

# 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, China

**Test Model: 15.5PAR38/930FL40/277V/SL**

<b>Report Type:</b>	Electrical and Photometric tests including: Luminous Flux, Chromaticity, Luminous Intensity Distribution, THD
<b>Reviewed By:</b>	Hill Liu 
<b>Report Number:</b>	KS2230727-43690E-EE-1
<b>Test Date:</b>	2023-08-08 to 2023-08-09
<b>Report Date:</b>	2023-08-25
<b>Approved by:</b>	Blake Zhang / EE Engineer
<b>Prepared By:</b>	Bay Area Compliance Laboratories Corp. (Shenzhen) 5/F(B-West) -7/F, the 3rd Phase of Wan Li Industrial Building D, Shihua Road, Futian Free Trade Zone Shenzhen, Guangdong, China. Tel: +86-755-33320018 Fax: +86-755-33320008
<b>Test Facility:</b>	Test facility was located at No.12, Pulong East 1 <sup>st</sup> Road, Tangxia Town, Dongguan, Guangdong, China.

**Note:** This test report is prepared for the customer shown above and for the device described herein. It may not be duplicated or used in part without prior written consent from Bay Area Compliance Laboratories Corp.(Shenzhen). This report must not be used by the customer to claim product certification, approval, or endorsement by NVLAP, or any agency of the U.S. Government.

## 1. Product Description#

### General Information:

Two test samples were in good condition and received on 2023-07-27. One was tested in integrating sphere and the other was tested in goniophotometer

Model Tested: 15.5PAR38/930FL40/277V/SL  
Manufacturer: GREEN CREATIVE LTD  
Brand Name: GREEN CREATIVE  
Product Designation: Directional LED Lamp  
Burning Time Before Test: 0hour(For New Products)

### Rated Values:

Rated Voltage/Frequency: 120-277V 60Hz  
Rated Power: 15.5W  
Nominal CCT: 3000K  
Nominal Lumen Output: 1370lm

## 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
- \*IES TM-30-18: IES Method for Evaluating Light Source Color Rendition (This method is not in NVLAP 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	2022-11-10	2023-11-09
spectroradiometer	EVERFINE	HAAS-2000	G112048TS81331121	2022-11-10	2023-11-09
Digital Power Meter	EVERFINE	PF2010A	1011004	2022-11-10	2023-11-09
Digital CC&CV DC Power Supply	EVERFINE	WY305-V1	1101047	2022-11-10	2023-11-09
Standard Light Source	EVERFINE	D204	N/A	2023-05-12	2025-05-11
Special zero-voltage synchronous switching AC	EVERFINE	DPS1010-YF	1011001T	2022-11-10	2023-11-09
AC POWER SUPPLY	EVERFINE	VPS1030 PWM	1012017	2022-11-16	2023-11-15
Digital CC&CV DC Power Supply	EVERFINE	WY12010	1009009	2022-11-10	2023-11-09
Digital power meter	YOKOGAWA	WT-210	91j926132	2022-11-10	2023-11-09
full-field speed goniophotometer	EVERFINE	GO-R5000	YG108492N10120001	2022-11-10	2023-11-09
wireless remote thermohygrometer	N/A	AOK-5017B	N/A	2022-11-10	2023-11-09

Device	Manufacture	Model No	Serial No	Calibration date	Calibration due date
Standard Light Source	EVERFINE	D908	1012003	2023-05-12	2025-05-11

Statement of Traceability: Bay Area Compliance Laboratories Corp. (Shenzhen) 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.

$4\pi$  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. The vertical angle ( $\gamma$ ) 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 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]

The Stabilization time: **30 minutes**

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

Test orientation: **Base up**

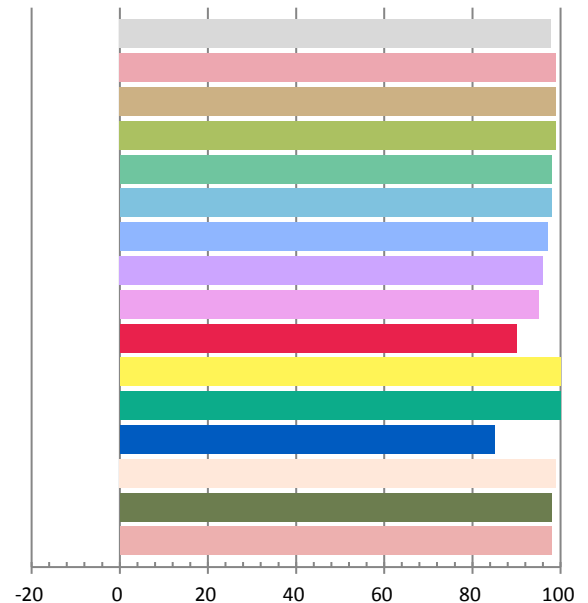
### Photometric and Electrical Measurement Result

