

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/927FL40/SL

Report Type:	Electrical and Photometric tests including: Luminous Flux, Chromaticity, Luminous Intensity Distribution, THD
Reviewed By:	Hill Liu <i>Hill Liu</i>
Report Number:	KS2230727-43671E-EE
Test Date:	2023-08-09 to 2023-08-12
Report Date:	2023-08-25
Approved by:	Blake Zhang / EE Engineer
Prepared By:	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
Test Facility:	Test facility was located at No.12, Pulong East 1 st 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/927FL40/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: 2700K
Nominal Lumen Output: 1320lm

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.

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. 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 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_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**

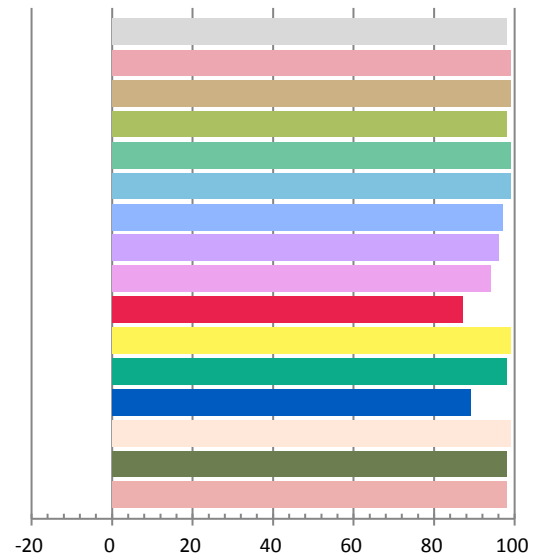
Photometric and Electrical Measurement Result

