

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: 6.5PAR20DIM/935FL40/SL

Report Type:	Electrical and Photometric tests including: Luminous Flux, Chromaticity, Luminous Intensity Distribution, THD
Reviewed By:	Hill Liu 
Report Number:	KS2230727-43593E-EE
Test Date:	2023-07-26 to 2023-07-27
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: 6.5PAR20DIM/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: 6.5W
Nominal CCT: 3500K
Nominal Lumen Output: 550lm

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**

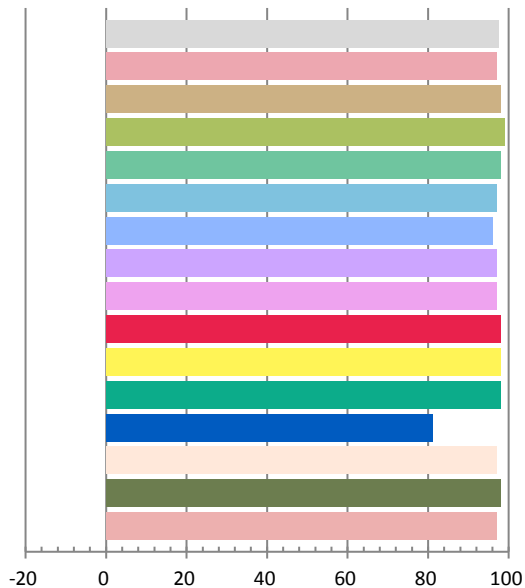
Photometric and Electrical Measurement Result

