

IES LM-79-08

MEASUREMENT AND TEST REPORT For

GREEN CREATIVE LTD

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

Test Model: LE109027DIM120VVN/ADR4BL

Report Type:	Electrical and Photometric tests including: Luminous Flux, Chromaticity, Luminous Intensity Distribution
Test Engineer:	George Yang <i>George Yang</i>
Report Number:	RKSB190329021-10-5
Test Date:	2019-04-02 to 2019-04-04
Report Date:	2019-05-16
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 2019-03-29 and used for testing.

Model Tested: LE109027DIM120VW/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: 12W
 Nominal CCT: 2700K
 Nominal Lumen Output: 900lm

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	2018-04-23	2019-04-22
Spectral photometer	INVENTFINE	CMS-3S	GSGSE100017	2019-01-23	2020-01-23
AC Power Supply	INVENTFINE	CHP500	JWJSD010071	2018-04-23	2019-04-22
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	2018-04-23	2019-04-22
AC Power Supply	INVENTFINE	CHP-5KVA	900511765	2018-04-23	2019-04-22
DC Power Supply	INVENTFINE	WL3010	JWDMP030001	2018-04-23	2019-04-22
Power Meter	INVENTFINE	WT500	GSDSQ200007	2018-04-23	2019-04-22
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 $U_{rel}=2.61\%$ ($k=2$), 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 $U_{rel}=0.48\%$ of rdg, AC Voltage $U_{rel}=0.25\%$ of rdg, Power $U_{rel}=0.44\%$, ($k=2$), 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 $U_{rel}=2.6\%$ ($k=2$), at the 95% confidence level.

Fidelity Index and Gamut Index Calculation

The R_f , 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**

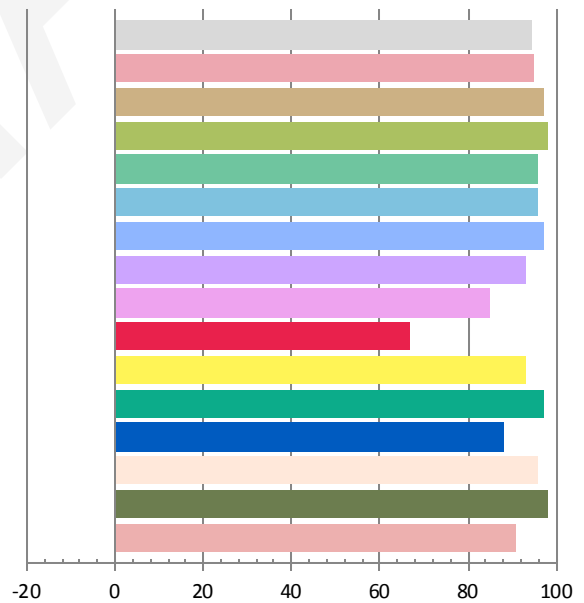
Photometric and Electrical Measurement Result

Voltage (V)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Luminous Flux(lm)	Efficacy (lm/W)
120	60	0.1027	12.18	0.9883	920.57	75.58

Radiant Flux (W)	CCT (K)	Duv	x	y	u'	v'
3.256	2733	-0.00024	0.4568	0.4093	0.2611	0.5264

Color Rendering Index

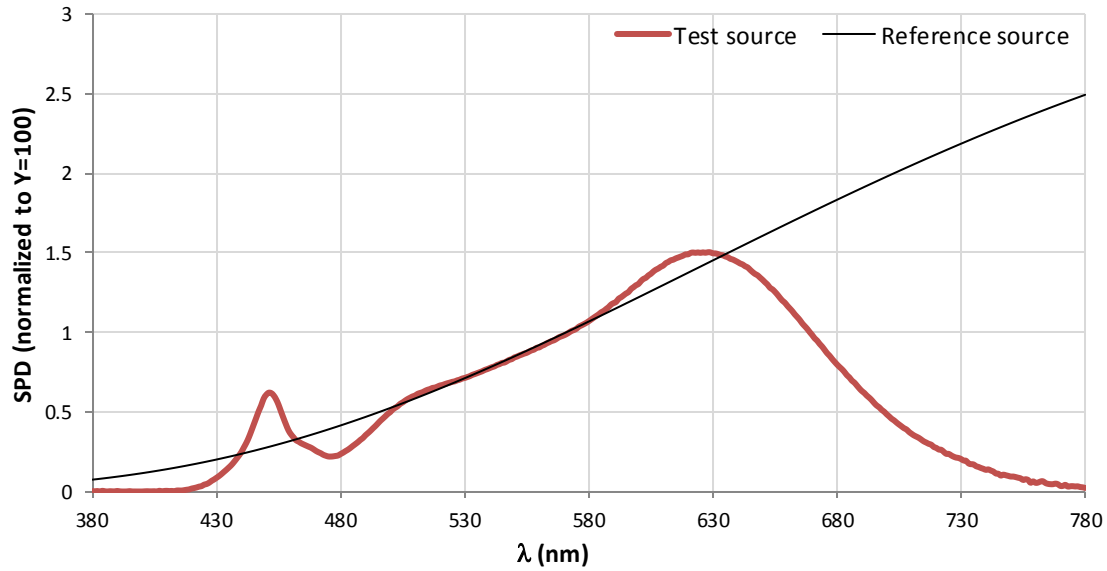
Ra			
94.7			
R1	R2	R3	R4
95	97	98	96
R5	R6	R7	R8
96	97	93	85
R9	R10	R11	R12
67	93	97	88
R13	R14	R15	
96	98	91	



