

IES LM-79-08

MEASUREMENT AND TEST REPORT

For

Shenzhen Brillloop 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-FL200W06

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:	R2DG170628057-10
Test Date:	2017-07-02 to 2017-07-03
Report Date:	2017-07-07
Reviewed By:	Blake Zhang / EE Engineer <i>Blake Zhang</i>
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Accreditation:	The NVLAP Lab Code is 200707-0.

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1. Product Description

General Information:

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

Model Tested:	BLP-FL200W06
Manufacturer:	Shenzhen Brillloop Lighting Co.,Ltd
Brand Name:	Brillloop
Product Designation:	LED Floodlight
Burning Time Before Test:	0hour(For New Products)
Driver Brand:	Meanwell
Driver Model:	ELG-240-48A

Rated Values:

Rated Voltage/Frequency:	100-240V AC 50/60Hz
Rated Power:	200W
Nominal CCT:	4000K
Nominal Lumen Output:	29293lm

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
Integrating Sphere	SENSING	SPR-600	S09008	25~50°C	2017-03-09	2018-03-08
High Accuracy Array spectroradiometer	EVERFINE	HAAS-2000	M112048CA13 61125	380-780nm	2016-07-08	2017-07-07
Power meter	YOKOGAWA	WT310	C20E17024V	2kV/20A	2016-07-08	2017-07-07
DC Power Supply	ITECH	IT6154	0061 0417 6471 0010 19	0~32V	2017-03-03	2018-03-02
Thermal Meter	SENSING	N/A	N/A	25、50°C	2017-03-09	2018-03-08
Standard Light Source	SENSING	N/A	LSD090808	N/A	2016-12-05	2017-12-04
AC Power Supply	ALL Power	APW-105N	970613	220V±10% 50Hz	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	15/30/60/150/3 00/600 V	2017-03-03	2018-03-02
Goniophotometer	EVERFINE	GO-R5000	YG108492N10 120001	1600mm,3000 W/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. (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 $25^{\circ}\text{C}\pm 1^{\circ}\text{C}$ 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 $U=20\text{K}$ ($K=2$), 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 $25^{\circ}\text{C}\pm 1^{\circ}\text{C}$. 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**

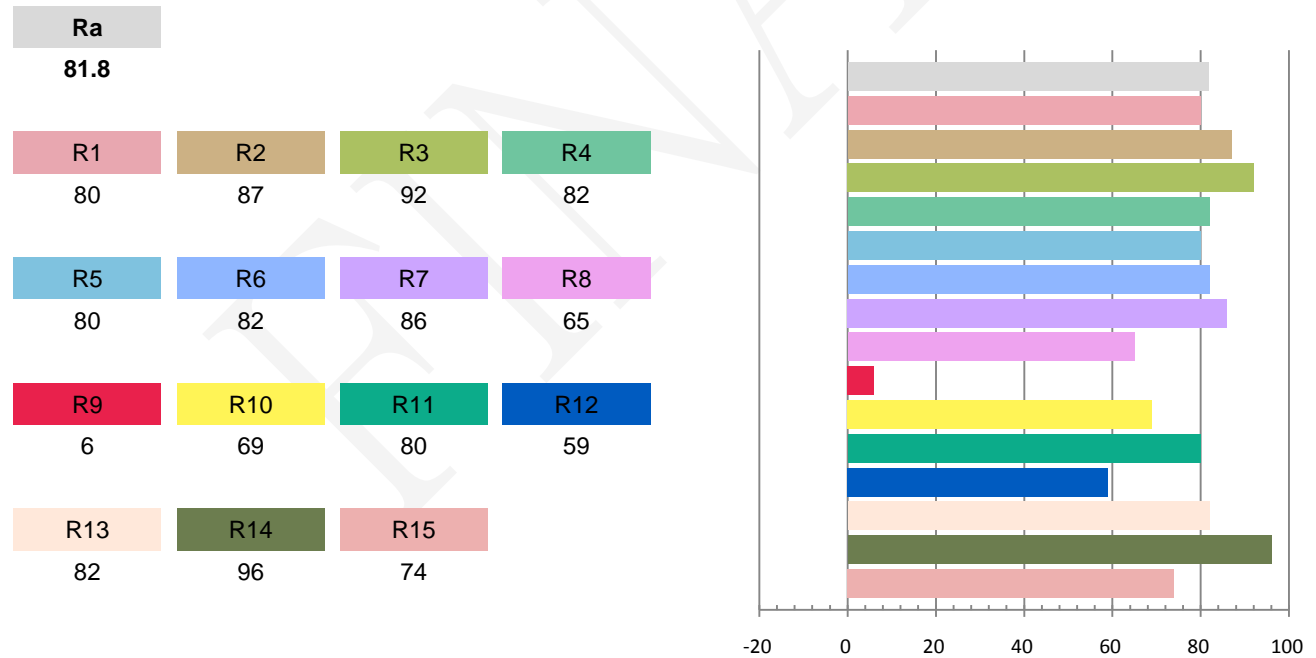
Test orientation: **Downward**

Photometric and Electrical Measurement Result

Voltage (V)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Luminous Flux(lm)	Efficacy (lm/W)
229.9	50	0.8802	199.1	0.9837	29293	147.15

Radiant Flux (W)	CCT (K)	Duv	x	y	u'	v'
88.606	4125	0.000366	0.3753	0.3743	0.2227	0.4997