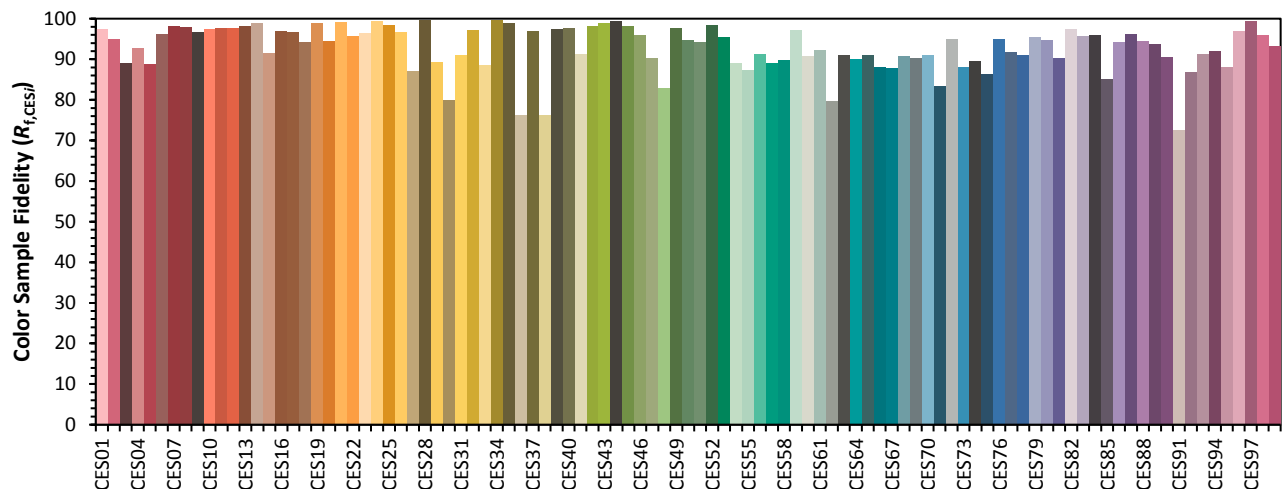
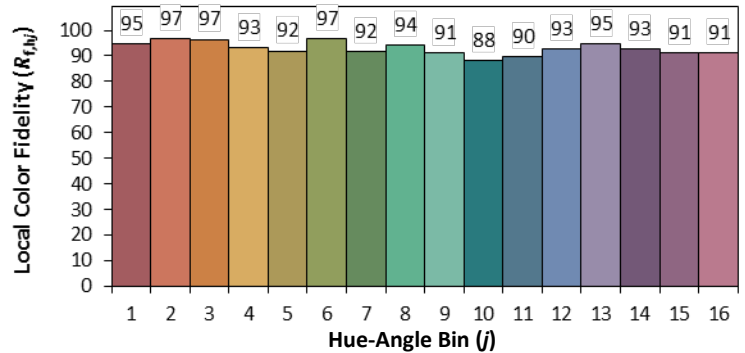
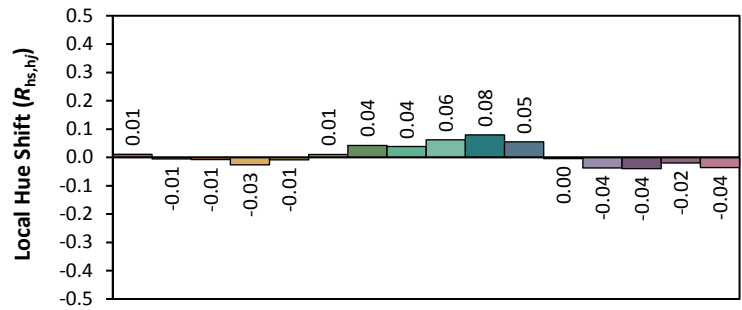
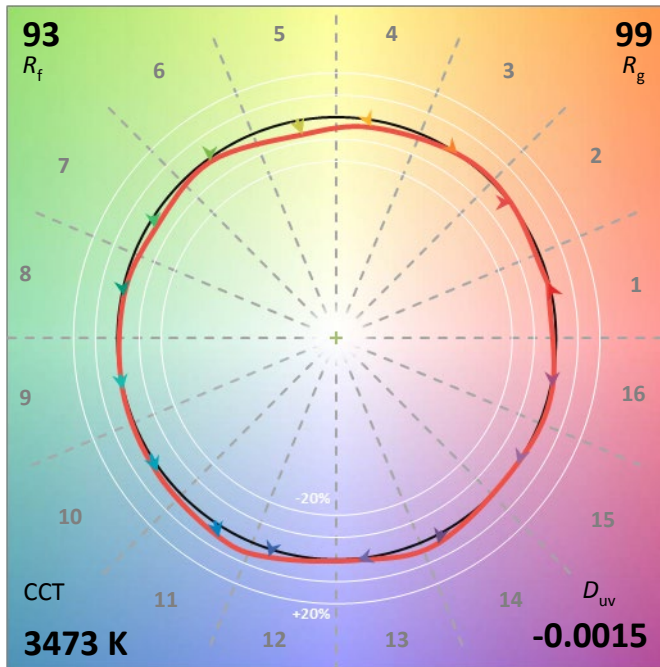
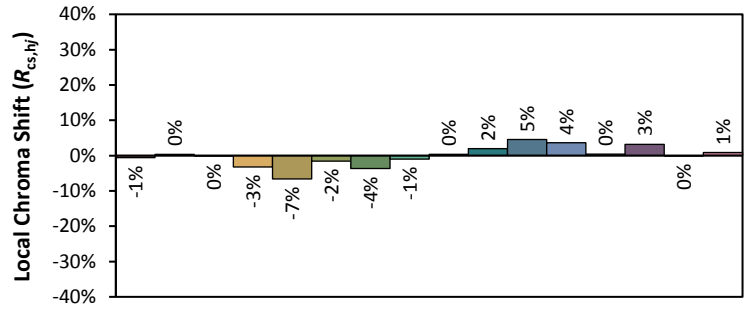
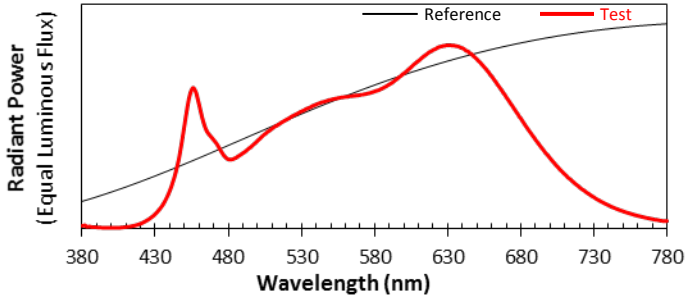
Voltage (V)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Luminous Flux(lm)	Efficacy (lm/W)
120.0	60	0.05685	6.435	0.9433	594.14	92.33

