

# 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/940FL40/277V**

<b>Report Type:</b>	Electrical and Photometric tests including: Luminous Flux, Chromaticity, Luminous Intensity Distribution
<b>Test Engineer:</b>	Hill Liu
<b>Report Number:</b>	R1KS200925086-10
<b>Test Date:</b>	2020-09-28 to 2020-10-09
<b>Report Date:</b>	2020-11-05
<b>Reviewed By:</b>	Bill Xiong / EE Engineer
<b>Prepared By:</b>	Bay Area Compliance Laboratories Corp. (Dongguan). No.69, Pulongcun, Puxinhu Industrial Area, Tangxia, Dongguan, Guangdong, China. Tel: +86-0769-86858888 Fax: +86-0769-86858588
<b>Accreditation:</b>	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/940FL40/277V  
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: 4000K  
Nominal Lumen Output: 3000lm

## 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.

$4\pi$  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 ( $\gamma$ ) 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**

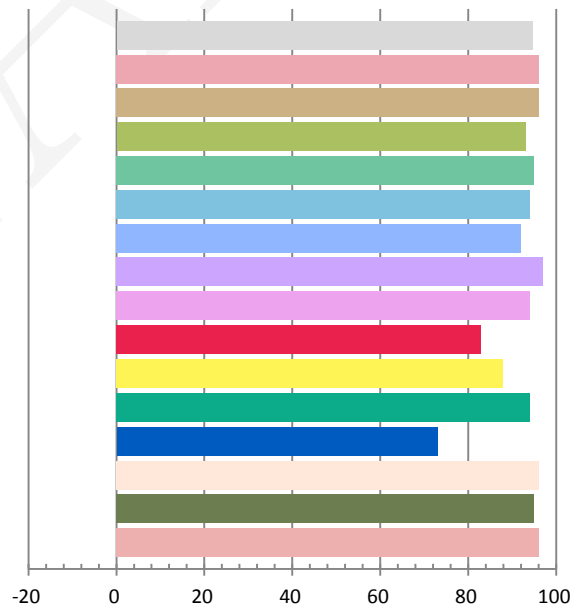
### Photometric and Electrical Measurement Result

