

IES LM-79-08

MEASUREMENT AND TEST REPORT

For

GREEN CREATIVE LTD

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

Test Model: LE259027DIM120VWD/ADR4BL

Report Type:	Electrical and Photometric tests including: Luminous Flux, Chromaticity, Luminous Intensity Distribution
Test Engineer:	George Yang <i>George Yang</i>
Report Number:	RKSB190329023-10-3
Test Date:	2019-04-04 to 2019-04-08
Report Date:	2019-05-06
Reviewed By:	Ray Gao/EE Engineer <i>Ry Gao</i>
Prepared By:	Bay Area Compliance Laboratories Corp. (Kunshan). No.248 Chenghu Road, Kunshan, Jiangsu province, China. Tel: +86-0512-86175000 Fax: +86-0512-88934268
Test Facility:	Test facility was located at No.248 Chenghu Road, Kunshan, Jiangsu province, China.
Accreditation:	The IAS Accreditation Number TL-749.

1. Product Description

General Information:

One sample was received on 2019-04-01 and used for testing.

Model Tested: LE259027DIM120VWD/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: 31W
 Nominal CCT: 2700K
 Nominal Lumen Output: 2050lm

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.

4π 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 (γ) 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**

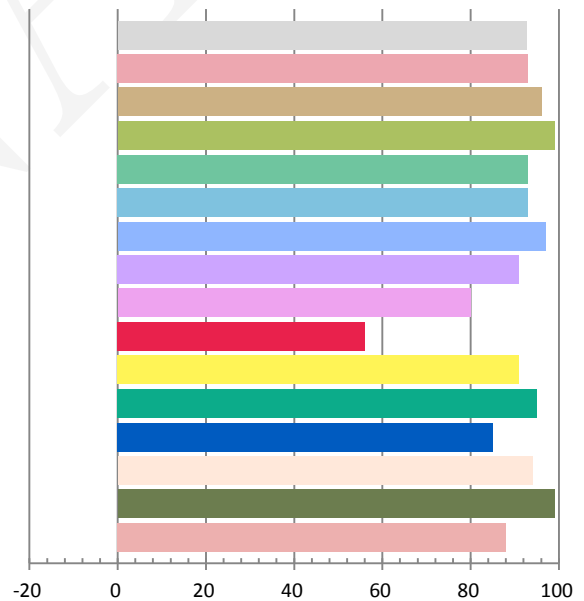
Photometric and Electrical Measurement Result

Voltage (V)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Luminous Flux(lm)	Efficacy (lm/W)
120	60	0.2637	31.23	0.9869	2143.8	68.65

Radiant Flux (W)	CCT (K)	Duv	x	y	u'	v'
7.462	2741	0.00009	0.4567	0.4101	0.2607	0.5267

Color Rendering Index

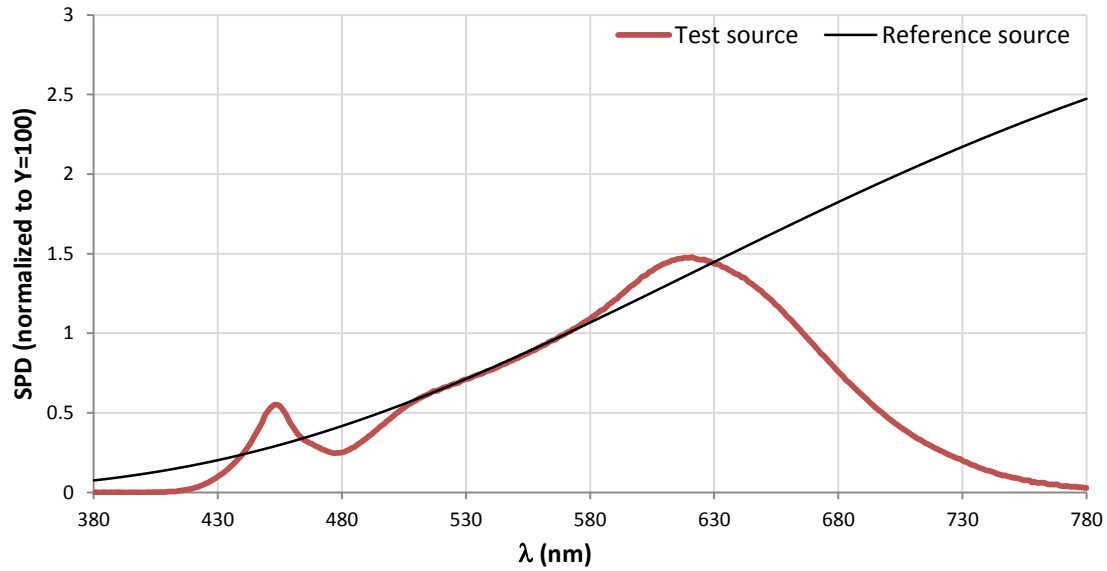
Ra			
92.7			
R1	R2	R3	R4
93	96	99	93
R5	R6	R7	R8
93	97	91	80
R9	R10	R11	R12
56	91	95	85
R13	R14	R15	
94	99	88	