Radiant Flux (W)	CCT (K)	Duv	x	y	u'	v'
2.189	3473	-0.00144	0.4053	0.3874	0.2371	0.5099

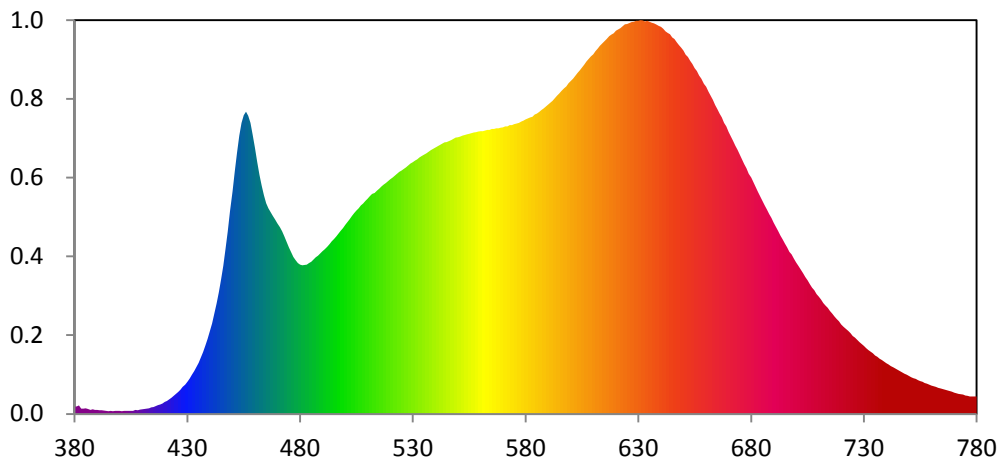
Color Rendering Index

Ra			
97.5			
R1	R2	R3	R4
97	98	99	98
R5	R6	R7	R8
97	96	97	97
R9	R10	R11	R12
98	98	98	81
R13	R14	R15	
97	98	97	





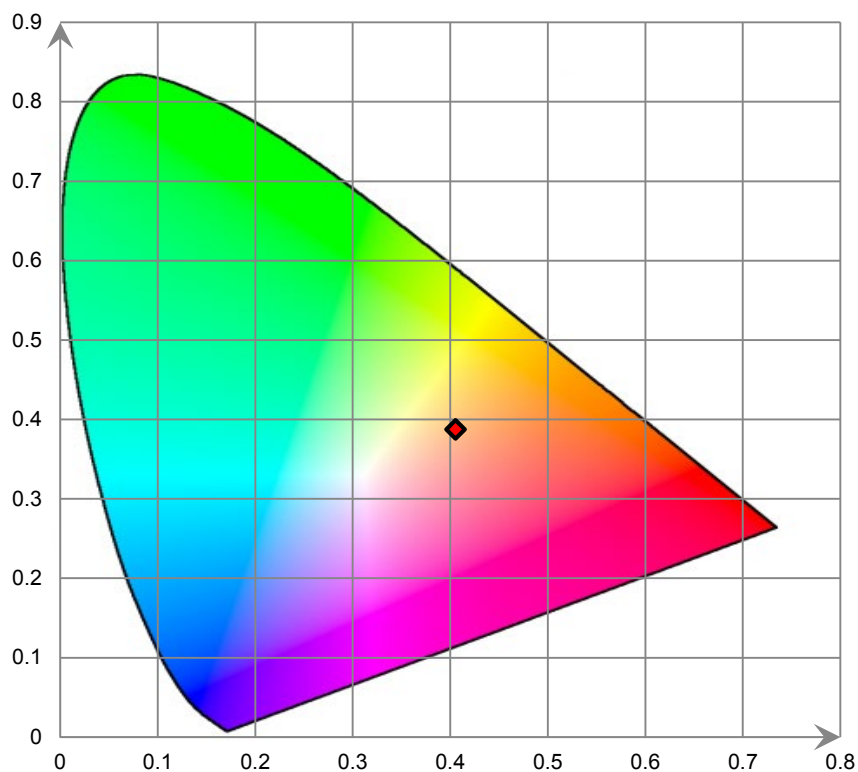
Relative Spectral Power Distribution



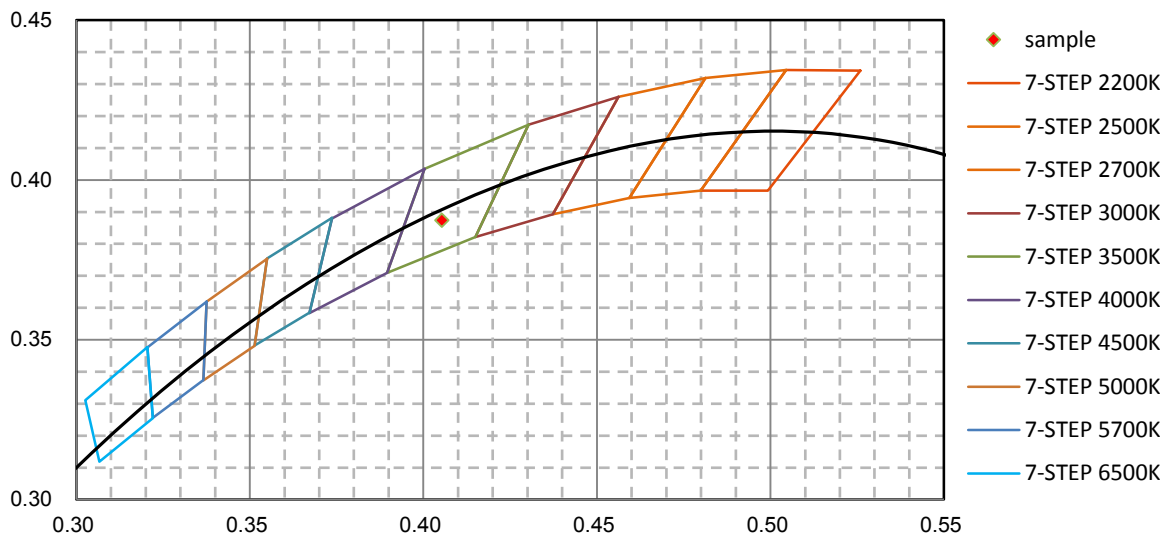
nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
380	2.100E-01	421	3.764E-01	462	6.916E+00	503	5.726E+00	544	7.851E+00
381	2.187E-01	422	4.233E-01	463	6.604E+00	504	5.805E+00	545	7.858E+00
382	2.444E-01	423	4.705E-01	464	6.322E+00	505	5.879E+00	546	7.891E+00
383	1.549E-01	424	5.261E-01	465	6.096E+00	506	5.942E+00	547	7.917E+00
384	1.539E-01	425	5.736E-01	466	5.949E+00	507	6.032E+00	548	7.949E+00
385	1.641E-01	426	6.314E-01	467	5.832E+00	508	6.078E+00	549	7.988E+00
386	1.441E-01	427	7.010E-01	468	5.720E+00	509	6.157E+00	550	7.998E+00
387	1.167E-01	428	7.794E-01	469	5.617E+00	510	6.226E+00	551	8.020E+00
388	1.316E-01	429	8.438E-01	470	5.507E+00	511	6.294E+00	552	8.043E+00
