

IES LM-79-08

MEASUREMENT AND TEST REPORT

For

GREEN CREATIVE LTD

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

Test Model: LE209027DIM120VNR/ADR4BL

Report Type:	Electrical and Photometric tests including: Luminous Flux, Chromaticity, Luminous Intensity Distribution
Test Engineer:	George Yang <i>George Yang</i>
Report Number:	RKSB190722004-10-1
Test Date:	2019-07-22 to 2019-07-23
Report Date:	2019-07-30
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:

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

Model Tested: LE209027DIM120VNR/ADR4BL
 Manufacturer: GREEN CREATIVE LTD
 Brand Name: GREEN CREATIVE
 Product Designation: LED Recessed Downlight
 Burning TimeBefore Test: 0hour(For New Products)

Rated Values:

Rated Voltage/Frequency: 120-277 VAC 60Hz
 Rated Power: 24W
 Nominal CCT: 2700K
 Nominal Lumen Output: 1650lm

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 $U_{\text{rel}}=2.70\%$ ($k=2$), at the 95% confidence level. The uncertainty of the correlated color temperature measurements is $U=27\text{K}$ ($k=2$), at the 95% confidence level. The uncertainty of the CRI is $U=2.7(k=2)$, at the 95% confidence level.

The uncertainty of power meter AC current $U_{\text{rel}}=0.27\%$ of rdg, AC Voltage $U_{\text{rel}}=0.26\%$ of rdg, Power $U_{\text{rel}}=0.41\%$ ($k=2$), 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 $U_{\text{rel}}=2.6\%$ ($k=2$), at the 95% confidence level.

Fidelity Index and Gamut Index Calculation

The R_i , R_g was calculated according to IES TM-30-18 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**

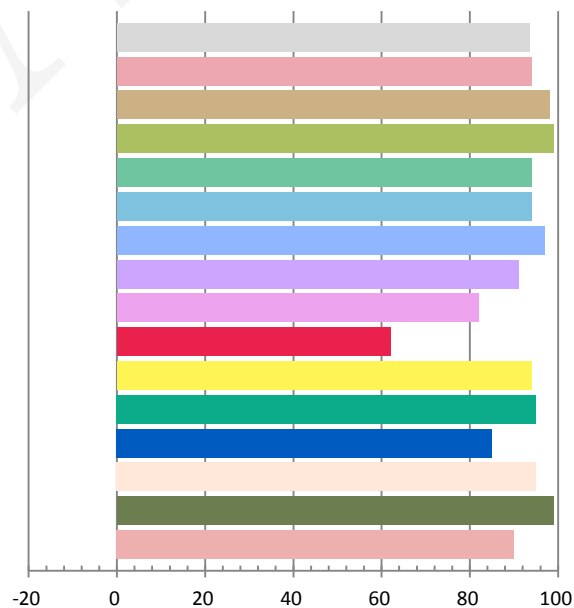
Photometric and Electrical Measurement Result

