



# IES LM-79-08

## MEASUREMENT AND TEST REPORT

For

### GREEN CREATIVE LTD

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

**Test Model: 7.5FA19DIM/827SB**

<b>Report Type:</b>	Electrical and Photometric tests including: Luminous Flux, Chromaticity, Luminous Intensity Distribution
<b>Test Engineer:</b>	George Yang <i>George Yang</i>
<b>Report Number:</b>	PKS180910082-10
<b>Test Date:</b>	2018-09-10 to 2018-09-11
<b>Report Date:</b>	2018-09-18
<b>Reviewed By:</b>	Ray Gao/EE Engineer <i>Ray Gao</i>
<b>Prepared By:</b>	Bay Area Compliance Laboratories Corp. (Kunshan). No.248 Chenghu Road, Kunshan, Jiangsu province, China. Tel: +86-0512-86175000 Fax: +86-0512-88934268
<b>Test Facility:</b>	Test facility was located at No.248 Chenghu Road, Kunshan, Jiangsu province, China.
<b>Accreditation:</b>	The IAS Accreditation Number TL-749.

**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. (Kunshan). 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 2018-09-10 and used for testing.

Model Tested: 7.5FA19DIM/827SB  
 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: 680lm

## 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

## 3. Description of Test Equipment

Device	Manufacture	Model No	Serial No	Calibration date	Calibration due date
Integrating Sphere	INVENTFINE	Dia 1.5m	JWWCV090112	2018-01-24	2019-01-24
Power Meter	INVENTFINE	WT500	GSJWQ20009	2018-04-08	2019-04-08
Spectral photometer	INVENTFINE	CMS-3S	GSGSE100017	2018-01-24	2019-01-24
AC Power Supply	INVENTFINE	CHP500	JWJSD010071	2018-04-08	2019-04-08
Standard Light Source	INVENTFINE	N/A	JWWCR020106	2018-01-24	2019-01-24
Thermal Meter	KEJIAN	TA298	N/A	2017-11-14	2018-11-14
DC Power Supply	INVENTFINE	WL3005	JWWCP020069	2018-04-08	2019-04-08
AC Power Supply	INVENTFINE	CHP-5KVA	900511765	2018-04-08	2019-04-08
DC Power Supply	INVENTFINE	WL3010	JWDMP030001	2018-04-08	2019-04-08
Power Meter	INVENTFINE	WT500	GSDSQ200007	2018-04-08	2019-04-08
Goniophotometer	INVENTFINE	GPM-1900	YWGCF120001	2018-01-24	2019-01-24
Wireless Weather Station	ZHONGXING	KG218	N/A	2017-11-14	2018-11-14
Standard Light Source	INVENTFINE	N/A	JWBYR040007	2018-01-24	2019-01-24

Statement of Traceability: Bay Area Compliance Laboratories Corp.(Kunshan) 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.

$4\pi$  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  $U=2.6\%$  ( $K=2$ ), at the 95% confidence level. The uncertainty of the correlated color temperature measurements is  $U=24\text{K}$  ( $K=2$ ), at the 95% confidence level. The uncertainty of the CRI is  $U=2.5$  ( $K=2$ ), at the 95% confidence level.

The uncertainty of power meter AC current  $U=0.16\%$  of rdg, AC Voltage  $U=0.18\%$  of rdg, Power  $U=0.14\%$  ( $K=2$ ), 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 ( $\gamma$ ) 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 flux is  $U=2.6\%$  ( $K=2$ ), 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**

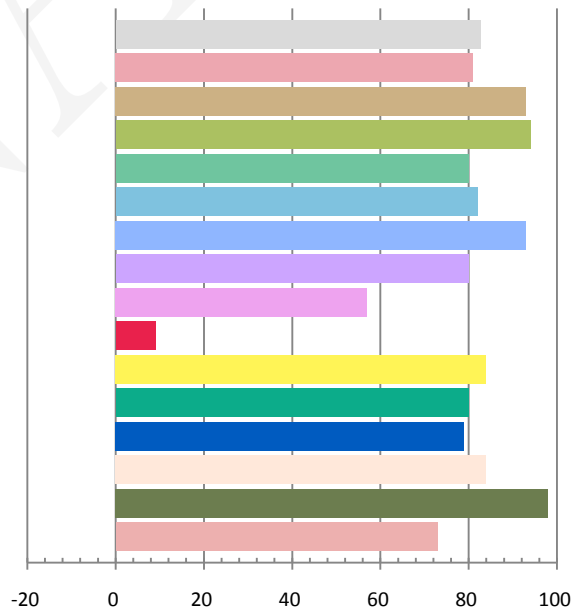
### Photometric and Electrical Measurement Result

Voltage (V)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Luminous Flux(lm)	Efficacy (lm/W)
120.0	60	0.0839	7.15	0.7103	745.4	104.25

Radiant Flux (W)	CCT (K)	Duv	x	y	u'	v'
2.315	2685	0.00006	0.4612	0.4111	0.2631	0.5277

