

# 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/835NF25/277V/SD**

<b>Report Type:</b>	Electrical and Photometric tests including: Luminous Flux, Chromaticity, Luminous Intensity Distribution
<b>Reviewed By:</b>	James Liang <i>James Liang</i>
<b>Report Number:</b>	KS2220711-31381E-EE-1
<b>Test Date:</b>	2022-07-13 to 2022-07-14
<b>Report Date:</b>	2022-09-22
<b>Approved by:</b>	Bill Xiong / 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<sup>#</sup>

### 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/835NF25/277V/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: 3500K  
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.

$4\pi$  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  $U=21\text{K}$  ( $K=2$ ), 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 ( $\gamma$ ) 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**

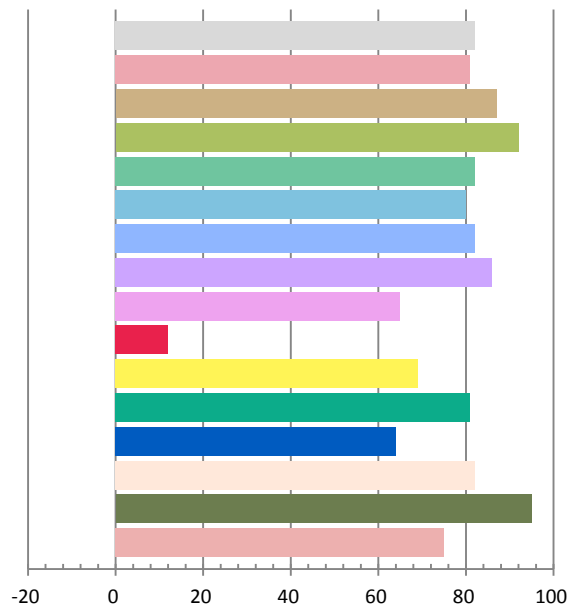
### Photometric and Electrical Measurement Result

