

IES LM-79-08

MEASUREMENT AND TEST REPORT

For

Shenzhen Brilloop Lighting Co., Ltd

6F, B6 Building, Junfeng Industrial Park, Yonghe Road, Fuyong, Bao'an District, Shenzhen City, Guangdong Province, P.R.China

Test Model: BLP-FL48W06

Report Type:	Electrical and Photometric tests including: Luminous Flux, Power Factor, Chromaticity, Luminous Intensity Distribution, THD
Test Engineer:	Hexy He <i>Hexy He</i>
Report Number:	R2DG170628052-10
Test Date:	2017-07-04
Report Date:	2017-07-10
Reviewed By:	Blake Zhang / EE Engineer <i>Blake Zhang</i>
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Test Facility:	Test facility was located at No.69,Pulongcun ,Puxinhu Industrial Area, Tangxia , Dongguan, Guangdong, China.

Note: The test data was only valid for the test sample(s). This test report is prepared for the customer shown above and for the device described herein. It may not be duplicated or used in part without prior written consent from Bay Area Compliance Laboratories Corp. (Shenzhen). This report **must not** be used by the customer to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the U.S. Federal Government. Some of the tests or test methods in this report may not in NVLAP accreditation scope and was noted.

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1. Product Description

General Information:

One sample was received on 2017-06-28 and used for testing.

Model Tested:	BLP-FL48W06
Manufacturer:	Shenzhen Brillloop Lighting Co., Ltd
Brand Name:	Brillloop
Product Designation:	LED Floodlight
Burning Time Before Test:	0hour(For New Products)
Driver Brand Name:	Meanwell
Driver Model:	LPF-60-42

Rated Values:

Rated Voltage/Frequency:	100-240V AC 50/60Hz
Rated Power:	50W
Nominal CCT:	4000K
Nominal Lumen Output:	7400lm

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 NVLAP accreditation scope)

3. Description of Test Equipment

Device	Manufacture	Model No	Serial No	Test Range	Calibration date	Calibration due date
1.5m temperature integrating sphere	SENSING	SPR-600	S09008	25~50°C	2017-03-09	2018-03-09
High-precision rapid spectral analysis system	EVERFINE	HAAS-2000	M112048CA13 61125	380-780nm	2017-07-07	2018-07-07
Digital power meter	YOKOGAWA	WT310	13398	N/A	2016-12-05	2017-12-05
Programmable Precision DC Power Supply	ITECH	IT6154	0061 0417 6471 0010 19	0~32V	2017-03-03	2018-03-03
thermometer	SENSING	NA	NA	25、50°C	2017-03-09	2018-03-09
Standard Light Source	SENSING	NA	LSD090808	N/A	2016-12-05	2017-12-05
Precision frequency power supply	ALL Power	APW-105N	970613	220V±10% 50Hz	2017-03-03	2018-03-03
AC POWER SUPPLY	EVERFINE	VPS1030 PWM	1012017	0-150V, 0-300V	2017-03-03	2018-03-03
Digital CC&CV DC Power Supply	EVERFINE	WY12010	1009009	30V/5A	2017-03-03	2018-03-03
Digital power meter	YOKOGAWA	WT-210	91KB35700	15/30/60/150/ 300/600 V	2017-03-03	2018-03-03

Device	Manufacture	Model No	Serial No	Test Range	Calibration date	Calibration due date
full-field speed goniophotometer	EVERFINE	GO-R5000	YG108492N10 120001	1600mm,3000 W/10A	2017-03-09	2018-03-09
Wireless Remote Sensor	N/A	433MHz	N/A	0°C~50°C; -20°C~60°C	2017-03-20	2018-03-20
Standard Light Source	EVERFINE	D908	1012003	N/A	2016-12-17	2017-12-17

Statement of Traceability: Bay Area Compliance Laboratories Corp. (Shenzhen) 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=2.1% (K=2), at the 95% confidence level. The uncertainty of the correlated color temperature measurements is U=32K (K=2), at the 95% confidence level. The uncertainty of the CRI is U=2.1 (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 is THD, was measured by Digital Power Meter after stabilized at 25°C±1°C. Test voltage for THD 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**

