



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: LE199027DIM120WDR4BL**

<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>	RKSB190329024-10-3
<b>Test Date:</b>	2019-04-04 to 2019-04-09
<b>Report Date:</b>	2019-05-07
<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>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.

**Note:** The test data was only valid for the test sample(s). This test report is prepared for the customer shown above and for the device described herein. It may not be duplicated or used in part without prior written consent from Bay Area Compliance Laboratories Corp. (Kunshan). This report is valid only with a valid digital signature. The digital signature may be available only under the Adobe software above version 7.0.

## 1. Product Description

### General Information:

One sample was received on 2019-03-29 and used for testing.

Model Tested: LE199027DIM120WDR4BL  
 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: 31W  
 Nominal CCT: 2700K  
 Nominal Lumen Output: 1950lm

## 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-30-15: 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	2020-01-23
Power Meter	INVENTFINE	WT500	GSJWQ20009	2019-04-08	2020-04-08
Spectral photometer	INVENTFINE	CMS-3S	GSGSE100017	2019-01-23	2020-01-23
AC Power Supply	INVENTFINE	CHP500	JWJSD010071	2019-04-08	2020-04-08
Standard Light Source	INVENTFINE	N/A	JWWCR020106	2018-12-24	2019-12-24
Thermal Meter	KEJIAN	TA298	N/A	2018-12-01	2019-12-01
DC Power Supply	INVENTFINE	WL3005	JWWCP020069	2019-04-08	2020-04-08
AC Power Supply	INVENTFINE	CHP-5KVA	900511765	2019-04-08	2020-04-08
DC Power Supply	INVENTFINE	WL3010	JWDMP030001	2019-04-08	2020-04-08
Power Meter	INVENTFINE	WT500	GSDSQ200007	2019-04-08	2020-04-08
Goniophotometer	INVENTFINE	GPM-1900	YWGCF120001	2019-01-24	2020-01-24
Wireless Weather Station	ZHONGXING	KG218	N/A	2018-12-01	2019-12-01
Standard Light Source	INVENTFINE	N/A	JWBYR040008	2019-03-08	2020-03-08

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**

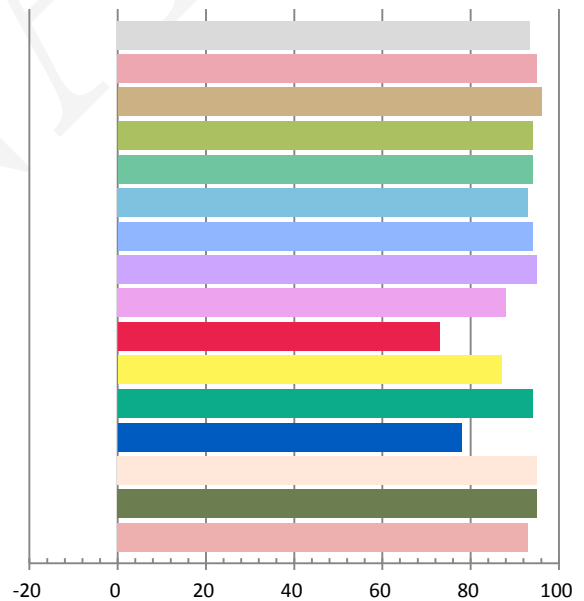
### Photometric and Electrical Measurement Result

Voltage (V)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Luminous Flux(lm)	Efficacy (lm/W)
120	60	0.262	31.06	0.9881	2050.92	66.03

Radiant Flux (W)	CCT (K)	Duv	x	y	u'	v'
7.493	2723	-0.00010	0.4578	0.4099	0.2615	0.5268

### Color Rendering Index

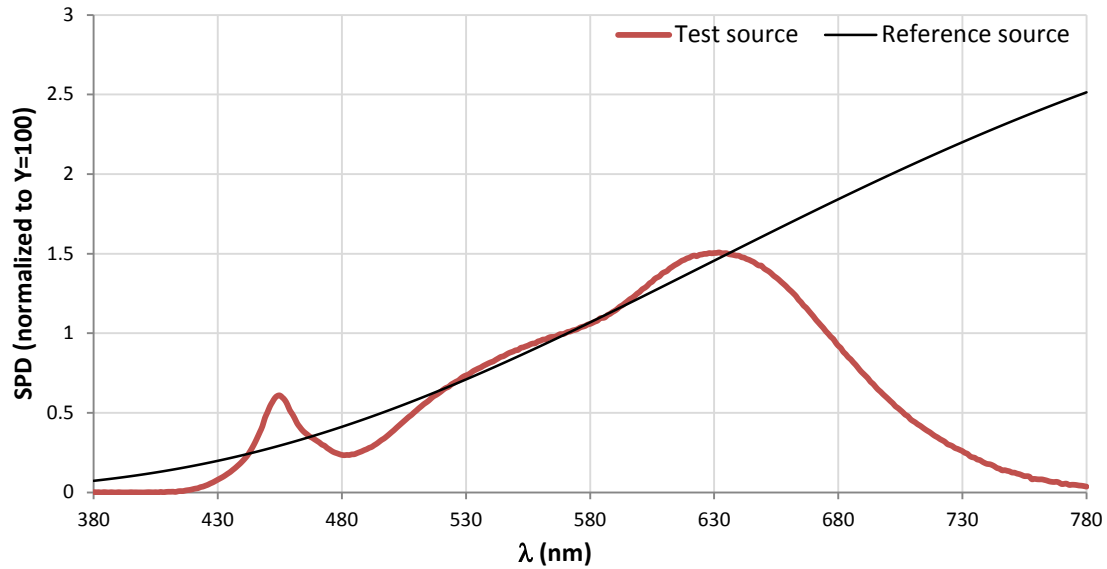
<b>Ra</b>			
93.5			
<b>R1</b>	<b>R2</b>	<b>R3</b>	<b>R4</b>
95	96	94	94
<b>R5</b>	<b>R6</b>	<b>R7</b>	<b>R8</b>
93	94	95	88
<b>R9</b>	<b>R10</b>	<b>R11</b>	<b>R12</b>
73	87	94	78
<b>R13</b>	<b>R14</b>	<b>R15</b>	
95	95	93	



