

# IES LM-79-08

## MEASUREMENT AND TEST REPORT

For

### GREEN CREATIVE LTD

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

**Test Model: LE409027DIM120VMD/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>	RKSB190722006-10-2
<b>Test Date:</b>	2019-07-22 to 2019-07-24
<b>Report Date:</b>	2019-07-29
<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: LE409027DIM120VMD/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**

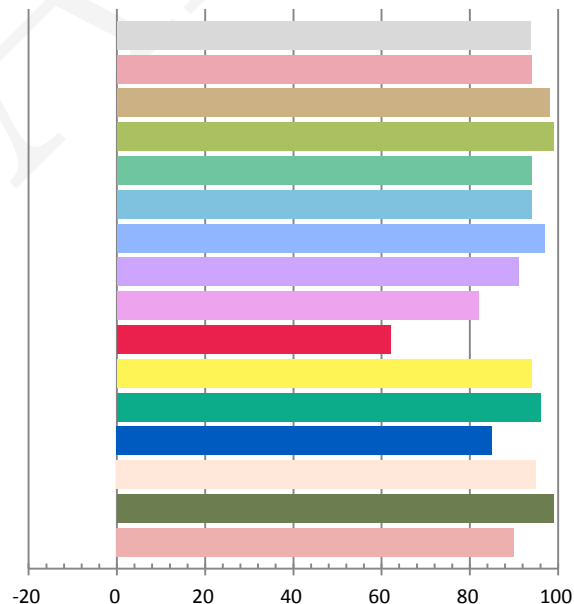
### Photometric and Electrical Measurement Result

