IES LM-79-08

MEASUREMENT AND TEST REPORT

For

SHENZHEN TUBU TECH CO.,LTD

Building C, Hankun Hi-tech Industrial Zone, Longteng Road, Gaoqiao District, Pingdi, Longgang, Shenzhen, Guangdong,China.

Test Model: LBF5F-100W(4000K)

Report Type:	Electrical and Photometric tests including: Luminous Flux, Power Factor, Chromaticity, Luminous Intensity Distribution, THD
Test Engineer:	Carl Du
Report Number:	RSZ170314520-10
Test Date:	2017-03-17 to 2017-03-25
Report Date:	2017-05-03
Reviewed By:	Blake Zhang / EE Engineer
Prepared By:	Bay Area Compliance Laboratories Corp. (Dongguan). No.69,Pulongcun ,Puxinhu Industrial Area, Tangxia , Dongguan, Guangdong, China. Tel: +86-0769-86858888 Fax:+86-0769-86858588
Accreditation:	The IAS Accreditation Number TL-460.

1. Product Description

General Information:

One sample was received on 2017-03-14 and used for testing.

Model Tested:	LBF5F-100W(4000K)
Manufacturer:	SHENZHEN TUBU TECH CO.,LTD
Brand Name:	TUBU
Product Designation:	High-bay Luminaires for Commercial and Industrial Buildings
Burning Time Before Test:	0hour(For New Products)

Rated Values:

Rated Voltage/Frequency:	AC 100-277V 50/60Hz
Rated Power:	100 W
Nominal CCT:	4000K
Nominal Lumen Output:	13000 lm

2. Standards Used

- IES LM-79-08: Approved Method: Electrical & Photometric Measurement of Solid-state Lighting Products
- ANSI C82.77-2002: Harmonic Emission Limits – Related Power Quality Requirements for Lighting
- IES TM-30-15: IES Method for Evaluating Light Source Color Rendition (This method is not in IAS accreditation scope)

3. Description of Test Equipment

Device	Manufacture	Model No	Serial No	Test Range	Calibration date	Calibration due date
2.0m integrating sphere	EVERFINE	R98	11010018	R98	2016-11-18	2017-11-17
spectroradiometer	EVERFINE	HAAS-2000	20140912	380-780nm	2016-11-18	2017-11-17
Digital Power Meter	EVERFINE	PF2010A	1011004	600V/20A	2016-07-11	2017-07-10
Digital CC&CV DC Power Supply	EVERFINE	WY305-V1	1101047	30V/5A	2016-07-07	2017-07-06
Rapid recording photometer	EVERFINE	PHOTO-2000F	1007010	0.1lm—200klm	2016-12-30	2017-12-29
Standard Light Source	SENSING	N/A	LSD090808	N/A	2016-12-05	2017-12-04
Special zero-voltage synchronous switching AC	EVERFINE	DPS1010-YF	1011001T	0-150V，0-300V	2017-03-03	2018-03-02
AC Power Supply	EVERFINE	VPS1030 PWM	1012017	0-150V，0-300V	2017-03-03	2018-03-02
DC Power Supply	EVERFINE	WY12010	1009009	30V/5A	2017-03-03	2018-03-02
Power Meter	YOKOGAWA	WT-210	91KB35700	15/30/60/150/300/600 V	2017-03-03	2018-03-02
Goniophotometer	EVERFINE	GO-R5000	YG108492N10120001	1600mm, 3000W/10A	2017-03-09	2018-03-08
Wireless Remote Sensor	N/A	433MHz	N/A	0°C~50°C; -20°C~60°C	2017-03-20	2018-03-19

Device	Manufacture	Model No	Serial No	Test Range	Calibration date	Calibration due date
Standard Light Source	EVERFINE	D908	1012003	N/A	2016-12-17	2017-12-17

Statement of Traceability: Bay Area Compliance Laboratories Corp. (Dongguan) attested that all calibration has been performed using suitable standards traceable to National Primary Standards and International System of Units (SI).

4. Test Method

Product was tested with no seasoning. All stabilization and measurements were made in compliance with IES LM-79-08. The product was operated at rated voltage or at voltage required by manufacturer. The ambient temperature of the sample was maintained at 25°C±1°C during measurement. And relative humidity is less than 65%.

Integrating Sphere System

The system includes AC power source, digital power meter, DC power supply, Spectroradiometer, and integrating sphere. The integrating sphere system is calibrated by standard spectrum light source before measurement.

4π geometry was used during measurement. The product was operated in its intended orientation in application and was recorded in this report.

The uncertainty of the light output (luminous flux) measurements is U=1.8% (K=2), at the 95% confidence level. The uncertainty of the correlated color temperature measurements is U=20K (K=2), at the 95% confidence level. The uncertainty of the CRI is U=1.8(K=2), at the 95% confidence level.

The uncertainty of power meter AC current U=0.19 % of rdg, AC Voltage U=0.15% of rdg, Power U=0.20%) (K=2), at the 95% confidence level.

Goniophotometer System

The goniophotometer system is calibrated by standard light source before measurement.

Type C goniophotometer was used for measuring total luminous flux, luminous intensity distribution, and color spatial uniformity. The product was operated in its intended orientation in application and was recorded in this report. The vertical angle (γ) test intervals were set no more than 1 degree while data for 5 degree intervals is reported. The horizontal angle (C plane) test intervals were set no more than 22.5 degree.

The uncertainty of the luminous intensity is U=1.6% (K=2) , at the 95% confidence level.

Additional Test

The Additional Test item may not be covered by IESNA LM-79-2008. Additional test including power factor, off-state power and THD, was measured by Digital Power Meter after stabilized at 25°C±1°C.Test voltage for THD and power factor test would be equal to rated voltage or, in case of a voltage range, maximum value of that range.

The uncertainty of power meter AC current U=0.19 % of rdg, AC Voltage U=0.15% of rdg, Power U=0.20%) (K=2), at the 95% confidence level.

Fidelity Index and Gamut Index Calculation

The R_f, R_g was calculated according to IES TM-30-15 by using calculation tools. The calculation was based on the measured SPD from 380nm to 780nm with 1nm intervals. All the colors in this report is for reference only.

