



# IES LM-79-08

## MEASUREMENT AND TEST REPORT

For

### GREEN CREATIVE LTD

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

**Test Model: 8A19DIM/840**

<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>	RKS171115081-10
<b>Test Date:</b>	2017-11-21
<b>Report Date:</b>	2017-11-22
<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 2017-11-20 and used for testing.

Model Tested: 8A19DIM/840  
 Manufacturer: GREEN CREATIVE LTD  
 Brand Name: GREEN CREATIVE  
 Product Designation: Omnidirectional LED Lamp  
 Aging Time Before Test: 0hour(For New Products)

### Rated Values:

Rated Voltage/Frequency: 120 VAC 60Hz  
 Rated Power: 8 W  
 Nominal CCT: 4000K  
 Nominal Lumen Output: 810lm

## 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

## 3. Description of Test Equipment

Device	Manufacture	Model No	Serial No	Test Range	Calibration date	Calibration due date
Integrating Sphere	INVENTFINE	Dia 1.5m	JWWCV090112	Dia 1.5m	2017-01-25	2018-01-25
Power Meter	INVENTFINE	WT500	GSJWQ20009	20/40/80/150/300/600V	2017-03-23	2018-03-22
Spectral photometer	INVENTFINE	CMS-3S	GSGSE100017	380nm~780nm	2017-01-25	2018-01-25
AC Power Supply	INVENTFINE	CHP500	JWJSD010071	0~150V 4.2A/0~300V 2.1A	2017-03-23	2018-03-22
Standard Light Source	INVENTFINE	N/A	JWWCR020106	24V/50W	2017-01-26	2018-01-26
Thermal Meter	KEJIAN	TA298	N/A	0~60°C	2017-10-17	2018-10-17
DC Power Supply	INVENTFINE	WL3005	JWWCP020069	30V/5A	2017-03-23	2018-03-22
AC Power Supply	INVENTFINE	CHP-5KVA	900511765	0-150V, 0-300V, 5KVA	2017-03-23	2018-03-22
DC Power Supply	INVENTFINE	WL3010	JWDMP030001	30V/10A	2017-03-23	2018-03-22
Power Meter	INVENTFINE	WT500	GSDSQ200007	20/40/80/150/300/600V	2017-03-23	2018-03-22
Goniophotometer	INVENTFINE	GPM-1900	YWGCF120001	0.001lx-99999lx	2017-01-25	2018-01-25
Wireless Weather Station	ZHONGXING	KG218	N/A	-40~65°C, 20%~99%RH	2017-10-17	2018-10-17
Standard Light Source	INVENTFINE	N/A	JWBYR040007	24V/150W	2017-01-25	2018-01-25

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  $R_i$ ,  $R_g$  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**

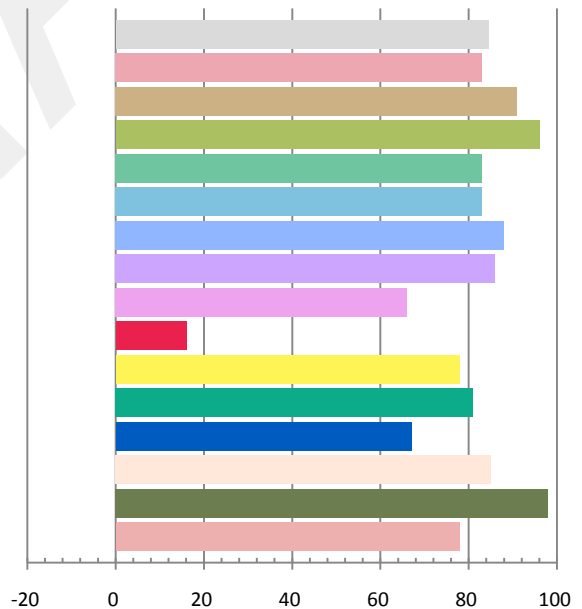
### Photometric and Electrical Measurement Result

Voltage (V)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Luminous Flux(lm)	Efficacy (lm/W)
120.0	60	0.0682	7.8	0.9539	936.9	120.05

Radiant Flux (W)	CCT (K)	Duv	x	y	u'	v'
2.888	3890	-0.00113	0.3846	0.3769	0.2278	0.5022

