



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: LE089027DIM120MDR4BL

Report Type:	Electrical and Photometric tests including: Luminous Flux, Chromaticity, Luminous Intensity Distribution
Test Engineer:	George Yang <i>George Yang</i>
Report Number:	RKSB190329022-10-2
Test Date:	2019-04-02 to 2019-04-04
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 2019-03-29 and used for testing.

Model Tested: LE089027DIM120MDR4BL
 Manufacturer: GREEN CREATIVE LTD
 Brand Name: GREEN CREATIVE
 Product Designation: LED Recessed Downlight
 Aging Time Before Test: 0 hour (For New Products)

Rated Values:

Rated Voltage/Frequency: 120-277 VAC 60Hz
 Rated Power: 12W
 Nominal CCT: 2700K
 Nominal Lumen Output: 850lm

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_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**

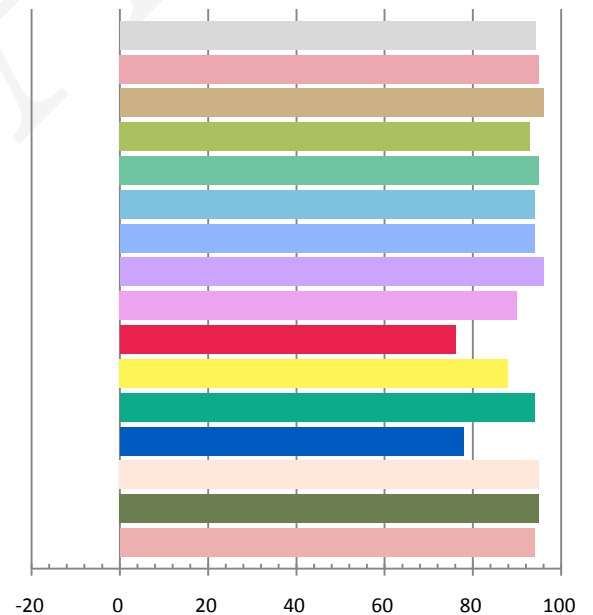
Photometric and Electrical Measurement Result

Voltage(V)	Frequency(Hz)	Current(A)	Power (W)	Power Factor	Luminous Flux(lm)	Efficacy(lm/W)
120.01	60	0.1021	12.11	0.9883	903.25	74.59

Radiant Flux (W)	CCT (K)	Duv	x	y	u'	v'
3.324	2705	0.00007	0.4595	0.4107	0.2622	0.5273

Color Rendering Index

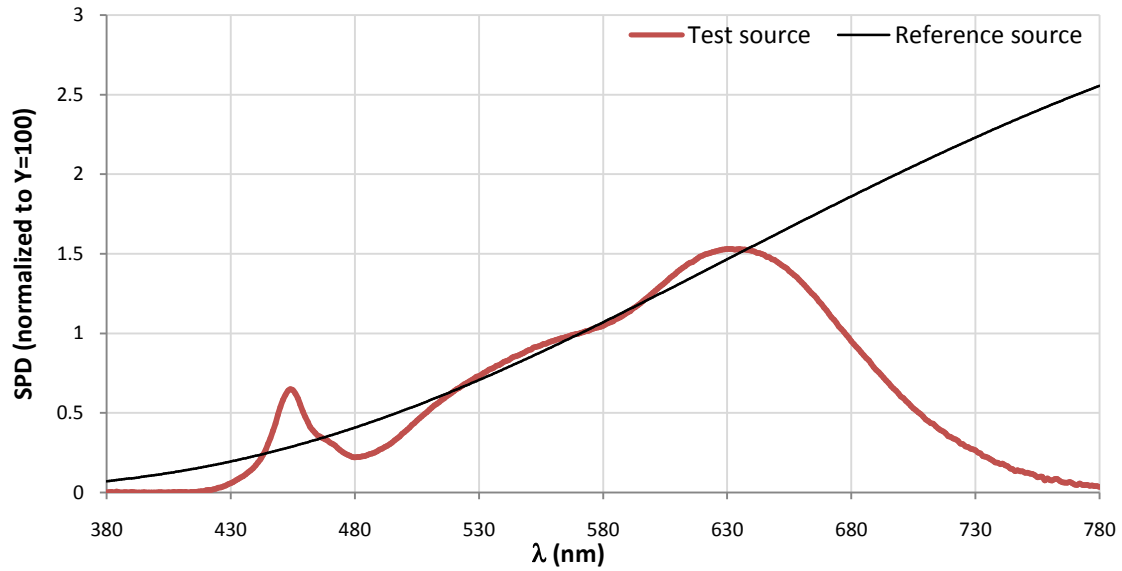
Ra			
94.2			
R1	R2	R3	R4
95	96	93	95
R5	R6	R7	R8
94	94	96	90
R9	R10	R11	R12
76	88	94	78
R13	R14	R15	
95	95	94	



