

# IES LM-79-08

## MEASUREMENT AND TEST REPORT For

### GREEN CREATIVE LTD

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

**Test Model: LE509027DIM120VNR/ADR6BL**

<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>	RKSB190329025-10-1
<b>Test Date:</b>	2019-04-03 to 2019-04-06
<b>Report Date:</b>	2019-05-16
<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.

## 1. Product Description

### General Information:

One sample was received on 2019-04-01 and used for testing.

Model Tested: LE509027DIM120VNR/ADR6BL  
 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: 53W  
 Nominal CCT: 2700K  
 Nominal Lumen Output: 3400lm

## 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	2018-04-08	2019-04-08
Spectral photometer	INVENTFINE	CMS-3S	GSGSE100017	2019-01-23	2020-01-23
AC Power Supply	INVENTFINE	CHP500	JWJSD010071	2018-04-08	2019-04-08
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	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	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  $U_{rel}=2.61\%$  ( $k=2$ ), 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  $U_{rel}=0.48\%$  of rdg, AC Voltage  $U_{rel}=0.25\%$  of rdg, Power  $U_{rel}=0.44\%$ , ( $k=2$ ), 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  $U_{rel}=2.6\%$  ( $k=2$ ), 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**

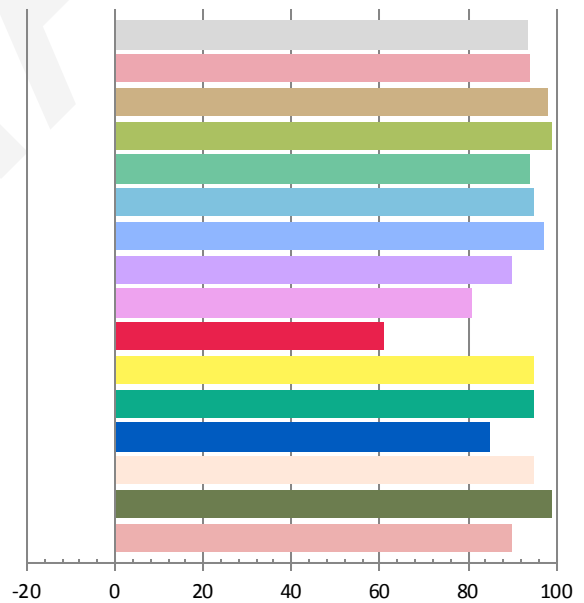
### Photometric and Electrical Measurement Result

Voltage (V)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Luminous Flux(lm)	Efficacy (lm/W)
120	60	0.4469	53.31	0.9941	3451.97	64.75

Radiant Flux (W)	CCT (K)	Duv	x	y	u'	v'
12.209	2703	-0.00092	0.4580	0.4077	0.2626	0.5260

### Color Rendering Index

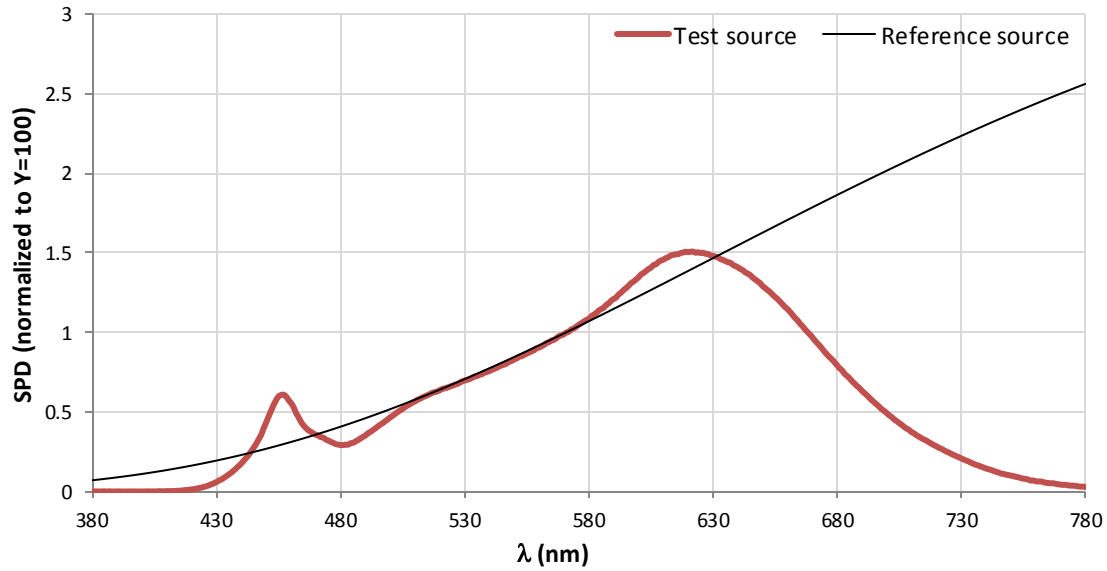
<b>Ra</b>			
93.5			
<b>R1</b>	<b>R2</b>	<b>R3</b>	<b>R4</b>
94	98	99	94
<b>R5</b>	<b>R6</b>	<b>R7</b>	<b>R8</b>
95	97	90	81
<b>R9</b>	<b>R10</b>	<b>R11</b>	<b>R12</b>
61	95	95	85
<b>R13</b>	<b>R14</b>	<b>R15</b>	
95	99	90	