### Color Rendering Index

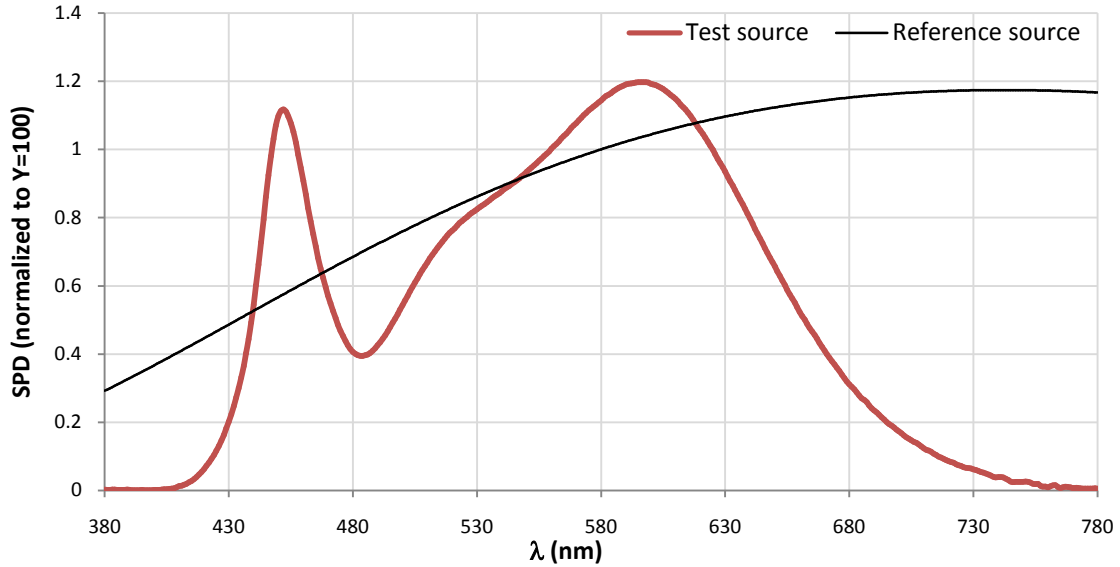
Ra			
<b>84.5</b>			
R1	R2	R3	R4
83	91	96	83
R5	R6	R7	R8
83	88	86	66
R9	R10	R11	R12
16	78	81	67
R13	R14	R15	
85	98	78	



