

IES LM-79-08

MEASUREMENT AND TEST REPORT

For

GREEN CREATIVE LTD

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

Test Model: LE309027DIM120VWD/ADR6BL

Report Type:	Electrical and Photometric tests including: Luminous Flux, Chromaticity, Luminous Intensity Distribution
Test Engineer:	George Yang <i>George Yang</i>
Report Number:	RKSB190722005-10-3
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: LE309027DIM120VWD/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: 40W
 Nominal CCT: 2700K
 Nominal Lumen Output: 2450lm

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**

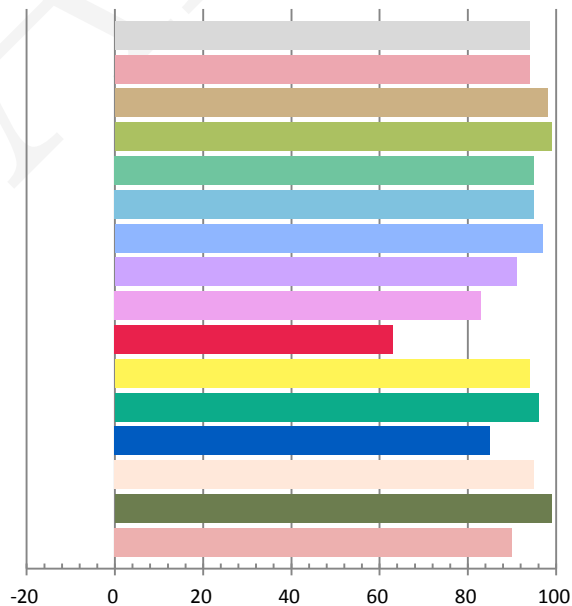
Photometric and Electrical Measurement Result

