IES LM-79-08

MEASUREMENT AND TEST REPORT

For

SIMKAR Corp

700 Ramona Avenue, Philadelphia PA 19120.

Test Model: LDP1439L35U1

Report Type:	Electrical and Photometric tests including: Luminous Flux, Chromaticity, Luminous Intensity Distribution, THD
Test Engineer:	Carl Du
Report Number:	RKS170414002-10
Test Date:	2016-07-28 to 2016-07-30
Report Date:	2017-04-17
Reviewed By:	Blake Zhang
Prepared By:	Bay Area Compliance Laboratories Corp. (Dongguan). No.69, Pulongcun, Puxinhu Industry Area, Tangxia, Dongguan, Guangdong, China. Tel: +86-0769-86858888 Fax:+86-0769-86858588
Test Facility:	Test facility was located at No.69, Pulongcun, Puxinhu Industry Area, Tangxia, Dongguan, Guangdong, China.
Accreditation:	The IAS Accreditation Number TL-460.

1. Product Description

General Information:

One sample was received on 2016-07-27 and used for testing.

Model Tested:	LDP1439L35U1
Manufacturer:	SIMKAR Corp
Brand Name:	SIMKAR
Product Designation:	1x4 Luminaires for Ambient Lighting of Interior Commercial Spaces
Dimmable:	Continuous
Dimming Range:	10% to 100%
Burning Time Before Test:	0hour(For New Products)

Rated Values:

Rated Voltage/Frequency:	120-277VAC, 60Hz
Rated Power:	40W
Nominal CCT:	3500K
Nominal Lumen Output:	4000lm
Nominal CRI:	80

Note:

1. The applicant SIMKAR Corp declare that their product with model LDP1439L35U1 is the same to the product in report# RKS160727006-10 and is authorized by original applicant to use their test data.

2. All the data in previous report (RKS160727006-10) is shared in report.

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	2015-11-09	2016-11-08
High accuracy array spectroradiometer	EVERFINE	HAAS-2000	1012016T	380-780nm	2016-03-10	2017-03-09
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
Temperature/humidity/clock	Victor	VC230	EE023	0~40°C0~90%	2016-03-21	2017-03-20
Standard Light Source	SENSING	N/A	LSD090808	N/A	2015-09-25	2016-09-24
Special zero-voltage synchronous switching AC	EVERFINE	DPS1010-YF	1011001T	30V/5A	2016-03-04	2017-03-03

Device	Manufacture	Model No	Serial No	Test Range	Calibration date	Calibration due date
AC Power Supply	EVERFINE	VPS1030 PWM	1012017	0-150V， 0-300V	2016-03-04	2017-03-03
DC Power Supply	EVERFINE	WY12010	1009009	30V/5A	2016-03-04	2017-03-03
Power Meter	YOKOGAWA	WT-210	91KB35700	15/30/60/150/300/600V	2016-03-04	2017-03-03
Goniophotometer	EVERFINE	GO-R5000	YG108492N10120001	1600mm,3000W/10A	2016-03-10	2017-03-09
Wireless Remote Sensor	N/A	433MHz	N/A	0°C~50°C;-20°C~60°C	2016-03-21	2017-03-20
Standard Light Source	EVERFINE	D908	1012003	N/A	2015-09-08	2016-09-07

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: **0.5 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	0.3168	37.85	0.995	3809.8	100.65

Radiant Flux (W)	CCT (K)	Duv	x	y	u'	v'
11.240	3339	0.00138	0.4163	0.3992	0.2393	0.5164

