



IES LM-79-19

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: 4.5FG25DIM/827/SB/R

Report Type:	Electrical and Photometric tests including: Luminous Flux, Chromaticity, Luminous Intensity Distribution, THD
Project Engineer:	George Chen
Report Number:	PKS210806080-10
Test Date:	2021-08-07
Report Date:	2021-08-09
Reviewed By:	Bill Xiong / EE Engineer
Prepared By:	Bay Area Compliance Laboratories Corp. (Dongguan). No.12, Pulong East 1 st Road, Tangxia Town, Dongguan, Guangdong, China. Tel: +86-0769-86858888 Fax:+86-0769-868585888
Accreditation:	The IAS Accreditation Number TL-460.

1. Product Description

General Information:

Two samples were received on 2021-08-06. One was tested in integrating sphere and the other was tested in goniophotometer.

Model Tested: 4.5FG25DIM/827/SB/R
 Manufacturer: GREEN CREATIVE LTD
 Brand Name: GREEN CREATIVE
 Product Designation: LED Lamp
 Burning Time Before Test: 0hour (For New Products)

Rated Values:

Rated Voltage/Frequency: 120VAC 60Hz
 Rated Power: 4.5W
 Nominal CCT: 2700K
 Nominal Lumen Output: 400lm

2. Standards Used

- IES LM-79-19: Approved Method: Optical and Electrical Measurements 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 (This method is not in IAS accreditation scope)

3. Description of Test Equipment

Device	Manufacture	Model No	Serial No	Calibration date	Calibration due date
2.0m integrating sphere	EVERFINE	R98	11010018	2020-10-21	2021-10-20
spectroradiometer	EVERFINE	HAAS-2000	G112048TS81331121	2020-10-21	2021-10-20
Digital Power Meter	EVERFINE	PF2010A	1011004	2020-10-21	2021-10-20
Digital CC&CV DC Power Supply	EVERFINE	WY305-V1	1101047	2021-06-30	2022-06-29
Rapid Recording Photometer	EVERFINE	PHOTO-2000F	1007010	2020-11-05	2021-11-04
Standard Light Source	EVERFINE	D204	N/A	2020-10-20	2021-10-19
Special zero-voltage synchronous switching AC	EVERFINE	DPS1010-YF	1011001T	2021-01-04	2022-01-03
AC POWER SUPPLY	EVERFINE	VPS1030 PWM	1012017	2021-01-04	2022-01-03
Digital CC&CV DC Power Supply	EVERFINE	WY12010	1009009	2021-01-04	2022-01-03
Digital power meter	YOKOGAWA	WT-210	91j926132	2021-01-04	2022-01-03
full-field speed goniophotometer	EVERFINE	GO-R5000	YG108492N10120001	2021-03-12	2022-03-11
Wireless Remote Sensor	N/A	433MHz	N/A	2021-03-12	2022-03-11
Standard Light Source	EVERFINE	D908	1012003	2020-10-20	2021-10-19

Statement of Traceability: Bay Area Compliance Laboratories Corp. (Dongguan) 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 ANSI/IES LM-79-19. The product was operated at rated voltage or at voltage required by manufacturer. The ambient temperature of the sample was maintained at $25^{\circ}\text{C}\pm 1.2^{\circ}\text{C}$ during measurement. And relative humidity is maintained between 10% 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 $U=2.1\%$ ($K=2$), at the 95% confidence level. The uncertainty of the correlated color temperature measurements is $U=22\text{K}$ ($K=2$), at the 95% confidence level. The uncertainty of the CRI is $U=2.1(K=2)$, at the 95% confidence level.

The uncertainty of power meter AC current $U=0.19\%$ of rdg, AC Voltage $U=0.18\%$ of rdg, Power $U=0.46\%$ ($K=2$), 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. For measurement of luminous intensity distribution, The horizontal angle (C plane) test intervals were set 22.5 degree, the vertical angle (γ) test intervals were set 1 degree while data for 5 degree intervals is reported.

The uncertainty of the luminous intensity is $U=2.00\%$ ($K=2$), at the 95% confidence level.

Additional Test

The Additional Test item may not be covered by IESNA LM-79-2008. Additional test including power factor, off-state power and THD, was measured by Digital Power Meter after stabilized at $25^{\circ}\text{C}\pm 1^{\circ}\text{C}$. Test voltage for THD and power factor test would be equal to rated voltage or, in case of a voltage range, maximum value of that range.

