

IES LM-79-08

MEASUREMENT AND TEST REPORT

For

GREEN CREATIVE LTD

756 North Zhongshan Rd., Unit B301 Zhabei District, Shanghai, China

Test Model: 6PLH/830/BYP/E26

Report Type:	Electrical and Photometric tests including: Luminous Flux, Chromaticity, Luminous Intensity Distribution, THD
Test Engineer:	Daniel Duan <i>Daniel Duan</i>
Report Number:	R1KS160624001-10
Test Date:	2016-06-25
Report Date:	2016-06-29
Reviewed By:	Jeanne Han/Safety Manager <i>Jeanne Han</i>
Prepared By:	Bay Area Compliance Laboratories Corp. (Shenzhen) 6/F, the 3rd Phase of WanLi Industrial Building, ShiHua Road, FuTian Free Trade Zone Shenzhen, Guangdong, China Tel: +86-755-33320018 Fax: +86-755-33320008
Test Facility:	Test facility was located at Pu Long Cun 69, Puxinghu Industrial Area, Tangxia Town, Dongguan, Guangdong, P.R.China.
Accreditation:	The NVLAP Lab Code is 200707-0.

STATEMENT: This test may not be duplicated or used in part without prior written consent from Bay Area Compliance Laboratories Corp. (Shenzhen). The test data was only valid for the test sample(s). 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. This report is valid only with a valid digital signature. The digital signature may be available only under the Adobe software above version 7.0.

1. Product Description

General Information:

One sample was received on 2016-06-24 and used for testing.

Model Tested: 6PLH/830/BYP/E26
Manufacturer: GREEN CREATIVE LTD
Brand Name: GREEN CREATIVE
Product Designation: PLV Lamp
Burning Time Before Test: 0hour(For New Products)

Rated Values:

Rated Voltage/Frequency: 120-277V/60Hz
Rated Power: 6 W
Nominal CCT: 3000K
Nominal Lumen Output: 550 lm

Family Declaration:

GREEN CREATIVE LTD, hereby declare that there are some differences between our Multiple Models and testing products. Details as below:

Testing Model Number	Multiple listed Model Number	Difference	Details
6PLH/830/BYP/E26	6PLH/830/BYP, 6PLH/830/BYP/GU24	Lamp base	The lamp base of test model is E26; The lamp base of 6PLH/830/BYP is G24D; The lamp base of 6PLH/830/BYP/GU24 is GU24;

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	Manufacturer	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	2015-07-24	2016-07-23
Digital CC&CV DC Power Supply	EVERFINE	WY305-V1	1101047	30V/5A	2015-07-27	2016-07-26
Temperature/humidity/cloc	Victor	VC230	EE023	0~40°C0~90%	2016-03-21	2017-03-20

Device	Manufacturer	Model No	Serial No	Test Range	Calibration date	Calibration due date
k						
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
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	15/30/60/150/300/600 V	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. (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=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.