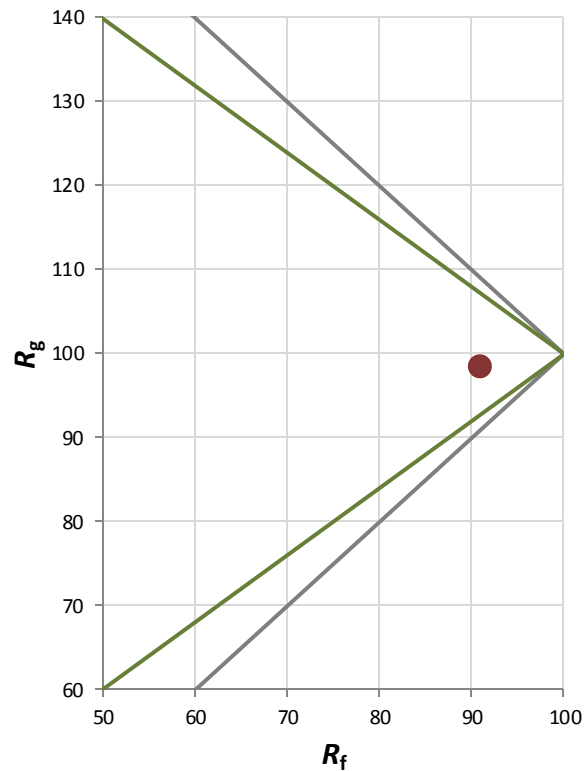
### Fidelity Index and Gamut Index

Fidelity Index $R_f$	91
Gamut Index $R_g$	99

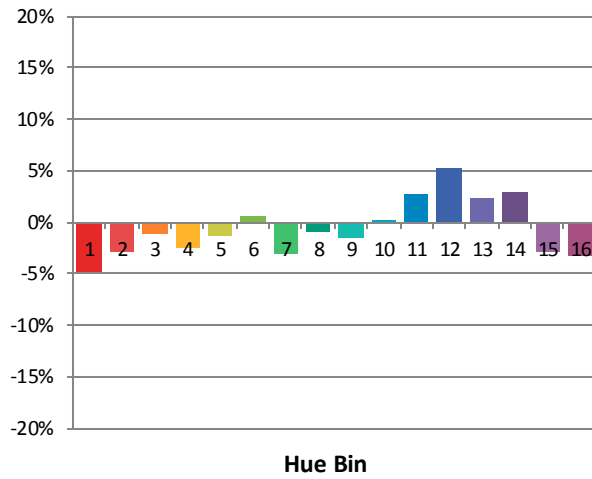
### Spectral Power Distribution Comparison