### Color Rendering Index

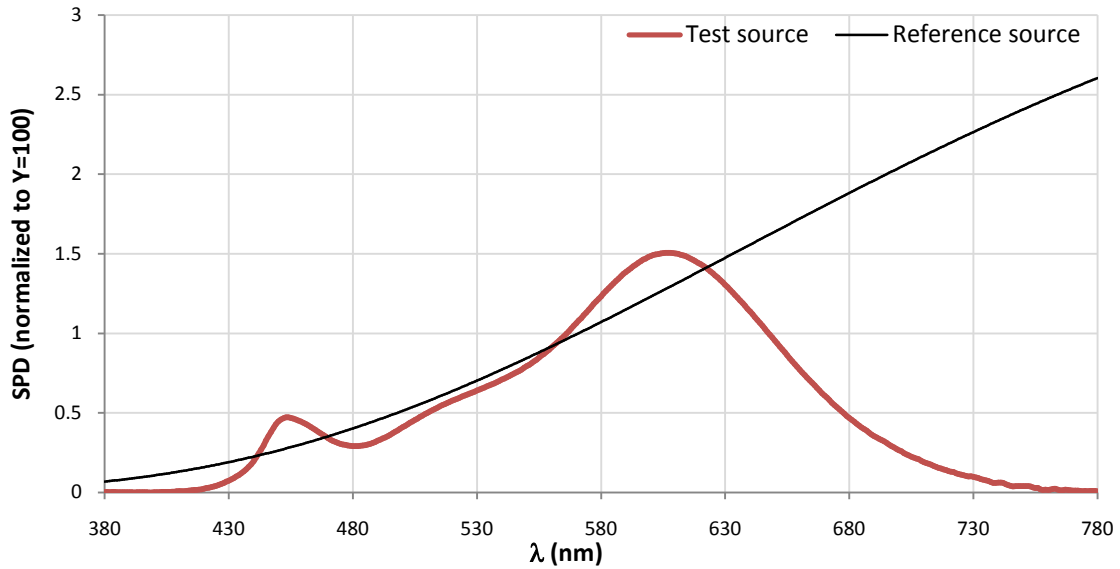
Ra			
<b>82.7</b>			
R1	R2	R3	R4
81	93	94	80
R5	R6	R7	R8
82	93	80	57
R9	R10	R11	R12
9	84	80	79
R13	R14	R15	
84	98	73	