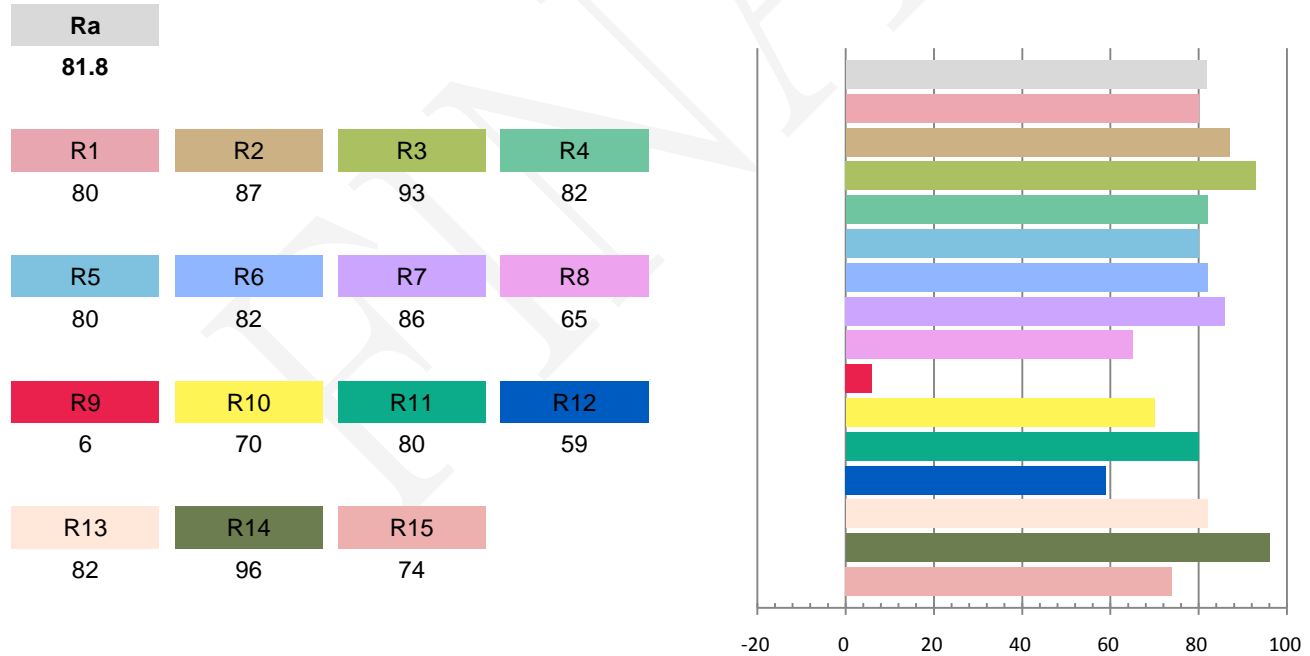
Test orientation: **Downward**

Photometric and Electrical Measurement Result

Voltage (V)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Luminous Flux(lm)	Efficacy (lm/W)
230.0	50	0.2269	49.69	0.9521	7477.2	150.46

Radiant Flux (W)	CCT (K)	Duv	x	y	u'	v'
22.561	4082	0.00044	0.3771	0.3756	0.2234	0.5006