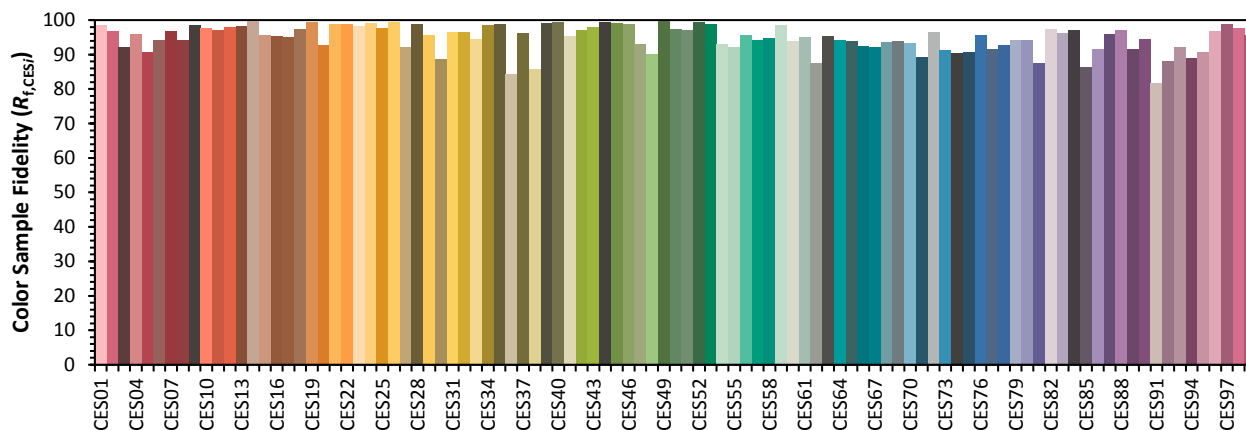
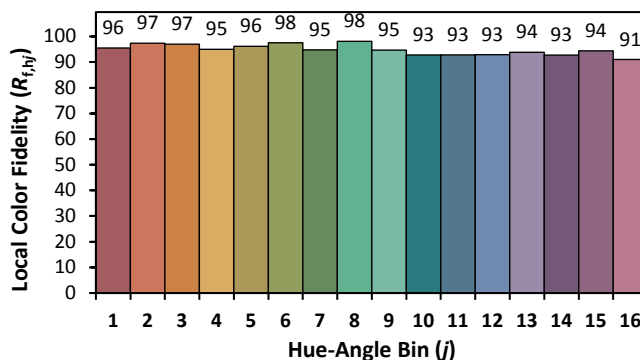
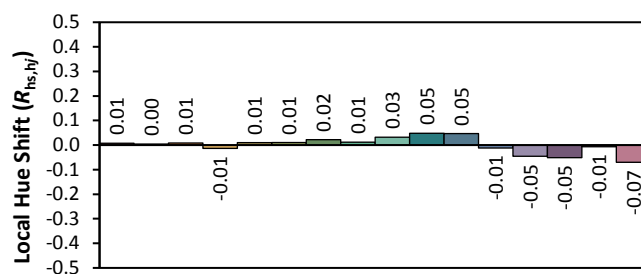
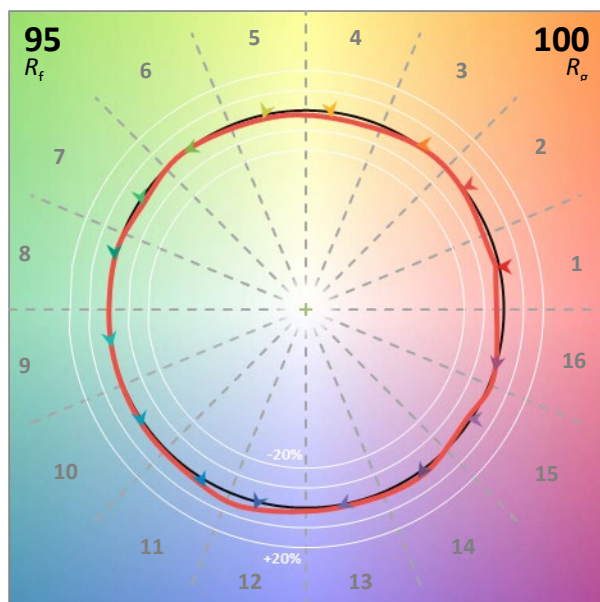
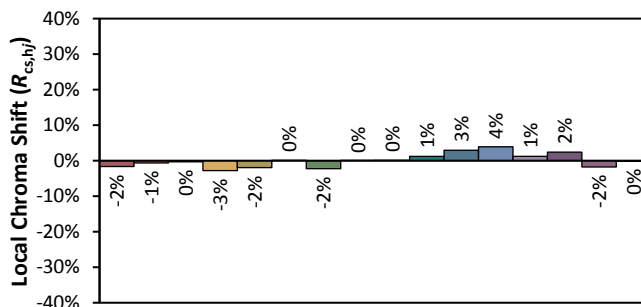
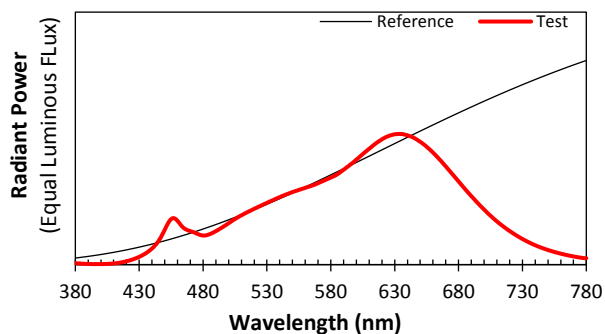
Voltage (V)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Luminous Flux(lm)	Efficacy (lm/W)
120.0	60	0.1323	15.32	0.9642	1343	87.69

Radiant Flux (W)	CCT (K)	Duv	x	y	u'	v'
5.1328	2764	-0.00071	0.4536	0.4072	0.2599	0.5251