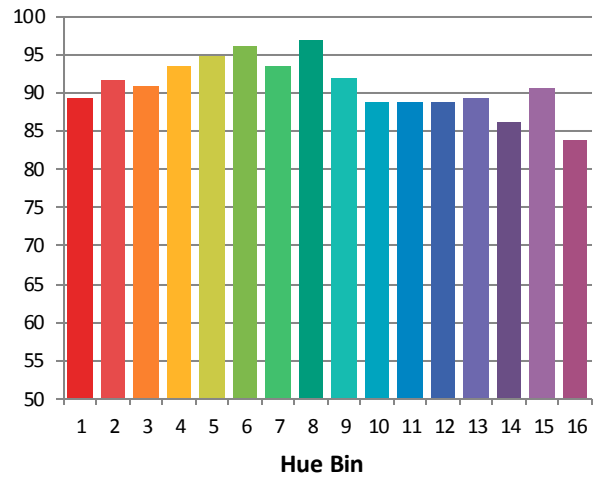
### Plot of $R_g$ versus $R_f$



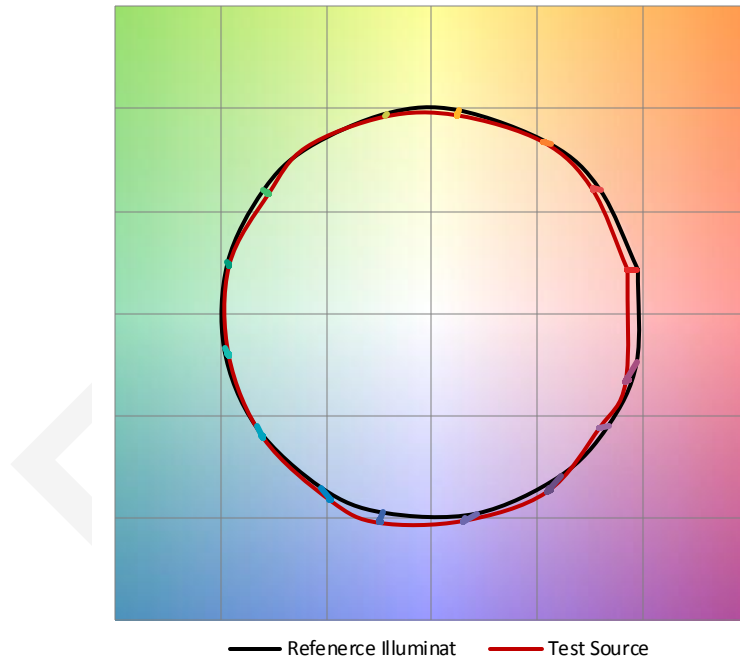
Chroma Shift by Hue



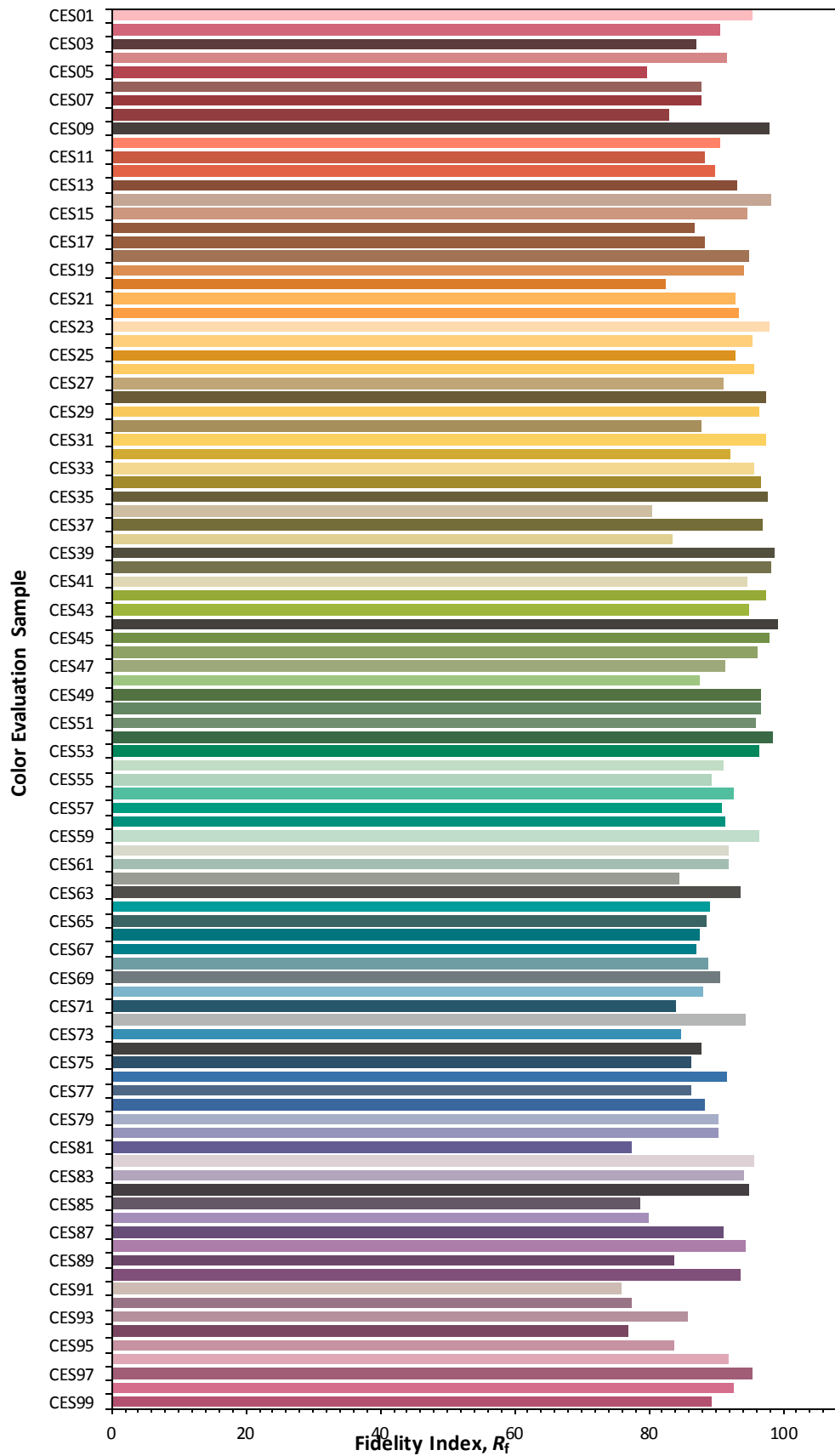
$R_f$  by Hue



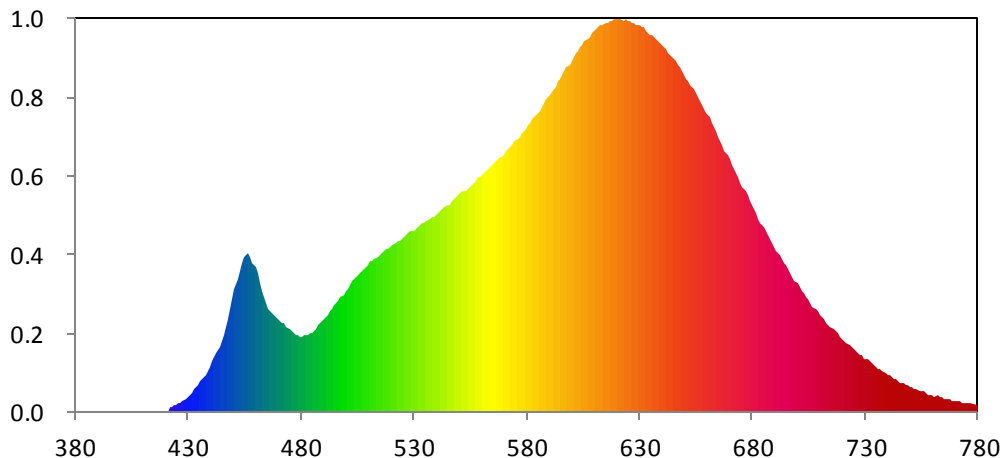
Color Vector Graphic



### Color Fidelity by CES Sample



### Relative Spectral Power Distribution

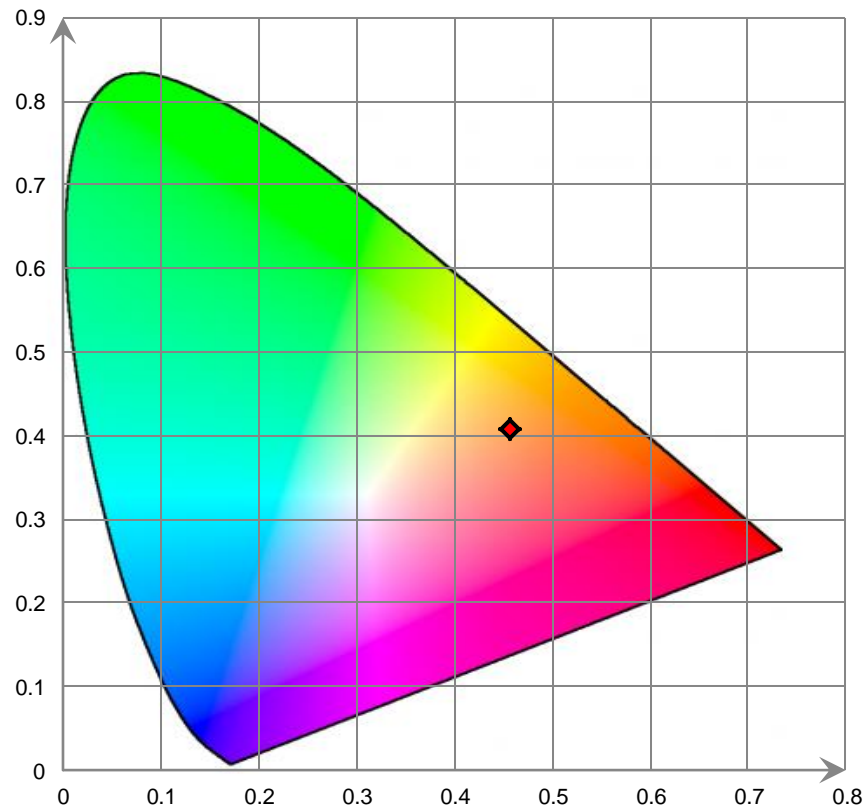


nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
380	1.670E-02	421	7.704E-01	462	2.500E+01	503	2.524E+01	544	3.975E+01
381	3.020E-02	422	9.185E-01	463	2.365E+01	504	2.577E+01	545	4.010E+01
382	7.200E-03	423	1.097E+00	464	2.218E+01	505	2.624E+01	546	4.032E+01
383	2.000E-04	424	1.254E+00	465	2.104E+01	506	2.685E+01	547	4.072E+01
384	4.150E-02	425	1.472E+00	466	2.020E+01	507	2.732E+01	548	4.121E+01
385	3.590E-02	426	1.706E+00	467	1.946E+01	508	2.778E+01	549	4.150E+01
386	2.900E-03	427	1.987E+00	468	1.898E+01	509	2.823E+01	550	4.196E+01
387	4.580E-02	428	2.315E+00	469	1.844E+01	510	2.862E+01	551	4.229E+01
388	4.200E-03	429	2.642E+00	470	1.805E+01	511	2.914E+01	552	4.281E+01