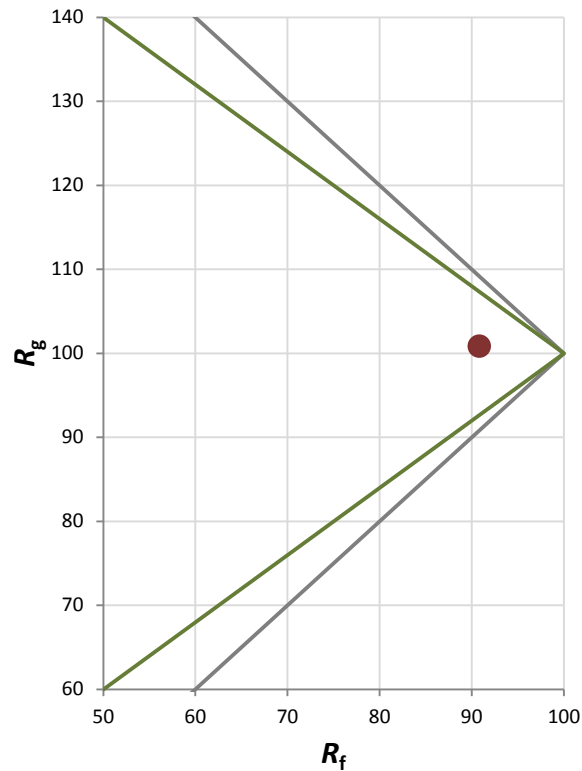
### Fidelity Index and Gamut Index

Fidelity Index $R_f$	91
Gamut Index $R_g$	101

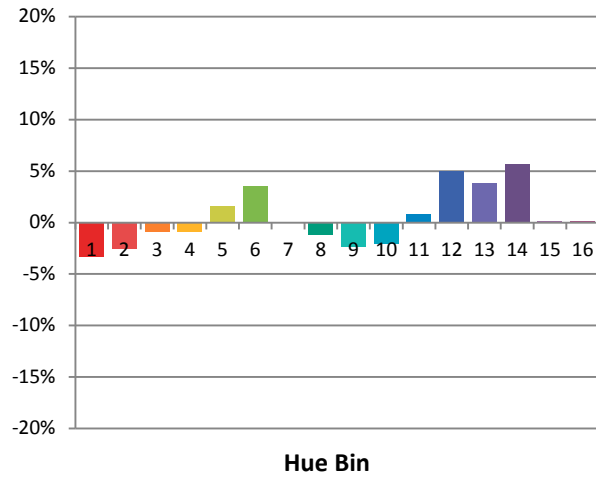
### Spectral Power Distribution Comparison