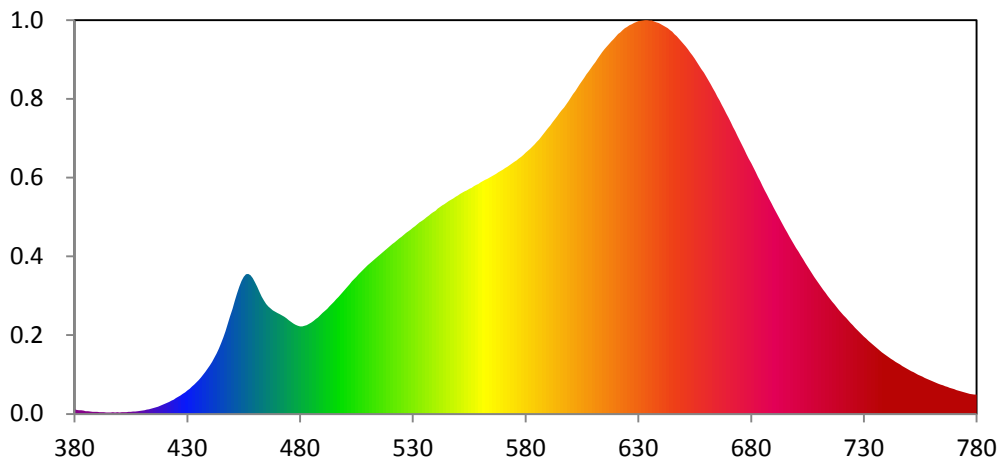
Color Rendering Index

Ra			
98.0			
R1	R2	R3	R4
99	99	98	99
R5	R6	R7	R8
99	97	96	94
R9	R10	R11	R12
87	99	98	89
R13	R14	R15	
99	98	98	





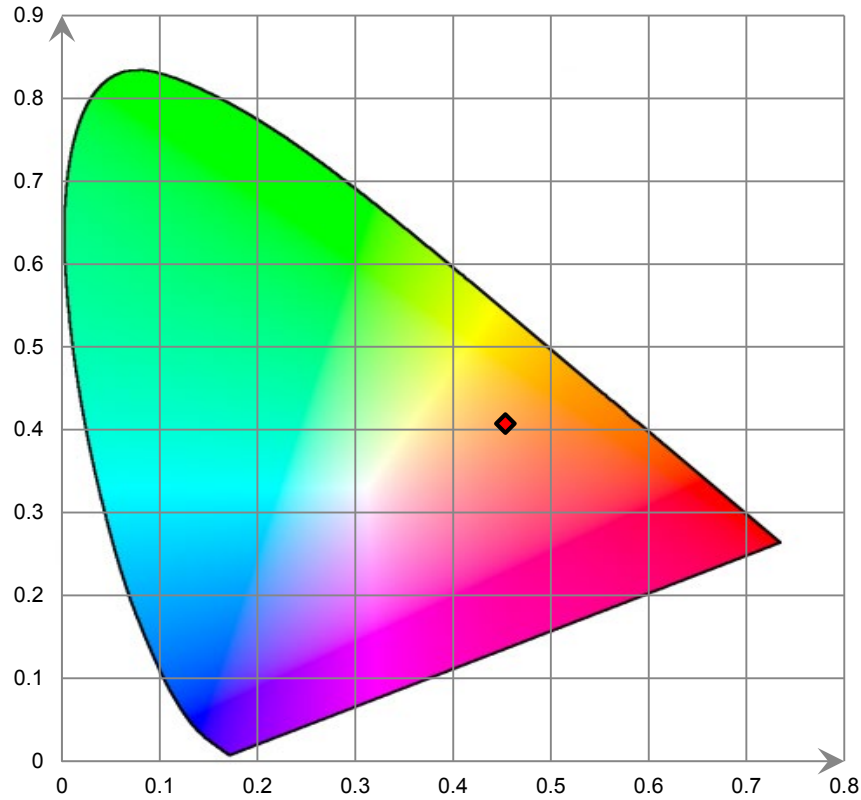
Relative Spectral Power Distribution



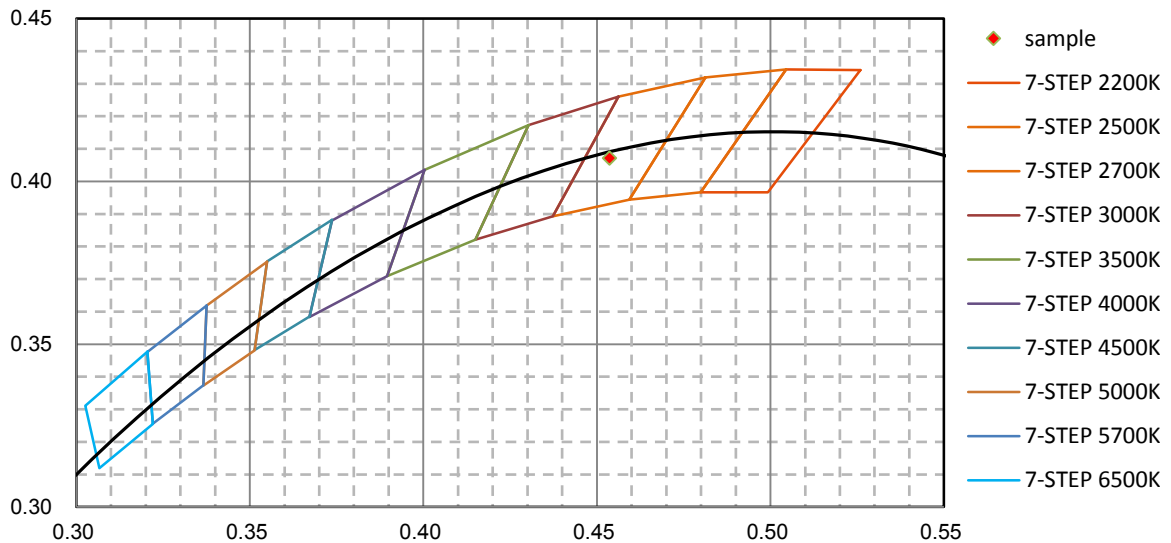
nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
380	3.531E-01	421	8.587E-01	462	9.472E+00	503	1.027E+01	544	1.625E+01
381	3.200E-01	422	9.356E-01	463	9.085E+00	504	1.047E+01	545	1.639E+01
382	2.864E-01	423	1.024E+00	464	8.787E+00	505	1.064E+01	546	1.650E+01
383	2.788E-01	424	1.116E+00	465	8.513E+00	506	1.084E+01	547	1.660E+01
384	2.539E-01	425	1.218E+00	466	8.312E+00	507	1.102E+01	548	1.672E+01
385	2.166E-01	426	1.324E+00	467	8.173E+00	508	1.118E+01	549	1.684E+01
386	2.000E-01	427	1.437E+00	468	8.036E+00	509	1.136E+01	550	1.694E+01
387	1.973E-01	428	1.558E+00	469	7.925E+00	510	1.152E+01	551	1.706E+01
388	1.747E-01	429	1.685E+00	470	7.821E+00	511	1.167E+01	552	1.715E+01
389	1.564E-01	430	1.812E+00	471	7.732E+00	512	1.183E+01	553	1.724E+01
390	1.544E-01	431	1.957E+00	472	7.627E+00	513	1.200E+01	554	1.734E+01
391	1.469E-01	432	2.110E+00	473	7.519E+00	514	1.214E+01	555	1.746E+01
392	1.369E-01	433	2.272E+00	474	7.406E+00	515	1.230E+01	556	1.754E+01
393	1.353E-01	434	2.444E+00	475	7.249E+00	516	1.245E+01	557	1.764E+01
394	1.183E-01	435	2.616E+00	476	7.136E+00	517	1.259E+01	558	1.775E+01
395	1.179E-01	436	2.822E+00	477	7.014E+00	518	1.274E+01	559	1.782E+01
396	1.235E-01	437	3.035E+00	478	6.913E+00	519	1.289E+01	560	1.794E+01
397	1.264E-01	438	3.257E+00	479	6.837E+00	520	1.303E+01	561	1.804E+01