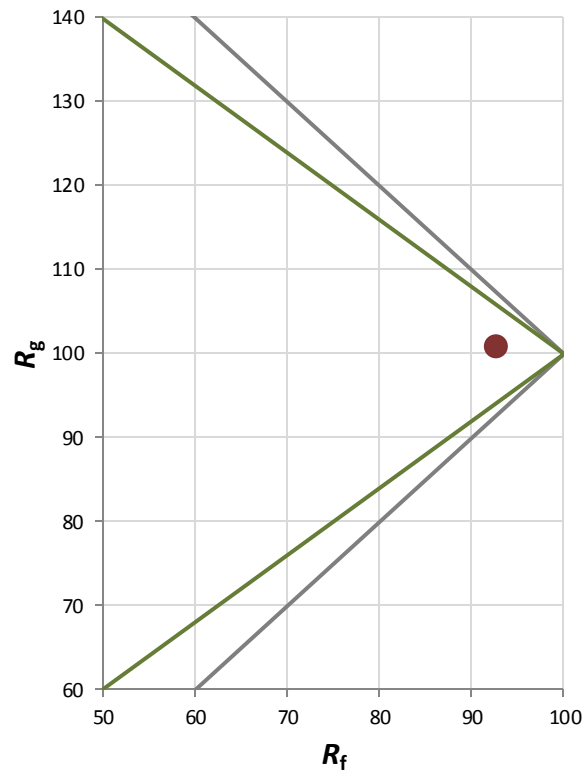
Fidelity Index and Gamut Index

Fidelity Index R_f	93
Gamut Index R_g	101

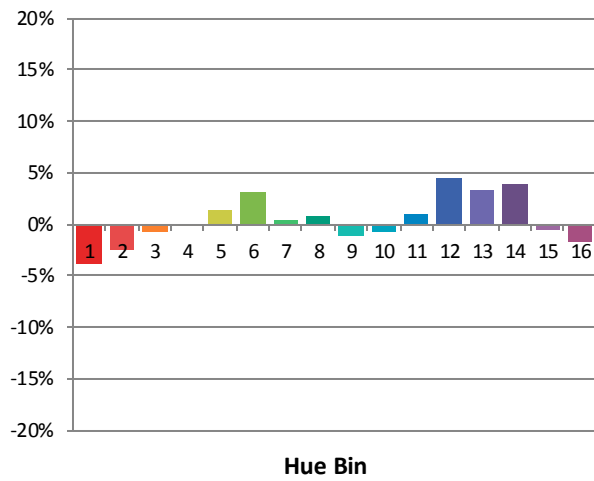
Spectral Power Distribution Comparison



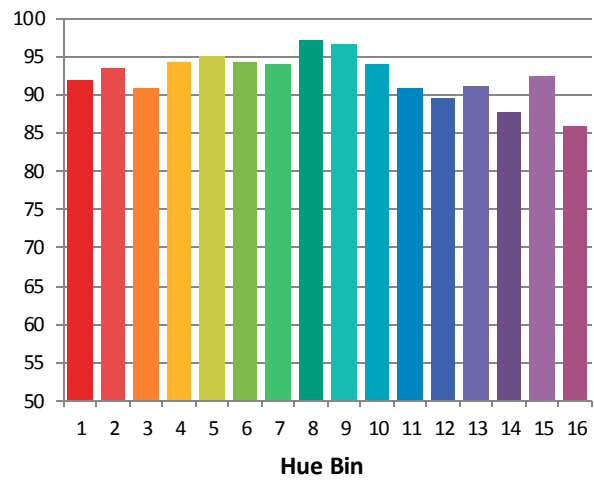
Plot of R_g versus R_f



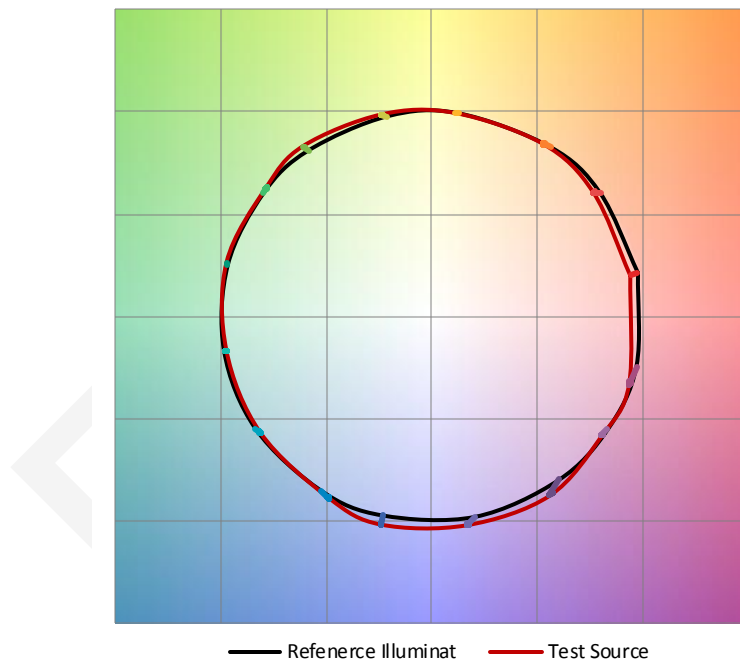
Chroma Shift by Hue



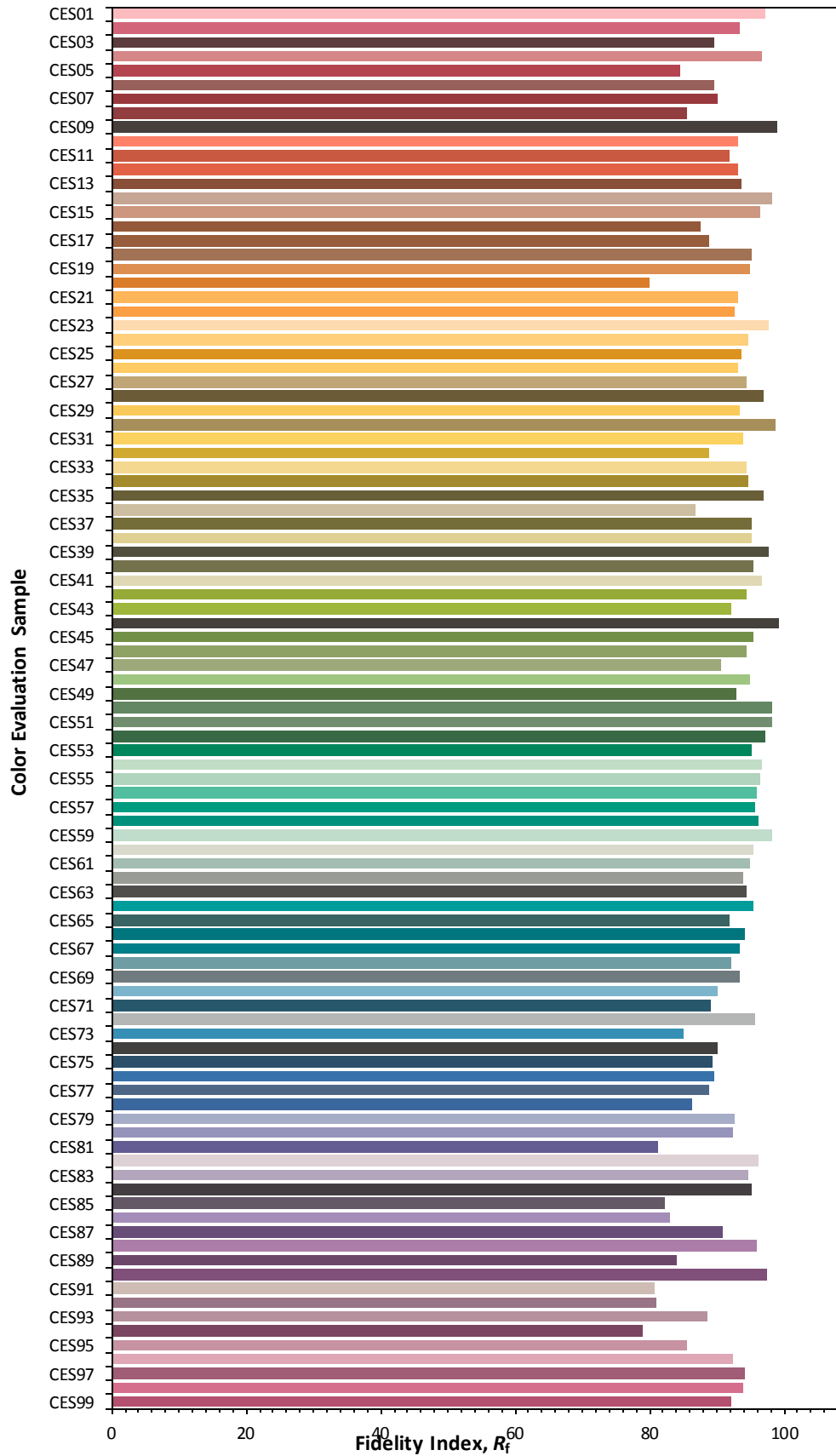
R_f by Hue



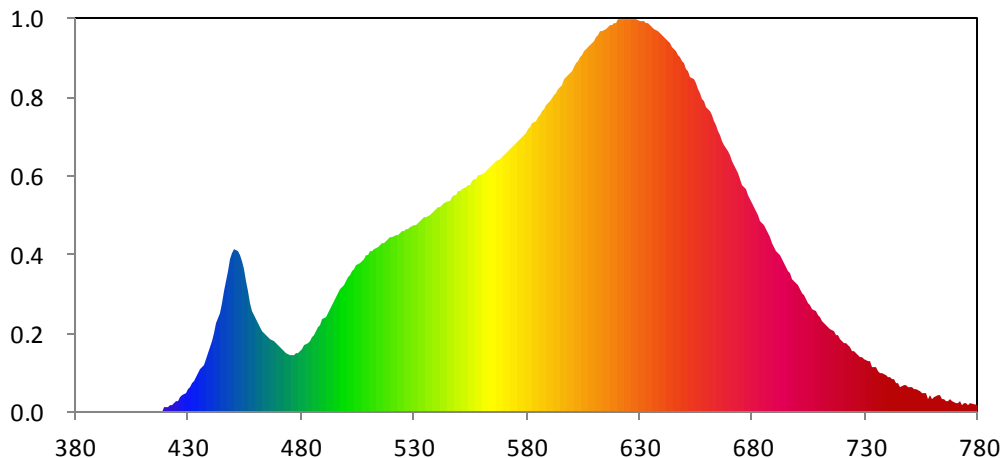
Color Vector Graphic



Color Fidelity by CES Sample



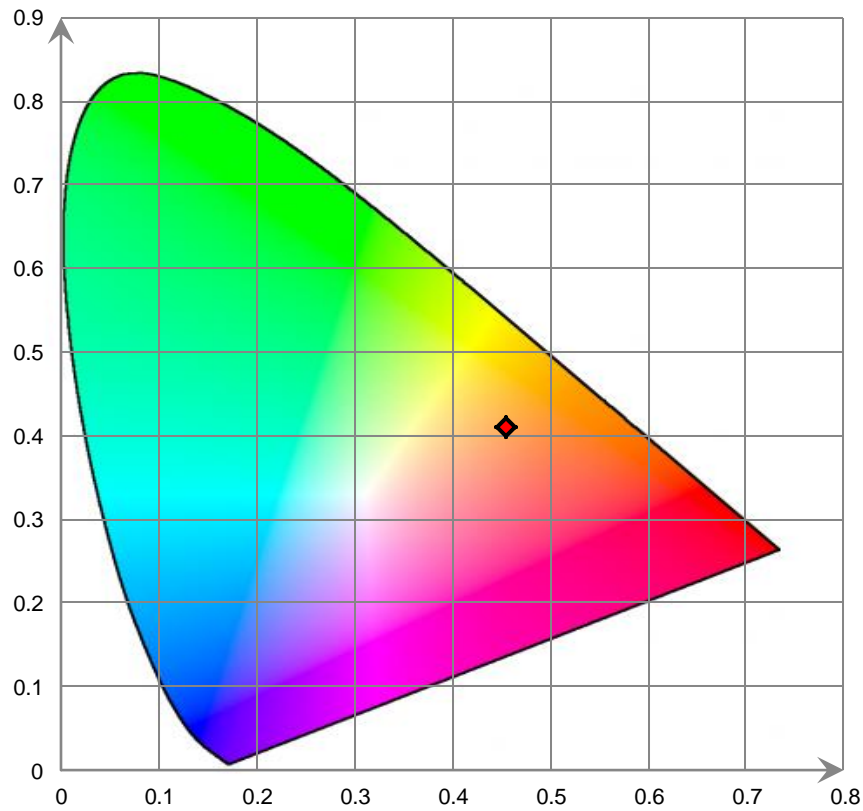
Relative Spectral Power Distribution



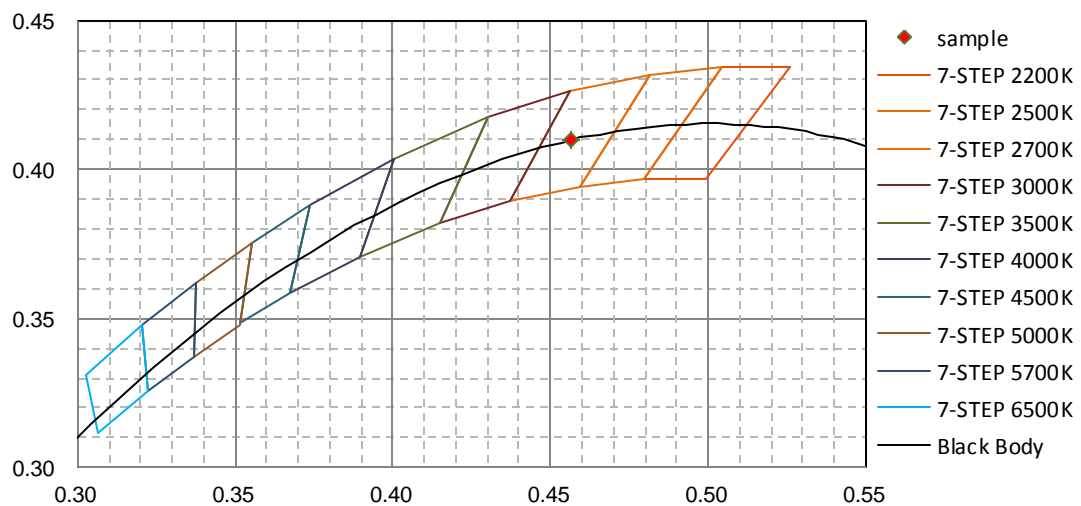
nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
380	3.420E-02	421	2.922E-01	462	4.347E+00	503	7.225E+00	544	1.078E+01
381	1.710E-02	422	3.448E-01	463	4.234E+00	504	7.420E+00	545	1.089E+01
382	3.850E-02	423	4.129E-01	464	4.099E+00	505	7.542E+00	546	1.092E+01