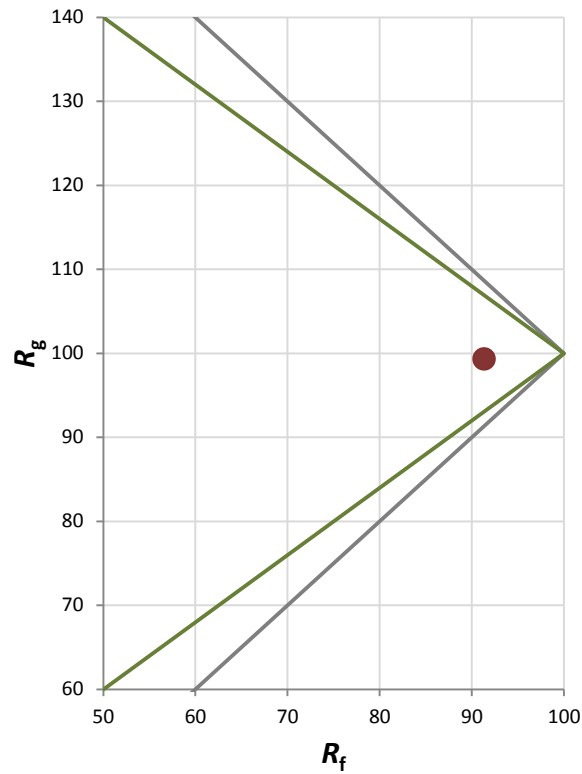
Fidelity Index and Gamut Index

Fidelity Index R_f	91
Gamut Index R_g	99

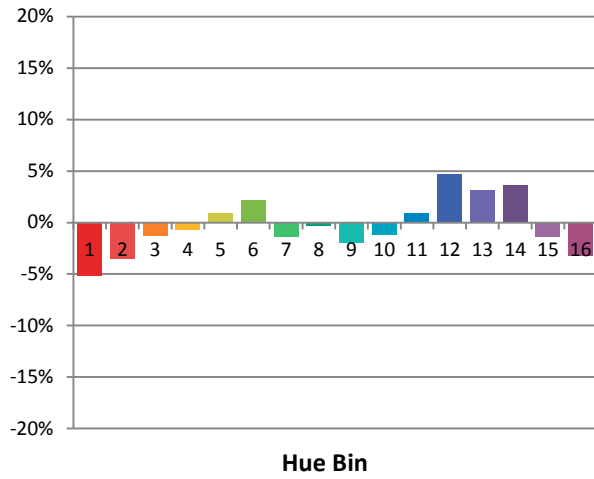
Spectral Power Distribution Comparison



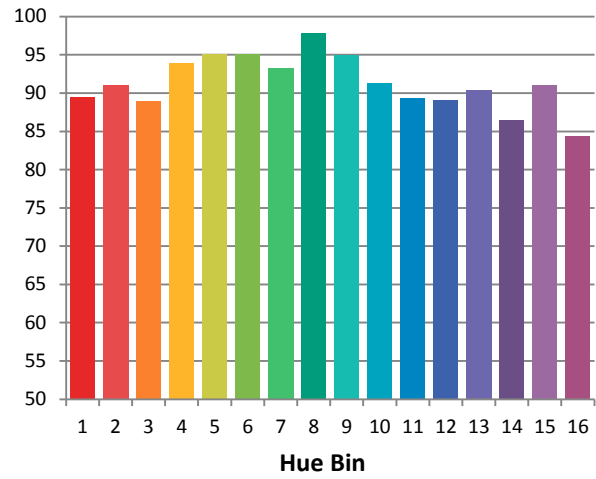
Plot of R_g versus R_f



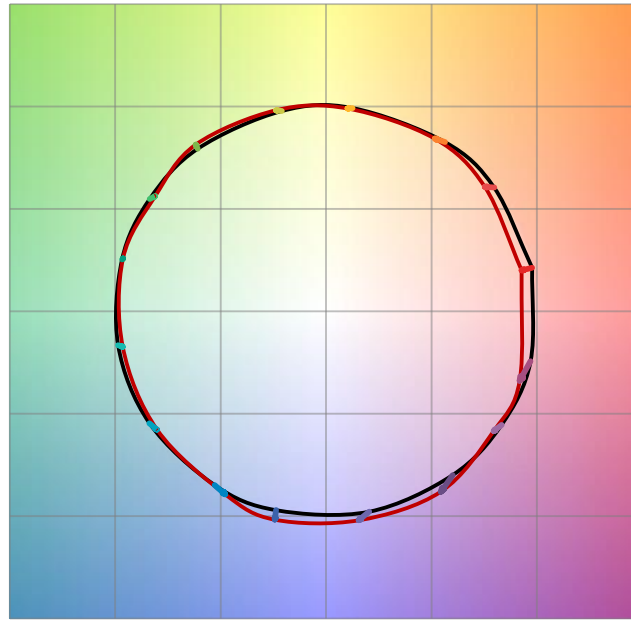
Chroma Shift by Hue



R_f by Hue

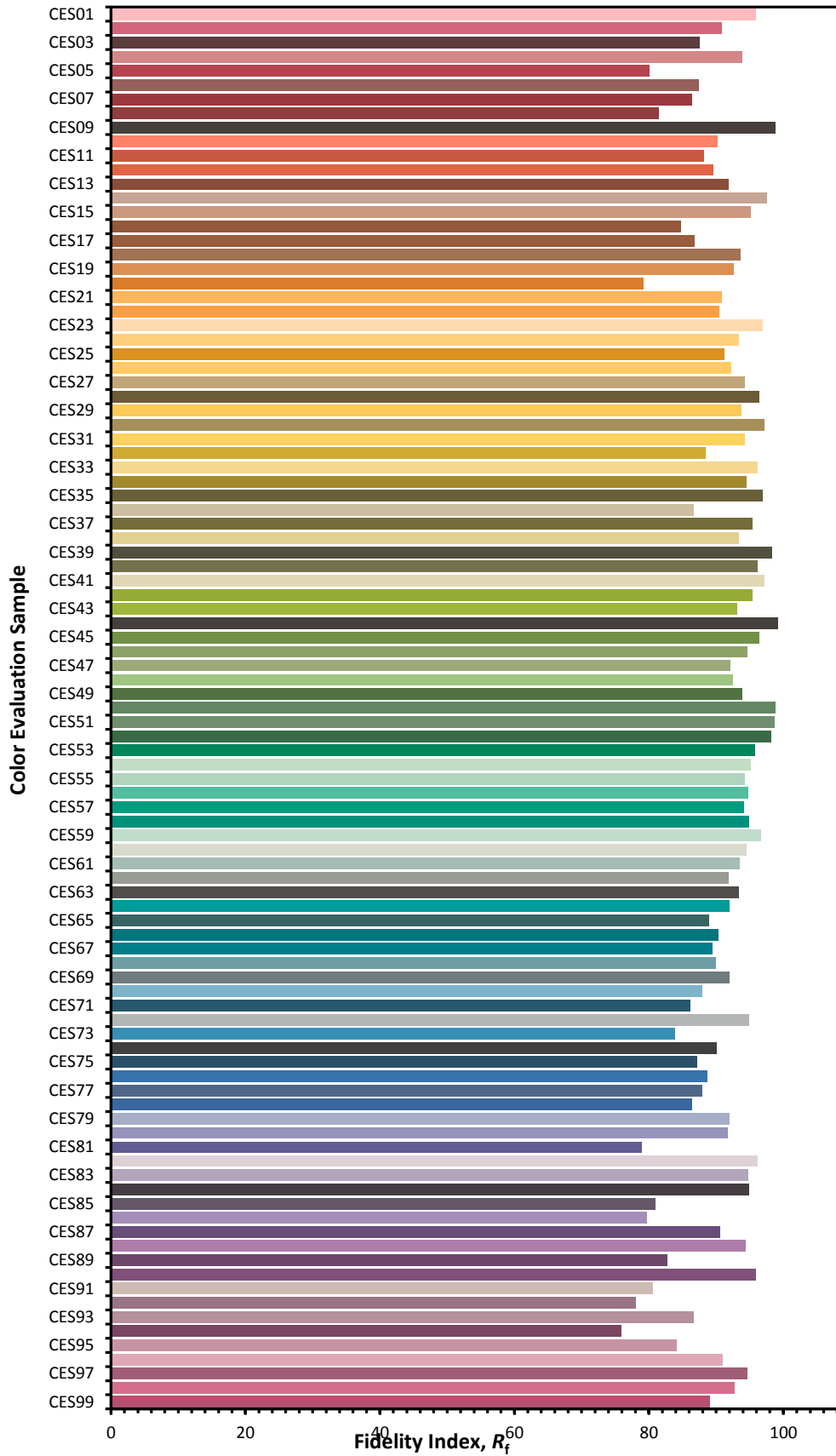


Color Vector Graphic

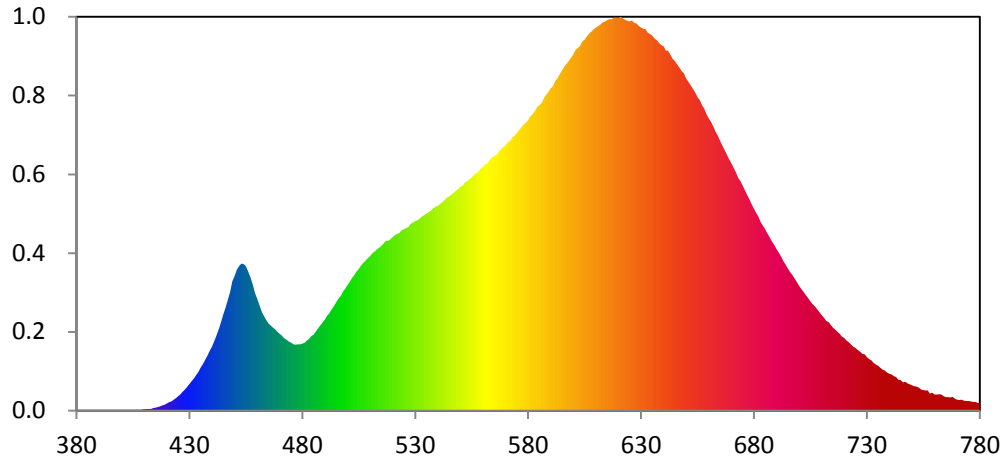


— Refenerce Illuminat — Test Source

Color Fidelity by CES Sample



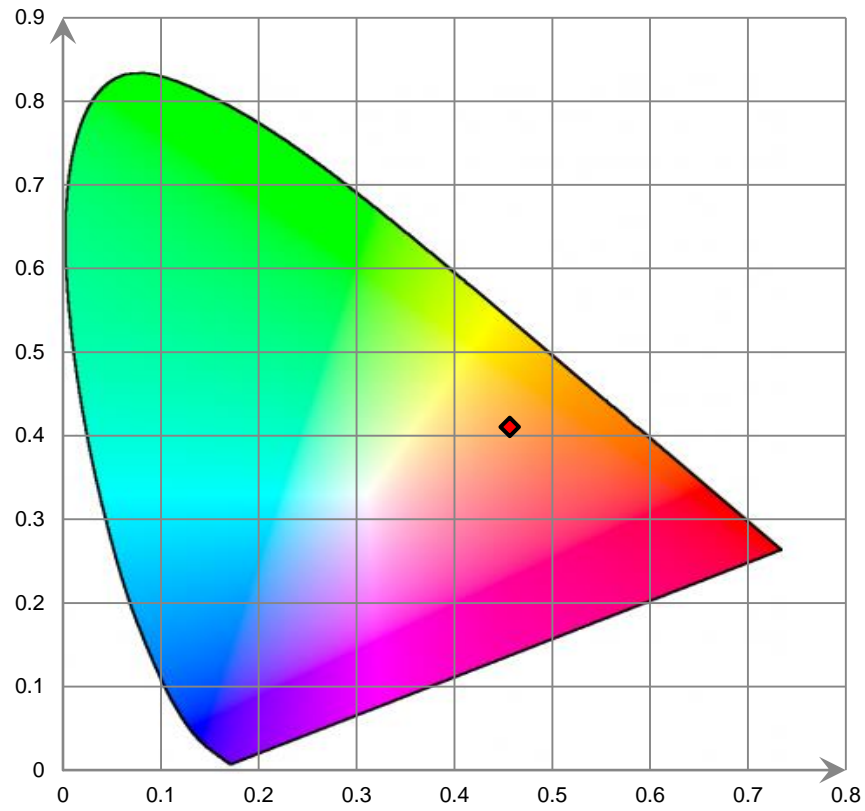
Relative Spectral Power Distribution



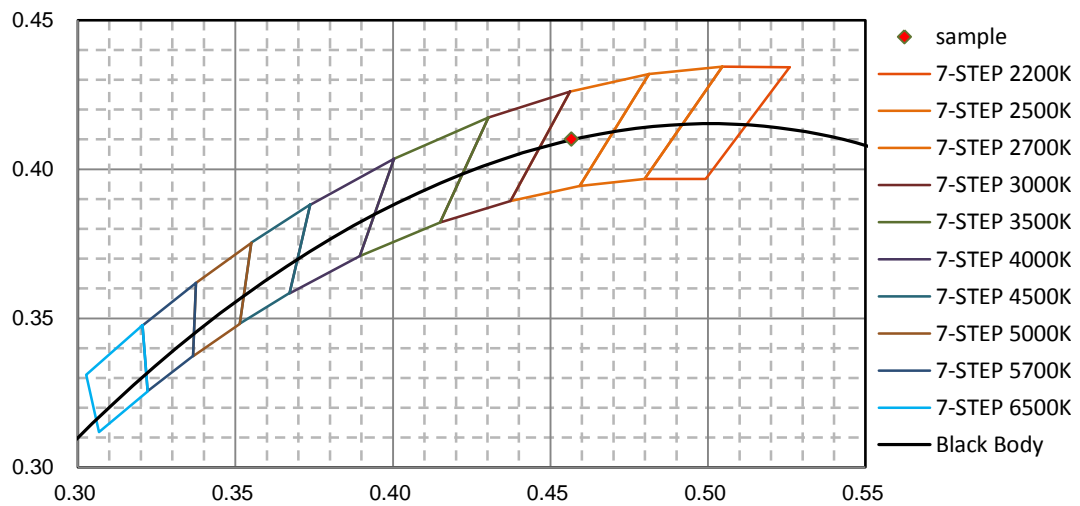
nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
380	3.620E-02	421	9.708E-01	462	1.163E+01	503	1.595E+01	544	2.507E+01
381	3.250E-02	422	1.084E+00	463	1.113E+01	504	1.635E+01	545	2.524E+01
382	1.610E-02	423	1.286E+00	464	1.067E+01	505	1.668E+01	546	2.540E+01