389	1.125E-01	430	9.314E-01	471	5.394E+00	512	6.356E+00	553	8.061E+00
390	1.126E-01	431	1.027E+00	472	5.277E+00	513	6.392E+00	554	8.078E+00
391	1.083E-01	432	1.130E+00	473	5.127E+00	514	6.455E+00	555	8.101E+00
392	1.095E-01	433	1.235E+00	474	4.971E+00	515	6.510E+00	556	8.117E+00
393	1.004E-01	434	1.351E+00	475	4.819E+00	516	6.574E+00	557	8.137E+00
394	8.769E-02	435	1.479E+00	476	4.674E+00	517	6.628E+00	558	8.147E+00
395	8.179E-02	436	1.634E+00	477	4.535E+00	518	6.676E+00	559	8.161E+00
396	8.598E-02	437	1.793E+00	478	4.449E+00	519	6.729E+00	560	8.178E+00
397	8.264E-02	438	1.970E+00	479	4.361E+00	520	6.783E+00	561	8.173E+00
398	9.269E-02	439	2.169E+00	480	4.317E+00	521	6.829E+00	562	8.196E+00
399	8.510E-02	440	2.393E+00	481	4.294E+00	522	6.886E+00	563	8.215E+00
400	8.889E-02	441	2.618E+00	482	4.304E+00	523	6.947E+00	564	8.211E+00
401	8.316E-02	442	2.898E+00	483	4.316E+00	524	6.998E+00	565	8.237E+00
402	8.813E-02	443	3.188E+00	484	4.365E+00	525	7.037E+00	566	8.237E+00
403	8.539E-02	444	3.509E+00	485	4.396E+00	526	7.086E+00	567	8.254E+00
404	9.111E-02	445	3.879E+00	486	4.460E+00	527	7.126E+00	568	8.256E+00
