

IES LM-79-08

MEASUREMENT AND TEST REPORT

For

GREEN CREATIVE LTD

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

Test Model: LE319027DIM120NRR6BL

Report Type:	Electrical and Photometric tests including: Luminous Flux, Chromaticity, Luminous Intensity Distribution
Test Engineer:	George Yang <i>George Yang</i>
Report Number:	RKSB190329026-10-1
Test Date:	2019-04-04 to 2019-04-06
Report Date:	2019-05-16
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 2019-04-01 and used for testing.

Model Tested: LE319027DIM120NRR6BL
 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: 3100lm

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.

4π 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 (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 $U_{\text{rel}}=2.6\%$ ($k=2$), 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**

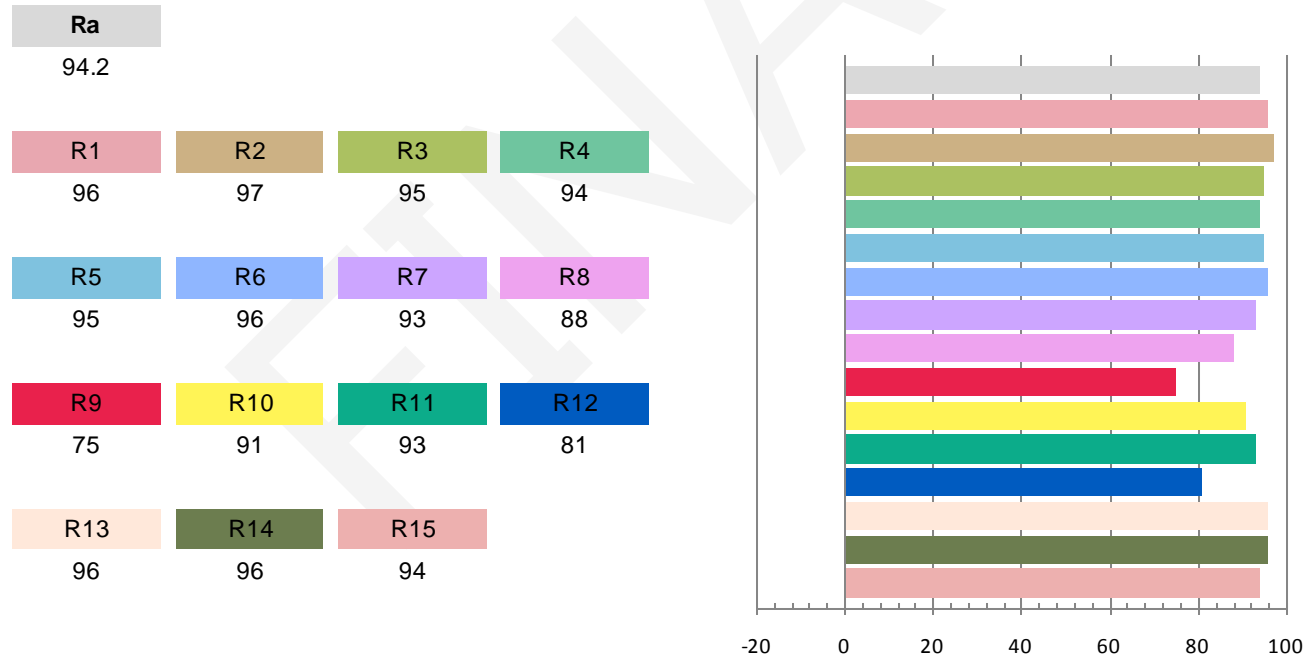
Test orientation: **Downward**

Photometric and Electrical Measurement Result

Voltage (V)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Luminous Flux(lm)	Efficacy (lm/W)
120	60	0.4269	50.9	0.9936	3153.44	61.95

Radiant Flux (W)	CCT (K)	Duv	x	y	u'	v'
11.792	2657	-0.00377	0.4569	0.3999	0.2655	0.5227

