



IES LM-79-08

MEASUREMENT AND TEST REPORT

For

GREEN CREATIVE LTD

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

Test Model: 7.5R20DIM/827

Report Type:	Electrical and Photometric tests including: Luminous Flux, Chromaticity, Luminous Intensity Distribution
Test Engineer:	Hill Liu Hill Liu
Report Number:	R1KS181130080-10
Test Date:	2018-12-14 to 2018-12-17
Report Date:	2018-12-19
Reviewed By:	Bill Xiong / EE Engineer Bill Xiong
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.

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. (Dongguan). 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 2018-11-30 and used for testing.

Model Tested: 7.5R20DIM/827
 Manufacturer: GREEN CREATIVE LTD
 Brand Name: GREEN CREATIVE
 Product Designation: LED Lamp
 Aging Time Before Test: 0hour(For New Products)

Rated Values:

Rated Voltage/Frequency: 120VAC 60Hz
 Rated Power: 7.5W
 Nominal CCT: 2700K
 Nominal Lumen Output: 525lm

2. Standards Used

- IES LM-79-08: Approved Method: Electrical & Photometric Measurement of Solid-state Lighting Products
- ANSI C82.77-10-2014: Harmonic Emission Limits – Related Power Quality Requirements for Lighting Equipment
- 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	Calibration date	Calibration due date
2.0m integrating sphere	EVERFINE	R98	11010018	2018-12-13	2019-12-13
spectroradiometer	EVERFINE	HAAS-2000	20140912	2018-12-13	2019-12-13
Digital Power Meter	EVERFINE	PF2010A	1011004	2018-07-28	2019-07-28
Digital CC&CV DC Power Supply	EVERFINE	WY305-V1	1101047	2018-06-15	2019-06-15
Rapid Recording Photometer	EVERFINE	PHOTO-2000F	1007010	2018-12-13	2019-12-13
Standard Light Source	EVERFINE	D204	G100283CA8351158	2018-01-08	2019-01-08
Special zero-voltage synchronous switching AC	EVERFINE	DPS1010-YF	1011001T	2018-03-19	2019-03-19
AC POWER SUPPLY	EVERFINE	VPS1030 PWM	1012017	2018-03-19	2019-03-19
Digital CC&CV DC Power Supply	EVERFINE	WY12010	1009009	2018-03-26	2019-03-26
Digital power meter	YOKOGAWA	WT-210	91j926132	2018-03-26	2019-03-26
full-field speed goniophotometer	EVERFINE	GO-R5000	YG108492N10120001	2018-03-18	2019-03-18
Wireless Remote Sensor	N/A	433MHz	N/A	2018-03-17	2019-03-17
Standard Light Source	EVERFINE	D908	1012003	2018-01-05	2019-01-05

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 $25^{\circ}\text{C}\pm 1^{\circ}\text{C}$ 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 $U=2.1\%$ ($K=2$), at the 95% confidence level. The uncertainty of the correlated color temperature measurements is $U=31\text{K}$ ($K=2$), 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 $U=0.18\%$ of rdg, Power $U=0.46\%$ ($K=2$), 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 $U=2.82\%$ ($K=2$), 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**