The uncertainty of power meter AC current $U=0.19\%$ of rdg, AC Voltage $U=0.18\%$ of rdg, Power $U=0.46\%$ ($K=2$), 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: **Base Up**

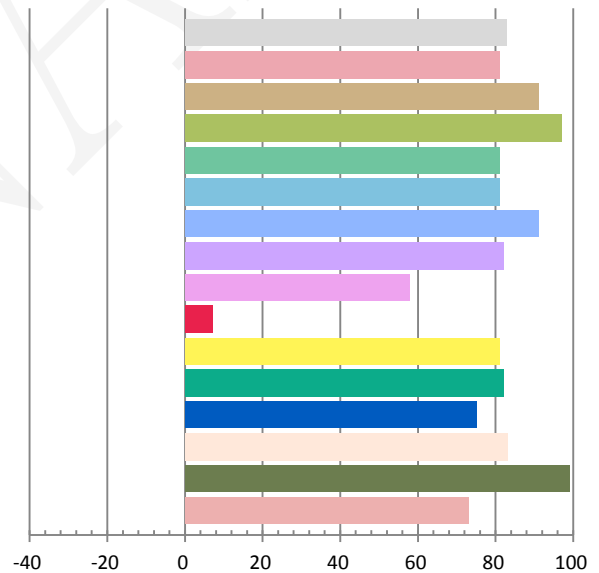
Photometric and Electrical Measurement Result

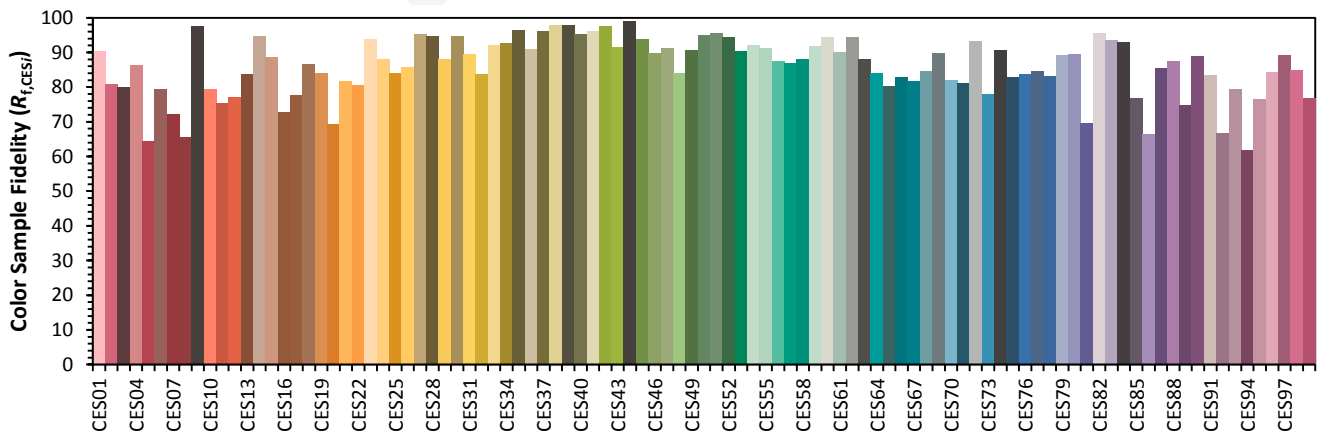
