



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: LE199027DIM120VNR4BL

Report Type:	Electrical and Photometric tests including: Luminous Flux, Chromaticity, Luminous Intensity Distribution
Test Engineer:	George Yang <i>George Yang</i>
Report Number:	RKSB190329024-10-5
Test Date:	2019-04-04 to 2019-04-09
Report Date:	2019-05-07
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.

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: LE199027DIM120VNR4BL
 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.

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**

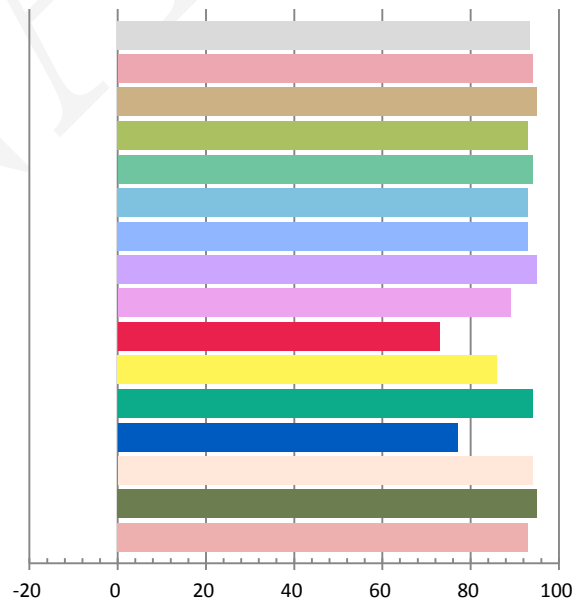
Photometric and Electrical Measurement Result

Voltage (V)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Luminous Flux(lm)	Efficacy (lm/W)
120	60	0.2617	31.02	0.9878	1967.9	63.44

Radiant Flux (W)	CCT (K)	Duv	x	y	u'	v'
7.162	2727	0.00030	0.4582	0.4110	0.2612	0.5273

Color Rendering Index

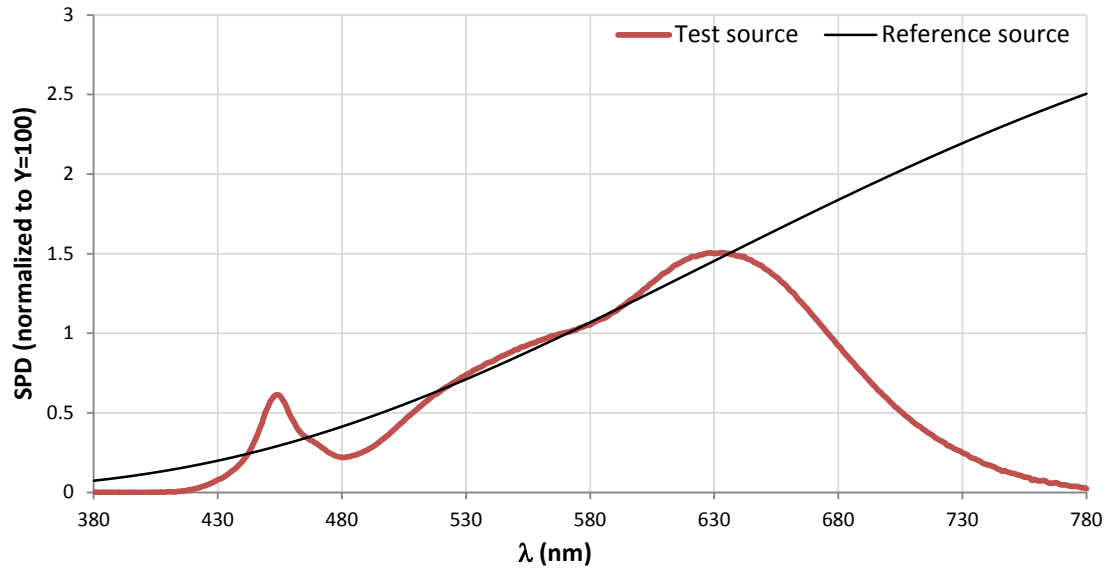
Ra			
93.4			
R1	R2	R3	R4
94	95	93	94
R5	R6	R7	R8
93	93	95	89
R9	R10	R11	R12
73	86	94	77
R13	R14	R15	
94	95	93	



