

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: INFT4/850/DIM010UNV

Report Type:	Electrical and Photometric tests including: Luminous Flux, Chromaticity, Luminous Intensity Distribution
Test Engineer:	George Yang
Report Number:	PKS200825083-10
Test Date:	2020-08-28 to 2020-09-07
Report Date:	2020-09-07
Reviewed By:	Ray Gao/ 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 2020-08-25 and used for testing.

Model Tested: INFT4/850/DIM010UNV
 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: 120-277VAC 50/60Hz
 Rated Power: 10W
 Nominal CCT: 5000K
 Nominal Lumen Output: 1090lm

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 $U_{rel}=2.61\%$ ($k=2$), 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 $U_{rel}=0.48\%$ of rdg, AC Voltage $U_{rel}=0.25\%$ of rdg, Power $U_{rel}=0.44\%$, ($k=2$), 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 $U_{rel}=2.6\%$ ($k=2$), 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**

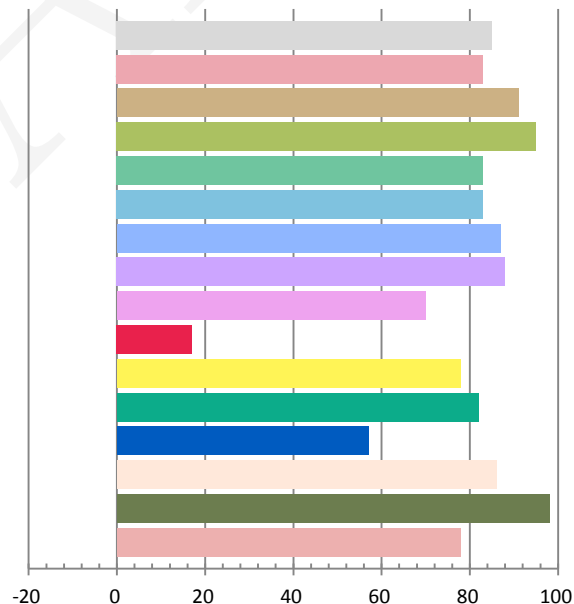
Photometric and Electrical Measurement Result

