



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: CY2389		Driver Details: CY963	
Test Report	L1511304-C1	Description	Clusters of 48 Cree XPE2 LED's	Type	Commercial
Test Date	30 November 2015	Manufacturer	Cree	Description	61W
Report Date	30 November 2015	Catalog No.	LOG-HO-120-48-27K-10x60-SI-NO	Manufacturer	Mean Well
Sphere Temperature	23.0 °C	Serial No.	SRIS 2226	Catalog No.	LPF-60-24
Humidity	13.7 %	Diameter	N/A mm	Voltage	120.00 V
Lamp Type	SSL	Color	White	Power Factor	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.

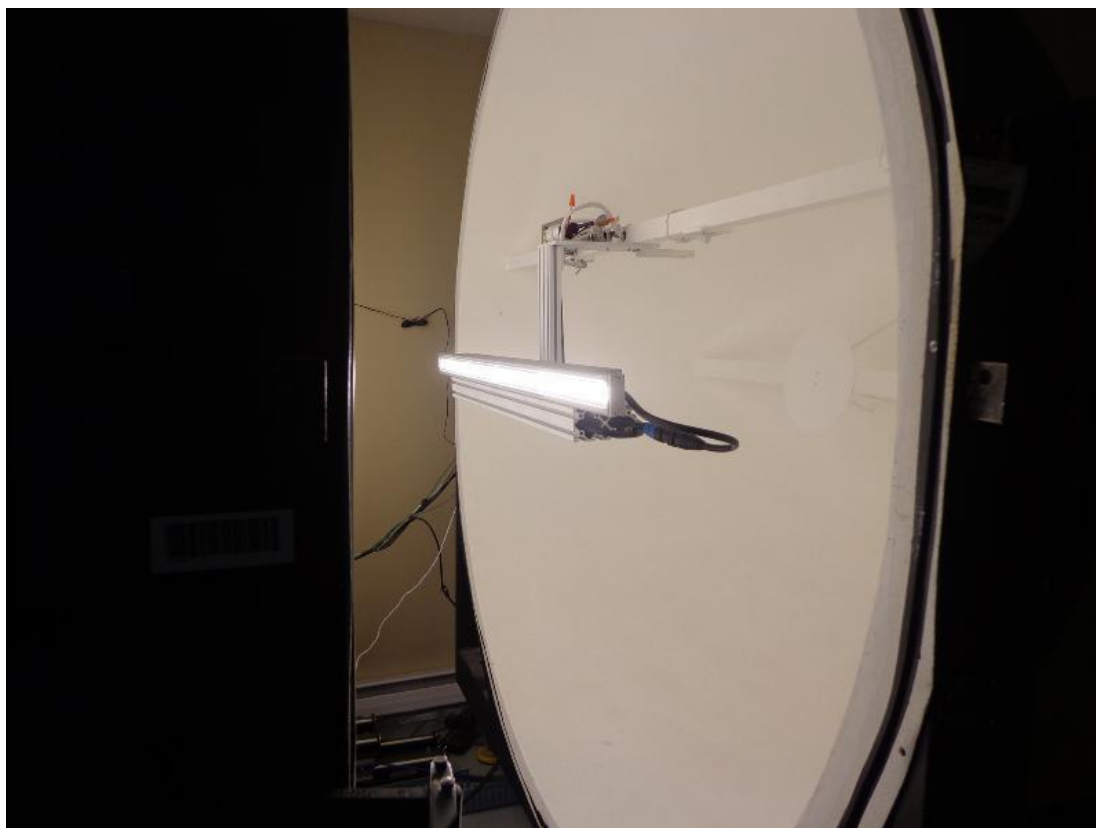


Realization of Sphere Test

A 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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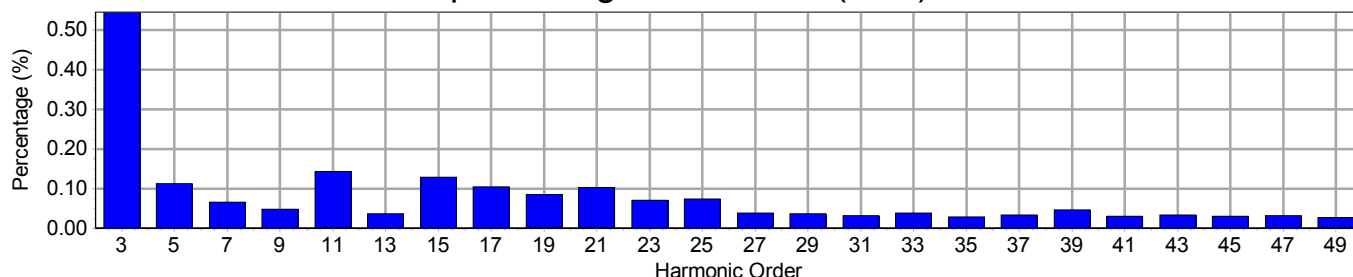
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Electrical Measurements