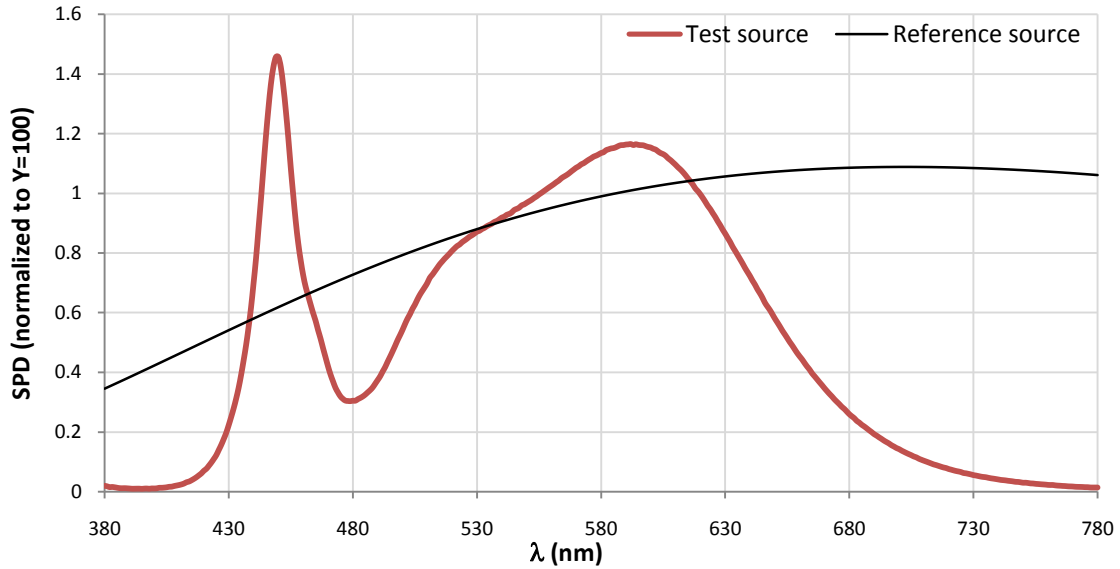
Color Rendering Index



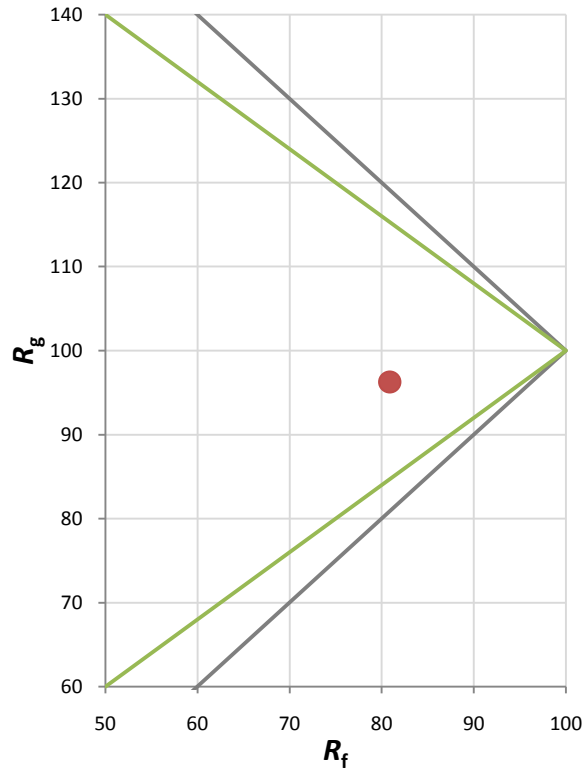
Fidelity Index and Gamut Index

Fidelity Index R_f	81
Gamut Index R_g	96

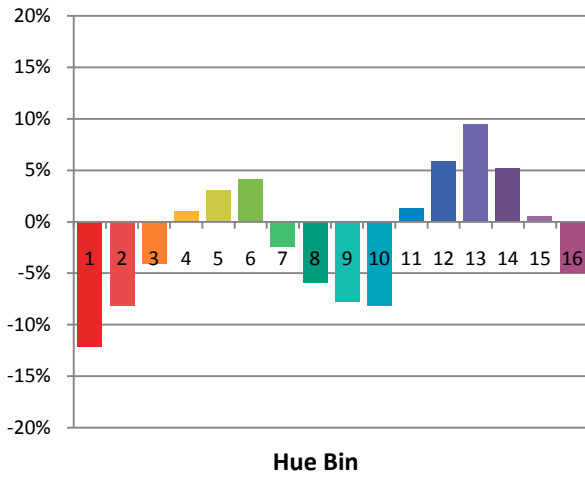
Spectral Power Distribution Comparison



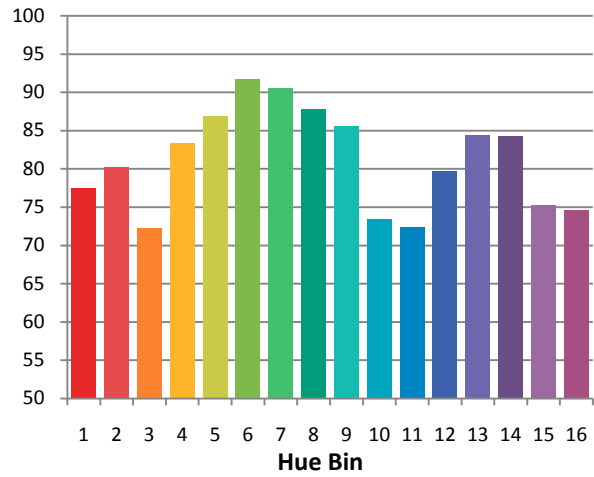
Plot of R_g versus R_f



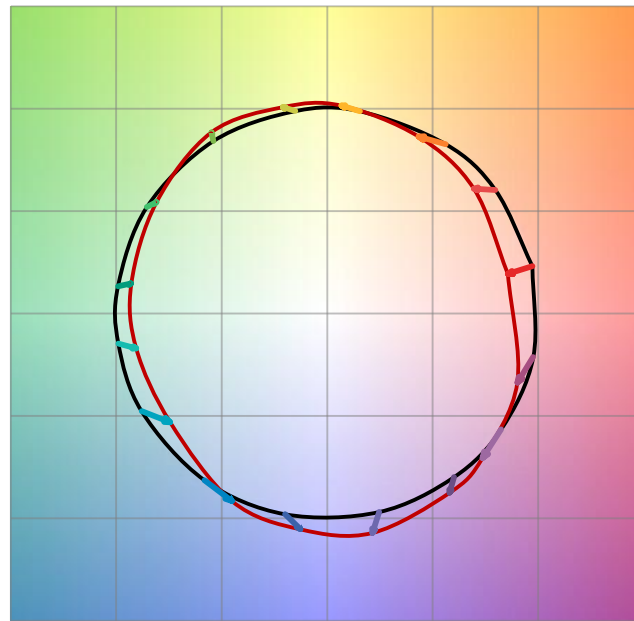
Chroma Shift by Hue



R_f by Hue

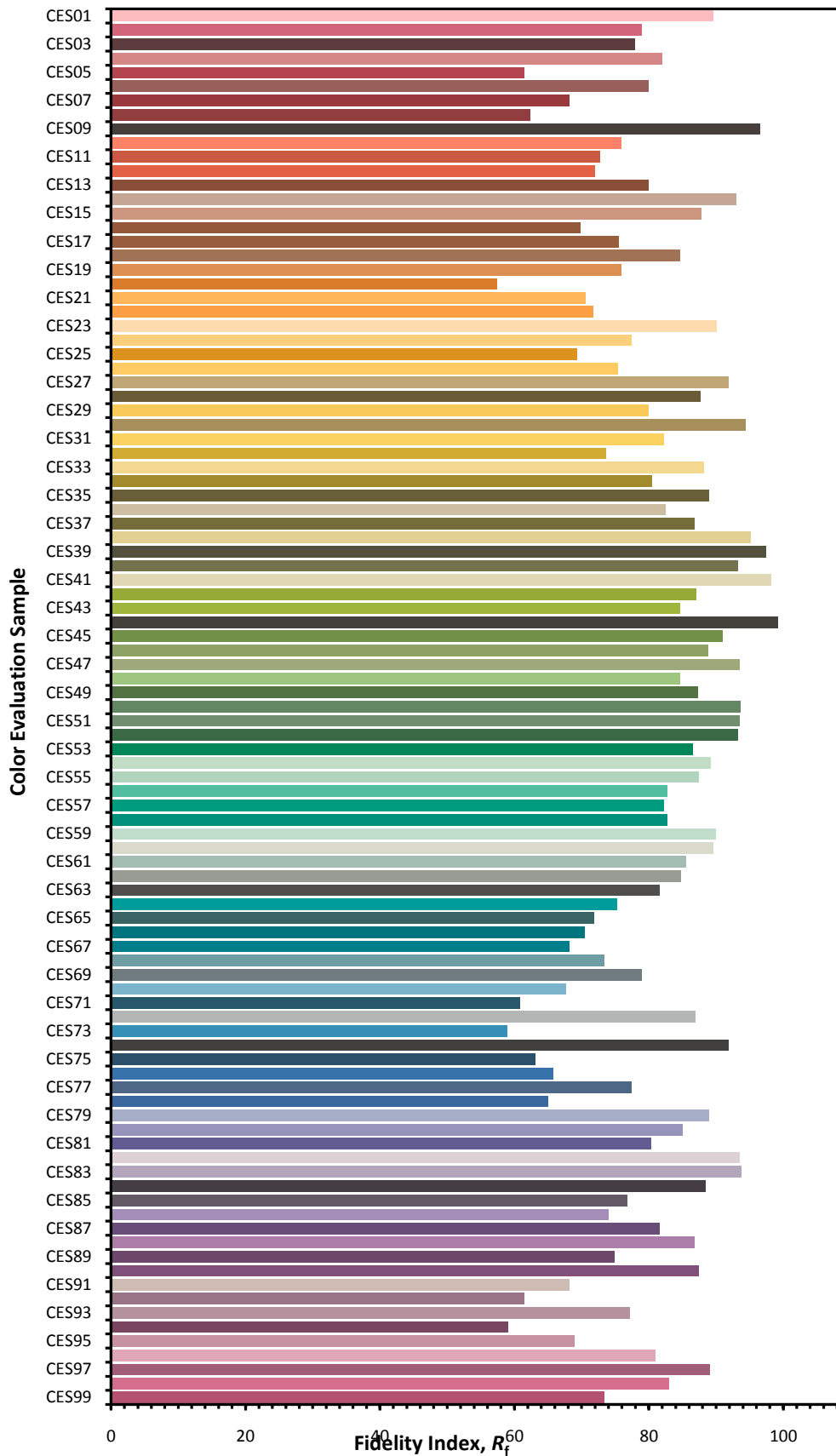


Color Vector Graphic

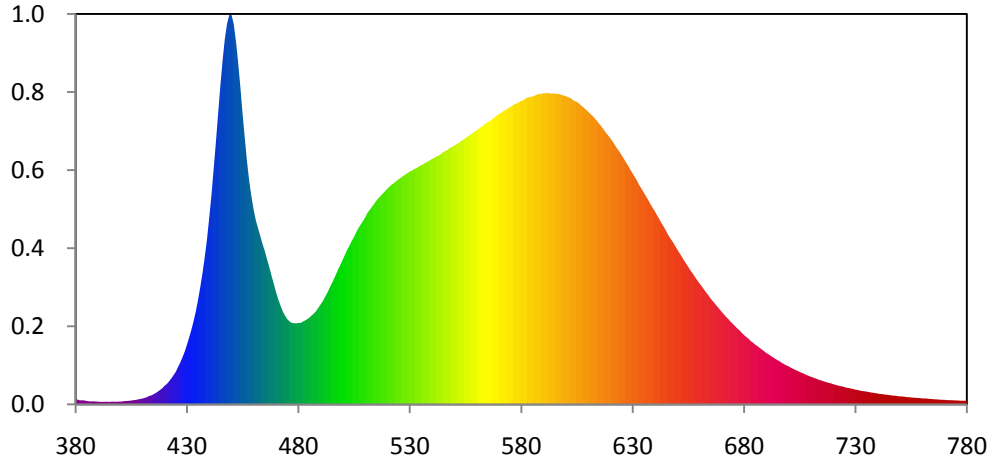


— Reference Illuminat — Test Source

Color Fidelity by CES Sample



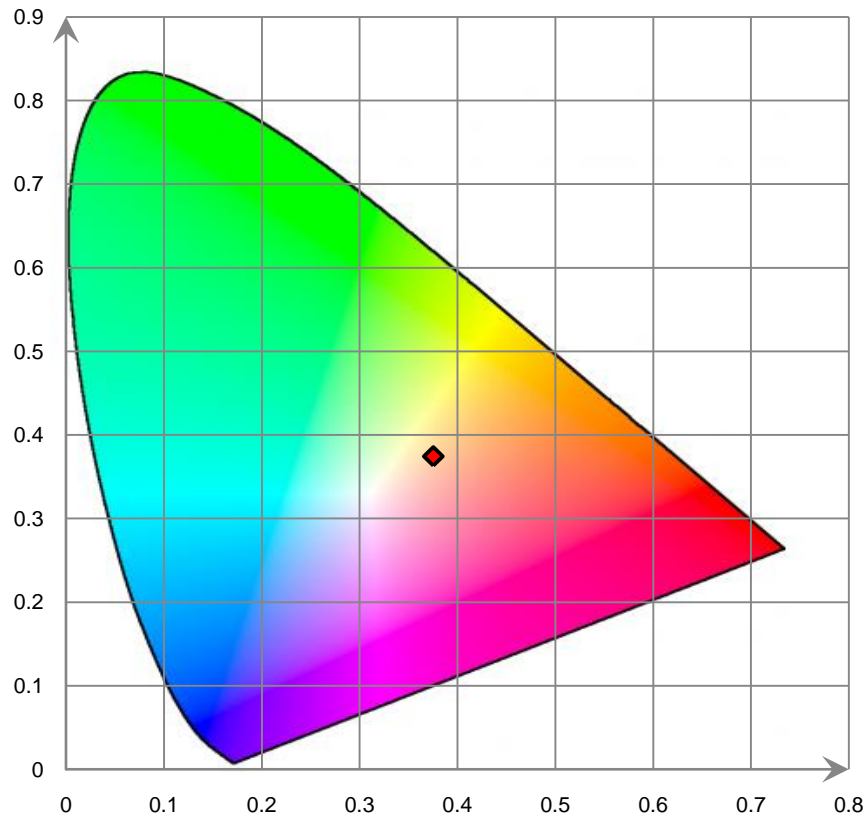
Relative Spectral Power Distribution



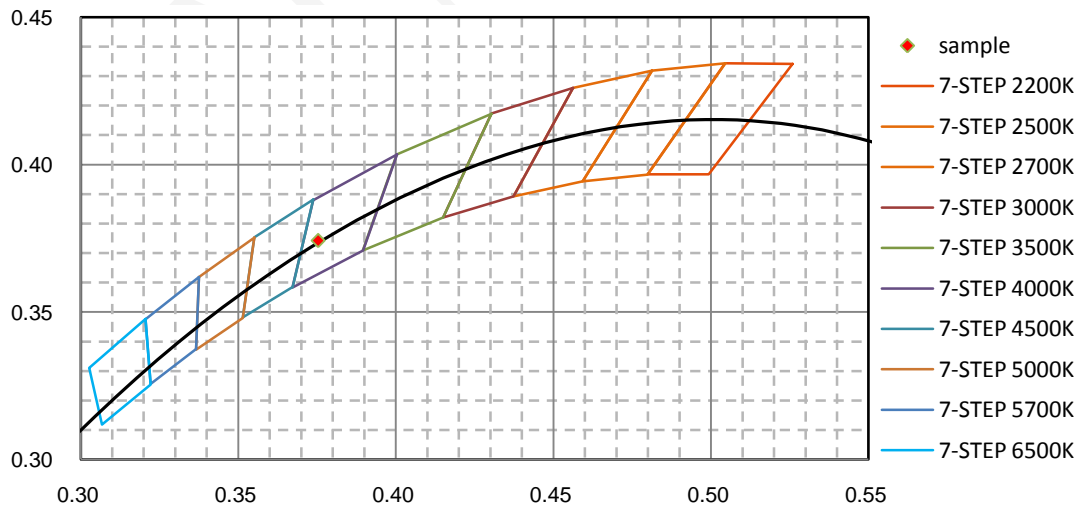
nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
380	8.292E+00	421	3.271E+01	462	2.815E+02	503	2.548E+02	544	4.011E+02
381	7.557E+00	422	3.708E+01	463	2.688E+02	504	2.624E+02	545	4.046E+02
