

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/927NF25/277V

Report Type:	Electrical and Photometric tests including: Luminous Flux, Chromaticity, Luminous Intensity Distribution
Test Engineer:	Hill Liu
Report Number:	R1KS200812080-10
Test Date:	2020-08-12 to 2020-08-13
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/927NF25/277V
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**

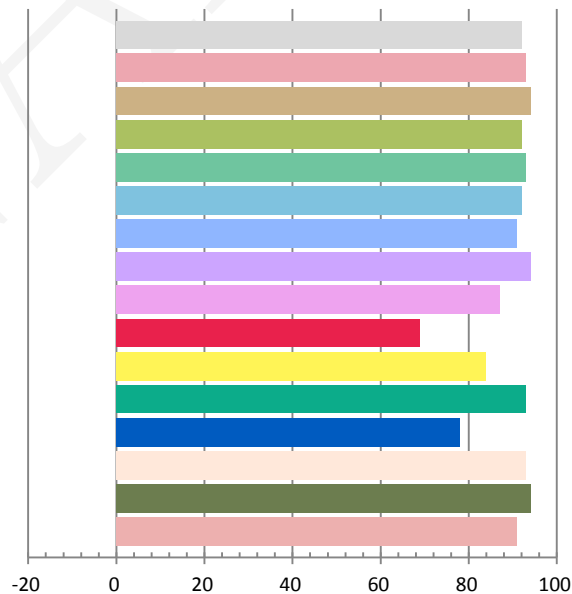
Photometric and Electrical Measurement Result

