

IES LM-79-08

MEASUREMENT AND TEST REPORT

For

GREEN CREATIVE LTD

Room 3603, Level 36, Tower 1, Enterprise Square Five, 38 Wang Chiu Road, Kowloon Bay, KL, Hong Kong

Test Model: INFT4/827/DIM120V

Report Type:	Electrical and Photometric tests including: Luminous Flux, Chromaticity, Luminous Intensity Distribution
Test Engineer:	Joker Gu
Report Number:	RKSB200515001-10-1
Test Date:	2020-06-06 to 2020-06-11
Report Date:	2020-06-12
Reviewed By:	Seven Xia/EE Engineer
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 2020-05-15 and used for testing.

Model Tested: INFT4/827/DIM120V
 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: 120VAC 60Hz
 Rated Power: 10W/7W/5W
 Nominal CCT: 2700K
 Nominal Lumen Output: 1020lm/715lm/510lm

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	2020-01-22	2021-01-21
Power Meter	INVENTFINE	WT500	GSJWQ20009	2020-04-02	2021-04-01
Spectral photometer	INVENTFINE	CMS-3S	GSGSE100017	2020-01-22	2021-01-21
AC Power Supply	INVENTFINE	CHP500	JWJSD010071	2020-04-02	2021-04-01
Standard Light Source	INVENTFINE	N/A	JWWCR020104	2019-11-19	2020-11-18
Thermal Meter	KEJIAN	TA298	N/A	2019-12-02	2020-12-01
DC Power Supply	INVENTFINE	WL3005	JWWCP020069	2019-12-20	2020-12-19
AC Power Supply	INVENTFINE	CHP-5KVA	900511765	2020-04-02	2021-04-01
DC Power Supply	INVENTFINE	WL3010	JWDMP030001	2019-12-20	2020-12-19
Power Meter	INVENTFINE	WT500	GSDSQ200007	2020-04-02	2021-04-01
Goniophotometer	INVENTFINE	GPM-1900	YWGCF120001	2020-01-22	2021-01-21
Wireless Weather Station	ZHONGXING	KG218	N/A	2019-12-02	2020-12-01
Standard Light Source	INVENTFINE	N/A	JWBYR040008	2020-03-19	2021-03-18

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-30-18 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.

Note: All the UUTs were tested at Most Consumptive Settings

5. Test Result

[Integrating Sphere System]

Total operating time for integrating sphere test: **1.0 hour**

Test orientation: **Downward**

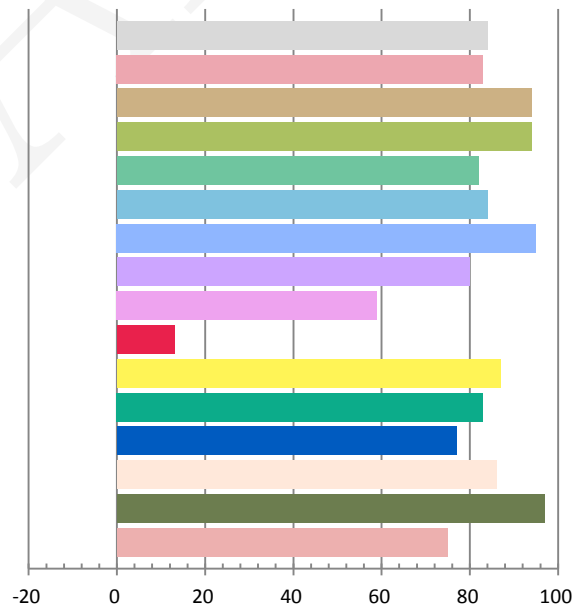
Photometric and Electrical Measurement Result