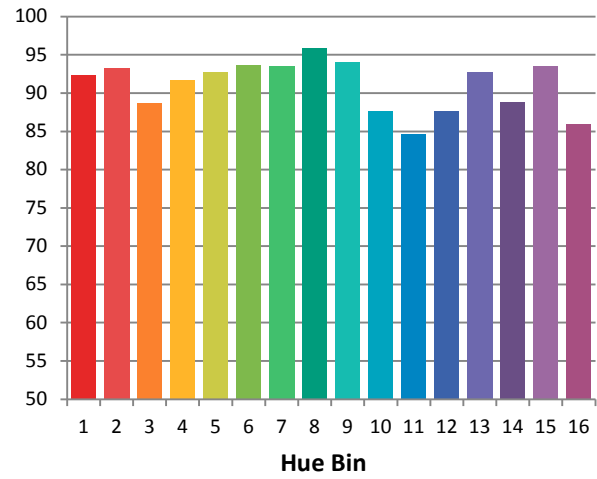
### Plot of $R_g$ versus $R_f$



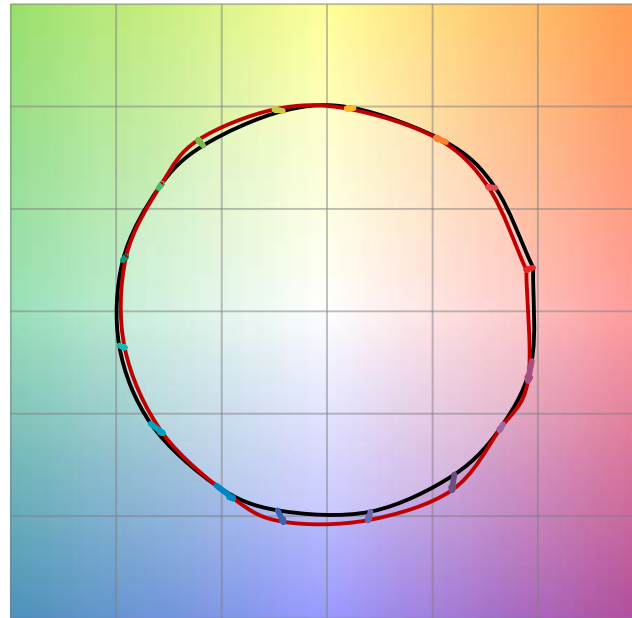
Chroma Shift by Hue



$R_t$  by Hue

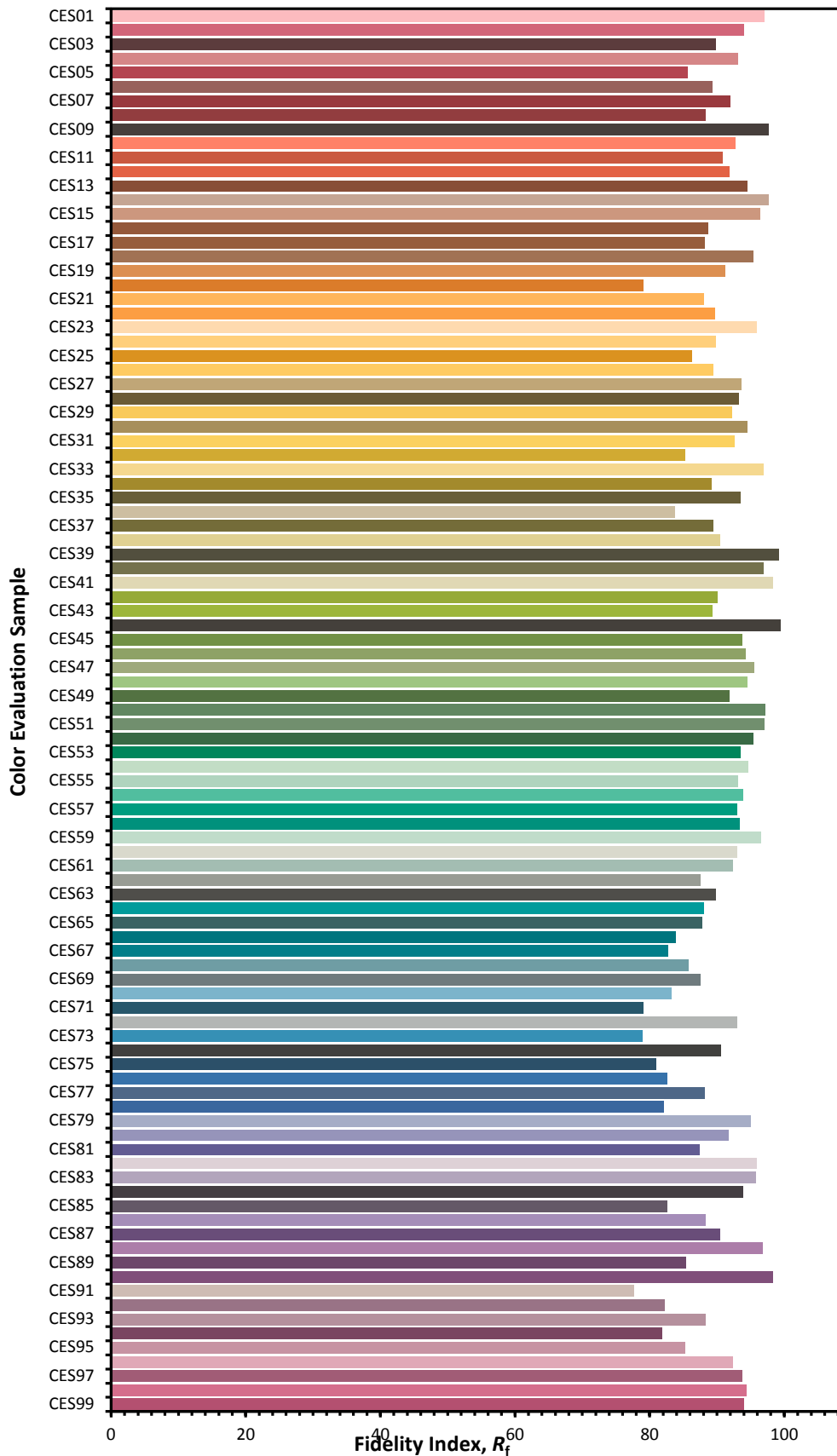


Color Vector Graphic

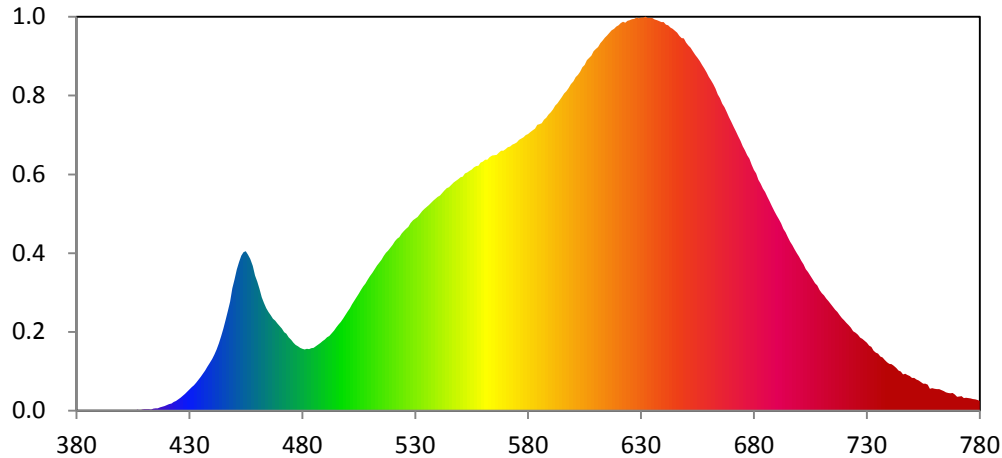


— Refenerce Illuminat — Test Source

### Color Fidelity by CES Sample



### Relative Spectral Power Distribution

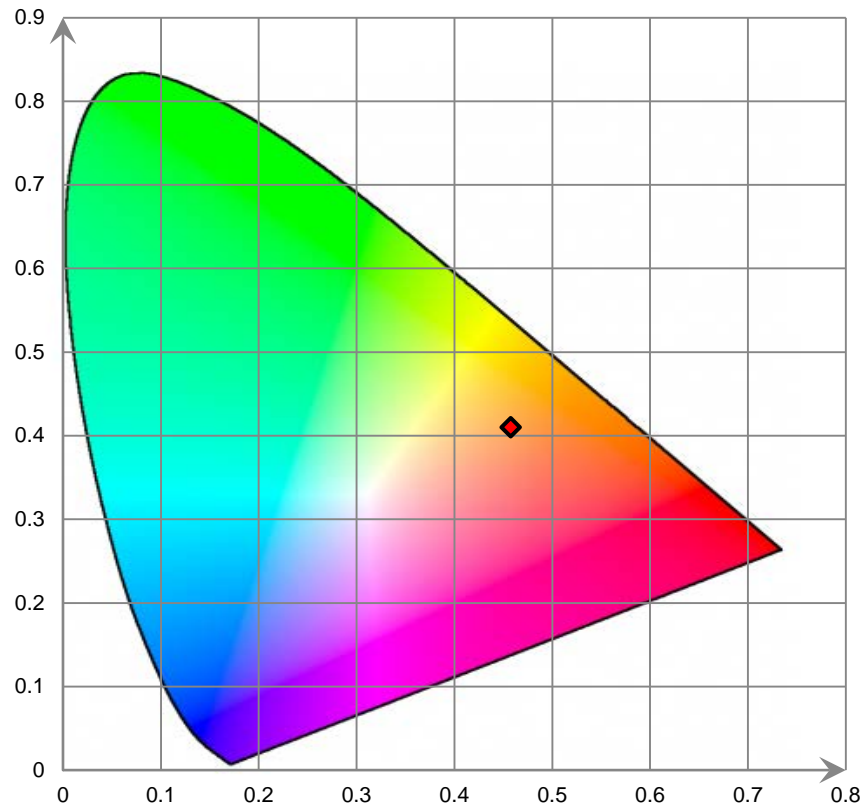


nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
380	7.450E-02	421	7.298E-01	462	1.302E+01	503	1.261E+01	544	2.557E+01
381	3.680E-02	422	8.059E-01	463	1.237E+01	504	1.303E+01	545	2.569E+01
382	5.220E-02	423	9.990E-01	464	1.177E+01	505	1.344E+01	546	2.595E+01
383	6.300E-03	424	1.101E+00	465	1.131E+01	506	1.386E+01	547	2.623E+01
384	6.050E-02	425	1.278E+00	466	1.096E+01	507	1.427E+01	548	2.643E+01
385	4.290E-02	426	1.455E+00	467	1.056E+01	508	1.461E+01	549	2.659E+01
386	3.800E-03	427	1.694E+00	468	1.033E+01	509	1.506E+01	550	2.682E+01
387	5.040E-02	428	1.896E+00	469	1.001E+01	510	1.545E+01	551	2.688E+01
388	1.440E-02	429	2.151E+00	470	9.715E+00	511	1.587E+01	552	2.727E+01
