



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: CY2618	Driver Details: CY1101	
Test Report	L1606285-C1	Description	Clusters of CREE XPE2 LED's	Type Commercial
Test Date	28 June 2016	Manufacturer	Cree	Description 71W
Report Date	7 July 2016	Catalog No.	LOG-HO-120-48-40K-15x25-SI-NO	Manufacturer Mean Well
Sphere Temperature	25.3°C	Serial No.	SRIS 2436	Catalog No. LPF-60-24
Humidity	45.3 %	Drive Current	300 mA	Voltage 120.00 V
Lamp Type	SSL	Color	White	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.



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	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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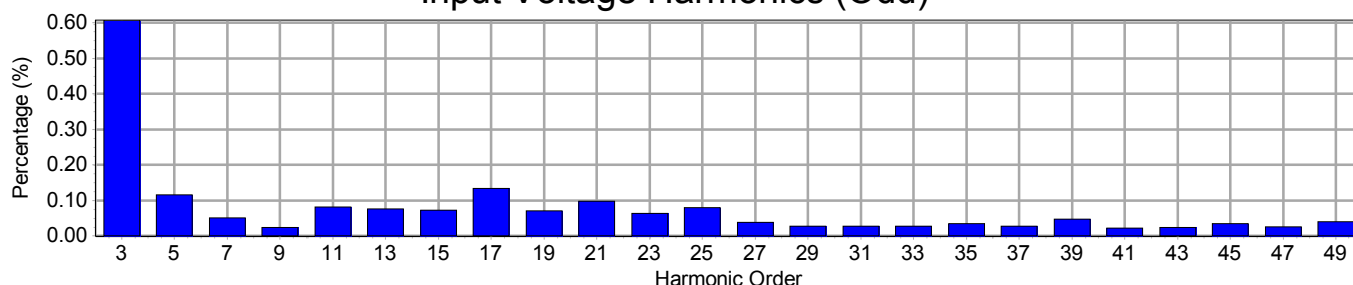
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Electrical Measurements

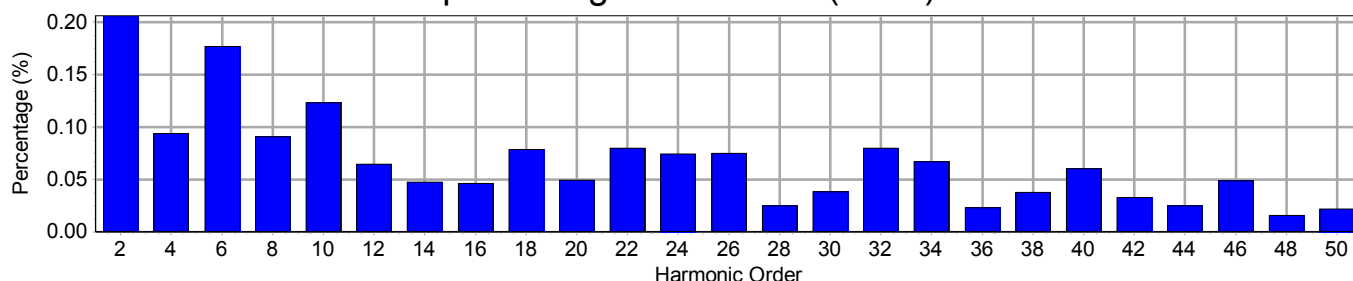
Input

Frequency	60 Hz	Active Power	61.95 W	THDV [ANSI]	0.78 %
Voltage	120.1 V(rms)	Apparent Power	62.37 VA	THDA [ANSI]	5.39 %
Current	0.5191 A(rms)	Power Factor	0.993	Max. Harmonic At	5th order

