

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/930FL40/277V

Report Type:	Electrical and Photometric tests including: Luminous Flux, Chromaticity, Luminous Intensity Distribution
Test Engineer:	Hill Liu
Report Number:	R1KS200925082-10
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/930FL40/277V
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**

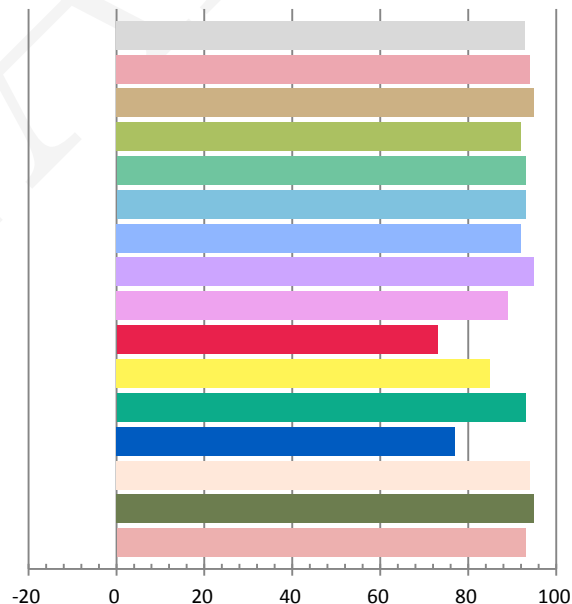
Photometric and Electrical Measurement Result