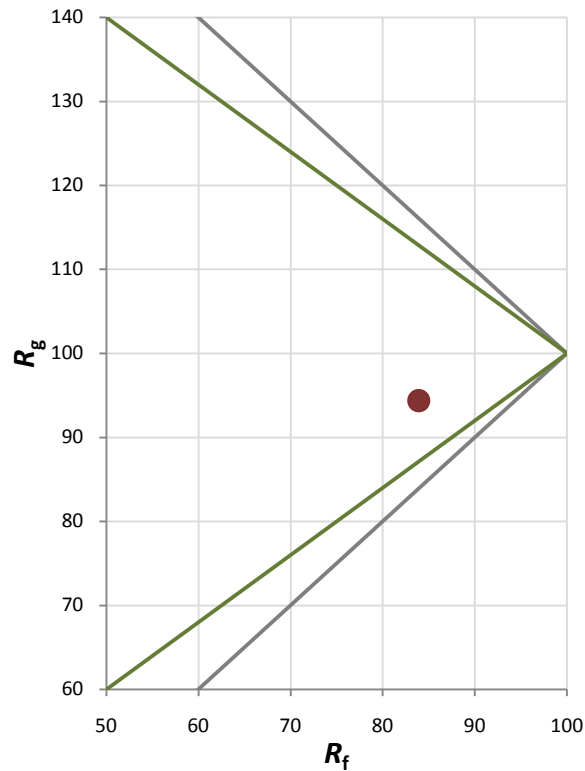
Fidelity Index and Gamut Index

Fidelity Index $R_f$	84
Gamut Index $R_g$	94

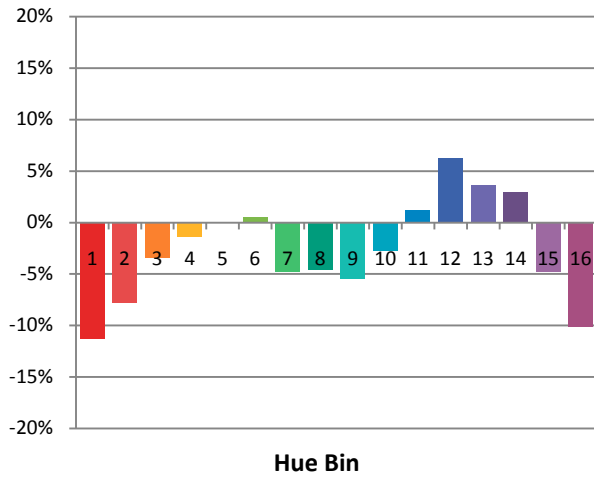
Spectral Power Distribution Comparison



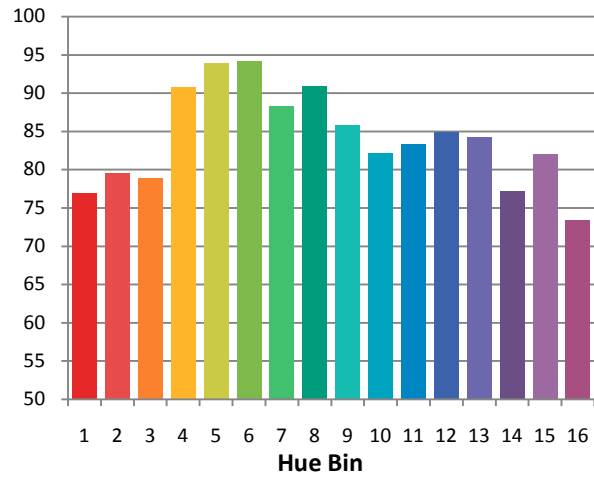
Plot of  $R_g$  versus  $R_f$



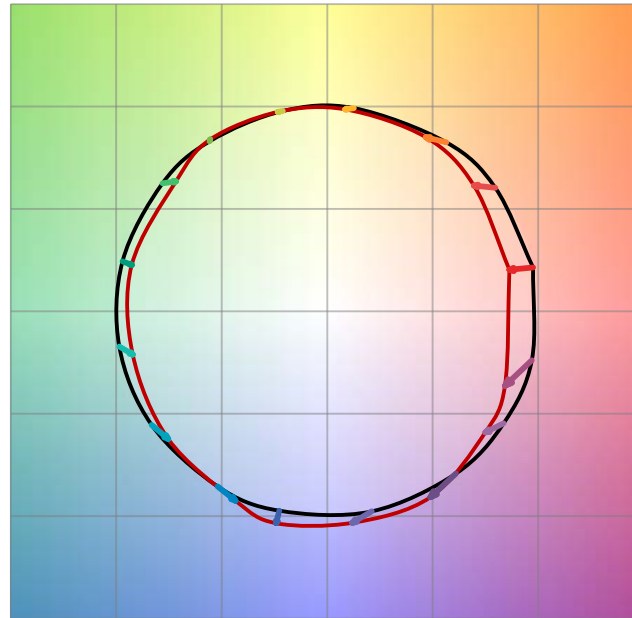
Chroma Shift by Hue



$R_f$  by Hue

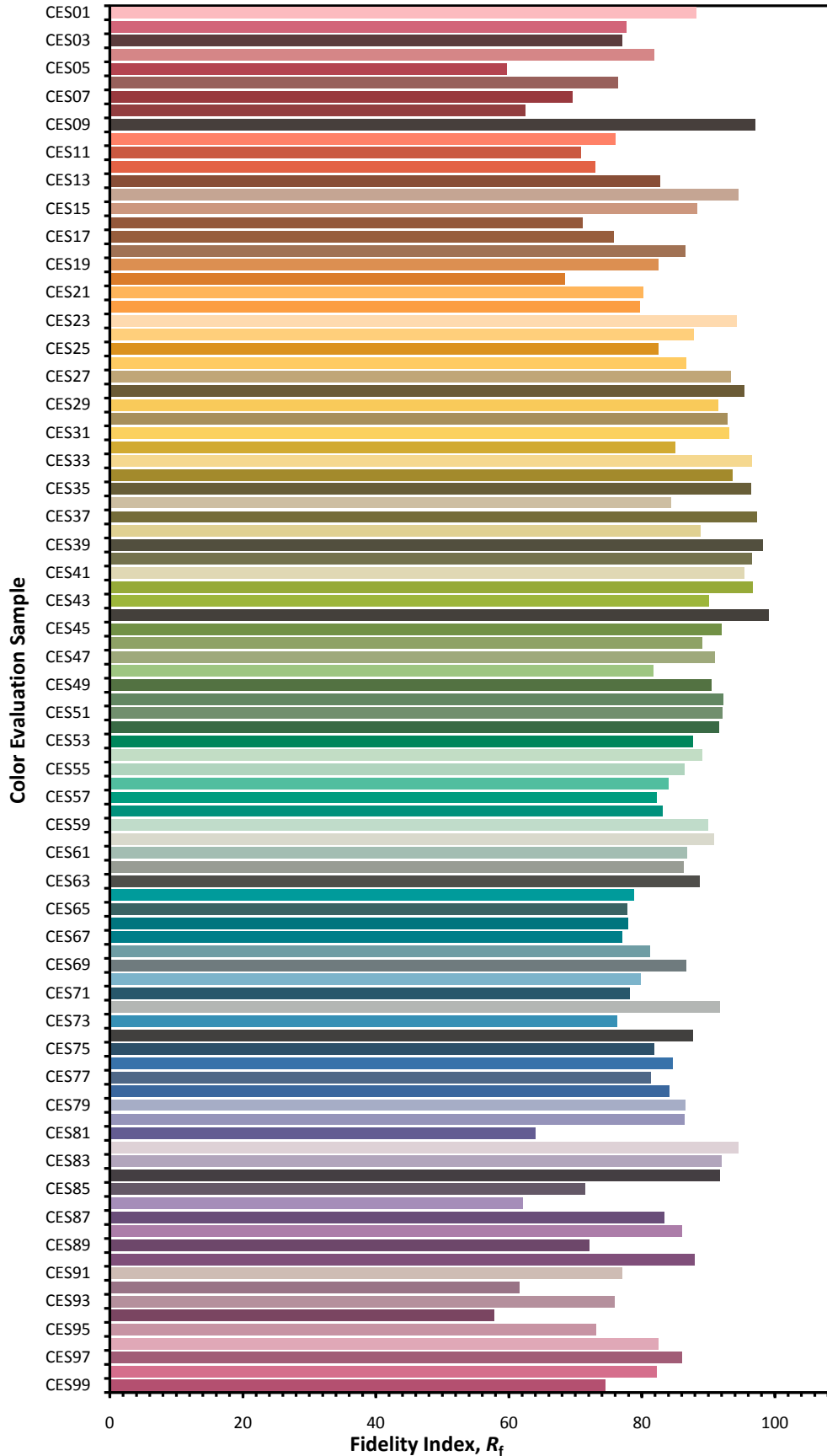


Color Vector Graphic

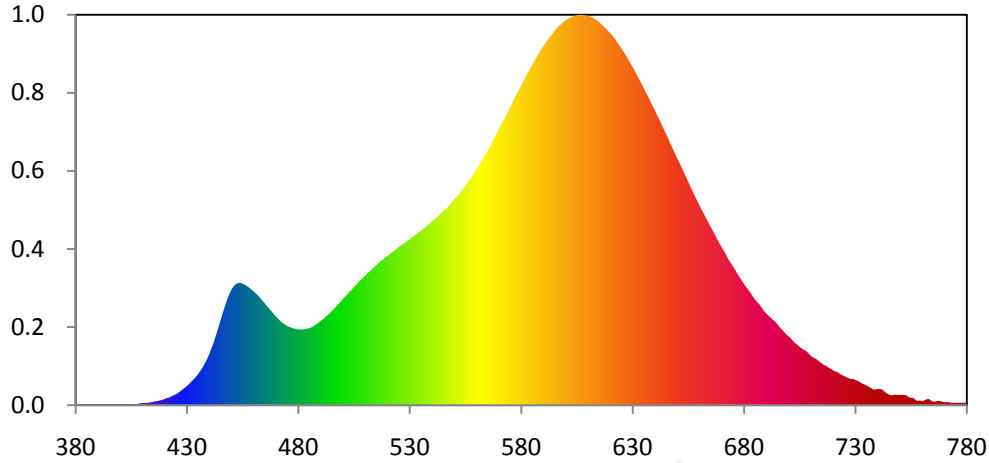


— Reference Illuminat    — Test Source

**Color Fidelity by CES Sample**



### Relative Spectral Power Distribution

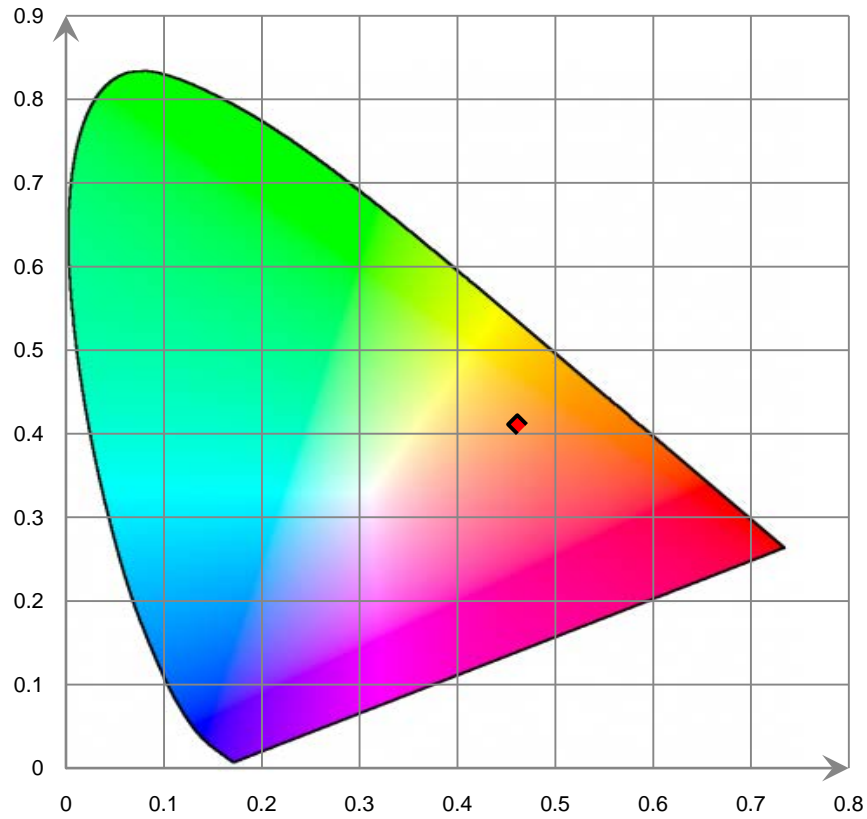


nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
380	4.490E-02	421	3.010E-01	462	4.607E+00	503	4.773E+00	544	8.070E+00
381	3.830E-02	422	3.221E-01	463	4.498E+00	504	4.874E+00	545	8.151E+00
382	3.000E-02	423	3.688E-01	464	4.387E+00	505	4.977E+00	546	8.239E+00
383	3.940E-02	424	4.150E-01	465	4.280E+00	506	5.074E+00	547	8.332E+00
384	4.830E-02	425	4.583E-01	466	4.166E+00	507	5.171E+00	548	8.431E+00
385	3.130E-02	426	5.147E-01	467	4.054E+00	508	5.271E+00	549	8.548E+00
386	2.700E-02	427	5.846E-01	468	3.944E+00	509	5.365E+00	550	8.662E+00