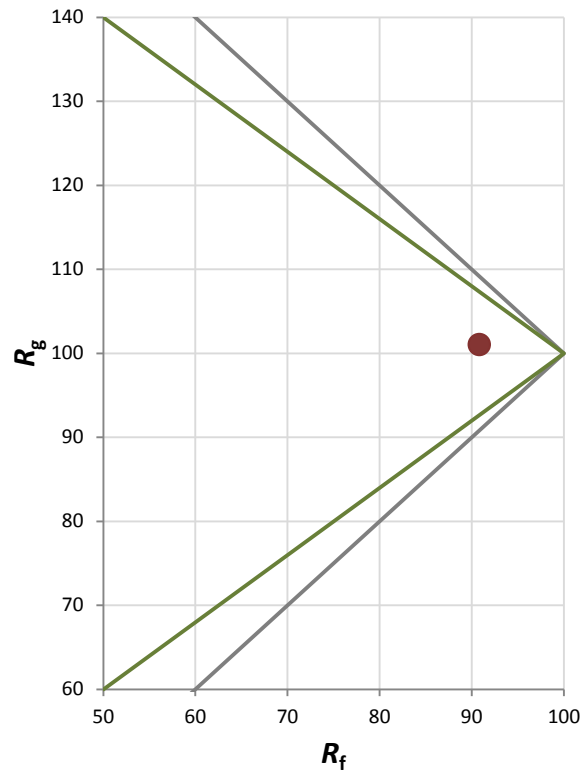
Fidelity Index and Gamut Index

Fidelity Index R_f	91
Gamut Index R_g	101

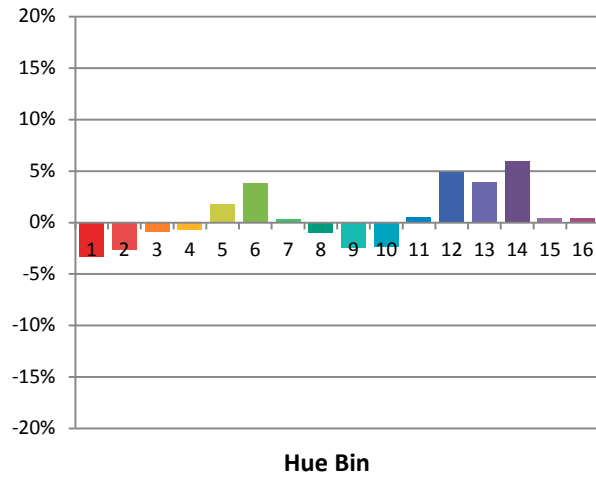
Spectral Power Distribution Comparison



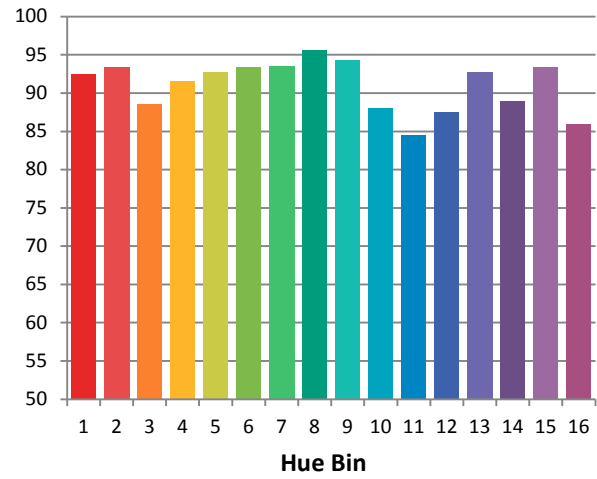
Plot of R_g versus R_f



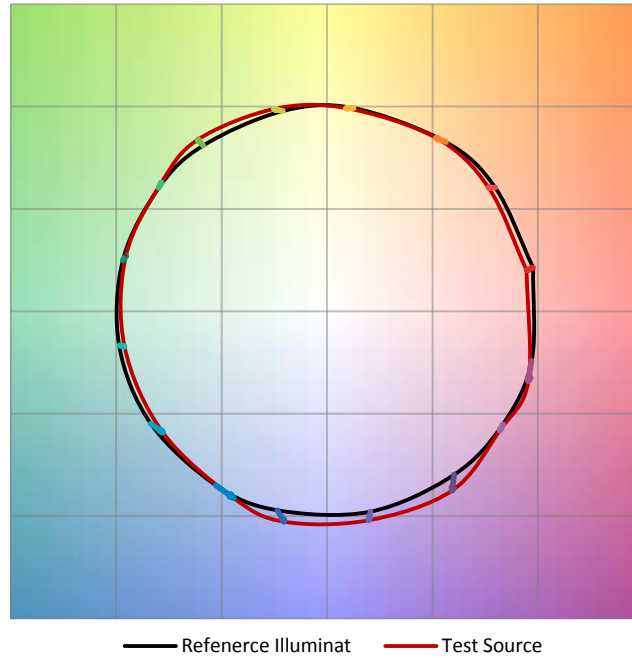
Chroma Shift by Hue



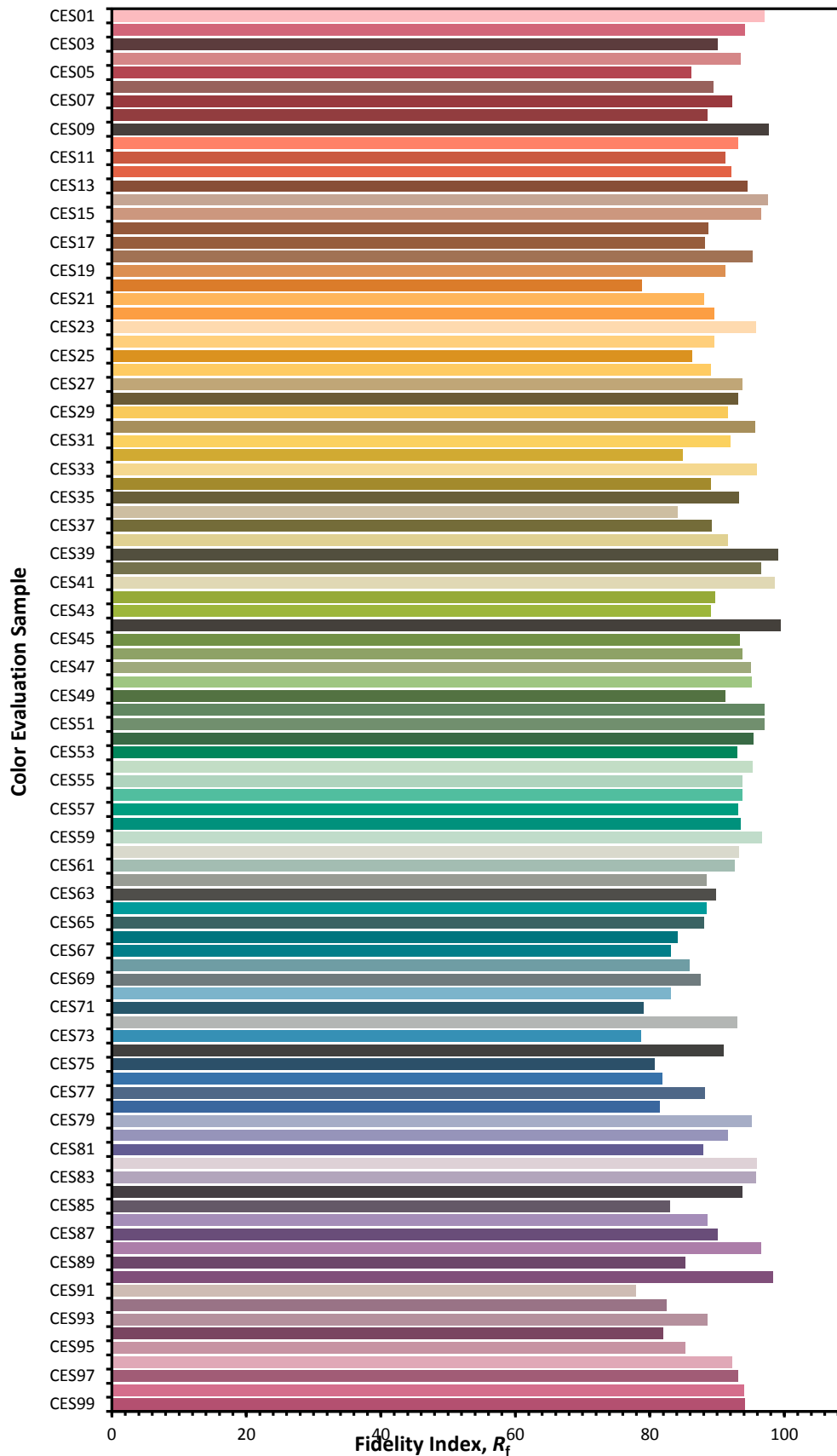
R_t by Hue



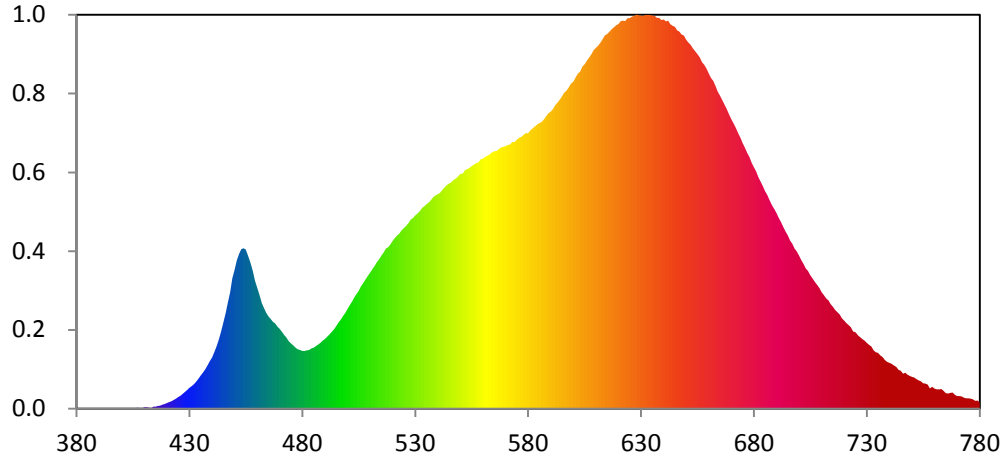
Color Vector Graphic



Color Fidelity by CES Sample



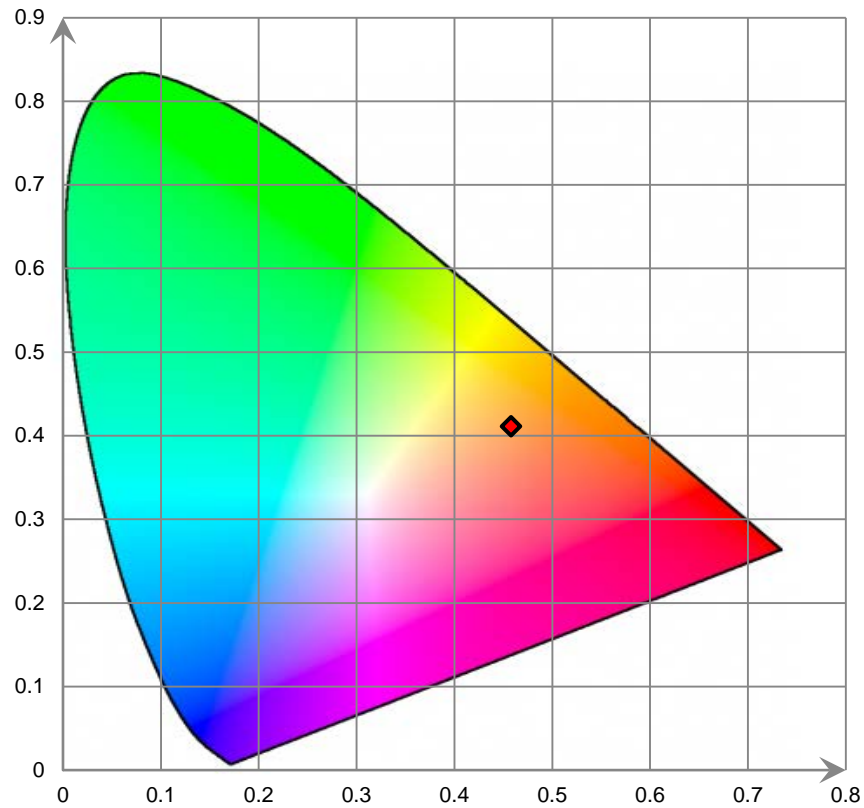
Relative Spectral Power Distribution



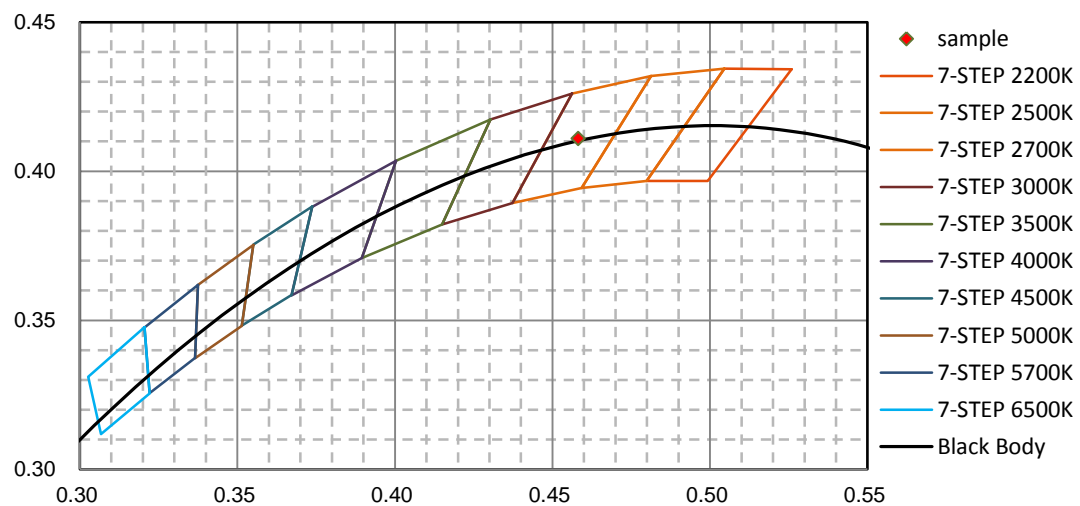
nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
380	1.870E-02	421	6.855E-01	462	1.162E+01	503	1.222E+01	544	2.460E+01
381	3.330E-02	422	7.939E-01	463	1.105E+01	504	1.261E+01	545	2.478E+01
382	2.900E-02	423	9.448E-01	464	1.055E+01	505	1.296E+01	546	2.494E+01
