



TL-749



# IES LM-79-08

## MEASUREMENT AND TEST REPORT

For

### GREEN CREATIVE LTD

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

**Test Model: LE109027DIM120VNR4CC**

<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>	RKSB190329016-10-7
<b>Test Date:</b>	2019-04-01 to 2019-04-04
<b>Report Date:</b>	2019-05-06
<b>Reviewed By:</b>	Ray Gao/EE Engineer <i>Ry 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 2019-03-29 and used for testing.

Model Tested: LE109027DIM120VNR4CC  
 Manufacturer: GREEN CREATIVE LTD  
 Brand Name: GREEN CREATIVE  
 Product Designation: LED Recessed Downlight  
 Aging Time Before Test: 0hour(For New Products)

### Rated Values:

Rated Voltage/Frequency: 120-277 VAC 60Hz  
 Rated Power: 12W  
 Nominal CCT: 2700K  
 Nominal Lumen Output: 1000lm

## 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	2019-01-23	2020-01-23
Power Meter	INVENTFINE	WT500	GSJWQ20009	2019-04-08	2020-04-08
Spectral photometer	INVENTFINE	CMS-3S	GSGSE100017	2019-01-23	2020-01-23
AC Power Supply	INVENTFINE	CHP500	JWJSD010071	2019-04-08	2020-04-08
Standard Light Source	INVENTFINE	N/A	JWWCR020106	2018-12-24	2019-12-24
Thermal Meter	KEJIAN	TA298	N/A	2018-12-01	2019-12-01
DC Power Supply	INVENTFINE	WL3005	JWWCP020069	2019-04-08	2020-04-08
AC Power Supply	INVENTFINE	CHP-5KVA	900511765	2019-04-08	2020-04-08
DC Power Supply	INVENTFINE	WL3010	JWDMP030001	2019-04-08	2020-04-08
Power Meter	INVENTFINE	WT500	GSDSQ200007	2019-04-08	2020-04-08
Goniophotometer	INVENTFINE	GPM-1900	YWGCF120001	2019-01-24	2020-01-24
Wireless Weather Station	ZHONGXING	KG218	N/A	2018-12-01	2019-12-01
Standard Light Source	INVENTFINE	N/A	JWBYR040008	2019-03-08	2020-03-08

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  $U_{re}=2.61\%$  ( $k=2$ ), at the 95% confidence level. The uncertainty of the correlated color temperature measurements is  $U=34\text{K}$  ( $k=2$ ), 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  $U_{re}=0.48\%$  of rdg, AC Voltage  $U_{re}=0.25\%$  of rdg, Power  $U_{re}=0.44\%$ , ( $k=2$ ), 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  $U_{re}=2.6\%$  ( $k=2$ ), 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: **Downward**

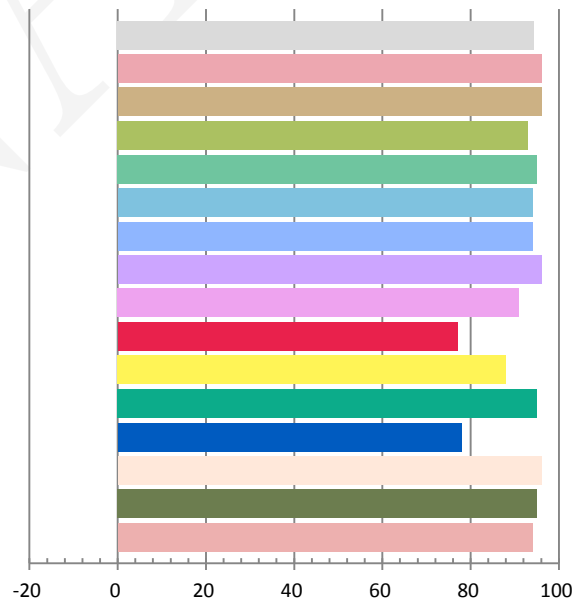
### Photometric and Electrical Measurement Result

Voltage (V)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Luminous Flux(lm)	Efficacy (lm/W)
120	60	0.1021	12.11	0.9884	1029.89	85.04

Radiant Flux (W)	CCT (K)	Duv	x	y	u'	v'
3.796	2709	-0.00004	0.4591	0.4103	0.2621	0.5271

