

# IES LM-79-08

## MEASUREMENT AND TEST REPORT

For

### GREEN CREATIVE LTD

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

**Test Model: LE409027DIM120VVN/ADR6BL**

<b>Report Type:</b>	Electrical and Photometric tests including: Luminous Flux, Chromaticity, Luminous Intensity Distribution
<b>Test Engineer:</b>	George Yang <i>George Yang</i>
<b>Report Number:</b>	RKSB190722006-10-11
<b>Test Date:</b>	2019-07-22 to 2019-07-24
<b>Report Date:</b>	2019-08-09
<b>Reviewed By:</b>	Ray Gao/EE Engineer <i>Ry Gao</i>
<b>Prepared By:</b>	Bay Area Compliance Laboratories Corp. (Kunshan). No.248 Chenghu Road, Kunshan, Jiangsu province, China. Tel: +86-0512-86175000 Fax: +86-0512-88934268
<b>Accreditation:</b>	The IAS Accreditation Number TL-749.

## 1. Product Description

### General Information:

One sample was received on 2019-07-22 and used for testing.

Model Tested: LE409027DIM120VVN/ADR6BL  
 Manufacturer: GREEN CREATIVE LTD  
 Brand Name: GREEN CREATIVE  
 Product Designation: LED Recessed Downlight  
 Burning Time Before Test: 0hour(For New Products)

### Rated Values:

Rated Voltage/Frequency: 120-277 VAC 60Hz  
 Rated Power: 48W  
 Nominal CCT: 2700K  
 Nominal Lumen Output: 3250lm

## 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  $25^{\circ}\text{C} \pm 1^{\circ}\text{C}$  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.

$4\pi$  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 ( $\gamma$ ) 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  $R_i$ ,  $R_g$  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**

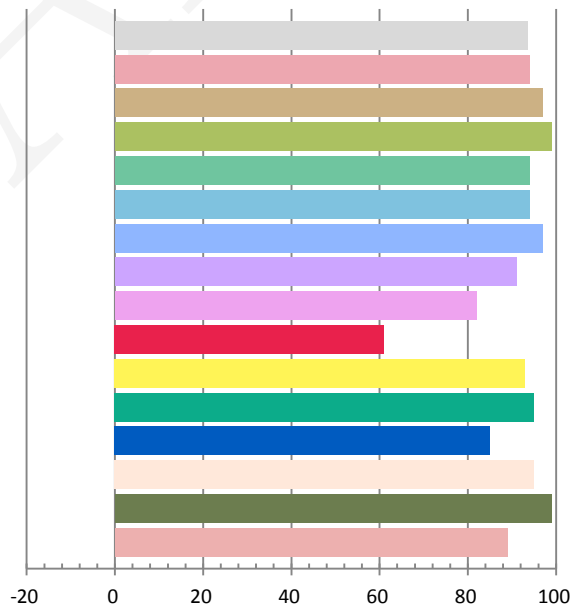
### Photometric and Electrical Measurement Result