383	9.000E-03	424	1.106E+00	465	1.016E+01	506	1.348E+01	547	2.522E+01
384	5.490E-02	425	1.250E+00	466	9.882E+00	507	1.382E+01	548	2.535E+01
385	3.030E-02	426	1.411E+00	467	9.560E+00	508	1.422E+01	549	2.561E+01
386	2.000E-03	427	1.605E+00	468	9.376E+00	509	1.458E+01	550	2.588E+01
387	5.700E-02	428	1.816E+00	469	9.037E+00	510	1.494E+01	551	2.586E+01
388	6.400E-03	429	2.036E+00	470	8.790E+00	511	1.536E+01	552	2.627E+01
389	2.000E-04	430	2.301E+00	471	8.453E+00	512	1.572E+01	553	2.636E+01
390	5.420E-02	431	2.454E+00	472	8.102E+00	513	1.614E+01	554	2.652E+01
391	8.400E-03	432	2.663E+00	473	7.838E+00	514	1.648E+01	555	2.672E+01
392	1.830E-02	433	2.966E+00	474	7.434E+00	515	1.685E+01	556	2.688E+01
393	1.500E-03	434	3.262E+00	475	7.169E+00	516	1.719E+01	557	2.704E+01
394	1.900E-02	435	3.622E+00	476	6.935E+00	517	1.763E+01	558	2.712E+01
395	3.330E-02	436	3.963E+00	477	6.712E+00	518	1.779E+01	559	2.745E+01