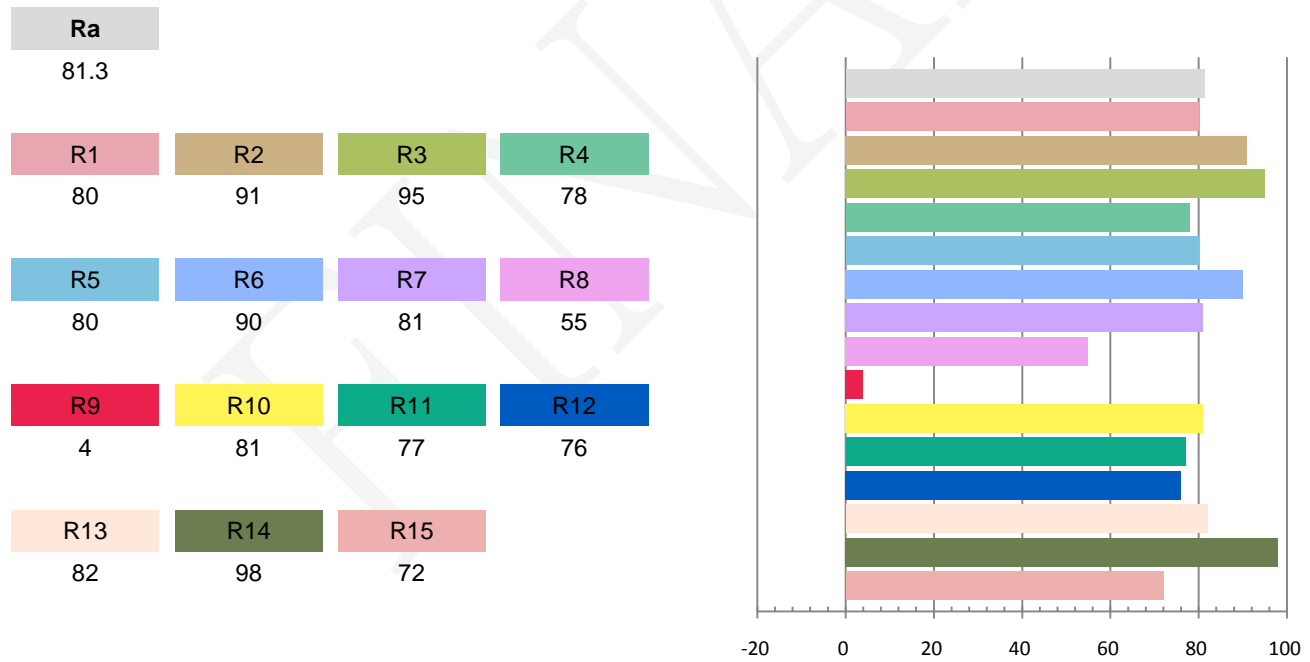
Test orientation: **Base Up**

Photometric and Electrical Measurement Result

Voltage (V)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Luminous Flux(lm)	Efficacy (lm/W)
120.0	60	0.08043	6.922	0.7170	621.33	89.76

Radiant Flux (W)	CCT (K)	Duv	x	y	u'	v'
1.925	2715	0.00036	0.4592	0.4114	0.2617	0.5276

