

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/840NF25/277V/SD

Report Type:	Electrical and Photometric tests including: Luminous Flux, Chromaticity, Luminous Intensity Distribution
Reviewed By:	James Liang <i>James Liang</i>
Report Number:	KS2220711-31383E-EE-1
Test Date:	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/840NF25/277V/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: 4000K
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**

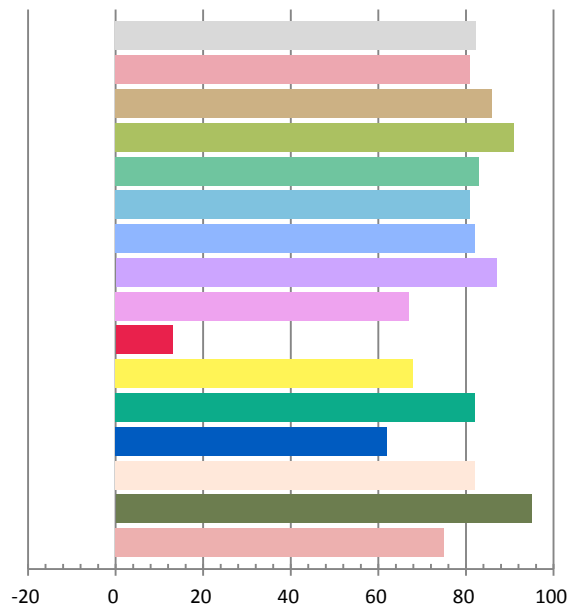
Photometric and Electrical Measurement Result