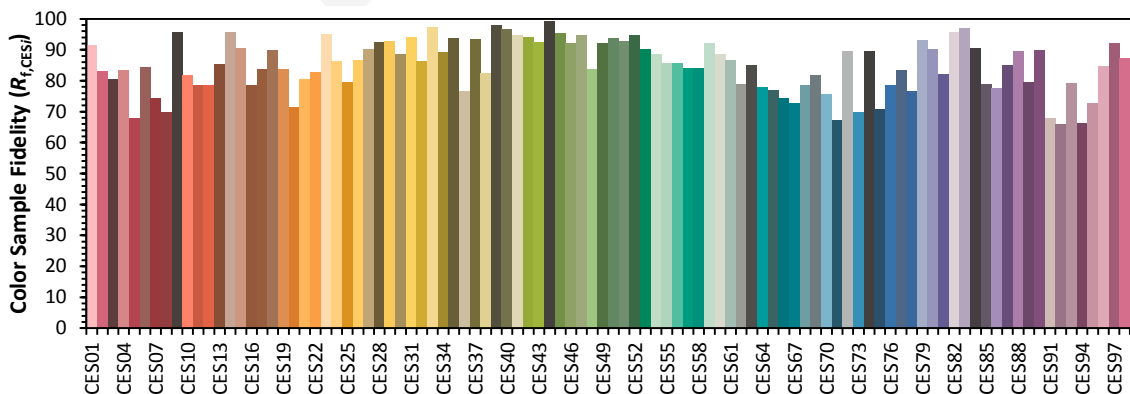
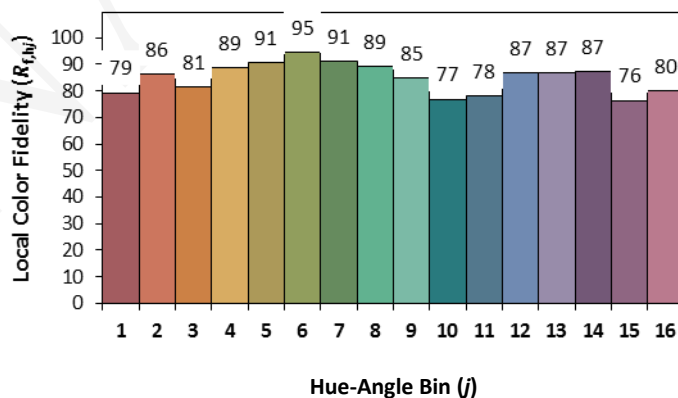
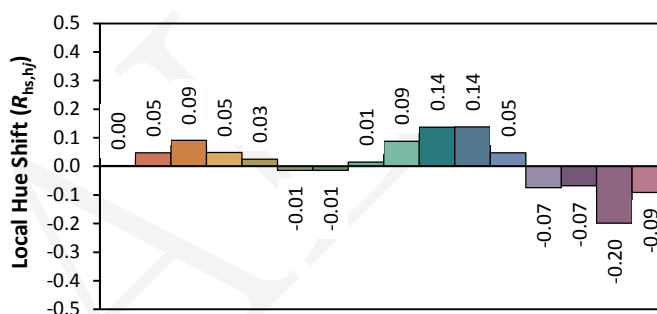
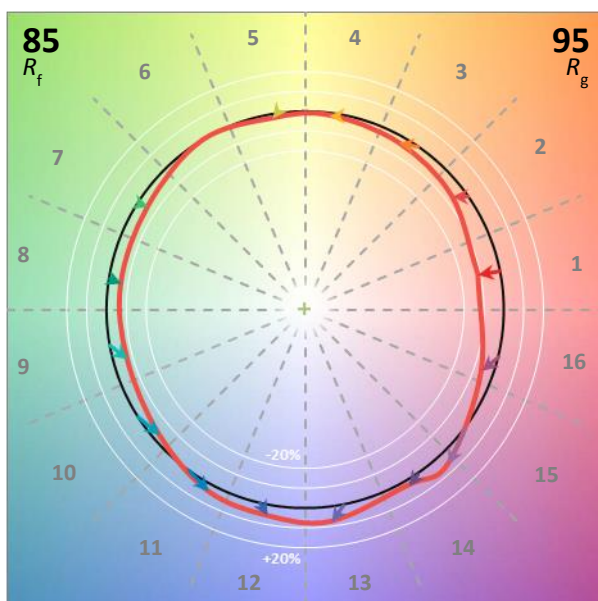
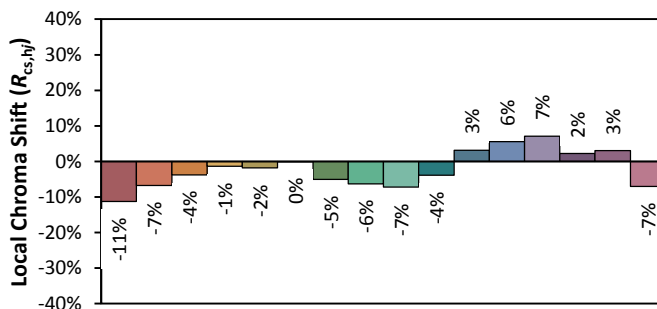
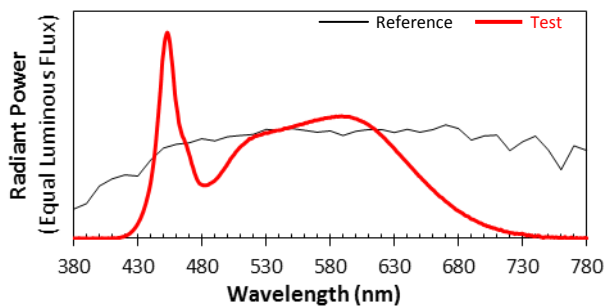
Voltage(V)	Frequency(Hz)	Current(A)	Power (W)	Power Factor	Luminous Flux(lm)	Efficacy(lm/W)
119.95	60	0.0825	9.78	0.9883	1092.14	111.67

Radiant Flux (W)	CCT (K)	Duv	x	y	u'	v'
3.372	4857	0.00295	0.3500	0.3615	0.2109	0.4901