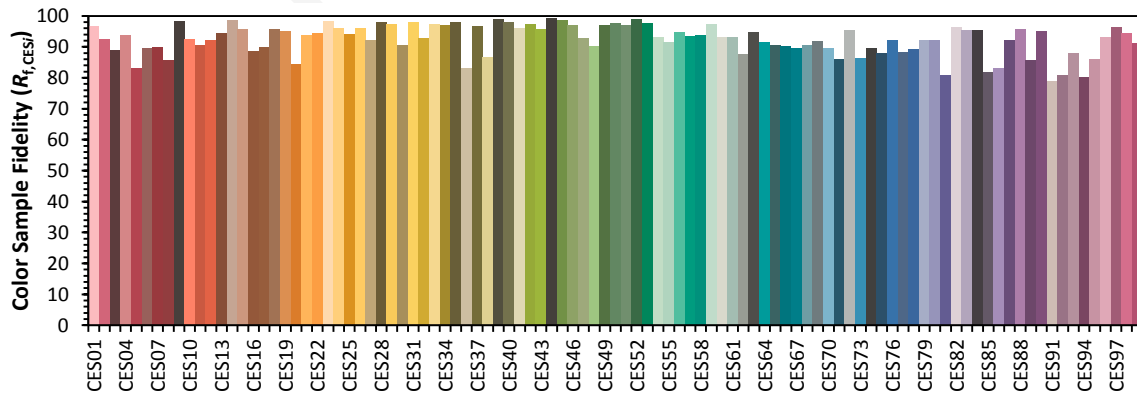
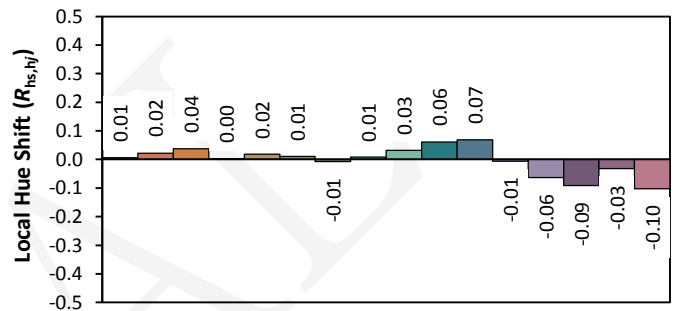
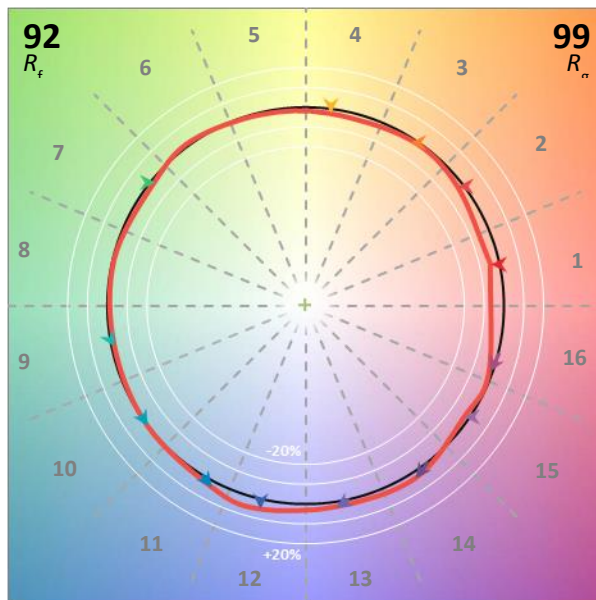
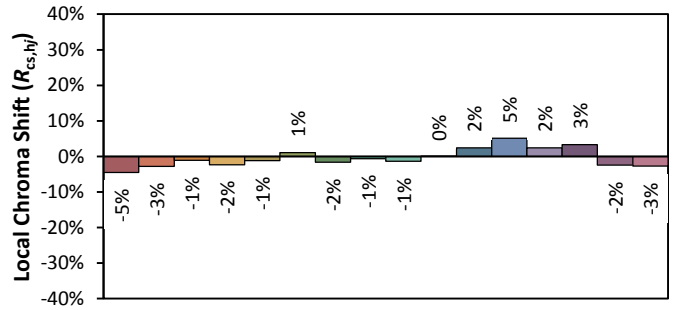
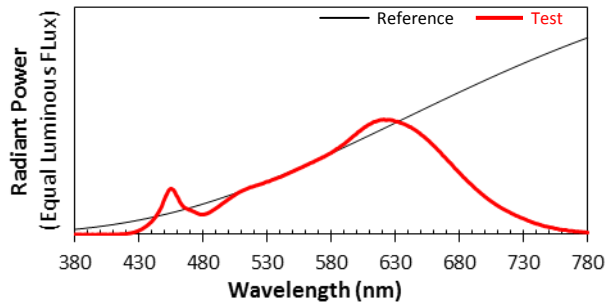
Voltage(V)	Frequency(Hz)	Current(A)	Power (W)	Power Factor	Luminous Flux(lm)	Efficacy(lm/W)
120.01	60	0.332	39.47	0.9906	2785.82	70.58

Radiant Flux (W)	CCT (K)	Duv	x	y	u'	v'
9.873	2689	-0.00037	0.4602	0.4097	0.2631	0.5270

