



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: CY2816	Driver Details: CY810	
Test Report	L1611154-C1	Description	4 Rows of 12 CREE XPE2 LED's	Type Commercial
Test Date	15 November 2016	Manufacturer	Cree	Description 61W
Report Date	15 November 2016	Catalog No.	LOGi HO-120/277-48-35K-WW-NO	Manufacturer MEAN WELL
Sphere Temperature	24.6°C	Serial No.	SRIS-2592	Catalog No. LPF-60-24
Humidity	42.5 %	Drive Current	300 mA	Voltage 120.00 V
Lamp Type	SSL	Color	3500K	Power Factor 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.



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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	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	5675014	2016/05/05	2017/05/05
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	2016/11/30



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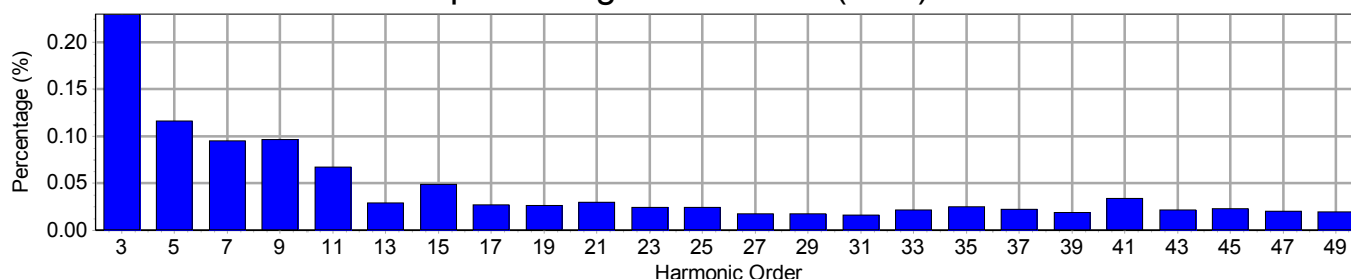
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Electrical Measurements

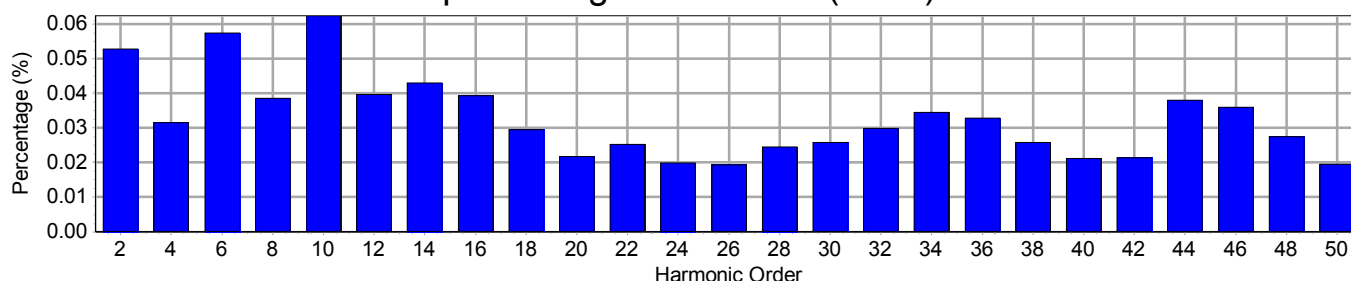
Input

Frequency	60 Hz	Active Power	60.86 W	THDV [ANSI]	0.35 %
Voltage	120.0 V(rms)	Apparent Power	61.25 VA	THDA [ANSI]	5.04 %
Current	0.5104 A(rms)	Power Factor	0.994	Max. Harmonic At	5th order