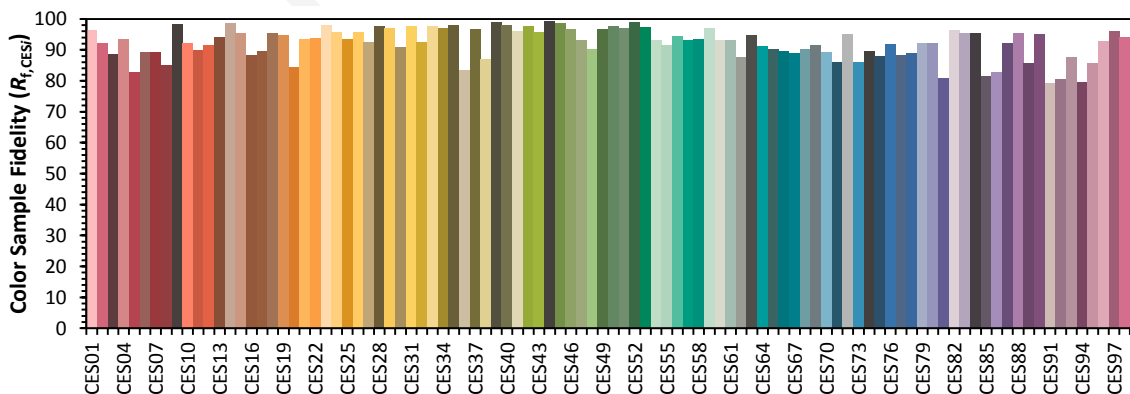
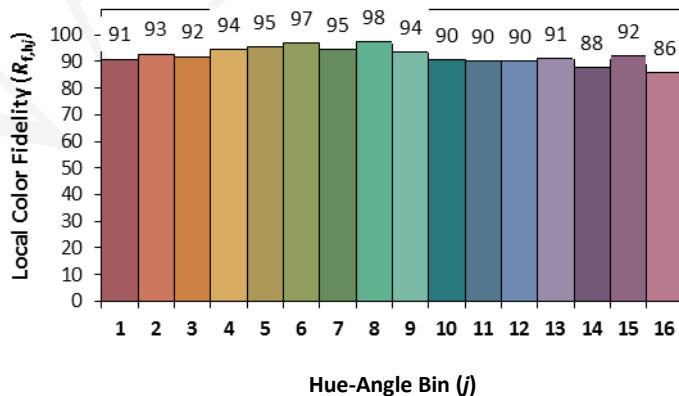
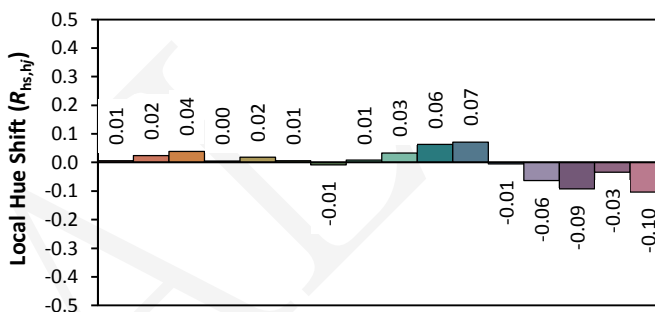
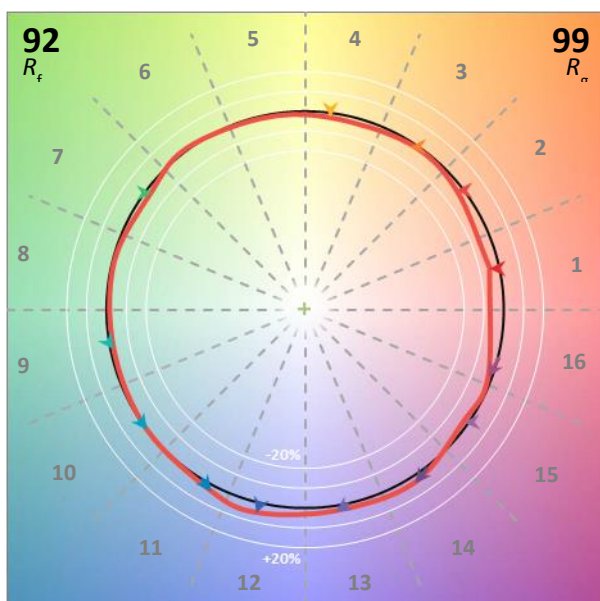
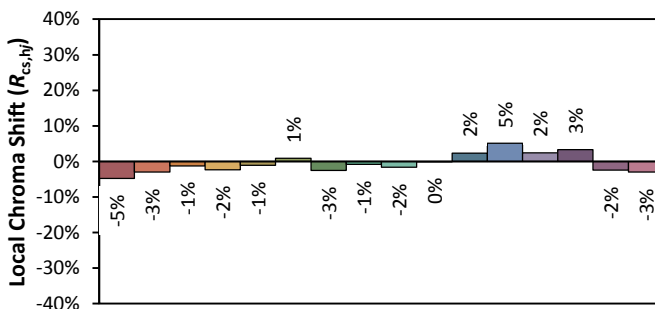
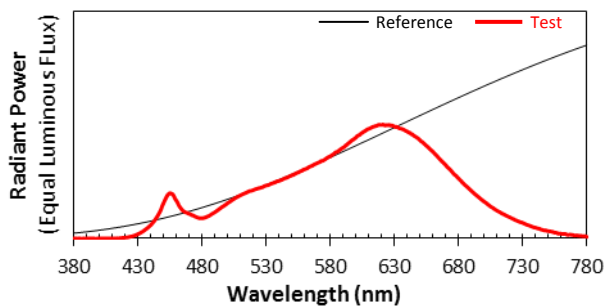
Voltage(V)	Frequency(Hz)	Current(A)	Power (W)	Power Factor	Luminous Flux(lm)	Efficacy(lm/W)
120.02	60	0.4085	48.65	0.9923	3309.36	68.02