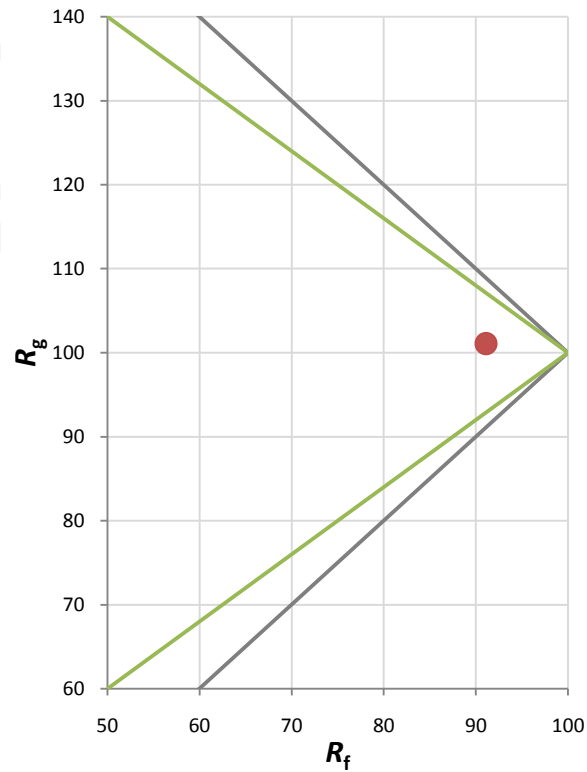
Fidelity Index and Gamut Index

Fidelity Index R_f	91
Gamut Index R_g	101

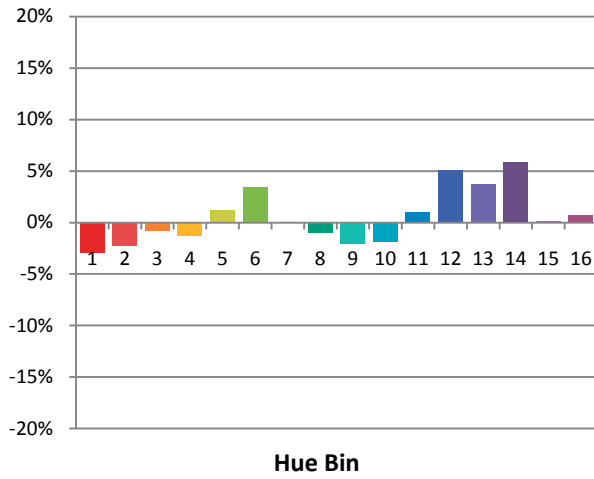
Spectral Power Distribution Comparison



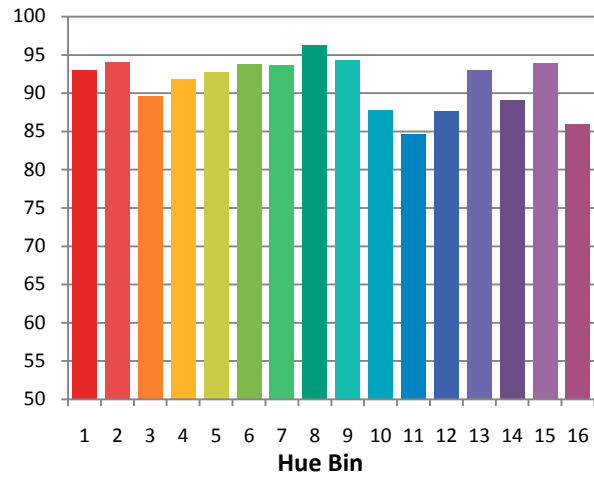
Plot of R_g versus R_f



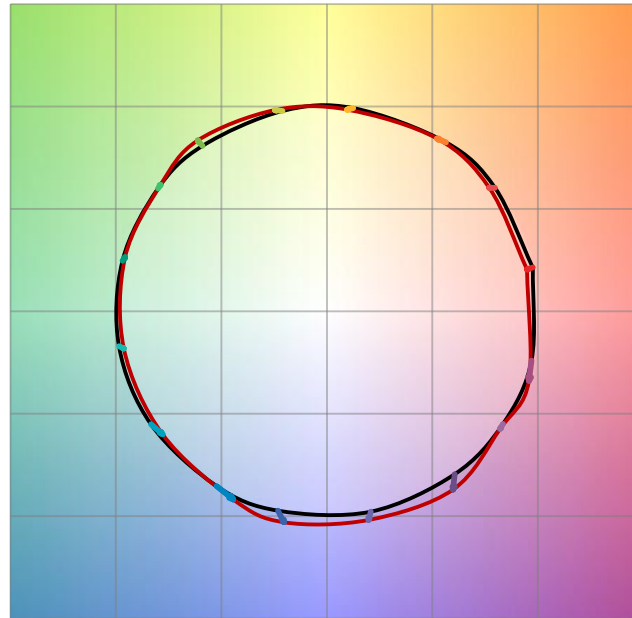
Chroma Shift by Hue



R_f by Hue

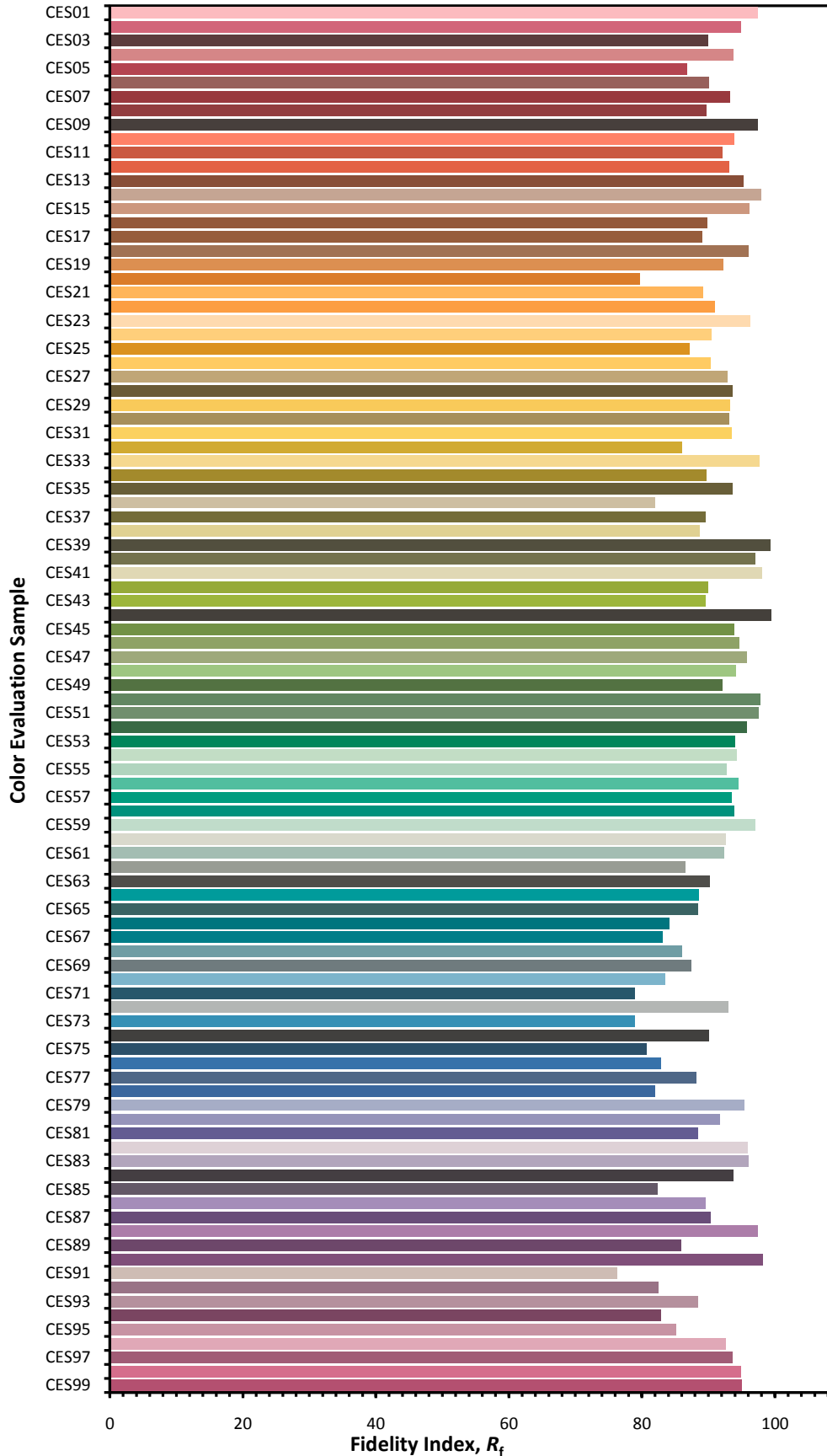


Color Vector Graphic

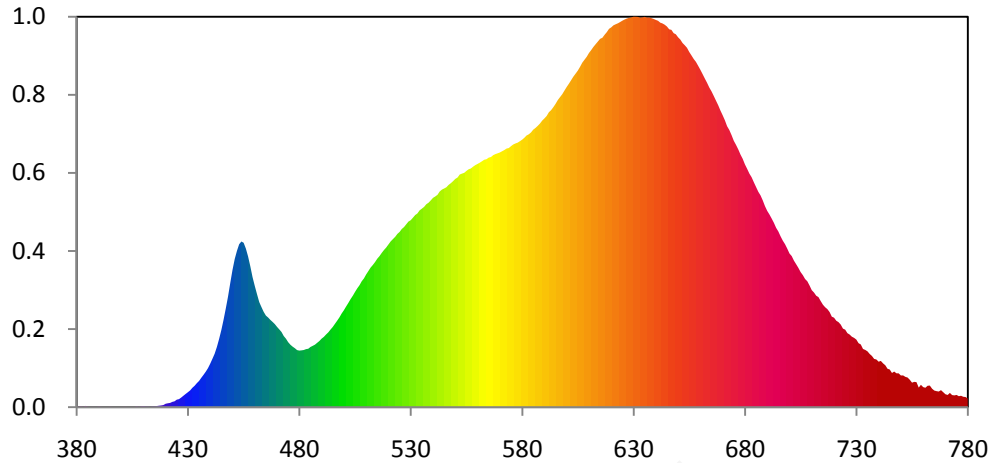


— Reference Illuminant — Test Source

Color Fidelity by CES Sample



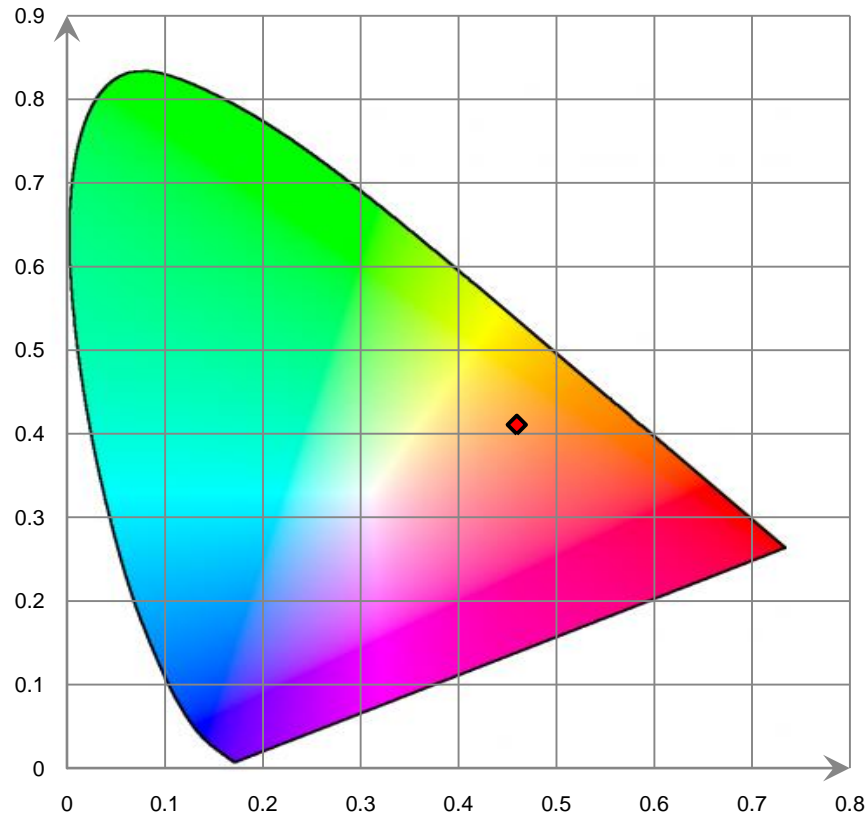
Relative Spectral Power Distribution



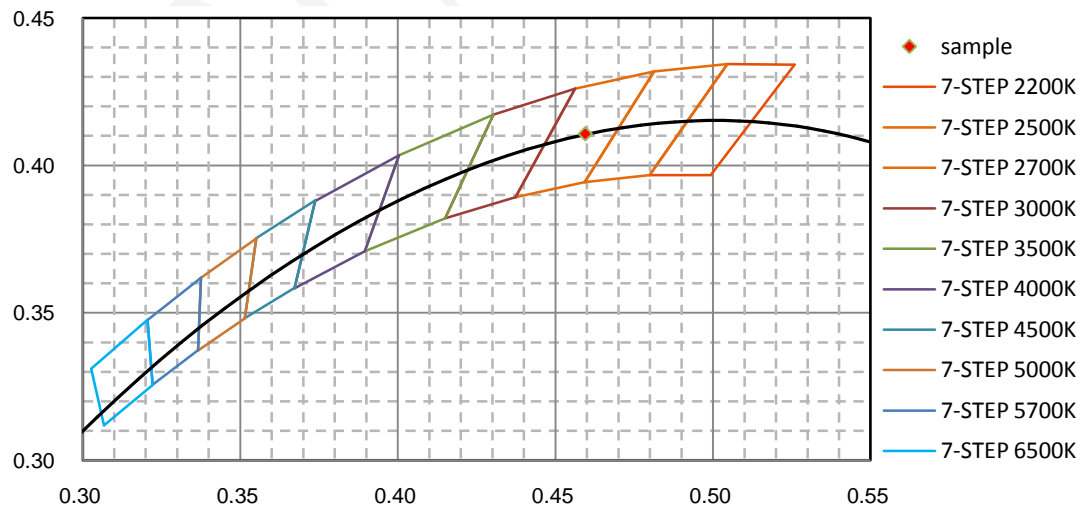
nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
380	2.160E-02	421	2.022E-01	462	5.447E+00	503	5.600E+00	544	1.127E+01
381	3.290E-02	422	2.203E-01	463	5.185E+00	504	5.770E+00	545	1.133E+01
382	4.760E-02	423	2.755E-01	464	4.937E+00	505	5.970E+00	546	1.139E+01
