

# IES LM-79-08

## MEASUREMENT AND TEST REPORT

For

### GREEN CREATIVE LTD

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

**Test Model: LE319027DIM120WDR6BL**

<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>	RKSB190329026-10-3
<b>Test Date:</b>	2019-04-04 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: LE319027DIM120WDR6BL  
 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: 3100 lm

## 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	2019-04-23	2020-04-22
Spectral photometer	INVENTFINE	CMS-3S	GSGSE100017	2019-01-23	2020-01-23
AC Power Supply	INVENTFINE	CHP500	JWJSD010071	2019-04-23	2020-04-22
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	2019-04-23	2020-04-22
AC Power Supply	INVENTFINE	CHP-5KVA	900511765	2019-04-23	2020-04-22
DC Power Supply	INVENTFINE	WL3010	JWDMP030001	2019-04-23	2020-04-22
Power Meter	INVENTFINE	WT500	GSDSQ200007	2019-04-23	2020-04-22
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  $U_{\text{rel}}=2.61\%$  ( $k=2$ ), 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  $U_{\text{rel}}=0.48\%$  of rdg, AC Voltage  $U_{\text{rel}}=0.25\%$  of rdg, Power  $U_{\text{rel}}=0.44\%$ , ( $k=2$ ), 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  $U_{\text{rel}}=2.6\%$  ( $k=2$ ), 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**

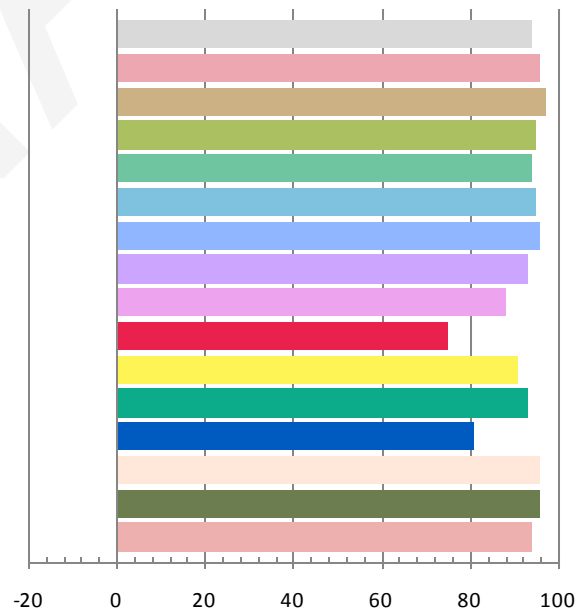
### Photometric and Electrical Measurement Result

Voltage (V)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Luminous Flux(lm)	Efficacy (lm/W)
120	60	0.4271	50.93	0.9937	3201.79	62.87

Radiant Flux (W)	CCT (K)	Duv	x	y	u'	v'
11.974	2660	-0.00377	0.4566	0.3998	0.2653	0.5227

### Color Rendering Index

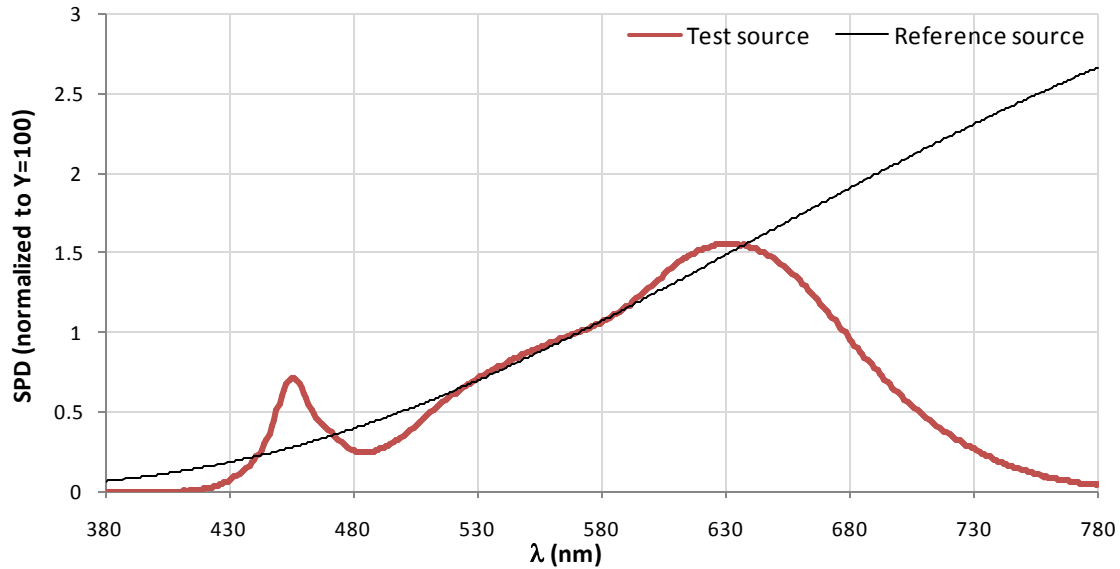
Ra			
94.2			
R1	R2	R3	R4
96	97	95	94
R5	R6	R7	R8
95	96	93	88
R9	R10	R11	R12
75	91	93	81
R13	R14	R15	
96	96	94	



