

# 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: INFT9.5/850/DIM010UNV**

<b>Report Type:</b>	Electrical and Photometric tests including: Luminous Flux, Chromaticity, Luminous Intensity Distribution
<b>Test Engineer:</b>	George Yang
<b>Report Number:</b>	PKS200825095-10
<b>Test Date:</b>	2020-08-28 to 2020-09-05
<b>Report Date:</b>	2020-09-07
<b>Reviewed By:</b>	Ray Gao/ EE Engineer
<b>Prepared By:</b>	Bay Area Compliance Laboratories Corp. (Kunshan). No.248 Chenghu Road, Kunshan, Jiangsu province, China. Tel: +86-0512-86175000 Fax: +86-0512-88934268
<b>Accreditation:</b>	The IAS Accreditation Number TL-749.

## 1. Product Description

### General Information:

One sample was received on 2020-08-25 and used for testing.

Model Tested: INFT9.5/850/DIM010UNV  
 Manufacturer: GREEN CREATIVE LTD  
 Brand Name: GREEN CREATIVE  
 Product Designation: LED Recessed Downlight  
 Burning Time Before Test: 0hour(For New Products)

### Rated Values:

Rated Voltage/Frequency: 120-277VAC 50/60Hz  
 Rated Power: 27W  
 Nominal CCT: 5000K  
 Nominal Lumen Output: 3430lm

## 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 Equipment
- IES TM-30-18: IES Method for Evaluating Light Source Color Rendition

## 3. Description of Test Equipment

Device	Manufacture	Model No	Serial No	Calibration date	Calibration due date
Integrating Sphere	INVENTFINE	Dia 1.5m	JWWCV090112	2020-01-22	2021-01-21
Power Meter	INVENTFINE	WT500	GSJWQ20009	2020-04-02	2021-04-01
Spectral photometer	INVENTFINE	CMS-3S	GSGSE100017	2020-01-22	2021-01-21
AC Power Supply	INVENTFINE	CHP500	JWJSD010071	2020-04-02	2021-04-01
Standard Light Source	INVENTFINE	N/A	JWWCR020104	2019-11-19	2020-11-18
Thermal Meter	KEJIAN	TA298	N/A	2019-12-02	2020-12-01
DC Power Supply	INVENTFINE	WL3005	JWWCP020069	2019-12-20	2020-12-19
AC Power Supply	INVENTFINE	CHP-5KVA	900511765	2020-04-02	2021-04-01
DC Power Supply	INVENTFINE	WL3010	JWDMP030001	2019-12-20	2020-12-19
Power Meter	INVENTFINE	WT500	GSDSQ200007	2020-04-02	2021-04-01
Goniophotometer	INVENTFINE	GPM-1900	YWGCF120001	2020-01-22	2021-01-21
Wireless Weather Station	ZHONGXING	KG218	N/A	2019-12-02	2020-12-01
Standard Light Source	INVENTFINE	N/A	JWBYR040008	2020-03-19	2021-03-18

Statement of Traceability: Bay Area Compliance Laboratories Corp. (Kunshan) 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  $U_{re}=2.61\%$  ( $k=2$ ), at the 95% confidence level. The uncertainty of the correlated color temperature measurements is  $U=34\text{K}$  ( $k=2$ ), at the 95% confidence level. The uncertainty of the CRI is  $U=2.5(k=2)$ , at the 95% confidence level.

The uncertainty of power meter AC current  $U_{re}=0.48\%$  of rdg, AC Voltage  $U_{re}=0.25\%$  of rdg, Power  $U_{re}=0.44\%$ , ( $k=2$ ), 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 flux is  $U_{re}=2.6\%$  ( $k=2$ ), 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: **Downward**

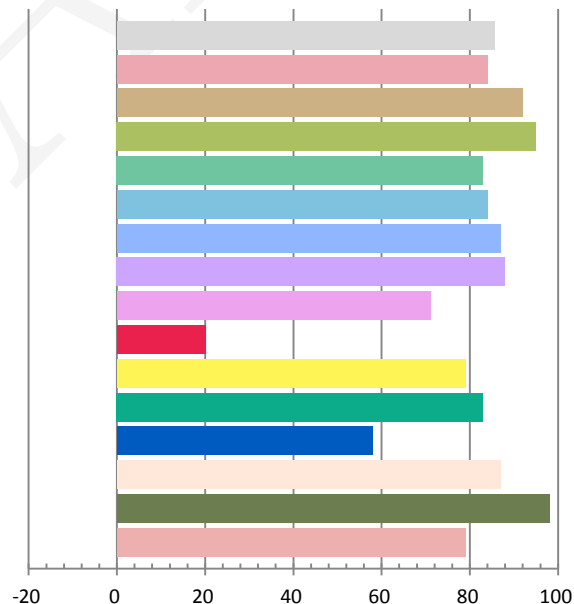
### Photometric and Electrical Measurement Result

