

# IES LM-79-08

## MEASUREMENT AND TEST REPORT

For

### GREEN CREATIVE LTD

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

**Test Model: LE159027DIM120VMD/ADR4BL**

<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>	RKSB190722003-10-2
<b>Test Date:</b>	2019-07-22 to 2019-07-23
<b>Report Date:</b>	2019-07-29
<b>Reviewed By:</b>	Ray Gao/EE Engineer <i>Ray 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>Test Facility:</b>	Test facility was located at No.248 Chenghu Road, Kunshan, Jiangsu province, China.
<b>Accreditation:</b>	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: LE159027DIM120VMD/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: 19.5W  
 Nominal CCT: 2700K  
 Nominal Lumen Output: 1250lm

## 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  $U_{rel}=2.6\%$  ( $k=2$ ), 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**

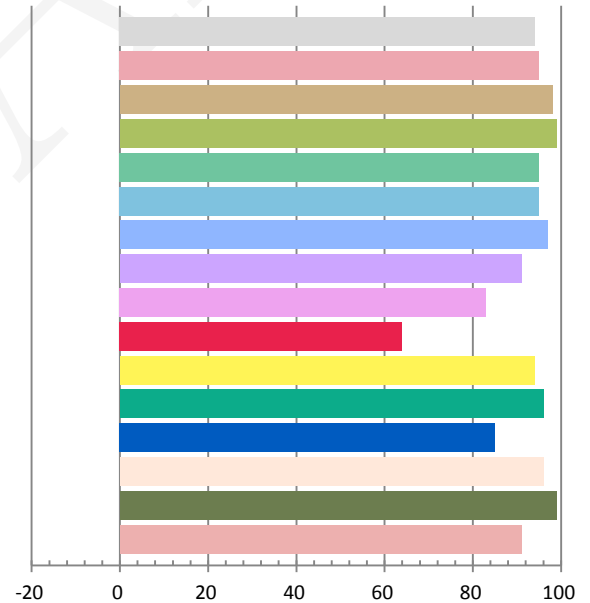
### Photometric and Electrical Measurement Result