389	6.000E-04	430	2.410E+00	471	9.406E+00	512	1.626E+01	553	2.737E+01
390	4.960E-02	431	2.667E+00	472	9.020E+00	513	1.666E+01	554	2.755E+01
391	2.120E-02	432	2.918E+00	473	8.821E+00	514	1.698E+01	555	2.772E+01
392	7.000E-03	433	3.215E+00	474	8.412E+00	515	1.733E+01	556	2.796E+01
393	1.040E-02	434	3.541E+00	475	8.109E+00	516	1.777E+01	557	2.810E+01
394	1.400E-02	435	3.850E+00	476	7.789E+00	517	1.814E+01	558	2.816E+01
395	4.980E-02	436	4.237E+00	477	7.551E+00	518	1.841E+01	559	2.850E+01
396	2.220E-02	437	4.606E+00	478	7.392E+00	519	1.872E+01	560	2.861E+01
397	2.820E-02	438	5.029E+00	479	7.220E+00	520	1.906E+01	561	2.885E+01
398	1.130E-02	439	5.449E+00	480	7.083E+00	521	1.945E+01	562	2.886E+01
399	1.150E-02	440	5.928E+00	481	7.026E+00	522	1.974E+01	563	2.913E+01
400	1.600E-03	441	6.438E+00	482	7.084E+00	523	1.993E+01	564	2.932E+01
401	2.720E-02	442	7.020E+00	483	7.062E+00	524	2.035E+01	565	2.935E+01
402	5.480E-02	443	7.733E+00	484	7.186E+00	525	2.062E+01	566	2.941E+01
403	4.140E-02	444	8.535E+00	485	7.206E+00	526	2.090E+01	567	2.965E+01
404	2.190E-02	445	9.425E+00	486	7.394E+00	527	2.113E+01	568	2.988E+01
