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: LE059027DIM120VMD/ADR4BL

Report Type:	Electrical and Photometric tests including: Luminous Flux, Chromaticity, Luminous Intensity Distribution
Test Engineer:	George Yang
Report Number:	RKSB190722001-10-2
Test Date:	2019-07-22
Report Date:	2019-07-29
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 2018-07-22 and used for testing.

Model Tested:	LE059027DIM120VMD/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:	5.5W
Nominal CCT:	2700K
Nominal Lumen Output:	410lm

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-30-18: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	2020-01-22
Power Meter	INVENTFINE	WT500	GSJWQ20009	2019-04-23	2020-04-22
Spectral photometer	INVENTFINE	CMS-3S	GSGSE100017	2019-01-23	2020-01-22
AC Power Supply	INVENTFINE	CHP500	JWJSD010071	2019-04-23	2020-04-22
Standard Light Source	INVENTFINE	N/A	JWWCR020106	2018-12-24	2019-12-23
Thermal Meter	KEJIAN	TA298	N/A	2018-12-01	2019-11-30
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	2020-01-23
Wireless Weather Station	ZHONGXING	KG218	N/A	2018-12-01	2019-11-30
Standard Light Source	INVENTFINE	N/A	JWBYR040008	2019-03-08	2020-03-07

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 Urel=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)
120.03	60	0.05	5.76	0.9598	455.81	79.13

Radiant Flux (W)	CCT (K)	Duv	x	y	u'	v'
1.586	2709	0.00092	0.4608	0.4133	0.2619	0.5285