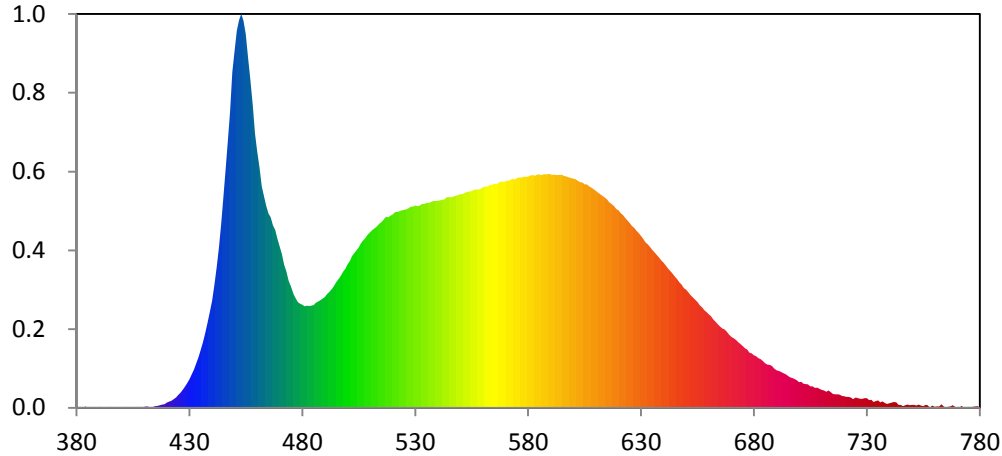
Color Rendering Index

Ra			
85.0			
R1	R2	R3	R4
83	91	95	83
R5	R6	R7	R8
83	87	88	70
R9	R10	R11	R12
17	78	82	57
R13	R14	R15	
86	98	78	





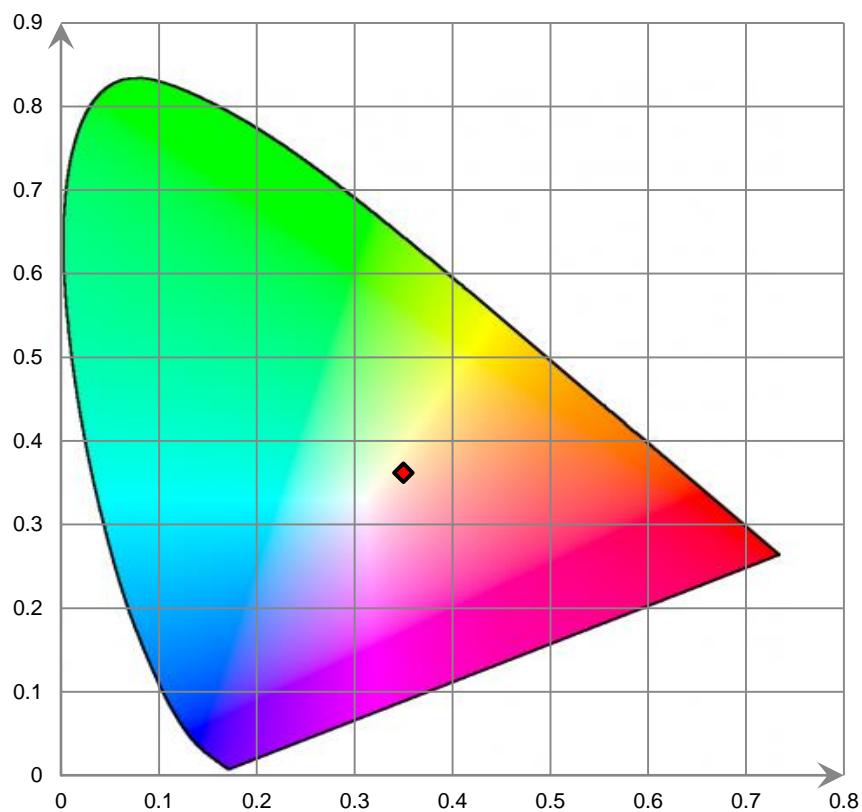
Relative Spectral Power Distribution



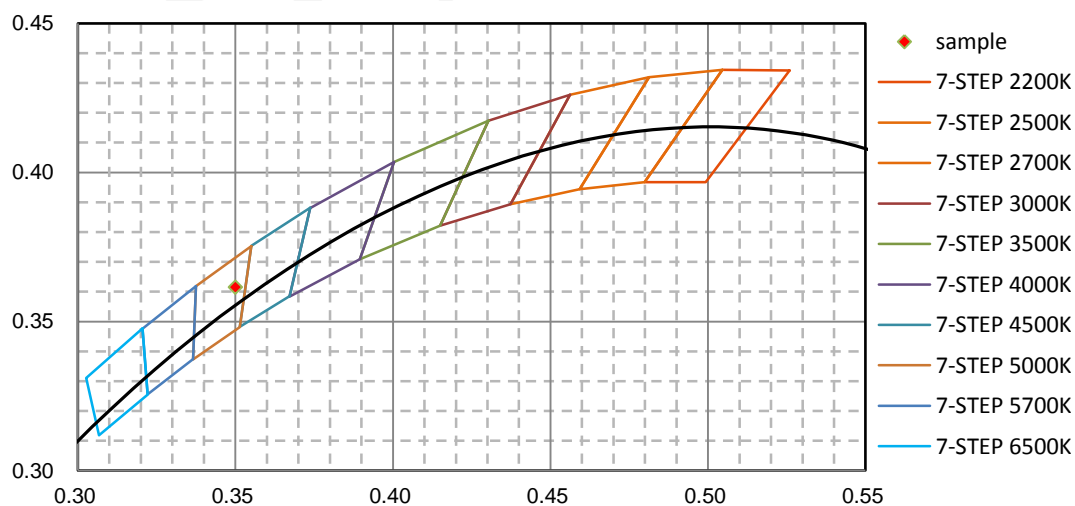
nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
380	5.560E-02	421	4.553E-01	462	1.629E+01	503	1.136E+01	544	1.549E+01
381	4.360E-02	422	5.186E-01	463	1.556E+01	504	1.159E+01	545	1.549E+01
382	4.570E-02	423	6.395E-01	464	1.486E+01	505	1.180E+01	546	1.549E+01
383	7.900E-03	424	7.422E-01	465	1.429E+01	506	1.210E+01	547	1.554E+01
384	8.590E-02	425	9.310E-01	466	1.401E+01	507	1.230E+01	548	1.560E+01
385	4.400E-02	426	1.100E+00	467	1.342E+01	508	1.249E+01	549	1.565E+01
386	3.400E-03	427	1.310E+00	468	1.309E+01	509	1.274E+01	550	1.569E+01
387	5.150E-02	428	1.545E+00	469	1.243E+01	510	1.289E+01	551	1.572E+01
388	2.850E-02	429	1.805E+00	470	1.186E+01	511	1.309E+01	552	1.582E+01
389	3.750E-02	430	2.097E+00	471	1.129E+01	512	1.320E+01	553	1.586E+01
390	6.020E-02	431	2.455E+00	472	1.051E+01	513	1.335E+01	554	1.591E+01
391	1.950E-02	432	2.792E+00	473	1.003E+01	514	1.354E+01	555	1.594E+01
392	8.000E-04	433	3.250E+00	474	9.342E+00	515	1.366E+01	556	1.603E+01
393	4.700E-03	434	3.682E+00	475	8.872E+00	516	1.383E+01	557	1.605E+01
394	7.000E-04	435	4.227E+00	476	8.375E+00	517	1.405E+01	558	1.606E+01
395	7.170E-02	436	4.808E+00	477	8.047E+00	518	1.400E+01	559	1.610E+01
396	2.050E-02	437	5.464E+00	478	7.760E+00	519	1.411E+01	560	1.621E+01
397	4.110E-02	438	6.177E+00	479	7.637E+00	520	1.422E+01	561	1.629E+01