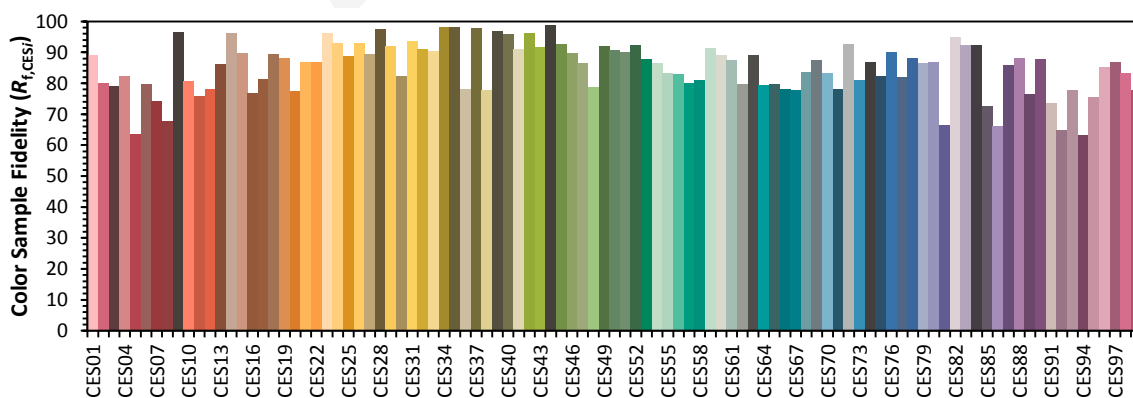
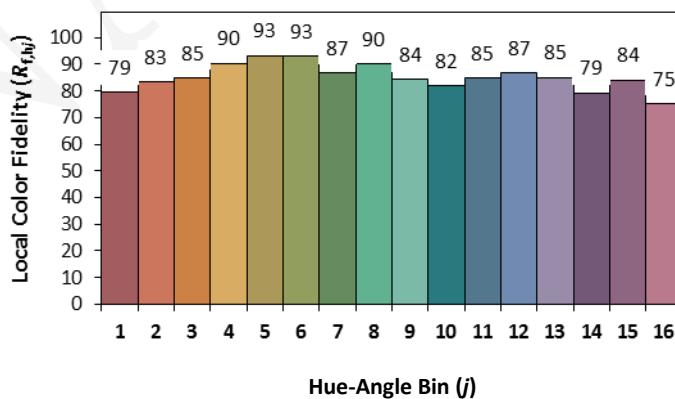
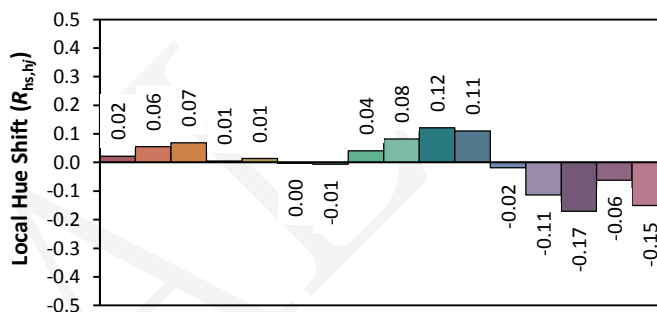
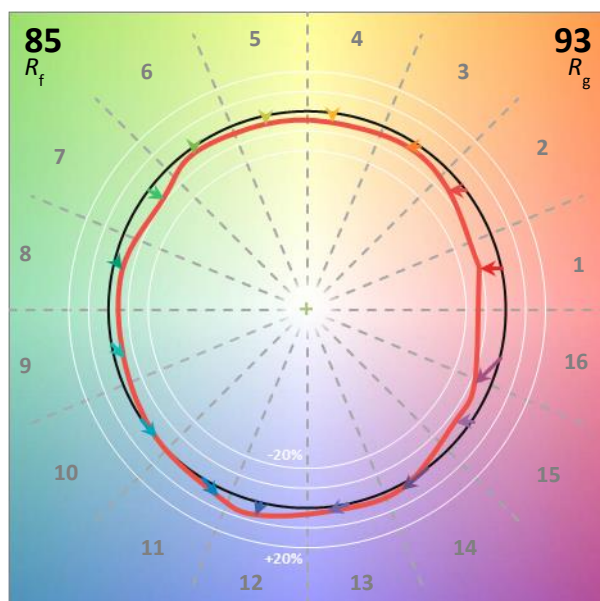
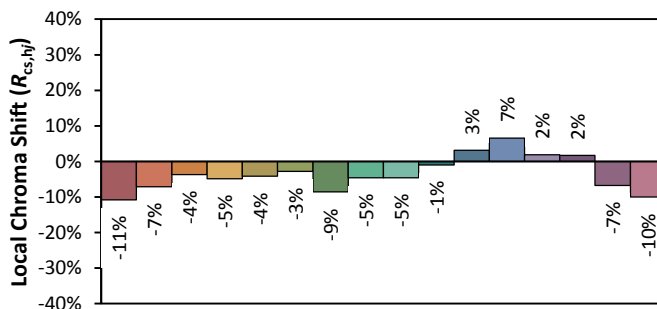
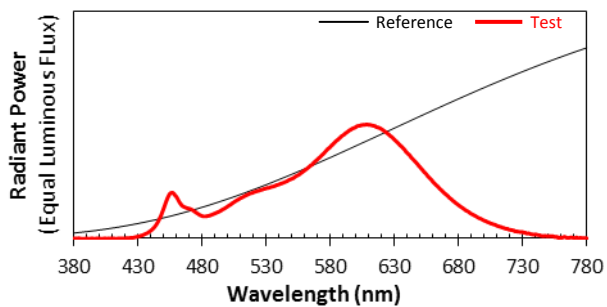
Voltage(V)	Frequency(Hz)	Current(A)	Power (W)	Power Factor	Luminous Flux(lm)	Efficacy(lm/W)
120	60	0.0913	10.49	0.9575	1127.44	107.48