387	2.410E-02	428	6.556E-01	469	3.837E+00	510	5.451E+00	551	8.761E+00
388	2.010E-02	429	7.344E-01	470	3.731E+00	511	5.551E+00	552	8.870E+00
389	2.590E-02	430	8.075E-01	471	3.629E+00	512	5.637E+00	553	8.990E+00
390	2.500E-02	431	8.950E-01	472	3.538E+00	513	5.722E+00	554	9.115E+00
391	1.150E-02	432	9.923E-01	473	3.458E+00	514	5.804E+00	555	9.247E+00
392	9.200E-03	433	1.087E+00	474	3.394E+00	515	5.891E+00	556	9.381E+00
393	1.300E-02	434	1.189E+00	475	3.335E+00	516	5.982E+00	557	9.509E+00
394	1.640E-02	435	1.310E+00	476	3.294E+00	517	6.063E+00	558	9.648E+00
395	2.180E-02	436	1.442E+00	477	3.260E+00	518	6.136E+00	559	9.784E+00
396	2.050E-02	437	1.587E+00	478	3.231E+00	519	6.218E+00	560	9.933E+00
397	1.510E-02	438	1.751E+00	479	3.205E+00	520	6.288E+00	561	1.009E+01
398	9.200E-03	439	1.934E+00	480	3.189E+00	521	6.360E+00	562	1.024E+01
399	5.200E-03	440	2.144E+00	481	3.185E+00	522	6.431E+00	563	1.039E+01
400	1.800E-02	441	2.383E+00	482	3.186E+00	523	6.496E+00	564	1.055E+01
401	2.640E-02	442	2.643E+00	483	3.202E+00	524	6.572E+00	565	1.072E+01
402	3.110E-02	443	2.932E+00	484	3.224E+00	525	6.649E+00	566	1.088E+01
403	3.440E-02	444	3.230E+00	485	3.248E+00	526	6.721E+00	567	1.105E+01