Color Rendering Index

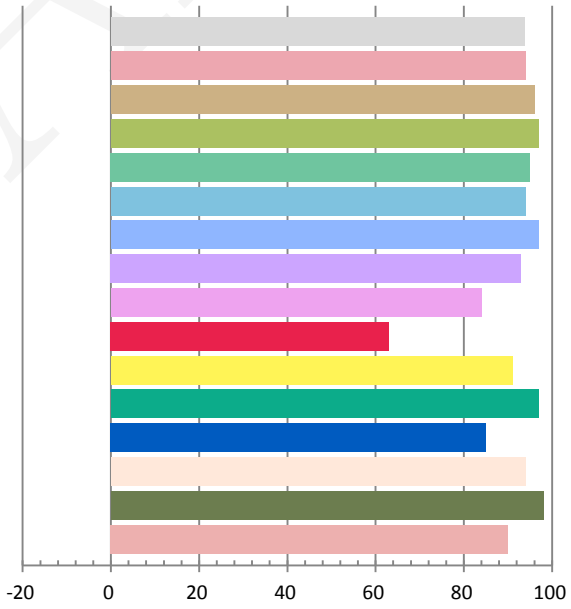
Ra
93.7

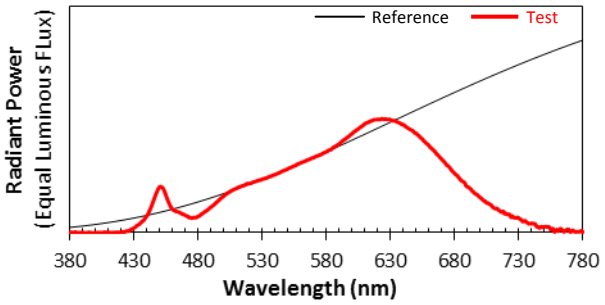
R1	R2	R3	R4
94	96	97	95

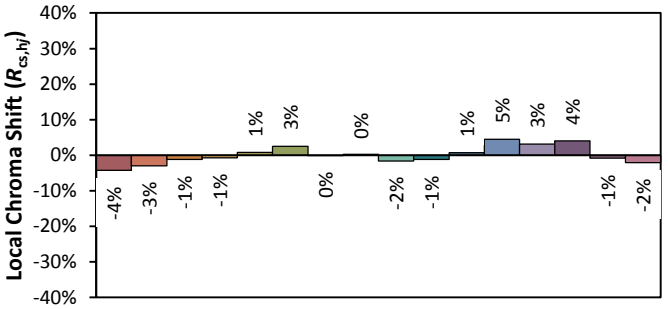
R5	R6	R7	R8
94	97	93	84

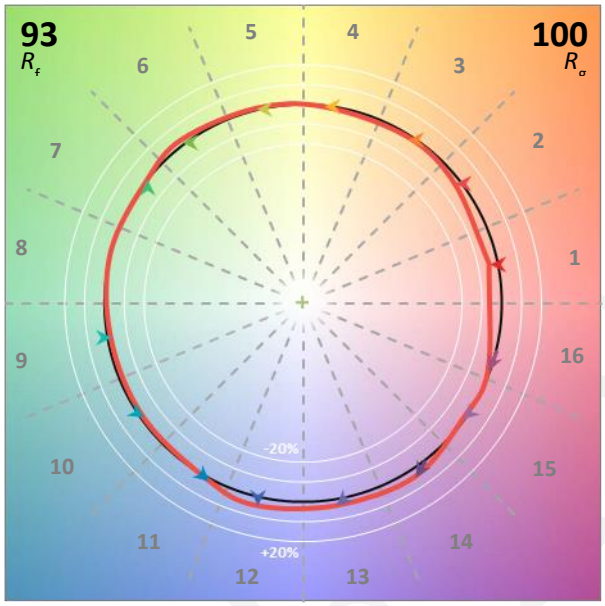
R9	R10	R11	R12
63	91	97	85

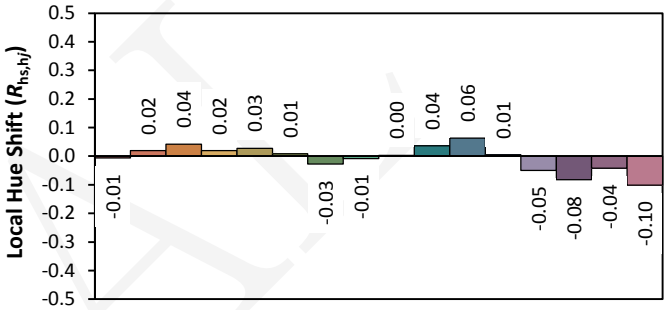
R13	R14	R15
94	98	90

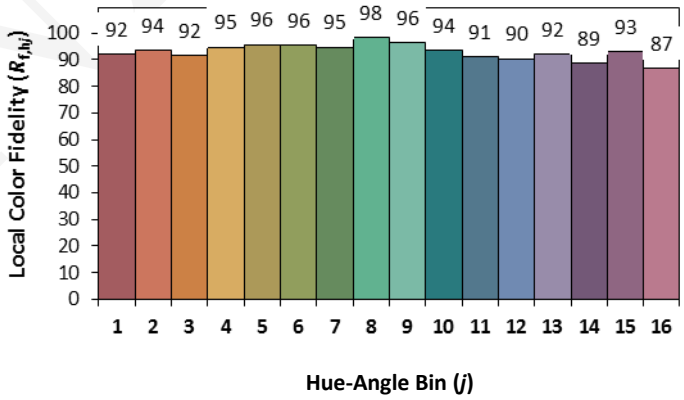


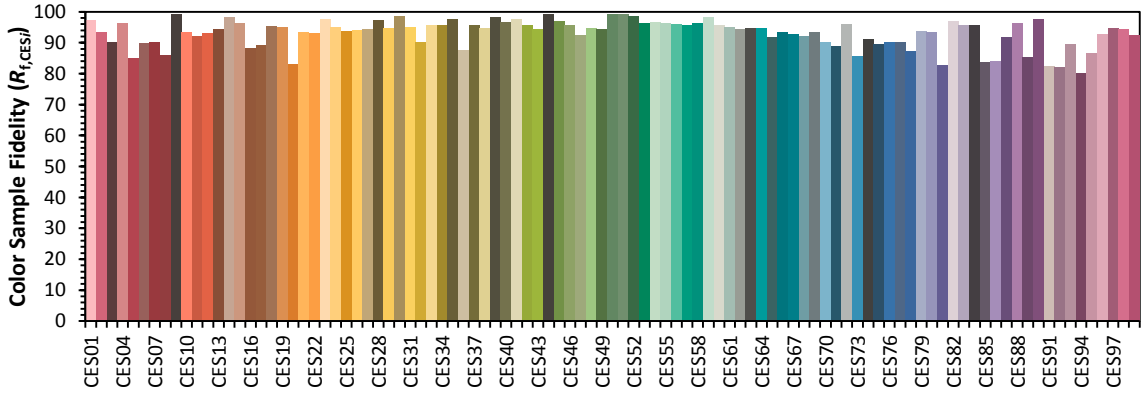

Reference
Test
Radiant Power
(Equal Luminous Flux)
380 430 480 530 580 630 680 730 780
Wavelength (nm)