Radiant Flux (W)	CCT (K)	Duv	x	y	u'	v'
3.464	2723	0.00109	0.4599	0.4136	0.2612	0.5285

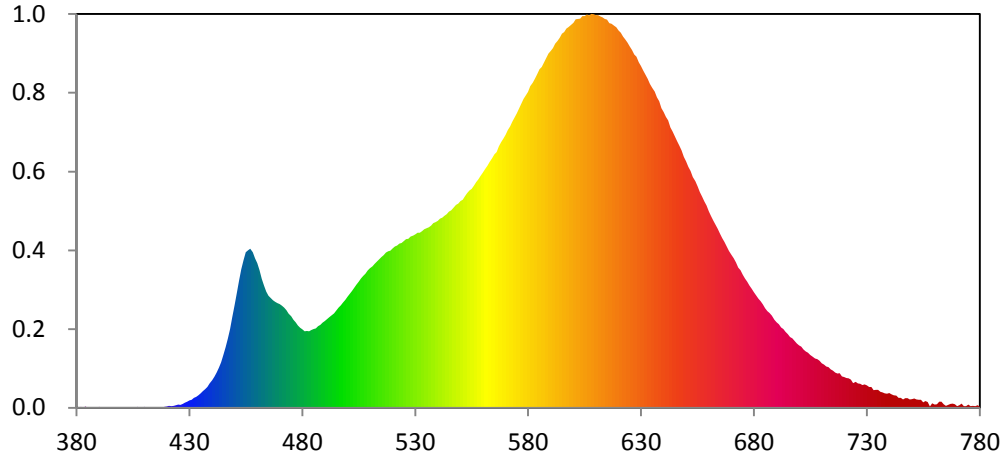
Color Rendering Index

Ra			
84.0			
R1	R2	R3	R4
83	94	94	82
R5	R6	R7	R8
84	95	80	59
R9	R10	R11	R12
13	87	83	77
R13	R14	R15	
86	97	75	





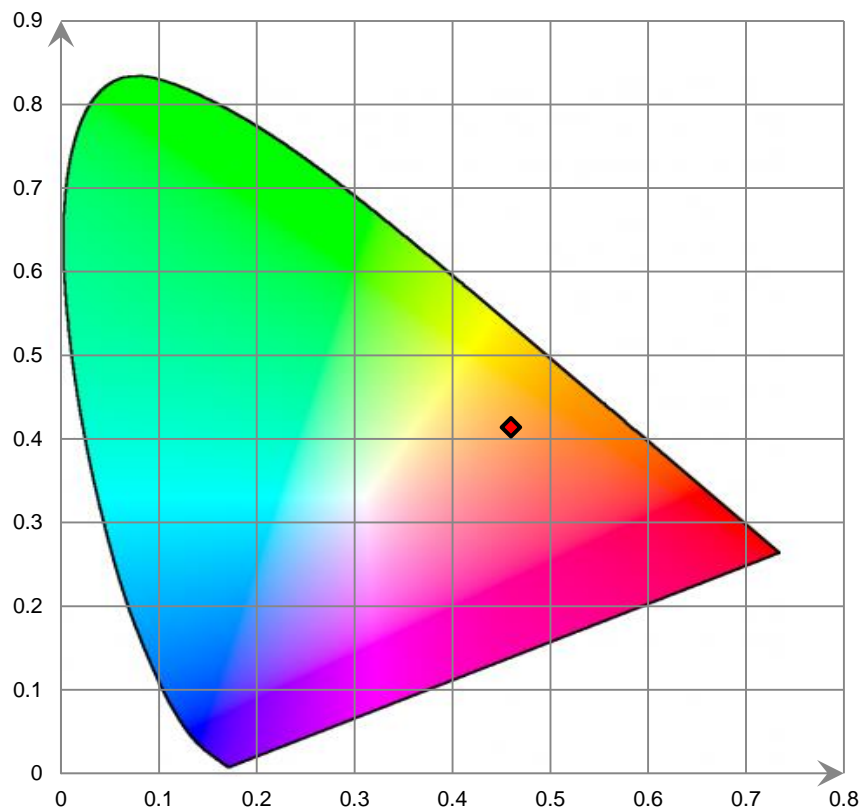
Relative Spectral Power Distribution



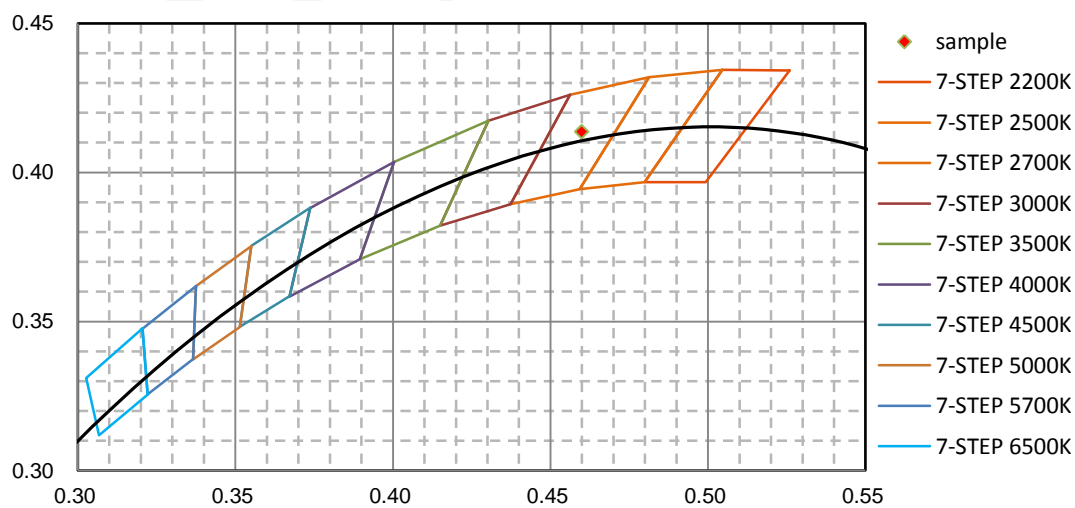
nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
380	1.230E-02	421	1.130E-01	462	8.131E+00	503	7.564E+00	544	1.222E+01
381	2.740E-02	422	1.007E-01	463	7.713E+00	504	7.773E+00	545	1.237E+01
382	5.950E-02	423	1.241E-01	464	7.335E+00	505	7.944E+00	546	1.246E+01
383	1.530E-02	424	1.597E-01	465	7.067E+00	506	8.150E+00	547	1.263E+01
384	8.140E-02	425	1.930E-01	466	6.919E+00	507	8.314E+00	548	1.280E+01
385	3.660E-02	426	1.842E-01	467	6.782E+00	508	8.446E+00	549	1.289E+01
386	2.100E-03	427	2.423E-01	468	6.685E+00	509	8.658E+00	550	1.304E+01
387	1.170E-02	428	3.197E-01	469	6.594E+00	510	8.806E+00	551	1.313E+01
388	1.200E-03	429	3.869E-01	470	6.532E+00	511	8.914E+00	552	1.333E+01
