



# ANSI/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, Kowloon, Hong Kong, China

**Test Model: 15.5PAR38DIM/935FL40/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>	KS2230727-43680E-EE
<b>Test Date:</b>	2023-07-26 to 2023-07-27
<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: 15.5PAR38DIM/935FL40/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: 120V AC 60Hz

Rated Power: 15.5W

Nominal CCT: 3500K

Nominal Lumen Output: 1370lm

## 2. Standards Used

- ANSI/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
- \*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
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 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% and 65%. The air flow around the SSL product is less than 0.2m/s.

### 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  $U=22K$  ( $K=2$ ), 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 ( $y$ ) 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 ANSI/IES LM-79-2019. Additional test including power factor, off-state power and THD, was measured by Digital Power Meter after stabilized at  $25^{\circ}\text{C} \pm 1.2^{\circ}\text{C}$ . 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  $R_f$ ,  $R_g$  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**

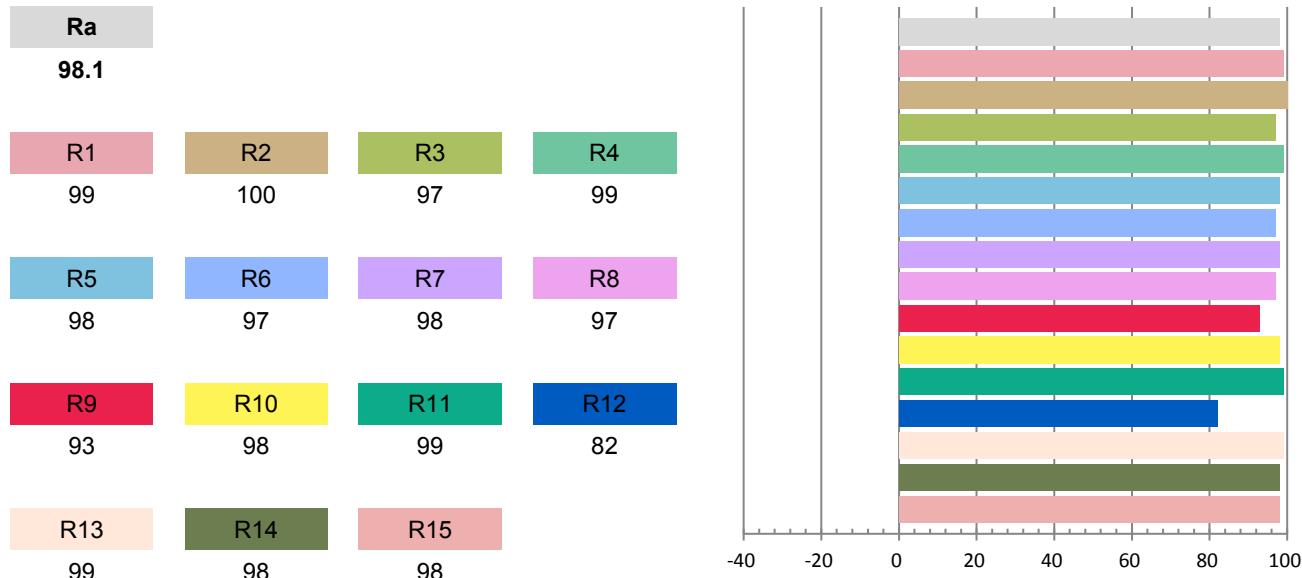
Test orientation: **Base Up**

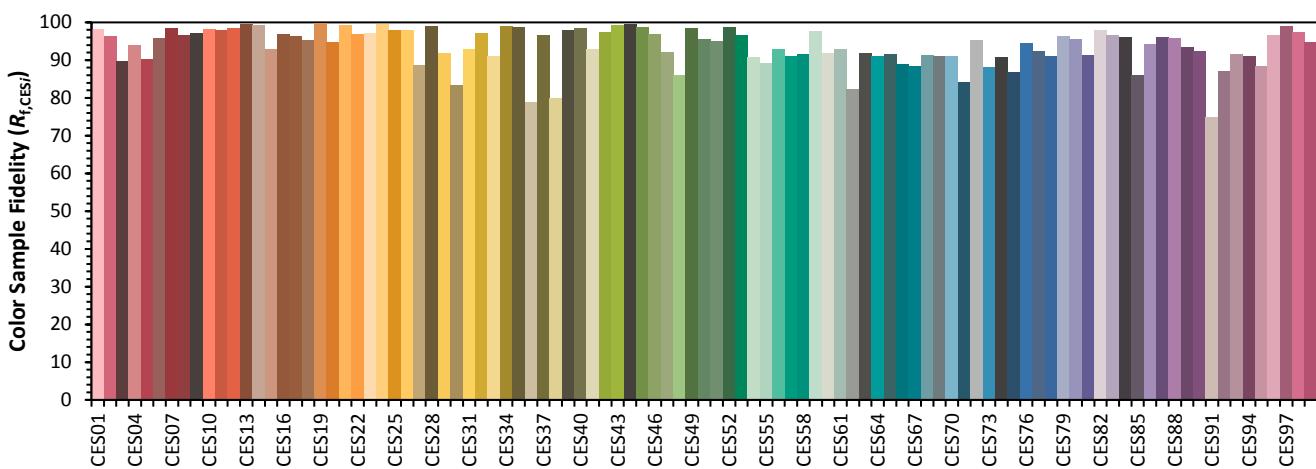
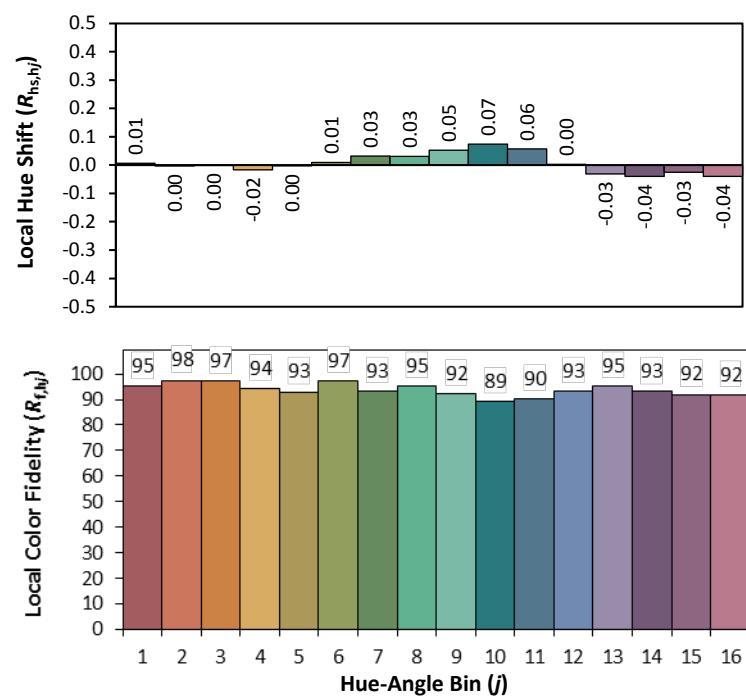
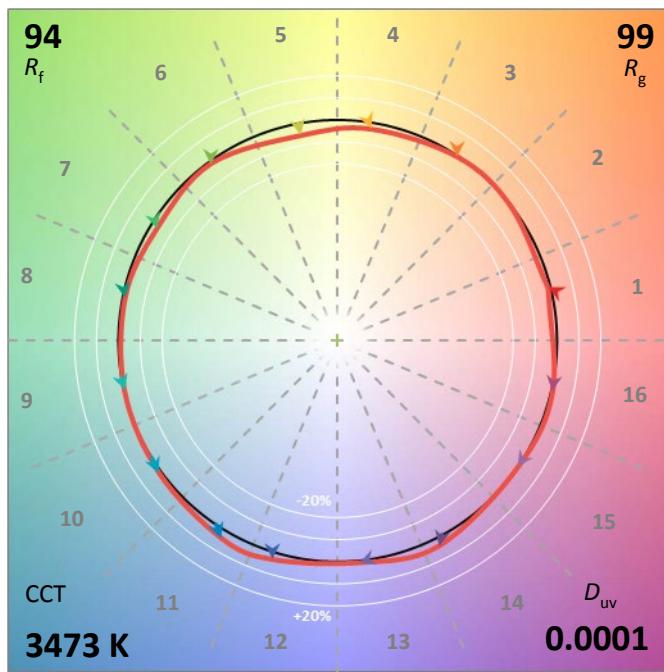
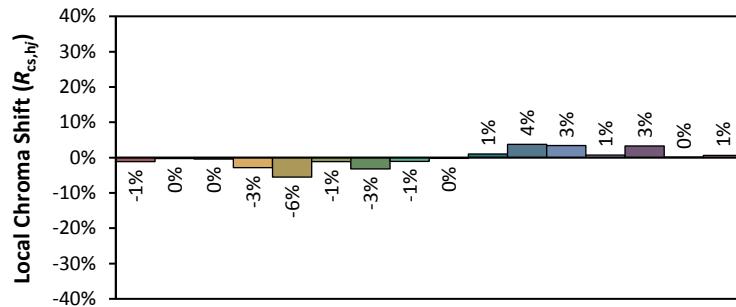
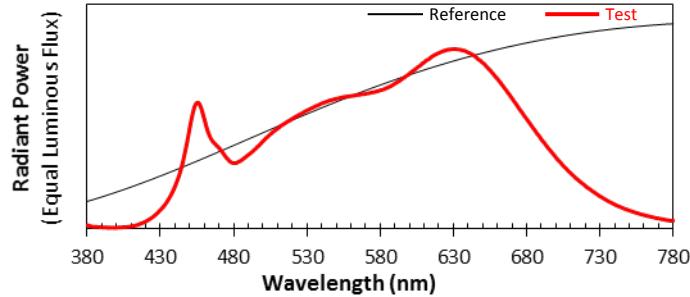
#### Photometric and Electrical Measurement Result

