

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/935FL40/277V

Report Type:	Electrical and Photometric tests including: Luminous Flux, Chromaticity, Luminous Intensity Distribution
Test Engineer:	Hill Liu
Report Number:	R1KS200925084-10
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/935FL40/277V
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**

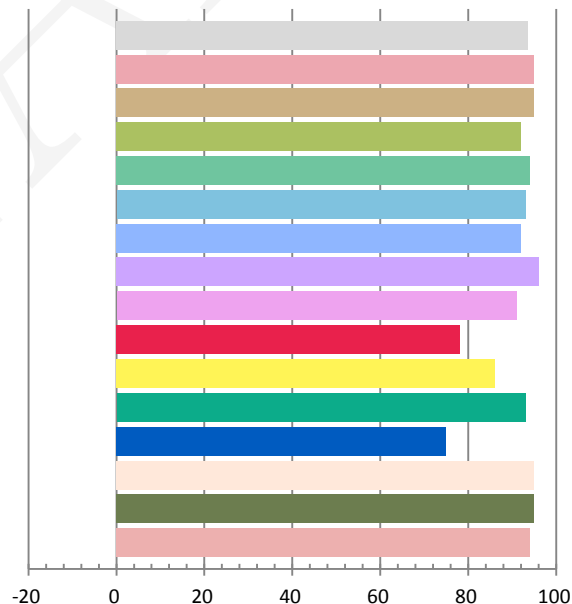
Photometric and Electrical Measurement Result