389	0.000E+00	430	4.536E-01	471	6.441E+00	512	9.078E+00	553	1.354E+01
390	5.930E-02	431	5.030E-01	472	6.312E+00	513	9.225E+00	554	1.370E+01
391	1.130E-02	432	6.193E-01	473	6.150E+00	514	9.363E+00	555	1.382E+01
392	4.000E-04	433	6.879E-01	474	5.941E+00	515	9.502E+00	556	1.400E+01
393	0.000E+00	434	7.746E-01	475	5.769E+00	516	9.618E+00	557	1.424E+01
394	1.440E-02	435	9.135E-01	476	5.547E+00	517	9.789E+00	558	1.442E+01
395	2.770E-02	436	1.048E+00	477	5.389E+00	518	9.878E+00	559	1.464E+01
396	8.800E-03	437	1.164E+00	478	5.177E+00	519	9.909E+00	560	1.483E+01
397	6.000E-04	438	1.314E+00	479	5.039E+00	520	1.005E+01	561	1.505E+01
398	0.000E+00	439	1.529E+00	480	4.935E+00	521	1.018E+01	562	1.526E+01
399	0.000E+00	440	1.726E+00	481	4.827E+00	522	1.024E+01	563	1.551E+01
400	0.000E+00	441	1.947E+00	482	4.850E+00	523	1.035E+01	564	1.575E+01
401	1.660E-02	442	2.211E+00	483	4.827E+00	524	1.041E+01	565	1.598E+01
402	6.700E-03	443	2.529E+00	484	4.911E+00	525	1.051E+01	566	1.613E+01
403	1.880E-02	444	2.874E+00	485	4.957E+00	526	1.063E+01	567	1.650E+01
404	1.110E-02	445	3.328E+00	486	5.010E+00	527	1.065E+01	568	1.675E+01
