

IES LM-79-08

MEASUREMENT AND TEST REPORT

For

GREEN CREATIVE LTD

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

Test Model: LE409027DIM120VNR/ADR6BL

Report Type:	Electrical and Photometric tests including: Luminous Flux, Chromaticity, Luminous Intensity Distribution
Test Engineer:	George Yang <i>George Yang</i>
Report Number:	RKSB190722006-10-1
Test Date:	2019-07-22 to 2019-07-24
Report Date:	2019-07-29
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
Accreditation:	The IAS Accreditation Number TL-749.

1. Product Description

General Information:

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

Model Tested: LE409027DIM120VNR/ADR6BL
 Manufacturer: GREEN CREATIVE LTD
 Brand Name: GREEN CREATIVE
 Product Designation: LED Recessed Downlight
 Burning Time Before Test: 0hour(For New Products)

Rated Values:

Rated Voltage/Frequency: 120-277 VAC 60Hz
 Rated Power: 48W
 Nominal CCT: 2700K
 Nominal Lumen Output: 3250lm

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.

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**

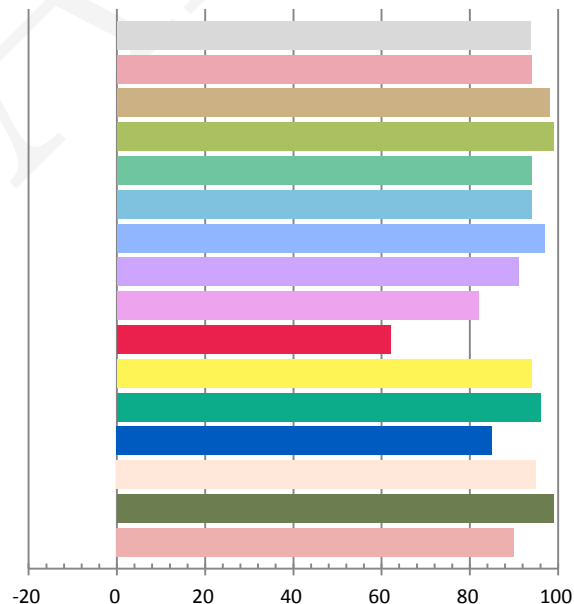
Photometric and Electrical Measurement Result