404	3.800E-02	445	3.542E+00	486	3.283E+00	527	6.786E+00	568	1.123E+01
405	4.370E-02	446	3.856E+00	487	3.337E+00	528	6.844E+00	569	1.142E+01
406	4.730E-02	447	4.150E+00	488	3.400E+00	529	6.911E+00	570	1.162E+01
407	5.320E-02	448	4.435E+00	489	3.470E+00	530	6.987E+00	571	1.179E+01
408	5.280E-02	449	4.678E+00	490	3.544E+00	531	7.060E+00	572	1.196E+01
409	8.130E-02	450	4.867E+00	491	3.615E+00	532	7.126E+00	573	1.215E+01
410	9.650E-02	451	5.010E+00	492	3.697E+00	533	7.196E+00	574	1.234E+01
411	8.940E-02	452	5.098E+00	493	3.783E+00	534	7.275E+00	575	1.253E+01
412	9.000E-02	453	5.149E+00	494	3.863E+00	535	7.343E+00	576	1.272E+01
413	1.073E-01	454	5.148E+00	495	3.955E+00	536	7.416E+00	577	1.291E+01
414	1.264E-01	455	5.118E+00	496	4.056E+00	537	7.489E+00	578	1.309E+01
415	1.463E-01	456	5.071E+00	497	4.159E+00	538	7.571E+00	579	1.327E+01
416	1.636E-01	457	5.008E+00	498	4.265E+00	539	7.654E+00	580	1.346E+01
417	1.780E-01	458	4.939E+00	499	4.365E+00	540	7.734E+00	581	1.364E+01
418	2.061E-01	459	4.864E+00	500	4.465E+00	541	7.811E+00	582	1.382E+01
419	2.245E-01	460	4.788E+00	501	4.569E+00	542	7.892E+00	583	1.400E+01
420	2.628E-01	461	4.701E+00	502	4.669E+00	543	7.985E+00	584	1.416E+01