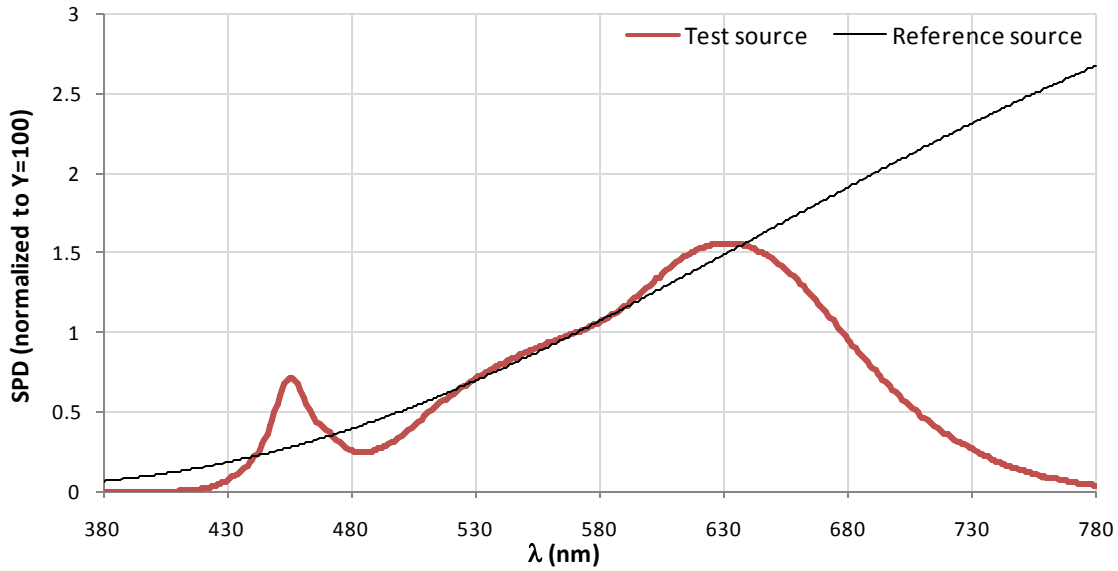
Color Rendering Index



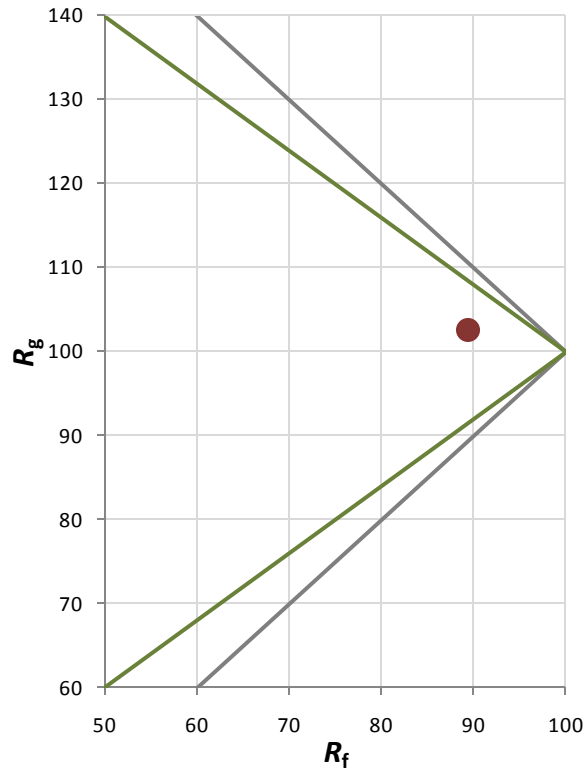
Fidelity Index and Gamut Index

Fidelity Index R_f	90
Gamut Index R_g	102

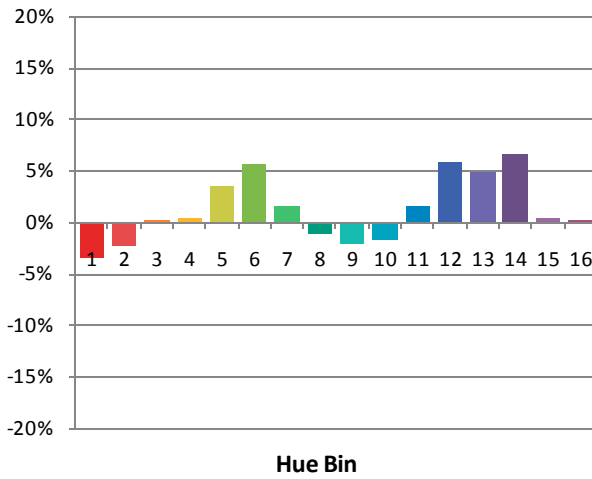
Spectral Power Distribution Comparison



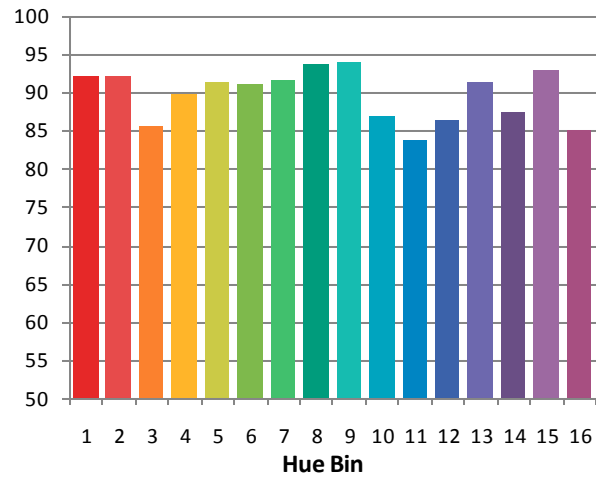
Plot of R_g versus R_f



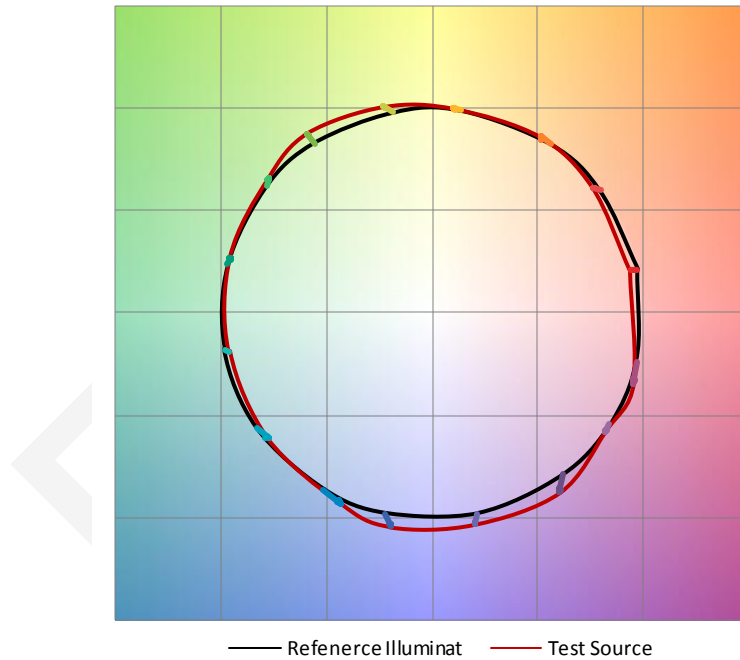
Chroma Shift by Hue



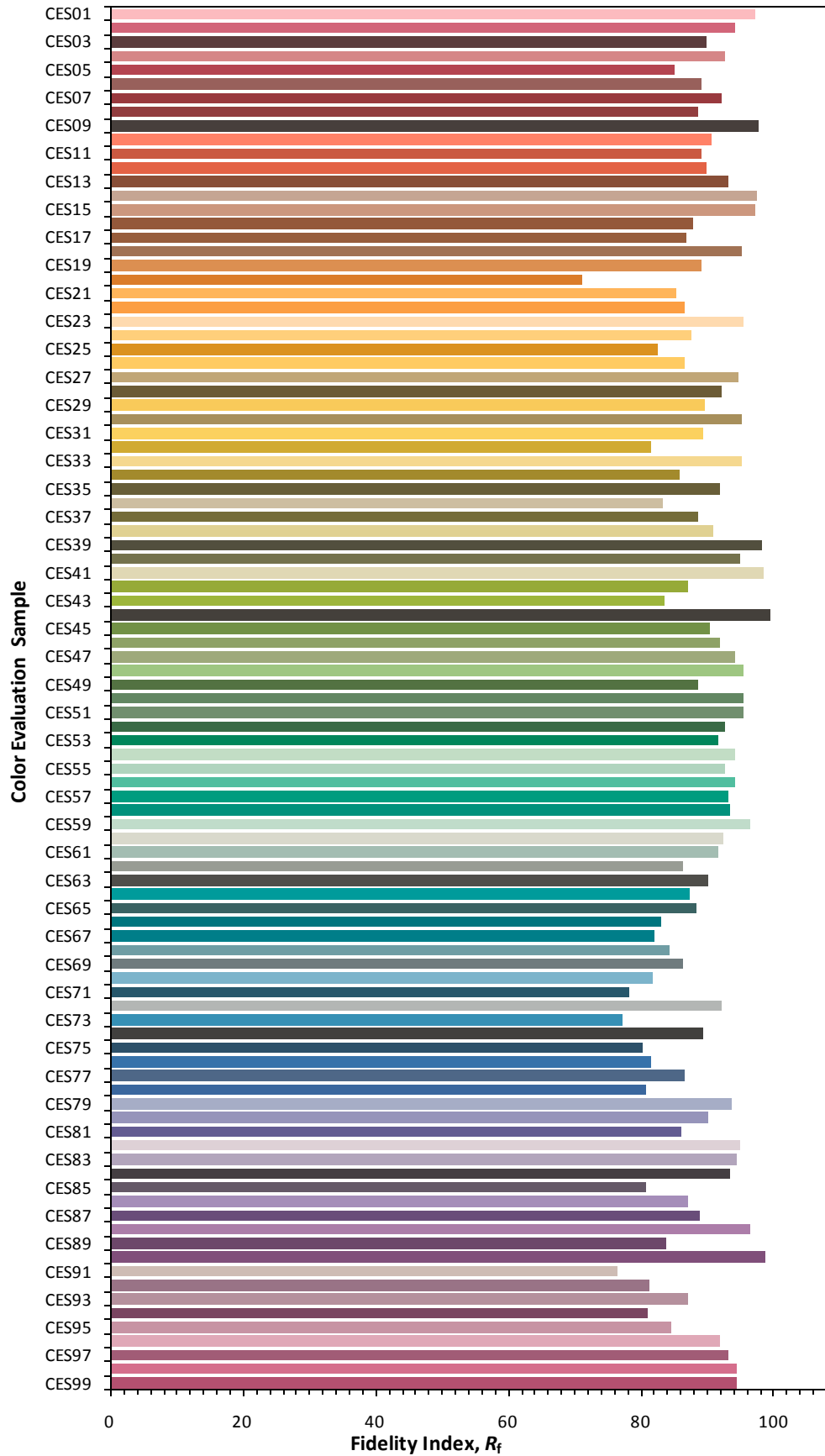
R_t by Hue



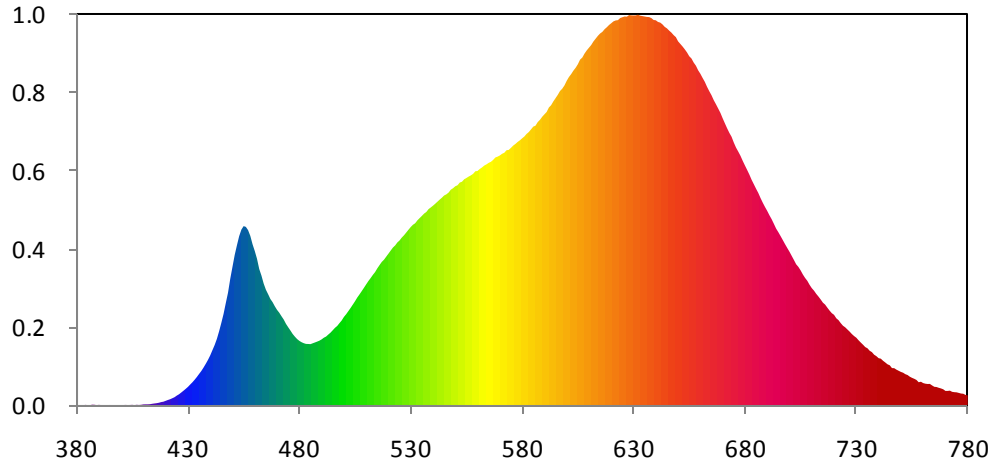
Color Vector Graphic



Color Fidelity by CES Sample



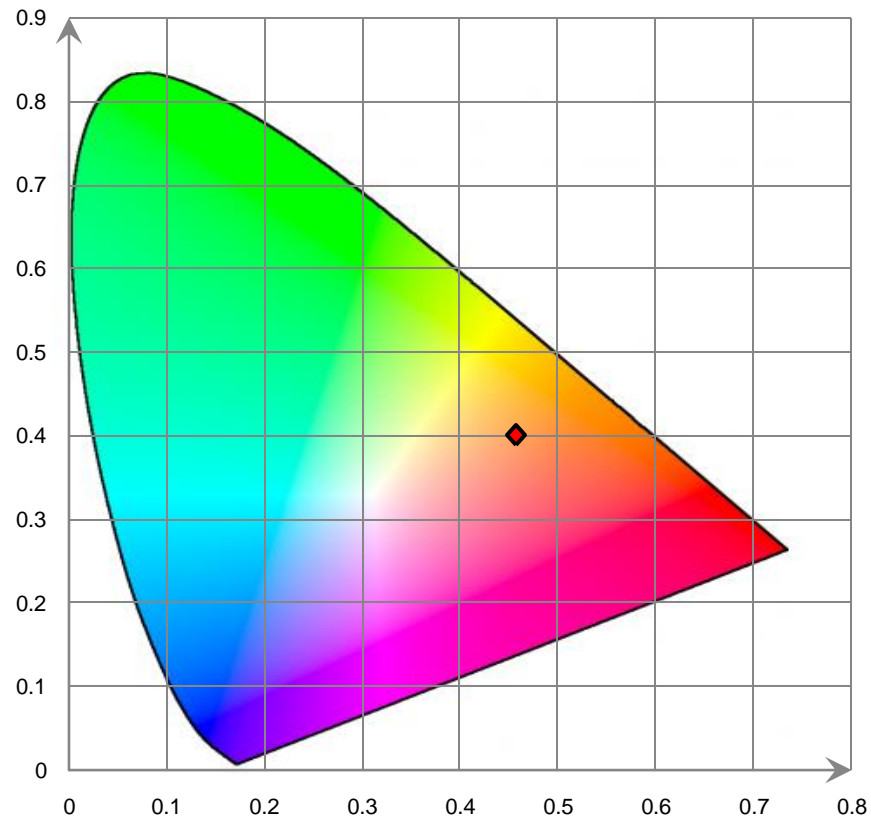
Relative Spectral Power Distribution



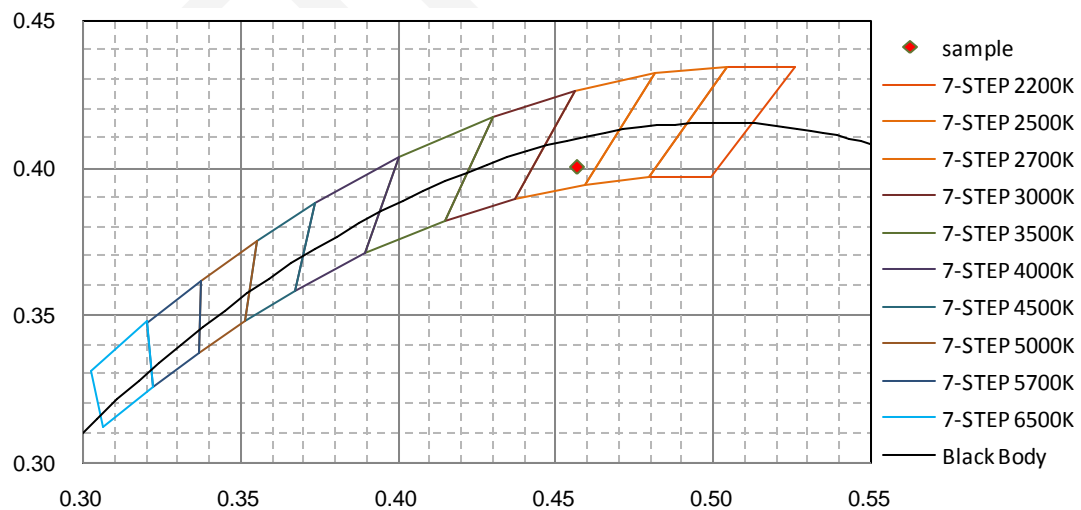
nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
380	2.720E-02	421	9.580E-01	462	2.511E+01	503	1.792E+01	544	3.825E+01
381	1.730E-02	422	1.095E+00	463	2.388E+01	504	1.853E+01	545	3.866E+01