396	2.370E-02	437	4.310E+00	478	6.518E+00	519	1.809E+01	560	2.753E+01
397	2.380E-02	438	4.721E+00	479	6.442E+00	520	1.847E+01	561	2.770E+01
398	2.800E-03	439	5.195E+00	480	6.342E+00	521	1.878E+01	562	2.785E+01
399	1.000E-04	440	5.650E+00	481	6.340E+00	522	1.908E+01	563	2.801E+01
400	0.000E+00	441	6.253E+00	482	6.429E+00	523	1.927E+01	564	2.823E+01
401	9.700E-03	442	6.870E+00	483	6.458E+00	524	1.963E+01	565	2.836E+01
402	2.720E-02	443	7.603E+00	484	6.630E+00	525	1.990E+01	566	2.839E+01
403	2.940E-02	444	8.511E+00	485	6.715E+00	526	2.013E+01	567	2.860E+01
404	2.280E-02	445	9.482E+00	486	6.866E+00	527	2.041E+01	568	2.876E+01
405	4.530E-02	446	1.047E+01	487	7.050E+00	528	2.080E+01	569	2.883E+01
406	1.720E-02	447	1.168E+01	488	7.208E+00	529	2.100E+01	570	2.892E+01
407	8.850E-02	448	1.277E+01	489	7.467E+00	530	2.130E+01	571	2.904E+01