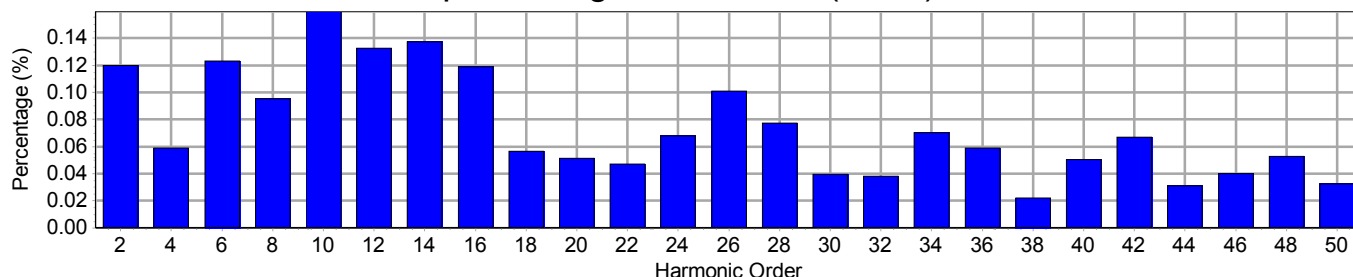
Input

Frequency	60 Hz	Active Power	60.87 W	THDV [ANSI]	0.75 %
Voltage	120.1 V(rms)	Apparent Power	61.34 VA	THDA [ANSI]	5.16 %
Current	0.5109 A(rms)	Power Factor	0.992	Max. Harmonic At	5th order

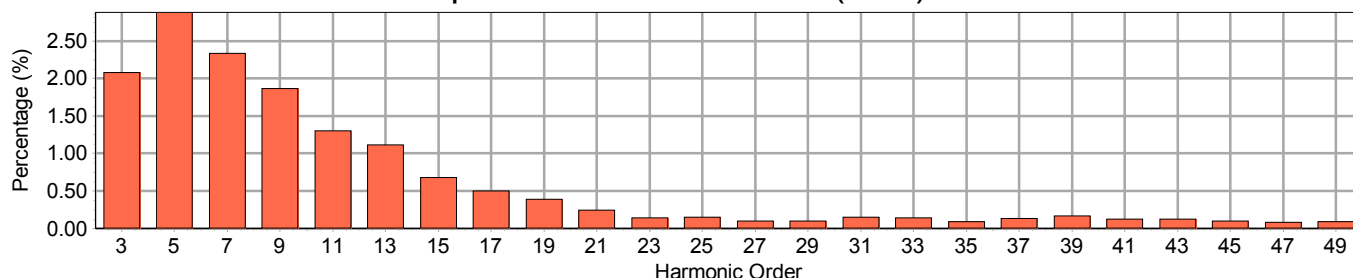
Input Voltage Harmonics (Odd)



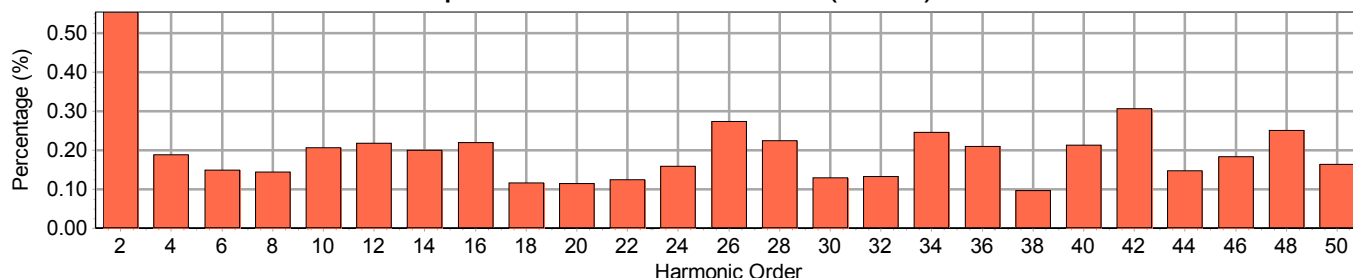
Input Voltage Harmonics (Even)