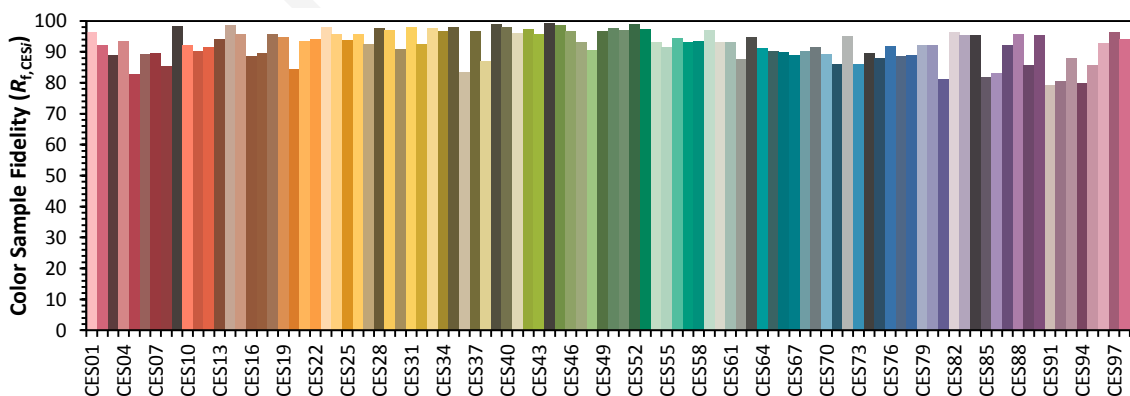
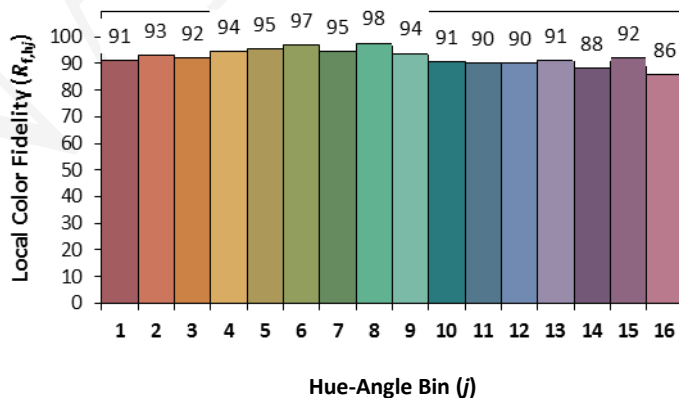
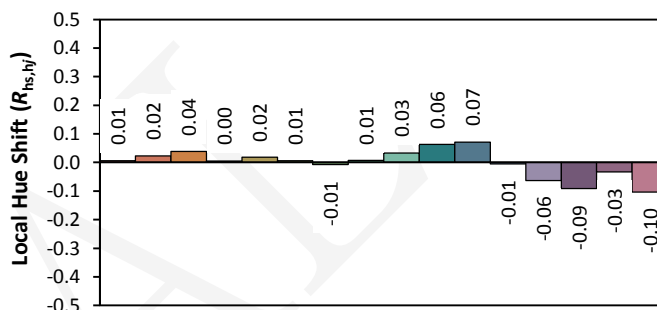
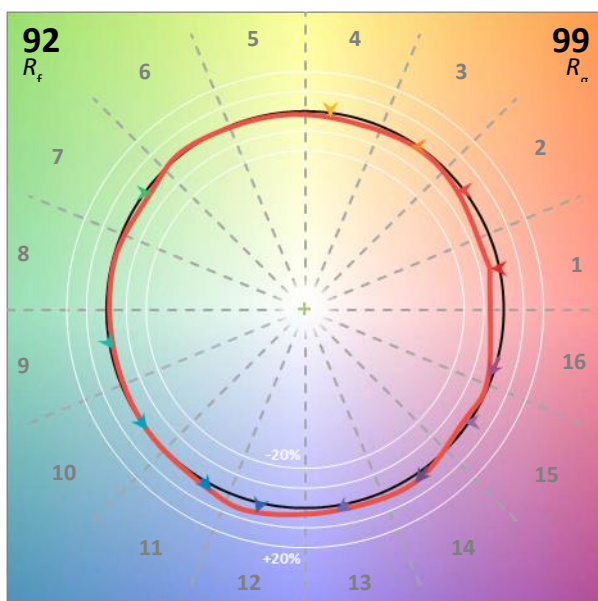
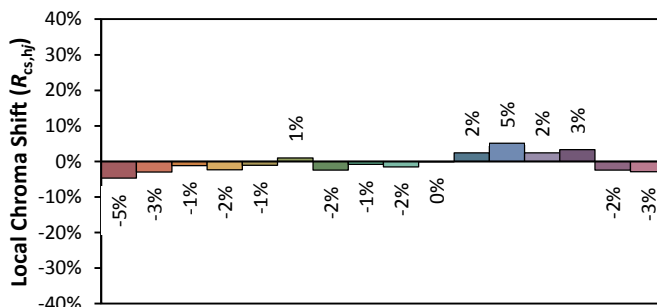
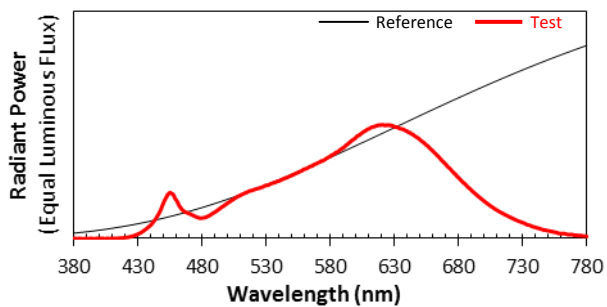
Voltage(V)	Frequency(Hz)	Current(A)	Power (W)	Power Factor	Luminous Flux(lm)	Efficacy(lm/W)
120.01	60	0.4088	48.68	0.9923	3414.59	70.14

Radiant Flux (W)	CCT (K)	Duv	x	y	u'	v'
12.074	2710	-0.00035	0.4585	0.4093	0.2622	0.5267