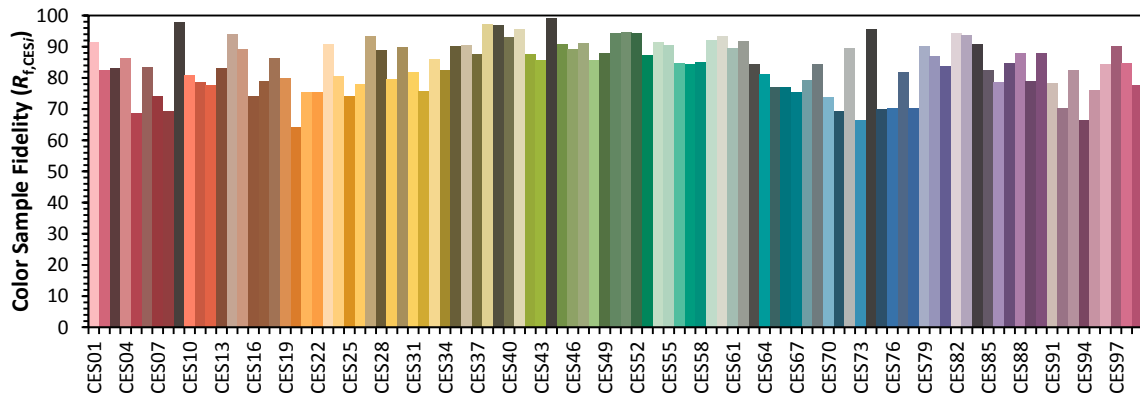
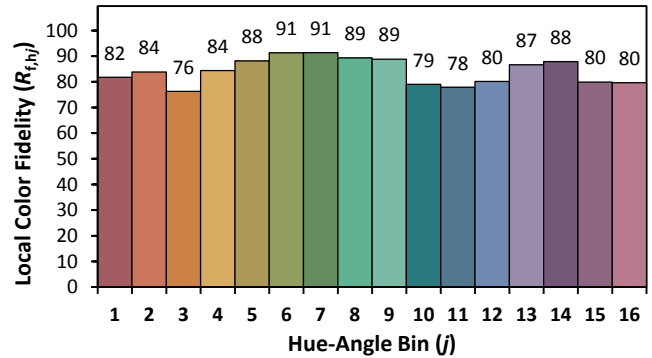
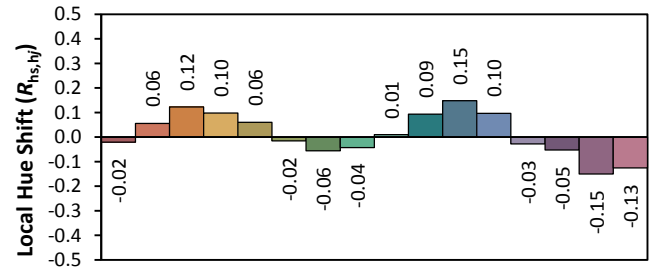
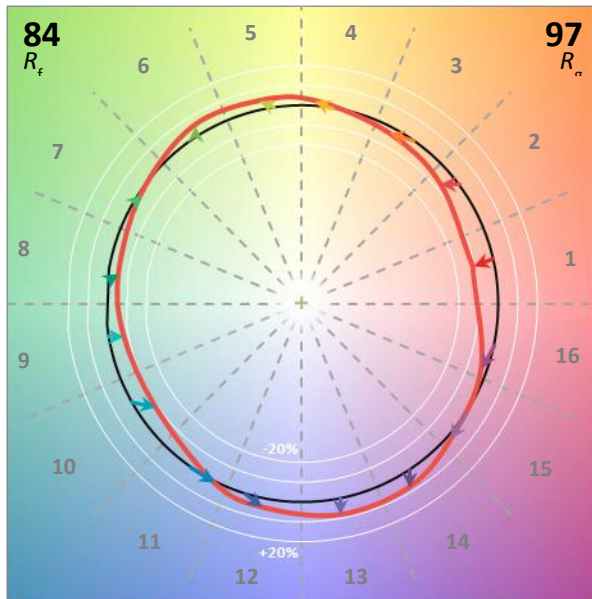
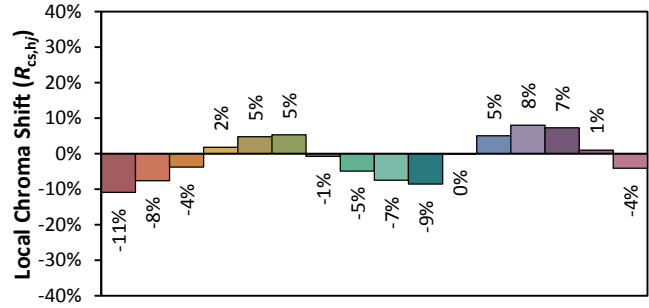
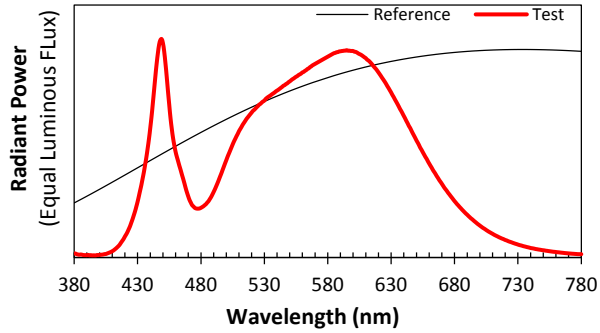
Voltage (V)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Luminous Flux(lm)	Efficacy (lm/W)
120.1	60	0.2006	23.97	0.9954	3197.9	133.40

Radiant Flux (W)	CCT (K)	Duv	x	y	u'	v'
9.7718	3951	0.00214	0.3842	0.3837	0.2248	0.5052