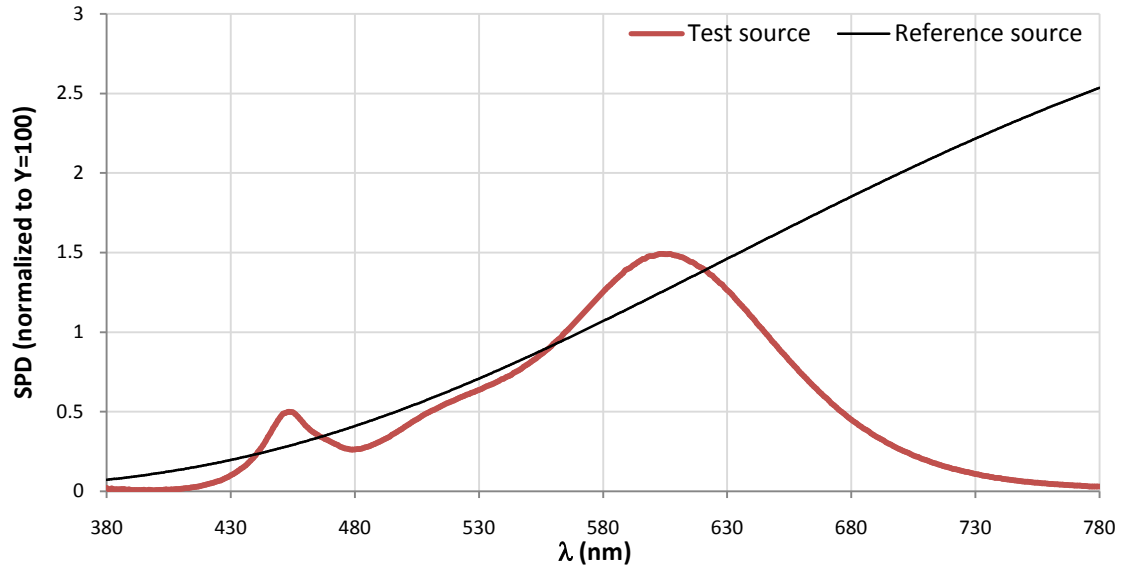
Color Rendering Index



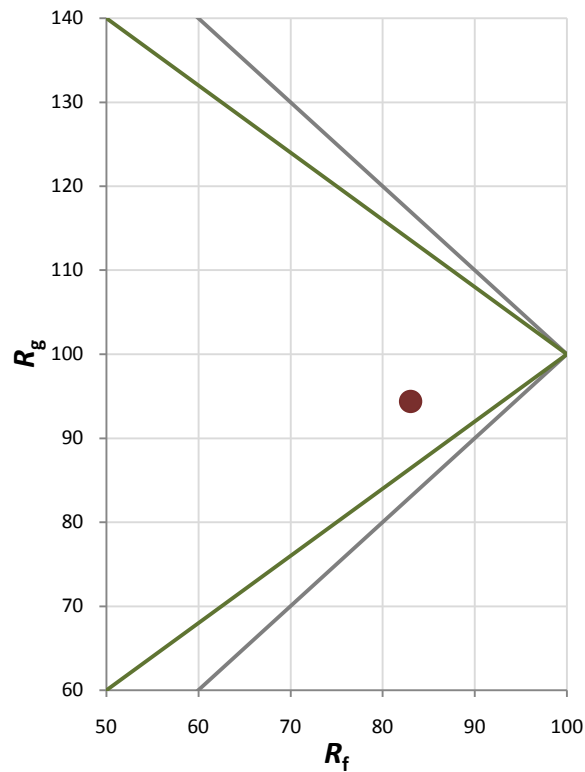
Fidelity Index and Gamut Index

Fidelity Index R_f	83
Gamut Index R_g	94

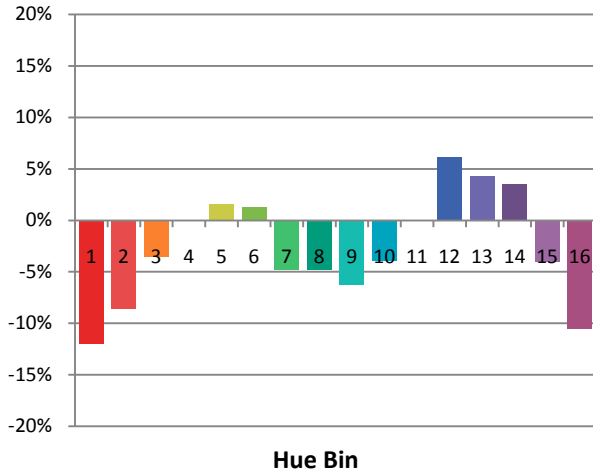
Spectral Power Distribution Comparison



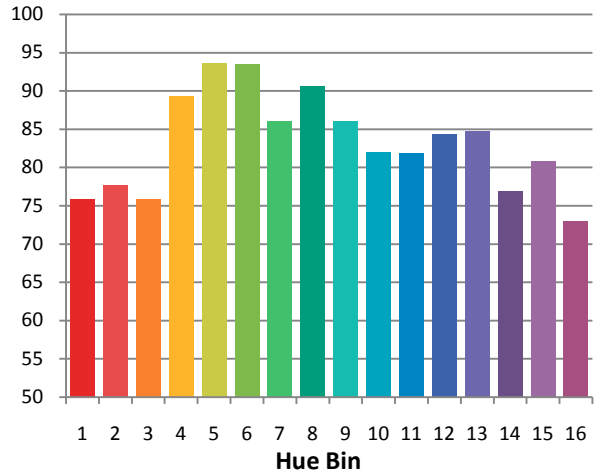
Plot of R_g versus R_f



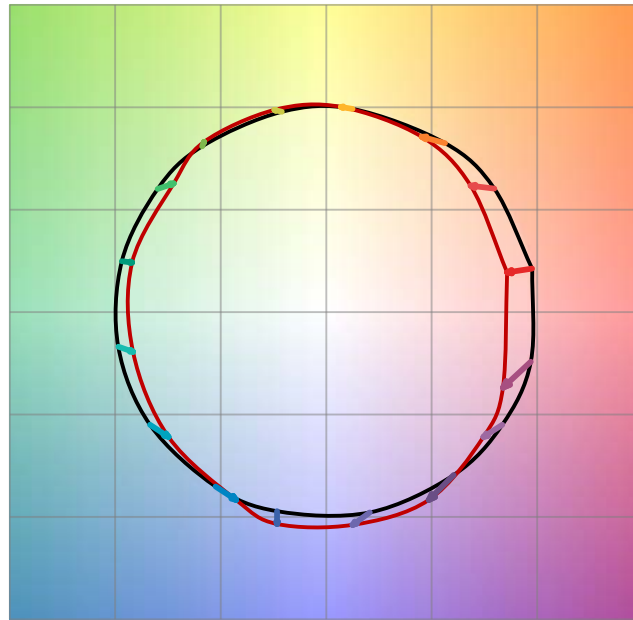
Chroma Shift by Hue



R_f by Hue

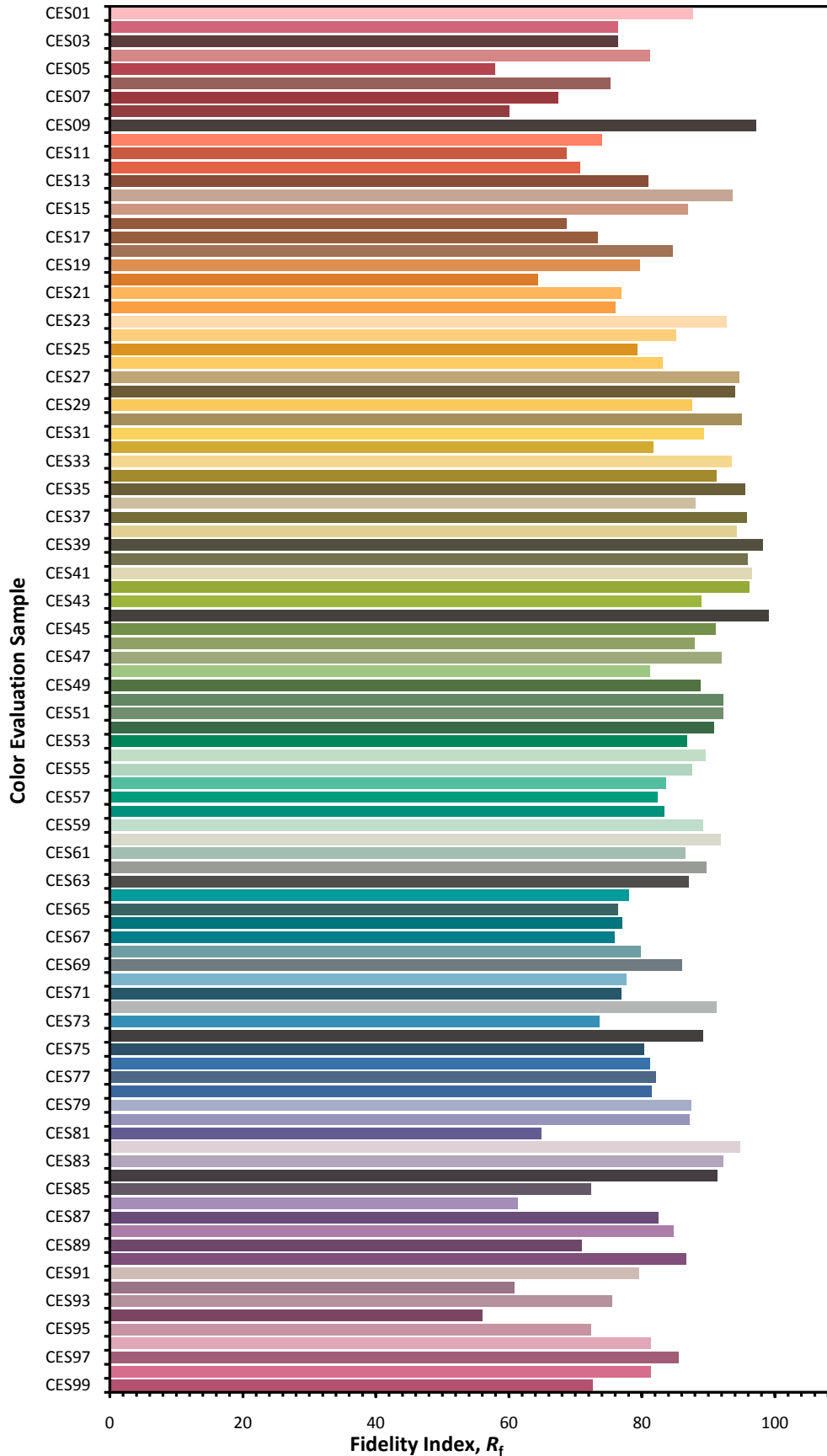


Color Vector Graphic

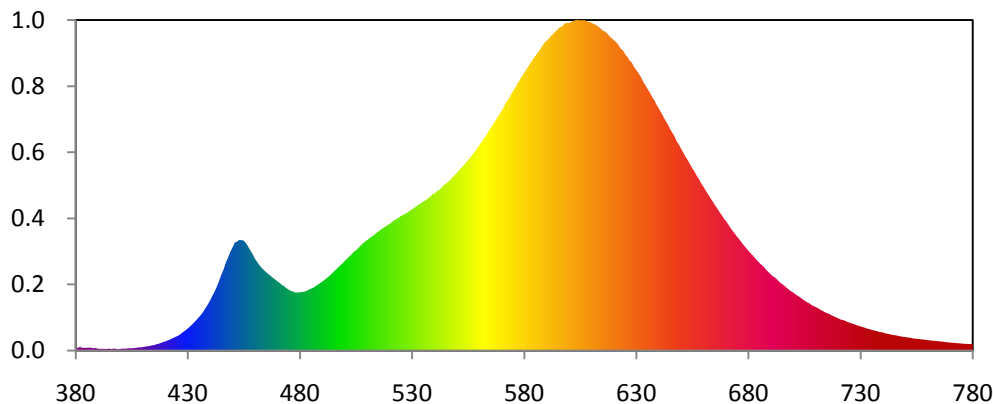


— Reference Illuminat — Test Source

Color Fidelity by CES Sample



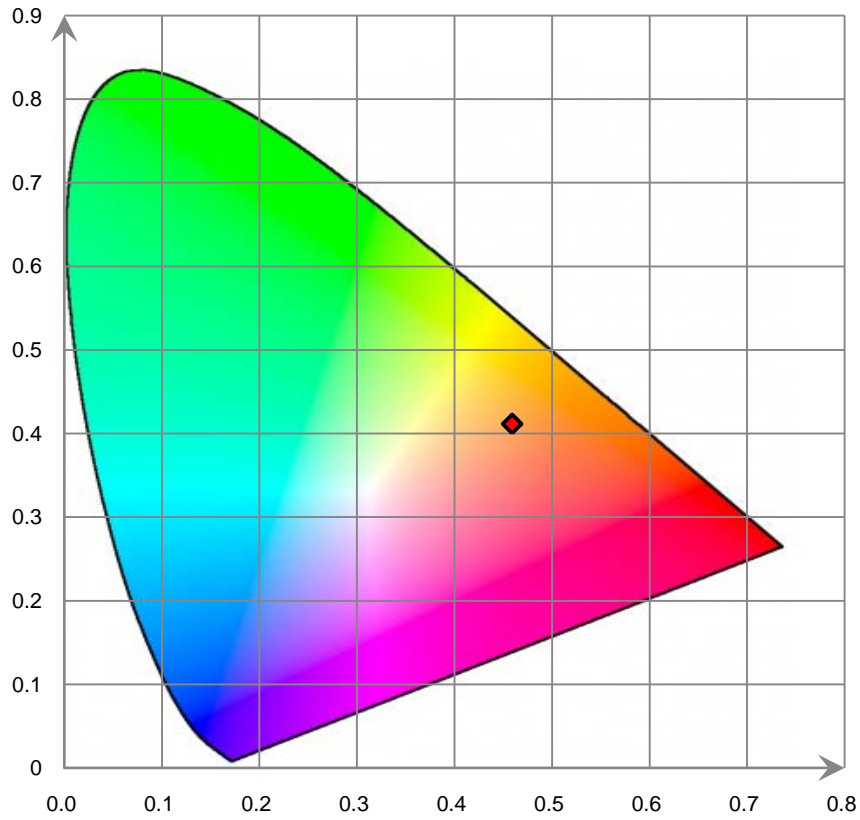
Relative Spectral Power Distribution



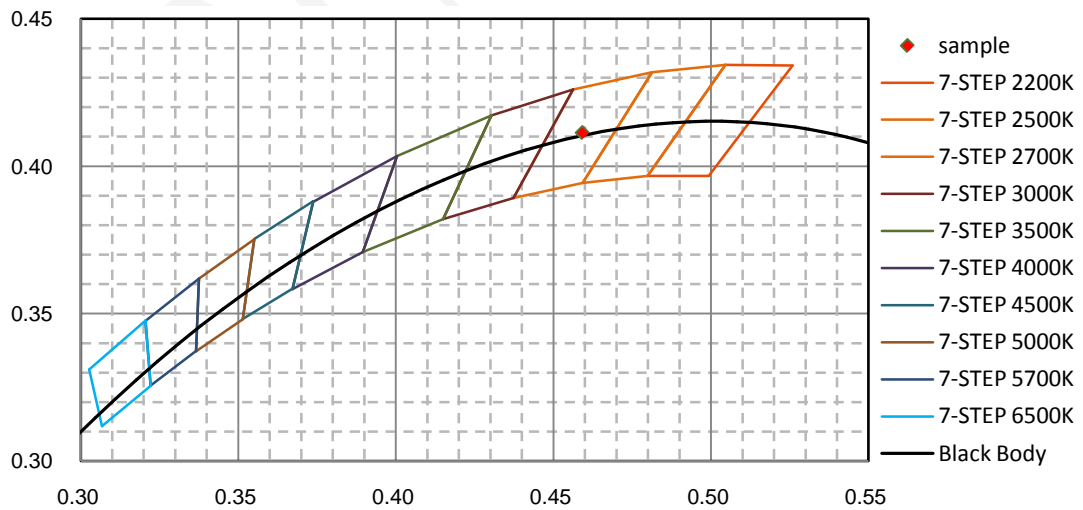
nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
380	2.056E-01	421	4.200E-01	462	3.504E+00	503	3.940E+00	544	6.772E+00
381	1.044E-01	422	4.496E-01	463	3.394E+00	504	4.046E+00	545	6.841E+00
382	1.554E-01	423	4.992E-01	464	3.301E+00	505	4.113E+00	546	6.917E+00
383	1.139E-01	424	5.386E-01	465	3.217E+00	506	4.202E+00	547	6.995E+00
384	1.175E-01	425	5.831E-01	466	3.135E+00	507	4.298E+00	548	7.108E+00
385	1.158E-01	426	6.273E-01	467	3.068E+00	508	4.392E+00	549	7.199E+00
