

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/927FL40/277V

Report Type:	Electrical and Photometric tests including: Luminous Flux, Chromaticity, Luminous Intensity Distribution
Test Engineer:	Hill Liu
Report Number:	R1KS200925080-10
Test Date:	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/927FL40/277V
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: 2700K
Nominal Lumen Output: 2700lm

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**

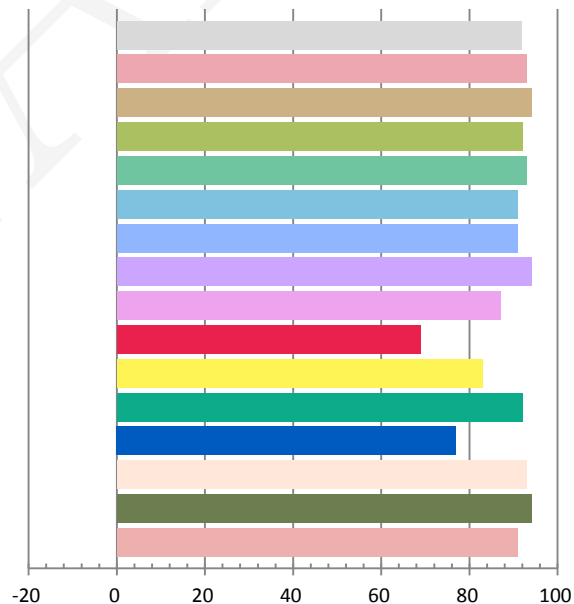
Photometric and Electrical Measurement Result