383	8.600E-03	424	3.054E-01	465	4.744E+00	506	6.155E+00	547	1.152E+01
384	6.610E-02	425	3.900E-01	466	4.644E+00	507	6.318E+00	548	1.160E+01
385	2.380E-02	426	4.172E-01	467	4.522E+00	508	6.522E+00	549	1.171E+01
386	1.700E-03	427	5.021E-01	468	4.415E+00	509	6.671E+00	550	1.182E+01
387	1.540E-02	428	5.942E-01	469	4.303E+00	510	6.876E+00	551	1.190E+01
388	1.340E-02	429	6.878E-01	470	4.159E+00	511	7.055E+00	552	1.205E+01
389	6.300E-03	430	7.761E-01	471	4.030E+00	512	7.234E+00	553	1.210E+01
390	3.970E-02	431	8.691E-01	472	3.894E+00	513	7.368E+00	554	1.214E+01
391	2.100E-02	432	1.005E+00	473	3.688E+00	514	7.521E+00	555	1.224E+01
392	9.000E-04	433	1.109E+00	474	3.546E+00	515	7.695E+00	556	1.232E+01
393	0.000E+00	434	1.244E+00	475	3.365E+00	516	7.827E+00	557	1.237E+01
394	7.100E-03	435	1.359E+00	476	3.234E+00	517	7.994E+00	558	1.246E+01
395	2.970E-02	436	1.523E+00	477	3.135E+00	518	8.144E+00	559	1.254E+01