398	1.181E-01	439	3.501E+00	480	6.797E+00	521	1.318E+01	562	1.814E+01
399	1.257E-01	440	3.760E+00	481	6.791E+00	522	1.330E+01	563	1.822E+01
400	1.227E-01	441	4.038E+00	482	6.831E+00	523	1.347E+01	564	1.833E+01
401	1.347E-01	442	4.360E+00	483	6.877E+00	524	1.360E+01	565	1.843E+01
402	1.322E-01	443	4.686E+00	484	6.981E+00	525	1.373E+01	566	1.853E+01
403	1.387E-01	444	5.060E+00	485	7.084E+00	526	1.387E+01	567	1.863E+01
404	1.531E-01	445	5.464E+00	486	7.218E+00	527	1.402E+01	568	1.876E+01
405	1.667E-01	446	5.923E+00	487	7.351E+00	528	1.416E+01	569	1.885E+01
406	1.857E-01	447	6.410E+00	488	7.490E+00	529	1.428E+01	570	1.895E+01
407	1.943E-01	448	6.980E+00	489	7.659E+00	530	1.443E+01	571	1.907E+01
408	2.181E-01	449	7.548E+00	490	7.818E+00	531	1.456E+01	572	1.917E+01
409	2.388E-01	450	8.147E+00	491	7.985E+00	532	1.470E+01	573	1.929E+01
410	2.715E-01	451	8.766E+00	492	8.160E+00	533	1.485E+01	574	1.941E+01
411	2.904E-01	452	9.343E+00	493	8.345E+00	534	1.497E+01	575	1.953E+01
412	3.316E-01	453	9.874E+00	494	8.516E+00	535	1.510E+01	576	1.967E+01
413	3.648E-01	454	1.031E+01	495	8.699E+00	536	1.525E+01	577	1.980E+01
414	4.110E-01	455	1.063E+01	496	8.894E+00	537	1.538E+01	578	1.992E+01
415	4.611E-01	456	1.082E+01	497	9.078E+00	538	1.551E+01	579	2.009E+01
416	5.167E-01	457	1.085E+01	498	9.278E+00	539	1.565E+01	580	2.025E+01
417	5.710E-01	458	1.075E+01	499	9.464E+00	540	1.575E+01	581	2.039E+01
418	6.389E-01	459	1.052E+01	500	9.676E+00	541	1.591E+01	582	2.055E+01
419	7.023E-01	460	1.021E+01	501	9.861E+00	542	1.603E+01	583	2.073E+01
420	7.816E-01	461	9.867E+00	502	1.007E+01	543	1.615E+01	584	2.091E+01

nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
585	2.110E+01	626	3.013E+01	667	2.396E+01	708	1.061E+01	749	3.515E+00
586	2.128E+01	627	3.022E+01	668	2.362E+01	709	1.036E+01	750	3.415E+00
587	2.149E+01	628	3.031E+01	669	2.328E+01	710	1.010E+01	751	3.324E+00
588	2.171E+01	629	3.037E+01	670	2.295E+01	711	9.862E+00	752	3.228E+00
589	2.194E+01	630	3.045E+01	671	2.260E+01	712	9.611E+00	753	3.139E+00
590	2.217E+01	631	3.048E+01	672	2.224E+01	713	9.382E+00	754	3.046E+00
591	2.236E+01	632	3.049E+01	673	2.191E+01	714	9.151E+00	755	2.962E+00
592	2.262E+01	633	3.053E+01	674	2.155E+01	715	8.928E+00	756	2.879E+00
593	2.284E+01	634	3.052E+01	675	2.120E+01	716	8.697E+00	757	2.796E+00
594	2.305E+01	635	3.050E+01	676	2.085E+01	717	8.489E+00	758	2.716E+00
595	2.331E+01	636	3.051E+01	677	2.050E+01	718	8.267E+00	759	2.639E+00
596	2.353E+01	637	3.043E+01	678	2.014E+01	719	8.058E+00	760	2.561E+00
597	2.376E+01	638	3.036E+01	679	1.979E+01	720	7.852E+00	761	2.490E+00
598	2.400E+01	639	3.029E+01	680	1.944E+01	721	7.648E+00	762	2.423E+00
599	2.426E+01	640	3.021E+01	681	1.908E+01	722	7.449E+00	763	2.348E+00
600	2.454E+01	641	3.010E+01	682	1.874E+01	723	7.249E+00	764	2.279E+00
601	2.478E+01	642	3.000E+01	683	1.838E+01	724	7.065E+00	765	2.211E+00
602	2.503E+01	643	2.990E+01	684	1.804E+01	725	6.875E+00	766	2.151E+00
603	2.530E+01	644	2.977E+01	685	1.769E+01	726	6.691E+00	767	2.086E+00
604	2.556E+01	645	2.963E+01	686	1.734E+01	727	6.508E+00	768	2.030E+00
605	2.580E+01	646	2.944E+01	687	1.701E+01	728	6.337E+00	769	1.970E+00
606	2.607E+01	647	2.929E+01	688	1.667E+01	729	6.160E+00	770	1.910E+00
607	2.632E+01	648	2.908E+01	689	1.633E+01	730	5.995E+00	771	1.855E+00
608	2.656E+01	649	2.888E+01	690	1.599E+01	731	5.836E+00	772	1.803E+00
609	2.682E+01	650	2.869E+01	691	1.568E+01	732	5.673E+00	773	1.752E+00
610	2.706E+01	651	2.848E+01	692	1.536E+01	733	5.510E+00	774	1.699E+00
611	2.728E+01	652	2.826E+01	693	1.502E+01	734	5.362E+00	775	1.652E+00
612	2.755E+01	653	2.803E+01	694	1.471E+01	735	5.217E+00	776	1.610E+00
613	2.779E+01	654	2.780E+01	695	1.439E+01	736	5.067E+00	777	1.560E+00
614	2.804E+01	655	2.754E+01	696	1.407E+01	737	4.924E+00	778	1.515E+00
615	2.826E+01	656	2.727E+01	697	1.376E+01	738	4.788E+00	779	1.501E+00
616	2.848E+01	657	2.702E+01	698	1.346E+01	739	4.653E+00	780	1.504E+00
617	2.870E+01	658	2.674E+01	699	1.316E+01	740	4.532E+00		
618	2.889E+01	659	2.646E+01	700	1.286E+01	741	4.399E+00		
619	2.907E+01	660	2.617E+01	701	1.257E+01	742	4.273E+00		
620	2.926E+01	661	2.587E+01	702	1.227E+01	743	4.160E+00		
621	2.945E+01	662	2.557E+01	703	1.198E+01	744	4.040E+00		
622	2.960E+01	663	2.525E+01	704	1.170E+01	745	3.937E+00		
623	2.977E+01	664	2.494E+01	705	1.143E+01	746	3.823E+00		
624	2.989E+01	665	2.460E+01	706	1.116E+01	747	3.718E+00		
625	3.000E+01	666	2.430E+01	707	1.087E+01	748	3.615E+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**

