

# 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/827**

<b>Report Type:</b>	Electrical and Photometric tests including: Luminous Flux, Chromaticity, Luminous Intensity Distribution
<b>Test Engineer:</b>	George Yang
<b>Report Number:</b>	PKS171129080-10-3
<b>Test Date:</b>	2017-11-30
<b>Report Date:</b>	2017-12-01
<b>Reviewed By:</b>	Ray Gao/EE Engineer
<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 2017-11-29 and used for testing.

Model Tested: 8A19DIM/827  
 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: 8W  
 Nominal CCT: 2700K  
 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℃	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℃, 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  $R_f$ ,  $R_g$  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: **Baseup**

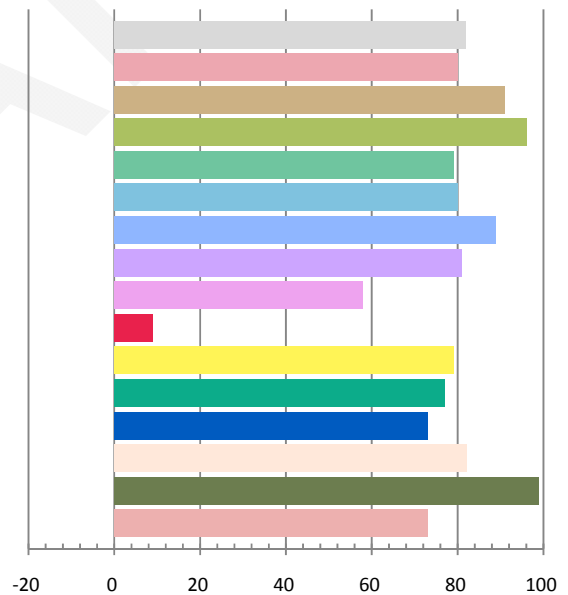
### Photometric and Electrical Measurement Result

Voltage (V)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Luminous Flux(lm)	Efficacy (lm/W)
120.0	60	0.0695	7.95	0.9527	867.9	109.23

Radiant Flux (W)	CCT (K)	Duv	x	y	u'	v'
2.712	2741	-0.00024	0.4561	0.4091	0.2608	0.5262

### Color Rendering Index

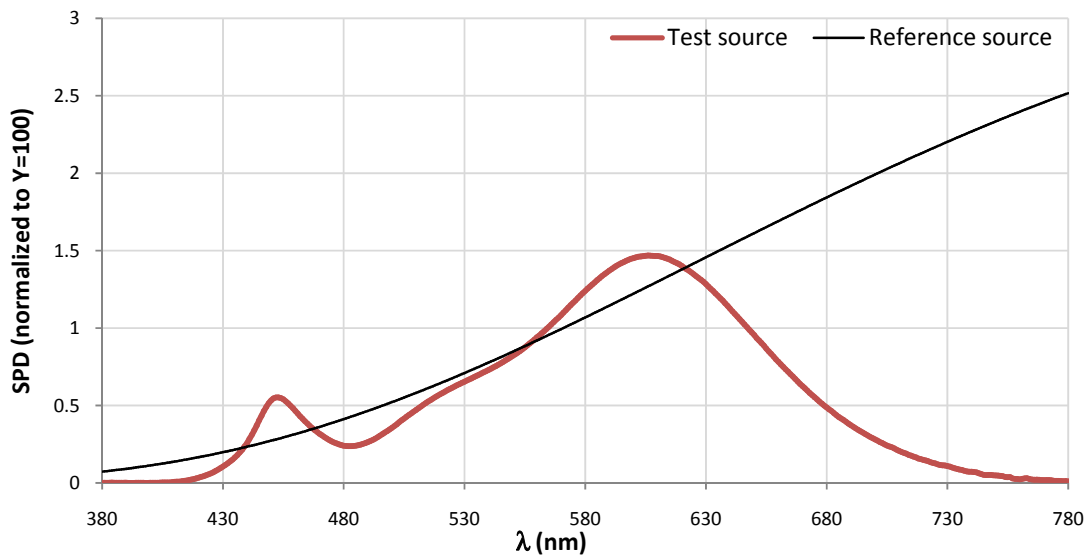
Ra			
<b>81.8</b>			
R1	R2	R3	R4
80	91	96	79
R5	R6	R7	R8
80	89	81	58
R9	R10	R11	R12
9	79	77	73
R13	R14	R15	
82	99	73	