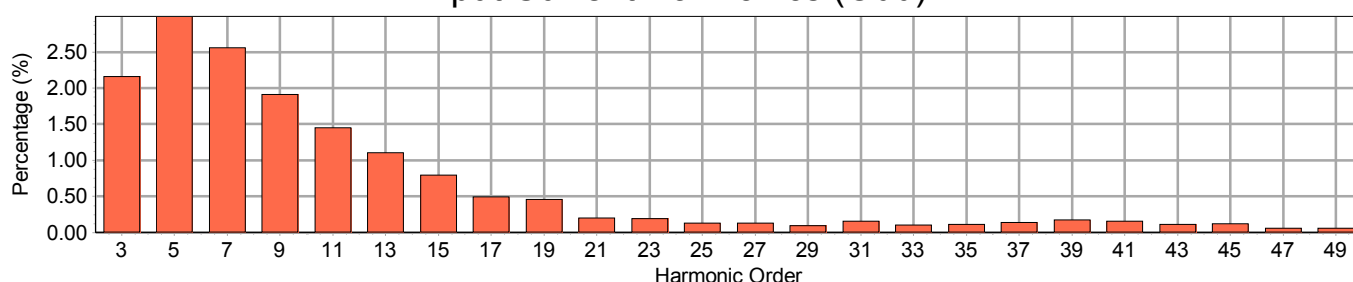
Input Voltage Harmonics (Odd)



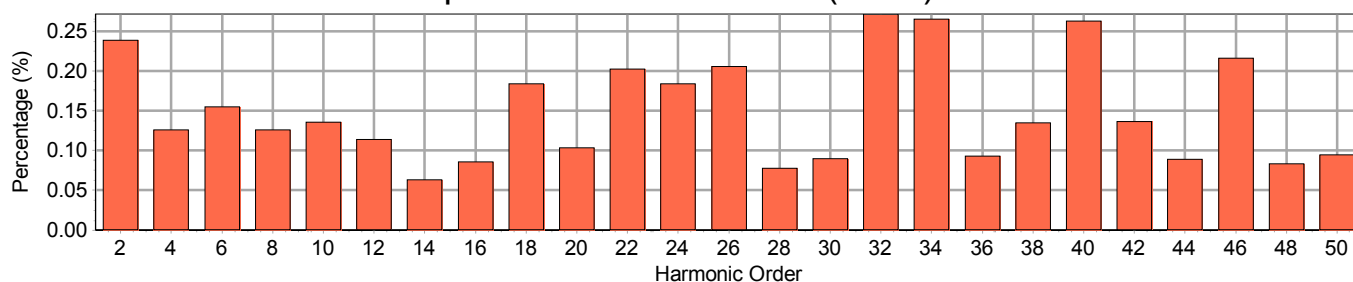
Input Voltage Harmonics (Even)



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	0.207	0.239
3	180	0.608	2.162	4	240	0.094	0.126
5	300	0.117	2.998	6	360	0.177	0.155
7	420	0.051	2.559	8	480	0.091	0.126
9	540	0.025	1.912	10	600	0.123	0.135
11	660	0.082	1.449	12	720	0.065	0.114
13	780	0.077	1.106	14	840	0.047	0.064
15	900	0.073	0.790	16	960	0.046	0.086
17	1020	0.134	0.492	18	1080	0.079	0.184
19	1140	0.071	0.461	20	1200	0.049	0.104
21	1260	0.098	0.196	22	1320	0.080	0.202
23	1380	0.064	0.189	24	1440	0.075	0.184
25	1500	0.080	0.126	26	1560	0.075	0.206
27	1620	0.038	0.128	28	1680	0.025	0.078
29	1740	0.029	0.089	30	1800	0.038	0.090
31	1860	0.027	0.151	32	1920	0.080	0.272
33	1980	0.028	0.103	34	2040	0.067	0.265
35	2100	0.035	0.109	36	2160	0.023	0.093
37	2220	0.028	0.140	38	2280	0.038	0.135
39	2340	0.048	0.173	40	2400	0.060	0.263
41	2460	0.022	0.153	42	2520	0.033	0.137
43	2580	0.024	0.112	44	2640	0.025	0.089
45	2700	0.035	0.117	46	2760	0.048	0.216
47	2820	0.026	0.060	48	2880	0.016	0.084
49	2940	0.041	0.062	50	3000	0.022	0.095



