

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: 30PAR38HODIM/930NF25/277V

Report Type:	Electrical and Photometric tests including: Luminous Flux, Chromaticity, Luminous Intensity Distribution
Test Engineer:	Hill Liu
Report Number:	R1KS200925081-10
Test Date:	2020-09-28 to 2020-10-09
Report Date:	2020-11-05
Reviewed By:	Bill Xiong / EE Engineer
Prepared By:	Bay Area Compliance Laboratories Corp. (Dongguan). No.69, Pulongcun, Puxinhu Industrial Area, Tangxia, Dongguan, Guangdong, China. Tel: +86-0769-86858888 Fax: +86-0769-86858588
Accreditation:	The IAS Accreditation Number TL-460.

1. Product Description

General Information:

Two samples were received on 2020-09-25. One was tested in integrating sphere and the other was tested in goniophotometer.

Model Tested: 30PAR38HODIM/930NF25/277V
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: 120-277VAC 50/60Hz
Rated Power: 30W
Nominal CCT: 3000K
Nominal Lumen Output: 2800lm

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 IAS 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	2020-07-01	2021-06-30
Digital power meter	EVERFINE	PF9811	G135717CN1361159	2019-11-05	2020-11-04
High-precision rapid spectral radiometer	EVERFINE	HAAS-2000	N/A	2020-07-01	2021-06-30
Precision frequency power supply	ALL Power	APW-105N	970663	2020-03-10	2021-03-09
Standard Light Source	EVERFINE	D204	N/A	2020-07-19	2021-07-18
thermometer	SENSING	NA	NA	2020-03-13	2021-03-12
Programmable Precision DC Power Supply	ITECH	IT6154	0061 0417 6471 0010 19	2020-04-10	2021-04-09
AC POWER SUPPLY	EVERFINE	VPS1030 PWM	1012017	2020-03-13	2021-03-12
Digital CC&CV DC Power Supply	EVERFINE	WY12010	1009009	2020-03-13	2021-03-12
Digital power meter	YOKOGAWA	WT-210	91j926132	2020-03-13	2021-03-12
full-field speed goniophotometer	EVERFINE	GO-R5000	YG108492N10120001	2020-03-13	2021-03-12
Wireless Remote Sensor	N/A	433MHz	N/A	2020-03-13	2021-03-12

Device	Manufacture	Model No	Serial No	Calibration date	Calibration due date
Standard Light Source	EVERFINE	D908	1012003	2019-11-19	2020-11-18

Statement of Traceability: Bay Area Compliance Laboratories Corp. (Dongguan) 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]

Total operating time for integrating sphere test: **1.0 hour**

Test orientation: **Base up**

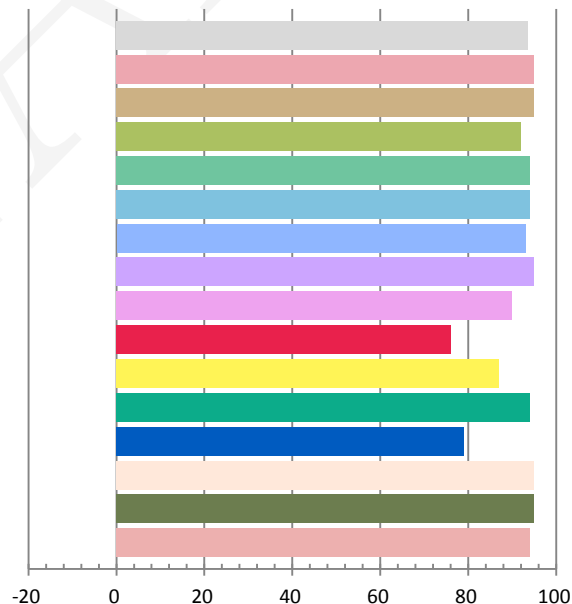
Photometric and Electrical Measurement Result

