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: LE259027DIM120VVN/ADR4BL

Report Type:	Electrical and Photometric tests including: Luminous Flux, Chromaticity, Luminous Intensity Distribution
Test Engineer:	George Yang
Report Number:	RKSB190329023-10-5
Test Date:	2019-04-03 to 2019-04-08
Report Date:	2019-05-06
Reviewed By:	Ray Gao/EE Engineer
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.

1. Product Description

General Information:

One sample was received on 2019-04-01 and used for testing.

Model Tested:	LE259027DIM120VVN/ADR4BL
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:	31W
Nominal CCT:	2700K
Nominal Lumen Output:	2050lm

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	2019-04-08	2020-04-08
Spectral photometer	INVENTFINE	CMS-3S	GSGSE100017	2019-01-23	2020-01-23
AC Power Supply	INVENTFINE	CHP500	JWJSD010071	2019-04-08	2020-04-08
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	2019-04-08	2020-04-08
AC Power Supply	INVENTFINE	CHP-5KVA	900511765	2019-04-08	2020-04-08
DC Power Supply	INVENTFINE	WL3010	JWDMP030001	2019-04-08	2020-04-08
Power Meter	INVENTFINE	WT500	GSDSQ200007	2019-04-08	2020-04-08
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°C±1°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_{rel}=2.61% (k=2), at the 95% confidence level. The uncertainty of the correlated color temperature measurements is U=34K (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_{rel}=0.48 % of rdg, AC Voltage U_{rel}=0.25% of rdg, Power U_{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_{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)
119.99	60	0.2634	31.2	0.9872	2070.55	66.36

Radiant Flux (W)	CCT (K)	Duv	x	y	u'	v'
7.211	2739	0.00011	0.4569	0.4102	0.2607	0.5267