Local Chroma Shift ($R_{cs,hj}$)
40% 30% 20% 10% 0% -10% -20% -30% -40%
-4% -3% -1% -1% 1% 3% 0% 0% -2% -1% 1% 5% 3% 4% -1% -2%

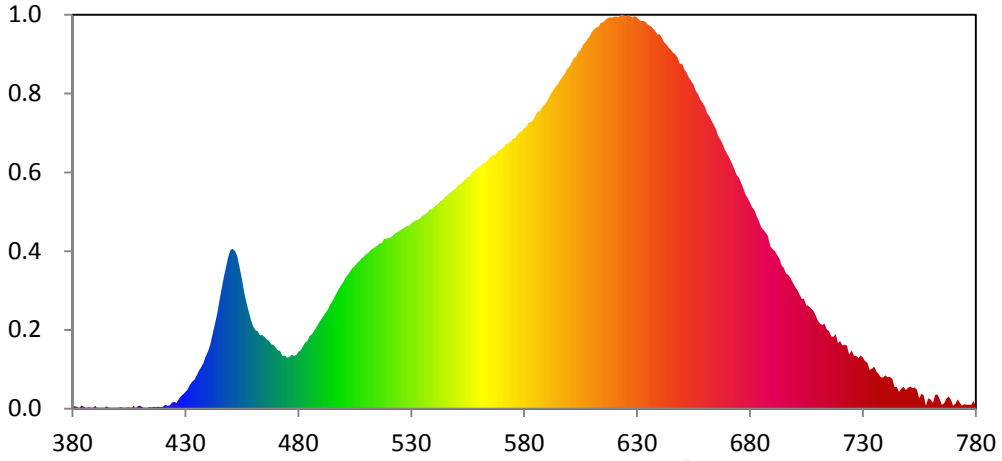

93
R_f
100
R_g
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
-20%
+20%


Local Hue Shift ($R_{hs,hj}$)
0.5 0.4 0.3 0.2 0.1 0.0 -0.1 -0.2 -0.3 -0.4 -0.5
-0.01 0.02 0.04 0.02 0.03 0.01 -0.03 -0.01 0.00 0.04 0.06 0.01 -0.05 -0.08 -0.04 -0.10


Local Color Fidelity ($R_{f,hj}$)
100 90 80 70 60 50 40 30 20 10 0
92 94 92 95 96 96 95 98 96 94 91 90 92 89 93 87
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
Hue-Angle Bin (j)


Color Sample Fidelity ($R_{f,CESi}$)
100 90 80 70 60 50 40 30 20 10 0
CES01 CES04 CES07 CES10 CES13 CES16 CES19 CES22 CES25 CES28 CES31 CES34 CES37 CES40 CES43 CES46 CES49 CES52 CES55 CES58 CES61 CES64 CES67 CES70 CES73 CES76 CES79 CES82 CES85 CES88 CES91 CES94 CES97