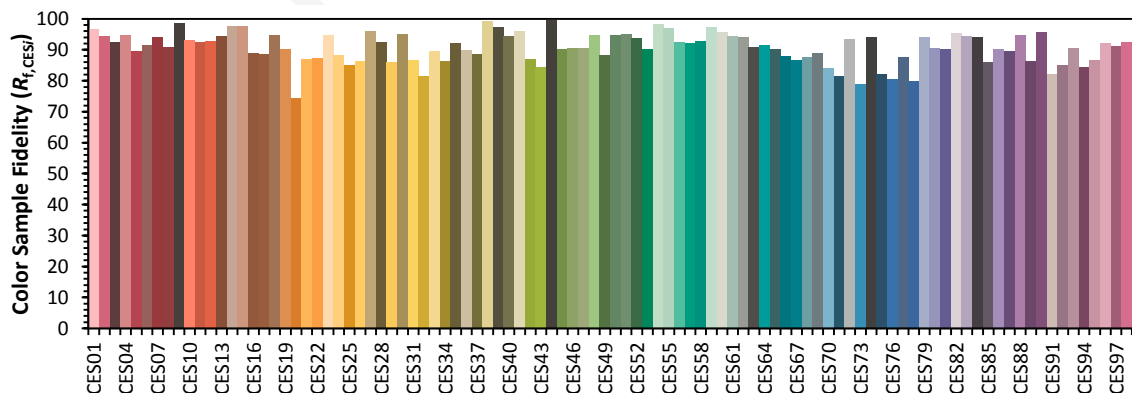
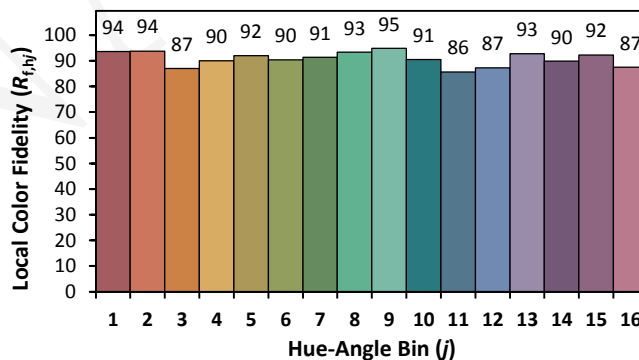
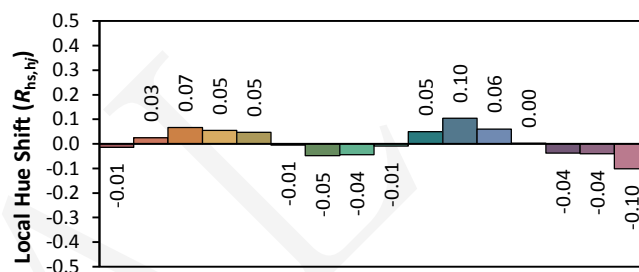
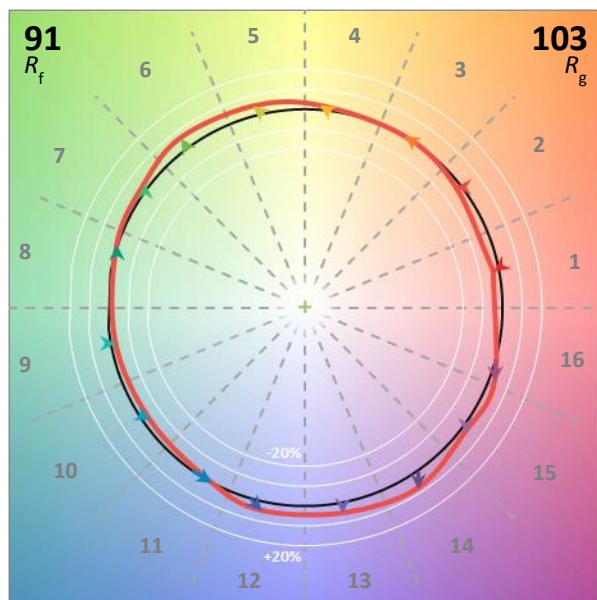
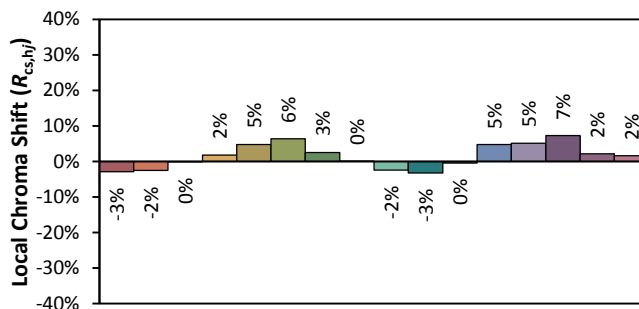
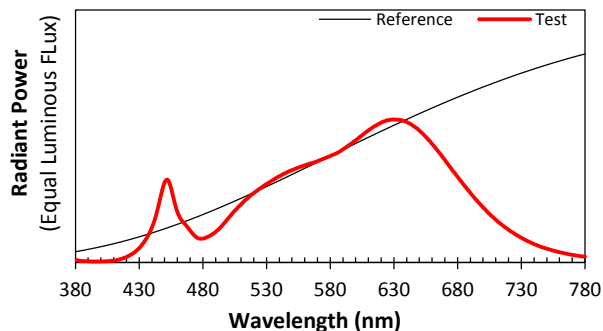
Voltage(V)	Frequency(Hz)	Current(A)	Power (W)	Power Factor	Luminous Flux(lm)	Efficacy(lm/W)
120.0	60	0.2510	29.83	0.9902	2906.9	97.46