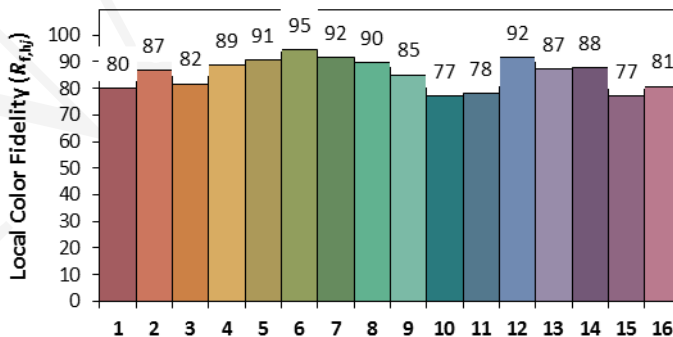
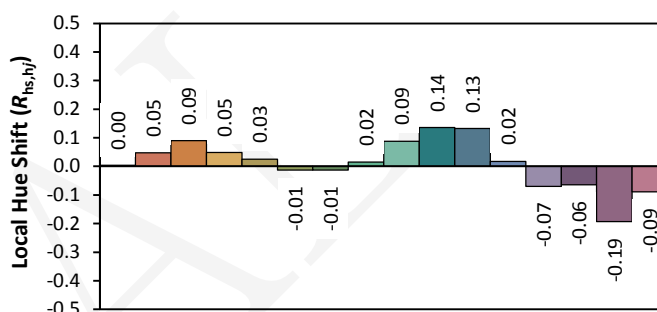
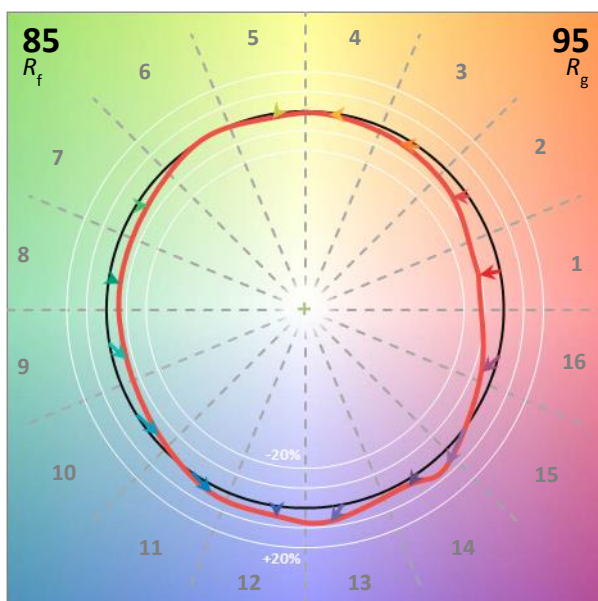
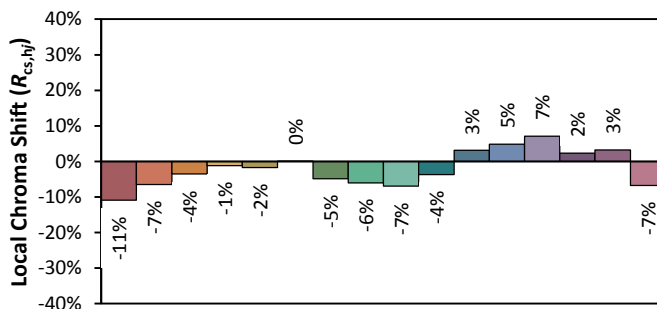
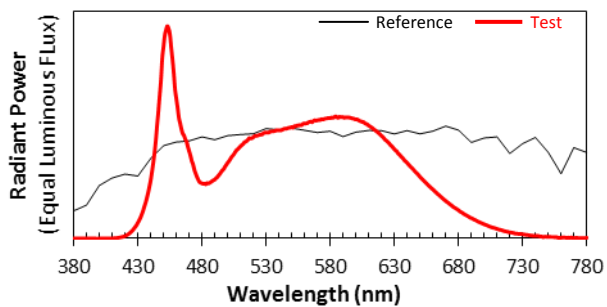
Voltage(V)	Frequency(Hz)	Current(A)	Power (W)	Power Factor	Luminous Flux(lm)	Efficacy(lm/W)
120	60	0.2368	27.86	0.9804	3685.01	132.27