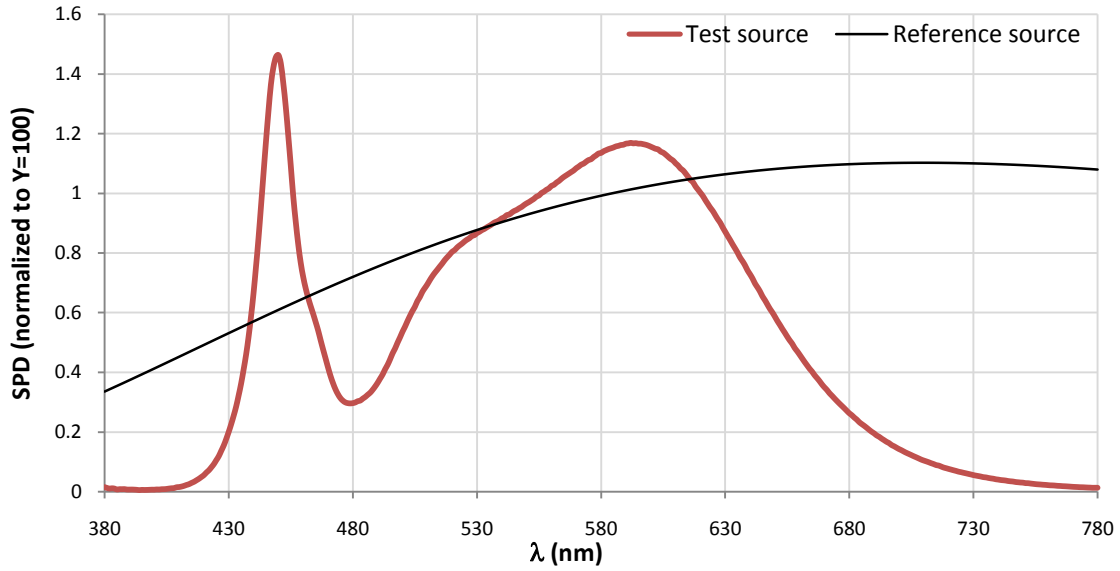
Color Rendering Index



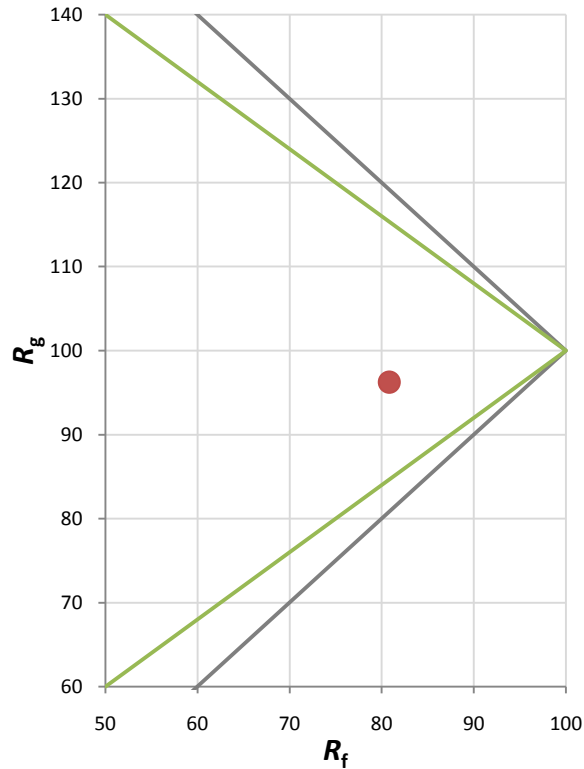
Fidelity Index and Gamut Index

Fidelity Index R_f	81
Gamut Index R_g	96

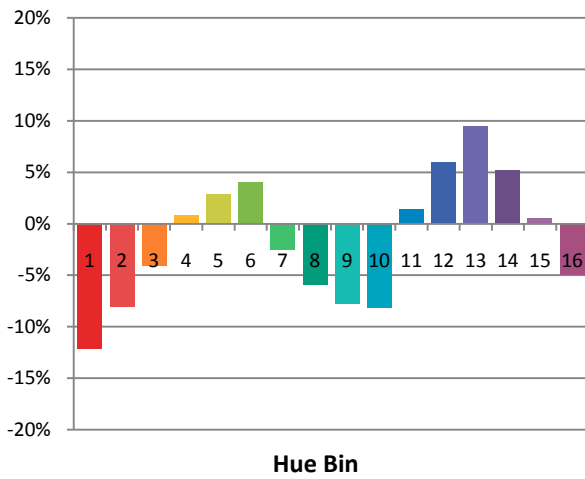
Spectral Power Distribution Comparison



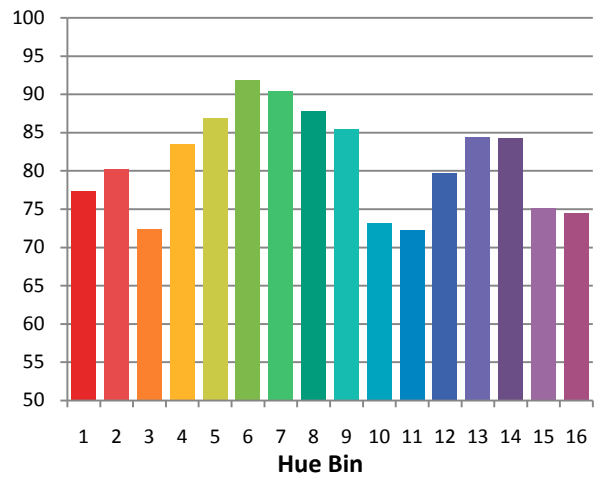
Plot of R_g versus R_f



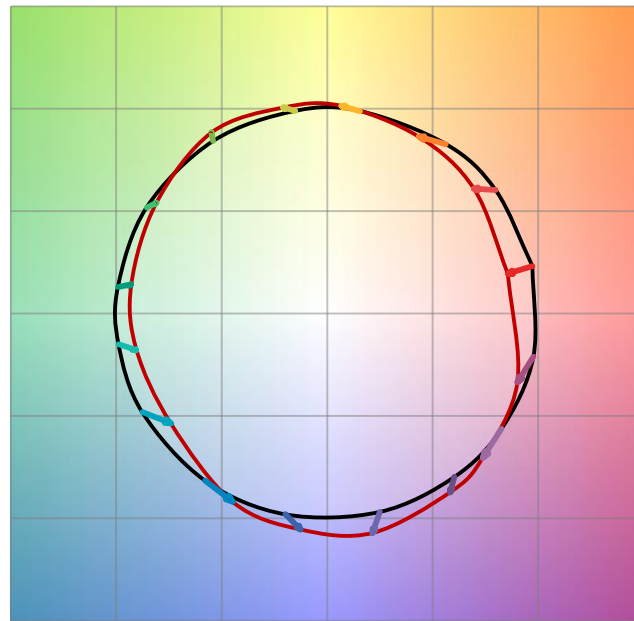
Chroma Shift by Hue



R_f by Hue

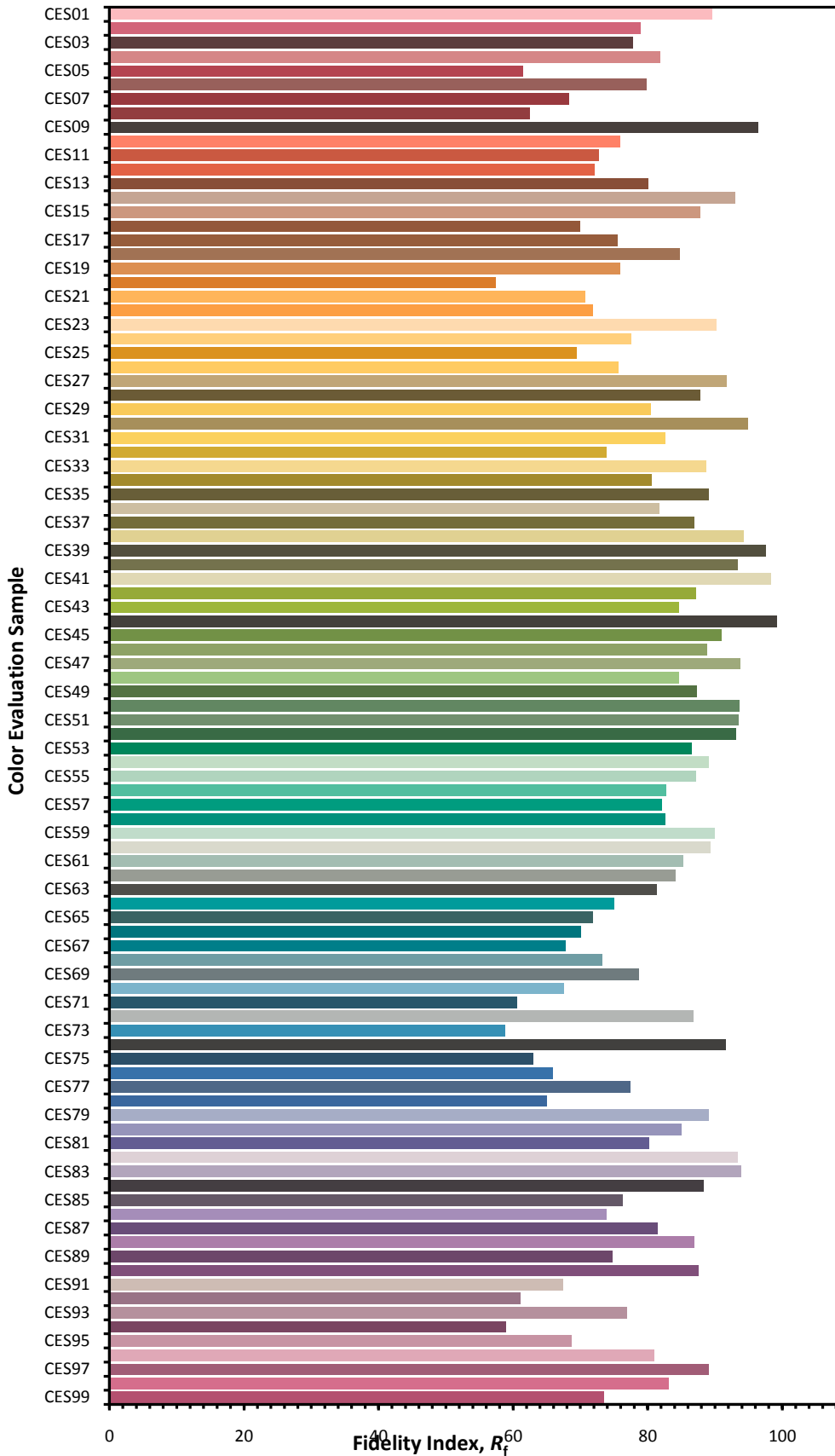


Color Vector Graphic

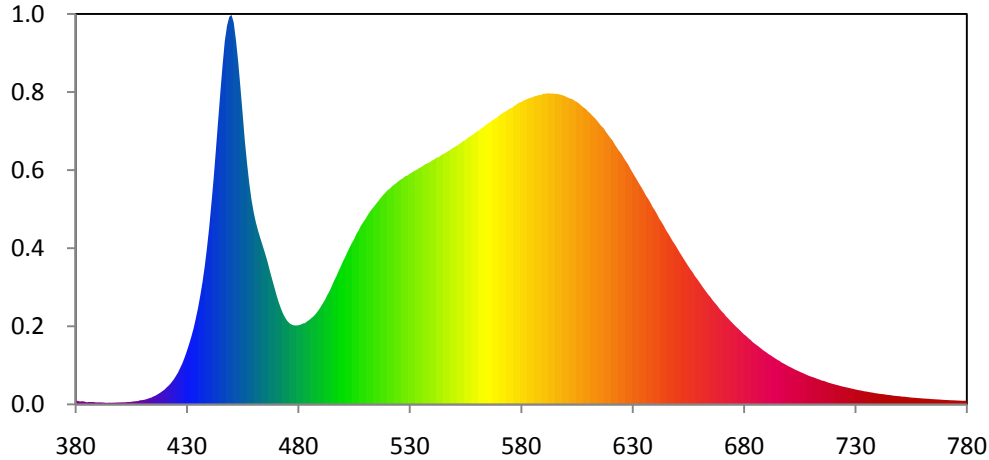


— Reference Illuminat — Test Source

Color Fidelity by CES Sample



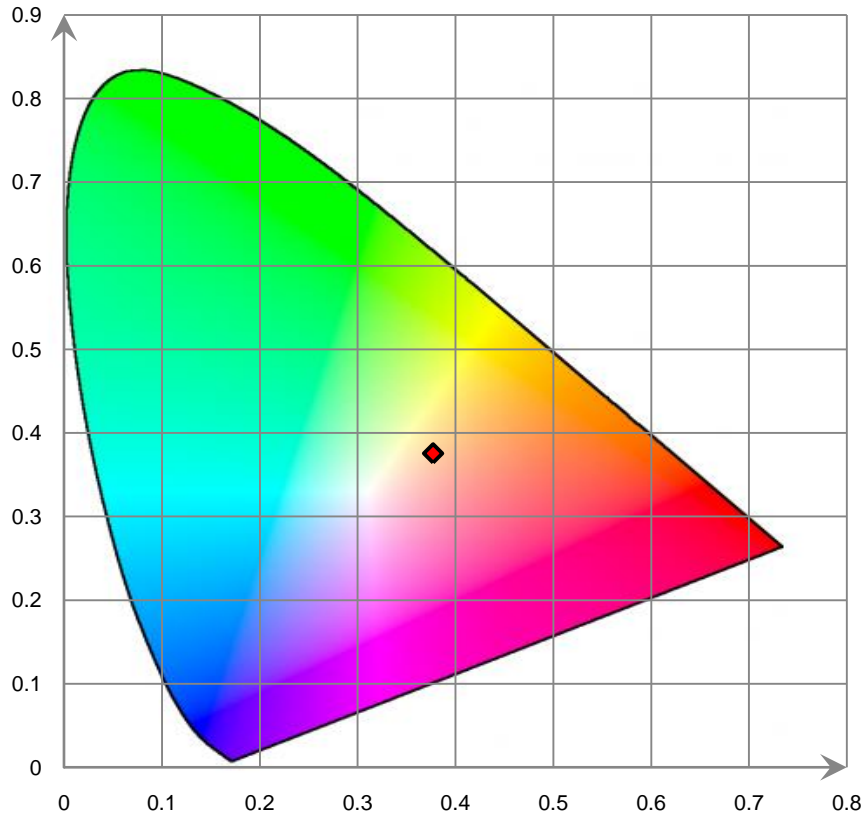
Relative Spectral Power Distribution



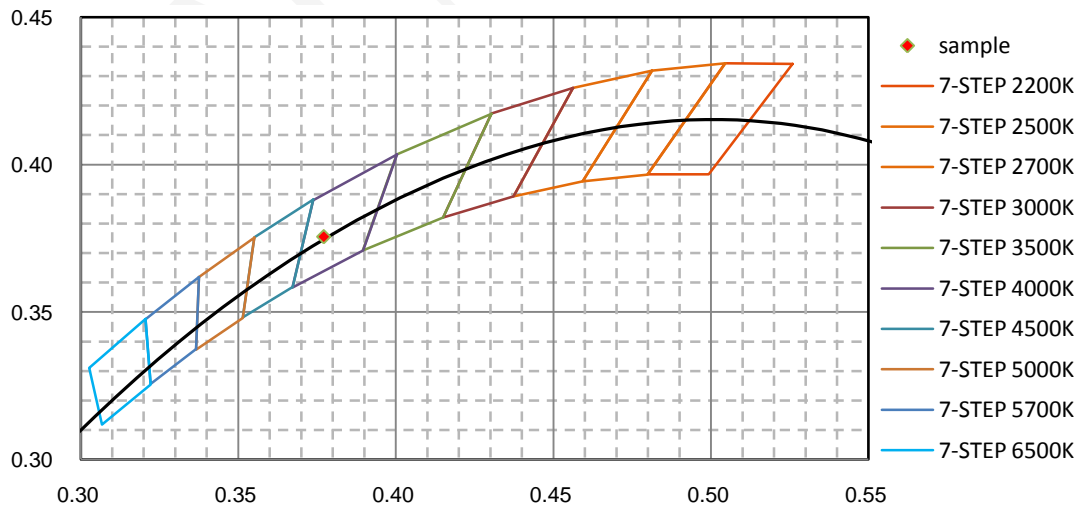
nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
380	1.723E+00	421	7.070E+00	462	7.120E+01	503	6.450E+01	544	1.024E+02
381	1.412E+00	422	7.887E+00	463	6.815E+01	504	6.630E+01	545	1.030E+02
382	1.194E+00	423	8.976E+00	464	6.531E+01	505	6.788E+01	546	1.034E+02
383	1.298E+00	424	1.014E+01	465	6.232E+01	506	6.993E+01	547	1.040E+02
384	1.174E+00	425	1.160E+01	466	5.925E+01	507	7.143E+01	548	1.045E+02
385	8.439E-01	426	1.307E+01	467	5.570E+01	508	7.334E+01	549	1.052E+02