386	1.243E-01	427	6.984E-01	468	2.986E+00	509	4.468E+00	550	7.292E+00
387	1.203E-01	428	7.668E-01	469	2.919E+00	510	4.535E+00	551	7.401E+00
388	9.713E-02	429	8.307E-01	470	2.843E+00	511	4.605E+00	552	7.497E+00
389	1.103E-01	430	9.055E-01	471	2.778E+00	512	4.666E+00	553	7.597E+00
390	7.582E-02	431	9.900E-01	472	2.698E+00	513	4.741E+00	554	7.710E+00
391	7.538E-02	432	1.076E+00	473	2.644E+00	514	4.816E+00	555	7.818E+00
392	7.395E-02	433	1.168E+00	474	2.563E+00	515	4.884E+00	556	7.920E+00
393	7.205E-02	434	1.270E+00	475	2.505E+00	516	4.956E+00	557	8.045E+00
394	6.809E-02	435	1.373E+00	476	2.448E+00	517	5.023E+00	558	8.152E+00
395	8.745E-02	436	1.478E+00	477	2.425E+00	518	5.078E+00	559	8.287E+00
396	6.045E-02	437	1.602E+00	478	2.386E+00	519	5.137E+00	560	8.421E+00
397	8.466E-02	438	1.755E+00	479	2.385E+00	520	5.196E+00	561	8.554E+00
398	7.542E-02	439	1.896E+00	480	2.392E+00	521	5.270E+00	562	8.691E+00
399	4.796E-02	440	2.060E+00	481	2.406E+00	522	5.343E+00	563	8.797E+00
400	7.479E-02	441	2.247E+00	482	2.417E+00	523	5.393E+00	564	8.987E+00
401	8.094E-02	442	2.425E+00	483	2.452E+00	524	5.444E+00	565	9.121E+00
402	8.102E-02	443	2.629E+00	484	2.502E+00	525	5.520E+00	566	9.257E+00
403	8.835E-02	444	2.862E+00	485	2.544E+00	526	5.567E+00	567	9.401E+00