Radiant Flux (W)	CCT (K)	Duv	x	y	u'	v'
11.483	4943	0.00221	0.3472	0.3577	0.2105	0.4879

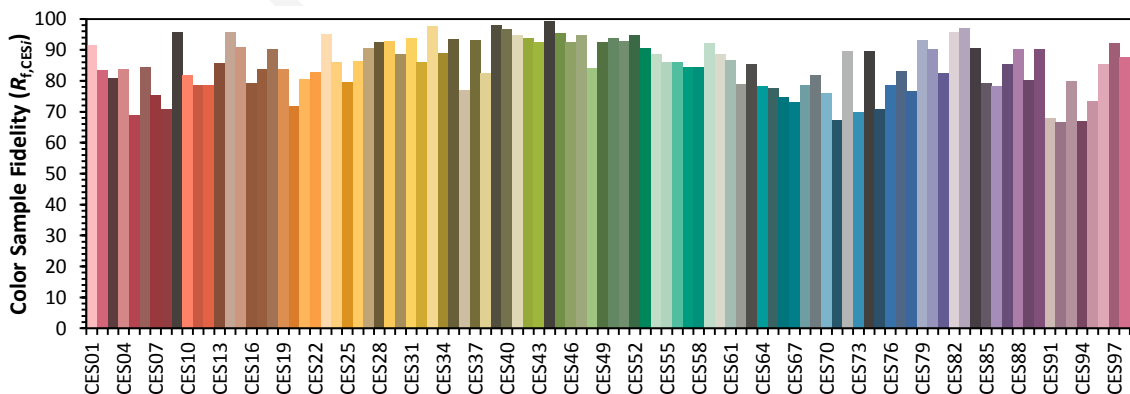
### Color Rendering Index

<b>Ra</b>			
85.5			
<b>R1</b>	<b>R2</b>	<b>R3</b>	<b>R4</b>
84	92	95	83
<b>R5</b>	<b>R6</b>	<b>R7</b>	<b>R8</b>
84	87	88	71
<b>R9</b>	<b>R10</b>	<b>R11</b>	<b>R12</b>
20	79	83	58
<b>R13</b>	<b>R14</b>	<b>R15</b>	
87	98	79	

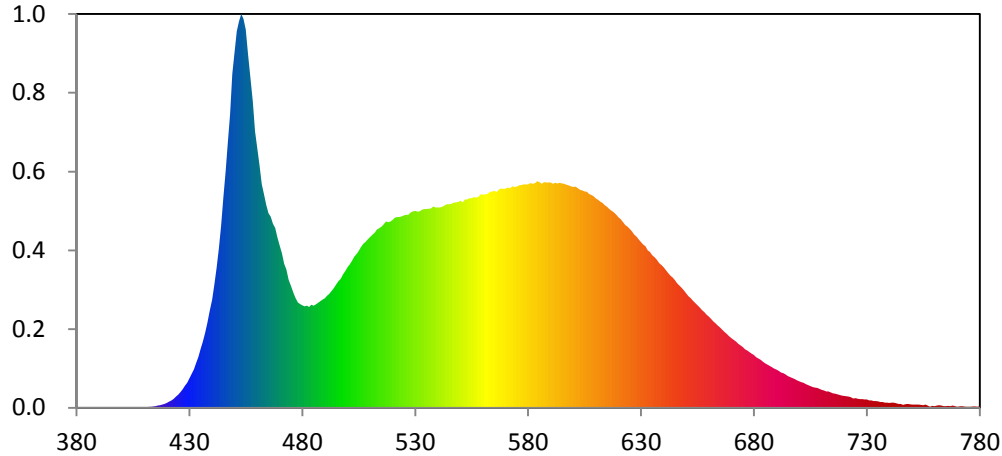




Hue-Angle Bin (j)