Fidelity Index and Gamut Index Calculation

The R_i , 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**

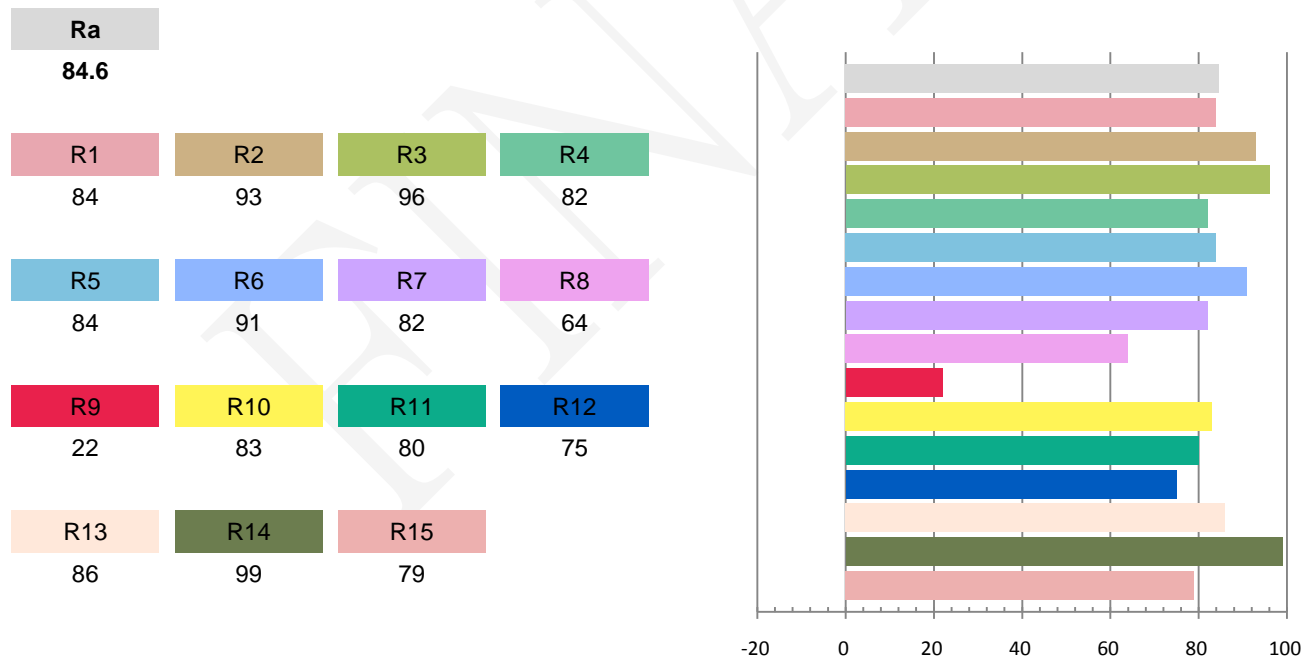
Test orientation: **Baseup**

Photometric and Electrical Measurement Result

Voltage (V)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Luminous Flux(lm)	Efficacy (lm/W)
120.0	60	0.0518	6.05	0.9733	607	100.3

Radiant Flux (W)	CCT (K)	Duv	x	y	u'	v'
1.883	2981	-0.00362	0.4331	0.3938	0.2525	0.5167