383	5.000E-03	424	4.579E-01	465	3.996E+00	506	7.693E+00	547	1.103E+01
384	5.520E-02	425	5.771E-01	466	3.900E+00	507	7.829E+00	548	1.115E+01
385	2.010E-02	426	6.351E-01	467	3.806E+00	508	7.940E+00	549	1.121E+01
386	1.200E-03	427	7.420E-01	468	3.716E+00	509	8.050E+00	550	1.135E+01
387	2.230E-02	428	8.953E-01	469	3.591E+00	510	8.125E+00	551	1.142E+01
388	1.390E-02	429	1.017E+00	470	3.448E+00	511	8.263E+00	552	1.152E+01
389	1.030E-02	430	1.161E+00	471	3.334E+00	512	8.342E+00	553	1.160E+01
390	4.280E-02	431	1.306E+00	472	3.241E+00	513	8.410E+00	554	1.168E+01
391	1.320E-02	432	1.477E+00	473	3.113E+00	514	8.518E+00	555	1.175E+01
392	6.000E-04	433	1.662E+00	474	3.033E+00	515	8.611E+00	556	1.186E+01
393	0.000E+00	434	1.842E+00	475	2.969E+00	516	8.674E+00	557	1.196E+01
394	5.700E-03	435	2.038E+00	476	2.960E+00	517	8.767E+00	558	1.202E+01
395	2.810E-02	436	2.243E+00	477	2.977E+00	518	8.801E+00	559	1.217E+01