Color Rendering Index

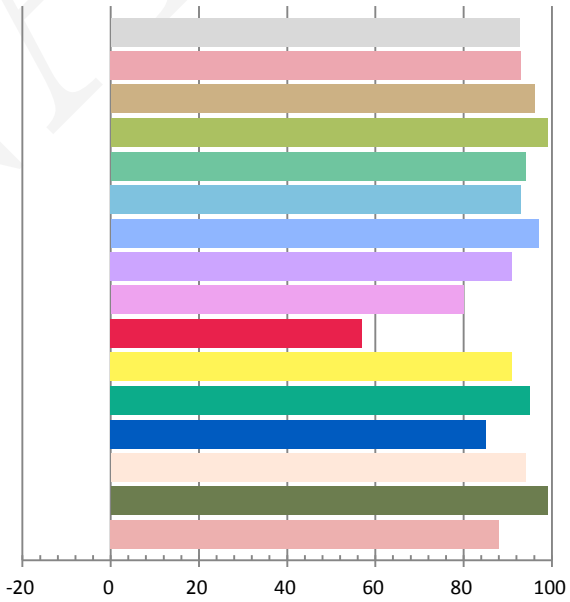
Ra
92.7

R1	R2	R3	R4
93	96	99	94

R5	R6	R7	R8
93	97	91	80

R9	R10	R11	R12
57	91	95	85

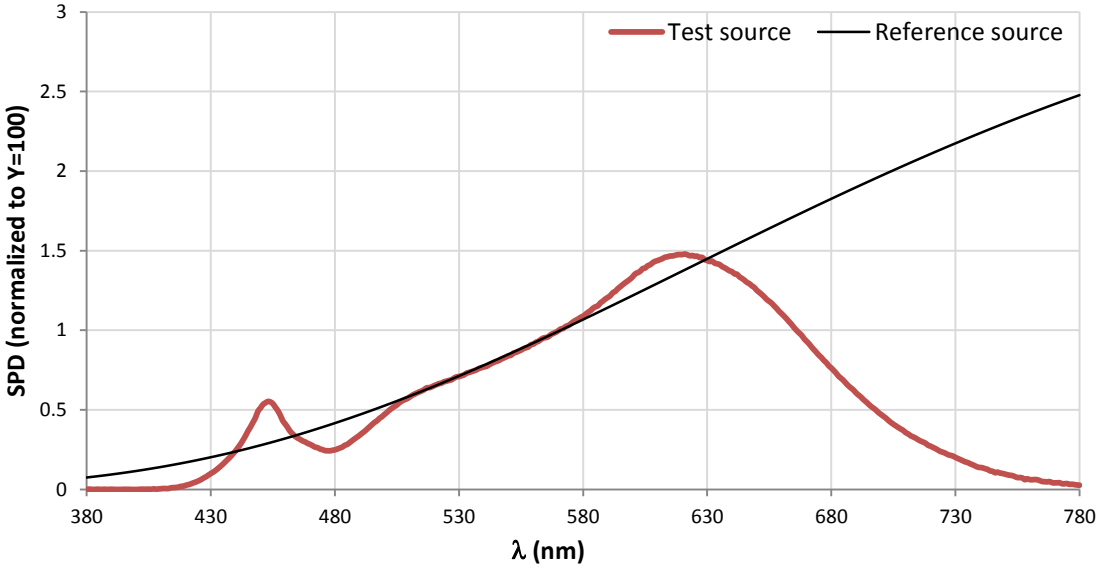
R13	R14	R15
94	99	88



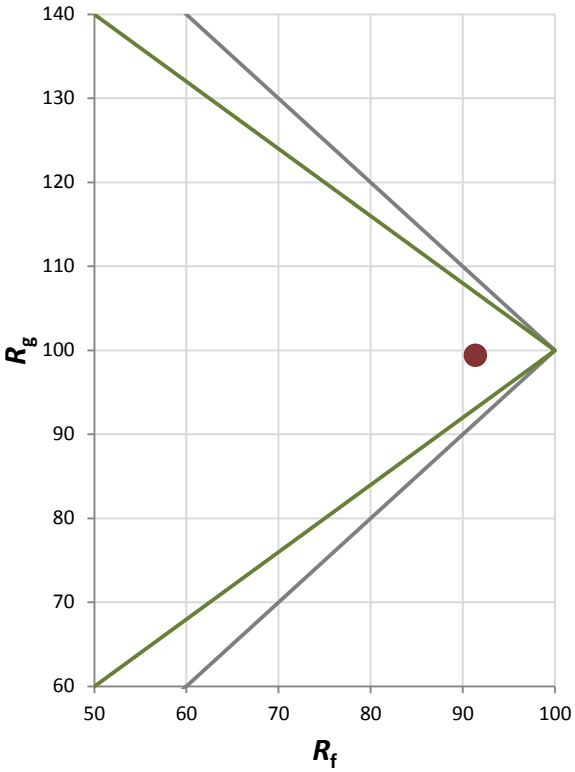
Fidelity Index and Gamut Index

Fidelity Index R_f	91
Gamut Index R_g	99

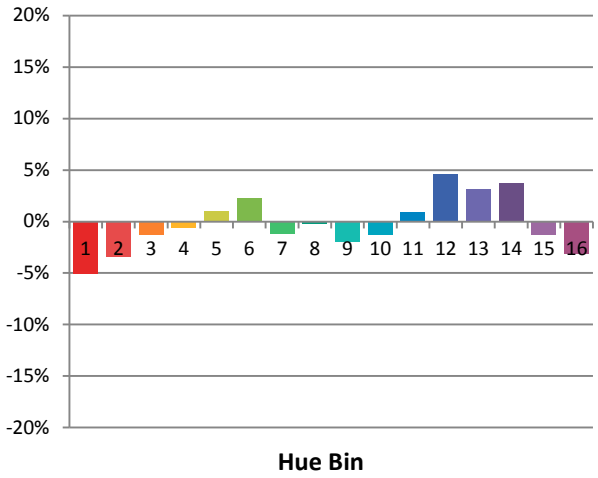
Spectral Power Distribution Comparison



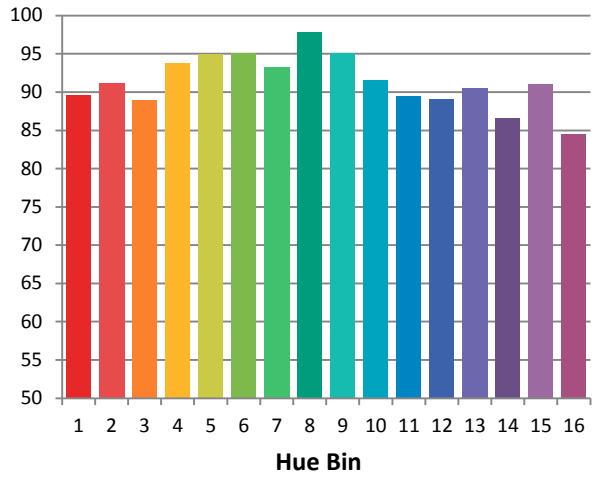
Plot of R_g versus R_f



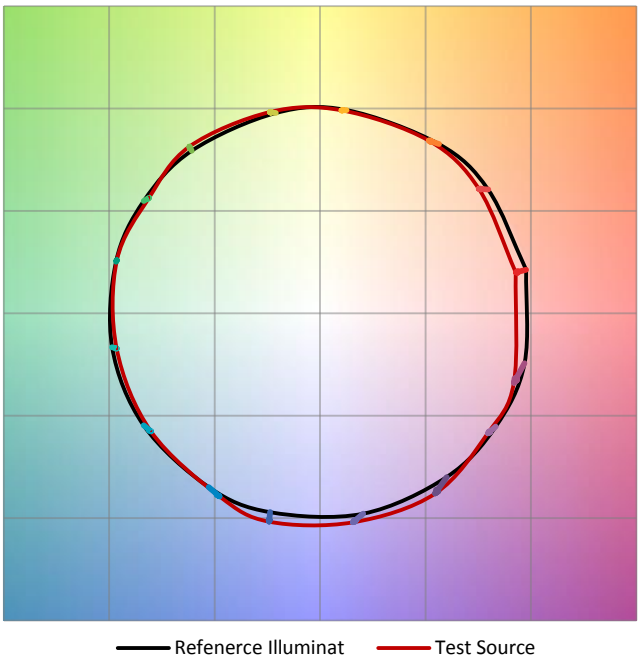
Chroma Shift by Hue



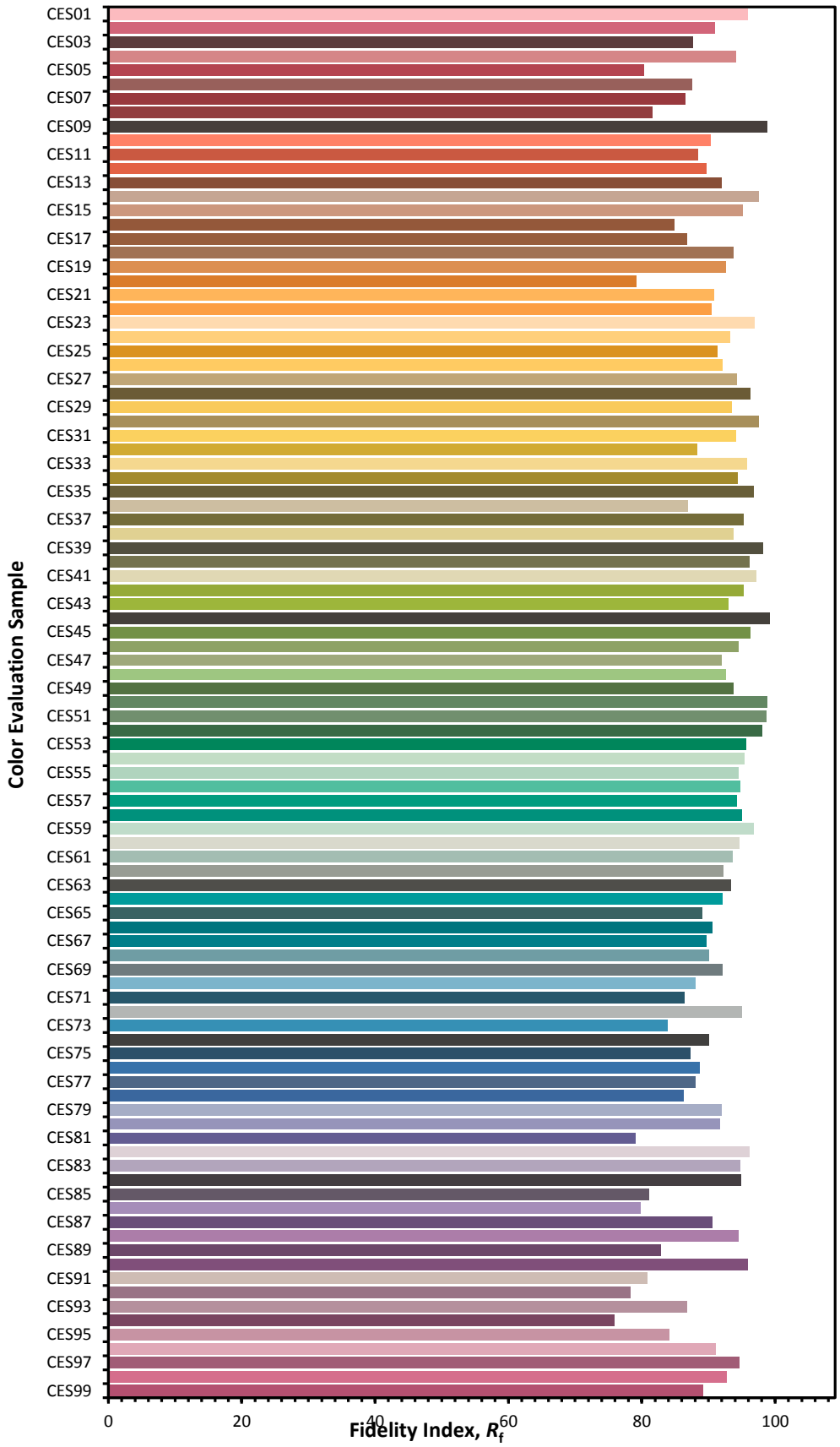
R_f by Hue



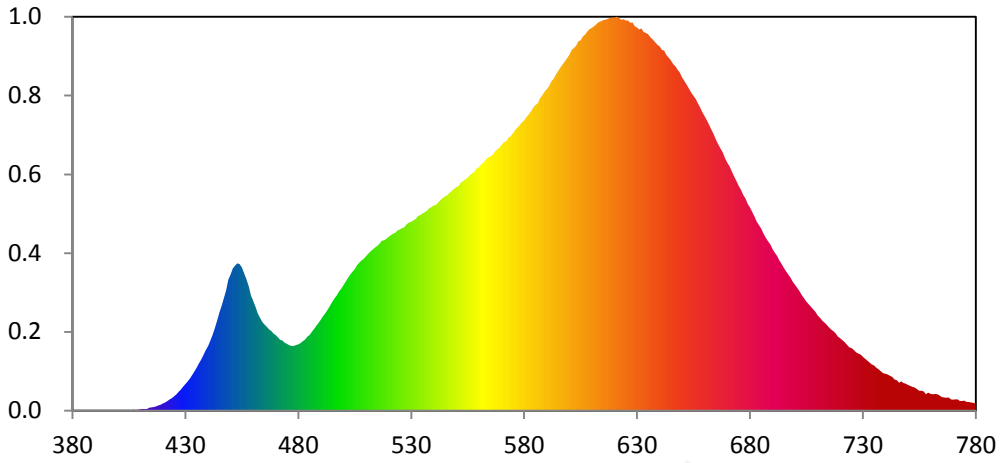
Color Vector Graphic



Color Fidelity by CES Sample



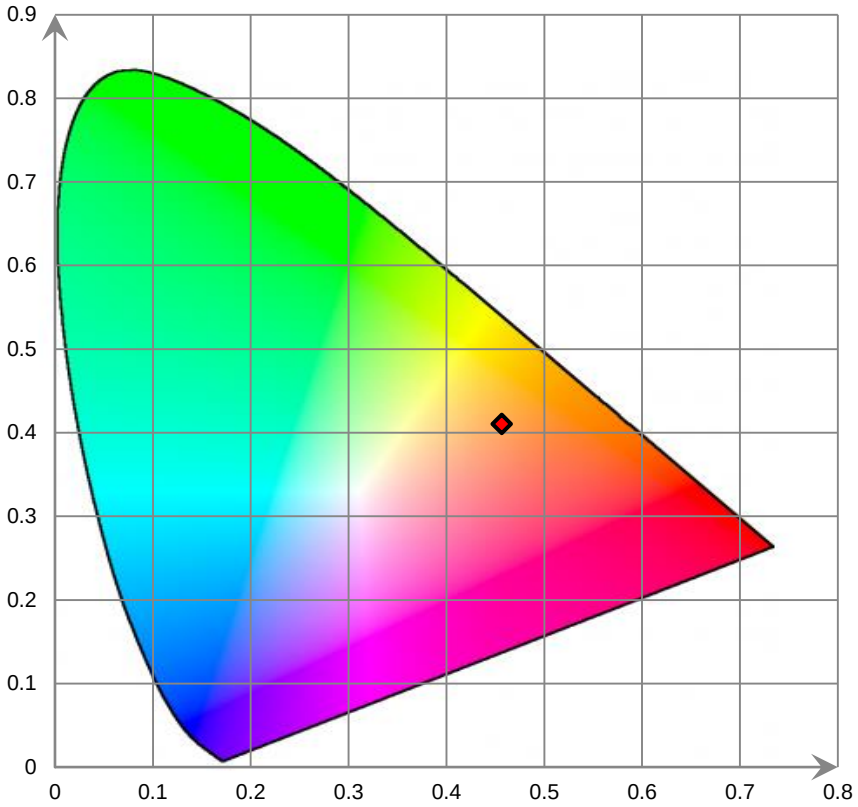
Relative Spectral Power Distribution



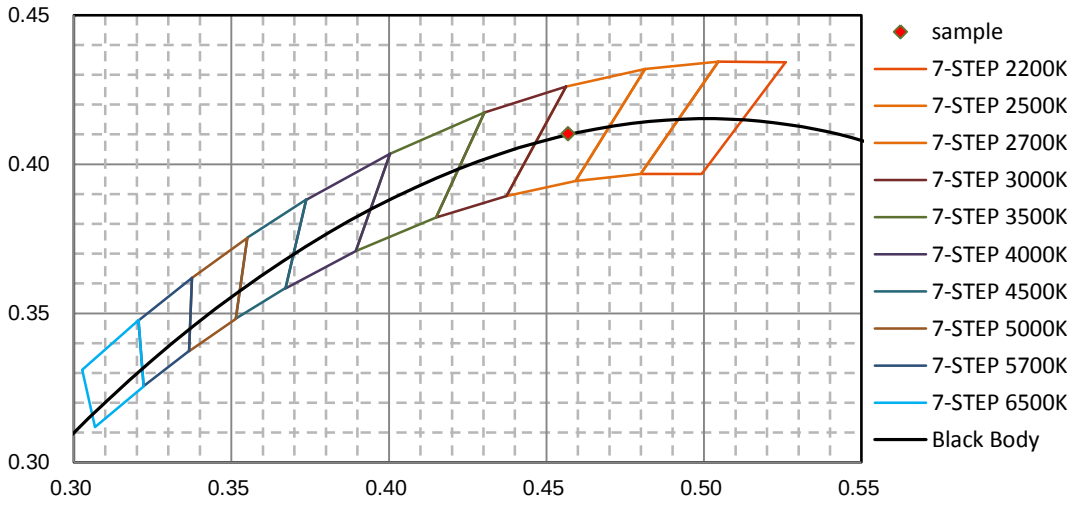
nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
380	1.740E-02	421	9.195E-01	462	1.106E+01	503	1.547E+01	544	2.420E+01
