

# IES LM-79-08

## MEASUREMENT AND TEST REPORT

For

### GREEN CREATIVE LTD

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

**Test Model: LE209027DIM120VWD/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>	RKSB190722004-10-3
<b>Test Date:</b>	2019-07-22 to 2019-07-25
<b>Report Date:</b>	2019-07-30
<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:

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

Model Tested: LE209027DIM120VWD/ADR4BL  
 Manufacturer: GREEN CREATIVE LTD  
 Brand Name: GREEN CREATIVE  
 Product Designation: LED Recessed Downlight  
 Burning TimeBefore Test: 0hour(For New Products)

### Rated Values:

Rated Voltage/Frequency: 120-277 VAC 60Hz  
 Rated Power: 24W  
 Nominal CCT: 2700K  
 Nominal Lumen Output: 1650lm

## 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  $U_{\text{rel}}=2.70\%$  ( $k=2$ ), at the 95% confidence level. The uncertainty of the correlated color temperature measurements is  $U=27\text{K}$  ( $k=2$ ), at the 95% confidence level. The uncertainty of the CRI is  $U=2.7(k=2)$ , at the 95% confidence level.

The uncertainty of power meter AC current  $U_{\text{rel}}=0.27\%$  of rdg, AC Voltage  $U_{\text{rel}}=0.26\%$  of rdg, Power  $U_{\text{rel}}=0.41\%$  ( $k=2$ ), 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  $U_{\text{rel}}=2.6\%$  ( $k=2$ ), at the 95% confidence level.

### Fidelity Index and Gamut Index Calculation

The  $R_i$ ,  $R_g$  was calculated according to IES TM-30-18 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**

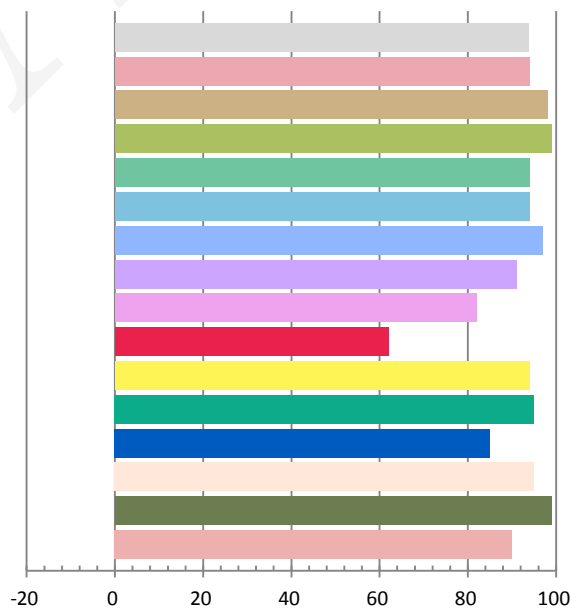
### Photometric and Electrical Measurement Result