### Color Rendering Index

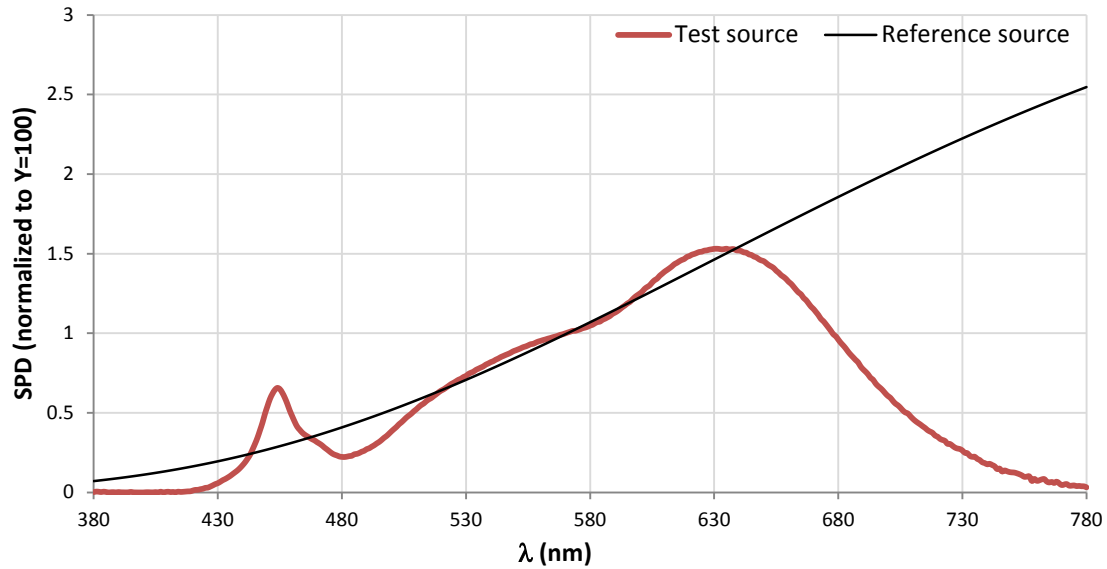
<b>Ra</b>			
94.4			
<b>R1</b>	<b>R2</b>	<b>R3</b>	<b>R4</b>
96	96	93	95
<b>R5</b>	<b>R6</b>	<b>R7</b>	<b>R8</b>
94	94	96	91
<b>R9</b>	<b>R10</b>	<b>R11</b>	<b>R12</b>
77	88	95	78
<b>R13</b>	<b>R14</b>	<b>R15</b>	
96	95	94	



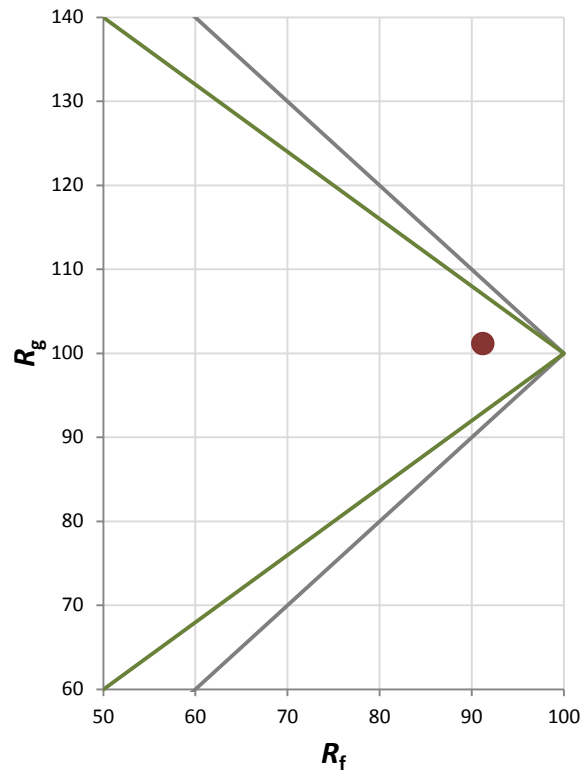
### Fidelity Index and Gamut Index

Fidelity Index $R_f$	91
Gamut Index $R_g$	101

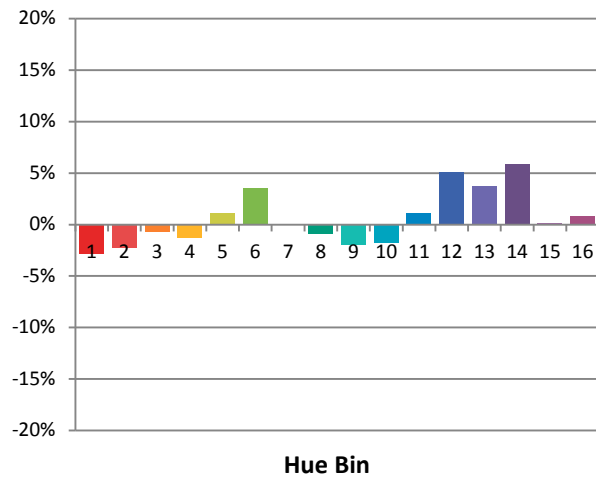
### Spectral Power Distribution Comparison