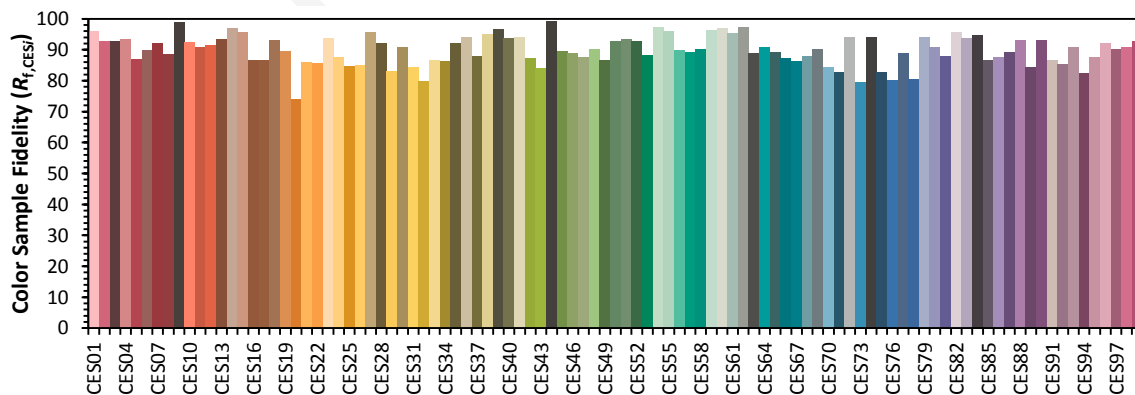
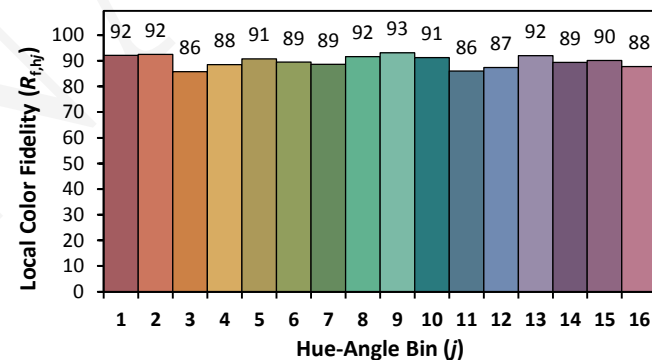
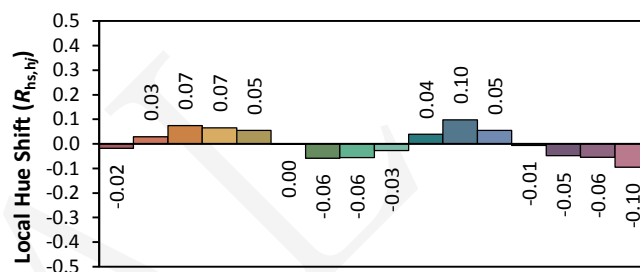
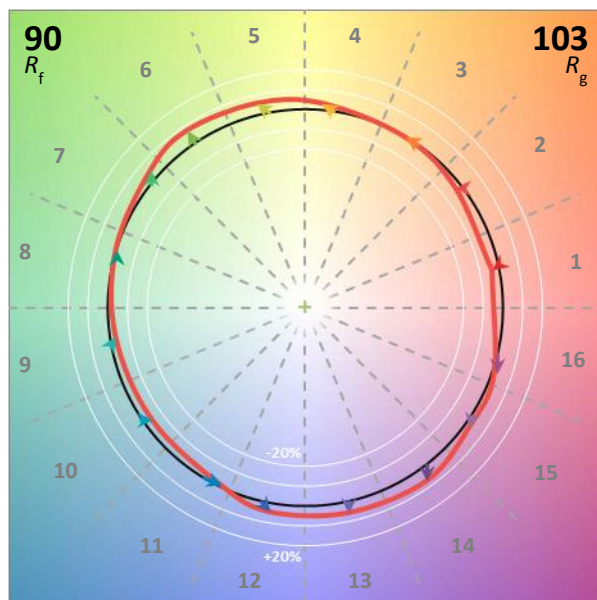
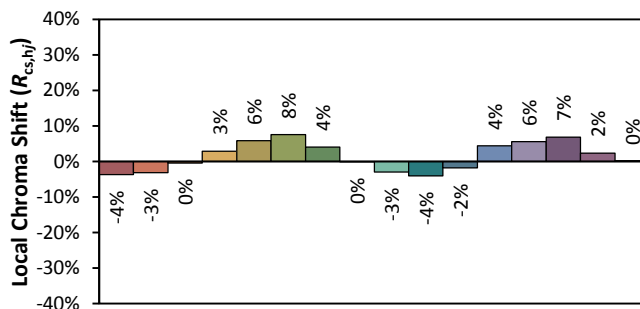
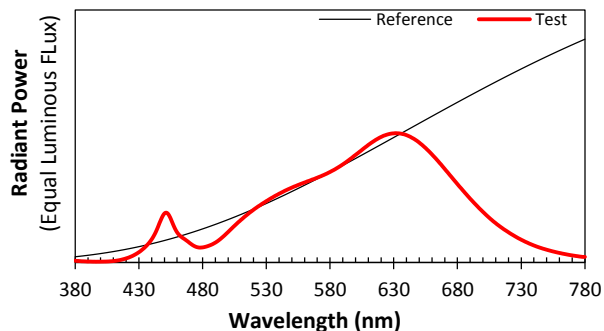
Voltage(V)	Frequency(Hz)	Current(A)	Power (W)	Power Factor	Luminous Flux(lm)	Efficacy(lm/W)
120.0	60	0.2518	29.93	0.9904	2877.0	96.11

Radiant Flux (W)	CCT (K)	Duv	x	y	u'	v'
10.588	2666	-0.000466	0.4618	0.4098	0.2641	0.5273