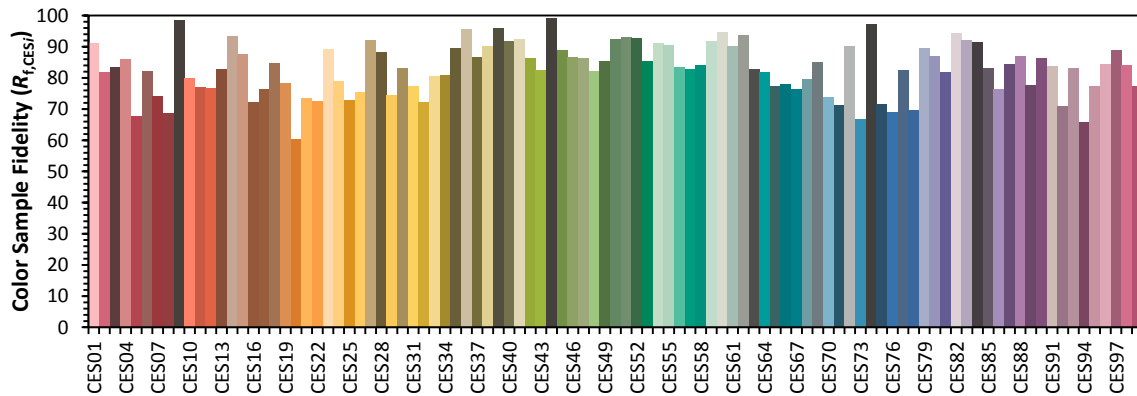
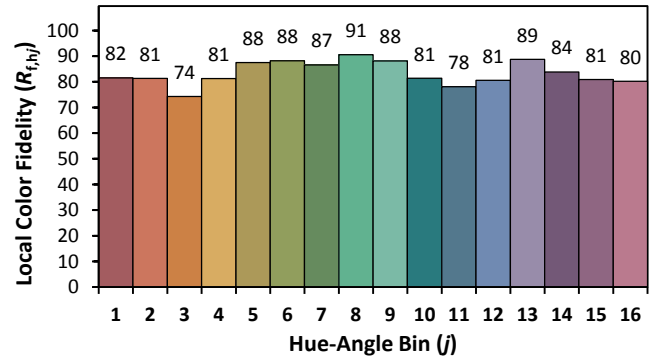
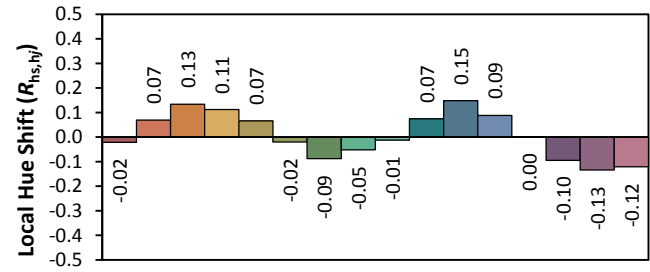
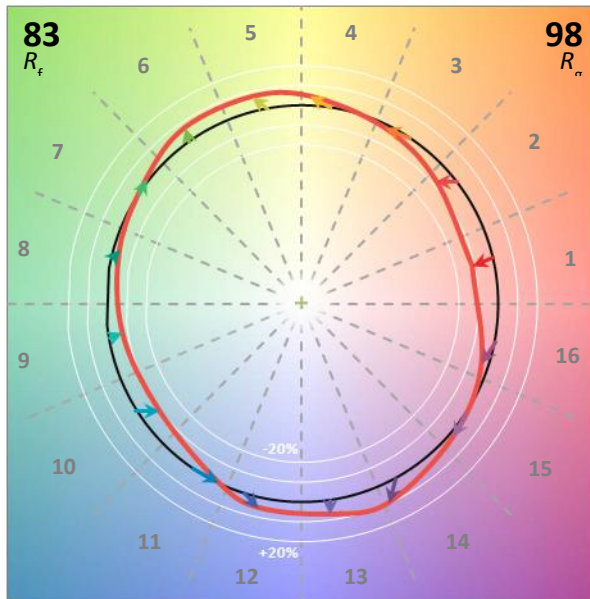
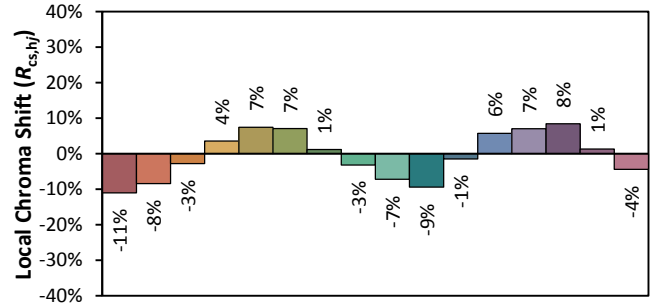
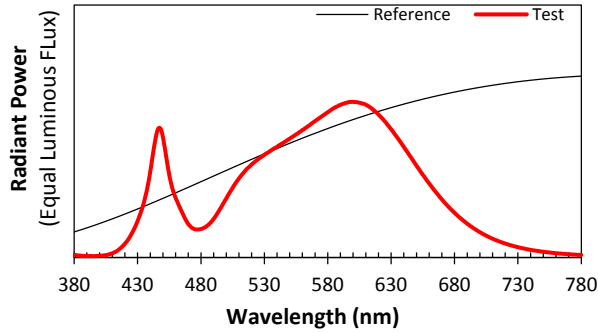
Voltage (V)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Luminous Flux(lm)	Efficacy (lm/W)
120.0	60	0.1997	23.81	0.9933	3052.5	128.20

Radiant Flux (W)	CCT (K)	Duv	x	y	u'	v'
9.3314	3500	0.0003620	0.4057	0.3917	0.2355	0.5117