389	2.000E-04	430	3.031E+00	471	1.774E+01	512	2.947E+01	553	4.300E+01
390	2.100E-02	431	3.470E+00	472	1.728E+01	513	2.987E+01	554	4.341E+01
391	1.830E-02	432	3.843E+00	473	1.711E+01	514	3.024E+01	555	4.379E+01
392	8.000E-04	433	4.348E+00	474	1.654E+01	515	3.055E+01	556	4.419E+01
393	0.000E+00	434	4.867E+00	475	1.619E+01	516	3.095E+01	557	4.455E+01
394	4.200E-03	435	5.443E+00	476	1.578E+01	517	3.138E+01	558	4.491E+01
395	1.740E-02	436	6.025E+00	477	1.545E+01	518	3.157E+01	559	4.552E+01
396	6.600E-03	437	6.704E+00	478	1.506E+01	519	3.180E+01	560	4.572E+01
397	1.210E-02	438	7.411E+00	479	1.489E+01	520	3.218E+01	561	4.615E+01
398	1.000E-03	439	8.132E+00	480	1.476E+01	521	3.258E+01	562	4.659E+01
399	1.100E-03	440	8.912E+00	481	1.472E+01	522	3.277E+01	563	4.716E+01
400	0.000E+00	441	9.818E+00	482	1.487E+01	523	3.300E+01	564	4.745E+01
401	1.100E-02	442	1.069E+01	483	1.487E+01	524	3.331E+01	565	4.796E+01
402	4.290E-02	443	1.167E+01	484	1.530E+01	525	3.359E+01	566	4.817E+01
403	2.760E-02	444	1.277E+01	485	1.546E+01	526	3.392E+01	567	4.873E+01
404	2.770E-02	445	1.393E+01	486	1.589E+01	527	3.415E+01	568	4.937E+01
