

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

#Test Model: 24PAR38HO/830NF25/277V/SD

Report Type:	Electrical and Photometric tests including: Luminous Flux, Chromaticity, Luminous Intensity Distribution
Reviewed By:	James Liang <i>James Liang</i>
Report Number:	KS2220711-31379E-EE-1
Test Date:	2022-07-13 to 2022-07-14
Report Date:	2022-09-22
Approved by:	Bill Xiong / 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 2022-07-11. One was tested in integrating sphere and the other was tested in goniophotometer. All tests and evaluations were performed at the most consumptive setting.

Model Tested: 24PAR38HO/830NF25/277V/SD
Manufacturer: GREEN CREATIVE LTD
Product Designation: Directional LED Lamp
Burning Time Before Test: 0hour(For New Products)

Rated Values:

Rated Voltage/Frequency: AC 120-277V 60 Hz
Rated Power: 24W
Nominal CCT: 3000K
Nominal Lumen Output: 2500lm

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
1.5m integrating sphere	SENSING	1.5m	NA	2022-06-07	2023-06-06
Digital power meter	EVERFINE	PF9811	G135717CN1361159	2022-01-05	2023-01-04
High-precision rapid spectral radiometer	EVERFINE	HAAS-2000	N/A	2022-06-07	2023-06-06
Precision frequency power supply	ALL Power	APW-105N	970663	2022-01-06	2023-01-05
Standard Light Source	EVERFINE	D204	N/A	2021-10-15	2022-10-14
thermometer	SENSING	NA	NA	2022-01-11	2023-01-10
Programmable Precision DC Power Supply	EVERFINE	WY5015	11060010	2022-01-05	2023-01-04
AC POWER SUPPLY	EVERFINE	VPS1030 PWM	1012017	2022-01-06	2023-01-05
Digital CC&CV DC Power Supply	EVERFINE	WY12010	1009009	2022-01-06	2023-01-05
Digital power meter	YOKOGAWA	WT-210	91j926132	2022-01-06	2023-01-05
full-field speed goniophotometer	EVERFINE	GO-R5000	YG108492N10120001	2021-10-26	2022-10-25
wireless remote thermohygrometer	N/A	433MHz	N/A	2022-01-10	2023-01-09

Device	Manufacture	Model No	Serial No	Calibration date	Calibration due date
Standard Light Source	EVERFINE	D908	1012003	2021-10-15	2022-10-14

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.

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 $U=21\text{K}$ ($K=2$), 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 $U=0.17\%$ of rdg, Power $U=0.48\%$ ($K=2$), 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.

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**

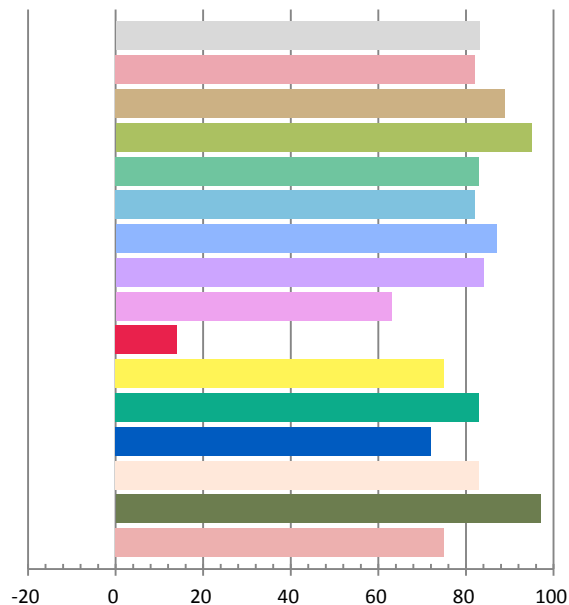
Photometric and Electrical Measurement Result