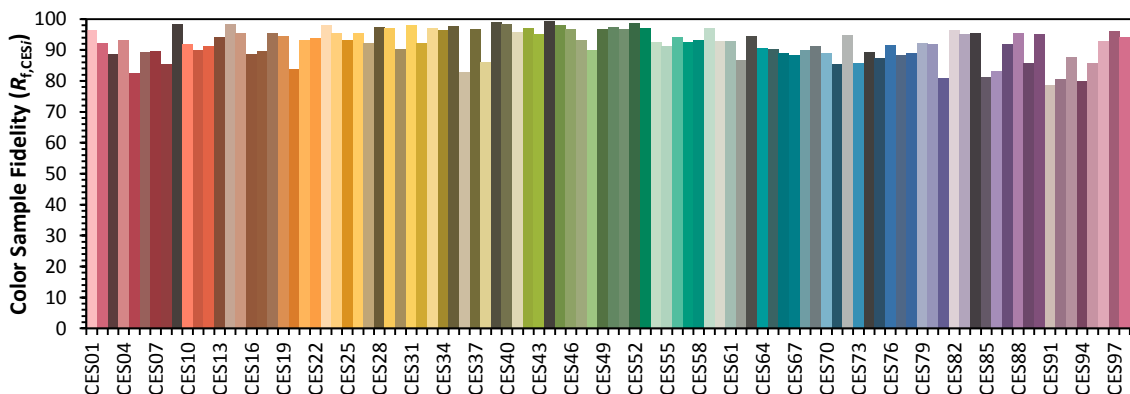
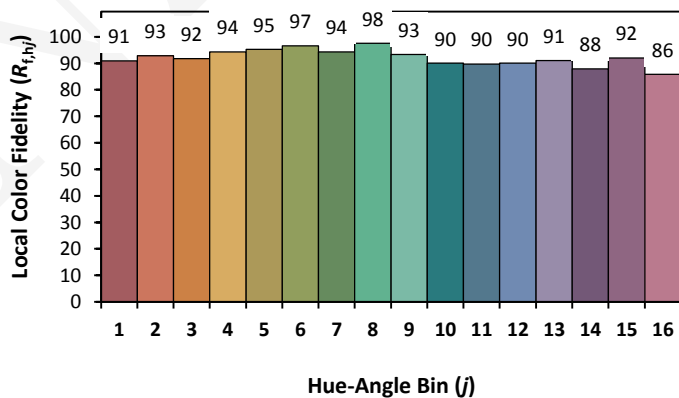
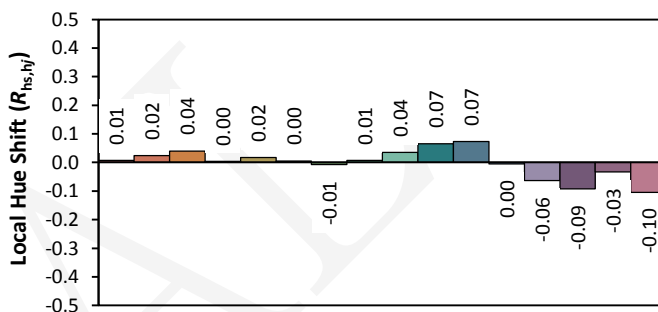
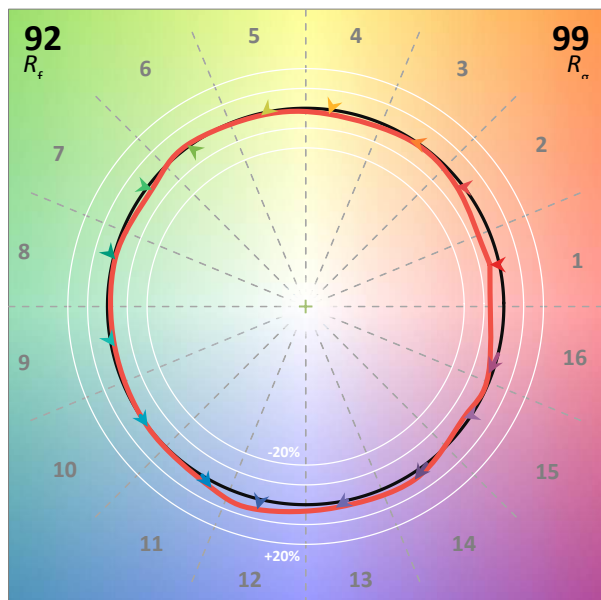
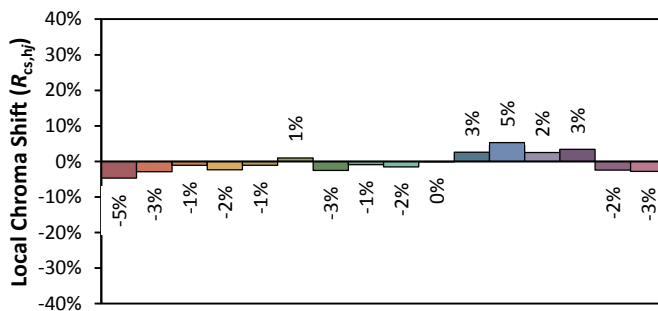
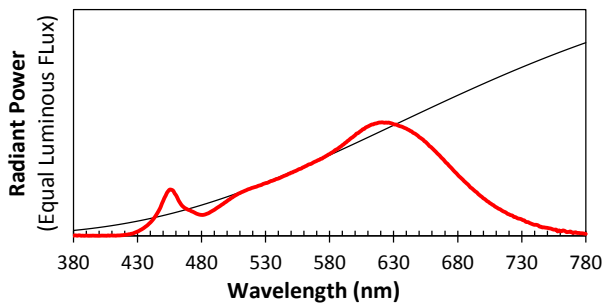
Voltage(V)	Frequency(Hz)	Current(A)	Power (W)	Power Factor	Luminous Flux(lm)	Efficacy(lm/W)
120	60	0.2068	24.4	0.9832	1778.31	72.88