382	6.380E+00	423	4.169E+01	464	2.564E+02	505	2.686E+02	546	4.062E+02
383	6.616E+00	424	4.686E+01	465	2.453E+02	506	2.760E+02	547	4.080E+02
384	6.188E+00	425	5.235E+01	466	2.319E+02	507	2.827E+02	548	4.112E+02
385	5.524E+00	426	5.975E+01	467	2.197E+02	508	2.884E+02	549	4.127E+02
386	4.939E+00	427	6.715E+01	468	2.060E+02	509	2.939E+02	550	4.149E+02
387	4.765E+00	428	7.555E+01	469	1.930E+02	510	2.997E+02	551	4.171E+02
388	4.887E+00	429	8.448E+01	470	1.800E+02	511	3.071E+02	552	4.192E+02
389	4.681E+00	430	9.553E+01	471	1.683E+02	512	3.115E+02	553	4.219E+02
390	4.404E+00	431	1.073E+02	472	1.585E+02	513	3.165E+02	554	4.241E+02
391	4.075E+00	432	1.197E+02	473	1.492E+02	514	3.215E+02	555	4.269E+02
392	4.087E+00	433	1.336E+02	474	1.426E+02	515	3.265E+02	556	4.293E+02
393	4.177E+00	434	1.492E+02	475	1.368E+02	516	3.306E+02	557	4.319E+02
394	4.185E+00	435	1.677E+02	476	1.332E+02	517	3.347E+02	558	4.344E+02