381	5.800E-02	422	1.072E+00	463	1.057E+01	504	1.581E+01	545	2.439E+01
382	1.910E-02	423	1.264E+00	464	1.011E+01	505	1.610E+01	546	2.454E+01
383	1.200E-03	424	1.424E+00	465	9.795E+00	506	1.653E+01	547	2.481E+01
384	4.040E-02	425	1.629E+00	466	9.534E+00	507	1.684E+01	548	2.503E+01
385	3.040E-02	426	1.865E+00	467	9.247E+00	508	1.708E+01	549	2.525E+01
386	2.500E-03	427	2.153E+00	468	9.055E+00	509	1.727E+01	550	2.547E+01
387	4.410E-02	428	2.409E+00	469	8.789E+00	510	1.756E+01	551	2.557E+01
388	1.190E-02	429	2.714E+00	470	8.589E+00	511	1.789E+01	552	2.598E+01
389	1.840E-02	430	3.025E+00	471	8.343E+00	512	1.814E+01	553	2.611E+01
390	3.870E-02	431	3.316E+00	472	8.069E+00	513	1.837E+01	554	2.634E+01
391	1.390E-02	432	3.645E+00	473	7.963E+00	514	1.859E+01	555	2.654E+01
392	6.000E-04	433	4.041E+00	474	7.711E+00	515	1.877E+01	556	2.683E+01
393	3.400E-03	434	4.439E+00	475	7.584E+00	516	1.903E+01	557	2.700E+01