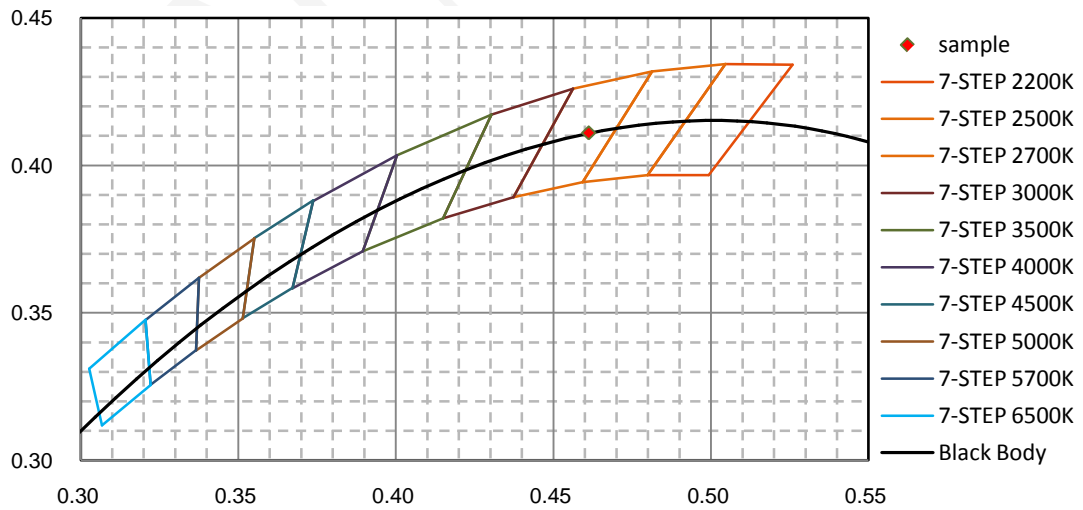


nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
585	1.433E+01	626	1.488E+01	667	7.182E+00	708	2.272E+00	749	4.325E-01
586	1.449E+01	627	1.473E+01	668	6.990E+00	709	2.181E+00	750	4.332E-01
587	1.466E+01	628	1.457E+01	669	6.811E+00	710	2.086E+00	751	4.334E-01
588	1.483E+01	629	1.441E+01	670	6.654E+00	711	2.012E+00	752	4.345E-01
589	1.498E+01	630	1.425E+01	671	6.506E+00	712	1.967E+00	753	4.117E-01
590	1.512E+01	631	1.408E+01	672	6.333E+00	713	1.903E+00	754	3.388E-01
591	1.525E+01	632	1.390E+01	673	6.150E+00	714	1.821E+00	755	3.090E-01
592	1.538E+01	633	1.372E+01	674	5.997E+00	715	1.753E+00	756	3.110E-01
593	1.551E+01	634	1.354E+01	675	5.853E+00	716	1.686E+00	757	2.212E-01
594	1.563E+01	635	1.335E+01	676	5.706E+00	717	1.654E+00	758	1.804E-01
595	1.575E+01	636	1.316E+01	677	5.544E+00	718	1.576E+00	759	1.968E-01
596	1.587E+01	637	1.299E+01	678	5.400E+00	719	1.527E+00	760	1.685E-01
597	1.596E+01	638	1.280E+01	679	5.247E+00	720	1.474E+00	761	2.040E-01
598	1.605E+01	639	1.260E+01	680	5.105E+00	721	1.419E+00	762	2.508E-01
599	1.614E+01	640	1.242E+01	681	4.980E+00	722	1.396E+00	763	2.618E-01
600	1.621E+01	641	1.222E+01	682	4.857E+00	723	1.322E+00	764	1.918E-01
601	1.627E+01	642	1.203E+01	683	4.724E+00	724	1.265E+00	765	1.460E-01
602	1.631E+01	643	1.183E+01	684	4.580E+00	725	1.229E+00	766	1.490E-01
603	1.635E+01	644	1.163E+01	685	4.442E+00	726	1.174E+00	767	1.867E-01
604	1.639E+01	645	1.144E+01	686	4.341E+00	727	1.133E+00	768	1.725E-01
605	1.642E+01	646	1.123E+01	687	4.240E+00	728	1.104E+00	769	1.482E-01
606	1.643E+01	647	1.101E+01	688	4.101E+00	729	1.107E+00	770	1.232E-01
607	1.644E+01	648	1.081E+01	689	3.971E+00	730	1.064E+00	771	1.287E-01
608	1.643E+01	649	1.061E+01	690	3.862E+00	731	1.034E+00	772	1.246E-01
609	1.641E+01	650	1.041E+01	691	3.774E+00	732	9.757E-01	773	1.042E-01
610	1.640E+01	651	1.021E+01	692	3.687E+00	733	9.098E-01	774	9.670E-02
611	1.636E+01	652	1.001E+01	693	3.597E+00	734	8.803E-01	775	1.030E-01
612	1.631E+01	653	9.813E+00	694	3.516E+00	735	8.286E-01	776	9.450E-02
613	1.626E+01	654	9.611E+00	695	3.408E+00	736	7.810E-01	777	1.052E-01
614	1.621E+01	655	9.402E+00	696	3.291E+00	737	7.216E-01	778	1.010E-01
615	1.613E+01	656	9.201E+00	697	3.191E+00	738	6.624E-01	779	1.031E-01
616	1.604E+01	657	8.997E+00	698	3.085E+00	739	6.588E-01	780	8.600E-02
617	1.595E+01	658	8.798E+00	699	2.981E+00	740	6.788E-01		
618	1.586E+01	659	8.617E+00	700	2.899E+00	741	6.803E-01		
619	1.576E+01	660	8.426E+00	701	2.821E+00	742	6.634E-01		
620	1.566E+01	661	8.225E+00	702	2.707E+00	743	5.778E-01		
621	1.556E+01	662	8.053E+00	703	2.615E+00	744	5.064E-01		
622	1.544E+01	663	7.882E+00	704	2.543E+00	745	4.521E-01		
623	1.530E+01	664	7.695E+00	705	2.456E+00	746	4.165E-01		
624	1.516E+01	665	7.514E+00	706	2.387E+00	747	4.272E-01		
625	1.502E+01	666	7.348E+00	707	2.328E+00	748	4.410E-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: **Downward**