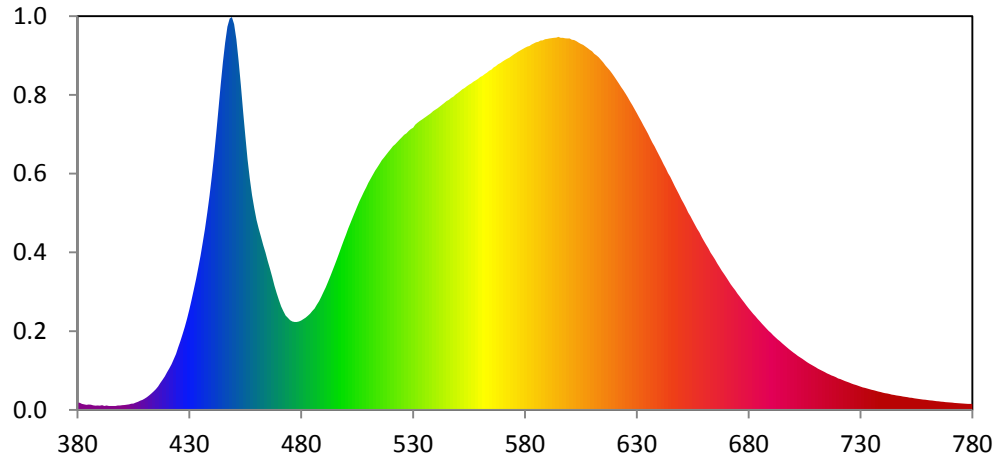
Color Rendering Index

Ra			
82.3			
R1	R2	R3	R4
81	86	91	83
R5	R6	R7	R8
81	82	87	67
R9	R10	R11	R12
13	68	82	62
R13	R14	R15	
82	95	75	





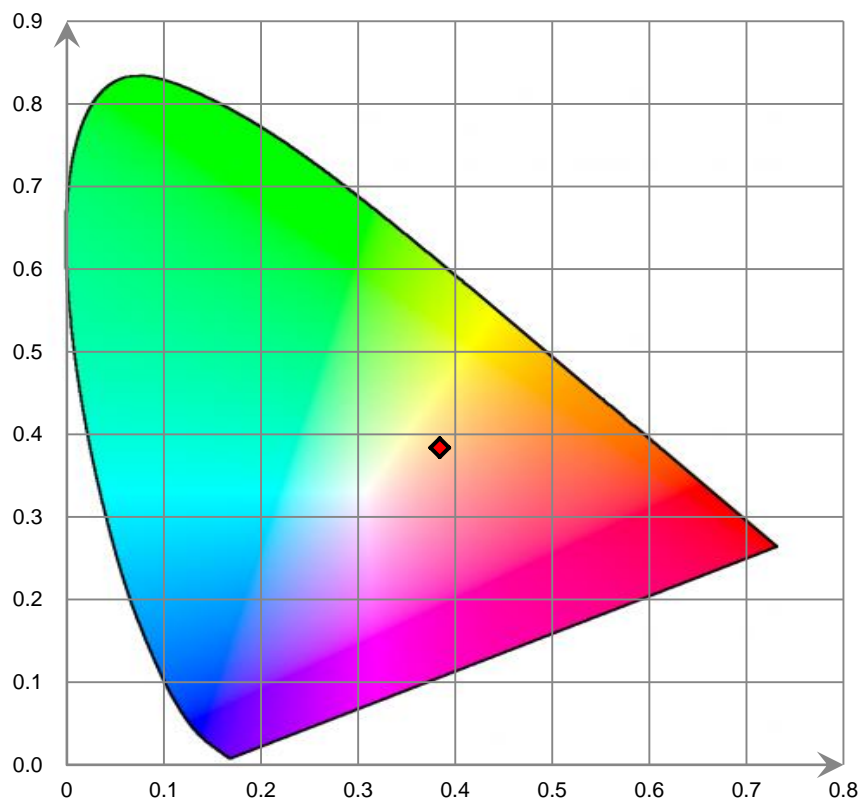
Relative Spectral Power Distribution



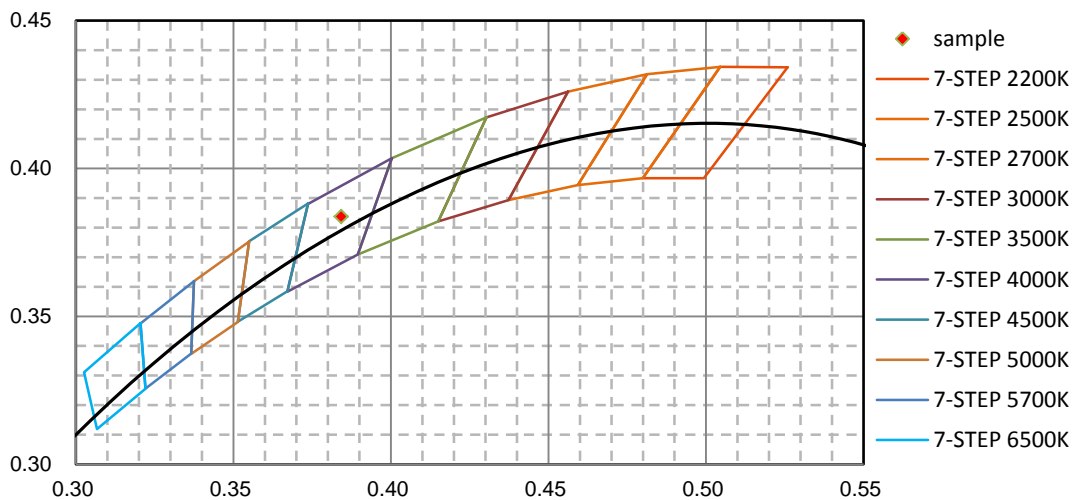
nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
380	1.054E+00	421	5.990E+00	462	2.499E+01	503	2.776E+01	544	4.430E+01
381	1.038E+00	422	6.610E+00	463	2.379E+01	504	2.855E+01	545	4.459E+01
382	8.785E-01	423	7.342E+00	464	2.271E+01	505	2.936E+01	546	4.476E+01
383	7.981E-01	424	8.090E+00	465	2.150E+01	506	3.011E+01	547	4.503E+01
384	7.334E-01	425	9.001E+00	466	2.039E+01	507	3.079E+01	548	4.521E+01
385	7.867E-01	426	9.931E+00	467	1.921E+01	508	3.147E+01	549	4.551E+01
386	7.540E-01	427	1.094E+01	468	1.795E+01	509	3.210E+01	550	4.573E+01
387	6.620E-01	428	1.200E+01	469	1.686E+01	510	3.280E+01	551	4.599E+01
388	6.278E-01	429	1.319E+01	470	1.585E+01	511	3.337E+01	552	4.626E+01
389	6.313E-01	430	1.446E+01	471	1.494E+01	512	3.393E+01	553	4.646E+01
390	6.068E-01	431	1.589E+01	472	1.426E+01	513	3.452E+01	554	4.670E+01
391	6.916E-01	432	1.737E+01	473	1.362E+01	514	3.501E+01	555	4.694E+01
392	5.679E-01	433	1.885E+01	474	1.329E+01	515	3.551E+01	556	4.712E+01
393	6.297E-01	434	2.052E+01	475	1.294E+01	516	3.603E+01	557	4.739E+01
394	5.621E-01	435	2.223E+01	476	1.276E+01	517	3.643E+01	558	4.757E+01
395	5.782E-01	436	2.417E+01	477	1.270E+01	518	3.685E+01	559	4.777E+01
396	5.657E-01	437	2.616E+01	478	1.270E+01	519	3.726E+01	560	4.806E+01
397	5.630E-01	438	2.841E+01	479	1.275E+01	520	3.766E+01	561	4.820E+01