5. Test Result

[Integrating Sphere System]

Total operating time for integrating sphere test: **1.0 hour**

Test orientation: **Downward**

Photometric and Electrical Measurement Result

Voltage (V)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Luminous Flux(lm)	Efficacy (lm/W)
120.0	60	0.8219	98.34	0.997	12863	130.8

Radiant Flux (W)	CCT (K)	Duv	x	y	u'	v'
39.131	4161	0.00147	0.3745	0.3761	0.2215	0.5004

Color Rendering Index

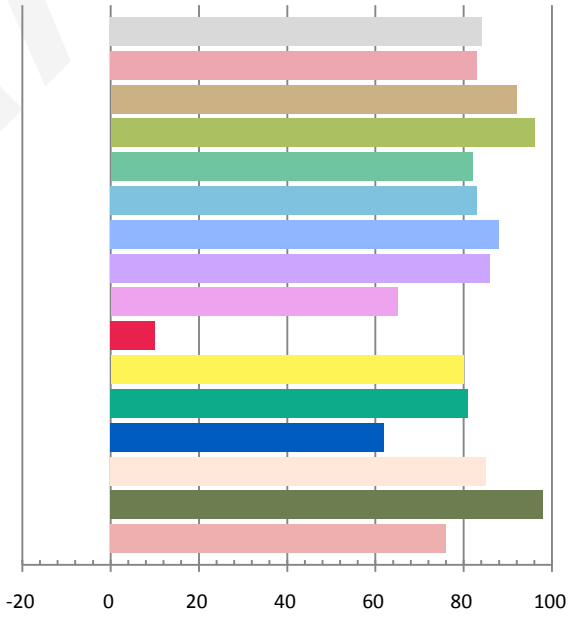
Ra
84.1

R1	R2	R3	R4
83	92	96	82

R5	R6	R7	R8
83	88	86	65

R9	R10	R11	R12
10	80	81	62

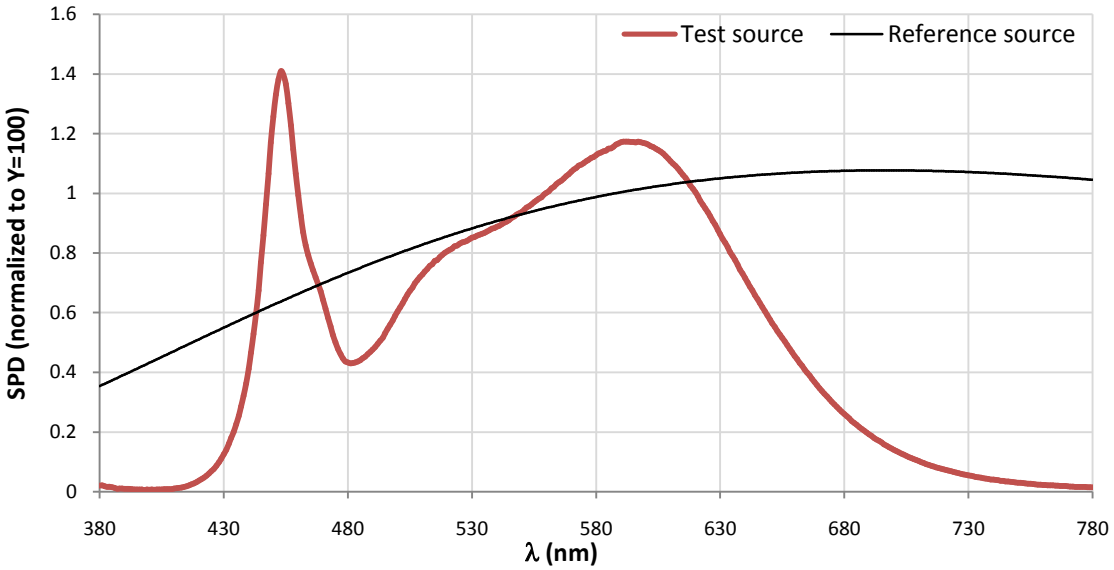
R13	R14	R15
85	98	76



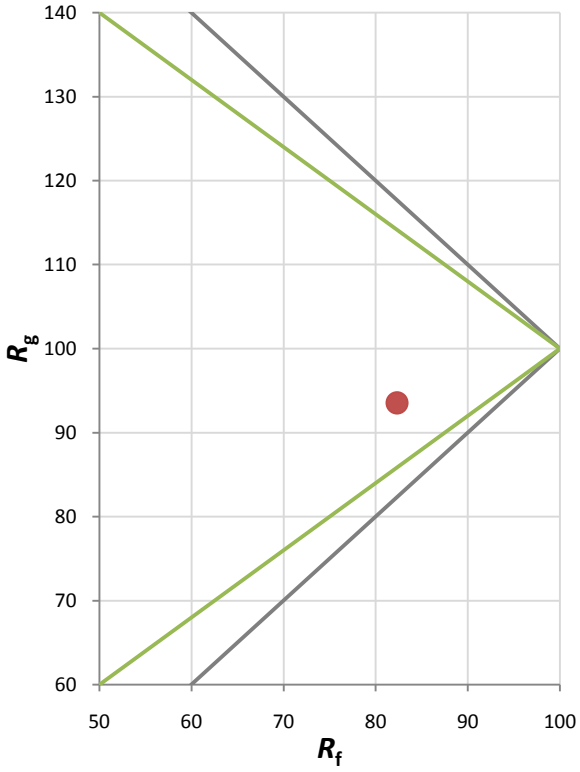
Fidelity Index and Gamut Index