Color Rendering Index

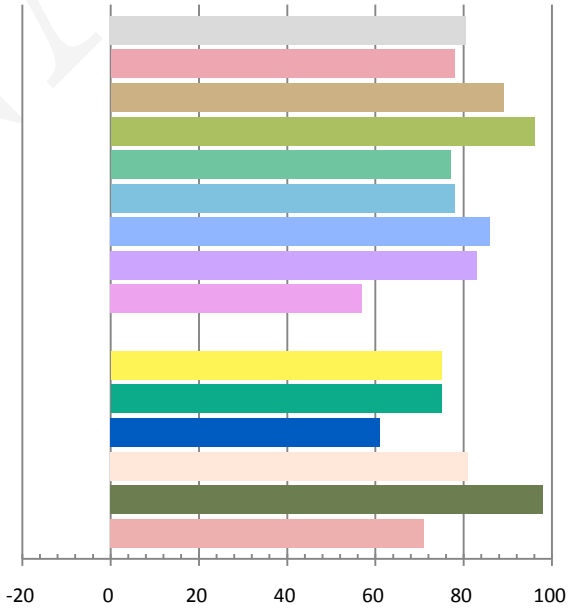
Ra
80.6

R1	R2	R3	R4
78	89	96	77

R5	R6	R7	R8
78	86	83	57

R9	R10	R11	R12
0	75	75	61

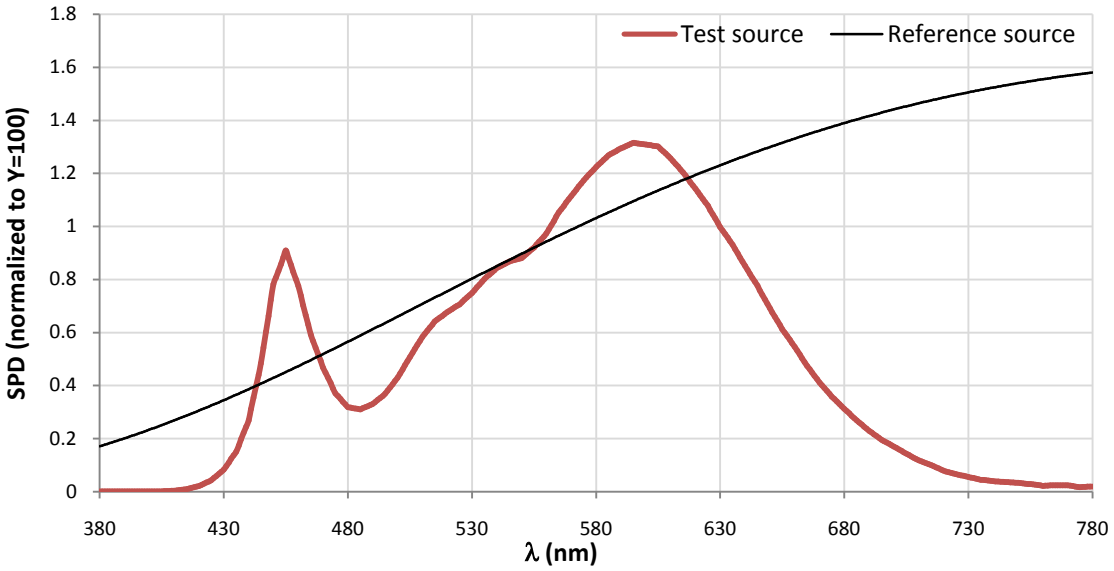
R13	R14	R15
81	98	71



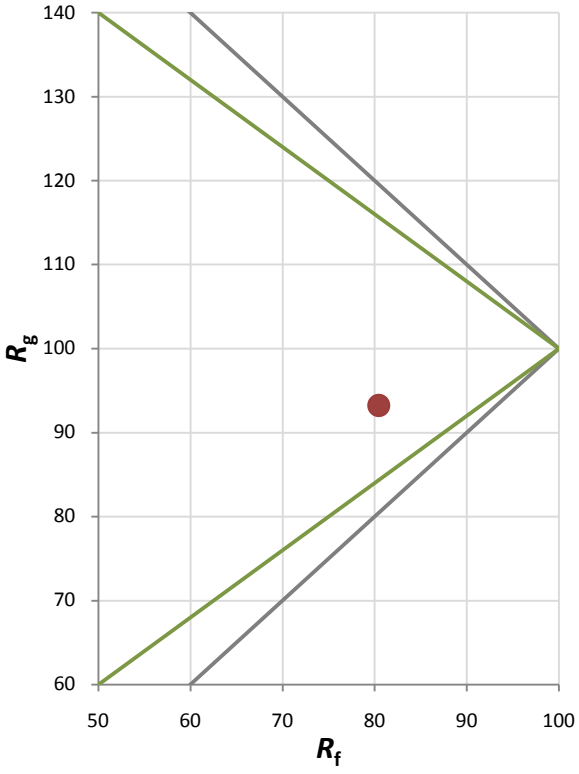
Fidelity Index and Gamut Index

Fidelity Index R_f	80
Gamut Index R_g	93

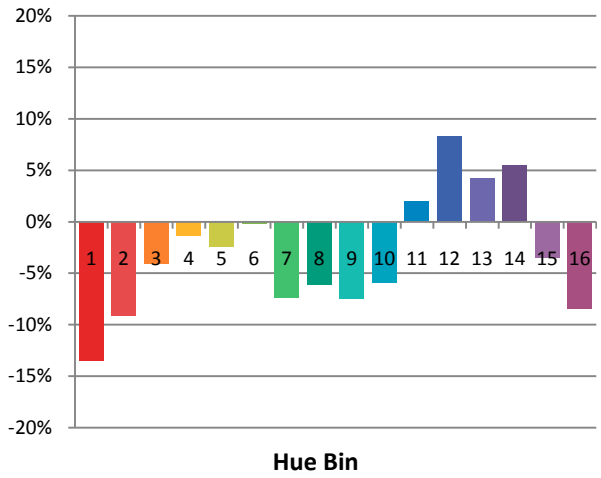
