

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/830FL40/277V/SD

Report Type:	Electrical and Photometric tests including: Luminous Flux, Power Factor, Chromaticity, Luminous Intensity Distribution
Reviewed By:	James Liang <i>James Liang</i>
Report Number:	KS2220711-31380E-EE
Test Date:	2022-07-13 to 2022-07-14
Report Date:	2022-09-22
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 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/830FL40/277V/SD
Manufacturer: GREEN CREATIVE LTD
Product Designation: Directional LED Lamp
Burning Time Before Test: 0hour(For New Products)

Rated Values:

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

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**

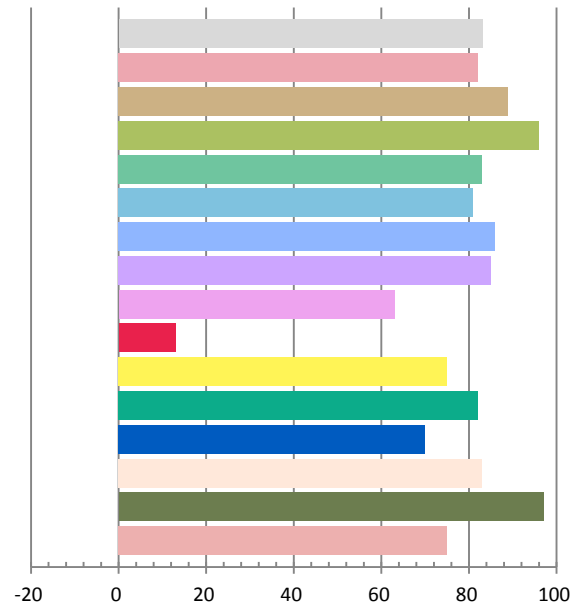
Photometric and Electrical Measurement Result