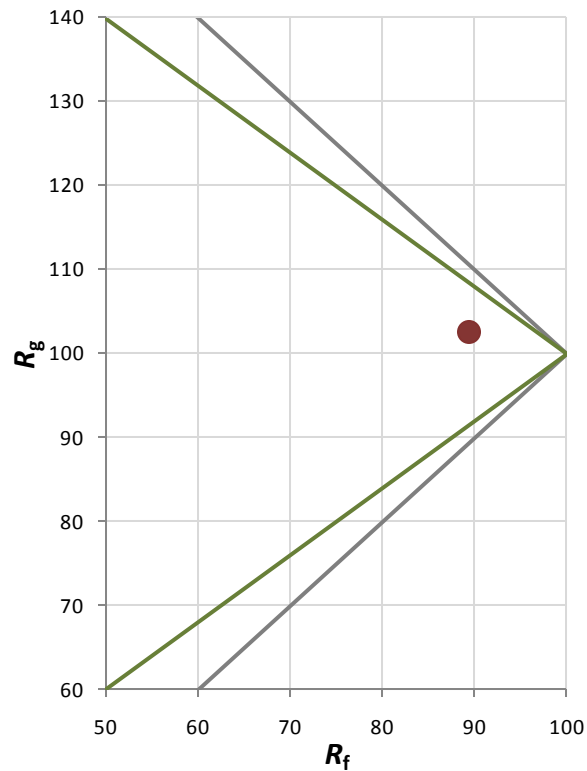
### Fidelity Index and Gamut Index

Fidelity Index $R_f$	90
Gamut Index $R_g$	102

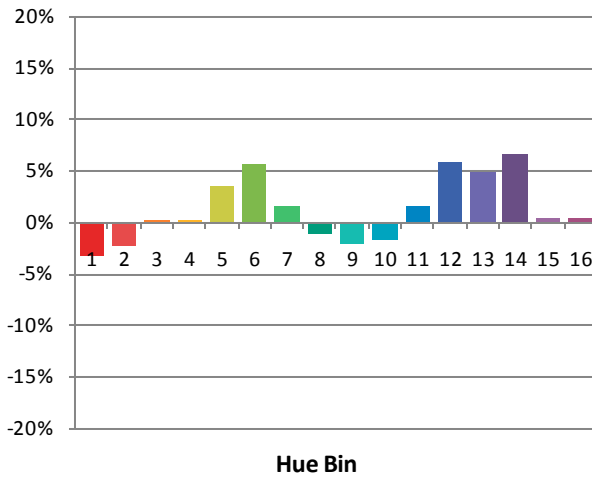
### Spectral Power Distribution Comparison