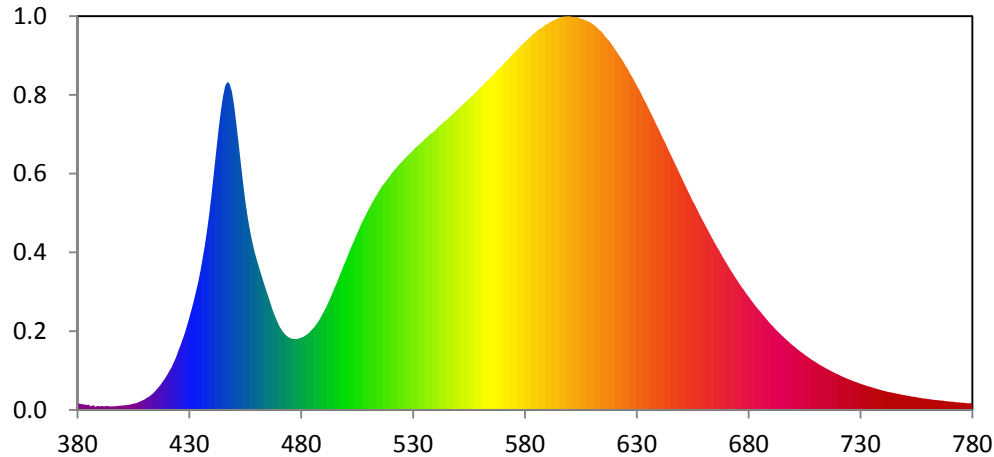
### Color Rendering Index

<b>Ra</b>			
82.0			
<b>R1</b>	<b>R2</b>	<b>R3</b>	<b>R4</b>
81	87	92	82
<b>R5</b>	<b>R6</b>	<b>R7</b>	<b>R8</b>
80	82	86	65
<b>R9</b>	<b>R10</b>	<b>R11</b>	<b>R12</b>
12	69	81	64
<b>R13</b>	<b>R14</b>	<b>R15</b>	
82	95	75	