382	2.630E-02	423	1.282E+00	464	2.242E+01	505	1.917E+01	546	3.887E+01
383	1.300E-03	424	1.477E+00	465	2.128E+01	506	1.983E+01	547	3.920E+01
384	6.050E-02	425	1.769E+00	466	2.046E+01	507	2.042E+01	548	3.972E+01
385	1.460E-02	426	2.006E+00	467	1.957E+01	508	2.102E+01	549	3.999E+01
386	1.000E-03	427	2.330E+00	468	1.899E+01	509	2.163E+01	550	4.035E+01
387	9.130E-02	428	2.666E+00	469	1.823E+01	510	2.226E+01	551	4.054E+01
388	8.000E-02	429	3.009E+00	470	1.757E+01	511	2.289E+01	552	4.103E+01
389	1.390E-02	430	3.370E+00	471	1.703E+01	512	2.343E+01	553	4.119E+01
390	6.020E-02	431	3.804E+00	472	1.639E+01	513	2.401E+01	554	4.164E+01
391	3.210E-02	432	4.219E+00	473	1.578E+01	514	2.454E+01	555	4.188E+01
392	4.700E-03	433	4.689E+00	474	1.499E+01	515	2.522E+01	556	4.214E+01
393	1.900E-03	434	5.200E+00	475	1.436E+01	516	2.582E+01	557	4.237E+01
394	2.130E-02	435	5.749E+00	476	1.376E+01	517	2.641E+01	558	4.265E+01