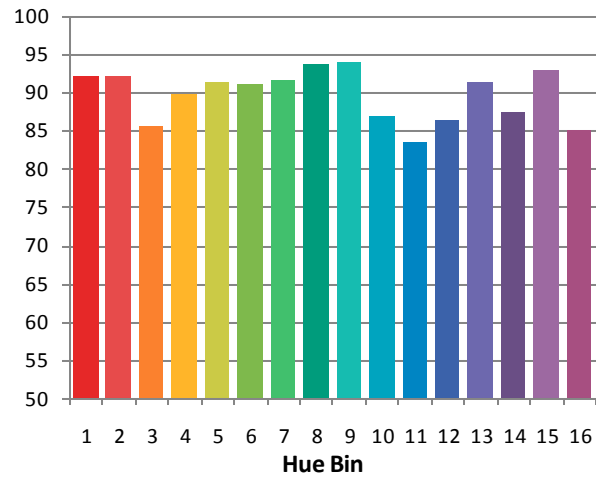
### Plot of $R_g$ versus $R_f$



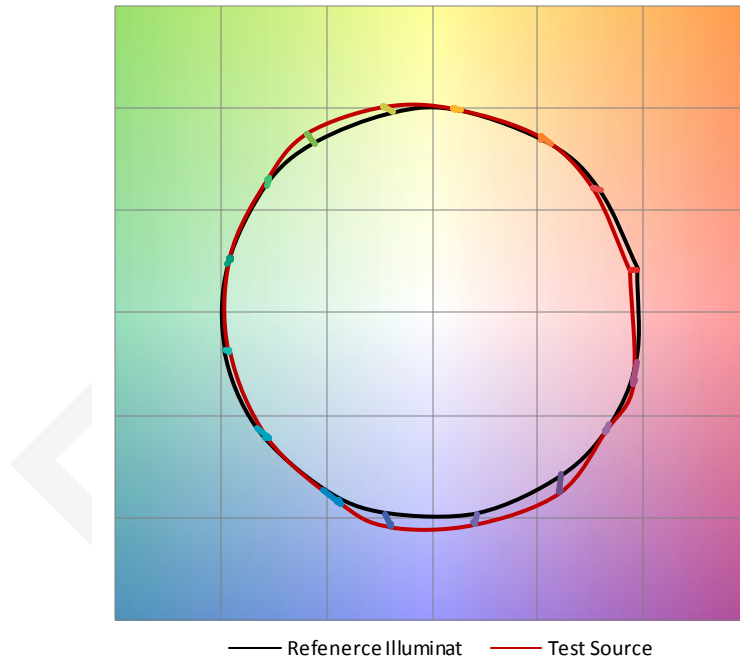
Chroma Shift by Hue



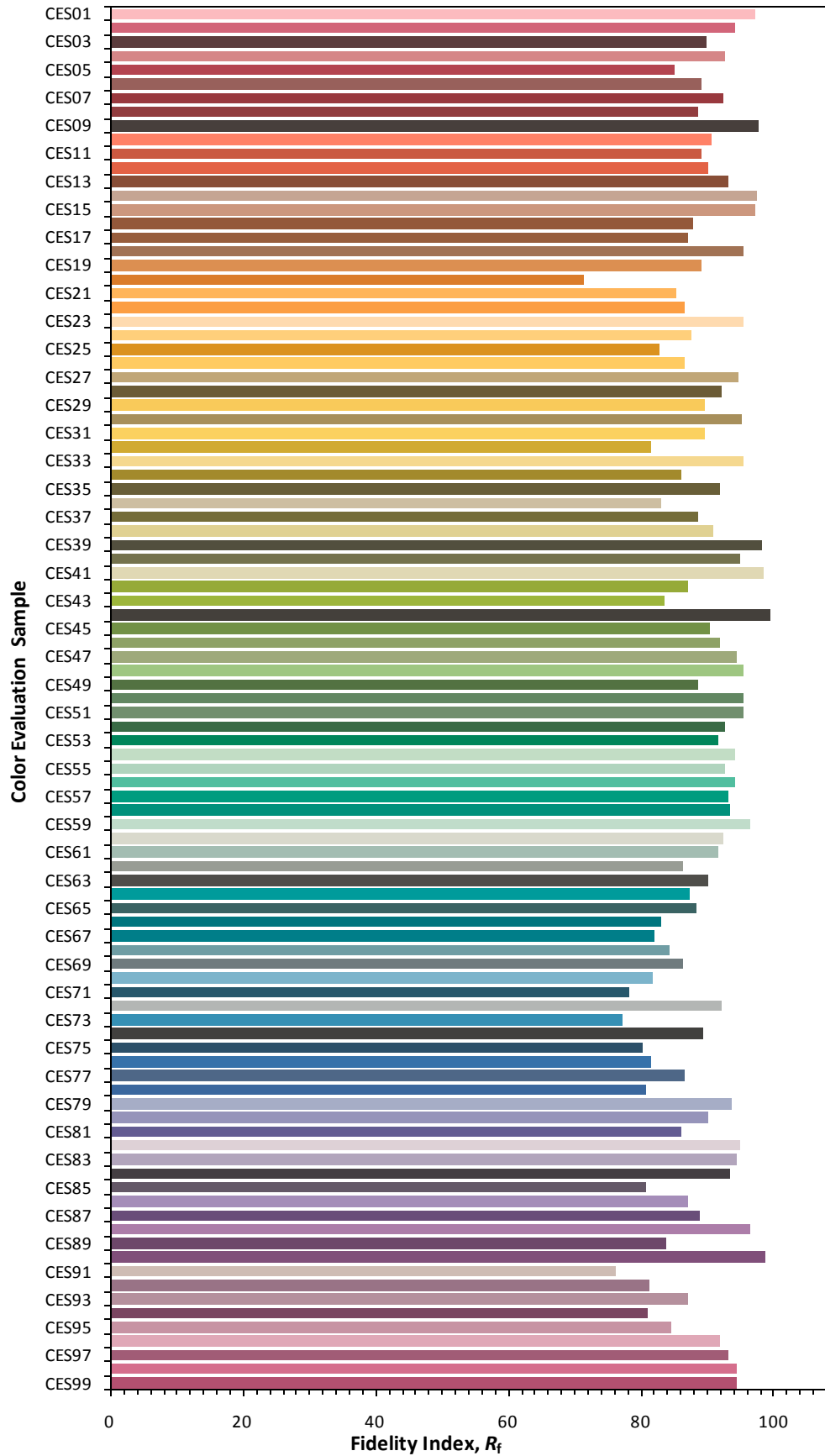
$R_t$  by Hue



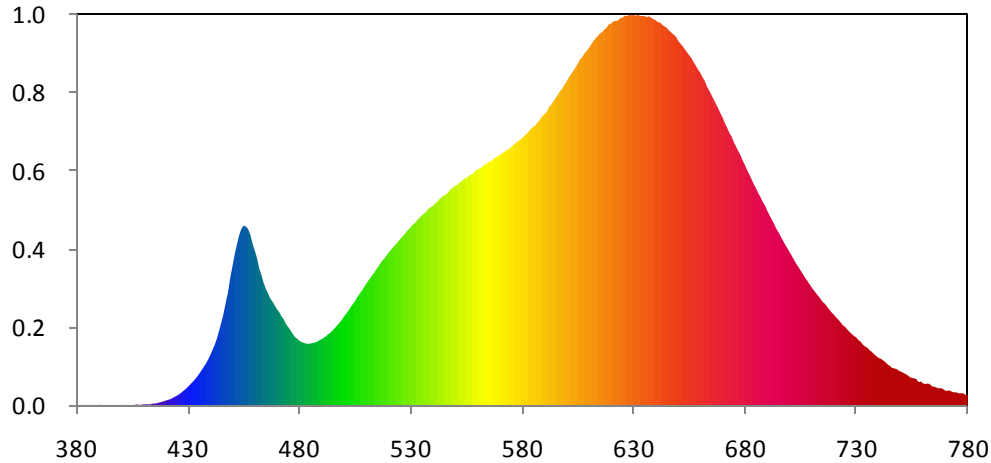
Color Vector Graphic



### Color Fidelity by CES Sample



### Relative Spectral Power Distribution

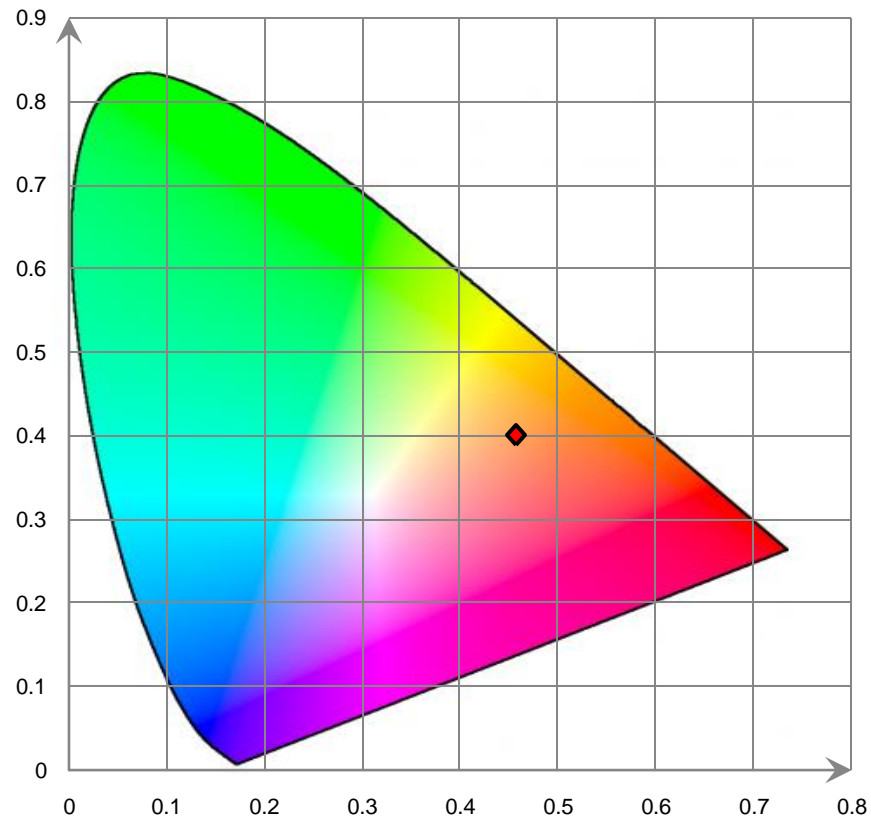


nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
380	4.230E-02	421	9.931E-01	462	2.557E+01	503	1.829E+01	544	3.892E+01
381	3.060E-02	422	1.103E+00	463	2.430E+01	504	1.891E+01	545	3.924E+01
382	3.100E-03	423	1.325E+00	464	2.283E+01	505	1.946E+01	546	3.942E+01
383	2.000E-04	424	1.537E+00	465	2.172E+01	506	2.018E+01	547	3.990E+01
384	5.640E-02	425	1.765E+00	466	2.085E+01	507	2.077E+01	548	4.038E+01
385	1.870E-02	426	2.023E+00	467	1.991E+01	508	2.137E+01	549	4.070E+01
386	9.600E-03	427	2.330E+00	468	1.933E+01	509	2.201E+01	550	4.099E+01
387	4.590E-02	428	2.695E+00	469	1.858E+01	510	2.264E+01	551	4.118E+01
388	2.070E-02	429	3.021E+00	470	1.792E+01	511	2.332E+01	552	4.169E+01
