



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: LE319027DIM120MDR6BL

Report Type:	Electrical and Photometric tests including: Luminous Flux, Chromaticity, Luminous Intensity Distribution
Test Engineer:	George Yang <i>George Yang</i>
Report Number:	RKSB190329026-10-2
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: LE319027DIM120MDR6BL
 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**

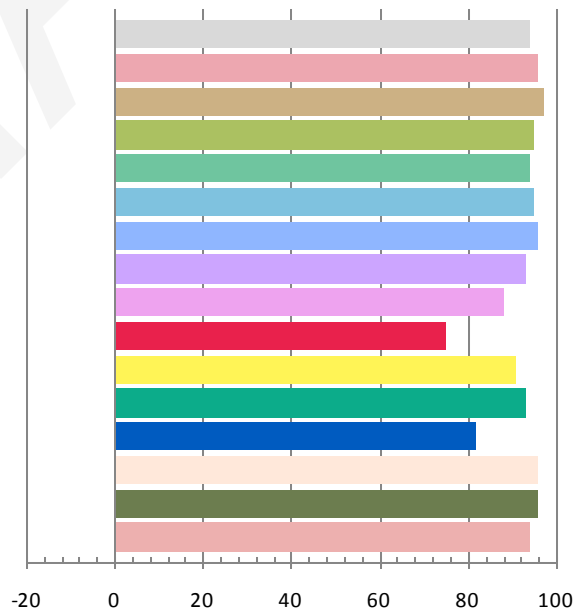
Photometric and Electrical Measurement Result

Voltage (V)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Luminous Flux(lm)	Efficacy (lm/W)
120	60	0.4272	50.94	0.9937	3179.18	62.41

Radiant Flux (W)	CCT (K)	Duv	x	y	u'	v'
11.892	2661	-0.00380	0.4565	0.3997	0.2653	0.5226

Color Rendering Index

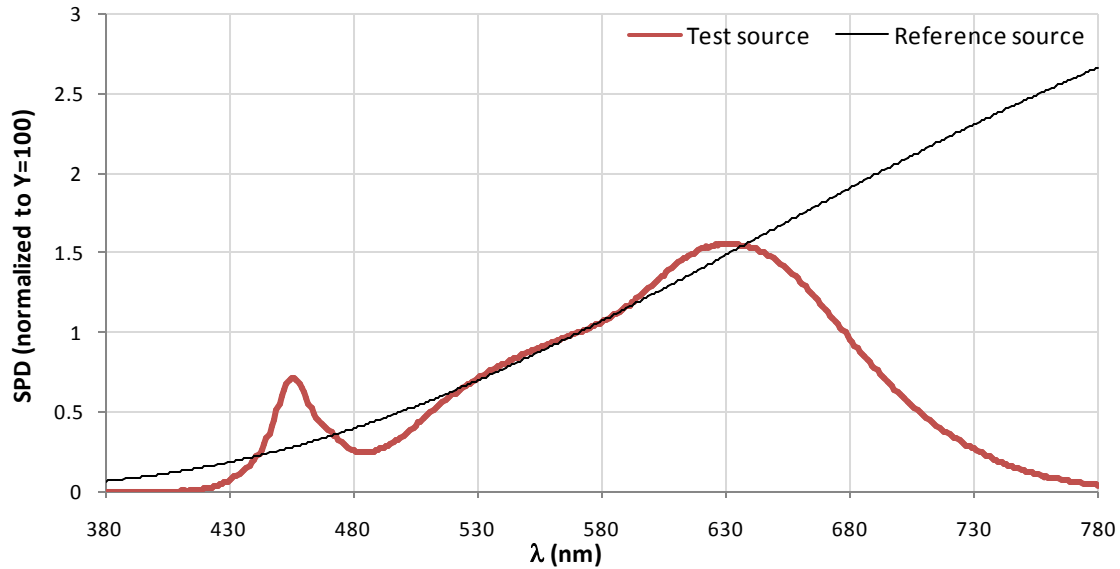
Ra			
94.2			
R1	R2	R3	R4
96	97	95	94
R5	R6	R7	R8
95	96	93	88
R9	R10	R11	R12
75	91	93	82
R13	R14	R15	
96	96	94	