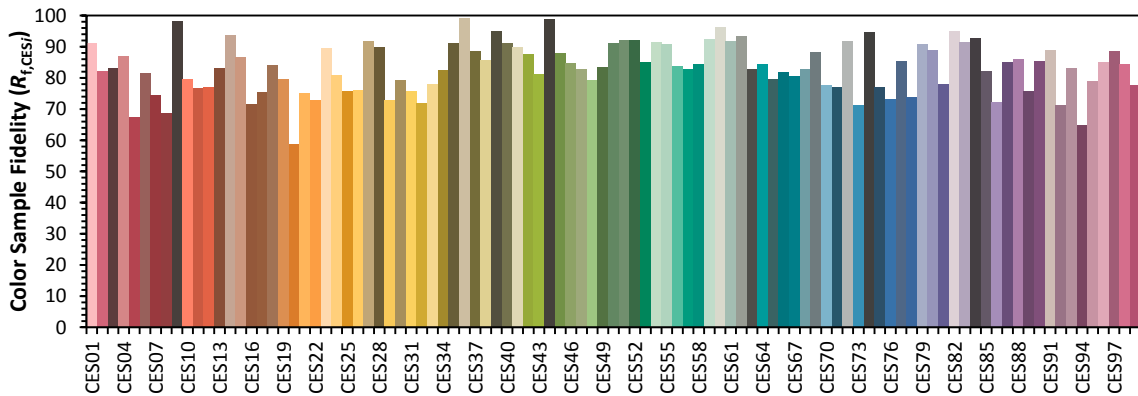
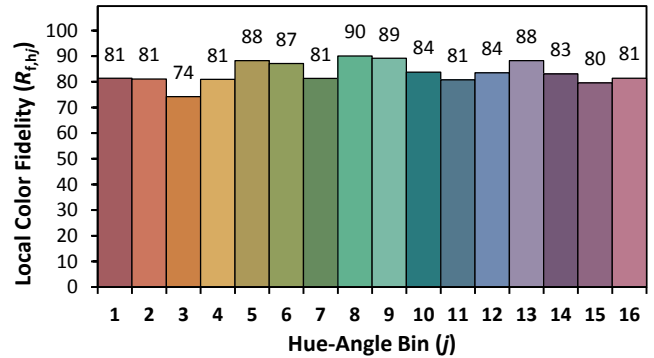
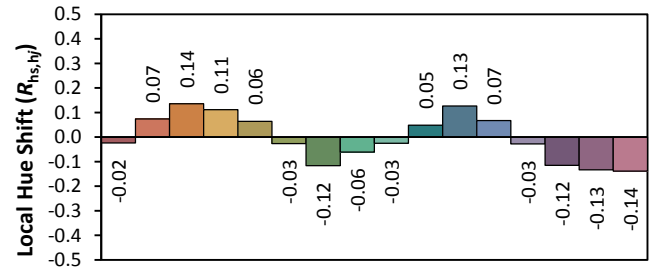
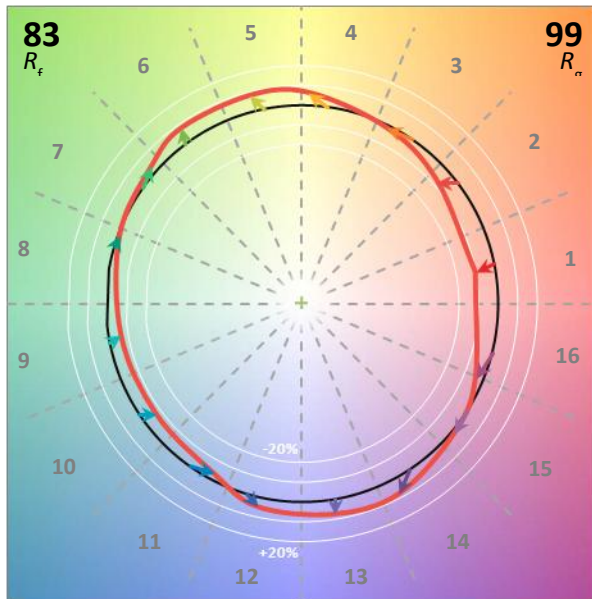
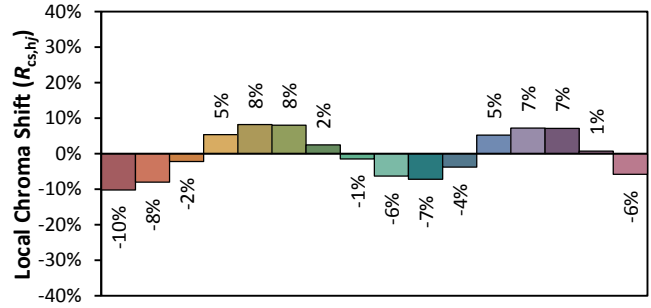
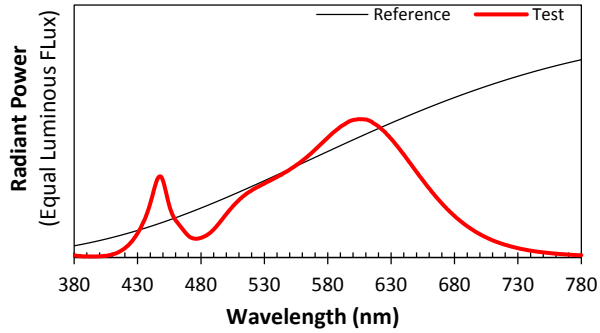
Voltage (V)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Luminous Flux(lm)	Efficacy (lm/W)
120.0	60	0.2009	23.97	0.9937	3003.1	125.31