405	4.970E-02	446	1.042E+01	487	7.581E+00	528	2.154E+01	569	2.986E+01
406	1.690E-02	447	1.144E+01	488	7.755E+00	529	2.187E+01	570	3.005E+01
407	1.010E-01	448	1.252E+01	489	7.981E+00	530	2.208E+01	571	3.029E+01
408	3.340E-02	449	1.407E+01	490	8.159E+00	531	2.227E+01	572	3.036E+01
409	9.010E-02	450	1.510E+01	491	8.410E+00	532	2.259E+01	573	3.057E+01
410	1.273E-01	451	1.623E+01	492	8.584E+00	533	2.293E+01	574	3.067E+01
411	1.290E-01	452	1.706E+01	493	8.905E+00	534	2.316E+01	575	3.084E+01
412	1.450E-01	453	1.781E+01	494	9.192E+00	535	2.340E+01	576	3.112E+01
413	9.980E-02	454	1.822E+01	495	9.549E+00	536	2.360E+01	577	3.127E+01
414	2.210E-01	455	1.830E+01	496	9.903E+00	537	2.389E+01	578	3.141E+01
415	2.605E-01	456	1.792E+01	497	1.019E+01	538	2.412E+01	579	3.167E+01
416	2.581E-01	457	1.744E+01	498	1.055E+01	539	2.436E+01	580	3.179E+01
417	3.703E-01	458	1.662E+01	499	1.095E+01	540	2.456E+01	581	3.200E+01
418	4.397E-01	459	1.553E+01	500	1.136E+01	541	2.473E+01	582	3.224E+01
419	5.084E-01	460	1.481E+01	501	1.175E+01	542	2.503E+01	583	3.241E+01
420	6.245E-01	461	1.397E+01	502	1.219E+01	543	2.529E+01	584	3.285E+01