Fidelity Index R_f	82
Gamut Index R_g	94

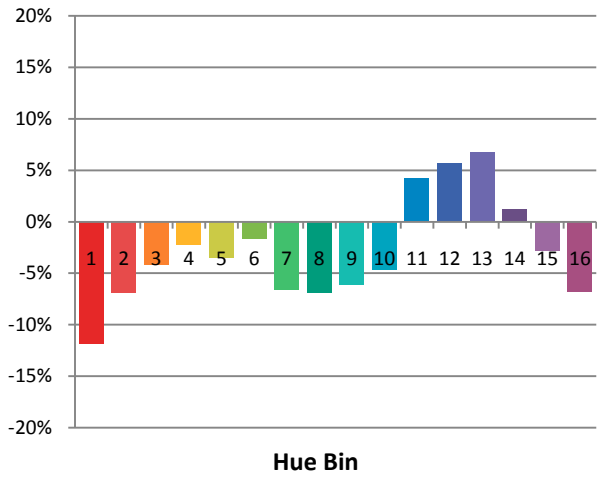
Spectral Power Distribution Comparison



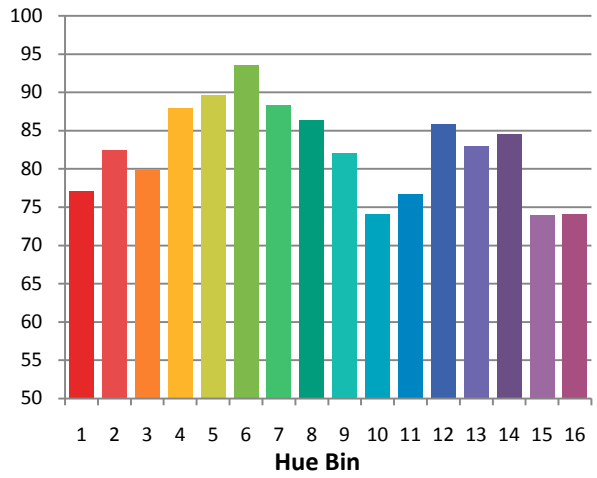
Plot of R_g versus R_f



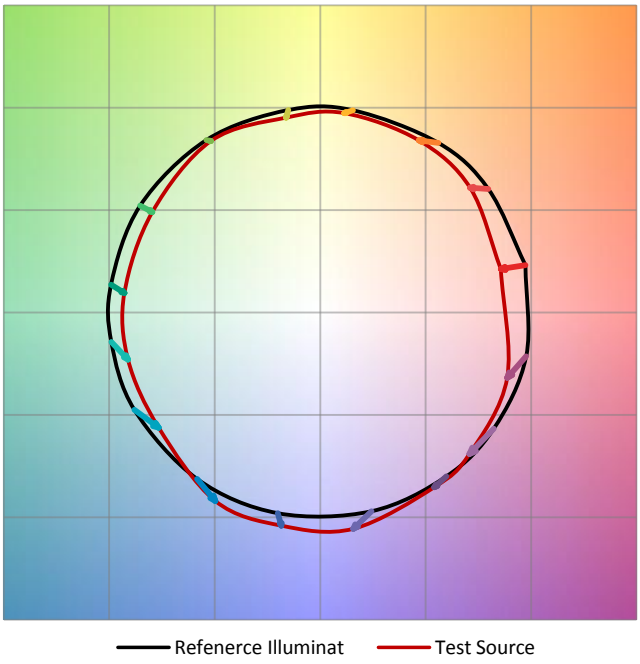
Chroma Shift by Hue

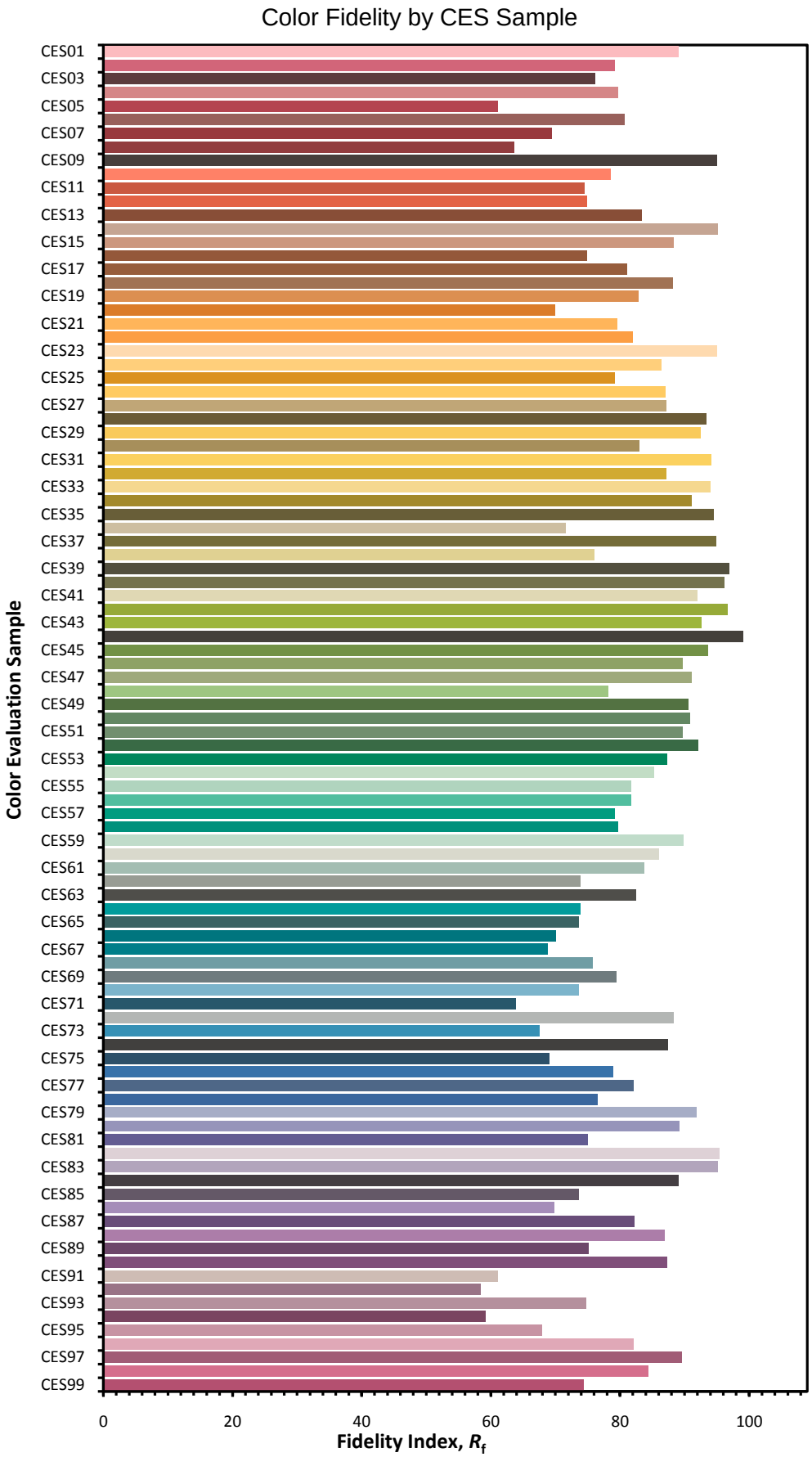


R_f by Hue



Color Vector Graphic




Color Fidelity by CES Sample
Color Evaluation Sample
CES01
CES03
CES05
CES07
CES09
CES11
CES13
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CES17
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CES25
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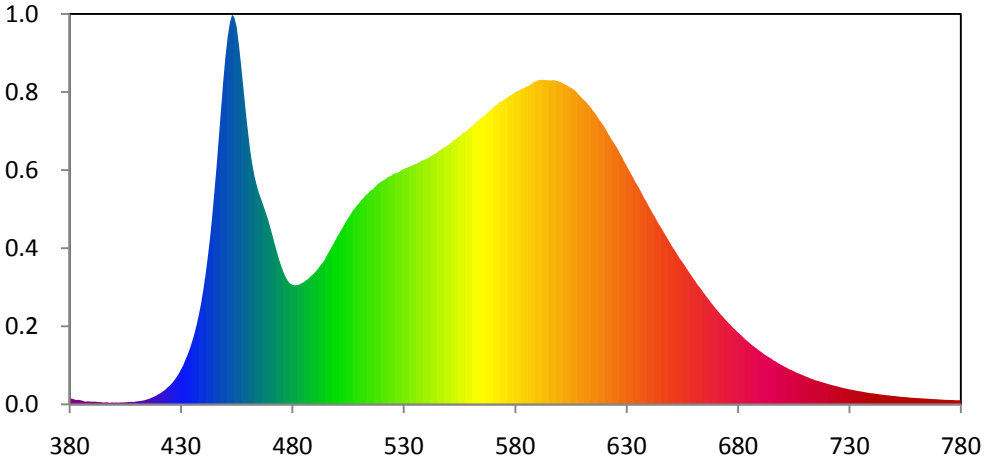
CES97
CES99
0
20
40
60
80
100
Fidelity Index, R_f