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	0.120	0.555
3	180	0.546	2.081	4	240	0.059	0.188
5	300	0.113	2.888	6	360	0.123	0.149
7	420	0.065	2.338	8	480	0.095	0.144
9	540	0.048	1.869	10	600	0.160	0.206
11	660	0.142	1.299	12	720	0.132	0.217
13	780	0.036	1.114	14	840	0.137	0.199
15	900	0.128	0.682	16	960	0.119	0.219
17	1020	0.104	0.498	18	1080	0.056	0.116
19	1140	0.084	0.388	20	1200	0.051	0.114
21	1260	0.102	0.240	22	1320	0.047	0.125
23	1380	0.070	0.138	24	1440	0.068	0.158
25	1500	0.074	0.153	26	1560	0.101	0.274
27	1620	0.038	0.101	28	1680	0.077	0.224
29	1740	0.037	0.101	30	1800	0.040	0.129
31	1860	0.031	0.146	32	1920	0.038	0.133
33	1980	0.037	0.137	34	2040	0.070	0.246
35	2100	0.029	0.094	36	2160	0.059	0.208
37	2220	0.033	0.132	38	2280	0.022	0.096
39	2340	0.046	0.168	40	2400	0.050	0.213
41	2460	0.030	0.126	42	2520	0.067	0.306
43	2580	0.034	0.123	44	2640	0.031	0.147
45	2700	0.029	0.101	46	2760	0.040	0.182
47	2820	0.032	0.083	48	2880	0.053	0.249
49	2940	0.027	0.086	50	3000	0.032	0.164



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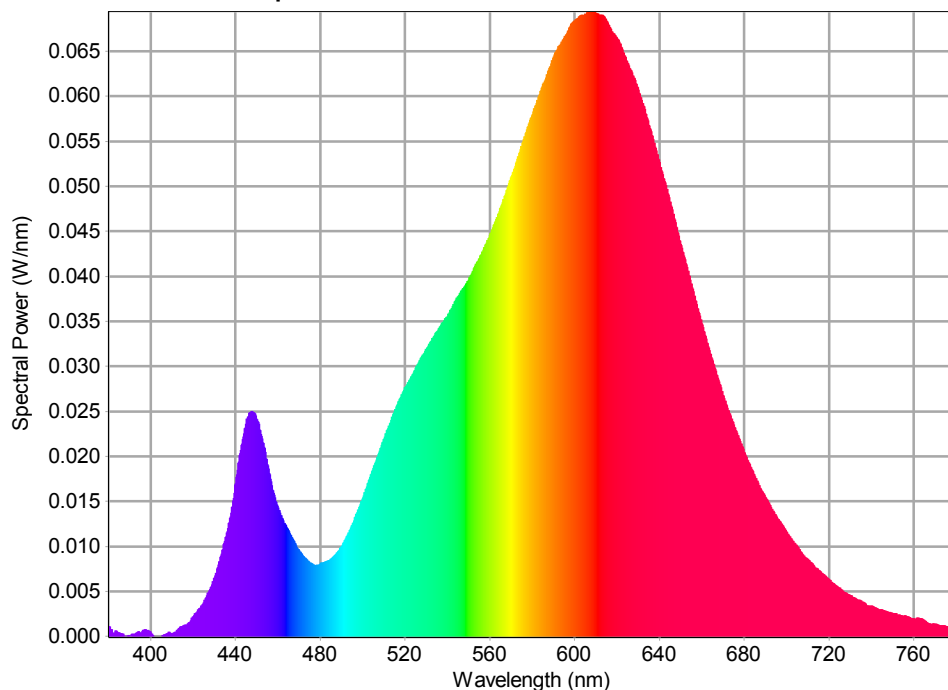
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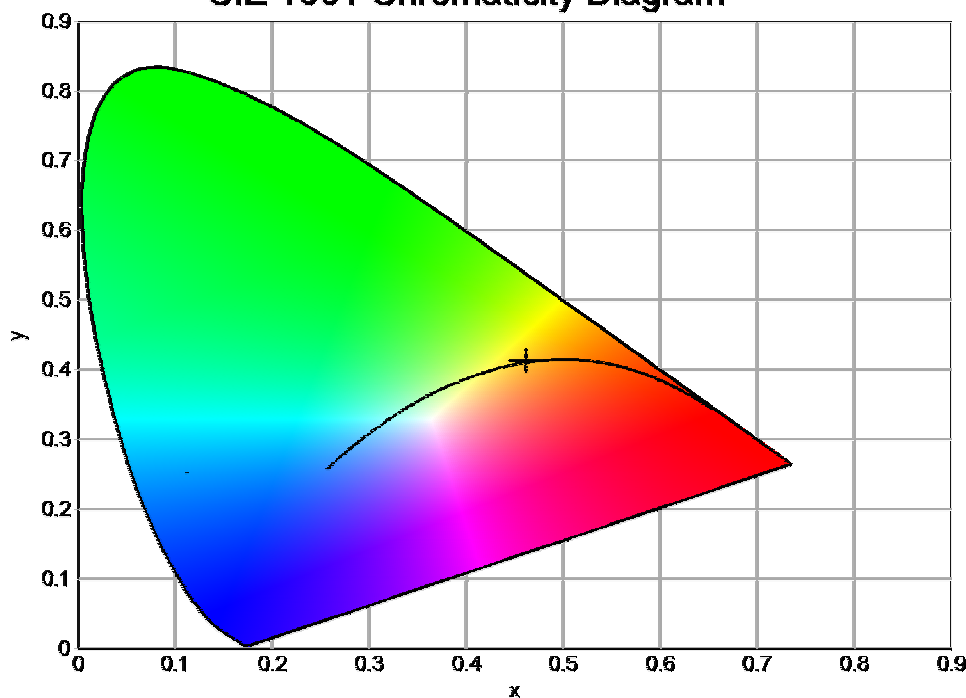
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Spectral Power Distribution