405	2.830E-02	446	1.515E+01	487	1.632E+01	528	3.456E+01	569	4.958E+01
406	3.270E-02	447	1.660E+01	488	1.684E+01	529	3.498E+01	570	4.998E+01
407	1.089E-01	448	1.800E+01	489	1.733E+01	530	3.524E+01	571	5.052E+01
408	5.480E-02	449	2.011E+01	490	1.780E+01	531	3.547E+01	572	5.077E+01
409	7.150E-02	450	2.190E+01	491	1.848E+01	532	3.573E+01	573	5.151E+01
410	1.187E-01	451	2.387E+01	492	1.893E+01	533	3.614E+01	574	5.177E+01
411	1.218E-01	452	2.565E+01	493	1.950E+01	534	3.650E+01	575	5.237E+01
412	1.436E-01	453	2.746E+01	494	2.004E+01	535	3.670E+01	576	5.296E+01
413	1.446E-01	454	2.899E+01	495	2.066E+01	536	3.704E+01	577	5.345E+01
414	2.185E-01	455	3.020E+01	496	2.122E+01	537	3.728E+01	578	5.397E+01
415	2.613E-01	456	3.062E+01	497	2.171E+01	538	3.773E+01	579	5.447E+01
416	3.062E-01	457	3.074E+01	498	2.234E+01	539	3.797E+01	580	5.487E+01
417	4.266E-01	458	3.020E+01	499	2.289E+01	540	3.828E+01	581	5.564E+01
418	4.844E-01	459	2.905E+01	500	2.354E+01	541	3.865E+01	582	5.616E+01
419	5.553E-01	460	2.812E+01	501	2.406E+01	542	3.899E+01	583	5.669E+01
420	6.734E-01	461	2.687E+01	502	2.467E+01	543	3.932E+01	584	5.743E+01