386	9.719E-01	427	1.504E+01	468	5.227E+01	509	7.473E+01	550	1.058E+02
387	9.627E-01	428	1.699E+01	469	4.897E+01	510	7.607E+01	551	1.063E+02
388	9.949E-01	429	1.937E+01	470	4.564E+01	511	7.762E+01	552	1.069E+02
389	8.396E-01	430	2.200E+01	471	4.253E+01	512	7.904E+01	553	1.075E+02
390	8.214E-01	431	2.484E+01	472	3.989E+01	513	8.030E+01	554	1.083E+02
391	8.336E-01	432	2.794E+01	473	3.761E+01	514	8.142E+01	555	1.087E+02
392	7.987E-01	433	3.130E+01	474	3.580E+01	515	8.260E+01	556	1.096E+02
393	7.302E-01	434	3.537E+01	475	3.437E+01	516	8.372E+01	557	1.101E+02
394	6.228E-01	435	3.972E+01	476	3.342E+01	517	8.496E+01	558	1.108E+02
395	7.105E-01	436	4.483E+01	477	3.279E+01	518	8.601E+01	559	1.113E+02
396	6.803E-01	437	5.029E+01	478	3.252E+01	519	8.700E+01	560	1.122E+02
397	6.992E-01	438	5.683E+01	479	3.243E+01	520	8.805E+01	561	1.126E+02
398	7.368E-01	439	6.437E+01	480	3.253E+01	521	8.865E+01	562	1.134E+02
399	7.877E-01	440	7.281E+01	481	3.278E+01	522	8.961E+01	563	1.140E+02
400	7.802E-01	441	8.262E+01	482	3.324E+01	523	9.037E+01	564	1.148E+02
401	8.689E-01	442	9.306E+01	483	3.346E+01	524	9.105E+01	565	1.155E+02
402	8.430E-01	443	1.047E+02	484	3.417E+01	525	9.183E+01	566	1.161E+02
403	9.552E-01	444	1.166E+02	485	3.479E+01	526	9.250E+01	567	1.167E+02