Radiant Flux (W)	CCT (K)	Duv	x	y	u'	v'
11.659	2707	-0.00026	0.4588	0.4097	0.2622	0.5268

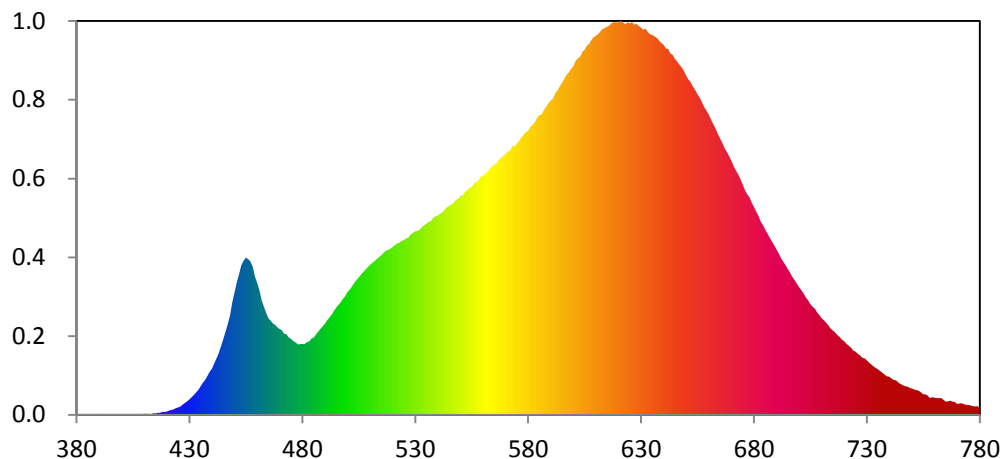
### Color Rendering Index

<b>Ra</b>			
93.5			
<b>R1</b>	<b>R2</b>	<b>R3</b>	<b>R4</b>
94	97	99	94
<b>R5</b>	<b>R6</b>	<b>R7</b>	<b>R8</b>
94	97	91	82
<b>R9</b>	<b>R10</b>	<b>R11</b>	<b>R12</b>
61	93	95	85
<b>R13</b>	<b>R14</b>	<b>R15</b>	
95	99	89	