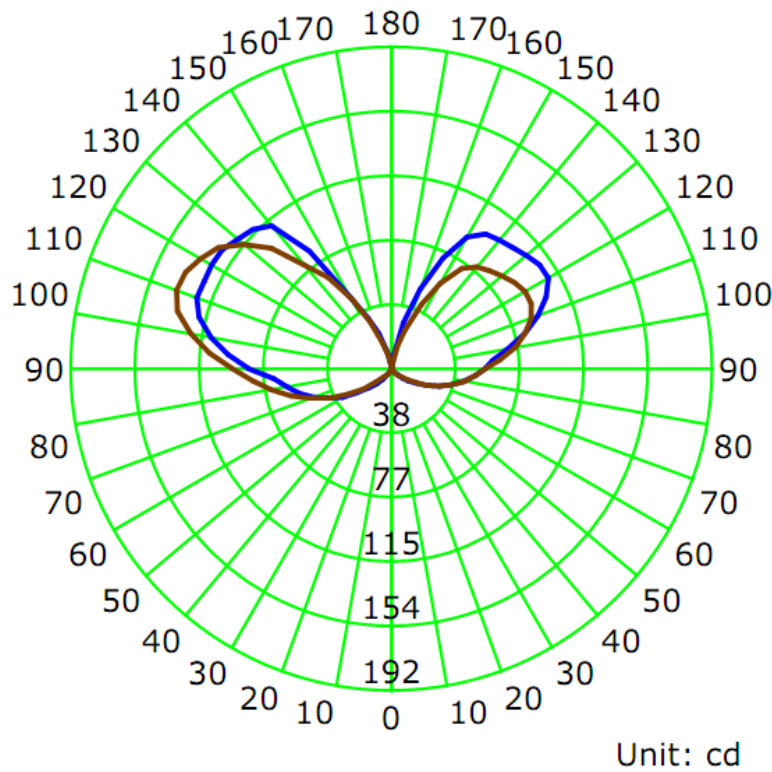
**Electrical Measurement**

Input Voltage (V)	Frequency (Hz)	Input Current (A)	Power (W)	Power Factor
120.0	60	0.0840	7.15	0.7110

**Photometric Measurement**

Luminous Flux (lm)	Efficacy (lm/W)	I <sub>max</sub> (cd)	S/MH (C0/180)	S/MH (C90/270)
747.4	104.58	154.3	-774.75	-779.65

**Luminous Intensity Distribution**



	C0/180	C45/225	C90/270	C135/315	AVG.
Beam Angle (50% I <sub>max</sub> ):	305.6	293.2	291.0	299.0	297.2
Field Angle (10% I <sub>max</sub> ):	333.3	324.6	326.9	330.6	328.9