404	9.679E-01	445	1.284E+02	486	3.560E+01	527	9.304E+01	568	1.173E+02
405	1.063E+00	446	1.395E+02	487	3.636E+01	528	9.385E+01	569	1.179E+02
406	1.199E+00	447	1.494E+02	488	3.744E+01	529	9.414E+01	570	1.187E+02
407	1.306E+00	448	1.557E+02	489	3.865E+01	530	9.489E+01	571	1.193E+02
408	1.377E+00	449	1.594E+02	490	4.000E+01	531	9.538E+01	572	1.200E+02
409	1.679E+00	450	1.602E+02	491	4.154E+01	532	9.599E+01	573	1.204E+02
410	1.749E+00	451	1.571E+02	492	4.304E+01	533	9.643E+01	574	1.211E+02
411	1.929E+00	452	1.498E+02	493	4.493E+01	534	9.703E+01	575	1.217E+02
412	2.186E+00	453	1.410E+02	494	4.657E+01	535	9.754E+01	576	1.220E+02
413	2.516E+00	454	1.305E+02	495	4.858E+01	536	9.813E+01	577	1.228E+02
414	2.798E+00	455	1.196E+02	496	5.075E+01	537	9.876E+01	578	1.234E+02
415	3.253E+00	456	1.083E+02	497	5.254E+01	538	9.914E+01	579	1.241E+02
416	3.662E+00	457	9.906E+01	498	5.468E+01	539	9.962E+01	580	1.243E+02
417	4.216E+00	458	9.082E+01	499	5.663E+01	540	1.003E+02	581	1.249E+02
418	4.779E+00	459	8.405E+01	500	5.872E+01	541	1.007E+02	582	1.253E+02
419	5.442E+00	460	7.884E+01	501	6.054E+01	542	1.015E+02	583	1.257E+02
420	6.117E+00	461	7.466E+01	502	6.258E+01	543	1.017E+02	584	1.260E+02

nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
585	1.263E+02	626	1.015E+02	667	4.172E+01	708	1.222E+01	749	3.412E+00
586	1.267E+02	627	1.000E+02	668	4.061E+01	709	1.180E+01	750	3.346E+00
587	1.269E+02	628	9.870E+01	669	3.937E+01	710	1.147E+01	751	3.187E+00
588	1.272E+02	629	9.698E+01	670	3.831E+01	711	1.116E+01	752	3.164E+00
589	1.273E+02	630	9.541E+01	671	3.735E+01	712	1.084E+01	753	3.036E+00
590	1.277E+02	631	9.382E+01	672	3.619E+01	713	1.048E+01	754	2.930E+00
591	1.278E+02	632	9.233E+01	673	3.526E+01	714	1.017E+01	755	2.817E+00
592	1.280E+02	633	9.073E+01	674	3.427E+01	715	9.798E+00	756	2.740E+00
593	1.278E+02	634	8.923E+01	675	3.331E+01	716	9.624E+00	757	2.682E+00
594	1.279E+02	635	8.767E+01	676	3.239E+01	717	9.262E+00	758	2.594E+00
595	1.277E+02	636	8.592E+01	677	3.151E+01	718	8.905E+00	759	2.541E+00
596	1.277E+02	637	8.457E+01	678	3.063E+01	719	8.658E+00	760	2.446E+00
597	1.275E+02	638	8.305E+01	679	2.971E+01	720	8.397E+00	761	2.375E+00
598	1.273E+02	639	8.123E+01	680	2.881E+01	721	8.148E+00	762	2.344E+00
599	1.270E+02	640	7.980E+01	681	2.811E+01	722	7.896E+00	763	2.273E+00
600	1.266E+02	641	7.826E+01	682	2.723E+01	723	7.658E+00	764	2.186E+00
601	1.262E+02	642	7.641E+01	683	2.649E+01	724	7.390E+00	765	2.144E+00
602	1.258E+02	643	7.501E+01	684	2.556E+01	725	7.205E+00	766	2.067E+00
603	1.256E+02	644	7.351E+01	685	2.486E+01	726	6.980E+00	767	2.029E+00
604	1.248E+02	645	7.171E+01	686	2.420E+01	727	6.785E+00	768	1.970E+00
605	1.244E+02	646	7.029E+01	687	2.349E+01	728	6.563E+00	769	1.899E+00
606	1.237E+02	647	6.871E+01	688	2.274E+01	729	6.358E+00	770	1.831E+00
607	1.229E+02	648	6.714E+01	689	2.203E+01	730	6.130E+00	771	1.782E+00
608	1.221E+02	649	6.580E+01	690	2.143E+01	731	5.940E+00	772	1.745E+00
609	1.215E+02	650	6.430E+01	691	2.069E+01	732	5.777E+00	773	1.686E+00
610	1.205E+02	651	6.270E+01	692	2.019E+01	733	5.597E+00	774	1.668E+00
611	1.197E+02	652	6.128E+01	693	1.953E+01	734	5.379E+00	775	1.621E+00
612	1.186E+02	653	5.976E+01	694	1.895E+01	735	5.289E+00	776	1.567E+00
613	1.179E+02	654	5.837E+01	695	1.834E+01	736	5.093E+00	777	1.535E+00
614	1.168E+02	655	5.690E+01	696	1.787E+01	737	4.930E+00	778	1.483E+00
615	1.156E+02	656	5.553E+01	697	1.717E+01	738	4.803E+00	779	1.487E+00
616	1.144E+02	657	5.431E+01	698	1.672E+01	739	4.601E+00	780	1.490E+00
617	1.136E+02	658	5.275E+01	699	1.619E+01	740	4.480E+00		
618	1.121E+02	659	5.157E+01	700	1.568E+01	741	4.322E+00		
619	1.109E+02	660	5.028E+01	701	1.525E+01	742	4.236E+00		
620	1.097E+02	661	4.895E+01	702	1.475E+01	743	4.131E+00		
621	1.085E+02	662	4.763E+01	703	1.429E+01	744	3.952E+00		
622	1.070E+02	663	4.639E+01	704	1.388E+01	745	3.851E+00		
623	1.056E+02	664	4.513E+01	705	1.346E+01	746	3.761E+00		
624	1.042E+02	665	4.408E+01	706	1.303E+01	747	3.591E+00		
625	1.030E+02	666	4.279E+01	707	1.264E+01	748	3.505E+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**