Radiant Flux (W)	CCT (K)	Duv	x	y	u'	v'
6.310	2703	-0.00077	0.4583	0.4082	0.2626	0.5262

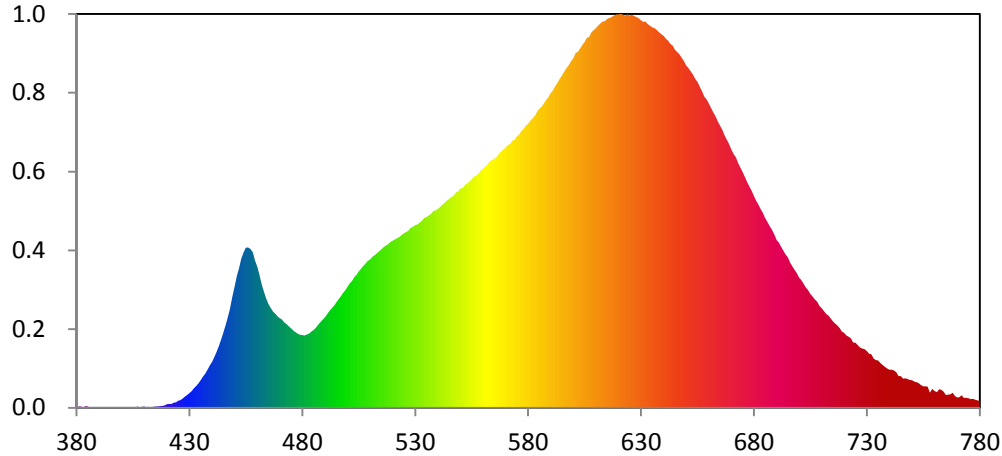
### Color Rendering Index

<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	95	85
<b>R13</b>	<b>R14</b>	<b>R15</b>	
95	99	90	





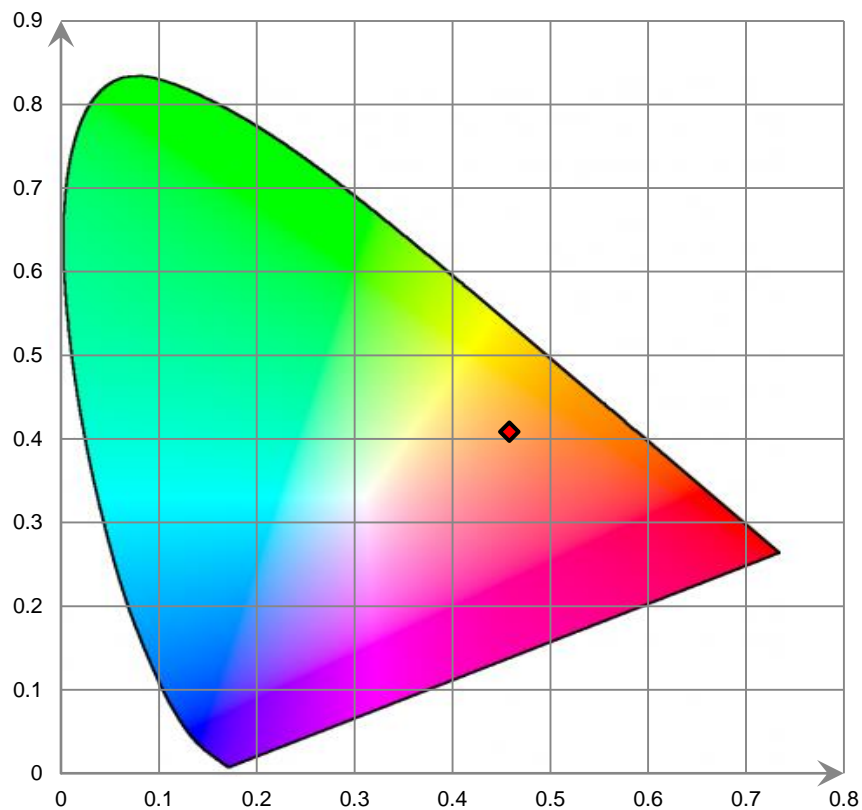
### Relative Spectral Power Distribution