404	1.051E-01	445	3.115E+00	486	2.579E+00	527	5.626E+00	568	9.554E+00
405	9.658E-02	446	3.329E+00	487	2.645E+00	528	5.662E+00	569	9.698E+00
406	1.072E-01	447	3.606E+00	488	2.707E+00	529	5.740E+00	570	9.840E+00
407	1.119E-01	448	3.822E+00	489	2.770E+00	530	5.791E+00	571	1.001E+01
408	1.321E-01	449	4.049E+00	490	2.828E+00	531	5.859E+00	572	1.019E+01
409	1.339E-01	450	4.237E+00	491	2.898E+00	532	5.933E+00	573	1.032E+01
410	1.468E-01	451	4.431E+00	492	2.978E+00	533	5.994E+00	574	1.048E+01
411	1.644E-01	452	4.473E+00	493	3.051E+00	534	6.044E+00	575	1.064E+01
412	1.765E-01	453	4.541E+00	494	3.132E+00	535	6.115E+00	576	1.077E+01
413	1.880E-01	454	4.535E+00	495	3.231E+00	536	6.161E+00	577	1.094E+01
414	2.172E-01	455	4.514E+00	496	3.314E+00	537	6.237E+00	578	1.109E+01
415	2.277E-01	456	4.407E+00	497	3.402E+00	538	6.307E+00	579	1.126E+01
416	2.613E-01	457	4.262E+00	498	3.496E+00	539	6.408E+00	580	1.139E+01
417	2.801E-01	458	4.105E+00	499	3.574E+00	540	6.437E+00	581	1.154E+01
418	3.159E-01	459	3.947E+00	500	3.679E+00	541	6.530E+00	582	1.168E+01
419	3.503E-01	460	3.770E+00	501	3.766E+00	542	6.588E+00	583	1.182E+01
420	3.754E-01	461	3.638E+00	502	3.857E+00	543	6.661E+00	584	1.196E+01

nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
585	1.209E+01	626	1.205E+01	667	5.702E+00	708	1.884E+00	749	5.684E-01
586	1.222E+01	627	1.190E+01	668	5.574E+00	709	1.830E+00	750	5.544E-01
587	1.234E+01	628	1.182E+01	669	5.424E+00	710	1.788E+00	751	5.409E-01
588	1.248E+01	629	1.163E+01	670	5.317E+00	711	1.741E+00	752	5.289E-01
589	1.263E+01	630	1.151E+01	671	5.184E+00	712	1.684E+00	753	5.104E-01
590	1.271E+01	631	1.138E+01	672	5.033E+00	713	1.634E+00	754	4.934E-01
591	1.279E+01	632	1.123E+01	673	4.911E+00	714	1.583E+00	755	4.860E-01
592	1.291E+01	633	1.104E+01	674	4.794E+00	715	1.538E+00	756	4.778E-01
593	1.299E+01	634	1.089E+01	675	4.666E+00	716	1.506E+00	757	4.615E-01
594	1.310E+01	635	1.074E+01	676	4.560E+00	717	1.452E+00	758	4.556E-01
595	1.318E+01	636	1.059E+01	677	4.434E+00	718	1.409E+00	759	4.420E-01
596	1.327E+01	637	1.042E+01	678	4.317E+00	719	1.368E+00	760	4.268E-01
597	1.330E+01	638	1.029E+01	679	4.205E+00	720	1.327E+00	761	4.220E-01
598	1.341E+01	639	1.010E+01	680	4.096E+00	721	1.277E+00	762	4.102E-01
599	1.344E+01	640	9.942E+00	681	3.993E+00	722	1.259E+00	763	4.006E-01
600	1.344E+01	641	9.780E+00	682	3.900E+00	723	1.230E+00	764	3.917E-01
601	1.348E+01	642	9.605E+00	683	3.789E+00	724	1.186E+00	765	3.836E-01
602	1.353E+01	643	9.439E+00	684	3.686E+00	725	1.149E+00	766	3.703E-01
603	1.356E+01	644	9.292E+00	685	3.589E+00	726	1.118E+00	767	3.644E-01
604	1.356E+01	645	9.100E+00	686	3.506E+00	727	1.091E+00	768	3.516E-01
605	1.355E+01	646	8.952E+00	687	3.422E+00	728	1.054E+00	769	3.394E-01
606	1.355E+01	647	8.799E+00	688	3.304E+00	729	1.022E+00	770	3.305E-01
607	1.356E+01	648	8.593E+00	689	3.217E+00	730	9.906E-01	771	3.257E-01
608	1.351E+01	649	8.454E+00	690	3.124E+00	731	9.674E-01	772	3.210E-01
609	1.348E+01	650	8.279E+00	691	3.048E+00	732	9.385E-01	773	3.034E-01
610	1.346E+01	651	8.119E+00	692	2.986E+00	733	9.008E-01	774	3.034E-01
611	1.340E+01	652	7.952E+00	693	2.898E+00	734	8.812E-01	775	2.902E-01
612	1.337E+01	653	7.812E+00	694	2.801E+00	735	8.527E-01	776	2.815E-01
613	1.330E+01	654	7.635E+00	695	2.731E+00	736	8.264E-01	777	2.779E-01
614	1.322E+01	655	7.479E+00	696	2.667E+00	737	8.065E-01	778	2.732E-01
615	1.313E+01	656	7.333E+00	697	2.584E+00	738	7.745E-01	779	2.735E-01
616	1.309E+01	657	7.171E+00	698	2.501E+00	739	7.612E-01	780	2.738E-01
617	1.301E+01	658	7.030E+00	699	2.438E+00	740	7.400E-01		
618	1.290E+01	659	6.852E+00	700	2.383E+00	741	7.116E-01		
619	1.282E+01	660	6.718E+00	701	2.306E+00	742	6.922E-01		
620	1.274E+01	661	6.558E+00	702	2.250E+00	743	6.765E-01		
621	1.266E+01	662	6.417E+00	703	2.188E+00	744	6.482E-01		
622	1.254E+01	663	6.268E+00	704	2.121E+00	745	6.382E-01		
623	1.239E+01	664	6.129E+00	705	2.055E+00	746	6.193E-01		
624	1.232E+01	665	5.979E+00	706	1.993E+00	747	6.023E-01		
625	1.216E+01	666	5.852E+00	707	1.950E+00	748	5.821E-01		