Radiant Flux (W)	CCT (K)	Duv	x	y	u'	v'
9.298	3027	-0.001280	0.4332	0.3996	0.2501	0.5191

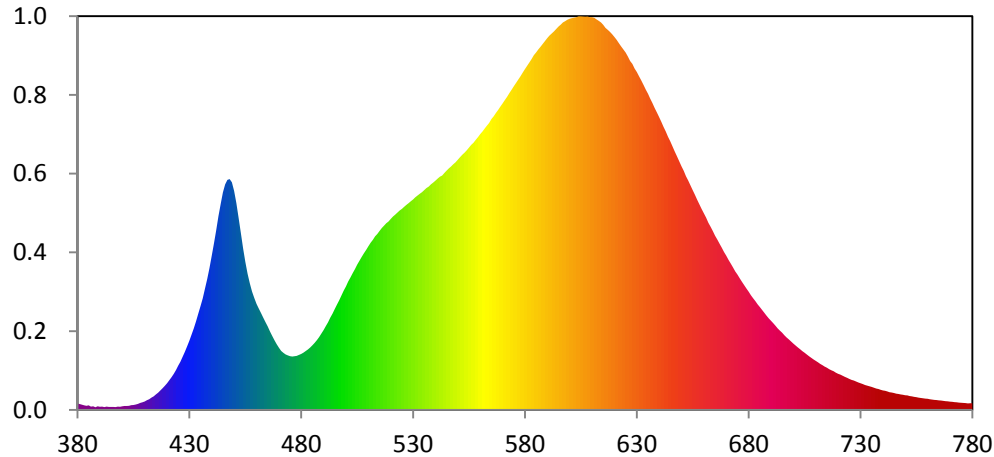
Color Rendering Index

Ra			
83.1			
R1	R2	R3	R4
82	89	95	83
R5	R6	R7	R8
82	87	84	63
R9	R10	R11	R12
14	75	83	72
R13	R14	R15	
83	97	75	





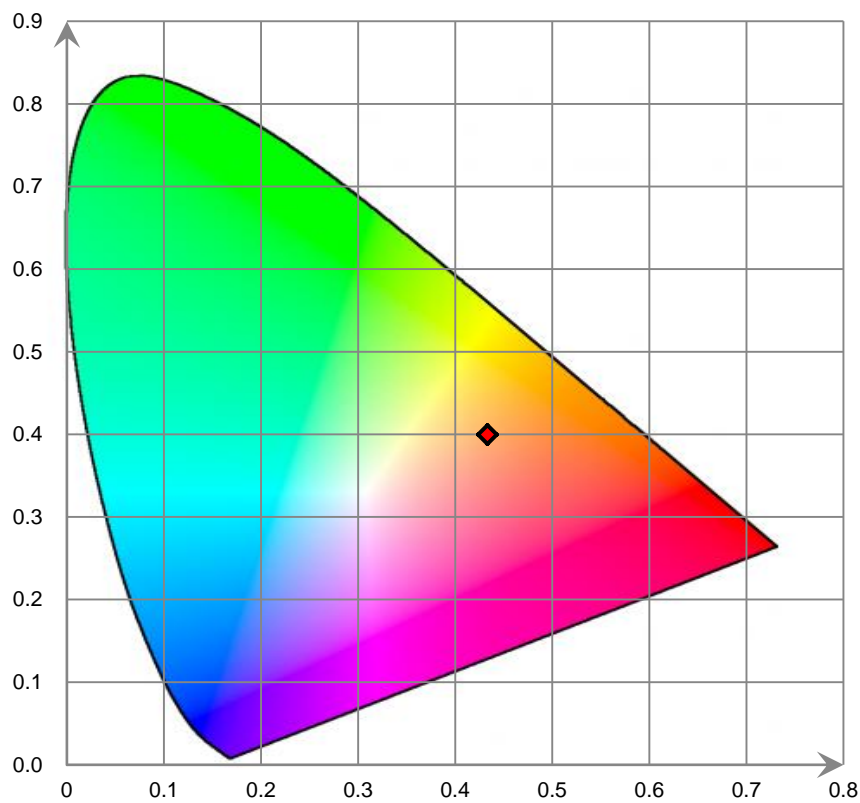
Relative Spectral Power Distribution



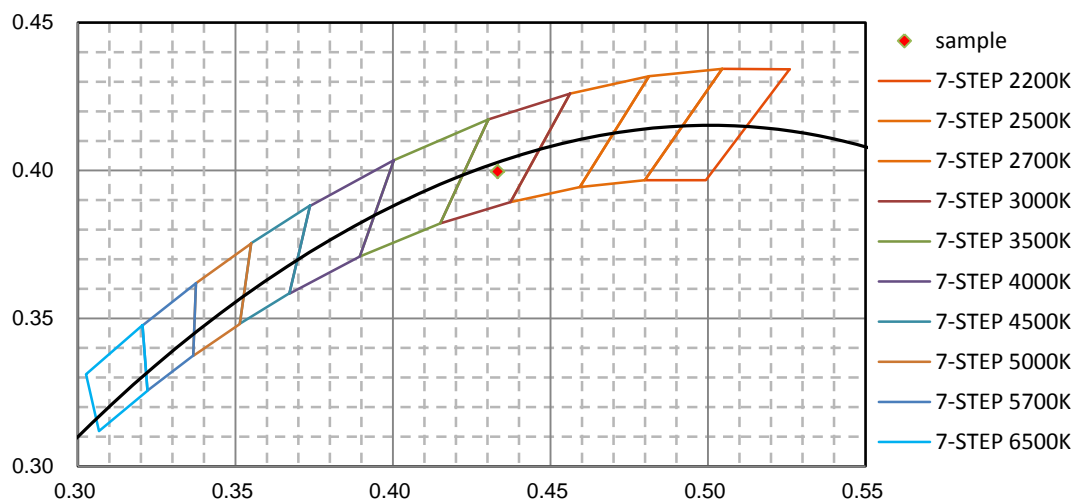
nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
380	9.696E-01	421	4.559E+00	462	1.485E+01	503	2.093E+01	544	3.626E+01
381	9.013E-01	422	5.023E+00	463	1.412E+01	504	2.155E+01	545	3.664E+01
382	7.955E-01	423	5.520E+00	464	1.343E+01	505	2.222E+01	546	3.698E+01
383	6.921E-01	424	6.122E+00	465	1.276E+01	506	2.283E+01	547	3.725E+01
384	6.214E-01	425	6.741E+00	466	1.202E+01	507	2.340E+01	548	3.760E+01
385	6.989E-01	426	7.366E+00	467	1.134E+01	508	2.397E+01	549	3.791E+01
386	5.156E-01	427	8.137E+00	468	1.067E+01	509	2.449E+01	550	3.829E+01
387	5.565E-01	428	8.879E+00	469	1.006E+01	510	2.505E+01	551	3.869E+01
388	4.199E-01	429	9.716E+00	470	9.510E+00	511	2.558E+01	552	3.904E+01