Voltage (V)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Luminous Flux(lm)	Efficacy (lm/W)
120.0	60	0.1308	15.12	0.9632	1403.9	92.87

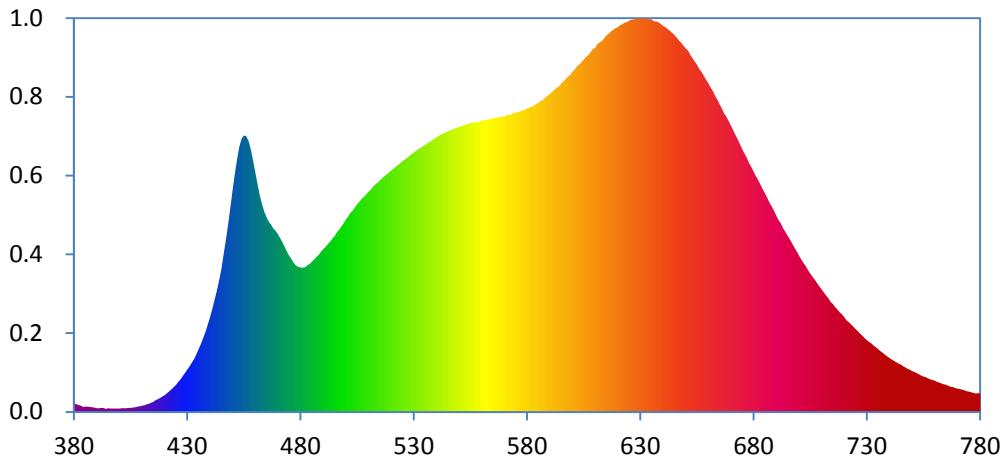
Radiant Flux (W)	CCT (K)	Duv	x	y	u'	v'
5.136	3473	0.0000787	0.4069	0.3917	0.2364	0.5119