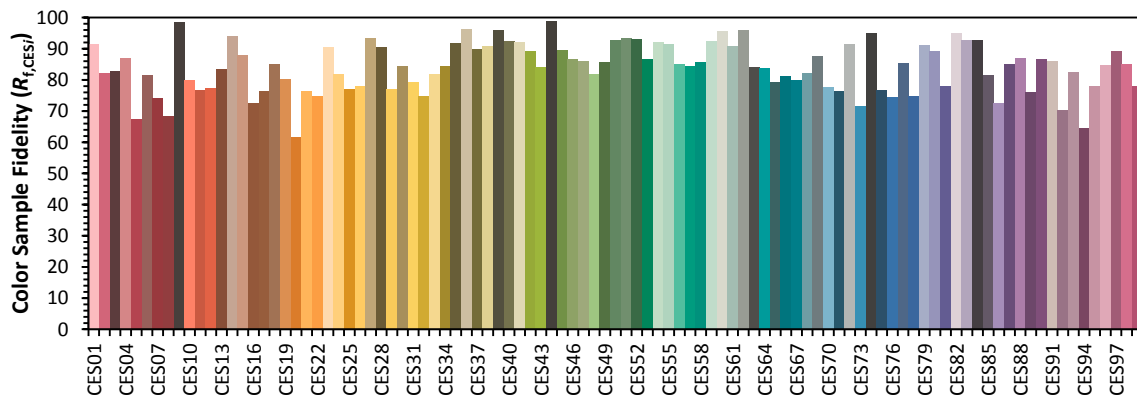
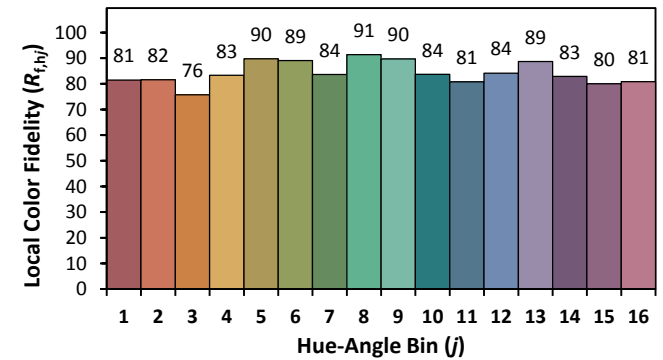
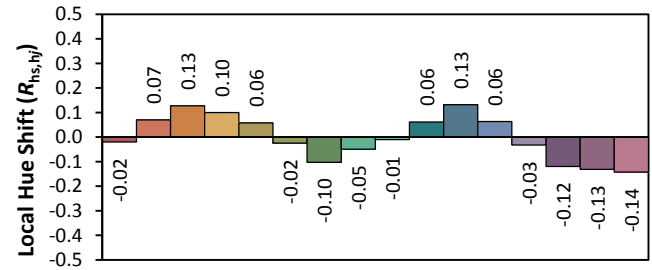
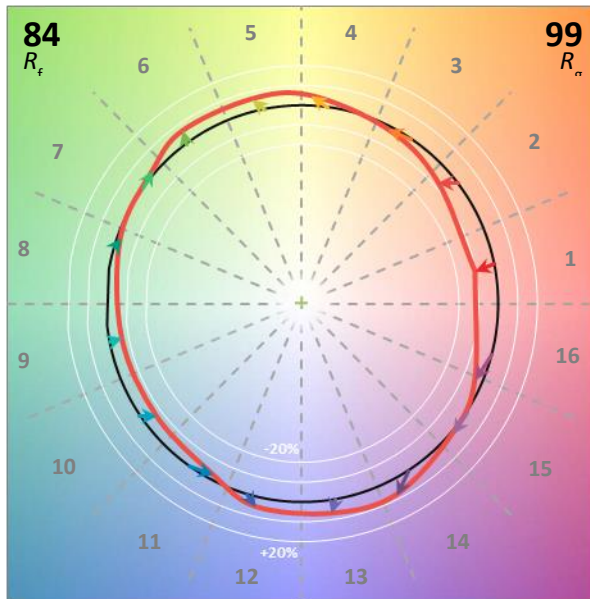
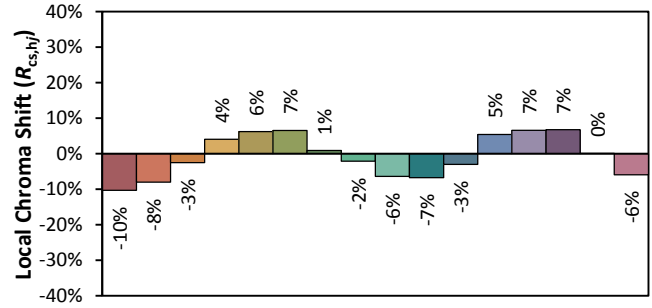
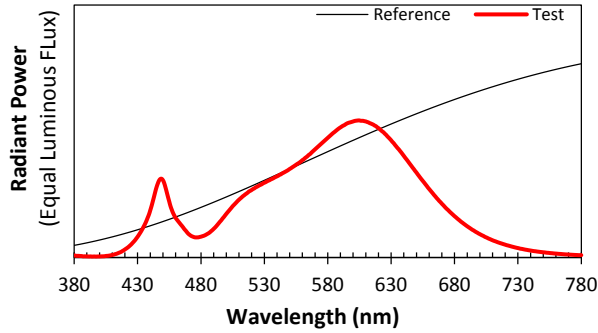
Voltage (V)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Luminous Flux(lm)	Efficacy (lm/W)
120.0	60	0.1982	23.68	0.9953	2864.5	120.97

Radiant Flux (W)	CCT (K)	Duv	x	y	u'	v'
8.8205	3054	-0.000114	0.4330	0.4024	0.2487	0.5201