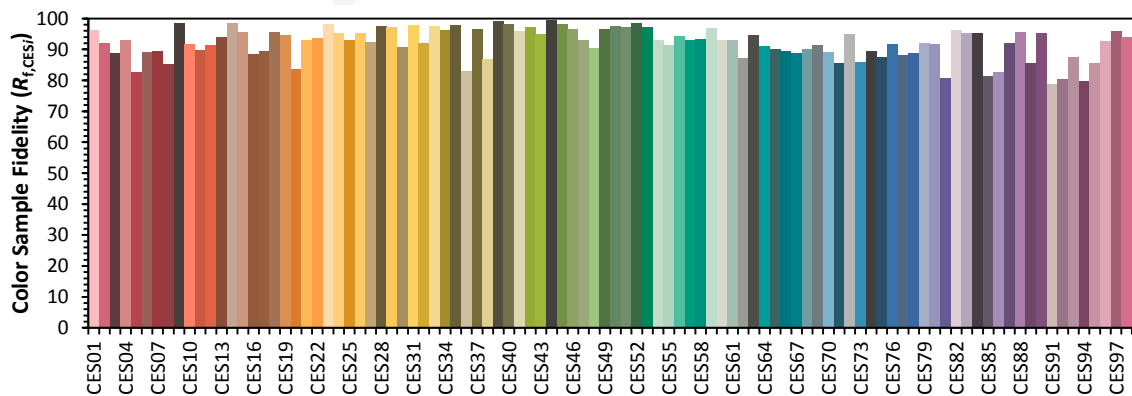
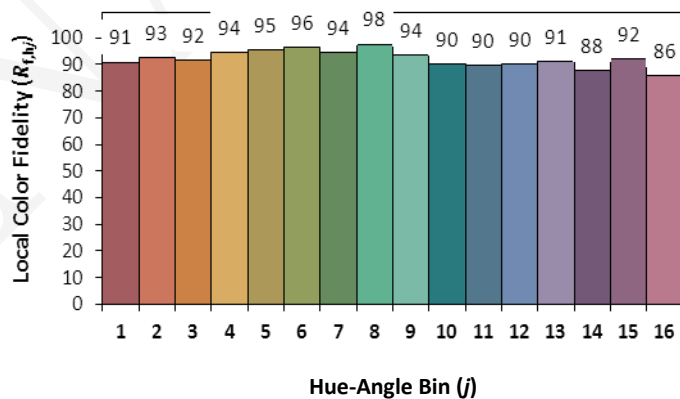
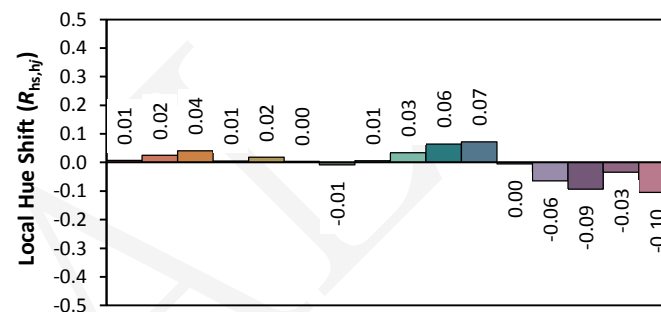
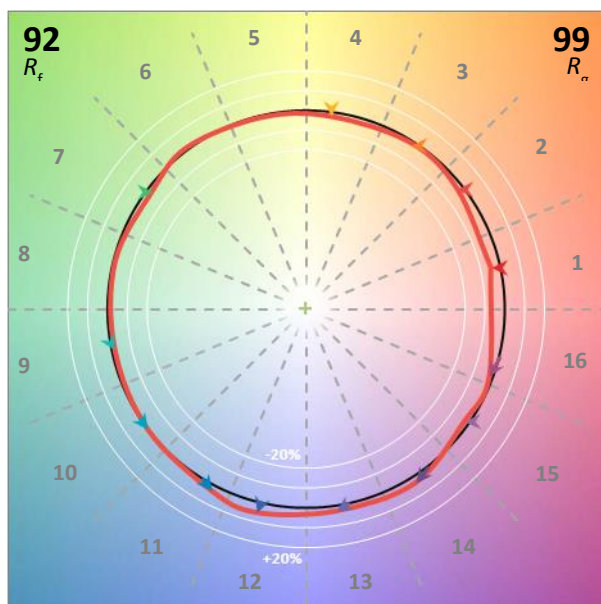
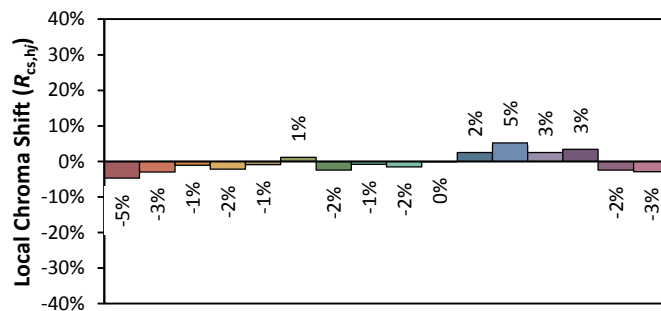
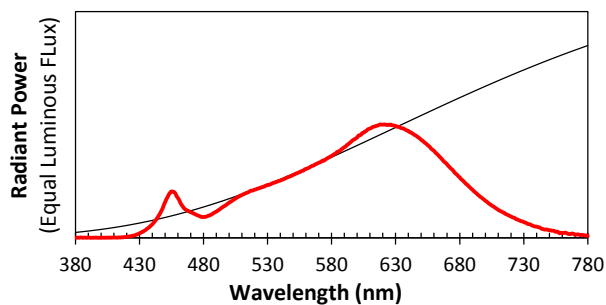
Voltage(V)	Frequency(Hz)	Current(A)	Power (W)	Power Factor	Luminous Flux(lm)	Efficacy(lm/W)
120	60	0.2064	24.35	0.9831	1713.87	70.38