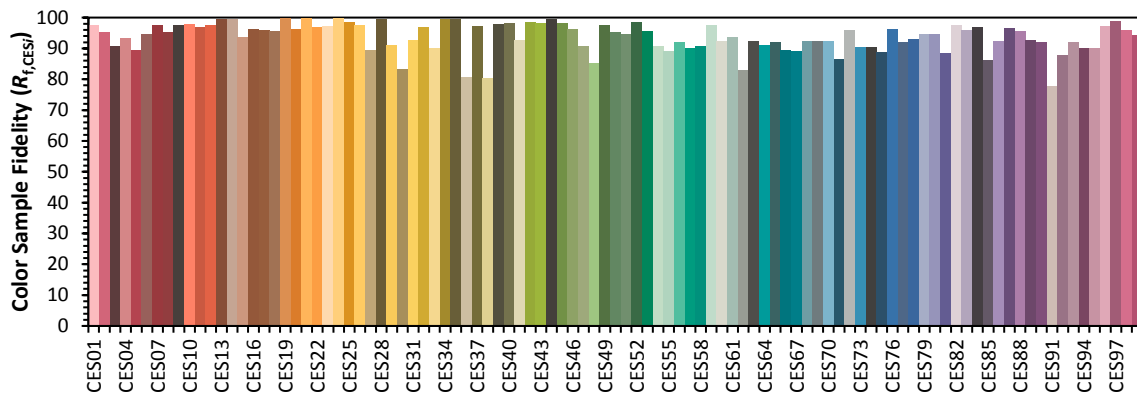
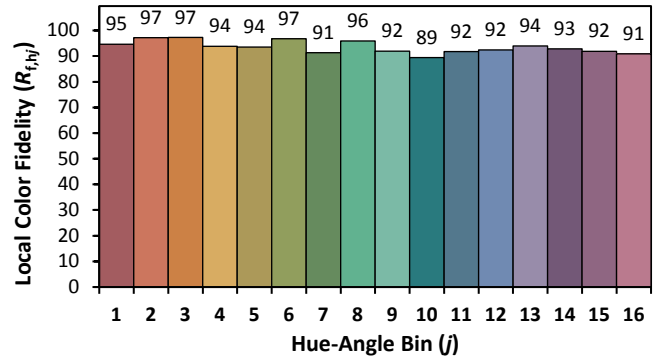
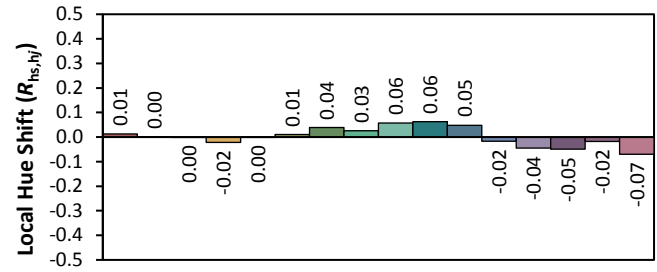
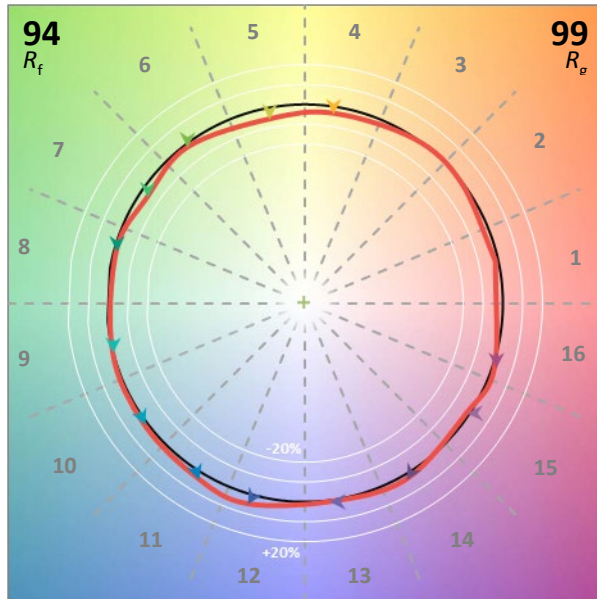
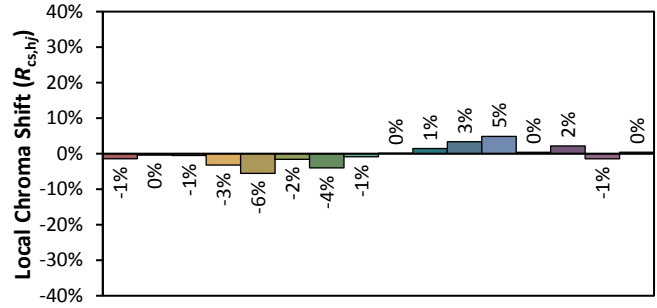
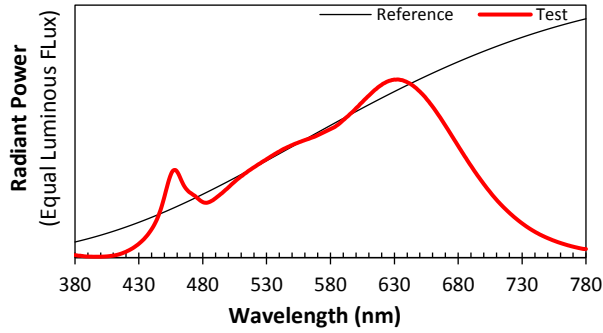
Voltage (V)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Luminous Flux(lm)	Efficacy (lm/W)
120.0	60	0.1286	15.33	0.9929	1408.3	91.89