#### Color Rendering Index





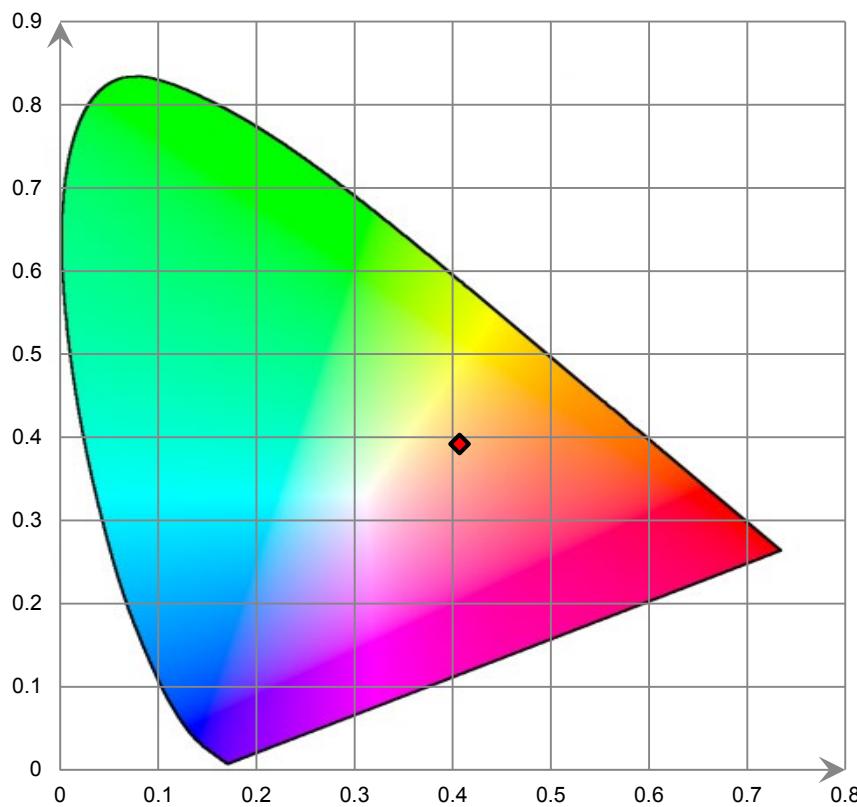
### Relative Spectral Power Distribution