Peak Wavelength	608 nm
Luminous Flux	3222 lm
Input Power	60.87 W
Lumens/Watt	52.9
Full Width/Half Maximum	123.01
Center Wavelength	599 nm
Centroid Wavelength	419 nm
Dominant Wavelength	586 nm
Excitation Purity	0.1329
Colorimetric Purity	0.1451

CIE 1931 Chromaticity Diagram



x	0.4609	CCT	2706 K
y	0.4133	CRI	81
u	0.2620	L*	25.67
v	0.3523	a*	0.91
u'	0.2620	b*	3.64
v'	0.5285	Duv	0.0009
R1	78.8	R9	4.8
R2	88.2	R10	72.6
R3	96.4	R11	77.3
R4	79.0	R12	66.6
R5	78.0	R13	80.6
R6	85.1	R14	97.7
R7	82.9		
R8	57.5		



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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	0.00092	405	-0.00001	430	0.00651	455	0.01916
381	0.00077	406	0.00014	431	0.00708	456	0.01813
382	0.00038	407	0.00027	432	0.00802	457	0.01682
383	0.00041	408	0.00038	433	0.00883	458	0.01593
384	0.00060	409	0.00048	434	0.00964	459	0.01505
385	0.00047	410	0.00040	435	0.01064	460	0.01433
386	0.00039	411	0.00046	436	0.01151	461	0.01375
387	0.00030	412	0.00054	437	0.01260	462	0.01319
388	-0.00001	413	0.00081	438	0.01372	463	0.01262
389	0.00007	414	0.00107	439	0.01508	464	0.01219
390	0.00013	415	0.00117	440	0.01685	465	0.01179
391	0.00024	416	0.00129	441	0.01851	466	0.01129
392	0.00027	417	0.00130	442	0.02013	467	0.01082
393	0.00037	418	0.00155	443	0.02131	468	0.01043
394	0.00054	419	0.00180	444	0.02258	469	0.00989
395	0.00042	420	0.00220	445	0.02361	470	0.00958
396	0.00059	421	0.00256	446	0.02439	471	0.00925
397	0.00076	422	0.00277	447	0.02491	472	0.00892
398	0.00068	423	0.00314	448	0.02501	473	0.00870
399	0.00068	424	0.00340	449	0.02481	474	0.00844
400	0.00044	425	0.00378	450	0.02417	475	0.00823
401	0.00013	426	0.00429	451	0.02361	476	0.00810
402	0.00001	427	0.00483	452	0.02246	477	0.00796
403	0.00000	428	0.00526	453	0.02157	478	0.00795
404	0.00000	429	0.00577	454	0.02053	479	0.00794