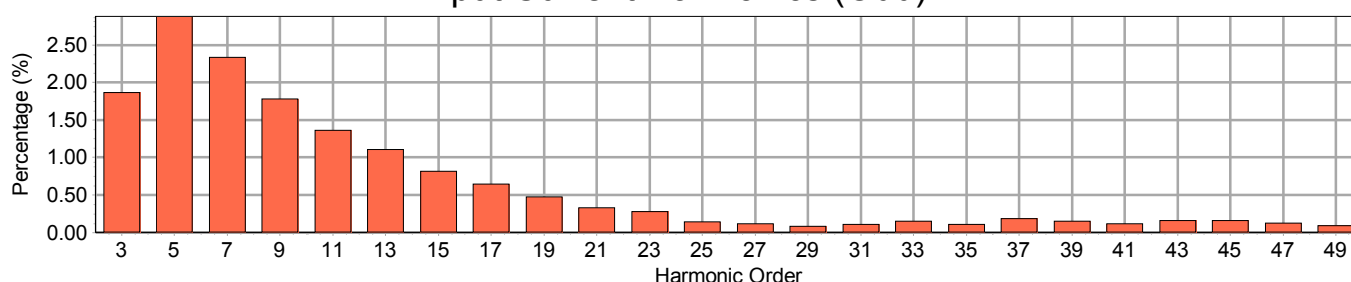
Input Voltage Harmonics (Odd)



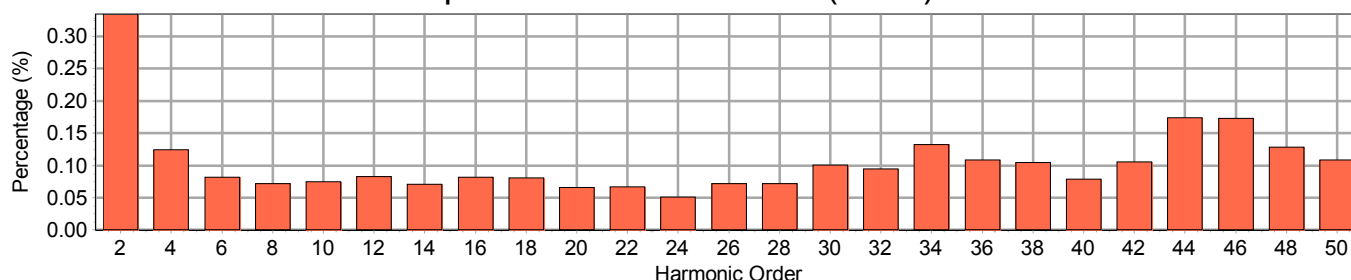
Input Voltage Harmonics (Even)



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	0.053	0.335
3	180	0.230	1.864	4	240	0.032	0.124
5	300	0.116	2.885	6	360	0.057	0.082
7	420	0.095	2.334	8	480	0.038	0.072
9	540	0.097	1.777	10	600	0.062	0.074
11	660	0.067	1.359	12	720	0.040	0.083
13	780	0.029	1.103	14	840	0.043	0.071
15	900	0.049	0.817	16	960	0.039	0.081
17	1020	0.027	0.642	18	1080	0.030	0.081
19	1140	0.026	0.470	20	1200	0.022	0.066
21	1260	0.029	0.327	22	1320	0.025	0.067
23	1380	0.024	0.279	24	1440	0.020	0.051
25	1500	0.025	0.145	26	1560	0.019	0.072
27	1620	0.018	0.111	28	1680	0.024	0.072
29	1740	0.017	0.078	30	1800	0.026	0.100
31	1860	0.016	0.104	32	1920	0.030	0.094
33	1980	0.021	0.150	34	2040	0.035	0.132
35	2100	0.025	0.108	36	2160	0.033	0.109
37	2220	0.022	0.187	38	2280	0.026	0.105
39	2340	0.019	0.153	40	2400	0.021	0.079
41	2460	0.034	0.111	42	2520	0.021	0.105
43	2580	0.021	0.157	44	2640	0.038	0.174
45	2700	0.023	0.157	46	2760	0.036	0.173
47	2820	0.020	0.122	48	2880	0.027	0.129
49	2940	0.020	0.091	50	3000	0.019	0.109