CIE 1931 x y Chromaticity Diagram



7-Step Chromaticity Quadrangles



[Goniophotometer System]

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

Test orientation: **Base Up**

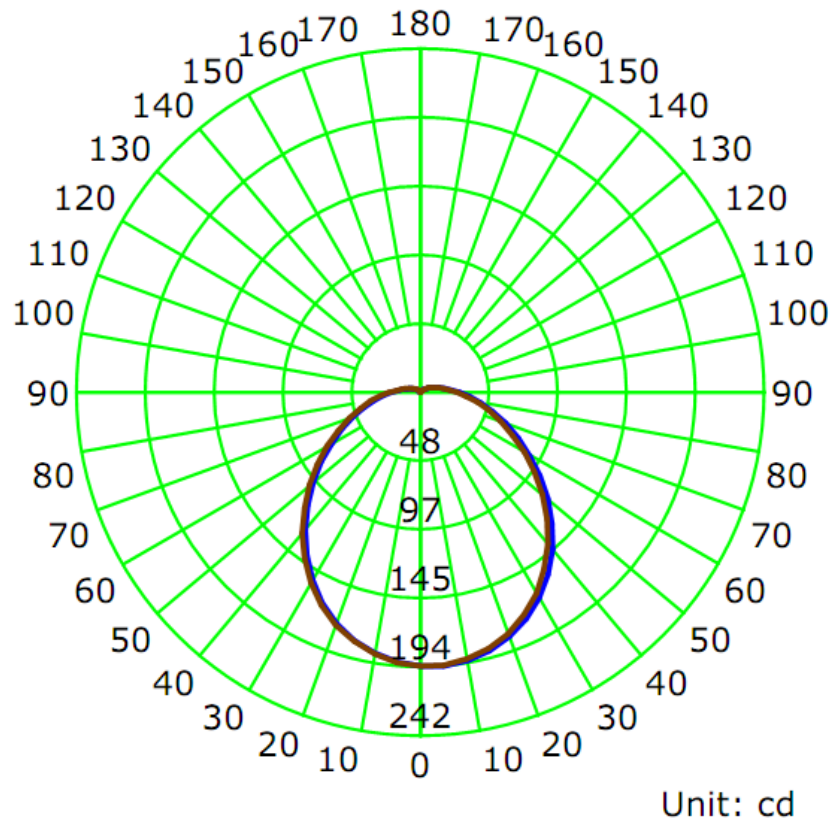
Electrical Measurement

Input Voltage (V)	Frequency (Hz)	Input Current (A)	Power (W)	Power Factor
120.0	60	0.0800	6.92	0.7220

Photometric Measurement

Luminous Flux (lm)	Efficacy (lm/W)	I _{max} (cd)	S/MH (C0/180)	S/MH (C90/270)
623.1	90.09	193.7	1.23	1.23

Luminous Intensity Distribution



	C0/180	C45/225	C90/270	C135/315	AVG.
Beam Angle (50% I _{max}):	107.9	107.2	107.6	108.1	107.8
Field Angle (10% I _{max}):	189.8	189.9	190.0	189.5	189.8