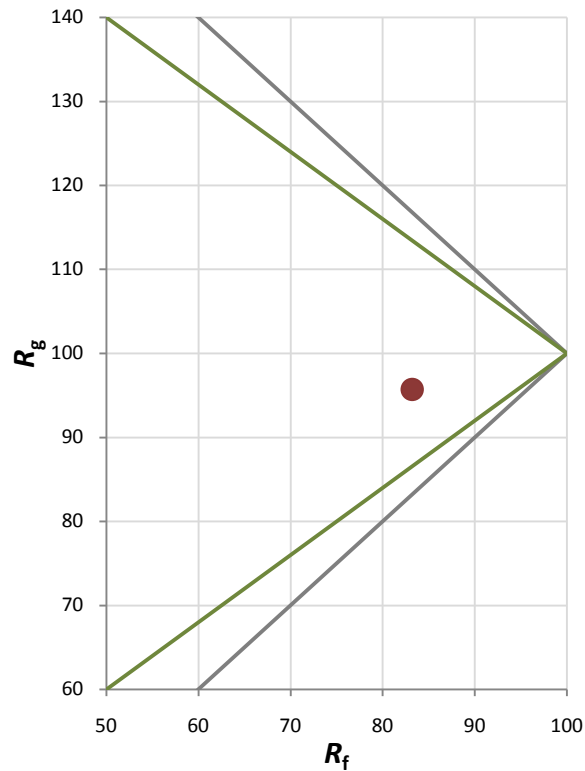
Fidelity Index and Gamut Index

Fidelity Index $R_f$	83
Gamut Index $R_g$	96

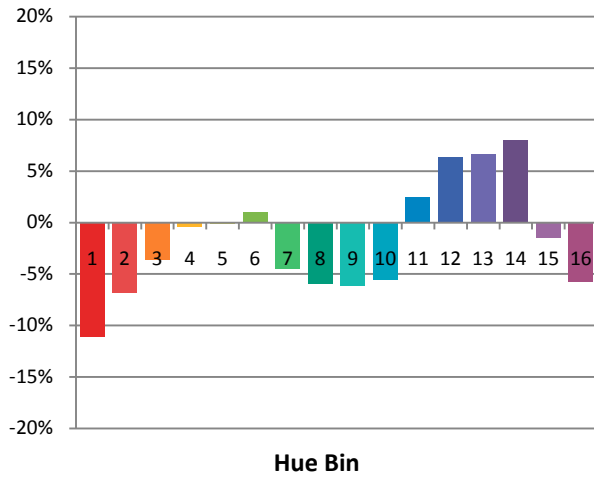
Spectral Power Distribution Comparison



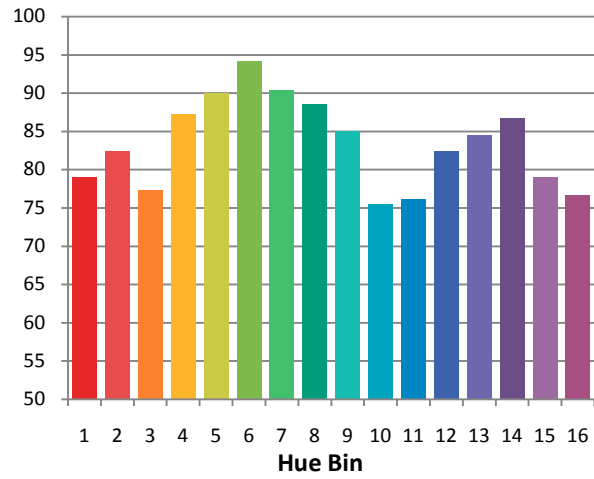
Plot of  $R_g$  versus  $R_f$



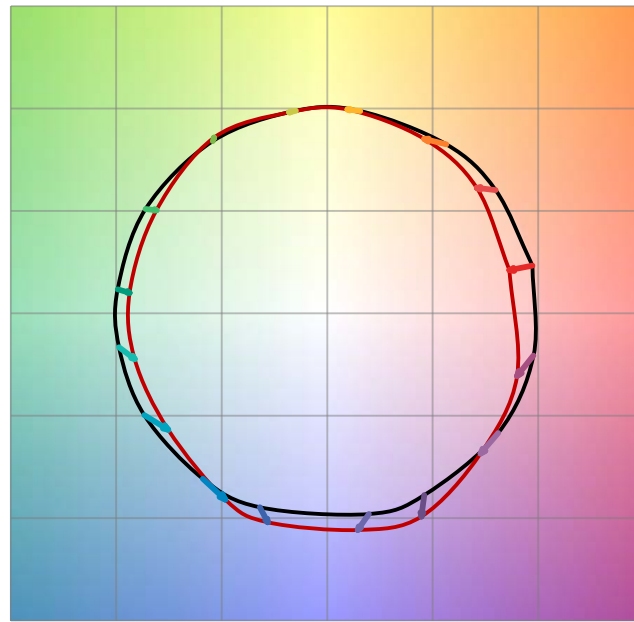
Chroma Shift by Hue



$R_f$  by Hue

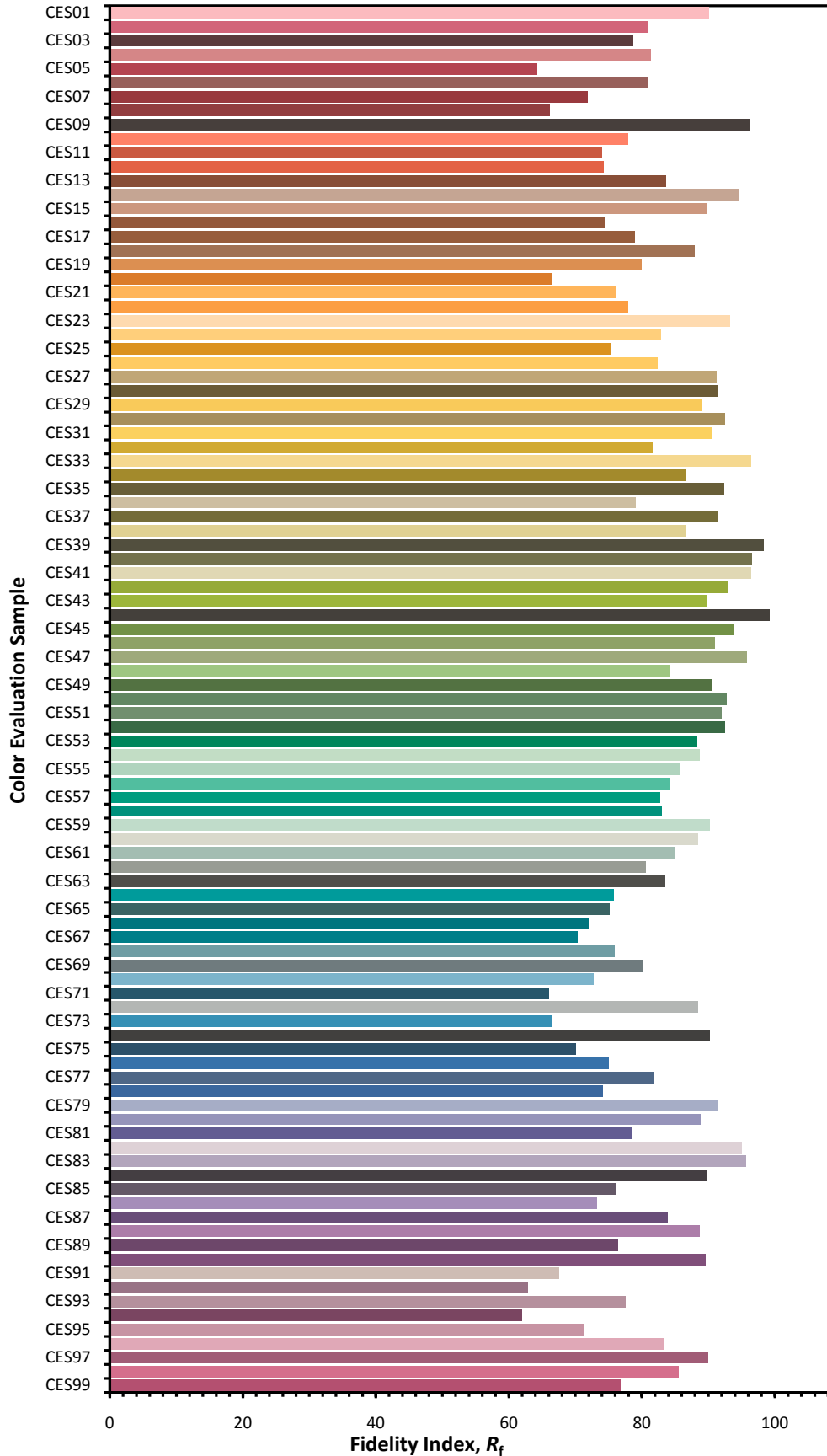


Color Vector Graphic

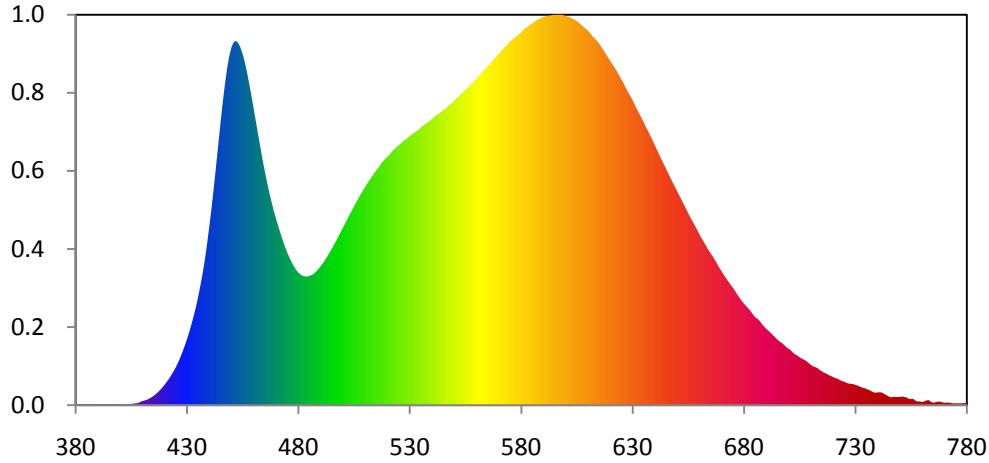


— Reference Illuminat    — Test Source

Color Fidelity by CES Sample



### Relative Spectral Power Distribution

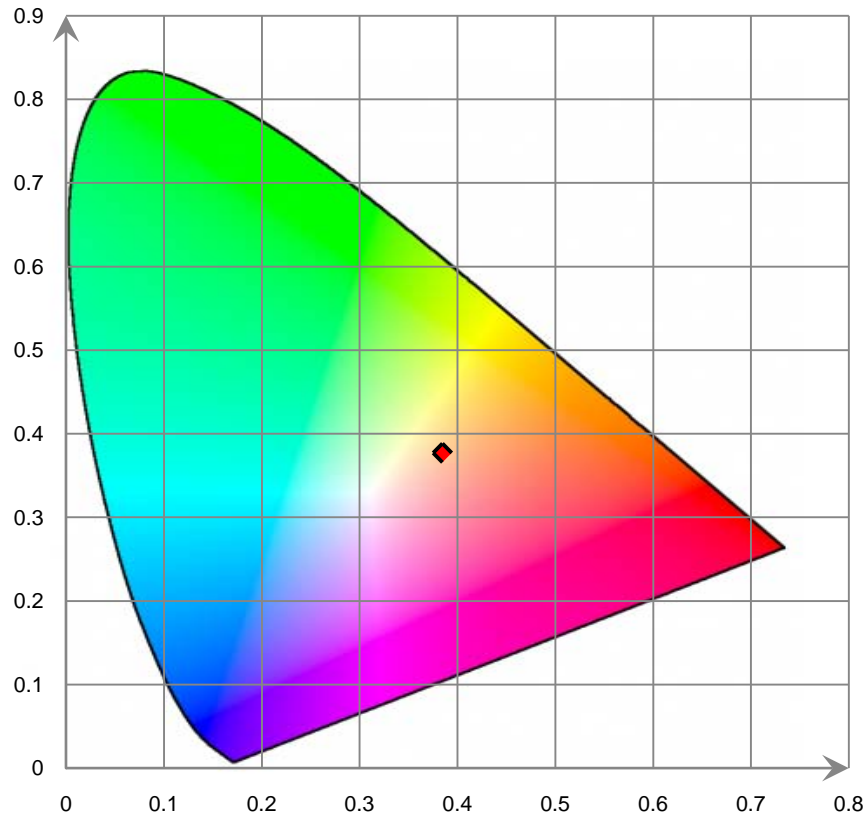


nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
380	3.650E-02	421	9.897E-01	462	1.136E+01	503	8.007E+00	544	1.233E+01
381	2.980E-02	422	1.115E+00	463	1.083E+01	504	8.180E+00	545	1.240E+01
382	2.280E-02	423	1.267E+00	464	1.031E+01	505	8.362E+00	546	1.247E+01
383	3.140E-02	424	1.423E+00	465	9.819E+00	506	8.536E+00	547	1.255E+01
384	3.600E-02	425	1.593E+00	466	9.358E+00	507	8.703E+00	548	1.264E+01
385	2.380E-02	426	1.787E+00	467	8.932E+00	508	8.866E+00	549	1.272E+01
386	2.420E-02	427	2.002E+00	468	8.538E+00	509	9.023E+00	550	1.281E+01
