

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/935NF25/277V

Report Type:	Electrical and Photometric tests including: Luminous Flux, Chromaticity, Luminous Intensity Distribution
Test Engineer:	Hill Liu
Report Number:	R1KS200925083-10
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/935NF25/277V
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: 3500K
Nominal Lumen Output: 2900lm

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**

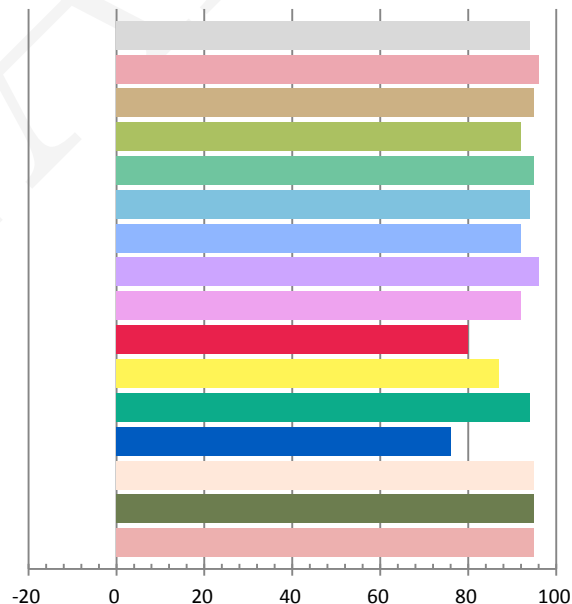
Photometric and Electrical Measurement Result