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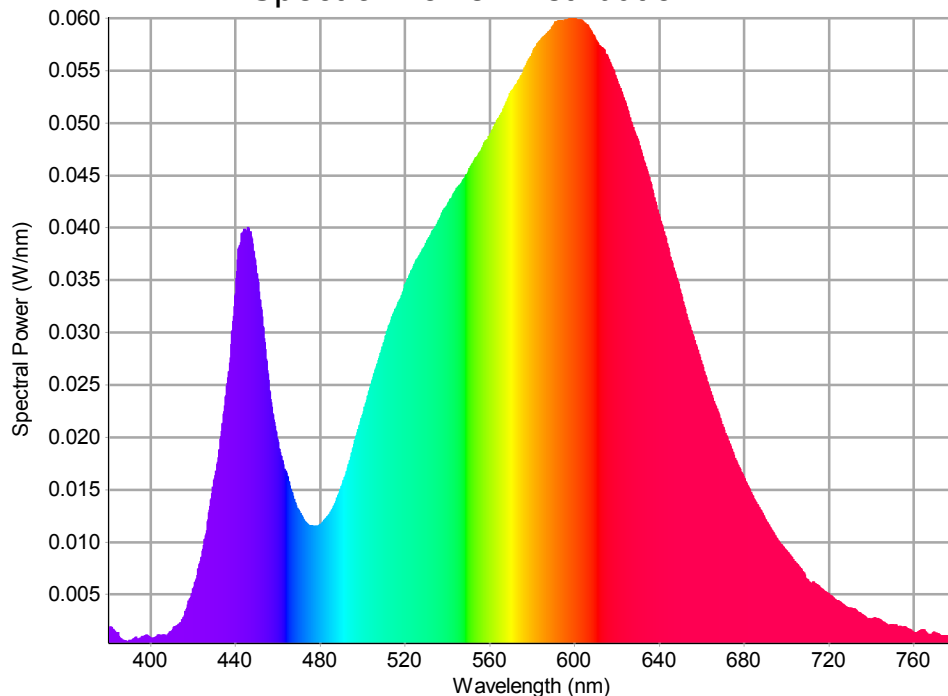
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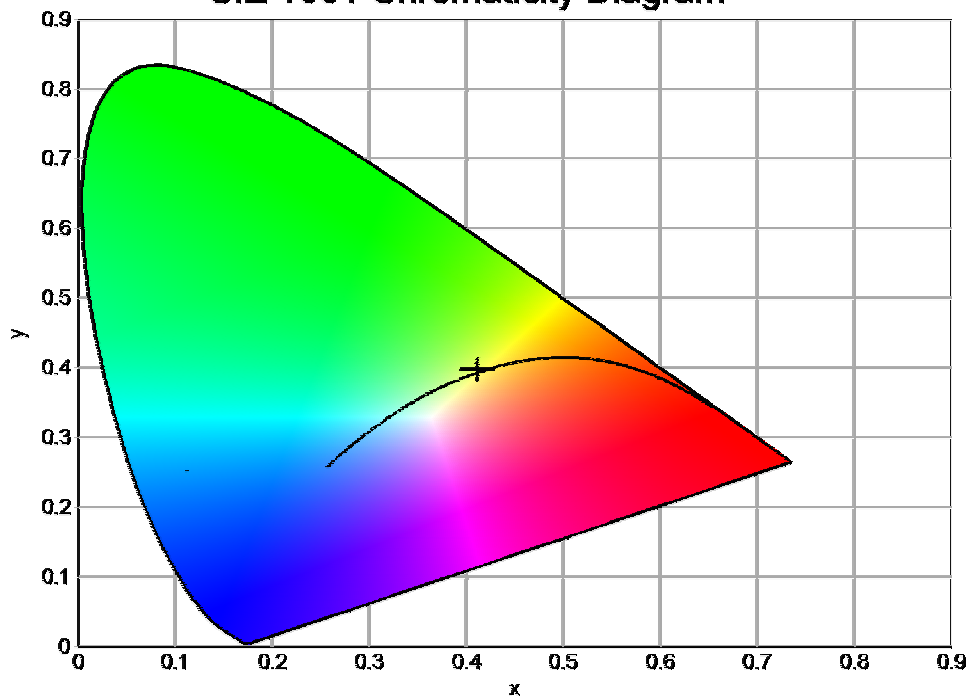
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Spectral Power Distribution