396	1.000E-02	437	1.676E+00	478	3.055E+00	519	8.272E+00	560	1.260E+01
397	5.300E-03	438	1.839E+00	479	2.957E+00	520	8.432E+00	561	1.267E+01
398	2.000E-04	439	2.020E+00	480	2.931E+00	521	8.586E+00	562	1.274E+01
399	9.600E-03	440	2.253E+00	481	2.943E+00	522	8.705E+00	563	1.282E+01
400	4.000E-04	441	2.507E+00	482	2.962E+00	523	8.823E+00	564	1.285E+01
401	1.450E-02	442	2.770E+00	483	3.008E+00	524	8.975E+00	565	1.293E+01
402	2.490E-02	443	3.124E+00	484	3.026E+00	525	9.079E+00	566	1.296E+01
403	7.700E-03	444	3.535E+00	485	3.120E+00	526	9.232E+00	567	1.305E+01
404	1.070E-02	445	4.002E+00	486	3.179E+00	527	9.333E+00	568	1.311E+01
405	1.350E-02	446	4.531E+00	487	3.238E+00	528	9.475E+00	569	1.315E+01
406	2.400E-03	447	5.117E+00	488	3.333E+00	529	9.619E+00	570	1.319E+01
407	5.460E-02	448	5.731E+00	489	3.429E+00	530	9.687E+00	571	1.326E+01