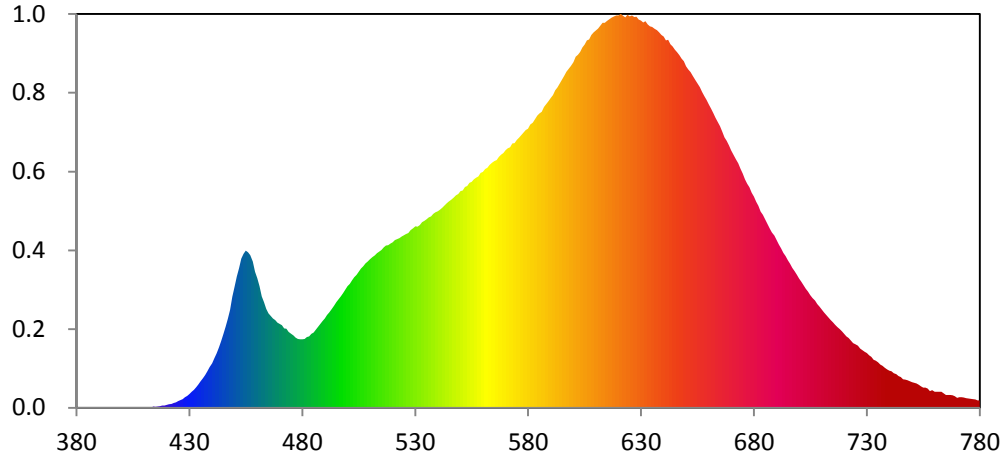
Color Rendering Index

Ra			
94.0			
R1	R2	R3	R4
94	98	99	95
R5	R6	R7	R8
95	97	91	83
R9	R10	R11	R12
63	94	96	85
R13	R14	R15	
95	99	90	





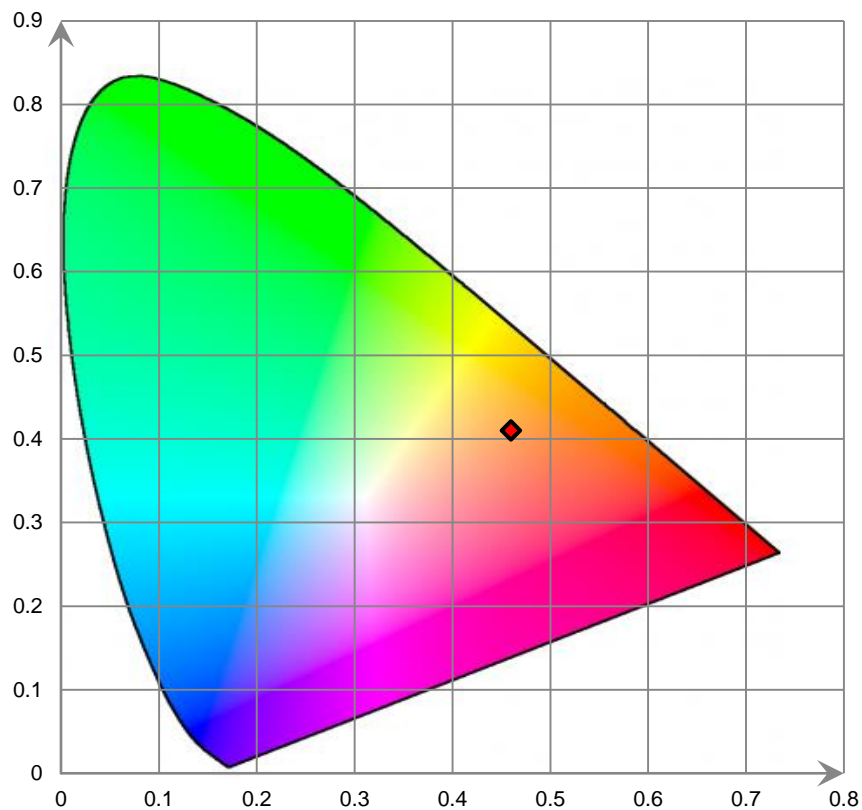
Relative Spectral Power Distribution



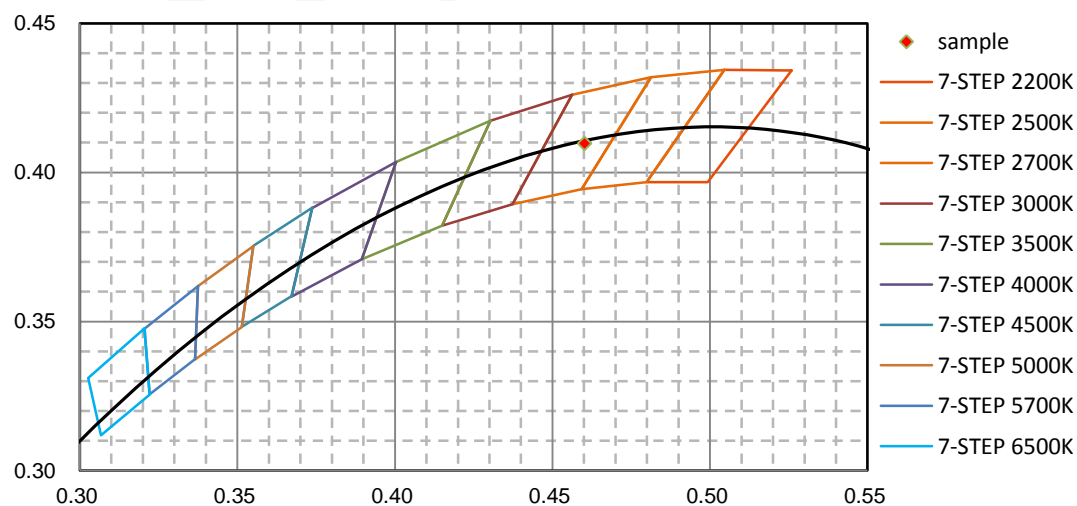
nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
380	8.210E-02	421	5.331E-01	462	1.755E+01	503	2.052E+01	544	3.218E+01
381	7.810E-02	422	6.177E-01	463	1.660E+01	504	2.092E+01	545	3.247E+01
382	1.057E-01	423	7.316E-01	464	1.558E+01	505	2.139E+01	546	3.273E+01
383	3.540E-02	424	8.287E-01	465	1.484E+01	506	2.188E+01	547	3.307E+01
384	8.190E-02	425	1.026E+00	466	1.443E+01	507	2.228E+01	548	3.345E+01
385	7.840E-02	426	1.191E+00	467	1.406E+01	508	2.270E+01	549	3.364E+01
386	6.000E-03	427	1.365E+00	468	1.380E+01	509	2.301E+01	550	3.410E+01
387	3.450E-02	428	1.639E+00	469	1.339E+01	510	2.335E+01	551	3.420E+01
388	3.540E-02	429	1.851E+00	470	1.318E+01	511	2.370E+01	552	3.473E+01
389	5.650E-02	430	2.159E+00	471	1.298E+01	512	2.398E+01	553	3.489E+01
390	8.390E-02	431	2.490E+00	472	1.249E+01	513	2.431E+01	554	3.538E+01
391	3.100E-02	432	2.831E+00	473	1.243E+01	514	2.455E+01	555	3.557E+01
392	8.000E-03	433	3.228E+00	474	1.195E+01	515	2.485E+01	556	3.593E+01
393	2.040E-02	434	3.674E+00	475	1.165E+01	516	2.521E+01	557	3.618E+01
394	1.340E-02	435	4.150E+00	476	1.137E+01	517	2.555E+01	558	3.641E+01
395	5.620E-02	436	4.636E+00	477	1.105E+01	518	2.556E+01	559	3.697E+01
396	2.430E-02	437	5.155E+00	478	1.082E+01	519	2.582E+01	560	3.713E+01
397	1.310E-02	438	5.740E+00	479	1.079E+01	520	2.604E+01	561	3.755E+01