395	3.410E-02	436	6.295E+00	477	1.313E+01	518	2.682E+01	559	4.311E+01
396	1.200E-02	437	6.930E+00	478	1.263E+01	519	2.737E+01	560	4.318E+01
397	9.000E-04	438	7.622E+00	479	1.220E+01	520	2.794E+01	561	4.355E+01
398	0.000E+00	439	8.348E+00	480	1.186E+01	521	2.850E+01	562	4.383E+01
399	0.000E+00	440	9.174E+00	481	1.161E+01	522	2.905E+01	563	4.416E+01
400	0.000E+00	441	1.014E+01	482	1.142E+01	523	2.944E+01	564	4.439E+01
401	2.760E-02	442	1.110E+01	483	1.129E+01	524	3.000E+01	565	4.468E+01
402	5.100E-02	443	1.223E+01	484	1.128E+01	525	3.037E+01	566	4.486E+01
403	2.680E-02	444	1.364E+01	485	1.125E+01	526	3.090E+01	567	4.523E+01
404	3.880E-02	445	1.519E+01	486	1.141E+01	527	3.133E+01	568	4.566E+01
405	6.240E-02	446	1.683E+01	487	1.156E+01	528	3.183E+01	569	4.582E+01
406	1.780E-02	447	1.883E+01	488	1.172E+01	529	3.234E+01	570	4.604E+01
407	7.470E-02	448	2.075E+01	489	1.189E+01	530	3.285E+01	571	4.634E+01