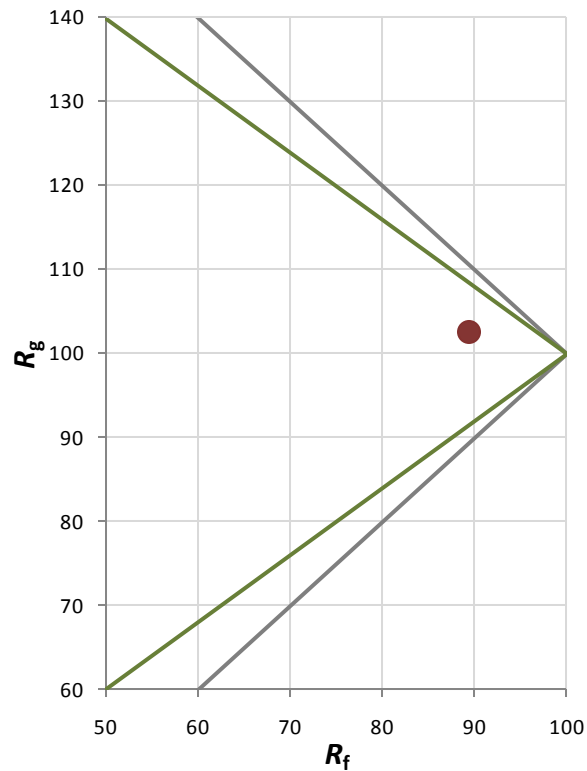
Fidelity Index and Gamut Index

Fidelity Index R_f	90
Gamut Index R_g	102

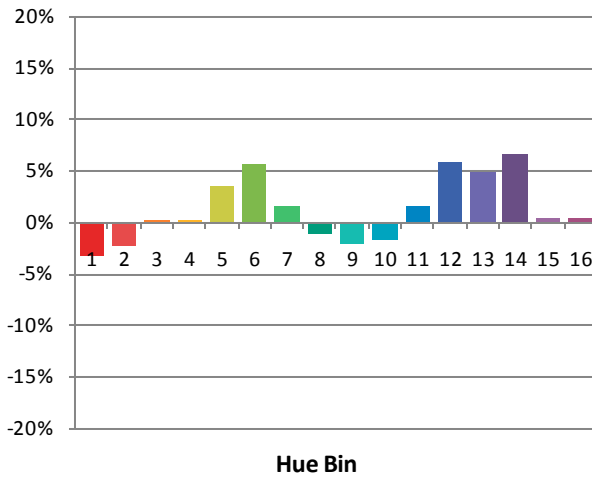
Spectral Power Distribution Comparison



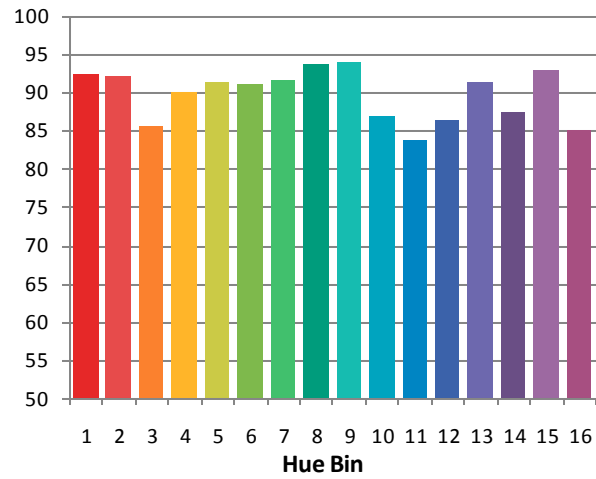
Plot of R_g versus R_f



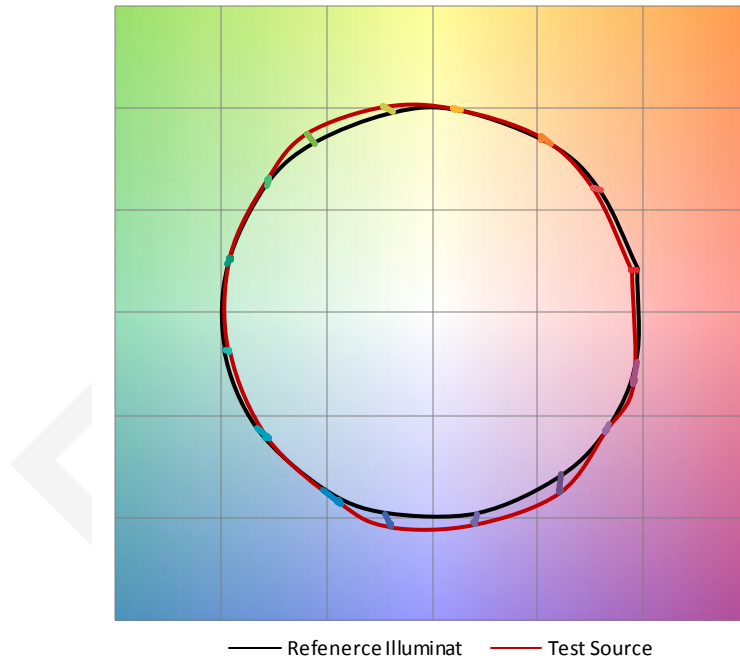
Chroma Shift by Hue



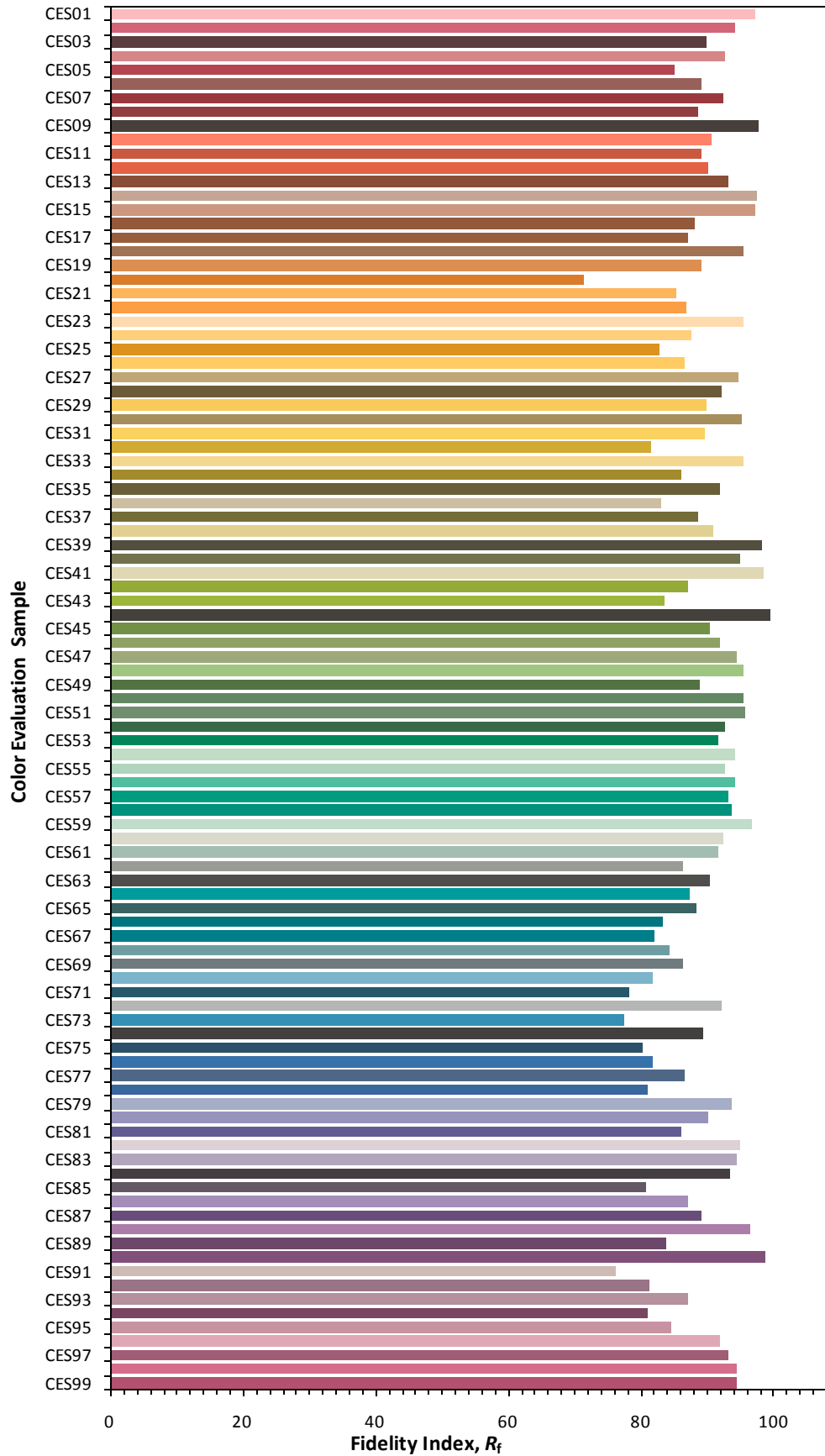
R_t by Hue



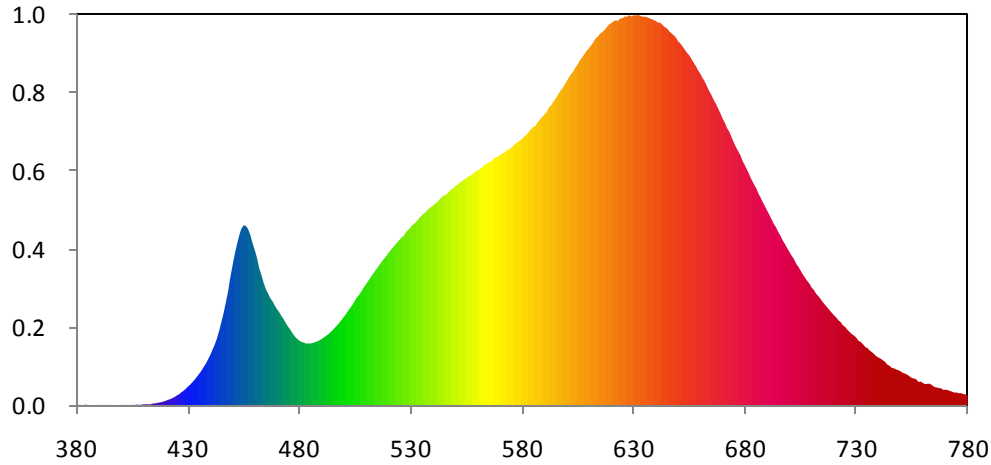
Color Vector Graphic



Color Fidelity by CES Sample



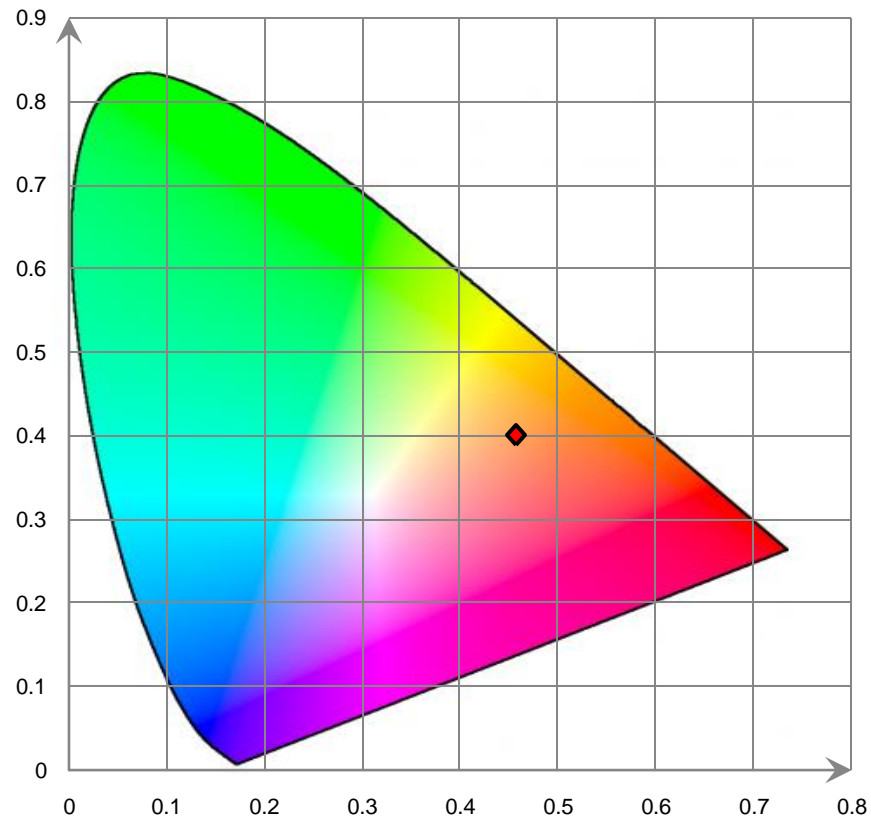
Relative Spectral Power Distribution



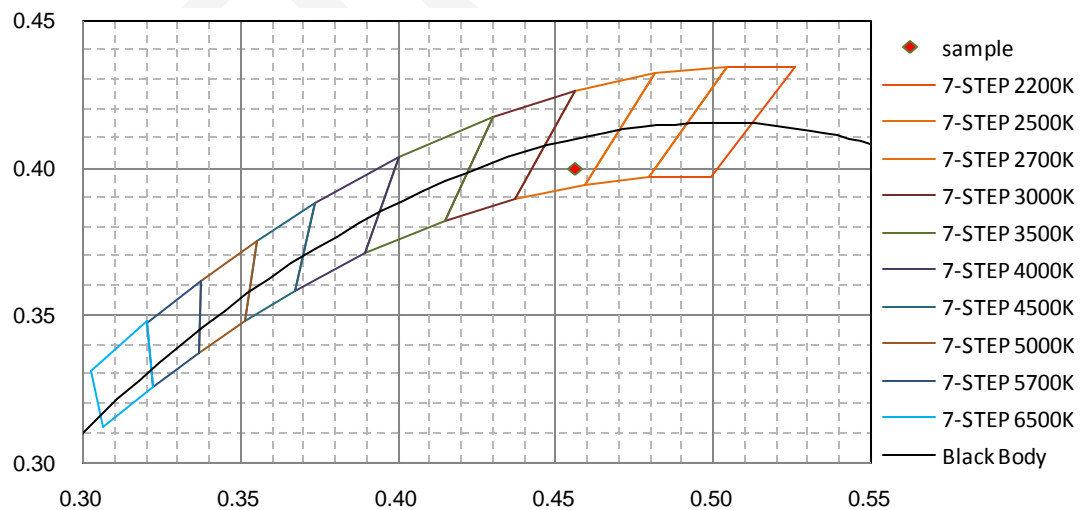
nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
380	3.650E-02	421	9.949E-01	462	2.543E+01	503	1.814E+01	544	3.867E+01
381	5.260E-02	422	1.099E+00	463	2.416E+01	504	1.875E+01	545	3.897E+01
382	1.150E-02	423	1.298E+00	464	2.271E+01	505	1.946E+01	546	3.916E+01