Radiant Flux (W)	CCT (K)	Duv	x	y	u'	v'
10.584	2958	-0.00224	0.4367	0.3984	0.2529	0.5191

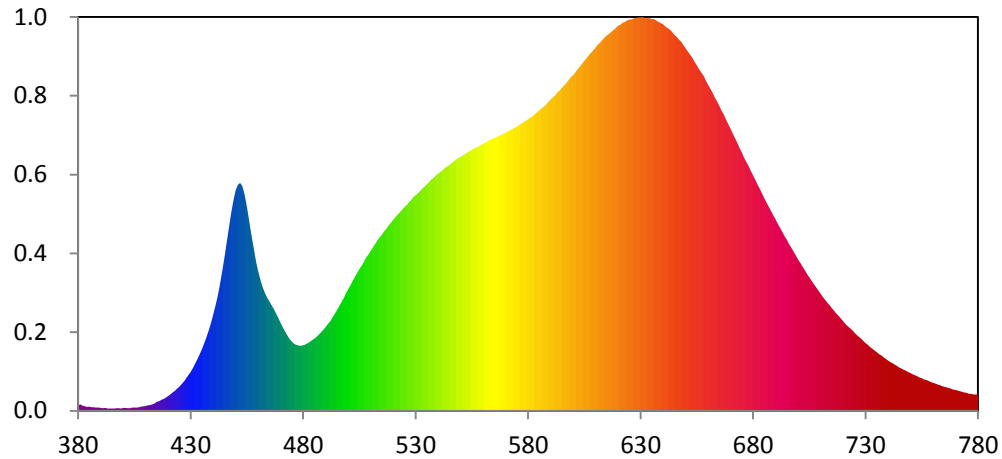
Color Rendering Index

Ra			
93.5			
R1	R2	R3	R4
95	95	92	94
R5	R6	R7	R8
94	93	95	90
R9	R10	R11	R12
76	87	94	79
R13	R14	R15	
95	95	94	





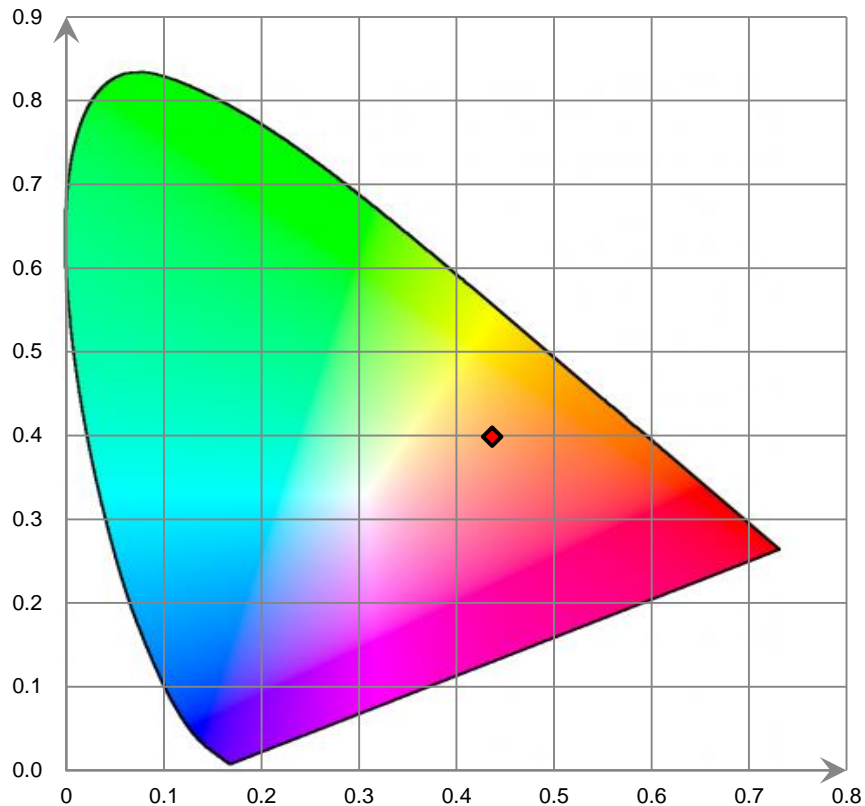
Relative Spectral Power Distribution



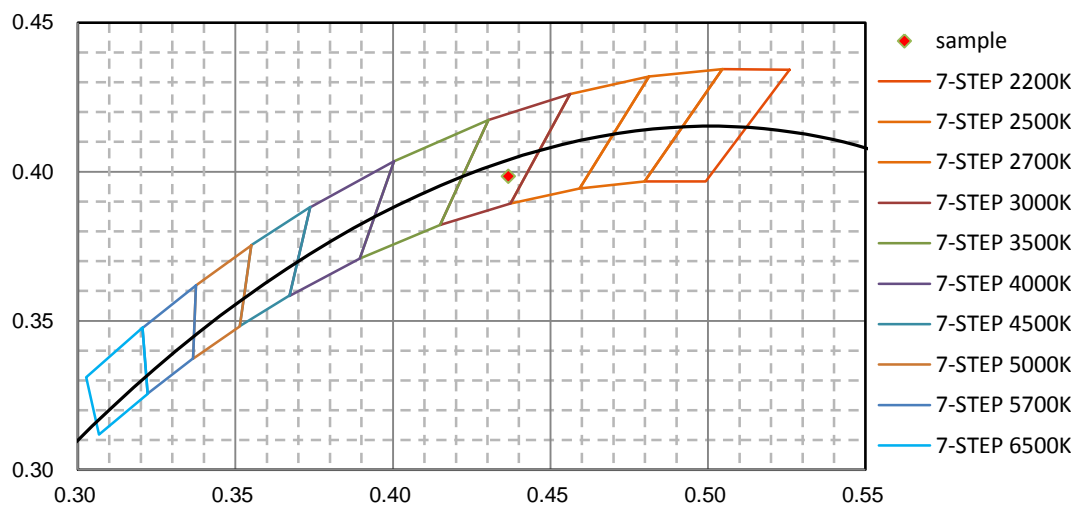
nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
380	8.337E-01	421	2.511E+00	462	1.884E+01	503	2.048E+01	544	3.739E+01
381	9.685E-01	422	2.789E+00	463	1.799E+01	504	2.111E+01	545	3.764E+01
382	7.952E-01	423	3.050E+00	464	1.726E+01	505	2.172E+01	546	3.791E+01
383	7.016E-01	424	3.385E+00	465	1.669E+01	506	2.220E+01	547	3.814E+01
384	5.848E-01	425	3.719E+00	466	1.612E+01	507	2.284E+01	548	3.847E+01
385	6.307E-01	426	4.096E+00	467	1.550E+01	508	2.344E+01	549	3.867E+01
386	5.221E-01	427	4.508E+00	468	1.485E+01	509	2.392E+01	550	3.886E+01
387	5.220E-01	428	4.980E+00	469	1.415E+01	510	2.444E+01	551	3.908E+01
388	5.036E-01	429	5.498E+00	470	1.342E+01	511	2.497E+01	552	3.930E+01