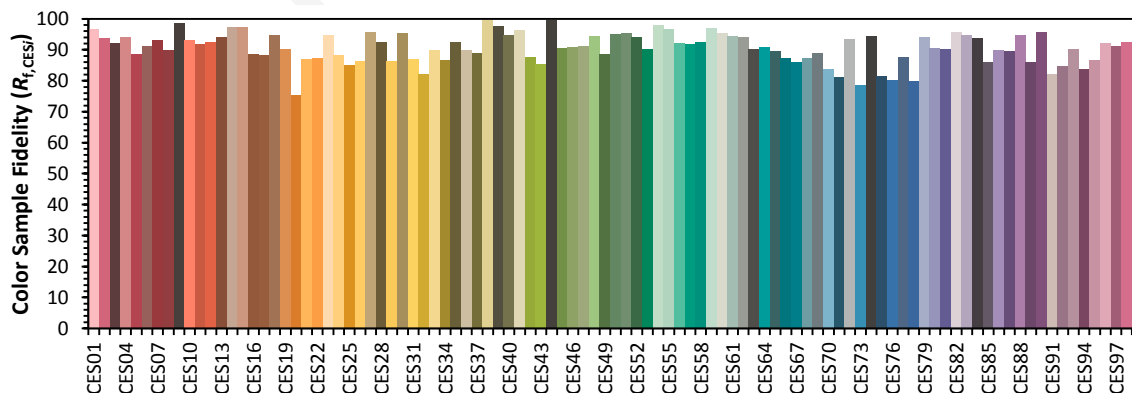
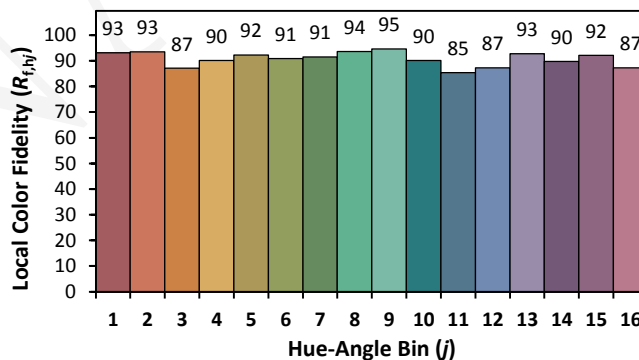
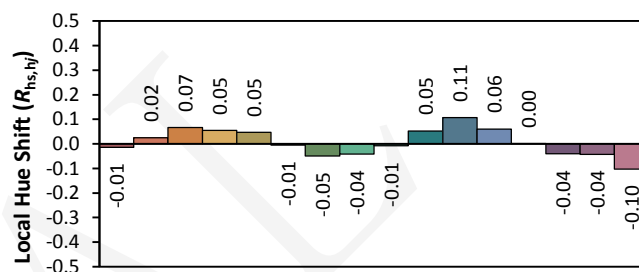
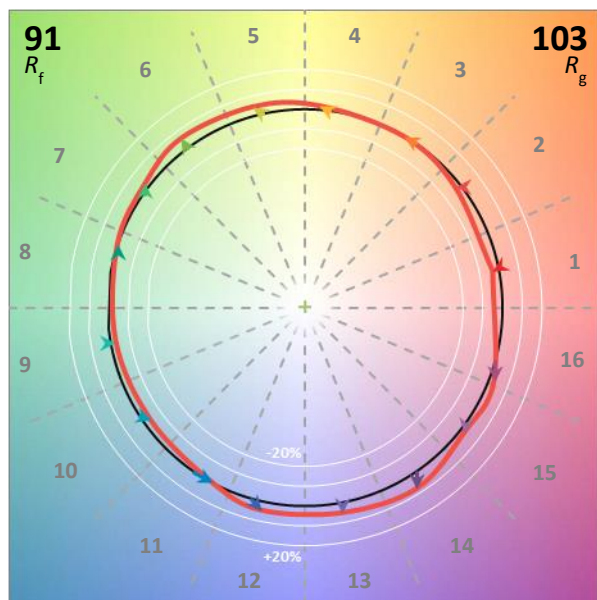
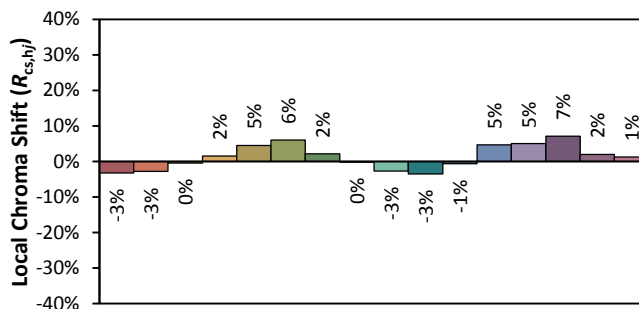
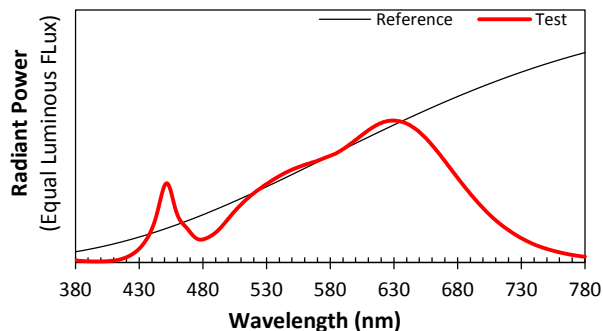
Voltage(V)	Frequency(Hz)	Current(A)	Power (W)	Power Factor	Luminous Flux(lm)	Efficacy(lm/W)
120.1	60	0.2515	29.91	0.9904	2965.7	99.16

Radiant Flux (W)	CCT (K)	Duv	x	y	u'	v'
10.706	2949	-0.0012	0.4388	0.4017	0.2528	0.5207