408	1.290E-02	449	1.435E+01	490	7.634E+00	531	2.150E+01	572	2.908E+01
409	7.320E-02	450	1.527E+01	491	7.904E+00	532	2.175E+01	573	2.935E+01
410	1.214E-01	451	1.634E+01	492	8.146E+00	533	2.210E+01	574	2.936E+01
411	1.248E-01	452	1.701E+01	493	8.443E+00	534	2.230E+01	575	2.962E+01
412	1.080E-01	453	1.755E+01	494	8.752E+00	535	2.252E+01	576	2.982E+01
413	7.960E-02	454	1.767E+01	495	9.100E+00	536	2.271E+01	577	2.994E+01
414	2.001E-01	455	1.751E+01	496	9.487E+00	537	2.297E+01	578	3.013E+01
415	2.140E-01	456	1.686E+01	497	9.803E+00	538	2.331E+01	579	3.034E+01
416	2.860E-01	457	1.616E+01	498	1.018E+01	539	2.350E+01	580	3.032E+01
417	3.005E-01	458	1.518E+01	499	1.053E+01	540	2.362E+01	581	3.065E+01
418	4.259E-01	459	1.405E+01	500	1.095E+01	541	2.378E+01	582	3.087E+01
419	5.014E-01	460	1.329E+01	501	1.138E+01	542	2.407E+01	583	3.111E+01
420	5.804E-01	461	1.251E+01	502	1.177E+01	543	2.436E+01	584	3.131E+01

nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
585	3.146E+01	626	4.319E+01	667	3.349E+01	708	1.361E+01	749	3.596E+00
586	3.158E+01	627	4.327E+01	668	3.302E+01	709	1.324E+01	750	3.483E+00
587	3.188E+01	628	4.339E+01	669	3.242E+01	710	1.281E+01	751	3.420E+00
588	3.224E+01	629	4.331E+01	670	3.192E+01	711	1.247E+01	752	3.227E+00
589	3.253E+01	630	4.328E+01	671	3.138E+01	712	1.213E+01	753	3.117E+00
590	3.273E+01	631	4.327E+01	672	3.090E+01	713	1.192E+01	754	2.978E+00
591	3.300E+01	632	4.336E+01	673	3.031E+01	714	1.151E+01	755	2.776E+00
592	3.343E+01	633	4.337E+01	674	2.982E+01	715	1.123E+01	756	2.738E+00
593	3.371E+01	634	4.335E+01	675	2.923E+01	716	1.087E+01	757	2.645E+00
594	3.402E+01	635	4.328E+01	676	2.872E+01	717	1.061E+01	758	2.203E+00
595	3.438E+01	636	4.325E+01	677	2.816E+01	718	1.036E+01	759	2.387E+00
596	3.480E+01	637	4.307E+01	678	2.772E+01	719	9.937E+00	760	2.173E+00
597	3.503E+01	638	4.306E+01	679	2.706E+01	720	9.690E+00	761	2.094E+00
598	3.536E+01	639	4.280E+01	680	2.658E+01	721	9.423E+00	762	2.119E+00
599	3.578E+01	640	4.287E+01	681	2.612E+01	722	9.218E+00	763	2.153E+00
600	3.605E+01	641	4.265E+01	682	2.550E+01	723	8.947E+00	764	1.918E+00
601	3.651E+01	642	4.275E+01	683	2.499E+01	724	8.495E+00	765	1.689E+00
602	3.691E+01	643	4.236E+01	684	2.450E+01	725	8.402E+00	766	1.666E+00
603	3.714E+01	644	4.217E+01	685	2.395E+01	726	8.088E+00	767	1.726E+00
604	3.769E+01	645	4.205E+01	686	2.353E+01	727	7.862E+00	768	1.748E+00
605	3.795E+01	646	4.167E+01	687	2.296E+01	728	7.664E+00	769	1.503E+00
606	3.833E+01	647	4.152E+01	688	2.241E+01	729	7.480E+00	770	1.367E+00
607	3.869E+01	648	4.121E+01	689	2.198E+01	730	7.214E+00	771	1.368E+00
608	3.905E+01	649	4.110E+01	690	2.151E+01	731	7.001E+00	772	1.322E+00
609	3.951E+01	650	4.065E+01	691	2.097E+01	732	6.829E+00	773	1.186E+00
610	3.974E+01	651	4.035E+01	692	2.051E+01	733	6.424E+00	774	1.111E+00
611	3.998E+01	652	4.009E+01	693	1.997E+01	734	6.212E+00	775	1.115E+00
612	4.029E+01	653	3.968E+01	694	1.949E+01	735	6.129E+00	776	1.075E+00
613	4.070E+01	654	3.934E+01	695	1.908E+01	736	5.862E+00	777	1.017E+00
614	4.110E+01	655	3.902E+01	696	1.850E+01	737	5.680E+00	778	8.522E-01
615	4.125E+01	656	3.868E+01	697	1.816E+01	738	5.371E+00	779	8.622E-01
616	4.151E+01	657	3.816E+01	698	1.764E+01	739	5.157E+00	780	6.771E-01
617	4.177E+01	658	3.785E+01	699	1.730E+01	740	5.043E+00		
618	4.203E+01	659	3.743E+01	700	1.685E+01	741	4.926E+00		
619	4.224E+01	660	3.690E+01	701	1.637E+01	742	4.752E+00		
620	4.238E+01	661	3.641E+01	702	1.595E+01	743	4.596E+00		
621	4.271E+01	662	3.611E+01	703	1.546E+01	744	4.273E+00		
622	4.272E+01	663	3.553E+01	704	1.515E+01	745	4.151E+00		
623	4.271E+01	664	3.489E+01	705	1.471E+01	746	3.846E+00		
624	4.302E+01	665	3.449E+01	706	1.436E+01	747	3.942E+00		
625	4.300E+01	666	3.399E+01	707	1.391E+01	748	3.747E+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**