405	2.290E-02	446	3.818E+00	487	5.139E+00	528	1.080E+01	569	1.699E+01
406	2.200E-03	447	4.358E+00	488	5.224E+00	529	1.085E+01	570	1.721E+01
407	5.620E-02	448	4.959E+00	489	5.367E+00	530	1.095E+01	571	1.752E+01
408	3.400E-03	449	5.728E+00	490	5.462E+00	531	1.104E+01	572	1.773E+01
409	4.400E-02	450	6.455E+00	491	5.590E+00	532	1.105E+01	573	1.804E+01
410	4.970E-02	451	7.229E+00	492	5.714E+00	533	1.114E+01	574	1.831E+01
411	3.160E-02	452	8.017E+00	493	5.837E+00	534	1.127E+01	575	1.857E+01
412	1.130E-02	453	8.733E+00	494	5.958E+00	535	1.132E+01	576	1.887E+01
413	5.000E-04	454	9.301E+00	495	6.133E+00	536	1.138E+01	577	1.917E+01
414	2.750E-02	455	9.801E+00	496	6.321E+00	537	1.148E+01	578	1.949E+01
415	1.350E-02	456	9.926E+00	497	6.456E+00	538	1.165E+01	579	1.970E+01
416	2.060E-02	457	1.002E+01	498	6.632E+00	539	1.171E+01	580	1.993E+01
417	1.680E-02	458	9.810E+00	499	6.795E+00	540	1.179E+01	581	2.029E+01
418	4.260E-02	459	9.425E+00	500	7.004E+00	541	1.193E+01	582	2.050E+01
419	5.730E-02	460	9.126E+00	501	7.191E+00	542	1.199E+01	583	2.077E+01
420	7.460E-02	461	8.680E+00	502	7.360E+00	543	1.211E+01	584	2.106E+01

nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
585	2.136E+01	626	2.257E+01	667	1.045E+01	708	3.071E+00	749	5.163E-01
586	2.150E+01	627	2.228E+01	668	1.018E+01	709	2.956E+00	750	5.366E-01
587	2.179E+01	628	2.214E+01	669	9.881E+00	710	2.794E+00	751	5.762E-01
588	2.206E+01	629	2.181E+01	670	9.661E+00	711	2.715E+00	752	5.166E-01
589	2.234E+01	630	2.155E+01	671	9.430E+00	712	2.608E+00	753	5.103E-01
590	2.250E+01	631	2.128E+01	672	9.171E+00	713	2.562E+00	754	5.085E-01
591	2.269E+01	632	2.102E+01	673	8.833E+00	714	2.425E+00	755	3.399E-01
592	2.298E+01	633	2.075E+01	674	8.681E+00	715	2.343E+00	756	4.134E-01
593	2.313E+01	634	2.043E+01	675	8.392E+00	716	2.228E+00	757	3.651E-01
594	2.334E+01	635	2.018E+01	676	8.162E+00	717	2.159E+00	758	6.910E-02
595	2.359E+01	636	1.993E+01	677	7.959E+00	718	2.173E+00	759	2.785E-01
596	2.369E+01	637	1.959E+01	678	7.701E+00	719	1.976E+00	760	1.979E-01
597	2.392E+01	638	1.933E+01	679	7.516E+00	720	1.945E+00	761	2.119E-01
598	2.402E+01	639	1.890E+01	680	7.294E+00	721	1.867E+00	762	3.724E-01
599	2.413E+01	640	1.866E+01	681	7.084E+00	722	1.846E+00	763	3.800E-01
600	2.427E+01	641	1.836E+01	682	6.889E+00	723	1.781E+00	764	2.130E-01
601	2.450E+01	642	1.813E+01	683	6.714E+00	724	1.560E+00	765	1.240E-01
602	2.453E+01	643	1.767E+01	684	6.514E+00	725	1.629E+00	766	1.820E-01
603	2.455E+01	644	1.742E+01	685	6.281E+00	726	1.526E+00	767	2.299E-01
604	2.470E+01	645	1.712E+01	686	6.086E+00	727	1.503E+00	768	2.688E-01
605	2.470E+01	646	1.681E+01	687	5.970E+00	728	1.426E+00	769	2.173E-01
606	2.482E+01	647	1.652E+01	688	5.809E+00	729	1.475E+00	770	9.860E-02
607	2.474E+01	648	1.622E+01	689	5.551E+00	730	1.418E+00	771	1.560E-01
608	2.484E+01	649	1.582E+01	690	5.396E+00	731	1.304E+00	772	2.648E-01
609	2.483E+01	650	1.555E+01	691	5.262E+00	732	1.311E+00	773	1.044E-01
610	2.477E+01	651	1.520E+01	692	5.073E+00	733	1.114E+00	774	1.064E-01
611	2.476E+01	652	1.494E+01	693	4.967E+00	734	1.133E+00	775	1.934E-01
612	2.468E+01	653	1.454E+01	694	4.783E+00	735	1.135E+00	776	1.033E-01
613	2.463E+01	654	1.430E+01	695	4.633E+00	736	1.003E+00	777	1.137E-01
614	2.452E+01	655	1.398E+01	696	4.449E+00	737	9.589E-01	778	9.040E-02
615	2.449E+01	656	1.360E+01	697	4.384E+00	738	8.979E-01	779	1.587E-01
616	2.426E+01	657	1.331E+01	698	4.214E+00	739	8.865E-01	780	8.030E-02
617	2.422E+01	658	1.302E+01	699	4.061E+00	740	9.239E-01		
618	2.411E+01	659	1.275E+01	700	3.931E+00	741	8.517E-01		
619	2.399E+01	660	1.239E+01	701	3.848E+00	742	7.922E-01		
620	2.380E+01	661	1.209E+01	702	3.683E+00	743	7.713E-01		
621	2.365E+01	662	1.182E+01	703	3.560E+00	744	6.245E-01		
622	2.341E+01	663	1.155E+01	704	3.472E+00	745	6.148E-01		
623	2.324E+01	664	1.127E+01	705	3.318E+00	746	5.207E-01		
624	2.303E+01	665	1.097E+01	706	3.233E+00	747	6.014E-01		
625	2.279E+01	666	1.069E+01	707	3.117E+00	748	5.943E-01		