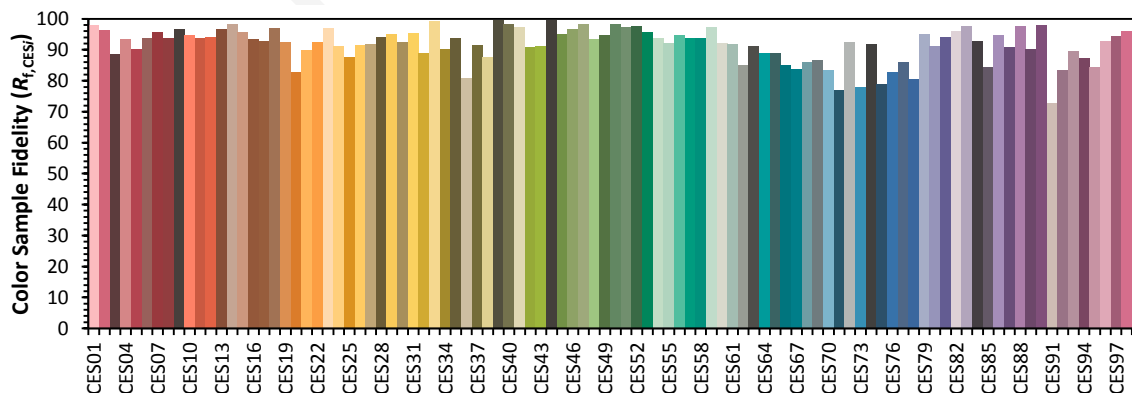
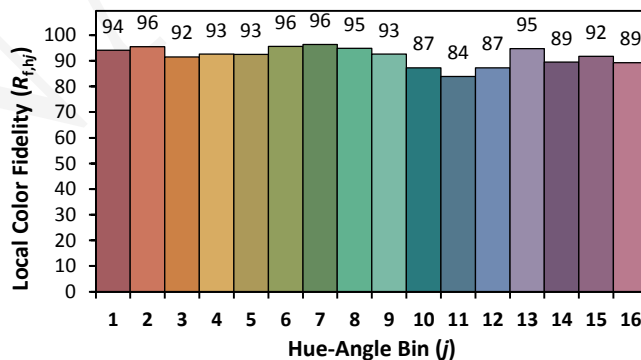
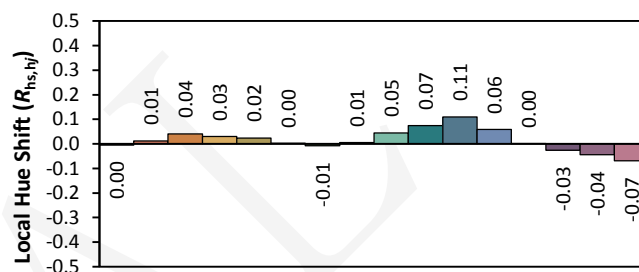
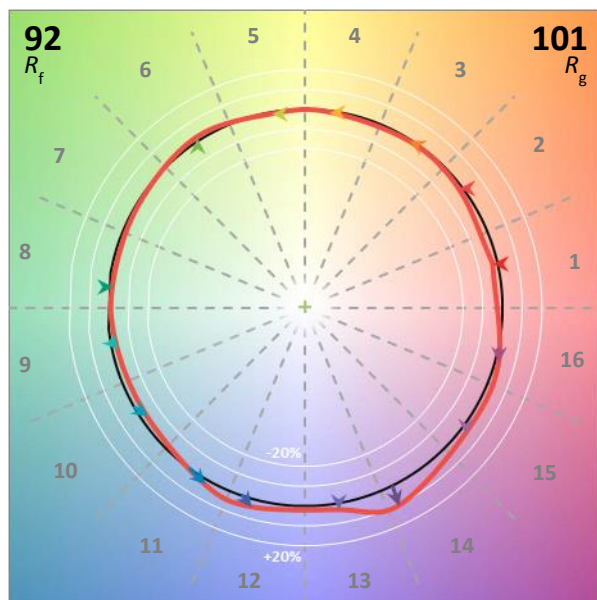
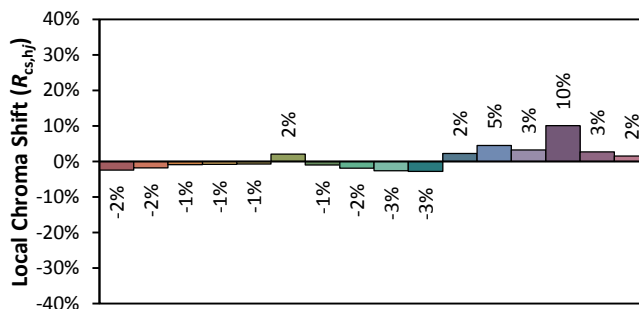
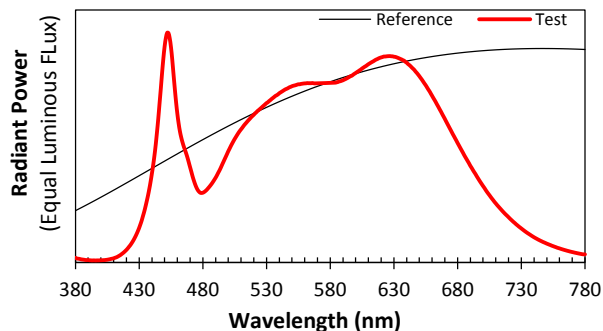
Voltage(V)	Frequency(Hz)	Current(A)	Power (W)	Power Factor	Luminous Flux(lm)	Efficacy(lm/W)
120.0	60	0.25	29.72	0.9904	3209	107.99

Radiant Flux (W)	CCT (K)	Duv	x	y	u'	v'
11.388	3881	-0.00115	0.3850	0.3770	0.2280	0.5024