389	5.487E-01	430	1.057E+01	471	9.032E+00	512	2.602E+01	553	3.937E+01
390	4.810E-01	431	1.152E+01	472	8.725E+00	513	2.656E+01	554	3.975E+01
391	5.087E-01	432	1.247E+01	473	8.482E+00	514	2.693E+01	555	4.016E+01
392	4.431E-01	433	1.357E+01	474	8.336E+00	515	2.740E+01	556	4.057E+01
393	4.994E-01	434	1.475E+01	475	8.218E+00	516	2.784E+01	557	4.090E+01
394	4.589E-01	435	1.588E+01	476	8.168E+00	517	2.820E+01	558	4.132E+01
395	4.668E-01	436	1.708E+01	477	8.222E+00	518	2.857E+01	559	4.175E+01
396	4.595E-01	437	1.857E+01	478	8.279E+00	519	2.883E+01	560	4.221E+01
397	4.335E-01	438	2.006E+01	479	8.419E+00	520	2.924E+01	561	4.259E+01
398	5.068E-01	439	2.172E+01	480	8.575E+00	521	2.960E+01	562	4.307E+01
399	4.852E-01	440	2.356E+01	481	8.761E+00	522	2.990E+01	563	4.351E+01
400	5.490E-01	441	2.550E+01	482	9.005E+00	523	3.022E+01	564	4.393E+01
401	6.010E-01	442	2.750E+01	483	9.252E+00	524	3.054E+01	565	4.450E+01
402	6.108E-01	443	2.965E+01	484	9.551E+00	525	3.078E+01	566	4.492E+01
403	6.413E-01	444	3.152E+01	485	9.887E+00	526	3.110E+01	567	4.543E+01
404	7.223E-01	445	3.329E+01	486	1.026E+01	527	3.138E+01	568	4.590E+01