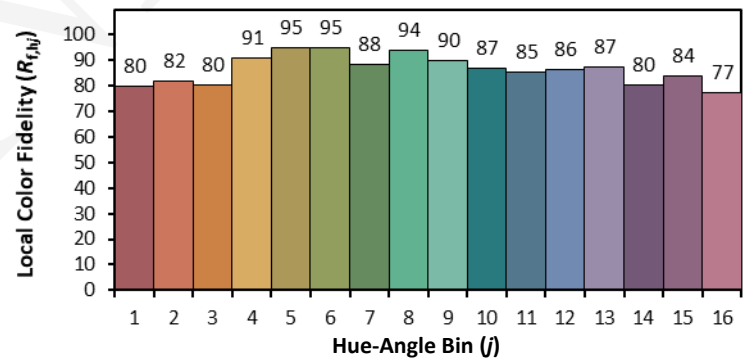
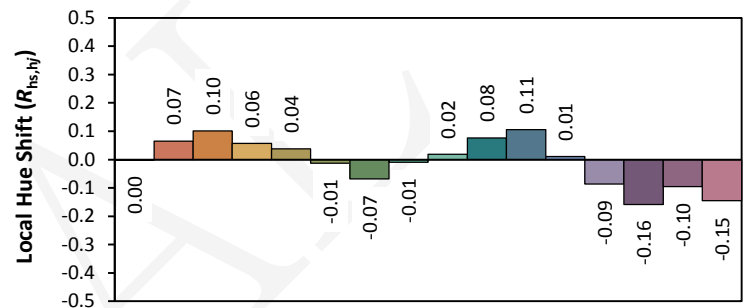
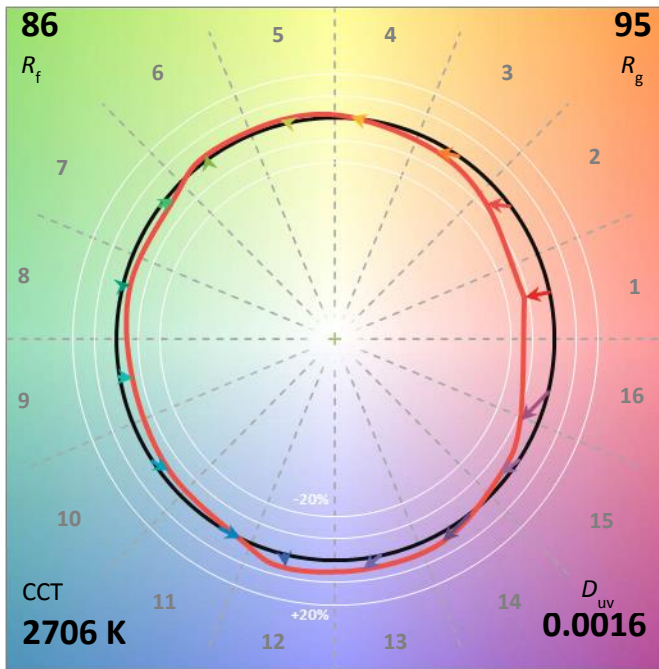
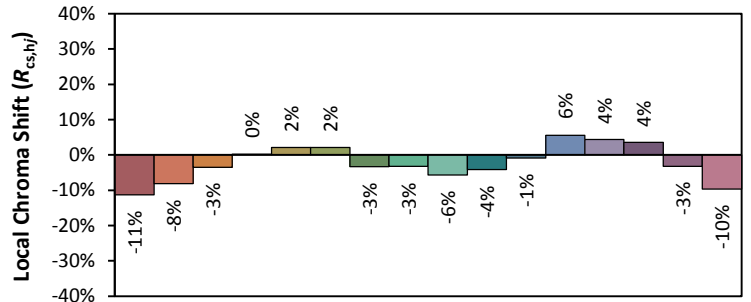
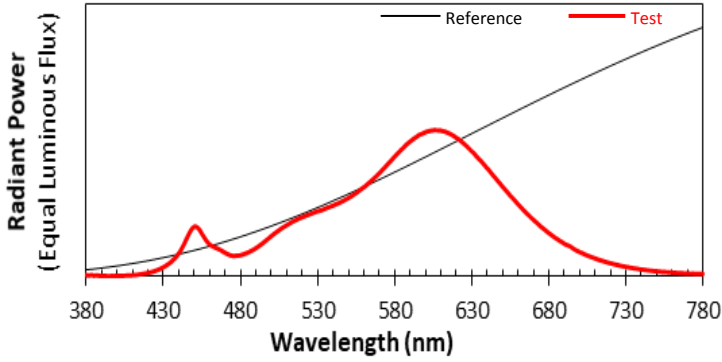
Voltage(V)	Frequency(Hz)	Current(A)	Power (W)	Power Factor	Luminous Flux(lm)	Efficacy(lm/W)
120.0	60	0.04509	4.047	0.7482	449.2	110.99