389	4.100E-03	430	3.430E+00	471	1.738E+01	512	2.385E+01	553	4.185E+01
390	7.740E-02	431	3.858E+00	472	1.659E+01	513	2.443E+01	554	4.230E+01
391	3.740E-02	432	4.295E+00	473	1.604E+01	514	2.504E+01	555	4.239E+01
392	1.600E-03	433	4.758E+00	474	1.519E+01	515	2.562E+01	556	4.287E+01
393	1.800E-03	434	5.252E+00	475	1.460E+01	516	2.626E+01	557	4.307E+01
394	3.000E-04	435	5.843E+00	476	1.402E+01	517	2.692E+01	558	4.329E+01
395	3.550E-02	436	6.440E+00	477	1.335E+01	518	2.733E+01	559	4.382E+01
396	1.000E-02	437	7.084E+00	478	1.277E+01	519	2.788E+01	560	4.399E+01
397	1.660E-02	438	7.713E+00	479	1.241E+01	520	2.848E+01	561	4.426E+01
398	2.700E-03	439	8.472E+00	480	1.206E+01	521	2.897E+01	562	4.449E+01
399	2.000E-04	440	9.311E+00	481	1.178E+01	522	2.946E+01	563	4.493E+01
400	1.100E-03	441	1.028E+01	482	1.167E+01	523	2.997E+01	564	4.509E+01
401	2.580E-02	442	1.125E+01	483	1.150E+01	524	3.039E+01	565	4.539E+01
402	5.390E-02	443	1.244E+01	484	1.148E+01	525	3.091E+01	566	4.558E+01
403	2.230E-02	444	1.391E+01	485	1.152E+01	526	3.139E+01	567	4.592E+01
404	3.150E-02	445	1.547E+01	486	1.160E+01	527	3.183E+01	568	4.631E+01