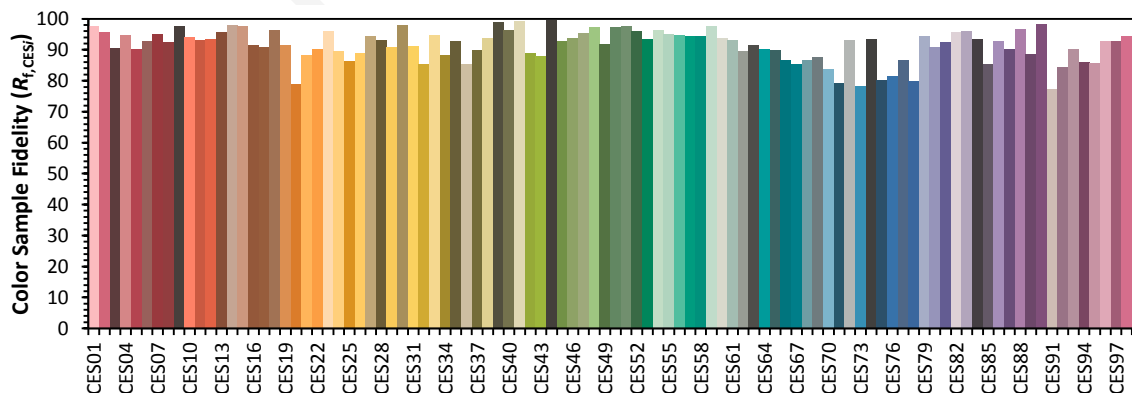
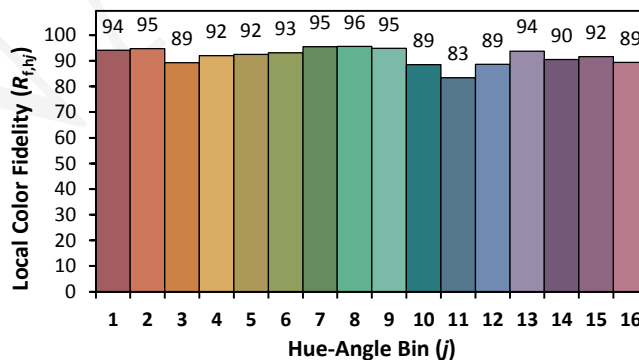
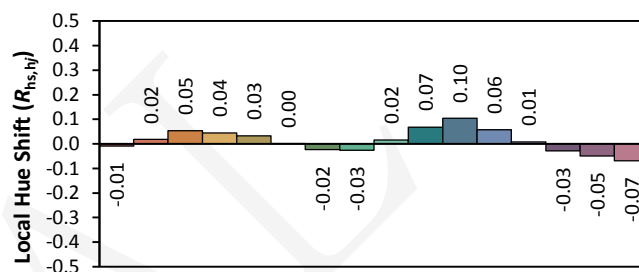
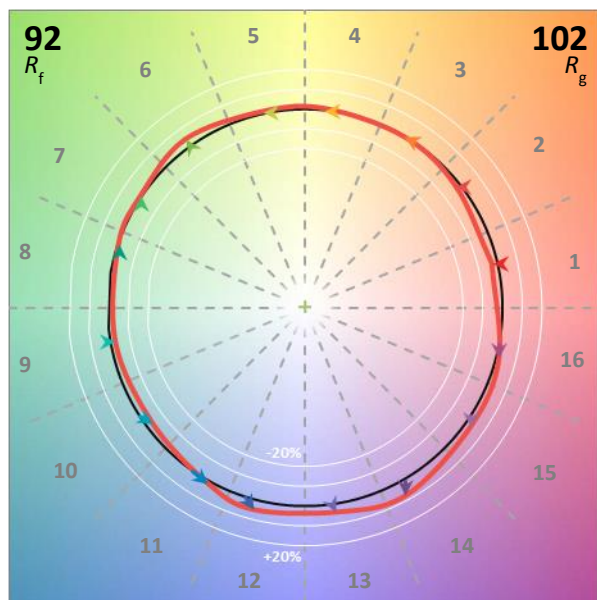
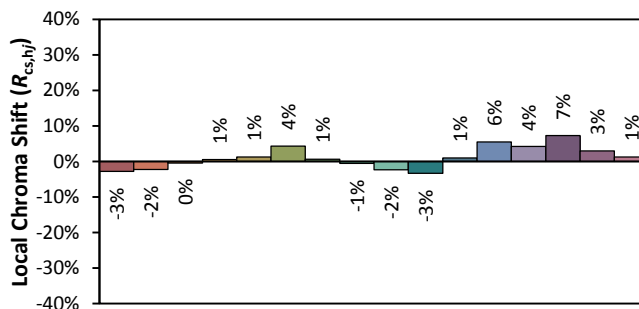
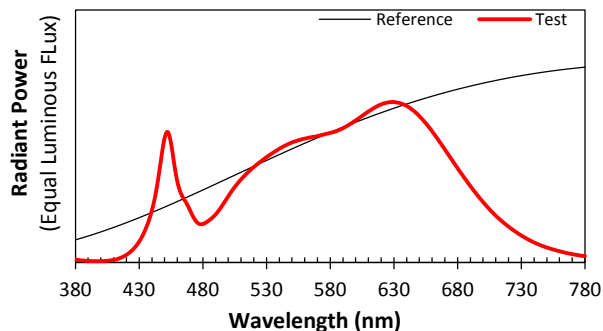
Voltage(V)	Frequency(Hz)	Current(A)	Power (W)	Power Factor	Luminous Flux(lm)	Efficacy(lm/W)
120.0	60	0.2488	29.57	0.9904	3051.3	103.18

Radiant Flux (W)	CCT (K)	Duv	x	y	u'	v'
10.901	3375	-0.00167	0.4106	0.3895	0.2397	0.5115