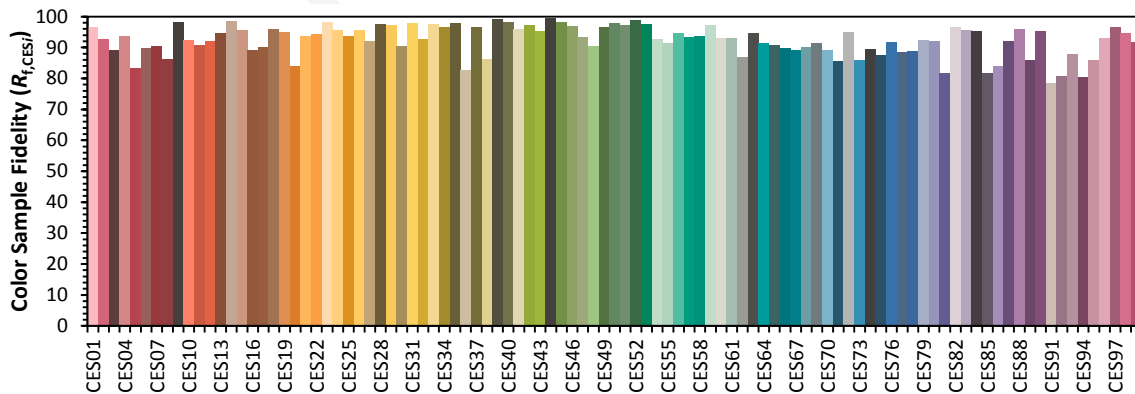
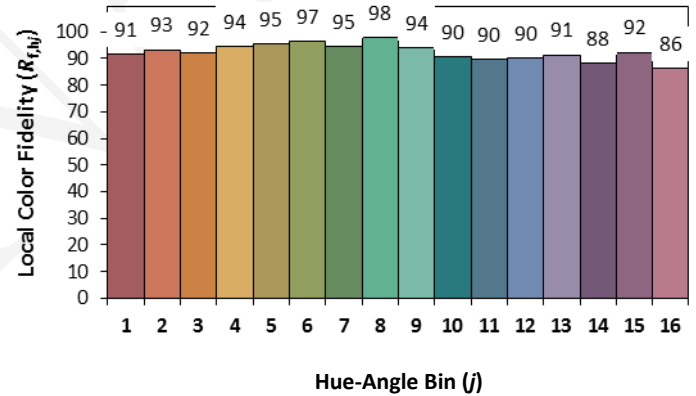
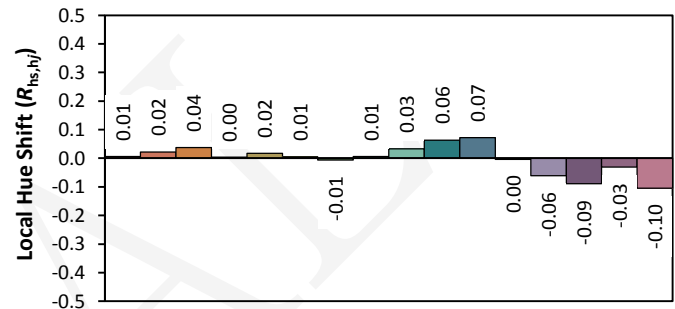
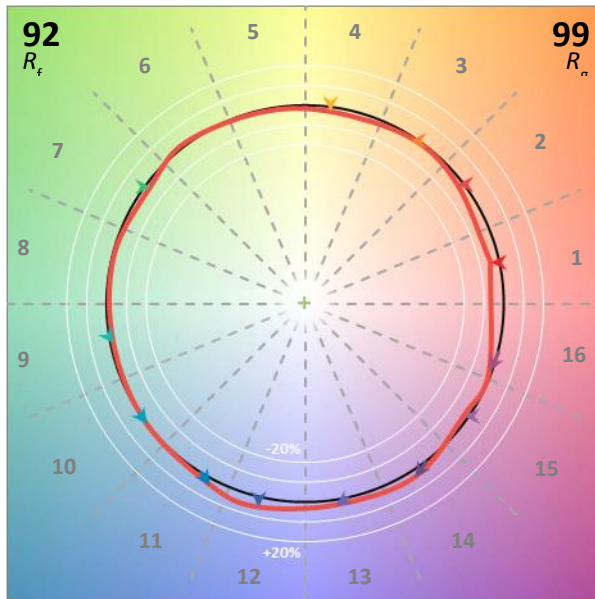
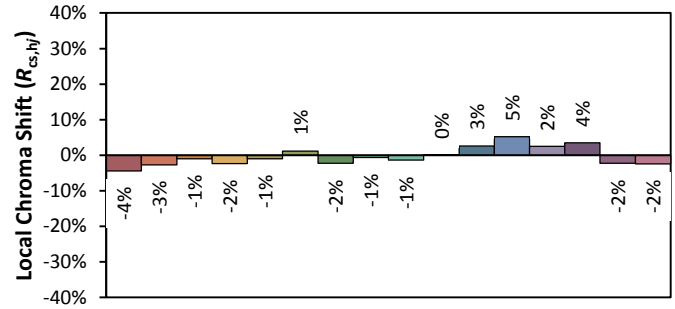
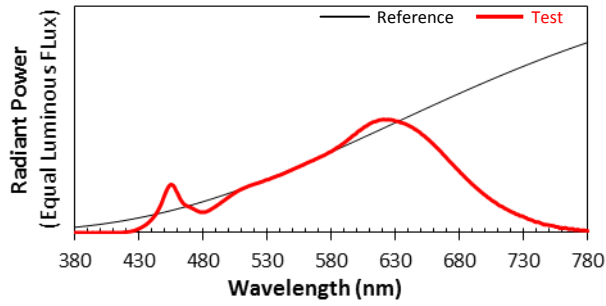
Voltage(V)	Frequency(Hz)	Current(A)	Power (W)	Power Factor	Luminous Flux(lm)	Efficacy(lm/W)
120	60	0.1693	19.84	0.9766	1333.52	67.21