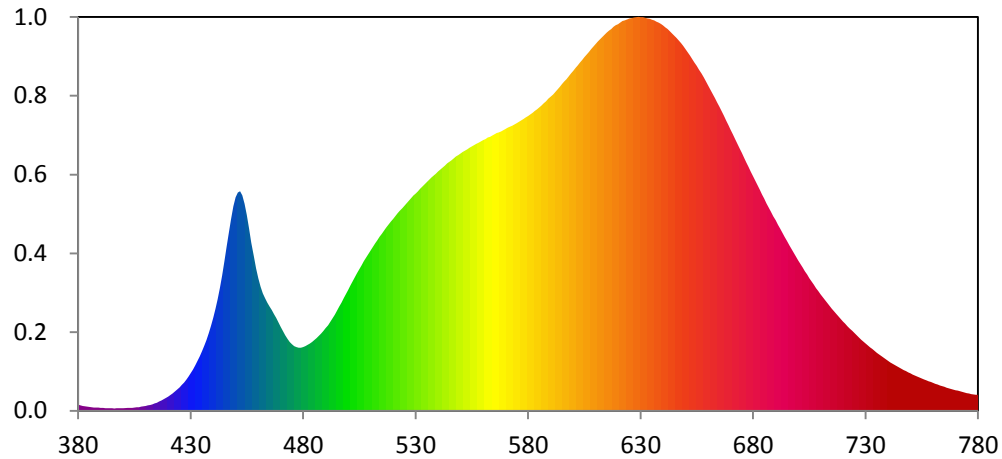
Color Rendering Index

Ra			
92.9			
R1	R2	R3	R4
94	95	92	93
R5	R6	R7	R8
93	92	95	89
R9	R10	R11	R12
73	85	93	77
R13	R14	R15	
94	95	93	





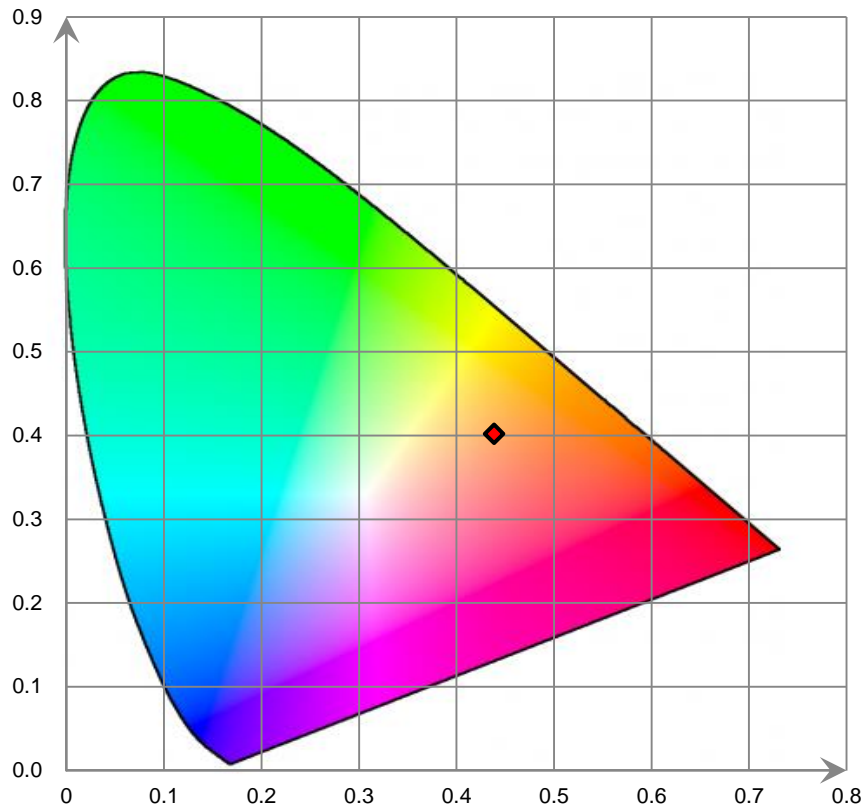
Relative Spectral Power Distribution



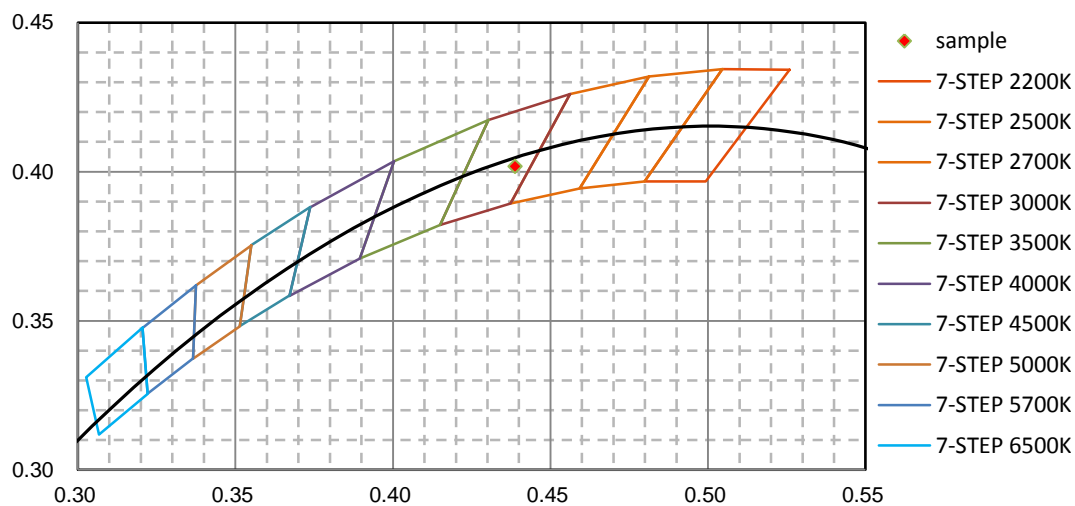
nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
380	9.545E-01	421	2.414E+00	462	1.820E+01	503	2.073E+01	544	3.828E+01
381	8.170E-01	422	2.674E+00	463	1.743E+01	504	2.135E+01	545	3.856E+01
382	7.241E-01	423	2.951E+00	464	1.673E+01	505	2.196E+01	546	3.881E+01
383	6.650E-01	424	3.269E+00	465	1.614E+01	506	2.256E+01	547	3.908E+01
384	6.452E-01	425	3.612E+00	466	1.559E+01	507	2.317E+01	548	3.938E+01
385	6.048E-01	426	3.987E+00	467	1.498E+01	508	2.375E+01	549	3.957E+01
386	5.614E-01	427	4.372E+00	468	1.437E+01	509	2.429E+01	550	3.986E+01
387	5.069E-01	428	4.827E+00	469	1.367E+01	510	2.484E+01	551	4.008E+01
388	4.727E-01	429	5.301E+00	470	1.298E+01	511	2.537E+01	552	4.030E+01
389	4.715E-01	430	5.838E+00	471	1.232E+01	512	2.592E+01	553	4.050E+01
390	4.496E-01	431	6.389E+00	472	1.167E+01	513	2.644E+01	554	4.073E+01
391	4.366E-01	432	7.011E+00	473	1.113E+01	514	2.694E+01	555	4.094E+01
392	4.153E-01	433	7.704E+00	474	1.067E+01	515	2.742E+01	556	4.114E+01
393	3.827E-01	434	8.423E+00	475	1.028E+01	516	2.788E+01	557	4.133E+01
394	3.797E-01	435	9.214E+00	476	1.000E+01	517	2.837E+01	558	4.153E+01
395	3.868E-01	436	1.004E+01	477	9.835E+00	518	2.884E+01	559	4.174E+01
396	3.541E-01	437	1.096E+01	478	9.748E+00	519	2.927E+01	560	4.192E+01
397	3.754E-01	438	1.200E+01	479	9.768E+00	520	2.970E+01	561	4.210E+01