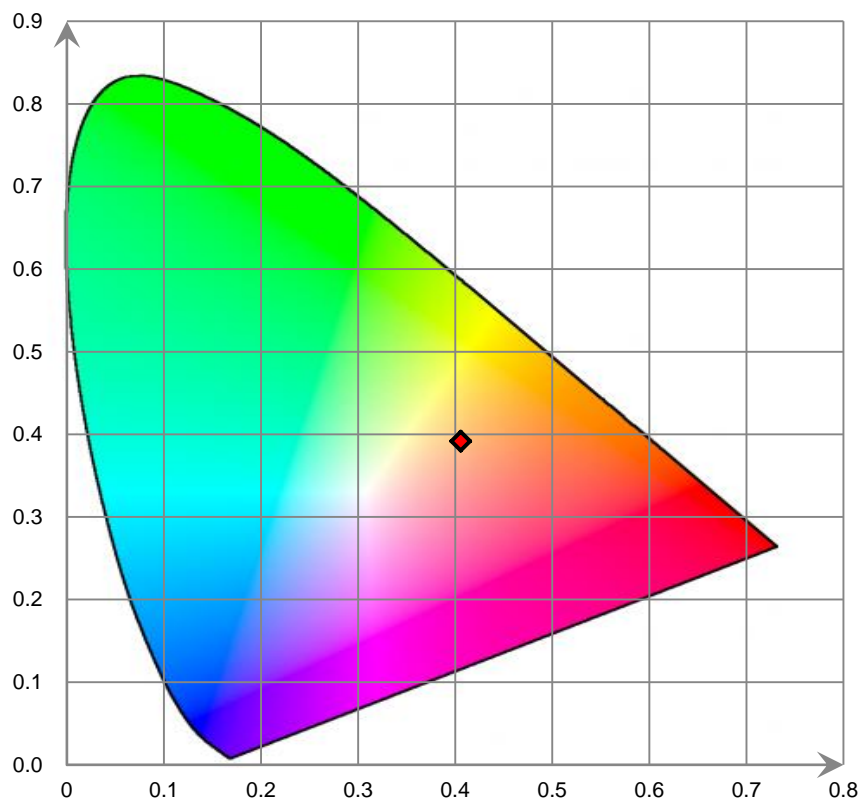
Relative Spectral Power Distribution



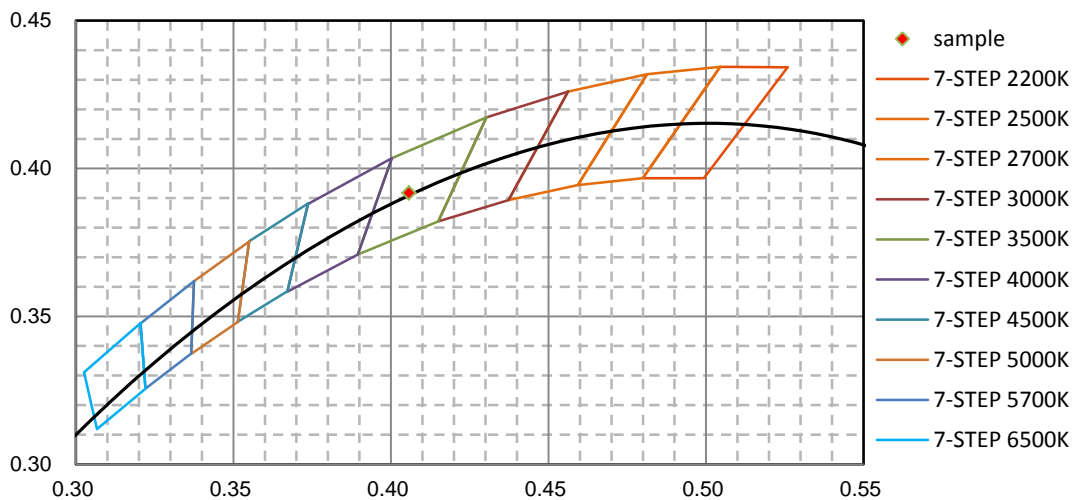
nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
380	8.924E-01	421	5.444E+00	462	1.906E+01	503	2.326E+01	544	4.037E+01
381	9.009E-01	422	5.976E+00	463	1.803E+01	504	2.397E+01	545	4.062E+01
382	7.963E-01	423	6.666E+00	464	1.706E+01	505	2.471E+01	546	4.095E+01
383	7.768E-01	424	7.374E+00	465	1.611E+01	506	2.543E+01	547	4.120E+01
384	6.915E-01	425	8.190E+00	466	1.517E+01	507	2.615E+01	548	4.151E+01
385	7.294E-01	426	8.997E+00	467	1.419E+01	508	2.679E+01	549	4.182E+01
386	4.868E-01	427	9.865E+00	468	1.332E+01	509	2.740E+01	550	4.207E+01
387	6.663E-01	428	1.078E+01	469	1.259E+01	510	2.803E+01	551	4.241E+01
388	4.539E-01	429	1.182E+01	470	1.185E+01	511	2.861E+01	552	4.267E+01
389	5.585E-01	430	1.292E+01	471	1.131E+01	512	2.916E+01	553	4.296E+01
390	5.127E-01	431	1.406E+01	472	1.086E+01	513	2.972E+01	554	4.327E+01
391	5.472E-01	432	1.528E+01	473	1.049E+01	514	3.021E+01	555	4.357E+01
392	4.913E-01	433	1.660E+01	474	1.024E+01	515	3.078E+01	556	4.386E+01
393	5.738E-01	434	1.794E+01	475	1.004E+01	516	3.127E+01	557	4.415E+01
394	5.011E-01	435	1.950E+01	476	9.961E+00	517	3.171E+01	558	4.449E+01
395	4.788E-01	436	2.132E+01	477	9.947E+00	518	3.206E+01	559	4.474E+01
396	5.202E-01	437	2.316E+01	478	9.922E+00	519	3.250E+01	560	4.516E+01
397	5.108E-01	438	2.533E+01	479	1.001E+01	520	3.295E+01	561	4.532E+01
398	5.864E-01	439	2.768E+01	480	1.011E+01	521	3.336E+01	562	4.575E+01