383	1.040E-02	424	1.517E+00	465	2.153E+01	506	2.007E+01	547	3.958E+01
384	8.610E-02	425	1.802E+00	466	2.072E+01	507	2.058E+01	548	4.004E+01
385	3.770E-02	426	2.023E+00	467	1.985E+01	508	2.125E+01	549	4.026E+01
386	6.100E-03	427	2.375E+00	468	1.930E+01	509	2.190E+01	550	4.070E+01
387	2.980E-02	428	2.663E+00	469	1.848E+01	510	2.250E+01	551	4.095E+01
388	1.120E-02	429	3.028E+00	470	1.783E+01	511	2.315E+01	552	4.137E+01
389	4.000E-04	430	3.446E+00	471	1.724E+01	512	2.369E+01	553	4.157E+01
390	6.070E-02	431	3.818E+00	472	1.653E+01	513	2.436E+01	554	4.191E+01
391	2.950E-02	432	4.261E+00	473	1.596E+01	514	2.494E+01	555	4.220E+01
392	2.700E-03	433	4.716E+00	474	1.518E+01	515	2.549E+01	556	4.251E+01
393	8.000E-04	434	5.249E+00	475	1.454E+01	516	2.609E+01	557	4.266E+01
394	2.000E-04	435	5.809E+00	476	1.398E+01	517	2.666E+01	558	4.300E+01
395	6.070E-02	436	6.363E+00	477	1.334E+01	518	2.718E+01	559	4.343E+01