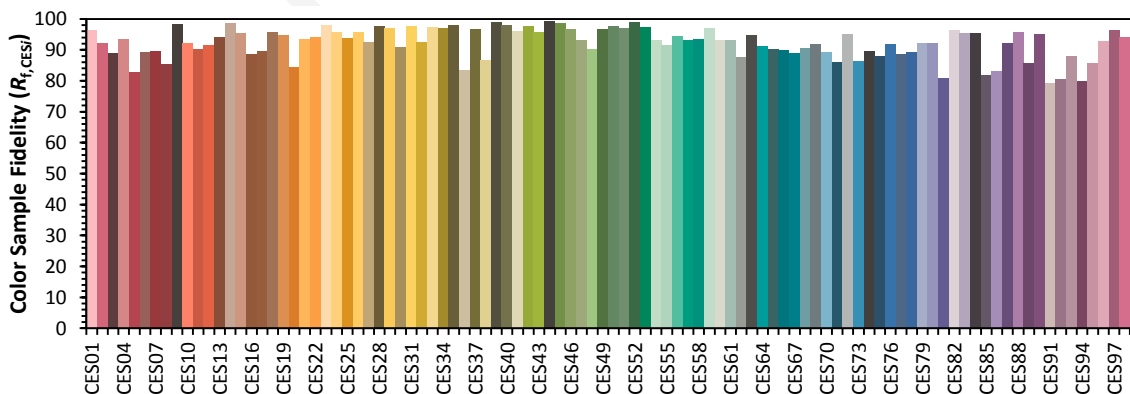
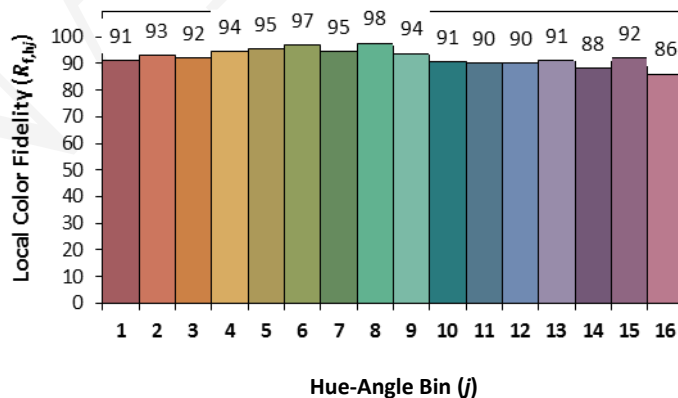
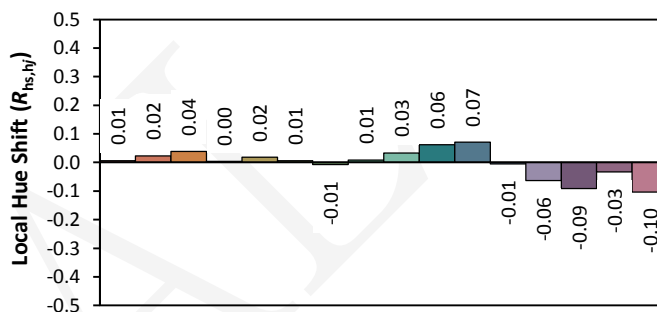
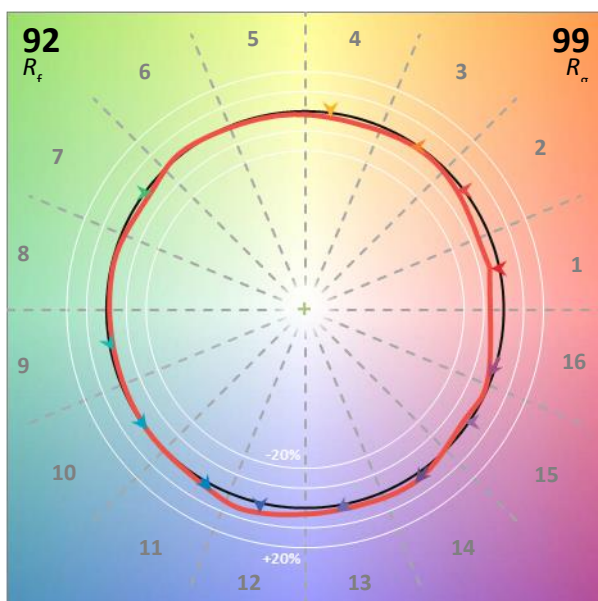
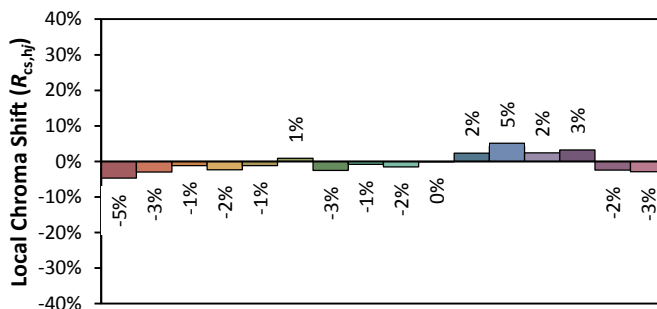
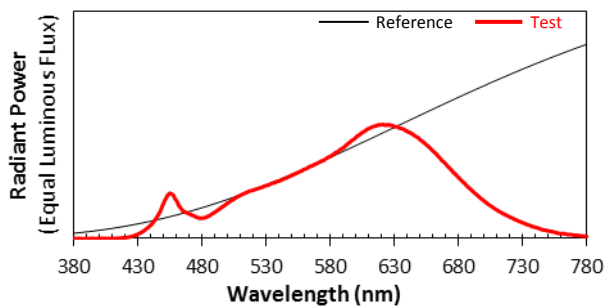
Voltage(V)	Frequency(Hz)	Current(A)	Power (W)	Power Factor	Luminous Flux(lm)	Efficacy(lm/W)
120	60	0.4081	48.6	0.9924	3358.14	69.1

Radiant Flux (W)	CCT (K)	Duv	x	y	u'	v'
11.876	2703	-0.00027	0.4592	0.4097	0.2625	0.5269