405	3.650E-02	446	1.712E+01	487	1.173E+01	528	3.237E+01	569	4.648E+01
406	4.380E-02	447	1.920E+01	488	1.188E+01	529	3.284E+01	570	4.677E+01
407	1.327E-01	448	2.111E+01	489	1.213E+01	530	3.329E+01	571	4.709E+01
408	4.810E-02	449	2.382E+01	490	1.233E+01	531	3.376E+01	572	4.731E+01
409	7.490E-02	450	2.596E+01	491	1.259E+01	532	3.408E+01	573	4.774E+01
410	1.396E-01	451	2.824E+01	492	1.290E+01	533	3.461E+01	574	4.780E+01
411	1.538E-01	452	3.009E+01	493	1.328E+01	534	3.505E+01	575	4.824E+01
412	1.655E-01	453	3.176E+01	494	1.358E+01	535	3.545E+01	576	4.861E+01
413	1.383E-01	454	3.299E+01	495	1.400E+01	536	3.582E+01	577	4.893E+01
414	2.758E-01	455	3.356E+01	496	1.445E+01	537	3.619E+01	578	4.927E+01
415	2.974E-01	456	3.339E+01	497	1.493E+01	538	3.671E+01	579	4.956E+01
416	3.543E-01	457	3.291E+01	498	1.539E+01	539	3.701E+01	580	4.986E+01
417	4.808E-01	458	3.190E+01	499	1.590E+01	540	3.724E+01	581	5.034E+01
418	5.904E-01	459	3.020E+01	500	1.653E+01	541	3.771E+01	582	5.072E+01
419	7.029E-01	460	2.890E+01	501	1.706E+01	542	3.806E+01	583	5.113E+01
420	8.518E-01	461	2.752E+01	502	1.766E+01	543	3.853E+01	584	5.169E+01