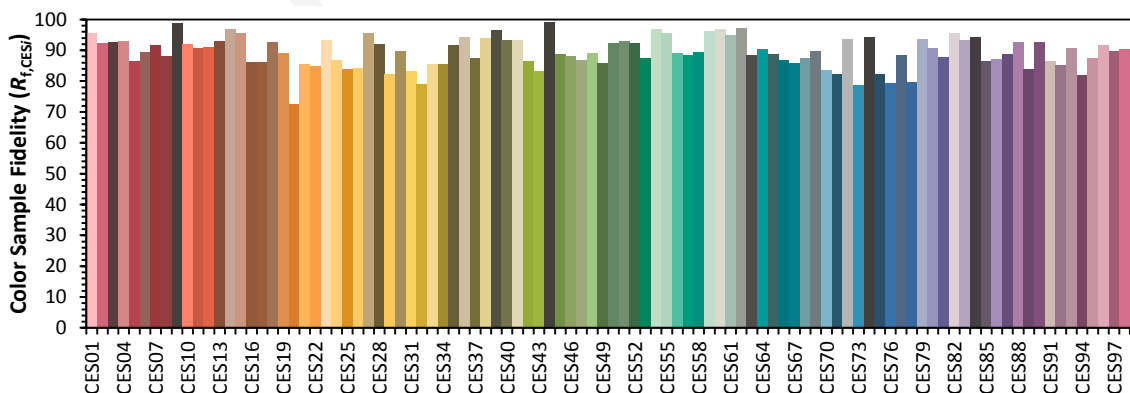
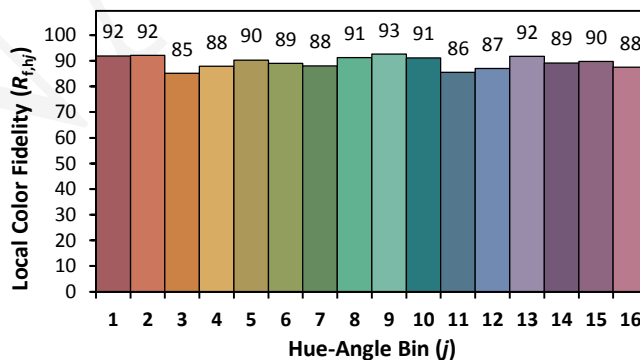
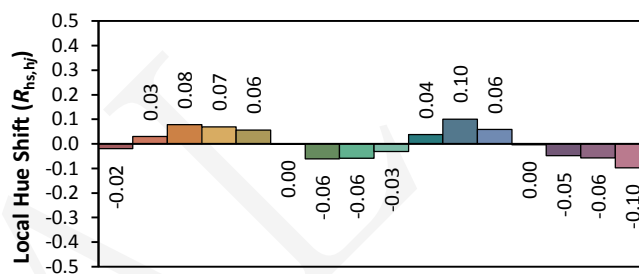
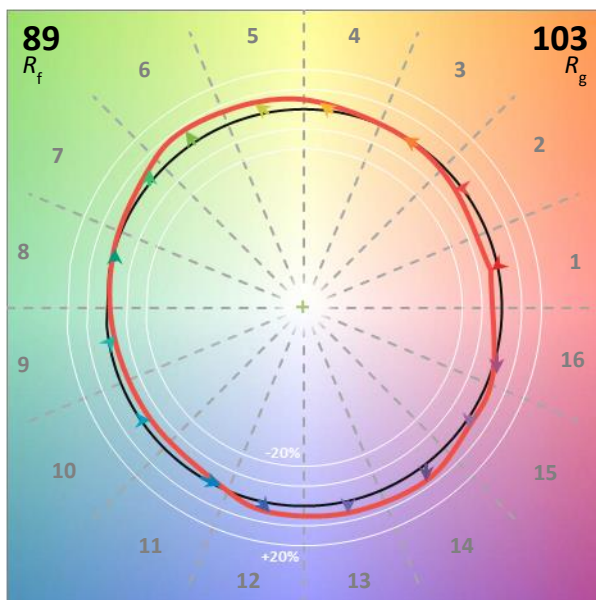
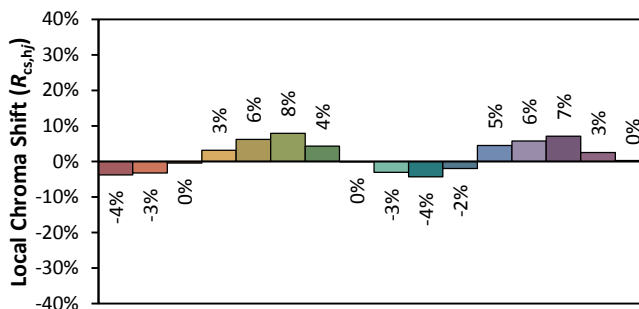
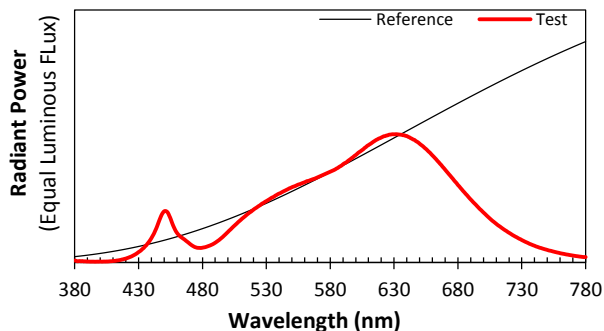
Voltage(V)	Frequency(Hz)	Current(A)	Power (W)	Power Factor	Luminous Flux(lm)	Efficacy(lm/W)
120.1	60	0.2505	29.77	0.99	2843.2	95.51

Radiant Flux (W)	CCT (K)	Duv	x	y	u'	v'
10.429	2678	-0.00059	0.4607	0.4092	0.2637	0.5269