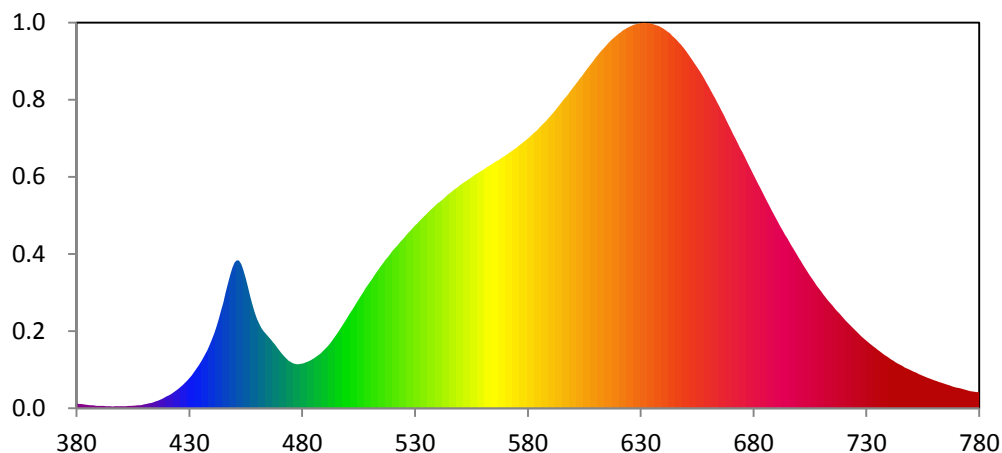
Color Rendering Index

Ra			
92.1			
R1	R2	R3	R4
93	94	92	93
R5	R6	R7	R8
92	91	94	87
R9	R10	R11	R12
69	84	93	78
R13	R14	R15	
93	94	91	





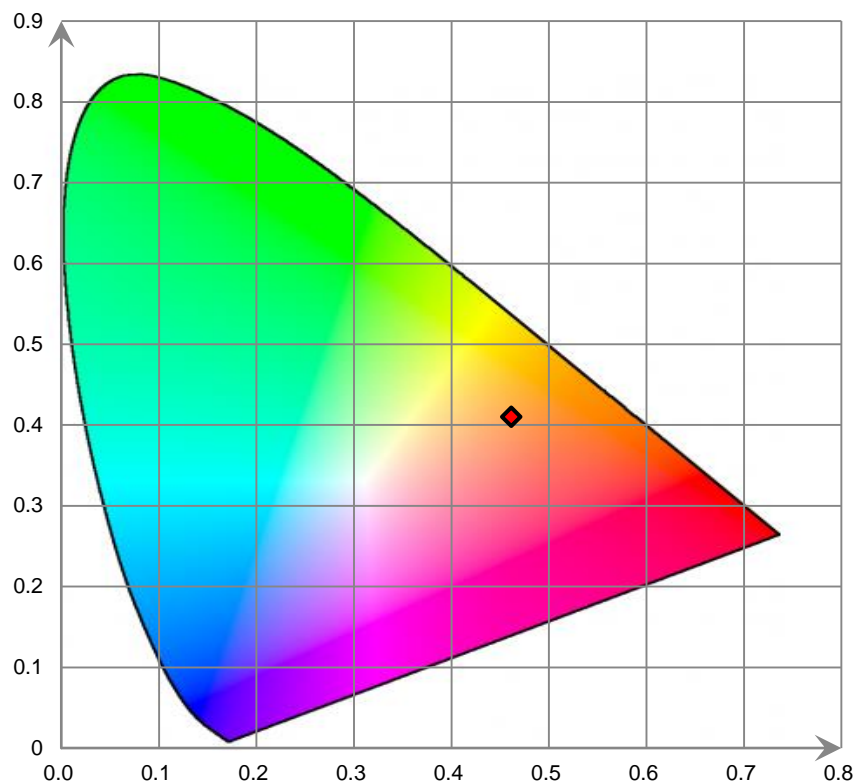
Relative Spectral Power Distribution



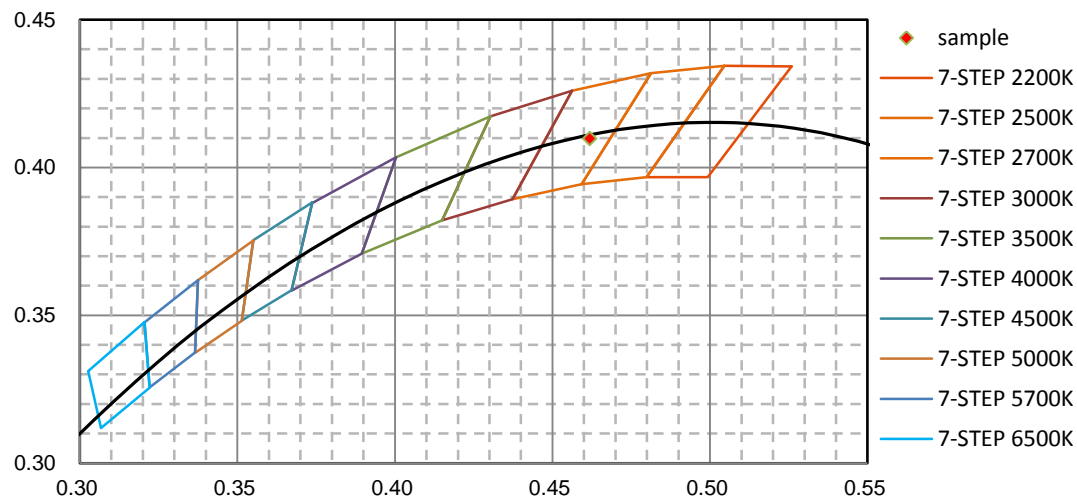
nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
380	8.489E-01	421	2.188E+00	462	1.345E+01	503	1.705E+01	544	3.564E+01
381	7.279E-01	422	2.399E+00	463	1.292E+01	504	1.768E+01	545	3.596E+01
382	7.096E-01	423	2.664E+00	464	1.240E+01	505	1.827E+01	546	3.624E+01
383	6.495E-01	424	2.933E+00	465	1.197E+01	506	1.887E+01	547	3.655E+01
384	5.965E-01	425	3.223E+00	466	1.156E+01	507	1.947E+01	548	3.683E+01
385	5.406E-01	426	3.557E+00	467	1.108E+01	508	2.008E+01	549	3.712E+01
386	5.177E-01	427	3.898E+00	468	1.062E+01	509	2.060E+01	550	3.740E+01
387	4.949E-01	428	4.253E+00	469	1.013E+01	510	2.119E+01	551	3.768E+01
388	4.713E-01	429	4.655E+00	470	9.614E+00	511	2.171E+01	552	3.797E+01
389	4.096E-01	430	5.077E+00	471	9.159E+00	512	2.229E+01	553	3.819E+01
390	3.795E-01	431	5.512E+00	472	8.696E+00	513	2.284E+01	554	3.846E+01
391	3.955E-01	432	6.017E+00	473	8.319E+00	514	2.335E+01	555	3.873E+01
392	3.854E-01	433	6.559E+00	474	7.990E+00	515	2.387E+01	556	3.897E+01
393	3.676E-01	434	7.089E+00	475	7.724E+00	516	2.439E+01	557	3.924E+01
394	3.283E-01	435	7.699E+00	476	7.547E+00	517	2.492E+01	558	3.948E+01
395	3.457E-01	436	8.335E+00	477	7.428E+00	518	2.537E+01	559	3.972E+01
396	3.122E-01	437	9.023E+00	478	7.381E+00	519	2.585E+01	560	3.996E+01
397	3.277E-01	438	9.745E+00	479	7.421E+00	520	2.634E+01	561	4.018E+01
