



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: LE409027DIM120WDR6CC

Report Type:	Electrical and Photometric tests including: Luminous Flux, Chromaticity, Luminous Intensity Distribution
Test Engineer:	George Yang <i>George Yang</i>
Report Number:	RKSB190329020-10-3
Test Date:	2019-04-04 to 2019-04-06
Report Date:	2019-05-15
Reviewed By:	Ray Gao/EE Engineer <i>Ry Gao</i>
Prepared By:	Bay Area Compliance Laboratories Corp. (Kunshan). No.248 Chenghu Road, Kunshan, Jiangsu province, China. Tel: +86-0512-86175000 Fax: +86-0512-88934268
Test Facility:	Test facility was located at No.248 Chenghu Road, Kunshan, Jiangsu province, China.
Accreditation:	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: LE409027DIM120WDR6CC
 Manufacturer: GREEN CREATIVE LTD
 Brand Name: GREEN CREATIVE
 Product Designation: LED Recessed Downlight
 Aging TimeBefore Test: 0hour(For New Products)

Rated Values:

Rated Voltage/Frequency: 120-277 VAC60Hz
 Rated Power: 53W
 Nominal CCT: 2700K
 Nominal Lumen Output: 4000lm

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 π 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 (γ) 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**

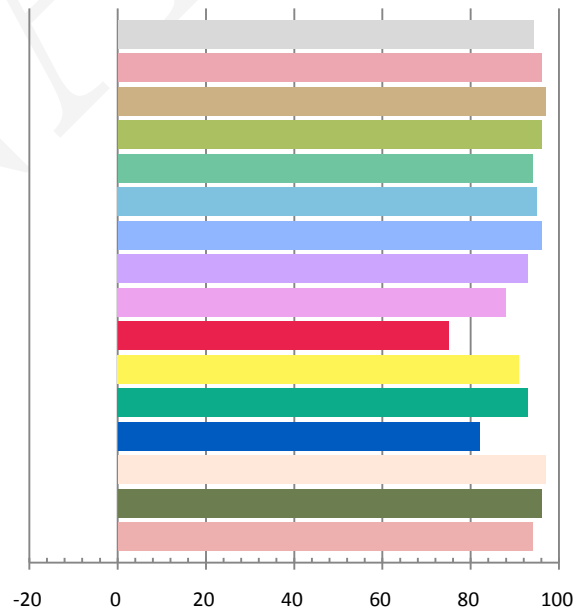
Photometric and Electrical Measurement Result

Voltage(V)	Frequency(Hz)	Current(A)	Power (W)	Power Factor	Luminous Flux(lm)	Efficacy(lm/W)
120	60	0.4334	51.67	0.9935	4106.69	79.48

Radiant Flux (W)	CCT (K)	Duv	x	y	u'	v'
15.378	2666	-0.00373	0.4562	0.3998	0.2650	0.5226

Color Rendering Index

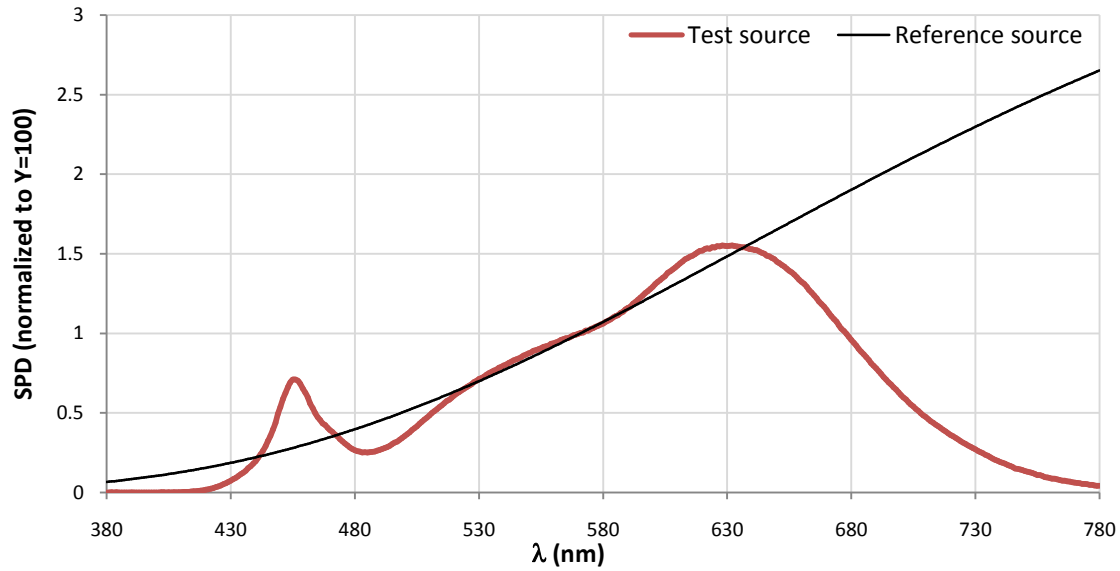
Ra			
94.3			
R1	R2	R3	R4
96	97	96	94
R5	R6	R7	R8
95	96	93	88
R9	R10	R11	R12
75	91	93	82
R13	R14	R15	
97	96	94	