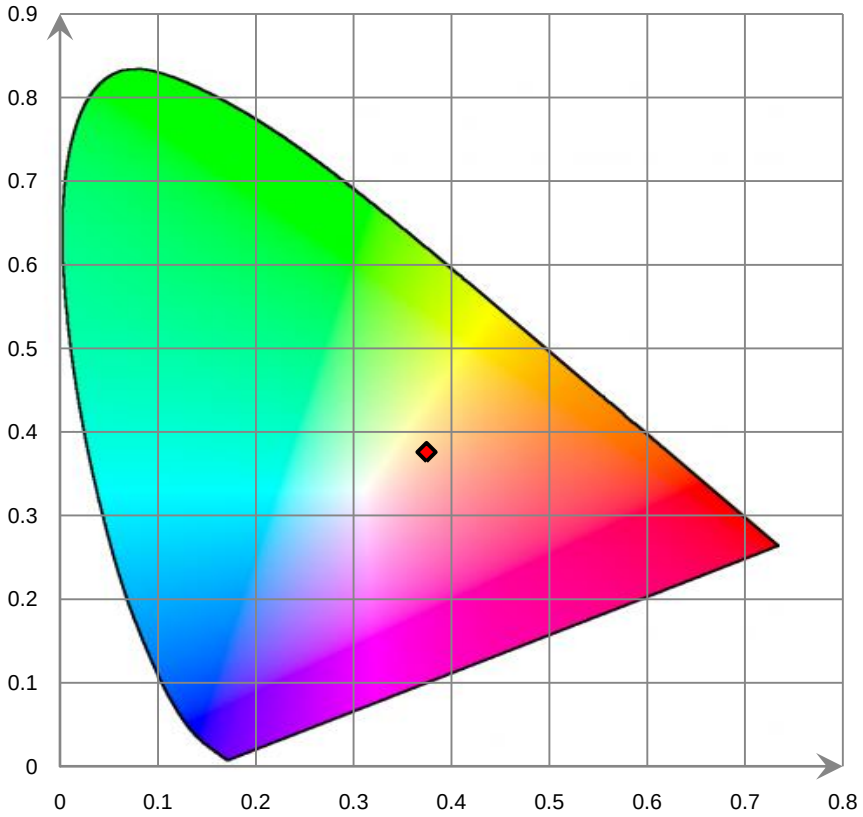
Relative Spectral Power Distribution



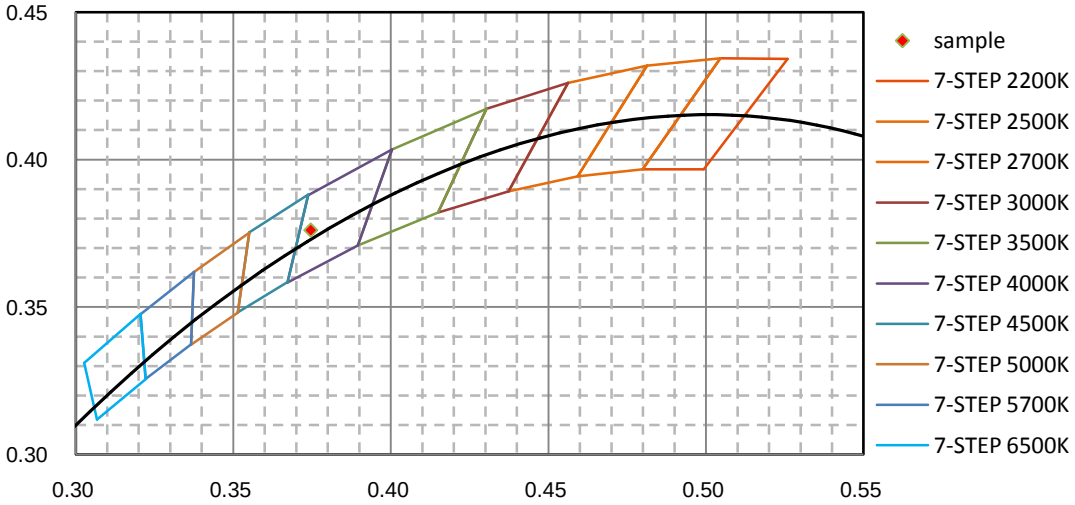
nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
380	3.850E+00	421	7.779E+00	462	1.637E+02	503	1.215E+02	544	1.705E+02
381	3.975E+00	422	8.971E+00	463	1.555E+02	504	1.243E+02	545	1.714E+02
382	3.423E+00	423	1.002E+01	464	1.492E+02	505	1.268E+02	546	1.728E+02
383	2.976E+00	424	1.153E+01	465	1.439E+02	506	1.289E+02	547	1.737E+02
384	3.116E+00	425	1.287E+01	466	1.398E+02	507	1.315E+02	548	1.748E+02
385	2.806E+00	426	1.442E+01	467	1.353E+02	508	1.334E+02	549	1.756E+02
386	2.421E+00	427	1.631E+01	468	1.309E+02	509	1.355E+02	550	1.765E+02
387	1.880E+00	428	1.848E+01	469	1.263E+02	510	1.370E+02	551	1.779E+02
388	2.054E+00	429	2.078E+01	470	1.211E+02	511	1.390E+02	552	1.793E+02
389	1.970E+00	430	2.367E+01	471	1.155E+02	512	1.406E+02	553	1.802E+02
390	1.804E+00	431	2.646E+01	472	1.096E+02	513	1.425E+02	554	1.814E+02
391	1.878E+00	432	3.028E+01	473	1.042E+02	514	1.436E+02	555	1.827E+02
392	1.763E+00	433	3.384E+01	474	9.885E+01	515	1.456E+02	556	1.838E+02
393	1.537E+00	434	3.782E+01	475	9.424E+01	516	1.461E+02	557	1.850E+02
394	1.490E+00	435	4.266E+01	476	9.009E+01	517	1.479E+02	558	1.858E+02
395	1.309E+00	436	4.779E+01	477	8.673E+01	518	1.494E+02	559	1.875E+02
396	1.304E+00	437	5.374E+01	478	8.411E+01	519	1.507E+02	560	1.886E+02
397	1.371E+00	438	6.065E+01	479	8.223E+01	520	1.517E+02	561	1.896E+02
398	1.067E+00	439	6.824E+01	480	8.153E+01	521	1.526E+02	562	1.914E+02