399	5.673E-01	440	3.039E+01	481	1.023E+01	522	3.371E+01	563	4.600E+01
400	6.209E-01	441	3.330E+01	482	1.046E+01	523	3.408E+01	564	4.636E+01
401	6.401E-01	442	3.623E+01	483	1.067E+01	524	3.446E+01	565	4.664E+01
402	6.974E-01	443	3.911E+01	484	1.094E+01	525	3.475E+01	566	4.697E+01
403	7.246E-01	444	4.168E+01	485	1.130E+01	526	3.511E+01	567	4.735E+01
404	8.042E-01	445	4.384E+01	486	1.164E+01	527	3.544E+01	568	4.768E+01
405	8.609E-01	446	4.537E+01	487	1.209E+01	528	3.572E+01	569	4.796E+01
406	9.423E-01	447	4.592E+01	488	1.257E+01	529	3.604E+01	570	4.826E+01
407	1.045E+00	448	4.568E+01	489	1.310E+01	530	3.637E+01	571	4.868E+01
408	1.187E+00	449	4.459E+01	490	1.370E+01	531	3.670E+01	572	4.896E+01
409	1.337E+00	450	4.263E+01	491	1.427E+01	532	3.697E+01	573	4.930E+01
410	1.481E+00	451	4.007E+01	492	1.497E+01	533	3.723E+01	574	4.965E+01
411	1.687E+00	452	3.736E+01	493	1.567E+01	534	3.752E+01	575	5.000E+01
412	1.888E+00	453	3.451E+01	494	1.639E+01	535	3.784E+01	576	5.026E+01
413	2.128E+00	454	3.179E+01	495	1.716E+01	536	3.814E+01	577	5.060E+01
414	2.380E+00	455	2.927E+01	496	1.786E+01	537	3.843E+01	578	5.094E+01
415	2.752E+00	456	2.710E+01	497	1.867E+01	538	3.871E+01	579	5.125E+01
416	3.106E+00	457	2.527E+01	498	1.945E+01	539	3.890E+01	580	5.153E+01
417	3.492E+00	458	2.369E+01	499	2.021E+01	540	3.919E+01	581	5.182E+01
418	3.931E+00	459	2.229E+01	500	2.095E+01	541	3.954E+01	582	5.214E+01
419	4.387E+00	460	2.114E+01	501	2.178E+01	542	3.982E+01	583	5.238E+01
420	4.880E+00	461	2.011E+01	502	2.254E+01	543	4.011E+01	584	5.270E+01

nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
585	5.294E+01	626	4.773E+01	667	2.224E+01	708	7.085E+00	749	2.108E+00
586	5.322E+01	627	4.706E+01	668	2.163E+01	709	6.863E+00	750	2.055E+00
587	5.342E+01	628	4.656E+01	669	2.111E+01	710	6.685E+00	751	1.988E+00
588	5.359E+01	629	4.598E+01	670	2.059E+01	711	6.474E+00	752	1.939E+00
589	5.390E+01	630	4.542E+01	671	2.007E+01	712	6.286E+00	753	1.869E+00
590	5.403E+01	631	4.484E+01	672	1.953E+01	713	6.117E+00	754	1.841E+00
591	5.425E+01	632	4.423E+01	673	1.906E+01	714	5.928E+00	755	1.790E+00
592	5.441E+01	633	4.358E+01	674	1.855E+01	715	5.745E+00	756	1.733E+00
593	5.454E+01	634	4.303E+01	675	1.809E+01	716	5.593E+00	757	1.670E+00
594	5.470E+01	635	4.236E+01	676	1.761E+01	717	5.407E+00	758	1.618E+00
595	5.483E+01	636	4.177E+01	677	1.714E+01	718	5.265E+00	759	1.591E+00
596	5.494E+01	637	4.112E+01	678	1.672E+01	719	5.103E+00	760	1.533E+00
597	5.508E+01	638	4.048E+01	679	1.624E+01	720	4.961E+00	761	1.501E+00
598	5.509E+01	639	3.981E+01	680	1.586E+01	721	4.812E+00	762	1.453E+00
599	5.511E+01	640	3.917E+01	681	1.541E+01	722	4.657E+00	763	1.410E+00
600	5.514E+01	641	3.848E+01	682	1.500E+01	723	4.529E+00	764	1.396E+00
601	5.505E+01	642	3.785E+01	683	1.458E+01	724	4.391E+00	765	1.338E+00
602	5.503E+01	643	3.722E+01	684	1.418E+01	725	4.260E+00	766	1.309E+00
603	5.501E+01	644	3.652E+01	685	1.383E+01	726	4.141E+00	767	1.285E+00
604	5.492E+01	645	3.588E+01	686	1.344E+01	727	4.013E+00	768	1.231E+00
605	5.478E+01	646	3.521E+01	687	1.305E+01	728	3.911E+00	769	1.204E+00
606	5.471E+01	647	3.455E+01	688	1.272E+01	729	3.777E+00	770	1.163E+00
607	5.456E+01	648	3.389E+01	689	1.233E+01	730	3.660E+00	771	1.153E+00
608	5.446E+01	649	3.321E+01	690	1.198E+01	731	3.561E+00	772	1.107E+00
609	5.431E+01	650	3.254E+01	691	1.167E+01	732	3.460E+00	773	1.069E+00
610	5.410E+01	651	3.188E+01	692	1.130E+01	733	3.342E+00	774	1.053E+00
611	5.388E+01	652	3.125E+01	693	1.100E+01	734	3.259E+00	775	1.029E+00
612	5.360E+01	653	3.055E+01	694	1.071E+01	735	3.168E+00	776	1.000E+00
613	5.328E+01	654	2.993E+01	695	1.038E+01	736	3.063E+00	777	9.653E-01
614	5.302E+01	655	2.928E+01	696	1.011E+01	737	2.968E+00	778	9.454E-01
615	5.266E+01	656	2.872E+01	697	9.803E+00	738	2.884E+00	779	9.394E-01
616	5.222E+01	657	2.806E+01	698	9.532E+00	739	2.796E+00	780	9.412E-01
617	5.192E+01	658	2.742E+01	699	9.233E+00	740	2.712E+00		
618	5.153E+01	659	2.681E+01	700	8.990E+00	741	2.648E+00		
619	5.108E+01	660	2.623E+01	701	8.731E+00	742	2.556E+00		
620	5.060E+01	661	2.564E+01	702	8.444E+00	743	2.491E+00		
621	5.017E+01	662	2.507E+01	703	8.211E+00	744	2.425E+00		
622	4.969E+01	663	2.443E+01	704	7.997E+00	745	2.364E+00		
623	4.924E+01	664	2.389E+01	705	7.740E+00	746	2.308E+00		
624	4.875E+01	665	2.329E+01	706	7.521E+00	747	2.234E+00		
625	4.818E+01	666	2.277E+01	707	7.291E+00	748	2.168E+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**