383	1.000E-02	424	1.482E+00	465	1.025E+01	506	1.707E+01	547	2.570E+01
384	5.860E-02	425	1.711E+00	466	1.004E+01	507	1.738E+01	548	2.591E+01
385	1.890E-02	426	1.937E+00	467	9.750E+00	508	1.764E+01	549	2.610E+01
386	1.400E-03	427	2.211E+00	468	9.562E+00	509	1.793E+01	550	2.639E+01
387	5.350E-02	428	2.504E+00	469	9.263E+00	510	1.819E+01	551	2.650E+01
388	1.760E-02	429	2.780E+00	470	9.044E+00	511	1.854E+01	552	2.688E+01
389	3.230E-02	430	3.129E+00	471	8.806E+00	512	1.874E+01	553	2.702E+01
390	6.840E-02	431	3.453E+00	472	8.507E+00	513	1.900E+01	554	2.728E+01
391	2.120E-02	432	3.766E+00	473	8.384E+00	514	1.920E+01	555	2.744E+01
392	9.000E-04	433	4.187E+00	474	8.135E+00	515	1.941E+01	556	2.778E+01
393	0.000E+00	434	4.548E+00	475	7.984E+00	516	1.970E+01	557	2.796E+01
394	1.000E-04	435	5.032E+00	476	7.808E+00	517	2.001E+01	558	2.813E+01
395	2.840E-02	436	5.483E+00	477	7.757E+00	518	2.000E+01	559	2.852E+01