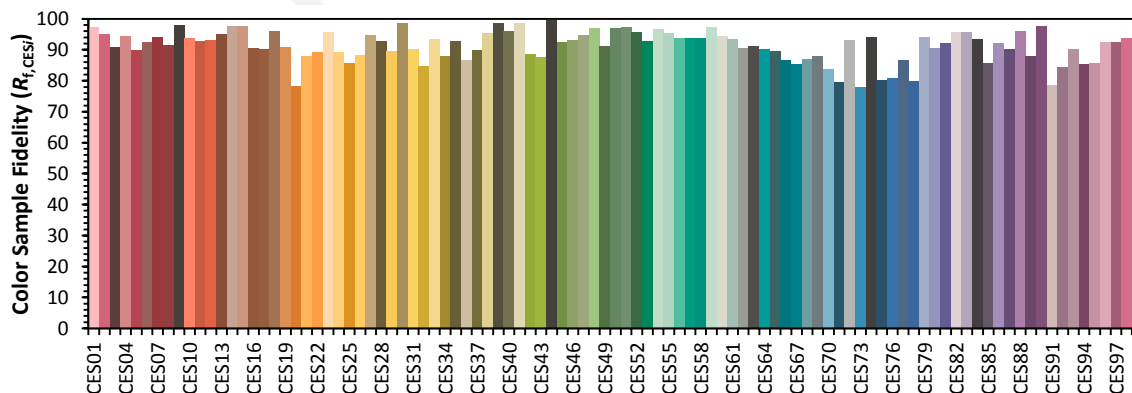
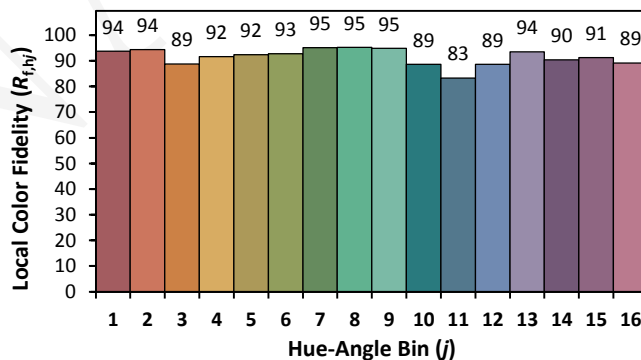
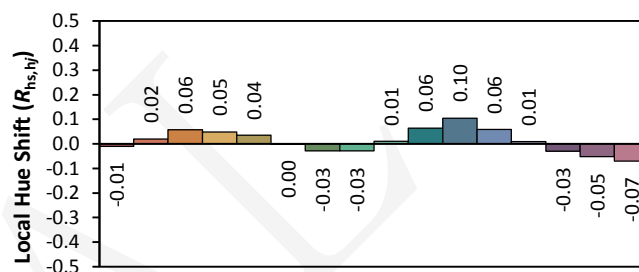
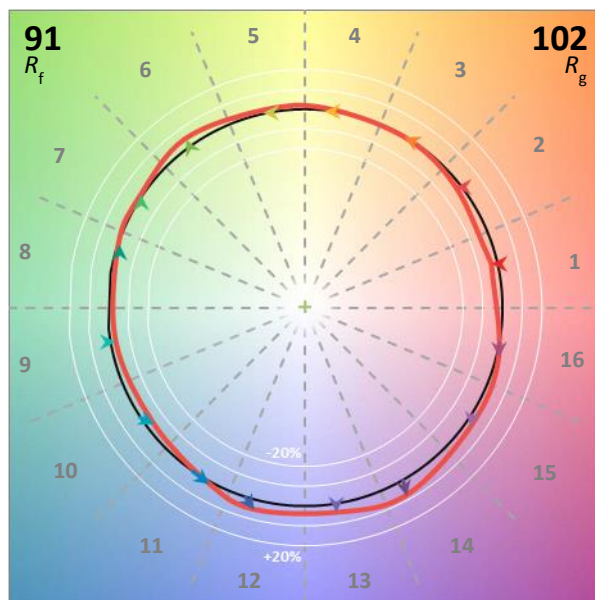
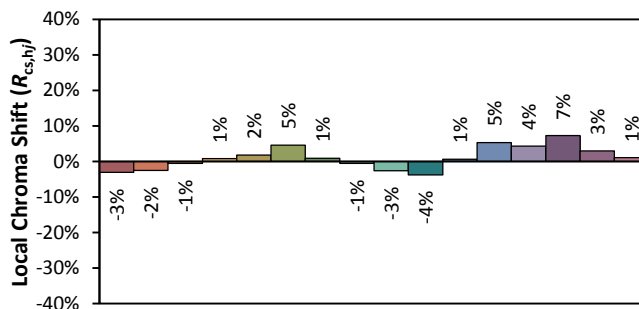
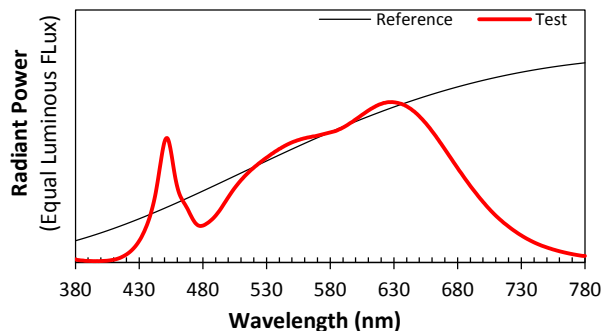
Voltage(V)	Frequency(Hz)	Current(A)	Power (W)	Power Factor	Luminous Flux(lm)	Efficacy(lm/W)
120.1	60	0.2512	29.92	0.9912	3162.2	105.7

Radiant Flux (W)	CCT (K)	Duv	x	y	u'	v'
11.252	3339	-0.00114	0.4133	0.3919	0.2404	0.5130