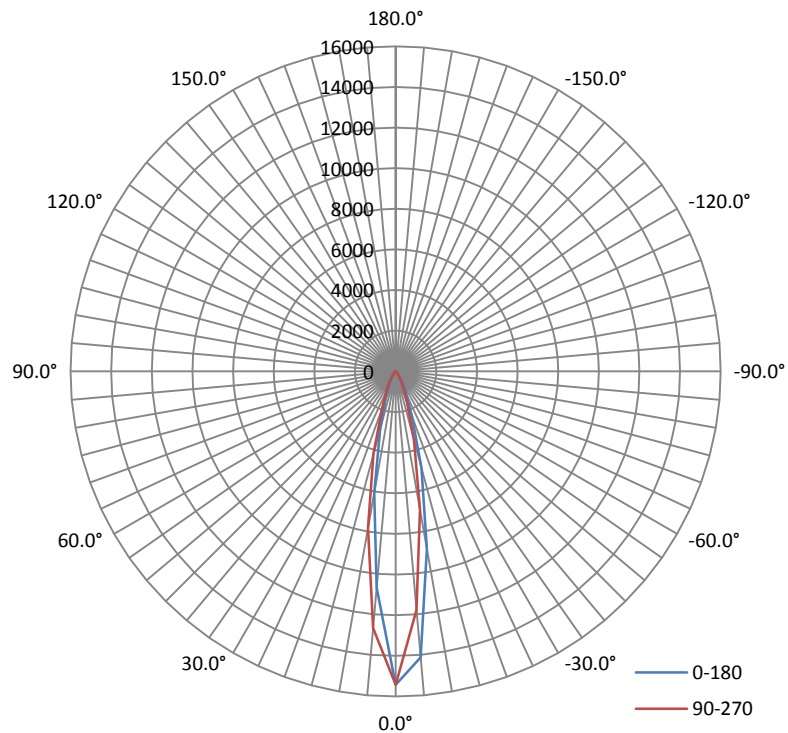
**Electrical Measurement**

Input Voltage (V)	Frequency (Hz)	Input Current (A)	Power (W)	Power Factor
120.0	60	0.1998	23.82	0.9935

**Photometric Measurement**

Luminous Flux (lm)	Efficacy (lm/W)	I <sub>max</sub> (cd)	S/MH (C0/180)	S/MH (C90/270)
3054.15	128.22	16681.0	0.38	0.31

**Luminous Intensity Distribution**



	C0/180	C45/225	C90/270	C135/315	AVG.
Beam Angle (50% I <sub>max</sub> ):	18.9	18.7	19.2	19.1	19.0
Field Angle (10% I <sub>max</sub> ):	41.9	42.1	42.3	41.9	42.1

**Luminous Intensity (cd) Distribution Data**

C Y	0°	22.5°	45°	67.5°	90°	112.5°	135°	157.5°
0.0°	15422	15422	15422	15422	15422	15422	15422	15422
5.0°	10686	10685	11062	11688	12682	13878	15062	15952
10.0°	6077	6112	6408	6961	7813	8779	9847	10871
15.0°	2951	2996	3229	3620	4212	4903	5626	6260
20.0°	1413	1446	1538	1701	1944	2268	2661	3018
25.0°	830	862	920	993	1090	1203	1346	1479
30.0°	465	497	538	586	635	704	793	874
35.0°	246	265	288	307	334	369	424	481
40.0°	131	140	151	160	173	196	225	256
45.0°	87	89	94	97	101	108	122	137
50.0°	69	69	70	71	75	80	87	91
55.0°	56	57	58	58	61	65	70	73
60.0°	45	46	47	48	50	53	56	58
65.0°	37	37	38	39	41	44	45	46
70.0°	28	29	30	31	33	35	37	37
75.0°	21	21	22	23	25	26	28	29
80.0°	13	13	14	15	17	19	20	21
85.0°	5	5	6	7	9	11	12	13
90.0°	0	0	0	0	0	2	3	4
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	0	0	0	0	0	0	0
135.0°	1	1	1	1	1	1	1	1
140.0°	3	3	3	2	2	2	2	2
145.0°	5	5	5	5	4	4	4	4
150.0°	7	7	7	7	7	6	6	6
155.0°	9	9	9	9	9	8	8	8
160.0°	9	9	10	10	10	10	10	10
165.0°	9	9	9	9	10	10	10	10
170.0°	7	7	8	8	8	9	9	9
175.0°	5	5	6	6	7	7	7	7
180.0°	3	4	4	4	5	5	5	5