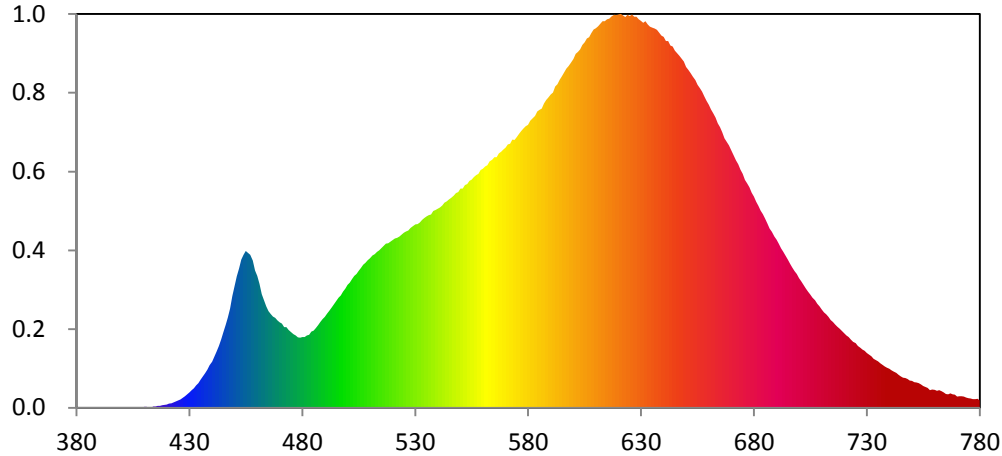
Color Rendering Index

Ra			
93.7			
R1	R2	R3	R4
94	98	99	94
R5	R6	R7	R8
94	97	91	82
R9	R10	R11	R12
62	94	96	85
R13	R14	R15	
95	99	90	





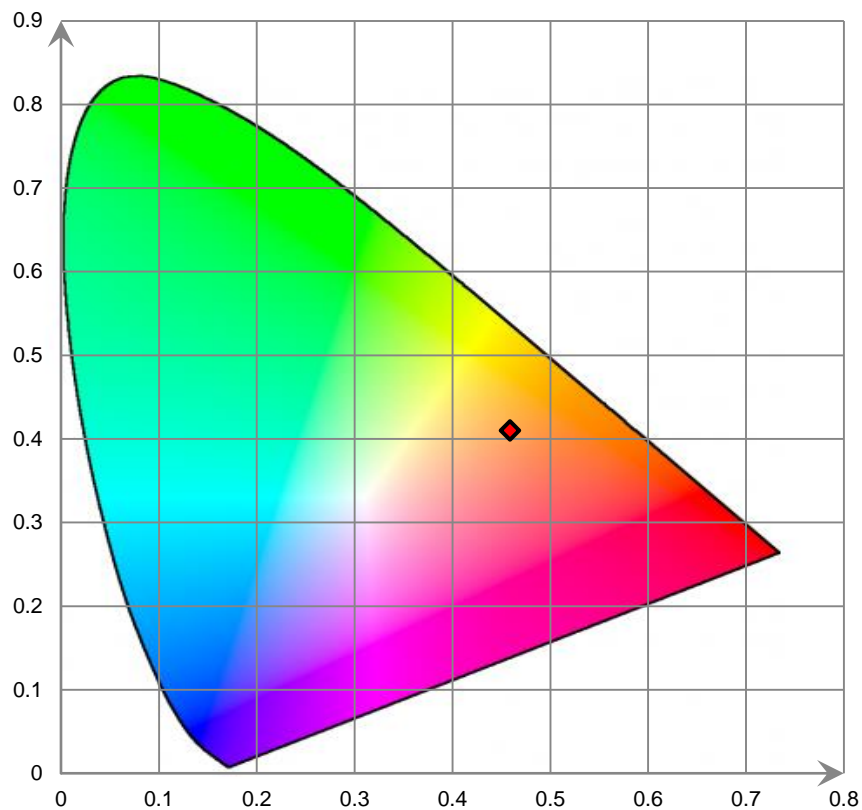
Relative Spectral Power Distribution



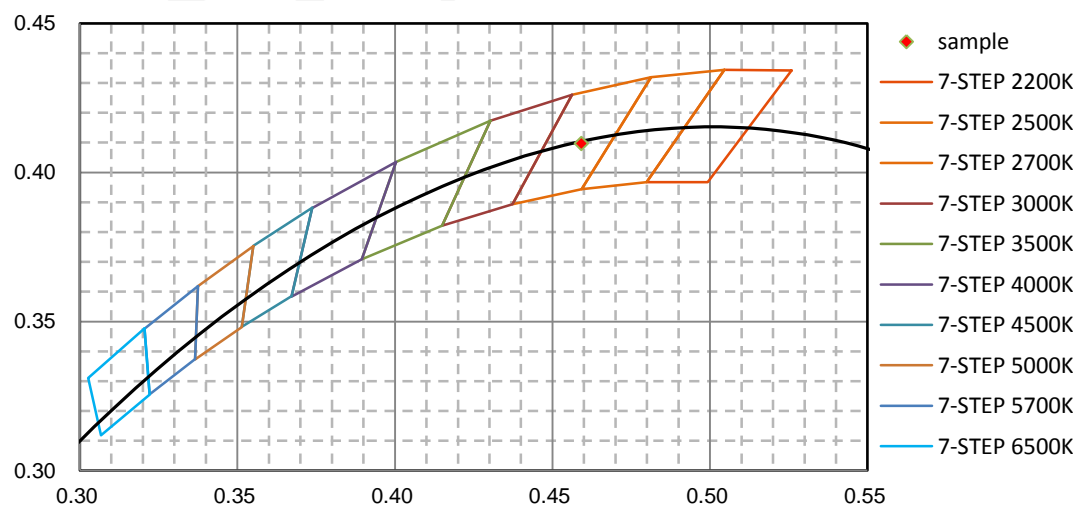
nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
380	7.570E-02	421	7.814E-01	462	2.137E+01	503	2.475E+01	544	3.876E+01
381	5.520E-02	422	8.571E-01	463	2.022E+01	504	2.515E+01	545	3.915E+01
382	8.700E-02	423	9.990E-01	464	1.904E+01	505	2.575E+01	546	3.946E+01
383	2.340E-02	424	1.176E+00	465	1.816E+01	506	2.628E+01	547	3.988E+01
384	1.088E-01	425	1.403E+00	466	1.760E+01	507	2.686E+01	548	4.037E+01
385	1.124E-01	426	1.581E+00	467	1.712E+01	508	2.724E+01	549	4.055E+01
386	5.800E-03	427	1.873E+00	468	1.688E+01	509	2.770E+01	550	4.117E+01
387	7.670E-02	428	2.186E+00	469	1.640E+01	510	2.810E+01	551	4.120E+01
388	1.760E-02	429	2.515E+00	470	1.607E+01	511	2.859E+01	552	4.183E+01
389	1.740E-02	430	2.867E+00	471	1.583E+01	512	2.885E+01	553	4.202E+01
390	1.108E-01	431	3.294E+00	472	1.517E+01	513	2.931E+01	554	4.263E+01
391	1.760E-02	432	3.666E+00	473	1.512E+01	514	2.956E+01	555	4.288E+01
392	6.500E-03	433	4.197E+00	474	1.462E+01	515	2.998E+01	556	4.337E+01
393	1.800E-02	434	4.644E+00	475	1.421E+01	516	3.040E+01	557	4.371E+01
394	7.100E-03	435	5.278E+00	476	1.384E+01	517	3.085E+01	558	4.393E+01
395	4.820E-02	436	5.895E+00	477	1.359E+01	518	3.093E+01	559	4.470E+01
396	3.190E-02	437	6.516E+00	478	1.325E+01	519	3.121E+01	560	4.493E+01
397	2.770E-02	438	7.161E+00	479	1.319E+01	520	3.150E+01	561	4.534E+01