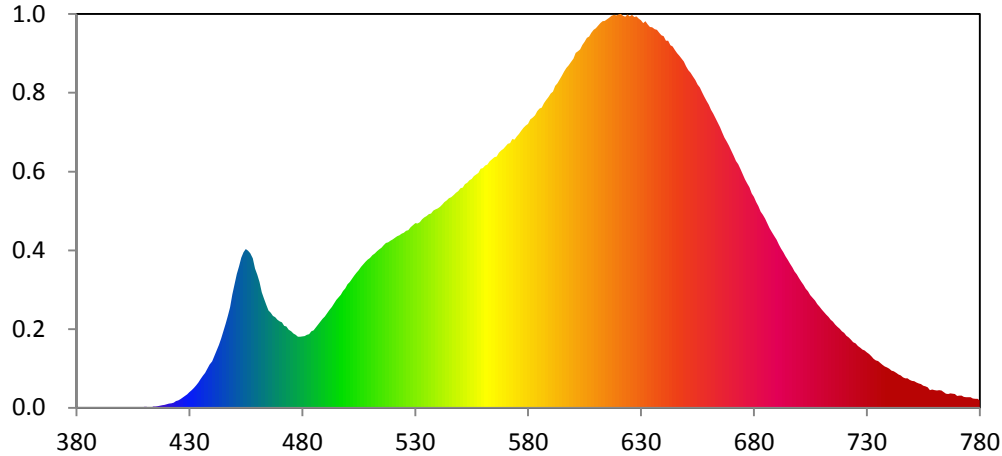
### Color Rendering Index

<b>Ra</b>			
93.7			
<b>R1</b>	<b>R2</b>	<b>R3</b>	<b>R4</b>
94	98	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>
62	94	96	85
<b>R13</b>	<b>R14</b>	<b>R15</b>	
95	99	90	





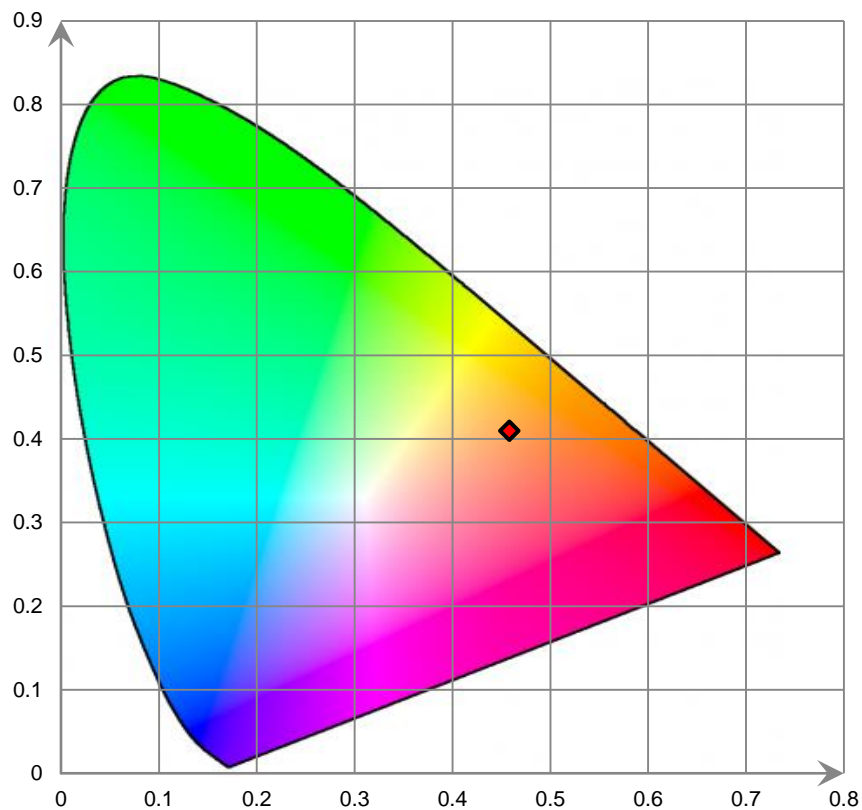
### Relative Spectral Power Distribution