399	1.358E+00	440	7.759E+01	481	8.102E+01	522	1.535E+02	563	1.925E+02
400	1.203E+00	441	8.772E+01	482	8.115E+01	523	1.549E+02	564	1.940E+02
401	1.307E+00	442	9.962E+01	483	8.150E+01	524	1.553E+02	565	1.953E+02
402	1.184E+00	443	1.124E+02	484	8.227E+01	525	1.564E+02	566	1.963E+02
403	1.316E+00	444	1.271E+02	485	8.306E+01	526	1.572E+02	567	1.976E+02
404	1.330E+00	445	1.446E+02	486	8.427E+01	527	1.576E+02	568	1.991E+02
405	1.402E+00	446	1.618E+02	487	8.521E+01	528	1.582E+02	569	2.003E+02
406	1.546E+00	447	1.813E+02	488	8.676E+01	529	1.594E+02	570	2.019E+02
407	1.640E+00	448	2.007E+02	489	8.815E+01	530	1.603E+02	571	2.033E+02
408	1.695E+00	449	2.202E+02	490	8.963E+01	531	1.607E+02	572	2.043E+02
409	1.681E+00	450	2.367E+02	491	9.134E+01	532	1.616E+02	573	2.057E+02
410	1.960E+00	451	2.505E+02	492	9.332E+01	533	1.621E+02	574	2.063E+02
411	2.222E+00	452	2.600E+02	493	9.528E+01	534	1.628E+02	575	2.073E+02
412	2.373E+00	453	2.654E+02	494	9.714E+01	535	1.634E+02	576	2.085E+02
413	2.638E+00	454	2.632E+02	495	9.986E+01	536	1.641E+02	577	2.094E+02
414	2.995E+00	455	2.572E+02	496	1.027E+02	537	1.649E+02	578	2.105E+02
415	3.444E+00	456	2.451E+02	497	1.053E+02	538	1.659E+02	579	2.113E+02
416	3.949E+00	457	2.311E+02	498	1.080E+02	539	1.663E+02	580	2.125E+02
417	4.685E+00	458	2.161E+02	499	1.109E+02	540	1.672E+02	581	2.134E+02
418	5.263E+00	459	2.007E+02	500	1.137E+02	541	1.677E+02	582	2.140E+02
419	6.059E+00	460	1.869E+02	501	1.162E+02	542	1.687E+02	583	2.148E+02
420	6.957E+00	461	1.741E+02	502	1.189E+02	543	1.698E+02	584	2.152E+02

nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
585	2.165E+02	626	1.739E+02	667	7.124E+01	708	2.057E+01	749	5.814E+00
586	2.166E+02	627	1.709E+02	668	6.916E+01	709	1.997E+01	750	5.705E+00
587	2.177E+02	628	1.684E+02	669	6.716E+01	710	1.930E+01	751	5.587E+00
588	2.190E+02	629	1.652E+02	670	6.531E+01	711	1.865E+01	752	5.347E+00
589	2.197E+02	630	1.626E+02	671	6.352E+01	712	1.809E+01	753	5.198E+00
590	2.205E+02	631	1.595E+02	672	6.176E+01	713	1.739E+01	754	5.036E+00
591	2.209E+02	632	1.571E+02	673	6.010E+01	714	1.695E+01	755	4.945E+00
592	2.209E+02	633	1.543E+02	674	5.836E+01	715	1.630E+01	756	4.833E+00
593	2.209E+02	634	1.513E+02	675	5.666E+01	716	1.589E+01	757	4.658E+00
594	2.207E+02	635	1.488E+02	676	5.516E+01	717	1.543E+01	758	4.504E+00
595	2.206E+02	636	1.461E+02	677	5.347E+01	718	1.498E+01	759	4.471E+00
596	2.204E+02	637	1.432E+02	678	5.188E+01	719	1.454E+01	760	4.310E+00
597	2.208E+02	638	1.402E+02	679	5.050E+01	720	1.405E+01	761	4.270E+00
598	2.205E+02	639	1.377E+02	680	4.903E+01	721	1.367E+01	762	4.126E+00
599	2.201E+02	640	1.348E+02	681	4.772E+01	722	1.322E+01	763	4.060E+00
600	2.196E+02	641	1.321E+02	682	4.621E+01	723	1.281E+01	764	3.990E+00
601	2.190E+02	642	1.294E+02	683	4.471E+01	724	1.252E+01	765	3.848E+00
602	2.180E+02	643	1.269E+02	684	4.337E+01	725	1.204E+01	766	3.739E+00
603	2.174E+02	644	1.239E+02	685	4.217E+01	726	1.162E+01	767	3.642E+00
604	2.164E+02	645	1.215E+02	686	4.078E+01	727	1.130E+01	768	3.563E+00
605	2.156E+02	646	1.191E+02	687	3.956E+01	728	1.090E+01	769	3.531E+00
606	2.146E+02	647	1.164E+02	688	3.851E+01	729	1.062E+01	770	3.379E+00
607	2.134E+02	648	1.139E+02	689	3.725E+01	730	1.023E+01	771	3.297E+00
608	2.118E+02	649	1.113E+02	690	3.617E+01	731	9.988E+00	772	3.219E+00
609	2.101E+02	650	1.087E+02	691	3.505E+01	732	9.700E+00	773	3.095E+00
610	2.086E+02	651	1.063E+02	692	3.382E+01	733	9.334E+00	774	3.055E+00
611	2.070E+02	652	1.040E+02	693	3.294E+01	734	9.100E+00	775	2.981E+00
612	2.056E+02	653	1.014E+02	694	3.201E+01	735	8.861E+00	776	2.940E+00
613	2.038E+02	654	9.905E+01	695	3.106E+01	736	8.526E+00	777	2.927E+00
614	2.020E+02	655	9.708E+01	696	2.992E+01	737	8.304E+00	778	2.812E+00
615	1.998E+02	656	9.482E+01	697	2.911E+01	738	8.026E+00	779	2.824E+00
616	1.980E+02	657	9.241E+01	698	2.814E+01	739	7.725E+00	780	2.830E+00
617	1.956E+02	658	9.013E+01	699	2.721E+01	740	7.594E+00		
618	1.932E+02	659	8.794E+01	700	2.644E+01	741	7.406E+00		
619	1.913E+02	660	8.556E+01	701	2.564E+01	742	7.209E+00		
620	1.889E+02	661	8.350E+01	702	2.486E+01	743	6.944E+00		
621	1.864E+02	662	8.116E+01	703	2.393E+01	744	6.760E+00		
622	1.836E+02	663	7.946E+01	704	2.333E+01	745	6.508E+00		
623	1.811E+02	664	7.718E+01	705	2.266E+01	746	6.376E+00		
624	1.787E+02	665	7.516E+01	706	2.183E+01	747	6.206E+00		
625	1.762E+02	666	7.322E+01	707	2.120E+01	748	6.040E+00		

CIE 1931 x y Chromaticity Diagram



7-Step Chromaticity Quadrangles



[Goniophotometer System]

Total operating time for luminous intensity distribution: **1.0 hour**

Test orientation: **Downward**

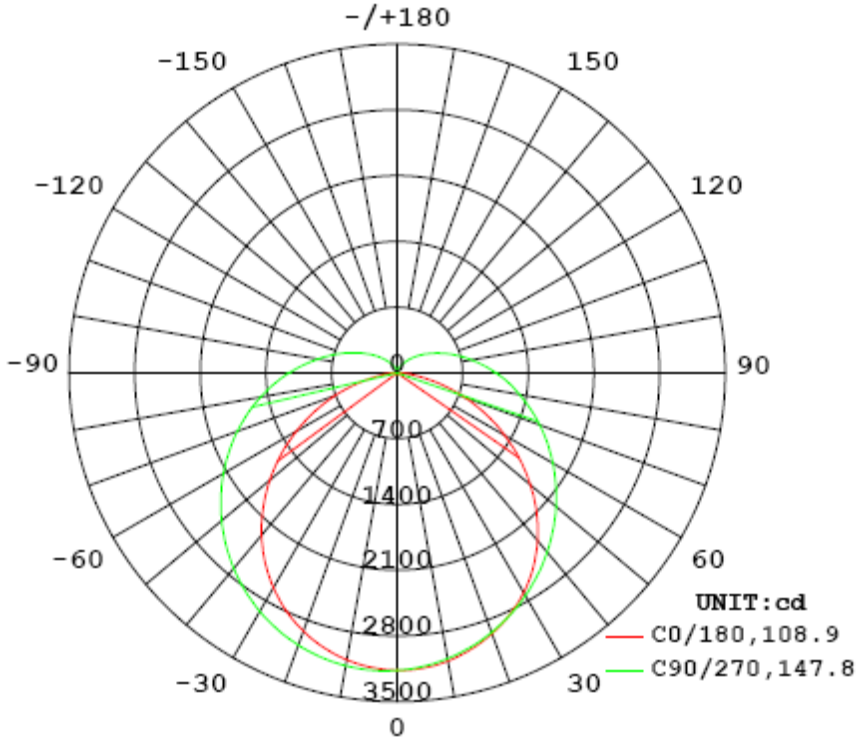
Electrical Measurement

Input Voltage (V)	Frequency (Hz)	Input Current (A)	Power (W)	Power Factor
120.1	60	0.8182	97.98	0.9974

Photometric Measurement

Luminous Flux (lm)	Efficacy (lm/W)	I_{max} (cd)	S/MH (C0/180)	S/MH (C90/270)
12869.5	131.35	3176.0	1.27	1.29

Luminous Intensity Distribution



	C0/180	C45/225	C90/270	C135/315	AVG.
Beam Angle (50% I_{max}):	108.9	130.1	147.8	130.3	129.3
Field Angle (10% I_{max}):	156.7	228.0	254.2	229.0	217.0