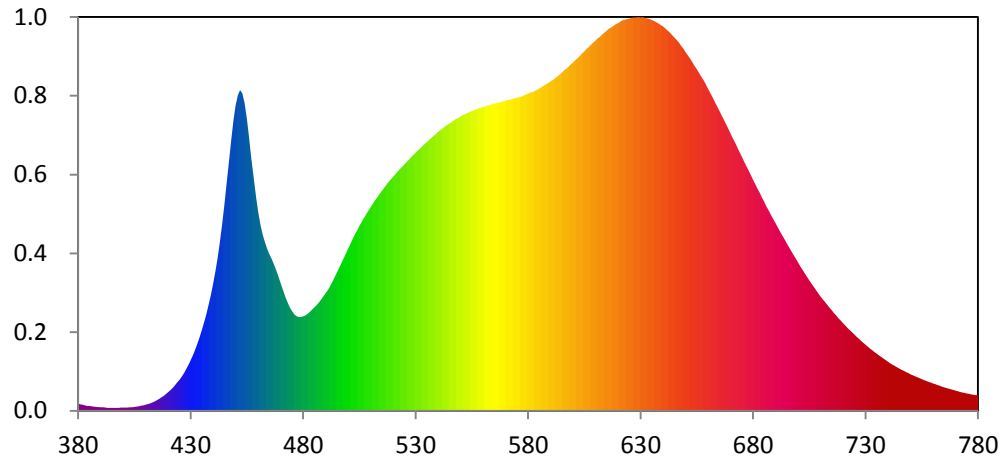
Color Rendering Index

Ra			
94.1			
R1	R2	R3	R4
96	95	92	95
R5	R6	R7	R8
94	92	96	92
R9	R10	R11	R12
80	87	94	76
R13	R14	R15	
95	95	95	





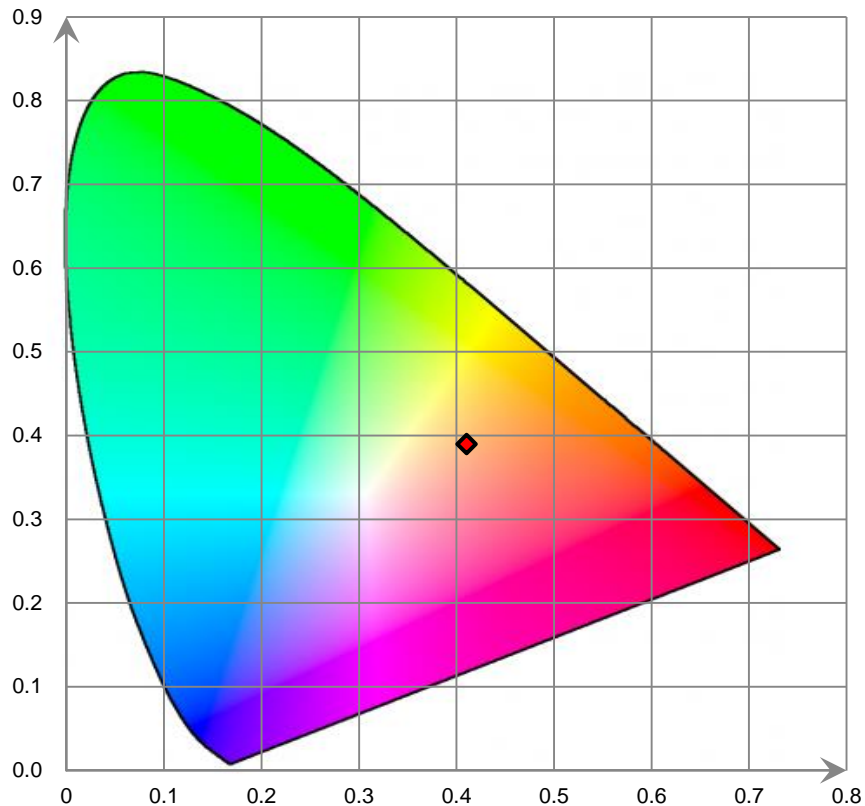
Relative Spectral Power Distribution



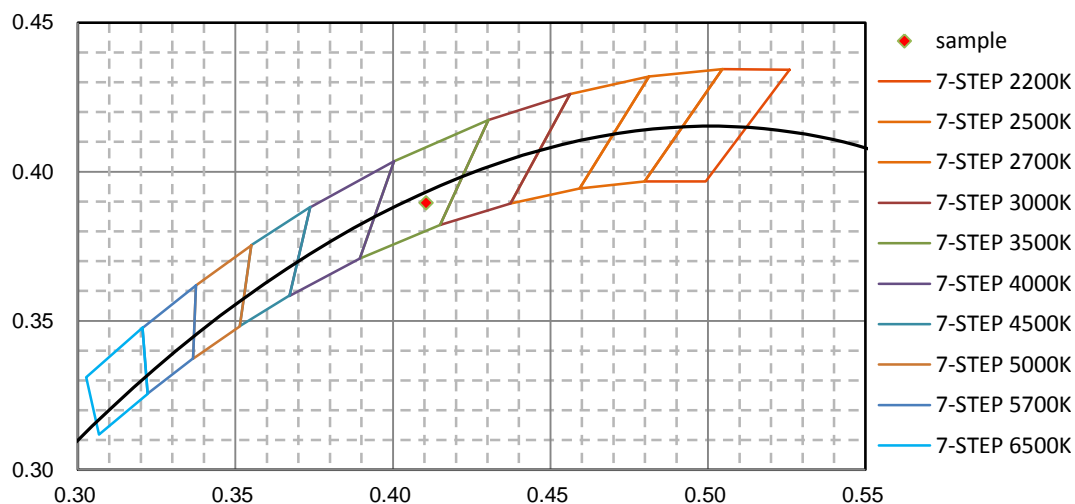
nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
380	1.056E+00	421	2.962E+00	462	2.532E+01	503	2.540E+01	544	4.118E+01
381	9.075E-01	422	3.287E+00	463	2.425E+01	504	2.600E+01	545	4.140E+01
382	8.492E-01	423	3.647E+00	464	2.328E+01	505	2.664E+01	546	4.161E+01
383	7.911E-01	424	4.050E+00	465	2.251E+01	506	2.719E+01	547	4.184E+01
384	6.929E-01	425	4.478E+00	466	2.185E+01	507	2.777E+01	548	4.208E+01
385	6.909E-01	426	4.949E+00	467	2.106E+01	508	2.833E+01	549	4.222E+01
386	6.529E-01	427	5.456E+00	468	2.023E+01	509	2.883E+01	550	4.242E+01
387	5.779E-01	428	6.033E+00	469	1.931E+01	510	2.934E+01	551	4.261E+01
388	5.294E-01	429	6.649E+00	470	1.834E+01	511	2.983E+01	552	4.274E+01
389	5.186E-01	430	7.328E+00	471	1.742E+01	512	3.032E+01	553	4.287E+01
390	5.073E-01	431	8.044E+00	472	1.648E+01	513	3.078E+01	554	4.305E+01
391	4.887E-01	432	8.832E+00	473	1.568E+01	514	3.125E+01	555	4.321E+01
392	4.586E-01	433	9.731E+00	474	1.495E+01	515	3.167E+01	556	4.330E+01
393	4.276E-01	434	1.066E+01	475	1.439E+01	516	3.212E+01	557	4.343E+01
394	4.315E-01	435	1.171E+01	476	1.393E+01	517	3.254E+01	558	4.358E+01
395	4.297E-01	436	1.280E+01	477	1.364E+01	518	3.296E+01	559	4.371E+01
396	4.065E-01	437	1.398E+01	478	1.350E+01	519	3.333E+01	560	4.377E+01
397	4.255E-01	438	1.533E+01	479	1.349E+01	520	3.371E+01	561	4.389E+01