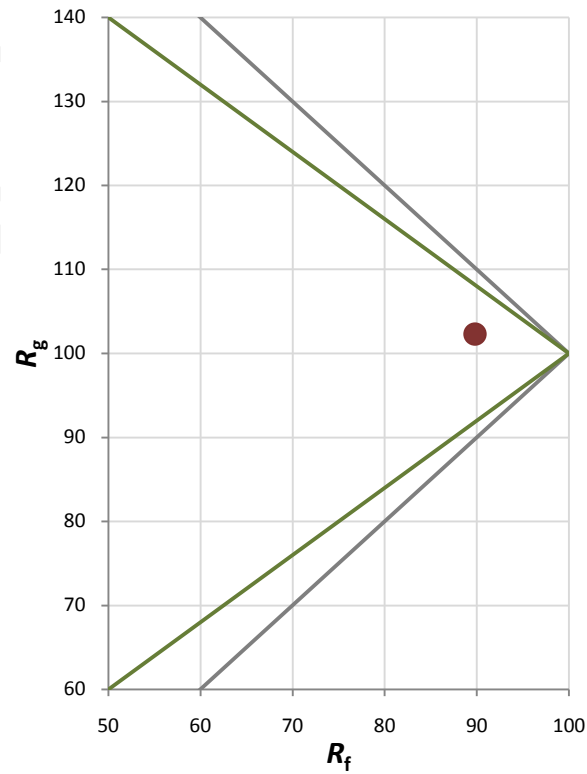
Fidelity Index and Gamut Index

Fidelity Index R_f	90
Gamut Index R_g	102

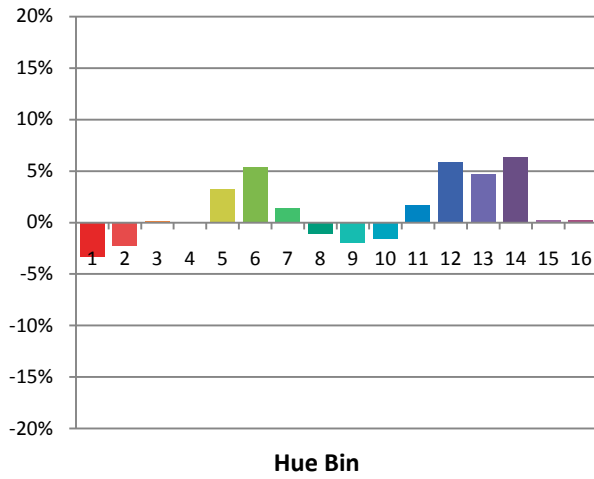
Spectral Power Distribution Comparison



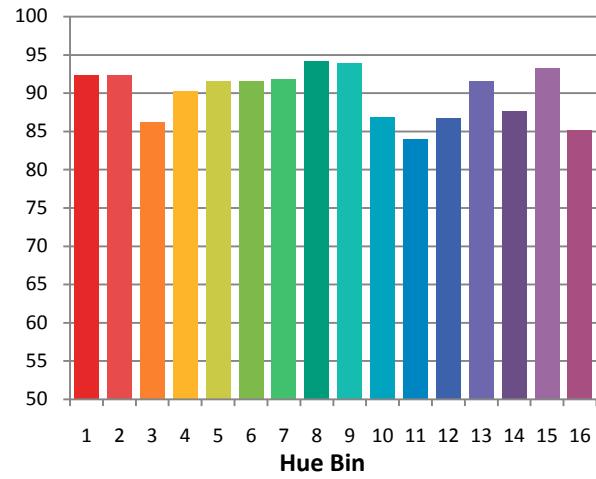
Plot of R_g versus R_f



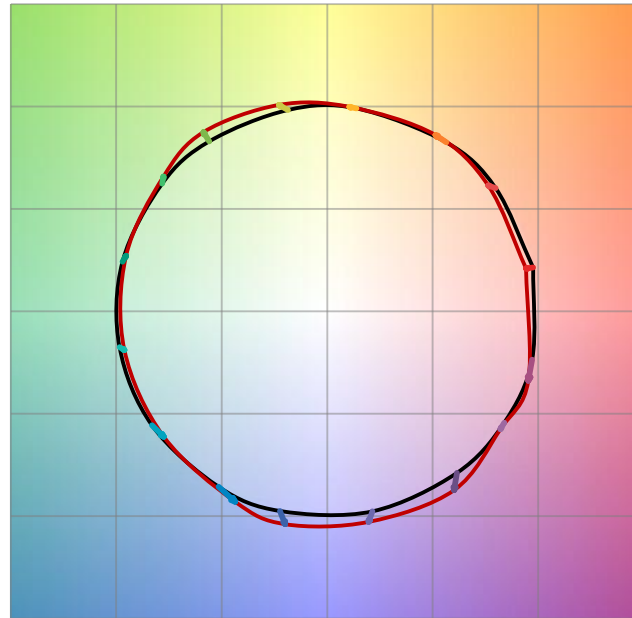
Chroma Shift by Hue



R_f by Hue

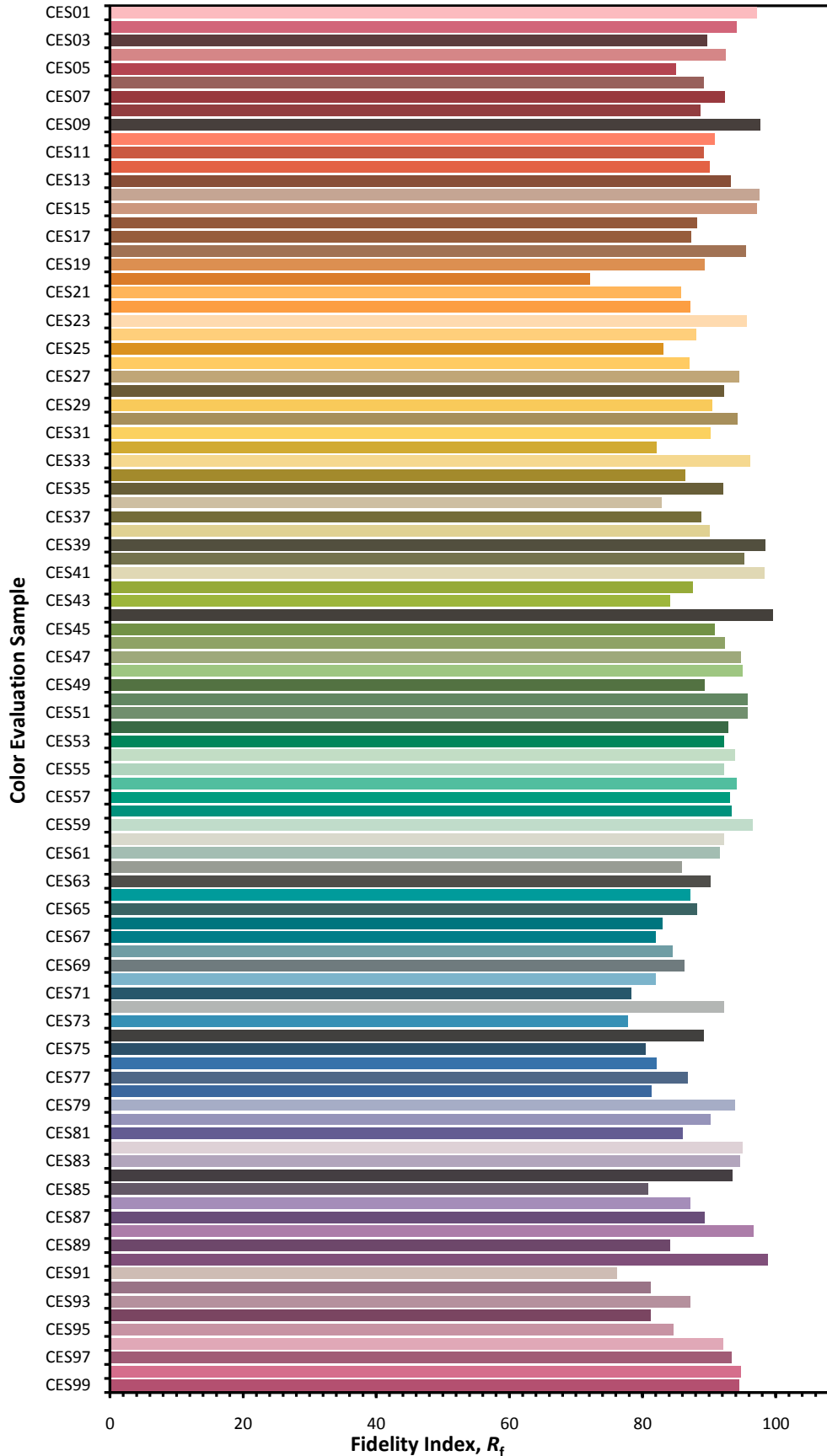


Color Vector Graphic

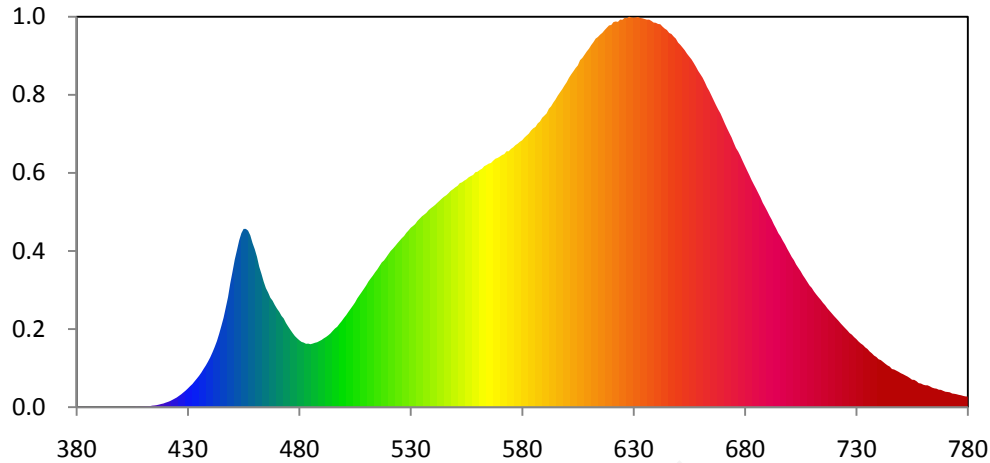


— Reference Illuminant — Test Source

Color Fidelity by CES Sample



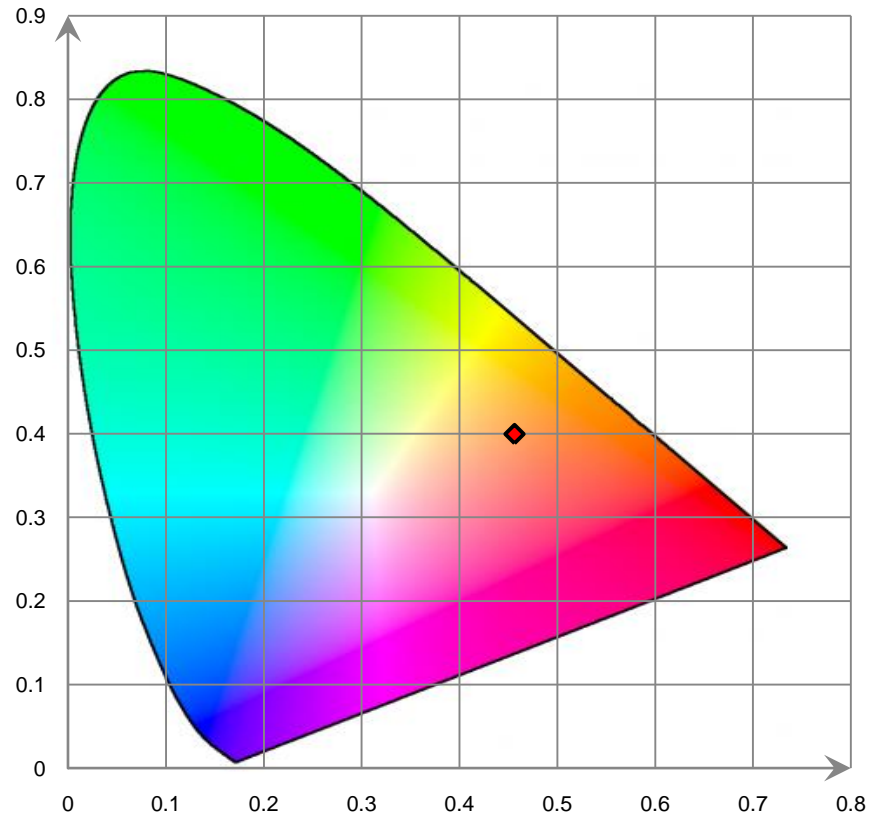
Relative Spectral Power Distribution



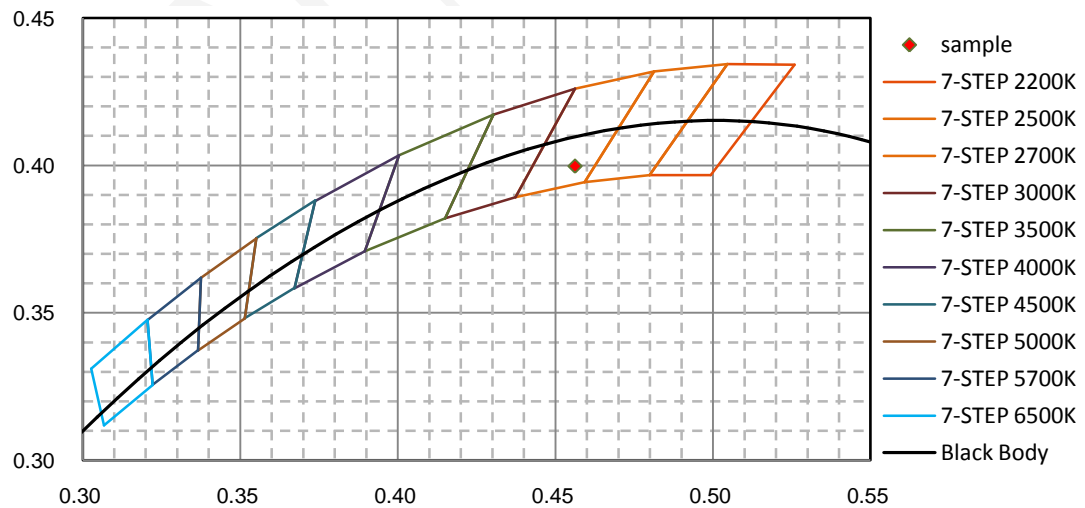
nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
380	1.910E-02	421	1.257E+00	462	3.357E+01	503	2.350E+01	544	4.988E+01
381	2.940E-02	422	1.470E+00	463	3.187E+01	504	2.425E+01	545	5.033E+01
382	6.420E-02	423	1.744E+00	464	3.000E+01	505	2.503E+01	546	5.067E+01