394	1.080E-02	435	4.880E+00	476	7.412E+00	517	1.936E+01	558	2.716E+01
395	2.830E-02	436	5.345E+00	477	7.372E+00	518	1.938E+01	559	2.758E+01
396	2.730E-02	437	5.808E+00	478	7.364E+00	519	1.955E+01	560	2.769E+01
397	1.730E-02	438	6.285E+00	479	7.457E+00	520	1.978E+01	561	2.804E+01
398	3.900E-03	439	6.829E+00	480	7.542E+00	521	1.996E+01	562	2.822E+01
399	4.000E-04	440	7.351E+00	481	7.700E+00	522	2.016E+01	563	2.857E+01
400	0.000E+00	441	7.994E+00	482	7.890E+00	523	2.026E+01	564	2.884E+01
401	2.110E-02	442	8.646E+00	483	8.074E+00	524	2.052E+01	565	2.894E+01
402	5.560E-02	443	9.401E+00	484	8.407E+00	525	2.063E+01	566	2.910E+01
403	3.870E-02	444	1.023E+01	485	8.583E+00	526	2.077E+01	567	2.949E+01
404	4.110E-02	445	1.113E+01	486	8.948E+00	527	2.089E+01	568	2.973E+01
405	5.690E-02	446	1.191E+01	487	9.303E+00	528	2.121E+01	569	2.993E+01
406	3.460E-02	447	1.279E+01	488	9.657E+00	529	2.144E+01	570	3.023E+01
407	1.121E-01	448	1.366E+01	489	9.996E+00	530	2.151E+01	571	3.057E+01