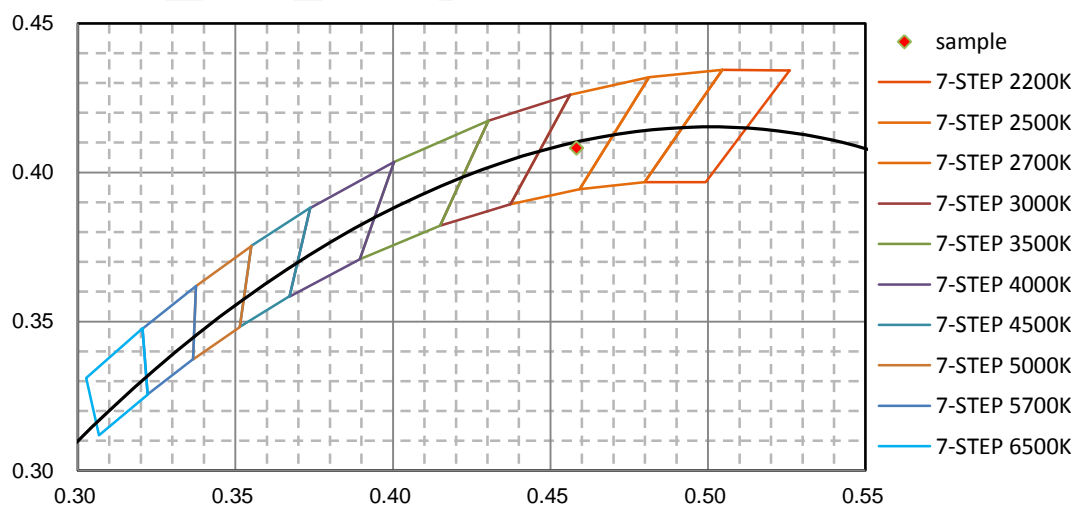
nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
380	4.820E-02	421	3.900E-01	462	1.226E+01	503	1.300E+01	544	2.059E+01
381	1.262E-01	422	3.926E-01	463	1.153E+01	504	1.322E+01	545	2.076E+01
382	1.208E-01	423	5.151E-01	464	1.084E+01	505	1.356E+01	546	2.093E+01
383	1.140E-02	424	5.446E-01	465	1.031E+01	506	1.382E+01	547	2.112E+01
384	1.462E-01	425	6.816E-01	466	9.920E+00	507	1.408E+01	548	2.140E+01
385	1.283E-01	426	7.501E-01	467	9.570E+00	508	1.431E+01	549	2.151E+01
386	1.020E-02	427	9.070E-01	468	9.356E+00	509	1.461E+01	550	2.182E+01
387	5.630E-02	428	1.109E+00	469	9.100E+00	510	1.474E+01	551	2.186E+01
388	1.890E-02	429	1.282E+00	470	8.906E+00	511	1.501E+01	552	2.216E+01
389	1.500E-02	430	1.470E+00	471	8.770E+00	512	1.518E+01	553	2.230E+01
390	8.130E-02	431	1.660E+00	472	8.493E+00	513	1.538E+01	554	2.250E+01
391	3.160E-02	432	1.936E+00	473	8.338E+00	514	1.558E+01	555	2.273E+01
392	1.300E-03	433	2.158E+00	474	8.123E+00	515	1.575E+01	556	2.299E+01
393	2.580E-02	434	2.429E+00	475	7.888E+00	516	1.599E+01	557	2.310E+01
394	2.300E-02	435	2.724E+00	476	7.656E+00	517	1.614E+01	558	2.327E+01
395	6.940E-02	436	3.070E+00	477	7.495E+00	518	1.626E+01	559	2.359E+01
396	3.380E-02	437	3.378E+00	478	7.350E+00	519	1.648E+01	560	2.375E+01
397	1.600E-02	438	3.739E+00	479	7.254E+00	520	1.661E+01	561	2.401E+01
398	1.970E-02	439	4.178E+00	480	7.213E+00	521	1.674E+01	562	2.418E+01
399	1.000E-03	440	4.573E+00	481	7.198E+00	522	1.686E+01	563	2.448E+01