Radiant Flux (W)	CCT (K)	Duv	x	y	u'	v'
6.061	2708	-0.00077	0.4579	0.4081	0.2624	0.5261

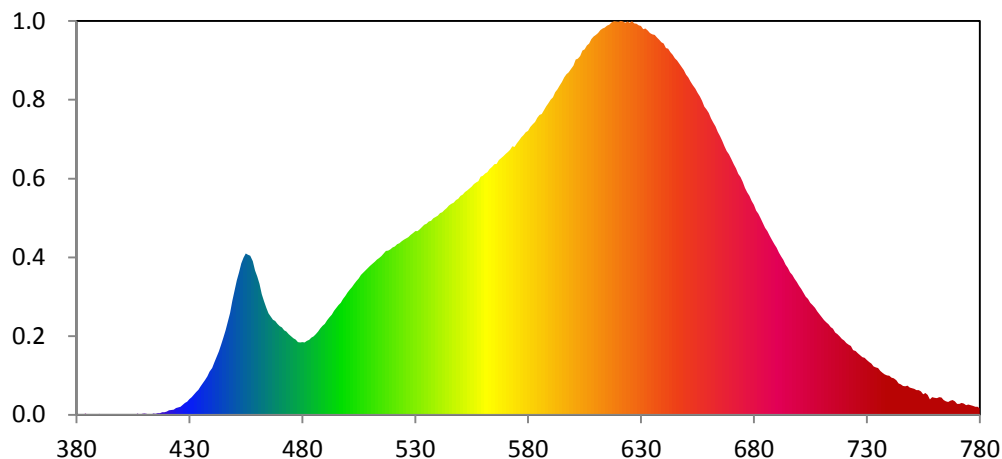
Color Rendering Index

Ra			
93.6			
R1	R2	R3	R4
94	98	99	94
R5	R6	R7	R8
94	97	91	82
R9	R10	R11	R12
62	94	95	85
R13	R14	R15	
95	99	90	





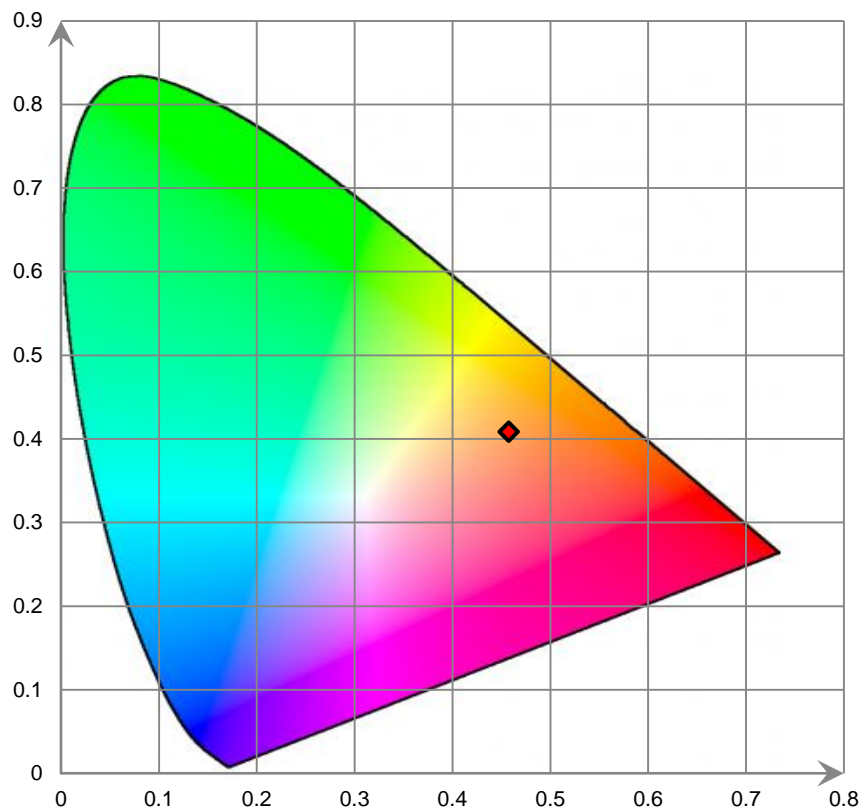
Relative Spectral Power Distribution



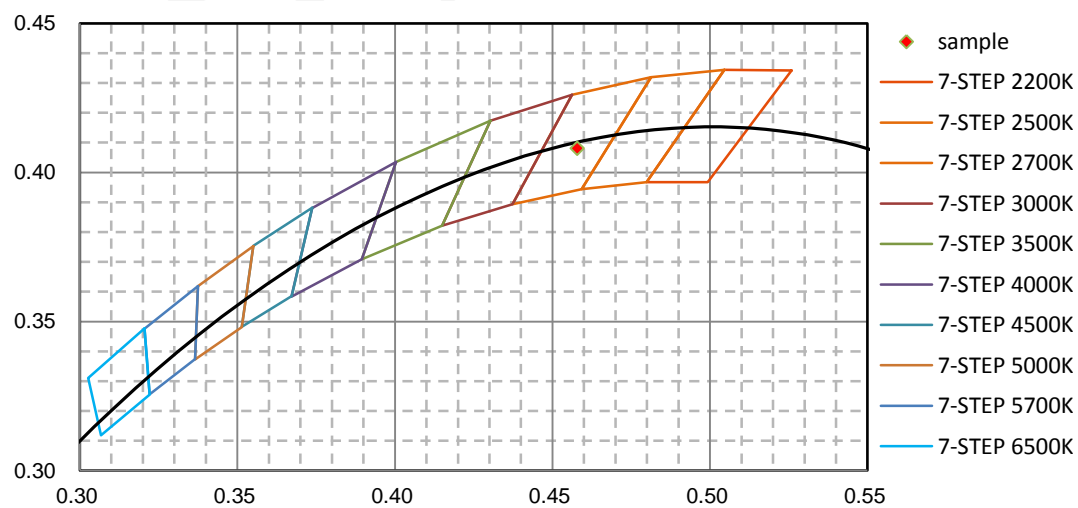
nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
380	5.060E-02	421	4.178E-01	462	1.154E+01	503	1.253E+01	544	1.980E+01
381	2.470E-02	422	4.538E-01	463	1.087E+01	504	1.280E+01	545	2.004E+01
382	3.870E-02	423	4.952E-01	464	1.027E+01	505	1.306E+01	546	2.020E+01
383	2.060E-02	424	6.343E-01	465	9.717E+00	506	1.339E+01	547	2.032E+01
384	1.136E-01	425	7.095E-01	466	9.418E+00	507	1.359E+01	548	2.056E+01
385	6.360E-02	426	7.620E-01	467	9.113E+00	508	1.383E+01	549	2.067E+01
386	3.700E-03	427	9.390E-01	468	8.968E+00	509	1.402E+01	550	2.096E+01
387	6.750E-02	428	1.128E+00	469	8.705E+00	510	1.426E+01	551	2.109E+01
388	3.260E-02	429	1.263E+00	470	8.479E+00	511	1.447E+01	552	2.133E+01