398	3.755E-01	439	1.311E+01	480	9.856E+00	521	3.014E+01	562	4.231E+01
399	3.900E-01	440	1.436E+01	481	9.993E+00	522	3.056E+01	563	4.242E+01
400	3.807E-01	441	1.573E+01	482	1.019E+01	523	3.098E+01	564	4.260E+01
401	4.002E-01	442	1.728E+01	483	1.040E+01	524	3.137E+01	565	4.280E+01
402	4.259E-01	443	1.902E+01	484	1.065E+01	525	3.174E+01	566	4.302E+01
403	4.313E-01	444	2.098E+01	485	1.094E+01	526	3.216E+01	567	4.310E+01
404	4.497E-01	445	2.312E+01	486	1.125E+01	527	3.254E+01	568	4.327E+01
405	4.869E-01	446	2.541E+01	487	1.157E+01	528	3.293E+01	569	4.348E+01
406	5.203E-01	447	2.761E+01	488	1.194E+01	529	3.333E+01	570	4.365E+01
407	5.601E-01	448	2.971E+01	489	1.235E+01	530	3.366E+01	571	4.383E+01
408	6.304E-01	449	3.165E+01	490	1.277E+01	531	3.398E+01	572	4.399E+01
409	6.752E-01	450	3.305E+01	491	1.325E+01	532	3.437E+01	573	4.415E+01
410	7.329E-01	451	3.380E+01	492	1.376E+01	533	3.473E+01	574	4.436E+01
411	8.207E-01	452	3.398E+01	493	1.431E+01	534	3.510E+01	575	4.454E+01
412	9.036E-01	453	3.333E+01	494	1.488E+01	535	3.544E+01	576	4.475E+01
413	9.967E-01	454	3.208E+01	495	1.552E+01	536	3.578E+01	577	4.496E+01
414	1.124E+00	455	3.035E+01	496	1.614E+01	537	3.612E+01	578	4.518E+01
415	1.252E+00	456	2.822E+01	497	1.675E+01	538	3.642E+01	579	4.544E+01
416	1.413E+00	457	2.601E+01	498	1.743E+01	539	3.674E+01	580	4.566E+01
417	1.584E+00	458	2.391E+01	499	1.809E+01	540	3.709E+01	581	4.589E+01
418	1.763E+00	459	2.204E+01	500	1.875E+01	541	3.736E+01	582	4.616E+01
419	1.965E+00	460	2.050E+01	501	1.941E+01	542	3.767E+01	583	4.642E+01
420	2.172E+00	461	1.924E+01	502	2.006E+01	543	3.795E+01	584	4.668E+01

nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
585	4.699E+01	626	6.082E+01	667	4.568E+01	708	1.900E+01	749	5.943E+00
586	4.729E+01	627	6.089E+01	668	4.495E+01	709	1.852E+01	750	5.781E+00
587	4.763E+01	628	6.094E+01	669	4.425E+01	710	1.805E+01	751	5.615E+00
588	4.793E+01	629	6.099E+01	670	4.353E+01	711	1.757E+01	752	5.445E+00
589	4.832E+01	630	6.093E+01	671	4.281E+01	712	1.712E+01	753	5.308E+00
590	4.862E+01	631	6.094E+01	672	4.207E+01	713	1.668E+01	754	5.141E+00
591	4.898E+01	632	6.087E+01	673	4.136E+01	714	1.625E+01	755	5.000E+00
592	4.938E+01	633	6.077E+01	674	4.065E+01	715	1.581E+01	756	4.838E+00
593	4.974E+01	634	6.070E+01	675	3.993E+01	716	1.539E+01	757	4.713E+00
594	5.015E+01	635	6.057E+01	676	3.919E+01	717	1.499E+01	758	4.570E+00
595	5.059E+01	636	6.044E+01	677	3.846E+01	718	1.460E+01	759	4.432E+00
596	5.100E+01	637	6.027E+01	678	3.779E+01	719	1.422E+01	760	4.309E+00
597	5.134E+01	638	6.012E+01	679	3.702E+01	720	1.384E+01	761	4.172E+00
598	5.178E+01	639	5.990E+01	680	3.634E+01	721	1.346E+01	762	4.045E+00
599	5.222E+01	640	5.967E+01	681	3.562E+01	722	1.309E+01	763	3.931E+00
600	5.262E+01	641	5.939E+01	682	3.492E+01	723	1.271E+01	764	3.810E+00
601	5.305E+01	642	5.913E+01	683	3.424E+01	724	1.237E+01	765	3.703E+00
602	5.349E+01	643	5.879E+01	684	3.352E+01	725	1.203E+01	766	3.586E+00
603	5.393E+01	644	5.844E+01	685	3.284E+01	726	1.168E+01	767	3.483E+00
604	5.433E+01	645	5.807E+01	686	3.213E+01	727	1.135E+01	768	3.387E+00
605	5.478E+01	646	5.774E+01	687	3.147E+01	728	1.102E+01	769	3.272E+00
606	5.516E+01	647	5.735E+01	688	3.081E+01	729	1.072E+01	770	3.178E+00
607	5.557E+01	648	5.692E+01	689	3.015E+01	730	1.040E+01	771	3.097E+00
608	5.599E+01	649	5.649E+01	690	2.946E+01	731	1.012E+01	772	2.996E+00
609	5.638E+01	650	5.599E+01	691	2.881E+01	732	9.822E+00	773	2.910E+00
610	5.681E+01	651	5.551E+01	692	2.817E+01	733	9.545E+00	774	2.819E+00
611	5.718E+01	652	5.499E+01	693	2.757E+01	734	9.262E+00	775	2.744E+00
612	5.753E+01	653	5.447E+01	694	2.691E+01	735	8.982E+00	776	2.671E+00
613	5.788E+01	654	5.391E+01	695	2.631E+01	736	8.722E+00	777	2.587E+00
614	5.822E+01	655	5.343E+01	696	2.568E+01	737	8.479E+00	778	2.510E+00
615	5.855E+01	656	5.284E+01	697	2.507E+01	738	8.210E+00	779	2.479E+00
616	5.887E+01	657	5.222E+01	698	2.449E+01	739	7.971E+00	780	2.484E+00
617	5.914E+01	658	5.164E+01	699	2.389E+01	740	7.735E+00		
618	5.945E+01	659	5.101E+01	700	2.331E+01	741	7.502E+00		
619	5.970E+01	660	5.036E+01	701	2.276E+01	742	7.276E+00		
620	5.988E+01	661	4.972E+01	702	2.218E+01	743	7.067E+00		
621	6.013E+01	662	4.908E+01	703	2.161E+01	744	6.862E+00		
622	6.037E+01	663	4.840E+01	704	2.109E+01	745	6.667E+00		
623	6.047E+01	664	4.773E+01	705	2.054E+01	746	6.493E+00		
624	6.063E+01	665	4.706E+01	706	2.003E+01	747	6.295E+00		
625	6.074E+01	666	4.638E+01	707	1.950E+01	748	6.127E+00		