389	4.962E-01	430	5.973E+00	471	1.273E+01	512	2.551E+01	553	3.953E+01
390	4.218E-01	431	6.575E+00	472	1.209E+01	513	2.607E+01	554	3.972E+01
391	3.942E-01	432	7.247E+00	473	1.151E+01	514	2.653E+01	555	3.995E+01
392	4.163E-01	433	7.951E+00	474	1.099E+01	515	2.692E+01	556	4.014E+01
393	3.294E-01	434	8.677E+00	475	1.058E+01	516	2.743E+01	557	4.032E+01
394	3.604E-01	435	9.451E+00	476	1.022E+01	517	2.788E+01	558	4.047E+01
395	3.440E-01	436	1.033E+01	477	1.008E+01	518	2.836E+01	559	4.071E+01
396	3.291E-01	437	1.127E+01	478	9.974E+00	519	2.877E+01	560	4.085E+01
397	3.746E-01	438	1.227E+01	479	9.950E+00	520	2.918E+01	561	4.105E+01
398	3.762E-01	439	1.342E+01	480	1.003E+01	521	2.962E+01	562	4.128E+01
399	3.407E-01	440	1.467E+01	481	1.012E+01	522	2.998E+01	563	4.143E+01
400	4.163E-01	441	1.604E+01	482	1.035E+01	523	3.038E+01	564	4.164E+01
401	4.209E-01	442	1.754E+01	483	1.052E+01	524	3.081E+01	565	4.173E+01
402	3.928E-01	443	1.928E+01	484	1.084E+01	525	3.119E+01	566	4.190E+01
403	4.086E-01	444	2.129E+01	485	1.102E+01	526	3.148E+01	567	4.209E+01
404	4.621E-01	445	2.341E+01	486	1.132E+01	527	3.192E+01	568	4.220E+01