Radiant Flux (W)	CCT (K)	Duv	x	y	u'	v'
1.383	2708	0.00159	0.4620	0.4154	0.2617	0.5295

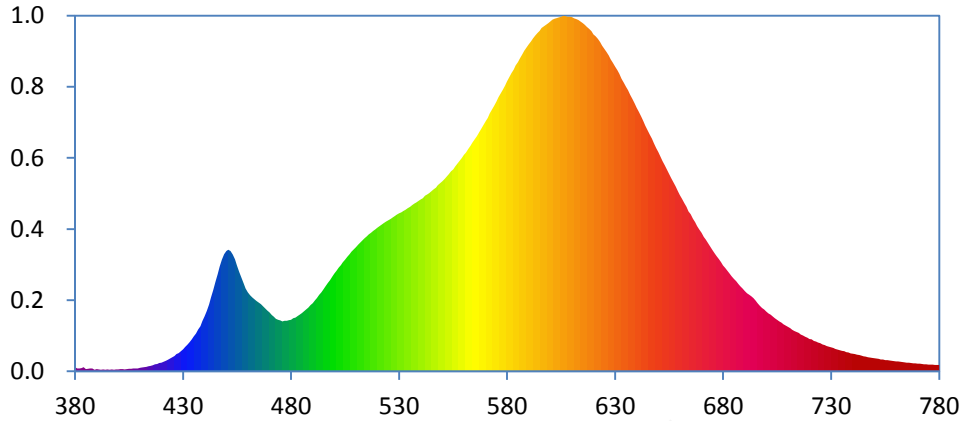
Color Rendering Index

Ra			
82.8			
R1	R2	R3	R4
81	91	97	81
R5	R6	R7	R8
81	91	82	58
R9	R10	R11	R12
7	81	82	75
R13	R14	R15	
83	99	73	





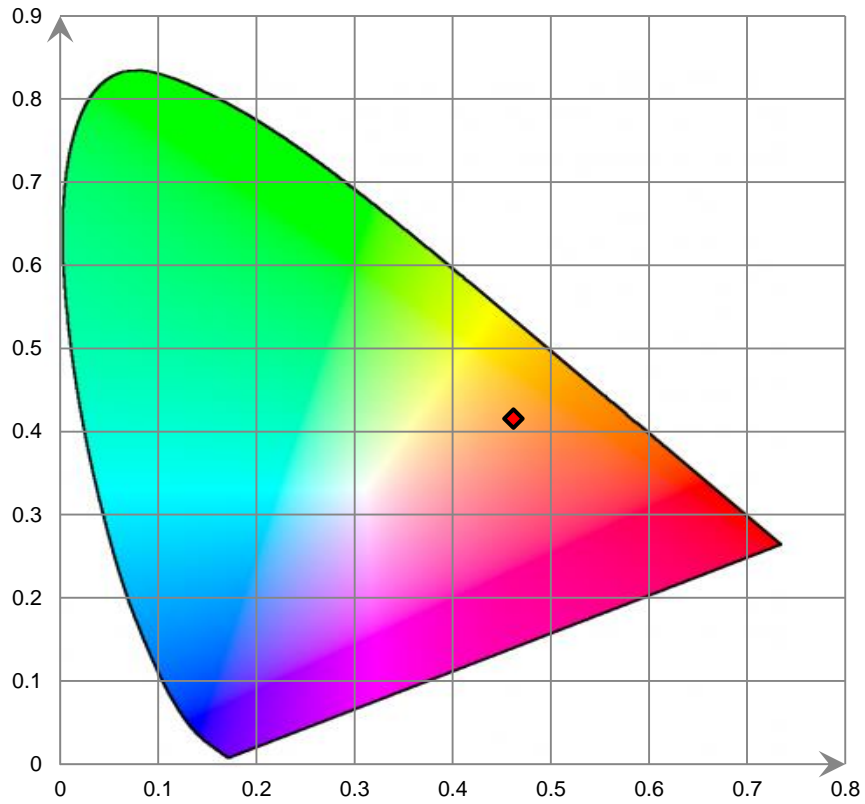
Relative Spectral Power Distribution



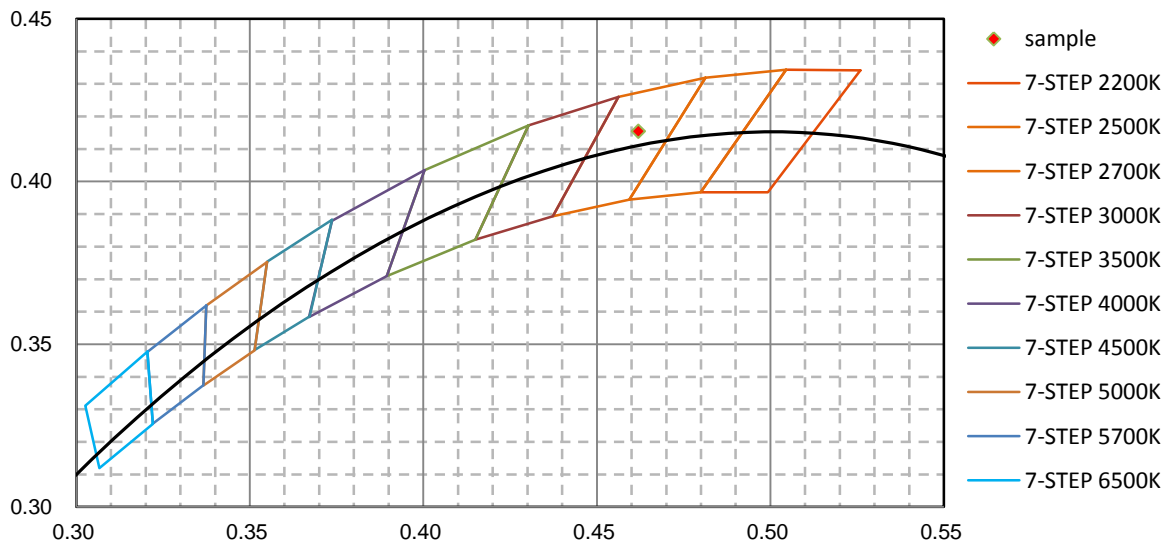
nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
380	1.200E-01	421	2.719E-01	462	2.056E+00	503	2.947E+00	544	4.946E+00
381	8.524E-02	422	2.993E-01	463	2.000E+00	504	3.027E+00	545	4.998E+00
382	8.235E-02	423	3.205E-01	464	1.954E+00	505	3.102E+00	546	5.052E+00
383	9.597E-02	424	3.605E-01	465	1.910E+00	506	3.182E+00	547	5.097E+00
384	1.141E-01	425	3.935E-01	466	1.861E+00	507	3.250E+00	548	5.163E+00
385	6.386E-02	426	4.282E-01	467	1.806E+00	508	3.320E+00	549	5.220E+00
386	7.776E-02	427	4.779E-01	468	1.753E+00	509	3.383E+00	550	5.272E+00
387	8.383E-02	428	5.114E-01	469	1.685E+00	510	3.442E+00	551	5.334E+00
388	8.429E-02	429	5.651E-01	470	1.631E+00	511	3.511E+00	552	5.396E+00
389	5.038E-02	430	6.180E-01	471	1.560E+00	512	3.567E+00	553	5.469E+00
390	6.491E-02	431	6.810E-01	472	1.516E+00	513	3.634E+00	554	5.544E+00
391	5.238E-02	432	7.422E-01	473	1.459E+00	514	3.693E+00	555	5.601E+00
392	5.055E-02	433	8.133E-01	474	1.428E+00	515	3.747E+00	556	5.678E+00
393	5.498E-02	434	8.858E-01	475	1.410E+00	516	3.800E+00	557	5.755E+00
394	4.383E-02	435	9.660E-01	476	1.385E+00	517	3.846E+00	558	5.836E+00
395	5.271E-02	436	1.050E+00	477	1.401E+00	518	3.898E+00	559	5.918E+00
396	4.301E-02	437	1.165E+00	478	1.401E+00	519	3.944E+00	560	5.997E+00