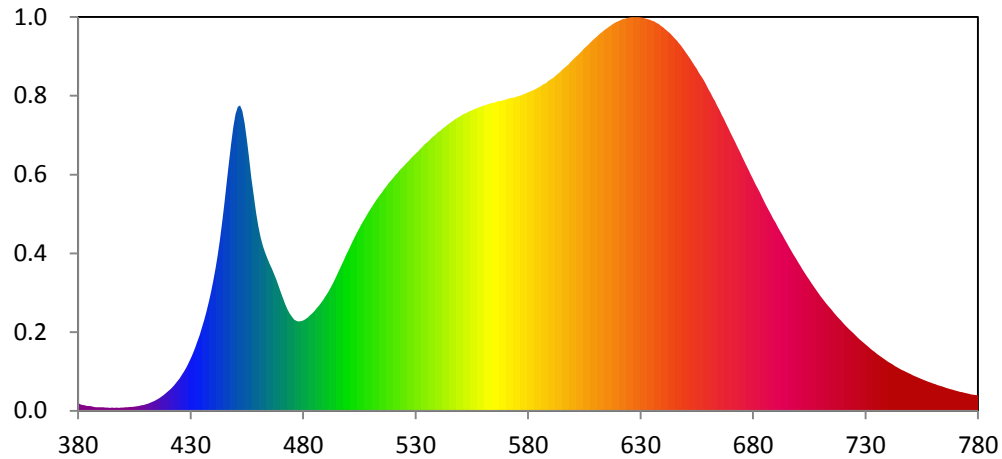
Color Rendering Index

Ra			
93.5			
R1	R2	R3	R4
95	95	92	94
R5	R6	R7	R8
93	92	96	91
R9	R10	R11	R12
78	86	93	75
R13	R14	R15	
95	95	94	





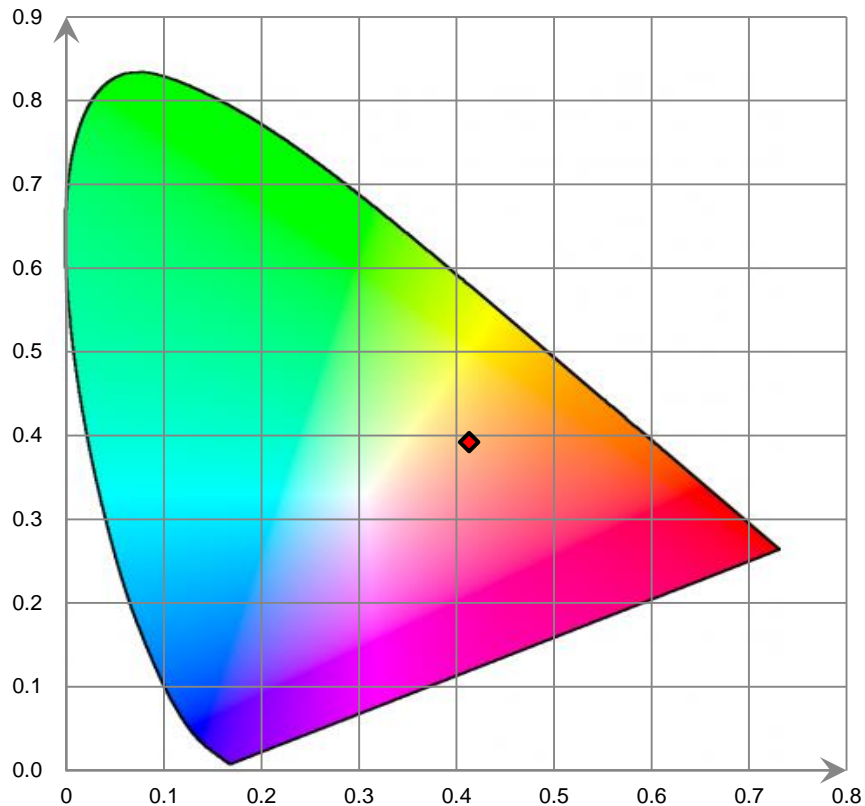
Relative Spectral Power Distribution



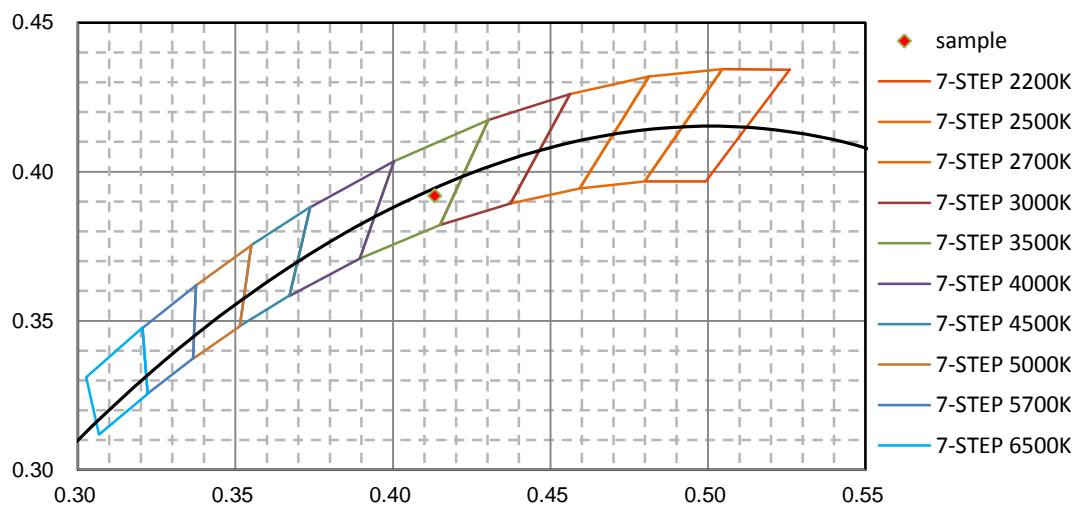
nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
380	1.137E+00	421	3.211E+00	462	2.463E+01	503	2.598E+01	544	4.265E+01
381	9.334E-01	422	3.553E+00	463	2.363E+01	504	2.663E+01	545	4.289E+01
382	8.490E-01	423	3.933E+00	464	2.278E+01	505	2.727E+01	546	4.314E+01
383	8.030E-01	424	4.361E+00	465	2.198E+01	506	2.787E+01	547	4.336E+01
384	7.208E-01	425	4.831E+00	466	2.124E+01	507	2.846E+01	548	4.358E+01
385	6.969E-01	426	5.328E+00	467	2.042E+01	508	2.904E+01	549	4.380E+01
386	6.719E-01	427	5.862E+00	468	1.961E+01	509	2.959E+01	550	4.400E+01
387	5.887E-01	428	6.467E+00	469	1.865E+01	510	3.015E+01	551	4.420E+01
388	5.340E-01	429	7.123E+00	470	1.770E+01	511	3.064E+01	552	4.436E+01
389	5.333E-01	430	7.841E+00	471	1.680E+01	512	3.117E+01	553	4.452E+01
390	5.180E-01	431	8.582E+00	472	1.591E+01	513	3.167E+01	554	4.471E+01
391	5.001E-01	432	9.426E+00	473	1.516E+01	514	3.214E+01	555	4.485E+01
392	4.907E-01	433	1.039E+01	474	1.449E+01	515	3.260E+01	556	4.498E+01
393	4.657E-01	434	1.134E+01	475	1.402E+01	516	3.305E+01	557	4.516E+01
394	4.455E-01	435	1.244E+01	476	1.363E+01	517	3.350E+01	558	4.527E+01
395	4.541E-01	436	1.355E+01	477	1.343E+01	518	3.394E+01	559	4.542E+01
396	4.406E-01	437	1.481E+01	478	1.333E+01	519	3.432E+01	560	4.552E+01
397	4.675E-01	438	1.617E+01	479	1.338E+01	520	3.473E+01	561	4.562E+01