408	4.640E-02	449	1.490E+01	490	1.034E+01	531	2.166E+01	572	3.066E+01
409	1.027E-01	450	1.550E+01	491	1.074E+01	532	2.182E+01	573	3.105E+01
410	1.407E-01	451	1.617E+01	492	1.108E+01	533	2.214E+01	574	3.121E+01
411	1.824E-01	452	1.649E+01	493	1.151E+01	534	2.228E+01	575	3.155E+01
412	1.659E-01	453	1.676E+01	494	1.195E+01	535	2.244E+01	576	3.192E+01
413	1.813E-01	454	1.667E+01	495	1.237E+01	536	2.259E+01	577	3.221E+01
414	3.097E-01	455	1.634E+01	496	1.278E+01	537	2.277E+01	578	3.247E+01
415	3.485E-01	456	1.568E+01	497	1.310E+01	538	2.303E+01	579	3.279E+01
416	3.826E-01	457	1.501E+01	498	1.355E+01	539	2.319E+01	580	3.300E+01
417	4.571E-01	458	1.414E+01	499	1.388E+01	540	2.334E+01	581	3.337E+01
418	5.874E-01	459	1.309E+01	500	1.430E+01	541	2.344E+01	582	3.375E+01
419	6.459E-01	460	1.246E+01	501	1.469E+01	542	2.370E+01	583	3.406E+01
420	8.076E-01	461	1.179E+01	502	1.511E+01	543	2.397E+01	584	3.452E+01

nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
585	3.480E+01	626	4.444E+01	667	2.984E+01	708	1.151E+01	749	3.051E+00
586	3.499E+01	627	4.417E+01	668	2.939E+01	709	1.123E+01	750	2.922E+00
587	3.554E+01	628	4.420E+01	669	2.874E+01	710	1.083E+01	751	2.796E+00
588	3.588E+01	629	4.378E+01	670	2.825E+01	711	1.058E+01	752	2.701E+00
589	3.629E+01	630	4.362E+01	671	2.776E+01	712	1.023E+01	753	2.632E+00
590	3.658E+01	631	4.342E+01	672	2.717E+01	713	1.001E+01	754	2.450E+00
591	3.693E+01	632	4.350E+01	673	2.663E+01	714	9.778E+00	755	2.266E+00
592	3.747E+01	633	4.311E+01	674	2.612E+01	715	9.473E+00	756	2.265E+00
593	3.775E+01	634	4.298E+01	675	2.557E+01	716	9.228E+00	757	2.188E+00
594	3.824E+01	635	4.284E+01	676	2.514E+01	717	9.019E+00	758	1.870E+00
595	3.862E+01	636	4.247E+01	677	2.457E+01	718	8.792E+00	759	2.025E+00
596	3.902E+01	637	4.223E+01	678	2.415E+01	719	8.420E+00	760	1.873E+00
597	3.938E+01	638	4.195E+01	679	2.355E+01	720	8.242E+00	761	1.852E+00
598	3.973E+01	639	4.164E+01	680	2.313E+01	721	8.001E+00	762	1.888E+00
599	4.008E+01	640	4.148E+01	681	2.264E+01	722	7.780E+00	763	1.845E+00
600	4.053E+01	641	4.107E+01	682	2.213E+01	723	7.504E+00	764	1.689E+00
601	4.106E+01	642	4.099E+01	683	2.155E+01	724	7.231E+00	765	1.511E+00
602	4.129E+01	643	4.050E+01	684	2.115E+01	725	7.087E+00	766	1.482E+00
603	4.156E+01	644	4.020E+01	685	2.072E+01	726	6.883E+00	767	1.443E+00
604	4.205E+01	645	3.986E+01	686	2.019E+01	727	6.639E+00	768	1.496E+00
605	4.218E+01	646	3.946E+01	687	1.970E+01	728	6.489E+00	769	1.289E+00
606	4.260E+01	647	3.919E+01	688	1.931E+01	729	6.371E+00	770	1.253E+00
607	4.280E+01	648	3.879E+01	689	1.891E+01	730	6.115E+00	771	1.269E+00
608	4.317E+01	649	3.846E+01	690	1.838E+01	731	5.891E+00	772	1.273E+00
609	4.344E+01	650	3.793E+01	691	1.797E+01	732	5.687E+00	773	1.092E+00
610	4.359E+01	651	3.754E+01	692	1.758E+01	733	5.466E+00	774	1.085E+00
611	4.378E+01	652	3.713E+01	693	1.709E+01	734	5.252E+00	775	1.120E+00
612	4.398E+01	653	3.668E+01	694	1.670E+01	735	5.118E+00	776	9.811E-01
613	4.423E+01	654	3.619E+01	695	1.625E+01	736	4.881E+00	777	9.973E-01
614	4.432E+01	655	3.583E+01	696	1.584E+01	737	4.697E+00	778	9.187E-01
615	4.446E+01	656	3.545E+01	697	1.548E+01	738	4.467E+00	779	8.564E-01
616	4.448E+01	657	3.495E+01	698	1.511E+01	739	4.263E+00	780	8.086E-01
617	4.459E+01	658	3.447E+01	699	1.465E+01	740	4.186E+00		
618	4.472E+01	659	3.392E+01	700	1.430E+01	741	4.121E+00		
619	4.474E+01	660	3.348E+01	701	1.394E+01	742	3.950E+00		
620	4.474E+01	661	3.300E+01	702	1.359E+01	743	3.817E+00		
621	4.485E+01	662	3.250E+01	703	1.315E+01	744	3.529E+00		
622	4.470E+01	663	3.195E+01	704	1.277E+01	745	3.464E+00		
623	4.451E+01	664	3.143E+01	705	1.243E+01	746	3.185E+00		
624	4.456E+01	665	3.083E+01	706	1.212E+01	747	3.296E+00		
625	4.442E+01	666	3.031E+01	707	1.181E+01	748	3.120E+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**