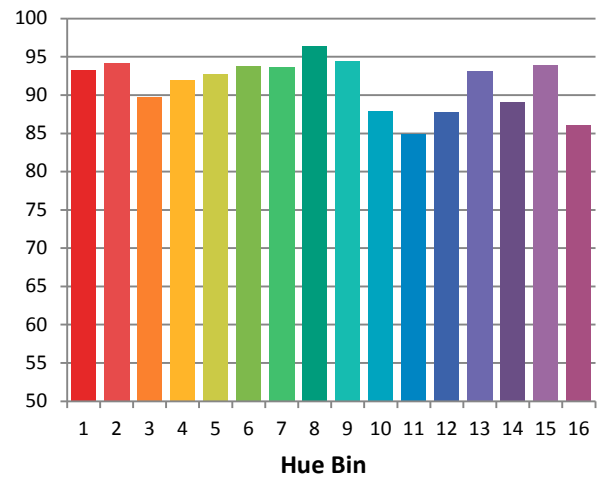
### Plot of $R_g$ versus $R_f$



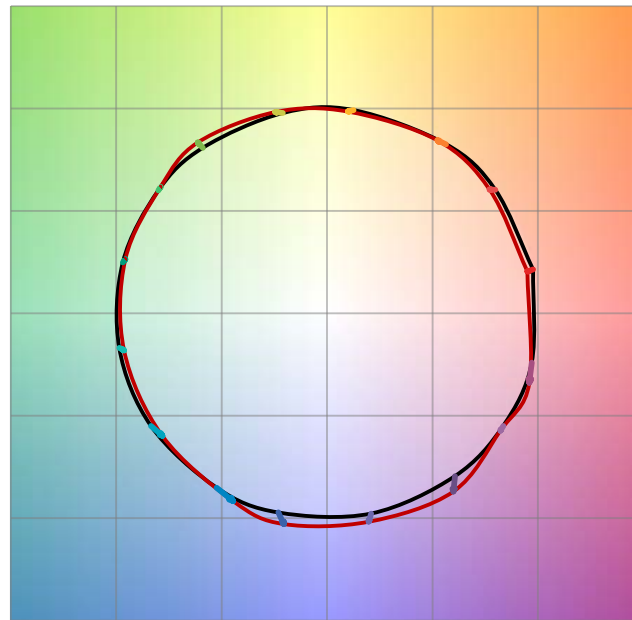
Chroma Shift by Hue



$R_t$  by Hue

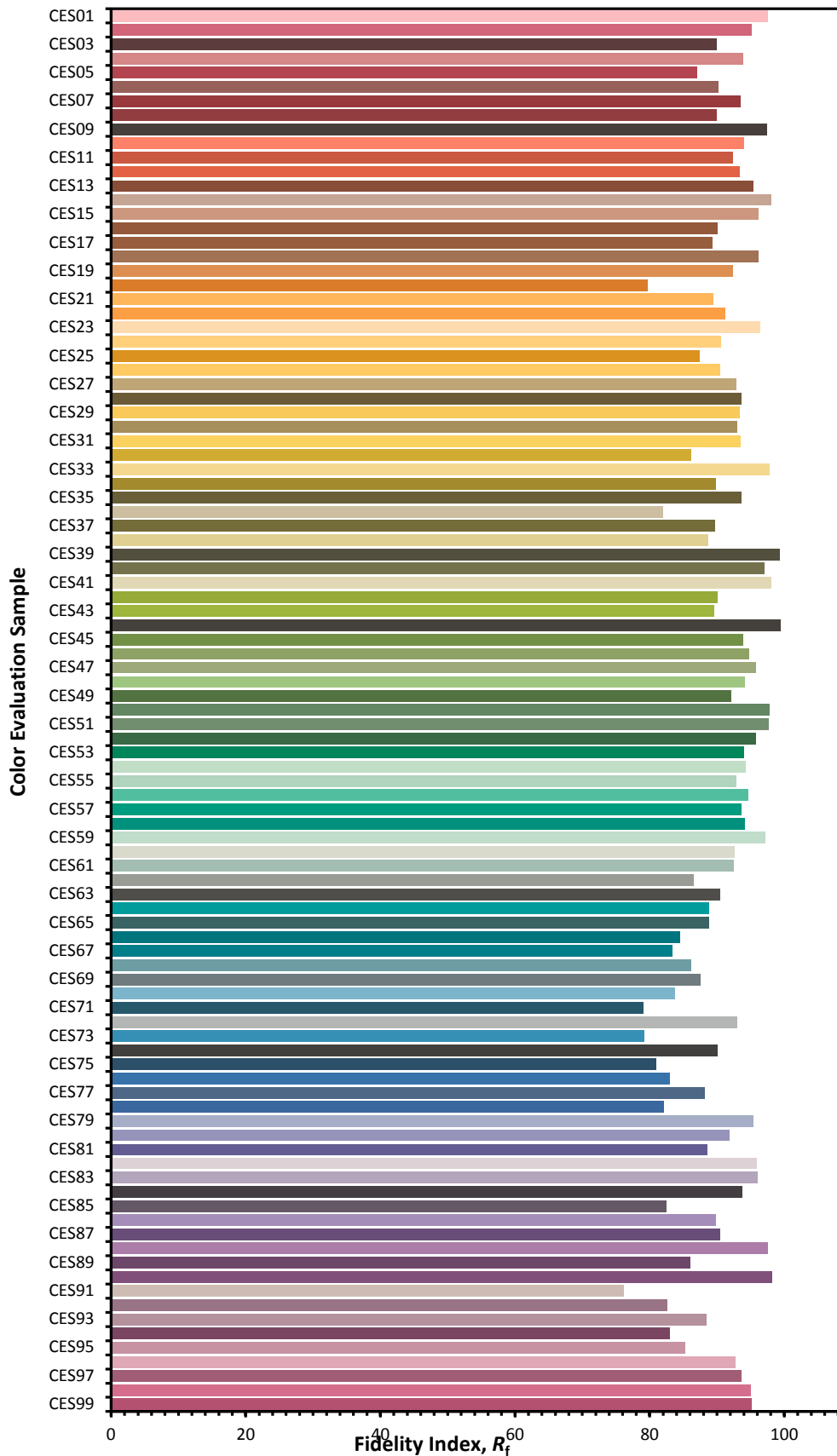


Color Vector Graphic

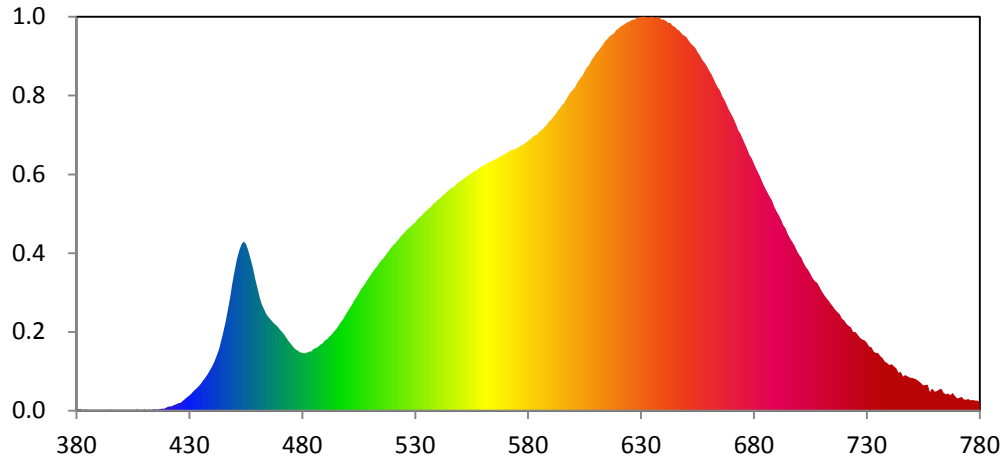


— Reference Illuminant — Test Source

### Color Fidelity by CES Sample



### Relative Spectral Power Distribution

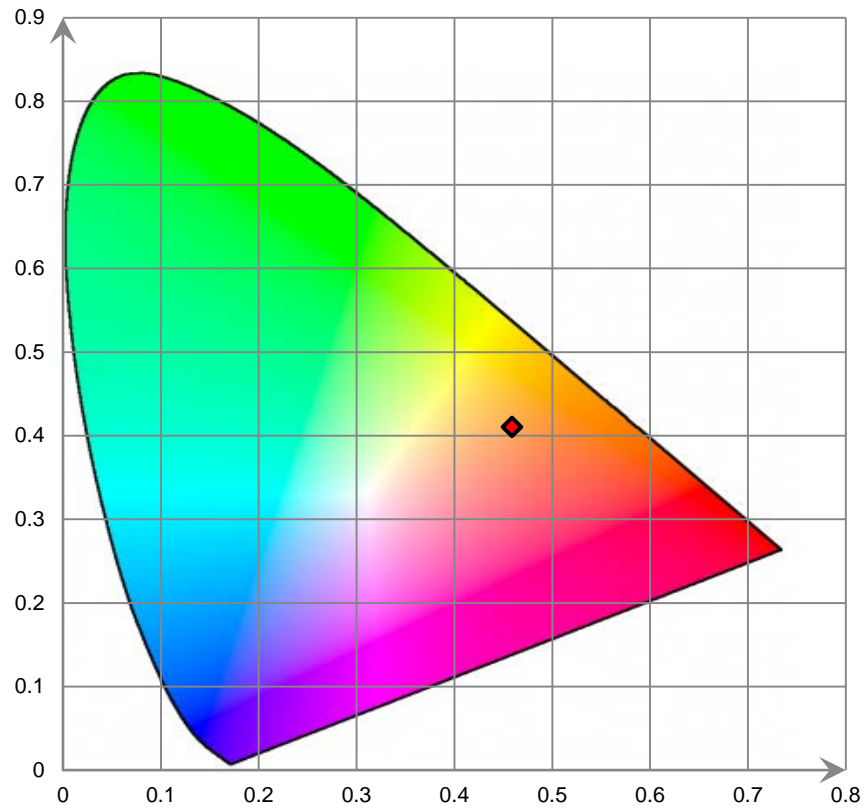


nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
380	3.380E-02	421	2.437E-01	462	6.227E+00	503	6.458E+00	544	1.282E+01
381	8.070E-02	422	2.505E-01	463	5.940E+00	504	6.648E+00	545	1.293E+01
382	6.830E-02	423	3.099E-01	464	5.674E+00	505	6.870E+00	546	1.303E+01
383	3.770E-02	424	3.524E-01	465	5.479E+00	506	7.100E+00	547	1.312E+01
384	7.350E-02	425	4.360E-01	466	5.325E+00	507	7.285E+00	548	1.324E+01
385	4.380E-02	426	4.577E-01	467	5.185E+00	508	7.469E+00	549	1.337E+01
386	3.100E-03	427	5.601E-01	468	5.044E+00	509	7.693E+00	550	1.346E+01
387	2.170E-02	428	6.717E-01	469	4.927E+00	510	7.879E+00	551	1.355E+01
388	2.690E-02	429	7.921E-01	470	4.764E+00	511	8.098E+00	552	1.365E+01