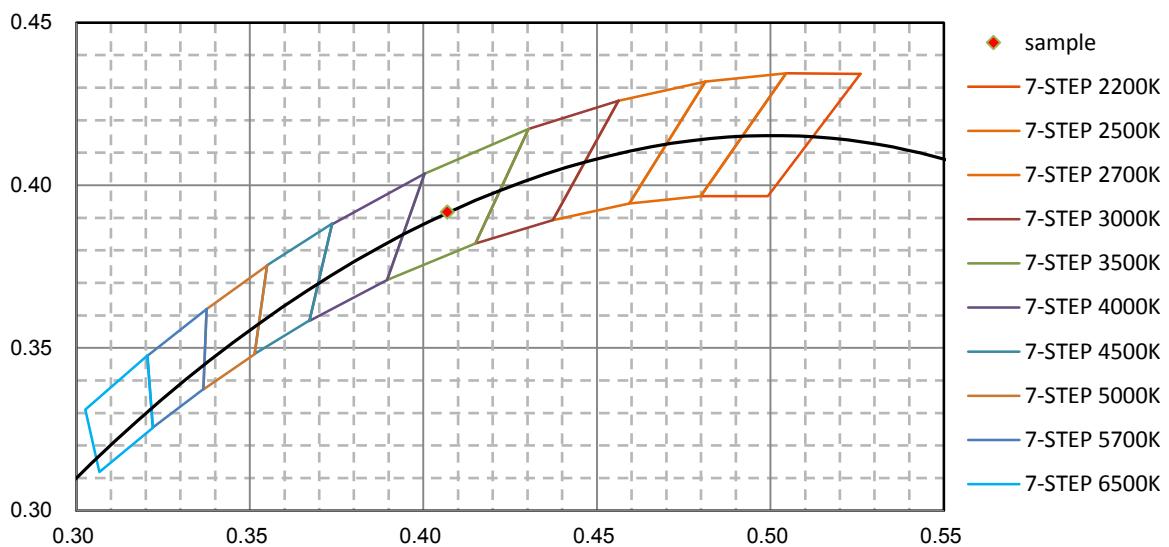
nm	mW								
380	5.763E-01	421	1.252E+00	462	1.447E+01	503	1.345E+01	544	1.867E+01
381	5.288E-01	422	1.379E+00	463	1.388E+01	504	1.367E+01	545	1.876E+01
382	4.596E-01	423	1.511E+00	464	1.338E+01	505	1.386E+01	546	1.881E+01
383	4.087E-01	424	1.651E+00	465	1.301E+01	506	1.404E+01	547	1.887E+01
384	3.421E-01	425	1.803E+00	466	1.272E+01	507	1.424E+01	548	1.894E+01
385	3.482E-01	426	1.990E+00	467	1.251E+01	508	1.438E+01	549	1.899E+01
386	3.613E-01	427	2.174E+00	468	1.227E+01	509	1.455E+01	550	1.906E+01
387	3.294E-01	428	2.379E+00	469	1.210E+01	510	1.472E+01	551	1.909E+01
388	3.176E-01	429	2.590E+00	470	1.185E+01	511	1.485E+01	552	1.914E+01
389	2.946E-01	430	2.806E+00	471	1.160E+01	512	1.506E+01	553	1.921E+01
390	2.496E-01	431	3.029E+00	472	1.133E+01	513	1.519E+01	554	1.926E+01
391	2.536E-01	432	3.311E+00	473	1.103E+01	514	1.531E+01	555	1.929E+01
392	2.603E-01	433	3.546E+00	474	1.070E+01	515	1.547E+01	556	1.933E+01
393	2.709E-01	434	3.867E+00	475	1.043E+01	516	1.560E+01	557	1.934E+01
394	1.975E-01	435	4.192E+00	476	1.021E+01	517	1.576E+01	558	1.939E+01
395	2.511E-01	436	4.544E+00	477	9.956E+00	518	1.584E+01	559	1.940E+01
396	2.159E-01	437	4.921E+00	478	9.788E+00	519	1.600E+01	560	1.945E+01
397	2.340E-01	438	5.341E+00	479	9.693E+00	520	1.614E+01	561	1.948E+01
398	2.158E-01	439	5.796E+00	480	9.651E+00	521	1.625E+01	562	1.950E+01
399	2.236E-01	440	6.288E+00	481	9.624E+00	522	1.639E+01	563	1.955E+01
400	2.174E-01	441	6.826E+00	482	9.684E+00	523	1.651E+01	564	1.959E+01
401	2.367E-01	442	7.432E+00	483	9.813E+00	524	1.663E+01	565	1.964E+01
402	2.446E-01	443	8.021E+00	484	9.885E+00	525	1.675E+01	566	1.963E+01
403	2.431E-01	444	8.796E+00	485	1.003E+01	526	1.685E+01	567	1.968E+01
404	2.719E-01	445	9.555E+00	486	1.019E+01	527	1.697E+01	568	1.971E+01
405	2.762E-01	446	1.052E+01	487	1.036E+01	528	1.710E+01	569	1.972E+01
406	2.942E-01	447	1.149E+01	488	1.049E+01	529	1.723E+01	570	1.974E+01
407	3.204E-01	448	1.252E+01	489	1.069E+01	530	1.733E+01	571	1.984E+01
408	3.516E-01	449	1.366E+01	490	1.087E+01	531	1.743E+01	572	1.983E+01
409	3.759E-01	450	1.483E+01	491	1.101E+01	532	1.756E+01	573	1.990E+01
410	4.148E-01	451	1.591E+01	492	1.120E+01	533	1.764E+01	574	1.996E+01
411	4.462E-01	452	1.687E+01	493	1.137E+01	534	1.776E+01	575	2.000E+01
412	5.072E-01	453	1.772E+01	494	1.158E+01	535	1.785E+01	576	2.002E+01
413	5.483E-01	454	1.824E+01	495	1.175E+01	536	1.798E+01	577	2.008E+01
414	6.058E-01	455	1.845E+01	496	1.200E+01	537	1.804E+01	578	2.015E+01
415	6.810E-01	456	1.844E+01	497	1.217E+01	538	1.814E+01	579	2.018E+01
416	7.718E-01	457	1.810E+01	498	1.240E+01	539	1.826E+01	580	2.029E+01
417	8.422E-01	458	1.755E+01	499	1.261E+01	540	1.836E+01	581	2.032E+01
418	9.287E-01	459	1.679E+01	500	1.285E+01	541	1.844E+01	582	2.041E+01
419	1.038E+00	460	1.600E+01	501	1.306E+01	542	1.852E+01	583	2.045E+01
420	1.124E+00	461	1.521E+01	502	1.330E+01	543	1.859E+01	584	2.061E+01