398	4.445E-01	439	1.766E+01	480	1.348E+01	521	3.515E+01	562	4.576E+01
399	4.615E-01	440	1.935E+01	481	1.366E+01	522	3.549E+01	563	4.583E+01
400	4.855E-01	441	2.116E+01	482	1.391E+01	523	3.589E+01	564	4.593E+01
401	5.041E-01	442	2.320E+01	483	1.421E+01	524	3.630E+01	565	4.600E+01
402	5.250E-01	443	2.549E+01	484	1.451E+01	525	3.664E+01	566	4.614E+01
403	5.455E-01	444	2.813E+01	485	1.486E+01	526	3.701E+01	567	4.621E+01
404	5.712E-01	445	3.096E+01	486	1.526E+01	527	3.735E+01	568	4.624E+01
405	6.037E-01	446	3.401E+01	487	1.565E+01	528	3.773E+01	569	4.637E+01
406	6.697E-01	447	3.694E+01	488	1.609E+01	529	3.806E+01	570	4.642E+01
407	7.237E-01	448	3.984E+01	489	1.658E+01	530	3.840E+01	571	4.654E+01
408	8.071E-01	449	4.238E+01	490	1.711E+01	531	3.870E+01	572	4.664E+01
409	8.730E-01	450	4.434E+01	491	1.768E+01	532	3.906E+01	573	4.670E+01
410	9.517E-01	451	4.537E+01	492	1.829E+01	533	3.939E+01	574	4.678E+01
411	1.059E+00	452	4.558E+01	493	1.890E+01	534	3.976E+01	575	4.689E+01
412	1.177E+00	453	4.477E+01	494	1.958E+01	535	4.002E+01	576	4.698E+01
413	1.324E+00	454	4.297E+01	495	2.028E+01	536	4.037E+01	577	4.711E+01
414	1.475E+00	455	4.055E+01	496	2.101E+01	537	4.069E+01	578	4.722E+01
415	1.647E+00	456	3.776E+01	497	2.174E+01	538	4.096E+01	579	4.738E+01
416	1.863E+00	457	3.482E+01	498	2.245E+01	539	4.126E+01	580	4.751E+01
417	2.096E+00	458	3.202E+01	499	2.319E+01	540	4.159E+01	581	4.765E+01
418	2.332E+00	459	2.958E+01	500	2.388E+01	541	4.179E+01	582	4.779E+01
419	2.603E+00	460	2.757E+01	501	2.460E+01	542	4.213E+01	583	4.793E+01
420	2.887E+00	461	2.593E+01	502	2.529E+01	543	4.236E+01	584	4.813E+01

nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
585	4.832E+01	626	5.876E+01	667	4.353E+01	708	1.804E+01	749	5.630E+00
586	4.852E+01	627	5.875E+01	668	4.285E+01	709	1.757E+01	750	5.470E+00
587	4.877E+01	628	5.877E+01	669	4.216E+01	710	1.711E+01	751	5.309E+00
588	4.893E+01	629	5.877E+01	670	4.147E+01	711	1.668E+01	752	5.158E+00
589	4.918E+01	630	5.870E+01	671	4.077E+01	712	1.625E+01	753	5.023E+00
590	4.943E+01	631	5.865E+01	672	4.010E+01	713	1.582E+01	754	4.860E+00
591	4.967E+01	632	5.855E+01	673	3.939E+01	714	1.542E+01	755	4.712E+00
592	4.996E+01	633	5.847E+01	674	3.871E+01	715	1.502E+01	756	4.586E+00
593	5.023E+01	634	5.834E+01	675	3.802E+01	716	1.459E+01	757	4.450E+00
594	5.053E+01	635	5.820E+01	676	3.732E+01	717	1.422E+01	758	4.314E+00
595	5.086E+01	636	5.811E+01	677	3.662E+01	718	1.387E+01	759	4.192E+00
596	5.116E+01	637	5.787E+01	678	3.595E+01	719	1.350E+01	760	4.061E+00
597	5.142E+01	638	5.773E+01	679	3.526E+01	720	1.313E+01	761	3.943E+00
598	5.173E+01	639	5.746E+01	680	3.458E+01	721	1.277E+01	762	3.839E+00
599	5.211E+01	640	5.723E+01	681	3.387E+01	722	1.240E+01	763	3.719E+00
600	5.243E+01	641	5.693E+01	682	3.322E+01	723	1.206E+01	764	3.609E+00
601	5.275E+01	642	5.664E+01	683	3.260E+01	724	1.173E+01	765	3.501E+00
602	5.308E+01	643	5.635E+01	684	3.190E+01	725	1.141E+01	766	3.398E+00
603	5.340E+01	644	5.600E+01	685	3.124E+01	726	1.109E+01	767	3.295E+00
604	5.375E+01	645	5.561E+01	686	3.057E+01	727	1.076E+01	768	3.196E+00
605	5.410E+01	646	5.530E+01	687	2.994E+01	728	1.046E+01	769	3.102E+00
606	5.441E+01	647	5.487E+01	688	2.930E+01	729	1.015E+01	770	3.012E+00
607	5.473E+01	648	5.447E+01	689	2.866E+01	730	9.881E+00	771	2.916E+00
608	5.505E+01	649	5.401E+01	690	2.801E+01	731	9.576E+00	772	2.834E+00
609	5.538E+01	650	5.355E+01	691	2.739E+01	732	9.298E+00	773	2.751E+00
610	5.570E+01	651	5.305E+01	692	2.679E+01	733	9.032E+00	774	2.669E+00
611	5.599E+01	652	5.259E+01	693	2.620E+01	734	8.765E+00	775	2.593E+00
612	5.629E+01	653	5.207E+01	694	2.561E+01	735	8.509E+00	776	2.514E+00
613	5.653E+01	654	5.153E+01	695	2.503E+01	736	8.270E+00	777	2.442E+00
614	5.682E+01	655	5.104E+01	696	2.440E+01	737	8.016E+00	778	2.376E+00
615	5.705E+01	656	5.046E+01	697	2.382E+01	738	7.782E+00	779	2.353E+00
616	5.734E+01	657	4.988E+01	698	2.326E+01	739	7.549E+00	780	2.357E+00
617	5.754E+01	658	4.932E+01	699	2.272E+01	740	7.323E+00		
618	5.778E+01	659	4.869E+01	700	2.214E+01	741	7.113E+00		
619	5.796E+01	660	4.806E+01	701	2.162E+01	742	6.903E+00		
620	5.810E+01	661	4.745E+01	702	2.107E+01	743	6.700E+00		
621	5.826E+01	662	4.683E+01	703	2.053E+01	744	6.505E+00		
622	5.846E+01	663	4.620E+01	704	2.001E+01	745	6.318E+00		
623	5.849E+01	664	4.552E+01	705	1.951E+01	746	6.125E+00		
624	5.862E+01	665	4.488E+01	706	1.899E+01	747	5.960E+00		
625	5.871E+01	666	4.417E+01	707	1.852E+01	748	5.796E+00		