389	8.400E-03	430	8.781E-01	471	4.624E+00	512	8.288E+00	553	1.376E+01
390	3.720E-02	431	1.012E+00	472	4.457E+00	513	8.434E+00	554	1.383E+01
391	1.700E-02	432	1.162E+00	473	4.251E+00	514	8.647E+00	555	1.393E+01
392	1.220E-02	433	1.275E+00	474	4.077E+00	515	8.814E+00	556	1.404E+01
393	6.500E-03	434	1.413E+00	475	3.889E+00	516	8.944E+00	557	1.408E+01
394	1.600E-02	435	1.563E+00	476	3.710E+00	517	9.130E+00	558	1.418E+01
395	5.060E-02	436	1.742E+00	477	3.586E+00	518	9.306E+00	559	1.429E+01
396	1.290E-02	437	1.918E+00	478	3.506E+00	519	9.491E+00	560	1.436E+01
397	4.000E-03	438	2.102E+00	479	3.408E+00	520	9.652E+00	561	1.443E+01
398	1.000E-04	439	2.325E+00	480	3.370E+00	521	9.774E+00	562	1.450E+01
399	0.000E+00	440	2.580E+00	481	3.358E+00	522	9.935E+00	563	1.457E+01
400	0.000E+00	441	2.863E+00	482	3.392E+00	523	1.010E+01	564	1.463E+01
401	1.890E-02	442	3.198E+00	483	3.445E+00	524	1.027E+01	565	1.471E+01
402	2.280E-02	443	3.571E+00	484	3.474E+00	525	1.039E+01	566	1.477E+01
403	1.220E-02	444	4.075E+00	485	3.615E+00	526	1.054E+01	567	1.485E+01
404	1.180E-02	445	4.608E+00	486	3.653E+00	527	1.068E+01	568	1.494E+01