387	2.760E-02	428	2.241E+00	469	8.171E+00	510	9.177E+00	551	1.290E+01
388	2.190E-02	429	2.494E+00	470	7.835E+00	511	9.329E+00	552	1.299E+01
389	3.220E-02	430	2.767E+00	471	7.524E+00	512	9.467E+00	553	1.308E+01
390	2.970E-02	431	3.066E+00	472	7.221E+00	513	9.608E+00	554	1.316E+01
391	1.340E-02	432	3.392E+00	473	6.935E+00	514	9.751E+00	555	1.326E+01
392	8.700E-03	433	3.734E+00	474	6.667E+00	515	9.872E+00	556	1.335E+01
393	1.000E-02	434	4.114E+00	475	6.420E+00	516	1.000E+01	557	1.345E+01
394	1.620E-02	435	4.537E+00	476	6.209E+00	517	1.013E+01	558	1.354E+01
395	1.870E-02	436	5.007E+00	477	6.015E+00	518	1.025E+01	559	1.363E+01
396	1.510E-02	437	5.518E+00	478	5.836E+00	519	1.036E+01	560	1.374E+01
397	1.390E-02	438	6.093E+00	479	5.691E+00	520	1.045E+01	561	1.385E+01
398	9.600E-03	439	6.754E+00	480	5.577E+00	521	1.054E+01	562	1.394E+01
399	7.600E-03	440	7.480E+00	481	5.493E+00	522	1.065E+01	563	1.404E+01
400	1.920E-02	441	8.255E+00	482	5.443E+00	523	1.075E+01	564	1.415E+01
401	2.470E-02	442	9.090E+00	483	5.413E+00	524	1.084E+01	565	1.425E+01
402	2.770E-02	443	9.981E+00	484	5.411E+00	525	1.092E+01	566	1.435E+01
403	3.360E-02	444	1.090E+01	485	5.438E+00	526	1.101E+01	567	1.446E+01