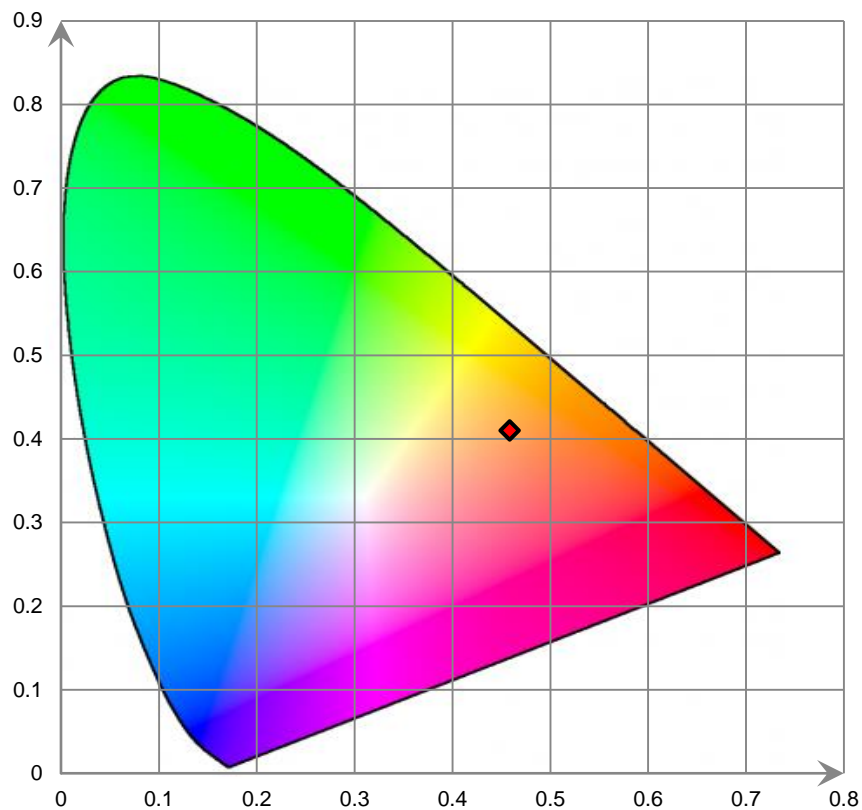
### Relative Spectral Power Distribution