398	2.100E-03	439	6.976E+00	480	7.580E+00	521	1.438E+01	562	1.625E+01
399	3.200E-03	440	7.877E+00	481	7.471E+00	522	1.440E+01	563	1.638E+01
400	1.000E-04	441	9.044E+00	482	7.518E+00	523	1.445E+01	564	1.640E+01
401	2.430E-02	442	1.031E+01	483	7.484E+00	524	1.453E+01	565	1.648E+01
402	7.390E-02	443	1.174E+01	484	7.518E+00	525	1.455E+01	566	1.645E+01
403	3.310E-02	444	1.345E+01	485	7.562E+00	526	1.459E+01	567	1.657E+01
404	2.070E-02	445	1.545E+01	486	7.710E+00	527	1.465E+01	568	1.664E+01
405	3.300E-02	446	1.751E+01	487	7.806E+00	528	1.477E+01	569	1.661E+01
406	1.750E-02	447	1.960E+01	488	7.902E+00	529	1.481E+01	570	1.666E+01
407	7.280E-02	448	2.180E+01	489	8.024E+00	530	1.486E+01	571	1.670E+01
408	6.700E-03	449	2.468E+01	490	8.139E+00	531	1.483E+01	572	1.674E+01
409	4.700E-02	450	2.622E+01	491	8.353E+00	532	1.487E+01	573	1.684E+01
410	7.680E-02	451	2.773E+01	492	8.522E+00	533	1.498E+01	574	1.679E+01
411	8.030E-02	452	2.850E+01	493	8.729E+00	534	1.500E+01	575	1.689E+01
412	6.570E-02	453	2.897E+01	494	8.960E+00	535	1.506E+01	576	1.695E+01
413	3.610E-02	454	2.846E+01	495	9.237E+00	536	1.507E+01	577	1.693E+01
414	7.800E-02	455	2.750E+01	496	9.469E+00	537	1.512E+01	578	1.698E+01
415	1.201E-01	456	2.580E+01	497	9.697E+00	538	1.521E+01	579	1.699E+01
416	1.293E-01	457	2.421E+01	498	9.991E+00	539	1.520E+01	580	1.698E+01
417	1.924E-01	458	2.223E+01	499	1.020E+01	540	1.522E+01	581	1.709E+01
418	2.414E-01	459	2.014E+01	500	1.054E+01	541	1.525E+01	582	1.710E+01
419	2.653E-01	460	1.880E+01	501	1.078E+01	542	1.529E+01	583	1.707E+01
420	3.810E-01	461	1.768E+01	502	1.114E+01	543	1.533E+01	584	1.715E+01

nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
585	1.715E+01	626	1.336E+01	667	5.755E+00	708	1.487E+00	749	1.963E-01
586	1.710E+01	627	1.322E+01	668	5.601E+00	709	1.392E+00	750	2.079E-01
587	1.718E+01	628	1.302E+01	669	5.393E+00	710	1.308E+00	751	2.087E-01
588	1.716E+01	629	1.285E+01	670	5.235E+00	711	1.275E+00	752	1.589E-01
589	1.721E+01	630	1.263E+01	671	5.113E+00	712	1.174E+00	753	2.342E-01
590	1.715E+01	631	1.242E+01	672	4.991E+00	713	1.277E+00	754	1.592E-01
591	1.714E+01	632	1.217E+01	673	4.818E+00	714	1.144E+00	755	1.246E-01
592	1.714E+01	633	1.202E+01	674	4.672E+00	715	1.018E+00	756	2.098E-01
593	1.712E+01	634	1.185E+01	675	4.551E+00	716	9.952E-01	757	1.828E-01
594	1.714E+01	635	1.163E+01	676	4.384E+00	717	9.887E-01	758	3.260E-02
595	1.712E+01	636	1.142E+01	677	4.270E+00	718	9.613E-01	759	1.580E-01
596	1.704E+01	637	1.122E+01	678	4.055E+00	719	8.690E-01	760	6.660E-02
597	1.701E+01	638	1.104E+01	679	4.007E+00	720	8.535E-01	761	1.013E-01
598	1.694E+01	639	1.084E+01	680	3.854E+00	721	7.955E-01	762	9.740E-02
599	1.689E+01	640	1.066E+01	681	3.798E+00	722	8.070E-01	763	2.484E-01
600	1.685E+01	641	1.044E+01	682	3.655E+00	723	7.485E-01	764	8.300E-02
601	1.680E+01	642	1.023E+01	683	3.581E+00	724	6.388E-01	765	4.700E-03
602	1.669E+01	643	1.004E+01	684	3.426E+00	725	7.512E-01	766	6.790E-02
603	1.659E+01	644	9.849E+00	685	3.263E+00	726	7.037E-01	767	8.660E-02
604	1.656E+01	645	9.648E+00	686	3.180E+00	727	6.494E-01	768	1.826E-01
605	1.643E+01	646	9.461E+00	687	3.143E+00	728	6.465E-01	769	6.220E-02
606	1.642E+01	647	9.219E+00	688	3.076E+00	729	6.952E-01	770	3.090E-02
607	1.629E+01	648	9.064E+00	689	2.866E+00	730	7.049E-01	771	3.110E-02
608	1.619E+01	649	8.806E+00	690	2.748E+00	731	5.553E-01	772	1.286E-01
609	1.609E+01	650	8.693E+00	691	2.702E+00	732	5.866E-01	773	4.020E-02
610	1.597E+01	651	8.496E+00	692	2.643E+00	733	4.141E-01	774	4.780E-02
611	1.582E+01	652	8.275E+00	693	2.537E+00	734	4.833E-01	775	7.920E-02
612	1.570E+01	653	8.116E+00	694	2.459E+00	735	5.284E-01	776	4.940E-02
613	1.558E+01	654	7.931E+00	695	2.350E+00	736	4.011E-01	777	6.070E-02
614	1.547E+01	655	7.759E+00	696	2.227E+00	737	4.727E-01	778	8.920E-02
615	1.533E+01	656	7.531E+00	697	2.197E+00	738	3.410E-01	779	1.164E-01
616	1.511E+01	657	7.396E+00	698	2.120E+00	739	2.875E-01	780	5.640E-02
617	1.499E+01	658	7.166E+00	699	2.010E+00	740	3.272E-01		
618	1.482E+01	659	7.024E+00	700	1.889E+00	741	3.643E-01		
619	1.462E+01	660	6.862E+00	701	1.911E+00	742	4.281E-01		
620	1.452E+01	661	6.726E+00	702	1.761E+00	743	3.878E-01		
621	1.431E+01	662	6.497E+00	703	1.747E+00	744	2.102E-01		
622	1.416E+01	663	6.326E+00	704	1.714E+00	745	2.207E-01		
623	1.396E+01	664	6.152E+00	705	1.573E+00	746	1.042E-01		
624	1.376E+01	665	5.976E+00	706	1.570E+00	747	1.905E-01		
625	1.358E+01	666	5.837E+00	707	1.459E+00	748	2.385E-01		