398	3.378E-01	439	1.059E+01	480	7.481E+00	521	2.683E+01	562	4.048E+01
399	3.285E-01	440	1.149E+01	481	7.586E+00	522	2.725E+01	563	4.068E+01
400	3.448E-01	441	1.247E+01	482	7.742E+00	523	2.772E+01	564	4.089E+01
401	3.589E-01	442	1.360E+01	483	7.912E+00	524	2.816E+01	565	4.115E+01
402	3.675E-01	443	1.483E+01	484	8.114E+00	525	2.854E+01	566	4.144E+01
403	3.898E-01	444	1.624E+01	485	8.340E+00	526	2.900E+01	567	4.162E+01
404	3.916E-01	445	1.775E+01	486	8.589E+00	527	2.941E+01	568	4.185E+01
405	4.179E-01	446	1.937E+01	487	8.857E+00	528	2.982E+01	569	4.214E+01
406	4.479E-01	447	2.085E+01	488	9.153E+00	529	3.021E+01	570	4.237E+01
407	4.969E-01	448	2.231E+01	489	9.515E+00	530	3.065E+01	571	4.265E+01
408	5.316E-01	449	2.354E+01	490	9.870E+00	531	3.099E+01	572	4.290E+01
409	5.790E-01	450	2.441E+01	491	1.028E+01	532	3.142E+01	573	4.314E+01
410	6.587E-01	451	2.483E+01	492	1.072E+01	533	3.180E+01	574	4.344E+01
411	7.186E-01	452	2.474E+01	493	1.121E+01	534	3.219E+01	575	4.370E+01
412	8.053E-01	453	2.416E+01	494	1.171E+01	535	3.253E+01	576	4.401E+01
413	9.045E-01	454	2.312E+01	495	1.226E+01	536	3.292E+01	577	4.428E+01
414	1.009E+00	455	2.179E+01	496	1.281E+01	537	3.329E+01	578	4.459E+01
415	1.134E+00	456	2.028E+01	497	1.338E+01	538	3.362E+01	579	4.492E+01
416	1.275E+00	457	1.875E+01	498	1.397E+01	539	3.396E+01	580	4.523E+01
417	1.439E+00	458	1.733E+01	499	1.458E+01	540	3.434E+01	581	4.559E+01
418	1.604E+00	459	1.605E+01	500	1.518E+01	541	3.464E+01	582	4.592E+01
419	1.782E+00	460	1.501E+01	501	1.581E+01	542	3.497E+01	583	4.625E+01
420	1.989E+00	461	1.417E+01	502	1.644E+01	543	3.529E+01	584	4.660E+01

nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
585	4.701E+01	626	6.416E+01	667	4.905E+01	708	2.059E+01	749	6.499E+00
586	4.738E+01	627	6.432E+01	668	4.827E+01	709	2.009E+01	750	6.318E+00
587	4.778E+01	628	6.443E+01	669	4.751E+01	710	1.959E+01	751	6.130E+00
588	4.816E+01	629	6.452E+01	670	4.675E+01	711	1.906E+01	752	5.958E+00
589	4.860E+01	630	6.455E+01	671	4.596E+01	712	1.859E+01	753	5.785E+00
590	4.901E+01	631	6.464E+01	672	4.524E+01	713	1.811E+01	754	5.611E+00
591	4.946E+01	632	6.464E+01	673	4.448E+01	714	1.764E+01	755	5.449E+00
592	4.989E+01	633	6.458E+01	674	4.369E+01	715	1.719E+01	756	5.304E+00
593	5.035E+01	634	6.456E+01	675	4.295E+01	716	1.673E+01	757	5.140E+00
594	5.083E+01	635	6.446E+01	676	4.217E+01	717	1.630E+01	758	4.987E+00
595	5.130E+01	636	6.437E+01	677	4.140E+01	718	1.589E+01	759	4.838E+00
596	5.180E+01	637	6.420E+01	678	4.066E+01	719	1.548E+01	760	4.702E+00
597	5.224E+01	638	6.411E+01	679	3.990E+01	720	1.505E+01	761	4.573E+00
598	5.277E+01	639	6.389E+01	680	3.913E+01	721	1.463E+01	762	4.423E+00
599	5.330E+01	640	6.366E+01	681	3.836E+01	722	1.423E+01	763	4.298E+00
600	5.376E+01	641	6.340E+01	682	3.762E+01	723	1.385E+01	764	4.172E+00
601	5.427E+01	642	6.311E+01	683	3.695E+01	724	1.347E+01	765	4.053E+00
602	5.473E+01	643	6.282E+01	684	3.617E+01	725	1.309E+01	766	3.929E+00
603	5.526E+01	644	6.243E+01	685	3.545E+01	726	1.272E+01	767	3.809E+00
604	5.574E+01	645	6.210E+01	686	3.469E+01	727	1.235E+01	768	3.691E+00
605	5.626E+01	646	6.174E+01	687	3.401E+01	728	1.199E+01	769	3.582E+00
606	5.679E+01	647	6.132E+01	688	3.326E+01	729	1.168E+01	770	3.482E+00
607	5.727E+01	648	6.090E+01	689	3.255E+01	730	1.133E+01	771	3.375E+00
608	5.776E+01	649	6.044E+01	690	3.182E+01	731	1.102E+01	772	3.282E+00
609	5.823E+01	650	5.994E+01	691	3.115E+01	732	1.070E+01	773	3.177E+00
610	5.876E+01	651	5.939E+01	692	3.047E+01	733	1.037E+01	774	3.100E+00
611	5.920E+01	652	5.890E+01	693	2.978E+01	734	1.009E+01	775	2.996E+00
612	5.966E+01	653	5.833E+01	694	2.912E+01	735	9.817E+00	776	2.895E+00
613	6.009E+01	654	5.775E+01	695	2.846E+01	736	9.496E+00	777	2.829E+00
614	6.051E+01	655	5.720E+01	696	2.779E+01	737	9.227E+00	778	2.737E+00
615	6.093E+01	656	5.655E+01	697	2.712E+01	738	8.956E+00	779	2.726E+00
616	6.135E+01	657	5.596E+01	698	2.650E+01	739	8.696E+00	780	2.731E+00
617	6.170E+01	658	5.532E+01	699	2.588E+01	740	8.437E+00		
618	6.208E+01	659	5.467E+01	700	2.524E+01	741	8.202E+00		
619	6.244E+01	660	5.400E+01	701	2.464E+01	742	7.944E+00		
620	6.274E+01	661	5.329E+01	702	2.403E+01	743	7.720E+00		
621	6.303E+01	662	5.263E+01	703	2.343E+01	744	7.497E+00		
622	6.335E+01	663	5.194E+01	704	2.283E+01	745	7.290E+00		
623	6.355E+01	664	5.122E+01	705	2.226E+01	746	7.082E+00		
624	6.378E+01	665	5.051E+01	706	2.169E+01	747	6.862E+00		
625	6.399E+01	666	4.973E+01	707	2.117E+01	748	6.688E+00		