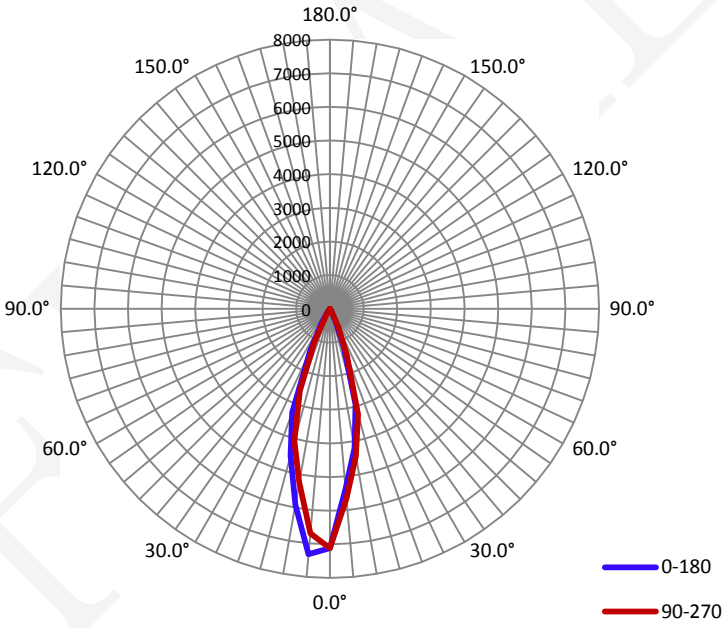
Electrical Measurement

Input Voltage (V)	Frequency (Hz)	Input Current (A)	Power (W)	Power Factor
120.0	60	0.2700	31.21	0.9630

Photometric Measurement

Luminous Flux (lm)	Efficacy (lm/W)	I_{max} (cd)	S/MH (C0/180)	S/MH (C90/270)
2072.3	66.45	7590.8	0.51	0.50

Luminous Intensity Distribution



	C0/180	C45/225	C90/270	C135/315	AVG.
Beam Angle (50% I_{max}):	30.6	29.3	30.5	30.5	30.5
Field Angle (10% I_{max}):	51.4	51.2	51.5	51.6	51.4

Luminous Intensity (cd) Distribution Data

C / γ	0°	22.5°	45°	67.5°	90°	112.5°	135°	157.5°
0.0°	7113	7113	7113	7113	7113	7113	7113	7113
5.0°	5363	5242	5245	5379	5655	6027	6527	7047
10.0°	4197	4074	4100	4213	4449	4719	5089	5608
15.0°	2948	2776	2877	3027	3252	3559	3916	4322
20.0°	1187	1121	1148	1258	1466	1955	2509	3053
25.0°	363	313	330	423	618	830	1038	1271
30.0°	77	79	70	79	90	114	206	399
35.0°	36	37	39	35	46	58	71	81
40.0°	31	20	28	26	33	34	41	51
45.0°	0	0	0	0	0	13	17	30
50.0°	0	0	0	0	0	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

Luminous Intensity (cd) Distribution Data (cont.)