404	4.440E-02	445	1.181E+01	486	5.471E+00	527	1.109E+01	568	1.458E+01
405	5.310E-02	446	1.267E+01	487	5.533E+00	528	1.116E+01	569	1.468E+01
406	6.700E-02	447	1.345E+01	488	5.618E+00	529	1.123E+01	570	1.478E+01
407	7.720E-02	448	1.414E+01	489	5.721E+00	530	1.131E+01	571	1.488E+01
408	8.880E-02	449	1.468E+01	490	5.838E+00	531	1.139E+01	572	1.500E+01
409	1.317E-01	450	1.506E+01	491	5.964E+00	532	1.145E+01	573	1.509E+01
410	1.745E-01	451	1.527E+01	492	6.101E+00	533	1.152E+01	574	1.518E+01
411	1.983E-01	452	1.532E+01	493	6.247E+00	534	1.159E+01	575	1.528E+01
412	2.255E-01	453	1.523E+01	494	6.405E+00	535	1.168E+01	576	1.537E+01
413	2.732E-01	454	1.505E+01	495	6.569E+00	536	1.175E+01	577	1.544E+01
414	3.279E-01	455	1.477E+01	496	6.739E+00	537	1.182E+01	578	1.553E+01
415	3.895E-01	456	1.442E+01	497	6.912E+00	538	1.189E+01	579	1.560E+01
416	4.643E-01	457	1.399E+01	498	7.095E+00	539	1.196E+01	580	1.568E+01
417	5.445E-01	458	1.349E+01	499	7.276E+00	540	1.204E+01	581	1.578E+01
418	6.422E-01	459	1.298E+01	500	7.456E+00	541	1.212E+01	582	1.586E+01
419	7.433E-01	460	1.245E+01	501	7.641E+00	542	1.219E+01	583	1.592E+01
420	8.626E-01	461	1.190E+01	502	7.823E+00	543	1.226E+01	584	1.599E+01