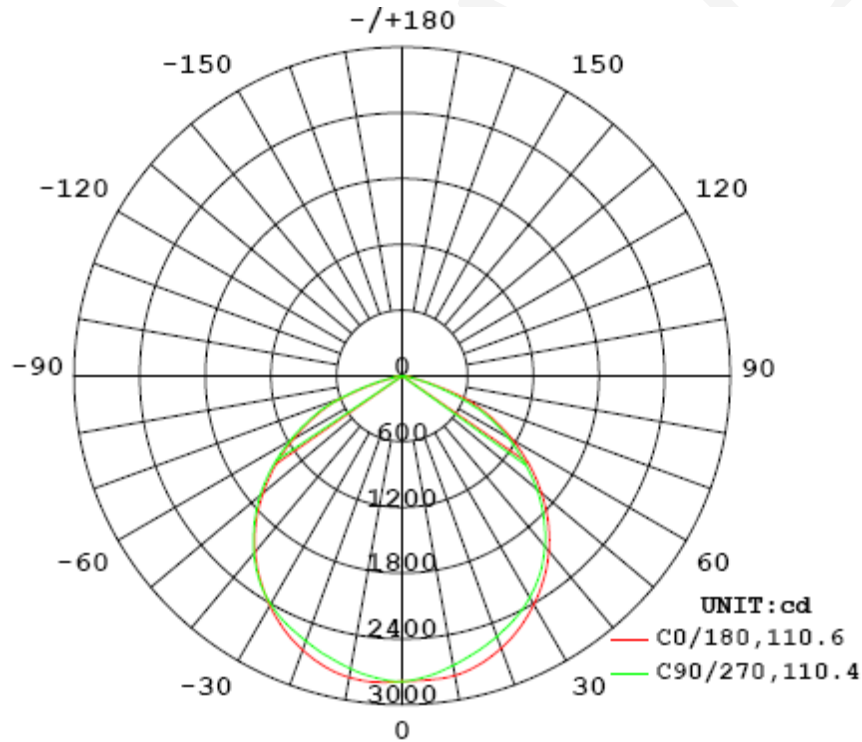
Electrical Measurement

Input Voltage (V)	Frequency (Hz)	Input Current (A)	Power (W)	Power Factor
230.1	50	0.2267	49.66	0.9523

Photometric Measurement

Luminous Flux (lm)	Efficacy (lm/W)	I _{max} (cd)	S/MH (C0/180)	S/MH (C90/270)
7492.83	150.88	2804	1.28	1.25

Luminous Intensity Distribution



	C0/180	C45/225	C90/270	C135/315	AVG.
Beam Angle (50% I _{max}):	110.6	111.4	110.4	111.4	111.0
Field Angle (10% I _{max}):	148.5	151.6	148.6	151.6	150.1

Luminous Intensity (cd) Distribution Data

C \ Y	0°	22.5°	45°	67.5°	90°	112.5°	135°	157.5°
0.0°	2787	2787	2787	2787	2787	2787	2787	2787
5.0°	2803	2803	2790	2773	2764	2763	2773	2784
10.0°	2793	2786	2766	2737	2713	2717	2741	2764
15.0°	2744	2734	2711	2681	2647	2656	2687	2709
20.0°	2661	2650	2632	2617	2575	2593	2611	2623
25.0°	2555	2536	2530	2540	2499	2517	2511	2511
30.0°	2419	2396	2400	2442	2405	2425	2387	2372
35.0°	2266	2235	2255	2309	2279	2298	2247	2217
40.0°	2092	2063	2088	2137	2112	2129	2088	2049
45.0°	1891	1872	1907	1931	1915	1925	1902	1863
50.0°	1662	1658	1696	1706	1697	1700	1690	1652
55.0°	1412	1421	1460	1459	1453	1453	1459	1422
60.0°	1148	1169	1204	1189	1186	1184	1202	1174
65.0°	889	906	928	921	923	920	931	906
70.0°	573	639	654	635	601	631	656	627
75.0°	217	274	370	307	272	299	358	284
80.0°	25	31	61	66	51	63	65	47
85.0°	4	4	5	5	5	5	6	5
90.0°	0	0	0	0	1	1	1	0
95.0°	0	0	0	0	0	0	0	0
100.0°	1	1	1	1	1	1	1	1
105.0°	1	1	1	1	1	1	1	1
110.0°	1	1	1	1	1	1	1	1
115.0°	1	1	1	1	1	1	1	1
120.0°	1	1	1	1	1	1	1	1
125.0°	1	1	1	1	1	1	1	1
130.0°	1	1	1	1	1	1	1	1
135.0°	2	2	2	1	1	1	1	1
140.0°	2	2	2	2	2	2	2	2
145.0°	3	3	2	2	2	2	2	3
150.0°	3	3	3	3	3	3	3	3
155.0°	3	3	3	3	3	3	3	3
160.0°	4	4	4	4	4	4	4	4
165.0°	4	4	4	4	4	4	4	4
170.0°	3	3	3	3	3	3	3	3
175.0°	3	3	3	3	3	3	3	3
180.0°	3	3	3	3	3	3	3	3

Luminous Intensity (cd) Distribution Data (cont.)