Spectral Power Distribution Comparison



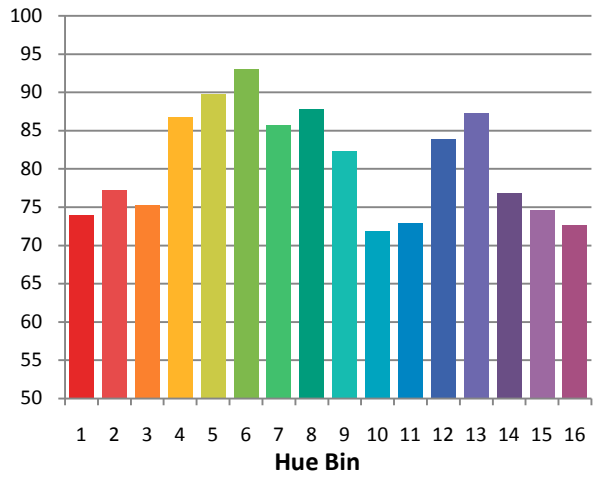
Plot of R_g versus R_f



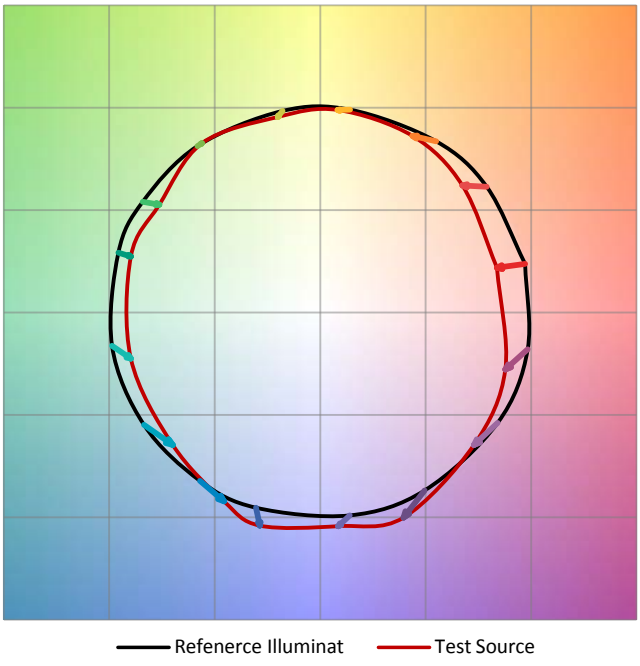
Chroma Shift by Hue

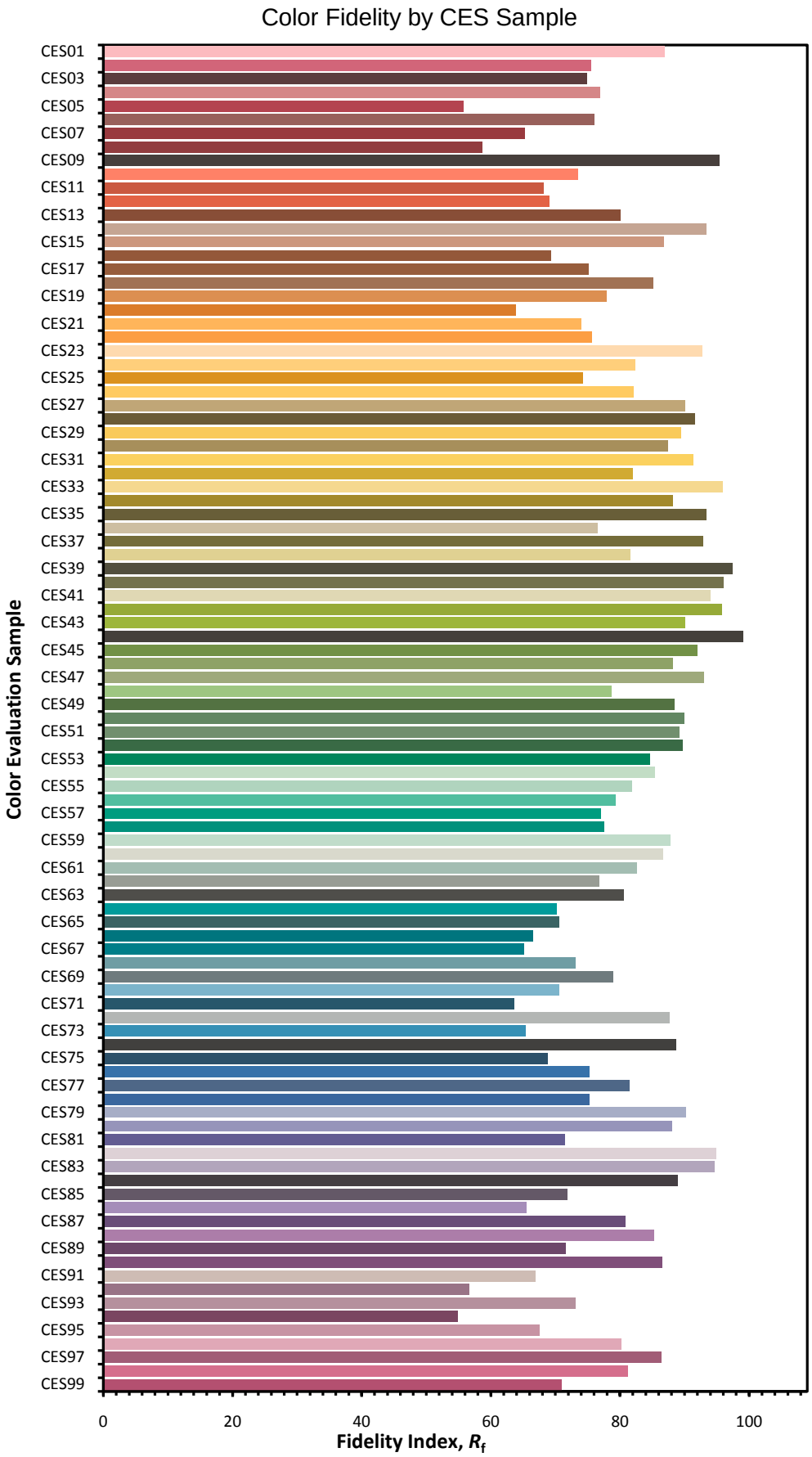


R_f by Hue



Color Vector Graphic




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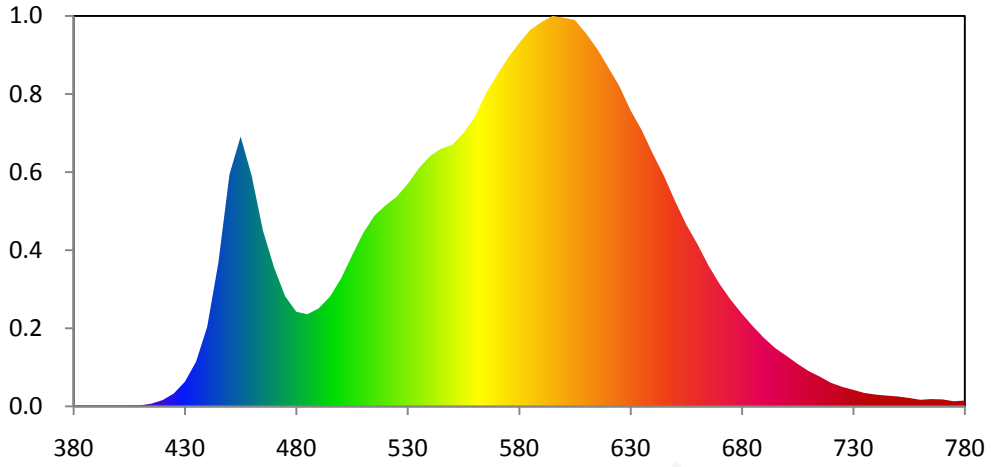
CES99
0
20
40
60
80
100
Fidelity Index, R_f