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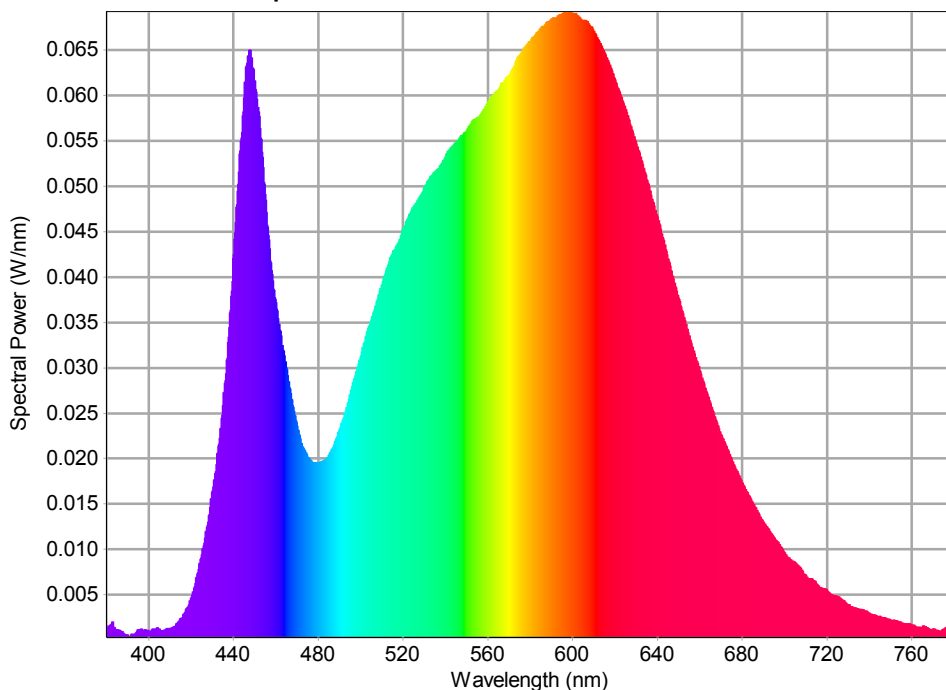
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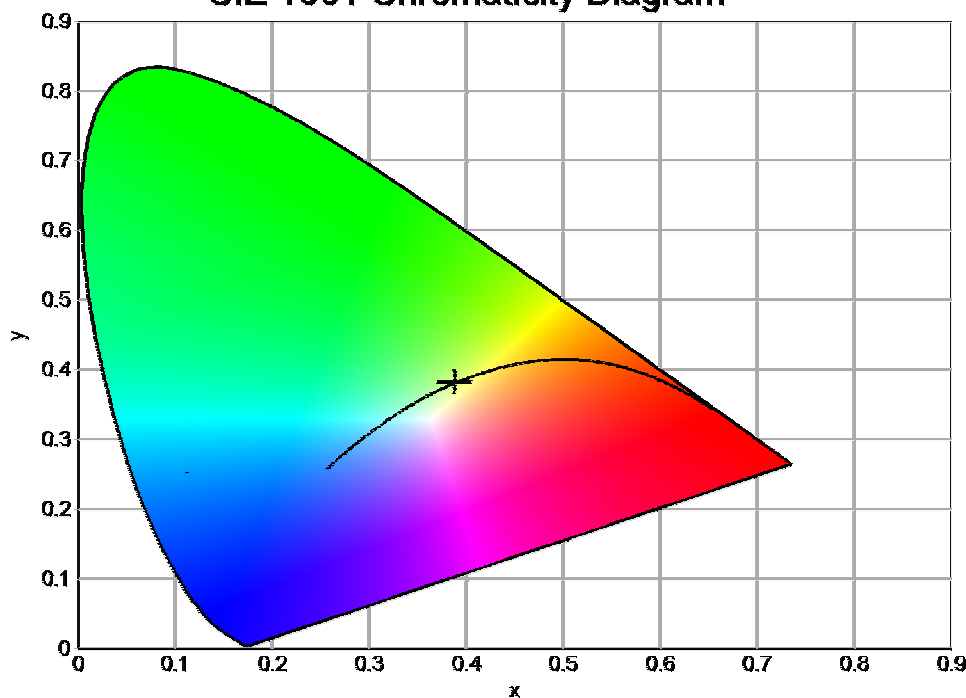
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Spectral Power Distribution