408	3.490E-02	449	2.331E+01	490	1.213E+01	531	3.326E+01	572	4.653E+01
409	7.470E-02	450	2.550E+01	491	1.244E+01	532	3.353E+01	573	4.700E+01
410	1.462E-01	451	2.771E+01	492	1.264E+01	533	3.407E+01	574	4.706E+01
411	1.567E-01	452	2.950E+01	493	1.302E+01	534	3.449E+01	575	4.744E+01
412	1.618E-01	453	3.116E+01	494	1.337E+01	535	3.489E+01	576	4.785E+01
413	1.867E-01	454	3.237E+01	495	1.381E+01	536	3.532E+01	577	4.816E+01
414	2.591E-01	455	3.301E+01	496	1.426E+01	537	3.561E+01	578	4.853E+01
415	3.163E-01	456	3.286E+01	497	1.461E+01	538	3.614E+01	579	4.883E+01
416	3.725E-01	457	3.227E+01	498	1.512E+01	539	3.645E+01	580	4.919E+01
417	4.566E-01	458	3.120E+01	499	1.561E+01	540	3.678E+01	581	4.953E+01
418	5.657E-01	459	2.968E+01	500	1.626E+01	541	3.714E+01	582	5.001E+01
419	6.440E-01	460	2.842E+01	501	1.676E+01	542	3.751E+01	583	5.035E+01
420	7.992E-01	461	2.700E+01	502	1.734E+01	543	3.790E+01	584	5.085E+01

nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
585	5.136E+01	626	7.166E+01	667	5.547E+01	708	2.293E+01	749	6.342E+00
586	5.152E+01	627	7.161E+01	668	5.468E+01	709	2.219E+01	750	6.130E+00
587	5.218E+01	628	7.191E+01	669	5.387E+01	710	2.158E+01	751	5.982E+00
588	5.260E+01	629	7.186E+01	670	5.289E+01	711	2.111E+01	752	5.716E+00
589	5.317E+01	630	7.184E+01	671	5.196E+01	712	2.052E+01	753	5.559E+00
590	5.361E+01	631	7.185E+01	672	5.105E+01	713	2.003E+01	754	5.253E+00
591	5.405E+01	632	7.198E+01	673	5.020E+01	714	1.949E+01	755	5.042E+00
592	5.487E+01	633	7.180E+01	674	4.948E+01	715	1.890E+01	756	4.868E+00
593	5.529E+01	634	7.173E+01	675	4.842E+01	716	1.854E+01	757	4.653E+00
594	5.599E+01	635	7.164E+01	676	4.750E+01	717	1.797E+01	758	4.224E+00
595	5.660E+01	636	7.157E+01	677	4.675E+01	718	1.743E+01	759	4.322E+00
596	5.721E+01	637	7.155E+01	678	4.597E+01	719	1.696E+01	760	4.071E+00
597	5.792E+01	638	7.136E+01	679	4.505E+01	720	1.666E+01	761	3.957E+00
598	5.833E+01	639	7.101E+01	680	4.420E+01	721	1.602E+01	762	3.908E+00
599	5.894E+01	640	7.095E+01	681	4.336E+01	722	1.568E+01	763	3.920E+00
600	5.979E+01	641	7.065E+01	682	4.250E+01	723	1.513E+01	764	3.639E+00
601	6.049E+01	642	7.052E+01	683	4.155E+01	724	1.465E+01	765	3.387E+00
602	6.102E+01	643	7.019E+01	684	4.073E+01	725	1.436E+01	766	3.350E+00
603	6.165E+01	644	6.974E+01	685	3.991E+01	726	1.396E+01	767	3.204E+00
604	6.219E+01	645	6.946E+01	686	3.912E+01	727	1.356E+01	768	3.091E+00
605	6.284E+01	646	6.905E+01	687	3.819E+01	728	1.312E+01	769	2.933E+00
606	6.369E+01	647	6.868E+01	688	3.733E+01	729	1.274E+01	770	2.629E+00
607	6.408E+01	648	6.822E+01	689	3.654E+01	730	1.244E+01	771	2.630E+00
608	6.480E+01	649	6.784E+01	690	3.581E+01	731	1.196E+01	772	2.681E+00
609	6.541E+01	650	6.707E+01	691	3.501E+01	732	1.155E+01	773	2.463E+00
610	6.590E+01	651	6.660E+01	692	3.428E+01	733	1.115E+01	774	2.398E+00
611	6.639E+01	652	6.613E+01	693	3.343E+01	734	1.071E+01	775	2.369E+00
612	6.704E+01	653	6.560E+01	694	3.255E+01	735	1.048E+01	776	2.263E+00
613	6.756E+01	654	6.503E+01	695	3.189E+01	736	1.003E+01	777	2.145E+00
614	6.809E+01	655	6.433E+01	696	3.118E+01	737	9.774E+00	778	2.111E+00
615	6.851E+01	656	6.392E+01	697	3.044E+01	738	9.308E+00	779	1.890E+00
616	6.882E+01	657	6.316E+01	698	2.968E+01	739	9.037E+00	780	1.824E+00
617	6.930E+01	658	6.258E+01	699	2.898E+01	740	8.663E+00		
618	6.967E+01	659	6.173E+01	700	2.828E+01	741	8.574E+00		
619	7.008E+01	660	6.109E+01	701	2.752E+01	742	8.187E+00		
620	7.042E+01	661	6.033E+01	702	2.676E+01	743	7.872E+00		
621	7.075E+01	662	5.959E+01	703	2.598E+01	744	7.532E+00		
622	7.093E+01	663	5.869E+01	704	2.549E+01	745	7.359E+00		
623	7.097E+01	664	5.788E+01	705	2.485E+01	746	6.835E+00		
624	7.137E+01	665	5.714E+01	706	2.410E+01	747	6.820E+00		
625	7.151E+01	666	5.623E+01	707	2.346E+01	748	6.554E+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**