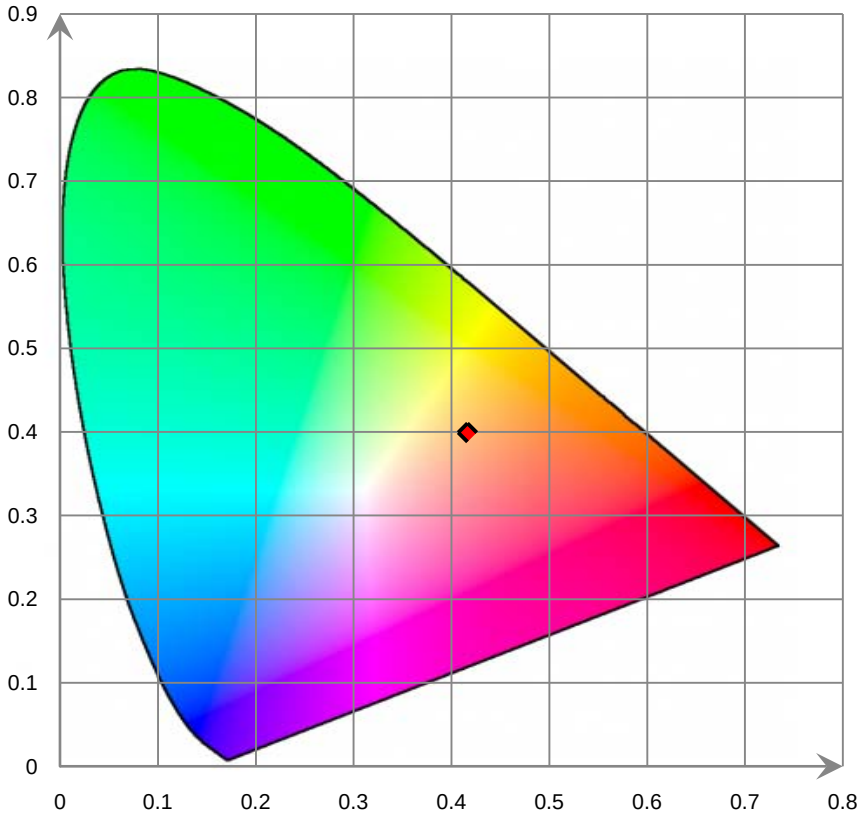
Relative Spectral Power Distribution



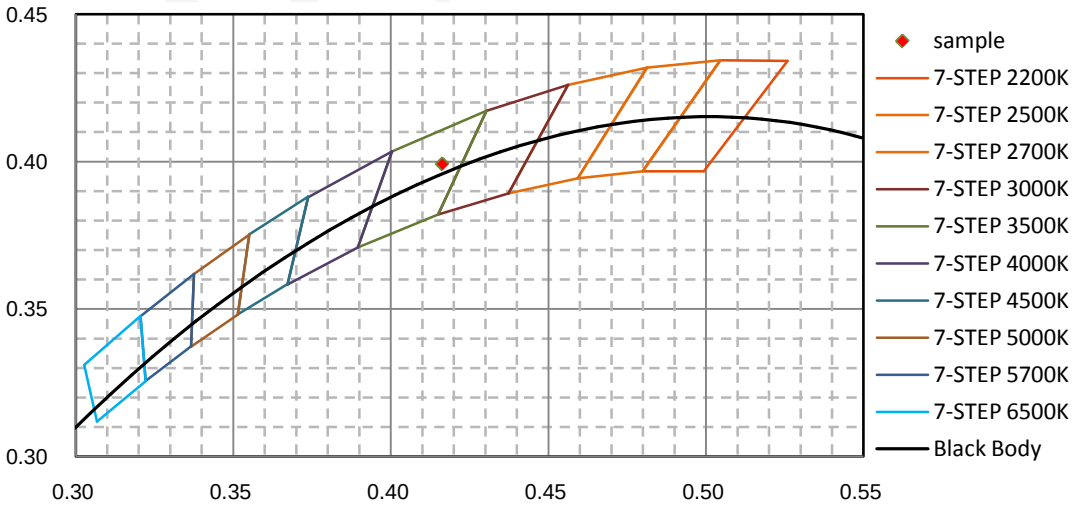
nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
380	9.087E-02	421	1.433E+00	462	3.917E+01	503	2.658E+01	544	4.813E+01
381	8.172E-02	422	1.681E+00	463	3.713E+01	504	2.746E+01	545	4.840E+01
382	7.258E-02	423	1.929E+00	464	3.509E+01	505	2.833E+01	546	4.855E+01
383	6.343E-02	424	2.177E+00	465	3.304E+01	506	2.918E+01	547	4.869E+01
384	5.429E-02	425	2.425E+00	466	3.166E+01	507	3.002E+01	548	4.884E+01
385	4.514E-02	426	2.866E+00	467	3.027E+01	508	3.086E+01	549	4.899E+01
386	4.441E-02	427	3.308E+00	468	2.888E+01	509	3.170E+01	550	4.913E+01
387	4.367E-02	428	3.750E+00	469	2.750E+01	510	3.254E+01	551	4.957E+01
388	4.294E-02	429	4.191E+00	470	2.611E+01	511	3.319E+01	552	5.001E+01
389	4.221E-02	430	4.633E+00	471	2.502E+01	512	3.384E+01	553	5.046E+01
390	4.148E-02	431	5.387E+00	472	2.393E+01	513	3.449E+01	554	5.090E+01
391	3.988E-02	432	6.141E+00	473	2.285E+01	514	3.514E+01	555	5.134E+01
392	3.828E-02	433	6.895E+00	474	2.176E+01	515	3.579E+01	556	5.193E+01
393	3.669E-02	434	7.649E+00	475	2.067E+01	516	3.618E+01	557	5.252E+01
394	3.509E-02	435	8.403E+00	476	2.009E+01	517	3.658E+01	558	5.310E+01
395	3.349E-02	436	9.717E+00	477	1.951E+01	518	3.697E+01	559	5.369E+01
396	3.512E-02	437	1.103E+01	478	1.893E+01	519	3.736E+01	560	5.428E+01
397	3.674E-02	438	1.235E+01	479	1.835E+01	520	3.775E+01	561	5.517E+01
398	3.837E-02	439	1.366E+01	480	1.777E+01	521	3.808E+01	562	5.606E+01
399	4.000E-02	440	1.497E+01	481	1.768E+01	522	3.840E+01	563	5.695E+01
400	4.162E-02	441	1.737E+01	482	1.759E+01	523	3.873E+01	564	5.784E+01
401	4.814E-02	442	1.978E+01	483	1.750E+01	524	3.906E+01	565	5.873E+01
402	5.465E-02	443	2.218E+01	484	1.740E+01	525	3.938E+01	566	5.942E+01
403	6.117E-02	444	2.458E+01	485	1.731E+01	526	3.986E+01	567	6.011E+01
404	6.769E-02	445	2.698E+01	486	1.753E+01	527	4.035E+01	568	6.079E+01
405	7.420E-02	446	3.030E+01	487	1.775E+01	528	4.083E+01	569	6.148E+01
406	9.702E-02	447	3.362E+01	488	1.798E+01	529	4.131E+01	570	6.217E+01
407	1.198E-01	448	3.695E+01	489	1.820E+01	530	4.179E+01	571	6.283E+01
408	1.427E-01	449	4.027E+01	490	1.842E+01	531	4.238E+01	572	6.349E+01
409	1.655E-01	450	4.359E+01	491	1.885E+01	532	4.296E+01	573	6.415E+01
410	1.883E-01	451	4.502E+01	492	1.928E+01	533	4.355E+01	574	6.482E+01
411	2.551E-01	452	4.644E+01	493	1.971E+01	534	4.414E+01	575	6.548E+01
412	3.218E-01	453	4.786E+01	494	2.013E+01	535	4.472E+01	576	6.604E+01
413	3.886E-01	454	4.928E+01	495	2.056E+01	536	4.518E+01	577	6.660E+01
414	4.554E-01	455	5.070E+01	496	2.124E+01	537	4.564E+01	578	6.715E+01
415	5.222E-01	456	4.921E+01	497	2.192E+01	538	4.610E+01	579	6.771E+01
416	6.547E-01	457	4.772E+01	498	2.260E+01	539	4.656E+01	580	6.827E+01
417	7.872E-01	458	4.624E+01	499	2.328E+01	540	4.702E+01	581	6.877E+01
418	9.197E-01	459	4.475E+01	500	2.396E+01	541	4.730E+01	582	6.926E+01