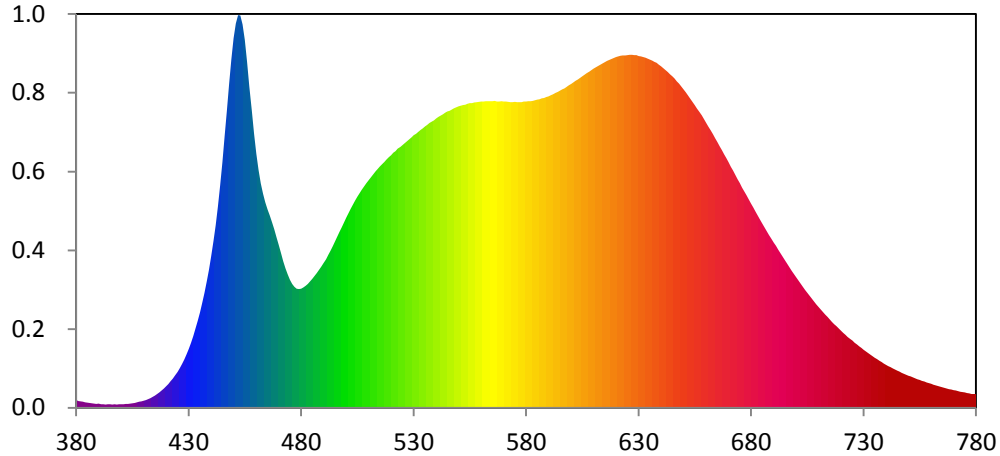
### Color Rendering Index

<b>Ra</b>			
94.6			
<b>R1</b>	<b>R2</b>	<b>R3</b>	<b>R4</b>
96	96	93	95
<b>R5</b>	<b>R6</b>	<b>R7</b>	<b>R8</b>
94	92	97	94
<b>R9</b>	<b>R10</b>	<b>R11</b>	<b>R12</b>
83	88	94	73
<b>R13</b>	<b>R14</b>	<b>R15</b>	
96	95	96	





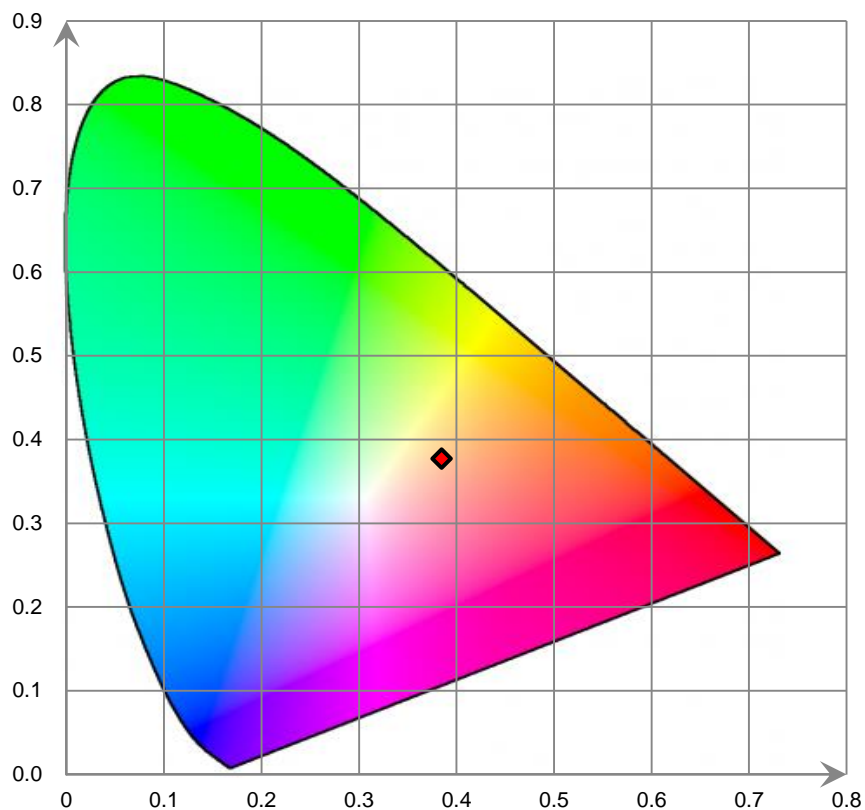
**Relative Spectral Power Distribution**