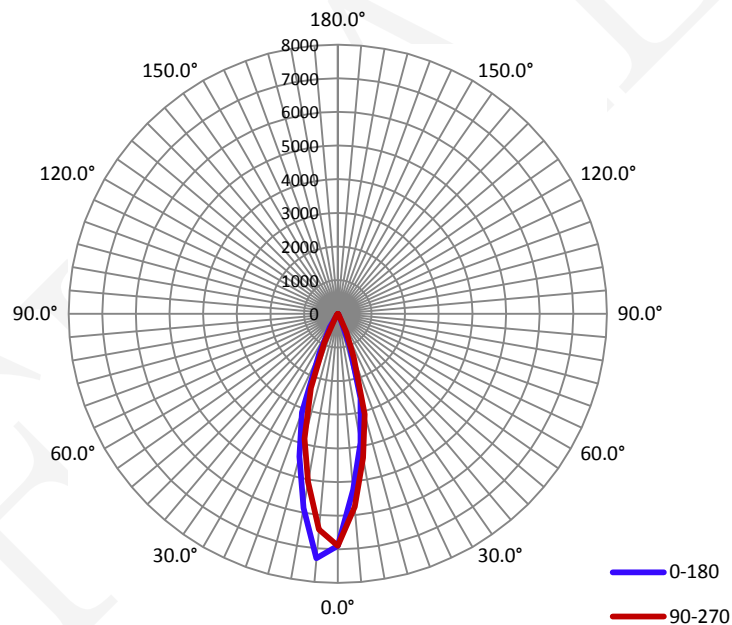
Electrical Measurement

Input Voltage (V)	Frequency (Hz)	Input Current (A)	Power (W)	Power Factor
120.0	60	0.2690	31.03	0.9610

Photometric Measurement

Luminous Flux (lm)	Efficacy (lm/W)	I _{max} (cd)	S/MH (C0/180)	S/MH (C90/270)
1970	63.54	7660.0	0.50	0.49

Luminous Intensity Distribution



	C0/180	C45/225	C90/270	C135/315	AVG.
Beam Angle (50% I _{max}):	28.9	28.7	29.9	29.8	29.3
Field Angle (10% I _{max}):	50.4	50.3	51.1	51.0	50.7

Luminous Intensity (cd) Distribution Data

C y	0°	22.5°	45°	67.5°	90°	112.5°	135°	157.5°
0.0°	6893	6893	6893	6893	6893	6893	6893	6893
5.0°	5246	5164	5277	5477	5755	6092	6602	7016
10.0°	3889	3842	3885	4083	4344	4705	5086	5584
15.0°	2602	2506	2568	2808	3087	3451	3836	4217
20.0°	1021	967	1012	1127	1387	1923	2464	2916
25.0°	281	260	295	402	605	804	1006	1228
30.0°	72	71	72	76	89	109	215	403
35.0°	41	45	44	52	56	61	64	74
40.0°	24	28	30	31	39	37	41	46
45.0°	0	0	0	0	9	19	26	26
50.0°	0	0	0	0	0	0	0	0
55.0°	0	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

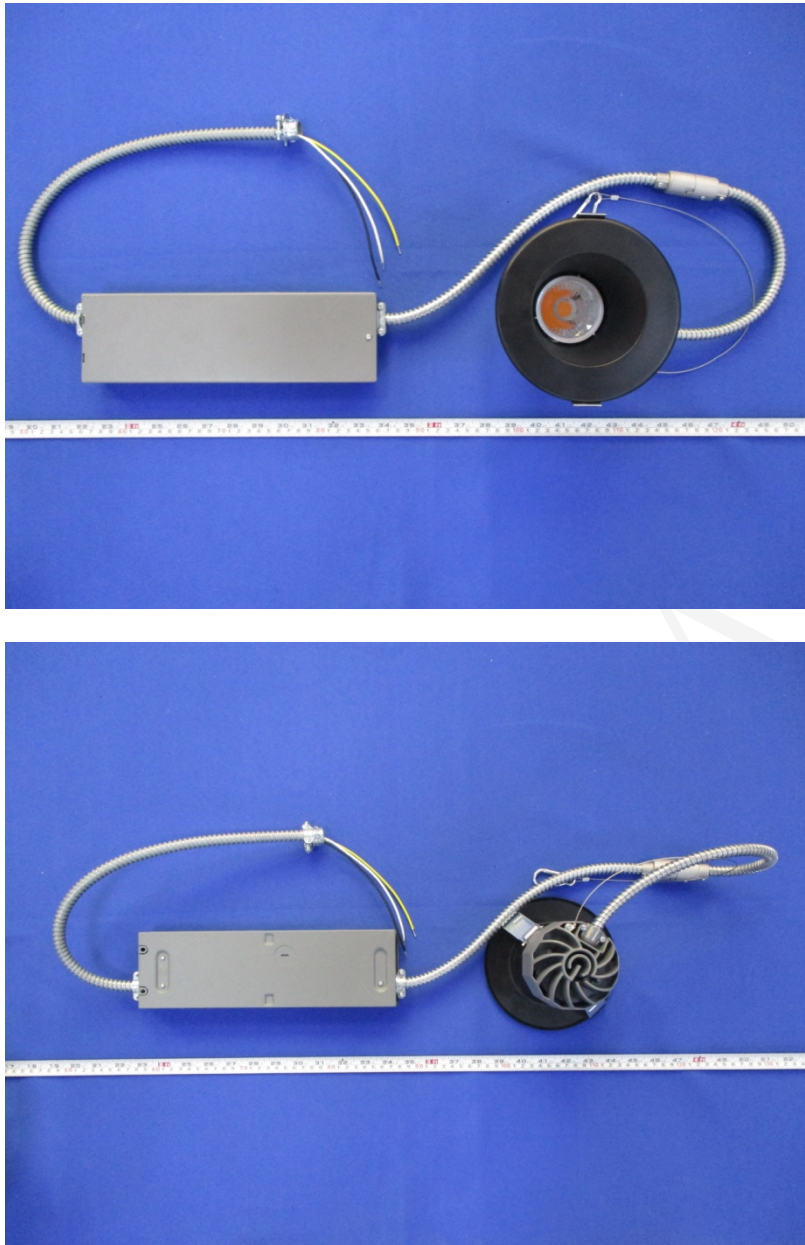
Luminous Intensity (cd) Distribution Data (cont.)