408	1.270E-02	449	6.435E+00	490	3.550E+00	531	9.820E+00	572	1.332E+01
409	4.710E-02	450	7.104E+00	491	3.641E+00	532	9.952E+00	573	1.340E+01
410	6.000E-02	451	7.677E+00	492	3.764E+00	533	1.004E+01	574	1.342E+01
411	3.650E-02	452	8.099E+00	493	3.875E+00	534	1.020E+01	575	1.352E+01
412	4.150E-02	453	8.443E+00	494	4.022E+00	535	1.028E+01	576	1.361E+01
413	1.000E-02	454	8.584E+00	495	4.155E+00	536	1.038E+01	577	1.366E+01
414	4.380E-02	455	8.519E+00	496	4.321E+00	537	1.052E+01	578	1.370E+01
415	4.070E-02	456	8.217E+00	497	4.482E+00	538	1.059E+01	579	1.378E+01
416	5.930E-02	457	7.810E+00	498	4.655E+00	539	1.071E+01	580	1.386E+01
417	7.660E-02	458	7.299E+00	499	4.852E+00	540	1.085E+01	581	1.396E+01
418	9.140E-02	459	6.739E+00	500	5.023E+00	541	1.092E+01	582	1.408E+01
419	1.120E-01	460	6.283E+00	501	5.214E+00	542	1.100E+01	583	1.414E+01
420	1.772E-01	461	5.860E+00	502	5.400E+00	543	1.117E+01	584	1.423E+01

nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
585	1.438E+01	626	2.008E+01	667	1.588E+01	708	6.523E+00	749	1.753E+00
586	1.446E+01	627	2.013E+01	668	1.564E+01	709	6.304E+00	750	1.642E+00
587	1.457E+01	628	2.017E+01	669	1.537E+01	710	6.063E+00	751	1.645E+00
588	1.469E+01	629	2.019E+01	670	1.513E+01	711	5.940E+00	752	1.571E+00
589	1.485E+01	630	2.023E+01	671	1.486E+01	712	5.775E+00	753	1.535E+00
590	1.496E+01	631	2.023E+01	672	1.456E+01	713	5.703E+00	754	1.421E+00
591	1.508E+01	632	2.022E+01	673	1.436E+01	714	5.501E+00	755	1.271E+00
592	1.528E+01	633	2.018E+01	674	1.410E+01	715	5.311E+00	756	1.313E+00
593	1.539E+01	634	2.019E+01	675	1.380E+01	716	5.179E+00	757	1.296E+00
594	1.554E+01	635	2.022E+01	676	1.359E+01	717	5.081E+00	758	1.016E+00
595	1.571E+01	636	2.019E+01	677	1.336E+01	718	4.927E+00	759	1.160E+00
596	1.591E+01	637	2.019E+01	678	1.309E+01	719	4.689E+00	760	1.040E+00
597	1.606E+01	638	2.016E+01	679	1.287E+01	720	4.636E+00	761	1.006E+00
598	1.621E+01	639	2.011E+01	680	1.258E+01	721	4.479E+00	762	1.110E+00
599	1.640E+01	640	2.006E+01	681	1.235E+01	722	4.406E+00	763	1.119E+00
600	1.659E+01	641	2.002E+01	682	1.210E+01	723	4.280E+00	764	9.564E-01
601	1.676E+01	642	1.992E+01	683	1.191E+01	724	4.070E+00	765	8.622E-01
602	1.694E+01	643	1.988E+01	684	1.165E+01	725	4.017E+00	766	8.297E-01
603	1.712E+01	644	1.981E+01	685	1.141E+01	726	3.836E+00	767	8.105E-01
604	1.728E+01	645	1.972E+01	686	1.116E+01	727	3.762E+00	768	8.829E-01
605	1.744E+01	646	1.958E+01	687	1.097E+01	728	3.650E+00	769	7.766E-01
606	1.763E+01	647	1.955E+01	688	1.071E+01	729	3.590E+00	770	6.695E-01
607	1.785E+01	648	1.938E+01	689	1.042E+01	730	3.503E+00	771	6.335E-01
608	1.800E+01	649	1.931E+01	690	1.017E+01	731	3.316E+00	772	7.376E-01
609	1.816E+01	650	1.916E+01	691	9.985E+00	732	3.248E+00	773	6.279E-01
610	1.835E+01	651	1.904E+01	692	9.775E+00	733	3.017E+00	774	6.109E-01
611	1.850E+01	652	1.887E+01	693	9.552E+00	734	2.967E+00	775	6.335E-01
612	1.866E+01	653	1.875E+01	694	9.292E+00	735	2.892E+00	776	5.677E-01
613	1.881E+01	654	1.862E+01	695	9.103E+00	736	2.758E+00	777	5.898E-01
614	1.894E+01	655	1.840E+01	696	8.851E+00	737	2.654E+00	778	5.384E-01
615	1.908E+01	656	1.822E+01	697	8.627E+00	738	2.501E+00	779	5.286E-01
616	1.914E+01	657	1.804E+01	698	8.443E+00	739	2.473E+00	780	4.540E-01
617	1.929E+01	658	1.789E+01	699	8.213E+00	740	2.356E+00		
618	1.943E+01	659	1.769E+01	700	7.963E+00	741	2.397E+00		
619	1.960E+01	660	1.748E+01	701	7.829E+00	742	2.270E+00		
620	1.968E+01	661	1.726E+01	702	7.590E+00	743	2.173E+00		
621	1.978E+01	662	1.703E+01	703	7.406E+00	744	1.990E+00		
622	1.984E+01	663	1.681E+01	704	7.214E+00	745	1.952E+00		
623	1.989E+01	664	1.656E+01	705	7.000E+00	746	1.773E+00		
624	1.995E+01	665	1.636E+01	706	6.839E+00	747	1.844E+00		
625	2.002E+01	666	1.613E+01	707	6.639E+00	748	1.755E+00		