405	7.554E-01	446	3.452E+01	487	1.067E+01	528	3.165E+01	569	4.642E+01
406	8.226E-01	447	3.520E+01	488	1.114E+01	529	3.196E+01	570	4.691E+01
407	9.356E-01	448	3.533E+01	489	1.169E+01	530	3.221E+01	571	4.742E+01
408	1.073E+00	449	3.484E+01	490	1.220E+01	531	3.254E+01	572	4.792E+01
409	1.177E+00	450	3.351E+01	491	1.282E+01	532	3.282E+01	573	4.847E+01
410	1.297E+00	451	3.166E+01	492	1.340E+01	533	3.309E+01	574	4.899E+01
411	1.485E+00	452	2.941E+01	493	1.411E+01	534	3.332E+01	575	4.954E+01
412	1.639E+00	453	2.711E+01	494	1.473E+01	535	3.364E+01	576	5.004E+01
413	1.871E+00	454	2.476E+01	495	1.544E+01	536	3.395E+01	577	5.055E+01
414	2.070E+00	455	2.267E+01	496	1.613E+01	537	3.419E+01	578	5.107E+01
415	2.364E+00	456	2.086E+01	497	1.679E+01	538	3.452E+01	579	5.163E+01
416	2.647E+00	457	1.939E+01	498	1.754E+01	539	3.478E+01	580	5.217E+01
417	2.974E+00	458	1.811E+01	499	1.826E+01	540	3.508E+01	581	5.269E+01
418	3.320E+00	459	1.713E+01	500	1.890E+01	541	3.541E+01	582	5.319E+01
419	3.680E+00	460	1.623E+01	501	1.965E+01	542	3.570E+01	583	5.369E+01
420	4.081E+00	461	1.552E+01	502	2.028E+01	543	3.587E+01	584	5.428E+01

nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
585	5.470E+01	626	5.409E+01	667	2.543E+01	708	7.983E+00	749	2.327E+00
586	5.515E+01	627	5.341E+01	668	2.482E+01	709	7.728E+00	750	2.248E+00
587	5.556E+01	628	5.297E+01	669	2.417E+01	710	7.500E+00	751	2.211E+00
588	5.601E+01	629	5.225E+01	670	2.361E+01	711	7.285E+00	752	2.114E+00
589	5.647E+01	630	5.171E+01	671	2.297E+01	712	7.046E+00	753	2.070E+00
590	5.691E+01	631	5.105E+01	672	2.239E+01	713	6.856E+00	754	2.005E+00
591	5.729E+01	632	5.040E+01	673	2.181E+01	714	6.643E+00	755	1.952E+00
592	5.762E+01	633	4.973E+01	674	2.121E+01	715	6.465E+00	756	1.887E+00
593	5.793E+01	634	4.901E+01	675	2.070E+01	716	6.251E+00	757	1.829E+00
594	5.829E+01	635	4.838E+01	676	2.014E+01	717	6.067E+00	758	1.774E+00
595	5.867E+01	636	4.766E+01	677	1.960E+01	718	5.910E+00	759	1.728E+00
596	5.896E+01	637	4.698E+01	678	1.911E+01	719	5.699E+00	760	1.699E+00
597	5.931E+01	638	4.621E+01	679	1.857E+01	720	5.534E+00	761	1.642E+00
598	5.950E+01	639	4.553E+01	680	1.809E+01	721	5.401E+00	762	1.588E+00
599	5.972E+01	640	4.483E+01	681	1.755E+01	722	5.226E+00	763	1.544E+00
600	5.986E+01	641	4.410E+01	682	1.708E+01	723	5.064E+00	764	1.505E+00
601	5.997E+01	642	4.331E+01	683	1.665E+01	724	4.907E+00	765	1.457E+00
602	6.005E+01	643	4.260E+01	684	1.616E+01	725	4.751E+00	766	1.429E+00
603	6.011E+01	644	4.179E+01	685	1.574E+01	726	4.606E+00	767	1.394E+00
604	6.024E+01	645	4.109E+01	686	1.530E+01	727	4.494E+00	768	1.335E+00
605	6.023E+01	646	4.033E+01	687	1.486E+01	728	4.348E+00	769	1.318E+00
606	6.020E+01	647	3.955E+01	688	1.444E+01	729	4.206E+00	770	1.274E+00
607	6.019E+01	648	3.881E+01	689	1.402E+01	730	4.079E+00	771	1.238E+00
608	6.021E+01	649	3.804E+01	690	1.365E+01	731	3.951E+00	772	1.199E+00
609	6.012E+01	650	3.729E+01	691	1.328E+01	732	3.821E+00	773	1.163E+00
610	6.010E+01	651	3.660E+01	692	1.290E+01	733	3.718E+00	774	1.119E+00
611	6.001E+01	652	3.576E+01	693	1.249E+01	734	3.611E+00	775	1.099E+00
612	5.976E+01	653	3.512E+01	694	1.214E+01	735	3.517E+00	776	1.080E+00
613	5.955E+01	654	3.437E+01	695	1.181E+01	736	3.398E+00	777	1.050E+00
614	5.930E+01	655	3.364E+01	696	1.143E+01	737	3.281E+00	778	1.008E+00
615	5.893E+01	656	3.292E+01	697	1.109E+01	738	3.194E+00	779	1.015E+00
616	5.847E+01	657	3.218E+01	698	1.078E+01	739	3.092E+00	780	1.017E+00
617	5.817E+01	658	3.146E+01	699	1.048E+01	740	2.989E+00		
618	5.785E+01	659	3.075E+01	700	1.015E+01	741	2.924E+00		
619	5.749E+01	660	3.008E+01	701	9.864E+00	742	2.824E+00		
620	5.707E+01	661	2.944E+01	702	9.558E+00	743	2.726E+00		
621	5.663E+01	662	2.864E+01	703	9.292E+00	744	2.655E+00		
622	5.611E+01	663	2.803E+01	704	8.997E+00	745	2.585E+00		
623	5.563E+01	664	2.738E+01	705	8.752E+00	746	2.503E+00		
624	5.516E+01	665	2.666E+01	706	8.479E+00	747	2.455E+00		
625	5.470E+01	666	2.608E+01	707	8.218E+00	748	2.368E+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**