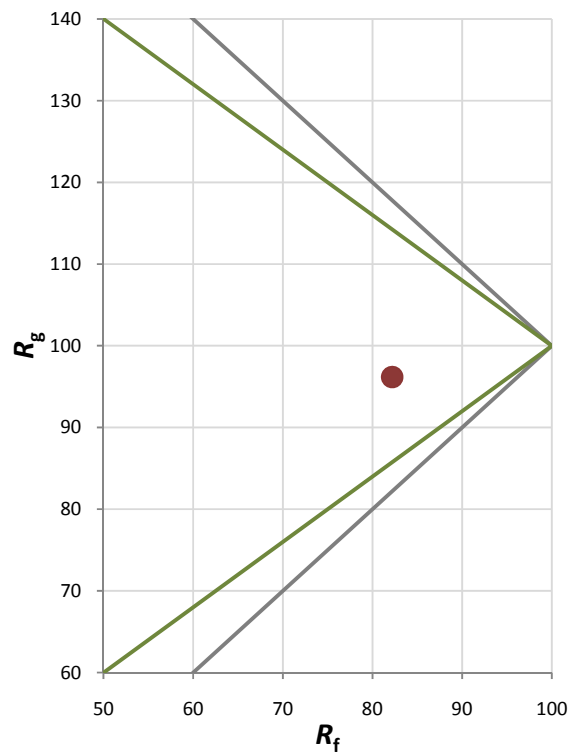
Fidelity Index and Gamut Index

Fidelity Index $R_f$	82
Gamut Index $R_g$	96

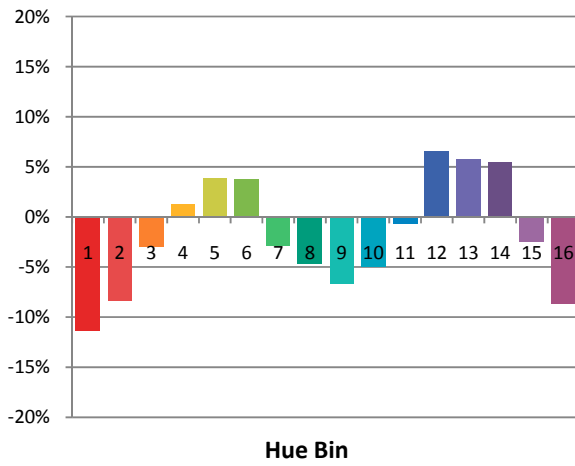
Spectral Power Distribution Comparison



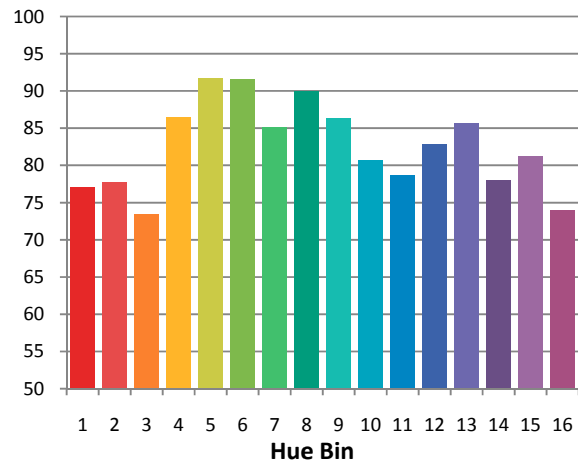
Plot of  $R_g$  versus  $R_f$



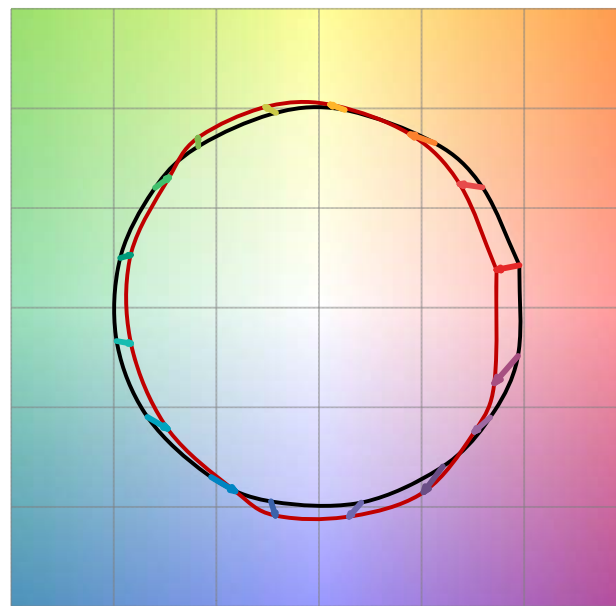
**Chroma Shift by Hue**



**$R_f$  by Hue**

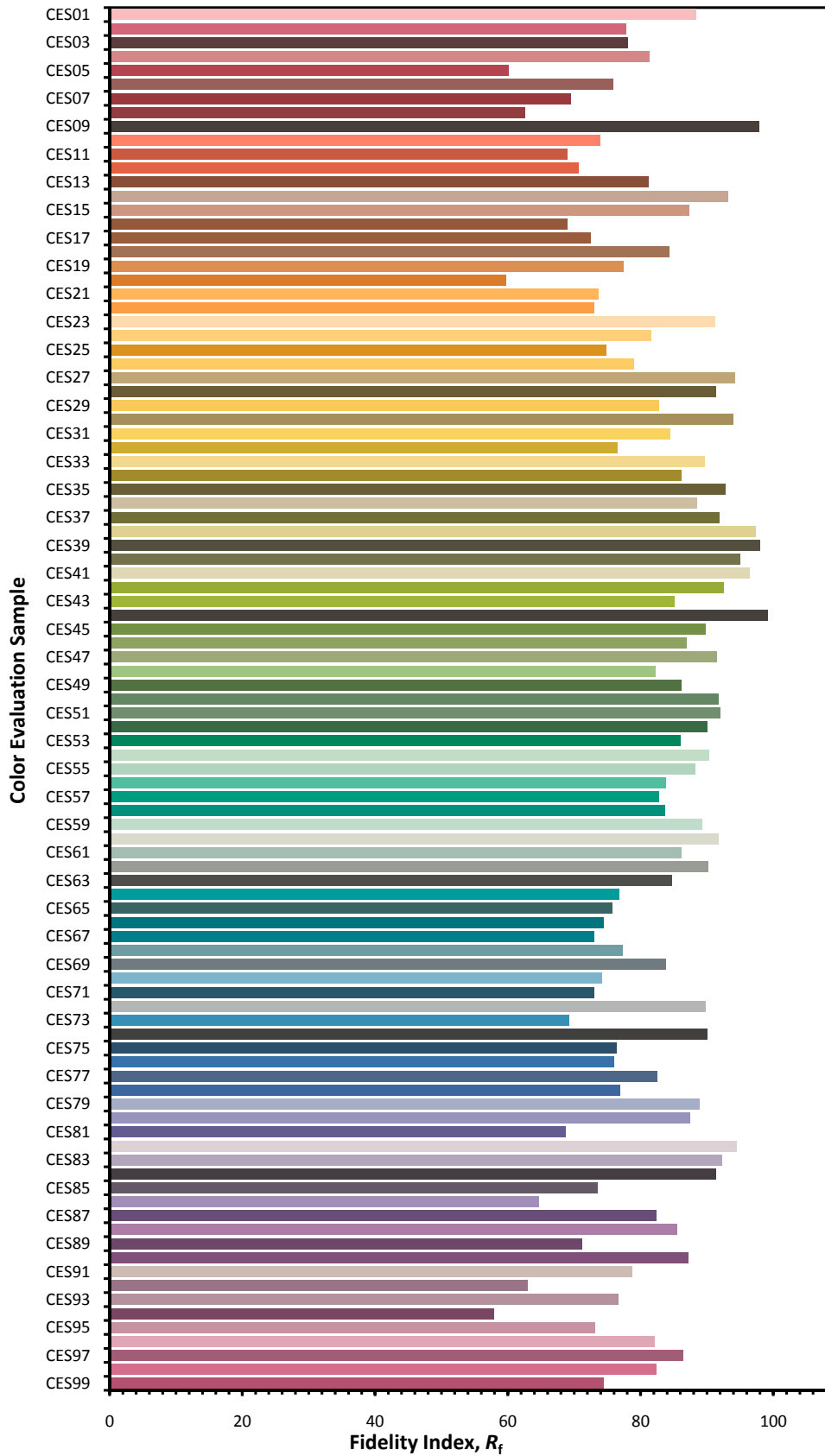


**Color Vector Graphic**

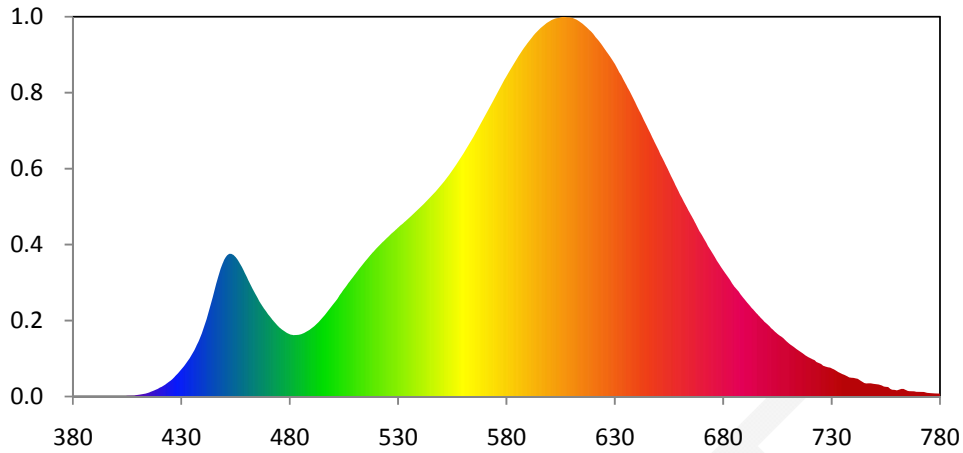


— Reference Illuminant    — Test Source

**Color Fidelity by CES Sample**



Relative Spectral Power Distribution

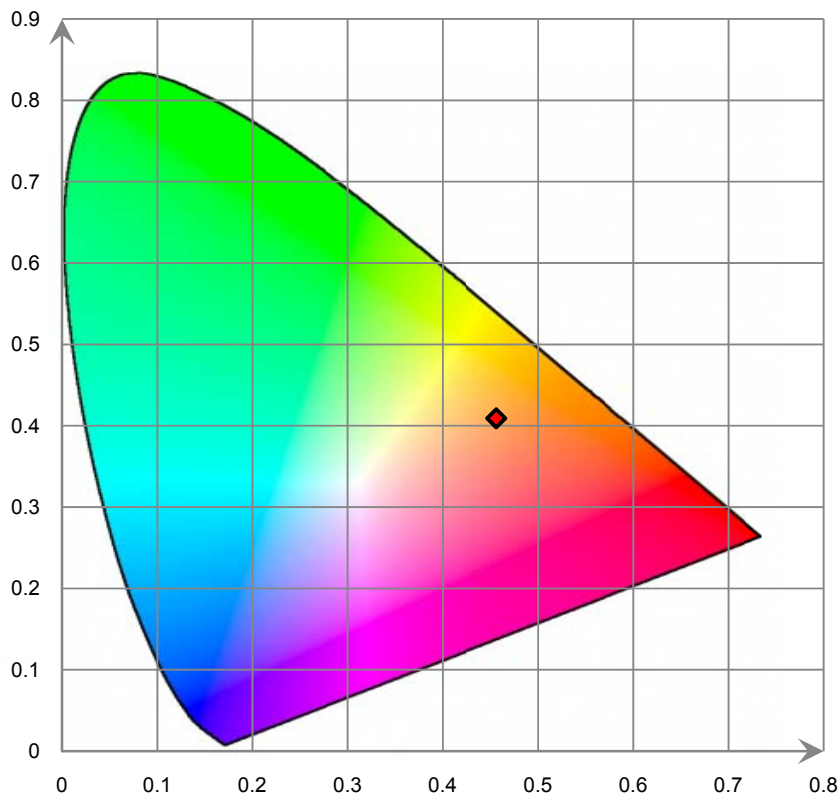


nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
380	1.900E-02	421	4.999E-01	462	5.477E+00	503	4.986E+00	544	9.694E+00
381	1.670E-02	422	5.538E-01	463	5.266E+00	504	5.138E+00	545	9.814E+00
382	1.150E-02	423	6.317E-01	464	5.065E+00	505	5.286E+00	546	9.935E+00