CIE 1931xy Chromaticity Diagram



7-Step Chromaticity Quadrangles



[Goniophotometer System]

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

Test orientation: **Downward**

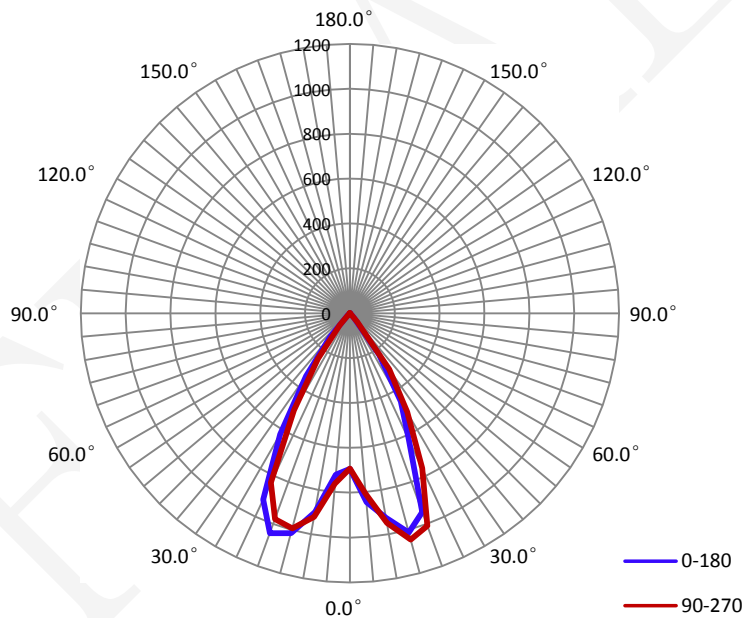
Electrical Measurement

Input Voltage(V)	Frequency(Hz)	Input Current(A)	Power (W)	Power Factor
120.0	60	0.1050	12.12	0.9580

Photometric Measurement

Luminous Flux(lm)	Efficacy(lm/W)	$I_{max}(cd)$	S/MH(C0/180)	S/MH(C90/270)
905.7	74.78	1046.4	1.16	1.14

Luminous Intensity Distribution



	C0/180	C45/225	C90/270	C135/315	AVG.
Beam Angle(50% I_{max}):	59.8	60.3	59.4	60.2	59.9
Field Angle(10% I_{max}):	79.3	78.7	78.0	77.8	78.5

Luminous Intensity (cd) Distribution Data

C γ	0°	22.5°	45°	67.5°	90°	112.5°	135°	157.5°
0.0°	693	693	693	693	693	693	693	693
5.0°	846	854	854	833	808	776	746	719
10.0°	926	942	954	959	950	938	920	898
15.0°	1012	1024	1039	1043	1045	1034	1024	1013
20.0°	943	952	968	989	1010	1033	1037	1046
25.0°	621	605	633	677	763	865	913	923
30.0°	454	467	479	491	510	537	564	613
35.0°	227	228	244	280	306	331	349	361
40.0°	27	25	27	38	52	66	101	148
45.0°	0	1	2	2	2	4	7	10
50.0°	0	0	0	0	0	0	1	2
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