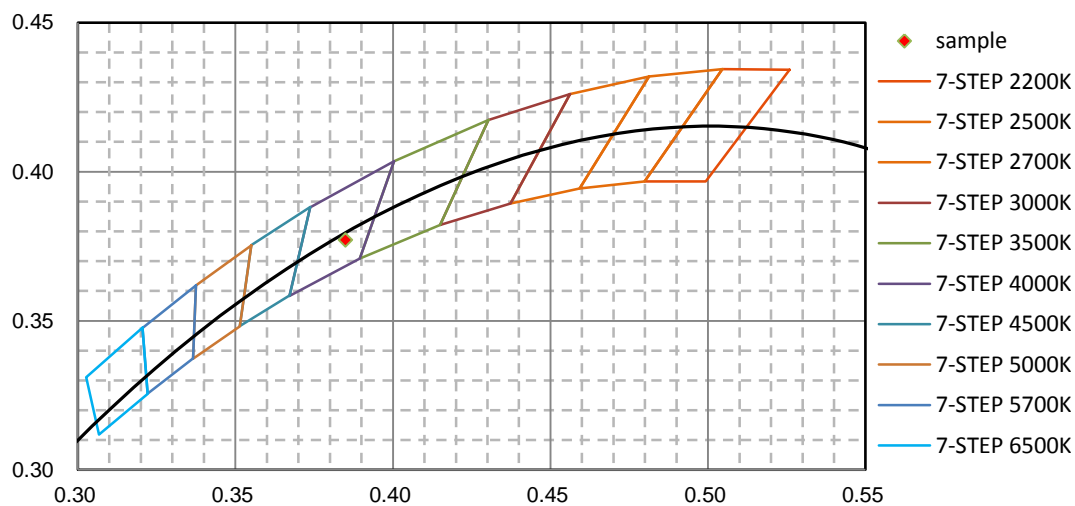
nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
380	1.185E+00	421	3.618E+00	462	3.415E+01	503	3.094E+01	544	4.491E+01
381	1.019E+00	422	4.034E+00	463	3.260E+01	504	3.155E+01	545	4.510E+01
382	9.527E-01	423	4.448E+00	464	3.131E+01	505	3.214E+01	546	4.524E+01
383	9.111E-01	424	4.934E+00	465	3.022E+01	506	3.268E+01	547	4.541E+01
384	8.203E-01	425	5.464E+00	466	2.926E+01	507	3.323E+01	548	4.561E+01
385	7.590E-01	426	6.045E+00	467	2.828E+01	508	3.374E+01	549	4.573E+01
386	7.129E-01	427	6.674E+00	468	2.720E+01	509	3.422E+01	550	4.589E+01
387	6.665E-01	428	7.379E+00	469	2.599E+01	510	3.465E+01	551	4.600E+01
388	6.068E-01	429	8.147E+00	470	2.478E+01	511	3.508E+01	552	4.608E+01
389	5.988E-01	430	8.975E+00	471	2.358E+01	512	3.554E+01	553	4.617E+01
390	6.047E-01	431	9.891E+00	472	2.233E+01	513	3.595E+01	554	4.629E+01
391	5.501E-01	432	1.089E+01	473	2.126E+01	514	3.633E+01	555	4.639E+01
392	5.240E-01	433	1.207E+01	474	2.030E+01	515	3.672E+01	556	4.639E+01
393	4.907E-01	434	1.323E+01	475	1.948E+01	516	3.709E+01	557	4.648E+01
394	5.115E-01	435	1.454E+01	476	1.884E+01	517	3.744E+01	558	4.653E+01
395	5.074E-01	436	1.598E+01	477	1.841E+01	518	3.782E+01	559	4.659E+01
396	4.833E-01	437	1.748E+01	478	1.813E+01	519	3.814E+01	560	4.662E+01
397	5.162E-01	438	1.918E+01	479	1.808E+01	520	3.845E+01	561	4.664E+01
398	5.042E-01	439	2.102E+01	480	1.814E+01	521	3.881E+01	562	4.670E+01
399	5.288E-01	440	2.310E+01	481	1.831E+01	522	3.910E+01	563	4.667E+01
400	5.391E-01	441	2.531E+01	482	1.857E+01	523	3.945E+01	564	4.668E+01
401	5.532E-01	442	2.779E+01	483	1.887E+01	524	3.971E+01	565	4.667E+01
402	5.778E-01	443	3.063E+01	484	1.925E+01	525	4.001E+01	566	4.671E+01
403	5.941E-01	444	3.387E+01	485	1.964E+01	526	4.029E+01	567	4.665E+01
404	6.421E-01	445	3.739E+01	486	2.006E+01	527	4.060E+01	568	4.662E+01
405	6.783E-01	446	4.135E+01	487	2.049E+01	528	4.089E+01	569	4.666E+01
406	7.487E-01	447	4.524E+01	488	2.098E+01	529	4.119E+01	570	4.662E+01
407	8.115E-01	448	4.930E+01	489	2.150E+01	530	4.149E+01	571	4.662E+01
408	9.018E-01	449	5.306E+01	490	2.204E+01	531	4.170E+01	572	4.660E+01
409	9.667E-01	450	5.626E+01	491	2.262E+01	532	4.201E+01	573	4.655E+01
410	1.059E+00	451	5.852E+01	492	2.328E+01	533	4.227E+01	574	4.653E+01
411	1.185E+00	452	5.979E+01	493	2.390E+01	534	4.256E+01	575	4.657E+01
412	1.305E+00	453	5.973E+01	494	2.459E+01	535	4.282E+01	576	4.655E+01
413	1.456E+00	454	5.838E+01	495	2.534E+01	536	4.309E+01	577	4.655E+01
414	1.651E+00	455	5.602E+01	496	2.605E+01	537	4.336E+01	578	4.656E+01
415	1.841E+00	456	5.275E+01	497	2.678E+01	538	4.354E+01	579	4.663E+01
416	2.086E+00	457	4.897E+01	498	2.750E+01	539	4.376E+01	580	4.661E+01
417	2.342E+00	458	4.522E+01	499	2.823E+01	540	4.405E+01	581	4.668E+01
418	2.605E+00	459	4.170E+01	500	2.896E+01	541	4.427E+01	582	4.668E+01
419	2.921E+00	460	3.867E+01	501	2.962E+01	542	4.448E+01	583	4.674E+01
420	3.243E+00	461	3.620E+01	502	3.031E+01	543	4.469E+01	584	4.681E+01

nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
585	4.690E+01	626	5.372E+01	667	3.923E+01	708	1.617E+01	749	5.033E+00
586	4.697E+01	627	5.373E+01	668	3.859E+01	709	1.573E+01	750	4.877E+00
587	4.712E+01	628	5.368E+01	669	3.798E+01	710	1.534E+01	751	4.748E+00
588	4.719E+01	629	5.367E+01	670	3.736E+01	711	1.494E+01	752	4.607E+00
589	4.731E+01	630	5.357E+01	671	3.670E+01	712	1.456E+01	753	4.480E+00
590	4.743E+01	631	5.353E+01	672	3.608E+01	713	1.419E+01	754	4.335E+00
591	4.760E+01	632	5.342E+01	673	3.545E+01	714	1.381E+01	755	4.218E+00
592	4.775E+01	633	5.329E+01	674	3.482E+01	715	1.344E+01	756	4.086E+00
593	4.793E+01	634	5.315E+01	675	3.419E+01	716	1.308E+01	757	3.974E+00
594	4.811E+01	635	5.300E+01	676	3.354E+01	717	1.273E+01	758	3.837E+00
595	4.831E+01	636	5.286E+01	677	3.295E+01	718	1.240E+01	759	3.731E+00
596	4.850E+01	637	5.268E+01	678	3.233E+01	719	1.209E+01	760	3.632E+00
597	4.863E+01	638	5.253E+01	679	3.173E+01	720	1.176E+01	761	3.514E+00
598	4.889E+01	639	5.224E+01	680	3.108E+01	721	1.142E+01	762	3.413E+00
599	4.912E+01	640	5.202E+01	681	3.049E+01	722	1.110E+01	763	3.316E+00
600	4.933E+01	641	5.169E+01	682	2.987E+01	723	1.079E+01	764	3.213E+00
601	4.956E+01	642	5.143E+01	683	2.927E+01	724	1.049E+01	765	3.119E+00
602	4.978E+01	643	5.113E+01	684	2.867E+01	725	1.021E+01	766	3.020E+00
603	5.001E+01	644	5.078E+01	685	2.805E+01	726	9.900E+00	767	2.940E+00
604	5.022E+01	645	5.046E+01	686	2.746E+01	727	9.629E+00	768	2.843E+00
605	5.050E+01	646	5.014E+01	687	2.690E+01	728	9.346E+00	769	2.760E+00
606	5.072E+01	647	4.971E+01	688	2.633E+01	729	9.091E+00	770	2.685E+00
607	5.095E+01	648	4.934E+01	689	2.576E+01	730	8.833E+00	771	2.605E+00
608	5.114E+01	649	4.892E+01	690	2.515E+01	731	8.570E+00	772	2.522E+00
609	5.139E+01	650	4.849E+01	691	2.463E+01	732	8.317E+00	773	2.455E+00
610	5.163E+01	651	4.803E+01	692	2.406E+01	733	8.070E+00	774	2.378E+00
611	5.183E+01	652	4.758E+01	693	2.352E+01	734	7.831E+00	775	2.312E+00
612	5.204E+01	653	4.708E+01	694	2.302E+01	735	7.602E+00	776	2.241E+00
613	5.223E+01	654	4.658E+01	695	2.245E+01	736	7.388E+00	777	2.180E+00
614	5.241E+01	655	4.612E+01	696	2.191E+01	737	7.176E+00	778	2.113E+00
615	5.263E+01	656	4.558E+01	697	2.138E+01	738	6.949E+00	779	2.084E+00
616	5.282E+01	657	4.503E+01	698	2.087E+01	739	6.740E+00	780	2.088E+00
617	5.296E+01	658	4.453E+01	699	2.037E+01	740	6.533E+00		
618	5.314E+01	659	4.395E+01	700	1.987E+01	741	6.343E+00		
619	5.328E+01	660	4.338E+01	701	1.940E+01	742	6.165E+00		
620	5.339E+01	661	4.279E+01	702	1.888E+01	743	5.975E+00		
621	5.348E+01	662	4.224E+01	703	1.839E+01	744	5.805E+00		
622	5.361E+01	663	4.165E+01	704	1.793E+01	745	5.636E+00		
623	5.362E+01	664	4.104E+01	705	1.749E+01	746	5.484E+00		
624	5.366E+01	665	4.045E+01	706	1.703E+01	747	5.315E+00		
625	5.370E+01	666	3.982E+01	707	1.660E+01	748	5.176E+00		