Radiant Flux (W)	CCT (K)	Duv	x	y	u'	v'
5.2583	3073	-0.00046	0.4312	0.4009	0.2482	0.5193

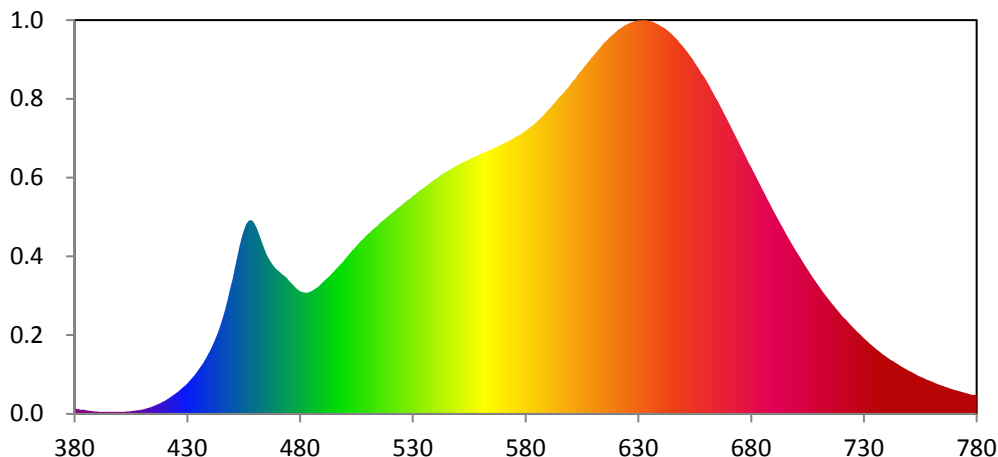
### Color Rendering Index

Ra			
97.8			
R1	R2	R3	R4
99	99	99	98
R5	R6	R7	R8
98	97	96	95
R9	R10	R11	R12
90	100	100	85
R13	R14	R15	
99	98	98	





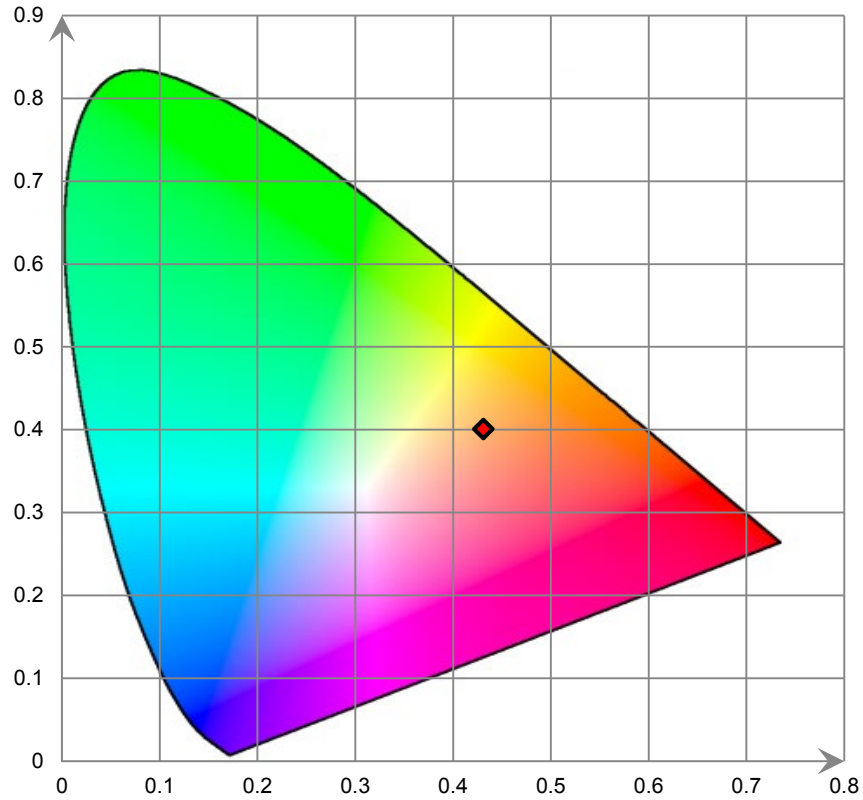
### Relative Spectral Power Distribution