389	4.700E-03	430	1.497E+00	471	8.377E+00	512	1.465E+01	553	2.148E+01
390	1.021E-01	431	1.691E+00	472	8.089E+00	513	1.486E+01	554	2.168E+01
391	1.540E-02	432	1.915E+00	473	7.962E+00	514	1.501E+01	555	2.184E+01
392	5.000E-04	433	2.169E+00	474	7.705E+00	515	1.520E+01	556	2.209E+01
393	0.000E+00	434	2.378E+00	475	7.522E+00	516	1.543E+01	557	2.226E+01
394	3.290E-02	435	2.715E+00	476	7.326E+00	517	1.570E+01	558	2.237E+01
395	4.550E-02	436	3.041E+00	477	7.196E+00	518	1.570E+01	559	2.280E+01
396	3.500E-02	437	3.342E+00	478	6.965E+00	519	1.585E+01	560	2.289E+01
397	1.830E-02	438	3.681E+00	479	6.922E+00	520	1.603E+01	561	2.309E+01
398	1.040E-02	439	4.146E+00	480	6.962E+00	521	1.612E+01	562	2.324E+01
399	3.000E-04	440	4.479E+00	481	6.915E+00	522	1.634E+01	563	2.352E+01
400	0.000E+00	441	5.018E+00	482	7.069E+00	523	1.643E+01	564	2.376E+01
401	4.650E-02	442	5.532E+00	483	7.181E+00	524	1.660E+01	565	2.398E+01
402	2.390E-02	443	6.061E+00	484	7.382E+00	525	1.676E+01	566	2.404E+01
403	2.660E-02	444	6.695E+00	485	7.497E+00	526	1.688E+01	567	2.441E+01
404	2.890E-02	445	7.392E+00	486	7.717E+00	527	1.700E+01	568	2.457E+01