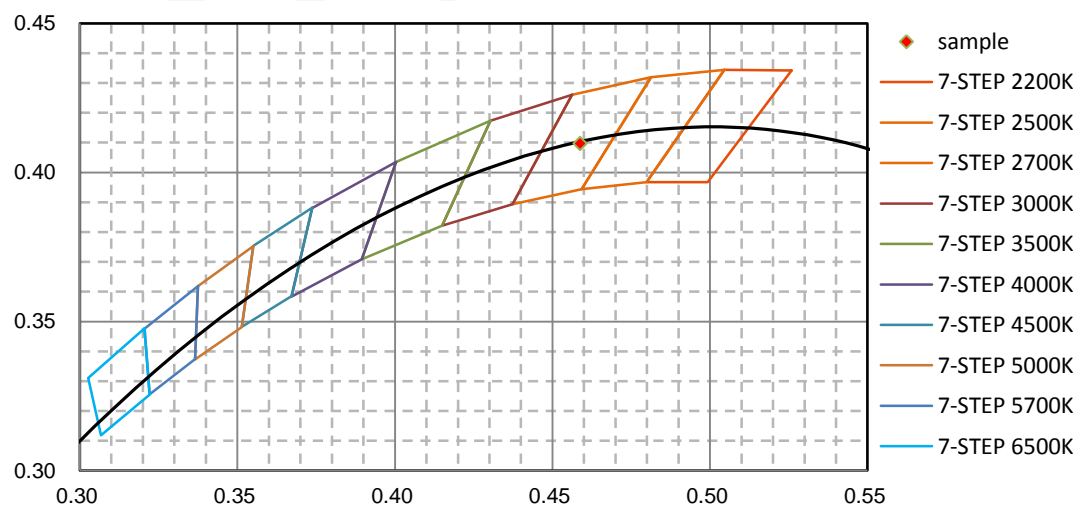
nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
380	7.530E-02	421	7.658E-01	462	2.112E+01	503	2.439E+01	544	3.834E+01
381	7.050E-02	422	8.516E-01	463	1.996E+01	504	2.492E+01	545	3.869E+01
382	8.330E-02	423	1.026E+00	464	1.885E+01	505	2.538E+01	546	3.887E+01
383	1.670E-02	424	1.259E+00	465	1.785E+01	506	2.597E+01	547	3.927E+01
384	1.375E-01	425	1.386E+00	466	1.738E+01	507	2.643E+01	548	3.978E+01
385	8.960E-02	426	1.555E+00	467	1.684E+01	508	2.684E+01	549	3.998E+01
386	1.000E-02	427	1.869E+00	468	1.662E+01	509	2.729E+01	550	4.057E+01
387	8.160E-02	428	2.168E+00	469	1.614E+01	510	2.769E+01	551	4.057E+01
388	4.740E-02	429	2.479E+00	470	1.584E+01	511	2.811E+01	552	4.122E+01
389	9.000E-03	430	2.858E+00	471	1.562E+01	512	2.847E+01	553	4.154E+01
390	1.657E-01	431	3.252E+00	472	1.501E+01	513	2.886E+01	554	4.207E+01
391	2.800E-02	432	3.651E+00	473	1.491E+01	514	2.917E+01	555	4.219E+01
392	6.300E-03	433	4.164E+00	474	1.434E+01	515	2.957E+01	556	4.273E+01
393	2.420E-02	434	4.624E+00	475	1.405E+01	516	2.995E+01	557	4.306E+01
394	2.400E-02	435	5.251E+00	476	1.364E+01	517	3.040E+01	558	4.335E+01
395	7.550E-02	436	5.900E+00	477	1.336E+01	518	3.048E+01	559	4.405E+01
396	4.460E-02	437	6.425E+00	478	1.303E+01	519	3.074E+01	560	4.423E+01
397	2.020E-02	438	7.172E+00	479	1.308E+01	520	3.102E+01	561	4.465E+01
398	2.160E-02	439	7.925E+00	480	1.307E+01	521	3.136E+01	562	4.486E+01
399	1.220E-02	440	8.600E+00	481	1.311E+01	522	3.167E+01	563	4.553E+01
400	6.000E-04	441	9.572E+00	482	1.341E+01	523	3.187E+01	564	4.594E+01
401	6.650E-02	442	1.050E+01	483	1.356E+01	524	3.217E+01	565	4.631E+01
402	6.040E-02	443	1.149E+01	484	1.408E+01	525	3.235E+01	566	4.652E+01
403	9.900E-02	444	1.270E+01	485	1.428E+01	526	3.263E+01	567	4.720E+01
404	6.870E-02	445	1.400E+01	486	1.477E+01	527	3.277E+01	568	4.756E+01
405	8.250E-02	446	1.540E+01	487	1.532E+01	528	3.331E+01	569	4.794E+01
406	3.900E-02	447	1.682E+01	488	1.589E+01	529	3.362E+01	570	4.829E+01
407	1.385E-01	448	1.844E+01	489	1.636E+01	530	3.398E+01	571	4.874E+01
408	4.850E-02	449	2.087E+01	490	1.684E+01	531	3.402E+01	572	4.889E+01
409	1.068E-01	450	2.261E+01	491	1.744E+01	532	3.431E+01	573	4.972E+01
410	1.778E-01	451	2.449E+01	492	1.793E+01	533	3.474E+01	574	4.961E+01
411	1.428E-01	452	2.597E+01	493	1.860E+01	534	3.512E+01	575	5.019E+01
412	9.610E-02	453	2.763E+01	494	1.925E+01	535	3.535E+01	576	5.063E+01
413	1.115E-01	454	2.850E+01	495	1.981E+01	536	3.571E+01	577	5.131E+01
414	2.647E-01	455	2.911E+01	496	2.039E+01	537	3.589E+01	578	5.180E+01
415	2.051E-01	456	2.881E+01	497	2.082E+01	538	3.649E+01	579	5.228E+01
416	3.265E-01	457	2.842E+01	498	2.150E+01	539	3.671E+01	580	5.251E+01
417	3.729E-01	458	2.734E+01	499	2.199E+01	540	3.687E+01	581	5.324E+01
418	5.027E-01	459	2.549E+01	500	2.275E+01	541	3.721E+01	582	5.372E+01
419	5.310E-01	460	2.433E+01	501	2.316E+01	542	3.745E+01	583	5.417E+01
420	6.032E-01	461	2.300E+01	502	2.375E+01	543	3.790E+01	584	5.501E+01

nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
585	5.541E+01	626	7.268E+01	667	4.936E+01	708	1.888E+01	749	4.955E+00
586	5.562E+01	627	7.218E+01	668	4.866E+01	709	1.840E+01	750	4.856E+00
587	5.642E+01	628	7.234E+01	669	4.788E+01	710	1.785E+01	751	4.666E+00
588	5.703E+01	629	7.196E+01	670	4.706E+01	711	1.744E+01	752	4.568E+00
589	5.765E+01	630	7.167E+01	671	4.593E+01	712	1.700E+01	753	4.443E+00
590	5.817E+01	631	7.123E+01	672	4.520E+01	713	1.650E+01	754	4.136E+00
591	5.849E+01	632	7.147E+01	673	4.447E+01	714	1.594E+01	755	3.815E+00
592	5.952E+01	633	7.090E+01	674	4.361E+01	715	1.557E+01	756	3.808E+00
593	5.996E+01	634	7.040E+01	675	4.260E+01	716	1.523E+01	757	3.542E+00
594	6.075E+01	635	7.031E+01	676	4.157E+01	717	1.473E+01	758	3.067E+00
595	6.143E+01	636	7.002E+01	677	4.078E+01	718	1.437E+01	759	3.261E+00
596	6.214E+01	637	6.973E+01	678	4.025E+01	719	1.392E+01	760	3.120E+00
597	6.289E+01	638	6.925E+01	679	3.925E+01	720	1.364E+01	761	3.058E+00
598	6.330E+01	639	6.874E+01	680	3.851E+01	721	1.317E+01	762	3.071E+00
599	6.395E+01	640	6.847E+01	681	3.758E+01	722	1.276E+01	763	3.049E+00
600	6.456E+01	641	6.781E+01	682	3.685E+01	723	1.246E+01	764	2.697E+00
601	6.552E+01	642	6.766E+01	683	3.576E+01	724	1.190E+01	765	2.436E+00
602	6.598E+01	643	6.685E+01	684	3.512E+01	725	1.165E+01	766	2.471E+00
603	6.627E+01	644	6.664E+01	685	3.426E+01	726	1.123E+01	767	2.570E+00
604	6.717E+01	645	6.583E+01	686	3.358E+01	727	1.093E+01	768	2.438E+00
605	6.760E+01	646	6.536E+01	687	3.278E+01	728	1.053E+01	769	2.359E+00
606	6.831E+01	647	6.481E+01	688	3.211E+01	729	1.040E+01	770	2.006E+00
607	6.862E+01	648	6.430E+01	689	3.126E+01	730	1.004E+01	771	2.043E+00
608	6.933E+01	649	6.365E+01	690	3.054E+01	731	9.656E+00	772	2.124E+00
609	6.986E+01	650	6.280E+01	691	2.977E+01	732	9.290E+00	773	1.941E+00
610	7.011E+01	651	6.205E+01	692	2.898E+01	733	8.911E+00	774	1.834E+00
611	7.047E+01	652	6.161E+01	693	2.830E+01	734	8.618E+00	775	1.805E+00
612	7.090E+01	653	6.079E+01	694	2.765E+01	735	8.402E+00	776	1.718E+00
613	7.141E+01	654	6.004E+01	695	2.692E+01	736	8.057E+00	777	1.593E+00
614	7.153E+01	655	5.926E+01	696	2.627E+01	737	7.728E+00	778	1.555E+00
615	7.185E+01	656	5.860E+01	697	2.553E+01	738	7.407E+00	779	1.583E+00
616	7.202E+01	657	5.783E+01	698	2.491E+01	739	7.101E+00	780	1.148E+00
617	7.250E+01	658	5.694E+01	699	2.428E+01	740	7.029E+00		
618	7.267E+01	659	5.625E+01	700	2.361E+01	741	6.700E+00		
619	7.262E+01	660	5.553E+01	701	2.307E+01	742	6.473E+00		
620	7.259E+01	661	5.460E+01	702	2.246E+01	743	6.317E+00		
621	7.289E+01	662	5.376E+01	703	2.175E+01	744	5.920E+00		
622	7.256E+01	663	5.298E+01	704	2.118E+01	745	5.699E+00		
623	7.233E+01	664	5.197E+01	705	2.047E+01	746	5.439E+00		
624	7.263E+01	665	5.115E+01	706	2.002E+01	747	5.269E+00		
625	7.244E+01	666	5.034E+01	707	1.959E+01	748	5.229E+00		