CIE 1931xy Chromaticity Diagram



7-Step Chromaticity Quadrangles



[Goniophotometer System]

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

Test orientation: **Base up**

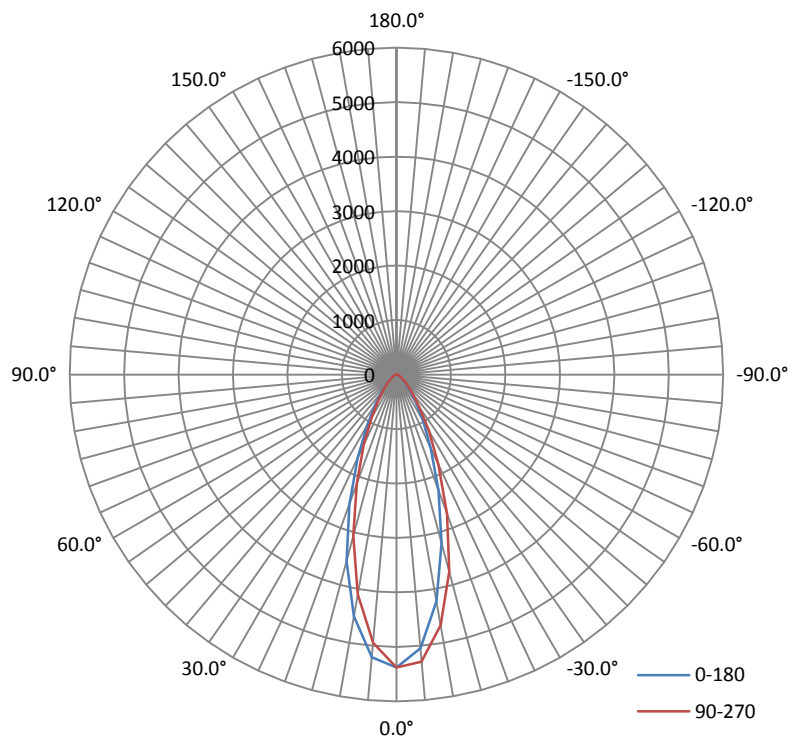
Electrical Measurement

Input Voltage(V)	Frequency(Hz)	Input Current(A)	Power (W)	Power Factor
120.1	60	0.2521	29.91	0.9882

Photometric Measurement

Luminous Flux(lm)	Efficacy(lm/W)	$I_{max}(cd)$	S/MH(C0/180)	S/MH(C90/270)
2970.3	99.31	5389.0	0.57	0.65

Luminous Intensity Distribution



	C0/180	C45/225	C90/270	C135/315	AVG.
Beam Angle(50% I_{max}):	36.7	36.8	37.1	36.8	36.9
Field Angle(10% I_{max}):	74.2	74.5	74.5	74.1	74.3