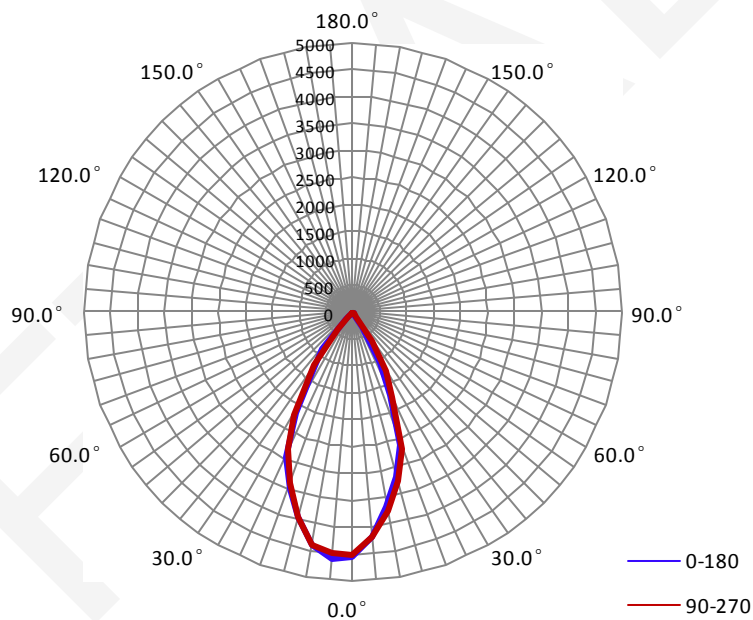
Electrical Measurement

Input Voltage (V)	Frequency (Hz)	Input Current (A)	Power (W)	Power Factor
120.0	60	0.4420	50.93	0.9600