419	1.052E+00	460	4.326E+01	501	2.483E+01	542	4.757E+01	583	6.975E+01
420	1.185E+00	461	4.122E+01	502	2.571E+01	543	4.785E+01	584	7.025E+01

nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
585	7.074E+01	626	5.924E+01	667	2.506E+01	708	7.157E+00	749	1.892E+00
586	7.103E+01	627	5.834E+01	668	2.436E+01	709	6.886E+00	750	1.860E+00
587	7.132E+01	628	5.744E+01	669	2.367E+01	710	6.615E+00	751	1.804E+00
588	7.161E+01	629	5.654E+01	670	2.297E+01	711	6.409E+00	752	1.748E+00
589	7.189E+01	630	5.564E+01	671	2.237E+01	712	6.202E+00	753	1.692E+00
590	7.218E+01	631	5.489E+01	672	2.178E+01	713	5.996E+00	754	1.637E+00
591	7.242E+01	632	5.415E+01	673	2.118E+01	714	5.790E+00	755	1.581E+00
592	7.265E+01	633	5.340E+01	674	2.059E+01	715	5.584E+00	756	1.513E+00
593	7.288E+01	634	5.266E+01	675	1.999E+01	716	5.351E+00	757	1.445E+00
594	7.312E+01	635	5.192E+01	676	1.948E+01	717	5.117E+00	758	1.376E+00
595	7.335E+01	636	5.103E+01	677	1.896E+01	718	4.883E+00	759	1.308E+00
596	7.328E+01	637	5.014E+01	678	1.844E+01	719	4.650E+00	760	1.240E+00
597	7.321E+01	638	4.925E+01	679	1.793E+01	720	4.416E+00	761	1.266E+00
598	7.314E+01	639	4.836E+01	680	1.741E+01	721	4.266E+00	762	1.291E+00
599	7.308E+01	640	4.747E+01	681	1.693E+01	722	4.116E+00	763	1.317E+00
600	7.301E+01	641	4.664E+01	682	1.645E+01	723	3.965E+00	764	1.343E+00
601	7.292E+01	642	4.580E+01	683	1.596E+01	724	3.815E+00	765	1.368E+00
602	7.284E+01	643	4.497E+01	684	1.548E+01	725	3.665E+00	766	1.357E+00
603	7.275E+01	644	4.413E+01	685	1.500E+01	726	3.552E+00	767	1.345E+00
604	7.267E+01	645	4.329E+01	686	1.456E+01	727	3.440E+00	768	1.333E+00
605	7.258E+01	646	4.235E+01	687	1.412E+01	728	3.328E+00	769	1.322E+00
606	7.208E+01	647	4.140E+01	688	1.368E+01	729	3.216E+00	770	1.310E+00
607	7.158E+01	648	4.046E+01	689	1.325E+01	730	3.104E+00	771	1.242E+00
608	7.108E+01	649	3.952E+01	690	1.281E+01	731	2.986E+00	772	1.174E+00
609	7.058E+01	650	3.857E+01	691	1.243E+01	732	2.869E+00	773	1.105E+00
610	7.009E+01	651	3.769E+01	692	1.205E+01	733	2.751E+00	774	1.037E+00
611	6.950E+01	652	3.681E+01	693	1.167E+01	734	2.634E+00	775	9.684E-01
612	6.892E+01	653	3.593E+01	694	1.130E+01	735	2.516E+00	776	9.933E-01
613	6.833E+01	654	3.505E+01	695	1.092E+01	736	2.457E+00	777	1.018E+00
614	6.775E+01	655	3.417E+01	696	1.063E+01	737	2.397E+00	778	1.043E+00
615	6.717E+01	656	3.343E+01	697	1.035E+01	738	2.337E+00	779	1.068E+00
616	6.647E+01	657	3.270E+01	698	1.006E+01	739	2.278E+00	780	1.093E+00
617	6.578E+01	658	3.196E+01	699	9.772E+00	740	2.218E+00		
618	6.508E+01	659	3.123E+01	700	9.485E+00	741	2.179E+00		
619	6.439E+01	660	3.049E+01	701	9.182E+00	742	2.140E+00		
620	6.370E+01	661	2.969E+01	702	8.879E+00	743	2.101E+00		
621	6.298E+01	662	2.888E+01	703	8.577E+00	744	2.062E+00		
622	6.227E+01	663	2.807E+01	704	8.274E+00	745	2.023E+00		
623	6.156E+01	664	2.727E+01	705	7.971E+00	746	1.990E+00		
624	6.085E+01	665	2.646E+01	706	7.700E+00	747	1.958E+00		
625	6.014E+01	666	2.576E+01	707	7.429E+00	748	1.925E+00		