nm	mW								
585	2.064E+01	626	2.620E+01	667	1.995E+01	708	8.585E+00	749	2.813E+00
586	2.079E+01	627	2.621E+01	668	1.972E+01	709	8.380E+00	750	2.730E+00
587	2.084E+01	628	2.626E+01	669	1.941E+01	710	8.188E+00	751	2.657E+00
588	2.100E+01	629	2.628E+01	670	1.910E+01	711	7.964E+00	752	2.588E+00
589	2.111E+01	630	2.629E+01	671	1.879E+01	712	7.778E+00	753	2.515E+00
590	2.125E+01	631	2.631E+01	672	1.849E+01	713	7.578E+00	754	2.435E+00
591	2.138E+01	632	2.628E+01	673	1.819E+01	714	7.353E+00	755	2.370E+00
592	2.152E+01	633	2.625E+01	674	1.787E+01	715	7.208E+00	756	2.316E+00
593	2.164E+01	634	2.624E+01	675	1.755E+01	716	7.006E+00	757	2.233E+00
594	2.175E+01	635	2.621E+01	676	1.725E+01	717	6.850E+00	758	2.173E+00
595	2.196E+01	636	2.610E+01	677	1.697E+01	718	6.656E+00	759	2.117E+00
596	2.210E+01	637	2.608E+01	678	1.663E+01	719	6.520E+00	760	2.077E+00
597	2.224E+01	638	2.602E+01	679	1.637E+01	720	6.324E+00	761	2.007E+00
598	2.240E+01	639	2.592E+01	680	1.607E+01	721	6.115E+00	762	1.955E+00
599	2.253E+01	640	2.579E+01	681	1.577E+01	722	5.994E+00	763	1.897E+00
600	2.271E+01	641	2.571E+01	682	1.547E+01	723	5.842E+00	764	1.859E+00
601	2.289E+01	642	2.559E+01	683	1.518E+01	724	5.697E+00	765	1.796E+00
602	2.308E+01	643	2.548E+01	684	1.486E+01	725	5.517E+00	766	1.753E+00
603	2.320E+01	644	2.533E+01	685	1.460E+01	726	5.406E+00	767	1.683E+00
604	2.336E+01	645	2.518E+01	686	1.429E+01	727	5.229E+00	768	1.647E+00
605	2.354E+01	646	2.501E+01	687	1.397E+01	728	5.101E+00	769	1.598E+00
606	2.372E+01	647	2.480E+01	688	1.372E+01	729	4.939E+00	770	1.560E+00
607	2.385E+01	648	2.467E+01	689	1.344E+01	730	4.805E+00	771	1.521E+00
608	2.404E+01	649	2.447E+01	690	1.311E+01	731	4.677E+00	772	1.476E+00
609	2.425E+01	650	2.428E+01	691	1.283E+01	732	4.554E+00	773	1.440E+00
610	2.433E+01	651	2.414E+01	692	1.260E+01	733	4.413E+00	774	1.383E+00
611	2.457E+01	652	2.387E+01	693	1.229E+01	734	4.304E+00	775	1.353E+00
612	2.470E+01	653	2.365E+01	694	1.201E+01	735	4.173E+00	776	1.316E+00
613	2.480E+01	654	2.341E+01	695	1.176E+01	736	4.044E+00	777	1.279E+00
614	2.497E+01	655	2.322E+01	696	1.151E+01	737	3.941E+00	778	1.240E+00
615	2.516E+01	656	2.294E+01	697	1.123E+01	738	3.824E+00	779	1.242E+00
616	2.527E+01	657	2.270E+01	698	1.099E+01	739	3.714E+00	780	1.245E+00
617	2.541E+01	658	2.244E+01	699	1.073E+01	740	3.613E+00		
618	2.552E+01	659	2.218E+01	700	1.044E+01	741	3.495E+00		
619	2.564E+01	660	2.196E+01	701	1.019E+01	742	3.417E+00		
620	2.571E+01	661	2.166E+01	702	9.962E+00	743	3.318E+00		
621	2.584E+01	662	2.144E+01	703	9.745E+00	744	3.229E+00		
622	2.591E+01	663	2.110E+01	704	9.487E+00	745	3.151E+00		
623	2.601E+01	664	2.085E+01	705	9.244E+00	746	3.048E+00		
624	2.606E+01	665	2.055E+01	706	9.036E+00	747	2.964E+00		
625	2.614E+01	666	2.029E+01	707	8.820E+00	748	2.887E+00		