405	3.340E-02	446	5.195E+00	487	3.738E+00	528	1.078E+01	569	1.499E+01
406	7.200E-03	447	5.889E+00	488	3.861E+00	529	1.094E+01	570	1.507E+01
407	7.350E-02	448	6.607E+00	489	3.947E+00	530	1.104E+01	571	1.515E+01
408	1.030E-02	449	7.444E+00	490	4.103E+00	531	1.123E+01	572	1.523E+01
409	4.430E-02	450	8.165E+00	491	4.186E+00	532	1.135E+01	573	1.531E+01
410	6.850E-02	451	8.847E+00	492	4.334E+00	533	1.145E+01	574	1.531E+01
411	3.410E-02	452	9.340E+00	493	4.468E+00	534	1.161E+01	575	1.538E+01
412	4.850E-02	453	9.716E+00	494	4.636E+00	535	1.172E+01	576	1.546E+01
413	1.860E-02	454	9.905E+00	495	4.785E+00	536	1.184E+01	577	1.556E+01
414	7.340E-02	455	9.790E+00	496	4.972E+00	537	1.195E+01	578	1.562E+01
415	4.770E-02	456	9.442E+00	497	5.179E+00	538	1.211E+01	579	1.570E+01
416	6.140E-02	457	8.975E+00	498	5.349E+00	539	1.222E+01	580	1.581E+01
417	8.290E-02	458	8.403E+00	499	5.569E+00	540	1.235E+01	581	1.589E+01
418	1.028E-01	459	7.760E+00	500	5.796E+00	541	1.244E+01	582	1.603E+01
419	1.123E-01	460	7.214E+00	501	6.006E+00	542	1.258E+01	583	1.614E+01
420	1.860E-01	461	6.685E+00	502	6.211E+00	543	1.269E+01	584	1.619E+01