398	6.498E-01	439	3.084E+01	480	1.291E+01	521	3.808E+01	562	4.847E+01
399	6.454E-01	440	3.358E+01	481	1.311E+01	522	3.835E+01	563	4.866E+01
400	6.913E-01	441	3.655E+01	482	1.332E+01	523	3.869E+01	564	4.895E+01
401	7.188E-01	442	3.986E+01	483	1.361E+01	524	3.904E+01	565	4.912E+01
402	7.525E-01	443	4.338E+01	484	1.388E+01	525	3.936E+01	566	4.943E+01
403	8.064E-01	444	4.692E+01	485	1.429E+01	526	3.971E+01	567	4.962E+01
404	8.922E-01	445	5.018E+01	486	1.465E+01	527	3.993E+01	568	4.990E+01
405	9.216E-01	446	5.301E+01	487	1.519E+01	528	4.026E+01	569	5.005E+01
406	1.056E+00	447	5.529E+01	488	1.571E+01	529	4.053E+01	570	5.030E+01
407	1.179E+00	448	5.647E+01	489	1.635E+01	530	4.074E+01	571	5.049E+01
408	1.321E+00	449	5.672E+01	490	1.703E+01	531	4.116E+01	572	5.069E+01
409	1.461E+00	450	5.566E+01	491	1.772E+01	532	4.144E+01	573	5.085E+01
410	1.643E+00	451	5.351E+01	492	1.850E+01	533	4.169E+01	574	5.108E+01
411	1.842E+00	452	5.040E+01	493	1.927E+01	534	4.190E+01	575	5.130E+01
412	2.104E+00	453	4.693E+01	494	2.010E+01	535	4.213E+01	576	5.151E+01
413	2.375E+00	454	4.312E+01	495	2.095E+01	536	4.238E+01	577	5.173E+01
414	2.678E+00	455	3.956E+01	496	2.178E+01	537	4.261E+01	578	5.191E+01
415	3.005E+00	456	3.616E+01	497	2.267E+01	538	4.283E+01	579	5.208E+01
416	3.387E+00	457	3.338E+01	498	2.356E+01	539	4.312E+01	580	5.228E+01
417	3.893E+00	458	3.101E+01	499	2.444E+01	540	4.334E+01	581	5.244E+01
418	4.352E+00	459	2.910E+01	500	2.529E+01	541	4.355E+01	582	5.254E+01
419	4.838E+00	460	2.743E+01	501	2.618E+01	542	4.380E+01	583	5.274E+01
420	5.456E+00	461	2.613E+01	502	2.696E+01	543	4.406E+01	584	5.289E+01

nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
585	5.306E+01	626	4.510E+01	667	2.063E+01	708	6.534E+00	749	1.933E+00
586	5.314E+01	627	4.451E+01	668	2.009E+01	709	6.339E+00	750	1.889E+00
587	5.330E+01	628	4.398E+01	669	1.963E+01	710	6.159E+00	751	1.847E+00
588	5.334E+01	629	4.341E+01	670	1.914E+01	711	5.964E+00	752	1.779E+00
589	5.350E+01	630	4.284E+01	671	1.863E+01	712	5.788E+00	753	1.744E+00
590	5.354E+01	631	4.222E+01	672	1.812E+01	713	5.623E+00	754	1.683E+00
591	5.361E+01	632	4.166E+01	673	1.769E+01	714	5.469E+00	755	1.642E+00
592	5.365E+01	633	4.104E+01	674	1.726E+01	715	5.287E+00	756	1.594E+00
593	5.371E+01	634	4.045E+01	675	1.678E+01	716	5.144E+00	757	1.547E+00
594	5.372E+01	635	3.986E+01	676	1.637E+01	717	4.984E+00	758	1.504E+00
595	5.384E+01	636	3.923E+01	677	1.593E+01	718	4.859E+00	759	1.472E+00
596	5.369E+01	637	3.858E+01	678	1.551E+01	719	4.724E+00	760	1.431E+00
597	5.371E+01	638	3.802E+01	679	1.508E+01	720	4.555E+00	761	1.387E+00
598	5.364E+01	639	3.739E+01	680	1.465E+01	721	4.457E+00	762	1.360E+00
599	5.363E+01	640	3.676E+01	681	1.427E+01	722	4.300E+00	763	1.314E+00
600	5.362E+01	641	3.614E+01	682	1.386E+01	723	4.169E+00	764	1.273E+00
601	5.344E+01	642	3.547E+01	683	1.352E+01	724	4.055E+00	765	1.243E+00
602	5.339E+01	643	3.485E+01	684	1.313E+01	725	3.946E+00	766	1.206E+00
603	5.323E+01	644	3.417E+01	685	1.279E+01	726	3.816E+00	767	1.166E+00
604	5.301E+01	645	3.363E+01	686	1.242E+01	727	3.702E+00	768	1.135E+00
605	5.283E+01	646	3.296E+01	687	1.208E+01	728	3.588E+00	769	1.105E+00
606	5.268E+01	647	3.229E+01	688	1.174E+01	729	3.491E+00	770	1.075E+00
607	5.247E+01	648	3.168E+01	689	1.140E+01	730	3.375E+00	771	1.045E+00
608	5.223E+01	649	3.105E+01	690	1.112E+01	731	3.262E+00	772	1.016E+00
609	5.198E+01	650	3.039E+01	691	1.078E+01	732	3.179E+00	773	9.889E-01
610	5.176E+01	651	2.981E+01	692	1.048E+01	733	3.097E+00	774	9.690E-01
611	5.140E+01	652	2.918E+01	693	1.017E+01	734	2.987E+00	775	9.411E-01
612	5.117E+01	653	2.849E+01	694	9.921E+00	735	2.898E+00	776	9.198E-01
613	5.088E+01	654	2.795E+01	695	9.618E+00	736	2.825E+00	777	8.897E-01
614	5.052E+01	655	2.733E+01	696	9.342E+00	737	2.731E+00	778	8.787E-01
615	5.014E+01	656	2.674E+01	697	9.072E+00	738	2.656E+00	779	8.712E-01
616	4.972E+01	657	2.614E+01	698	8.786E+00	739	2.576E+00	780	8.729E-01
617	4.933E+01	658	2.562E+01	699	8.541E+00	740	2.478E+00		
618	4.897E+01	659	2.499E+01	700	8.289E+00	741	2.421E+00		
619	4.853E+01	660	2.441E+01	701	8.048E+00	742	2.366E+00		
620	4.807E+01	661	2.385E+01	702	7.796E+00	743	2.296E+00		
621	4.759E+01	662	2.331E+01	703	7.591E+00	744	2.213E+00		
622	4.711E+01	663	2.270E+01	704	7.380E+00	745	2.164E+00		
623	4.659E+01	664	2.221E+01	705	7.147E+00	746	2.098E+00		
624	4.613E+01	665	2.169E+01	706	6.927E+00	747	2.051E+00		
625	4.562E+01	666	2.113E+01	707	6.720E+00	748	1.995E+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**