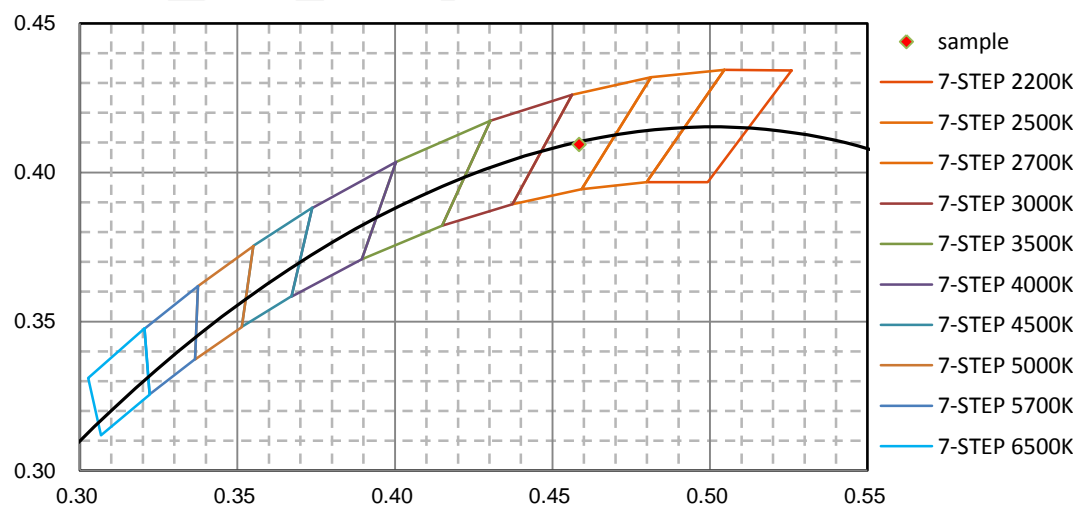
nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
380	4.960E-02	421	8.019E-01	462	2.202E+01	503	2.521E+01	544	3.952E+01
381	3.510E-02	422	8.403E-01	463	2.081E+01	504	2.572E+01	545	3.996E+01
382	6.930E-02	423	9.909E-01	464	1.964E+01	505	2.623E+01	546	4.016E+01
383	2.140E-02	424	1.251E+00	465	1.855E+01	506	2.682E+01	547	4.053E+01
384	1.367E-01	425	1.425E+00	466	1.809E+01	507	2.734E+01	548	4.099E+01
385	9.940E-02	426	1.650E+00	467	1.750E+01	508	2.780E+01	549	4.130E+01
386	8.900E-03	427	1.932E+00	468	1.724E+01	509	2.821E+01	550	4.186E+01
387	7.490E-02	428	2.277E+00	469	1.676E+01	510	2.856E+01	551	4.195E+01
388	1.010E-02	429	2.566E+00	470	1.648E+01	511	2.910E+01	552	4.262E+01
389	2.270E-02	430	2.966E+00	471	1.625E+01	512	2.940E+01	553	4.285E+01
390	1.104E-01	431	3.373E+00	472	1.558E+01	513	2.985E+01	554	4.336E+01
391	1.680E-02	432	3.744E+00	473	1.549E+01	514	3.017E+01	555	4.363E+01
392	5.200E-03	433	4.266E+00	474	1.486E+01	515	3.048E+01	556	4.416E+01
393	1.900E-03	434	4.806E+00	475	1.456E+01	516	3.099E+01	557	4.444E+01
394	8.000E-04	435	5.464E+00	476	1.415E+01	517	3.144E+01	558	4.475E+01
395	3.490E-02	436	6.084E+00	477	1.388E+01	518	3.151E+01	559	4.555E+01
396	1.950E-02	437	6.667E+00	478	1.357E+01	519	3.183E+01	560	4.569E+01
397	1.230E-02	438	7.426E+00	479	1.352E+01	520	3.207E+01	561	4.614E+01
398	1.060E-02	439	8.225E+00	480	1.359E+01	521	3.241E+01	562	4.636E+01
399	3.000E-04	440	8.867E+00	481	1.365E+01	522	3.268E+01	563	4.695E+01
400	0.000E+00	441	9.890E+00	482	1.390E+01	523	3.287E+01	564	4.742E+01
401	6.680E-02	442	1.091E+01	483	1.405E+01	524	3.317E+01	565	4.773E+01
402	4.610E-02	443	1.194E+01	484	1.460E+01	525	3.337E+01	566	4.787E+01
403	4.350E-02	444	1.317E+01	485	1.474E+01	526	3.372E+01	567	4.863E+01
404	1.830E-02	445	1.455E+01	486	1.527E+01	527	3.387E+01	568	4.901E+01
405	2.960E-02	446	1.596E+01	487	1.584E+01	528	3.439E+01	569	4.931E+01
406	1.590E-02	447	1.750E+01	488	1.641E+01	529	3.484E+01	570	4.981E+01
407	1.229E-01	448	1.914E+01	489	1.696E+01	530	3.518E+01	571	5.030E+01
408	1.840E-02	449	2.157E+01	490	1.737E+01	531	3.513E+01	572	5.042E+01
409	1.043E-01	450	2.353E+01	491	1.801E+01	532	3.538E+01	573	5.121E+01
410	1.764E-01	451	2.547E+01	492	1.858E+01	533	3.591E+01	574	5.114E+01
411	1.495E-01	452	2.694E+01	493	1.922E+01	534	3.627E+01	575	5.172E+01
412	7.760E-02	453	2.863E+01	494	1.985E+01	535	3.655E+01	576	5.224E+01
413	1.331E-01	454	2.963E+01	495	2.053E+01	536	3.688E+01	577	5.281E+01
414	2.312E-01	455	3.028E+01	496	2.104E+01	537	3.700E+01	578	5.335E+01
415	2.096E-01	456	2.992E+01	497	2.150E+01	538	3.758E+01	579	5.382E+01
416	2.943E-01	457	2.947E+01	498	2.226E+01	539	3.783E+01	580	5.412E+01
417	3.723E-01	458	2.845E+01	499	2.274E+01	540	3.798E+01	581	5.494E+01
418	4.554E-01	459	2.652E+01	500	2.352E+01	541	3.833E+01	582	5.533E+01
419	5.207E-01	460	2.536E+01	501	2.398E+01	542	3.872E+01	583	5.574E+01
420	6.363E-01	461	2.398E+01	502	2.457E+01	543	3.924E+01	584	5.656E+01

nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
585	5.700E+01	626	7.490E+01	667	5.145E+01	708	1.976E+01	749	5.304E+00
586	5.721E+01	627	7.447E+01	668	5.071E+01	709	1.926E+01	750	5.133E+00
587	5.805E+01	628	7.458E+01	669	4.993E+01	710	1.874E+01	751	5.029E+00
588	5.870E+01	629	7.417E+01	670	4.905E+01	711	1.823E+01	752	4.832E+00
589	5.924E+01	630	7.384E+01	671	4.798E+01	712	1.772E+01	753	4.620E+00
590	5.987E+01	631	7.331E+01	672	4.700E+01	713	1.729E+01	754	4.501E+00
591	6.024E+01	632	7.367E+01	673	4.641E+01	714	1.675E+01	755	4.208E+00
592	6.134E+01	633	7.305E+01	674	4.547E+01	715	1.641E+01	756	4.096E+00
593	6.185E+01	634	7.259E+01	675	4.451E+01	716	1.587E+01	757	3.902E+00
594	6.257E+01	635	7.253E+01	676	4.358E+01	717	1.543E+01	758	3.358E+00
595	6.331E+01	636	7.218E+01	677	4.273E+01	718	1.506E+01	759	3.457E+00
596	6.409E+01	637	7.201E+01	678	4.201E+01	719	1.455E+01	760	3.336E+00
597	6.480E+01	638	7.149E+01	679	4.088E+01	720	1.425E+01	761	3.274E+00
598	6.524E+01	639	7.100E+01	680	4.019E+01	721	1.372E+01	762	3.354E+00
599	6.590E+01	640	7.079E+01	681	3.924E+01	722	1.344E+01	763	3.260E+00
600	6.657E+01	641	6.997E+01	682	3.843E+01	723	1.300E+01	764	2.972E+00
601	6.764E+01	642	6.997E+01	683	3.740E+01	724	1.247E+01	765	2.693E+00
602	6.792E+01	643	6.910E+01	684	3.675E+01	725	1.227E+01	766	2.636E+00
603	6.833E+01	644	6.885E+01	685	3.607E+01	726	1.178E+01	767	2.744E+00
604	6.916E+01	645	6.821E+01	686	3.515E+01	727	1.144E+01	768	2.661E+00
605	6.975E+01	646	6.759E+01	687	3.420E+01	728	1.113E+01	769	2.596E+00
606	7.048E+01	647	6.707E+01	688	3.347E+01	729	1.089E+01	770	2.278E+00
607	7.077E+01	648	6.651E+01	689	3.271E+01	730	1.052E+01	771	2.291E+00
608	7.149E+01	649	6.597E+01	690	3.200E+01	731	1.024E+01	772	2.301E+00
609	7.205E+01	650	6.507E+01	691	3.109E+01	732	9.813E+00	773	2.044E+00
610	7.232E+01	651	6.438E+01	692	3.032E+01	733	9.336E+00	774	2.013E+00
611	7.283E+01	652	6.389E+01	693	2.965E+01	734	9.018E+00	775	1.981E+00
612	7.330E+01	653	6.320E+01	694	2.885E+01	735	8.920E+00	776	1.979E+00
613	7.366E+01	654	6.242E+01	695	2.815E+01	736	8.525E+00	777	1.735E+00
614	7.375E+01	655	6.159E+01	696	2.744E+01	737	8.181E+00	778	1.683E+00
615	7.405E+01	656	6.109E+01	697	2.679E+01	738	7.839E+00	779	1.709E+00
616	7.435E+01	657	6.012E+01	698	2.598E+01	739	7.667E+00	780	1.413E+00
617	7.469E+01	658	5.927E+01	699	2.542E+01	740	7.459E+00		
618	7.489E+01	659	5.852E+01	700	2.469E+01	741	7.071E+00		
619	7.480E+01	660	5.779E+01	701	2.403E+01	742	6.925E+00		
620	7.497E+01	661	5.678E+01	702	2.342E+01	743	6.665E+00		
621	7.507E+01	662	5.603E+01	703	2.270E+01	744	6.310E+00		
622	7.471E+01	663	5.521E+01	704	2.219E+01	745	6.130E+00		
623	7.452E+01	664	5.434E+01	705	2.149E+01	746	5.774E+00		
624	7.494E+01	665	5.349E+01	706	2.098E+01	747	5.592E+00		
625	7.462E+01	666	5.248E+01	707	2.041E+01	748	5.587E+00		

