

# 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/940NF25/277V**

<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>	R1KS200925085-10
<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/940NF25/277V  
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**

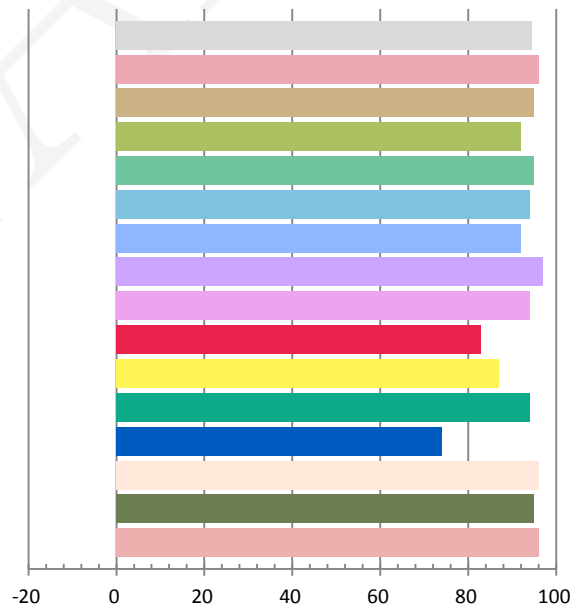
### Photometric and Electrical Measurement Result

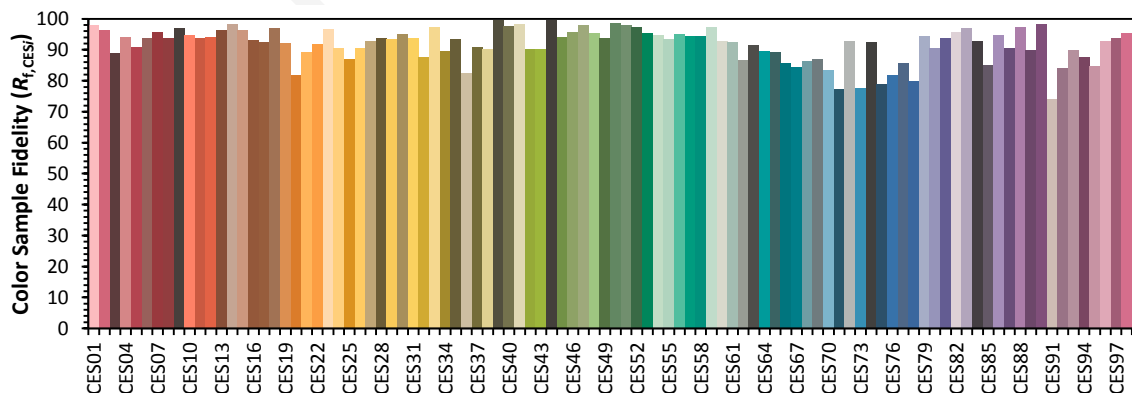
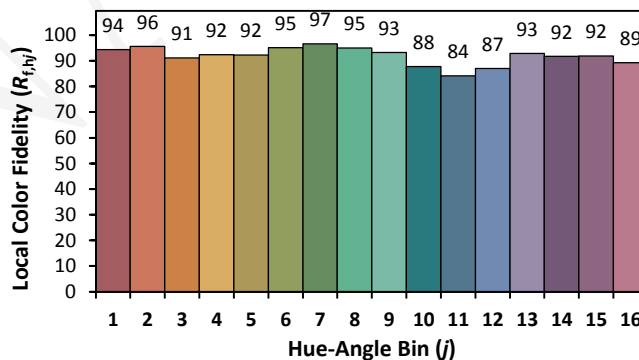
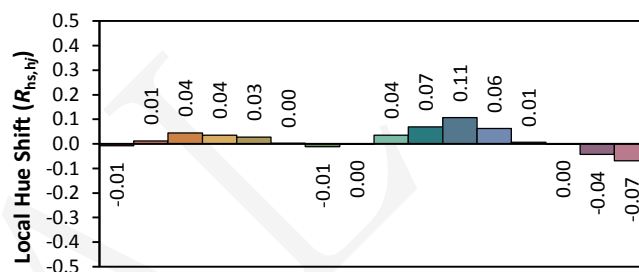
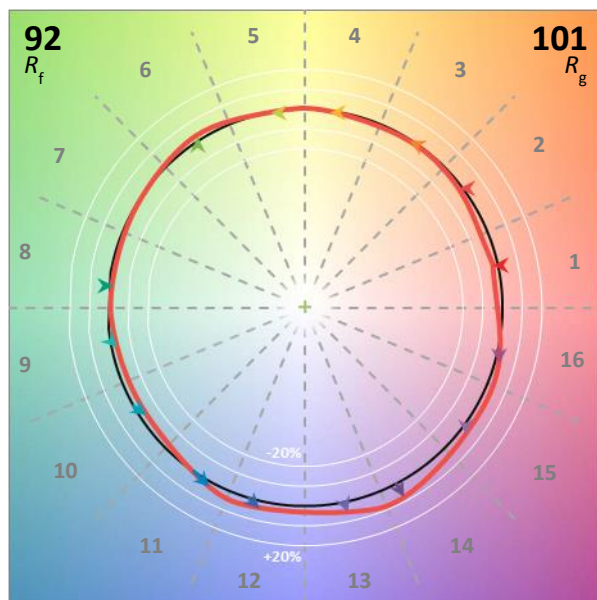
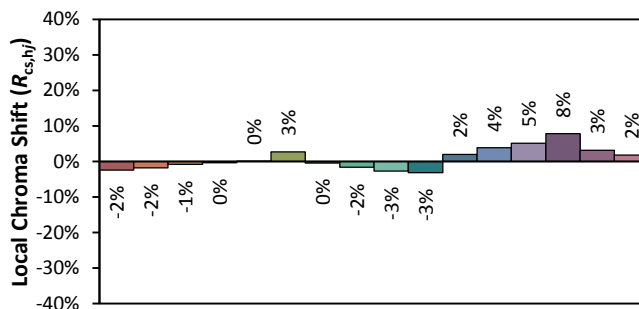
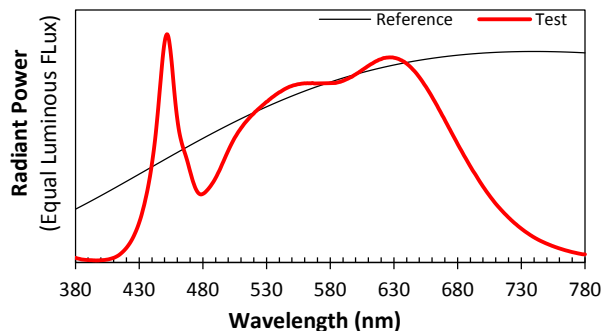
Voltage(V)	Frequency(Hz)	Current(A)	Power (W)	Power Factor	Luminous Flux(lm)	Efficacy(lm/W)
120.1	60	0.2520	29.97	0.9907	3200.7	106.80