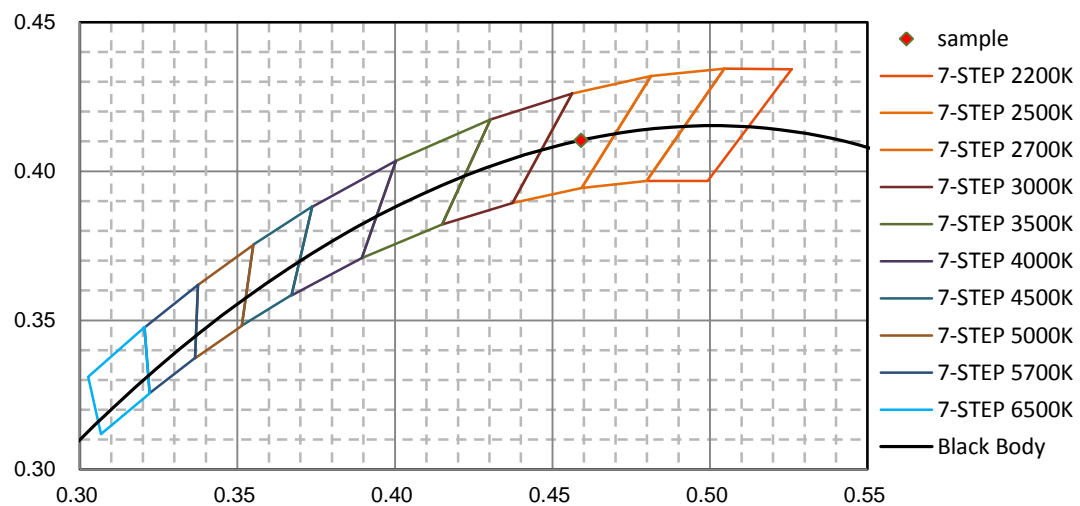


nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
585	1.636E+01	626	2.291E+01	667	1.823E+01	708	7.488E+00	749	1.931E+00
586	1.646E+01	627	2.293E+01	668	1.792E+01	709	7.234E+00	750	1.902E+00
587	1.659E+01	628	2.300E+01	669	1.761E+01	710	6.991E+00	751	1.882E+00
588	1.671E+01	629	2.304E+01	670	1.738E+01	711	6.783E+00	752	1.812E+00
589	1.691E+01	630	2.308E+01	671	1.710E+01	712	6.610E+00	753	1.726E+00
590	1.703E+01	631	2.309E+01	672	1.680E+01	713	6.452E+00	754	1.615E+00
591	1.718E+01	632	2.307E+01	673	1.644E+01	714	6.271E+00	755	1.477E+00
592	1.735E+01	633	2.303E+01	674	1.622E+01	715	6.106E+00	756	1.506E+00
593	1.755E+01	634	2.305E+01	675	1.594E+01	716	5.901E+00	757	1.516E+00
594	1.771E+01	635	2.309E+01	676	1.563E+01	717	5.768E+00	758	1.085E+00
595	1.790E+01	636	2.302E+01	677	1.532E+01	718	5.643E+00	759	1.287E+00
596	1.804E+01	637	2.305E+01	678	1.499E+01	719	5.391E+00	760	1.099E+00
597	1.827E+01	638	2.305E+01	679	1.479E+01	720	5.284E+00	761	1.151E+00
598	1.850E+01	639	2.293E+01	680	1.448E+01	721	5.076E+00	762	1.240E+00
599	1.868E+01	640	2.292E+01	681	1.418E+01	722	4.974E+00	763	1.266E+00
600	1.884E+01	641	2.286E+01	682	1.392E+01	723	4.882E+00	764	1.036E+00
601	1.903E+01	642	2.274E+01	683	1.364E+01	724	4.609E+00	765	9.475E-01
602	1.930E+01	643	2.271E+01	684	1.332E+01	725	4.595E+00	766	9.977E-01
603	1.947E+01	644	2.255E+01	685	1.305E+01	726	4.424E+00	767	9.000E-01
604	1.962E+01	645	2.250E+01	686	1.280E+01	727	4.256E+00	768	1.026E+00
605	1.989E+01	646	2.235E+01	687	1.255E+01	728	4.162E+00	769	8.619E-01
606	2.011E+01	647	2.227E+01	688	1.232E+01	729	4.113E+00	770	7.016E-01
607	2.026E+01	648	2.210E+01	689	1.194E+01	730	3.974E+00	771	7.498E-01
608	2.052E+01	649	2.198E+01	690	1.166E+01	731	3.756E+00	772	7.969E-01
609	2.071E+01	650	2.191E+01	691	1.144E+01	732	3.721E+00	773	6.466E-01
610	2.091E+01	651	2.172E+01	692	1.119E+01	733	3.467E+00	774	6.428E-01
611	2.108E+01	652	2.154E+01	693	1.086E+01	734	3.376E+00	775	6.669E-01
612	2.124E+01	653	2.141E+01	694	1.068E+01	735	3.383E+00	776	6.014E-01
613	2.142E+01	654	2.125E+01	695	1.034E+01	736	3.180E+00	777	6.200E-01
614	2.163E+01	655	2.101E+01	696	1.008E+01	737	3.072E+00	778	5.865E-01
615	2.176E+01	656	2.082E+01	697	9.886E+00	738	2.863E+00	779	5.803E-01
616	2.191E+01	657	2.058E+01	698	9.652E+00	739	2.784E+00	780	4.859E-01
617	2.203E+01	658	2.042E+01	699	9.376E+00	740	2.668E+00		
618	2.213E+01	659	2.022E+01	700	9.141E+00	741	2.714E+00		
619	2.231E+01	660	1.996E+01	701	8.965E+00	742	2.598E+00		
620	2.240E+01	661	1.976E+01	702	8.672E+00	743	2.477E+00		
621	2.253E+01	662	1.948E+01	703	8.422E+00	744	2.213E+00		
622	2.260E+01	663	1.920E+01	704	8.259E+00	745	2.264E+00		
623	2.269E+01	664	1.894E+01	705	8.036E+00	746	1.983E+00		
624	2.278E+01	665	1.877E+01	706	7.776E+00	747	2.088E+00		
625	2.281E+01	666	1.843E+01	707	7.580E+00	748	2.007E+00		