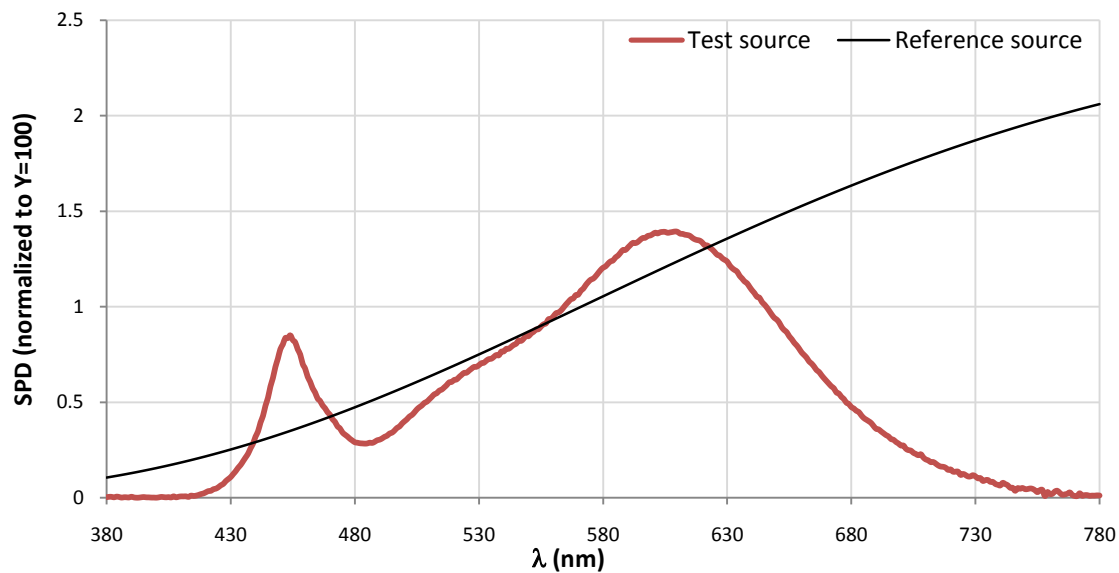
Color Rendering Index



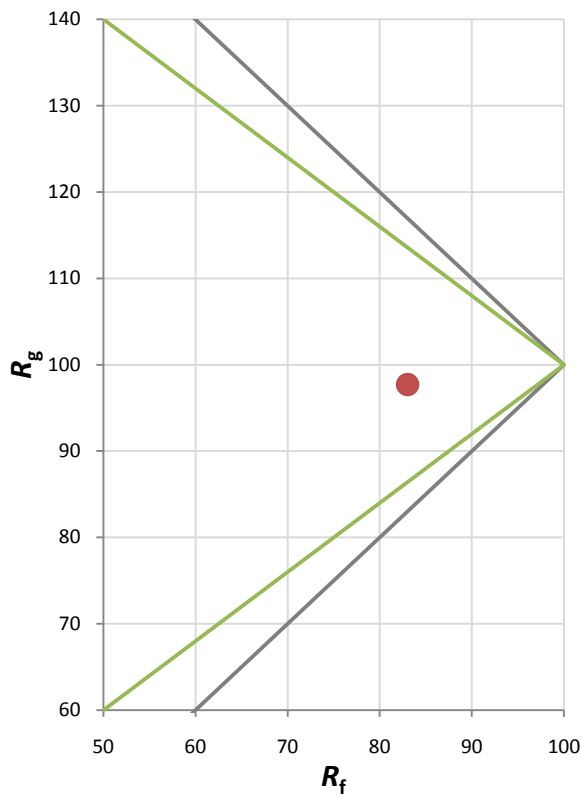
Fidelity Index and Gamut Index

Fidelity Index R_f	83
Gamut Index R_g	98

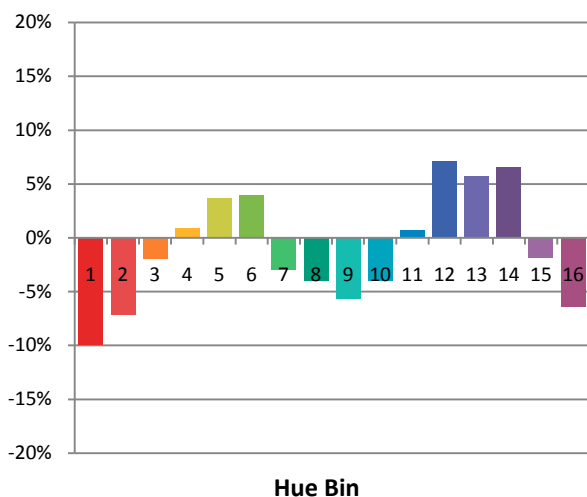
Spectral Power Distribution Comparison



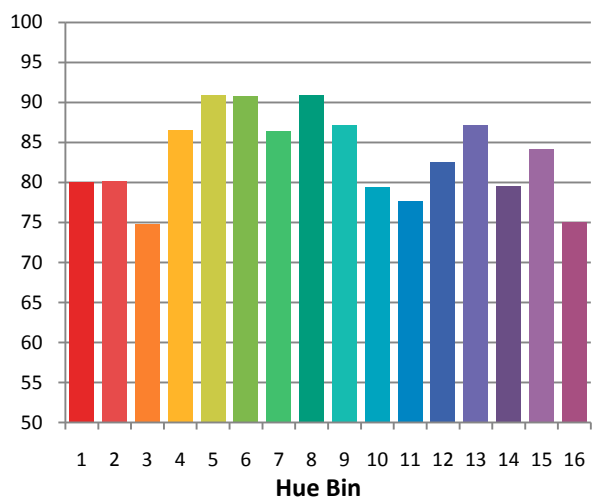
Plot of R_g versus R_f



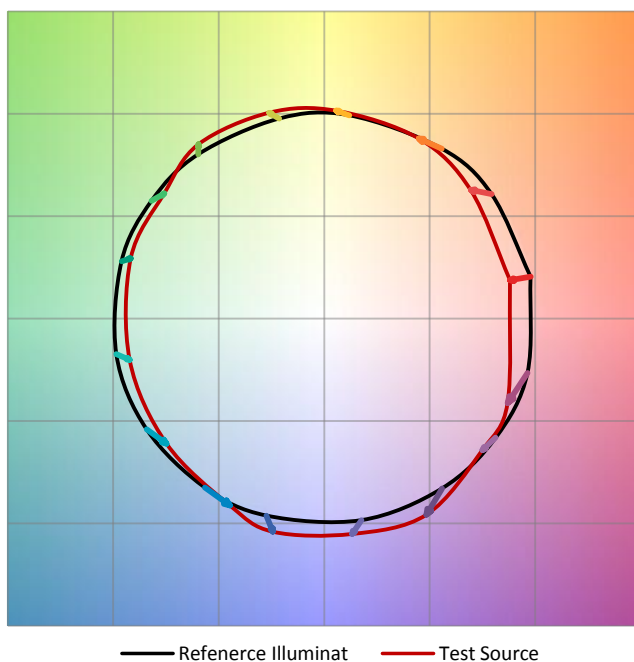
Chroma Shift by Hue



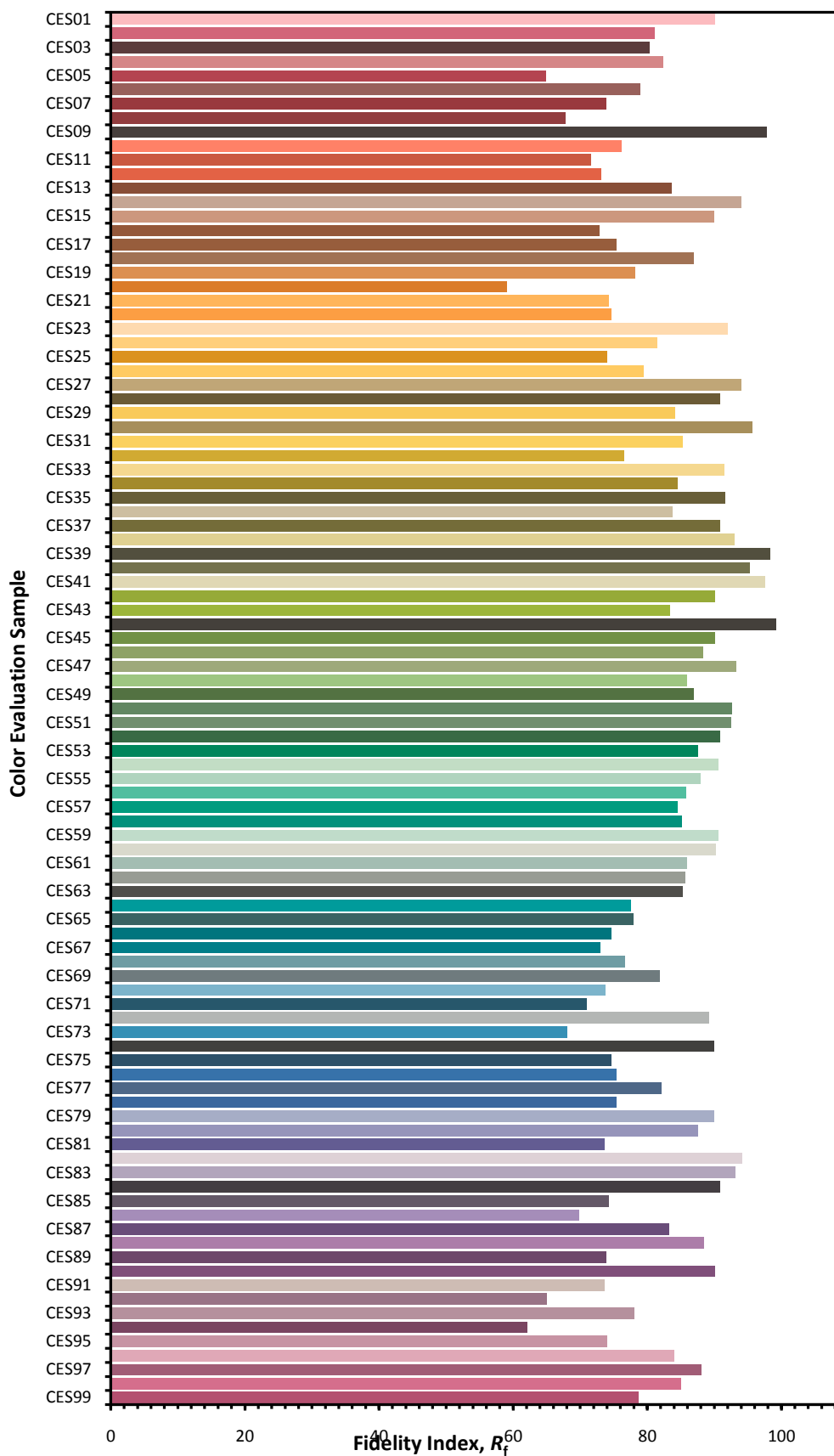
R_f by Hue



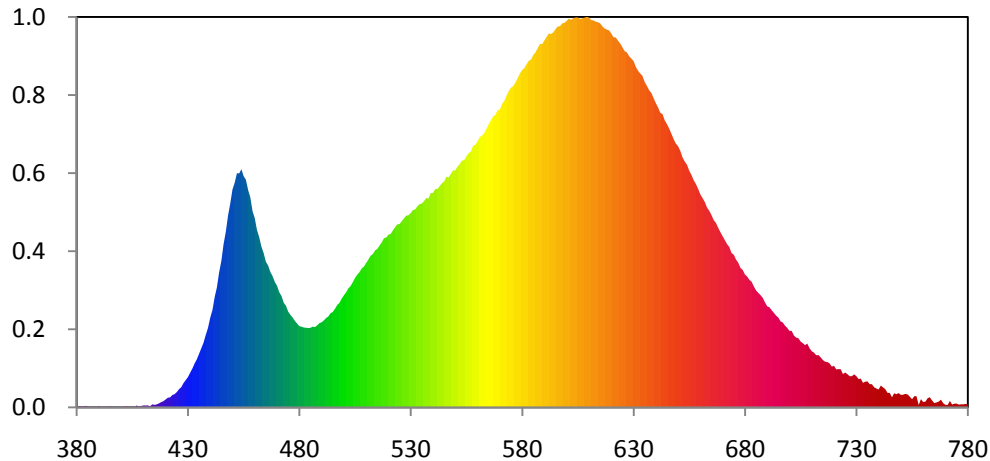
Color Vector Graphic



Color Fidelity by CES Sample



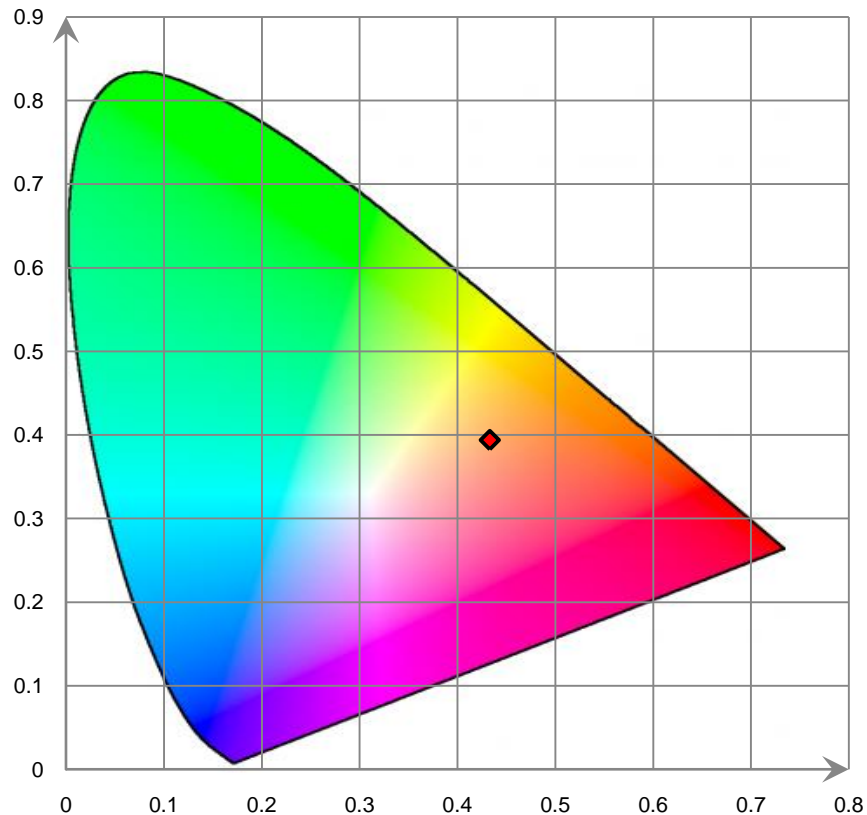
Relative Spectral Power Distribution



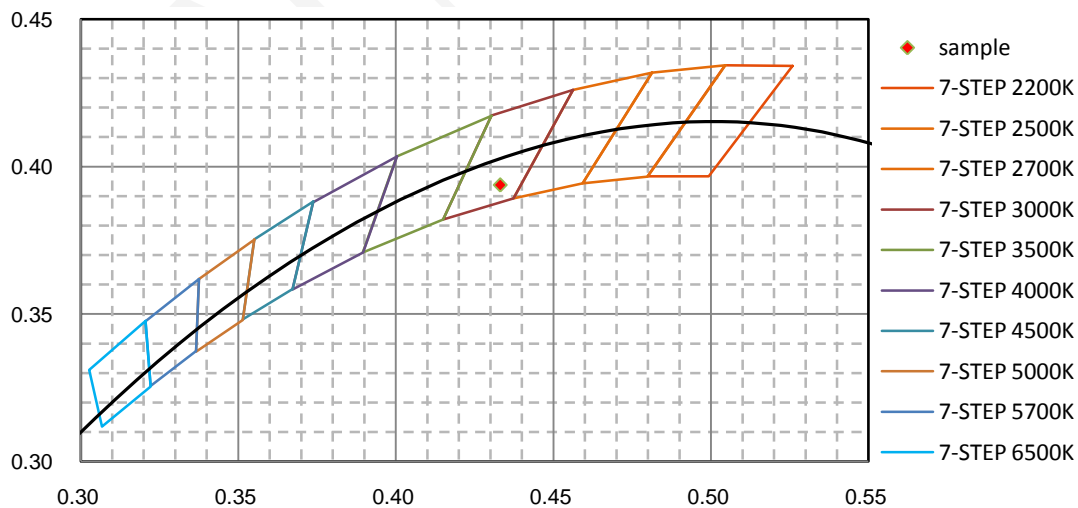
nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
380	2.250E-02	421	3.074E-01	462	5.397E+00	503	3.850E+00	544	7.110E+00
381	3.970E-02	422	3.179E-01	463	5.094E+00	504	3.972E+00	545	7.167E+00
382	4.030E-02	423	3.933E-01	464	4.894E+00	505	4.109E+00	546	7.319E+00
383	1.580E-02	424	4.205E-01	465	4.616E+00	506	4.210E+00	547	7.295E+00
384	4.940E-02	425	4.857E-01	466	4.501E+00	507	4.291E+00	548	7.404E+00
385	3.360E-02	426	5.760E-01	467	4.297E+00	508	4.410E+00	549	7.520E+00
386	3.600E-03	427	6.406E-01	468	4.162E+00	509	4.467E+00	550	7.518E+00