383	3.800E-03	424	2.031E+00	465	2.845E+01	506	2.599E+01	547	5.118E+01
384	6.840E-02	425	2.323E+00	466	2.740E+01	507	2.676E+01	548	5.174E+01
385	1.050E-02	426	2.704E+00	467	2.616E+01	508	2.752E+01	549	5.211E+01
386	4.000E-04	427	3.089E+00	468	2.545E+01	509	2.831E+01	550	5.255E+01
387	3.850E-02	428	3.538E+00	469	2.441E+01	510	2.909E+01	551	5.289E+01
388	3.700E-02	429	3.987E+00	470	2.353E+01	511	3.002E+01	552	5.354E+01
389	6.300E-03	430	4.491E+00	471	2.278E+01	512	3.075E+01	553	5.374E+01
390	5.120E-02	431	5.027E+00	472	2.182E+01	513	3.144E+01	554	5.414E+01
391	2.970E-02	432	5.533E+00	473	2.119E+01	514	3.223E+01	555	5.446E+01
392	1.400E-03	433	6.191E+00	474	2.012E+01	515	3.292E+01	556	5.495E+01
393	1.000E-04	434	6.827E+00	475	1.928E+01	516	3.376E+01	557	5.524E+01
394	1.340E-02	435	7.501E+00	476	1.848E+01	517	3.459E+01	558	5.551E+01
395	2.740E-02	436	8.263E+00	477	1.771E+01	518	3.508E+01	559	5.616E+01