Peak Wavelength	596 nm
Luminous Flux	4000 lm
Input Power	61.95 W
Lumens/Watt	64.6
Full Width/Half Maximum	149.73
Center Wavelength	579 nm
Centroid Wavelength	371 nm
Dominant Wavelength	488 nm
Excitation Purity	0.1538
Colorimetric Purity	0.0994

CIE 1931 Chromaticity Diagram



x	0.3874	CCT	3862 K
y	0.3828	CRI	83
u	0.2272	L*	25.67
v	0.3368	a*	-4.85
u'	0.2272	b*	-13.67
v'	0.5053	Duv	0.0009
R1	81.7	R9	12.4
R2	88.2	R10	71.8
R3	93.3	R11	81.8
R4	83.1	R12	64.7
R5	81.6	R13	83.1
R6	84.0	R14	96.1
R7	86.9		
R8	66.4		



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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	0.00097	405	0.00125	430	0.01639	455	0.04919
381	0.00158	406	0.00108	431	0.01768	456	0.04575
382	0.00172	407	0.00109	432	0.01940	457	0.04319
383	0.00205	408	0.00117	433	0.02146	458	0.04079
384	0.00137	409	0.00127	434	0.02336	459	0.03875
385	0.00116	410	0.00132	435	0.02587	460	0.03727
386	0.00113	411	0.00141	436	0.02834	461	0.03545
387	0.00093	412	0.00154	437	0.03090	462	0.03421
388	0.00085	413	0.00180	438	0.03452	463	0.03252
389	0.00061	414	0.00201	439	0.03798	464	0.03136
390	0.00061	415	0.00236	440	0.04214	465	0.03006
391	0.00038	416	0.00255	441	0.04604	466	0.02854
392	0.00071	417	0.00306	442	0.04952	467	0.02726
393	0.00069	418	0.00355	443	0.05364	468	0.02587
394	0.00084	419	0.00396	444	0.05604	469	0.02479
395	0.00120	420	0.00467	445	0.05983	470	0.02363
396	0.00106	421	0.00533	446	0.06318	471	0.02271
397	0.00115	422	0.00630	447	0.06441	472	0.02175
398	0.00114	423	0.00734	448	0.06505	473	0.02113
399	0.00107	424	0.00845	449	0.06316	474	0.02074
400	0.00106	425	0.00941	450	0.06175	475	0.02021
401	0.00101	426	0.01044	451	0.05965	476	0.01997
402	0.00123	427	0.01197	452	0.05824	477	0.01967
403	0.00126	428	0.01307	453	0.05534	478	0.01963
404	0.00143	429	0.01467	454	0.05210	479	0.01959



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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	0.01961	505	0.03534	530	0.04988	555	0.05763
481	0.01964	506	0.03614	531	0.05032	556	0.05773
482	0.01977	507	0.03681	532	0.05074	557	0.05811
483	0.01989	508	0.03769	533	0.05114	558	0.05849
484	0.02003	509	0.03850	534	0.05138	559	0.05882
485	0.02039	510	0.03912	535	0.05164	560	0.05922
486	0.02086	511	0.04000	536	0.05187	561	0.05968
487	0.02125	512	0.04076	537	0.05209	562	0.06001
488	0.02196	513	0.04137	538	0.05250	563	0.06024
489	0.02253	514	0.04216	539	0.05289	564	0.06052
490	0.02320	515	0.04269	540	0.05335	565	0.06068
491	0.02388	516	0.04300	541	0.05386	566	0.06119
492	0.02456	517	0.04353	542	0.05413	567	0.06150
493	0.02529	518	0.04397	543	0.05441	568	0.06171
494	0.02614	519	0.04456	544	0.05468	569	0.06214
495	0.02707	520	0.04536	545	0.05490	570	0.06230
496	0.02797	521	0.04578	546	0.05509	571	0.06273
497	0.02886	522	0.04642	547	0.05555	572	0.06314
498	0.02965	523	0.04697	548	0.05567	573	0.06369
499	0.03049	524	0.04747	549	0.05597	574	0.06425
500	0.03124	525	0.04780	550	0.05618	575	0.06450
501	0.03227	526	0.04815	551	0.05661	576	0.06488
502	0.03296	527	0.04852	552	0.05691	577	0.06529
503	0.03401	528	0.04893	553	0.05734	578	0.06551
504	0.03462	529	0.04931	554	0.05748	579	0.06583