Radiant Flux (W)	CCT (K)	Duv	x	y	u'	v'
4.731	2721	-0.00070	0.4569	0.4080	0.2618	0.5259

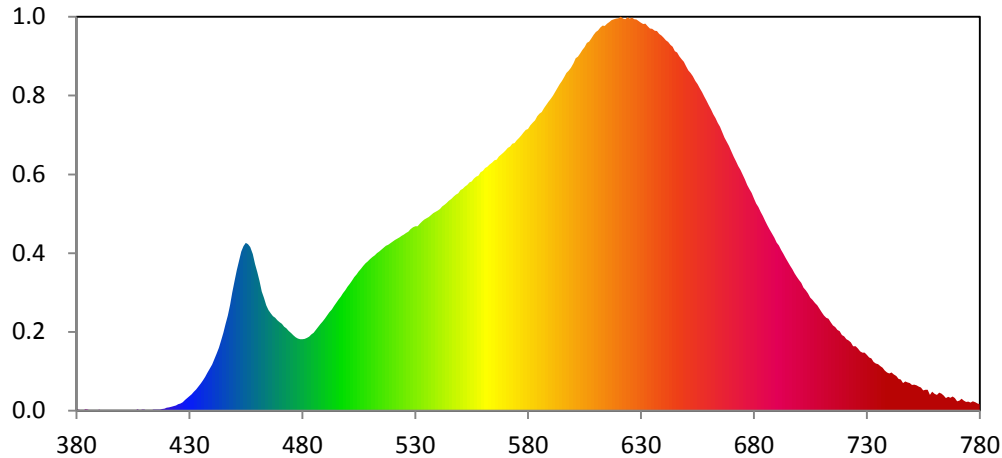
### Color Rendering Index

<b>Ra</b>			
94.1			
<b>R1</b>	<b>R2</b>	<b>R3</b>	<b>R4</b>
95	98	99	95
<b>R5</b>	<b>R6</b>	<b>R7</b>	<b>R8</b>
95	97	91	83
<b>R9</b>	<b>R10</b>	<b>R11</b>	<b>R12</b>
64	94	96	85
<b>R13</b>	<b>R14</b>	<b>R15</b>	
96	99	91	





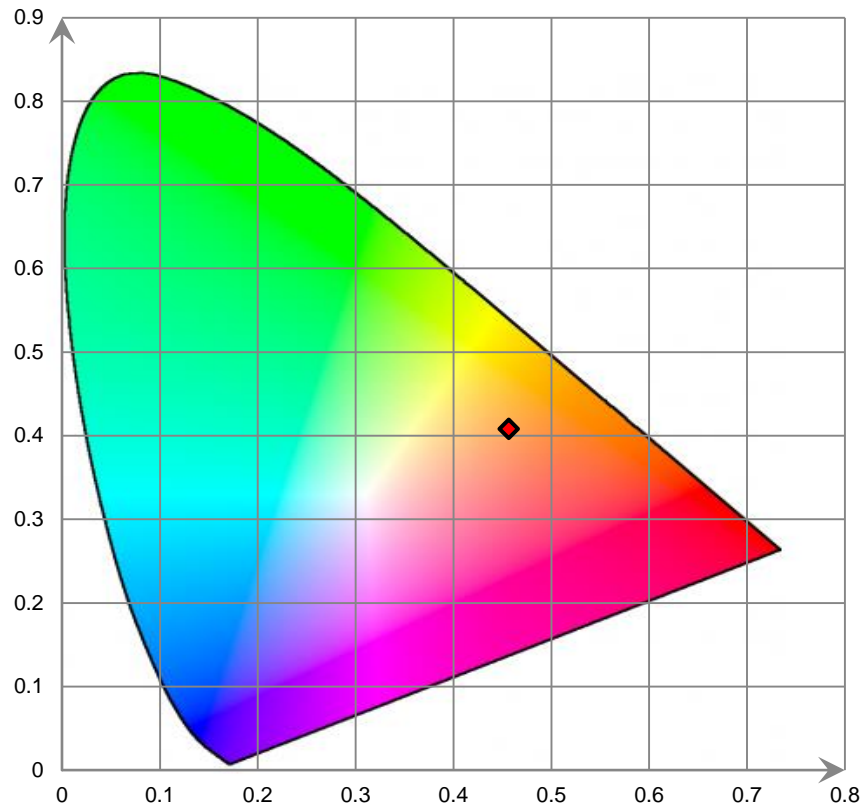
### Relative Spectral Power Distribution