CIE 1931xy Chromaticity Diagram



7-StepChromaticity Quadrangles



[Goniophotometer System]

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

Test orientation: **Base up**

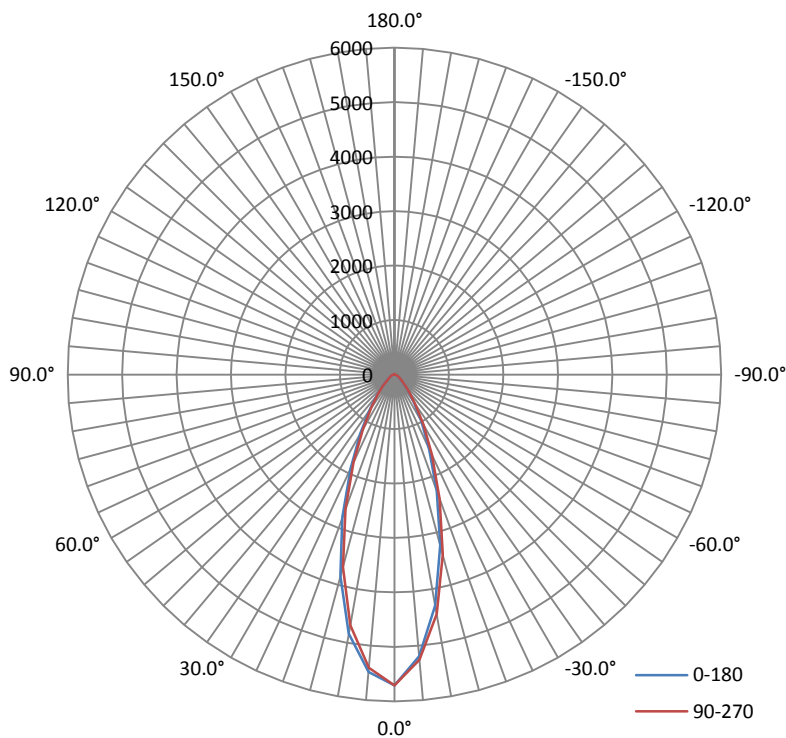
Electrical Measurement

Input Voltage(V)	Frequency(Hz)	Input Current(A)	Power (W)	Power Factor
120.0	60	0.2518	29.90	0.9892

Photometric Measurement

Luminous Flux(lm)	Efficacy(lm/W)	$I_{max}(cd)$	S/MH(C0/180)	S/MH(C90/270)
3164.74	105.84	5761.0	0.55	0.57

Luminous Intensity Distribution



	C0/180	C45/225	C90/270	C135/315	AVG.
Beam Angle(50% I_{max}):	36.3	36.2	36.4	36.5	36.4
Field Angle(10% I_{max}):	74.7	74.7	74.9	74.9	74.8