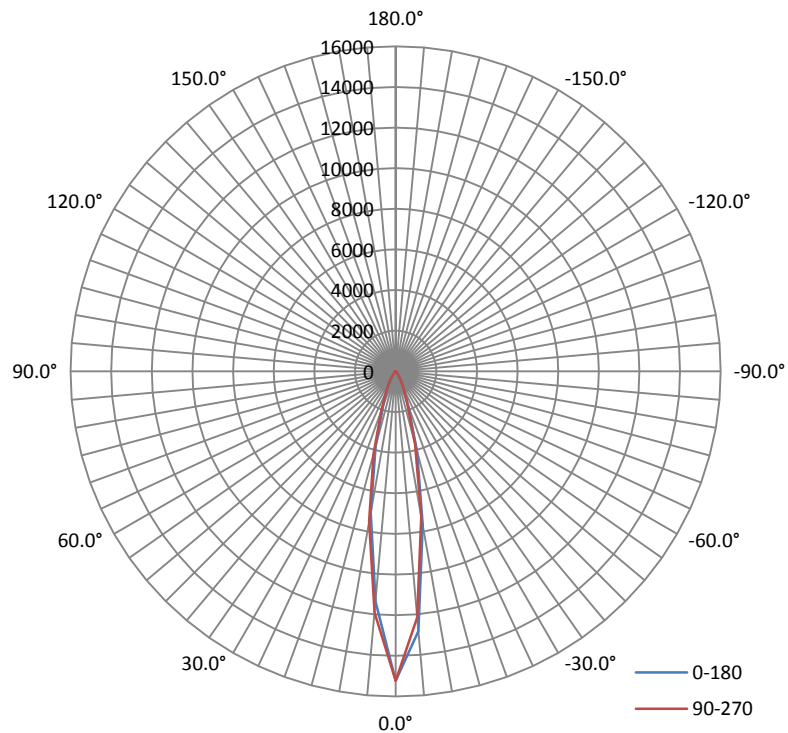
Electrical Measurement

Input Voltage (V)	Frequency (Hz)	Input Current (A)	Power (W)	Power Factor
120.0	60	0.2011	23.98	0.9939

Photometric Measurement

Luminous Flux (lm)	Efficacy (lm/W)	I _{max} (cd)	S/MH (C0/180)	S/MH (C90/270)
3006.05	125.36	15726.0	0.35	0.33

Luminous Intensity Distribution



	C0/180	C45/225	C90/270	C135/315	AVG.
Beam Angle (50% I _{max}):	19.2	19.1	19.4	19.6	19.3
Field Angle (10% I _{max}):	42.5	42.0	43.2	43.3	42.8

Luminous Intensity (cd) Distribution Data

C y	0°	22.5°	45°	67.5°	90°	112.5°	135°	157.5°
0.0°	15225	15225	15225	15225	15225	15225	15225	15225
5.0°	11372	11130	11140	11411	11914	12597	13494	14400
10.0°	7059	6900	6921	7112	7496	7974	8583	9203
15.0°	3791	3714	3768	3927	4187	4486	4798	5150
20.0°	1816	1777	1823	1930	2035	2170	2319	2461
25.0°	1016	994	1021	1085	1157	1184	1222	1232
30.0°	561	536	552	603	674	707	720	708
35.0°	284	276	284	311	351	383	390	377
40.0°	147	145	148	158	177	198	207	199
45.0°	95	96	97	100	104	110	115	116
50.0°	72	74	73	75	78	81	83	85
55.0°	59	60	60	60	61	64	66	68
60.0°	48	48	48	48	49	50	52	54
65.0°	38	38	38	38	40	41	42	43
70.0°	30	29	29	29	31	32	33	34
75.0°	22	21	21	21	22	23	24	25
80.0°	13	13	13	13	14	15	16	17
85.0°	5	5	5	5	6	7	8	9
90.0°	0	0	0	0	0	0	1	1
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°	2	2	2	2	2	2	2	2
145.0°	5	5	5	4	4	4	4	4
150.0°	7	7	7	7	6	6	6	6
155.0°	8	8	8	8	8	8	8	8
160.0°	9	9	9	9	9	9	10	10
165.0°	9	9	9	9	9	9	10	10
170.0°	7	7	7	8	8	8	8	8
175.0°	6	6	6	6	6	6	7	7
180.0°	4	4	4	4	4	4	5	5

Luminous Intensity (cd) Distribution Data (cont.)