387	2.140E-02	428	7.696E-01	469	3.979E+00	510	4.580E+00	551	7.642E+00
388	1.920E-02	429	8.645E-01	470	3.858E+00	511	4.692E+00	552	7.719E+00
389	8.700E-03	430	9.600E-01	471	3.653E+00	512	4.811E+00	553	7.830E+00
390	4.510E-02	431	1.099E+00	472	3.533E+00	513	4.861E+00	554	7.842E+00
391	1.250E-02	432	1.234E+00	473	3.322E+00	514	4.982E+00	555	7.966E+00
392	5.000E-04	433	1.394E+00	474	3.225E+00	515	5.030E+00	556	8.068E+00
393	2.300E-03	434	1.525E+00	475	3.038E+00	516	5.132E+00	557	8.113E+00
394	1.880E-02	435	1.700E+00	476	2.937E+00	517	5.238E+00	558	8.304E+00
395	2.920E-02	436	1.876E+00	477	2.850E+00	518	5.366E+00	559	8.330E+00
396	1.610E-02	437	2.050E+00	478	2.743E+00	519	5.388E+00	560	8.440E+00
397	1.470E-02	438	2.301E+00	479	2.661E+00	520	5.480E+00	561	8.581E+00
398	5.800E-03	439	2.519E+00	480	2.579E+00	521	5.503E+00	562	8.620E+00
399	5.900E-03	440	2.842E+00	481	2.559E+00	522	5.615E+00	563	8.705E+00
400	2.000E-04	441	3.085E+00	482	2.534E+00	523	5.715E+00	564	8.842E+00
401	1.440E-02	442	3.499E+00	483	2.526E+00	524	5.810E+00	565	8.986E+00
402	3.590E-02	443	3.809E+00	484	2.517E+00	525	5.816E+00	566	9.112E+00
403	2.610E-02	444	4.283E+00	485	2.525E+00	526	5.912E+00	567	9.233E+00