Peak Wavelength	599 nm
Luminous Flux	3291 lm
Input Power	60.86 W
Lumens/Watt	54.1
Full Width/Half Maximum	143.93
Center Wavelength	583 nm
Centroid Wavelength	385 nm
Dominant Wavelength	491 nm
Excitation Purity	0.0910
Colorimetric Purity	0.0704

CIE 1931 Chromaticity Diagram



x	0.4107	CCT	3446 K
y	0.3984	CRI	80
u	0.2361	L*	25.67
v	0.3435	a*	-3.76
u'	0.2361	b*	-7.49
v'	0.5152	Duv	0.0022
R1	78.3	R9	3.3
R2	85.8	R10	66.8
R3	92.6	R11	78.8
R4	80.5	R12	63.2
R5	78.1	R13	79.5
R6	81.1	R14	95.6
R7	85.2		
R8	61.7		



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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	0.00194	405	0.00106	430	0.01598	455	0.02641
381	0.00197	406	0.00115	431	0.01681	456	0.02454
382	0.00175	407	0.00102	432	0.01811	457	0.02290
383	0.00157	408	0.00117	433	0.01987	458	0.02173
384	0.00121	409	0.00146	434	0.02132	459	0.02068
385	0.00103	410	0.00155	435	0.02305	460	0.01955
386	0.00081	411	0.00194	436	0.02493	461	0.01858
387	0.00069	412	0.00202	437	0.02627	462	0.01787
388	0.00064	413	0.00215	438	0.02894	463	0.01703
389	0.00042	414	0.00234	439	0.03111	464	0.01663
390	0.00068	415	0.00262	440	0.03355	465	0.01587
391	0.00062	416	0.00302	441	0.03698	466	0.01508
392	0.00080	417	0.00364	442	0.03831	467	0.01447
393	0.00100	418	0.00439	443	0.03946	468	0.01384
394	0.00076	419	0.00477	444	0.03988	469	0.01330
395	0.00086	420	0.00559	445	0.03959	470	0.01296
396	0.00107	421	0.00619	446	0.04007	471	0.01263
397	0.00108	422	0.00688	447	0.03965	472	0.01221
398	0.00116	423	0.00791	448	0.03852	473	0.01195
399	0.00105	424	0.00859	449	0.03714	474	0.01173
400	0.00090	425	0.00974	450	0.03569	475	0.01161
401	0.00087	426	0.01065	451	0.03390	476	0.01160
402	0.00092	427	0.01197	452	0.03245	477	0.01153
403	0.00105	428	0.01344	453	0.03064	478	0.01157
404	0.00119	429	0.01468	454	0.02841	479	0.01157



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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	0.01172	505	0.02577	530	0.03855	555	0.04718
481	0.01188	506	0.02647	531	0.03901	556	0.04751
482	0.01214	507	0.02703	532	0.03932	557	0.04789
483	0.01238	508	0.02775	533	0.03974	558	0.04833
484	0.01259	509	0.02836	534	0.03999	559	0.04848
485	0.01290	510	0.02903	535	0.04033	560	0.04885
486	0.01328	511	0.02973	536	0.04074	561	0.04933
487	0.01368	512	0.03039	537	0.04117	562	0.04968
488	0.01424	513	0.03089	538	0.04166	563	0.05007
489	0.01477	514	0.03152	539	0.04193	564	0.05044
490	0.01533	515	0.03205	540	0.04222	565	0.05075
491	0.01589	516	0.03242	541	0.04259	566	0.05110
492	0.01648	517	0.03292	542	0.04286	567	0.05161
493	0.01710	518	0.03332	543	0.04330	568	0.05205
494	0.01779	519	0.03388	544	0.04364	569	0.05258
495	0.01855	520	0.03462	545	0.04393	570	0.05301
496	0.01938	521	0.03499	546	0.04413	571	0.05324
497	0.02014	522	0.03546	547	0.04445	572	0.05365
498	0.02078	523	0.03592	548	0.04474	573	0.05385
499	0.02151	524	0.03633	549	0.04507	574	0.05421
500	0.02213	525	0.03678	550	0.04548	575	0.05459
501	0.02292	526	0.03712	551	0.04588	576	0.05497
502	0.02361	527	0.03743	552	0.04617	577	0.05548
503	0.02442	528	0.03784	553	0.04663	578	0.05594
504	0.02509	529	0.03813	554	0.04679	579	0.05626