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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	0.00804	505	0.01870	530	0.03192	555	0.04199
481	0.00818	506	0.01929	531	0.03229	556	0.04246
482	0.00830	507	0.01996	532	0.03271	557	0.04295
483	0.00837	508	0.02063	533	0.03312	558	0.04356
484	0.00846	509	0.02130	534	0.03354	559	0.04400
485	0.00861	510	0.02192	535	0.03387	560	0.04459
486	0.00883	511	0.02254	536	0.03425	561	0.04517
487	0.00904	512	0.02315	537	0.03462	562	0.04574
488	0.00931	513	0.02369	538	0.03495	563	0.04636
489	0.00963	514	0.02438	539	0.03534	564	0.04691
490	0.01000	515	0.02499	540	0.03560	565	0.04759
491	0.01042	516	0.02558	541	0.03602	566	0.04821
492	0.01089	517	0.02614	542	0.03645	567	0.04890
493	0.01134	518	0.02660	543	0.03691	568	0.04956
494	0.01184	519	0.02713	544	0.03745	569	0.05032
495	0.01236	520	0.02767	545	0.03779	570	0.05100
496	0.01292	521	0.02800	546	0.03815	571	0.05158
497	0.01357	522	0.02844	547	0.03855	572	0.05225
498	0.01411	523	0.02888	548	0.03885	573	0.05307
499	0.01473	524	0.02928	549	0.03921	574	0.05372
500	0.01533	525	0.02978	550	0.03960	575	0.05449
501	0.01600	526	0.03023	551	0.04012	576	0.05528
502	0.01668	527	0.03070	552	0.04056	577	0.05593
503	0.01738	528	0.03119	553	0.04117	578	0.05662
504	0.01804	529	0.03147	554	0.04160	579	0.05738



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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	0.05790	605	0.06918	630	0.06076	655	0.03922
581	0.05865	606	0.06930	631	0.05998	656	0.03834
582	0.05923	607	0.06936	632	0.05925	657	0.03737
583	0.05995	608	0.06944	633	0.05861	658	0.03647
584	0.06057	609	0.06941	634	0.05768	659	0.03562
585	0.06136	610	0.06928	635	0.05684	660	0.03479
586	0.06175	611	0.06916	636	0.05612	661	0.03391
587	0.06240	612	0.06908	637	0.05525	662	0.03306
588	0.06312	613	0.06903	638	0.05437	663	0.03223
589	0.06365	614	0.06887	639	0.05355	664	0.03142
590	0.06431	615	0.06841	640	0.05268	665	0.03065
591	0.06489	616	0.06797	641	0.05176	666	0.02987
592	0.06529	617	0.06749	642	0.05090	667	0.02913
593	0.06570	618	0.06702	643	0.05015	668	0.02835
594	0.06607	619	0.06682	644	0.04923	669	0.02765
595	0.06646	620	0.06643	645	0.04833	670	0.02685
596	0.06688	621	0.06605	646	0.04742	671	0.02619
597	0.06730	622	0.06552	647	0.04645	672	0.02543
598	0.06786	623	0.06483	648	0.04550	673	0.02485
599	0.06818	624	0.06432	649	0.04454	674	0.02423
600	0.06842	625	0.06369	650	0.04360	675	0.02356
601	0.06859	626	0.06313	651	0.04274	676	0.02295
602	0.06882	627	0.06262	652	0.04188	677	0.02237
603	0.06900	628	0.06207	653	0.04104	678	0.02171
604	0.06900	629	0.06143	654	0.04013	679	0.02116



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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	0.02049	706	0.00969	732	0.00432	758	0.00215
681	0.01995	707	0.00933	733	0.00412	759	0.00202
682	0.01935	708	0.00901	734	0.00407	760	0.00201
683	0.01885	709	0.00875	735	0.00404	761	0.00195
684	0.01834	710	0.00861	736	0.00384	762	0.00209
685	0.01782	711	0.00832	737	0.00370	763	0.00202
686	0.01732	712	0.00812	738	0.00345	764	0.00197
687	0.01681	713	0.00779	739	0.00346	765	0.00183
688	0.01631	714	0.00761	740	0.00343	766	0.00161
689	0.01592	715	0.00739	741	0.00333	767	0.00142
690	0.01549	716	0.00719	742	0.00319	768	0.00141
691	0.01511	717	0.00701	743	0.00307	769	0.00145
692	0.01467	718	0.00679	744	0.00297	770	0.00140
693	0.01419	719	0.00654	745	0.00301	771	0.00135
694	0.01382	720	0.00638	746	0.00286	772	0.00125
695	0.01343	721	0.00608	747	0.00279	773	0.00121
696	0.01304	722	0.00593	748	0.00261	774	0.00125
697	0.01273	723	0.00574	749	0.00267	775	0.00113
698	0.01237	724	0.00553	750	0.00262	776	0.00107
699	0.01203	725	0.00542	751	0.00257	777	0.00107
700	0.01158	726	0.00518	752	0.00245	778	0.00104
701	0.01122	727	0.00495	753	0.00242	779	0.00108
702	0.01092	728	0.00488	754	0.00236	780	0.00094
703	0.01061	729	0.00470	755	0.00232		
704	0.01031	730	0.00458	756	0.00235		
705	0.01003	731	0.00441	757	0.00221		