400	0.000E+00	441	5.053E+00	482	7.276E+00	523	1.698E+01	564	2.467E+01
401	2.720E-02	442	5.575E+00	483	7.393E+00	524	1.720E+01	565	2.476E+01
402	6.180E-02	443	6.141E+00	484	7.581E+00	525	1.734E+01	566	2.496E+01
403	5.820E-02	444	6.787E+00	485	7.729E+00	526	1.746E+01	567	2.524E+01
404	3.690E-02	445	7.477E+00	486	7.950E+00	527	1.761E+01	568	2.548E+01
405	4.170E-02	446	8.213E+00	487	8.231E+00	528	1.789E+01	569	2.567E+01
406	8.000E-03	447	9.004E+00	488	8.481E+00	529	1.802E+01	570	2.586E+01
407	1.321E-01	448	9.886E+00	489	8.736E+00	530	1.817E+01	571	2.613E+01
408	2.500E-02	449	1.106E+01	490	8.979E+00	531	1.823E+01	572	2.623E+01
409	9.790E-02	450	1.203E+01	491	9.298E+00	532	1.842E+01	573	2.658E+01
410	1.093E-01	451	1.307E+01	492	9.611E+00	533	1.862E+01	574	2.663E+01
411	6.450E-02	452	1.389E+01	493	9.897E+00	534	1.887E+01	575	2.699E+01
412	8.240E-02	453	1.484E+01	494	1.016E+01	535	1.896E+01	576	2.719E+01
413	2.730E-02	454	1.544E+01	495	1.048E+01	536	1.913E+01	577	2.749E+01
414	1.047E-01	455	1.592E+01	496	1.079E+01	537	1.928E+01	578	2.772E+01
415	1.151E-01	456	1.594E+01	497	1.106E+01	538	1.954E+01	579	2.805E+01
416	1.175E-01	457	1.581E+01	498	1.143E+01	539	1.964E+01	580	2.822E+01
417	1.529E-01	458	1.547E+01	499	1.169E+01	540	1.977E+01	581	2.855E+01
418	2.012E-01	459	1.463E+01	500	1.202E+01	541	1.996E+01	582	2.881E+01
419	2.172E-01	460	1.404E+01	501	1.237E+01	542	2.017E+01	583	2.907E+01
420	3.325E-01	461	1.322E+01	502	1.261E+01	543	2.038E+01	584	2.948E+01

nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
585	2.975E+01	626	3.909E+01	667	2.712E+01	708	1.053E+01	749	2.783E+00
586	2.995E+01	627	3.897E+01	668	2.669E+01	709	1.014E+01	750	2.739E+00
587	3.029E+01	628	3.886E+01	669	2.627E+01	710	9.882E+00	751	2.619E+00
588	3.063E+01	629	3.872E+01	670	2.571E+01	711	9.620E+00	752	2.549E+00
589	3.090E+01	630	3.854E+01	671	2.522E+01	712	9.325E+00	753	2.454E+00
590	3.131E+01	631	3.841E+01	672	2.488E+01	713	9.180E+00	754	2.265E+00
591	3.158E+01	632	3.842E+01	673	2.433E+01	714	8.874E+00	755	2.128E+00
592	3.200E+01	633	3.818E+01	674	2.388E+01	715	8.580E+00	756	2.119E+00
593	3.230E+01	634	3.800E+01	675	2.344E+01	716	8.355E+00	757	2.100E+00
594	3.272E+01	635	3.783E+01	676	2.294E+01	717	8.188E+00	758	1.492E+00
595	3.302E+01	636	3.774E+01	677	2.244E+01	718	7.920E+00	759	1.877E+00
596	3.344E+01	637	3.757E+01	678	2.199E+01	719	7.561E+00	760	1.661E+00
597	3.378E+01	638	3.735E+01	679	2.158E+01	720	7.440E+00	761	1.546E+00
598	3.406E+01	639	3.716E+01	680	2.108E+01	721	7.180E+00	762	1.831E+00
599	3.443E+01	640	3.698E+01	681	2.058E+01	722	7.069E+00	763	1.780E+00
600	3.478E+01	641	3.669E+01	682	2.021E+01	723	6.906E+00	764	1.590E+00
601	3.529E+01	642	3.652E+01	683	1.978E+01	724	6.478E+00	765	1.269E+00
602	3.541E+01	643	3.619E+01	684	1.937E+01	725	6.466E+00	766	1.301E+00
603	3.574E+01	644	3.604E+01	685	1.888E+01	726	6.212E+00	767	1.341E+00
604	3.609E+01	645	3.562E+01	686	1.850E+01	727	5.988E+00	768	1.498E+00
605	3.639E+01	646	3.540E+01	687	1.807E+01	728	5.900E+00	769	1.174E+00
606	3.680E+01	647	3.517E+01	688	1.772E+01	729	5.824E+00	770	1.027E+00
607	3.690E+01	648	3.483E+01	689	1.721E+01	730	5.632E+00	771	1.063E+00
608	3.734E+01	649	3.451E+01	690	1.668E+01	731	5.377E+00	772	1.236E+00
609	3.756E+01	650	3.406E+01	691	1.642E+01	732	5.313E+00	773	9.955E-01
610	3.777E+01	651	3.380E+01	692	1.601E+01	733	4.884E+00	774	9.755E-01
611	3.800E+01	652	3.347E+01	693	1.562E+01	734	4.733E+00	775	9.583E-01
612	3.822E+01	653	3.317E+01	694	1.524E+01	735	4.711E+00	776	8.617E-01
613	3.843E+01	654	3.267E+01	695	1.495E+01	736	4.449E+00	777	8.738E-01
614	3.846E+01	655	3.239E+01	696	1.444E+01	737	4.259E+00	778	8.067E-01
615	3.869E+01	656	3.194E+01	697	1.407E+01	738	4.083E+00	779	7.352E-01
616	3.877E+01	657	3.149E+01	698	1.371E+01	739	3.905E+00	780	6.560E-01
617	3.886E+01	658	3.095E+01	699	1.339E+01	740	3.783E+00		
618	3.904E+01	659	3.069E+01	700	1.295E+01	741	3.802E+00		
619	3.912E+01	660	3.027E+01	701	1.271E+01	742	3.724E+00		
620	3.912E+01	661	2.984E+01	702	1.235E+01	743	3.533E+00		
621	3.918E+01	662	2.939E+01	703	1.195E+01	744	3.147E+00		
622	3.909E+01	663	2.898E+01	704	1.172E+01	745	3.161E+00		
623	3.902E+01	664	2.848E+01	705	1.133E+01	746	2.882E+00		
624	3.911E+01	665	2.807E+01	706	1.108E+01	747	2.931E+00		
625	3.902E+01	666	2.766E+01	707	1.075E+01	748	2.848E+00		