CIE 1931xy Chromaticity Diagram



7-StepChromaticity Quadrangles



[Goniophotometer System]

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

Test orientation: **Base up**

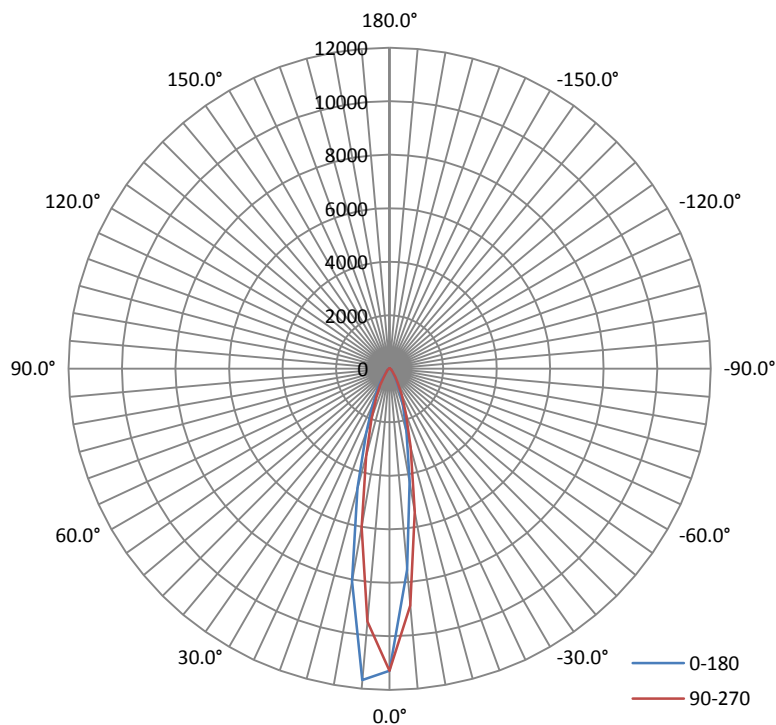
Electrical Measurement

Input Voltage(V)	Frequency(Hz)	Input Current(A)	Power (W)	Power Factor
120.0	60	0.2520	29.93	0.9897

Photometric Measurement

Luminous Flux(lm)	Efficacy(lm/W)	$I_{max}(cd)$	S/MH(C0/180)	S/MH(C90/270)
2883.82	96.35	12108	0.26	0.33

Luminous Intensity Distribution



	C0/180	C45/225	C90/270	C135/315	AVG.
Beam Angle(50% I_{max}):	19.8	20.0	20.3	20.1	20.1
Field Angle(10% I_{max}):	48.9	49.6	49.8	49.2	49.4