396	3.700E-03	437	2.489E+00	478	3.011E+00	519	8.882E+00	560	1.220E+01
397	2.000E-03	438	2.755E+00	479	3.050E+00	520	8.974E+00	561	1.233E+01
398	2.000E-04	439	3.033E+00	480	3.174E+00	521	9.019E+00	562	1.242E+01
399	0.000E+00	440	3.339E+00	481	3.289E+00	522	9.095E+00	563	1.254E+01
400	0.000E+00	441	3.724E+00	482	3.424E+00	523	9.163E+00	564	1.264E+01
401	1.220E-02	442	4.113E+00	483	3.548E+00	524	9.220E+00	565	1.274E+01
402	2.140E-02	443	4.572E+00	484	3.702E+00	525	9.285E+00	566	1.281E+01
403	1.380E-02	444	5.109E+00	485	3.867E+00	526	9.329E+00	567	1.293E+01
404	1.290E-02	445	5.669E+00	486	4.024E+00	527	9.414E+00	568	1.306E+01
405	2.040E-02	446	6.233E+00	487	4.187E+00	528	9.472E+00	569	1.314E+01
406	5.000E-03	447	6.794E+00	488	4.374E+00	529	9.566E+00	570	1.323E+01
407	6.030E-02	448	7.287E+00	489	4.532E+00	530	9.615E+00	571	1.333E+01