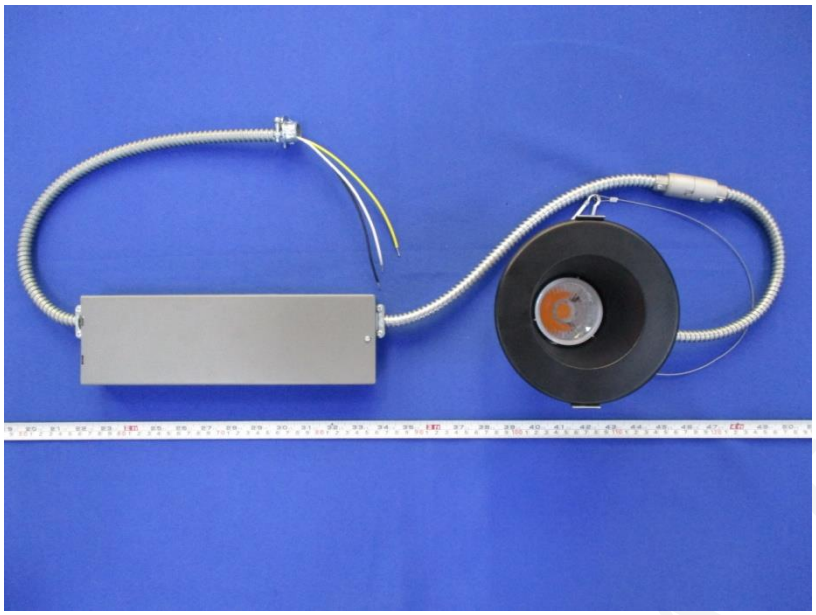
C / γ	180°	202.5°	225°	247.5°	270°	292.5°	315°	337.5°
0.0°	7113	7113	7113	7113	7113	7113	7113	7113
5.0°	7320	7591	7570	7189	6698	6206	5761	5466
10.0°	5913	6024	5902	5572	5231	4835	4519	4278
15.0°	4519	4604	4521	4320	4062	3737	3381	3079
20.0°	3278	3373	3302	3100	2601	2037	1575	1285
25.0°	1388	1505	1495	1301	1075	858	646	434
30.0°	487	565	522	370	204	115	90	83
35.0°	74	74	79	79	68	60	43	37
40.0°	48	53	46	41	40	33	24	26
45.0°	33	35	28	30	22	18	0	0
50.0°	0	0	0	0	0	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

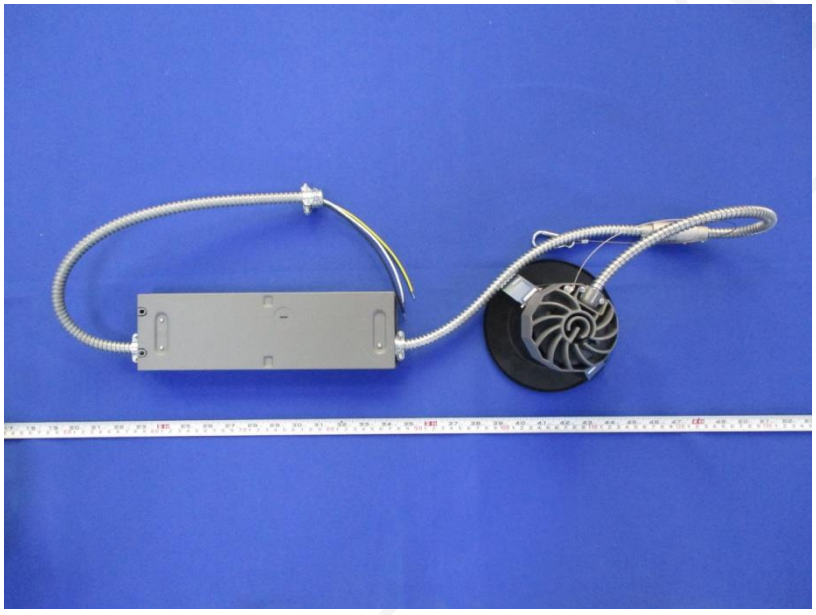
Zonal Lumen Density Measurement

Deg	Flux (lm)	%
0-5	160.0	7.72
5-10	400.2	19.31
10-15	510.2	24.62
15-20	479.8	23.15
20-25	315.5	15.23
25-30	137.9	6.66
30-35	41.1	1.98
35-40	15.5	0.75
40-45	9.2	0.44
45-50	2.8	0.14
50-55	0.0	0.00
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	160.0	7.72
0-10	560.2	27.03
0-15	1070.4	51.65
0-20	1550.2	74.81
0-25	1865.7	90.03
0-30	2003.6	96.69
0-35	2044.7	98.67
0-40	2060.2	99.42
0-45	2069.4	99.86
0-50	2072.3	100.00
0-55	2072.3	100.00
0-60	2072.3	100.00
0-65	2072.3	100.00
0-70	2072.3	100.00
0-75	2072.3	100.00
0-80	2072.3	100.00
0-85	2072.3	100.00
0-90	2072.3	100.00
0-95	2072.3	100.00
0-100	2072.3	100.00
0-105	2072.3	100.00
0-110	2072.3	100.00
0-115	2072.3	100.00
0-120	2072.3	100.00
0-125	2072.3	100.00
0-130	2072.3	100.00
0-135	2072.3	100.00
0-140	2072.3	100.00
0-145	2072.3	100.00
0-150	2072.3	100.00
0-155	2072.3	100.00
0-160	2072.3	100.00
0-165	2072.3	100.00
0-170	2072.3	100.00
0-175	2072.3	100.00
0-180	2072.3	100.00

6. Product Photo





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