398	1.410E-02	439	7.985E+00	480	1.326E+01	521	3.181E+01	562	4.558E+01
399	1.200E-03	440	8.631E+00	481	1.330E+01	522	3.196E+01	563	4.629E+01
400	3.000E-04	441	9.611E+00	482	1.359E+01	523	3.219E+01	564	4.662E+01
401	5.080E-02	442	1.058E+01	483	1.373E+01	524	3.256E+01	565	4.707E+01
402	6.220E-02	443	1.161E+01	484	1.431E+01	525	3.290E+01	566	4.710E+01
403	8.790E-02	444	1.281E+01	485	1.446E+01	526	3.313E+01	567	4.780E+01
404	7.670E-02	445	1.416E+01	486	1.497E+01	527	3.328E+01	568	4.812E+01
405	6.110E-02	446	1.553E+01	487	1.554E+01	528	3.378E+01	569	4.850E+01
406	1.920E-02	447	1.697E+01	488	1.613E+01	529	3.418E+01	570	4.888E+01
407	1.285E-01	448	1.862E+01	489	1.664E+01	530	3.446E+01	571	4.947E+01
408	3.040E-02	449	2.101E+01	490	1.704E+01	531	3.454E+01	572	4.960E+01
409	1.045E-01	450	2.282E+01	491	1.770E+01	532	3.483E+01	573	5.037E+01
410	1.644E-01	451	2.469E+01	492	1.823E+01	533	3.532E+01	574	5.032E+01
411	1.629E-01	452	2.617E+01	493	1.885E+01	534	3.564E+01	575	5.089E+01
412	1.040E-01	453	2.784E+01	494	1.946E+01	535	3.594E+01	576	5.146E+01
413	1.211E-01	454	2.877E+01	495	2.008E+01	536	3.620E+01	577	5.199E+01
414	2.406E-01	455	2.944E+01	496	2.065E+01	537	3.633E+01	578	5.252E+01
415	2.128E-01	456	2.911E+01	497	2.108E+01	538	3.696E+01	579	5.293E+01
416	3.362E-01	457	2.871E+01	498	2.184E+01	539	3.713E+01	580	5.314E+01
417	3.434E-01	458	2.764E+01	499	2.237E+01	540	3.738E+01	581	5.396E+01
418	4.500E-01	459	2.578E+01	500	2.309E+01	541	3.767E+01	582	5.440E+01
419	5.214E-01	460	2.474E+01	501	2.351E+01	542	3.799E+01	583	5.487E+01
420	5.965E-01	461	2.325E+01	502	2.415E+01	543	3.852E+01	584	5.567E+01

nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
585	5.601E+01	626	7.390E+01	667	5.065E+01	708	1.952E+01	749	5.115E+00
586	5.623E+01	627	7.349E+01	668	4.997E+01	709	1.905E+01	750	5.022E+00
587	5.717E+01	628	7.347E+01	669	4.933E+01	710	1.845E+01	751	4.835E+00
588	5.783E+01	629	7.299E+01	670	4.842E+01	711	1.794E+01	752	4.754E+00
589	5.832E+01	630	7.270E+01	671	4.736E+01	712	1.755E+01	753	4.618E+00
590	5.885E+01	631	7.234E+01	672	4.647E+01	713	1.705E+01	754	4.373E+00
591	5.924E+01	632	7.265E+01	673	4.575E+01	714	1.647E+01	755	4.076E+00
592	6.035E+01	633	7.207E+01	674	4.474E+01	715	1.609E+01	756	3.891E+00
593	6.082E+01	634	7.161E+01	675	4.394E+01	716	1.566E+01	757	3.707E+00
594	6.165E+01	635	7.144E+01	676	4.282E+01	717	1.520E+01	758	3.288E+00
595	6.230E+01	636	7.127E+01	677	4.214E+01	718	1.486E+01	759	3.421E+00
596	6.303E+01	637	7.101E+01	678	4.144E+01	719	1.441E+01	760	3.345E+00
597	6.376E+01	638	7.046E+01	679	4.042E+01	720	1.400E+01	761	3.203E+00
598	6.421E+01	639	6.992E+01	680	3.970E+01	721	1.360E+01	762	3.273E+00
599	6.481E+01	640	6.968E+01	681	3.875E+01	722	1.330E+01	763	3.119E+00
600	6.553E+01	641	6.892E+01	682	3.792E+01	723	1.281E+01	764	2.863E+00
601	6.653E+01	642	6.894E+01	683	3.701E+01	724	1.237E+01	765	2.603E+00
602	6.689E+01	643	6.809E+01	684	3.637E+01	725	1.212E+01	766	2.545E+00
603	6.736E+01	644	6.789E+01	685	3.556E+01	726	1.163E+01	767	2.673E+00
604	6.820E+01	645	6.710E+01	686	3.461E+01	727	1.127E+01	768	2.546E+00
605	6.868E+01	646	6.664E+01	687	3.369E+01	728	1.095E+01	769	2.460E+00
606	6.941E+01	647	6.615E+01	688	3.308E+01	729	1.069E+01	770	2.121E+00
607	6.961E+01	648	6.561E+01	689	3.217E+01	730	1.028E+01	771	2.135E+00
608	7.041E+01	649	6.504E+01	690	3.157E+01	731	9.974E+00	772	2.159E+00
609	7.105E+01	650	6.404E+01	691	3.076E+01	732	9.695E+00	773	2.097E+00
610	7.131E+01	651	6.351E+01	692	2.994E+01	733	9.177E+00	774	1.922E+00
611	7.167E+01	652	6.290E+01	693	2.926E+01	734	8.977E+00	775	1.811E+00
612	7.217E+01	653	6.225E+01	694	2.854E+01	735	8.694E+00	776	1.762E+00
613	7.264E+01	654	6.155E+01	695	2.786E+01	736	8.334E+00	777	1.628E+00
614	7.265E+01	655	6.069E+01	696	2.708E+01	737	8.030E+00	778	1.593E+00
615	7.303E+01	656	6.009E+01	697	2.633E+01	738	7.729E+00	779	1.660E+00
616	7.315E+01	657	5.939E+01	698	2.565E+01	739	7.490E+00	780	1.399E+00
617	7.356E+01	658	5.851E+01	699	2.510E+01	740	7.314E+00		
618	7.387E+01	659	5.767E+01	700	2.436E+01	741	7.039E+00		
619	7.380E+01	660	5.692E+01	701	2.373E+01	742	6.782E+00		
620	7.388E+01	661	5.606E+01	702	2.306E+01	743	6.526E+00		
621	7.401E+01	662	5.535E+01	703	2.240E+01	744	6.185E+00		
622	7.371E+01	663	5.452E+01	704	2.183E+01	745	5.870E+00		
623	7.343E+01	664	5.349E+01	705	2.126E+01	746	5.657E+00		
624	7.384E+01	665	5.271E+01	706	2.070E+01	747	5.566E+00		
625	7.361E+01	666	5.175E+01	707	2.020E+01	748	5.431E+00		