397	5.737E-02	438	1.257E+00	479	1.422E+00	520	3.986E+00	561	6.066E+00
398	4.696E-02	439	1.391E+00	480	1.435E+00	521	4.029E+00	562	6.163E+00
399	5.611E-02	440	1.526E+00	481	1.471E+00	522	4.074E+00	563	6.257E+00
400	5.916E-02	441	1.679E+00	482	1.493E+00	523	4.121E+00	564	6.341E+00
401	6.131E-02	442	1.855E+00	483	1.537E+00	524	4.154E+00	565	6.435E+00
402	6.507E-02	443	2.052E+00	484	1.571E+00	525	4.190E+00	566	6.525E+00
403	5.785E-02	444	2.252E+00	485	1.621E+00	526	4.227E+00	567	6.632E+00
404	6.210E-02	445	2.487E+00	486	1.671E+00	527	4.266E+00	568	6.720E+00
405	7.134E-02	446	2.702E+00	487	1.722E+00	528	4.306E+00	569	6.825E+00
406	6.975E-02	447	2.905E+00	488	1.772E+00	529	4.349E+00	570	6.932E+00
407	8.031E-02	448	3.099E+00	489	1.834E+00	530	4.383E+00	571	7.028E+00
408	8.411E-02	449	3.252E+00	490	1.896E+00	531	4.415E+00	572	7.153E+00
409	8.451E-02	450	3.340E+00	491	1.968E+00	532	4.447E+00	573	7.257E+00
410	9.629E-02	451	3.371E+00	492	2.034E+00	533	4.480E+00	574	7.363E+00
411	1.125E-01	452	3.337E+00	493	2.121E+00	534	4.523E+00	575	7.476E+00
412	1.188E-01	453	3.241E+00	494	2.194E+00	535	4.559E+00	576	7.592E+00
413	1.255E-01	454	3.111E+00	495	2.279E+00	536	4.607E+00	577	7.705E+00
414	1.452E-01	455	2.940E+00	496	2.361E+00	537	4.653E+00	578	7.808E+00
415	1.532E-01	456	2.761E+00	497	2.450E+00	538	4.682E+00	579	7.926E+00
416	1.723E-01	457	2.599E+00	498	2.530E+00	539	4.729E+00	580	8.041E+00
417	1.943E-01	458	2.439E+00	499	2.624E+00	540	4.765E+00	581	8.153E+00
418	2.084E-01	459	2.301E+00	500	2.706E+00	541	4.805E+00	582	8.268E+00
419	2.302E-01	460	2.197E+00	501	2.785E+00	542	4.869E+00	583	8.363E+00
420	2.467E-01	461	2.117E+00	502	2.876E+00	543	4.904E+00	584	8.483E+00

nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
585	8.574E+00	626	8.854E+00	667	4.138E+00	708	1.310E+00	749	3.741E-01
586	8.683E+00	627	8.760E+00	668	4.032E+00	709	1.273E+00	750	3.640E-01
587	8.789E+00	628	8.652E+00	669	3.930E+00	710	1.232E+00	751	3.540E-01
588	8.893E+00	629	8.553E+00	670	3.841E+00	711	1.198E+00	752	3.453E-01
589	8.975E+00	630	8.444E+00	671	3.730E+00	712	1.158E+00	753	3.354E-01
590	9.063E+00	631	8.347E+00	672	3.653E+00	713	1.125E+00	754	3.274E-01
591	9.143E+00	632	8.248E+00	673	3.557E+00	714	1.091E+00	755	3.163E-01
592	9.230E+00	633	8.111E+00	674	3.458E+00	715	1.066E+00	756	3.111E-01
593	9.303E+00	634	8.006E+00	675	3.364E+00	716	1.027E+00	757	3.033E-01
594	9.375E+00	635	7.884E+00	676	3.284E+00	717	9.965E-01	758	2.964E-01
595	9.444E+00	636	7.801E+00	677	3.200E+00	718	9.603E-01	759	2.854E-01
596	9.523E+00	637	7.667E+00	678	3.113E+00	719	9.343E-01	760	2.811E-01
597	9.561E+00	638	7.551E+00	679	3.025E+00	720	9.026E-01	761	2.756E-01
598	9.608E+00	639	7.425E+00	680	2.942E+00	721	8.869E-01	762	2.662E-01
599	9.654E+00	640	7.310E+00	681	2.869E+00	722	8.484E-01	763	2.592E-01
600	9.700E+00	641	7.193E+00	682	2.785E+00	723	8.293E-01	764	2.553E-01
601	9.750E+00	642	7.071E+00	683	2.708E+00	724	8.011E-01	765	2.443E-01
602	9.772E+00	643	6.940E+00	684	2.637E+00	725	7.804E-01	766	2.408E-01
603	9.796E+00	644	6.812E+00	685	2.566E+00	726	7.509E-01	767	2.346E-01
604	9.814E+00	645	6.689E+00	686	2.501E+00	727	7.294E-01	768	2.256E-01
605	9.832E+00	646	6.563E+00	687	2.427E+00	728	7.062E-01	769	2.227E-01
606	9.857E+00	647	6.450E+00	688	2.360E+00	729	6.872E-01	770	2.131E-01
607	9.844E+00	648	6.326E+00	689	2.296E+00	730	6.689E-01	771	2.131E-01
608	9.833E+00	649	6.196E+00	690	2.225E+00	731	6.490E-01	772	2.045E-01
609	9.829E+00	650	6.079E+00	691	2.168E+00	732	6.282E-01	773	2.007E-01
610	9.823E+00	651	5.947E+00	692	2.127E+00	733	6.043E-01	774	1.995E-01
611	9.790E+00	652	5.829E+00	693	2.090E+00	734	5.850E-01	775	1.856E-01
612	9.768E+00	653	5.712E+00	694	2.034E+00	735	5.707E-01	776	1.869E-01
613	9.745E+00	654	5.593E+00	695	1.963E+00	736	5.577E-01	777	1.853E-01
614	9.696E+00	655	5.465E+00	696	1.888E+00	737	5.396E-01	778	1.791E-01
615	9.652E+00	656	5.355E+00	697	1.819E+00	738	5.222E-01	779	1.794E-01
616	9.605E+00	657	5.246E+00	698	1.760E+00	739	5.001E-01	780	1.796E-01
617	9.546E+00	658	5.129E+00	699	1.716E+00	740	4.901E-01		
618	9.490E+00	659	4.997E+00	700	1.664E+00	741	4.776E-01		
619	9.431E+00	660	4.888E+00	701	1.611E+00	742	4.601E-01		
620	9.339E+00	661	4.785E+00	702	1.576E+00	743	4.526E-01		
621	9.289E+00	662	4.666E+00	703	1.518E+00	744	4.338E-01		
622	9.216E+00	663	4.559E+00	704	1.474E+00	745	4.192E-01		
623	9.126E+00	664	4.439E+00	705	1.430E+00	746	4.095E-01		
624	9.031E+00	665	4.356E+00	706	1.388E+00	747	3.960E-01		
625	8.947E+00	666	4.230E+00	707	1.352E+00	748	3.864E-01		