405	5.990E-02	446	8.077E+00	487	7.967E+00	528	1.723E+01	569	2.477E+01
406	2.770E-02	447	8.923E+00	488	8.265E+00	529	1.740E+01	570	2.498E+01
407	1.072E-01	448	9.738E+00	489	8.517E+00	530	1.760E+01	571	2.516E+01
408	2.280E-02	449	1.092E+01	490	8.707E+00	531	1.759E+01	572	2.537E+01
409	7.960E-02	450	1.188E+01	491	9.027E+00	532	1.777E+01	573	2.572E+01
410	1.040E-01	451	1.287E+01	492	9.323E+00	533	1.798E+01	574	2.564E+01
411	8.960E-02	452	1.363E+01	493	9.585E+00	534	1.819E+01	575	2.599E+01
412	3.280E-02	453	1.450E+01	494	9.956E+00	535	1.829E+01	576	2.627E+01
413	6.250E-02	454	1.504E+01	495	1.022E+01	536	1.850E+01	577	2.658E+01
414	1.185E-01	455	1.544E+01	496	1.052E+01	537	1.858E+01	578	2.677E+01
415	8.200E-02	456	1.533E+01	497	1.072E+01	538	1.882E+01	579	2.705E+01
416	1.608E-01	457	1.522E+01	498	1.108E+01	539	1.894E+01	580	2.718E+01
417	1.452E-01	458	1.472E+01	499	1.137E+01	540	1.905E+01	581	2.756E+01
418	2.395E-01	459	1.382E+01	500	1.171E+01	541	1.929E+01	582	2.782E+01
419	2.404E-01	460	1.322E+01	501	1.197E+01	542	1.940E+01	583	2.804E+01
420	3.163E-01	461	1.252E+01	502	1.222E+01	543	1.960E+01	584	2.845E+01

nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
585	2.871E+01	626	3.770E+01	667	2.572E+01	708	9.898E+00	749	2.613E+00
586	2.882E+01	627	3.749E+01	668	2.526E+01	709	9.632E+00	750	2.538E+00
587	2.918E+01	628	3.744E+01	669	2.494E+01	710	9.331E+00	751	2.481E+00
588	2.955E+01	629	3.729E+01	670	2.451E+01	711	9.082E+00	752	2.368E+00
589	2.985E+01	630	3.723E+01	671	2.398E+01	712	8.852E+00	753	2.358E+00
590	3.018E+01	631	3.691E+01	672	2.359E+01	713	8.660E+00	754	2.236E+00
591	3.039E+01	632	3.699E+01	673	2.309E+01	714	8.386E+00	755	1.967E+00
592	3.088E+01	633	3.680E+01	674	2.276E+01	715	8.246E+00	756	2.067E+00
593	3.115E+01	634	3.656E+01	675	2.231E+01	716	7.870E+00	757	1.883E+00
594	3.153E+01	635	3.645E+01	676	2.173E+01	717	7.713E+00	758	1.466E+00
595	3.188E+01	636	3.638E+01	677	2.131E+01	718	7.518E+00	759	1.681E+00
596	3.229E+01	637	3.613E+01	678	2.097E+01	719	7.274E+00	760	1.611E+00
597	3.261E+01	638	3.591E+01	679	2.046E+01	720	7.103E+00	761	1.586E+00
598	3.280E+01	639	3.566E+01	680	2.012E+01	721	6.870E+00	762	1.684E+00
599	3.310E+01	640	3.555E+01	681	1.955E+01	722	6.710E+00	763	1.650E+00
600	3.342E+01	641	3.513E+01	682	1.923E+01	723	6.587E+00	764	1.411E+00
601	3.403E+01	642	3.507E+01	683	1.880E+01	724	6.193E+00	765	1.283E+00
602	3.411E+01	643	3.471E+01	684	1.837E+01	725	6.106E+00	766	1.226E+00
603	3.435E+01	644	3.447E+01	685	1.790E+01	726	5.887E+00	767	1.341E+00
604	3.487E+01	645	3.415E+01	686	1.760E+01	727	5.711E+00	768	1.417E+00
605	3.499E+01	646	3.394E+01	687	1.715E+01	728	5.508E+00	769	1.271E+00
606	3.536E+01	647	3.361E+01	688	1.676E+01	729	5.448E+00	770	1.037E+00
607	3.555E+01	648	3.331E+01	689	1.632E+01	730	5.234E+00	771	1.030E+00
608	3.598E+01	649	3.300E+01	690	1.598E+01	731	5.050E+00	772	1.125E+00
609	3.623E+01	650	3.256E+01	691	1.554E+01	732	4.914E+00	773	1.074E+00
610	3.637E+01	651	3.230E+01	692	1.516E+01	733	4.621E+00	774	9.089E-01
611	3.657E+01	652	3.191E+01	693	1.483E+01	734	4.545E+00	775	9.692E-01
612	3.683E+01	653	3.155E+01	694	1.436E+01	735	4.457E+00	776	9.288E-01
613	3.700E+01	654	3.123E+01	695	1.407E+01	736	4.207E+00	777	8.491E-01
614	3.708E+01	655	3.082E+01	696	1.365E+01	737	4.019E+00	778	7.727E-01
615	3.727E+01	656	3.049E+01	697	1.340E+01	738	3.845E+00	779	7.695E-01
616	3.736E+01	657	3.006E+01	698	1.302E+01	739	3.754E+00	780	6.122E-01
617	3.756E+01	658	2.952E+01	699	1.272E+01	740	3.727E+00		
618	3.771E+01	659	2.925E+01	700	1.234E+01	741	3.543E+00		
619	3.766E+01	660	2.890E+01	701	1.205E+01	742	3.489E+00		
620	3.765E+01	661	2.838E+01	702	1.168E+01	743	3.296E+00		
621	3.772E+01	662	2.798E+01	703	1.132E+01	744	2.994E+00		
622	3.766E+01	663	2.760E+01	704	1.109E+01	745	2.913E+00		
623	3.753E+01	664	2.710E+01	705	1.073E+01	746	2.758E+00		
624	3.766E+01	665	2.670E+01	706	1.051E+01	747	2.734E+00		
625	3.753E+01	666	2.622E+01	707	1.023E+01	748	2.780E+00		