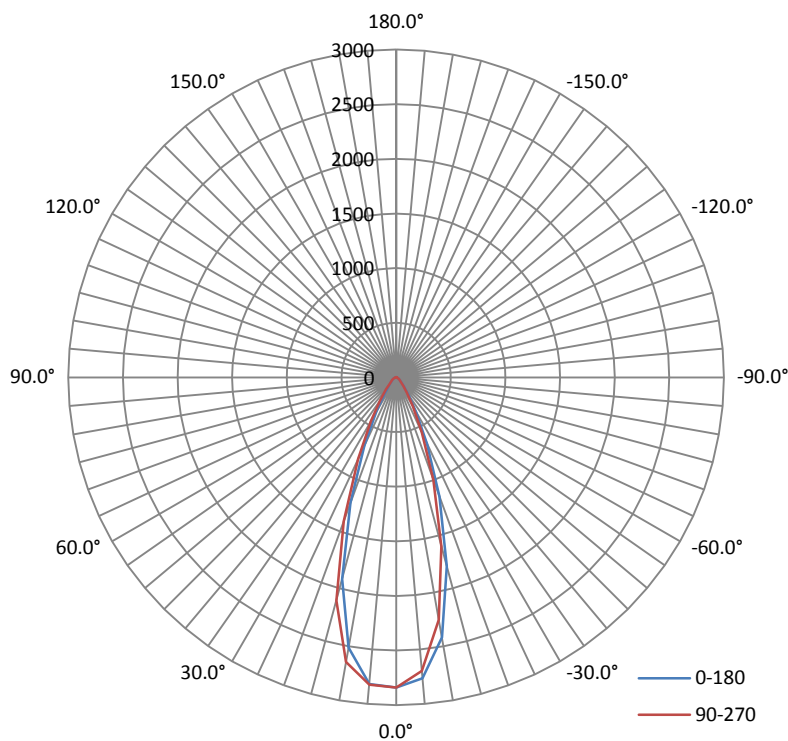
Electrical Measurement

Input Voltage (V)	Frequency (Hz)	Input Current (A)	Power (W)	Power Factor
120.10	60	0.1325	15.341	0.9640

Photometric Measurement

Luminous Flux (lm)	Efficacy (lm/W)	I _{max} (cd)	S/MH (C0/180)	S/MH (C90/270)
1345.76	87.72	2860.0	0.59	0.54

Luminous Intensity Distribution



	C0/180	C45/225	C90/270	C135/315	AVG.
Beam Angle (50% I _{max}):	36.1	36.1	36.1	36.1	36.1
Field Angle (10% I _{max}):	63.9	64.2	64.5	63.7	64.1