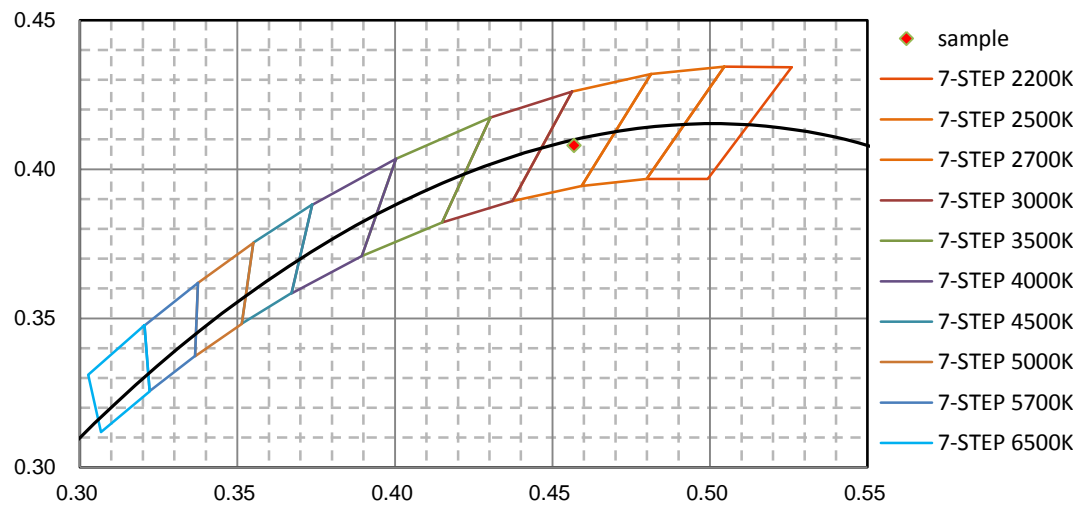
nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
380	4.910E-02	421	2.444E-01	462	8.878E+00	503	9.930E+00	544	1.548E+01
381	7.890E-02	422	2.776E-01	463	8.387E+00	504	1.013E+01	545	1.564E+01
382	4.060E-02	423	3.287E-01	464	7.852E+00	505	1.036E+01	546	1.576E+01
383	2.760E-02	424	3.756E-01	465	7.477E+00	506	1.056E+01	547	1.596E+01
384	8.170E-02	425	4.655E-01	466	7.239E+00	507	1.077E+01	548	1.608E+01
385	6.180E-02	426	5.268E-01	467	7.029E+00	508	1.096E+01	549	1.620E+01
386	4.900E-03	427	6.250E-01	468	6.900E+00	509	1.111E+01	550	1.642E+01
387	4.660E-02	428	7.809E-01	469	6.726E+00	510	1.128E+01	551	1.652E+01
388	2.230E-02	429	9.143E-01	470	6.586E+00	511	1.143E+01	552	1.668E+01
389	8.800E-03	430	1.064E+00	471	6.468E+00	512	1.156E+01	553	1.681E+01
390	7.080E-02	431	1.207E+00	472	6.250E+00	513	1.173E+01	554	1.699E+01
391	2.490E-02	432	1.400E+00	473	6.123E+00	514	1.186E+01	555	1.708E+01
392	4.800E-03	433	1.574E+00	474	5.932E+00	515	1.199E+01	556	1.729E+01
393	1.410E-02	434	1.788E+00	475	5.757E+00	516	1.212E+01	557	1.742E+01
394	1.740E-02	435	1.990E+00	476	5.611E+00	517	1.227E+01	558	1.750E+01
395	4.160E-02	436	2.235E+00	477	5.451E+00	518	1.235E+01	559	1.776E+01
396	6.100E-03	437	2.507E+00	478	5.359E+00	519	1.247E+01	560	1.786E+01
397	1.170E-02	438	2.798E+00	479	5.306E+00	520	1.257E+01	561	1.806E+01
398	1.200E-03	439	3.103E+00	480	5.307E+00	521	1.269E+01	562	1.816E+01
399	1.000E-04	440	3.442E+00	481	5.329E+00	522	1.279E+01	563	1.834E+01