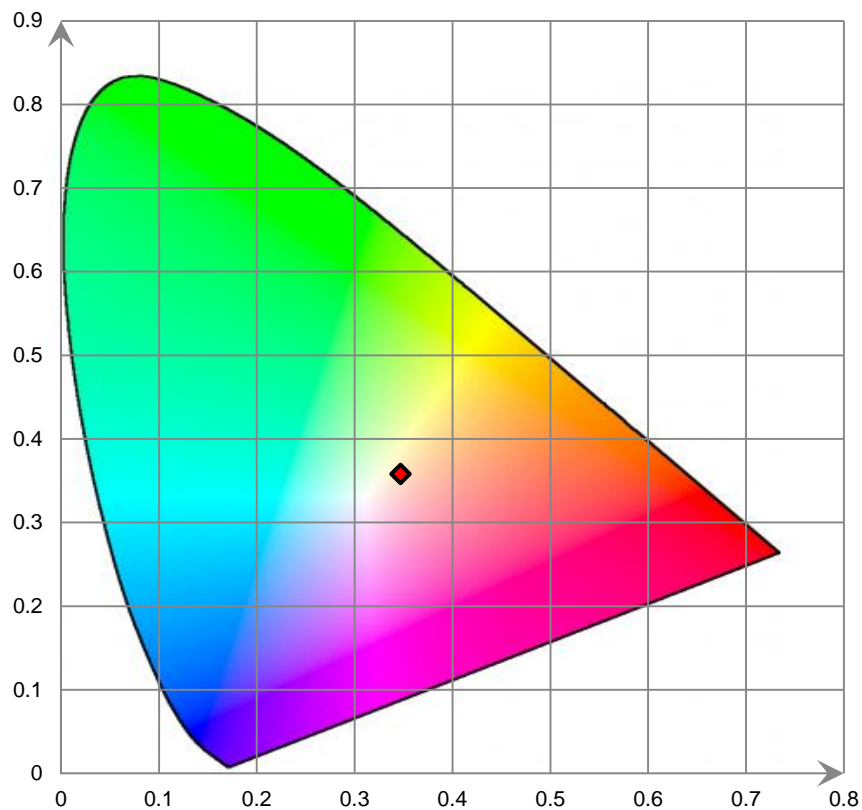
### Relative Spectral Power Distribution