396	1.980E-02	437	7.052E+00	478	1.276E+01	519	2.767E+01	560	4.357E+01
397	3.000E-03	438	7.683E+00	479	1.233E+01	520	2.828E+01	561	4.387E+01
398	3.250E-02	439	8.488E+00	480	1.199E+01	521	2.881E+01	562	4.413E+01
399	1.700E-03	440	9.295E+00	481	1.174E+01	522	2.930E+01	563	4.459E+01
400	1.000E-04	441	1.026E+01	482	1.163E+01	523	2.978E+01	564	4.482E+01
401	2.720E-02	442	1.122E+01	483	1.145E+01	524	3.027E+01	565	4.508E+01
402	5.730E-02	443	1.238E+01	484	1.146E+01	525	3.073E+01	566	4.528E+01
403	2.700E-02	444	1.379E+01	485	1.146E+01	526	3.119E+01	567	4.568E+01
404	2.700E-02	445	1.540E+01	486	1.154E+01	527	3.153E+01	568	4.605E+01
405	4.990E-02	446	1.707E+01	487	1.170E+01	528	3.221E+01	569	4.615E+01
406	3.270E-02	447	1.906E+01	488	1.183E+01	529	3.260E+01	570	4.642E+01
407	1.113E-01	448	2.107E+01	489	1.204E+01	530	3.310E+01	571	4.673E+01