404	1.640E-02	445	4.649E+00	486	2.560E+00	527	6.002E+00	568	9.279E+00
405	2.750E-02	446	5.179E+00	487	2.548E+00	528	6.085E+00	569	9.429E+00
406	1.050E-02	447	5.570E+00	488	2.601E+00	529	6.092E+00	570	9.448E+00
407	6.200E-02	448	6.084E+00	489	2.672E+00	530	6.167E+00	571	9.630E+00
408	1.660E-02	449	6.471E+00	490	2.700E+00	531	6.260E+00	572	9.725E+00
409	4.450E-02	450	6.911E+00	491	2.759E+00	532	6.282E+00	573	9.891E+00
410	6.080E-02	451	7.132E+00	492	2.834E+00	533	6.381E+00	574	1.003E+01
411	5.920E-02	452	7.431E+00	493	2.885E+00	534	6.450E+00	575	1.014E+01
412	6.350E-02	453	7.422E+00	494	2.986E+00	535	6.468E+00	576	1.019E+01
413	3.520E-02	454	7.557E+00	495	3.027E+00	536	6.552E+00	577	1.031E+01
414	9.700E-02	455	7.340E+00	496	3.128E+00	537	6.642E+00	578	1.045E+01
415	7.970E-02	456	7.225E+00	497	3.249E+00	538	6.626E+00	579	1.059E+01
416	9.480E-02	457	6.903E+00	498	3.315E+00	539	6.799E+00	580	1.070E+01
417	1.259E-01	458	6.666E+00	499	3.450E+00	540	6.807E+00	581	1.076E+01
418	1.677E-01	459	6.225E+00	500	3.554E+00	541	6.927E+00	582	1.089E+01
419	1.968E-01	460	6.002E+00	501	3.652E+00	542	6.932E+00	583	1.100E+01
420	2.516E-01	461	5.628E+00	502	3.776E+00	543	7.023E+00	584	1.104E+01

nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
585	1.118E+01	626	1.130E+01	667	5.852E+00	708	2.023E+00	749	4.527E-01
586	1.127E+01	627	1.126E+01	668	5.697E+00	709	1.875E+00	750	3.959E-01
587	1.140E+01	628	1.114E+01	669	5.559E+00	710	1.780E+00	751	4.021E-01
588	1.153E+01	629	1.107E+01	670	5.430E+00	711	1.737E+00	752	4.290E-01
589	1.153E+01	630	1.099E+01	671	5.303E+00	712	1.655E+00	753	4.113E-01
590	1.164E+01	631	1.081E+01	672	5.179E+00	713	1.660E+00	754	3.423E-01
591	1.176E+01	632	1.068E+01	673	5.087E+00	714	1.586E+00	755	2.587E-01
592	1.186E+01	633	1.060E+01	674	4.898E+00	715	1.502E+00	756	3.529E-01
593	1.185E+01	634	1.052E+01	675	4.844E+00	716	1.450E+00	757	3.562E-01
594	1.190E+01	635	1.033E+01	676	4.691E+00	717	1.438E+00	758	7.420E-02
595	1.200E+01	636	1.020E+01	677	4.591E+00	718	1.395E+00	759	2.629E-01
596	1.209E+01	637	1.006E+01	678	4.424E+00	719	1.293E+00	760	1.705E-01
597	1.210E+01	638	9.980E+00	679	4.362E+00	720	1.316E+00	761	1.803E-01
598	1.218E+01	639	9.813E+00	680	4.216E+00	721	1.206E+00	762	2.894E-01
599	1.220E+01	640	9.653E+00	681	4.152E+00	722	1.214E+00	763	3.226E-01
600	1.227E+01	641	9.518E+00	682	4.044E+00	723	1.210E+00	764	2.195E-01
601	1.233E+01	642	9.350E+00	683	3.988E+00	724	1.058E+00	765	1.351E-01
602	1.230E+01	643	9.306E+00	684	3.838E+00	725	1.107E+00	766	1.555E-01
603	1.235E+01	644	9.108E+00	685	3.712E+00	726	1.055E+00	767	1.841E-01
604	1.237E+01	645	8.989E+00	686	3.632E+00	727	9.886E-01	768	2.459E-01
605	1.237E+01	646	8.847E+00	687	3.560E+00	728	9.898E-01	769	1.307E-01
606	1.233E+01	647	8.682E+00	688	3.474E+00	729	1.048E+00	770	8.000E-02
607	1.235E+01	648	8.514E+00	689	3.331E+00	730	9.929E-01	771	7.700E-02
608	1.237E+01	649	8.368E+00	690	3.206E+00	731	8.983E-01	772	2.063E-01
609	1.239E+01	650	8.284E+00	691	3.177E+00	732	9.134E-01	773	9.100E-02
610	1.237E+01	651	8.140E+00	692	3.084E+00	733	7.783E-01	774	1.176E-01
611	1.229E+01	652	7.931E+00	693	2.998E+00	734	8.159E-01	775	1.200E-01
612	1.228E+01	653	7.798E+00	694	2.912E+00	735	8.241E-01	776	8.760E-02
613	1.224E+01	654	7.699E+00	695	2.849E+00	736	7.371E-01	777	9.830E-02
614	1.222E+01	655	7.510E+00	696	2.730E+00	737	7.362E-01	778	9.520E-02
615	1.219E+01	656	7.376E+00	697	2.693E+00	738	6.396E-01	779	1.086E-01
616	1.209E+01	657	7.209E+00	698	2.592E+00	739	6.001E-01	780	1.006E-01
617	1.202E+01	658	7.087E+00	699	2.522E+00	740	5.672E-01		
618	1.199E+01	659	6.931E+00	700	2.425E+00	741	6.925E-01		
619	1.196E+01	660	6.759E+00	701	2.427E+00	742	6.340E-01		
620	1.187E+01	661	6.640E+00	702	2.277E+00	743	5.783E-01		
621	1.174E+01	662	6.514E+00	703	2.214E+00	744	4.593E-01		
622	1.174E+01	663	6.341E+00	704	2.193E+00	745	4.610E-01		
623	1.164E+01	664	6.239E+00	705	2.090E+00	746	3.202E-01		
624	1.155E+01	665	6.101E+00	706	2.035E+00	747	4.469E-01		
625	1.143E+01	666	5.940E+00	707	1.974E+00	748	4.170E-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**