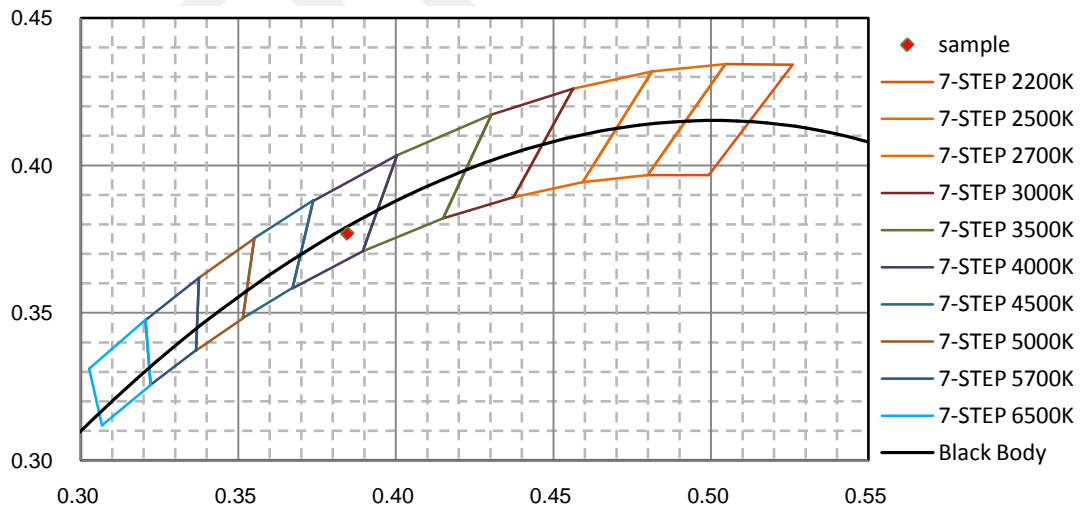


nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
585	1.606E+01	626	1.352E+01	667	6.107E+00	708	1.855E+00	749	3.416E-01
586	1.613E+01	627	1.333E+01	668	5.936E+00	709	1.774E+00	750	3.482E-01
587	1.619E+01	628	1.317E+01	669	5.775E+00	710	1.698E+00	751	3.646E-01
588	1.624E+01	629	1.300E+01	670	5.627E+00	711	1.633E+00	752	3.500E-01
589	1.628E+01	630	1.283E+01	671	5.477E+00	712	1.602E+00	753	3.206E-01
590	1.633E+01	631	1.263E+01	672	5.334E+00	713	1.558E+00	754	2.720E-01
591	1.636E+01	632	1.244E+01	673	5.200E+00	714	1.482E+00	755	2.546E-01
592	1.637E+01	633	1.227E+01	674	5.069E+00	715	1.429E+00	756	2.639E-01
593	1.639E+01	634	1.209E+01	675	4.947E+00	716	1.361E+00	757	1.895E-01
594	1.641E+01	635	1.189E+01	676	4.809E+00	717	1.325E+00	758	1.531E-01
595	1.642E+01	636	1.170E+01	677	4.656E+00	718	1.270E+00	759	1.581E-01
596	1.642E+01	637	1.152E+01	678	4.518E+00	719	1.226E+00	760	1.323E-01
597	1.642E+01	638	1.134E+01	679	4.388E+00	720	1.185E+00	761	1.602E-01
598	1.642E+01	639	1.114E+01	680	4.272E+00	721	1.139E+00	762	2.029E-01
599	1.640E+01	640	1.094E+01	681	4.167E+00	722	1.118E+00	763	2.121E-01
600	1.636E+01	641	1.073E+01	682	4.068E+00	723	1.057E+00	764	1.368E-01
601	1.633E+01	642	1.053E+01	683	3.956E+00	724	1.014E+00	765	1.075E-01
602	1.630E+01	643	1.033E+01	684	3.823E+00	725	9.949E-01	766	1.238E-01
603	1.626E+01	644	1.014E+01	685	3.704E+00	726	9.377E-01	767	1.524E-01
604	1.621E+01	645	9.950E+00	686	3.635E+00	727	9.089E-01	768	1.469E-01
605	1.615E+01	646	9.748E+00	687	3.551E+00	728	8.948E-01	769	1.228E-01
606	1.608E+01	647	9.561E+00	688	3.423E+00	729	8.887E-01	770	1.009E-01
607	1.599E+01	648	9.367E+00	689	3.309E+00	730	8.499E-01	771	1.065E-01
608	1.591E+01	649	9.191E+00	690	3.212E+00	731	8.253E-01	772	1.070E-01
609	1.583E+01	650	9.006E+00	691	3.133E+00	732	7.836E-01	773	9.070E-02
610	1.575E+01	651	8.814E+00	692	3.044E+00	733	7.420E-01	774	7.500E-02
611	1.564E+01	652	8.640E+00	693	2.945E+00	734	7.216E-01	775	8.050E-02
612	1.552E+01	653	8.445E+00	694	2.859E+00	735	6.793E-01	776	7.590E-02
613	1.542E+01	654	8.262E+00	695	2.757E+00	736	6.458E-01	777	7.840E-02
614	1.533E+01	655	8.068E+00	696	2.679E+00	737	6.013E-01	778	7.810E-02
615	1.520E+01	656	7.883E+00	697	2.617E+00	738	5.466E-01	779	9.130E-02
616	1.507E+01	657	7.721E+00	698	2.533E+00	739	5.241E-01	780	7.280E-02
617	1.492E+01	658	7.548E+00	699	2.441E+00	740	5.375E-01		
618	1.477E+01	659	7.376E+00	700	2.376E+00	741	5.420E-01		
619	1.462E+01	660	7.186E+00	701	2.306E+00	742	5.313E-01		
620	1.448E+01	661	7.012E+00	702	2.209E+00	743	4.699E-01		
621	1.433E+01	662	6.865E+00	703	2.136E+00	744	4.217E-01		
622	1.419E+01	663	6.698E+00	704	2.084E+00	745	3.633E-01		
623	1.403E+01	664	6.540E+00	705	2.016E+00	746	3.352E-01		
624	1.386E+01	665	6.397E+00	706	1.958E+00	747	3.460E-01		
625	1.370E+01	666	6.256E+00	707	1.912E+00	748	3.501E-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: **Baseup**