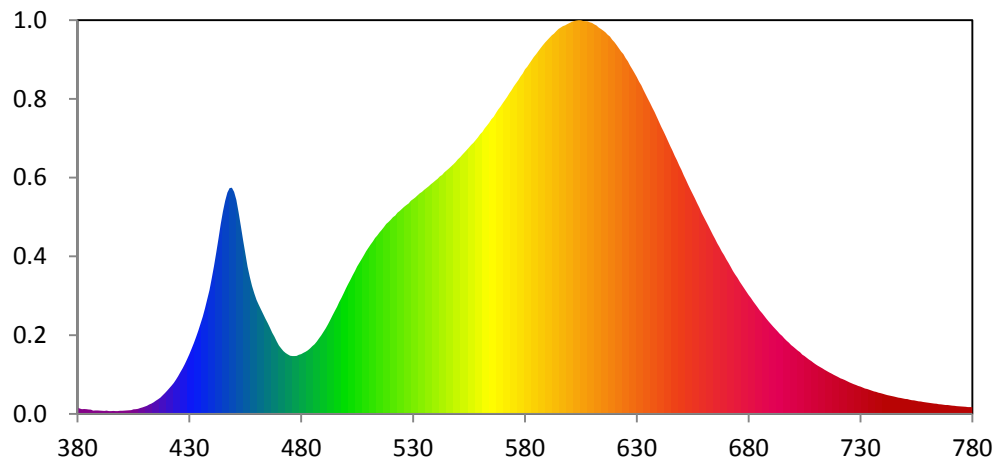
Color Rendering Index

Ra			
83.1			
R1	R2	R3	R4
82	89	96	83
R5	R6	R7	R8
81	86	85	63
R9	R10	R11	R12
13	75	82	70
R13	R14	R15	
83	97	75	





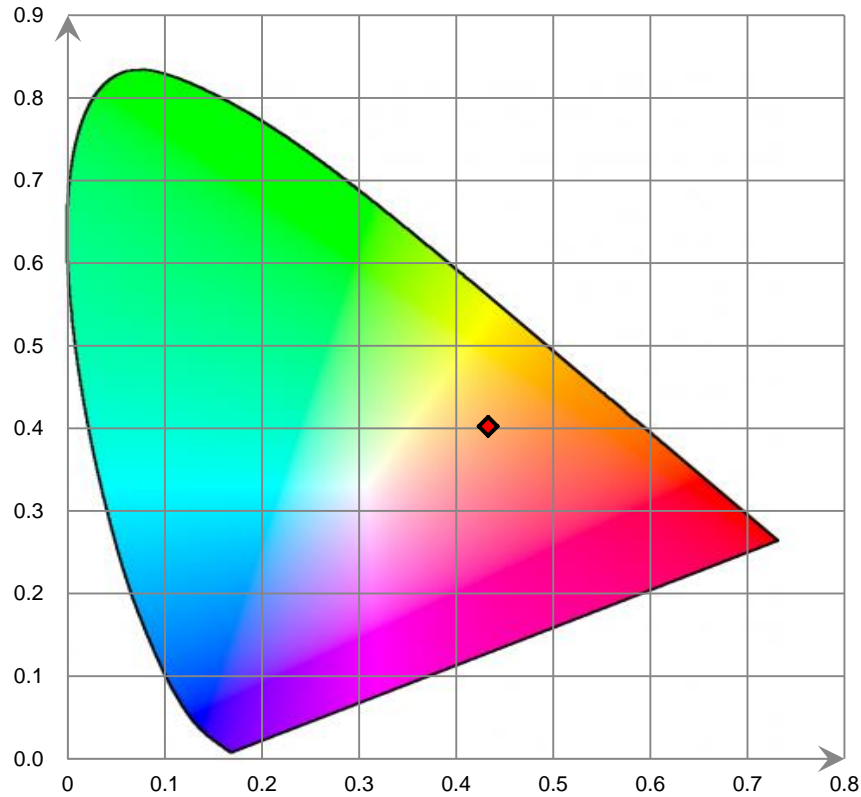
Relative Spectral Power Distribution



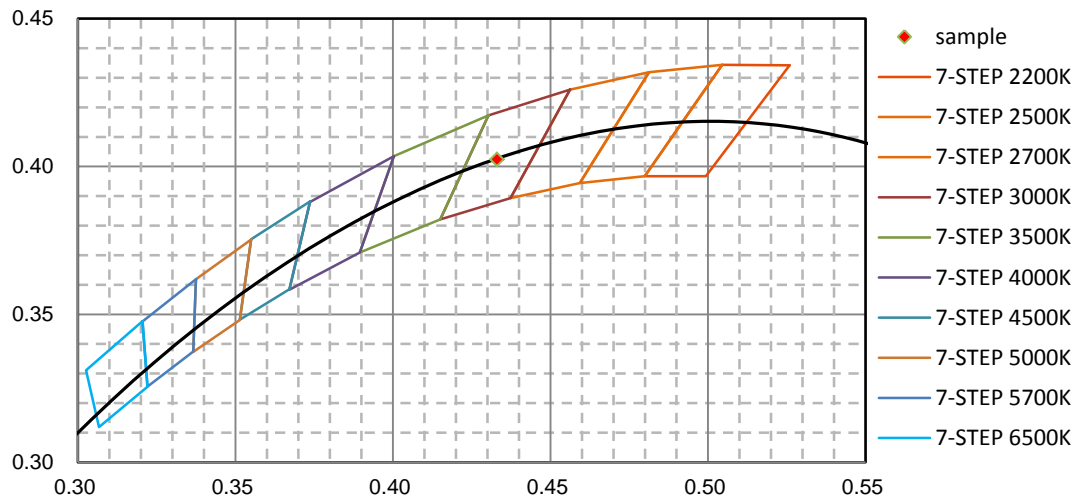
nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
380	9.201E-01	421	3.710E+00	462	1.509E+01	503	2.004E+01	544	3.492E+01
381	7.738E-01	422	4.081E+00	463	1.443E+01	504	2.065E+01	545	3.519E+01
382	7.008E-01	423	4.489E+00	464	1.376E+01	505	2.132E+01	546	3.548E+01
383	7.061E-01	424	4.975E+00	465	1.314E+01	506	2.185E+01	547	3.578E+01
384	6.906E-01	425	5.447E+00	466	1.246E+01	507	2.240E+01	548	3.607E+01
385	6.353E-01	426	6.039E+00	467	1.174E+01	508	2.295E+01	549	3.641E+01
386	6.139E-01	427	6.593E+00	468	1.116E+01	509	2.352E+01	550	3.679E+01
387	4.880E-01	428	7.203E+00	469	1.050E+01	510	2.401E+01	551	3.710E+01
388	5.098E-01	429	7.902E+00	470	9.894E+00	511	2.450E+01	552	3.747E+01
389	5.017E-01	430	8.611E+00	471	9.467E+00	512	2.494E+01	553	3.781E+01