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**

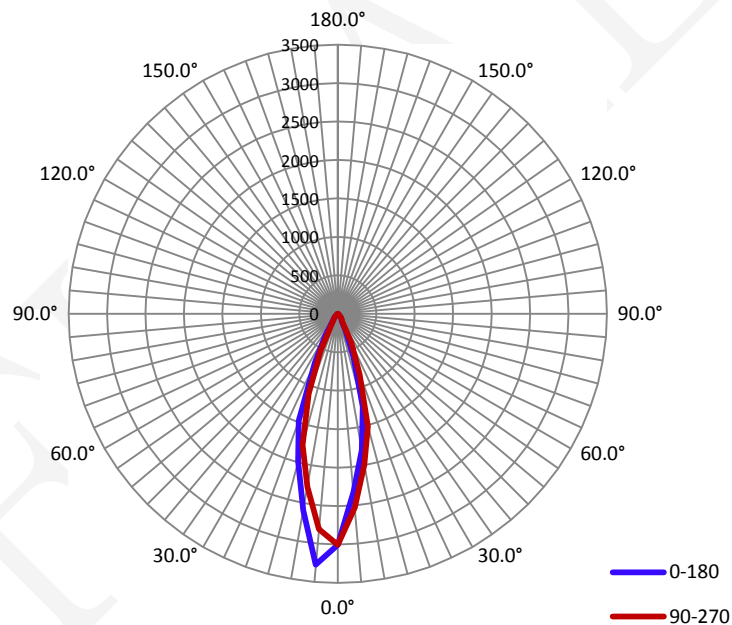
### Electrical Measurement

Input Voltage (V)	Frequency (Hz)	Input Current (A)	Power (W)	Power Factor
120.0	60	0.1050	12.13	0.9580

### Photometric Measurement

Luminous Flux (lm)	Efficacy (lm/W)	I <sub>max</sub> (cd)	S/MH (C0/180)	S/MH (C90/270)
1033.4	85.25	3273.3	0.52	0.53

### Luminous Intensity Distribution



	C0/180	C45/225	C90/270	C135/315	AVG.
Beam Angle (50% I <sub>max</sub> ):	29.9	31.3	32.1	32.4	31.4
Field Angle (10% I <sub>max</sub> ):	53.8	53.8	55.0	54.8	54.4