400	0.000E+00	441	3.827E+00	482	5.398E+00	523	1.289E+01	564	1.848E+01
401	2.150E-02	442	4.249E+00	483	5.515E+00	524	1.302E+01	565	1.863E+01
402	3.700E-02	443	4.673E+00	484	5.681E+00	525	1.310E+01	566	1.870E+01
403	3.560E-02	444	5.215E+00	485	5.797E+00	526	1.323E+01	567	1.892E+01
404	2.790E-02	445	5.790E+00	486	6.005E+00	527	1.333E+01	568	1.908E+01
405	3.820E-02	446	6.454E+00	487	6.226E+00	528	1.351E+01	569	1.920E+01
406	7.000E-03	447	7.076E+00	488	6.425E+00	529	1.365E+01	570	1.938E+01
407	8.210E-02	448	7.854E+00	489	6.632E+00	530	1.373E+01	571	1.957E+01
408	7.100E-03	449	8.821E+00	490	6.840E+00	531	1.374E+01	572	1.967E+01
409	6.200E-02	450	9.651E+00	491	7.083E+00	532	1.392E+01	573	1.988E+01
410	7.450E-02	451	1.047E+01	492	7.315E+00	533	1.409E+01	574	1.993E+01
411	3.950E-02	452	1.115E+01	493	7.530E+00	534	1.423E+01	575	2.013E+01
412	4.720E-02	453	1.184E+01	494	7.799E+00	535	1.432E+01	576	2.032E+01
413	1.010E-02	454	1.225E+01	495	8.037E+00	536	1.443E+01	577	2.051E+01
414	7.500E-02	455	1.249E+01	496	8.259E+00	537	1.456E+01	578	2.072E+01
415	6.200E-02	456	1.240E+01	497	8.480E+00	538	1.472E+01	579	2.090E+01
416	5.900E-02	457	1.217E+01	498	8.745E+00	539	1.481E+01	580	2.097E+01
417	7.780E-02	458	1.166E+01	499	8.973E+00	540	1.491E+01	581	2.124E+01
418	1.235E-01	459	1.090E+01	500	9.227E+00	541	1.502E+01	582	2.144E+01
419	1.440E-01	460	1.032E+01	501	9.442E+00	542	1.520E+01	583	2.163E+01
420	2.222E-01	461	9.656E+00	502	9.689E+00	543	1.533E+01	584	2.192E+01

nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
585	2.212E+01	626	2.926E+01	667	2.033E+01	708	7.844E+00	749	2.042E+00
586	2.223E+01	627	2.916E+01	668	2.003E+01	709	7.578E+00	750	1.900E+00
587	2.252E+01	628	2.914E+01	669	1.971E+01	710	7.322E+00	751	1.927E+00
588	2.276E+01	629	2.901E+01	670	1.933E+01	711	7.067E+00	752	1.871E+00
589	2.300E+01	630	2.888E+01	671	1.891E+01	712	6.919E+00	753	1.795E+00
590	2.322E+01	631	2.879E+01	672	1.858E+01	713	6.839E+00	754	1.720E+00
591	2.346E+01	632	2.883E+01	673	1.822E+01	714	6.584E+00	755	1.505E+00
592	2.374E+01	633	2.864E+01	674	1.792E+01	715	6.344E+00	756	1.540E+00
593	2.402E+01	634	2.847E+01	675	1.757E+01	716	6.212E+00	757	1.546E+00
594	2.431E+01	635	2.844E+01	676	1.720E+01	717	6.010E+00	758	1.174E+00
595	2.456E+01	636	2.831E+01	677	1.681E+01	718	5.905E+00	759	1.392E+00
596	2.484E+01	637	2.826E+01	678	1.650E+01	719	5.632E+00	760	1.227E+00
597	2.514E+01	638	2.807E+01	679	1.620E+01	720	5.532E+00	761	1.163E+00
598	2.530E+01	639	2.793E+01	680	1.581E+01	721	5.320E+00	762	1.337E+00
599	2.554E+01	640	2.777E+01	681	1.541E+01	722	5.221E+00	763	1.269E+00
600	2.585E+01	641	2.758E+01	682	1.517E+01	723	5.084E+00	764	1.111E+00
601	2.625E+01	642	2.745E+01	683	1.480E+01	724	4.785E+00	765	9.365E-01
602	2.637E+01	643	2.724E+01	684	1.449E+01	725	4.793E+00	766	1.030E+00
603	2.662E+01	644	2.710E+01	685	1.413E+01	726	4.634E+00	767	9.492E-01
604	2.687E+01	645	2.676E+01	686	1.380E+01	727	4.403E+00	768	1.056E+00
605	2.709E+01	646	2.666E+01	687	1.348E+01	728	4.305E+00	769	9.194E-01
606	2.740E+01	647	2.639E+01	688	1.319E+01	729	4.301E+00	770	6.891E-01
607	2.748E+01	648	2.618E+01	689	1.286E+01	730	4.157E+00	771	7.358E-01
608	2.774E+01	649	2.599E+01	690	1.251E+01	731	3.947E+00	772	8.811E-01
609	2.798E+01	650	2.565E+01	691	1.229E+01	732	3.887E+00	773	7.376E-01
610	2.820E+01	651	2.533E+01	692	1.196E+01	733	3.611E+00	774	6.502E-01
611	2.832E+01	652	2.515E+01	693	1.167E+01	734	3.505E+00	775	6.562E-01
612	2.853E+01	653	2.490E+01	694	1.136E+01	735	3.443E+00	776	5.982E-01
613	2.869E+01	654	2.456E+01	695	1.109E+01	736	3.308E+00	777	6.877E-01
614	2.867E+01	655	2.430E+01	696	1.079E+01	737	3.205E+00	778	6.071E-01
615	2.883E+01	656	2.401E+01	697	1.053E+01	738	2.978E+00	779	5.305E-01
616	2.895E+01	657	2.371E+01	698	1.023E+01	739	2.828E+00	780	4.682E-01
617	2.909E+01	658	2.338E+01	699	9.973E+00	740	2.751E+00		
618	2.915E+01	659	2.307E+01	700	9.715E+00	741	2.830E+00		
619	2.921E+01	660	2.273E+01	701	9.506E+00	742	2.690E+00		
620	2.922E+01	661	2.243E+01	702	9.150E+00	743	2.573E+00		
621	2.934E+01	662	2.208E+01	703	8.973E+00	744	2.364E+00		
622	2.920E+01	663	2.179E+01	704	8.715E+00	745	2.304E+00		
623	2.916E+01	664	2.143E+01	705	8.411E+00	746	2.055E+00		
624	2.929E+01	665	2.115E+01	706	8.245E+00	747	2.159E+00		
625	2.921E+01	666	2.074E+01	707	8.002E+00	748	2.099E+00		