398	4.109E-01	439	1.675E+01	480	1.359E+01	521	3.410E+01	562	4.400E+01
399	4.379E-01	440	1.837E+01	481	1.374E+01	522	3.445E+01	563	4.408E+01
400	4.369E-01	441	2.013E+01	482	1.396E+01	523	3.484E+01	564	4.416E+01
401	4.578E-01	442	2.210E+01	483	1.424E+01	524	3.520E+01	565	4.425E+01
402	4.658E-01	443	2.435E+01	484	1.455E+01	525	3.552E+01	566	4.439E+01
403	4.919E-01	444	2.691E+01	485	1.487E+01	526	3.587E+01	567	4.443E+01
404	5.098E-01	445	2.969E+01	486	1.522E+01	527	3.622E+01	568	4.448E+01
405	5.357E-01	446	3.279E+01	487	1.559E+01	528	3.656E+01	569	4.460E+01
406	5.941E-01	447	3.579E+01	488	1.601E+01	529	3.691E+01	570	4.468E+01
407	6.435E-01	448	3.888E+01	489	1.645E+01	530	3.721E+01	571	4.476E+01
408	7.203E-01	449	4.174E+01	490	1.694E+01	531	3.751E+01	572	4.484E+01
409	7.809E-01	450	4.401E+01	491	1.745E+01	532	3.781E+01	573	4.492E+01
410	8.580E-01	451	4.546E+01	492	1.805E+01	533	3.815E+01	574	4.500E+01
411	9.586E-01	452	4.619E+01	493	1.864E+01	534	3.846E+01	575	4.512E+01
412	1.065E+00	453	4.577E+01	494	1.926E+01	535	3.876E+01	576	4.519E+01
413	1.194E+00	454	4.435E+01	495	1.997E+01	536	3.904E+01	577	4.531E+01
414	1.335E+00	455	4.219E+01	496	2.063E+01	537	3.935E+01	578	4.541E+01
415	1.510E+00	456	3.944E+01	497	2.131E+01	538	3.961E+01	579	4.558E+01
416	1.701E+00	457	3.637E+01	498	2.200E+01	539	3.989E+01	580	4.568E+01
417	1.921E+00	458	3.346E+01	499	2.271E+01	540	4.019E+01	581	4.583E+01
418	2.132E+00	459	3.080E+01	500	2.338E+01	541	4.043E+01	582	4.593E+01
419	2.393E+00	460	2.854E+01	501	2.409E+01	542	4.067E+01	583	4.609E+01
420	2.664E+00	461	2.676E+01	502	2.475E+01	543	4.095E+01	584	4.627E+01

nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
585	4.646E+01	626	5.664E+01	667	4.193E+01	708	1.739E+01	749	5.420E+00
586	4.663E+01	627	5.670E+01	668	4.127E+01	709	1.692E+01	750	5.262E+00
587	4.685E+01	628	5.670E+01	669	4.062E+01	710	1.648E+01	751	5.125E+00
588	4.703E+01	629	5.675E+01	670	3.995E+01	711	1.606E+01	752	4.968E+00
589	4.725E+01	630	5.670E+01	671	3.926E+01	712	1.565E+01	753	4.822E+00
590	4.747E+01	631	5.671E+01	672	3.863E+01	713	1.525E+01	754	4.681E+00
591	4.771E+01	632	5.659E+01	673	3.797E+01	714	1.484E+01	755	4.549E+00
592	4.796E+01	633	5.653E+01	674	3.728E+01	715	1.448E+01	756	4.414E+00
593	4.819E+01	634	5.644E+01	675	3.662E+01	716	1.408E+01	757	4.294E+00
594	4.849E+01	635	5.629E+01	676	3.595E+01	717	1.372E+01	758	4.161E+00
595	4.876E+01	636	5.618E+01	677	3.527E+01	718	1.335E+01	759	4.036E+00
596	4.906E+01	637	5.598E+01	678	3.463E+01	719	1.300E+01	760	3.933E+00
597	4.928E+01	638	5.582E+01	679	3.398E+01	720	1.264E+01	761	3.801E+00
598	4.964E+01	639	5.559E+01	680	3.330E+01	721	1.229E+01	762	3.694E+00
599	4.993E+01	640	5.539E+01	681	3.265E+01	722	1.195E+01	763	3.584E+00
600	5.021E+01	641	5.510E+01	682	3.201E+01	723	1.163E+01	764	3.472E+00
601	5.055E+01	642	5.480E+01	683	3.140E+01	724	1.130E+01	765	3.373E+00
602	5.084E+01	643	5.450E+01	684	3.072E+01	725	1.099E+01	766	3.276E+00
603	5.116E+01	644	5.414E+01	685	3.010E+01	726	1.066E+01	767	3.173E+00
604	5.149E+01	645	5.381E+01	686	2.945E+01	727	1.037E+01	768	3.075E+00
605	5.180E+01	646	5.347E+01	687	2.887E+01	728	1.006E+01	769	2.985E+00
606	5.214E+01	647	5.306E+01	688	2.821E+01	729	9.778E+00	770	2.891E+00
607	5.244E+01	648	5.263E+01	689	2.761E+01	730	9.511E+00	771	2.810E+00
608	5.275E+01	649	5.223E+01	690	2.699E+01	731	9.228E+00	772	2.731E+00
609	5.308E+01	650	5.171E+01	691	2.639E+01	732	8.954E+00	773	2.648E+00
610	5.337E+01	651	5.126E+01	692	2.579E+01	733	8.703E+00	774	2.572E+00
611	5.369E+01	652	5.078E+01	693	2.522E+01	734	8.443E+00	775	2.492E+00
612	5.392E+01	653	5.027E+01	694	2.467E+01	735	8.208E+00	776	2.424E+00
613	5.423E+01	654	4.973E+01	695	2.408E+01	736	7.958E+00	777	2.349E+00
614	5.451E+01	655	4.924E+01	696	2.353E+01	737	7.728E+00	778	2.283E+00
615	5.477E+01	656	4.870E+01	697	2.294E+01	738	7.492E+00	779	2.266E+00
616	5.506E+01	657	4.813E+01	698	2.240E+01	739	7.268E+00	780	2.270E+00
617	5.526E+01	658	4.757E+01	699	2.190E+01	740	7.037E+00		
618	5.550E+01	659	4.699E+01	700	2.133E+01	741	6.842E+00		
619	5.573E+01	660	4.637E+01	701	2.080E+01	742	6.638E+00		
620	5.586E+01	661	4.573E+01	702	2.030E+01	743	6.445E+00		
621	5.606E+01	662	4.515E+01	703	1.977E+01	744	6.268E+00		
622	5.625E+01	663	4.448E+01	704	1.928E+01	745	6.076E+00		
623	5.634E+01	664	4.388E+01	705	1.878E+01	746	5.896E+00		
624	5.648E+01	665	4.324E+01	706	1.832E+01	747	5.742E+00		
625	5.654E+01	666	4.257E+01	707	1.785E+01	748	5.579E+00		