383	2.230E-02	424	7.097E-01	465	4.866E+00	506	5.432E+00	547	1.006E+01
384	3.170E-02	425	7.868E-01	466	4.676E+00	507	5.576E+00	548	1.017E+01
385	2.350E-02	426	8.768E-01	467	4.503E+00	508	5.719E+00	549	1.029E+01
386	2.100E-02	427	9.887E-01	468	4.344E+00	509	5.856E+00	550	1.042E+01
387	2.130E-02	428	1.103E+00	469	4.193E+00	510	5.995E+00	551	1.055E+01
388	1.660E-02	429	1.221E+00	470	4.044E+00	511	6.138E+00	552	1.068E+01
389	2.220E-02	430	1.340E+00	471	3.911E+00	512	6.278E+00	553	1.082E+01
390	2.250E-02	431	1.472E+00	472	3.777E+00	513	6.416E+00	554	1.097E+01
391	9.700E-03	432	1.618E+00	473	3.648E+00	514	6.554E+00	555	1.112E+01
392	6.300E-03	433	1.766E+00	474	3.531E+00	515	6.679E+00	556	1.128E+01
393	9.600E-03	434	1.923E+00	475	3.416E+00	516	6.803E+00	557	1.145E+01
394	1.440E-02	435	2.096E+00	476	3.328E+00	517	6.933E+00	558	1.160E+01
395	1.990E-02	436	2.294E+00	477	3.248E+00	518	7.055E+00	559	1.177E+01