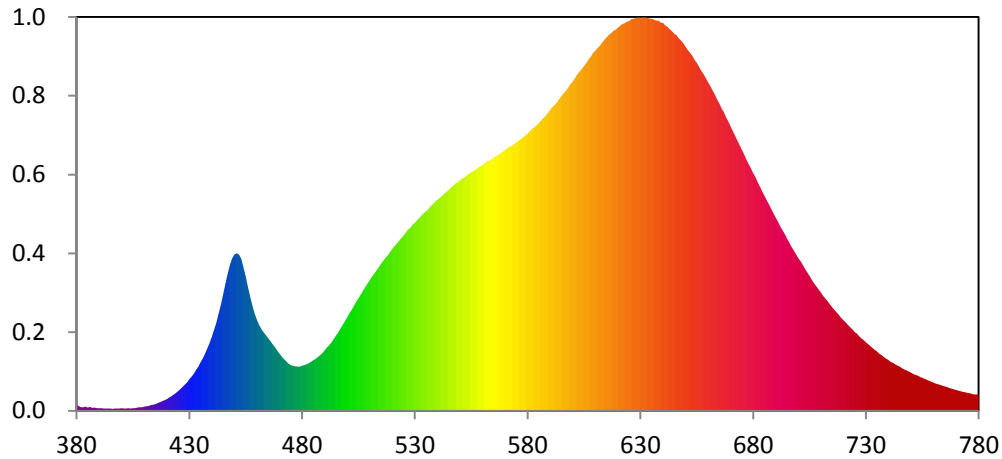
Color Rendering Index

Ra			
91.8			
R1	R2	R3	R4
93	94	92	93
R5	R6	R7	R8
91	91	94	87
R9	R10	R11	R12
69	83	92	77
R13	R14	R15	
93	94	91	





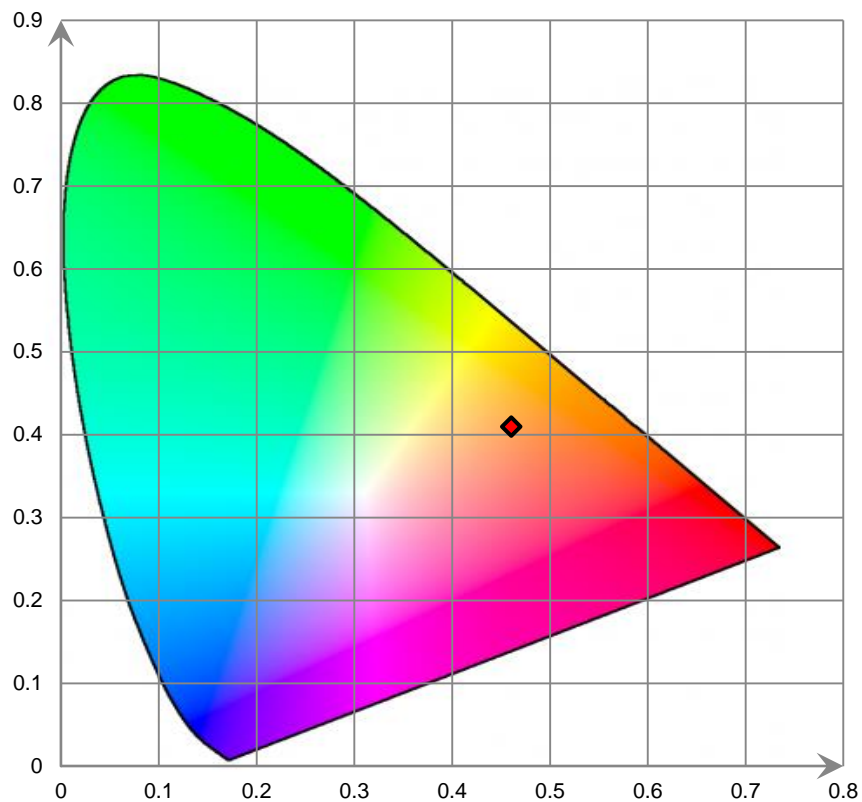
Relative Spectral Power Distribution



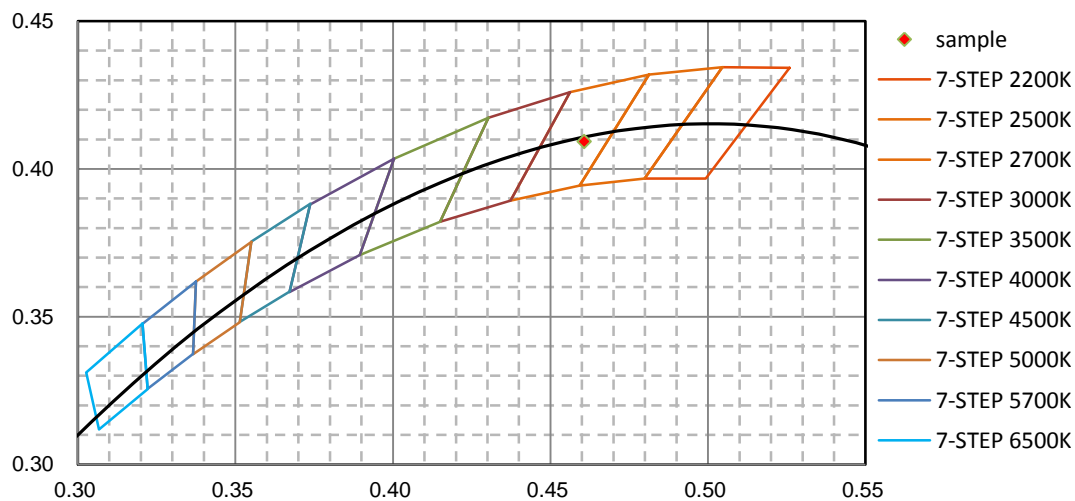
nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
380	9.083E-01	421	2.099E+00	462	1.314E+01	503	1.691E+01	544	3.529E+01
381	7.724E-01	422	2.315E+00	463	1.261E+01	504	1.754E+01	545	3.559E+01
382	5.506E-01	423	2.577E+00	464	1.216E+01	505	1.812E+01	546	3.592E+01
383	5.807E-01	424	2.805E+00	465	1.170E+01	506	1.870E+01	547	3.622E+01
384	6.506E-01	425	3.119E+00	466	1.126E+01	507	1.928E+01	548	3.659E+01
385	5.152E-01	426	3.455E+00	467	1.074E+01	508	1.991E+01	549	3.682E+01
386	6.329E-01	427	3.788E+00	468	1.025E+01	509	2.045E+01	550	3.713E+01
387	4.508E-01	428	4.162E+00	469	9.757E+00	510	2.099E+01	551	3.741E+01
388	5.108E-01	429	4.590E+00	470	9.225E+00	511	2.158E+01	552	3.760E+01
389	4.219E-01	430	5.084E+00	471	8.733E+00	512	2.209E+01	553	3.787E+01
390	3.916E-01	431	5.490E+00	472	8.298E+00	513	2.261E+01	554	3.817E+01
391	3.929E-01	432	5.980E+00	473	7.920E+00	514	2.314E+01	555	3.846E+01
392	3.553E-01	433	6.606E+00	474	7.586E+00	515	2.370E+01	556	3.863E+01
393	3.498E-01	434	7.096E+00	475	7.375E+00	516	2.418E+01	557	3.887E+01
394	3.629E-01	435	7.851E+00	476	7.195E+00	517	2.468E+01	558	3.914E+01
395	3.443E-01	436	8.431E+00	477	7.160E+00	518	2.505E+01	559	3.937E+01
396	3.034E-01	437	9.243E+00	478	7.130E+00	519	2.558E+01	560	3.961E+01
397	3.439E-01	438	1.004E+01	479	7.121E+00	520	2.607E+01	561	3.991E+01