390	4.724E-01	431	9.404E+00	472	9.074E+00	513	2.544E+01	554	3.816E+01
391	4.580E-01	432	1.021E+01	473	8.805E+00	514	2.581E+01	555	3.853E+01
392	4.352E-01	433	1.109E+01	474	8.591E+00	515	2.626E+01	556	3.889E+01
393	4.754E-01	434	1.203E+01	475	8.414E+00	516	2.661E+01	557	3.920E+01
394	4.030E-01	435	1.304E+01	476	8.356E+00	517	2.703E+01	558	3.958E+01
395	4.231E-01	436	1.407E+01	477	8.371E+00	518	2.747E+01	559	3.998E+01
396	4.461E-01	437	1.526E+01	478	8.400E+00	519	2.774E+01	560	4.045E+01
397	4.047E-01	438	1.658E+01	479	8.546E+00	520	2.806E+01	561	4.078E+01
398	4.218E-01	439	1.791E+01	480	8.655E+00	521	2.844E+01	562	4.128E+01
399	4.595E-01	440	1.958E+01	481	8.833E+00	522	2.869E+01	563	4.167E+01
400	4.482E-01	441	2.134E+01	482	8.997E+00	523	2.909E+01	564	4.209E+01
401	4.805E-01	442	2.329E+01	483	9.209E+00	524	2.935E+01	565	4.260E+01
402	5.011E-01	443	2.529E+01	484	9.483E+00	525	2.964E+01	566	4.296E+01
403	5.229E-01	444	2.740E+01	485	9.800E+00	526	2.996E+01	567	4.347E+01
404	5.547E-01	445	2.926E+01	486	1.009E+01	527	3.021E+01	568	4.399E+01
405	6.595E-01	446	3.080E+01	487	1.048E+01	528	3.045E+01	569	4.440E+01