Luminous Intensity (cd) Distribution Data

C y	0°	22.5°	45°	67.5°	90°	112.5°	135°	157.5°
0.0°	5377	5377	5377	5377	5377	5377	5377	5377
5.0°	5210	5116	5038	4977	4946	4926	4944	5004
10.0°	4504	4377	4250	4155	4092	4065	4086	4161
15.0°	3548	3388	3238	3137	3064	3034	3055	3140
20.0°	2526	2391	2275	2187	2135	2106	2126	2195
25.0°	1681	1586	1502	1441	1410	1389	1402	1457
30.0°	1071	1009	959	924	905	892	901	937
35.0°	673	640	612	599	586	581	585	602
40.0°	428	407	391	379	371	367	370	384
45.0°	271	258	248	241	236	234	234	243
50.0°	171	164	159	156	153	149	149	154
55.0°	115	111	108	107	106	102	103	106
60.0°	84	80	78	78	76	75	74	77
65.0°	63	60	58	57	55	54	54	57
70.0°	45	43	41	40	38	38	38	39
75.0°	31	28	27	26	25	24	24	25
80.0°	18	17	15	14	13	12	13	14
85.0°	8	7	6	5	4	4	4	5
90.0°	1	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°	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	4	4	4	4	3
150.0°	4	4	5	5	5	5	5	5
155.0°	5	6	6	6	6	6	6	6
160.0°	6	6	6	6	6	6	6	6
165.0°	6	6	6	6	6	6	6	6
170.0°	6	5	5	5	5	5	5	6
175.0°	5	5	5	4	4	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°	5377	5377	5377	5377	5377	5377	5377	5377
5.0°	5042	5120	5199	5245	5290	5294	5293	5256
10.0°	4224	4348	4479	4583	4675	4695	4659	4568
15.0°	3202	3355	3511	3645	3743	3764	3724	3620
20.0°	2252	2381	2514	2628	2722	2732	2685	2594
25.0°	1495	1591	1694	1768	1823	1833	1797	1729
30.0°	975	1038	1104	1149	1182	1184	1155	1115
35.0°	627	664	701	725	739	737	724	700
40.0°	401	424	447	463	470	465	457	441
45.0°	254	268	282	296	298	295	288	278
50.0°	161	169	179	187	190	188	184	178
55.0°	109	113	119	123	124	124	122	118
60.0°	79	82	85	88	89	89	88	86
65.0°	58	60	63	65	66	66	66	64
70.0°	41	42	45	47	48	48	48	47
75.0°	27	28	30	32	33	33	33	32
80.0°	15	16	18	19	20	21	20	19
85.0°	5	6	8	9	10	10	10	9
90.0°	0	1	1	2	2	2	2	2
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	2	2	2	2	2
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	125.5	4.23
5-10	338.6	11.40
10-15	457.5	15.40
15-20	471.9	15.89
20-25	413.4	13.91
25-30	326.5	11.00
30-35	242.9	8.17
35-40	175.5	5.91
40-45	123.5	4.16
45-50	85.5	2.88
50-55	60.1	2.03
55-60	44.4	1.49
60-65	34.4	1.16
65-70	26.0	0.87
70-75	18.6	0.63
75-80	11.9	0.40
80-85	6.2	0.21
85-90	1.9	0.06
90-95	0.1	0.01
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	0.01
120-125	0.1	0.00
125-130	0.2	0.00
130-135	0.3	0.01
135-140	0.4	0.02
140-145	0.6	0.02
145-150	0.8	0.02
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	125.5	4.23
0-10	464.2	15.63
0-15	921.7	31.03
0-20	1393.6	46.92
0-25	1806.9	60.83
0-30	2133.4	71.83
0-35	2376.4	80.00
0-40	2551.9	85.91
0-45	2675.4	90.07
0-50	2760.9	92.95
0-55	2821.0	94.98
0-60	2865.5	96.47
0-65	2899.9	97.63
0-70	2925.8	98.50
0-75	2944.4	99.13
0-80	2956.3	99.53
0-85	2962.6	99.74
0-90	2964.5	99.80
0-95	2964.6	99.81
0-100	2964.6	99.81
0-105	2964.7	99.81
0-110	2964.7	99.81
0-115	2964.7	99.81
0-120	2964.8	99.82
0-125	2964.9	99.82
0-130	2965.1	99.82
0-135	2965.3	99.83
0-140	2965.7	99.85
0-145	2966.3	99.87
0-150	2967.1	99.89
0-155	2967.9	99.92
0-160	2968.8	99.95
0-165	2969.5	99.97
0-170	2969.9	99.99
0-175	2970.2	100.00
0-180	2970.3	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.
5. This report cannot be reproduced except in full, without prior written approval of the Company.
6. This report is valid only with a valid digital signature. The digital signature may be available only under the Adobe software above version 7.0.

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