405	8.460E-02	446	4.276E+00	487	4.525E+00	528	7.185E+00	569	8.277E+00
406	9.145E-02	447	4.770E+00	488	4.579E+00	529	7.236E+00	570	8.285E+00
407	1.131E-01	448	5.283E+00	489	4.640E+00	530	7.274E+00	571	8.315E+00
408	1.081E-01	449	5.857E+00	490	4.701E+00	531	7.318E+00	572	8.309E+00
409	1.279E-01	450	6.432E+00	491	4.761E+00	532	7.362E+00	573	8.346E+00
410	1.303E-01	451	7.015E+00	492	4.834E+00	533	7.420E+00	574	8.352E+00
411	1.412E-01	452	7.556E+00	493	4.903E+00	534	7.463E+00	575	8.378E+00
412	1.542E-01	453	8.044E+00	494	4.988E+00	535	7.496E+00	576	8.400E+00
413	1.654E-01	454	8.415E+00	495	5.051E+00	536	7.531E+00	577	8.418E+00
414	1.900E-01	455	8.635E+00	496	5.134E+00	537	7.583E+00	578	8.454E+00
415	2.031E-01	456	8.738E+00	497	5.214E+00	538	7.633E+00	579	8.480E+00
416	2.245E-01	457	8.617E+00	498	5.296E+00	539	7.662E+00	580	8.511E+00
417	2.509E-01	458	8.411E+00	499	5.372E+00	540	7.706E+00	581	8.546E+00
418	2.761E-01	459	8.060E+00	500	5.466E+00	541	7.744E+00	582	8.569E+00
419	3.018E-01	460	7.697E+00	501	5.549E+00	542	7.777E+00	583	8.595E+00
420	3.435E-01	461	7.284E+00	502	5.633E+00	543	7.809E+00	584	8.652E+00

nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
585	8.682E+00	626	1.130E+01	667	8.569E+00	708	3.575E+00	749	1.132E+00
586	8.732E+00	627	1.133E+01	668	8.417E+00	709	3.470E+00	750	1.097E+00
587	8.785E+00	628	1.133E+01	669	8.311E+00	710	3.392E+00	751	1.062E+00
588	8.829E+00	629	1.137E+01	670	8.153E+00	711	3.310E+00	752	1.035E+00
589	8.889E+00	630	1.137E+01	671	8.028E+00	712	3.203E+00	753	1.013E+00
590	8.945E+00	631	1.138E+01	672	7.897E+00	713	3.128E+00	754	9.793E-01
591	9.000E+00	632	1.137E+01	673	7.753E+00	714	3.068E+00	755	9.530E-01
592	9.051E+00	633	1.134E+01	674	7.636E+00	715	2.975E+00	756	9.271E-01
593	9.124E+00	634	1.136E+01	675	7.496E+00	716	2.899E+00	757	8.961E-01
594	9.199E+00	635	1.133E+01	676	7.356E+00	717	2.818E+00	758	8.722E-01
595	9.266E+00	636	1.131E+01	677	7.219E+00	718	2.742E+00	759	8.502E-01
596	9.339E+00	637	1.130E+01	678	7.100E+00	719	2.679E+00	760	8.227E-01
597	9.410E+00	638	1.126E+01	679	6.941E+00	720	2.590E+00	761	8.038E-01
598	9.474E+00	639	1.121E+01	680	6.834E+00	721	2.521E+00	762	7.812E-01
599	9.561E+00	640	1.119E+01	681	6.689E+00	722	2.454E+00	763	7.559E-01
600	9.625E+00	641	1.114E+01	682	6.558E+00	723	2.397E+00	764	7.394E-01
601	9.695E+00	642	1.106E+01	683	6.412E+00	724	2.332E+00	765	7.147E-01
602	9.773E+00	643	1.101E+01	684	6.285E+00	725	2.256E+00	766	6.977E-01
603	9.858E+00	644	1.098E+01	685	6.156E+00	726	2.203E+00	767	6.769E-01
604	9.932E+00	645	1.088E+01	686	6.029E+00	727	2.143E+00	768	6.592E-01
605	1.002E+01	646	1.084E+01	687	5.910E+00	728	2.075E+00	769	6.405E-01
606	1.010E+01	647	1.075E+01	688	5.776E+00	729	2.019E+00	770	6.186E-01
607	1.019E+01	648	1.066E+01	689	5.668E+00	730	1.970E+00	771	5.990E-01
608	1.026E+01	649	1.058E+01	690	5.526E+00	731	1.899E+00	772	5.794E-01
609	1.034E+01	650	1.050E+01	691	5.406E+00	732	1.845E+00	773	5.720E-01
610	1.040E+01	651	1.039E+01	692	5.285E+00	733	1.796E+00	774	5.557E-01
611	1.048E+01	652	1.032E+01	693	5.163E+00	734	1.749E+00	775	5.344E-01
612	1.056E+01	653	1.021E+01	694	5.050E+00	735	1.693E+00	776	5.216E-01
613	1.064E+01	654	1.011E+01	695	4.928E+00	736	1.654E+00	777	5.072E-01
614	1.071E+01	655	9.996E+00	696	4.817E+00	737	1.600E+00	778	4.999E-01
615	1.077E+01	656	9.912E+00	697	4.688E+00	738	1.562E+00	779	5.009E-01
616	1.084E+01	657	9.784E+00	698	4.609E+00	739	1.512E+00	780	5.018E-01
617	1.092E+01	658	9.689E+00	699	4.491E+00	740	1.470E+00		
618	1.097E+01	659	9.547E+00	700	4.379E+00	741	1.425E+00		
619	1.101E+01	660	9.461E+00	701	4.270E+00	742	1.383E+00		
620	1.108E+01	661	9.322E+00	702	4.163E+00	743	1.345E+00		
621	1.111E+01	662	9.196E+00	703	4.066E+00	744	1.305E+00		
622	1.115E+01	663	9.079E+00	704	3.952E+00	745	1.269E+00		
623	1.121E+01	664	8.934E+00	705	3.865E+00	746	1.234E+00		
624	1.126E+01	665	8.816E+00	706	3.755E+00	747	1.196E+00		
625	1.128E+01	666	8.686E+00	707	3.651E+00	748	1.165E+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**