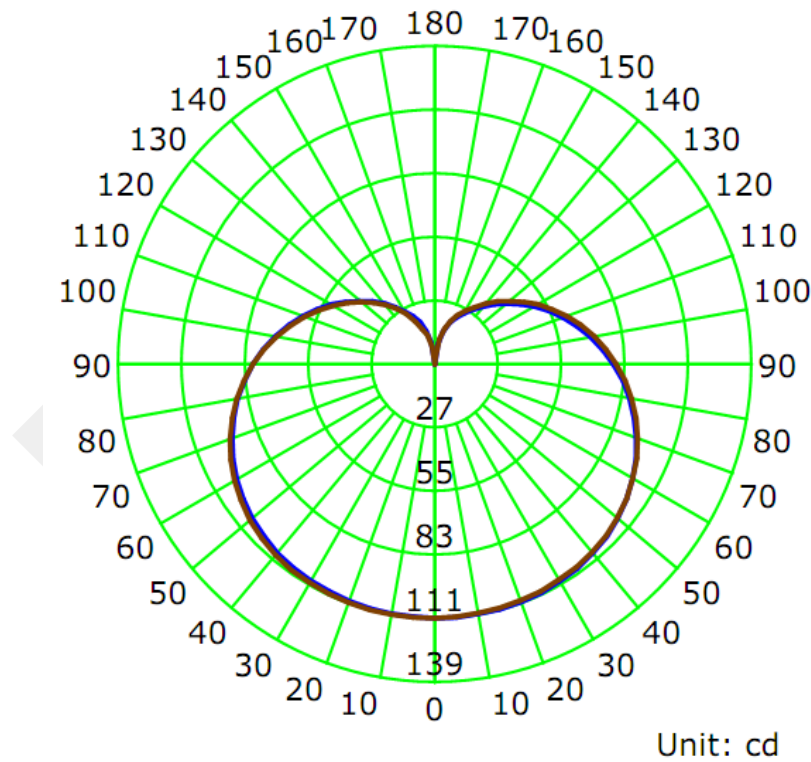
**Electrical Measurement**

Input Voltage (V)	Frequency (Hz)	Input Current (A)	Power (W)	Power Factor
120.0	60	0.0680	7.86	0.9600

**Photometric Measurement**

Luminous Flux (lm)	Efficacy (lm/W)	I <sub>max</sub> (cd)	S/MH (C0/180)	S/MH (C90/270)
939.5	119.53	111.7	1.50	1.51

**Luminous Intensity Distribution**



	C0/180	C45/225	C90/270	C135/315	AVG.
Beam Angle (50% I <sub>max</sub> ):	231.5	231.9	232.3	232.1	232.0
Field Angle (10% I <sub>max</sub> ):	337.1	337.2	337.1	338.4	337.5