Luminous Intensity (cd) Distribution Data

C γ	0°	22.5°	45°	67.5°	90°	112.5°	135°	157.5°
0.0°	0	0	0	0	0	0	0	0
5.0°	0	0	0	0	0	0	0	0
10.0°	0	0	0	0	0	0	0	0
15.0°	0	0	0	0	0	0	1	1
20.0°	0	0	0	0	0	1	1	1
25.0°	1	1	1	1	1	1	1	2
30.0°	1	1	1	1	2	2	2	2
35.0°	2	2	2	2	2	3	3	4
40.0°	3	3	4	4	4	5	5	6
45.0°	5	6	6	6	6	7	8	10
50.0°	8	9	9	8	8	9	11	15
55.0°	13	13	12	11	11	12	18	21
60.0°	17	17	17	14	17	16	25	29
65.0°	24	24	23	18	24	20	33	38
70.0°	31	31	30	22	31	25	40	46
75.0°	38	39	37	26	38	30	48	54
80.0°	44	46	44	30	44	36	56	61
85.0°	51	53	51	33	51	43	63	69
90.0°	56	60	57	36	57	51	73	80
95.0°	61	66	63	41	65	64	86	93
100.0°	71	77	73	50	76	77	97	104
105.0°	83	88	82	60	83	89	106	112
110.0°	94	98	90	68	89	98	112	116
115.0°	103	105	96	77	93	102	112	116
120.0°	109	109	102	82	93	102	109	116
125.0°	109	110	103	83	91	101	106	118
130.0°	106	107	100	84	87	98	102	117
135.0°	103	104	96	84	84	94	95	112
140.0°	101	97	90	84	80	89	86	103
145.0°	99	89	82	82	74	78	73	84
150.0°	91	77	72	70	59	58	59	64
155.0°	74	64	54	53	43	41	38	42
160.0°	51	45	38	33	25	27	22	20
165.0°	29	24	20	17	15	8	10	12
170.0°	9	9	5	4	3	1	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°	0	0	0	0	0	0	0	0
5.0°	0	0	0	0	0	0	0	0
10.0°	0	0	0	0	0	0	0	0
15.0°	1	1	1	1	0	0	0	0
20.0°	1	1	1	1	1	1	1	0
25.0°	2	2	2	2	1	1	1	1
30.0°	2	2	2	2	2	2	2	1
35.0°	5	5	4	4	3	2	2	2
40.0°	8	9	9	6	5	4	3	3
45.0°	13	14	13	10	7	6	6	5
50.0°	18	19	18	16	13	10	9	8
55.0°	26	29	28	24	21	16	13	13
60.0°	35	39	39	33	31	25	22	19
65.0°	42	49	50	42	42	36	32	28
70.0°	50	60	61	49	52	46	41	37
75.0°	57	70	72	57	63	56	51	45
80.0°	64	80	82	64	74	65	61	54
85.0°	71	89	92	71	84	73	70	61
90.0°	86	102	110	82	96	78	79	68
95.0°	99	115	127	96	110	86	89	75
100.0°	110	126	141	109	123	93	102	85
105.0°	120	135	151	119	134	98	113	95
110.0°	125	138	154	126	138	102	121	104
115.0°	125	136	154	128	137	101	126	111
120.0°	125	132	152	126	133	100	125	114
125.0°	125	128	148	119	127	98	121	115
130.0°	121	121	140	109	116	97	116	115
135.0°	118	111	128	98	103	93	108	115
140.0°	112	95	105	71	81	87	98	116
145.0°	86	72	82	49	67	77	82	115
150.0°	49	54	49	37	48	59	64	96
155.0°	34	34	28	26	32	40	46	64
160.0°	23	17	6	12	16	22	27	34
165.0°	11	7	4	4	8	15	16	19
170.0°	1	0	0	1	1	1	5	6
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)	%	Deg	Flux (lm)	%
0-5	0.0	0.00	0-5	0.0	0.00
5-10	0.0	0.00	0-10	0.0	0.00
10-15	0.0	0.00	0-15	0.0	0.00
15-20	0.1	0.01	0-20	0.1	0.01
20-25	0.2	0.02	0-25	0.3	0.04
25-30	0.4	0.05	0-30	0.7	0.09
30-35	0.7	0.09	0-35	1.3	0.18
35-40	1.3	0.18	0-40	2.7	0.36
40-45	2.4	0.32	0-45	5.0	0.67
45-50	4.0	0.53	0-50	9.0	1.20
50-55	6.4	0.85	0-55	15.4	2.06
55-60	9.8	1.31	0-60	25.1	3.36
60-65	13.9	1.87	0-65	39.1	5.23
65-70	18.6	2.49	0-70	57.7	7.71
70-75	23.4	3.13	0-75	81.1	10.84
75-80	28.1	3.77	0-80	109.2	14.61
80-85	32.7	4.38	0-85	141.9	18.99
85-90	37.5	5.02	0-90	179.4	24.01
90-95	42.9	5.74	0-95	222.3	29.75
95-100	48.4	6.47	0-100	270.7	36.22
100-105	53.2	7.12	0-105	323.9	43.34
105-110	56.2	7.52	0-110	380.1	50.86
110-115	56.9	7.61	0-115	437.0	58.47
115-120	55.4	7.42	0-120	492.4	65.88
120-125	52.4	7.01	0-125	544.8	72.89
125-130	48.0	6.43	0-130	592.9	79.32
130-135	42.7	5.71	0-135	635.5	85.03
135-140	36.3	4.86	0-140	671.9	89.89
140-145	29.1	3.89	0-145	701.0	93.78
145-150	21.1	2.83	0-150	722.1	96.61
150-155	13.6	1.82	0-155	735.7	98.43
155-160	7.4	0.99	0-160	743.1	99.42
160-165	3.3	0.44	0-165	746.3	99.85
165-170	1.0	0.13	0-170	747.3	99.99
170-175	0.1	0.01	0-175	747.4	100.00
175-180	0.0	0.00	0-180	747.4	100.00

## 6. Product Photo



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