408	5.000E-02	449	2.370E+01	490	1.226E+01	531	3.352E+01	572	4.689E+01
409	8.400E-02	450	2.586E+01	491	1.256E+01	532	3.386E+01	573	4.735E+01
410	1.524E-01	451	2.806E+01	492	1.289E+01	533	3.433E+01	574	4.749E+01
411	1.668E-01	452	2.988E+01	493	1.316E+01	534	3.483E+01	575	4.777E+01
412	1.709E-01	453	3.150E+01	494	1.358E+01	535	3.527E+01	576	4.818E+01
413	1.475E-01	454	3.282E+01	495	1.394E+01	536	3.562E+01	577	4.858E+01
414	2.852E-01	455	3.340E+01	496	1.442E+01	537	3.599E+01	578	4.880E+01
415	3.323E-01	456	3.330E+01	497	1.484E+01	538	3.646E+01	579	4.916E+01
416	3.884E-01	457	3.272E+01	498	1.533E+01	539	3.676E+01	580	4.949E+01
417	4.778E-01	458	3.165E+01	499	1.586E+01	540	3.708E+01	581	4.991E+01
418	5.551E-01	459	3.012E+01	500	1.640E+01	541	3.742E+01	582	5.029E+01
419	6.769E-01	460	2.883E+01	501	1.693E+01	542	3.776E+01	583	5.072E+01
420	7.952E-01	461	2.739E+01	502	1.758E+01	543	3.824E+01	584	5.127E+01

nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
585	5.168E+01	626	7.221E+01	667	5.598E+01	708	2.307E+01	749	6.475E+00
586	5.186E+01	627	7.213E+01	668	5.508E+01	709	2.255E+01	750	6.260E+00
587	5.259E+01	628	7.246E+01	669	5.420E+01	710	2.181E+01	751	5.960E+00
588	5.307E+01	629	7.223E+01	670	5.324E+01	711	2.137E+01	752	5.836E+00
589	5.352E+01	630	7.242E+01	671	5.244E+01	712	2.068E+01	753	5.635E+00
590	5.404E+01	631	7.240E+01	672	5.145E+01	713	2.024E+01	754	5.334E+00
591	5.446E+01	632	7.253E+01	673	5.079E+01	714	1.971E+01	755	5.016E+00
592	5.527E+01	633	7.232E+01	674	4.980E+01	715	1.910E+01	756	4.959E+00
593	5.568E+01	634	7.217E+01	675	4.880E+01	716	1.863E+01	757	4.753E+00
594	5.637E+01	635	7.216E+01	676	4.794E+01	717	1.812E+01	758	4.311E+00
595	5.697E+01	636	7.207E+01	677	4.715E+01	718	1.763E+01	759	4.387E+00
596	5.761E+01	637	7.190E+01	678	4.639E+01	719	1.716E+01	760	4.083E+00
597	5.829E+01	638	7.174E+01	679	4.531E+01	720	1.669E+01	761	3.912E+00
598	5.882E+01	639	7.154E+01	680	4.455E+01	721	1.628E+01	762	3.976E+00
599	5.949E+01	640	7.137E+01	681	4.371E+01	722	1.575E+01	763	3.982E+00
600	6.016E+01	641	7.107E+01	682	4.282E+01	723	1.542E+01	764	3.713E+00
601	6.092E+01	642	7.106E+01	683	4.187E+01	724	1.481E+01	765	3.396E+00
602	6.149E+01	643	7.063E+01	684	4.108E+01	725	1.453E+01	766	3.308E+00
603	6.203E+01	644	7.025E+01	685	4.037E+01	726	1.400E+01	767	3.167E+00
604	6.280E+01	645	6.999E+01	686	3.938E+01	727	1.358E+01	768	3.137E+00
605	6.331E+01	646	6.947E+01	687	3.857E+01	728	1.320E+01	769	2.853E+00
606	6.412E+01	647	6.908E+01	688	3.771E+01	729	1.292E+01	770	2.873E+00
607	6.463E+01	648	6.874E+01	689	3.694E+01	730	1.252E+01	771	2.806E+00
608	6.524E+01	649	6.828E+01	690	3.612E+01	731	1.195E+01	772	2.649E+00
609	6.586E+01	650	6.761E+01	691	3.534E+01	732	1.175E+01	773	2.499E+00
610	6.631E+01	651	6.720E+01	692	3.448E+01	733	1.132E+01	774	2.333E+00
611	6.686E+01	652	6.662E+01	693	3.366E+01	734	1.080E+01	775	2.360E+00
612	6.745E+01	653	6.604E+01	694	3.300E+01	735	1.060E+01	776	2.214E+00
613	6.814E+01	654	6.546E+01	695	3.212E+01	736	1.015E+01	777	2.234E+00
614	6.845E+01	655	6.499E+01	696	3.144E+01	737	9.853E+00	778	2.089E+00
615	6.900E+01	656	6.432E+01	697	3.058E+01	738	9.489E+00	779	1.976E+00
616	6.934E+01	657	6.363E+01	698	2.990E+01	739	9.077E+00	780	1.847E+00
617	6.968E+01	658	6.295E+01	699	2.916E+01	740	8.836E+00		
618	7.022E+01	659	6.219E+01	700	2.842E+01	741	8.620E+00		
619	7.072E+01	660	6.154E+01	701	2.776E+01	742	8.320E+00		
620	7.096E+01	661	6.077E+01	702	2.713E+01	743	8.015E+00		
621	7.128E+01	662	6.010E+01	703	2.628E+01	744	7.490E+00		
622	7.150E+01	663	5.918E+01	704	2.571E+01	745	7.296E+00		
623	7.137E+01	664	5.833E+01	705	2.498E+01	746	6.898E+00		
624	7.185E+01	665	5.759E+01	706	2.428E+01	747	6.842E+00		
625	7.186E+01	666	5.668E+01	707	2.367E+01	748	6.613E+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**