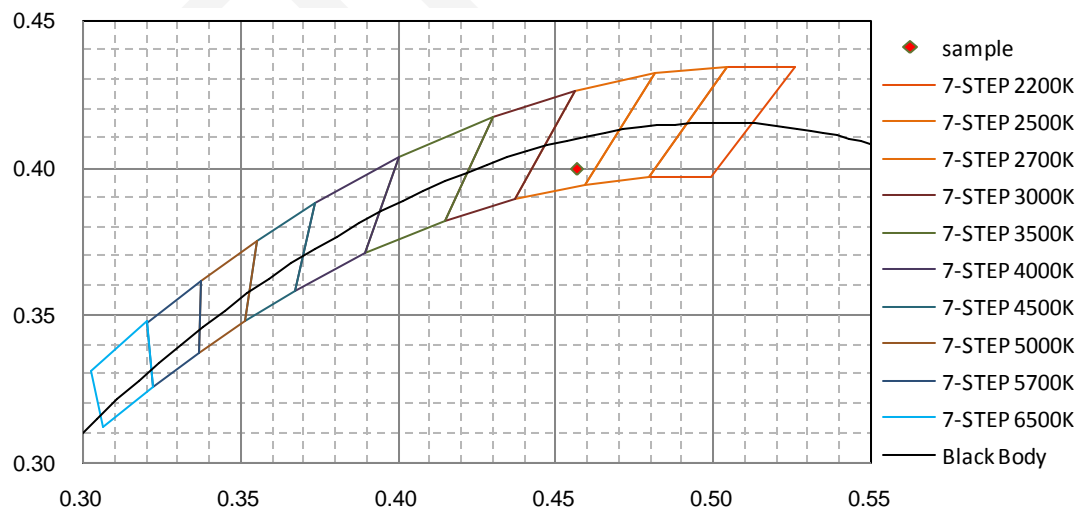


nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
585	5.208E+01	626	7.279E+01	667	5.629E+01	708	2.326E+01	749	6.472E+00
586	5.229E+01	627	7.269E+01	668	5.547E+01	709	2.260E+01	750	6.244E+00
587	5.286E+01	628	7.294E+01	669	5.455E+01	710	2.198E+01	751	6.068E+00
588	5.337E+01	629	7.289E+01	670	5.375E+01	711	2.142E+01	752	5.837E+00
589	5.399E+01	630	7.295E+01	671	5.270E+01	712	2.089E+01	753	5.599E+00
590	5.440E+01	631	7.278E+01	672	5.187E+01	713	2.036E+01	754	5.279E+00
591	5.480E+01	632	7.297E+01	673	5.090E+01	714	1.986E+01	755	5.062E+00
592	5.569E+01	633	7.271E+01	674	5.024E+01	715	1.922E+01	756	5.025E+00
593	5.612E+01	634	7.276E+01	675	4.918E+01	716	1.893E+01	757	4.842E+00
594	5.677E+01	635	7.269E+01	676	4.835E+01	717	1.833E+01	758	4.302E+00
595	5.739E+01	636	7.251E+01	677	4.750E+01	718	1.783E+01	759	4.412E+00
596	5.802E+01	637	7.269E+01	678	4.672E+01	719	1.729E+01	760	4.058E+00
597	5.866E+01	638	7.238E+01	679	4.572E+01	720	1.690E+01	761	3.957E+00
598	5.920E+01	639	7.215E+01	680	4.490E+01	721	1.637E+01	762	4.054E+00
599	5.985E+01	640	7.192E+01	681	4.394E+01	722	1.594E+01	763	3.933E+00
600	6.054E+01	641	7.156E+01	682	4.309E+01	723	1.545E+01	764	3.517E+00
601	6.133E+01	642	7.151E+01	683	4.221E+01	724	1.491E+01	765	3.423E+00
602	6.185E+01	643	7.103E+01	684	4.127E+01	725	1.461E+01	766	3.296E+00
603	6.252E+01	644	7.078E+01	685	4.052E+01	726	1.411E+01	767	3.141E+00
604	6.315E+01	645	7.049E+01	686	3.961E+01	727	1.368E+01	768	3.186E+00
605	6.381E+01	646	6.999E+01	687	3.888E+01	728	1.329E+01	769	3.000E+00
606	6.466E+01	647	6.962E+01	688	3.799E+01	729	1.291E+01	770	2.698E+00