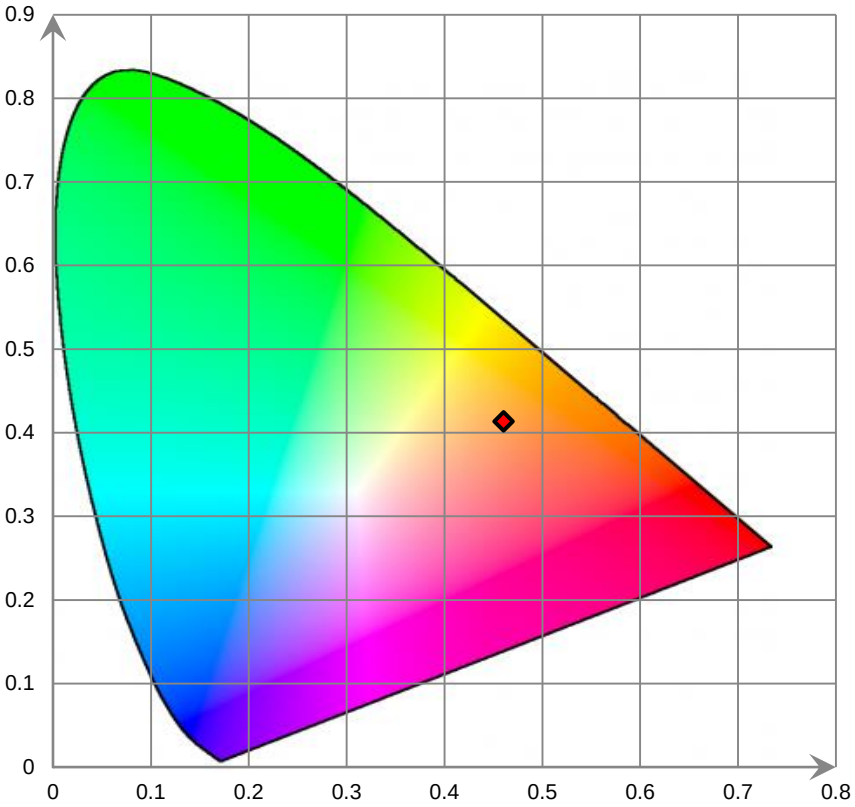
Relative Spectral Power Distribution



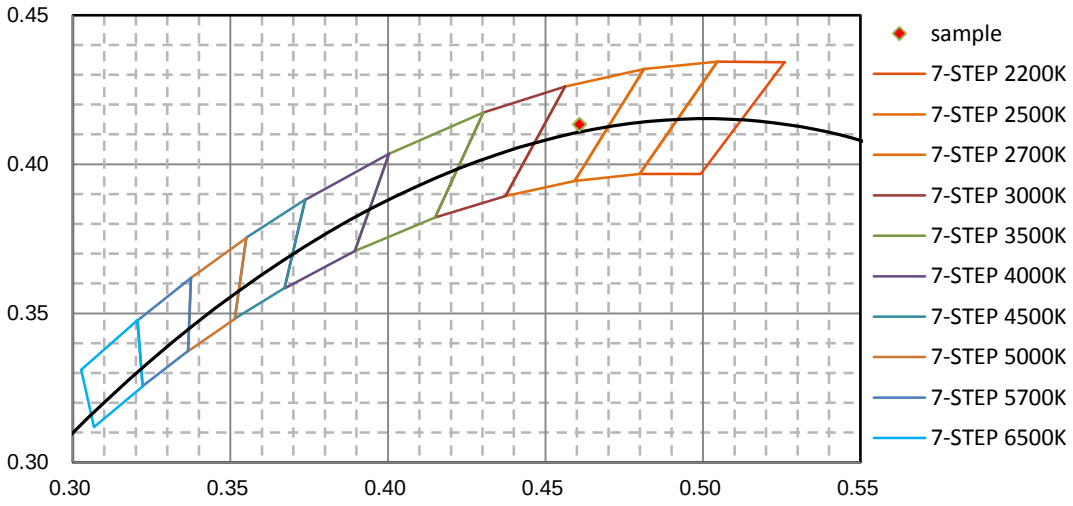
nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
380	5.320E-02	421	1.001E-01	462	1.971E+00	503	3.505E+00	544	5.328E+00
381	5.410E-02	422	7.470E-02	463	1.873E+00	504	3.587E+00	545	5.405E+00
382	5.040E-02	423	8.320E-02	464	1.877E+00	505	3.640E+00	546	5.457E+00
383	1.330E-02	424	1.530E-01	465	1.835E+00	506	3.723E+00	547	5.498E+00
384	7.780E-02	425	1.722E-01	466	1.762E+00	507	3.760E+00	548	5.553E+00
385	4.530E-02	426	1.461E-01	467	1.729E+00	508	3.838E+00	549	5.588E+00
386	3.400E-03	427	2.327E-01	468	1.644E+00	509	3.873E+00	550	5.646E+00
387	3.210E-02	428	3.172E-01	469	1.625E+00	510	3.941E+00	551	5.719E+00
388	2.220E-02	429	3.640E-01	470	1.558E+00	511	3.978E+00	552	5.742E+00
389	4.100E-03	430	4.280E-01	471	1.487E+00	512	4.054E+00	553	5.803E+00
390	7.310E-02	431	4.900E-01	472	1.471E+00	513	4.084E+00	554	5.864E+00
391	8.100E-03	432	6.063E-01	473	1.341E+00	514	4.131E+00	555	5.909E+00
392	3.000E-03	433	6.822E-01	474	1.353E+00	515	4.167E+00	556	5.933E+00
393	2.200E-03	434	7.355E-01	475	1.299E+00	516	4.215E+00	557	6.041E+00
394	5.900E-03	435	8.428E-01	476	1.313E+00	517	4.230E+00	558	6.079E+00
395	5.230E-02	436	9.624E-01	477	1.370E+00	518	4.338E+00	559	6.127E+00
396	2.360E-02	437	1.051E+00	478	1.347E+00	519	4.340E+00	560	6.174E+00
397	6.600E-03	438	1.157E+00	479	1.369E+00	520	4.355E+00	561	6.217E+00
398	3.000E-04	439	1.322E+00	480	1.454E+00	521	4.371E+00	562	6.267E+00