CIE 1931xy Chromaticity Diagram



7-Step Chromaticity Quadrangles



[Goniophotometer System]

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

Test orientation: **Downward**

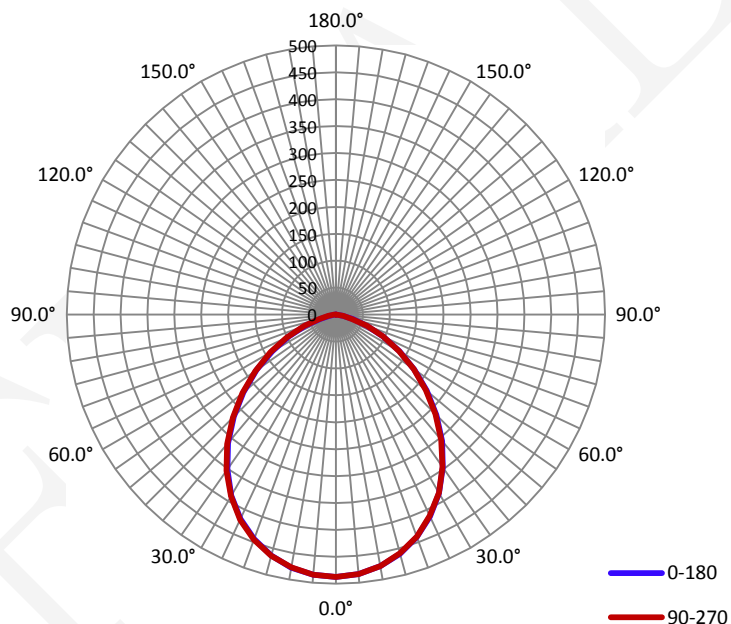
Electrical Measurement

Input Voltage(V)	Frequency(Hz)	Input Current(A)	Power (W)	Power Factor
120.0	60	0.0820	9.8	0.9920