CIE 1931xy Chromaticity Diagram



7-Step Chromaticity Quadrangles



[Goniophotometer System]

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

Test orientation: **Downward**

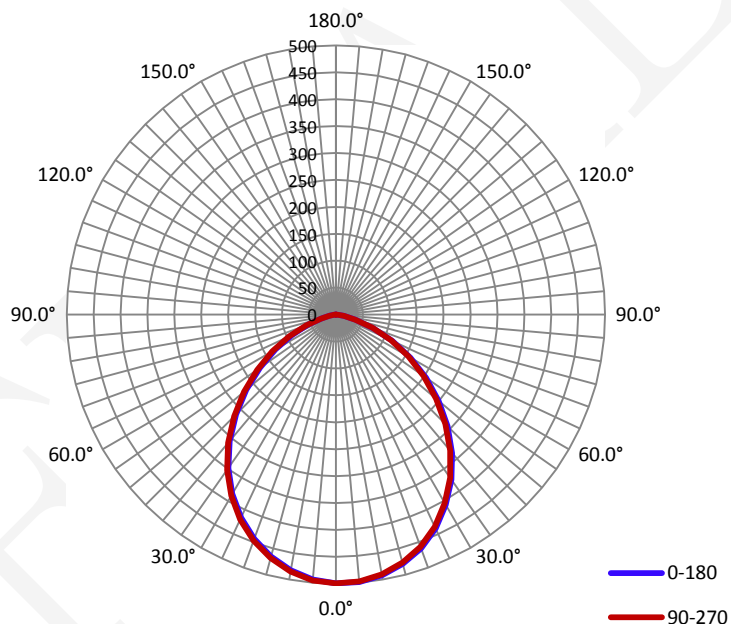
Electrical Measurement

Input Voltage(V)	Frequency(Hz)	Input Current(A)	Power (W)	Power Factor
120.0	60	0.0910	10.53	0.9610

Photometric Measurement

Luminous Flux(lm)	Efficacy(lm/W)	$I_{max}(cd)$	S/MH(C0/180)	S/MH(C90/270)
1131.7	107.52	499.2	1.18	1.18

Luminous Intensity Distribution



	C0/180	C45/225	C90/270	C135/315	AVG.
Beam Angle(50% I_{max}):	96.4	96.3	96.3	96.3	96.3
Field Angle(10% I_{max}):	144.0	144.2	144.6	144.7	144.4