Luminous Intensity (cd) Distribution Data

C γ	0°	22.5°	45°	67.5°	90°	112.5°	135°	157.5°
0.0°	111	111	111	111	111	111	111	111
5.0°	112	112	111	111	111	111	111	111
10.0°	111	111	111	111	111	111	111	111
15.0°	111	111	111	111	111	111	111	111
20.0°	111	111	111	110	110	111	111	111
25.0°	111	110	110	110	110	110	110	110
30.0°	110	110	109	109	109	110	110	110
35.0°	110	109	109	109	109	109	109	109
40.0°	108	108	108	108	108	108	108	108
45.0°	107	107	106	106	107	107	107	107
50.0°	105	105	105	105	105	105	106	106
55.0°	103	103	103	103	103	103	104	104
60.0°	101	100	100	100	101	101	102	101
65.0°	98	97	97	98	98	99	99	99
70.0°	95	94	94	95	95	96	96	96
75.0°	91	91	91	91	92	92	93	92
80.0°	87	87	87	88	88	89	89	89
85.0°	83	83	83	84	84	85	85	85
90.0°	79	79	79	80	80	81	81	81
95.0°	74	74	75	75	76	76	77	76
100.0°	70	70	70	71	71	72	72	72
105.0°	65	65	65	66	67	67	67	67
110.0°	60	60	61	61	62	63	63	62
115.0°	56	56	56	57	57	58	58	58
120.0°	51	51	51	52	53	53	53	53
125.0°	46	47	47	47	48	48	49	48
130.0°	42	42	42	43	43	44	44	44
135.0°	38	38	38	39	39	39	40	39
140.0°	33	34	34	35	35	35	35	35
145.0°	30	30	30	31	31	31	31	31
150.0°	26	26	26	27	27	27	27	27
155.0°	23	23	23	23	24	24	24	24
160.0°	19	20	20	20	20	21	21	20
165.0°	15	15	16	17	16	17	17	16
170.0°	9	10	11	11	11	12	12	11
175.0°	0	0	0	2	2	1	1	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°	111	111	111	111	111	111	111	111
5.0°	111	111	111	112	112	112	112	111
10.0°	111	111	111	112	112	112	112	112
15.0°	111	111	111	111	112	112	112	111
20.0°	111	111	111	111	112	112	112	111
25.0°	110	110	111	111	111	112	112	111
30.0°	110	110	110	111	111	111	111	111
35.0°	109	109	110	110	111	111	110	110
40.0°	108	108	109	109	110	110	110	109
45.0°	107	107	107	108	108	109	108	108
50.0°	105	106	106	106	107	107	107	106
55.0°	103	104	104	104	105	105	104	104
60.0°	101	101	101	102	102	102	102	101
65.0°	98	98	99	99	99	100	99	98
70.0°	95	95	96	96	96	96	96	95
75.0°	92	92	92	92	93	93	92	91
80.0°	88	88	88	89	89	89	88	87
85.0°	84	85	85	85	85	85	84	83
90.0°	80	80	80	80	80	80	80	79
95.0°	76	76	76	76	76	76	75	74
100.0°	71	71	71	71	71	71	70	70
105.0°	67	67	67	66	66	66	65	65
110.0°	62	62	62	62	61	61	61	60
115.0°	57	57	57	57	57	56	56	55
120.0°	53	53	52	52	52	52	51	51
125.0°	48	48	48	47	47	47	46	46
130.0°	43	43	43	43	43	42	42	42
135.0°	39	39	39	38	38	38	38	37
140.0°	35	35	34	34	34	34	33	33
145.0°	31	31	29	30	30	30	30	29
150.0°	27	27	25	26	26	25	26	26
155.0°	23	23	21	21	21	21	23	22
160.0°	20	19	18	17	17	17	19	19
165.0°	15	14	14	14	13	13	15	15
170.0°	10	7	8	8	8	8	9	8
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	2.7	0.28	0-5	2.7	0.28
5-10	8.0	0.85	0-10	10.6	1.13
10-15	13.2	1.40	0-15	23.8	2.54
15-20	18.3	1.95	0-20	42.1	4.48
20-25	23.2	2.47	0-25	65.4	6.96
25-30	27.9	2.97	0-30	93.3	9.93
30-35	32.3	3.44	0-35	125.6	13.37
35-40	36.4	3.87	0-40	162.0	17.24
40-45	39.9	4.25	0-45	201.9	21.49
45-50	43.0	4.58	0-50	244.9	26.07
50-55	45.5	4.84	0-55	290.4	30.91
55-60	47.3	5.04	0-60	337.7	35.95
60-65	48.5	5.17	0-65	386.3	41.11
65-70	49.1	5.22	0-70	435.3	46.34
70-75	48.9	5.21	0-75	484.2	51.54
75-80	48.2	5.13	0-80	532.4	56.67
80-85	46.8	4.98	0-85	579.2	61.65
85-90	44.9	4.78	0-90	624.2	66.44
90-95	42.5	4.53	0-95	666.7	70.96
95-100	39.8	4.23	0-100	706.4	75.20
100-105	36.7	3.90	0-105	743.1	79.10
105-110	33.3	3.55	0-110	776.4	82.65
110-115	29.9	3.18	0-115	806.3	85.83
115-120	26.4	2.81	0-120	832.8	88.64
120-125	22.9	2.44	0-125	855.7	91.08
125-130	19.6	2.09	0-130	875.3	93.17
130-135	16.4	1.75	0-135	891.7	94.92
135-140	13.4	1.43	0-140	905.2	96.35
140-145	10.7	1.14	0-145	915.9	97.49
145-150	8.3	0.89	0-150	924.2	98.38
150-155	6.2	0.66	0-155	930.4	99.04
155-160	4.4	0.47	0-160	934.8	99.50
160-165	2.8	0.30	0-165	937.6	99.81
165-170	1.5	0.16	0-170	939.1	99.96
170-175	0.4	0.04	0-175	939.5	100.00
175-180	0.0	0.00	0-180	939.5	100.00

6. Product Photo



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