399	9.000E-04	440	1.467E+00	481	1.491E+00	522	4.424E+00	563	6.299E+00
400	1.000E-04	441	1.643E+00	482	1.584E+00	523	4.476E+00	564	6.358E+00
401	3.570E-02	442	1.908E+00	483	1.681E+00	524	4.509E+00	565	6.422E+00
402	2.220E-02	443	2.154E+00	484	1.721E+00	525	4.548E+00	566	6.463E+00
403	1.400E-02	444	2.414E+00	485	1.855E+00	526	4.588E+00	567	6.482E+00
404	1.970E-02	445	2.748E+00	486	1.894E+00	527	4.618E+00	568	6.554E+00
405	2.990E-02	446	3.055E+00	487	1.986E+00	528	4.662E+00	569	6.609E+00
406	7.600E-03	447	3.363E+00	488	2.077E+00	529	4.667E+00	570	6.629E+00
407	7.000E-02	448	3.622E+00	489	2.174E+00	530	4.734E+00	571	6.684E+00
408	3.600E-03	449	3.880E+00	490	2.266E+00	531	4.773E+00	572	6.765E+00
409	6.280E-02	450	4.051E+00	491	2.347E+00	532	4.804E+00	573	6.780E+00
410	6.980E-02	451	4.082E+00	492	2.446E+00	533	4.825E+00	574	6.817E+00
411	3.310E-02	452	4.024E+00	493	2.525E+00	534	4.868E+00	575	6.898E+00
412	1.640E-02	453	3.888E+00	494	2.651E+00	535	4.925E+00	576	6.901E+00
413	8.300E-03	454	3.615E+00	495	2.739E+00	536	4.966E+00	577	6.998E+00
414	3.850E-02	455	3.331E+00	496	2.851E+00	537	4.993E+00	578	7.057E+00
415	2.480E-02	456	2.997E+00	497	2.957E+00	538	5.080E+00	579	7.087E+00
416	4.750E-02	457	2.732E+00	498	3.069E+00	539	5.093E+00	580	7.165E+00
417	3.080E-02	458	2.472E+00	499	3.155E+00	540	5.142E+00	581	7.204E+00
418	5.140E-02	459	2.252E+00	500	3.246E+00	541	5.191E+00	582	7.305E+00
419	3.570E-02	460	2.096E+00	501	3.350E+00	542	5.234E+00	583	7.315E+00
420	4.370E-02	461	2.005E+00	502	3.422E+00	543	5.294E+00	584	7.372E+00

nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
585	7.494E+00	626	1.006E+01	667	6.875E+00	708	2.497E+00	749	4.739E-01
586	7.588E+00	627	1.002E+01	668	6.750E+00	709	2.395E+00	750	5.275E-01
587	7.605E+00	628	9.991E+00	669	6.605E+00	710	2.250E+00	751	5.601E-01
588	7.710E+00	629	1.003E+01	670	6.507E+00	711	2.176E+00	752	5.233E-01
589	7.758E+00	630	9.987E+00	671	6.388E+00	712	2.137E+00	753	5.423E-01
590	7.838E+00	631	9.930E+00	672	6.261E+00	713	2.170E+00	754	4.833E-01
591	7.944E+00	632	9.900E+00	673	6.126E+00	714	2.025E+00	755	2.633E-01
592	8.053E+00	633	9.903E+00	674	5.972E+00	715	1.974E+00	756	3.798E-01
593	8.142E+00	634	9.866E+00	675	5.912E+00	716	1.849E+00	757	3.362E-01
594	8.226E+00	635	9.800E+00	676	5.783E+00	717	1.832E+00	758	6.900E-02
595	8.294E+00	636	9.766E+00	677	5.636E+00	718	1.904E+00	759	2.588E-01
596	8.388E+00	637	9.710E+00	678	5.481E+00	719	1.672E+00	760	2.281E-01
597	8.475E+00	638	9.649E+00	679	5.377E+00	720	1.725E+00	761	1.497E-01
598	8.546E+00	639	9.558E+00	680	5.264E+00	721	1.613E+00	762	3.496E-01
599	8.674E+00	640	9.566E+00	681	5.142E+00	722	1.633E+00	763	3.561E-01
600	8.735E+00	641	9.464E+00	682	5.071E+00	723	1.613E+00	764	2.430E-01
601	8.856E+00	642	9.365E+00	683	4.922E+00	724	1.382E+00	765	8.610E-02
602	8.953E+00	643	9.306E+00	684	4.786E+00	725	1.486E+00	766	1.378E-01
603	8.997E+00	644	9.220E+00	685	4.637E+00	726	1.346E+00	767	2.530E-01
604	9.115E+00	645	9.165E+00	686	4.572E+00	727	1.351E+00	768	3.088E-01
605	9.165E+00	646	9.093E+00	687	4.498E+00	728	1.294E+00	769	2.296E-01
606	9.290E+00	647	9.049E+00	688	4.411E+00	729	1.359E+00	770	7.170E-02
607	9.341E+00	648	8.959E+00	689	4.145E+00	730	1.310E+00	771	1.204E-01
608	9.441E+00	649	8.802E+00	690	4.070E+00	731	1.212E+00	772	2.345E-01
609	9.511E+00	650	8.816E+00	691	4.020E+00	732	1.168E+00	773	1.429E-01
610	9.624E+00	651	8.669E+00	692	3.925E+00	733	9.896E-01	774	7.170E-02
611	9.691E+00	652	8.584E+00	693	3.832E+00	734	1.016E+00	775	1.163E-01
612	9.737E+00	653	8.466E+00	694	3.659E+00	735	1.071E+00	776	9.960E-02
613	9.756E+00	654	8.363E+00	695	3.588E+00	736	9.535E-01	777	1.007E-01
614	9.857E+00	655	8.276E+00	696	3.448E+00	737	8.816E-01	778	9.550E-02
615	9.868E+00	656	8.108E+00	697	3.417E+00	738	7.969E-01	779	1.994E-01
616	9.924E+00	657	8.038E+00	698	3.326E+00	739	7.916E-01	780	6.630E-02
617	9.972E+00	658	7.893E+00	699	3.218E+00	740	8.470E-01		
618	1.000E+01	659	7.817E+00	700	3.118E+00	741	8.001E-01		
619	9.995E+00	660	7.714E+00	701	3.029E+00	742	8.125E-01		
620	1.001E+01	661	7.553E+00	702	2.916E+00	743	7.627E-01		
621	1.001E+01	662	7.469E+00	703	2.803E+00	744	5.455E-01		
622	1.000E+01	663	7.360E+00	704	2.803E+00	745	5.521E-01		
623	1.006E+01	664	7.249E+00	705	2.640E+00	746	4.235E-01		
624	1.006E+01	665	7.136E+00	706	2.627E+00	747	5.026E-01		
625	1.001E+01	666	6.960E+00	707	2.560E+00	748	5.559E-01		

CIE 1931xy Chromaticity Diagram



7-StepChromaticity Quadrangles



[Goniophotometer System]