C Y	180°	202.5°	225°	247.5°	270°	292.5°	315°	337.5°
0.0°	15225	15225	15225	15225	15225	15225	15225	15225
5.0°	12835	13112	13062	12767	12174	11607	11094	10681
10.0°	7675	7843	7788	7569	7255	6901	6569	6347
15.0°	4052	4066	4042	3916	3693	3452	3290	3194
20.0°	1825	1785	1731	1699	1670	1613	1594	1597
25.0°	963	924	896	910	927	931	949	943
30.0°	539	532	507	497	507	518	534	509
35.0°	290	291	277	257	258	271	278	261
40.0°	164	163	161	153	146	148	148	139
45.0°	100	101	102	99	95	94	92	90
50.0°	77	79	79	78	76	73	70	70
55.0°	62	63	63	63	61	59	57	57
60.0°	50	51	50	50	49	47	46	47
65.0°	40	40	40	39	39	38	38	38
70.0°	31	31	31	31	30	30	29	29
75.0°	22	23	23	22	22	21	21	20
80.0°	14	15	15	14	14	13	12	12
85.0°	7	7	7	7	6	5	4	4
90.0°	0	1	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°	1	1	1	1	1	1	1	1
145.0°	1	1	1	1	1	1	1	1
150.0°	2	2	2	2	2	2	2	2
155.0°	2	2	2	2	3	3	3	3
160.0°	2	2	2	3	3	3	3	3
165.0°	2	2	2	2	2	2	2	2
170.0°	2	2	2	2	2	2	2	2
175.0°	3	3	3	3	3	3	3	3
180.0°	4	4	4	4	4	4	4	5

Zonal Lumen Density Measurement

Deg	Flux (lm)	%	Deg	Flux (lm)	%
0-5	325.0	10.81	0-5	325.0	10.81
5-10	680.4	22.64	0-10	1005.4	33.45
10-15	651.9	21.68	0-15	1657.3	55.13
15-20	451.8	15.03	0-20	2109.1	70.16
20-25	288.0	9.58	0-25	2397.0	79.74
25-30	196.8	6.55	0-30	2593.9	86.29
30-35	124.4	4.14	0-35	2718.3	90.43
35-40	74.9	2.49	0-40	2793.2	92.92
40-45	46.2	1.54	0-45	2839.4	94.46
45-50	35.3	1.17	0-50	2874.7	95.63
50-55	29.8	0.99	0-55	2904.4	96.62
55-60	25.4	0.84	0-60	2929.8	97.46
60-65	21.4	0.72	0-65	2951.3	98.18
65-70	17.7	0.59	0-70	2968.9	98.77
70-75	13.7	0.45	0-75	2982.6	99.22
75-80	9.6	0.32	0-80	2992.3	99.54
80-85	5.3	0.18	0-85	2997.6	99.72
85-90	1.4	0.05	0-90	2999.0	99.77
90-95	0.0	0.00	0-95	2999.1	99.77
95-100	0.0	0.00	0-100	2999.1	99.77
100-105	0.0	0.00	0-105	2999.1	99.77
105-110	0.0	0.00	0-110	2999.1	99.77
110-115	0.0	0.00	0-115	2999.2	99.77
115-120	0.0	0.00	0-120	2999.2	99.77
120-125	0.0	0.00	0-125	2999.2	99.77
125-130	0.1	0.01	0-130	2999.3	99.78
130-135	0.2	0.00	0-135	2999.5	99.78
135-140	0.4	0.01	0-140	2999.8	99.79
140-145	0.7	0.03	0-145	3000.5	99.82
145-150	1.0	0.03	0-150	3001.6	99.85
150-155	1.2	0.04	0-155	3002.8	99.89
155-160	1.2	0.04	0-160	3004.0	99.93
160-165	1.0	0.03	0-165	3005.0	99.96
165-170	0.7	0.03	0-170	3005.6	99.99
170-175	0.3	0.01	0-175	3005.9	100.00
175-180	0.1	0.00	0-180	3006.1	100.00

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