607	6.507E+01	648	6.926E+01	689	3.733E+01	730	1.264E+01	771	2.686E+00
608	6.575E+01	649	6.888E+01	690	3.635E+01	731	1.213E+01	772	2.744E+00
609	6.623E+01	650	6.810E+01	691	3.553E+01	732	1.184E+01	773	2.471E+00
610	6.676E+01	651	6.760E+01	692	3.474E+01	733	1.126E+01	774	2.400E+00
611	6.744E+01	652	6.713E+01	693	3.394E+01	734	1.095E+01	775	2.387E+00
612	6.802E+01	653	6.653E+01	694	3.305E+01	735	1.072E+01	776	2.194E+00
613	6.857E+01	654	6.596E+01	695	3.235E+01	736	1.022E+01	777	2.250E+00
614	6.901E+01	655	6.538E+01	696	3.159E+01	737	9.959E+00	778	2.223E+00
615	6.948E+01	656	6.489E+01	697	3.079E+01	738	9.506E+00	779	1.930E+00
616	6.978E+01	657	6.410E+01	698	3.004E+01	739	9.179E+00	780	1.956E+00
617	7.024E+01	658	6.341E+01	699	2.937E+01	740	8.837E+00		
618	7.060E+01	659	6.269E+01	700	2.863E+01	741	8.673E+00		
619	7.120E+01	660	6.208E+01	701	2.794E+01	742	8.393E+00		
620	7.137E+01	661	6.127E+01	702	2.718E+01	743	8.057E+00		
621	7.172E+01	662	6.056E+01	703	2.645E+01	744	7.625E+00		
622	7.185E+01	663	5.951E+01	704	2.583E+01	745	7.384E+00		
623	7.187E+01	664	5.880E+01	705	2.515E+01	746	6.967E+00		
624	7.232E+01	665	5.797E+01	706	2.452E+01	747	6.873E+00		
625	7.240E+01	666	5.711E+01	707	2.381E+01	748	6.754E+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**

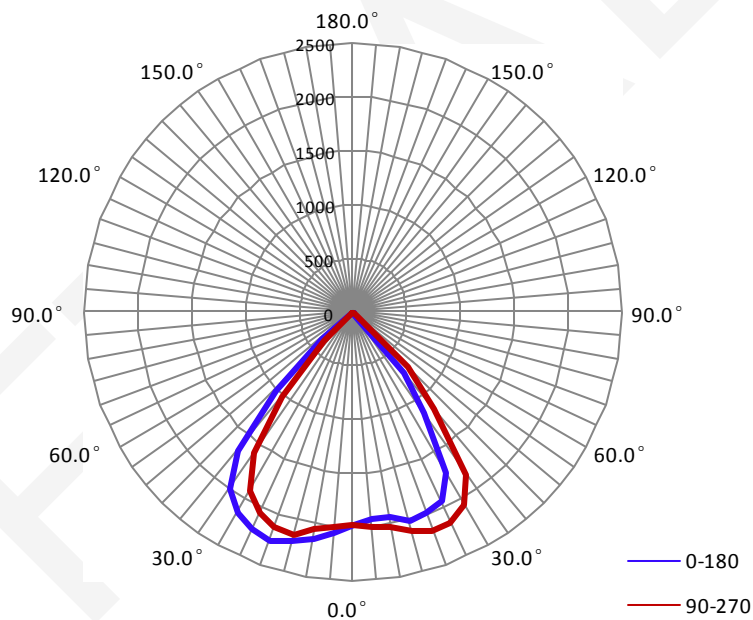
### Electrical Measurement

Input Voltage (V)	Frequency (Hz)	Input Current (A)	Power (W)	Power Factor
120.0	60	0.4420	50.95	0.9610

### Photometric Measurement

Luminous Flux (lm)	Efficacy (lm/W)	I <sub>max</sub> (cd)	S/MH (C0/180)	S/MH (C90/270)
3209.7	63.05	2321.2	1.31	1.36