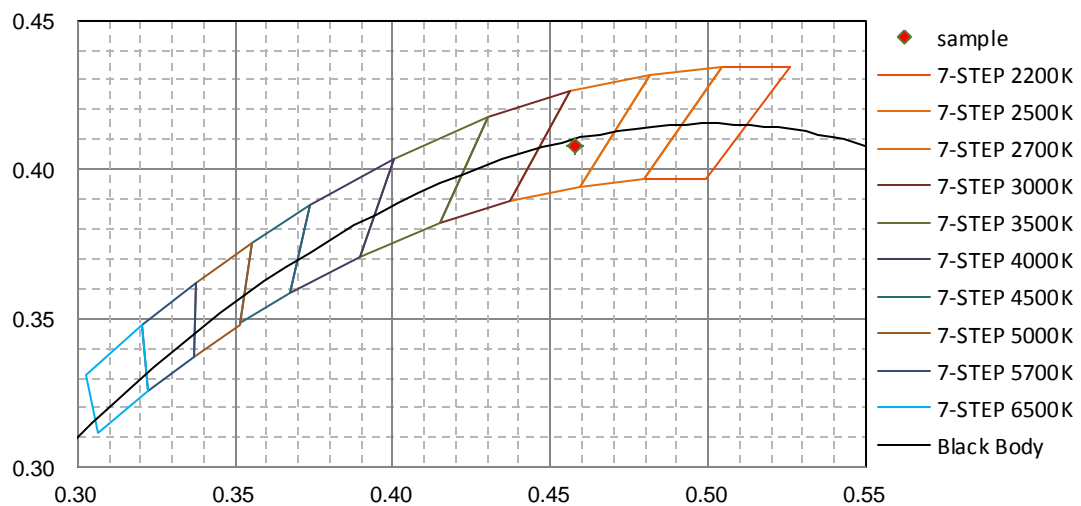


nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
585	5.797E+01	626	7.582E+01	667	5.160E+01	708	2.001E+01	749	5.252E+00
586	5.834E+01	627	7.549E+01	668	5.075E+01	709	1.955E+01	750	5.039E+00
587	5.924E+01	628	7.542E+01	669	4.992E+01	710	1.890E+01	751	4.902E+00
588	5.977E+01	629	7.501E+01	670	4.904E+01	711	1.847E+01	752	4.667E+00
589	6.055E+01	630	7.485E+01	671	4.804E+01	712	1.790E+01	753	4.538E+00
590	6.114E+01	631	7.457E+01	672	4.716E+01	713	1.743E+01	754	4.281E+00
591	6.159E+01	632	7.437E+01	673	4.632E+01	714	1.694E+01	755	4.088E+00
592	6.256E+01	633	7.383E+01	674	4.537E+01	715	1.652E+01	756	3.975E+00
593	6.315E+01	634	7.356E+01	675	4.435E+01	716	1.617E+01	757	3.799E+00
594	6.396E+01	635	7.320E+01	676	4.351E+01	717	1.566E+01	758	3.469E+00
595	6.459E+01	636	7.283E+01	677	4.265E+01	718	1.519E+01	759	3.499E+00
596	6.532E+01	637	7.263E+01	678	4.194E+01	719	1.474E+01	760	3.275E+00
597	6.614E+01	638	7.200E+01	679	4.102E+01	720	1.439E+01	761	3.166E+00
598	6.665E+01	639	7.159E+01	680	4.014E+01	721	1.390E+01	762	3.208E+00
599	6.734E+01	640	7.124E+01	681	3.917E+01	722	1.359E+01	763	3.017E+00
600	6.797E+01	641	7.069E+01	682	3.850E+01	723	1.314E+01	764	2.798E+00
601	6.887E+01	642	7.029E+01	683	3.744E+01	724	1.271E+01	765	2.696E+00
602	6.937E+01	643	6.961E+01	684	3.673E+01	725	1.239E+01	766	2.620E+00
603	6.997E+01	644	6.920E+01	685	3.599E+01	726	1.194E+01	767	2.601E+00
604	7.062E+01	645	6.873E+01	686	3.508E+01	727	1.160E+01	768	2.475E+00
605	7.105E+01	646	6.794E+01	687	3.433E+01	728	1.123E+01	769	2.317E+00
606	7.187E+01	647	6.737E+01	688	3.353E+01	729	1.093E+01	770	2.202E+00
607	7.212E+01	648	6.676E+01	689	3.289E+01	730	1.052E+01	771	2.099E+00