405	4.949E-01	446	2.571E+01	487	1.167E+01	528	3.230E+01	569	4.242E+01
406	5.043E-01	447	2.796E+01	488	1.201E+01	529	3.270E+01	570	4.258E+01
407	5.515E-01	448	3.022E+01	489	1.240E+01	530	3.302E+01	571	4.275E+01
408	6.210E-01	449	3.214E+01	490	1.279E+01	531	3.332E+01	572	4.297E+01
409	6.720E-01	450	3.371E+01	491	1.331E+01	532	3.366E+01	573	4.308E+01
410	7.213E-01	451	3.460E+01	492	1.373E+01	533	3.402E+01	574	4.332E+01
411	8.177E-01	452	3.487E+01	493	1.429E+01	534	3.433E+01	575	4.348E+01
412	8.953E-01	453	3.438E+01	494	1.484E+01	535	3.468E+01	576	4.373E+01
413	9.916E-01	454	3.311E+01	495	1.543E+01	536	3.500E+01	577	4.393E+01
414	1.146E+00	455	3.134E+01	496	1.603E+01	537	3.540E+01	578	4.420E+01
415	1.348E+00	456	2.921E+01	497	1.663E+01	538	3.564E+01	579	4.439E+01
416	1.456E+00	457	2.704E+01	498	1.725E+01	539	3.601E+01	580	4.462E+01
417	1.650E+00	458	2.485E+01	499	1.796E+01	540	3.628E+01	581	4.489E+01
418	1.826E+00	459	2.282E+01	500	1.859E+01	541	3.654E+01	582	4.508E+01
419	1.999E+00	460	2.125E+01	501	1.920E+01	542	3.682E+01	583	4.539E+01
420	2.244E+00	461	1.996E+01	502	1.988E+01	543	3.717E+01	584	4.570E+01

nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
585	4.598E+01	626	5.993E+01	667	4.530E+01	708	1.892E+01	749	5.909E+00
586	4.627E+01	627	6.010E+01	668	4.454E+01	709	1.841E+01	750	5.754E+00
587	4.655E+01	628	6.012E+01	669	4.383E+01	710	1.793E+01	751	5.585E+00
588	4.684E+01	629	6.020E+01	670	4.315E+01	711	1.745E+01	752	5.445E+00
589	4.727E+01	630	6.017E+01	671	4.240E+01	712	1.701E+01	753	5.270E+00
590	4.759E+01	631	6.025E+01	672	4.168E+01	713	1.653E+01	754	5.104E+00
591	4.800E+01	632	6.008E+01	673	4.097E+01	714	1.614E+01	755	4.976E+00
592	4.829E+01	633	6.011E+01	674	4.023E+01	715	1.572E+01	756	4.795E+00
593	4.875E+01	634	6.012E+01	675	3.953E+01	716	1.533E+01	757	4.711E+00
594	4.904E+01	635	5.994E+01	676	3.874E+01	717	1.489E+01	758	4.530E+00
595	4.949E+01	636	5.995E+01	677	3.811E+01	718	1.453E+01	759	4.381E+00
596	4.983E+01	637	5.969E+01	678	3.749E+01	719	1.415E+01	760	4.267E+00
597	5.015E+01	638	5.953E+01	679	3.671E+01	720	1.375E+01	761	4.161E+00
598	5.067E+01	639	5.932E+01	680	3.603E+01	721	1.331E+01	762	4.034E+00
599	5.109E+01	640	5.918E+01	681	3.536E+01	722	1.299E+01	763	3.924E+00
600	5.138E+01	641	5.884E+01	682	3.462E+01	723	1.266E+01	764	3.779E+00
601	5.184E+01	642	5.860E+01	683	3.398E+01	724	1.234E+01	765	3.690E+00
602	5.228E+01	643	5.834E+01	684	3.324E+01	725	1.194E+01	766	3.566E+00
603	5.269E+01	644	5.800E+01	685	3.258E+01	726	1.159E+01	767	3.452E+00
604	5.315E+01	645	5.755E+01	686	3.190E+01	727	1.129E+01	768	3.358E+00
605	5.355E+01	646	5.725E+01	687	3.126E+01	728	1.101E+01	769	3.248E+00
606	5.395E+01	647	5.682E+01	688	3.059E+01	729	1.065E+01	770	3.159E+00
607	5.440E+01	648	5.651E+01	689	2.995E+01	730	1.034E+01	771	3.077E+00
608	5.482E+01	649	5.601E+01	690	2.925E+01	731	1.010E+01	772	2.988E+00
609	5.520E+01	650	5.552E+01	691	2.858E+01	732	9.733E+00	773	2.901E+00
610	5.562E+01	651	5.502E+01	692	2.798E+01	733	9.507E+00	774	2.798E+00
611	5.604E+01	652	5.452E+01	693	2.735E+01	734	9.192E+00	775	2.718E+00
612	5.631E+01	653	5.406E+01	694	2.668E+01	735	8.941E+00	776	2.611E+00
613	5.676E+01	654	5.343E+01	695	2.614E+01	736	8.689E+00	777	2.573E+00
614	5.709E+01	655	5.291E+01	696	2.548E+01	737	8.447E+00	778	2.489E+00
615	5.745E+01	656	5.232E+01	697	2.492E+01	738	8.174E+00	779	2.477E+00
616	5.769E+01	657	5.171E+01	698	2.433E+01	739	7.939E+00	780	2.482E+00
617	5.800E+01	658	5.122E+01	699	2.377E+01	740	7.692E+00		
618	5.830E+01	659	5.052E+01	700	2.313E+01	741	7.459E+00		
619	5.859E+01	660	4.985E+01	701	2.263E+01	742	7.290E+00		
620	5.891E+01	661	4.926E+01	702	2.206E+01	743	7.035E+00		
621	5.909E+01	662	4.863E+01	703	2.148E+01	744	6.843E+00		
622	5.939E+01	663	4.792E+01	704	2.093E+01	745	6.606E+00		
623	5.949E+01	664	4.729E+01	705	2.042E+01	746	6.441E+00		
624	5.977E+01	665	4.661E+01	706	1.988E+01	747	6.274E+00		
625	5.992E+01	666	4.591E+01	707	1.938E+01	748	6.104E+00		

CIE 1931xy Chromaticity Diagram



7-StepChromaticity Quadrangles



[Goniophotometer System]