396	2.910E-02	437	9.121E+00	478	1.700E+01	519	3.580E+01	560	5.629E+01
397	5.300E-03	438	9.949E+00	479	1.648E+01	520	3.659E+01	561	5.671E+01
398	4.000E-04	439	1.088E+01	480	1.600E+01	521	3.733E+01	562	5.700E+01
399	0.000E+00	440	1.189E+01	481	1.561E+01	522	3.789E+01	563	5.760E+01
400	0.000E+00	441	1.307E+01	482	1.542E+01	523	3.850E+01	564	5.787E+01
401	2.640E-02	442	1.437E+01	483	1.514E+01	524	3.917E+01	565	5.821E+01
402	5.960E-02	443	1.579E+01	484	1.520E+01	525	3.978E+01	566	5.836E+01
403	5.340E-02	444	1.750E+01	485	1.505E+01	526	4.039E+01	567	5.890E+01
404	3.140E-02	445	1.941E+01	486	1.520E+01	527	4.090E+01	568	5.938E+01
405	6.670E-02	446	2.137E+01	487	1.538E+01	528	4.166E+01	569	5.958E+01
406	5.120E-02	447	2.384E+01	488	1.552E+01	529	4.223E+01	570	5.990E+01
407	1.666E-01	448	2.631E+01	489	1.580E+01	530	4.288E+01	571	6.028E+01