Luminous Intensity (cd) Distribution Data

C / γ	0°	22.5°	45°	67.5°	90°	112.5°	135°	157.5°
0.0°	3166	3166	3166	3166	3166	3166	3166	3166
5.0°	3147	3159	3171	3176	3175	3170	3165	3162
10.0°	3101	3123	3148	3164	3164	3153	3140	3129
15.0°	3027	3060	3100	3131	3134	3114	3091	3072
20.0°	2927	2971	3030	3076	3084	3055	3021	2990
25.0°	2797	2857	2937	3002	3017	2979	2931	2887
30.0°	2641	2718	2824	2911	2932	2885	2825	2762
35.0°	2460	2555	2693	2802	2830	2775	2703	2611
40.0°	2252	2370	2544	2677	2715	2651	2566	2434
45.0°	2024	2166	2382	2540	2586	2515	2414	2234
50.0°	1775	1947	2207	2393	2445	2368	2249	2018
55.0°	1515	1719	2024	2236	2297	2213	2072	1788
60.0°	1245	1485	1837	2073	2141	2054	1888	1556
65.0°	972	1253	1648	1907	1981	1889	1699	1322
70.0°	705	1030	1461	1737	1815	1722	1511	1096
75.0°	451	821	1280	1567	1648	1554	1327	883
80.0°	223	635	1108	1397	1481	1387	1151	693
85.0°	55	481	948	1233	1315	1224	987	533
90.0°	1	357	802	1075	1155	1068	836	401
95.0°	1	264	671	927	1003	921	702	302
100.0°	1	196	559	790	860	785	584	227
105.0°	2	147	459	667	731	663	482	172
110.0°	3	112	373	560	615	556	393	131
115.0°	4	86	301	463	515	460	317	101
120.0°	5	67	240	378	424	376	254	79
125.0°	6	53	190	306	345	304	201	62
130.0°	7	42	149	244	277	243	158	49
135.0°	8	34	116	192	219	191	122	39
140.0°	9	28	89	148	170	148	93	32
145.0°	10	23	68	112	129	112	71	26
150.0°	11	20	51	83	95	83	53	21
155.0°	11	18	38	59	68	60	39	18
160.0°	11	16	27	41	46	41	27	15
165.0°	11	14	20	27	30	27	17	13
170.0°	11	12	16	18	20	17	14	12
175.0°	12	12	12	13	13	11	12	12
180.0°	12	12	12	10	8	10	11	11

Luminous Intensity (cd) Distribution Data (cont.)

C / γ	180°	202.5°	225°	247.5°	270°	292.5°	315°	337.5°
0.0°	3166	3166	3166	3166	3166	3166	3166	3166
5.0°	3154	3142	3134	3133	3136	3139	3140	3141
10.0°	3113	3091	3079	3080	3088	3092	3090	3089
15.0°	3045	3015	3002	3008	3022	3025	3016	3013
20.0°	2954	2919	2906	2919	2940	2940	2921	2911
25.0°	2840	2804	2795	2815	2845	2839	2807	2784
30.0°	2700	2671	2669	2698	2737	2725	2676	2634
35.0°	2529	2516	2533	2572	2618	2599	2530	2464
40.0°	2330	2337	2387	2437	2490	2463	2371	2273
45.0°	2103	2131	2231	2294	2354	2319	2202	2067
50.0°	1857	1912	2064	2146	2211	2169	2026	1848
55.0°	1593	1682	1890	1996	2066	2016	1847	1622
60.0°	1322	1449	1711	1842	1917	1860	1667	1396
65.0°	1049	1226	1531	1690	1768	1704	1490	1182
70.0°	772	1005	1356	1538	1617	1550	1318	969
75.0°	504	800	1195	1388	1469	1398	1163	773
80.0°	264	618	1037	1247	1324	1255	1010	602
85.0°	76	467	891	1111	1191	1118	868	460
90.0°	1	350	760	978	1055	984	742	348
95.0°	1	264	643	852	926	858	629	265
100.0°	1	201	541	737	806	742	531	204
105.0°	2	155	451	631	695	636	444	159
110.0°	3	121	374	535	593	540	369	125
115.0°	4	96	307	449	502	455	304	99
120.0°	5	77	250	373	420	379	249	80
125.0°	6	63	202	307	348	312	202	65
130.0°	7	51	162	249	284	254	163	53
135.0°	8	41	126	199	229	204	129	44
140.0°	8	33	97	155	181	162	103	38
145.0°	9	25	71	117	139	126	84	34
150.0°	9	19	49	84	104	98	68	32
155.0°	10	14	33	58	74	73	55	30
160.0°	10	11	21	37	50	52	42	27
165.0°	9	10	15	23	34	36	31	23
170.0°	10	10	13	16	20	24	22	18
175.0°	11	11	12	13	13	15	14	13
180.0°	12	12	12	11	11	8	11	11

Zonal Lumen Density Measurement

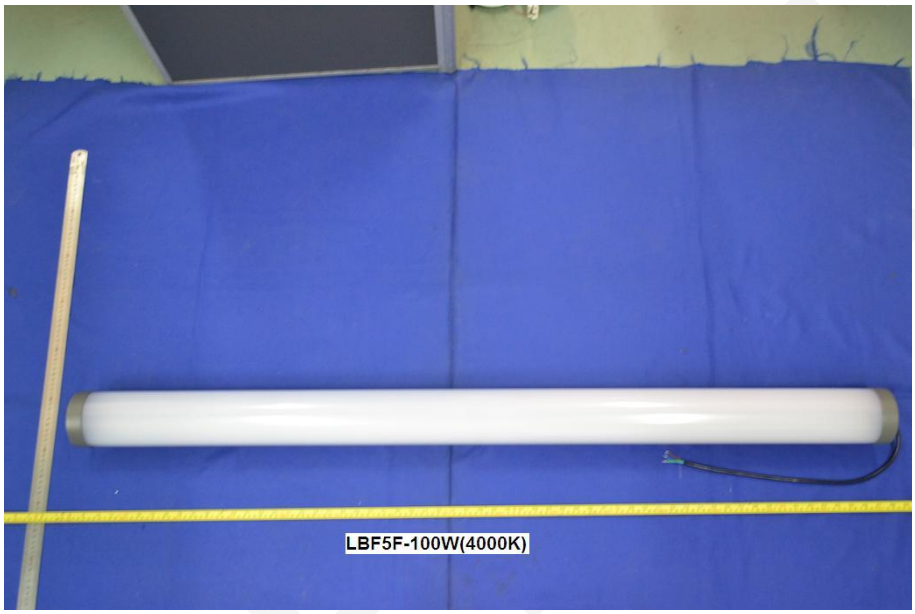
Deg	Flux (lm)	%
0-5	75.5	0.59
5-10	224.2	1.74
10-15	366.0	2.84
15-20	496.7	3.86
20-25	612.9	4.76
25-30	711.4	5.53
30-35	789.6	6.14
35-40	845.4	6.57
40-45	877.7	6.82
45-50	886.3	6.88
50-55	872.3	6.78
55-60	837.7	6.51
60-65	785.6	6.10
65-70	719.4	5.59
70-75	643.0	5.00
75-80	561.6	4.36
80-85	480.8	3.74
85-90	406.8	3.16
90-95	343.7	2.67
95-100	287.7	2.24
100-105	237.8	1.85
105-110	193.8	1.50
110-115	155.7	1.21
115-120	123.0	0.96
120-125	95.5	0.74
125-130	72.7	0.56
130-135	54.1	0.42
135-140	39.2	0.31
140-145	27.6	0.21
145-150	18.7	0.15
150-155	12.1	0.09
155-160	7.4	0.06
160-165	4.2	0.03
165-170	2.2	0.02
170-175	1.0	0.01
175-180	0.3	0.00