Total operating time for luminous intensity distribution: **1.0 hour**

Test orientation: **Base up**

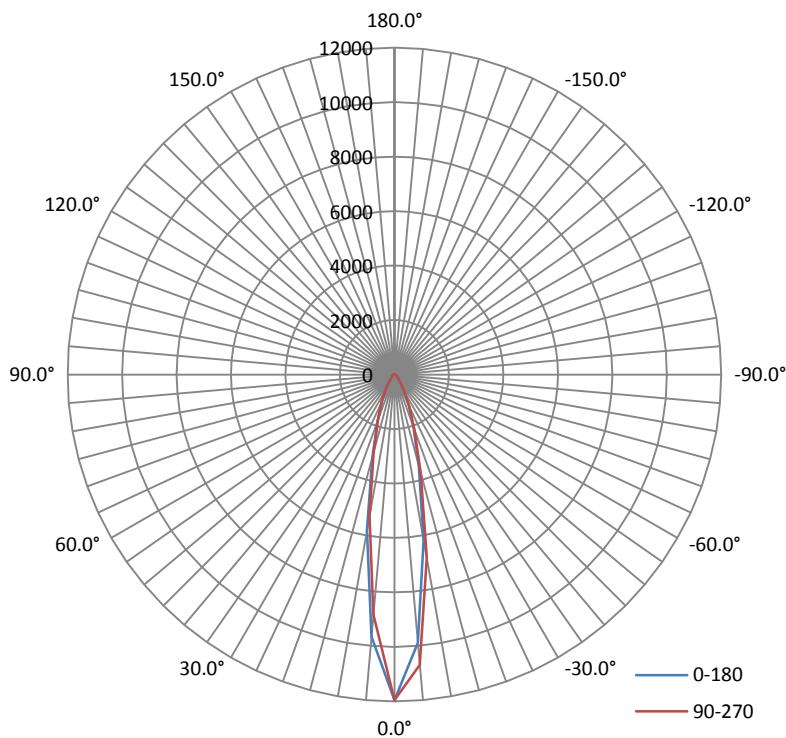
Electrical Measurement

Input Voltage(V)	Frequency(Hz)	Input Current(A)	Power (W)	Power Factor
120.0	60	0.2510	29.79	0.9887

Photometric Measurement

Luminous Flux(lm)	Efficacy(lm/W)	$I_{max}(cd)$	S/MH(C0/180)	S/MH(C90/270)
2908.69	97.64	12099.0	0.35	0.38

Luminous Intensity Distribution



	C0/180	C45/225	C90/270	C135/315	AVG.
Beam Angle(50% I_{max}):	20.0	19.8	19.8	19.9	19.9
Field Angle(10% I_{max}):	49.4	49.1	49.3	49.3	49.3

Luminous Intensity (cd) Distribution Data

C y	0°	22.5°	45°	67.5°	90°	112.5°	135°	157.5°
0.0°	11954	11954	11954	11954	11954	11954	11954	11954
5.0°	9648	9277	8975	8829	8836	8977	9254	9648
10.0°	5783	5462	5265	5203	5262	5396	5644	5987
15.0°	3150	3006	2909	2893	2932	3018	3177	3375
20.0°	1817	1743	1708	1723	1745	1795	1879	1976
25.0°	1078	1044	1048	1076	1097	1123	1163	1217
30.0°	625	608	614	636	648	659	691	733
35.0°	355	343	349	363	368	374	391	419
40.0°	216	210	211	216	220	223	231	247
45.0°	159	153	152	154	156	159	165	170
50.0°	123	121	118	119	120	122	125	129
55.0°	99	98	96	96	96	96	97	100
60.0°	83	83	82	81	80	80	80	82
65.0°	72	72	70	69	68	67	68	69
70.0°	59	59	57	56	55	54	55	57
75.0°	46	45	43	42	41	41	42	44
80.0°	30	29	28	27	26	26	27	29
85.0°	15	14	13	12	11	12	13	15
90.0°	3	2	2	1	1	2	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	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°	4	4	4	4	4	4	4	4
150.0°	6	6	6	6	6	6	6	6
155.0°	7	7	7	7	7	7	7	7
160.0°	8	8	8	8	8	8	8	8
165.0°	8	8	8	8	8	8	8	8
170.0°	6	6	6	6	6	6	6	7
175.0°	5	5	5	5	5	5	5	5
180.0°	3	3	3	3	3	3	4	4

Luminous Intensity (cd) Distribution Data (cont.)

