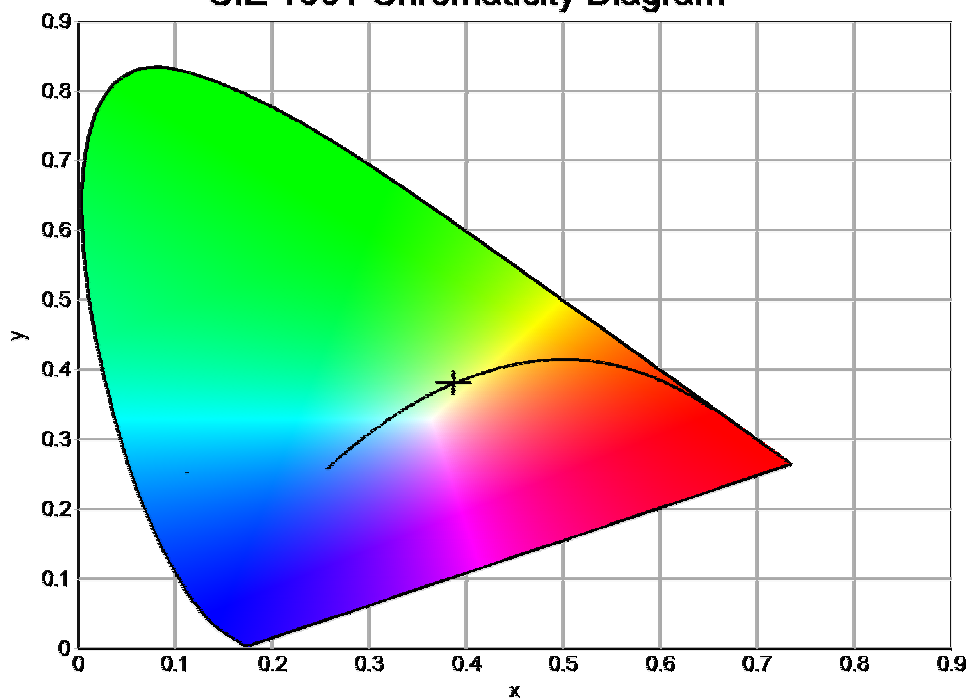
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## Spectral Power Distribution



Peak Wavelength	597 nm
Luminous Flux	3957 lm
Input Power	62.14 W
Lumens/Watt	63.7
Full Width/Half Maximum	150.02
Center Wavelength	579 nm
Centroid Wavelength	370 nm
Dominant Wavelength	487 nm
Excitation Purity	0.1564
Colorimetric Purity	0.1000

## CIE 1931 Chromaticity Diagram



x	0.3865	CCT	3878 K
y	0.3819	CRI	83
u	0.2270	L*	25.67
v	0.3365	a*	-4.84
u'	0.2270	b*	-13.96
v'	0.5047	Duv	0.0007
R1	81.7	R9	12.7
R2	88.1	R10	71.5
R3	93.1	R11	82.0
R4	83.2	R12	65.1
R5	81.7	R13	83.0
R6	83.9	R14	95.9
R7	86.9		
R8	66.6		



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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	-0.00001	405	0.00064	430	0.01775	455	0.04778
381	0.00033	406	0.00082	431	0.01922	456	0.04423
382	0.00065	407	0.00067	432	0.02093	457	0.04154
383	0.00112	408	0.00084	433	0.02306	458	0.03905
384	0.00058	409	0.00125	434	0.02548	459	0.03739
385	0.00049	410	0.00121	435	0.02774	460	0.03601
386	0.00081	411	0.00147	436	0.03027	461	0.03446
387	0.00075	412	0.00168	437	0.03273	462	0.03321
388	0.00091	413	0.00194	438	0.03554	463	0.03169
389	0.00061	414	0.00229	439	0.03928	464	0.03047
390	0.00066	415	0.00275	440	0.04304	465	0.02939
391	0.00061	416	0.00292	441	0.04708	466	0.02794
392	0.00057	417	0.00338	442	0.05017	467	0.02668
393	0.00057	418	0.00389	443	0.05386	468	0.02536
394	0.00056	419	0.00445	444	0.05732	469	0.02414
395	0.00044	420	0.00544	445	0.06081	470	0.02327
396	0.00056	421	0.00620	446	0.06391	471	0.02245
397	0.00111	422	0.00710	447	0.06459	472	0.02140
398	0.00115	423	0.00807	448	0.06407	473	0.02069
399	0.00110	424	0.00910	449	0.06235	474	0.02019
400	0.00092	425	0.01005	450	0.06055	475	0.01964
401	0.00055	426	0.01112	451	0.05832	476	0.01951
402	0.00069	427	0.01272	452	0.05701	477	0.01930
403	0.00074	428	0.01403	453	0.05402	478	0.01924
404	0.00081	429	0.01568	454	0.05089	479	0.01916