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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	0.05662	605	0.05959	630	0.04825	655	0.03023
581	0.05713	606	0.05940	631	0.04752	656	0.02962
582	0.05739	607	0.05906	632	0.04686	657	0.02890
583	0.05777	608	0.05874	633	0.04618	658	0.02836
584	0.05793	609	0.05839	634	0.04557	659	0.02771
585	0.05825	610	0.05797	635	0.04489	660	0.02703
586	0.05840	611	0.05763	636	0.04418	661	0.02632
587	0.05857	612	0.05737	637	0.04334	662	0.02576
588	0.05880	613	0.05723	638	0.04254	663	0.02501
589	0.05899	614	0.05698	639	0.04176	664	0.02442
590	0.05934	615	0.05656	640	0.04110	665	0.02381
591	0.05968	616	0.05614	641	0.04038	666	0.02323
592	0.05978	617	0.05559	642	0.03968	667	0.02276
593	0.05983	618	0.05518	643	0.03906	668	0.02218
594	0.05984	619	0.05464	644	0.03822	669	0.02158
595	0.05978	620	0.05401	645	0.03727	670	0.02101
596	0.05989	621	0.05356	646	0.03665	671	0.02042
597	0.05994	622	0.05303	647	0.03591	672	0.01997
598	0.06007	623	0.05247	648	0.03528	673	0.01946
599	0.06009	624	0.05193	649	0.03464	674	0.01893
600	0.06007	625	0.05128	650	0.03381	675	0.01836
601	0.05989	626	0.05053	651	0.03300	676	0.01786
602	0.05991	627	0.04989	652	0.03225	677	0.01742
603	0.05987	628	0.04931	653	0.03150	678	0.01698
604	0.05968	629	0.04881	654	0.03085	679	0.01660



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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	0.01612	706	0.00764	732	0.00367	758	0.00174
681	0.01565	707	0.00741	733	0.00349	759	0.00157
682	0.01528	708	0.00714	734	0.00335	760	0.00139
683	0.01483	709	0.00659	735	0.00323	761	0.00144
684	0.01442	710	0.00640	736	0.00310	762	0.00146
685	0.01400	711	0.00618	737	0.00294	763	0.00163
686	0.01365	712	0.00608	738	0.00273	764	0.00167
687	0.01335	713	0.00614	739	0.00274	765	0.00164
688	0.01301	714	0.00603	740	0.00269	766	0.00137
689	0.01260	715	0.00590	741	0.00279	767	0.00124
690	0.01219	716	0.00566	742	0.00278	768	0.00127
691	0.01186	717	0.00554	743	0.00274	769	0.00139
692	0.01149	718	0.00535	744	0.00264	770	0.00139
693	0.01117	719	0.00524	745	0.00249	771	0.00132
694	0.01083	720	0.00511	746	0.00237	772	0.00124
695	0.01046	721	0.00491	747	0.00225	773	0.00109
696	0.01018	722	0.00474	748	0.00211	774	0.00111
697	0.00987	723	0.00452	749	0.00219	775	0.00113
698	0.00968	724	0.00447	750	0.00217	776	0.00114
699	0.00941	725	0.00434	751	0.00211	777	0.00111
700	0.00921	726	0.00418	752	0.00204	778	0.00113
701	0.00893	727	0.00404	753	0.00199	779	0.00105
702	0.00867	728	0.00385	754	0.00197	780	0.00100
703	0.00839	729	0.00376	755	0.00190		
704	0.00814	730	0.00375	756	0.00195		
705	0.00793	731	0.00369	757	0.00179		