395	3.920E+00	436	1.884E+02	477	1.307E+02	518	3.383E+02	559	4.370E+02
396	4.239E+00	437	2.104E+02	478	1.302E+02	519	3.421E+02	560	4.394E+02
397	4.389E+00	438	2.361E+02	479	1.299E+02	520	3.460E+02	561	4.419E+02
398	4.052E+00	439	2.646E+02	480	1.306E+02	521	3.495E+02	562	4.446E+02
399	4.475E+00	440	2.989E+02	481	1.305E+02	522	3.528E+02	563	4.470E+02
400	4.462E+00	441	3.348E+02	482	1.327E+02	523	3.550E+02	564	4.502E+02
401	4.687E+00	442	3.780E+02	483	1.345E+02	524	3.583E+02	565	4.525E+02
402	5.393E+00	443	4.205E+02	484	1.366E+02	525	3.608E+02	566	4.546E+02
403	5.435E+00	444	4.663E+02	485	1.393E+02	526	3.634E+02	567	4.571E+02
404	5.709E+00	445	5.109E+02	486	1.426E+02	527	3.662E+02	568	4.600E+02
405	6.132E+00	446	5.508E+02	487	1.458E+02	528	3.683E+02	569	4.627E+02
406	6.825E+00	447	5.856E+02	488	1.497E+02	529	3.708E+02	570	4.654E+02
407	7.028E+00	448	6.101E+02	489	1.549E+02	530	3.734E+02	571	4.674E+02