CIE 1931xy Chromaticity Diagram



7-Step Chromaticity Quadrangles



[Goniophotometer System]

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

Test orientation: **Base Up**

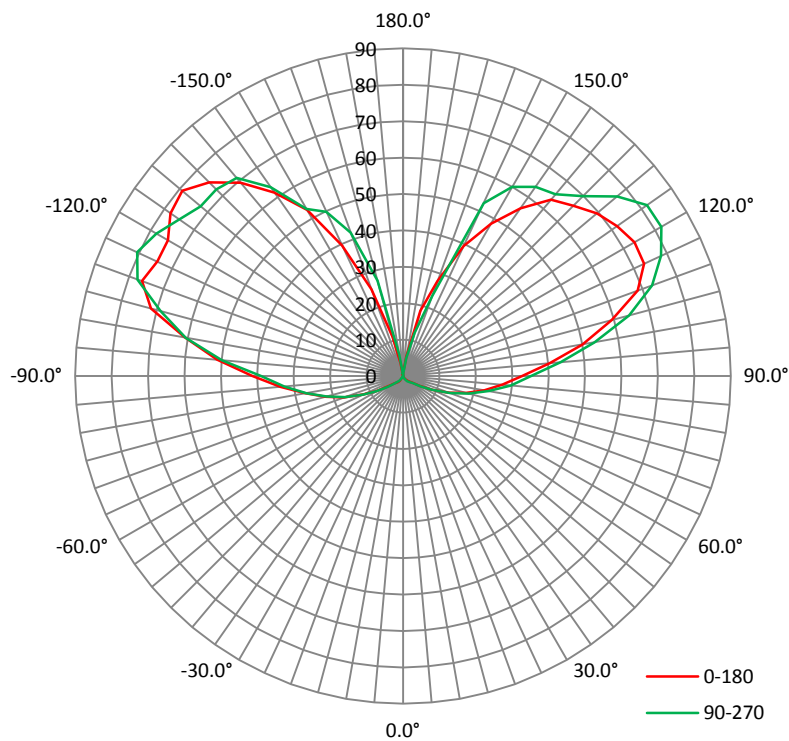
Electrical Measurement

Input Voltage(V)	Frequency(Hz)	Input Current(A)	Power (W)	Power Factor
120.1	60	0.0450	4.070	0.7534

Photometric Measurement

Luminous Flux(lm)	Efficacy(lm/W)	I _{max} (cd)	S/MH(C0/180)	S/MH(C90/270)
460.617	113.17	85.29	12.61	13.02

Luminous Intensity Distribution



	C0/180	C45/225	C90/270	C135/315	AVG.
Beam Angle(50%I _{max}):	354.5	355.1	354.8	354.0	354.6
Field Angle(10%I _{max}):	357.5	359.7	357.6	357.0	358.0