398	3.505E-01	439	1.093E+01	480	7.246E+00	521	2.657E+01	562	4.020E+01
399	3.471E-01	440	1.192E+01	481	7.372E+00	522	2.693E+01	563	4.028E+01
400	4.145E-01	441	1.306E+01	482	7.475E+00	523	2.738E+01	564	4.054E+01
401	3.438E-01	442	1.418E+01	483	7.677E+00	524	2.784E+01	565	4.078E+01
402	3.516E-01	443	1.560E+01	484	7.906E+00	525	2.820E+01	566	4.102E+01
403	4.116E-01	444	1.701E+01	485	8.136E+00	526	2.874E+01	567	4.124E+01
404	3.769E-01	445	1.867E+01	486	8.358E+00	527	2.916E+01	568	4.143E+01
405	4.179E-01	446	2.038E+01	487	8.652E+00	528	2.947E+01	569	4.175E+01
406	4.270E-01	447	2.194E+01	488	8.936E+00	529	2.994E+01	570	4.195E+01
407	4.870E-01	448	2.341E+01	489	9.299E+00	530	3.027E+01	571	4.226E+01
408	5.411E-01	449	2.450E+01	490	9.693E+00	531	3.066E+01	572	4.253E+01
409	5.650E-01	450	2.522E+01	491	1.013E+01	532	3.105E+01	573	4.271E+01
410	6.698E-01	451	2.539E+01	492	1.059E+01	533	3.144E+01	574	4.298E+01
411	7.132E-01	452	2.514E+01	493	1.103E+01	534	3.188E+01	575	4.327E+01
412	7.747E-01	453	2.446E+01	494	1.157E+01	535	3.218E+01	576	4.352E+01
413	9.065E-01	454	2.310E+01	495	1.209E+01	536	3.249E+01	577	4.378E+01
414	9.705E-01	455	2.167E+01	496	1.264E+01	537	3.297E+01	578	4.409E+01
415	1.097E+00	456	1.992E+01	497	1.324E+01	538	3.329E+01	579	4.441E+01
416	1.209E+00	457	1.832E+01	498	1.382E+01	539	3.370E+01	580	4.467E+01
417	1.400E+00	458	1.692E+01	499	1.445E+01	540	3.400E+01	581	4.508E+01
418	1.523E+00	459	1.563E+01	500	1.505E+01	541	3.426E+01	582	4.541E+01
419	1.713E+00	460	1.463E+01	501	1.571E+01	542	3.462E+01	583	4.567E+01
420	1.856E+00	461	1.381E+01	502	1.626E+01	543	3.497E+01	584	4.600E+01

nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
585	4.641E+01	626	6.312E+01	667	4.811E+01	708	2.007E+01	749	6.315E+00
586	4.672E+01	627	6.319E+01	668	4.728E+01	709	1.956E+01	750	6.131E+00
587	4.720E+01	628	6.328E+01	669	4.662E+01	710	1.906E+01	751	5.916E+00
588	4.755E+01	629	6.336E+01	670	4.584E+01	711	1.853E+01	752	5.780E+00
589	4.793E+01	630	6.333E+01	671	4.507E+01	712	1.808E+01	753	5.664E+00
590	4.847E+01	631	6.337E+01	672	4.433E+01	713	1.767E+01	754	5.455E+00
591	4.893E+01	632	6.338E+01	673	4.357E+01	714	1.717E+01	755	5.302E+00
592	4.925E+01	633	6.330E+01	674	4.286E+01	715	1.672E+01	756	5.133E+00
593	4.963E+01	634	6.322E+01	675	4.208E+01	716	1.628E+01	757	4.988E+00
594	5.022E+01	635	6.316E+01	676	4.137E+01	717	1.586E+01	758	4.827E+00
595	5.066E+01	636	6.307E+01	677	4.053E+01	718	1.548E+01	759	4.706E+00
596	5.113E+01	637	6.288E+01	678	3.981E+01	719	1.502E+01	760	4.524E+00
597	5.163E+01	638	6.287E+01	679	3.913E+01	720	1.464E+01	761	4.391E+00
598	5.207E+01	639	6.256E+01	680	3.826E+01	721	1.426E+01	762	4.272E+00
599	5.264E+01	640	6.248E+01	681	3.762E+01	722	1.384E+01	763	4.167E+00
600	5.306E+01	641	6.210E+01	682	3.683E+01	723	1.343E+01	764	4.025E+00
601	5.361E+01	642	6.185E+01	683	3.612E+01	724	1.309E+01	765	3.889E+00
602	5.420E+01	643	6.144E+01	684	3.533E+01	725	1.271E+01	766	3.807E+00
603	5.464E+01	644	6.115E+01	685	3.467E+01	726	1.241E+01	767	3.678E+00
604	5.506E+01	645	6.075E+01	686	3.391E+01	727	1.203E+01	768	3.570E+00
605	5.554E+01	646	6.054E+01	687	3.327E+01	728	1.167E+01	769	3.469E+00
606	5.599E+01	647	6.002E+01	688	3.252E+01	729	1.141E+01	770	3.359E+00
607	5.661E+01	648	5.965E+01	689	3.179E+01	730	1.103E+01	771	3.254E+00
608	5.704E+01	649	5.925E+01	690	3.112E+01	731	1.072E+01	772	3.150E+00
609	5.762E+01	650	5.869E+01	691	3.045E+01	732	1.039E+01	773	3.061E+00
610	5.799E+01	651	5.818E+01	692	2.975E+01	733	1.009E+01	774	2.986E+00
611	5.842E+01	652	5.772E+01	693	2.912E+01	734	9.817E+00	775	2.870E+00
612	5.880E+01	653	5.721E+01	694	2.850E+01	735	9.527E+00	776	2.815E+00
613	5.927E+01	654	5.658E+01	695	2.780E+01	736	9.185E+00	777	2.722E+00
614	5.972E+01	655	5.608E+01	696	2.715E+01	737	8.946E+00	778	2.640E+00
615	6.012E+01	656	5.548E+01	697	2.646E+01	738	8.684E+00	779	2.611E+00
616	6.054E+01	657	5.482E+01	698	2.590E+01	739	8.418E+00	780	2.616E+00
617	6.084E+01	658	5.429E+01	699	2.528E+01	740	8.207E+00		
618	6.122E+01	659	5.360E+01	700	2.465E+01	741	7.908E+00		
619	6.142E+01	660	5.292E+01	701	2.408E+01	742	7.705E+00		
620	6.174E+01	661	5.229E+01	702	2.346E+01	743	7.475E+00		
621	6.205E+01	662	5.160E+01	703	2.284E+01	744	7.238E+00		
622	6.236E+01	663	5.094E+01	704	2.227E+01	745	7.094E+00		
623	6.245E+01	664	5.017E+01	705	2.168E+01	746	6.868E+00		
624	6.272E+01	665	4.952E+01	706	2.111E+01	747	6.672E+00		
625	6.283E+01	666	4.875E+01	707	2.055E+01	748	6.481E+00		