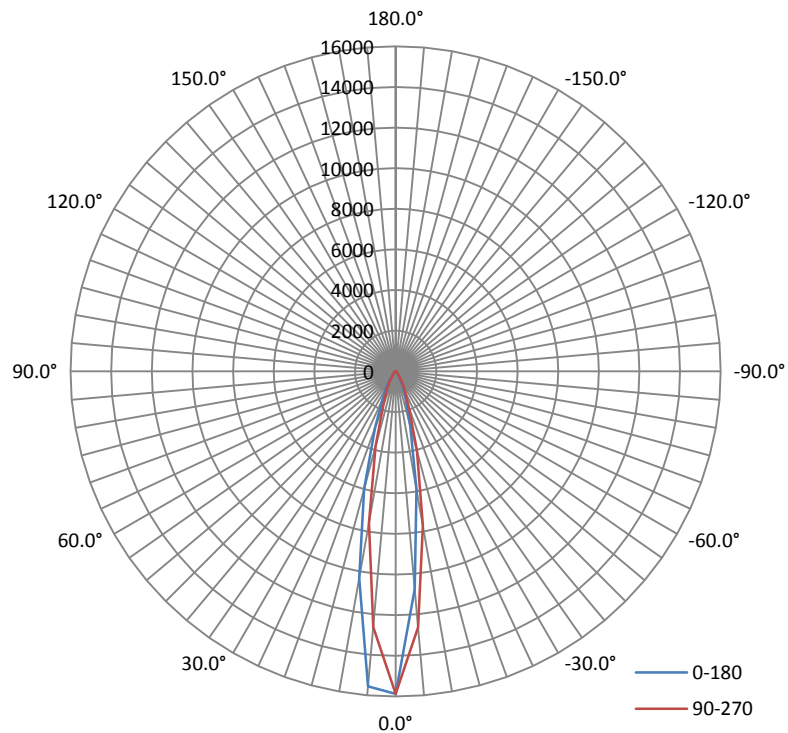
Electrical Measurement

Input Voltage (V)	Frequency (Hz)	Input Current (A)	Power (W)	Power Factor
120.0	60	0.2008	23.99	0.9957

Photometric Measurement

Luminous Flux (lm)	Efficacy (lm/W)	I _{max} (cd)	S/MH (C0/180)	S/MH (C90/270)
3200.87	133.43	16634.0	0.26	0.33

Luminous Intensity Distribution



	C0/180	C45/225	C90/270	C135/315	AVG.
Beam Angle (50% I _{max}):	19.3	19.3	19.3	19.4	19.3
Field Angle (10% I _{max}):	42.8	42.7	42.6	43.0	42.8