Radiant Flux (W)	CCT (K)	Duv	x	y	u'	v'
11.362	3916	-0.00119	0.3834	0.3760	0.2273	0.5017

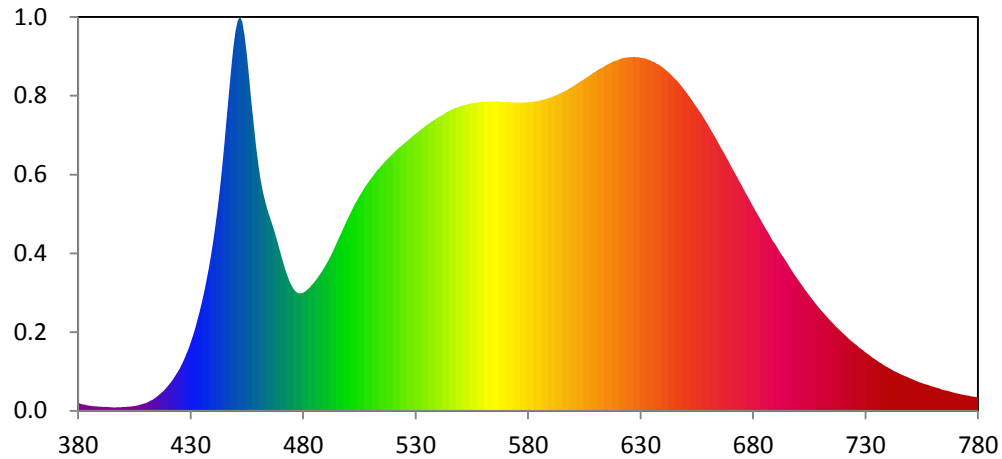
### Color Rendering Index

<b>Ra</b>			
94.4			
<b>R1</b>	<b>R2</b>	<b>R3</b>	<b>R4</b>
96	95	92	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	87	94	74
<b>R13</b>	<b>R14</b>	<b>R15</b>	
96	95	96	