CIE 1931xy Chromaticity Diagram



7-Step Chromaticity Quadrangles



[Goniophotometer System]

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

Test orientation: **Downward**

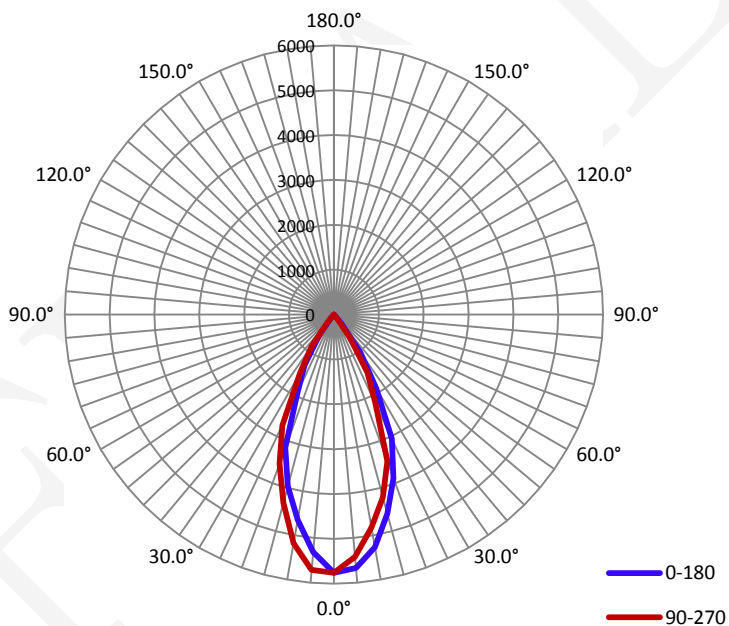
Electrical Measurement

Input Voltage(V)	Frequency(Hz)	Input Current(A)	Power (W)	Power Factor
120.0	60	0.4250	48.74	0.9560

Photometric Measurement

Luminous Flux(lm)	Efficacy(lm/W)	$I_{max}(cd)$	S/MH(C0/180)	S/MH(C90/270)
3376.8	69.33	5755.4	0.74	0.73

Luminous Intensity Distribution



	C0/180	C45/225	C90/270	C135/315	AVG.
Beam Angle(50% I_{max}):	46.9	46.1	46.4	47.0	46.7
Field Angle(10% I_{max}):	72.9	73.3	72.7	72.7	72.9

Luminous Intensity (cd) Distribution Data

C y	0°	22.5°	45°	67.5°	90°	112.5°	135°	157.5°
0.0°	5755	5755	5755	5755	5755	5755	5755	5755
5.0°	5668	5618	5553	5487	5417	5345	5304	5285
10.0°	5266	5166	5093	4917	4823	4754	4681	4681
15.0°	4595	4548	4421	4312	4218	4118	4056	4036
20.0°	3882	3823	3734	3588	3477	3321	3251	3226
25.0°	3055	2895	2674	2412	2194	2064	2003	1978
30.0°	1891	1767	1650	1574	1496	1429	1393	1384
35.0°	1035	940	837	727	624	556	558	626
40.0°	246	205	164	123	101	84	85	103
45.0°	26	22	14	13	14	17	15	15
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.)