Total operating time for luminous intensity distribution: **2.0hour**

Test orientation: **Downward**

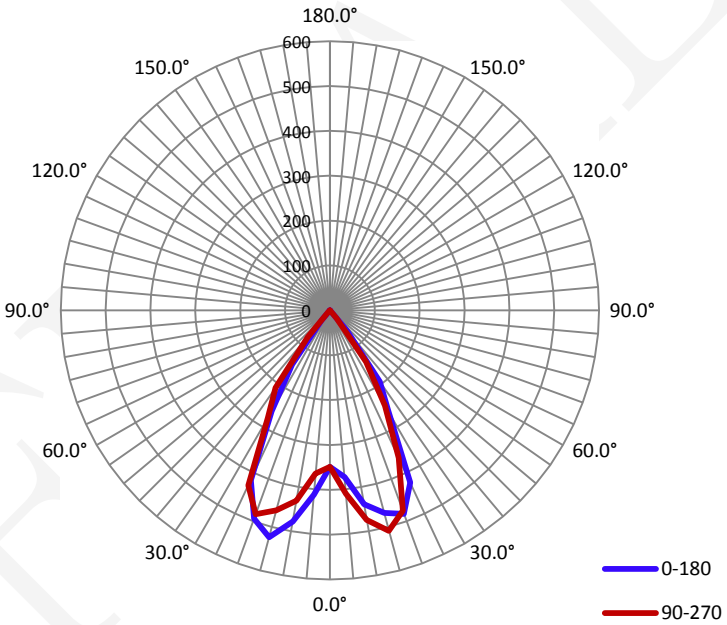
Electrical Measurement

Input Voltage(V)	Frequency(Hz)	Input Current(A)	Power (W)	Power Factor
120.0	60	0.0550	5.84	0.8870

Photometric Measurement

Luminous Flux(lm)	Efficacy(lm/W)	I_{max}(cd)	S/MH(C0/180)	S/MH(C90/270)
463	79.33	528.5	1.15	1.15

Luminous Intensity Distribution



	C0/180	C45/225	C90/270	C135/315	AVG.
Beam Angle(50%I_{max}):	59.9	61.6	61.3	60.0	60.7
Field Angle(10%I_{max}):	79.6	78.9	80.7	79.9	79.8

Luminous Intensity (cd) Distribution Data

C / γ	0°	22.5°	45°	67.5°	90°	112.5°	135°	157.5°
0.0°	349	349	349	349	349	349	349	349
5.0°	373	380	390	400	410	416	419	415
10.0°	439	448	454	462	475	482	485	483
15.0°	467	478	485	499	509	516	524	529
20.0°	483	481	474	470	475	482	490	501
25.0°	423	402	379	367	363	371	386	416
30.0°	261	255	248	244	246	245	248	257
35.0°	194	176	159	143	140	134	134	143
40.0°	59	39	29	25	24	25	28	32
45.0°	3	2	2	2	2	2	2	2
50.0°	1	1	1	1	1	1	1	1
55.0°	1	0	1	0	0	1	1	1
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.)

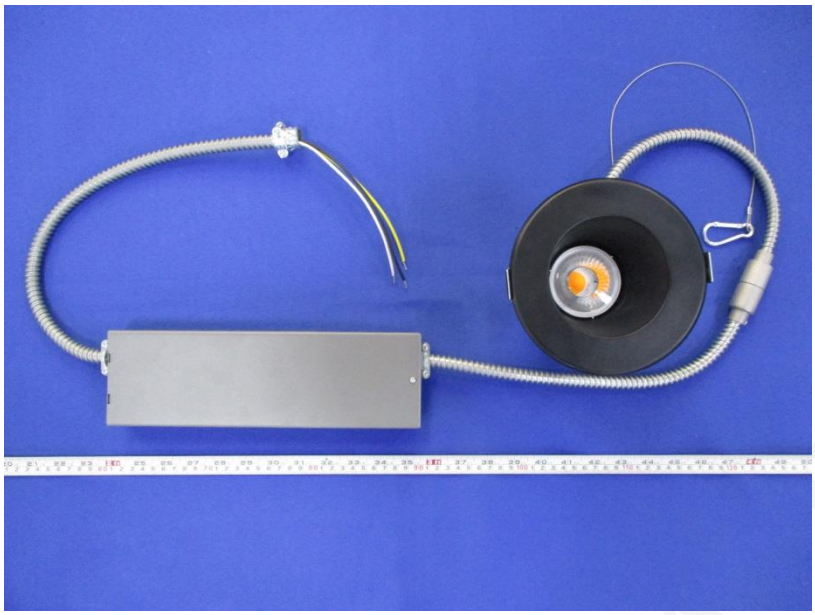
C / γ	180°	202.5°	225°	247.5°	270°	292.5°	315°	337.5°
0.0°	349	349	349	349	349	349	349	349
5.0°	412	402	391	378	365	359	360	367
10.0°	478	470	461	442	431	425	424	428
15.0°	524	512	496	468	462	459	457	460
20.0°	494	498	494	485	484	485	480	477
25.0°	418	431	433	429	431	429	429	420
30.0°	259	269	278	277	277	276	270	263
35.0°	147	163	184	201	211	210	202	194
40.0°	29	31	40	65	77	72	66	57
45.0°	2	3	3	5	5	5	4	3
50.0°	1	1	1	1	1	1	1	1
55.0°	1	0	1	1	1	1	1	1
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