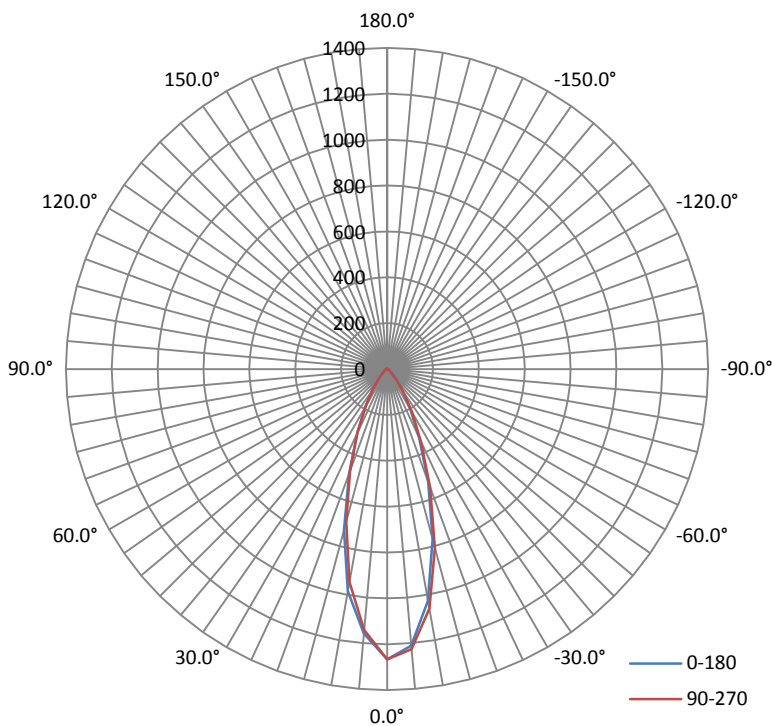
Electrical Measurement

Input Voltage (V)	Frequency (Hz)	Input Current (A)	Power (W)	Power Factor
120.05	60	0.0571	6.4200	0.9366

Photometric Measurement

Luminous Flux (lm)	Efficacy (lm/W)	I _{max} (cd)	S/MH (C0/180)	S/MH (C90/270)
595.026	92.68	1294	0.58	0.6

Luminous Intensity Distribution



	C0/180	C45/225	C90/270	C135/315	AVG.
Beam Angle (50% I _{max}):	34.2	33.6	34.1	34.2	34.0
Field Angle (10% I _{max}):	68.1	67.3	68.1	68.7	68.1

Luminous Intensity (cd) Distribution Data

C y	0°	22.5°	45°	67.5°	90°	112.5°	135°	157.5°
0.0°	1265	1265	1265	1265	1265	1265	1265	1265
5.0°	1157	1153	1150	1148	1143	1150	1158	1166
10.0°	984	969	955	945	942	950	964	978
15.0°	726	707	689	682	686	694	705	719
20.0°	485	477	468	464	472	475	481	493
25.0°	307	305	299	297	304	305	308	316
30.0°	189	188	181	177	187	186	189	195
35.0°	111	108	102	101	105	109	112	115
40.0°	62	59	55	55	58	60	64	66
45.0°	34	32	30	29	31	32	34	35
50.0°	21	20	20	19	20	20	20	21
55.0°	15	14	14	14	14	14	15	15
60.0°	12	11	11	11	11	11	11	12
65.0°	9	9	9	9	9	9	9	9
70.0°	7	6	6	6	6	6	7	7
75.0°	4	4	4	4	4	4	4	4
80.0°	3	3	2	2	2	2	3	3
85.0°	1	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°	1	1	1	1	1	1	1	1
180.0°	1	1	1	1	1	1	1	1

Luminous Intensity (cd) Distribution Data (cont.)