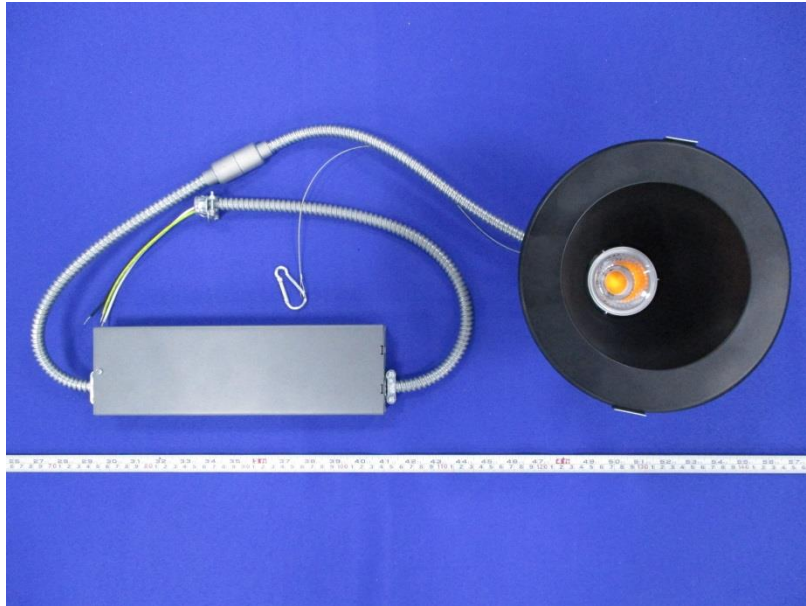
C y	180°	202.5°	225°	247.5°	270°	292.5°	315°	337.5°
0.0°	5755	5755	5755	5755	5755	5755	5755	5755
5.0°	5310	5416	5530	5595	5713	5755	5737	5645
10.0°	4651	4723	4867	5025	5177	5312	5311	5215
15.0°	3965	4012	4083	4192	4341	4457	4520	4528
20.0°	3160	3221	3277	3403	3541	3686	3784	3818
25.0°	1929	2068	2309	2558	2724	2878	2985	3007
30.0°	1313	1311	1312	1385	1511	1679	1817	1844
35.0°	578	631	735	804	874	932	963	956
40.0°	100	128	135	157	210	263	275	254
45.0°	20	17	23	21	30	34	27	24
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)	%
0-5	134.8	3.99
5-10	375.7	11.13
10-15	548.9	16.26
15-20	641.7	19.00
20-25	628.8	18.62
25-30	510.1	15.10
30-35	341.7	10.12
35-40	156.5	4.63
40-45	34.3	1.02
45-50	4.2	0.12
50-55	0.0	0.00
55-60	0.0	0.00
60-65	0.0	0.00
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	134.8	3.99
0-10	510.5	15.12
0-15	1059.5	31.38
0-20	1701.2	50.38
0-25	2330.0	69.00
0-30	2840.0	84.10
0-35	3181.8	94.22
0-40	3338.3	98.86
0-45	3372.6	99.88
0-50	3376.8	100.00
0-55	3376.8	100.00
0-60	3376.8	100.00
0-65	3376.8	100.00
0-70	3376.8	100.00
0-75	3376.8	100.00
0-80	3376.8	100.00
0-85	3376.8	100.00
0-90	3376.8	100.00
0-95	3376.8	100.00
0-100	3376.8	100.00
0-105	3376.8	100.00
0-110	3376.8	100.00
0-115	3376.8	100.00
0-120	3376.8	100.00
0-125	3376.8	100.00
0-130	3376.8	100.00
0-135	3376.8	100.00
0-140	3376.8	100.00
0-145	3376.8	100.00
0-150	3376.8	100.00
0-155	3376.8	100.00
0-160	3376.8	100.00
0-165	3376.8	100.00
0-170	3376.8	100.00
0-175	3376.8	100.00
0-180	3376.8	100.00

6. Product Photo



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