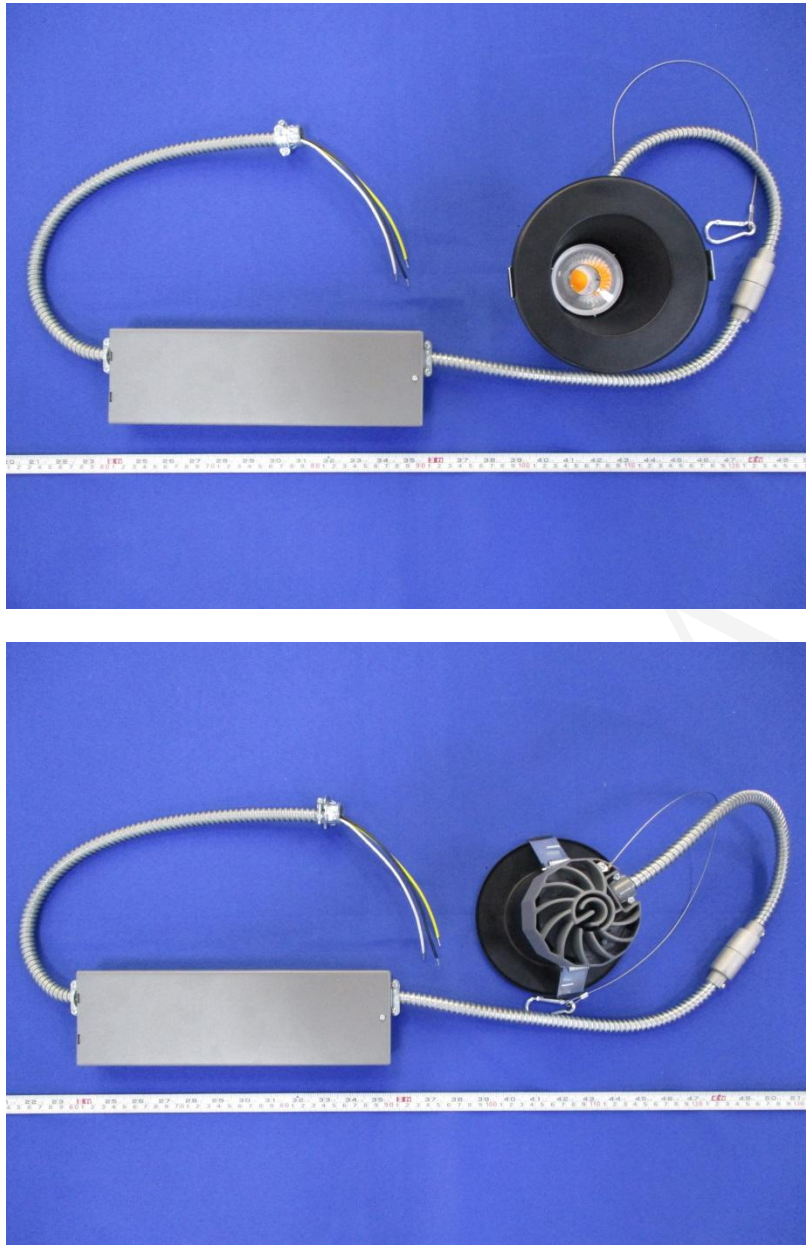
Luminous Intensity (cd) Distribution Data (cont.)

C Y	180°	202.5°	225°	247.5°	270°	292.5°	315°	337.5°
0.0°	693	693	693	693	693	693	693	693
5.0°	722	715	724	741	764	788	817	834
10.0°	901	908	907	912	922	917	916	919
15.0°	1015	1000	1004	1001	994	993	997	1000
20.0°	1043	1032	1020	1000	978	956	941	924
25.0°	916	917	902	859	834	804	713	643
30.0°	623	637	613	562	500	473	476	455
35.0°	342	345	329	282	248	226	206	193
40.0°	136	131	114	104	71	52	27	18
45.0°	12	14	10	8	6	4	2	2
50.0°	2	3	2	2	2	2	0	0
55.0°	0	0	1	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	17.7	1.95	0-5	17.7	1.95
5-10	61.1	6.75	0-10	78.8	8.70
10-15	115.0	12.70	0-15	193.8	21.39
15-20	165.4	18.26	0-20	359.2	39.65
20-25	186.6	20.60	0-25	545.7	60.25
25-30	166.4	18.37	0-30	712.1	78.62
30-35	119.2	13.16	0-35	831.3	91.78
35-40	58.8	6.49	0-40	890.1	98.27
40-45	14.1	1.56	0-45	904.2	99.83
45-50	1.3	0.14	0-50	905.5	99.97
50-55	0.2	0.02	0-55	905.7	100.00
55-60	0.0	0.00	0-60	905.7	100.00
60-65	0.0	0.00	0-65	905.7	100.00
65-70	0.0	0.00	0-70	905.7	100.00
70-75	0.0	0.00	0-75	905.7	100.00
75-80	0.0	0.00	0-80	905.7	100.00
80-85	0.0	0.00	0-85	905.7	100.00
85-90	0.0	0.00	0-90	905.7	100.00
90-95	0.0	0.00	0-95	905.7	100.00
95-100	0.0	0.00	0-100	905.7	100.00
100-105	0.0	0.00	0-105	905.7	100.00
105-110	0.0	0.00	0-110	905.7	100.00
110-115	0.0	0.00	0-115	905.7	100.00
115-120	0.0	0.00	0-120	905.7	100.00
120-125	0.0	0.00	0-125	905.7	100.00
125-130	0.0	0.00	0-130	905.7	100.00
130-135	0.0	0.00	0-135	905.7	100.00
135-140	0.0	0.00	0-140	905.7	100.00
140-145	0.0	0.00	0-145	905.7	100.00
145-150	0.0	0.00	0-150	905.7	100.00
150-155	0.0	0.00	0-155	905.7	100.00
155-160	0.0	0.00	0-160	905.7	100.00
160-165	0.0	0.00	0-165	905.7	100.00
165-170	0.0	0.00	0-170	905.7	100.00
170-175	0.0	0.00	0-175	905.7	100.00
175-180	0.0	0.00	0-180	905.7	100.00

6. Product Photo



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