CIE 1931xy Chromaticity Diagram



7-StepChromaticity Quadrangles



[Goniophotometer System]

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

Test orientation: **Base up**

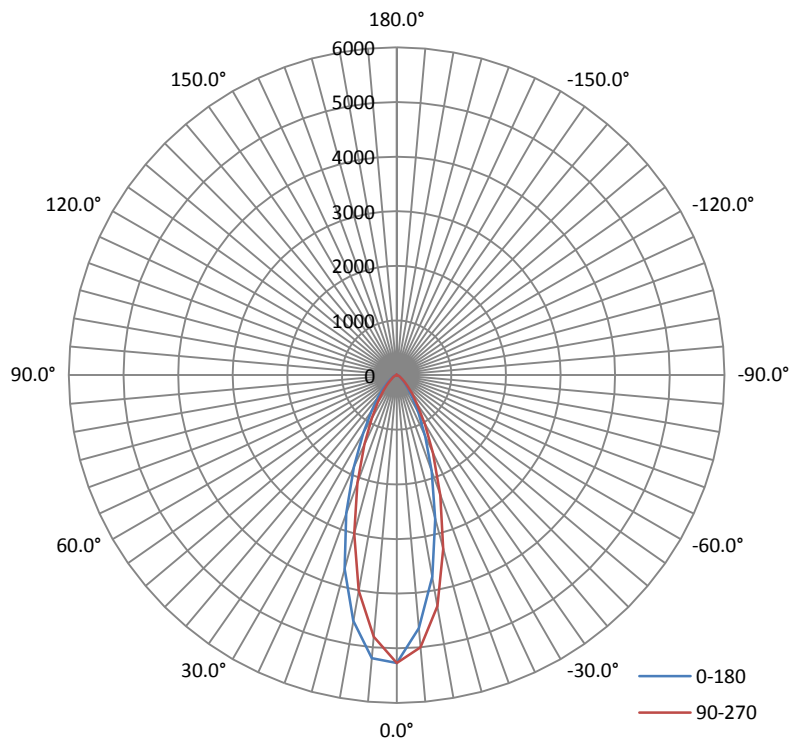
Electrical Measurement

Input Voltage(V)	Frequency(Hz)	Input Current(A)	Power (W)	Power Factor
120.1	60	0.2510	29.80	0.9889

Photometric Measurement

Luminous Flux(lm)	Efficacy(lm/W)	$I_{max}(cd)$	S/MH(C0/180)	S/MH(C90/270)
2855.91	95.84	5340.0	0.51	0.60

Luminous Intensity Distribution



	C0/180	C45/225	C90/270	C135/315	AVG.
Beam Angle(50% I_{max}):	35.4	35.4	35.2	35.2	35.3
Field Angle(10% I_{max}):	74.6	74.4	74.3	74.7	74.5