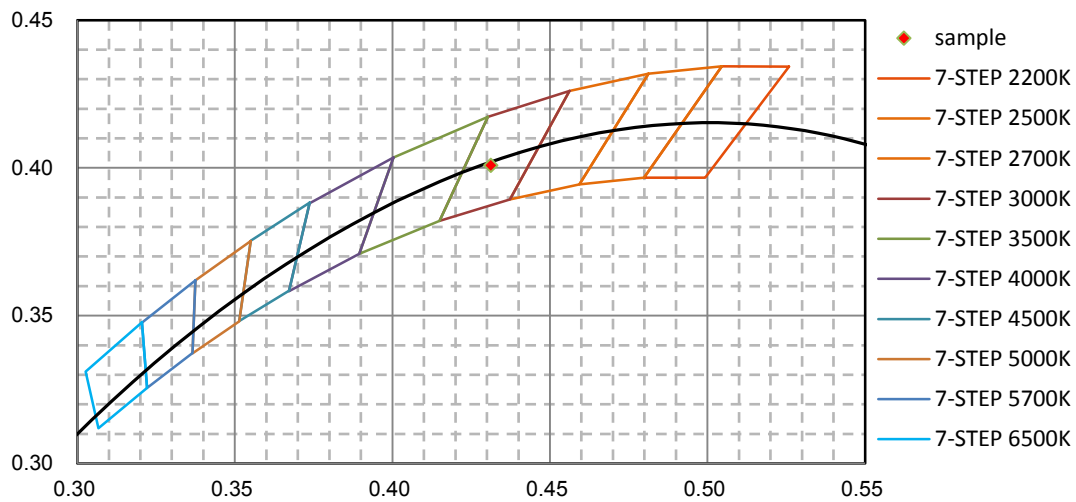
nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
380	4.158E-01	421	1.077E+00	462	1.321E+01	503	1.204E+01	544	1.781E+01
381	3.764E-01	422	1.172E+00	463	1.273E+01	504	1.222E+01	545	1.790E+01
382	3.407E-01	423	1.283E+00	464	1.228E+01	505	1.240E+01	546	1.801E+01
383	3.051E-01	424	1.399E+00	465	1.186E+01	506	1.259E+01	547	1.810E+01
384	3.152E-01	425	1.517E+00	466	1.152E+01	507	1.277E+01	548	1.819E+01
385	2.763E-01	426	1.654E+00	467	1.123E+01	508	1.293E+01	549	1.830E+01
386	2.569E-01	427	1.795E+00	468	1.100E+01	509	1.310E+01	550	1.838E+01
387	2.150E-01	428	1.950E+00	469	1.078E+01	510	1.327E+01	551	1.848E+01
388	1.973E-01	429	2.096E+00	470	1.062E+01	511	1.339E+01	552	1.857E+01
389	1.755E-01	430	2.266E+00	471	1.049E+01	512	1.358E+01	553	1.865E+01
390	1.805E-01	431	2.450E+00	472	1.033E+01	513	1.373E+01	554	1.872E+01
391	1.638E-01	432	2.631E+00	473	1.019E+01	514	1.386E+01	555	1.881E+01
392	1.570E-01	433	2.830E+00	474	1.006E+01	515	1.403E+01	556	1.889E+01
393	1.565E-01	434	3.028E+00	475	9.854E+00	516	1.419E+01	557	1.896E+01
394	1.430E-01	435	3.270E+00	476	9.683E+00	517	1.432E+01	558	1.905E+01
395	1.415E-01	436	3.502E+00	477	9.511E+00	518	1.446E+01	559	1.912E+01
396	1.449E-01	437	3.756E+00	478	9.333E+00	519	1.461E+01	560	1.920E+01
397	1.467E-01	438	4.041E+00	479	9.196E+00	520	1.474E+01	561	1.927E+01
398	1.444E-01	439	4.332E+00	480	9.077E+00	521	1.487E+01	562	1.934E+01
399	1.456E-01	440	4.646E+00	481	8.992E+00	522	1.501E+01	563	1.940E+01