396	2.210E-02	437	5.954E+00	478	7.789E+00	519	2.019E+01	560	2.871E+01
397	3.310E-02	438	6.456E+00	479	7.821E+00	520	2.044E+01	561	2.903E+01
398	1.390E-02	439	7.025E+00	480	7.868E+00	521	2.068E+01	562	2.912E+01
399	7.000E-04	440	7.560E+00	481	8.000E+00	522	2.081E+01	563	2.953E+01
400	0.000E+00	441	8.207E+00	482	8.257E+00	523	2.094E+01	564	2.981E+01
401	1.990E-02	442	8.878E+00	483	8.438E+00	524	2.121E+01	565	3.001E+01
402	5.220E-02	443	9.617E+00	484	8.767E+00	525	2.137E+01	566	3.013E+01
403	3.580E-02	444	1.043E+01	485	8.939E+00	526	2.151E+01	567	3.051E+01
404	5.190E-02	445	1.135E+01	486	9.318E+00	527	2.161E+01	568	3.082E+01
405	7.070E-02	446	1.215E+01	487	9.681E+00	528	2.197E+01	569	3.104E+01
406	4.110E-02	447	1.306E+01	488	1.001E+01	529	2.219E+01	570	3.128E+01
407	1.009E-01	448	1.394E+01	489	1.036E+01	530	2.232E+01	571	3.163E+01