406	6.971E-01	447	3.201E+01	488	1.094E+01	529	3.082E+01	570	4.490E+01
407	7.485E-01	448	3.265E+01	489	1.138E+01	530	3.106E+01	571	4.534E+01
408	8.435E-01	449	3.270E+01	490	1.190E+01	531	3.130E+01	572	4.582E+01
409	9.385E-01	450	3.211E+01	491	1.240E+01	532	3.160E+01	573	4.636E+01
410	1.065E+00	451	3.094E+01	492	1.298E+01	533	3.189E+01	574	4.682E+01
411	1.169E+00	452	2.915E+01	493	1.360E+01	534	3.209E+01	575	4.734E+01
412	1.358E+00	453	2.719E+01	494	1.424E+01	535	3.241E+01	576	4.781E+01
413	1.501E+00	454	2.515E+01	495	1.488E+01	536	3.265E+01	577	4.824E+01
414	1.684E+00	455	2.321E+01	496	1.547E+01	537	3.290E+01	578	4.878E+01
415	1.913E+00	456	2.130E+01	497	1.618E+01	538	3.322E+01	579	4.923E+01
416	2.130E+00	457	1.982E+01	498	1.679E+01	539	3.348E+01	580	4.981E+01
417	2.357E+00	458	1.849E+01	499	1.747E+01	540	3.373E+01	581	5.019E+01
418	2.681E+00	459	1.743E+01	500	1.815E+01	541	3.399E+01	582	5.068E+01
419	2.992E+00	460	1.648E+01	501	1.879E+01	542	3.435E+01	583	5.111E+01
420	3.354E+00	461	1.576E+01	502	1.940E+01	543	3.455E+01	584	5.160E+01

nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
585	5.200E+01	626	5.097E+01	667	2.409E+01	708	7.645E+00	749	2.247E+00
586	5.243E+01	627	5.035E+01	668	2.347E+01	709	7.397E+00	750	2.180E+00
587	5.287E+01	628	4.982E+01	669	2.296E+01	710	7.172E+00	751	2.138E+00
588	5.330E+01	629	4.928E+01	670	2.235E+01	711	6.953E+00	752	2.056E+00
589	5.369E+01	630	4.869E+01	671	2.182E+01	712	6.780E+00	753	1.987E+00
590	5.404E+01	631	4.804E+01	672	2.124E+01	713	6.582E+00	754	1.963E+00
591	5.438E+01	632	4.750E+01	673	2.066E+01	714	6.368E+00	755	1.888E+00
592	5.473E+01	633	4.680E+01	674	2.014E+01	715	6.196E+00	756	1.829E+00
593	5.496E+01	634	4.616E+01	675	1.969E+01	716	6.004E+00	757	1.791E+00
594	5.532E+01	635	4.551E+01	676	1.913E+01	717	5.843E+00	758	1.729E+00
595	5.564E+01	636	4.495E+01	677	1.864E+01	718	5.672E+00	759	1.682E+00
596	5.587E+01	637	4.428E+01	678	1.815E+01	719	5.505E+00	760	1.639E+00
597	5.605E+01	638	4.363E+01	679	1.767E+01	720	5.336E+00	761	1.597E+00
598	5.618E+01	639	4.292E+01	680	1.718E+01	721	5.158E+00	762	1.540E+00
599	5.635E+01	640	4.222E+01	681	1.675E+01	722	5.033E+00	763	1.509E+00
600	5.651E+01	641	4.150E+01	682	1.628E+01	723	4.889E+00	764	1.473E+00
601	5.669E+01	642	4.084E+01	683	1.584E+01	724	4.737E+00	765	1.416E+00
602	5.680E+01	643	4.015E+01	684	1.541E+01	725	4.582E+00	766	1.379E+00
603	5.687E+01	644	3.944E+01	685	1.494E+01	726	4.447E+00	767	1.335E+00
604	5.693E+01	645	3.873E+01	686	1.456E+01	727	4.306E+00	768	1.296E+00
605	5.693E+01	646	3.804E+01	687	1.415E+01	728	4.173E+00	769	1.280E+00
606	5.680E+01	647	3.731E+01	688	1.377E+01	729	4.046E+00	770	1.240E+00
607	5.679E+01	648	3.665E+01	689	1.337E+01	730	3.939E+00	771	1.201E+00
608	5.676E+01	649	3.591E+01	690	1.299E+01	731	3.806E+00	772	1.171E+00
609	5.662E+01	650	3.527E+01	691	1.263E+01	732	3.671E+00	773	1.139E+00
610	5.652E+01	651	3.452E+01	692	1.228E+01	733	3.603E+00	774	1.110E+00
611	5.631E+01	652	3.383E+01	693	1.192E+01	734	3.492E+00	775	1.078E+00
612	5.614E+01	653	3.313E+01	694	1.155E+01	735	3.370E+00	776	1.058E+00
613	5.585E+01	654	3.245E+01	695	1.127E+01	736	3.268E+00	777	1.028E+00
614	5.565E+01	655	3.180E+01	696	1.092E+01	737	3.186E+00	778	9.945E-01
615	5.541E+01	656	3.115E+01	697	1.059E+01	738	3.082E+00	779	9.940E-01
616	5.517E+01	657	3.046E+01	698	1.031E+01	739	2.993E+00	780	9.959E-01
617	5.481E+01	658	2.980E+01	699	9.975E+00	740	2.906E+00		
618	5.456E+01	659	2.908E+01	700	9.710E+00	741	2.811E+00		
619	5.411E+01	660	2.845E+01	701	9.420E+00	742	2.721E+00		
620	5.375E+01	661	2.782E+01	702	9.155E+00	743	2.651E+00		
621	5.331E+01	662	2.719E+01	703	8.919E+00	744	2.596E+00		
622	5.285E+01	663	2.654E+01	704	8.586E+00	745	2.508E+00		
623	5.238E+01	664	2.589E+01	705	8.373E+00	746	2.437E+00		
624	5.201E+01	665	2.530E+01	706	8.114E+00	747	2.365E+00		
625	5.144E+01	666	2.465E+01	707	7.848E+00	748	2.301E+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**