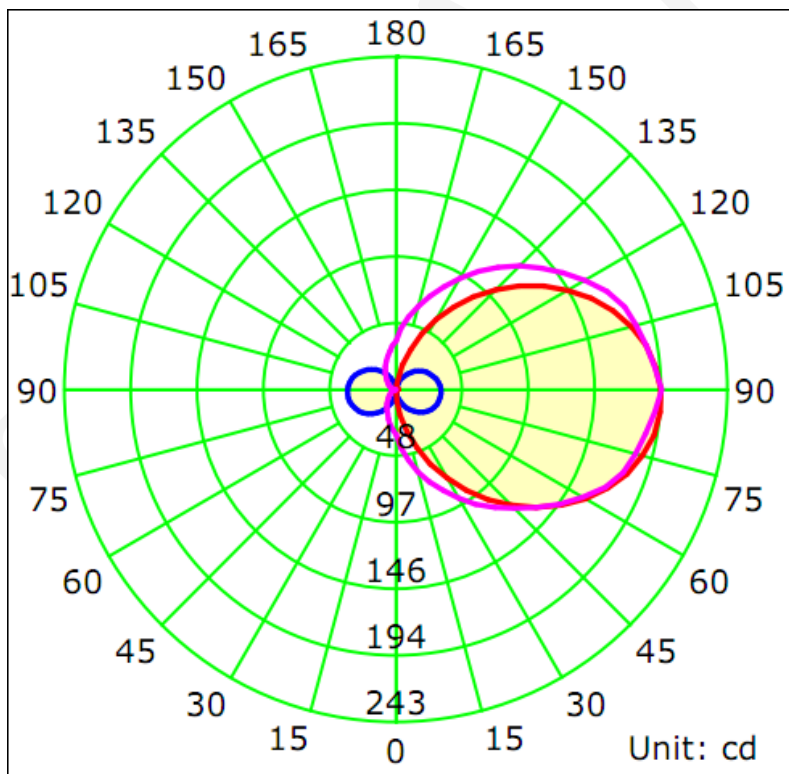
Electrical Measurement

Input Voltage (V)	Frequency (Hz)	Input Current (A)	Power (W)	Power Factor
120.0	60	0.0520	6.07	0.9760

Photometric Measurement

Luminous Flux (lm)	Efficacy (lm/W)	I _{max} (cd)	S/MH (C0/180)	S/MH (C90/270)
609.7	100.44	195.0	6.15	8.93

Luminous Intensity Distribution



	C0/180	C45/225	C90/270	C135/315	AVG.
Beam Angle (50% I _{max}):	278.3	173.6	174.5	173.9	200.1
Field Angle (10% I _{max}):	329.3	168.1	175.0	174.6	211.8