**Luminous Intensity (cd) Distribution Data (cont.)**

$\begin{matrix} C \\ \backslash \\ Y \end{matrix}$	180°	202.5°	225°	247.5°	270°	292.5°	315°	337.5°
0.0°	15422	15422	15422	15422	15422	15422	15422	15422
5.0°	14127	13995	13452	12553	11788	11013	10397	9942
10.0°	8877	8686	8225	7623	6898	6252	5744	5445
15.0°	4903	4784	4469	3988	3479	3017	2694	2511
20.0°	2325	2294	2123	1869	1634	1483	1354	1313
25.0°	1238	1239	1152	1041	925	826	766	744
30.0°	725	730	688	606	512	441	405	394
35.0°	393	398	373	317	264	232	215	209
40.0°	207	215	199	168	146	126	121	119
45.0°	114	117	113	101	92	89	86	85
50.0°	79	79	77	74	72	70	69	69
55.0°	64	64	63	60	59	57	56	55
60.0°	51	51	50	49	48	47	46	45
65.0°	42	42	41	40	39	38	37	36
70.0°	33	33	32	32	31	29	28	28
75.0°	25	25	24	23	22	21	20	20
80.0°	18	18	17	16	15	13	12	12
85.0°	10	10	9	8	7	5	4	3
90.0°	2	1	1	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	1	1	1	1	1	1	1
145.0°	1	1	1	1	1	1	2	2
150.0°	2	2	2	2	2	2	2	2
155.0°	2	2	2	3	3	3	3	3
160.0°	2	2	3	3	3	3	3	3
165.0°	2	2	2	3	3	3	3	3
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	5	5	5

**Zonal Lumen Density Measurement**

Deg	Flux (lm)	%	Deg	Flux (lm)	%
0-5	330.2	10.81	0-5	330.2	10.81
5-10	690.7	22.62	0-10	1020.9	33.43
10-15	656.0	21.48	0-15	1676.9	54.91
15-20	454.9	14.89	0-20	2131.8	69.80
20-25	292.0	9.56	0-25	2423.8	79.36
25-30	202.2	6.62	0-30	2625.9	85.98
30-35	130.9	4.28	0-35	2756.8	90.26
35-40	78.9	2.59	0-40	2835.7	92.85
40-45	48.4	1.58	0-45	2884.0	94.43
45-50	35.0	1.15	0-50	2919.0	95.58
50-55	29.4	0.96	0-55	2948.4	96.54
55-60	25.4	0.83	0-60	2973.8	97.37
60-65	21.6	0.71	0-65	2995.4	98.08
65-70	18.1	0.59	0-70	3013.6	98.67
70-75	14.4	0.47	0-75	3027.9	99.14
75-80	10.5	0.35	0-80	3038.4	99.49
80-85	6.4	0.20	0-85	3044.8	99.69
85-90	2.1	0.07	0-90	3046.9	99.76
90-95	0.1	0.01	0-95	3047.0	99.77
95-100	0.0	0.00	0-100	3047.0	99.77
100-105	0.0	0.00	0-105	3047.0	99.77
105-110	0.0	0.00	0-110	3047.0	99.77
110-115	0.0	0.00	0-115	3047.1	99.77
115-120	0.0	0.00	0-120	3047.1	99.77
120-125	0.1	0.00	0-125	3047.2	99.77
125-130	0.1	0.00	0-130	3047.2	99.77
130-135	0.2	0.01	0-135	3047.4	99.78
135-140	0.4	0.01	0-140	3047.8	99.79
140-145	0.7	0.02	0-145	3048.5	99.81
145-150	1.0	0.04	0-150	3049.5	99.85
150-155	1.2	0.04	0-155	3050.8	99.89
155-160	1.2	0.04	0-160	3052.0	99.93
160-165	1.0	0.03	0-165	3053.0	99.96
165-170	0.7	0.02	0-170	3053.7	99.98
170-175	0.4	0.02	0-175	3054.0	100.00
175-180	0.1	0.00	0-180	3054.1	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\*\*\*\*\*