398	1.590E-02	439	6.412E+00	480	1.079E+01	521	2.636E+01	562	3.778E+01
399	5.300E-03	440	6.988E+00	481	1.082E+01	522	2.655E+01	563	3.821E+01
400	7.000E-04	441	7.776E+00	482	1.111E+01	523	2.667E+01	564	3.855E+01
401	2.370E-02	442	8.566E+00	483	1.121E+01	524	2.696E+01	565	3.882E+01
402	6.860E-02	443	9.446E+00	484	1.165E+01	525	2.713E+01	566	3.896E+01
403	4.890E-02	444	1.046E+01	485	1.182E+01	526	2.735E+01	567	3.948E+01
404	3.540E-02	445	1.158E+01	486	1.229E+01	527	2.751E+01	568	3.985E+01
405	4.280E-02	446	1.275E+01	487	1.273E+01	528	2.797E+01	569	4.007E+01
406	1.820E-02	447	1.401E+01	488	1.322E+01	529	2.826E+01	570	4.052E+01
407	1.083E-01	448	1.539E+01	489	1.362E+01	530	2.854E+01	571	4.083E+01
408	3.340E-02	449	1.749E+01	490	1.405E+01	531	2.849E+01	572	4.099E+01
409	9.190E-02	450	1.904E+01	491	1.459E+01	532	2.874E+01	573	4.162E+01
410	1.014E-01	451	2.067E+01	492	1.502E+01	533	2.919E+01	574	4.165E+01
411	8.170E-02	452	2.198E+01	493	1.555E+01	534	2.943E+01	575	4.213E+01
412	1.191E-01	453	2.345E+01	494	1.608E+01	535	2.967E+01	576	4.251E+01
413	7.530E-02	454	2.422E+01	495	1.661E+01	536	2.995E+01	577	4.292E+01
414	1.772E-01	455	2.471E+01	496	1.708E+01	537	3.014E+01	578	4.330E+01
415	1.566E-01	456	2.446E+01	497	1.753E+01	538	3.050E+01	579	4.372E+01
416	1.868E-01	457	2.401E+01	498	1.805E+01	539	3.077E+01	580	4.389E+01
417	2.255E-01	458	2.302E+01	499	1.856E+01	540	3.093E+01	581	4.454E+01
418	3.256E-01	459	2.142E+01	500	1.911E+01	541	3.116E+01	582	4.488E+01
419	3.290E-01	460	2.042E+01	501	1.949E+01	542	3.146E+01	583	4.542E+01
420	4.608E-01	461	1.914E+01	502	2.004E+01	543	3.183E+01	584	4.599E+01

nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
585	4.631E+01	626	6.175E+01	667	4.253E+01	708	1.633E+01	749	4.161E+00
586	4.660E+01	627	6.148E+01	668	4.199E+01	709	1.589E+01	750	4.006E+00
587	4.733E+01	628	6.152E+01	669	4.132E+01	710	1.544E+01	751	3.913E+00
588	4.781E+01	629	6.110E+01	670	4.047E+01	711	1.503E+01	752	3.826E+00
589	4.825E+01	630	6.092E+01	671	3.971E+01	712	1.458E+01	753	3.638E+00
590	4.874E+01	631	6.062E+01	672	3.905E+01	713	1.419E+01	754	3.352E+00
591	4.919E+01	632	6.084E+01	673	3.845E+01	714	1.379E+01	755	3.181E+00
592	4.996E+01	633	6.031E+01	674	3.764E+01	715	1.346E+01	756	3.168E+00
593	5.041E+01	634	6.001E+01	675	3.689E+01	716	1.306E+01	757	3.033E+00
594	5.103E+01	635	5.991E+01	676	3.595E+01	717	1.268E+01	758	2.616E+00
595	5.161E+01	636	5.965E+01	677	3.526E+01	718	1.241E+01	759	2.764E+00
596	5.220E+01	637	5.942E+01	678	3.468E+01	719	1.201E+01	760	2.524E+00
597	5.285E+01	638	5.906E+01	679	3.384E+01	720	1.162E+01	761	2.504E+00
598	5.335E+01	639	5.869E+01	680	3.323E+01	721	1.125E+01	762	2.532E+00
599	5.380E+01	640	5.843E+01	681	3.242E+01	722	1.098E+01	763	2.530E+00
600	5.440E+01	641	5.780E+01	682	3.175E+01	723	1.059E+01	764	2.253E+00
601	5.527E+01	642	5.789E+01	683	3.086E+01	724	1.018E+01	765	2.031E+00
602	5.553E+01	643	5.722E+01	684	3.039E+01	725	9.989E+00	766	2.012E+00
603	5.602E+01	644	5.687E+01	685	2.966E+01	726	9.745E+00	767	1.993E+00
604	5.669E+01	645	5.638E+01	686	2.896E+01	727	9.326E+00	768	1.975E+00
605	5.716E+01	646	5.595E+01	687	2.824E+01	728	9.064E+00	769	1.830E+00
606	5.780E+01	647	5.551E+01	688	2.762E+01	729	8.812E+00	770	1.573E+00
607	5.798E+01	648	5.493E+01	689	2.710E+01	730	8.595E+00	771	1.663E+00
608	5.865E+01	649	5.456E+01	690	2.638E+01	731	8.236E+00	772	1.659E+00
609	5.905E+01	650	5.375E+01	691	2.566E+01	732	8.024E+00	773	1.593E+00
610	5.936E+01	651	5.325E+01	692	2.507E+01	733	7.558E+00	774	1.500E+00
611	5.970E+01	652	5.283E+01	693	2.437E+01	734	7.381E+00	775	1.472E+00
612	6.013E+01	653	5.222E+01	694	2.387E+01	735	7.131E+00	776	1.398E+00
613	6.060E+01	654	5.159E+01	695	2.322E+01	736	6.804E+00	777	1.342E+00
614	6.056E+01	655	5.099E+01	696	2.266E+01	737	6.605E+00	778	1.322E+00
615	6.091E+01	656	5.047E+01	697	2.200E+01	738	6.288E+00	779	1.165E+00
616	6.111E+01	657	4.972E+01	698	2.152E+01	739	6.058E+00	780	1.126E+00
617	6.140E+01	658	4.904E+01	699	2.093E+01	740	5.812E+00		
618	6.162E+01	659	4.843E+01	700	2.031E+01	741	5.750E+00		
619	6.176E+01	660	4.775E+01	701	1.983E+01	742	5.456E+00		
620	6.172E+01	661	4.711E+01	702	1.926E+01	743	5.283E+00		
621	6.198E+01	662	4.636E+01	703	1.874E+01	744	4.989E+00		
622	6.170E+01	663	4.561E+01	704	1.827E+01	745	4.811E+00		
623	6.145E+01	664	4.495E+01	705	1.774E+01	746	4.483E+00		
624	6.186E+01	665	4.430E+01	706	1.727E+01	747	4.441E+00		
625	6.160E+01	666	4.347E+01	707	1.685E+01	748	4.329E+00		