CIE 1931xy Chromaticity Diagram



7-Step Chromaticity Quadrangles





### [Goniophotometer System]

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

Test orientation: **Downward**

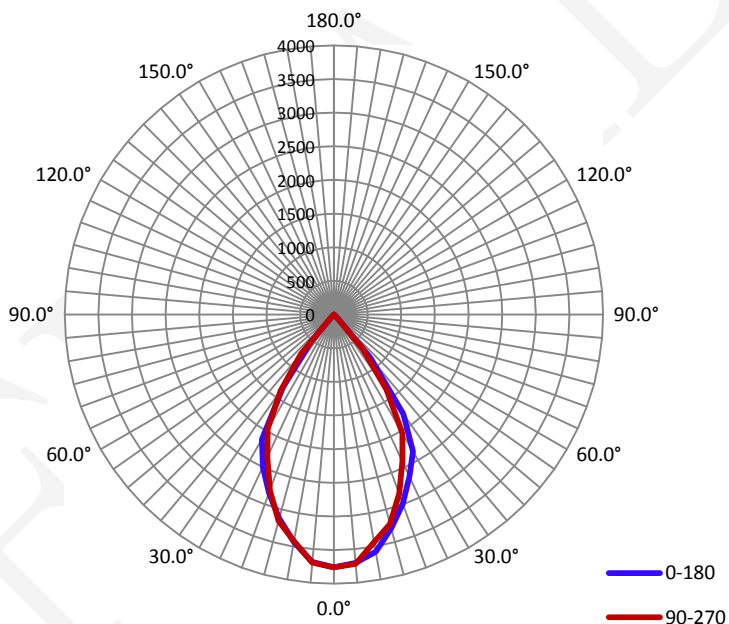
### Electrical Measurement

Input Voltage(V)	Frequency(Hz)	Input Current(A)	Power (W)	Power Factor
120.0	60	0.4250	48.71	0.9550

### Photometric Measurement

Luminous Flux(lm)	Efficacy(lm/W)	$I_{max}(cd)$	S/MH(C0/180)	S/MH(C90/270)
3424.5	70.35	3755.4	0.95	0.89

### Luminous Intensity Distribution



	C0/180	C45/225	C90/270	C135/315	AVG.
Beam Angle(50% $I_{max}$ ):	65.9	63.5	62.0	64.3	63.9
Field Angle(10% $I_{max}$ ):	84.6	84.8	85.1	84.8	84.8

**Luminous Intensity (cd) Distribution Data**

C y	0°	22.5°	45°	67.5°	90°	112.5°	135°	157.5°
0.0°	3755	3755	3755	3755	3755	3755	3755	3755
5.0°	3705	3720	3725	3715	3716	3726	3718	3713
10.0°	3577	3587	3522	3442	3437	3494	3504	3487
15.0°	3287	3327	3283	3247	3223	3199	3203	3194
20.0°	2995	2971	2910	2871	2831	2819	2833	2857
25.0°	2653	2597	2502	2442	2410	2417	2472	2516
30.0°	2347	2273	2151	2058	2038	2045	2120	2179
35.0°	1803	1708	1573	1445	1359	1354	1357	1373
40.0°	841	780	746	726	658	607	561	556
45.0°	92	66	57	55	46	39	35	34
50.0°	4	4	3	2	2	2	2	2
55.0°	1	1	1	0	1	1	1	1
60.0°	1	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.)