Luminous Intensity (cd) Distribution Data

C y	0°	22.5°	45°	67.5°	90°	112.5°	135°	157.5°
0.0°	5708	5708	5708	5708	5708	5708	5708	5708
5.0°	5481	5477	5471	5456	5404	5354	5290	5250
10.0°	4827	4828	4803	4762	4672	4569	4448	4372
15.0°	3831	3845	3824	3764	3659	3538	3404	3322
20.0°	2794	2798	2770	2721	2625	2519	2403	2335
25.0°	1905	1921	1895	1849	1779	1693	1614	1557
30.0°	1251	1263	1242	1208	1167	1105	1044	1004
35.0°	803	807	800	777	748	709	672	645
40.0°	512	519	512	497	475	455	431	411
45.0°	326	329	325	317	303	290	277	261
50.0°	208	209	208	201	193	186	178	169
55.0°	138	138	137	134	130	126	121	116
60.0°	99	99	98	96	93	91	88	85
65.0°	73	73	72	71	69	67	64	62
70.0°	53	53	52	51	49	47	45	44
75.0°	36	36	35	35	33	31	29	28
80.0°	22	22	22	21	20	18	17	16
85.0°	11	11	10	9	8	7	6	6
90.0°	2	2	2	2	1	1	1	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	3	3	4	4	4
150.0°	5	5	5	5	5	5	5	5
155.0°	6	6	6	6	6	6	6	6
160.0°	7	6	6	6	6	7	7	7
165.0°	7	7	6	6	6	6	6	6
170.0°	6	6	6	6	6	6	6	6
175.0°	5	5	5	5	5	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°	5708	5708	5708	5708	5708	5708	5708	5708
5.0°	5194	5174	5181	5212	5254	5314	5363	5412
10.0°	4310	4292	4302	4369	4464	4586	4693	4779
15.0°	3243	3232	3256	3331	3420	3552	3675	3750
20.0°	2266	2259	2277	2345	2427	2532	2634	2713
25.0°	1509	1505	1514	1563	1626	1703	1782	1856
30.0°	985	978	988	1023	1068	1117	1175	1230
35.0°	629	625	635	656	682	717	753	783
40.0°	401	399	406	420	435	459	481	498
45.0°	254	256	261	269	278	293	308	317
50.0°	165	166	170	175	179	187	197	204
55.0°	113	114	117	120	121	125	133	138
60.0°	83	83	85	88	89	91	95	98
65.0°	61	61	63	65	66	68	70	72
70.0°	43	43	44	45	47	48	50	51
75.0°	27	27	28	30	31	32	33	35
80.0°	15	15	15	17	18	19	20	21
85.0°	5	5	5	6	7	8	9	10
90.0°	0	0	0	0	1	1	1	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°	2	2	2	2	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°	3	3	3	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	131.5	4.16
5-10	353.4	11.16
10-15	478.1	15.11
15-20	494.2	15.61
20-25	436.9	13.81
25-30	350.9	11.09
30-35	264.3	8.35
35-40	191.7	6.06
40-45	136.0	4.29
45-50	94.8	3.00
50-55	67.0	2.11
55-60	49.6	1.57
60-65	38.2	1.21
65-70	29.0	0.91
70-75	20.7	0.66
75-80	13.3	0.42
80-85	7.0	0.22
85-90	2.2	0.07
90-95	0.2	0.00
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	0.2	0.01
130-135	0.3	0.01
135-140	0.4	0.01
140-145	0.6	0.02
145-150	0.8	0.02
150-155	0.9	0.03
155-160	0.9	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	131.5	4.16
0-10	484.9	15.32
0-15	963.0	30.43
0-20	1457.2	46.04
0-25	1894.1	59.85
0-30	2245.0	70.94
0-35	2509.2	79.29
0-40	2701.0	85.35
0-45	2836.9	89.64
0-50	2931.7	92.64
0-55	2998.7	94.75
0-60	3048.3	96.32
0-65	3086.5	97.53
0-70	3115.5	98.44
0-75	3136.1	99.10
0-80	3149.5	99.52
0-85	3156.5	99.74
0-90	3158.7	99.81
0-95	3158.8	99.81
0-100	3158.8	99.81
0-105	3158.9	99.81
0-110	3158.9	99.82
0-115	3159.0	99.82
0-120	3159.0	99.82
0-125	3159.1	99.82
0-130	3159.3	99.83
0-135	3159.5	99.84
0-140	3160.0	99.85
0-145	3160.6	99.87
0-150	3161.4	99.89
0-155	3162.2	99.92
0-160	3163.1	99.95
0-165	3163.8	99.97
0-170	3164.4	99.99
0-175	3164.6	100.00
0-180	3164.7	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*****