C Y	180°	202.5°	225°	247.5°	270°	292.5°	315°	337.5°
0.0°	1265	1265	1265	1265	1265	1265	1265	1265
5.0°	1210	1228	1236	1234	1226	1213	1197	1180
10.0°	1028	1047	1060	1062	1061	1055	1040	1023
15.0°	767	788	800	808	808	802	788	767
20.0°	522	534	542	546	549	541	528	515
25.0°	331	341	346	347	353	348	340	330
30.0°	201	206	208	206	218	214	211	208
35.0°	117	119	118	117	125	125	124	123
40.0°	67	66	65	66	68	69	70	69
45.0°	36	36	35	35	36	38	39	38
50.0°	22	22	22	22	23	23	24	23
55.0°	15	15	15	15	16	16	16	16
60.0°	12	12	12	12	12	12	12	12
65.0°	9	9	10	10	10	10	10	10
70.0°	7	7	7	7	7	7	7	7
75.0°	5	5	5	5	5	5	5	5
80.0°	3	3	3	3	3	3	3	3
85.0°	1	2	2	2	2	2	2	1
90.0°	0	1	1	1	1	1	1	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°	1	1	1	1	1	1	1	1
175.0°	1	1	1	1	1	1	1	1
180.0°	1	1	1	1	1	1	1	1

Zonal Lumen Density Measurement

Deg	Flux (lm)	%
0-5	29.2	4.91
5-10	78.1	13.13
10-15	103.1	17.32
15-20	101.6	17.07
20-25	85.4	14.35
25-30	64.5	10.85
30-35	45.0	7.56
35-40	28.9	4.85
40-45	17.5	2.95
45-50	10.9	1.83
50-55	7.7	1.29
55-60	6.1	1.02
60-65	5.1	0.86
65-70	4.1	0.69
70-75	3.0	0.50
75-80	2.0	0.33
80-85	1.1	0.19
85-90	0.5	0.08
90-95	0.1	0.02
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	0.01
135-140	0.1	0.01
140-145	0.1	0.03
145-150	0.2	0.02
150-155	0.2	0.04
155-160	0.2	0.03
160-165	0.2	0.03
165-170	0.1	0.02
170-175	0.1	0.01
175-180	0.0	0.00

Deg	Flux (lm)	%
0-5	29.2	4.91
0-10	107.3	18.04
0-15	210.4	35.36
0-20	312.0	52.43
0-25	397.4	66.78
0-30	461.9	77.63
0-35	506.9	85.19
0-40	535.8	90.04
0-45	553.3	92.99
0-50	564.2	94.82
0-55	571.9	96.11
0-60	577.9	97.13
0-65	583.1	97.99
0-70	587.2	98.68
0-75	590.1	99.18
0-80	592.1	99.51
0-85	593.2	99.70
0-90	593.7	99.78
0-95	593.8	99.80
0-100	593.8	99.80
0-105	593.8	99.80
0-110	593.8	99.80
0-115	593.8	99.80
0-120	593.8	99.80
0-125	593.8	99.80
0-130	593.8	99.80
0-135	593.9	99.81
0-140	594.0	99.82
0-145	594.1	99.85
0-150	594.3	99.87
0-155	594.5	99.91
0-160	594.7	99.94
0-165	594.8	99.97
0-170	594.9	99.99
0-175	595.0	100.00
0-180	595.0	100.00

Test Item	Test Voltage (V)	Frequency (Hz)	Test Result
Total Harmonic Distortion:	120.0	60	14.41%

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*****