Luminous Intensity (cd) Distribution Data

C y	0°	22.5°	45°	67.5°	90°	112.5°	135°	157.5°
0.0°	0	0	0	0	0	0	0	0
5.0°	0	0	0	0	0	0	0	0
10.0°	0	0	0	0	0	0	0	0
15.0°	0	0	0	0	0	0	0	0
20.0°	0	0	0	0	0	0	0	0
25.0°	0	0	0	0	0	0	0	0
30.0°	1	1	1	1	1	1	1	0
35.0°	2	1	1	1	1	1	1	1
40.0°	2	2	2	2	2	2	1	1
45.0°	3	3	3	2	2	2	2	2
50.0°	3	3	4	4	3	3	3	2
55.0°	5	5	6	5	5	5	4	3
60.0°	8	8	8	8	8	8	7	5
65.0°	12	12	13	12	12	11	10	9
70.0°	17	18	19	17	17	16	14	13
75.0°	22	24	24	22	22	22	19	18
80.0°	27	30	29	28	27	28	24	24
85.0°	34	37	35	34	33	33	29	29
90.0°	41	45	43	39	39	39	35	34
95.0°	51	57	53	51	50	45	44	41
100.0°	61	68	62	61	61	58	54	51
105.0°	72	75	73	70	69	67	64	60
110.0°	76	80	81	78	78	74	72	68
115.0°	74	82	85	80	81	79	79	75
120.0°	75	82	85	79	78	81	81	77
125.0°	78	81	85	78	75	79	79	74
130.0°	79	76	84	78	73	75	77	73
135.0°	75	71	80	76	73	73	78	71
140.0°	69	64	73	70	71	69	75	68
145.0°	62	56	63	62	63	60	61	60
150.0°	53	48	50	50	53	52	50	52
155.0°	40	39	33	47	50	45	40	39
160.0°	25	24	22	43	42	35	29	26
165.0°	11	11	15	24	27	21	18	17
170.0°	4	4	6	8	6	4	5	6
175.0°	0	1	1	1	1	1	1	1
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°	0	0	0	0	0	0	0	0
5.0°	0	0	0	0	0	0	0	0
10.0°	0	0	0	0	0	0	0	0
15.0°	0	0	0	0	0	0	0	0
20.0°	0	0	0	0	0	0	0	0
25.0°	0	0	0	0	0	0	1	0
30.0°	0	1	1	1	1	1	1	1
35.0°	1	1	1	1	1	1	1	1
40.0°	1	1	1	2	2	2	2	2
45.0°	2	2	2	2	2	2	2	2
50.0°	2	2	3	3	3	3	3	3
55.0°	3	3	3	3	3	3	4	4
60.0°	5	5	5	5	6	6	6	7
65.0°	9	8	9	8	9	10	10	11
70.0°	13	13	14	12	14	15	15	16
75.0°	18	18	19	17	19	21	20	22
80.0°	23	24	24	23	24	27	26	28
85.0°	27	29	29	29	30	33	32	34
90.0°	33	35	35	33	35	38	38	40
95.0°	40	45	43	42	43	46	46	50
100.0°	50	56	53	53	53	57	55	60
105.0°	59	64	65	62	64	70	64	70
110.0°	69	71	75	69	73	78	70	78
115.0°	73	77	81	74	78	83	73	80
120.0°	73	78	84	75	82	85	75	81
125.0°	72	75	84	73	82	81	77	80
130.0°	70	71	81	70	77	78	75	78
135.0°	66	68	79	68	70	75	71	74
140.0°	63	66	77	65	65	66	63	65
145.0°	56	61	64	61	63	58	58	54
150.0°	48	54	52	55	60	53	44	45
155.0°	39	45	45	29	52	43	29	28
160.0°	28	34	36	26	23	29	26	17
165.0°	19	19	23	15	12	13	12	8
170.0°	6	6	5	5	5	5	3	3
175.0°	1	1	1	1	1	0	0	0
180.0°	0	0	0	0	0	0	0	0

Zonal Lumen Density Measurement

Deg	Flux (lm)	%	Deg	Flux (lm)	%
Deg	Flux (lm)	%	Deg	Flux (lm)	%
0-5	0.0	0.00	0-5	0.0	0.00
5-10	0.0	0.00	0-10	0.0	0.00
10-15	0.0	0.01	0-15	0.0	0.01
15-20	0.0	0.01	0-20	0.1	0.02
20-25	0.1	0.01	0-25	0.2	0.03
25-30	0.1	0.03	0-30	0.3	0.06
30-35	0.3	0.06	0-35	0.6	0.12
35-40	0.5	0.11	0-40	1.0	0.23
40-45	0.7	0.15	0-45	1.8	0.38
45-50	1.0	0.23	0-50	2.8	0.61
50-55	1.5	0.32	0-55	4.3	0.93
55-60	2.4	0.52	0-60	6.7	1.45
60-65	4.1	0.89	0-65	10.8	2.34
65-70	6.4	1.40	0-70	17.2	3.74
70-75	9.3	2.03	0-75	26.6	5.77
75-80	12.4	2.70	0-80	39.0	8.47
80-85	15.7	3.40	0-85	54.7	11.87
85-90	18.9	4.10	0-90	73.6	15.97
90-95	22.9	4.98	0-95	96.5	20.95
95-100	28.2	6.12	0-100	124.7	27.07
100-105	33.1	7.20	0-105	157.8	34.27
105-110	37.0	8.03	0-110	194.9	42.30
110-115	38.7	8.41	0-115	233.6	50.71
115-120	38.5	8.36	0-120	272.1	59.07
120-125	36.5	7.92	0-125	308.6	66.99
125-130	33.5	7.28	0-130	342.1	74.27
130-135	30.1	6.53	0-135	372.2	80.80
135-140	26.2	5.70	0-140	398.4	86.50
140-145	21.5	4.66	0-145	419.9	91.16
145-150	16.5	3.58	0-150	436.4	94.74
150-155	11.6	2.52	0-155	448.0	97.26
155-160	7.3	1.59	0-160	455.3	98.85
160-165	3.8	0.83	0-165	459.1	99.68
165-170	1.3	0.28	0-170	460.4	99.96
170-175	0.2	0.04	0-175	460.6	100.00

[Additional Test]

Test Item	Test Voltage (V)	Frequency (Hz)	Test Result
Power Factor:	120.0	60	0.7482
Total Harmonic Distortion:	120.0	60	86.52%

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.
6. This report is valid only with a valid digital signature. The digital signature may be available only under the Adobe software above version 7.0.

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