Luminous Intensity (cd) Distribution Data

C y	0°	22.5°	45°	67.5°	90°	112.5°	135°	157.5°
0.0°	11290	11290	11290	11290	11290	11290	11290	11290
5.0°	11676	11524	11036	10279	9483	8768	8143	7740
10.0°	8066	7941	7452	6767	6021	5368	4816	4474
15.0°	4618	4597	4321	3886	3398	3003	2694	2505
20.0°	2573	2584	2449	2225	1983	1757	1578	1464
25.0°	1518	1527	1447	1313	1177	1055	942	876
30.0°	911	924	872	782	696	620	552	508
35.0°	521	531	489	437	393	359	314	289
40.0°	291	296	280	255	234	218	200	187
45.0°	188	191	186	176	167	159	150	141
50.0°	143	145	142	137	130	123	116	110
55.0°	112	113	111	107	102	97	92	89
60.0°	90	91	91	88	84	80	77	74
65.0°	78	78	77	74	71	68	64	62
70.0°	65	66	65	62	59	55	52	50
75.0°	53	53	52	49	46	42	39	37
80.0°	40	39	38	35	32	28	25	23
85.0°	25	25	23	20	17	14	11	9
90.0°	10	10	9	7	5	2	1	1
95.0°	1	1	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	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	4	4	4	4
150.0°	5	5	5	5	5	6	6	6
155.0°	6	6	6	7	7	7	7	7
160.0°	8	7	7	7	8	8	8	8
165.0°	8	8	7	7	7	7	7	7
170.0°	7	7	7	6	6	6	6	6
175.0°	6	5	5	5	5	4	4	4
180.0°	4	4	4	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°	11290	11290	11290	11290	11290	11290	11290	11290
5.0°	7546	7539	7795	8234	8881	9749	10568	11206
10.0°	4275	4307	4506	4878	5437	6192	6935	7560
15.0°	2420	2436	2540	2727	3013	3426	3864	4286
20.0°	1442	1437	1499	1607	1771	1983	2191	2393
25.0°	866	885	921	981	1068	1187	1315	1425
30.0°	493	508	533	567	623	706	778	847
35.0°	282	291	305	326	359	407	442	475
40.0°	183	189	195	205	220	244	259	274
45.0°	139	142	147	153	159	169	174	180
50.0°	107	109	112	116	121	128	132	137
55.0°	87	89	91	93	96	100	103	106
60.0°	73	74	75	77	79	82	84	87
65.0°	61	62	63	65	68	70	72	74
70.0°	49	50	52	54	57	59	60	63
75.0°	36	37	39	42	44	47	49	52
80.0°	22	23	25	28	31	34	36	39
85.0°	9	9	11	13	16	19	21	24
90.0°	0	0	1	2	4	6	8	10
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	0
145.0°	1	1	1	1	1	1	1	1
150.0°	2	2	2	2	2	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	2	2	2	2	2	2
180.0°	4	4	4	4	3	3	3	3

Zonal Lumen Density Measurement

Deg	Flux (lm)	%
0-5	246.1	8.54
5-10	534.4	18.53
10-15	529.6	18.36
15-20	418.8	14.53
20-25	314.2	10.89
25-30	226.9	7.87
30-35	152.9	5.30
35-40	100.2	3.48
40-45	71.8	2.49
45-50	57.9	2.00
50-55	48.4	1.68
55-60	41.5	1.44
60-65	36.6	1.27
65-70	32.0	1.11
70-75	26.7	0.93
75-80	20.3	0.70
80-85	12.9	0.44
85-90	5.6	0.20
90-95	1.0	0.03
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	0.00
135-140	0.3	0.01
140-145	0.6	0.03
145-150	0.9	0.02
150-155	1.0	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	246.1	8.54
0-10	780.6	27.07
0-15	1310.2	45.43
0-20	1729.1	59.96
0-25	2043.3	70.85
0-30	2270.2	78.72
0-35	2423.1	84.02
0-40	2523.3	87.50
0-45	2595.0	89.99
0-50	2652.9	91.99
0-55	2701.3	93.67
0-60	2742.8	95.11
0-65	2779.4	96.38
0-70	2811.4	97.49
0-75	2838.1	98.42
0-80	2858.4	99.12
0-85	2871.3	99.56
0-90	2876.9	99.76
0-95	2877.9	99.79
0-100	2877.9	99.79
0-105	2877.9	99.80
0-110	2878.0	99.80
0-115	2878.0	99.80
0-120	2878.1	99.80
0-125	2878.1	99.80
0-130	2878.2	99.81
0-135	2878.4	99.81
0-140	2878.7	99.82
0-145	2879.4	99.85
0-150	2880.2	99.87
0-155	2881.2	99.91
0-160	2882.2	99.94
0-165	2882.9	99.97
0-170	2883.5	99.99
0-175	2883.7	100.00
0-180	2883.8	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*****