396	1.390E-02	437	2.509E+00	478	3.168E+00	519	7.175E+00	560	1.194E+01
397	1.240E-02	438	2.737E+00	479	3.105E+00	520	7.290E+00	561	1.210E+01
398	9.100E-03	439	2.993E+00	480	3.060E+00	521	7.393E+00	562	1.227E+01
399	5.900E-03	440	3.280E+00	481	3.034E+00	522	7.502E+00	563	1.245E+01
400	1.530E-02	441	3.603E+00	482	3.023E+00	523	7.612E+00	564	1.263E+01
401	1.900E-02	442	3.949E+00	483	3.025E+00	524	7.717E+00	565	1.282E+01
402	1.790E-02	443	4.319E+00	484	3.035E+00	525	7.817E+00	566	1.301E+01
403	1.900E-02	444	4.714E+00	485	3.062E+00	526	7.921E+00	567	1.320E+01
404	2.870E-02	445	5.121E+00	486	3.094E+00	527	8.027E+00	568	1.339E+01
405	3.670E-02	446	5.522E+00	487	3.146E+00	528	8.117E+00	569	1.357E+01
406	4.320E-02	447	5.906E+00	488	3.206E+00	529	8.213E+00	570	1.377E+01
407	4.390E-02	448	6.250E+00	489	3.274E+00	530	8.312E+00	571	1.398E+01