408	7.928E+00	449	6.243E+02	490	1.602E+02	531	3.747E+02	572	4.702E+02
409	8.669E+00	450	6.245E+02	491	1.656E+02	532	3.772E+02	573	4.719E+02
410	9.404E+00	451	6.099E+02	492	1.724E+02	533	3.789E+02	574	4.744E+02
411	1.033E+01	452	5.822E+02	493	1.787E+02	534	3.813E+02	575	4.768E+02
412	1.153E+01	453	5.476E+02	494	1.864E+02	535	3.831E+02	576	4.789E+02
413	1.339E+01	454	5.082E+02	495	1.937E+02	536	3.849E+02	577	4.813E+02
414	1.438E+01	455	4.651E+02	496	2.013E+02	537	3.874E+02	578	4.827E+02
415	1.622E+01	456	4.256E+02	497	2.092E+02	538	3.889E+02	579	4.845E+02
416	1.829E+01	457	3.883E+02	498	2.174E+02	539	3.912E+02	580	4.865E+02
417	2.063E+01	458	3.571E+02	499	2.247E+02	540	3.937E+02	581	4.876E+02
418	2.333E+01	459	3.322E+02	500	2.323E+02	541	3.951E+02	582	4.905E+02
419	2.619E+01	460	3.109E+02	501	2.406E+02	542	3.977E+02	583	4.918E+02
420	2.995E+01	461	2.942E+02	502	2.483E+02	543	3.990E+02	584	4.930E+02

nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
585	4.936E+02	626	3.946E+02	667	1.614E+02	708	4.722E+01	749	1.331E+01
586	4.948E+02	627	3.883E+02	668	1.571E+02	709	4.575E+01	750	1.270E+01
587	4.966E+02	628	3.827E+02	669	1.529E+02	710	4.437E+01	751	1.271E+01
588	4.978E+02	629	3.763E+02	670	1.485E+02	711	4.306E+01	752	1.231E+01
589	4.979E+02	630	3.707E+02	671	1.444E+02	712	4.173E+01	753	1.174E+01
590	4.987E+02	631	3.645E+02	672	1.404E+02	713	4.037E+01	754	1.157E+01
591	4.989E+02	632	3.586E+02	673	1.367E+02	714	3.899E+01	755	1.110E+01
592	4.994E+02	633	3.517E+02	674	1.326E+02	715	3.800E+01	756	1.084E+01
593	4.979E+02	634	3.459E+02	675	1.290E+02	716	3.684E+01	757	1.054E+01
594	4.991E+02	635	3.399E+02	676	1.255E+02	717	3.565E+01	758	1.026E+01
595	4.982E+02	636	3.339E+02	677	1.217E+02	718	3.456E+01	759	1.002E+01
596	4.978E+02	637	3.278E+02	678	1.187E+02	719	3.377E+01	760	9.590E+00
597	4.976E+02	638	3.213E+02	679	1.149E+02	720	3.243E+01	761	9.424E+00
598	4.963E+02	639	3.154E+02	680	1.112E+02	721	3.149E+01	762	9.439E+00
599	4.952E+02	640	3.096E+02	681	1.082E+02	722	3.045E+01	763	8.877E+00
600	4.944E+02	641	3.031E+02	682	1.054E+02	723	2.956E+01	764	8.567E+00
601	4.926E+02	642	2.973E+02	683	1.016E+02	724	2.884E+01	765	8.351E+00
602	4.914E+02	643	2.906E+02	684	9.914E+01	725	2.800E+01	766	8.061E+00
603	4.887E+02	644	2.849E+02	685	9.600E+01	726	2.669E+01	767	7.913E+00
604	4.864E+02	645	2.786E+02	686	9.360E+01	727	2.620E+01	768	7.533E+00
605	4.849E+02	646	2.714E+02	687	9.085E+01	728	2.544E+01	769	7.399E+00
606	4.825E+02	647	2.660E+02	688	8.805E+01	729	2.465E+01	770	7.249E+00
607	4.790E+02	648	2.609E+02	689	8.543E+01	730	2.363E+01	771	6.896E+00
608	4.762E+02	649	2.549E+02	690	8.251E+01	731	2.303E+01	772	6.753E+00
609	4.729E+02	650	2.487E+02	691	8.036E+01	732	2.225E+01	773	6.670E+00
610	4.696E+02	651	2.431E+02	692	7.789E+01	733	2.150E+01	774	6.541E+00
611	4.659E+02	652	2.374E+02	693	7.562E+01	734	2.098E+01	775	6.325E+00
612	4.627E+02	653	2.313E+02	694	7.315E+01	735	2.060E+01	776	6.276E+00
613	4.589E+02	654	2.260E+02	695	7.109E+01	736	1.978E+01	777	5.920E+00
614	4.547E+02	655	2.205E+02	696	6.906E+01	737	1.910E+01	778	5.814E+00
615	4.500E+02	656	2.149E+02	697	6.652E+01	738	1.858E+01	779	5.825E+00
616	4.457E+02	657	2.099E+02	698	6.466E+01	739	1.802E+01	780	5.836E+00
617	4.411E+02	658	2.044E+02	699	6.254E+01	740	1.740E+01		
618	4.355E+02	659	1.991E+02	700	6.105E+01	741	1.676E+01		
619	4.316E+02	660	1.943E+02	701	5.898E+01	742	1.640E+01		
620	4.270E+02	661	1.898E+02	702	5.717E+01	743	1.601E+01		
621	4.218E+02	662	1.846E+02	703	5.540E+01	744	1.543E+01		
622	4.163E+02	663	1.797E+02	704	5.376E+01	745	1.508E+01		
623	4.105E+02	664	1.752E+02	705	5.220E+01	746	1.456E+01		
624	4.058E+02	665	1.699E+02	706	5.040E+01	747	1.398E+01		
625	4.000E+02	666	1.657E+02	707	4.915E+01	748	1.382E+01		