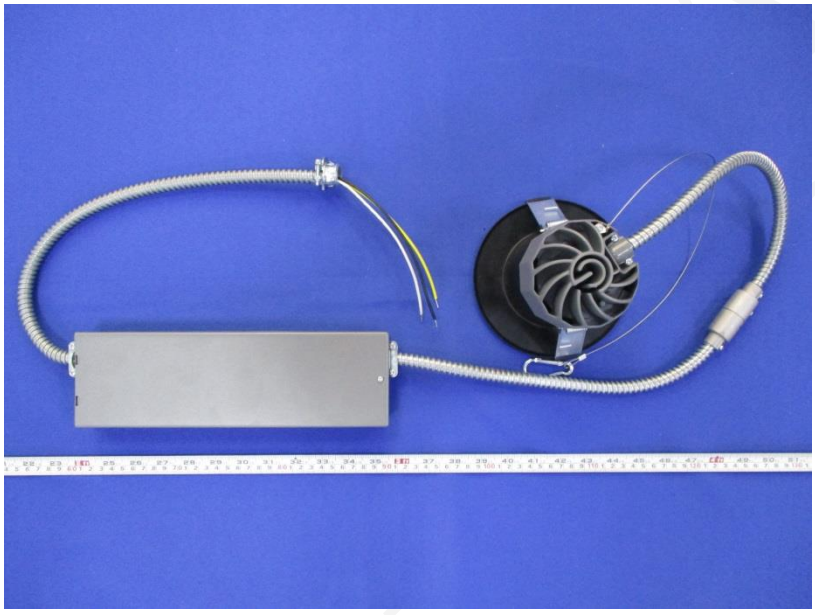
Zonal Lumen Density Measurement

Deg	Flux (lm)	%
0-5	8.8	1.91
5-10	30.2	6.53
10-15	56.1	12.11
15-20	80.3	17.35
20-25	93.6	20.21
25-30	84.6	18.28
30-35	63.6	13.73
35-40	35.8	7.73
40-45	8.6	1.85
45-50	0.8	0.16
50-55	0.3	0.07
55-60	0.2	0.04
60-65	0.1	0.02
65-70	0.0	0.01
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	8.8	1.91
0-10	39.1	8.44
0-15	95.2	20.55
0-20	175.5	37.90
0-25	269.1	58.12
0-30	353.7	76.39
0-35	417.3	90.12
0-40	453.0	97.85
0-45	461.6	99.70
0-50	462.4	99.86
0-55	462.7	99.93
0-60	462.9	99.97
0-65	463.0	99.99
0-70	463.0	100.00
0-75	463.0	100.00
0-80	463.0	100.00
0-85	463.0	100.00
0-90	463.0	100.00
0-95	463.0	100.00
0-100	463.0	100.00
0-105	463.0	100.00
0-110	463.0	100.00
0-115	463.0	100.00
0-120	463.0	100.00
0-125	463.0	100.00
0-130	463.0	100.00
0-135	463.0	100.00
0-140	463.0	100.00
0-145	463.0	100.00
0-150	463.0	100.00
0-155	463.0	100.00
0-160	463.0	100.00
0-165	463.0	100.00
0-170	463.0	100.00
0-175	463.0	100.00
0-180	463.0	100.00

6. Product Photo





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