408	4.380E-02	449	6.545E+00	490	3.355E+00	531	8.405E+00	572	1.419E+01
409	7.370E-02	450	6.777E+00	491	3.438E+00	532	8.498E+00	573	1.439E+01
410	9.630E-02	451	6.934E+00	492	3.532E+00	533	8.589E+00	574	1.459E+01
411	1.020E-01	452	7.013E+00	493	3.635E+00	534	8.691E+00	575	1.478E+01
412	1.128E-01	453	7.014E+00	494	3.742E+00	535	8.789E+00	576	1.498E+01
413	1.399E-01	454	6.962E+00	495	3.870E+00	536	8.878E+00	577	1.518E+01
414	1.702E-01	455	6.859E+00	496	4.004E+00	537	8.982E+00	578	1.538E+01
415	2.010E-01	456	6.712E+00	497	4.136E+00	538	9.083E+00	579	1.557E+01
416	2.447E-01	457	6.534E+00	498	4.262E+00	539	9.175E+00	580	1.575E+01
417	2.830E-01	458	6.344E+00	499	4.390E+00	540	9.274E+00	581	1.594E+01
418	3.295E-01	459	6.136E+00	500	4.522E+00	541	9.378E+00	582	1.612E+01
419	3.780E-01	460	5.919E+00	501	4.669E+00	542	9.483E+00	583	1.630E+01
420	4.396E-01	461	5.692E+00	502	4.818E+00	543	9.587E+00	584	1.648E+01