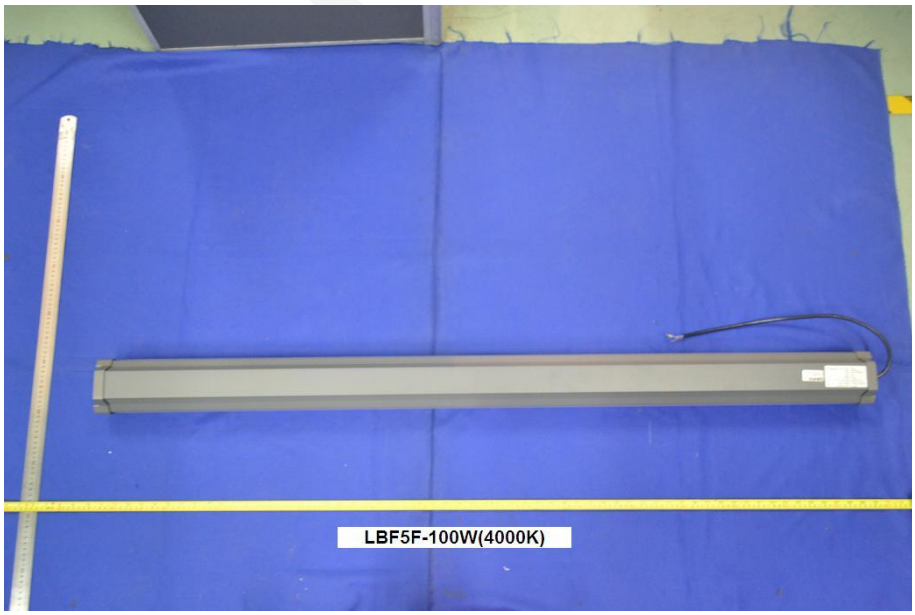
Deg	Flux (lm)	%
0-5	75.5	0.59
0-10	299.8	2.33
0-15	665.7	5.17
0-20	1162.4	9.03
0-25	1775.3	13.79
0-30	2486.7	19.32
0-35	3276.2	25.46
0-40	4121.7	32.03
0-45	4999.3	38.85
0-50	5885.6	45.73
0-55	6758.0	52.51
0-60	7595.7	59.02
0-65	8381.3	65.12
0-70	9100.7	70.71
0-75	9743.7	75.71
0-80	10305.2	80.07
0-85	10786.0	83.81
0-90	11192.8	86.97
0-95	11536.6	89.64
0-100	11824.3	91.88
0-105	12062.1	93.73
0-110	12255.9	95.23
0-115	12411.6	96.44
0-120	12534.6	97.40
0-125	12630.1	98.14
0-130	12702.8	98.70
0-135	12756.9	99.12
0-140	12796.1	99.43
0-145	12823.7	99.64
0-150	12842.4	99.79
0-155	12854.5	99.88
0-160	12861.9	99.94
0-165	12866.1	99.97
0-170	12868.3	99.99
0-175	12869.3	100.00
0-180	12869.5	100.00

[Additional Test]

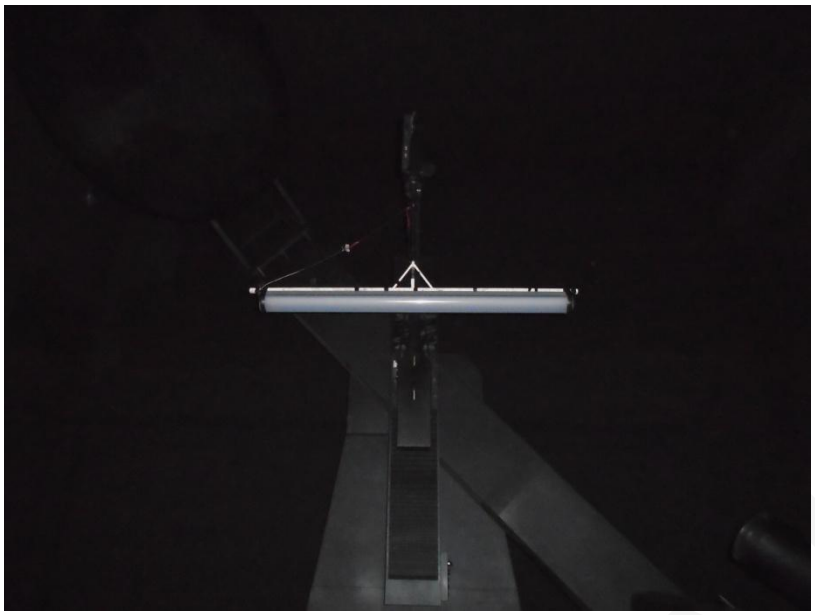
Test Item	Test Voltage (V)	Frequency (Hz)	Test Result
Power Factor:	277.0	60	0.9423
Total Harmonic Distortion:	277.0	60	9.66%
Total Harmonic Distortion:	120.0	60	4.06%
Total Harmonic Distortion:	100.0	60	4.86%
Power Factor:	100.0	60	0.9984

6. Product Photo





7. Product Test orientation in the Goniophotometer



**********END OF REPORT**********