608	7.282E+01	649	6.617E+01	690	3.201E+01	731	1.017E+01	772	2.141E+00
609	7.332E+01	650	6.524E+01	691	3.128E+01	732	9.835E+00	773	1.947E+00
610	7.362E+01	651	6.463E+01	692	3.058E+01	733	9.539E+00	774	1.895E+00
611	7.408E+01	652	6.396E+01	693	2.980E+01	734	9.136E+00	775	1.863E+00
612	7.442E+01	653	6.335E+01	694	2.901E+01	735	8.816E+00	776	1.787E+00
613	7.493E+01	654	6.253E+01	695	2.833E+01	736	8.459E+00	777	1.657E+00
614	7.512E+01	655	6.180E+01	696	2.764E+01	737	8.252E+00	778	1.537E+00
615	7.532E+01	656	6.113E+01	697	2.691E+01	738	7.899E+00	779	1.569E+00
616	7.538E+01	657	6.031E+01	698	2.616E+01	739	7.635E+00	780	1.430E+00
617	7.572E+01	658	5.949E+01	699	2.558E+01	740	7.292E+00		
618	7.588E+01	659	5.864E+01	700	2.492E+01	741	7.105E+00		
619	7.613E+01	660	5.795E+01	701	2.421E+01	742	6.852E+00		
620	7.601E+01	661	5.711E+01	702	2.366E+01	743	6.579E+00		
621	7.614E+01	662	5.617E+01	703	2.294E+01	744	6.269E+00		
622	7.619E+01	663	5.520E+01	704	2.237E+01	745	6.053E+00		
623	7.582E+01	664	5.442E+01	705	2.178E+01	746	5.704E+00		
624	7.596E+01	665	5.340E+01	706	2.121E+01	747	5.590E+00		
625	7.573E+01	666	5.256E+01	707	2.056E+01	748	5.369E+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**

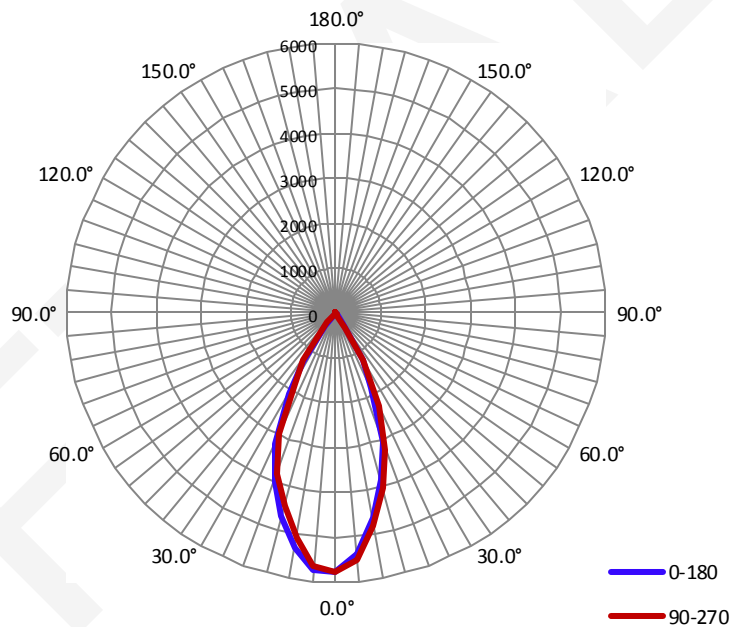
### Electrical Measurement

Input Voltage (V)	Frequency (Hz)	Input Current (A)	Power (W)	Power Factor
120.0	60	0.4630	53.33	0.9600

### Photometric Measurement

Luminous Flux (lm)	Efficacy (lm/W)	I <sub>max</sub> (cd)	S/MH (C0/180)	S/MH (C90/270)
3456.4	64.86	5807.0	0.73	0.74

### Luminous Intensity Distribution



	C0/180	C45/225	C90/270	C135/315	AVG.
Beam Angle (50% I <sub>max</sub> ):	47.3	47.3	47.3	47.0	47.3
Field Angle (10% I <sub>max</sub> ):	72.4	72.7	72.4	73.2	72.7