Luminous Intensity (cd) Distribution Data

C y	0°	22.5°	45°	67.5°	90°	112.5°	135°	157.5°
0.0°	499	499	499	499	499	499	499	499
5.0°	499	499	498	498	498	497	496	495
10.0°	492	493	492	491	490	489	487	485
15.0°	480	481	480	479	477	474	472	469
20.0°	462	464	462	461	459	455	451	448
25.0°	438	440	439	438	435	430	426	423
30.0°	408	410	410	408	404	400	396	392
35.0°	374	376	376	374	370	365	360	355
40.0°	336	338	337	334	330	324	319	316
45.0°	293	296	295	292	287	282	276	271
50.0°	249	252	250	248	243	237	232	227
55.0°	205	206	206	203	199	193	188	183
60.0°	160	162	161	159	155	149	145	141
65.0°	115	118	117	116	113	108	103	100
70.0°	74	75	76	75	72	69	66	62
75.0°	38	39	38	39	37	35	33	31
80.0°	15	16	16	16	15	15	14	13
85.0°	5	5	5	5	5	5	4	4
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°	499	499	499	499	499	499	499	499
5.0°	494	493	493	494	496	496	497	498
10.0°	482	483	482	483	485	486	489	490
15.0°	465	464	464	466	468	471	474	476
20.0°	444	443	442	444	447	450	454	457
25.0°	417	416	416	417	421	424	428	431
30.0°	385	384	383	386	389	393	397	401
35.0°	348	347	347	348	353	356	361	365
40.0°	307	306	305	307	311	316	321	326
45.0°	263	260	261	264	267	272	278	283
50.0°	217	216	216	219	223	228	234	239
55.0°	172	171	172	175	179	184	189	193
60.0°	130	129	130	132	137	141	145	149
65.0°	90	89	91	92	96	100	105	107
70.0°	54	53	54	56	59	62	65	67
75.0°	26	25	26	28	29	31	32	33
80.0°	11	11	12	12	13	13	14	14
85.0°	1	1	2	2	2	3	4	4
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	11.9	1.05
5-10	35.2	3.11
10-15	56.9	5.03
15-20	76.3	6.74
20-25	92.3	8.16
25-30	104.3	9.21
30-35	111.5	9.86
35-40	113.7	10.05
40-45	110.8	9.79
45-50	103.2	9.12
50-55	91.7	8.11
55-60	77.2	6.82
60-65	60.5	5.35
65-70	42.7	3.77
70-75	25.4	2.25
75-80	12.4	1.09
80-85	4.7	0.41
85-90	0.9	0.08
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	11.9	1.05
0-10	47.1	4.16
0-15	104.0	9.19
0-20	180.3	15.93
0-25	272.6	24.09
0-30	376.8	33.30
0-35	488.4	43.15
0-40	602.1	53.21
0-45	712.9	63.00
0-50	816.1	72.12
0-55	907.9	80.22
0-60	985.0	87.04
0-65	1045.6	92.39
0-70	1088.2	96.16
0-75	1113.7	98.41
0-80	1126.0	99.50
0-85	1130.7	99.92
0-90	1131.7	100.00
0-95	1131.7	100.00
0-100	1131.7	100.00
0-105	1131.7	100.00
0-110	1131.7	100.00
0-115	1131.7	100.00
0-120	1131.7	100.00
0-125	1131.7	100.00
0-130	1131.7	100.00
0-135	1131.7	100.00
0-140	1131.7	100.00
0-145	1131.7	100.00
0-150	1131.7	100.00
0-155	1131.7	100.00
0-160	1131.7	100.00
0-165	1131.7	100.00
0-170	1131.7	100.00
0-175	1131.7	100.00
0-180	1131.7	100.00

6. Product Photo



Directions

1. The information marked "superscript #" is provided by the applicant, the laboratory is not responsible for its authenticity and this information can affect the validity of the result in the test report.
2. Unless otherwise stated the results shown in this test report refer only to the sample(s) tested.
3. Otherwise required by the applicant or Product Regulations, Decision Rule in this report did not consider the uncertainty.
4. The extended uncertainty given in this report is obtained by combining the standard uncertainty times the coverage factor K with the 95% confidence interval.
5. This report cannot be reproduced except in full, without prior written approval of the Company.
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*****END OF REPORT*****