408	1.850E-02	449	7.865E+00	490	4.758E+00	531	9.690E+00	572	1.346E+01
409	4.440E-02	450	8.181E+00	491	4.941E+00	532	9.764E+00	573	1.359E+01
410	5.470E-02	451	8.363E+00	492	5.132E+00	533	9.870E+00	574	1.367E+01
411	3.680E-02	452	8.337E+00	493	5.342E+00	534	9.943E+00	575	1.378E+01
412	4.820E-02	453	8.142E+00	494	5.540E+00	535	1.002E+01	576	1.396E+01
413	3.090E-02	454	7.807E+00	495	5.760E+00	536	1.010E+01	577	1.406E+01
414	8.120E-02	455	7.341E+00	496	5.979E+00	537	1.018E+01	578	1.417E+01
415	8.390E-02	456	6.765E+00	497	6.170E+00	538	1.028E+01	579	1.429E+01
416	8.190E-02	457	6.208E+00	498	6.363E+00	539	1.036E+01	580	1.442E+01
417	1.131E-01	458	5.670E+00	499	6.564E+00	540	1.044E+01	581	1.457E+01
418	1.485E-01	459	5.183E+00	500	6.724E+00	541	1.053E+01	582	1.472E+01
419	1.794E-01	460	4.845E+00	501	6.941E+00	542	1.060E+01	583	1.486E+01
420	2.484E-01	461	4.593E+00	502	7.089E+00	543	1.072E+01	584	1.500E+01

nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
585	1.518E+01	626	2.025E+01	667	1.400E+01	708	5.250E+00	749	1.323E+00
586	1.529E+01	627	2.022E+01	668	1.377E+01	709	5.050E+00	750	1.266E+00
587	1.546E+01	628	2.026E+01	669	1.350E+01	710	4.893E+00	751	1.266E+00
588	1.562E+01	629	2.025E+01	670	1.325E+01	711	4.751E+00	752	1.221E+00
589	1.584E+01	630	2.017E+01	671	1.297E+01	712	4.645E+00	753	1.166E+00
590	1.596E+01	631	2.016E+01	672	1.278E+01	713	4.536E+00	754	1.110E+00
591	1.606E+01	632	2.011E+01	673	1.250E+01	714	4.390E+00	755	9.775E-01
592	1.632E+01	633	2.003E+01	674	1.227E+01	715	4.243E+00	756	1.037E+00
593	1.645E+01	634	2.000E+01	675	1.200E+01	716	4.141E+00	757	9.720E-01
594	1.661E+01	635	1.991E+01	676	1.172E+01	717	4.032E+00	758	7.395E-01
595	1.677E+01	636	1.984E+01	677	1.150E+01	718	3.959E+00	759	8.548E-01
596	1.689E+01	637	1.971E+01	678	1.123E+01	719	3.770E+00	760	7.366E-01
597	1.715E+01	638	1.964E+01	679	1.099E+01	720	3.692E+00	761	7.589E-01
598	1.730E+01	639	1.954E+01	680	1.076E+01	721	3.555E+00	762	8.477E-01
599	1.746E+01	640	1.943E+01	681	1.055E+01	722	3.530E+00	763	8.655E-01
600	1.757E+01	641	1.931E+01	682	1.035E+01	723	3.360E+00	764	7.182E-01
601	1.782E+01	642	1.922E+01	683	1.012E+01	724	3.193E+00	765	6.489E-01
602	1.800E+01	643	1.908E+01	684	9.851E+00	725	3.183E+00	766	6.211E-01
603	1.810E+01	644	1.898E+01	685	9.655E+00	726	3.059E+00	767	6.194E-01
604	1.829E+01	645	1.878E+01	686	9.392E+00	727	2.948E+00	768	6.637E-01
605	1.843E+01	646	1.859E+01	687	9.223E+00	728	2.873E+00	769	6.165E-01
606	1.862E+01	647	1.842E+01	688	8.978E+00	729	2.837E+00	770	4.725E-01
607	1.878E+01	648	1.831E+01	689	8.733E+00	730	2.745E+00	771	4.753E-01
608	1.888E+01	649	1.811E+01	690	8.510E+00	731	2.627E+00	772	5.614E-01
609	1.903E+01	650	1.793E+01	691	8.341E+00	732	2.598E+00	773	4.180E-01
610	1.913E+01	651	1.772E+01	692	8.121E+00	733	2.380E+00	774	4.448E-01
611	1.934E+01	652	1.752E+01	693	7.943E+00	734	2.314E+00	775	4.516E-01
612	1.944E+01	653	1.725E+01	694	7.734E+00	735	2.294E+00	776	4.259E-01
613	1.957E+01	654	1.712E+01	695	7.493E+00	736	2.147E+00	777	4.375E-01
614	1.963E+01	655	1.691E+01	696	7.280E+00	737	2.079E+00	778	3.769E-01
615	1.974E+01	656	1.667E+01	697	7.130E+00	738	1.988E+00	779	3.522E-01
616	1.981E+01	657	1.641E+01	698	6.915E+00	739	1.918E+00	780	3.003E-01
617	1.989E+01	658	1.616E+01	699	6.756E+00	740	1.836E+00		
618	1.997E+01	659	1.599E+01	700	6.545E+00	741	1.871E+00		
619	2.008E+01	660	1.573E+01	701	6.359E+00	742	1.770E+00		
620	2.008E+01	661	1.550E+01	702	6.163E+00	743	1.689E+00		
621	2.020E+01	662	1.527E+01	703	6.020E+00	744	1.527E+00		
622	2.024E+01	663	1.500E+01	704	5.837E+00	745	1.499E+00		
623	2.021E+01	664	1.477E+01	705	5.673E+00	746	1.352E+00		
624	2.024E+01	665	1.453E+01	706	5.518E+00	747	1.424E+00		
625	2.021E+01	666	1.423E+01	707	5.360E+00	748	1.374E+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**