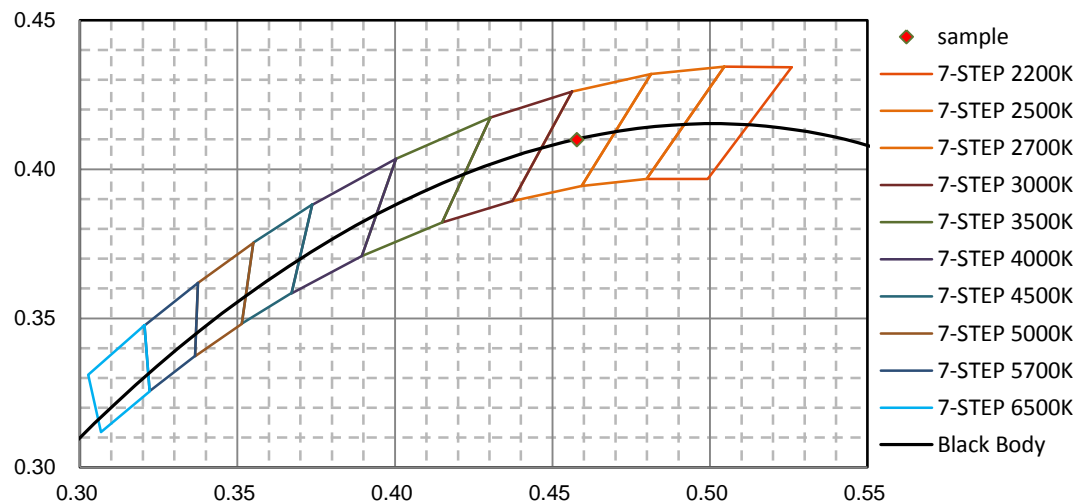


nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
585	3.292E+01	626	4.501E+01	667	3.487E+01	708	1.440E+01	749	3.981E+00
586	3.303E+01	627	4.503E+01	668	3.431E+01	709	1.385E+01	750	3.754E+00
587	3.346E+01	628	4.517E+01	669	3.376E+01	710	1.350E+01	751	3.741E+00
588	3.368E+01	629	4.512E+01	670	3.321E+01	711	1.323E+01	752	3.559E+00
589	3.402E+01	630	4.518E+01	671	3.258E+01	712	1.286E+01	753	3.452E+00
590	3.428E+01	631	4.520E+01	672	3.206E+01	713	1.259E+01	754	3.267E+00
591	3.464E+01	632	4.528E+01	673	3.153E+01	714	1.224E+01	755	3.081E+00
592	3.505E+01	633	4.514E+01	674	3.102E+01	715	1.190E+01	756	3.076E+00
593	3.531E+01	634	4.513E+01	675	3.041E+01	716	1.160E+01	757	2.975E+00
594	3.569E+01	635	4.514E+01	676	2.992E+01	717	1.133E+01	758	2.491E+00
595	3.605E+01	636	4.495E+01	677	2.937E+01	718	1.096E+01	759	2.560E+00
596	3.645E+01	637	4.487E+01	678	2.895E+01	719	1.064E+01	760	2.496E+00
597	3.673E+01	638	4.478E+01	679	2.825E+01	720	1.039E+01	761	2.466E+00
598	3.710E+01	639	4.468E+01	680	2.766E+01	721	1.007E+01	762	2.470E+00
599	3.752E+01	640	4.466E+01	681	2.725E+01	722	9.819E+00	763	2.369E+00
600	3.785E+01	641	4.438E+01	682	2.654E+01	723	9.537E+00	764	2.252E+00
601	3.832E+01	642	4.431E+01	683	2.609E+01	724	9.112E+00	765	2.092E+00
602	3.860E+01	643	4.405E+01	684	2.552E+01	725	8.941E+00	766	2.007E+00
603	3.897E+01	644	4.390E+01	685	2.512E+01	726	8.735E+00	767	1.971E+00
604	3.947E+01	645	4.367E+01	686	2.457E+01	727	8.395E+00	768	2.006E+00
605	3.976E+01	646	4.345E+01	687	2.408E+01	728	8.230E+00	769	1.848E+00
606	4.027E+01	647	4.310E+01	688	2.349E+01	729	8.018E+00	770	1.582E+00
607	4.056E+01	648	4.282E+01	689	2.291E+01	730	7.801E+00	771	1.623E+00
608	4.080E+01	649	4.279E+01	690	2.245E+01	731	7.479E+00	772	1.661E+00
609	4.131E+01	650	4.230E+01	691	2.199E+01	732	7.303E+00	773	1.411E+00
610	4.157E+01	651	4.198E+01	692	2.151E+01	733	6.865E+00	774	1.453E+00
611	4.178E+01	652	4.171E+01	693	2.089E+01	734	6.643E+00	775	1.447E+00
612	4.223E+01	653	4.133E+01	694	2.049E+01	735	6.541E+00	776	1.396E+00
613	4.254E+01	654	4.088E+01	695	1.994E+01	736	6.211E+00	777	1.311E+00
614	4.286E+01	655	4.054E+01	696	1.942E+01	737	6.119E+00	778	1.275E+00
615	4.312E+01	656	4.016E+01	697	1.902E+01	738	5.815E+00	779	1.197E+00
616	4.341E+01	657	3.972E+01	698	1.854E+01	739	5.563E+00	780	1.099E+00
617	4.372E+01	658	3.931E+01	699	1.812E+01	740	5.380E+00		
618	4.389E+01	659	3.889E+01	700	1.769E+01	741	5.327E+00		
619	4.416E+01	660	3.839E+01	701	1.723E+01	742	5.162E+00		
620	4.430E+01	661	3.798E+01	702	1.681E+01	743	4.905E+00		
621	4.456E+01	662	3.752E+01	703	1.627E+01	744	4.595E+00		
622	4.469E+01	663	3.702E+01	704	1.594E+01	745	4.474E+00		
623	4.458E+01	664	3.636E+01	705	1.554E+01	746	4.160E+00		
624	4.482E+01	665	3.589E+01	706	1.513E+01	747	4.211E+00		
625	4.489E+01	666	3.528E+01	707	1.466E+01	748	4.085E+00		