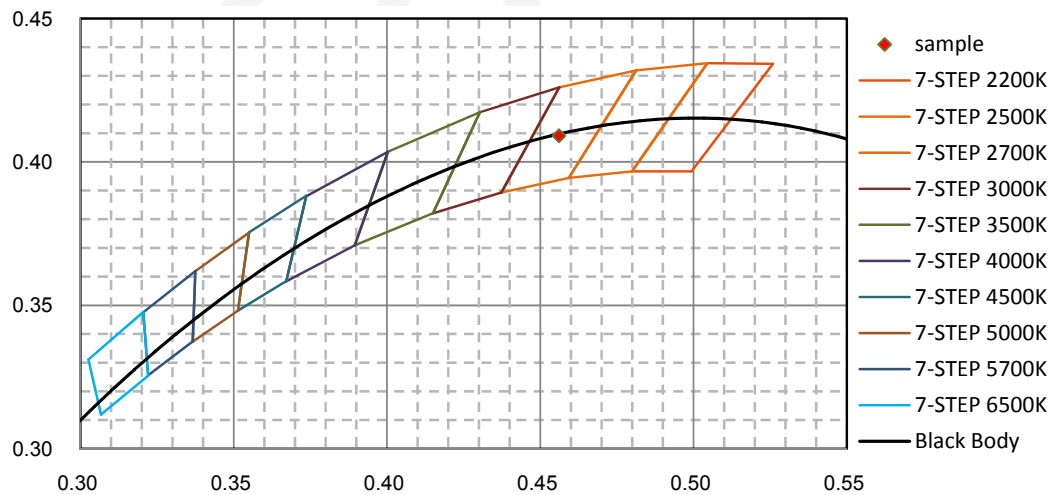


nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
585	1.664E+01	626	1.697E+01	667	8.540E+00	708	2.839E+00	749	6.323E-01
586	1.681E+01	627	1.682E+01	668	8.329E+00	709	2.731E+00	750	6.222E-01
587	1.698E+01	628	1.667E+01	669	8.127E+00	710	2.636E+00	751	6.021E-01
588	1.713E+01	629	1.651E+01	670	7.949E+00	711	2.550E+00	752	5.799E-01
589	1.728E+01	630	1.633E+01	671	7.774E+00	712	2.475E+00	753	5.496E-01
590	1.742E+01	631	1.613E+01	672	7.580E+00	713	2.401E+00	754	4.964E-01
591	1.755E+01	632	1.594E+01	673	7.389E+00	714	2.310E+00	755	4.790E-01
592	1.769E+01	633	1.576E+01	674	7.212E+00	715	2.239E+00	756	4.752E-01
593	1.783E+01	634	1.555E+01	675	7.045E+00	716	2.165E+00	757	3.793E-01
594	1.794E+01	635	1.535E+01	676	6.864E+00	717	2.103E+00	758	3.317E-01
595	1.805E+01	636	1.515E+01	677	6.684E+00	718	2.014E+00	759	3.283E-01
596	1.814E+01	637	1.496E+01	678	6.518E+00	719	1.954E+00	760	3.045E-01
597	1.823E+01	638	1.475E+01	679	6.347E+00	720	1.897E+00	761	3.421E-01
598	1.833E+01	639	1.453E+01	680	6.196E+00	721	1.843E+00	762	3.803E-01
599	1.840E+01	640	1.432E+01	681	6.044E+00	722	1.794E+00	763	3.861E-01
600	1.846E+01	641	1.409E+01	682	5.902E+00	723	1.703E+00	764	3.279E-01
601	1.851E+01	642	1.388E+01	683	5.745E+00	724	1.650E+00	765	2.848E-01
602	1.857E+01	643	1.366E+01	684	5.569E+00	725	1.607E+00	766	2.636E-01
603	1.859E+01	644	1.344E+01	685	5.416E+00	726	1.521E+00	767	2.714E-01
604	1.861E+01	645	1.323E+01	686	5.292E+00	727	1.478E+00	768	2.599E-01
605	1.864E+01	646	1.301E+01	687	5.167E+00	728	1.448E+00	769	2.374E-01
606	1.866E+01	647	1.279E+01	688	5.019E+00	729	1.431E+00	770	2.286E-01
607	1.866E+01	648	1.256E+01	689	4.873E+00	730	1.386E+00	771	2.305E-01
608	1.864E+01	649	1.235E+01	690	4.740E+00	731	1.341E+00	772	2.342E-01
609	1.863E+01	650	1.213E+01	691	4.617E+00	732	1.275E+00	773	2.184E-01
610	1.862E+01	651	1.190E+01	692	4.493E+00	733	1.202E+00	774	1.832E-01
611	1.859E+01	652	1.170E+01	693	4.365E+00	734	1.157E+00	775	1.769E-01
612	1.853E+01	653	1.148E+01	694	4.246E+00	735	1.102E+00	776	1.662E-01
613	1.848E+01	654	1.126E+01	695	4.126E+00	736	1.062E+00	777	1.617E-01
614	1.841E+01	655	1.103E+01	696	4.013E+00	737	1.006E+00	778	1.503E-01
615	1.833E+01	656	1.080E+01	697	3.903E+00	738	9.484E-01	779	1.600E-01
616	1.824E+01	657	1.059E+01	698	3.790E+00	739	9.267E-01	780	1.442E-01
617	1.813E+01	658	1.037E+01	699	3.677E+00	740	9.196E-01		
618	1.804E+01	659	1.015E+01	700	3.582E+00	741	9.023E-01		
619	1.794E+01	660	9.937E+00	701	3.485E+00	742	8.746E-01		
620	1.782E+01	661	9.736E+00	702	3.369E+00	743	8.010E-01		
621	1.767E+01	662	9.536E+00	703	3.272E+00	744	7.363E-01		
622	1.754E+01	663	9.329E+00	704	3.171E+00	745	6.699E-01		
623	1.742E+01	664	9.135E+00	705	3.074E+00	746	6.427E-01		
624	1.727E+01	665	8.938E+00	706	3.000E+00	747	6.556E-01		
625	1.712E+01	666	8.739E+00	707	2.928E+00	748	6.533E-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**