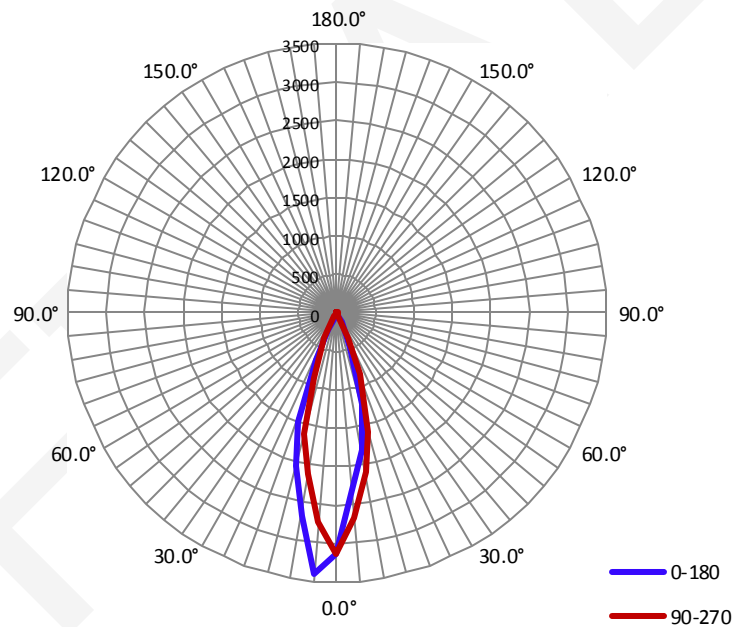
Electrical Measurement

Input Voltage (V)	Frequency (Hz)	Input Current (A)	Power (W)	Power Factor
120.0	60	0.1060	12.21	0.9600

Photometric Measurement

Luminous Flux (lm)	Efficacy (lm/W)	I _{max} (cd)	S/MH (C0/180)	S/MH (C90/270)
924.7	75.78	3411.3	0.51	0.50

Luminous Intensity Distribution



	C0/180	C45/225	C90/270	C135/315	AVG.
Beam Angle (50% I _{max}):	29.1	30.7	30.7	31.1	30.4
Field Angle (10% I _{max}):	51.0	51.4	51.8	51.6	51.5

Luminous Intensity (cd) Distribution Data

C y	0°	22.5°	45°	67.5°	90°	112.5°	135°	157.5°
0.0°	3132	3132	3132	3132	3132	3132	3132	3132
5.0°	2323	2320	2369	2511	2682	2896	3157	3388
10.0°	1801	1810	1860	1972	2109	2283	2510	2757
15.0°	1223	1255	1326	1439	1596	1758	1936	2097
20.0°	486	497	556	653	854	1111	1383	1543
25.0°	127	136	187	273	369	471	578	679
30.0°	35	35	36	40	52	88	182	270
35.0°	20	20	21	24	28	33	36	41
40.0°	13	13	13	15	19	20	23	25
45.0°	2	2	2	3	8	11	16	18
50.0°	0	0	0	1	1	2	2	4
55.0°	0	0	0	0	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