Luminous Intensity (cd) Distribution Data

C y	0°	22.5°	45°	67.5°	90°	112.5°	135°	157.5°
0.0°	2839	2839	2839	2839	2839	2839	2839	2839
5.0°	2818	2812	2834	2841	2824	2831	2820	2798
10.0°	2510	2544	2640	2660	2644	2638	2596	2534
15.0°	1911	1952	2111	2134	2114	2079	2002	1914
20.0°	1219	1247	1415	1425	1400	1365	1301	1240
25.0°	682	709	818	827	820	792	752	726
30.0°	359	378	450	463	462	436	411	400
35.0°	188	201	240	254	253	244	227	218
40.0°	107	116	142	147	144	137	127	119
45.0°	72	75	88	90	87	83	77	75
50.0°	52	53	60	61	60	57	54	53
55.0°	40	41	44	44	44	42	41	40
60.0°	31	31	33	34	33	33	32	31
65.0°	24	24	26	26	26	25	25	24
70.0°	17	18	19	20	19	19	18	17
75.0°	11	12	13	13	13	13	12	11
80.0°	6	7	8	8	8	7	7	6
85.0°	2	3	4	4	3	3	3	2
90.0°	0	0	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°	1	1	0	0	0	0	0	1
140.0°	1	1	1	1	1	1	1	1
145.0°	2	2	2	2	2	2	2	2
150.0°	3	2	2	2	2	2	2	2
155.0°	3	3	3	3	3	3	3	3
160.0°	4	4	4	4	3	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.)

$\begin{matrix} C \\ \backslash \\ \gamma \end{matrix}$	180°	202.5°	225°	247.5°	270°	292.5°	315°	337.5°
0.0°	2839	2839	2839	2839	2839	2839	2839	2839
5.0°	2763	2739	2665	2683	2695	2733	2767	2780
10.0°	2416	2366	2227	2230	2252	2297	2341	2393
15.0°	1790	1745	1579	1589	1601	1656	1705	1761
20.0°	1160	1120	986	994	998	1032	1065	1112
25.0°	669	646	568	566	556	571	590	615
30.0°	367	359	312	314	304	307	310	319
35.0°	200	195	174	175	169	166	167	169
40.0°	109	110	101	104	101	99	98	99
45.0°	70	70	65	65	65	65	65	66
50.0°	50	50	47	47	47	48	48	49
55.0°	39	38	36	36	36	37	37	38
60.0°	30	29	27	28	28	29	29	29
65.0°	23	22	21	21	21	21	22	23
70.0°	16	16	14	15	14	15	16	16
75.0°	10	10	9	9	9	9	10	10
80.0°	6	5	4	4	4	5	5	5
85.0°	2	2	1	1	1	1	1	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°	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)	%
0-5	67.5	5.01
5-10	187.4	13.93
10-15	255.2	18.96
15-20	247.7	18.40
20-25	191.2	14.21
25-30	128.8	9.57
30-35	81.2	6.04
35-40	51.5	3.82
40-45	34.1	2.54
45-50	25.0	1.86
50-55	19.7	1.46
55-60	16.1	1.19
60-65	13.0	0.97
65-70	10.1	0.75
70-75	7.2	0.54
75-80	4.5	0.33
80-85	2.2	0.16
85-90	0.6	0.04
90-95	0.0	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	0.00
125-130	0.1	0.01
130-135	0.1	0.00
135-140	0.2	0.02
140-145	0.3	0.02
145-150	0.4	0.03
150-155	0.4	0.03
155-160	0.5	0.04
160-165	0.4	0.02
165-170	0.3	0.02
170-175	0.2	0.02
175-180	0.1	0.00

Deg	Flux (lm)	%
0-5	67.5	5.01
0-10	254.9	18.94
0-15	510.0	37.90
0-20	757.7	56.30
0-25	948.9	70.51
0-30	1077.7	80.08
0-35	1158.9	86.12
0-40	1210.4	89.94
0-45	1244.6	92.48
0-50	1269.5	94.34
0-55	1289.3	95.80
0-60	1305.3	96.99
0-65	1318.3	97.96
0-70	1328.4	98.71
0-75	1335.6	99.25
0-80	1340.1	99.58
0-85	1342.3	99.74
0-90	1342.9	99.78
0-95	1342.9	99.79
0-100	1342.9	99.79
0-105	1342.9	99.79
0-110	1342.9	99.79
0-115	1342.9	99.79
0-120	1342.9	99.79
0-125	1343.0	99.79
0-130	1343.0	99.80
0-135	1343.1	99.80
0-140	1343.3	99.82
0-145	1343.6	99.84
0-150	1344.0	99.87
0-155	1344.4	99.90
0-160	1344.9	99.94
0-165	1345.3	99.96
0-170	1345.6	99.98
0-175	1345.7	100.00
0-180	1345.8	100.00

Test Item	Test Voltage (V)	Frequency (Hz)	Test Result
Total Harmonic Distortion:	120.0	60	15.84%

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