CIE 1931xy Chromaticity Diagram



7-Step Chromaticity Quadrangles





### [Goniophotometer System]

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

Test orientation: **Downward**

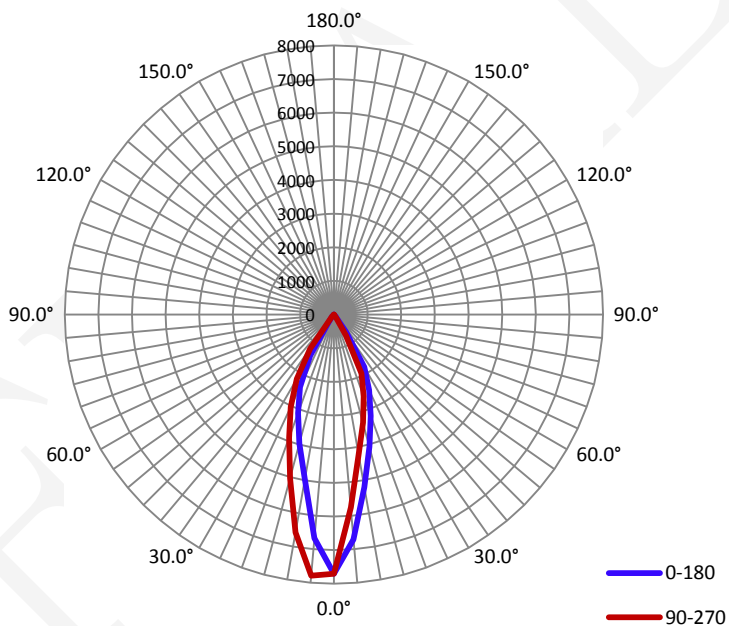
### Electrical Measurement

Input Voltage(V)	Frequency(Hz)	Input Current(A)	Power (W)	Power Factor
120.0	60	0.4240	48.68	0.9560

### Photometric Measurement

Luminous Flux(lm)	Efficacy(lm/W)	$I_{max}(cd)$	S/MH(C0/180)	S/MH(C90/270)
3318.9	68.23	7803.6	0.50	0.53

### Luminous Intensity Distribution



	C0/180	C45/225	C90/270	C135/315	AVG.
Beam Angle(50% $I_{max}$ ):	32.0	32.1	31.9	32.5	32.1
Field Angle(10% $I_{max}$ ):	67.3	67.4	67.0	67.5	67.3

**Luminous Intensity (cd) Distribution Data**

C y	0°	22.5°	45°	67.5°	90°	112.5°	135°	157.5°
0.0°	7700	7700	7700	7700	7700	7700	7700	7700
5.0°	6708	6312	6031	5832	5756	5824	5983	6357
10.0°	5216	4734	4420	4271	4241	4288	4452	4735
15.0°	4066	3711	3501	3356	3330	3370	3481	3738
20.0°	3213	2922	2780	2641	2592	2631	2736	2937
25.0°	2477	2244	2083	1988	1927	1972	2074	2240
30.0°	1799	1425	1058	831	730	764	910	1185
35.0°	655	307	158	129	115	126	147	178
40.0°	120	91	77	64	44	54	71	74
45.0°	65	41	31	20	9	13	23	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.)