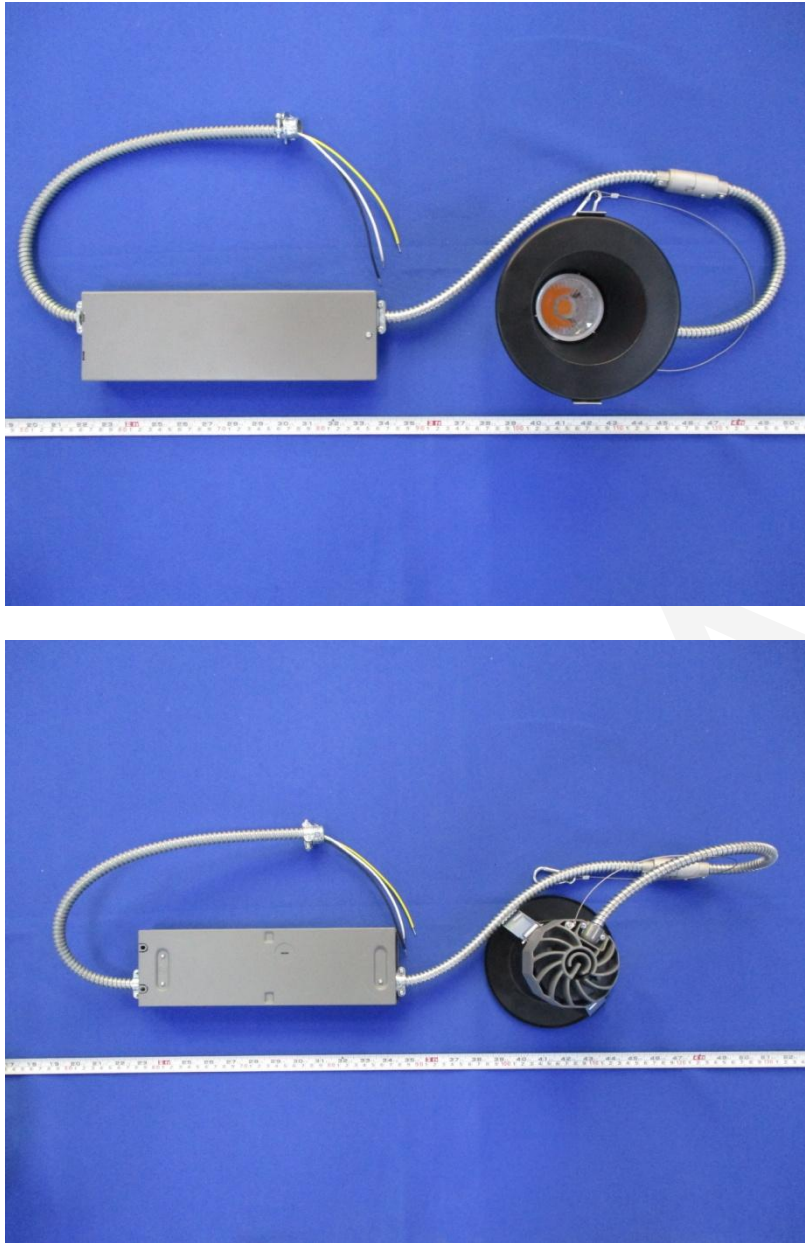
Luminous Intensity (cd) Distribution Data (cont.)

C y	180°	202.5°	225°	247.5°	270°	292.5°	315°	337.5°
0.0°	3132	3132	3132	3132	3132	3132	3132	3132
5.0°	3411	3387	3160	2930	2717	2532	2410	2356
10.0°	2694	2618	2464	2299	2128	1982	1885	1835
15.0°	2055	2001	1899	1786	1632	1475	1349	1233
20.0°	1514	1484	1379	1148	908	682	566	490
25.0°	674	671	573	470	370	287	182	126
30.0°	259	240	166	89	53	41	37	35
35.0°	39	38	36	33	28	24	21	20
40.0°	24	23	21	19	17	16	14	13
45.0°	17	15	14	12	8	4	2	1
50.0°	3	3	2	1	1	1	1	0
55.0°	1	0	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

Zonal Lumen Density Measurement

Deg	Flux (lm)	%	Deg	Flux (lm)	%
0-5	70.7	7.65	0-5	70.7	7.65
5-10	177.9	19.24	0-10	248.6	26.89
10-15	226.4	24.48	0-15	475.0	51.37
15-20	212.8	23.01	0-20	687.8	74.38
20-25	140.5	15.19	0-25	828.3	89.57
25-30	61.9	6.70	0-30	890.2	96.27
30-35	19.5	2.11	0-35	909.7	98.38
35-40	7.8	0.84	0-40	917.5	99.22
40-45	4.9	0.53	0-45	922.3	99.75
45-50	2.0	0.21	0-50	924.3	99.96
50-55	0.3	0.04	0-55	924.6	100.00
55-60	0.0	0.00	0-60	924.7	100.00
60-65	0.0	0.00	0-65	924.7	100.00
65-70	0.0	0.00	0-70	924.7	100.00
70-75	0.0	0.00	0-75	924.7	100.00
75-80	0.0	0.00	0-80	924.7	100.00
80-85	0.0	0.00	0-85	924.7	100.00
85-90	0.0	0.00	0-90	924.7	100.00
90-95	0.0	0.00	0-95	924.7	100.00
95-100	0.0	0.00	0-100	924.7	100.00
100-105	0.0	0.00	0-105	924.7	100.00
105-110	0.0	0.00	0-110	924.7	100.00
110-115	0.0	0.00	0-115	924.7	100.00
115-120	0.0	0.00	0-120	924.7	100.00
120-125	0.0	0.00	0-125	924.7	100.00
125-130	0.0	0.00	0-130	924.7	100.00
130-135	0.0	0.00	0-135	924.7	100.00
135-140	0.0	0.00	0-140	924.7	100.00
140-145	0.0	0.00	0-145	924.7	100.00
145-150	0.0	0.00	0-150	924.7	100.00
150-155	0.0	0.00	0-155	924.7	100.00
155-160	0.0	0.00	0-160	924.7	100.00
160-165	0.0	0.00	0-165	924.7	100.00
165-170	0.0	0.00	0-170	924.7	100.00
170-175	0.0	0.00	0-175	924.7	100.00
175-180	0.0	0.00	0-180	924.7	100.00

6. Product Photo



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