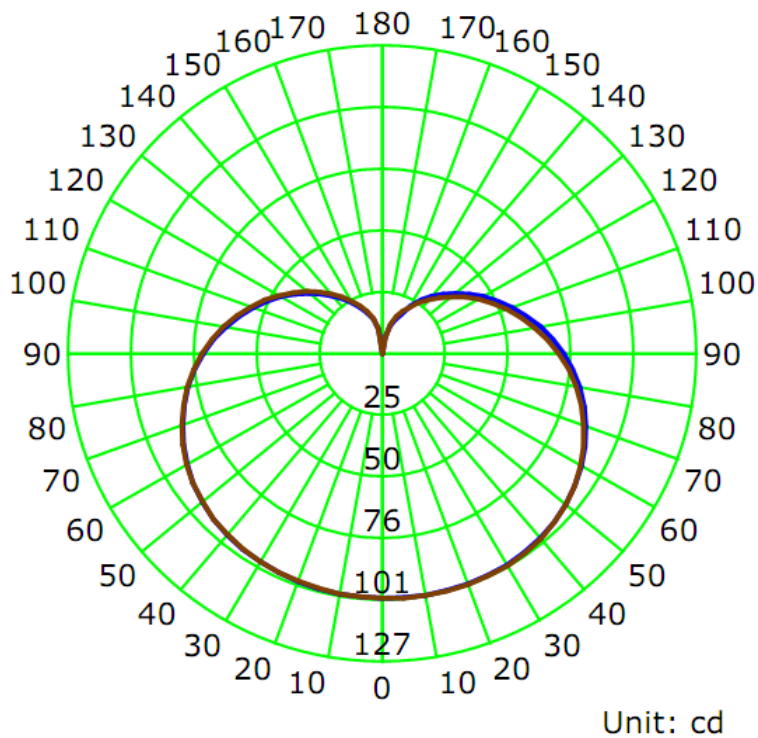
**Electrical Measurement**

Input Voltage (V)	Frequency (Hz)	Input Current (A)	Power (W)	Power Factor
120.0	60	0.0690	7.99	0.9590

**Photometric Measurement**

Luminous Flux (lm)	Efficacy (lm/W)	I <sub>max</sub> (cd)	S/MH (C0/180)	S/MH (C90/270)
854.5	106.95	101.9	1.51	1.51

**Luminous Intensity Distribution**



	C0/180	C45/225	C90/270	C135/315	AVG.
Beam Angle (50% I <sub>max</sub> ):	232.4	231.5	230.6	231.4	231.5
Field Angle (10% I <sub>max</sub> ):	336.8	337.8	337.6	337.6	337.5