CIE 1931xy Chromaticity Diagram



7-StepChromaticity Quadrangles





### [Goniophotometer System]

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

Test orientation: **Base up**

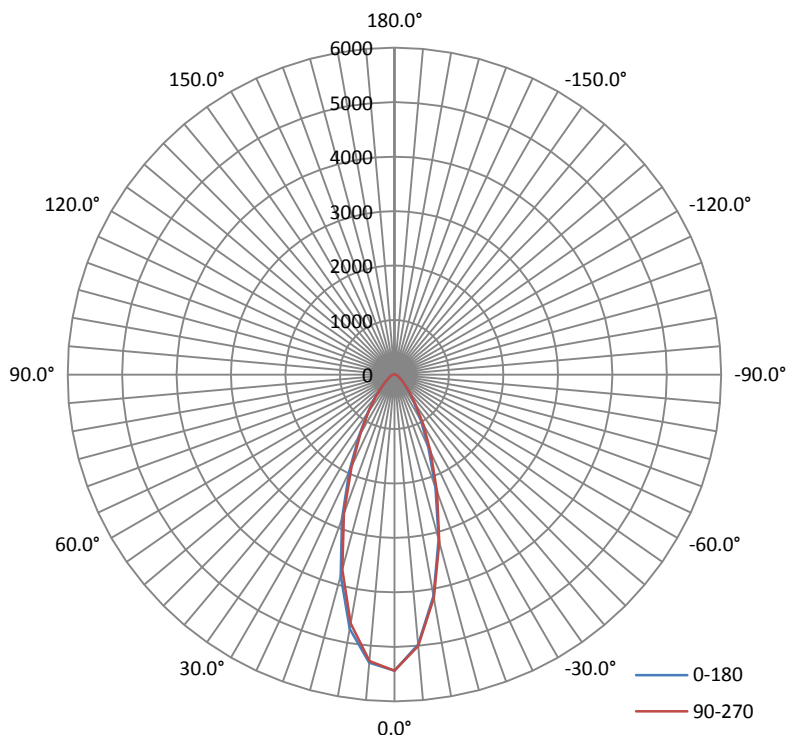
### Electrical Measurement

Input Voltage(V)	Frequency(Hz)	Input Current(A)	Power (W)	Power Factor
120.0	60	0.2507	29.74	0.9884

### Photometric Measurement

Luminous Flux(lm)	Efficacy(lm/W)	$I_{max}(cd)$	S/MH(C0/180)	S/MH(C90/270)
3212.66	108.03	5473.0	0.55	0.57

### Luminous Intensity Distribution



	C0/180	C45/225	C90/270	C135/315	AVG.
Beam Angle(50% $I_{max}$ ):	37.4	37.6	37.5	37.5	37.5
Field Angle(10% $I_{max}$ ):	77.2	77.3	77.7	77.6	77.5