CIE 1931 x y Chromaticity Diagram



7-Step Chromaticity Quadrangles



[Goniophotometer System]

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

Test orientation: **Downward**

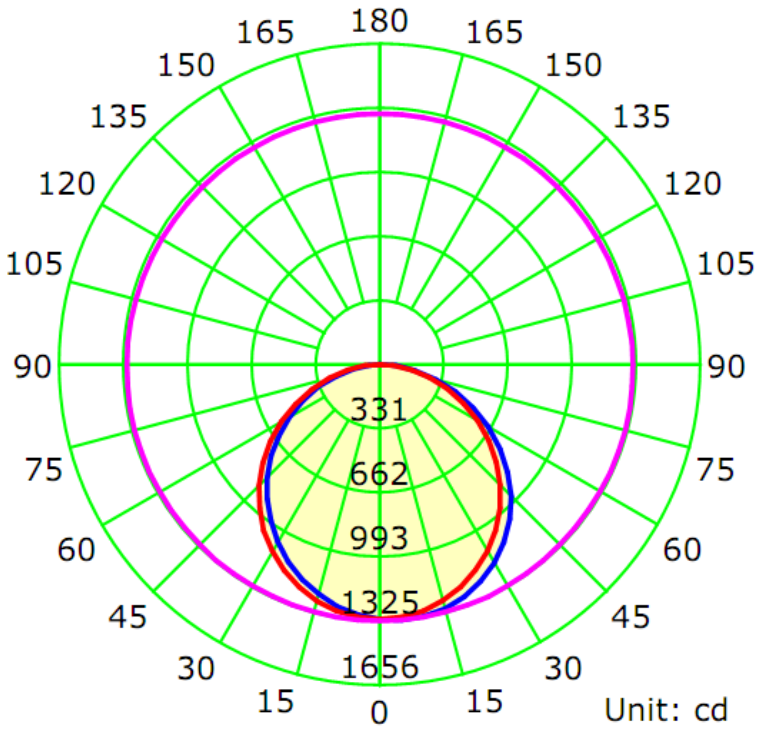
Electrical Measurement

Input Voltage (V)	Frequency (Hz)	Input Current (A)	Power (W)	Power Factor
120.0	60	0.3160	37.79	0.9960

Photometric Measurement

Luminous Flux (lm)	Efficacy (lm/W)	I_{max} (cd)	S/MH (C0/180)	S/MH (C90/270)
3837.2	101.54	1325.1	1.27	1.26

Luminous Intensity Distribution



	C0/180	C45/225	C90/270	C135/315	AVG.
Beam Angle (50% I_{max}):	113.1	112.9	113.2	112.7	113.0
Field Angle (10% I_{max}):	163.4	163.5	163.8	163.5	163.6