Luminous Intensity (cd) Distribution Data

C y	0°	22.5°	45°	67.5°	90°	112.5°	135°	157.5°
0.0°	5268	5268	5268	5268	5268	5268	5268	5268
5.0°	5202	5128	5030	4907	4806	4718	4653	4635
10.0°	4568	4490	4349	4175	4004	3857	3763	3726
15.0°	3672	3572	3397	3202	3004	2849	2747	2714
20.0°	2689	2596	2450	2262	2100	1968	1885	1854
25.0°	1854	1780	1665	1526	1394	1303	1241	1215
30.0°	1228	1172	1089	997	909	846	805	791
35.0°	803	766	712	651	598	559	533	517
40.0°	530	504	469	425	390	361	342	332
45.0°	341	328	304	274	249	231	221	216
50.0°	219	211	196	177	159	149	143	140
55.0°	141	137	128	117	107	100	97	95
60.0°	96	95	90	83	78	73	71	70
65.0°	70	69	66	62	57	54	52	51
70.0°	50	49	47	44	41	38	36	36
75.0°	34	34	32	29	27	25	23	23
80.0°	21	20	19	17	15	13	12	12
85.0°	10	10	8	7	6	5	4	3
90.0°	2	2	1	1	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	3	3	3	3	3
150.0°	4	4	4	4	4	4	5	5
155.0°	5	5	5	5	5	5	5	5
160.0°	6	6	6	6	6	6	6	6
165.0°	6	6	6	6	6	6	6	6
170.0°	5	5	5	5	5	5	5	5
175.0°	5	4	4	4	4	4	4	4
180.0°	4	4	3	3	3	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°	5268	5268	5268	5268	5268	5268	5268	5268
5.0°	4646	4696	4784	4880	4999	5112	5186	5218
10.0°	3746	3826	3960	4123	4292	4438	4523	4564
15.0°	2731	2812	2940	3110	3297	3481	3612	3671
20.0°	1869	1924	2030	2173	2341	2507	2627	2685
25.0°	1245	1274	1349	1451	1574	1706	1811	1856
30.0°	803	824	873	949	1037	1137	1216	1245
35.0°	520	537	565	612	673	740	795	813
40.0°	334	346	366	396	438	482	518	532
45.0°	217	224	237	255	281	308	330	344
50.0°	140	145	154	164	180	198	211	218
55.0°	95	97	103	110	117	126	136	141
60.0°	70	71	75	79	83	88	92	95
65.0°	51	52	55	58	61	64	67	69
70.0°	36	37	39	42	44	46	48	50
75.0°	23	24	26	28	30	32	34	35
80.0°	12	13	15	16	18	20	21	21
85.0°	4	4	5	6	8	9	10	11
90.0°	0	0	0	1	1	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	2	2	2	2
180.0°	4	4	4	3	3	3	3	3

Zonal Lumen Density Measurement

Deg	Flux (lm)	%
0-5	121.4	4.25
5-10	322.8	11.30
10-15	431.7	15.12
15-20	441.1	15.44
20-25	388.1	13.59
25-30	311.9	10.92
30-35	237.4	8.31
35-40	175.7	6.16
40-45	126.3	4.42
45-50	88.8	3.11
50-55	61.9	2.17
55-60	44.8	1.57
60-65	34.1	1.19
65-70	25.8	0.90
70-75	18.5	0.65
75-80	12.0	0.42
80-85	6.3	0.22
85-90	1.9	0.07
90-95	0.1	0.00
95-100	0.0	0.00
100-105	0.0	0.01
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	0.6	0.02
145-150	0.7	0.03
150-155	0.8	0.02
155-160	0.8	0.03
160-165	0.6	0.02
165-170	0.4	0.02
170-175	0.3	0.01
175-180	0.1	0.00

Deg	Flux (lm)	%
0-5	121.4	4.25
0-10	444.2	15.55
0-15	875.9	30.67
0-20	1317.0	46.11
0-25	1705.0	59.70
0-30	2016.9	70.62
0-35	2254.3	78.93
0-40	2430.0	85.09
0-45	2556.4	89.51
0-50	2645.2	92.62
0-55	2707.0	94.79
0-60	2751.8	96.36
0-65	2786.0	97.55
0-70	2811.8	98.45
0-75	2830.3	99.10
0-80	2842.3	99.52
0-85	2848.6	99.74
0-90	2850.5	99.81
0-95	2850.6	99.81
0-100	2850.6	99.81
0-105	2850.7	99.82
0-110	2850.7	99.82
0-115	2850.7	99.82
0-120	2850.8	99.82
0-125	2850.9	99.82
0-130	2851.0	99.83
0-135	2851.3	99.84
0-140	2851.6	99.85
0-145	2852.2	99.87
0-150	2852.9	99.90
0-155	2853.7	99.92
0-160	2854.5	99.95
0-165	2855.1	99.97
0-170	2855.6	99.99
0-175	2855.8	100.00
0-180	2855.9	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. 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*****