**Luminous Intensity (cd) Distribution Data**

C y	0°	22.5°	45°	67.5°	90°	112.5°	135°	157.5°
0.0°	5438	5438	5438	5438	5438	5438	5438	5438
5.0°	5309	5340	5350	5329	5281	5210	5104	5065
10.0°	4741	4799	4804	4755	4641	4527	4379	4238
15.0°	3820	3894	3906	3843	3708	3557	3401	3255
20.0°	2814	2876	2891	2820	2710	2586	2444	2311
25.0°	1953	2002	2004	1953	1866	1776	1661	1565
30.0°	1302	1330	1334	1293	1244	1182	1095	1024
35.0°	853	870	871	848	816	771	715	673
40.0°	564	568	566	559	541	507	472	439
45.0°	366	371	369	363	349	331	308	287
50.0°	239	241	242	238	227	217	202	189
55.0°	160	162	162	160	153	146	137	130
60.0°	115	116	116	114	110	105	100	96
65.0°	86	87	87	86	82	78	75	71
70.0°	63	64	64	62	60	57	53	50
75.0°	43	44	44	43	41	38	36	33
80.0°	27	28	28	27	25	23	21	19
85.0°	14	14	14	14	12	11	9	7
90.0°	3	4	4	3	2	2	1	1
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	4	4
150.0°	4	4	4	4	4	5	5	5
155.0°	6	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	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°	5438	5438	5438	5438	5438	5438	5438	5438
5.0°	4973	4941	4951	4966	5005	5066	5143	5233
10.0°	4125	4071	4065	4094	4165	4292	4419	4582
15.0°	3125	3069	3070	3111	3191	3324	3476	3645
20.0°	2201	2162	2171	2210	2293	2409	2541	2665
25.0°	1478	1452	1466	1505	1569	1667	1751	1849
30.0°	978	962	974	1001	1055	1122	1188	1255
35.0°	639	630	639	661	690	736	779	822
40.0°	419	416	418	433	451	480	513	541
45.0°	272	270	274	283	295	314	335	353
50.0°	181	180	183	186	193	204	219	230
55.0°	125	125	126	128	134	141	150	156
60.0°	92	92	93	94	97	102	108	112
65.0°	68	68	68	70	72	76	80	83
70.0°	48	48	48	49	51	54	57	60
75.0°	32	31	32	32	34	36	39	41
80.0°	18	17	17	18	19	21	23	25
85.0°	6	6	6	6	7	8	10	12
90.0°	0	0	0	0	0	1	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°	1	1	1	1	1	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	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	126.5	3.94
5-10	341.3	10.62
10-15	465.1	14.48
15-20	487.0	15.16
20-25	437.2	13.60
25-30	356.9	11.11
30-35	274.3	8.54
35-40	203.7	6.34
40-45	148.1	4.61
45-50	105.6	3.29
50-55	75.7	2.36
55-60	56.4	1.75
60-65	43.8	1.36
65-70	33.4	1.04
70-75	24.2	0.76
75-80	15.9	0.49
80-85	8.6	0.27
85-90	2.8	0.09
90-95	0.2	0.01
95-100	0.0	0.00
100-105	0.0	0.00
105-110	0.0	0.00
110-115	0.1	0.00
115-120	0.1	0.00
120-125	0.1	0.01
125-130	0.2	0.00
130-135	0.3	0.01
135-140	0.4	0.01
140-145	0.6	0.02
145-150	0.8	0.03
150-155	0.9	0.02
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	126.5	3.94
0-10	467.7	14.56
0-15	932.8	29.04
0-20	1419.8	44.20
0-25	1857.1	57.80
0-30	2214.0	68.91
0-35	2488.3	77.45
0-40	2692.0	83.79
0-45	2840.1	88.40
0-50	2945.7	91.69
0-55	3021.4	94.05
0-60	3077.8	95.80
0-65	3121.5	97.16
0-70	3155.0	98.20
0-75	3179.1	98.96
0-80	3195.1	99.45
0-85	3203.7	99.72
0-90	3206.5	99.81
0-95	3206.8	99.82
0-100	3206.8	99.82
0-105	3206.9	99.82
0-110	3206.9	99.82
0-115	3206.9	99.82
0-120	3207.0	99.82
0-125	3207.1	99.83
0-130	3207.3	99.83
0-135	3207.6	99.84
0-140	3208.0	99.85
0-145	3208.6	99.87
0-150	3209.4	99.90
0-155	3210.2	99.92
0-160	3211.1	99.95
0-165	3211.8	99.97
0-170	3212.3	99.99
0-175	3212.6	100.00
0-180	3212.7	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\*\*\*\*\*