CIE 1931xy Chromaticity Diagram



7-Step Chromaticity Quadrangles



[Goniophotometer System]

Total operating time for luminous intensity distribution: **2.0hour**

Test orientation: **Downward**

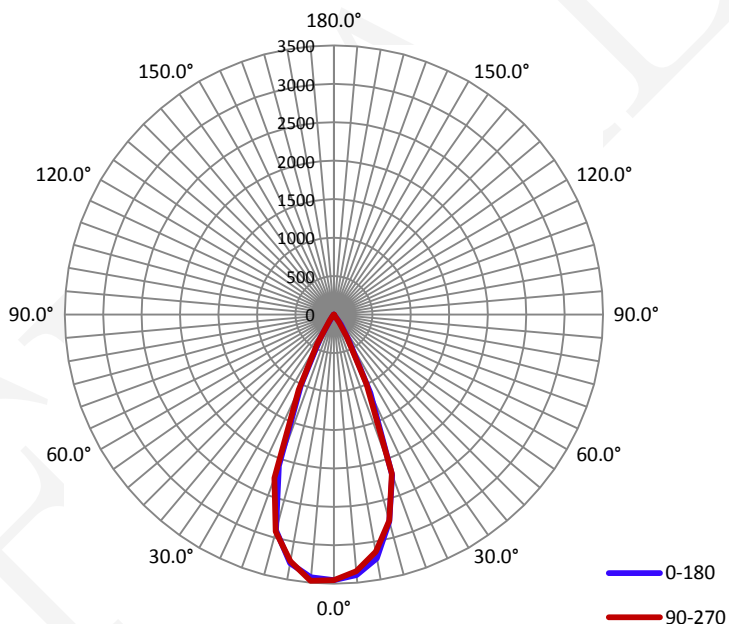
Electrical Measurement

Input Voltage(V)	Frequency(Hz)	Input Current(A)	Power (W)	Power Factor
120.0	60	0.2120	24.38	0.9580

Photometric Measurement

Luminous Flux(lm)	Efficacy(lm/W)	$I_{max}(cd)$	S/MH(C0/180)	S/MH(C90/270)
1719.9	70.59	3499.9	0.74	0.75

Luminous Intensity Distribution



	C0/180	C45/225	C90/270	C135/315	AVG.
Beam Angle(50% I_{max}):	44.0	44.2	44.1	44.3	44.2
Field Angle(10% I_{max}):	60.8	60.8	61.2	61.0	61.0

Luminous Intensity (cd) Distribution Data

C y	0°	22.5°	45°	67.5°	90°	112.5°	135°	157.5°
0.0°	3454	3454	3454	3454	3454	3454	3454	3454
5.0°	3400	3353	3310	3292	3350	3370	3412	3457
10.0°	3218	3117	3079	3053	3130	3174	3248	3301
15.0°	2785	2745	2740	2742	2775	2817	2859	2910
20.0°	2221	2227	2230	2222	2201	2183	2222	2244
25.0°	1123	1085	1083	1054	1000	989	1022	1049
30.0°	381	351	344	336	332	339	346	361
35.0°	157	162	148	135	120	108	94	92
40.0°	22	21	19	17	16	15	16	18
45.0°	8	7	6	5	5	5	5	6
50.0°	2	2	2	2	2	2	2	2
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.)