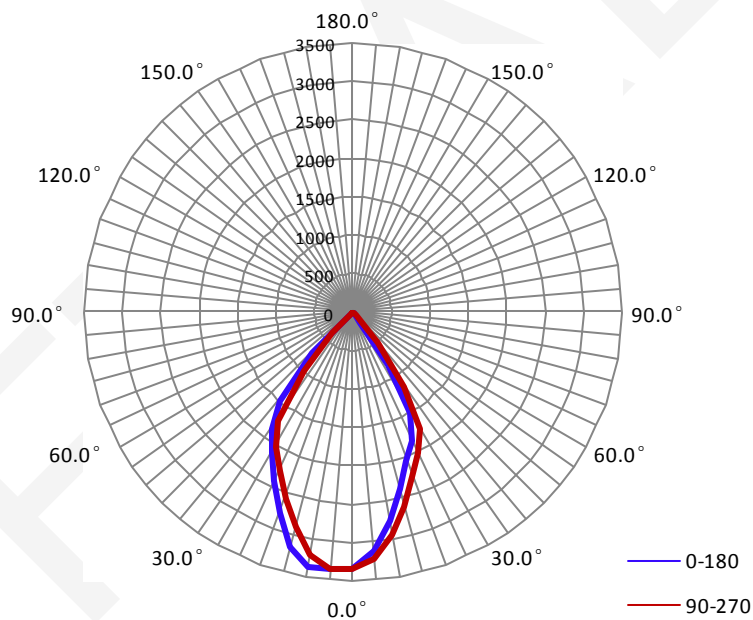
Electrical Measurement

Input Voltage (V)	Frequency (Hz)	Input Current (A)	Power (W)	Power Factor
120.0	60	0.4420	50.97	0.9610