C y	180°	202.5°	225°	247.5°	270°	292.5°	315°	337.5°
0.0°	2787	2787	2787	2787	2787	2787	2787	2787
5.0°	2784	2774	2759	2750	2748	2756	2772	2791
10.0°	2775	2751	2723	2691	2683	2702	2736	2766
15.0°	2727	2698	2662	2624	2608	2640	2677	2710
20.0°	2645	2608	2578	2556	2531	2573	2597	2621
25.0°	2538	2492	2473	2469	2442	2490	2493	2504
30.0°	2408	2352	2340	2361	2334	2382	2362	2361
35.0°	2259	2194	2189	2222	2199	2240	2210	2202
40.0°	2088	2026	2023	2051	2030	2065	2038	2032
45.0°	1888	1838	1841	1850	1831	1858	1849	1845
50.0°	1664	1626	1635	1623	1609	1627	1634	1629
55.0°	1422	1397	1404	1371	1355	1371	1398	1396
60.0°	1170	1156	1154	1115	1111	1116	1149	1150
65.0°	902	887	878	856	847	858	875	888
70.0°	626	611	605	560	509	544	610	623
75.0°	249	264	321	246	215	237	309	266
80.0°	34	43	52	44	36	47	43	38
85.0°	5	5	5	5	5	5	4	4
90.0°	1	0	0	0	0	0	0	0
95.0°	0	0	0	0	0	0	0	0
100.0°	0	0	0	0	0	0	0	0
105.0°	0	0	0	0	0	0	0	0
110.0°	0	0	0	0	0	0	0	0
115.0°	1	1	1	1	1	1	1	1
120.0°	1	1	1	1	1	1	1	1
125.0°	1	1	1	1	1	1	1	1
130.0°	1	1	1	1	1	1	1	1
135.0°	1	1	1	1	1	1	1	1
140.0°	1	1	1	1	2	1	2	2
145.0°	2	2	2	2	2	2	2	2
150.0°	2	2	2	2	2	2	2	2
155.0°	2	2	2	2	2	2	2	2
160.0°	2	2	2	2	2	2	2	2
165.0°	2	2	2	2	2	2	2	2
170.0°	2	2	2	2	2	2	2	2
175.0°	2	2	2	3	3	3	3	2
180.0°	3	3	3	3	3	3	3	3

Zonal Lumen Density Measurement

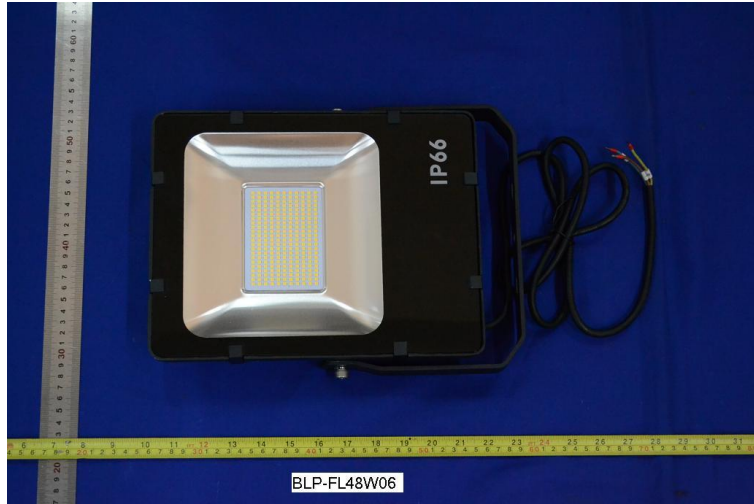
Deg	Flux (lm)	%
0-5	66.5	0.89
5-10	197.3	2.63
10-15	321.6	4.29
15-20	435.7	5.82
20-25	536.0	7.15
25-30	619.0	8.26
30-35	680.8	9.09
35-40	718.9	9.59
40-45	730.5	9.75
45-50	713.9	9.53
50-55	668.3	8.92
55-60	595.3	7.94
60-65	499.4	6.67
65-70	382.3	5.10
70-75	231.0	3.08
75-80	78.4	1.05
80-85	9.4	0.13
85-90	1.4	0.01
90-95	0.2	0.01
95-100	0.2	0.00
100-105	0.3	0.00
105-110	0.3	0.01
110-115	0.3	0.00
115-120	0.4	0.01
120-125	0.4	0.00
125-130	0.5	0.01
130-135	0.5	0.00
135-140	0.6	0.01
140-145	0.6	0.01
145-150	0.7	0.01
150-155	0.6	0.01
155-160	0.6	0.01
160-165	0.5	0.00
165-170	0.3	0.01
170-175	0.2	0.00
175-180	0.1	0.00

Deg	Flux (lm)	%
0-5	66.5	0.89
0-10	263.8	3.52
0-15	585.4	7.81
0-20	1021.1	13.63
0-25	1557.1	20.78
0-30	2176.1	29.04
0-35	2856.9	38.13
0-40	3575.8	47.72
0-45	4306.3	57.47
0-50	5020.2	67.00
0-55	5688.5	75.92
0-60	6283.8	83.86
0-65	6783.2	90.53
0-70	7165.4	95.63
0-75	7396.5	98.71
0-80	7474.9	99.76
0-85	7484.3	99.89
0-90	7485.7	99.90
0-95	7485.8	99.91
0-100	7486.1	99.91
0-105	7486.3	99.91
0-110	7486.6	99.92
0-115	7487.0	99.92
0-120	7487.3	99.93
0-125	7487.7	99.93
0-130	7488.2	99.94
0-135	7488.7	99.94
0-140	7489.3	99.95
0-145	7489.9	99.96
0-150	7490.5	99.97
0-155	7491.2	99.98
0-160	7491.8	99.99
0-165	7492.2	99.99
0-170	7492.6	100.00
0-175	7492.8	100.00
0-180	7492.8	100.00

[Additional Test]

Test Item	Test Voltage (V)	Frequency (Hz)	Test Result
Total Harmonic Distortion:	230.0	50	11.89%

6. Product Photo



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