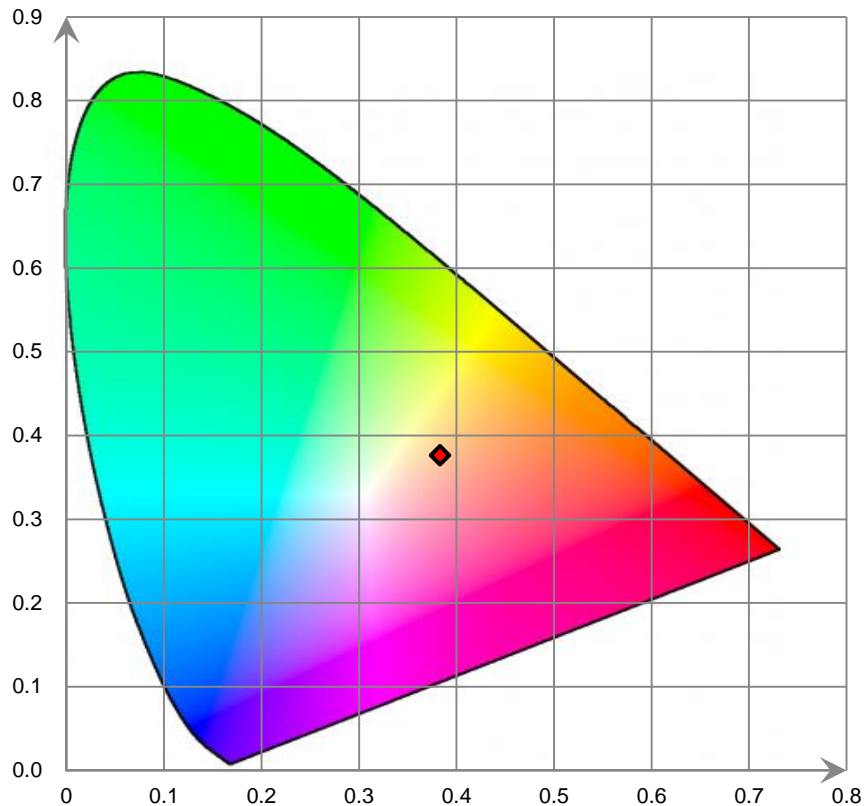
**Relative Spectral Power Distribution**