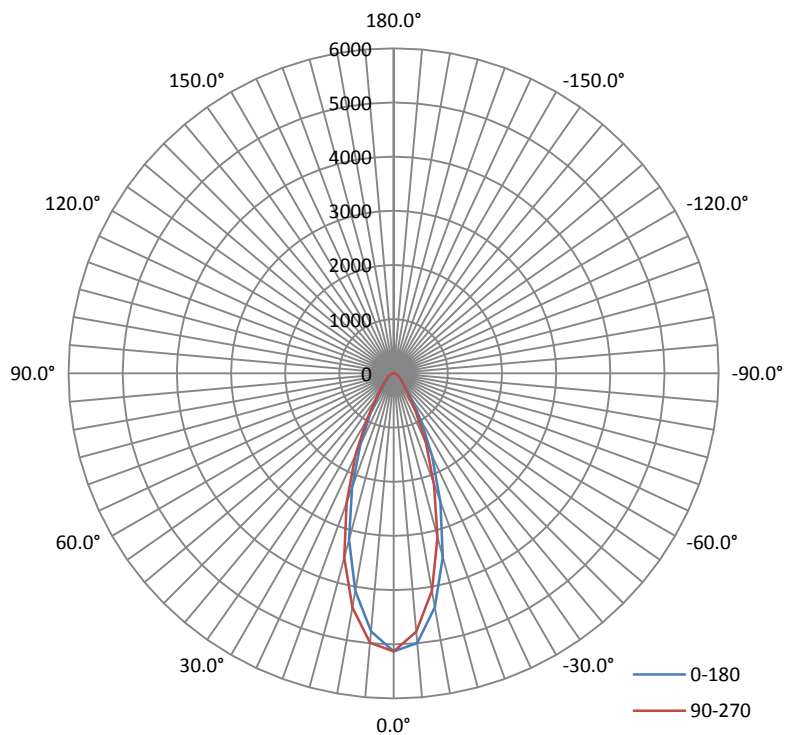
Electrical Measurement

Input Voltage (V)	Frequency (Hz)	Input Current (A)	Power (W)	Power Factor
120.0	60	0.1983	23.69	0.9956

Photometric Measurement

Luminous Flux (lm)	Efficacy (lm/W)	I _{max} (cd)	S/MH (C0/180)	S/MH (C90/270)
2866.14	120.99	5222.0	0.64	0.58

Luminous Intensity Distribution



	C0/180	C45/225	C90/270	C135/315	AVG.
Beam Angle (50% I _{max}):	37.9	37.8	37.7	37.7	37.8
Field Angle (10% I _{max}):	70.9	70.8	70.3	70.4	70.6

Luminous Intensity (cd) Distribution Data

C γ	0°	22.5°	45°	67.5°	90°	112.5°	135°	157.5°
0.0°	5131	5131	5131	5131	5131	5131	5131	5131
5.0°	4779	4790	4837	4908	4990	5067	5133	5167
10.0°	4074	4098	4163	4261	4387	4508	4611	4686
15.0°	3178	3199	3272	3380	3521	3655	3779	3860
20.0°	2238	2262	2313	2408	2539	2670	2779	2867
25.0°	1457	1471	1511	1571	1665	1764	1864	1935
30.0°	868	881	906	943	1002	1075	1149	1203
35.0°	502	512	528	542	581	613	654	690
40.0°	306	314	322	331	349	366	383	401
45.0°	218	222	227	233	241	248	256	264
50.0°	165	167	170	173	180	185	191	196
55.0°	130	131	133	136	140	143	146	150
60.0°	103	103	104	107	110	113	116	119
65.0°	78	79	81	83	86	88	91	93
70.0°	56	57	59	61	64	66	68	70
75.0°	37	37	39	41	43	45	47	48
80.0°	19	20	21	23	25	27	28	29
85.0°	6	6	7	8	10	11	13	14
90.0°	0	0	0	0	0	1	2	3
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°	1	1	1	1	1	1	1	1
135.0°	1	1	1	1	1	1	1	1
140.0°	2	2	2	2	2	2	2	2
145.0°	3	3	3	3	3	3	3	3
150.0°	4	4	4	4	4	4	4	4
155.0°	5	5	5	5	5	5	5	5
160.0°	6	6	6	6	6	6	6	6
165.0°	6	6	6	6	6	6	6	6
170.0°	5	6	6	6	6	6	6	6
175.0°	5	5	5	5	5	5	5	5
180.0°	4	4	4	4	4	4	4	4

Luminous Intensity (cd) Distribution Data (cont.)