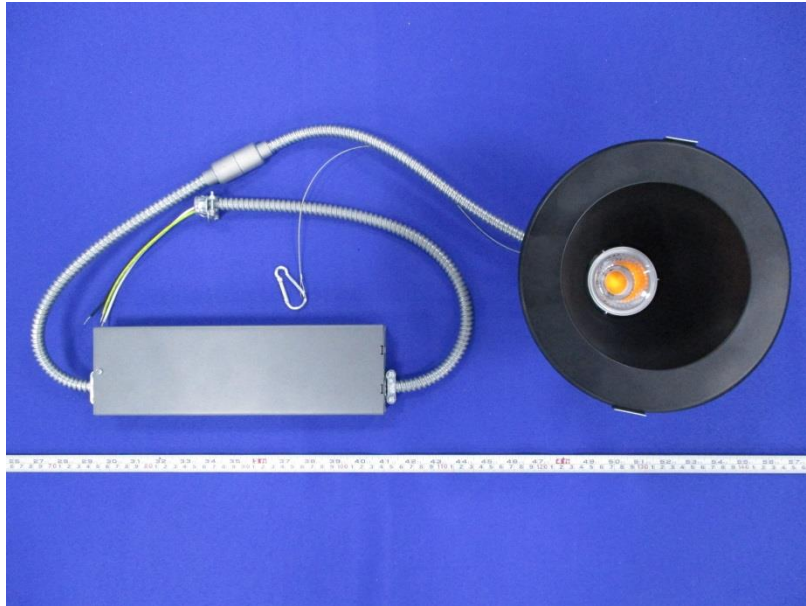
C y	180°	202.5°	225°	247.5°	270°	292.5°	315°	337.5°
0.0°	3755	3755	3755	3755	3755	3755	3755	3755
5.0°	3689	3691	3707	3705	3697	3711	3694	3682
10.0°	3431	3482	3474	3434	3416	3479	3555	3535
15.0°	3136	3162	3180	3159	3175	3201	3253	3236
20.0°	2820	2803	2778	2757	2783	2826	2876	2949
25.0°	2500	2435	2352	2318	2339	2390	2505	2587
30.0°	2140	2101	2023	1956	1968	2035	2151	2263
35.0°	1316	1352	1363	1356	1386	1540	1652	1699
40.0°	521	567	627	701	763	792	799	793
45.0°	29	32	39	53	70	88	96	91
50.0°	2	2	2	2	2	3	3	4
55.0°	1	1	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	89.2	2.61
5-10	257.5	7.52
10-15	397.9	11.62
15-20	500.4	14.61
20-25	557.9	16.29
25-30	579.6	16.93
30-35	529.0	15.45
35-40	361.5	10.56
40-45	138.4	4.04
45-50	12.1	0.35
50-55	0.7	0.02
55-60	0.2	0.01
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	89.2	2.61
0-10	346.7	10.12
0-15	744.6	21.74
0-20	1245.0	36.35
0-25	1802.9	52.65
0-30	2382.5	69.57
0-35	2911.5	85.02
0-40	3273.1	95.58
0-45	3411.4	99.62
0-50	3423.6	99.97
0-55	3424.3	99.99
0-60	3424.5	100.00
0-65	3424.5	100.00
0-70	3424.5	100.00
0-75	3424.5	100.00
0-80	3424.5	100.00
0-85	3424.5	100.00
0-90	3424.5	100.00
0-95	3424.5	100.00
0-100	3424.5	100.00
0-105	3424.5	100.00
0-110	3424.5	100.00
0-115	3424.5	100.00
0-120	3424.5	100.00
0-125	3424.5	100.00
0-130	3424.5	100.00
0-135	3424.5	100.00
0-140	3424.5	100.00
0-145	3424.5	100.00
0-150	3424.5	100.00
0-155	3424.5	100.00
0-160	3424.5	100.00
0-165	3424.5	100.00
0-170	3424.5	100.00
0-175	3424.5	100.00
0-180	3424.5	100.00

## 6. Product Photo



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