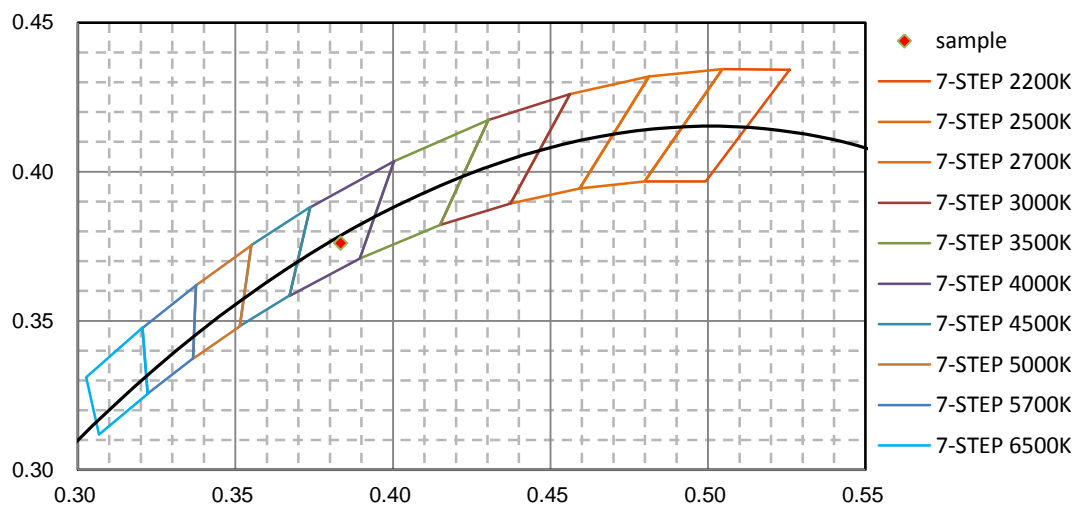
nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
380	1.184E+00	421	4.183E+00	462	3.302E+01	503	3.110E+01	544	4.497E+01
381	1.073E+00	422	4.640E+00	463	3.159E+01	504	3.172E+01	545	4.514E+01
382	9.787E-01	423	5.142E+00	464	3.033E+01	505	3.234E+01	546	4.531E+01
383	9.174E-01	424	5.702E+00	465	2.928E+01	506	3.286E+01	547	4.546E+01
384	8.221E-01	425	6.315E+00	466	2.829E+01	507	3.341E+01	548	4.563E+01
385	7.477E-01	426	6.995E+00	467	2.724E+01	508	3.394E+01	549	4.573E+01
386	7.166E-01	427	7.719E+00	468	2.611E+01	509	3.439E+01	550	4.585E+01
387	6.732E-01	428	8.506E+00	469	2.486E+01	510	3.488E+01	551	4.598E+01
388	6.441E-01	429	9.361E+00	470	2.365E+01	511	3.531E+01	552	4.605E+01
389	6.127E-01	430	1.032E+01	471	2.247E+01	512	3.578E+01	553	4.612E+01
390	6.081E-01	431	1.131E+01	472	2.129E+01	513	3.620E+01	554	4.623E+01
391	5.766E-01	432	1.244E+01	473	2.032E+01	514	3.658E+01	555	4.630E+01
392	5.661E-01	433	1.373E+01	474	1.943E+01	515	3.696E+01	556	4.633E+01
393	5.534E-01	434	1.499E+01	475	1.874E+01	516	3.734E+01	557	4.640E+01
394	5.213E-01	435	1.645E+01	476	1.820E+01	517	3.770E+01	558	4.645E+01
395	5.209E-01	436	1.793E+01	477	1.786E+01	518	3.807E+01	559	4.648E+01
396	4.879E-01	437	1.958E+01	478	1.767E+01	519	3.838E+01	560	4.653E+01
397	5.080E-01	438	2.141E+01	479	1.766E+01	520	3.869E+01	561	4.650E+01
398	5.022E-01	439	2.332E+01	480	1.779E+01	521	3.908E+01	562	4.656E+01
399	5.386E-01	440	2.554E+01	481	1.798E+01	522	3.934E+01	563	4.652E+01
400	5.582E-01	441	2.788E+01	482	1.826E+01	523	3.967E+01	564	4.654E+01
401	5.765E-01	442	3.047E+01	483	1.860E+01	524	3.996E+01	565	4.652E+01
402	5.984E-01	443	3.337E+01	484	1.896E+01	525	4.025E+01	566	4.661E+01
403	6.146E-01	444	3.666E+01	485	1.937E+01	526	4.054E+01	567	4.651E+01
404	6.777E-01	445	4.019E+01	486	1.980E+01	527	4.084E+01	568	4.648E+01
405	7.237E-01	446	4.404E+01	487	2.028E+01	528	4.111E+01	569	4.649E+01
406	7.800E-01	447	4.773E+01	488	2.077E+01	529	4.142E+01	570	4.649E+01
407	8.730E-01	448	5.141E+01	489	2.131E+01	530	4.170E+01	571	4.646E+01
408	9.619E-01	449	5.471E+01	490	2.191E+01	531	4.190E+01	572	4.643E+01
409	1.070E+00	450	5.723E+01	491	2.252E+01	532	4.223E+01	573	4.643E+01
410	1.173E+00	451	5.878E+01	492	2.322E+01	533	4.248E+01	574	4.640E+01
411	1.300E+00	452	5.928E+01	493	2.386E+01	534	4.277E+01	575	4.640E+01
412	1.469E+00	453	5.852E+01	494	2.459E+01	535	4.300E+01	576	4.639E+01
413	1.648E+00	454	5.652E+01	495	2.538E+01	536	4.324E+01	577	4.638E+01
414	1.853E+00	455	5.372E+01	496	2.609E+01	537	4.350E+01	578	4.640E+01
415	2.110E+00	456	5.034E+01	497	2.685E+01	538	4.373E+01	579	4.645E+01
416	2.386E+00	457	4.660E+01	498	2.761E+01	539	4.395E+01	580	4.643E+01
417	2.691E+00	458	4.302E+01	499	2.835E+01	540	4.419E+01	581	4.647E+01
418	3.005E+00	459	3.981E+01	500	2.905E+01	541	4.433E+01	582	4.649E+01
419	3.368E+00	460	3.710E+01	501	2.977E+01	542	4.456E+01	583	4.656E+01
420	3.751E+00	461	3.483E+01	502	3.045E+01	543	4.476E+01	584	4.660E+01

nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
585	4.669E+01	626	5.324E+01	667	3.880E+01	708	1.605E+01	749	4.989E+00
586	4.676E+01	627	5.326E+01	668	3.817E+01	709	1.561E+01	750	4.853E+00
587	4.685E+01	628	5.324E+01	669	3.762E+01	710	1.520E+01	751	4.718E+00
588	4.691E+01	629	5.325E+01	670	3.697E+01	711	1.482E+01	752	4.575E+00
589	4.705E+01	630	5.316E+01	671	3.633E+01	712	1.444E+01	753	4.447E+00
590	4.715E+01	631	5.310E+01	672	3.573E+01	713	1.408E+01	754	4.306E+00
591	4.730E+01	632	5.302E+01	673	3.509E+01	714	1.370E+01	755	4.192E+00
592	4.745E+01	633	5.291E+01	674	3.449E+01	715	1.335E+01	756	4.063E+00
593	4.760E+01	634	5.280E+01	675	3.385E+01	716	1.299E+01	757	3.944E+00
594	4.774E+01	635	5.261E+01	676	3.323E+01	717	1.264E+01	758	3.832E+00
595	4.792E+01	636	5.249E+01	677	3.263E+01	718	1.232E+01	759	3.715E+00
596	4.808E+01	637	5.228E+01	678	3.201E+01	719	1.198E+01	760	3.610E+00
597	4.821E+01	638	5.213E+01	679	3.140E+01	720	1.165E+01	761	3.507E+00
598	4.845E+01	639	5.187E+01	680	3.076E+01	721	1.134E+01	762	3.403E+00
599	4.867E+01	640	5.163E+01	681	3.016E+01	722	1.101E+01	763	3.299E+00
600	4.885E+01	641	5.136E+01	682	2.957E+01	723	1.071E+01	764	3.194E+00
601	4.908E+01	642	5.108E+01	683	2.900E+01	724	1.041E+01	765	3.099E+00
602	4.925E+01	643	5.076E+01	684	2.839E+01	725	1.012E+01	766	3.013E+00
603	4.950E+01	644	5.043E+01	685	2.778E+01	726	9.859E+00	767	2.929E+00
604	4.971E+01	645	5.006E+01	686	2.723E+01	727	9.558E+00	768	2.833E+00
605	4.996E+01	646	4.974E+01	687	2.666E+01	728	9.282E+00	769	2.745E+00
606	5.017E+01	647	4.936E+01	688	2.607E+01	729	9.027E+00	770	2.662E+00
607	5.040E+01	648	4.896E+01	689	2.549E+01	730	8.765E+00	771	2.591E+00
608	5.061E+01	649	4.852E+01	690	2.493E+01	731	8.511E+00	772	2.517E+00
609	5.086E+01	650	4.809E+01	691	2.437E+01	732	8.259E+00	773	2.444E+00
610	5.107E+01	651	4.764E+01	692	2.381E+01	733	8.017E+00	774	2.365E+00
611	5.129E+01	652	4.717E+01	693	2.332E+01	734	7.787E+00	775	2.296E+00
612	5.150E+01	653	4.667E+01	694	2.283E+01	735	7.568E+00	776	2.233E+00
613	5.166E+01	654	4.615E+01	695	2.229E+01	736	7.337E+00	777	2.166E+00
614	5.187E+01	655	4.570E+01	696	2.174E+01	737	7.113E+00	778	2.102E+00
615	5.208E+01	656	4.517E+01	697	2.120E+01	738	6.908E+00	779	2.084E+00
616	5.226E+01	657	4.463E+01	698	2.069E+01	739	6.688E+00	780	2.088E+00
617	5.239E+01	658	4.409E+01	699	2.019E+01	740	6.499E+00		
618	5.259E+01	659	4.355E+01	700	1.968E+01	741	6.301E+00		
619	5.271E+01	660	4.297E+01	701	1.921E+01	742	6.125E+00		
620	5.280E+01	661	4.237E+01	702	1.872E+01	743	5.936E+00		
621	5.295E+01	662	4.182E+01	703	1.825E+01	744	5.765E+00		
622	5.309E+01	663	4.123E+01	704	1.780E+01	745	5.599E+00		
623	5.311E+01	664	4.066E+01	705	1.735E+01	746	5.445E+00		
624	5.319E+01	665	4.000E+01	706	1.689E+01	747	5.292E+00		
625	5.321E+01	666	3.941E+01	707	1.648E+01	748	5.145E+00		