C Y	180°	202.5°	225°	247.5°	270°	292.5°	315°	337.5°
0.0°	5131	5131	5131	5131	5131	5131	5131	5131
5.0°	4995	4966	4929	4857	4786	4726	4671	4633
10.0°	4382	4347	4282	4177	4074	3973	3894	3846
15.0°	3510	3467	3382	3263	3136	3019	2940	2896
20.0°	2526	2497	2415	2300	2182	2079	2020	1986
25.0°	1670	1647	1584	1488	1409	1338	1289	1267
30.0°	1025	1007	963	892	826	777	749	735
35.0°	581	577	547	505	469	442	426	420
40.0°	345	345	331	311	296	282	275	274
45.0°	237	238	231	221	213	206	201	200
50.0°	178	177	173	167	162	157	154	154
55.0°	138	138	135	130	127	124	122	122
60.0°	109	109	106	103	100	98	96	95
65.0°	84	84	82	79	76	74	73	72
70.0°	62	62	60	58	55	53	51	50
75.0°	42	41	40	38	35	34	32	32
80.0°	24	24	22	20	19	17	16	15
85.0°	9	9	8	7	5	4	3	3
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°	1	1	1	1	1	1	1	1
145.0°	1	1	1	1	1	1	1	1
150.0°	1	1	1	1	1	1	1	1
155.0°	2	2	2	2	2	2	2	2
160.0°	2	2	2	2	2	2	2	2
165.0°	2	2	2	2	2	2	2	2
170.0°	2	2	2	3	3	3	3	3
175.0°	3	3	3	3	3	3	3	3
180.0°	4	4	4	4	4	4	4	4

Zonal Lumen Density Measurement

Deg	Flux (lm)	%
0-5	119.8	4.18
5-10	325.7	11.36
10-15	447.4	15.61
15-20	467.2	16.30
20-25	406.6	14.19
25-30	309.8	10.81
30-35	210.6	7.35
35-40	139.3	4.86
40-45	100.6	3.51
45-50	79.9	2.79
50-55	66.0	2.30
55-60	55.1	1.92
60-65	45.3	1.58
65-70	35.6	1.24
70-75	25.7	0.90
75-80	16.3	0.57
80-85	7.8	0.27
85-90	1.9	0.07
90-95	0.1	0.00
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	0.1	0.00
120-125	0.1	0.01
125-130	0.1	0.00
130-135	0.2	0.01
135-140	0.4	0.01
140-145	0.6	0.02
145-150	0.7	0.03
150-155	0.8	0.03
155-160	0.8	0.03
160-165	0.7	0.02
165-170	0.5	0.02
170-175	0.3	0.01
175-180	0.1	0.00

Deg	Flux (lm)	%
0-5	119.8	4.18
0-10	445.5	15.54
0-15	892.9	31.15
0-20	1360.1	47.45
0-25	1766.7	61.64
0-30	2076.5	72.45
0-35	2287.1	79.80
0-40	2426.5	84.66
0-45	2527.1	88.17
0-50	2606.9	90.96
0-55	2672.9	93.26
0-60	2728.1	95.18
0-65	2773.3	96.76
0-70	2808.9	98.00
0-75	2834.6	98.90
0-80	2850.9	99.47
0-85	2858.7	99.74
0-90	2860.6	99.81
0-95	2860.6	99.81
0-100	2860.6	99.81
0-105	2860.7	99.81
0-110	2860.7	99.81
0-115	2860.8	99.81
0-120	2860.8	99.81
0-125	2860.9	99.82
0-130	2861.0	99.82
0-135	2861.3	99.83
0-140	2861.7	99.84
0-145	2862.2	99.86
0-150	2862.9	99.89
0-155	2863.8	99.92
0-160	2864.6	99.95
0-165	2865.3	99.97
0-170	2865.8	99.99
0-175	2866.0	100.00
0-180	2866.1	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.
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*****