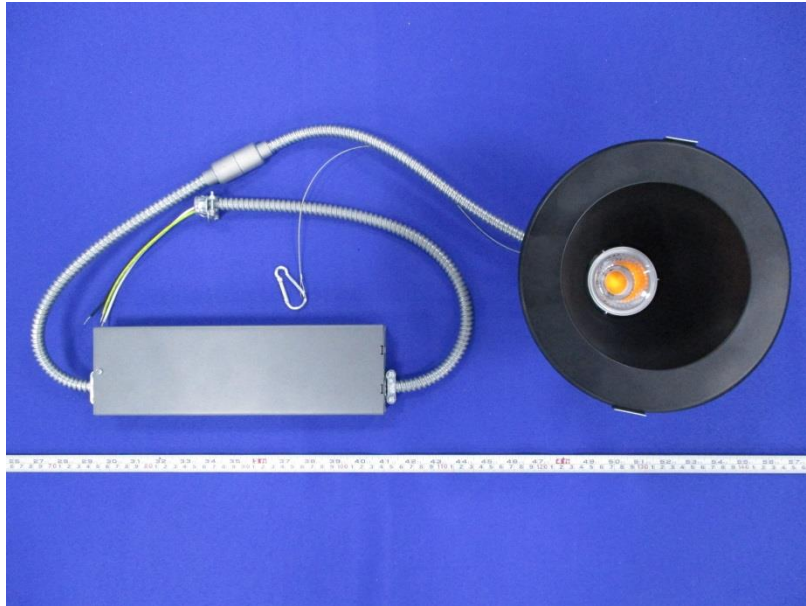
C y	180°	202.5°	225°	247.5°	270°	292.5°	315°	337.5°
0.0°	7700	7700	7700	7700	7700	7700	7700	7700
5.0°	6673	7198	7611	7804	7786	7731	7405	7061
10.0°	4964	5463	5970	6419	6573	6309	5972	5551
15.0°	3972	4270	4617	4935	5042	4950	4687	4359
20.0°	3120	3383	3657	3833	3894	3846	3738	3443
25.0°	2378	2594	2833	2973	3037	3008	2850	2641
30.0°	1406	1790	2022	2170	2203	2203	2114	1966
35.0°	286	618	890	1107	1229	1212	1064	826
40.0°	68	107	132	161	184	188	156	132
45.0°	35	62	58	65	77	79	75	69
50.0°	0	0	16	29	38	38	31	15
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	172.8	5.21
5-10	428.5	12.91
10-15	552.3	16.64
15-20	601.4	18.12
20-25	594.5	17.91
25-30	505.4	15.23
30-35	309.4	9.32
35-40	112.3	3.38
40-45	28.6	0.86
45-50	11.6	0.35
50-55	2.3	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	172.8	5.21
0-10	601.3	18.12
0-15	1153.5	34.76
0-20	1754.9	52.88
0-25	2349.4	70.79
0-30	2854.7	86.01
0-35	3164.1	95.34
0-40	3276.4	98.72
0-45	3305.1	99.58
0-50	3316.7	99.93
0-55	3318.9	100.00
0-60	3318.9	100.00
0-65	3318.9	100.00
0-70	3318.9	100.00
0-75	3318.9	100.00
0-80	3318.9	100.00
0-85	3318.9	100.00
0-90	3318.9	100.00
0-95	3318.9	100.00
0-100	3318.9	100.00
0-105	3318.9	100.00
0-110	3318.9	100.00
0-115	3318.9	100.00
0-120	3318.9	100.00
0-125	3318.9	100.00
0-130	3318.9	100.00
0-135	3318.9	100.00
0-140	3318.9	100.00
0-145	3318.9	100.00
0-150	3318.9	100.00
0-155	3318.9	100.00
0-160	3318.9	100.00
0-165	3318.9	100.00
0-170	3318.9	100.00
0-175	3318.9	100.00
0-180	3318.9	100.00

## 6. Product Photo



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