### CIE 1931xy Chromaticity Diagram



### 7-Step Chromaticity Quadrangles





## [Goniophotometer System]

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

Test orientation: **Base up**

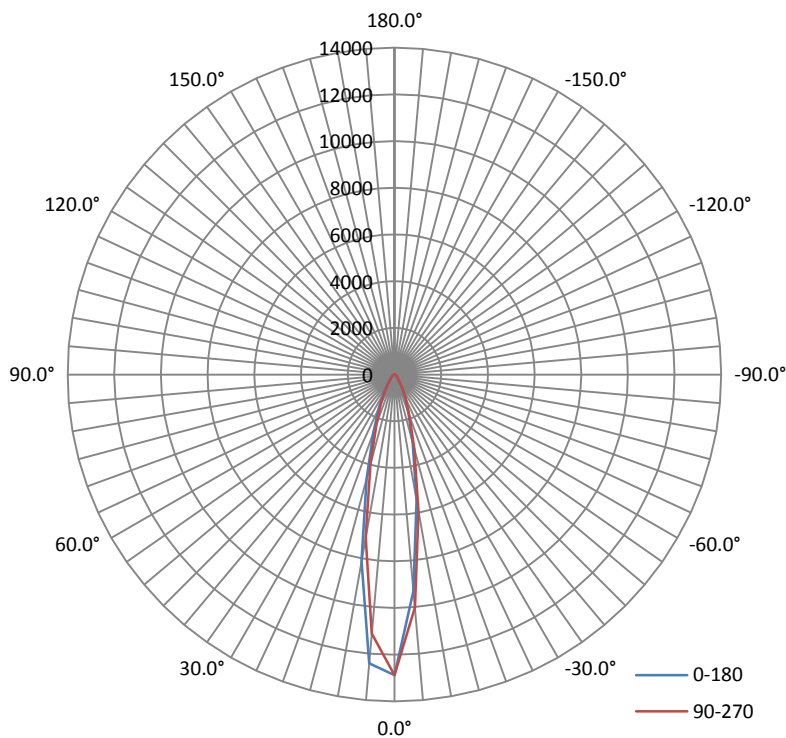
### Electrical Measurement

Input Voltage(V)	Frequency(Hz)	Input Current(A)	Power (W)	Power Factor
120.0	60	0.2526	29.98	0.9888

### Photometric Measurement

Luminous Flux(lm)	Efficacy(lm/W)	$I_{max}(cd)$	S/MH(C0/180)	S/MH(C90/270)
3205.04	106.91	13456.0	0.29	0.32

### Luminous Intensity Distribution



	C0/180	C45/225	C90/270	C135/315	AVG.
Beam Angle(50% $I_{max}$ ):	19.9	19.9	20.1	20.2	20.0
Field Angle(10% $I_{max}$ ):	49.4	49.1	49.3	49.0	49.2