Luminous Intensity (cd) Distribution Data

C γ	0°	22.5°	45°	67.5°	90°	112.5°	135°	157.5°
0.0°	194	194	194	194	194	194	194	194
5.0°	194	194	194	194	194	193	193	192
10.0°	193	193	193	192	192	191	190	189
15.0°	189	189	189	188	188	187	185	184
20.0°	184	184	183	183	182	181	179	177
25.0°	177	177	176	175	174	173	171	168
30.0°	168	167	166	165	164	163	160	157
35.0°	157	157	155	154	153	151	148	145
40.0°	145	145	143	142	140	138	135	131
45.0°	132	131	130	128	126	124	120	117
50.0°	117	117	116	115	112	109	106	103
55.0°	103	103	102	101	98	95	92	89
60.0°	89	90	89	87	85	82	79	76
65.0°	76	77	76	74	72	69	66	64
70.0°	64	65	64	63	61	58	55	53
75.0°	53	54	53	52	50	48	46	44
80.0°	44	44	44	43	41	39	37	35
85.0°	35	36	35	34	33	31	30	28
90.0°	28	28	28	27	26	25	23	22
95.0°	22	22	22	22	21	20	18	18
100.0°	17	18	18	17	16	16	15	14
105.0°	14	14	14	14	13	12	12	11
110.0°	11	11	11	11	11	10	10	9
115.0°	9	9	9	9	9	8	8	7
120.0°	7	7	7	7	7	6	6	6
125.0°	6	6	6	6	5	5	5	5
130.0°	4	5	5	4	4	4	4	3
135.0°	3	3	3	3	3	3	3	3
140.0°	2	3	3	2	2	2	2	2
145.0°	2	2	2	2	1	1	1	1
150.0°	1	1	1	1	1	1	1	1
155.0°	1	1	1	1	0	0	0	0
160.0°	0	0	0	0	0	0	0	0
165.0°	0	0	0	0	0	0	0	0
170.0°	0	0	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

Luminous Intensity (cd) Distribution Data (cont.)

C y	180°	202.5°	225°	247.5°	270°	292.5°	315°	337.5°
0.0°	194	194	194	194	194	194	194	194
5.0°	192	191	191	191	192	193	193	194
10.0°	188	187	187	187	188	189	191	192
15.0°	182	181	180	181	182	185	187	188
20.0°	174	172	172	173	175	178	181	183
25.0°	164	163	162	164	166	170	173	175
30.0°	153	151	151	152	156	160	163	166
35.0°	141	139	139	140	143	148	152	155
40.0°	127	125	125	127	130	135	139	143
45.0°	113	112	112	113	116	121	125	129
50.0°	99	98	98	100	103	107	111	114
55.0°	86	84	85	87	89	93	97	100
60.0°	73	72	73	74	76	80	83	86
65.0°	61	61	61	62	65	67	70	73
70.0°	51	50	51	52	54	56	59	61
75.0°	42	41	41	42	44	46	49	51
80.0°	34	33	33	34	36	38	40	41
85.0°	27	26	27	27	29	30	32	33
90.0°	21	21	21	22	23	24	25	26
95.0°	17	17	17	17	18	19	20	21
100.0°	13	13	14	14	14	15	16	17
105.0°	11	11	11	11	12	12	13	13
110.0°	9	9	9	9	9	10	10	11
115.0°	7	7	7	7	8	8	8	9
120.0°	6	6	6	6	6	6	7	7
125.0°	4	4	4	5	5	5	5	5
130.0°	3	3	3	4	4	4	4	4
135.0°	2	2	2	3	3	3	3	3
140.0°	2	2	2	2	2	2	2	2
145.0°	1	1	1	1	1	1	1	2
150.0°	1	1	1	1	1	1	1	1
155.0°	0	0	1	0	0	1	1	1
160.0°	0	0	0	0	0	0	0	0
165.0°	0	0	0	0	0	0	0	0
170.0°	0	0	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	4.6	0.74
5-10	13.7	2.20
10-15	22.3	3.57
15-20	30.0	4.81
20-25	36.6	5.88
25-30	41.8	6.71
30-35	45.5	7.30
35-40	47.4	7.61
40-45	47.6	7.65
45-50	46.4	7.44
50-55	43.8	7.04
55-60	40.4	6.48
60-65	36.3	5.82
65-70	31.9	5.11
70-75	27.3	4.38
75-80	22.9	3.68
80-85	18.8	3.01
85-90	15.1	2.43
90-95	12.0	1.92
95-100	9.4	1.51
100-105	7.4	1.19
105-110	5.8	0.94
110-115	4.6	0.73
115-120	3.5	0.56
120-125	2.6	0.42
125-130	1.9	0.31
130-135	1.3	0.22
135-140	0.9	0.14
140-145	0.6	0.09
145-150	0.3	0.05
150-155	0.2	0.03
155-160	0.1	0.01
160-165	0.0	0.01
165-170	0.0	0.00
170-175	0.0	0.00
175-180	0.0	0.00

Deg	Flux (lm)	%
0-5	4.6	0.74
0-10	18.3	2.94
0-15	40.6	6.51
0-20	70.6	11.32
0-25	107.2	17.20
0-30	149.0	23.91
0-35	194.5	31.21
0-40	241.9	38.82
0-45	289.5	46.46
0-50	335.9	53.91
0-55	379.7	60.94
0-60	420.1	67.43
0-65	456.4	73.25
0-70	488.3	78.36
0-75	515.6	82.75
0-80	538.5	86.42
0-85	557.3	89.44
0-90	572.4	91.86
0-95	584.3	93.78
0-100	593.8	95.30
0-105	601.2	96.49
0-110	607.0	97.43
0-115	611.6	98.16
0-120	615.1	98.72
0-125	617.7	99.14
0-130	619.7	99.45
0-135	621.0	99.67
0-140	621.9	99.81
0-145	622.5	99.90
0-150	622.8	99.95
0-155	622.9	99.98
0-160	623.0	99.99
0-165	623.1	100.00
0-170	623.1	100.00
0-175	623.1	100.00
0-180	623.1	100.00

6. Product Photo



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