408	6.070E-02	449	1.522E+01	490	1.072E+01	531	2.243E+01	572	3.176E+01
409	9.490E-02	450	1.585E+01	491	1.117E+01	532	2.263E+01	573	3.221E+01
410	1.540E-01	451	1.658E+01	492	1.147E+01	533	2.287E+01	574	3.238E+01
411	1.816E-01	452	1.699E+01	493	1.196E+01	534	2.306E+01	575	3.269E+01
412	1.888E-01	453	1.731E+01	494	1.234E+01	535	2.323E+01	576	3.305E+01
413	1.858E-01	454	1.728E+01	495	1.280E+01	536	2.337E+01	577	3.336E+01
414	2.961E-01	455	1.705E+01	496	1.318E+01	537	2.355E+01	578	3.366E+01
415	3.511E-01	456	1.644E+01	497	1.351E+01	538	2.385E+01	579	3.396E+01
416	4.183E-01	457	1.577E+01	498	1.401E+01	539	2.401E+01	580	3.421E+01
417	4.955E-01	458	1.487E+01	499	1.435E+01	540	2.414E+01	581	3.467E+01
418	5.956E-01	459	1.385E+01	500	1.478E+01	541	2.431E+01	582	3.496E+01
419	6.896E-01	460	1.315E+01	501	1.517E+01	542	2.455E+01	583	3.533E+01
420	8.162E-01	461	1.242E+01	502	1.561E+01	543	2.478E+01	584	3.578E+01

nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
585	3.603E+01	626	4.596E+01	667	3.075E+01	708	1.193E+01	749	3.101E+00
586	3.626E+01	627	4.566E+01	668	3.020E+01	709	1.157E+01	750	2.960E+00
587	3.684E+01	628	4.562E+01	669	2.966E+01	710	1.124E+01	751	2.875E+00
588	3.722E+01	629	4.535E+01	670	2.919E+01	711	1.094E+01	752	2.810E+00
589	3.756E+01	630	4.514E+01	671	2.858E+01	712	1.057E+01	753	2.707E+00
590	3.799E+01	631	4.499E+01	672	2.804E+01	713	1.043E+01	754	2.491E+00
591	3.824E+01	632	4.495E+01	673	2.741E+01	714	1.010E+01	755	2.413E+00
592	3.884E+01	633	4.455E+01	674	2.702E+01	715	9.762E+00	756	2.376E+00
593	3.916E+01	634	4.439E+01	675	2.651E+01	716	9.541E+00	757	2.377E+00
594	3.963E+01	635	4.420E+01	676	2.593E+01	717	9.275E+00	758	1.987E+00
595	4.004E+01	636	4.384E+01	677	2.542E+01	718	9.037E+00	759	2.122E+00
596	4.054E+01	637	4.363E+01	678	2.488E+01	719	8.724E+00	760	1.898E+00
597	4.084E+01	638	4.329E+01	679	2.434E+01	720	8.544E+00	761	1.896E+00
598	4.119E+01	639	4.306E+01	680	2.380E+01	721	8.254E+00	762	1.929E+00
599	4.157E+01	640	4.291E+01	681	2.332E+01	722	8.072E+00	763	1.893E+00
600	4.202E+01	641	4.244E+01	682	2.285E+01	723	7.794E+00	764	1.692E+00
601	4.256E+01	642	4.238E+01	683	2.221E+01	724	7.544E+00	765	1.582E+00
602	4.273E+01	643	4.195E+01	684	2.181E+01	725	7.360E+00	766	1.584E+00
603	4.301E+01	644	4.146E+01	685	2.137E+01	726	7.114E+00	767	1.553E+00
604	4.354E+01	645	4.120E+01	686	2.089E+01	727	6.928E+00	768	1.609E+00
605	4.371E+01	646	4.080E+01	687	2.042E+01	728	6.688E+00	769	1.375E+00
606	4.410E+01	647	4.044E+01	688	1.993E+01	729	6.630E+00	770	1.266E+00
607	4.442E+01	648	4.001E+01	689	1.949E+01	730	6.299E+00	771	1.224E+00
608	4.465E+01	649	3.973E+01	690	1.902E+01	731	6.053E+00	772	1.289E+00
609	4.492E+01	650	3.916E+01	691	1.861E+01	732	5.930E+00	773	1.161E+00
610	4.513E+01	651	3.877E+01	692	1.813E+01	733	5.611E+00	774	1.125E+00
611	4.529E+01	652	3.837E+01	693	1.763E+01	734	5.411E+00	775	1.125E+00
612	4.550E+01	653	3.794E+01	694	1.720E+01	735	5.284E+00	776	1.094E+00
613	4.575E+01	654	3.745E+01	695	1.674E+01	736	5.057E+00	777	1.027E+00
614	4.584E+01	655	3.691E+01	696	1.634E+01	737	4.822E+00	778	1.027E+00
615	4.602E+01	656	3.658E+01	697	1.599E+01	738	4.694E+00	779	9.121E-01
616	4.611E+01	657	3.600E+01	698	1.559E+01	739	4.479E+00	780	8.936E-01
617	4.614E+01	658	3.555E+01	699	1.515E+01	740	4.322E+00		
618	4.630E+01	659	3.491E+01	700	1.473E+01	741	4.257E+00		
619	4.628E+01	660	3.445E+01	701	1.435E+01	742	4.082E+00		
620	4.627E+01	661	3.402E+01	702	1.397E+01	743	3.926E+00		
621	4.642E+01	662	3.348E+01	703	1.360E+01	744	3.627E+00		
622	4.621E+01	663	3.289E+01	704	1.326E+01	745	3.598E+00		
623	4.604E+01	664	3.241E+01	705	1.289E+01	746	3.318E+00		
624	4.593E+01	665	3.183E+01	706	1.255E+01	747	3.392E+00		
625	4.587E+01	666	3.128E+01	707	1.224E+01	748	3.214E+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**