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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	0.01928	505	0.03504	530	0.04929	555	0.05725
481	0.01937	506	0.03587	531	0.04976	556	0.05737
482	0.01955	507	0.03667	532	0.05015	557	0.05752
483	0.01984	508	0.03759	533	0.05050	558	0.05781
484	0.02008	509	0.03844	534	0.05076	559	0.05816
485	0.02046	510	0.03901	535	0.05108	560	0.05860
486	0.02095	511	0.03973	536	0.05137	561	0.05904
487	0.02117	512	0.04040	537	0.05170	562	0.05945
488	0.02170	513	0.04098	538	0.05218	563	0.05981
489	0.02223	514	0.04173	539	0.05253	564	0.06005
490	0.02288	515	0.04230	540	0.05286	565	0.06025
491	0.02359	516	0.04268	541	0.05332	566	0.06058
492	0.02435	517	0.04331	542	0.05356	567	0.06081
493	0.02501	518	0.04374	543	0.05372	568	0.06116
494	0.02590	519	0.04433	544	0.05410	569	0.06148
495	0.02682	520	0.04497	545	0.05417	570	0.06169
496	0.02766	521	0.04540	546	0.05443	571	0.06200
497	0.02852	522	0.04599	547	0.05500	572	0.06242
498	0.02925	523	0.04657	548	0.05517	573	0.06289
499	0.03012	524	0.04710	549	0.05552	574	0.06342
500	0.03091	525	0.04738	550	0.05571	575	0.06371
501	0.03199	526	0.04772	551	0.05600	576	0.06420
502	0.03275	527	0.04808	552	0.05637	577	0.06462
503	0.03371	528	0.04846	553	0.05687	578	0.06483
504	0.03441	529	0.04883	554	0.05715	579	0.06506





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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	0.06519	605	0.06729	630	0.05425	655	0.03319
581	0.06563	606	0.06733	631	0.05347	656	0.03232
582	0.06589	607	0.06725	632	0.05260	657	0.03150
583	0.06609	608	0.06685	633	0.05172	658	0.03074
584	0.06625	609	0.06661	634	0.05086	659	0.03007
585	0.06671	610	0.06624	635	0.05003	660	0.02938
586	0.06683	611	0.06580	636	0.04940	661	0.02868
587	0.06709	612	0.06537	637	0.04847	662	0.02795
588	0.06741	613	0.06515	638	0.04780	663	0.02722
589	0.06720	614	0.06455	639	0.04687	664	0.02651
590	0.06745	615	0.06408	640	0.04606	665	0.02577
591	0.06760	616	0.06353	641	0.04525	666	0.02507
592	0.06768	617	0.06287	642	0.04425	667	0.02438
593	0.06783	618	0.06227	643	0.04349	668	0.02383
594	0.06817	619	0.06158	644	0.04261	669	0.02314
595	0.06821	620	0.06093	645	0.04164	670	0.02247
596	0.06833	621	0.06021	646	0.04087	671	0.02191
597	0.06826	622	0.05982	647	0.03988	672	0.02130
598	0.06817	623	0.05920	648	0.03899	673	0.02082
599	0.06817	624	0.05847	649	0.03809	674	0.02026
600	0.06810	625	0.05784	650	0.03720	675	0.01966
601	0.06808	626	0.05708	651	0.03632	676	0.01897
602	0.06802	627	0.05621	652	0.03556	677	0.01846
603	0.06784	628	0.05569	653	0.03480	678	0.01803
604	0.06745	629	0.05498	654	0.03398	679	0.01760



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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	0.01718	706	0.00816	732	0.00384	758	0.00175
681	0.01672	707	0.00786	733	0.00369	759	0.00181
682	0.01621	708	0.00762	734	0.00349	760	0.00177
683	0.01579	709	0.00751	735	0.00339	761	0.00161
684	0.01527	710	0.00740	736	0.00330	762	0.00148
685	0.01492	711	0.00711	737	0.00304	763	0.00134
686	0.01449	712	0.00683	738	0.00288	764	0.00131
687	0.01406	713	0.00658	739	0.00272	765	0.00133
688	0.01370	714	0.00635	740	0.00263	766	0.00146
689	0.01331	715	0.00616	741	0.00267	767	0.00132
690	0.01299	716	0.00592	742	0.00275	768	0.00131
691	0.01263	717	0.00579	743	0.00272	769	0.00120
692	0.01225	718	0.00562	744	0.00260	770	0.00114
693	0.01180	719	0.00542	745	0.00247	771	0.00107
694	0.01147	720	0.00528	746	0.00231	772	0.00109
695	0.01111	721	0.00502	747	0.00229	773	0.00119
696	0.01090	722	0.00499	748	0.00223	774	0.00114
697	0.01058	723	0.00484	749	0.00220	775	0.00122
698	0.01026	724	0.00473	750	0.00209	776	0.00124
699	0.00987	725	0.00461	751	0.00205	777	0.00096
700	0.00956	726	0.00437	752	0.00204	778	0.00072
701	0.00930	727	0.00430	753	0.00194	779	0.00064
702	0.00901	728	0.00410	754	0.00191	780	0.00072
703	0.00880	729	0.00401	755	0.00173		
704	0.00865	730	0.00384	756	0.00171		
705	0.00841	731	0.00390	757	0.00171		