400	1.477E-01	441	4.973E+00	482	8.966E+00	523	1.516E+01	564	1.949E+01
401	1.579E-01	442	5.344E+00	483	8.954E+00	524	1.529E+01	565	1.957E+01
402	1.645E-01	443	5.752E+00	484	8.998E+00	525	1.540E+01	566	1.964E+01
403	1.709E-01	444	6.181E+00	485	9.068E+00	526	1.556E+01	567	1.971E+01
404	1.869E-01	445	6.675E+00	486	9.159E+00	527	1.569E+01	568	1.979E+01
405	1.984E-01	446	7.232E+00	487	9.277E+00	528	1.582E+01	569	1.987E+01
406	2.216E-01	447	7.804E+00	488	9.386E+00	529	1.593E+01	570	1.996E+01
407	2.428E-01	448	8.470E+00	489	9.547E+00	530	1.608E+01	571	2.003E+01
408	2.752E-01	449	9.199E+00	490	9.696E+00	531	1.621E+01	572	2.010E+01
409	2.968E-01	450	9.949E+00	491	9.866E+00	532	1.634E+01	573	2.021E+01
410	3.288E-01	451	1.076E+01	492	1.003E+01	533	1.648E+01	574	2.030E+01
411	3.642E-01	452	1.153E+01	493	1.019E+01	534	1.661E+01	575	2.038E+01
412	4.059E-01	453	1.230E+01	494	1.037E+01	535	1.673E+01	576	2.050E+01
413	4.543E-01	454	1.298E+01	495	1.052E+01	536	1.687E+01	577	2.058E+01
414	5.094E-01	455	1.355E+01	496	1.071E+01	537	1.699E+01	578	2.069E+01
415	5.706E-01	456	1.400E+01	497	1.090E+01	538	1.711E+01	579	2.081E+01
416	6.394E-01	457	1.424E+01	498	1.109E+01	539	1.724E+01	580	2.093E+01
417	7.134E-01	458	1.431E+01	499	1.125E+01	540	1.733E+01	581	2.104E+01
418	7.973E-01	459	1.426E+01	500	1.145E+01	541	1.747E+01	582	2.118E+01
419	8.833E-01	460	1.401E+01	501	1.164E+01	542	1.759E+01	583	2.130E+01
420	9.636E-01	461	1.366E+01	502	1.185E+01	543	1.771E+01	584	2.144E+01

nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
585	2.159E+01	626	2.888E+01	667	2.252E+01	708	9.919E+00	749	3.276E+00
586	2.173E+01	627	2.892E+01	668	2.220E+01	709	9.678E+00	750	3.184E+00
587	2.190E+01	628	2.900E+01	669	2.187E+01	710	9.439E+00	751	3.099E+00
588	2.208E+01	629	2.903E+01	670	2.155E+01	711	9.200E+00	752	3.011E+00
589	2.227E+01	630	2.908E+01	671	2.122E+01	712	8.983E+00	753	2.926E+00
590	2.246E+01	631	2.906E+01	672	2.090E+01	713	8.757E+00	754	2.837E+00
591	2.262E+01	632	2.909E+01	673	2.056E+01	714	8.545E+00	755	2.764E+00
592	2.283E+01	633	2.909E+01	674	2.023E+01	715	8.328E+00	756	2.682E+00
593	2.300E+01	634	2.906E+01	675	1.989E+01	716	8.121E+00	757	2.607E+00
594	2.317E+01	635	2.901E+01	676	1.956E+01	717	7.922E+00	758	2.528E+00
595	2.339E+01	636	2.899E+01	677	1.922E+01	718	7.719E+00	759	2.460E+00
596	2.357E+01	637	2.892E+01	678	1.890E+01	719	7.521E+00	760	2.391E+00
597	2.375E+01	638	2.883E+01	679	1.856E+01	720	7.328E+00	761	2.322E+00
598	2.395E+01	639	2.876E+01	680	1.823E+01	721	7.134E+00	762	2.257E+00
599	2.416E+01	640	2.865E+01	681	1.789E+01	722	6.956E+00	763	2.193E+00
600	2.439E+01	641	2.855E+01	682	1.757E+01	723	6.766E+00	764	2.128E+00
601	2.459E+01	642	2.845E+01	683	1.723E+01	724	6.586E+00	765	2.066E+00
602	2.477E+01	643	2.832E+01	684	1.691E+01	725	6.417E+00	766	2.002E+00
603	2.503E+01	644	2.817E+01	685	1.657E+01	726	6.244E+00	767	1.953E+00
604	2.523E+01	645	2.802E+01	686	1.627E+01	727	6.074E+00	768	1.889E+00
605	2.542E+01	646	2.785E+01	687	1.593E+01	728	5.911E+00	769	1.836E+00
606	2.565E+01	647	2.769E+01	688	1.561E+01	729	5.749E+00	770	1.785E+00
607	2.586E+01	648	2.749E+01	689	1.529E+01	730	5.594E+00	771	1.731E+00
608	2.605E+01	649	2.729E+01	690	1.499E+01	731	5.441E+00	772	1.683E+00
609	2.627E+01	650	2.711E+01	691	1.468E+01	732	5.293E+00	773	1.636E+00
610	2.645E+01	651	2.689E+01	692	1.436E+01	733	5.141E+00	774	1.585E+00
611	2.665E+01	652	2.669E+01	693	1.405E+01	734	5.000E+00	775	1.542E+00
612	2.685E+01	653	2.646E+01	694	1.376E+01	735	4.862E+00	776	1.497E+00
613	2.705E+01	654	2.624E+01	695	1.345E+01	736	4.724E+00	777	1.455E+00
614	2.725E+01	655	2.597E+01	696	1.317E+01	737	4.595E+00	778	1.417E+00
615	2.743E+01	656	2.571E+01	697	1.288E+01	738	4.465E+00	779	1.405E+00
616	2.758E+01	657	2.547E+01	698	1.259E+01	739	4.343E+00	780	1.408E+00
617	2.778E+01	658	2.518E+01	699	1.231E+01	740	4.219E+00		
618	2.793E+01	659	2.492E+01	700	1.202E+01	741	4.099E+00		
619	2.808E+01	660	2.464E+01	701	1.175E+01	742	3.992E+00		
620	2.821E+01	661	2.436E+01	702	1.147E+01	743	3.877E+00		
621	2.838E+01	662	2.406E+01	703	1.120E+01	744	3.761E+00		
622	2.848E+01	663	2.376E+01	704	1.095E+01	745	3.668E+00		
623	2.859E+01	664	2.345E+01	705	1.069E+01	746	3.561E+00		
624	2.871E+01	665	2.315E+01	706	1.042E+01	747	3.468E+00		
625	2.879E+01	666	2.285E+01	707	1.016E+01	748	3.367E+00		