### CIE 1931 x y Chromaticity Diagram



### 7-Step Chromaticity Quadrangles



## [Goniophotometer System]

The Stabilization time: **30 minutes**

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

Test orientation: **Base up**

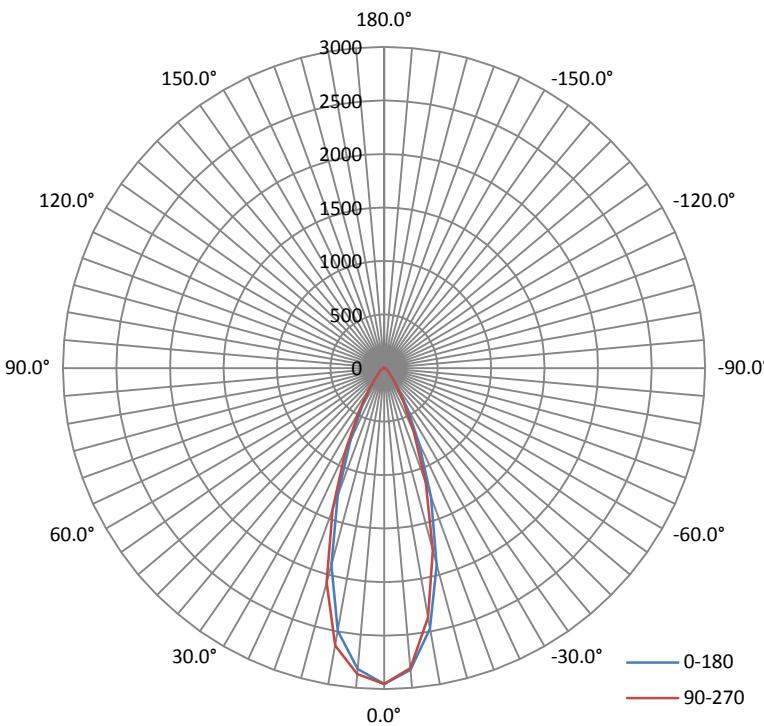
### Electrical Measurement

Input Voltage (V)	Frequency (Hz)	Input Current (A)	Power (W)	Power Factor
120.01	60	0.1317	15.150	0.9585

### Photometric Measurement

Luminous Flux (lm)	Efficacy (lm/W)	$I_{max}$ (cd)	S/MH (C0/180)	S/MH (C90/270)
1408.46	92.97	2985	0.6	0.57

### Luminous Intensity Distribution



	C0/180	C45/225	C90/270	C135/315	AVG.
Beam Angle (50% $I_{max}$ ):	36.5	36.4	36.3	36.3	36.4
Field Angle (10% $I_{max}$ ):	65.5	65.0	65.2	64.8	65.1

Luminous Intensity (cd) Distribution Data

C γ \ C	0°	22.5°	45°	67.5°	90°	112.5°	135°	157.5°
0.0°	2952	2952	2952	2952	2952	2952	2952	2952
5.0°	2824	2838	2841	2864	2870	2858	2848	2836
10.0°	2492	2543	2586	2634	2634	2621	2568	2506
15.0°	1903	1979	2035	2071	2072	2065	2011	1939
20.0°	1260	1314	1364	1402	1400	1400	1346	1282
25.0°	739	784	812	835	843	830	798	761
30.0°	412	438	440	461	468	453	436	423
35.0°	222	233	237	244	245	242	230	224
40.0°	121	128	134	135	133	132	129	124
45.0°	73	78	80	81	80	80	79	75
50.0°	51	53	54	55	55	54	54	52
55.0°	38	39	40	41	41	41	40	39
60.0°	29	30	30	31	31	31	30	30
65.0°	22	22	23	23	23	23	23	23
70.0°	15	16	16	17	17	17	17	16
75.0°	9	10	11	11	11	11	11	10
80.0°	5	5	6	6	6	6	6	5
85.0°	1	2	2	2	2	2	2	2
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°	1	1	1	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°	3	3	3	3	3	3	3	3
155.0°	3	3	3	3	3	3	3	3
160.0°	4	4	4	4	4	4	4	4
165.0°	4	4	4	4	4	4	4	4
170.0°	3	3	3	3	3	3	3	3
175.0°	3	3	3	3	3	3	3	3
180.0°	2	2	2	2	2	2	2	2

Luminous Intensity (cd) Distribution Data (cont.)