Luminous Intensity (cd) Distribution Data

C y	0°	22.5°	45°	67.5°	90°	112.5°	135°	157.5°
0.0°	2	2	2	2	2	2	2	2
5.0°	3	5	6	8	9	8	6	4
10.0°	5	9	13	18	19	17	13	9
15.0°	7	14	22	30	32	29	22	14
20.0°	10	20	31	43	46	42	31	20
25.0°	13	27	41	56	60	55	41	26
30.0°	16	33	51	70	75	69	52	32
35.0°	19	39	60	83	90	82	62	39
40.0°	21	45	70	97	105	96	72	45
45.0°	24	51	79	110	120	110	82	51
50.0°	26	56	88	122	134	123	91	56
55.0°	28	61	96	135	148	135	100	61
60.0°	30	66	104	146	160	146	108	66
65.0°	31	69	110	155	172	156	114	70
70.0°	32	72	115	163	181	164	120	73
75.0°	33	75	120	170	188	170	124	75
80.0°	33	76	122	174	193	174	127	77
85.0°	33	77	123	175	195	177	129	78
90.0°	33	76	123	175	195	176	129	77
95.0°	33	75	121	173	192	174	127	76
100.0°	32	73	118	168	187	169	123	74
105.0°	31	70	114	161	179	162	119	71
110.0°	30	67	108	153	170	154	112	68
115.0°	28	63	101	143	158	144	105	64
120.0°	26	58	94	132	146	133	97	59
125.0°	24	53	85	120	133	121	89	54
130.0°	22	48	76	107	118	108	79	48
135.0°	20	42	67	94	104	94	70	42
140.0°	17	36	58	81	89	81	60	36
145.0°	14	30	48	68	74	68	50	30
150.0°	12	24	39	55	60	54	40	24
155.0°	9	14	24	42	46	41	30	18
160.0°	6	7	8	23	32	29	21	13
165.0°	2	2	2	6	19	17	12	8
170.0°	0	1	1	1	5	4	4	3
175.0°	0	0	0	0	0	0	0	0
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°	2	2	2	2	2	2	2	2
5.0°	3	1	1	0	0	0	1	2
10.0°	5	3	1	0	0	1	1	3
15.0°	8	4	2	1	0	1	2	4
20.0°	11	6	2	1	0	1	2	6
25.0°	14	8	3	1	0	1	3	7
30.0°	17	9	4	1	0	1	4	9
35.0°	20	11	5	2	0	1	5	10
40.0°	23	13	6	2	1	2	5	11
45.0°	25	14	7	2	1	2	6	13
50.0°	28	16	7	3	1	2	7	14
55.0°	30	17	8	3	1	2	7	15
60.0°	32	18	9	3	1	3	8	16
65.0°	33	19	9	4	1	3	8	16
70.0°	35	19	10	4	1	3	8	17
75.0°	36	20	10	4	1	3	8	17
80.0°	36	20	10	4	1	3	9	17
85.0°	36	20	10	4	1	3	9	17
90.0°	36	20	10	4	1	3	9	17
95.0°	35	20	10	4	1	3	8	17
100.0°	35	19	10	4	1	3	8	17
105.0°	33	19	10	4	1	3	8	16
110.0°	32	18	9	4	1	3	8	15
115.0°	30	17	9	3	1	2	7	15
120.0°	28	16	8	3	1	2	7	14
125.0°	26	15	8	3	1	2	6	13
130.0°	24	14	7	3	1	2	5	12
135.0°	21	12	6	2	1	2	5	10
140.0°	18	11	5	2	0	1	4	9
145.0°	16	9	4	2	0	1	3	8
150.0°	13	8	4	1	0	1	3	6
155.0°	10	6	3	1	0	1	2	5
160.0°	7	4	2	1	0	0	1	3
165.0°	4	3	1	0	0	0	1	2
170.0°	2	1	0	0	0	0	0	0
175.0°	0	0	0	0	0	0	0	0
180.0°	0	0	0	0	0	0	0	0

Zonal Lumen Density Measurement

Deg	Flux (lm)	%
0-5	0.1	0.01
5-10	0.4	0.06
10-15	1.1	0.19
15-20	2.4	0.39
20-25	4.1	0.67
25-30	6.3	1.03
30-35	8.9	1.46
35-40	11.9	1.95
40-45	15.1	2.48
45-50	18.5	3.04
50-55	22.0	3.60
55-60	25.4	4.16
60-65	28.6	4.68
65-70	31.4	5.15
70-75	33.8	5.54
75-80	35.6	5.84
80-85	36.7	6.02
85-90	37.1	6.09
90-95	36.8	6.04
95-100	35.8	5.87
100-105	34.1	5.60
105-110	31.9	5.23
110-115	29.1	4.78
115-120	26.0	4.27
120-125	22.7	3.73
125-130	19.3	3.17
130-135	16.0	2.62
135-140	12.7	2.09
140-145	9.7	1.60
145-150	7.1	1.16
150-155	4.7	0.77
155-160	2.7	0.44
160-165	1.2	0.20
165-170	0.4	0.06
170-175	0.0	0.01
175-180	0.0	0.00

Deg	Flux (lm)	%
0-5	0.1	0.01
0-10	0.5	0.07
0-15	1.6	0.26
0-20	4.0	0.65
0-25	8.1	1.32
0-30	14.4	2.36
0-35	23.3	3.82
0-40	35.2	5.77
0-45	50.3	8.25
0-50	68.8	11.29
0-55	90.8	14.89
0-60	116.2	19.05
0-65	144.7	23.74
0-70	176.1	28.89
0-75	209.9	34.43
0-80	245.5	40.27
0-85	282.2	46.29
0-90	319.4	52.38
0-95	356.2	58.42
0-100	392.0	64.29
0-105	426.1	69.89
0-110	457.9	75.11
0-115	487.1	79.89
0-120	513.1	84.16
0-125	535.8	87.89
0-130	555.2	91.06
0-135	571.1	93.68
0-140	583.9	95.77
0-145	593.6	97.37
0-150	600.6	98.52
0-155	605.3	99.29
0-160	608.0	99.73
0-165	609.2	99.93
0-170	609.6	99.99
0-175	609.7	100.00
0-180	609.7	100.00

Product Photo



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