Photometric Measurement

Luminous Flux (lm)	Efficacy (lm/W)	I_{max} (cd)	S/MH (C0/180)	S/MH (C90/270)
3154.4	61.99	4653.8	0.79	0.79

Luminous Intensity Distribution



	C0/180	C45/225	C90/270	C135/315	AVG.
Beam Angle (50% I_{max}):	50.8	51.5	51.6	51.5	51.4
Field Angle (10% I_{max}):	76.9	77.0	76.3	76.1	76.6

Luminous Intensity (cd) Distribution Data

C y	0°	22.5°	45°	67.5°	90°	112.5°	135°	157.5°
0.0°	4526	4526	4526	4526	4526	4526	4526	4526
5.0°	4200	4145	4154	4137	4207	4279	4435	4579
10.0°	3686	3629	3580	3631	3761	3880	4031	4245
15.0°	3169	3094	3090	3151	3263	3414	3603	3800
20.0°	2603	2468	2434	2510	2693	2915	3151	3370
25.0°	1703	1557	1529	1585	1714	2025	2482	2837
30.0°	1057	1023	1064	1129	1237	1376	1574	1878
35.0°	304	258	258	338	619	940	1118	1271
40.0°	52	41	55	69	113	188	376	730
45.0°	9	0	8	15	22	34	68	127
50.0°	0	0	0	0	0	0	14	25
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.)

C y	180°	202.5°	225°	247.5°	270°	292.5°	315°	337.5°
0.0°	4526	4526	4526	4526	4526	4526	4526	4526
5.0°	4598	4654	4634	4631	4517	4487	4358	4232
10.0°	4398	4503	4586	4482	4400	4166	3920	3762
15.0°	3939	4149	4222	4174	3935	3672	3453	3258
20.0°	3469	3612	3658	3548	3384	3147	2909	2728
25.0°	2966	3052	3091	2992	2817	2582	2310	1944
30.0°	2160	2441	2484	2386	2183	1808	1359	1099
35.0°	1361	1470	1535	1428	1208	935	584	358
40.0°	868	966	935	724	401	287	187	74
45.0°	173	207	215	191	110	34	15	11
50.0°	25	32	27	20	11	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)	%
0-5	106.6	3.38
5-10	301.6	9.56
10-15	452.5	14.34
15-20	545.9	17.31
20-25	562.3	17.83
25-30	501.8	15.91
30-35	370.4	11.74
35-40	209.1	6.63
40-45	84.5	2.68
45-50	17.6	0.56
50-55	2.1	0.07
55-60	0.0	0.00
60-65	0.0	0.00
65-70	0.0	0.00
70-75	0.0	0.00
75-80	0.0	0.00
80-85	0.0	0.00
85-90	0.0	0.00
90-95	0.0	0.00
95-100	0.0	0.00
100-105	0.0	0.00
105-110	0.0	0.00
110-115	0.0	0.00
115-120	0.0	0.00
120-125	0.0	0.00
125-130	0.0	0.00
130-135	0.0	0.00
135-140	0.0	0.00
140-145	0.0	0.00
145-150	0.0	0.00
150-155	0.0	0.00
155-160	0.0	0.00
160-165	0.0	0.00
165-170	0.0	0.00
170-175	0.0	0.00
175-180	0.0	0.00

Deg	Flux (lm)	%
0-5	106.6	3.38
0-10	408.2	12.94
0-15	860.7	27.29
0-20	1406.6	44.59
0-25	1968.9	62.42
0-30	2470.8	78.33
0-35	2841.2	90.07
0-40	3050.2	96.70
0-45	3134.8	99.38
0-50	3152.4	99.93
0-55	3154.4	100.00
0-60	3154.4	100.00
0-65	3154.4	100.00
0-70	3154.4	100.00
0-75	3154.4	100.00
0-80	3154.4	100.00
0-85	3154.4	100.00
0-90	3154.4	100.00
0-95	3154.4	100.00
0-100	3154.4	100.00
0-105	3154.4	100.00
0-110	3154.4	100.00
0-115	3154.4	100.00
0-120	3154.4	100.00
0-125	3154.4	100.00
0-130	3154.4	100.00
0-135	3154.4	100.00
0-140	3154.4	100.00
0-145	3154.4	100.00
0-150	3154.4	100.00
0-155	3154.4	100.00
0-160	3154.4	100.00
0-165	3154.4	100.00
0-170	3154.4	100.00
0-175	3154.4	100.00
0-180	3154.4	100.00

6. Product Photo



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