### Luminous Intensity Distribution



	C0/180	C45/225	C90/270	C135/315	AVG.
Beam Angle (50% I <sub>max</sub> ):	79.4	79.1	80.4	80.6	79.9
Field Angle (10% I <sub>max</sub> ):	95.6	93.8	95.6	95.9	95.2

**Luminous Intensity (cd) Distribution Data**

C y	0°	22.5°	45°	67.5°	90°	112.5°	135°	157.5°
0.0°	1987	1987	1987	1987	1987	1987	1987	1987
5.0°	1941	1938	1939	1968	1999	2021	2030	2068
10.0°	1933	1962	1982	2011	2028	2041	2083	2110
15.0°	2009	2052	2075	2112	2114	2102	2131	2166
20.0°	1984	2045	2101	2150	2174	2170	2182	2223
25.0°	1937	2023	2099	2151	2160	2148	2156	2196
30.0°	1728	1809	1907	2006	2071	2077	2106	2127
35.0°	1148	1216	1384	1676	1841	1892	1955	1998
40.0°	739	810	922	1065	1179	1393	1601	1717
45.0°	13	43	206	443	721	908	1052	1089
50.0°	3	4	5	7	13	164	385	481
55.0°	2	2	2	4	4	5	7	9
60.0°	1	0	2	2	2	3	3	4
65.0°	0	1	0	1	1	1	2	2
70.0°	0	0	0	0	1	0	0	1
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°	1987	1987	1987	1987	1987	1987	1987	1987
5.0°	2071	2077	2071	2049	2013	1985	1971	1958
10.0°	2145	2192	2170	2105	2051	1996	1970	1949
15.0°	2205	2257	2259	2209	2145	2063	2008	1991
20.0°	2259	2321	2314	2233	2119	2011	1942	1943
25.0°	2226	2264	2264	2172	2051	1948	1880	1872
30.0°	2147	2173	2146	2056	1911	1780	1701	1680
35.0°	1999	2003	1911	1784	1586	1305	1162	1129
40.0°	1677	1581	1335	1137	1013	881	773	694
45.0°	1026	955	796	626	369	133	18	10
50.0°	377	270	89	12	7	4	4	4
55.0°	9	7	5	4	3	2	2	2
60.0°	3	4	3	2	2	2	2	1
65.0°	2	2	2	2	0	0	0	0
70.0°	1	0	1	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	47.7	1.49	0-5	47.7	1.49
5-10	144.9	4.52	0-10	192.7	6.00
10-15	247.0	7.70	0-15	439.7	13.70
15-20	350.6	10.92	0-20	790.3	24.62
20-25	443.9	13.83	0-25	1234.2	38.45
25-30	513.9	16.01	0-30	1748.1	54.46
30-35	528.4	16.46	0-35	2276.5	70.93
35-40	464.1	14.46	0-40	2740.6	85.39
40-45	311.6	9.71	0-45	3052.1	95.09
45-50	129.2	4.03	0-50	3181.4	99.12
50-55	25.7	0.80	0-55	3207.1	99.92
55-60	1.5	0.05	0-60	3208.5	99.96
60-65	0.7	0.02	0-65	3209.3	99.99
65-70	0.3	0.01	0-70	3209.6	100.00
70-75	0.1	0.00	0-75	3209.7	100.00
75-80	0.0	0.00	0-80	3209.7	100.00
80-85	0.0	0.00	0-85	3209.7	100.00
85-90	0.0	0.00	0-90	3209.7	100.00
90-95	0.0	0.00	0-95	3209.7	100.00
95-100	0.0	0.00	0-100	3209.7	100.00
100-105	0.0	0.00	0-105	3209.7	100.00
105-110	0.0	0.00	0-110	3209.7	100.00
110-115	0.0	0.00	0-115	3209.7	100.00
115-120	0.0	0.00	0-120	3209.7	100.00
120-125	0.0	0.00	0-125	3209.7	100.00
125-130	0.0	0.00	0-130	3209.7	100.00
130-135	0.0	0.00	0-135	3209.7	100.00
135-140	0.0	0.00	0-140	3209.7	100.00
140-145	0.0	0.00	0-145	3209.7	100.00
145-150	0.0	0.00	0-150	3209.7	100.00
150-155	0.0	0.00	0-155	3209.7	100.00
155-160	0.0	0.00	0-160	3209.7	100.00
160-165	0.0	0.00	0-165	3209.7	100.00
165-170	0.0	0.00	0-170	3209.7	100.00
170-175	0.0	0.00	0-175	3209.7	100.00
175-180	0.0	0.00	0-180	3209.7	100.00

## 6. Product Photo



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