Photometric Measurement

Luminous Flux(lm)	Efficacy(lm/W)	$I_{max}(cd)$	S/MH(C0/180)	S/MH(C90/270)
1091.3	111.41	487.1	1.18	1.18

Luminous Intensity Distribution



	C0/180	C45/225	C90/270	C135/315	AVG.
Beam Angle(50% I_{max}):	95.2	95.1	95.1	95.2	95.2
Field Angle(10% I_{max}):	144.1	144.0	144.4	144.5	144.3

Luminous Intensity (cd) Distribution Data

C y	0°	22.5°	45°	67.5°	90°	112.5°	135°	157.5°
0.0°	487	487	487	487	487	487	487	487
5.0°	484	483	483	483	484	483	484	485
10.0°	474	474	473	473	475	475	476	476
15.0°	460	459	458	458	459	461	461	464
20.0°	440	438	437	438	439	442	442	443
25.0°	414	413	412	412	412	416	417	420
30.0°	383	382	381	381	382	384	387	389
35.0°	347	345	344	344	345	347	350	355
40.0°	307	305	302	303	304	307	310	314
45.0°	264	261	260	260	261	264	268	271
50.0°	221	218	216	217	218	220	223	228
55.0°	178	176	174	175	176	178	181	185
60.0°	137	134	133	134	135	137	139	143
65.0°	97	97	96	95	96	99	100	102
70.0°	62	61	60	61	61	62	64	64
75.0°	33	31	31	31	31	31	32	32
80.0°	14	14	14	14	14	14	14	14
85.0°	4	5	5	4	4	4	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°	487	487	487	487	487	487	487	487
5.0°	485	485	485	486	485	484	484	484
10.0°	477	477	478	478	477	477	476	474
15.0°	463	464	464	465	464	463	461	460
20.0°	444	445	445	446	445	444	442	439
25.0°	419	420	421	421	421	418	417	413
30.0°	388	389	390	391	389	388	385	382
35.0°	352	354	354	355	354	353	349	347
40.0°	312	313	313	315	314	312	308	305
45.0°	268	271	271	272	270	268	265	262
50.0°	225	226	228	228	226	225	222	218
55.0°	180	182	184	184	183	182	178	175
60.0°	137	139	141	141	141	140	136	134
65.0°	97	99	101	101	101	100	98	95
70.0°	60	61	62	63	63	63	62	60
75.0°	29	29	31	32	32	32	32	32
80.0°	12	13	13	14	15	14	14	14
85.0°	2	2	3	3	3	3	5	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	11.6	1.06
5-10	34.3	3.15
10-15	55.6	5.09
15-20	74.5	6.82
20-25	90.0	8.25
25-30	101.5	9.30
30-35	108.3	9.92
35-40	109.9	10.07
40-45	106.5	9.76
45-50	98.7	9.04
50-55	87.3	8.00
55-60	73.2	6.71
60-65	57.3	5.25
65-70	40.5	3.71
70-75	24.3	2.23
75-80	12.0	1.10
80-85	4.7	0.43
85-90	1.0	0.09
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	11.6	1.06
0-10	45.9	4.21
0-15	101.5	9.30
0-20	176.0	16.13
0-25	266.0	24.38
0-30	367.6	33.68
0-35	475.8	43.60
0-40	585.7	53.67
0-45	692.2	63.43
0-50	790.9	72.47
0-55	878.2	80.48
0-60	951.4	87.19
0-65	1008.8	92.44
0-70	1049.3	96.15
0-75	1073.6	98.38
0-80	1085.6	99.48
0-85	1090.3	99.91
0-90	1091.3	100.00
0-95	1091.3	100.00
0-100	1091.3	100.00
0-105	1091.3	100.00
0-110	1091.3	100.00
0-115	1091.3	100.00
0-120	1091.3	100.00
0-125	1091.3	100.00
0-130	1091.3	100.00
0-135	1091.3	100.00
0-140	1091.3	100.00
0-145	1091.3	100.00
0-150	1091.3	100.00
0-155	1091.3	100.00
0-160	1091.3	100.00
0-165	1091.3	100.00
0-170	1091.3	100.00
0-175	1091.3	100.00
0-180	1091.3	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*****