**Luminous Intensity (cd) Distribution Data**

C \ Y	0°	22.5°	45°	67.5°	90°	112.5°	135°	157.5°
0.0°	101	101	101	101	101	101	101	101
5.0°	101	101	101	101	101	101	101	101
10.0°	101	102	102	102	102	101	101	101
15.0°	101	102	102	102	102	102	101	101
20.0°	101	102	102	102	102	101	101	101
25.0°	101	102	102	102	102	101	101	100
30.0°	101	101	102	102	101	101	100	100
35.0°	101	101	101	101	101	100	100	99
40.0°	100	100	100	100	100	99	99	98
45.0°	99	99	99	99	99	98	98	97
50.0°	97	98	98	98	97	97	96	96
55.0°	95	96	96	96	95	95	94	94
60.0°	93	93	93	93	93	92	92	92
65.0°	91	91	91	90	90	90	89	89
70.0°	88	88	88	87	87	87	86	86
75.0°	85	85	84	84	84	83	83	83
80.0°	81	81	81	80	80	80	80	80
85.0°	77	77	77	76	76	76	76	76
90.0°	74	73	73	72	72	72	72	72
95.0°	69	69	68	68	67	67	68	68
100.0°	65	65	64	63	63	63	63	64
105.0°	61	60	59	59	58	59	59	60
110.0°	56	56	55	54	54	54	55	55
115.0°	52	51	50	50	50	50	50	51
120.0°	47	47	46	45	45	45	46	47
125.0°	43	43	42	41	41	41	42	43
130.0°	39	38	38	37	37	37	38	39
135.0°	35	34	34	33	33	33	34	35
140.0°	31	30	30	29	29	29	30	31
145.0°	27	26	26	26	26	26	27	27
150.0°	23	21	23	23	23	23	23	24
155.0°	18	17	20	20	20	20	20	21
160.0°	15	14	17	17	17	17	18	18
165.0°	12	11	13	13	13	13	14	14
170.0°	7	7	8	7	7	8	9	9
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°	101	101	101	101	101	101	101	101
5.0°	101	101	101	101	101	101	101	101
10.0°	101	101	101	101	101	101	101	101
15.0°	101	100	100	100	100	101	101	101
20.0°	100	100	100	100	100	100	101	101
25.0°	100	100	100	100	100	100	100	101
30.0°	99	99	99	99	99	100	100	100
35.0°	99	99	99	99	99	99	99	100
40.0°	98	98	98	98	98	98	99	99
45.0°	97	97	97	97	97	97	97	98
50.0°	95	95	95	95	95	96	96	97
55.0°	94	94	94	94	94	94	94	95
60.0°	92	92	92	92	92	92	92	93
65.0°	89	89	89	89	89	90	90	90
70.0°	86	87	87	87	87	87	87	87
75.0°	83	84	84	84	84	84	84	84
80.0°	80	80	81	80	81	80	81	81
85.0°	77	77	77	77	77	77	77	77
90.0°	73	73	73	73	73	73	73	73
95.0°	69	69	70	69	69	69	69	69
100.0°	65	65	65	65	65	65	65	65
105.0°	60	61	61	61	61	61	61	61
110.0°	56	57	57	57	57	57	57	56
115.0°	52	53	53	53	53	53	52	52
120.0°	47	48	49	49	49	48	48	48
125.0°	43	44	44	44	44	44	44	43
130.0°	39	40	40	40	40	40	40	39
135.0°	35	36	36	36	36	36	36	35
140.0°	31	32	32	32	32	32	32	30
145.0°	28	28	29	29	29	28	28	26
150.0°	24	25	25	25	25	25	24	22
155.0°	21	22	22	22	22	22	21	19
160.0°	18	19	19	19	19	18	17	16
165.0°	15	15	15	16	16	14	13	13
170.0°	10	10	11	11	11	10	9	7
175.0°	0	0	0	0	0	1	1	0
180.0°	0	0	0	0	0	0	0	0

**Zonal Lumen Density Measurement**

Deg	Flux (lm)	%
0-5	2.4	0.28
5-10	7.2	0.85
10-15	12.0	1.40
15-20	16.6	1.95
20-25	21.1	2.47
25-30	25.4	2.97
30-35	29.4	3.44
35-40	33.1	3.88
40-45	36.4	4.26
45-50	39.2	4.59
50-55	41.5	4.85
55-60	43.2	5.05
60-65	44.2	5.18
65-70	44.7	5.23
70-75	44.6	5.22
75-80	43.9	5.14
80-85	42.6	4.99
85-90	40.9	4.79
90-95	38.7	4.53
95-100	36.1	4.23
100-105	33.3	3.90
105-110	30.3	3.54
110-115	27.1	3.17
115-120	23.9	2.80
120-125	20.8	2.43
125-130	17.7	2.08
130-135	14.8	1.74
135-140	12.1	1.42
140-145	9.7	1.13
145-150	7.5	0.88
150-155	5.6	0.65
155-160	3.9	0.46
160-165	2.6	0.30
165-170	1.3	0.16
170-175	0.3	0.04
175-180	0.0	0.00

Deg	Flux (lm)	%
0-5	2.4	0.28
0-10	9.7	1.13
0-15	21.6	2.53
0-20	38.3	4.48
0-25	59.4	6.95
0-30	84.8	9.93
0-35	114.3	13.37
0-40	147.4	17.25
0-45	183.8	21.51
0-50	223.0	26.09
0-55	264.4	30.95
0-60	307.6	36.00
0-65	351.8	41.18
0-70	396.6	46.41
0-75	441.2	51.63
0-80	485.1	56.77
0-85	527.7	61.76
0-90	568.6	66.55
0-95	607.3	71.08
0-100	643.4	75.30
0-105	676.7	79.20
0-110	707.0	82.74
0-115	734.1	85.92
0-120	758.1	88.72
0-125	778.9	91.15
0-130	796.6	93.23
0-135	811.4	94.96
0-140	823.6	96.38
0-145	833.2	97.52
0-150	840.7	98.39
0-155	846.3	99.04
0-160	850.2	99.51
0-165	852.8	99.81
0-170	854.1	99.96
0-175	854.5	100.00
0-180	854.5	100.00

6. Product Photo



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