CIE 1931xy Chromaticity Diagram



7-StepChromaticity Quadrangles



[Goniophotometer System]

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

Test orientation: **Base up**

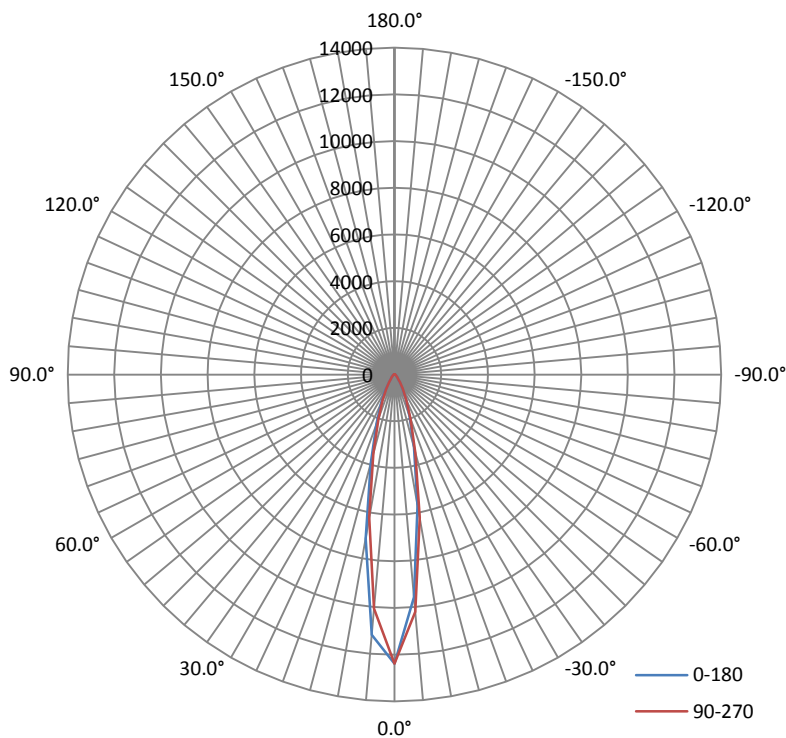
Electrical Measurement

Input Voltage(V)	Frequency(Hz)	Input Current(A)	Power (W)	Power Factor
120.0	60	0.2488	29.50	0.9880

Photometric Measurement

Luminous Flux(lm)	Efficacy(lm/W)	$I_{max}(cd)$	S/MH(C0/180)	S/MH(C90/270)
3052.73	103.48	12660.0	0.32	0.34

Luminous Intensity Distribution



	C0/180	C45/225	C90/270	C135/315	AVG.
Beam Angle(50% I_{max}):	20.1	20.1	20.0	20.1	20.1
Field Angle(10% I_{max}):	49.6	49.3	49.4	49.3	49.4

Luminous Intensity (cd) Distribution Data

C y	0°	22.5°	45°	67.5°	90°	112.5°	135°	157.5°
0.0°	12385	12385	12385	12385	12385	12385	12385	12385
5.0°	11199	11096	10881	10545	10060	9741	9500	9428
10.0°	7130	7041	6835	6560	6196	6039	5823	5727
15.0°	3917	3885	3802	3683	3491	3373	3274	3228
20.0°	2225	2198	2156	2110	2018	1952	1906	1888
25.0°	1311	1292	1263	1242	1197	1157	1137	1143
30.0°	780	764	743	735	712	683	669	677
35.0°	438	428	415	413	402	389	383	391
40.0°	257	253	246	245	240	234	232	236
45.0°	177	175	173	171	167	166	165	167
50.0°	137	136	134	134	130	128	128	129
55.0°	108	107	106	104	101	99	99	100
60.0°	89	88	87	85	83	82	81	82
65.0°	75	74	74	72	70	69	68	69
70.0°	63	62	61	60	58	57	56	56
75.0°	51	50	48	47	46	44	43	43
80.0°	37	36	35	34	32	31	30	29
85.0°	22	21	20	19	18	16	15	15
90.0°	8	8	7	6	5	4	4	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°	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	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	8
160.0°	8	8	8	8	8	8	8	8
165.0°	8	8	8	8	8	8	8	8
170.0°	7	7	7	7	7	7	7	7
175.0°	5	5	5	5	5	5	5	5
180.0°	4	4	4	4	4	3	3	3