CIE 1931xy Chromaticity Diagram



7-Step Chromaticity Quadrangles



[Goniophotometer System]

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

Test orientation: **Downward**

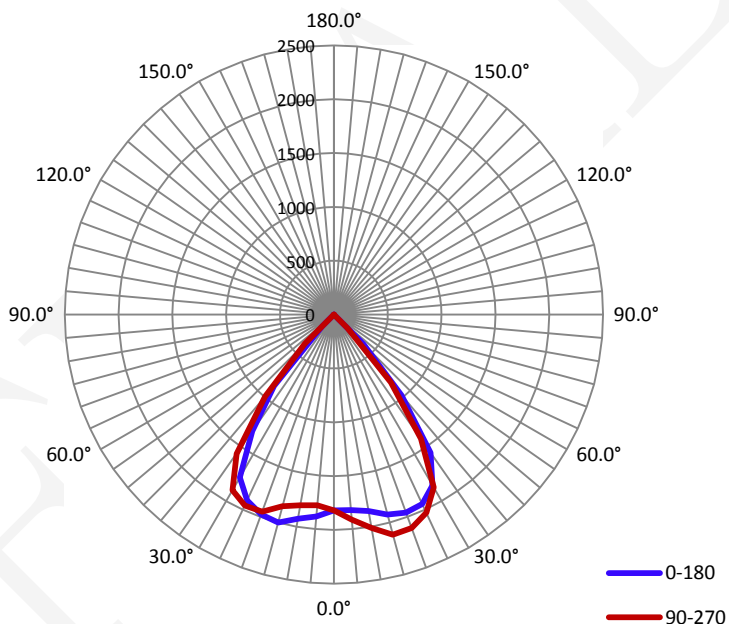
Electrical Measurement

Input Voltage(V)	Frequency(Hz)	Input Current(A)	Power (W)	Power Factor
119.9	60	0.3440	39.51	0.9570

Photometric Measurement

Luminous Flux(lm)	Efficacy(lm/W)	$I_{max}(cd)$	S/MH(C0/180)	S/MH(C90/270)
2794.5	70.78	2131.0	1.32	1.34

Luminous Intensity Distribution



	C0/180	C45/225	C90/270	C135/315	AVG.
Beam Angle(50% I_{max}):	78.3	78.7	77.4	77.6	77.9
Field Angle(10% I_{max}):	92.1	93.0	92.0	92.0	92.3

Luminous Intensity (cd) Distribution Data

C y	0°	22.5°	45°	67.5°	90°	112.5°	135°	157.5°
0.0°	1818	1818	1818	1818	1818	1818	1818	1818
5.0°	1822	1850	1885	1904	1913	1918	1918	1906
10.0°	1852	1878	1931	1984	2014	2028	2009	1972
15.0°	1923	1955	2010	2071	2117	2131	2109	2061
20.0°	1957	1963	1990	2058	2110	2116	2093	2051
25.0°	1940	1922	1930	1991	2030	2046	2014	1981
30.0°	1833	1803	1811	1842	1854	1854	1842	1808
35.0°	1567	1533	1477	1444	1408	1394	1401	1384
40.0°	977	961	923	866	823	805	829	859
45.0°	385	348	286	223	178	164	160	188
50.0°	5	4	4	4	4	4	3	3
55.0°	2	2	2	2	2	2	2	2
60.0°	1	1	1	1	1	1	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.)