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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	0.06605	605	0.06832	630	0.05473	655	0.03357
581	0.06646	606	0.06834	631	0.05406	656	0.03269
582	0.06662	607	0.06818	632	0.05330	657	0.03195
583	0.06699	608	0.06779	633	0.05248	658	0.03120
584	0.06713	609	0.06762	634	0.05165	659	0.03050
585	0.06750	610	0.06715	635	0.05081	660	0.02977
586	0.06768	611	0.06671	636	0.05003	661	0.02893
587	0.06784	612	0.06627	637	0.04913	662	0.02825
588	0.06818	613	0.06584	638	0.04831	663	0.02751
589	0.06823	614	0.06524	639	0.04743	664	0.02684
590	0.06849	615	0.06479	640	0.04667	665	0.02610
591	0.06864	616	0.06424	641	0.04588	666	0.02541
592	0.06866	617	0.06369	642	0.04484	667	0.02468
593	0.06885	618	0.06310	643	0.04406	668	0.02400
594	0.06898	619	0.06251	644	0.04307	669	0.02336
595	0.06904	620	0.06177	645	0.04206	670	0.02273
596	0.06930	621	0.06104	646	0.04127	671	0.02222
597	0.06918	622	0.06056	647	0.04024	672	0.02168
598	0.06912	623	0.05992	648	0.03942	673	0.02110
599	0.06919	624	0.05917	649	0.03853	674	0.02052
600	0.06907	625	0.05857	650	0.03774	675	0.01998
601	0.06906	626	0.05784	651	0.03686	676	0.01941
602	0.06890	627	0.05695	652	0.03605	677	0.01889
603	0.06872	628	0.05626	653	0.03526	678	0.01844
604	0.06839	629	0.05553	654	0.03435	679	0.01788



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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	0.01737	706	0.00835	732	0.00363	758	0.00185
681	0.01691	707	0.00813	733	0.00358	759	0.00180
682	0.01643	708	0.00778	734	0.00350	760	0.00169
683	0.01601	709	0.00734	735	0.00348	761	0.00166
684	0.01557	710	0.00718	736	0.00345	762	0.00149
685	0.01517	711	0.00686	737	0.00337	763	0.00142
686	0.01473	712	0.00680	738	0.00321	764	0.00141
687	0.01429	713	0.00676	739	0.00319	765	0.00148
688	0.01387	714	0.00654	740	0.00300	766	0.00154
689	0.01341	715	0.00625	741	0.00289	767	0.00143
690	0.01305	716	0.00596	742	0.00279	768	0.00133
691	0.01272	717	0.00582	743	0.00277	769	0.00122
692	0.01241	718	0.00572	744	0.00263	770	0.00124
693	0.01203	719	0.00572	745	0.00267	771	0.00118
694	0.01169	720	0.00550	746	0.00249	772	0.00111
695	0.01134	721	0.00526	747	0.00257	773	0.00106
696	0.01103	722	0.00507	748	0.00236	774	0.00108
697	0.01077	723	0.00496	749	0.00236	775	0.00128
698	0.01039	724	0.00493	750	0.00223	776	0.00137
699	0.01008	725	0.00484	751	0.00219	777	0.00154
700	0.00963	726	0.00466	752	0.00221	778	0.00144
701	0.00931	727	0.00448	753	0.00215	779	0.00152
702	0.00909	728	0.00436	754	0.00207	780	0.00127
703	0.00890	729	0.00407	755	0.00194		
704	0.00872	730	0.00391	756	0.00187		
705	0.00859	731	0.00376	757	0.00186		