C y	180°	202.5°	225°	247.5°	270°	292.5°	315°	337.5°
0.0°	6893	6893	6893	6893	6893	6893	6893	6893
5.0°	7292	7660	7376	6887	6433	5946	5628	5327
10.0°	5860	5979	5781	5418	5068	4653	4272	3981
15.0°	4393	4503	4396	4172	3837	3420	3042	2693
20.0°	3117	3242	3178	2802	2344	1715	1308	1080
25.0°	1307	1415	1313	1143	945	760	537	344
30.0°	466	532	469	318	169	93	78	76
35.0°	73	81	76	71	60	54	38	41
40.0°	48	47	47	38	32	33	26	32
45.0°	18	27	25	27	27	12	0	0
50.0°	0	0	0	0	0	0	0	0
55.0°	0	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	156.5	7.94	0-5	156.5	7.94
5-10	392.6	19.93	0-10	549.1	27.87
10-15	489.2	24.83	0-15	1038.4	52.71
15-20	448.8	22.78	0-20	1487.1	75.49
20-25	290.0	14.72	0-25	1777.2	90.21
25-30	126.2	6.40	0-30	1903.3	96.62
30-35	39.0	1.98	0-35	1942.3	98.60
35-40	15.7	0.80	0-40	1958.1	99.39
40-45	9.2	0.47	0-45	1967.3	99.86
45-50	2.7	0.14	0-50	1970.0	100.00
50-55	0.0	0.00	0-55	1970.0	100.00
55-60	0.0	0.00	0-60	1970.0	100.00
60-65	0.0	0.00	0-65	1970.0	100.00
65-70	0.0	0.00	0-70	1970.0	100.00
70-75	0.0	0.00	0-75	1970.0	100.00
75-80	0.0	0.00	0-80	1970.0	100.00
80-85	0.0	0.00	0-85	1970.0	100.00
85-90	0.0	0.00	0-90	1970.0	100.00
90-95	0.0	0.00	0-95	1970.0	100.00
95-100	0.0	0.00	0-100	1970.0	100.00
100-105	0.0	0.00	0-105	1970.0	100.00
105-110	0.0	0.00	0-110	1970.0	100.00
110-115	0.0	0.00	0-115	1970.0	100.00
115-120	0.0	0.00	0-120	1970.0	100.00
120-125	0.0	0.00	0-125	1970.0	100.00
125-130	0.0	0.00	0-130	1970.0	100.00
130-135	0.0	0.00	0-135	1970.0	100.00
135-140	0.0	0.00	0-140	1970.0	100.00
140-145	0.0	0.00	0-145	1970.0	100.00
145-150	0.0	0.00	0-150	1970.0	100.00
150-155	0.0	0.00	0-155	1970.0	100.00
155-160	0.0	0.00	0-160	1970.0	100.00
160-165	0.0	0.00	0-165	1970.0	100.00
165-170	0.0	0.00	0-170	1970.0	100.00
170-175	0.0	0.00	0-175	1970.0	100.00
175-180	0.0	0.00	0-180	1970.0	100.00

6. Product Photo



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