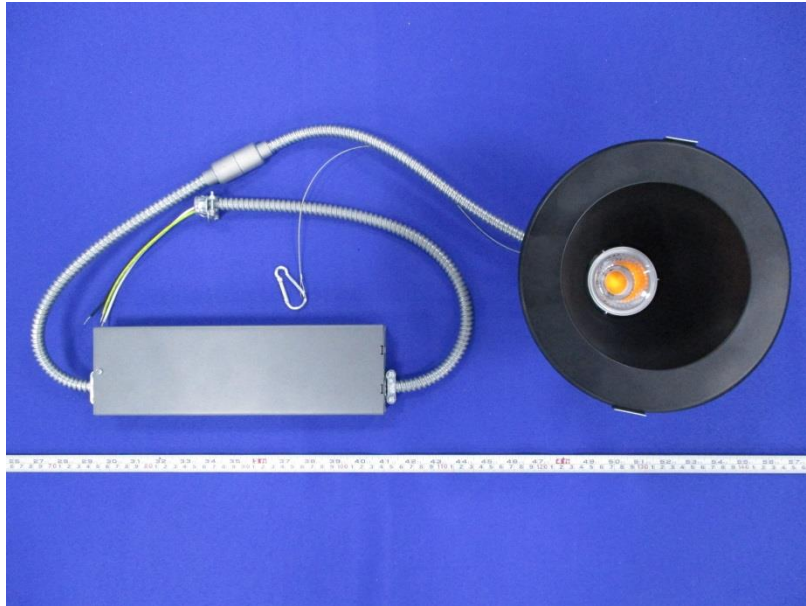
C y	180°	202.5°	225°	247.5°	270°	292.5°	315°	337.5°
0.0°	1818	1818	1818	1818	1818	1818	1818	1818
5.0°	1883	1855	1824	1801	1779	1771	1784	1805
10.0°	1924	1888	1839	1815	1798	1782	1789	1819
15.0°	2000	1929	1886	1853	1843	1848	1868	1899
20.0°	1975	1929	1906	1935	1947	1941	1963	1965
25.0°	1904	1871	1875	1925	1956	1966	1981	1980
30.0°	1747	1735	1773	1828	1885	1894	1902	1875
35.0°	1320	1360	1420	1509	1576	1604	1609	1580
40.0°	864	903	949	978	993	1007	999	984
45.0°	151	208	286	345	383	386	392	373
50.0°	3	3	3	5	5	5	5	5
55.0°	2	1	2	2	2	2	2	2
60.0°	0	1	1	1	1	1	1	1
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	43.9	1.57
5-10	134.0	4.80
10-15	229.2	8.20
15-20	326.6	11.69
20-25	414.3	14.83
25-30	479.3	17.15
30-35	486.6	17.41
35-40	399.4	14.29
40-45	221.9	7.94
45-50	57.1	2.04
50-55	1.3	0.05
55-60	0.6	0.02
60-65	0.2	0.01
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	43.9	1.57
0-10	177.9	6.37
0-15	407.1	14.57
0-20	733.7	26.25
0-25	1148.0	41.08
0-30	1627.3	58.23
0-35	2113.9	75.64
0-40	2513.3	89.94
0-45	2735.2	97.88
0-50	2792.4	99.92
0-55	2793.7	99.97
0-60	2794.3	99.99
0-65	2794.5	100.00
0-70	2794.5	100.00
0-75	2794.5	100.00
0-80	2794.5	100.00
0-85	2794.5	100.00
0-90	2794.5	100.00
0-95	2794.5	100.00
0-100	2794.5	100.00
0-105	2794.5	100.00
0-110	2794.5	100.00
0-115	2794.5	100.00
0-120	2794.5	100.00
0-125	2794.5	100.00
0-130	2794.5	100.00
0-135	2794.5	100.00
0-140	2794.5	100.00
0-145	2794.5	100.00
0-150	2794.5	100.00
0-155	2794.5	100.00
0-160	2794.5	100.00
0-165	2794.5	100.00
0-170	2794.5	100.00
0-175	2794.5	100.00
0-180	2794.5	100.00

6. Product Photo



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