CIE 1931 x y Chromaticity Diagram



7-Step Chromaticity Quadrangles



## [Goniophotometer System]

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

Test orientation: **Downward**

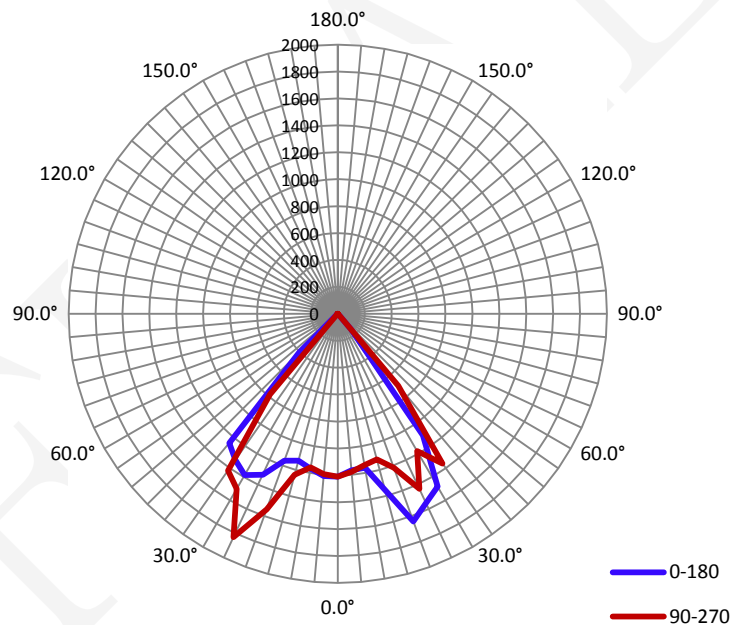
### Electrical Measurement

Input Voltage (V)	Frequency (Hz)	Input Current (A)	Power (W)	Power Factor
120	60	0.269	31.05	0.962

### Photometric Measurement

Luminous Flux (lm)	Efficacy (lm/W)	I <sub>max</sub> (cd)	S/MH (C0/180)	S/MH (C90/270)
2054.7	66.22	1834.3	1.44	1.49

### Luminous Intensity Distribution



	C0/180	C45/225	C90/270	C135/315	AVG.
Beam Angle (50% I <sub>max</sub> ):	79.0	79.4	77.3	78.2	78.5
Field Angle (10% I <sub>max</sub> ):	88.0	88.9	87.7	88.0	88.2

Luminous Intensity (cd) Distribution Data

C y	0°	22.5°	45°	67.5°	90°	112.5°	135°	157.5°
0.0°	1210	1210	1210	1210	1210	1210	1210	1210
5.0°	1168	1167	1170	1174	1180	1191	1202	1209
10.0°	1162	1145	1136	1135	1142	1147	1158	1169
15.0°	1356	1289	1221	1166	1120	1119	1124	1128
20.0°	1643	1591	1487	1359	1218	1124	1110	1135
25.0°	1551	1501	1461	1444	1435	1337	1234	1243
30.0°	1482	1486	1436	1333	1178	1076	1109	1282
35.0°	1103	1130	1209	1303	1357	1337	1267	1240
40.0°	150	157	259	448	699	1013	1163	1251
45.0°	12	11	10	12	13	57	230	410
50.0°	7	5	7	7	7	7	10	11
55.0°	4	4	4	4	4	5	6	7
60.0°	3	2	2	2	3	3	4	5
65.0°	1	2	1	2	1	2	2	2
70.0°	1	0	0	0	0	0	1	2
75.0°	0	0	0	0	1	1	0	1
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

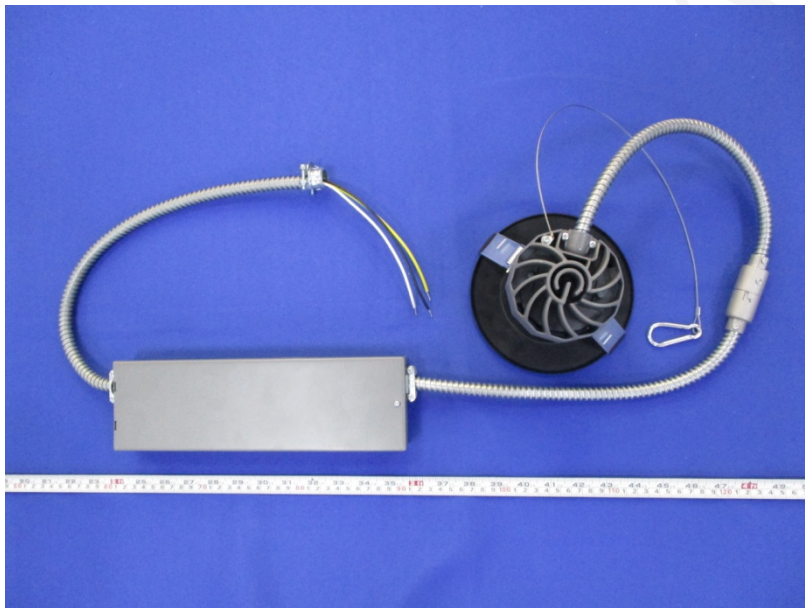
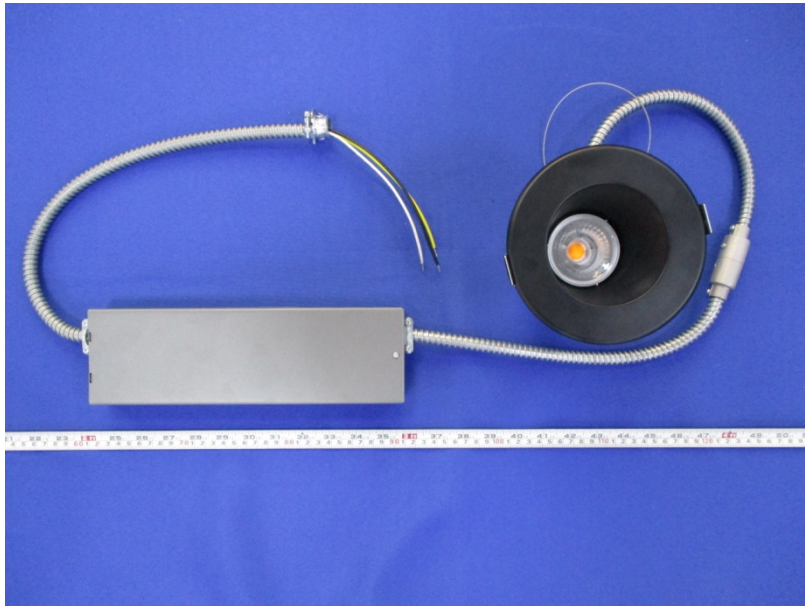
Luminous Intensity (cd) Distribution Data (cont.)