CIE 1931xy Chromaticity Diagram



7-Step Chromaticity Quadrangles





### [Goniophotometer System]

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

Test orientation: **Downward**

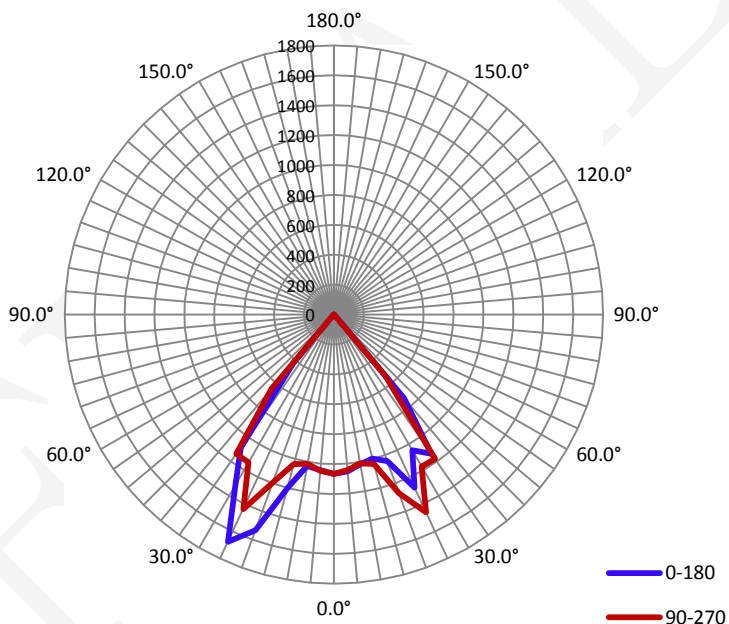
### Electrical Measurement

Input Voltage(V)	Frequency(Hz)	Input Current(A)	Power (W)	Power Factor
120.0	60	0.2120	24.41	0.9600

### Photometric Measurement

Luminous Flux(lm)	Efficacy(lm/W)	$I_{max}$ (cd)	S/MH(C0/180)	S/MH(C90/270)
1784.4	73.15	1689.8	1.45	1.47

### Luminous Intensity Distribution



	C0/180	C45/225	C90/270	C135/315	AVG.
Beam Angle(50% $I_{max}$ ):	75.5	77.1	77.7	76.5	76.7
Field Angle(10% $I_{max}$ ):	87.1	87.6	87.7	87.5	87.5

**Luminous Intensity (cd) Distribution Data**

C y	0°	22.5°	45°	67.5°	90°	112.5°	135°	157.5°
0.0°	1066	1066	1066	1066	1066	1066	1066	1066
5.0°	1052	1048	1046	1044	1044	1044	1046	1046
10.0°	1016	1012	1010	1010	1011	1012	1019	1023
15.0°	996	996	998	1017	1035	1081	1157	1192
20.0°	1043	1063	1116	1174	1270	1373	1449	1507
25.0°	1277	1305	1364	1401	1459	1526	1629	1690
30.0°	1048	1037	1073	1120	1174	1255	1297	1338
35.0°	1136	1144	1172	1186	1178	1162	1164	1154
40.0°	729	720	667	599	537	507	511	497
45.0°	20	13	12	12	11	11	12	12
50.0°	7	6	6	6	6	6	6	7
55.0°	4	3	3	4	4	3	4	3
60.0°	2	2	1	2	2	1	2	2
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.)