**Luminous Intensity (cd) Distribution Data**

C y	0°	22.5°	45°	67.5°	90°	112.5°	135°	157.5°
0.0°	5781	5781	5781	5781	5781	5781	5781	5781
5.0°	5397	5372	5402	5489	5549	5625	5699	5784
10.0°	4629	4560	4613	4714	4817	5016	5193	5320
15.0°	3865	3791	3814	3905	4048	4220	4402	4595
20.0°	3055	2985	2990	3077	3255	3466	3705	3923
25.0°	1869	1789	1829	1982	2284	2586	2863	3124
30.0°	1220	1143	1107	1143	1235	1411	1698	1994
35.0°	300	271	273	325	386	523	869	1172
40.0°	55	46	36	47	67	128	242	321
45.0°	0	0	0	0	14	18	19	41
50.0°	0	0	0	0	0	0	0	0
55.0°	0	0	0	0	0	0	0	0
60.0°	0	0	0	0	0	0	0	0
65.0°	0	0	0	0	0	0	0	0
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.)

$\begin{matrix} C \\ \backslash \\ y \end{matrix}$	180°	202.5°	225°	247.5°	270°	292.5°	315°	337.5°
0.0°	5781	5781	5781	5781	5781	5781	5781	5781
5.0°	5769	5775	5807	5717	5675	5540	5445	5390
10.0°	5338	5420	5381	5258	5088	4904	4774	4645
15.0°	4675	4756	4739	4633	4471	4293	4118	3914
20.0°	3995	4079	4073	3996	3836	3629	3365	3147
25.0°	3247	3353	3369	3261	2986	2642	2254	1979
30.0°	2102	2213	2169	2021	1823	1623	1438	1293
35.0°	1317	1437	1454	1392	1269	1059	676	371
40.0°	368	468	495	409	283	189	107	65
45.0°	55	68	75	62	45	33	21	11
50.0°	0	17	17	10	0	0	0	0
55.0°	0	0	0	0	0	0	0	0
60.0°	0	0	0	0	0	0	0	0
65.0°	0	0	0	0	0	0	0	0
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

### Zonal Lumen Density Measurement

Deg	Flux (lm)	%	Deg	Flux (lm)	%
0-5	135.9	3.93	0-5	135.9	3.93
5-10	378.1	10.94	0-10	514.0	14.87
10-15	548.4	15.87	0-15	1062.4	30.74
15-20	642.9	18.60	0-20	1705.3	49.34
20-25	642.4	18.58	0-25	2347.6	67.92
25-30	530.3	15.34	0-30	2877.9	83.27
30-35	356.4	10.31	0-35	3234.4	93.58
35-40	171.2	4.95	0-40	3405.6	98.53
40-45	43.8	1.27	0-45	3449.4	99.80
45-50	6.4	0.18	0-50	3455.8	99.98
50-55	0.6	0.02	0-55	3456.4	100.00
55-60	0.0	0.00	0-60	3456.4	100.00
60-65	0.0	0.00	0-65	3456.4	100.00
65-70	0.0	0.00	0-70	3456.4	100.00
70-75	0.0	0.00	0-75	3456.4	100.00
75-80	0.0	0.00	0-80	3456.4	100.00
80-85	0.0	0.00	0-85	3456.4	100.00
85-90	0.0	0.00	0-90	3456.4	100.00
90-95	0.0	0.00	0-95	3456.4	100.00
95-100	0.0	0.00	0-100	3456.4	100.00
100-105	0.0	0.00	0-105	3456.4	100.00
105-110	0.0	0.00	0-110	3456.4	100.00
110-115	0.0	0.00	0-115	3456.4	100.00
115-120	0.0	0.00	0-120	3456.4	100.00
120-125	0.0	0.00	0-125	3456.4	100.00
125-130	0.0	0.00	0-130	3456.4	100.00
130-135	0.0	0.00	0-135	3456.4	100.00
135-140	0.0	0.00	0-140	3456.4	100.00
140-145	0.0	0.00	0-145	3456.4	100.00
145-150	0.0	0.00	0-150	3456.4	100.00
150-155	0.0	0.00	0-155	3456.4	100.00
155-160	0.0	0.00	0-160	3456.4	100.00
160-165	0.0	0.00	0-165	3456.4	100.00
165-170	0.0	0.00	0-170	3456.4	100.00
170-175	0.0	0.00	0-175	3456.4	100.00
175-180	0.0	0.00	0-180	3456.4	100.00

## 6. Product Photo



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