C y	180°	202.5°	225°	247.5°	270°	292.5°	315°	337.5°
0.0°	11954	11954	11954	11954	11954	11954	11954	11954
5.0°	9884	10313	10610	10745	10701	10577	10301	9913
10.0°	6181	6524	6752	6866	6819	6610	6315	5978
15.0°	3466	3652	3775	3812	3743	3588	3419	3229
20.0°	2017	2099	2158	2173	2133	2057	1961	1870
25.0°	1245	1268	1281	1283	1257	1204	1150	1111
30.0°	736	744	754	753	724	688	666	647
35.0°	419	419	424	423	405	385	375	368
40.0°	248	249	250	250	243	236	231	226
45.0°	172	172	171	173	173	172	169	165
50.0°	130	131	132	134	134	133	130	126
55.0°	101	102	103	105	105	105	103	100
60.0°	82	84	86	88	87	86	84	84
65.0°	69	71	74	76	75	73	72	72
70.0°	57	59	62	64	64	62	61	60
75.0°	44	46	48	50	51	49	48	47
80.0°	30	32	34	35	35	34	33	32
85.0°	16	17	18	19	19	18	17	16
90.0°	4	5	5	6	6	5	4	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°	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	1	1	2	2	2	2
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	2	2	2	2	2
175.0°	2	2	2	2	2	2	2	3
180.0°	3	3	3	3	3	3	3	4

Zonal Lumen Density Measurement

Deg	Flux (lm)	%
0-5	258.8	8.90
5-10	546.9	18.80
10-15	529.9	18.22
15-20	415.6	14.29
20-25	313.9	10.79
25-30	228.4	7.85
30-35	152.7	5.25
35-40	99.6	3.42
40-45	71.5	2.46
45-50	58.5	2.01
50-55	48.8	1.68
55-60	42.1	1.45
60-65	37.5	1.28
65-70	32.9	1.13
70-75	27.2	0.94
75-80	20.3	0.70
80-85	12.4	0.43
85-90	4.9	0.16
90-95	0.5	0.02
95-100	0.0	0.00
100-105	0.0	0.00
105-110	0.0	0.01
110-115	0.0	0.00
115-120	0.1	0.00
120-125	0.1	0.00
125-130	0.1	0.01
130-135	0.2	0.00
135-140	0.4	0.01
140-145	0.7	0.03
145-150	0.9	0.03
150-155	1.1	0.04
155-160	1.0	0.03
160-165	0.8	0.03
165-170	0.5	0.02
170-175	0.3	0.01
175-180	0.1	0.00

Deg	Flux (lm)	%
0-5	258.8	8.90
0-10	805.6	27.70
0-15	1335.6	45.92
0-20	1751.2	60.21
0-25	2065.1	71.00
0-30	2293.5	78.85
0-35	2446.1	84.10
0-40	2545.8	87.52
0-45	2617.3	89.98
0-50	2675.7	91.99
0-55	2724.5	93.67
0-60	2766.6	95.12
0-65	2804.1	96.40
0-70	2837.0	97.53
0-75	2864.2	98.47
0-80	2884.5	99.17
0-85	2896.9	99.60
0-90	2901.8	99.76
0-95	2902.4	99.78
0-100	2902.4	99.78
0-105	2902.4	99.78
0-110	2902.5	99.79
0-115	2902.5	99.79
0-120	2902.6	99.79
0-125	2902.6	99.79
0-130	2902.7	99.80
0-135	2902.9	99.80
0-140	2903.3	99.81
0-145	2903.9	99.84
0-150	2904.9	99.87
0-155	2905.9	99.91
0-160	2907.0	99.94
0-165	2907.8	99.97
0-170	2908.3	99.99
0-175	2908.6	100.00
0-180	2908.7	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. Unless otherwise stated the results shown in this test report refer only to the sample(s) tested.
3. Otherwise required by the applicant or Product Regulations, Decision Rule in this report did not consider the uncertainty.
4. The extended uncertainty given in this report is obtained by combining the standard uncertainty times the coverage factor K with the 95% confidence interval.
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*****END OF REPORT*****