408	5.810E-02	449	2.960E+01	490	1.607E+01	531	4.330E+01	572	6.049E+01
409	1.195E-01	450	3.231E+01	491	1.646E+01	532	4.375E+01	573	6.116E+01
410	1.577E-01	451	3.524E+01	492	1.678E+01	533	4.451E+01	574	6.116E+01
411	2.025E-01	452	3.753E+01	493	1.718E+01	534	4.506E+01	575	6.174E+01
412	2.036E-01	453	3.986E+01	494	1.765E+01	535	4.560E+01	576	6.210E+01
413	2.482E-01	454	4.160E+01	495	1.825E+01	536	4.601E+01	577	6.263E+01
414	3.750E-01	455	4.261E+01	496	1.880E+01	537	4.643E+01	578	6.298E+01
415	4.237E-01	456	4.261E+01	497	1.921E+01	538	4.708E+01	579	6.345E+01
416	4.928E-01	457	4.219E+01	498	1.993E+01	539	4.754E+01	580	6.379E+01
417	6.192E-01	458	4.106E+01	499	2.056E+01	540	4.794E+01	581	6.441E+01
418	7.618E-01	459	3.923E+01	500	2.130E+01	541	4.837E+01	582	6.491E+01
419	8.757E-01	460	3.775E+01	501	2.197E+01	542	4.889E+01	583	6.538E+01
420	1.084E+00	461	3.595E+01	502	2.276E+01	543	4.938E+01	584	6.613E+01

nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
585	6.665E+01	626	9.306E+01	667	7.220E+01	708	2.993E+01	749	8.449E+00
586	6.698E+01	627	9.298E+01	668	7.116E+01	709	2.909E+01	750	8.118E+00
587	6.783E+01	628	9.332E+01	669	7.021E+01	710	2.851E+01	751	7.881E+00
588	6.828E+01	629	9.315E+01	670	6.903E+01	711	2.766E+01	752	7.583E+00
589	6.918E+01	630	9.310E+01	671	6.778E+01	712	2.696E+01	753	7.315E+00
590	6.968E+01	631	9.316E+01	672	6.663E+01	713	2.630E+01	754	6.970E+00
591	7.022E+01	632	9.326E+01	673	6.554E+01	714	2.568E+01	755	6.559E+00
592	7.133E+01	633	9.304E+01	674	6.449E+01	715	2.497E+01	756	6.527E+00
593	7.191E+01	634	9.294E+01	675	6.316E+01	716	2.438E+01	757	6.218E+00
594	7.279E+01	635	9.278E+01	676	6.192E+01	717	2.364E+01	758	5.737E+00
595	7.355E+01	636	9.261E+01	677	6.107E+01	718	2.302E+01	759	5.652E+00
596	7.447E+01	637	9.263E+01	678	6.000E+01	719	2.241E+01	760	5.383E+00
597	7.525E+01	638	9.232E+01	679	5.882E+01	720	2.179E+01	761	5.239E+00
598	7.600E+01	639	9.193E+01	680	5.767E+01	721	2.122E+01	762	5.224E+00
599	7.687E+01	640	9.186E+01	681	5.655E+01	722	2.064E+01	763	4.983E+00
600	7.767E+01	641	9.159E+01	682	5.544E+01	723	2.002E+01	764	4.676E+00
601	7.870E+01	642	9.153E+01	683	5.428E+01	724	1.944E+01	765	4.504E+00
602	7.953E+01	643	9.096E+01	684	5.322E+01	725	1.888E+01	766	4.428E+00
603	8.026E+01	644	9.048E+01	685	5.223E+01	726	1.833E+01	767	4.177E+00
604	8.106E+01	645	9.015E+01	686	5.116E+01	727	1.771E+01	768	4.147E+00
605	8.169E+01	646	8.944E+01	687	5.009E+01	728	1.733E+01	769	3.900E+00
606	8.293E+01	647	8.920E+01	688	4.884E+01	729	1.675E+01	770	3.690E+00
607	8.347E+01	648	8.859E+01	689	4.789E+01	730	1.629E+01	771	3.634E+00
608	8.422E+01	649	8.808E+01	690	4.689E+01	731	1.569E+01	772	3.543E+00
609	8.502E+01	650	8.714E+01	691	4.580E+01	732	1.523E+01	773	3.267E+00
610	8.568E+01	651	8.660E+01	692	4.484E+01	733	1.486E+01	774	3.201E+00
611	8.654E+01	652	8.596E+01	693	4.368E+01	734	1.430E+01	775	3.096E+00
612	8.725E+01	653	8.530E+01	694	4.271E+01	735	1.391E+01	776	2.951E+00
613	8.808E+01	654	8.448E+01	695	4.160E+01	736	1.330E+01	777	2.850E+00
614	8.848E+01	655	8.380E+01	696	4.081E+01	737	1.286E+01	778	2.688E+00
615	8.903E+01	656	8.315E+01	697	3.980E+01	738	1.233E+01	779	2.580E+00
616	8.947E+01	657	8.229E+01	698	3.890E+01	739	1.200E+01	780	2.545E+00
617	9.011E+01	658	8.139E+01	699	3.785E+01	740	1.145E+01		
618	9.068E+01	659	8.039E+01	700	3.690E+01	741	1.125E+01		
619	9.124E+01	660	7.959E+01	701	3.592E+01	742	1.082E+01		
620	9.135E+01	661	7.875E+01	702	3.513E+01	743	1.038E+01		
621	9.204E+01	662	7.769E+01	703	3.409E+01	744	9.990E+00		
622	9.218E+01	663	7.652E+01	704	3.329E+01	745	9.696E+00		
623	9.209E+01	664	7.557E+01	705	3.249E+01	746	9.116E+00		
624	9.265E+01	665	7.446E+01	706	3.155E+01	747	8.992E+00		
625	9.258E+01	666	7.333E+01	707	3.077E+01	748	8.722E+00		