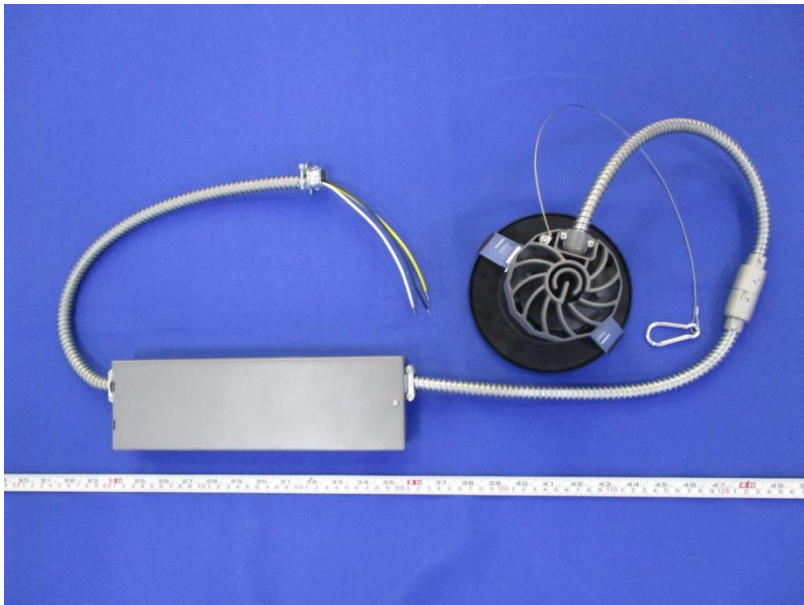
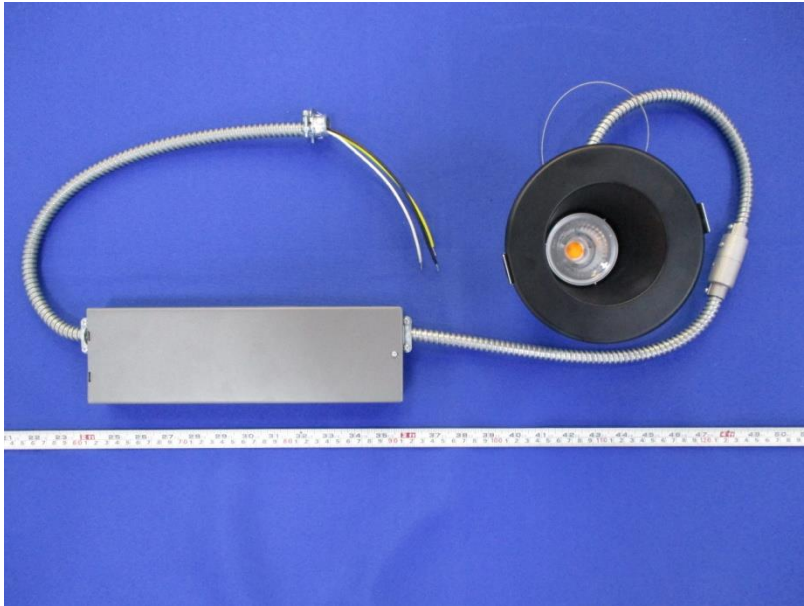
C y	180°	202.5°	225°	247.5°	270°	292.5°	315°	337.5°
0.0°	1066	1066	1066	1066	1066	1066	1066	1066
5.0°	1044	1046	1047	1048	1049	1051	1052	1050
10.0°	1028	1024	1016	1013	1015	1018	1019	1016
15.0°	1201	1167	1131	1083	1035	1005	996	991
20.0°	1535	1461	1350	1273	1198	1124	1081	1039
25.0°	1677	1614	1540	1474	1434	1382	1336	1289
30.0°	1319	1271	1191	1179	1140	1100	1076	1052
35.0°	1087	1108	1117	1128	1137	1128	1136	1144
40.0°	424	497	553	617	648	692	715	700
45.0°	13	13	13	14	16	18	22	17
50.0°	7	6	6	6	7	8	7	6
55.0°	3	4	4	4	4	5	4	3
60.0°	2	2	2	3	2	2	2	2
65.0°	0	0	0	0	0	0	0	1
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	25.3	1.42
5-10	73.8	4.14
10-15	123.6	6.93
15-20	191.3	10.72
20-25	284.8	15.96
25-30	332.7	18.65
30-35	340.1	19.06
35-40	290.9	16.30
40-45	113.9	6.38
45-50	4.2	0.23
50-55	2.2	0.12
55-60	1.3	0.07
60-65	0.5	0.03
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	25.3	1.42
0-10	99.1	5.55
0-15	222.7	12.48
0-20	414.0	23.20
0-25	698.8	39.16
0-30	1031.5	57.81
0-35	1371.6	76.86
0-40	1662.5	93.16
0-45	1776.3	99.55
0-50	1780.5	99.78
0-55	1782.7	99.90
0-60	1784.0	99.97
0-65	1784.4	100.00
0-70	1784.4	100.00
0-75	1784.4	100.00
0-80	1784.4	100.00
0-85	1784.4	100.00
0-90	1784.4	100.00
0-95	1784.4	100.00
0-100	1784.4	100.00
0-105	1784.4	100.00
0-110	1784.4	100.00
0-115	1784.4	100.00
0-120	1784.4	100.00
0-125	1784.4	100.00
0-130	1784.4	100.00
0-135	1784.4	100.00
0-140	1784.4	100.00
0-145	1784.4	100.00
0-150	1784.4	100.00
0-155	1784.4	100.00
0-160	1784.4	100.00
0-165	1784.4	100.00
0-170	1784.4	100.00
0-175	1784.4	100.00
0-180	1784.4	100.00

## 6. Product Photo



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