Luminous Intensity (cd) Distribution Data

C Y	0°	22.5°	45°	67.5°	90°	112.5°	135°	157.5°
0.0°	15868	15868	15868	15868	15868	15868	15868	15868
5.0°	15559	14928	14185	13352	12640	12213	11896	11837
10.0°	10328	9770	8954	8175	7573	7115	6869	6745
15.0°	5982	5525	4950	4313	3831	3514	3347	3304
20.0°	2956	2663	2320	2002	1791	1664	1606	1591
25.0°	1534	1412	1279	1149	1047	981	942	932
30.0°	934	855	766	679	610	571	542	529
35.0°	534	469	413	364	328	306	290	282
40.0°	276	244	216	200	183	169	161	158
45.0°	146	133	126	123	119	114	110	106
50.0°	96	93	93	92	89	84	83	81
55.0°	75	74	75	72	70	68	66	65
60.0°	61	59	58	57	55	53	52	51
65.0°	49	48	46	45	43	41	41	40
70.0°	39	38	36	35	32	31	31	30
75.0°	29	28	27	25	23	22	22	21
80.0°	20	19	18	16	14	14	13	13
85.0°	10	10	8	7	6	5	5	4
90.0°	3	2	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	1	1	1
135.0°	1	1	1	1	1	1	1	1
140.0°	2	2	2	2	2	3	3	3
145.0°	4	4	4	5	5	5	5	5
150.0°	6	6	7	7	7	7	7	7
155.0°	8	8	9	9	9	9	9	9
160.0°	10	10	10	10	10	10	10	10
165.0°	10	10	10	10	9	9	9	9
170.0°	9	9	8	8	8	8	8	8
175.0°	7	7	6	6	6	6	6	6
180.0°	5	5	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°	15868	15868	15868	15868	15868	15868	15868	15868
5.0°	10758	11023	11545	12057	12643	13238	13610	13697
10.0°	5892	6196	6629	7155	7707	8256	8594	8647
15.0°	2771	2956	3257	3634	4049	4470	4780	4818
20.0°	1440	1474	1589	1748	1947	2168	2325	2337
25.0°	841	872	942	1023	1129	1244	1302	1318
30.0°	454	471	516	582	661	737	789	805
35.0°	245	250	270	303	350	398	431	440
40.0°	141	141	152	167	194	215	226	228
45.0°	100	101	105	111	119	130	134	132
50.0°	78	77	79	82	86	88	88	87
55.0°	63	63	64	66	68	69	69	69
60.0°	50	50	51	53	54	55	55	55
65.0°	39	39	40	41	43	44	44	44
70.0°	29	29	30	31	33	34	34	34
75.0°	20	20	21	22	23	24	25	25
80.0°	10	11	12	14	15	16	16	16
85.0°	3	3	4	5	6	7	7	8
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°	0	0	0	0	0	0	0	0
140.0°	1	1	1	1	1	1	1	1
145.0°	2	2	1	1	1	1	1	1
150.0°	2	2	2	2	2	2	2	2
155.0°	3	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	2	2	2	2	2
175.0°	3	3	3	3	3	3	3	3
180.0°	5	5	5	4	4	4	4	4

Zonal Lumen Density Measurement

Deg	Flux (lm)	%	Deg	Flux (lm)	%
0-5	341.0	10.65	0-5	341.0	10.65
5-10	714.0	22.31	0-10	1055.0	32.96
10-15	675.7	21.11	0-15	1730.7	54.07
15-20	469.8	14.68	0-20	2200.4	68.75
20-25	309.5	9.66	0-25	2509.9	78.41
25-30	219.5	6.86	0-30	2729.4	85.27
30-35	144.0	4.50	0-35	2873.4	89.77
35-40	87.9	2.75	0-40	2961.3	92.52
40-45	55.2	1.72	0-45	3016.6	94.24
45-50	40.6	1.27	0-50	3057.2	95.51
50-55	33.3	1.04	0-55	3090.5	96.55
55-60	28.3	0.88	0-60	3118.8	97.43
60-65	23.5	0.74	0-65	3142.3	98.17
65-70	19.1	0.60	0-70	3161.4	98.77
70-75	14.7	0.46	0-75	3176.1	99.23
75-80	10.3	0.32	0-80	3186.4	99.55
80-85	5.6	0.17	0-85	3192.0	99.72
85-90	1.6	0.05	0-90	3193.6	99.77
90-95	0.1	0.00	0-95	3193.6	99.77
95-100	0.0	0.00	0-100	3193.6	99.77
100-105	0.0	0.00	0-105	3193.7	99.77
105-110	0.0	0.01	0-110	3193.7	99.78
110-115	0.0	0.00	0-115	3193.7	99.78
115-120	0.0	0.00	0-120	3193.7	99.78
120-125	0.1	0.00	0-125	3193.8	99.78
125-130	0.1	0.00	0-130	3193.9	99.78
130-135	0.2	0.01	0-135	3194.1	99.79
135-140	0.4	0.01	0-140	3194.4	99.80
140-145	0.7	0.02	0-145	3195.2	99.82
145-150	1.1	0.04	0-150	3196.3	99.86
150-155	1.3	0.04	0-155	3197.5	99.90
155-160	1.2	0.03	0-160	3198.8	99.93
160-165	1.0	0.04	0-165	3199.8	99.97
165-170	0.7	0.02	0-170	3200.4	99.99
170-175	0.3	0.01	0-175	3200.8	100.00
175-180	0.1	0.00	0-180	3200.9	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*****