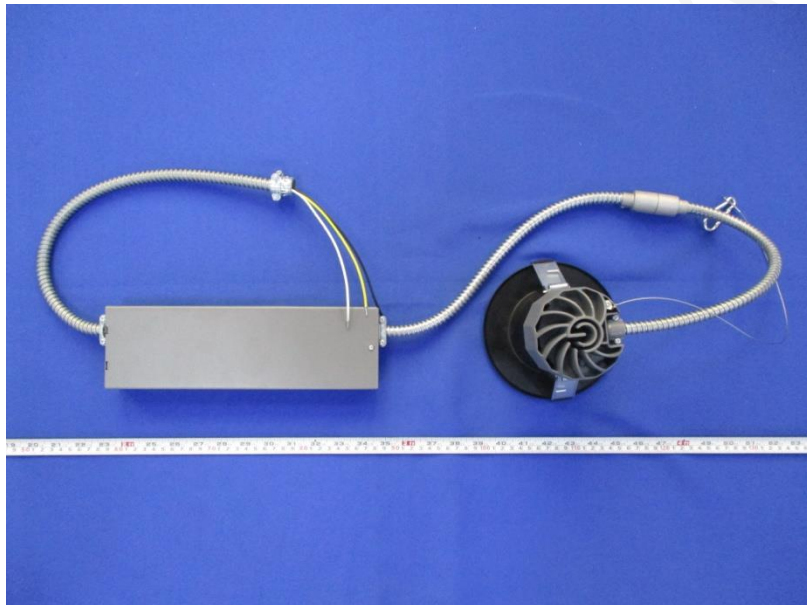
C y	180°	202.5°	225°	247.5°	270°	292.5°	315°	337.5°
0.0°	3454	3454	3454	3454	3454	3454	3454	3454
5.0°	3427	3417	3411	3422	3475	3500	3456	3425
10.0°	3284	3273	3243	3233	3256	3283	3259	3253
15.0°	2903	2942	2909	2911	2919	2906	2855	2836
20.0°	2094	2125	2169	2242	2264	2275	2266	2250
25.0°	1017	1038	1071	1088	1079	1072	1068	1052
30.0°	347	374	395	423	435	430	402	391
35.0°	76	77	81	89	103	110	110	118
40.0°	17	19	21	22	23	25	23	22
45.0°	5	7	8	9	10	9	9	8
50.0°	2	1	2	3	3	3	3	2
55.0°	0	0	1	0	2	1	0	1
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	82.0	4.77
5-10	236.7	13.76
10-15	359.5	20.90
15-20	417.1	24.25
20-25	343.0	19.94
25-30	180.9	10.52
30-35	71.5	4.16
35-40	21.8	1.27
40-45	4.9	0.29
45-50	1.8	0.11
50-55	0.5	0.03
55-60	0.1	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	82.0	4.77
0-10	318.7	18.53
0-15	678.2	39.43
0-20	1095.3	63.69
0-25	1438.3	83.63
0-30	1619.2	94.15
0-35	1690.7	98.31
0-40	1712.5	99.57
0-45	1717.4	99.86
0-50	1719.3	99.97
0-55	1719.8	100.00
0-60	1719.8	100.00
0-65	1719.8	100.00
0-70	1719.8	100.00
0-75	1719.8	100.00
0-80	1719.8	100.00
0-85	1719.8	100.00
0-90	1719.8	100.00
0-95	1719.8	100.00
0-100	1719.8	100.00
0-105	1719.8	100.00
0-110	1719.8	100.00
0-115	1719.8	100.00
0-120	1719.8	100.00
0-125	1719.8	100.00
0-130	1719.8	100.00
0-135	1719.8	100.00
0-140	1719.8	100.00
0-145	1719.8	100.00
0-150	1719.8	100.00
0-155	1719.8	100.00
0-160	1719.8	100.00
0-165	1719.8	100.00
0-170	1719.8	100.00
0-175	1719.8	100.00
0-180	1719.8	100.00

6. Product Photo



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