Luminous Intensity (cd) Distribution Data (cont.)

C y	180°	202.5°	225°	247.5°	270°	292.5°	315°	337.5°
0.0°	12385	12385	12385	12385	12385	12385	12385	12385
5.0°	9564	9666	9856	10075	10198	10508	10745	10973
10.0°	5717	5785	5889	6091	6226	6467	6755	6933
15.0°	3232	3238	3287	3383	3454	3581	3724	3808
20.0°	1906	1906	1936	1980	2013	2071	2120	2169
25.0°	1173	1166	1168	1200	1213	1234	1264	1286
30.0°	700	685	684	700	710	720	737	763
35.0°	402	391	384	393	400	403	411	428
40.0°	243	236	234	237	239	240	244	250
45.0°	171	169	169	169	168	169	169	171
50.0°	130	129	129	130	130	132	132	133
55.0°	101	101	101	102	101	103	103	104
60.0°	84	84	84	84	84	85	85	85
65.0°	70	71	71	71	71	72	72	72
70.0°	58	59	59	59	59	60	61	61
75.0°	45	45	46	47	47	48	49	49
80.0°	30	31	31	32	33	35	35	36
85.0°	15	16	16	17	18	20	21	21
90.0°	3	4	4	5	5	7	7	8
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	2	2	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°	3	3	3	3	2	2	2	2
180.0°	4	4	4	4	4	4	3	3

Zonal Lumen Density Measurement

Deg	Flux (lm)	%
0-5	270.6	8.87
5-10	574.1	18.80
10-15	560.5	18.36
15-20	439.8	14.41
20-25	329.3	10.79
25-30	238.7	7.82
30-35	160.1	5.24
35-40	104.2	3.42
40-45	74.1	2.42
45-50	60.4	1.98
50-55	50.4	1.65
55-60	42.9	1.40
60-65	37.8	1.24
65-70	33.1	1.08
70-75	27.7	0.91
75-80	21.4	0.70
80-85	13.9	0.46
85-90	6.3	0.20
90-95	1.0	0.04
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	0.00
125-130	0.1	0.01
130-135	0.2	0.01
135-140	0.4	0.01
140-145	0.7	0.02
145-150	0.9	0.03
150-155	1.1	0.04
155-160	1.1	0.03
160-165	0.9	0.03
165-170	0.6	0.02
170-175	0.3	0.01
175-180	0.1	0.00

Deg	Flux (lm)	%
0-5	270.6	8.87
0-10	844.8	27.67
0-15	1405.3	46.03
0-20	1845.1	60.44
0-25	2174.4	71.23
0-30	2413.1	79.05
0-35	2573.2	84.29
0-40	2677.4	87.71
0-45	2751.5	90.13
0-50	2811.9	92.11
0-55	2862.2	93.76
0-60	2905.1	95.16
0-65	2942.9	96.40
0-70	2975.9	97.48
0-75	3003.6	98.39
0-80	3025.0	99.09
0-85	3038.8	99.55
0-90	3045.2	99.75
0-95	3046.2	99.79
0-100	3046.2	99.79
0-105	3046.3	99.79
0-110	3046.3	99.79
0-115	3046.3	99.79
0-120	3046.4	99.79
0-125	3046.5	99.79
0-130	3046.6	99.80
0-135	3046.8	99.81
0-140	3047.1	99.82
0-145	3047.8	99.84
0-150	3048.8	99.87
0-155	3049.8	99.91
0-160	3050.9	99.94
0-165	3051.8	99.97
0-170	3052.3	99.99
0-175	3052.6	100.00
0-180	3052.7	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*****