CIE 1931 x y Chromaticity Diagram



7-Step Chromaticity Quadrangles





The Stabilization time: **30 minutes**

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

Test orientation: **Base up**

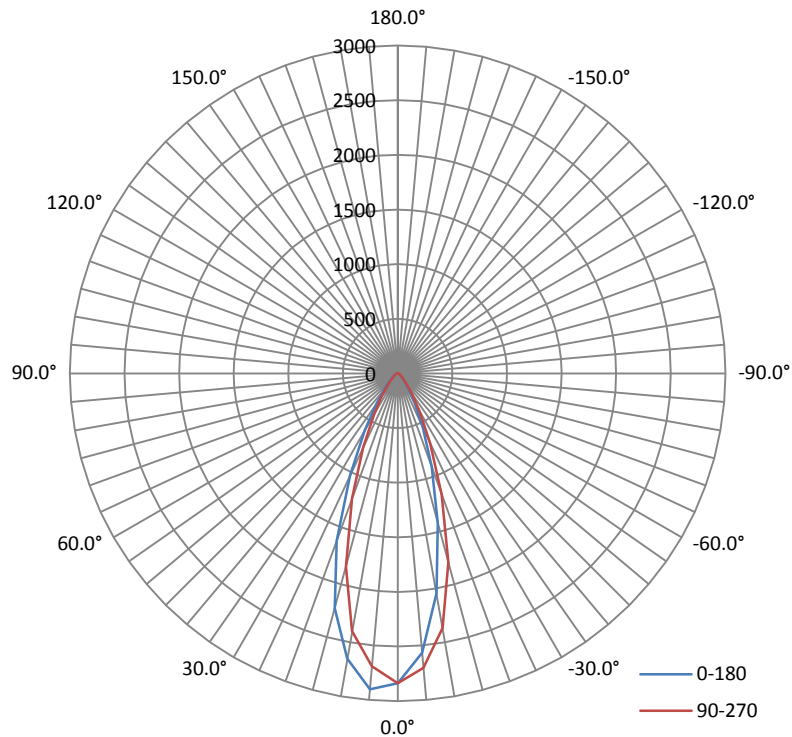
### Electrical Measurement

Input Voltage (V)	Frequency (Hz)	Input Current (A)	Power (W)	Power Factor
120.10	60	0.1285	15.320	0.9927

### Photometric Measurement

Luminous Flux (lm)	Efficacy (lm/W)	I <sub>max</sub> (cd)	S/MH (C0/180)	S/MH (C90/270)
1408.01	91.91	2929.0	0.49	0.59

### Luminous Intensity Distribution



	C0/180	C45/225	C90/270	C135/315	AVG.
Beam Angle (50% I <sub>max</sub> ):	36.1	36.3	36.2	35.7	36.1
Field Angle (10% I <sub>max</sub> ):	66.7	67.1	66.9	66.2	66.7

**Luminous Intensity (cd) Distribution Data**

C y	0°	22.5°	45°	67.5°	90°	112.5°	135°	157.5°
0.0°	2837	2837	2837	2837	2837	2837	2837	2837
5.0°	2903	2888	2838	2744	2692	2646	2607	2570
10.0°	2652	2650	2596	2509	2395	2257	2136	2050
15.0°	2227	2221	2152	2007	1831	1645	1511	1420
20.0°	1632	1630	1534	1390	1217	1067	970	903
25.0°	1027	1034	958	858	745	653	587	541
30.0°	601	607	563	497	433	378	332	304
35.0°	333	340	320	287	251	217	191	176
40.0°	188	194	186	165	145	124	109	101
45.0°	112	114	109	98	87	77	69	64
50.0°	70	71	70	63	57	51	47	45
55.0°	48	49	48	44	41	38	35	34
60.0°	36	37	36	34	31	29	27	26
65.0°	28	28	28	26	24	22	21	20
70.0°	21	22	21	20	18	16	15	14
75.0°	15	16	15	14	12	11	10	9
80.0°	10	10	9	8	7	6	5	4
85.0°	5	5	5	4	3	2	2	1
90.0°	2	2	1	1	1	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	1	1	1	1	1
140.0°	1	1	1	1	1	1	1	1
145.0°	2	2	2	2	2	2	2	2
150.0°	2	2	2	2	2	3	3	3
155.0°	3	3	3	3	3	3	3	3
160.0°	3	3	3	3	3	4	4	4
165.0°	4	4	4	3	3	3	3	3
170.0°	3	3	3	3	3	3	3	3
175.0°	3	3	3	3	3	3	2	2
180.0°	2	2	2	2	2	2	2	2