CIE 1931xy Chromaticity Diagram



7-Step Chromaticity Quadrangles





### [Goniophotometer System]

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

Test orientation: **Downward**

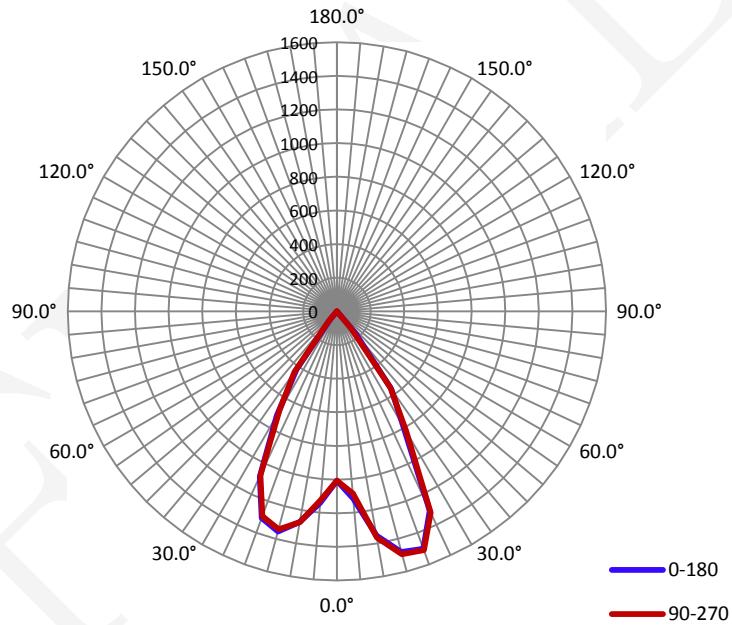
#### Electrical Measurement

Input Voltage(V)	Frequency(Hz)	Input Current(A)	Power (W)	Power Factor
120.0	60	0.1730	19.86	0.9570

#### Photometric Measurement

Luminous Flux(lm)	Efficacy(lm/W)	$I_{max}(cd)$	S/MH(C0/180)	S/MH(C90/270)
1337.6	67.40	1524.1	1.14	1.15

#### Luminous Intensity Distribution



	C0/180	C45/225	C90/270	C135/315	AVG.
Beam Angle(50% $I_{max}$ ):	60.3	60.7	60.3	61.3	60.7
Field Angle(10% $I_{max}$ ):	79.5	78.9	78.7	79.3	79.1

Luminous Intensity (cd) Distribution Data

C γ	0°	22.5°	45°	67.5°	90°	112.5°	135°	157.5°
0.0°	1007	1007	1007	1007	1007	1007	1007	1007
5.0°	1116	1108	1088	1083	1087	1096	1109	1120
10.0°	1354	1347	1335	1357	1365	1333	1299	1287
15.0°	1480	1495	1512	1513	1495	1473	1444	1385
20.0°	1502	1524	1505	1518	1511	1485	1436	1382
25.0°	1307	1329	1347	1348	1320	1296	1256	1186
30.0°	786	809	834	838	820	792	784	765
35.0°	564	584	594	576	552	533	504	478
40.0°	174	170	155	129	125	123	106	83
45.0°	7	7	7	7	7	7	4	6
50.0°	2	2	2	2	2	2	2	2
55.0°	0	1	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.)