Luminous Intensity (cd) Distribution Data

C y	0°	22.5°	45°	67.5°	90°	112.5°	135°	157.5°
0.0°	3002	3002	3002	3002	3002	3002	3002	3002
5.0°	2328	2326	2357	2407	2533	2693	2913	3178
10.0°	1799	1799	1826	1889	1988	2128	2289	2482
15.0°	1250	1249	1305	1404	1518	1654	1802	1952
20.0°	599	583	606	688	831	1046	1263	1459
25.0°	239	229	249	319	413	482	584	694
30.0°	104	103	103	108	120	139	203	302
35.0°	78	77	78	79	84	90	95	101
40.0°	59	58	59	61	65	69	73	77
45.0°	25	25	25	29	37	46	54	58
50.0°	8	8	9	10	12	17	22	28
55.0°	3	3	4	4	5	6	8	9
60.0°	2	1	2	2	2	2	3	4
65.0°	1	0	1	0	0	1	1	3
70.0°	0	0	0	0	0	0	0	0
75.0°	0	0	0	0	0	0	0	0
80.0°	0	0	0	0	0	0	0	0
85.0°	0	0	0	0	0	0	0	0
90.0°	0	0	0	0	0	0	0	0
95.0°	0	0	0	0	0	0	0	0
100.0°	0	0	0	0	0	0	0	0
105.0°	0	0	0	0	0	0	0	0
110.0°	0	0	0	0	0	0	0	0
115.0°	0	0	0	0	0	0	0	0
120.0°	0	0	0	0	0	0	0	0
125.0°	0	0	0	0	0	0	0	0
130.0°	0	0	0	0	0	0	0	0
135.0°	0	0	0	0	0	0	0	0
140.0°	0	0	0	0	0	0	0	0
145.0°	0	0	0	0	0	0	0	0
150.0°	0	0	0	0	0	0	0	0
155.0°	0	0	0	0	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°	3002	3002	3002	3002	3002	3002	3002	3002
5.0°	3273	3268	3178	3005	2812	2601	2452	2360
10.0°	2595	2674	2640	2470	2286	2106	1961	1855
15.0°	1985	2030	2006	1898	1768	1617	1460	1324
20.0°	1478	1518	1493	1321	1109	881	719	624
25.0°	708	737	694	614	532	448	349	255
30.0°	327	342	296	223	155	126	115	109
35.0°	106	103	101	97	92	88	84	81
40.0°	78	77	77	75	73	70	64	61
45.0°	59	61	59	55	50	39	31	27
50.0°	29	29	26	21	17	12	10	9
55.0°	10	9	8	8	6	5	5	4
60.0°	4	4	3	3	3	2	1	2
65.0°	2	2	1	1	1	0	0	0
70.0°	1	0	0	0	0	0	0	0
75.0°	0	0	0	0	0	0	0	0
80.0°	0	0	0	0	0	0	0	0
85.0°	0	0	0	0	0	0	0	0
90.0°	0	0	0	0	0	0	0	0
95.0°	0	0	0	0	0	0	0	0
100.0°	0	0	0	0	0	0	0	0
105.0°	0	0	0	0	0	0	0	0
110.0°	0	0	0	0	0	0	0	0
115.0°	0	0	0	0	0	0	0	0
120.0°	0	0	0	0	0	0	0	0
125.0°	0	0	0	0	0	0	0	0
130.0°	0	0	0	0	0	0	0	0
135.0°	0	0	0	0	0	0	0	0
140.0°	0	0	0	0	0	0	0	0
145.0°	0	0	0	0	0	0	0	0
150.0°	0	0	0	0	0	0	0	0
155.0°	0	0	0	0	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

### Zonal Lumen Density Measurement

Deg	Flux (lm)	%	Deg	Flux (lm)	%
0-5	68.5	6.63	0-5	68.5	6.63
5-10	175.4	16.98	0-10	244.0	23.61
10-15	226.2	21.89	0-15	470.2	45.50
15-20	218.6	21.15	0-20	688.8	66.65
20-25	155.8	15.07	0-25	844.5	81.72
25-30	82.4	7.97	0-30	926.9	89.69
30-35	39.7	3.84	0-35	966.6	93.53
35-40	26.4	2.55	0-40	993.0	96.08
40-45	20.5	1.99	0-45	1013.5	98.07
45-50	12.0	1.16	0-50	1025.5	99.23
50-55	4.9	0.47	0-55	1030.4	99.70
55-60	2.0	0.19	0-60	1032.3	99.89
60-65	0.8	0.08	0-65	1033.2	99.98
65-70	0.2	0.02	0-70	1033.4	100.00
70-75	0.0	0.00	0-75	1033.4	100.00
75-80	0.0	0.00	0-80	1033.4	100.00
80-85	0.0	0.00	0-85	1033.4	100.00
85-90	0.0	0.00	0-90	1033.4	100.00
90-95	0.0	0.00	0-95	1033.4	100.00
95-100	0.0	0.00	0-100	1033.4	100.00
100-105	0.0	0.00	0-105	1033.4	100.00
105-110	0.0	0.00	0-110	1033.4	100.00
110-115	0.0	0.00	0-115	1033.4	100.00
115-120	0.0	0.00	0-120	1033.4	100.00
120-125	0.0	0.00	0-125	1033.4	100.00
125-130	0.0	0.00	0-130	1033.4	100.00
130-135	0.0	0.00	0-135	1033.4	100.00
135-140	0.0	0.00	0-140	1033.4	100.00
140-145	0.0	0.00	0-145	1033.4	100.00
145-150	0.0	0.00	0-150	1033.4	100.00
150-155	0.0	0.00	0-155	1033.4	100.00
155-160	0.0	0.00	0-160	1033.4	100.00
160-165	0.0	0.00	0-165	1033.4	100.00
165-170	0.0	0.00	0-170	1033.4	100.00
170-175	0.0	0.00	0-175	1033.4	100.00
175-180	0.0	0.00	0-180	1033.4	100.00

## 6. Product Photo



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