**Luminous Intensity (cd) Distribution Data (cont.)**

C Y	180°	202.5°	225°	247.5°	270°	292.5°	315°	337.5°
0.0°	2837	2837	2837	2837	2837	2837	2837	2837
5.0°	2566	2571	2601	2649	2705	2770	2859	2920
10.0°	2045	2062	2141	2246	2364	2485	2580	2663
15.0°	1420	1429	1510	1627	1789	1962	2117	2230
20.0°	909	910	971	1056	1180	1341	1483	1631
25.0°	542	538	574	629	706	814	925	1050
30.0°	309	309	329	360	401	458	531	607
35.0°	177	180	191	206	225	250	291	332
40.0°	104	106	111	119	129	143	162	183
45.0°	65	65	68	72	78	84	94	106
50.0°	45	46	47	49	52	56	61	68
55.0°	33	34	35	37	39	41	44	48
60.0°	26	26	27	28	30	32	34	37
65.0°	20	20	21	22	23	24	26	28
70.0°	14	14	15	16	17	19	20	21
75.0°	9	9	9	10	12	13	14	16
80.0°	4	4	5	6	7	8	9	10
85.0°	1	1	1	2	3	4	5	6
90.0°	0	0	0	0	0	1	1	2
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°	1	1	1	1	1	1	0	0
150.0°	1	1	1	1	1	1	1	1
155.0°	1	1	1	1	1	1	1	1
160.0°	1	1	1	1	1	1	1	1
165.0°	1	1	1	1	1	1	1	1
170.0°	1	1	1	1	1	1	1	1
175.0°	2	2	2	2	1	1	1	1
180.0°	2	2	2	2	2	2	2	2

### Zonal Lumen Density Measurement

Deg	Flux (lm)	%
0-5	66.4	4.71
5-10	181.9	12.92
10-15	247.3	17.57
15-20	249.3	17.70
20-25	205.8	14.61
25-30	147.5	10.48
30-35	98.0	6.96
35-40	63.0	4.47
40-45	40.8	2.90
45-50	27.9	1.98
50-55	20.6	1.47
55-60	16.4	1.16
60-65	13.2	0.94
65-70	10.4	0.74
70-75	7.7	0.55
75-80	5.1	0.36
80-85	2.7	0.19
85-90	1.0	0.07
90-95	0.1	0.01
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	0.01
125-130	0.1	0.00
130-135	0.1	0.01
135-140	0.2	0.01
140-145	0.3	0.03
145-150	0.4	0.02
150-155	0.5	0.04
155-160	0.5	0.03
160-165	0.4	0.03
165-170	0.3	0.02
170-175	0.2	0.01
175-180	0.1	0.00

Deg	Flux (lm)	%
0-5	66.4	4.71
0-10	248.3	17.63
0-15	495.6	35.20
0-20	744.9	52.90
0-25	950.6	67.51
0-30	1098.1	77.99
0-35	1196.1	84.95
0-40	1259.1	89.42
0-45	1299.9	92.32
0-50	1327.7	94.30
0-55	1348.4	95.77
0-60	1364.8	96.93
0-65	1378.0	97.87
0-70	1388.4	98.61
0-75	1396.2	99.16
0-80	1401.2	99.52
0-85	1404.0	99.71
0-90	1404.9	99.78
0-95	1405.1	99.79
0-100	1405.1	99.79
0-105	1405.1	99.79
0-110	1405.1	99.79
0-115	1405.1	99.79
0-120	1405.1	99.79
0-125	1405.2	99.80
0-130	1405.2	99.80
0-135	1405.3	99.81
0-140	1405.5	99.82
0-145	1405.8	99.85
0-150	1406.3	99.87
0-155	1406.7	99.91
0-160	1407.2	99.94
0-165	1407.5	99.97
0-170	1407.8	99.99
0-175	1408.0	100.00
0-180	1408.0	100.00

**[Additional Test]**

Test Item	Test Voltage (V)	Frequency (Hz)	Test Result
Total Harmonic Distortion:	120.0	60	12.04%

**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. This report includes some test methods are not in NVLAP accreditation scope marked \*.
3. Unless otherwise stated the results shown in this test report refer only to the sample(s) tested.
4. Otherwise required by the applicant or Product Regulations, Decision Rule in this report did not consider the uncertainty.
5. The extended uncertainty given in this report is obtained by combining the standard uncertainty times the coverage factor  $K=2$  with the 95% confidence interval.
6. This report cannot be reproduced except in full, without prior written approval of the Company.
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\*\*\*\*\*END OF REPORT\*\*\*\*\*