Luminous Intensity (cd) Distribution Data

C / γ	0°	22.5°	45°	67.5°	90°	112.5°	135°	157.5°
0.0°	1315	1315	1315	1315	1315	1315	1315	1315
5.0°	1325	1323	1317	1315	1308	1303	1300	1297
10.0°	1321	1316	1310	1301	1291	1282	1273	1269
15.0°	1305	1301	1287	1278	1261	1248	1237	1231
20.0°	1277	1271	1255	1242	1222	1204	1190	1183
25.0°	1236	1230	1210	1194	1171	1150	1136	1128
30.0°	1185	1175	1153	1135	1112	1090	1073	1063
35.0°	1121	1111	1087	1066	1044	1019	1000	992
40.0°	1044	1033	1010	989	966	942	921	913
45.0°	959	948	922	902	879	855	835	830
50.0°	863	852	829	806	787	765	744	740
55.0°	759	750	728	707	689	669	650	646
60.0°	647	640	620	601	584	568	550	548
65.0°	533	524	510	492	477	465	449	446
70.0°	416	407	395	381	371	359	345	345
75.0°	300	293	282	273	265	256	246	246
80.0°	188	183	176	170	165	159	152	151
85.0°	88	83	79	75	72	69	66	67
90.0°	3	3	3	3	2	3	2	2
95.0°	1	1	2	2	1	2	2	2
100.0°	1	1	2	2	1	2	2	1
105.0°	1	1	2	2	1	2	2	1
110.0°	1	1	1	2	1	2	1	1
115.0°	1	1	2	2	1	2	2	2
120.0°	1	2	2	2	1	2	2	2
125.0°	1	2	2	2	2	2	2	2
130.0°	1	2	2	2	2	3	3	2
135.0°	2	2	3	3	2	3	3	3
140.0°	2	3	3	3	3	3	3	3
145.0°	3	3	3	3	3	4	4	3
150.0°	3	3	4	4	3	4	4	4
155.0°	3	4	4	4	3	4	4	4
160.0°	3	4	4	4	3	4	4	4
165.0°	3	4	4	4	3	4	5	4
170.0°	4	4	4	4	3	4	5	4
175.0°	4	5	4	4	3	4	4	5
180.0°	0	0	0	0	0	0	0	0

Luminous Intensity (cd) Distribution Data (cont.)

C / γ	180°	202.5°	225°	247.5°	270°	292.5°	315°	337.5°
0.0°	1315	1315	1315	1315	1315	1315	1315	1315
5.0°	1298	1298	1299	1304	1308	1315	1318	1321
10.0°	1268	1271	1274	1282	1292	1303	1312	1317
15.0°	1228	1231	1236	1251	1264	1281	1291	1297
20.0°	1181	1183	1191	1207	1224	1244	1259	1269
25.0°	1123	1127	1135	1154	1174	1198	1213	1226
30.0°	1058	1064	1070	1093	1116	1140	1159	1171
35.0°	985	991	1001	1022	1048	1074	1091	1104
40.0°	908	914	921	945	970	995	1014	1029
45.0°	823	828	836	858	885	910	928	941
50.0°	734	739	746	768	792	817	831	845
55.0°	639	643	652	670	694	715	728	742
60.0°	540	545	553	571	589	609	619	632
65.0°	439	444	453	466	483	500	508	519
70.0°	338	342	348	363	377	390	395	401
75.0°	239	241	248	260	271	281	282	287
80.0°	144	147	154	163	169	175	176	179
85.0°	59	63	67	74	78	80	79	80
90.0°	1	2	2	3	2	3	3	3
95.0°	1	2	1	2	1	2	2	2
100.0°	1	2	1	2	1	2	2	2
105.0°	1	1	1	2	1	2	2	2
110.0°	1	1	1	2	1	2	2	2
115.0°	1	2	1	2	1	2	2	1
120.0°	1	2	2	2	1	2	2	1
125.0°	1	2	2	3	2	2	2	2
130.0°	1	2	2	3	2	2	2	2
135.0°	2	2	3	3	2	2	3	3
140.0°	2	3	3	3	2	3	3	3
145.0°	3	3	3	4	3	3	3	3
150.0°	3	4	4	4	3	3	3	4
155.0°	3	4	4	4	3	4	4	3
160.0°	3	4	4	4	3	4	4	4
165.0°	3	4	4	4	4	4	4	4
170.0°	3	4	4	4	4	4	4	4
175.0°	4	4	4	4	4	4	4	5
180.0°	0	0	0	0	0	0	0	0

Zonal Lumen Density Measurement

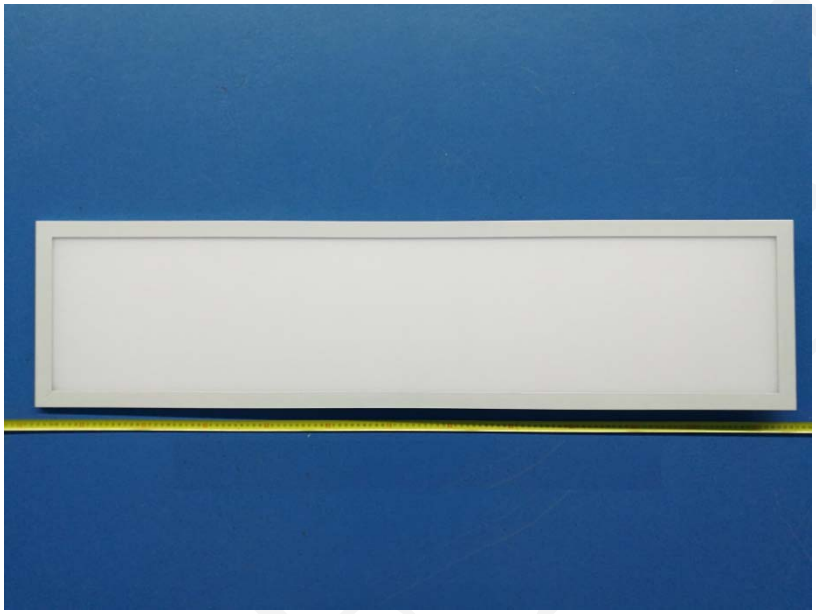
Deg	Flux (lm)	%
0-5	31.4	0.82
5-10	93.1	2.43
10-15	151.7	3.95
15-20	205.2	5.35
20-25	251.8	6.56
25-30	290.0	7.56
30-35	318.6	8.30
35-40	336.5	8.77
40-45	343.2	8.94
45-50	338.5	8.82
50-55	322.6	8.41
55-60	296.1	7.72
60-65	260.1	6.78
65-70	216.4	5.64
70-75	167.3	4.36
75-80	115.7	3.01
80-85	64.9	1.69
85-90	20.8	0.54
90-95	1.1	0.03
95-100	0.9	0.02
100-105	0.8	0.02
105-110	0.7	0.02
110-115	0.7	0.02
115-120	0.7	0.02
120-125	0.8	0.02
125-130	0.9	0.02
130-135	0.9	0.02
135-140	1.0	0.02
140-145	1.0	0.03
145-150	1.0	0.03
150-155	0.9	0.02
155-160	0.8	0.02
160-165	0.6	0.02
165-170	0.5	0.01
170-175	0.3	0.01
175-180	0.0	0.00