**Luminous Intensity (cd) Distribution Data**

C y	0°	22.5°	45°	67.5°	90°	112.5°	135°	157.5°
0.0°	12874	12874	12874	12874	12874	12874	12874	12874
5.0°	12419	12468	12241	11901	11141	10528	9957	9500
10.0°	8114	8207	8053	7690	7066	6515	6140	5713
15.0°	4621	4723	4615	4362	3946	3618	3333	3138
20.0°	2645	2689	2607	2476	2257	2069	1926	1836
25.0°	1573	1589	1541	1471	1346	1233	1148	1106
30.0°	949	966	930	883	804	721	666	637
35.0°	550	556	541	515	458	406	373	357
40.0°	315	323	313	297	269	241	227	221
45.0°	205	209	206	198	183	171	166	164
50.0°	155	158	155	152	141	134	130	128
55.0°	120	121	120	118	111	105	102	100
60.0°	98	99	98	96	91	87	84	83
65.0°	83	83	82	81	77	74	71	69
70.0°	70	70	69	66	63	61	58	56
75.0°	56	57	55	52	49	47	44	42
80.0°	40	42	40	37	34	32	29	27
85.0°	24	25	23	21	18	17	15	13
90.0°	8	9	8	7	6	4	3	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	1	1	1
135.0°	1	1	1	1	1	1	1	1
140.0°	2	2	2	2	2	2	2	3
145.0°	4	4	4	4	4	4	4	5
150.0°	6	6	6	6	6	6	6	6
155.0°	8	8	7	8	8	8	8	8
160.0°	9	9	9	9	8	8	9	9
165.0°	9	9	9	8	8	8	8	8
170.0°	8	8	7	7	7	7	7	7
175.0°	6	6	6	6	5	5	5	5
180.0°	4	4	4	4	4	4	3	3

**Luminous Intensity (cd) Distribution Data (cont.)**

C y	180°	202.5°	225°	247.5°	270°	292.5°	315°	337.5°
0.0°	12874	12874	12874	12874	12874	12874	12874	12874
5.0°	9321	9232	9283	9663	10004	10614	11247	11747
10.0°	5472	5405	5436	5682	5964	6448	7008	7525
15.0°	3042	2999	3031	3162	3301	3550	3863	4187
20.0°	1784	1749	1749	1819	1903	2052	2238	2420
25.0°	1088	1052	1043	1081	1129	1212	1318	1422
30.0°	620	597	588	615	648	689	762	858
35.0°	352	342	338	352	370	387	420	482
40.0°	222	221	221	225	231	239	251	280
45.0°	167	167	167	169	170	174	179	189
50.0°	128	128	128	130	131	135	139	145
55.0°	101	101	101	103	104	107	109	113
60.0°	84	84	84	86	87	89	91	93
65.0°	71	70	70	72	73	76	78	79
70.0°	57	57	57	59	61	63	65	66
75.0°	43	43	43	45	47	49	52	53
80.0°	28	28	27	30	31	33	36	38
85.0°	13	12	12	14	16	17	20	22
90.0°	1	1	1	2	3	4	6	7
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	3	2	2	2
180.0°	4	4	4	4	4	4	4	3

**Zonal Lumen Density Measurement**

Deg	Flux (lm)	%
0-5	281.4	8.78
5-10	603.2	18.82
10-15	590.4	18.42
15-20	463.6	14.46
20-25	346.2	10.81
25-30	249.1	7.77
30-35	167.0	5.21
35-40	109.7	3.42
40-45	78.7	2.46
45-50	63.9	1.99
50-55	53.2	1.66
55-60	45.5	1.42
60-65	40.1	1.25
65-70	34.9	1.09
70-75	29.0	0.91
75-80	22.0	0.68
80-85	13.8	0.43
85-90	5.8	0.18
90-95	0.8	0.03
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	0.01
120-125	0.1	0.00
125-130	0.1	0.00
130-135	0.2	0.01
135-140	0.4	0.01
140-145	0.7	0.02
145-150	1.0	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	281.4	8.78
0-10	884.6	27.60
0-15	1475.0	46.02
0-20	1938.6	60.48
0-25	2284.8	71.29
0-30	2533.8	79.06
0-35	2700.9	84.27
0-40	2810.6	87.69
0-45	2889.3	90.15
0-50	2953.1	92.14
0-55	3006.4	93.80
0-60	3051.9	95.22
0-65	3092.0	96.47
0-70	3126.9	97.56
0-75	3155.9	98.47
0-80	3177.9	99.15
0-85	3191.7	99.58
0-90	3197.5	99.76
0-95	3198.3	99.79
0-100	3198.3	99.79
0-105	3198.4	99.79
0-110	3198.4	99.79
0-115	3198.5	99.79
0-120	3198.5	99.80
0-125	3198.6	99.80
0-130	3198.7	99.80
0-135	3198.9	99.81
0-140	3199.3	99.82
0-145	3200.0	99.84
0-150	3200.9	99.87
0-155	3202.0	99.91
0-160	3203.1	99.94
0-165	3204.0	99.97
0-170	3204.6	99.99
0-175	3204.9	100.00
0-180	3205.0	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\*\*\*\*\*