$\gamma \backslash C$	180°	202.5°	225°	247.5°	270°	292.5°	315°	337.5°
0.0°	2952	2952	2952	2952	2952	2952	2952	2952
5.0°	2831	2825	2818	2821	2812	2808	2826	2837
10.0°	2473	2420	2373	2364	2367	2387	2424	2490
15.0°	1903	1843	1789	1764	1764	1784	1818	1883
20.0°	1279	1214	1174	1156	1142	1162	1189	1233
25.0°	768	725	695	679	665	674	689	729
30.0°	426	401	380	375	370	373	382	398
35.0°	227	212	202	200	199	202	207	215
40.0°	125	119	117	113	112	114	117	121
45.0°	74	73	71	69	68	69	71	73
50.0°	52	51	50	49	48	48	49	51
55.0°	39	38	37	36	36	37	37	38
60.0°	30	29	28	27	27	28	28	29
65.0°	23	22	21	21	21	21	21	22
70.0°	16	15	15	14	14	14	15	15
75.0°	10	10	9	9	9	9	9	10
80.0°	5	5	4	4	4	4	4	5
85.0°	2	1	1	1	1	1	1	1
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°	1	1	1	1	1	1	1	1
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	2	2	2	2
180.0°	2	2	2	2	2	2	2	2

**Zonal Lumen Density Measurement**

Deg	Flux (lm)	%	Deg	Flux (lm)	%
0-5	69.3	4.92	0-5	69.3	4.92
5-10	190.9	13.55	0-10	260.1	18.47
10-15	261.1	18.54	0-15	521.2	37.01
15-20	259.1	18.39	0-20	780.3	55.40
20-25	207.2	14.71	0-25	987.5	70.11
25-30	142.7	10.13	0-30	1130.2	80.24
30-35	89.9	6.39	0-35	1220.1	86.63
35-40	55.4	3.93	0-40	1275.5	90.56
40-45	35.4	2.52	0-45	1311.0	93.08
45-50	24.9	1.77	0-50	1335.9	94.85
50-55	19.4	1.37	0-55	1355.3	96.22
55-60	15.5	1.11	0-60	1370.8	97.33
60-65	12.4	0.88	0-65	1383.2	98.21
65-70	9.5	0.67	0-70	1392.7	98.88
70-75	6.6	0.48	0-75	1399.4	99.36
75-80	4.0	0.28	0-80	1403.3	99.64
80-85	1.7	0.12	0-85	1405.1	99.76
85-90	0.3	0.02	0-90	1405.4	99.78
90-95	0.0	0.00	0-95	1405.4	99.78
95-100	0.0	0.00	0-100	1405.4	99.78
100-105	0.0	0.00	0-105	1405.4	99.78
105-110	0.0	0.01	0-110	1405.4	99.79
110-115	0.0	0.00	0-115	1405.4	99.79
115-120	0.0	0.00	0-120	1405.5	99.79
120-125	0.0	0.00	0-125	1405.5	99.79
125-130	0.1	0.00	0-130	1405.6	99.79
130-135	0.1	0.01	0-135	1405.7	99.80
135-140	0.2	0.02	0-140	1405.9	99.82
140-145	0.3	0.02	0-145	1406.2	99.84
145-150	0.4	0.03	0-150	1406.6	99.87
150-155	0.5	0.03	0-155	1407.1	99.90
155-160	0.5	0.04	0-160	1407.6	99.94
160-165	0.4	0.02	0-165	1408.0	99.96
165-170	0.3	0.02	0-170	1408.2	99.98
170-175	0.2	0.02	0-175	1408.4	100.00
175-180	0.1	0.00	0-180	1408.5	100.00

Test Item	Test Voltage (V)	Frequency (Hz)	Test Result
Total Harmonic Distortion:	120.0	60	15.67%

## 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\*\*\*\*\*