CIE 1931xy Chromaticity Diagram



7-Step Chromaticity Quadrangles



[Goniophotometer System]

Total operating time for luminous intensity distribution: **1.0 hours**

Test orientation: **Downward**

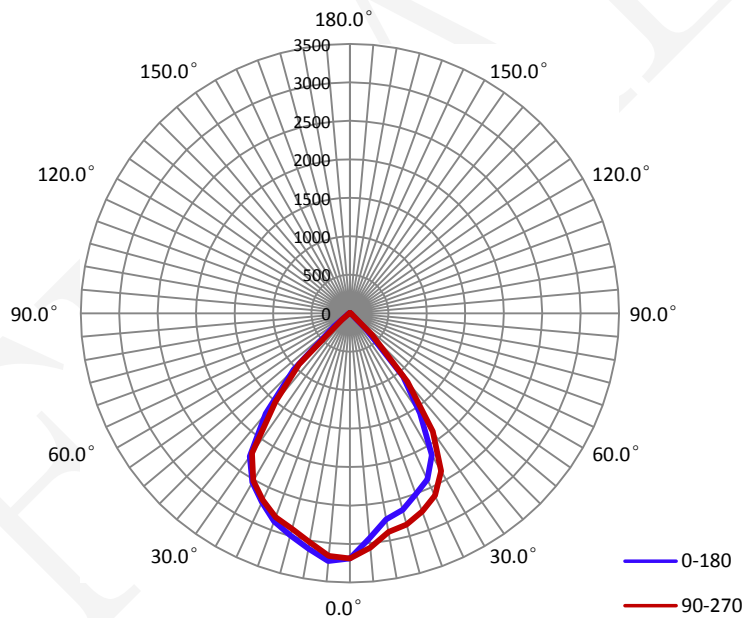
Electrical Measurement

Input Voltage(V)	Frequency(Hz)	Input Current(A)	Power (W)	Power Factor
120.0	60	0.4490	51.71	0.9600

Photometric Measurement

Luminous Flux(lm)	Efficacy(lm/W)	$I_{max}(cd)$	S/MH(C0/180)	S/MH(C90/270)
4119.9	79.72	3288.4	1.11	1.15

Luminous Intensity Distribution



	C0/180	C45/225	C90/270	C135/315	AVG.
Beam Angle(50% I_{max}):	75.4	75.8	76.4	76.2	76.0
Field Angle(10% I_{max}):	94.4	94.3	95.1	96.1	95.0