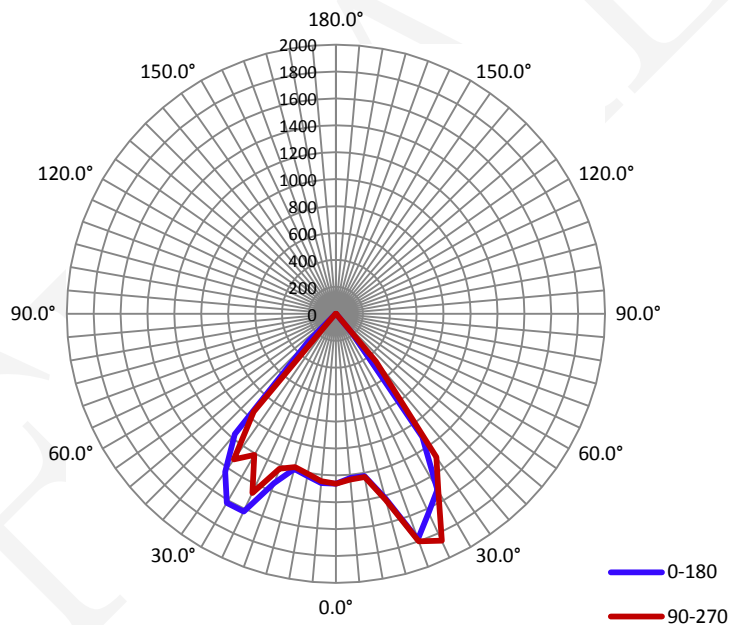
Electrical Measurement

Input Voltage (V)	Frequency (Hz)	Input Current (A)	Power (W)	Power Factor
120.0	60	0.2700	31.21	0.9630

Photometric Measurement

Luminous Flux (lm)	Efficacy (lm/W)	I _{max} (cd)	S/MH (C0/180)	S/MH (C90/270)
2144.2	68.75	1893.2	1.44	1.45

Luminous Intensity Distribution



	C0/180	C45/225	C90/270	C135/315	AVG.
Beam Angle (50% I _{max}):	77.8	77.2	77.3	77.4	77.6
Field Angle (10% I _{max}):	87.3	87.2	87.3	87.4	87.3

Luminous Intensity (cd) Distribution Data

C γ	0°	22.5°	45°	67.5°	90°	112.5°	135°	157.5°
0.0°	1262	1262	1262	1262	1262	1262	1262	1262
5.0°	1225	1223	1225	1229	1236	1243	1250	1260
10.0°	1223	1246	1261	1253	1231	1213	1213	1221
15.0°	1417	1501	1540	1512	1432	1360	1259	1217
20.0°	1782	1871	1893	1856	1799	1671	1589	1412
25.0°	1630	1652	1702	1797	1860	1891	1832	1768
30.0°	1509	1523	1560	1556	1520	1484	1589	1648
35.0°	1118	1086	1101	1175	1300	1400	1489	1479
40.0°	189	145	171	265	462	733	968	1121
45.0°	11	11	10	12	14	17	58	222
50.0°	6	6	6	7	8	9	11	12
55.0°	3	3	3	4	5	5	6	4
60.0°	3	1	1	2	3	3	3	3
65.0°	0	0	1	1	2	2	2	3
70.0°	0	0	0	0	0	0	1	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

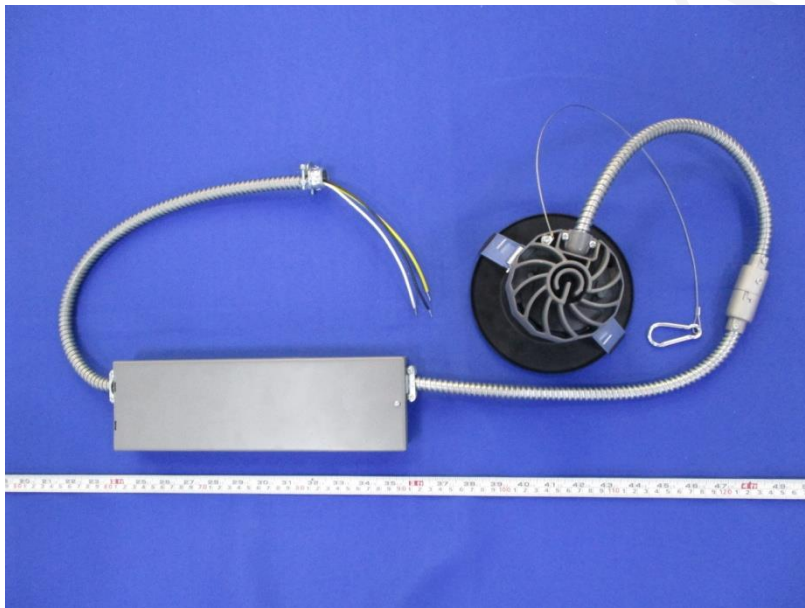
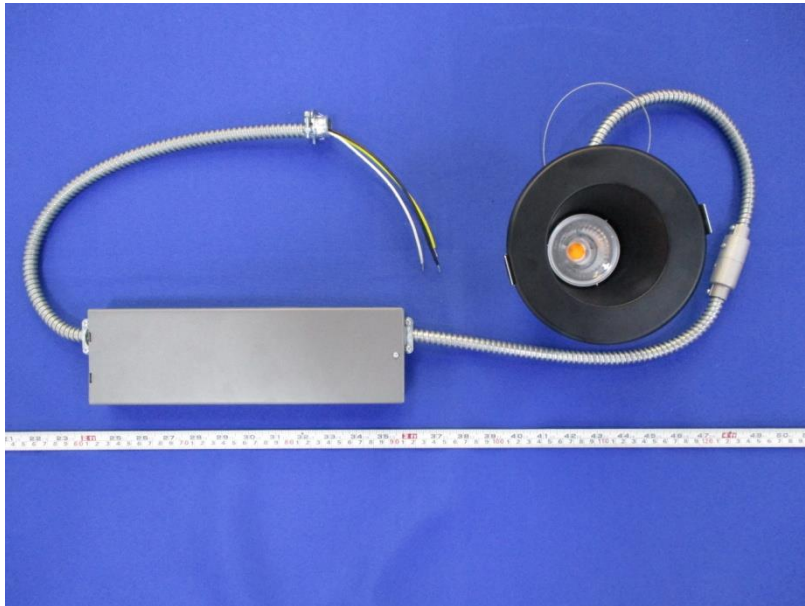
Luminous Intensity (cd) Distribution Data (cont.)