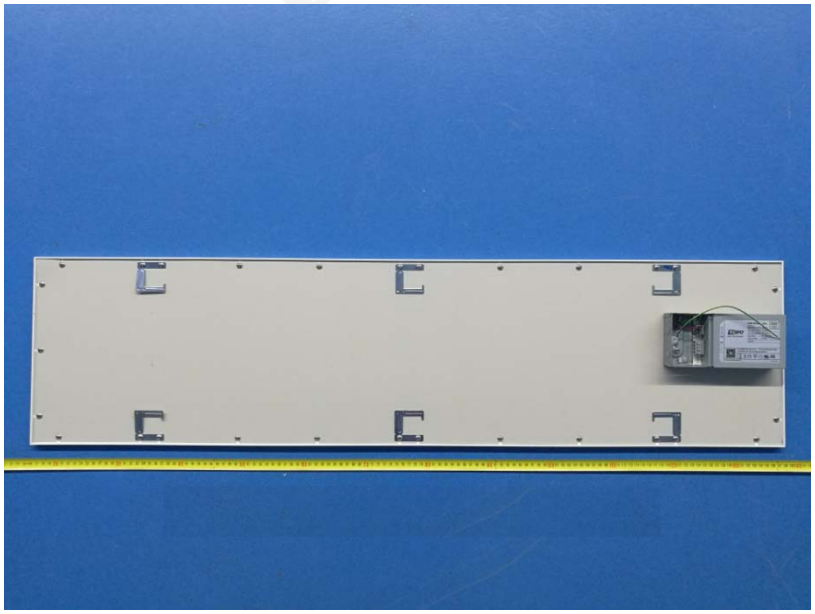
Deg	Flux (lm)	%
0-5	31.4	0.82
0-10	124.4	3.24
0-15	276.1	7.20
0-20	481.3	12.54
0-25	733.0	19.10
0-30	1023.0	26.66
0-35	1341.6	34.96
0-40	1678.0	43.73
0-45	2021.2	52.67
0-50	2359.7	61.49
0-55	2682.3	69.90
0-60	2978.4	77.62
0-65	3238.5	84.40
0-70	3454.9	90.04
0-75	3622.2	94.40
0-80	3737.9	97.41
0-85	3802.9	99.11
0-90	3823.7	99.65
0-95	3824.8	99.68
0-100	3825.6	99.70
0-105	3826.4	99.72
0-110	3827.1	99.74
0-115	3827.8	99.76
0-120	3828.6	99.78
0-125	3829.4	99.80
0-130	3830.2	99.82
0-135	3831.2	99.84
0-140	3832.1	99.87
0-145	3833.1	99.89
0-150	3834.1	99.92
0-155	3835.0	99.94
0-160	3835.7	99.96
0-165	3836.4	99.98
0-170	3836.9	99.99
0-175	3837.1	100.00
0-180	3837.2	100.00

[Additional Test]

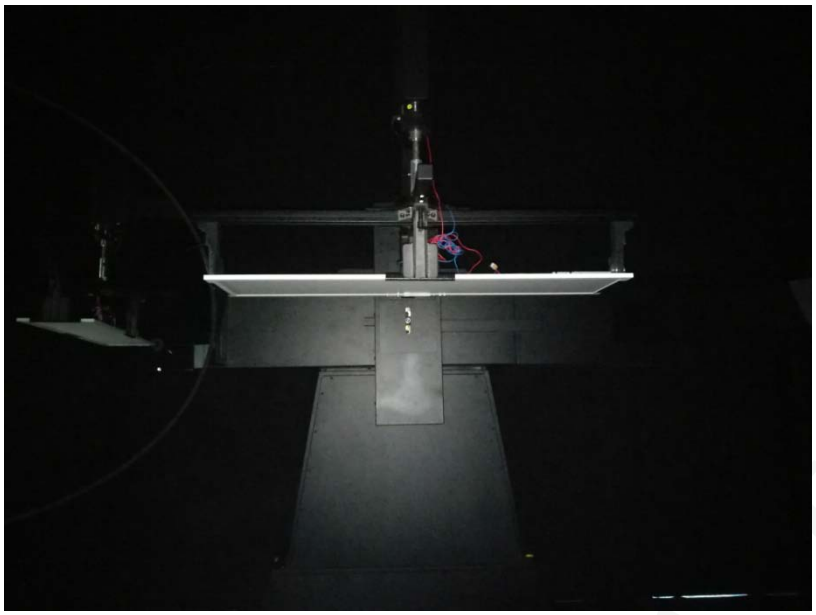
Test Item	Test Voltage (V)	Frequency (Hz)	Test Result
Power Factor:	240.0	60	0.9235
Total Harmonic Distortion:	240.0	60	12.63%
Total Harmonic Distortion:	120.0	60	6.31%
Total Harmonic Distortion:	277.0	60	16.08%
Power Factor:	277.0	60	0.893

6. Product Photo





7. Product Test orientation in the Goniophotometer



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