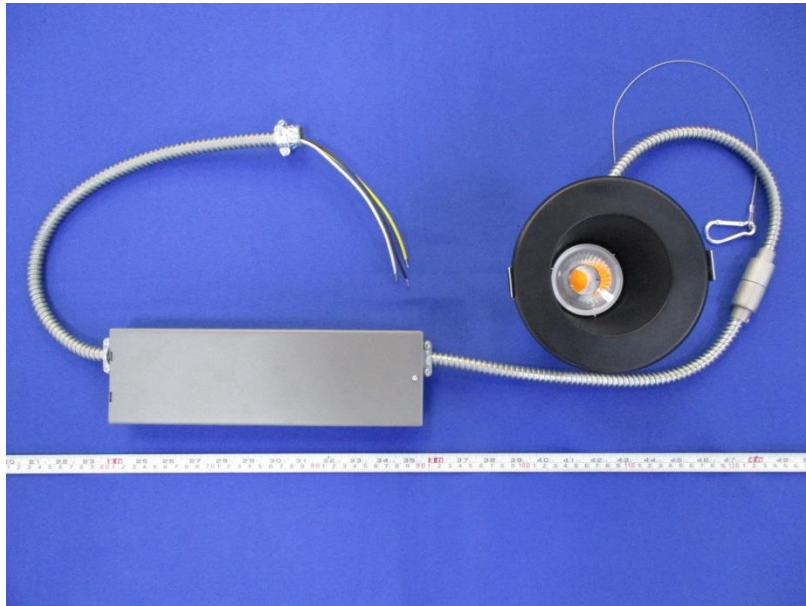
C γ	180°	202.5°	225°	247.5°	270°	292.5°	315°	337.5°
0.0°	1007	1007	1007	1007	1007	1007	1007	1007
5.0°	1142	1138	1132	1126	1128	1138	1145	1143
10.0°	1270	1259	1258	1258	1273	1294	1324	1351
15.0°	1355	1324	1300	1312	1340	1375	1425	1467
20.0°	1307	1279	1253	1261	1295	1341	1403	1459
25.0°	1084	1048	1045	1041	1074	1135	1184	1246
30.0°	716	697	692	687	683	694	733	756
35.0°	419	415	417	419	440	461	492	507
40.0°	63	68	64	58	79	106	132	144
45.0°	5	5	5	6	6	5	5	6
50.0°	2	2	2	2	2	2	2	2
55.0°	0	0	0	1	0	0	1	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	25.4	1.90
5-10	86.9	6.50
10-15	161.9	12.10
15-20	232.6	17.39
20-25	273.4	20.44
25-30	247.8	18.53
30-35	184.4	13.79
35-40	101.5	7.59
40-45	21.7	1.62
45-50	1.6	0.12
50-55	0.5	0.04
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	25.4	1.90
0-10	112.3	8.40
0-15	274.2	20.50
0-20	506.7	37.88
0-25	780.1	58.32
0-30	1027.9	76.85
0-35	1212.4	90.63
0-40	1313.8	98.22
0-45	1335.5	99.84
0-50	1337.1	99.96
0-55	1337.6	100.00
0-60	1337.6	100.00
0-65	1337.6	100.00
0-70	1337.6	100.00
0-75	1337.6	100.00
0-80	1337.6	100.00
0-85	1337.6	100.00
0-90	1337.6	100.00
0-95	1337.6	100.00
0-100	1337.6	100.00
0-105	1337.6	100.00
0-110	1337.6	100.00
0-115	1337.6	100.00
0-120	1337.6	100.00
0-125	1337.6	100.00
0-130	1337.6	100.00
0-135	1337.6	100.00
0-140	1337.6	100.00
0-145	1337.6	100.00
0-150	1337.6	100.00
0-155	1337.6	100.00
0-160	1337.6	100.00
0-165	1337.6	100.00
0-170	1337.6	100.00
0-175	1337.6	100.00
0-180	1337.6	100.00

## 6. Product Photo



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