C Y	180°	202.5°	225°	247.5°	270°	292.5°	315°	337.5°
0.0°	1210	1210	1210	1210	1210	1210	1210	1210
5.0°	1211	1213	1212	1204	1195	1184	1175	1169
10.0°	1168	1174	1173	1165	1159	1155	1163	1170
15.0°	1129	1136	1154	1179	1237	1287	1350	1401
20.0°	1162	1190	1252	1396	1546	1629	1679	1691
25.0°	1318	1416	1539	1688	1832	1834	1729	1596
30.0°	1384	1472	1529	1511	1502	1555	1532	1484
35.0°	1326	1394	1453	1466	1423	1287	1146	1072
40.0°	1255	1250	1158	1009	782	488	259	132
45.0°	407	356	233	78	19	15	13	11
50.0°	12	12	11	11	11	9	8	7
55.0°	5	7	7	6	6	4	5	4
60.0°	4	4	4	4	3	3	3	3
65.0°	3	3	2	2	2	2	2	1
70.0°	1	1	0	1	1	1	1	0
75.0°	0	1	1	0	1	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)	%	Deg	Flux (lm)	%
0-5	28.7	1.40	0-5	28.7	1.40
5-10	83.9	4.09	0-10	112.6	5.48
10-15	140.6	6.84	0-15	253.2	12.32
15-20	214.3	10.43	0-20	467.5	22.75
20-25	304.0	14.79	0-25	771.5	37.55
25-30	367.9	17.90	0-30	1139.3	55.45
30-35	394.5	19.20	0-35	1533.8	74.65
35-40	333.5	16.23	0-40	1867.4	90.88
40-45	154.6	7.52	0-45	2022.0	98.41
45-50	25.6	1.25	0-50	2047.6	99.65
50-55	3.0	0.15	0-55	2050.5	99.80
55-60	1.9	0.09	0-60	2052.4	99.89
60-65	1.2	0.06	0-65	2053.6	99.95
65-70	0.6	0.03	0-70	2054.3	99.98
70-75	0.3	0.01	0-75	2054.6	99.99
75-80	0.1	0.01	0-80	2054.7	100.00
80-85	0.0	0.00	0-85	2054.7	100.00
85-90	0.0	0.00	0-90	2054.7	100.00
90-95	0.0	0.00	0-95	2054.7	100.00
95-100	0.0	0.00	0-100	2054.7	100.00
100-105	0.0	0.00	0-105	2054.7	100.00
105-110	0.0	0.00	0-110	2054.7	100.00
110-115	0.0	0.00	0-115	2054.7	100.00
115-120	0.0	0.00	0-120	2054.7	100.00
120-125	0.0	0.00	0-125	2054.7	100.00
125-130	0.0	0.00	0-130	2054.7	100.00
130-135	0.0	0.00	0-135	2054.7	100.00
135-140	0.0	0.00	0-140	2054.7	100.00
140-145	0.0	0.00	0-145	2054.7	100.00
145-150	0.0	0.00	0-150	2054.7	100.00
150-155	0.0	0.00	0-155	2054.7	100.00
155-160	0.0	0.00	0-160	2054.7	100.00
160-165	0.0	0.00	0-165	2054.7	100.00
165-170	0.0	0.00	0-170	2054.7	100.00
170-175	0.0	0.00	0-175	2054.7	100.00
175-180	0.0	0.00	0-180	2054.7	100.00

## 6. Product Photo



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