Photometric Measurement

Luminous Flux (lm)	Efficacy (lm/W)	I_{max} (cd)	S/MH (C0/180)	S/MH (C90/270)
3184.2	62.52	3409.3	0.89	0.89

Luminous Intensity Distribution



	C0/180	C45/225	C90/270	C135/315	AVG.
Beam Angle (50% I_{max}):	64.7	65.7	65.9	65.3	65.4
Field Angle (10% I_{max}):	86.9	87.0	87.3	87.4	87.2

Luminous Intensity (cd) Distribution Data

C y	0°	22.5°	45°	67.5°	90°	112.5°	135°	157.5°
0.0°	3341	3341	3341	3341	3341	3341	3341	3341
5.0°	3107	3090	3105	3144	3211	3276	3334	3372
10.0°	2758	2758	2769	2843	2933	3059	3195	3350
15.0°	2380	2388	2421	2496	2610	2747	2887	3058
20.0°	2068	2072	2108	2194	2290	2387	2540	2706
25.0°	1835	1839	1897	1954	2014	2106	2220	2337
30.0°	1514	1484	1517	1625	1753	1869	1938	2040
35.0°	817	762	793	931	1177	1526	1677	1814
40.0°	162	121	166	289	495	769	1054	1388
45.0°	8	7	8	18	45	160	388	624
50.0°	1	1	1	1	3	8	28	61
55.0°	0	0	0	0	1	1	2	4
60.0°	0	0	0	0	0	0	0	1
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°	3341	3341	3341	3341	3341	3341	3341	3341
5.0°	3352	3348	3361	3393	3354	3298	3201	3125
10.0°	3367	3409	3397	3338	3215	3049	2892	2791
15.0°	3149	3227	3225	3087	2892	2720	2541	2434
20.0°	2788	2867	2873	2752	2577	2380	2204	2076
25.0°	2423	2497	2516	2433	2264	2084	1943	1867
30.0°	2106	2200	2207	2143	2014	1856	1704	1538
35.0°	1853	1919	1933	1868	1715	1460	1093	891
40.0°	1497	1587	1551	1277	991	750	479	248
45.0°	749	833	789	629	372	109	30	9
50.0°	104	153	118	61	16	4	2	1
55.0°	5	7	5	2	2	1	0	0
60.0°	1	1	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	78.8	2.48
5-10	226.2	7.11
10-15	346.2	10.87
15-20	428.3	13.45
20-25	479.2	15.05
25-30	504.1	15.83
30-35	476.1	14.95
35-40	365.5	11.48
40-45	203.6	6.40
45-50	67.4	2.12
50-55	8.1	0.25
55-60	0.5	0.02
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	78.8	2.48
0-10	305.1	9.58
0-15	651.3	20.45
0-20	1079.6	33.90
0-25	1558.8	48.95
0-30	2062.9	64.79
0-35	2539.0	79.74
0-40	2904.5	91.22
0-45	3108.2	97.61
0-50	3175.6	99.73
0-55	3183.7	99.98
0-60	3184.2	100.00
0-65	3184.2	100.00
0-70	3184.2	100.00
0-75	3184.2	100.00
0-80	3184.2	100.00
0-85	3184.2	100.00
0-90	3184.2	100.00
0-95	3184.2	100.00
0-100	3184.2	100.00
0-105	3184.2	100.00
0-110	3184.2	100.00
0-115	3184.2	100.00
0-120	3184.2	100.00
0-125	3184.2	100.00
0-130	3184.2	100.00
0-135	3184.2	100.00
0-140	3184.2	100.00
0-145	3184.2	100.00
0-150	3184.2	100.00
0-155	3184.2	100.00
0-160	3184.2	100.00
0-165	3184.2	100.00
0-170	3184.2	100.00
0-175	3184.2	100.00
0-180	3184.2	100.00

6. Product Photo



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