C Y	180°	202.5°	225°	247.5°	270°	292.5°	315°	337.5°
0.0°	1262	1262	1262	1262	1262	1262	1262	1262
5.0°	1262	1264	1264	1257	1249	1238	1230	1224
10.0°	1224	1223	1224	1214	1206	1198	1193	1199
15.0°	1193	1186	1186	1179	1180	1190	1245	1324
20.0°	1339	1257	1225	1195	1225	1328	1475	1646
25.0°	1621	1491	1399	1398	1469	1602	1604	1597
30.0°	1623	1548	1437	1293	1212	1259	1408	1451
35.0°	1432	1379	1329	1301	1320	1334	1268	1163
40.0°	1167	1203	1181	1094	951	706	447	227
45.0°	290	365	340	203	36	15	13	11
50.0°	13	13	11	11	9	8	7	6
55.0°	7	7	6	6	5	4	4	4
60.0°	5	4	4	3	3	3	3	2
65.0°	2	3	2	2	1	2	1	1
70.0°	1	1	1	0	1	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)	%	Deg	Flux (lm)	%
0-5	29.9	1.40	0-5	29.9	1.40
5-10	88.1	4.11	0-10	118.1	5.51
10-15	150.0	7.00	0-15	268.1	12.50
15-20	234.3	10.93	0-20	502.3	23.43
20-25	333.5	15.55	0-25	835.8	38.98
25-30	394.9	18.42	0-30	1230.8	57.40
30-35	407.6	19.01	0-35	1638.4	76.41
35-40	330.6	15.42	0-40	1969.0	91.83
40-45	146.5	6.83	0-45	2115.5	98.66
45-50	22.3	1.04	0-50	2137.8	99.70
50-55	3.0	0.14	0-55	2140.8	99.84
55-60	1.8	0.08	0-60	2142.6	99.92
60-65	1.1	0.05	0-65	2143.6	99.97
65-70	0.5	0.02	0-70	2144.1	100.00
70-75	0.1	0.00	0-75	2144.2	100.00
75-80	0.0	0.00	0-80	2144.2	100.00
80-85	0.0	0.00	0-85	2144.2	100.00
85-90	0.0	0.00	0-90	2144.2	100.00
90-95	0.0	0.00	0-95	2144.2	100.00
95-100	0.0	0.00	0-100	2144.2	100.00
100-105	0.0	0.00	0-105	2144.2	100.00
105-110	0.0	0.00	0-110	2144.2	100.00
110-115	0.0	0.00	0-115	2144.2	100.00
115-120	0.0	0.00	0-120	2144.2	100.00
120-125	0.0	0.00	0-125	2144.2	100.00
125-130	0.0	0.00	0-130	2144.2	100.00
130-135	0.0	0.00	0-135	2144.2	100.00
135-140	0.0	0.00	0-140	2144.2	100.00
140-145	0.0	0.00	0-145	2144.2	100.00
145-150	0.0	0.00	0-150	2144.2	100.00
150-155	0.0	0.00	0-155	2144.2	100.00
155-160	0.0	0.00	0-160	2144.2	100.00
160-165	0.0	0.00	0-165	2144.2	100.00
165-170	0.0	0.00	0-170	2144.2	100.00
170-175	0.0	0.00	0-175	2144.2	100.00
175-180	0.0	0.00	0-180	2144.2	100.00

6. Product Photo



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