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**

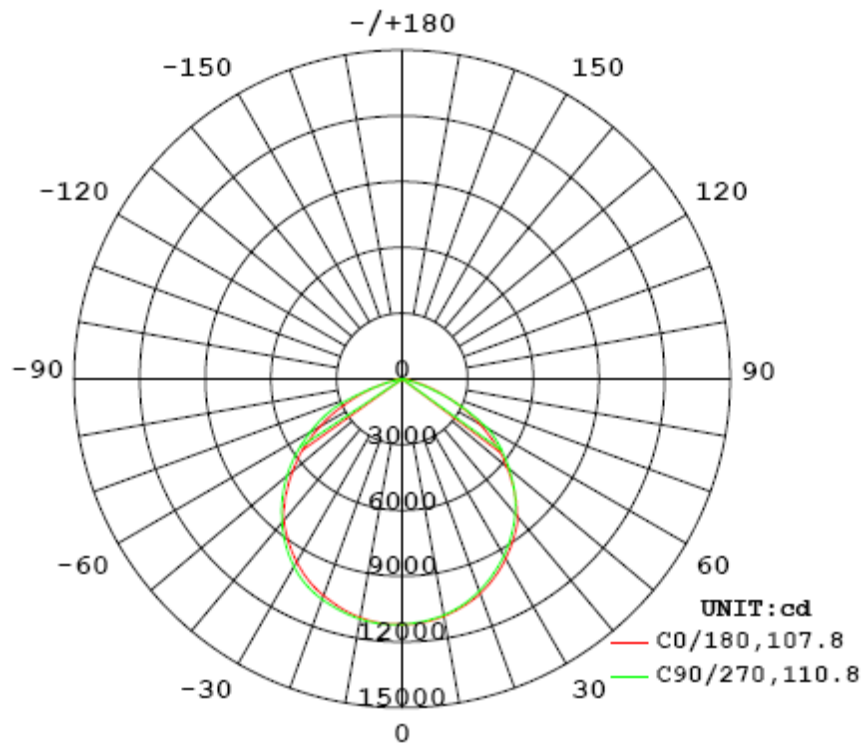
Electrical Measurement

Input Voltage (V)	Frequency (Hz)	Input Current (A)	Power (W)	Power Factor
230.1	50	0.8791	198.8	0.9832

Photometric Measurement

Luminous Flux (lm)	Efficacy (lm/W)	I _{max} (cd)	S/MH (C0/180)	S/MH (C90/270)
29311.8	147.41	11219.0	1.26	1.24

Luminous Intensity Distribution



	C0/180	C45/225	C90/270	C135/315	AVG.
Beam Angle (50% I _{max}):	107.8	109.3	110.8	109.3	109.3
Field Angle (10% I _{max}):	147.4	148.4	146.0	148.4	147.6

Luminous Intensity (cd) Distribution Data

C γ	0°	22.5°	45°	67.5°	90°	112.5°	135°	157.5°
0.0°	11192	11192	11192	11192	11192	11192	11192	11192
5.0°	11178	11198	11211	11218	11216	11204	11191	11164
10.0°	11051	11098	11128	11133	11121	11108	11074	11030
15.0°	10820	10888	10926	10959	10946	10914	10854	10802
20.0°	10521	10589	10639	10709	10708	10651	10559	10484
25.0°	10142	10231	10282	10369	10376	10312	10179	10059
30.0°	9650	9759	9853	9910	9896	9844	9714	9552
35.0°	9070	9185	9298	9300	9279	9230	9127	8964
40.0°	8439	8538	8600	8575	8564	8496	8413	8317
45.0°	7560	7735	7778	7768	7762	7669	7597	7434
50.0°	6556	6767	6898	6878	6883	6757	6655	6401
55.0°	5490	5671	5833	5892	5908	5762	5529	5347
60.0°	4338	4533	4669	4844	4877	4727	4377	4192
65.0°	3137	3319	3514	3816	3822	3703	3260	2995
70.0°	1965	2102	2367	2540	2324	2377	2131	1851
75.0°	927	1034	1212	1004	885	919	1004	841
80.0°	191	265	242	78	69	51	164	153
85.0°	31	34	25	22	21	20	19	25
90.0°	4	4	3	1	1	1	1	1
95.0°	2	1	1	1	1	2	2	2
100.0°	2	2	2	2	2	2	2	2
105.0°	3	2	3	3	3	3	3	3
110.0°	3	3	3	3	3	3	3	3
115.0°	3	3	3	3	3	3	3	3
120.0°	3	3	3	3	3	3	3	3
125.0°	4	4	4	4	4	4	4	4
130.0°	5	5	4	5	5	5	5	5
135.0°	6	6	6	6	6	6	6	6
140.0°	7	7	7	7	8	8	8	7
145.0°	9	9	10	10	10	10	10	9
150.0°	11	11	12	12	12	12	12	11
155.0°	13	13	13	13	13	14	14	13
160.0°	14	14	14	15	14	15	15	14
165.0°	14	14	14	14	15	15	15	14
170.0°	14	14	14	13	14	14	14	14
175.0°	13	13	13	13	12	13	13	13
180.0°	12	11	11	11	11	12	12	12

Luminous Intensity (cd) Distribution Data (cont.)

C γ	180°	202.5°	225°	247.5°	270°	292.5°	315°	337.5°
0.0°	11192	11192	11192	11192	11192	11192	11192	11192
5.0°	11145	11122	11109	11100	11101	11113	11128	11151
10.0°	10988	10950	10939	10934	10937	10959	10986	11015
15.0°	10748	10691	10676	10671	10671	10708	10741	10778
20.0°	10417	10358	10316	10301	10296	10351	10400	10454
25.0°	9987	9913	9864	9837	9837	9892	9964	10070
30.0°	9469	9377	9312	9294	9306	9359	9445	9567
35.0°	8880	8761	8666	8683	8709	8752	8833	8969
40.0°	8186	8074	7948	7996	8039	8073	8131	8293
45.0°	7250	7183	7172	7212	7263	7311	7360	7477
50.0°	6230	6129	6325	6315	6386	6436	6535	6492
55.0°	5213	5130	5236	5393	5501	5517	5538	5419
60.0°	4094	4018	4138	4449	4538	4568	4421	4340
65.0°	2902	2917	3094	3074	2968	3206	3329	3194
70.0°	1818	1817	1828	1629	1563	1825	2089	2022
75.0°	814	851	730	529	483	617	868	998
80.0°	162	191	120	43	40	41	169	271
85.0°	27	25	18	19	18	18	21	32
90.0°	1	1	1	1	1	1	1	2
95.0°	1	1	1	1	1	1	1	1
100.0°	1	1	1	1	1	1	1	1
105.0°	1	1	2	2	2	2	1	1
110.0°	2	2	2	2	2	2	2	2
115.0°	2	2	2	2	2	2	2	2
120.0°	3	3	3	3	3	3	3	3
125.0°	4	3	4	4	3	3	3	3
130.0°	4	4	4	4	4	4	4	4
135.0°	5	5	5	5	5	5	5	5
140.0°	6	6	6	6	6	6	6	6
145.0°	6	6	7	7	7	7	7	7
150.0°	7	7	7	7	7	7	7	7
155.0°	8	7	8	8	8	8	8	8
160.0°	8	8	8	9	9	9	8	9
165.0°	9	9	9	9	9	9	9	9
170.0°	9	9	9	9	9	9	9	10
175.0°	11	11	10	10	10	10	10	11
180.0°	12	12	12	11	11	11	12	12