Luminous Intensity (cd) Distribution Data

C γ	0°	22.5°	45°	67.5°	90°	112.5°	135°	157.5°
0.0°	3190	3190	3190	3190	3190	3190	3190	3190
5.0°	2937	2936	2965	3014	3058	3100	3152	3211
10.0°	2723	2755	2799	2850	2888	2952	3016	3070
15.0°	2649	2686	2735	2793	2846	2876	2916	2958
20.0°	2504	2559	2633	2689	2742	2756	2779	2839
25.0°	2386	2452	2518	2581	2614	2632	2639	2673
30.0°	2133	2178	2222	2288	2371	2451	2476	2512
35.0°	1588	1555	1573	1685	1878	2081	2173	2254
40.0°	1073	1033	1021	1048	1166	1310	1428	1619
45.0°	293	231	223	277	408	659	869	1006
50.0°	51	49	46	46	52	65	84	205
55.0°	30	27	25	26	28	33	40	51
60.0°	18	16	15	14	16	18	23	29
65.0°	11	10	9	8	9	11	13	17
70.0°	6	6	5	5	6	6	7	10
75.0°	4	3	3	3	3	4	5	6
80.0°	2	1	1	2	1	2	3	4
85.0°	0	0	0	0	0	0	1	2
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°	3190	3190	3190	3190	3190	3190	3190	3190
5.0°	3234	3278	3288	3251	3167	3074	2991	2946
10.0°	3107	3175	3202	3148	3023	2889	2803	2735
15.0°	2989	3043	3073	3025	2905	2780	2676	2635
20.0°	2880	2946	2994	2955	2825	2682	2538	2487
25.0°	2710	2793	2836	2798	2686	2538	2408	2360
30.0°	2538	2605	2652	2627	2516	2378	2243	2145
35.0°	2272	2363	2379	2340	2223	2081	1897	1650
40.0°	1703	1829	1835	1714	1512	1365	1255	1131
45.0°	1038	1116	1105	1042	941	809	588	377
50.0°	265	338	327	249	135	79	63	53
55.0°	58	66	63	55	48	40	34	30
60.0°	33	38	36	31	27	23	20	18
65.0°	19	22	21	19	16	13	11	11
70.0°	12	14	13	11	10	8	7	6
75.0°	8	8	7	6	6	4	4	4
80.0°	4	5	5	4	3	3	2	2
85.0°	3	3	2	2	1	1	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	75.2	1.83	0-5	75.2	1.83
5-10	216.3	5.25	0-10	291.5	7.07
10-15	343.7	8.34	0-15	635.2	15.42
15-20	460.4	11.18	0-20	1095.7	26.59
20-25	560.0	13.59	0-25	1655.7	40.19
25-30	632.4	15.35	0-30	2288.1	55.54
30-35	647.3	15.71	0-35	2935.3	71.25
35-40	563.4	13.68	0-40	3498.8	84.92
40-45	382.2	9.28	0-45	3880.9	94.20
45-50	165.3	4.01	0-50	4046.2	98.21
50-55	37.5	0.91	0-55	4083.8	99.12
55-60	14.9	0.36	0-60	4098.7	99.49
60-65	9.0	0.22	0-65	4107.7	99.70
65-70	5.5	0.13	0-70	4113.2	99.84
70-75	3.4	0.08	0-75	4116.6	99.92
75-80	2.0	0.05	0-80	4118.7	99.97
80-85	1.0	0.02	0-85	4119.6	99.99
85-90	0.2	0.01	0-90	4119.9	100.00
90-95	0.0	0.00	0-95	4119.9	100.00
95-100	0.0	0.00	0-100	4119.9	100.00
100-105	0.0	0.00	0-105	4119.9	100.00
105-110	0.0	0.00	0-110	4119.9	100.00
110-115	0.0	0.00	0-115	4119.9	100.00
115-120	0.0	0.00	0-120	4119.9	100.00
120-125	0.0	0.00	0-125	4119.9	100.00
125-130	0.0	0.00	0-130	4119.9	100.00
130-135	0.0	0.00	0-135	4119.9	100.00
135-140	0.0	0.00	0-140	4119.9	100.00
140-145	0.0	0.00	0-145	4119.9	100.00
145-150	0.0	0.00	0-150	4119.9	100.00
150-155	0.0	0.00	0-155	4119.9	100.00
155-160	0.0	0.00	0-160	4119.9	100.00
160-165	0.0	0.00	0-165	4119.9	100.00
165-170	0.0	0.00	0-170	4119.9	100.00
170-175	0.0	0.00	0-175	4119.9	100.00
175-180	0.0	0.00	0-180	4119.9	100.00

6. Product Photo



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