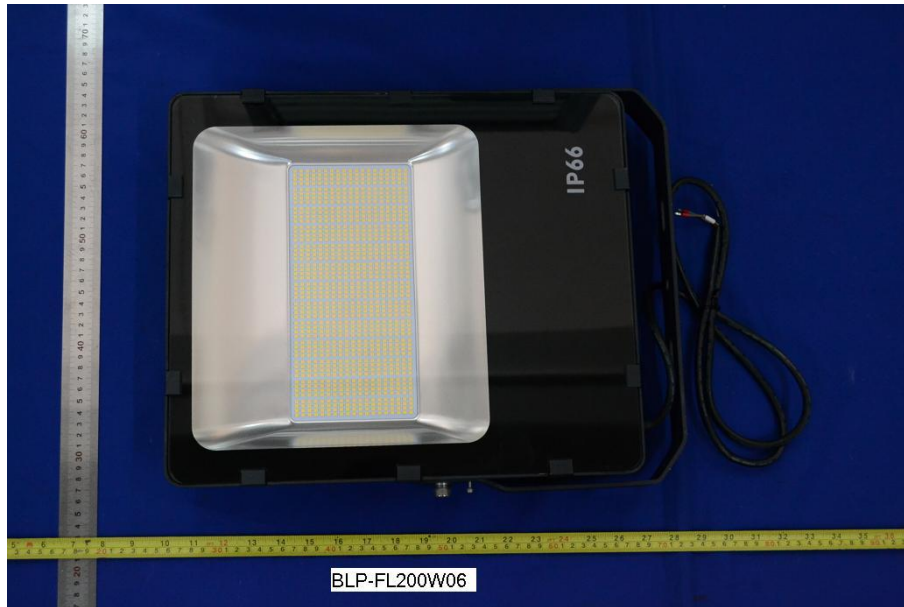
Zonal Lumen Density Measurement

Deg	Flux (lm)	%	Deg	Flux (lm)	%
0-5	267.2	0.91	0-5	267.2	0.91
5-10	793.8	2.71	0-10	1061.1	3.62
10-15	1294.8	4.42	0-15	2355.9	8.04
15-20	1754.2	5.98	0-20	4110.1	14.02
20-25	2157.3	7.36	0-25	6267.3	21.38
25-30	2489.0	8.49	0-30	8756.3	29.87
30-35	2734.0	9.33	0-35	11490.3	39.20
35-40	2882.4	9.83	0-40	14372.7	49.03
40-45	2920.7	9.97	0-45	17293.4	59.00
45-50	2831.1	9.66	0-50	20124.5	68.66
50-55	2622.8	8.94	0-55	22747.3	77.60
55-60	2303.4	7.86	0-60	25050.6	85.46
60-65	1876.2	6.40	0-65	26926.8	91.86
65-70	1341.0	4.58	0-70	28267.8	96.44
70-75	741.0	2.53	0-75	29008.8	98.97
75-80	238.3	0.81	0-80	29247.1	99.78
80-85	31.1	0.11	0-85	29278.2	99.89
85-90	5.7	0.01	0-90	29283.9	99.90
90-95	0.6	0.01	0-95	29284.5	99.91
95-100	0.8	0.00	0-100	29285.2	99.91
100-105	1.0	0.00	0-105	29286.2	99.91
105-110	1.2	0.01	0-110	29287.4	99.92
110-115	1.3	0.00	0-115	29288.7	99.92
115-120	1.4	0.01	0-120	29290.0	99.93
120-125	1.5	0.00	0-125	29291.6	99.93
125-130	1.7	0.01	0-130	29293.3	99.94
130-135	2.0	0.00	0-135	29295.3	99.94
135-140	2.2	0.01	0-140	29297.5	99.95
140-145	2.5	0.01	0-145	29300.0	99.96
145-150	2.6	0.01	0-150	29302.6	99.97
150-155	2.5	0.01	0-155	29305.1	99.98
155-160	2.3	0.01	0-160	29307.4	99.99
160-165	1.9	0.00	0-165	29309.3	99.99
165-170	1.4	0.01	0-170	29310.7	100.00
170-175	0.8	0.00	0-175	29311.5	100.00
175-180	0.3	0.00	0-180	29311.8	100.00

[Additional Test]

Test Item	Test Voltage (V)	Frequency (Hz)	Test Result
Total Harmonic Distortion:	230.0	50	10.29%

6. Product Photo



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