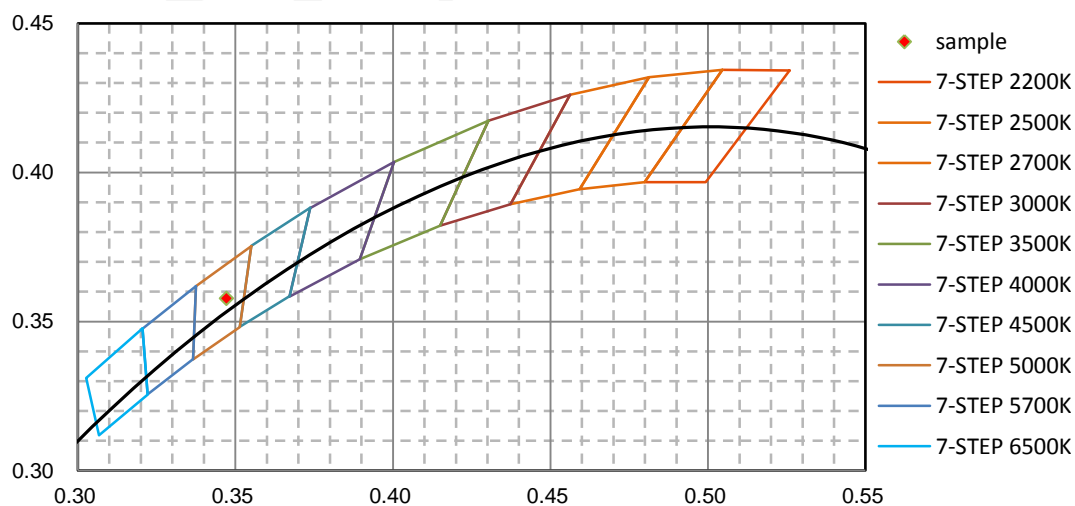
nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
380	3.160E-02	421	1.551E+00	462	5.727E+01	503	3.864E+01	544	5.209E+01
381	9.380E-02	422	1.870E+00	463	5.463E+01	504	3.933E+01	545	5.209E+01
382	4.800E-02	423	2.280E+00	464	5.188E+01	505	4.012E+01	546	5.215E+01
383	5.530E-02	424	2.829E+00	465	4.977E+01	506	4.114E+01	547	5.248E+01
384	1.047E-01	425	3.344E+00	466	4.891E+01	507	4.196E+01	548	5.257E+01
385	8.860E-02	426	4.003E+00	467	4.707E+01	508	4.246E+01	549	5.267E+01
386	1.590E-02	427	4.747E+00	468	4.599E+01	509	4.308E+01	550	5.298E+01
387	1.042E-01	428	5.617E+00	469	4.359E+01	510	4.368E+01	551	5.259E+01
388	6.980E-02	429	6.420E+00	470	4.148E+01	511	4.433E+01	552	5.333E+01
389	6.540E-02	430	7.497E+00	471	3.951E+01	512	4.479E+01	553	5.330E+01
390	8.890E-02	431	8.671E+00	472	3.685E+01	513	4.563E+01	554	5.361E+01
391	6.200E-02	432	9.837E+00	473	3.538E+01	514	4.594E+01	555	5.361E+01
392	2.870E-02	433	1.143E+01	474	3.278E+01	515	4.634E+01	556	5.387E+01
393	2.890E-02	434	1.302E+01	475	3.103E+01	516	4.693E+01	557	5.383E+01
394	6.080E-02	435	1.509E+01	476	2.942E+01	517	4.766E+01	558	5.394E+01
395	7.550E-02	436	1.696E+01	477	2.804E+01	518	4.748E+01	559	5.459E+01
396	4.510E-02	437	1.919E+01	478	2.692E+01	519	4.765E+01	560	5.450E+01
397	6.810E-02	438	2.169E+01	479	2.652E+01	520	4.804E+01	561	5.464E+01
398	8.100E-03	439	2.464E+01	480	2.623E+01	521	4.860E+01	562	5.469E+01
399	2.070E-02	440	2.764E+01	481	2.600E+01	522	4.879E+01	563	5.519E+01
400	2.260E-02	441	3.161E+01	482	2.610E+01	523	4.880E+01	564	5.536E+01
401	2.600E-02	442	3.588E+01	483	2.576E+01	524	4.900E+01	565	5.551E+01
402	5.530E-02	443	4.074E+01	484	2.634E+01	525	4.922E+01	566	5.522E+01
403	4.380E-02	444	4.661E+01	485	2.614E+01	526	4.938E+01	567	5.585E+01
404	4.230E-02	445	5.382E+01	486	2.645E+01	527	4.940E+01	568	5.612E+01
405	4.530E-02	446	6.038E+01	487	2.685E+01	528	4.998E+01	569	5.599E+01
406	3.530E-02	447	6.785E+01	488	2.730E+01	529	5.030E+01	570	5.611E+01
407	1.356E-01	448	7.507E+01	489	2.771E+01	530	5.036E+01	571	5.633E+01
408	5.760E-02	449	8.549E+01	490	2.799E+01	531	5.022E+01	572	5.619E+01
409	1.091E-01	450	9.103E+01	491	2.869E+01	532	5.025E+01	573	5.671E+01
410	1.512E-01	451	9.639E+01	492	2.919E+01	533	5.070E+01	574	5.648E+01
411	1.770E-01	452	9.894E+01	493	2.997E+01	534	5.082E+01	575	5.661E+01
412	2.332E-01	453	1.008E+02	494	3.072E+01	535	5.089E+01	576	5.693E+01
413	2.153E-01	454	9.953E+01	495	3.163E+01	536	5.095E+01	577	5.699E+01
414	3.298E-01	455	9.678E+01	496	3.242E+01	537	5.103E+01	578	5.717E+01
415	4.334E-01	456	9.060E+01	497	3.302E+01	538	5.148E+01	579	5.712E+01
416	5.839E-01	457	8.494E+01	498	3.415E+01	539	5.129E+01	580	5.713E+01
417	6.880E-01	458	7.843E+01	499	3.497E+01	540	5.129E+01	581	5.749E+01
418	8.381E-01	459	7.075E+01	500	3.594E+01	541	5.129E+01	582	5.729E+01
419	9.728E-01	460	6.641E+01	501	3.666E+01	542	5.143E+01	583	5.752E+01
420	1.222E+00	461	6.207E+01	502	3.761E+01	543	5.173E+01	584	5.799E+01

nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
585	5.770E+01	626	4.514E+01	667	1.940E+01	708	5.053E+00	749	8.661E-01
586	5.729E+01	627	4.434E+01	668	1.889E+01	709	4.791E+00	750	8.076E-01
587	5.773E+01	628	4.384E+01	669	1.836E+01	710	4.597E+00	751	8.260E-01
588	5.768E+01	629	4.310E+01	670	1.788E+01	711	4.422E+00	752	7.975E-01
589	5.769E+01	630	4.241E+01	671	1.737E+01	712	4.201E+00	753	7.721E-01
590	5.761E+01	631	4.174E+01	672	1.698E+01	713	4.158E+00	754	7.603E-01
591	5.731E+01	632	4.136E+01	673	1.639E+01	714	3.925E+00	755	6.898E-01
592	5.756E+01	633	4.032E+01	674	1.599E+01	715	3.712E+00	756	7.818E-01
593	5.744E+01	634	3.988E+01	675	1.553E+01	716	3.556E+00	757	6.006E-01
594	5.753E+01	635	3.907E+01	676	1.496E+01	717	3.403E+00	758	2.705E-01
595	5.738E+01	636	3.849E+01	677	1.466E+01	718	3.297E+00	759	4.891E-01
596	5.729E+01	637	3.783E+01	678	1.425E+01	719	3.065E+00	760	4.174E-01
597	5.706E+01	638	3.702E+01	679	1.383E+01	720	2.993E+00	761	5.591E-01
598	5.694E+01	639	3.652E+01	680	1.348E+01	721	2.904E+00	762	6.220E-01
599	5.666E+01	640	3.591E+01	681	1.291E+01	722	2.826E+00	763	5.331E-01
600	5.649E+01	641	3.518E+01	682	1.257E+01	723	2.676E+00	764	4.149E-01
601	5.656E+01	642	3.452E+01	683	1.226E+01	724	2.404E+00	765	3.583E-01
602	5.616E+01	643	3.384E+01	684	1.175E+01	725	2.440E+00	766	4.827E-01
603	5.579E+01	644	3.335E+01	685	1.139E+01	726	2.309E+00	767	3.903E-01
604	5.563E+01	645	3.265E+01	686	1.108E+01	727	2.204E+00	768	5.191E-01
605	5.535E+01	646	3.189E+01	687	1.071E+01	728	2.172E+00	769	3.900E-01
606	5.529E+01	647	3.131E+01	688	1.043E+01	729	2.155E+00	770	2.493E-01
607	5.471E+01	648	3.074E+01	689	9.969E+00	730	2.118E+00	771	3.303E-01
608	5.442E+01	649	3.002E+01	690	9.735E+00	731	1.889E+00	772	4.051E-01
609	5.414E+01	650	2.928E+01	691	9.448E+00	732	1.886E+00	773	2.901E-01
610	5.359E+01	651	2.861E+01	692	9.041E+00	733	1.709E+00	774	2.758E-01
611	5.324E+01	652	2.809E+01	693	8.834E+00	734	1.699E+00	775	2.541E-01
612	5.276E+01	653	2.745E+01	694	8.510E+00	735	1.651E+00	776	2.642E-01
613	5.244E+01	654	2.678E+01	695	8.128E+00	736	1.488E+00	777	3.052E-01
614	5.180E+01	655	2.620E+01	696	7.870E+00	737	1.492E+00	778	2.936E-01
615	5.144E+01	656	2.560E+01	697	7.602E+00	738	1.338E+00	779	2.480E-01
616	5.086E+01	657	2.494E+01	698	7.336E+00	739	1.288E+00	780	4.227E-01
617	5.048E+01	658	2.448E+01	699	7.039E+00	740	1.245E+00		
618	4.991E+01	659	2.385E+01	700	6.775E+00	741	1.329E+00		
619	4.939E+01	660	2.334E+01	701	6.551E+00	742	1.296E+00		
620	4.874E+01	661	2.277E+01	702	6.384E+00	743	1.136E+00		
621	4.822E+01	662	2.214E+01	703	6.067E+00	744	9.438E-01		
622	4.748E+01	663	2.162E+01	704	5.789E+00	745	9.380E-01		
623	4.673E+01	664	2.100E+01	705	5.574E+00	746	7.354E-01		
624	4.638E+01	665	2.055E+01	706	5.355E+00	747	8.599E-01		
625	4.574E+01	666	1.996E+01	707	5.172E+00	748	9.356E-01		

CIE 1931xy Chromaticity Diagram



7-Step Chromaticity Quadrangles





### [Goniophotometer System]

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

Test orientation: **Downward**

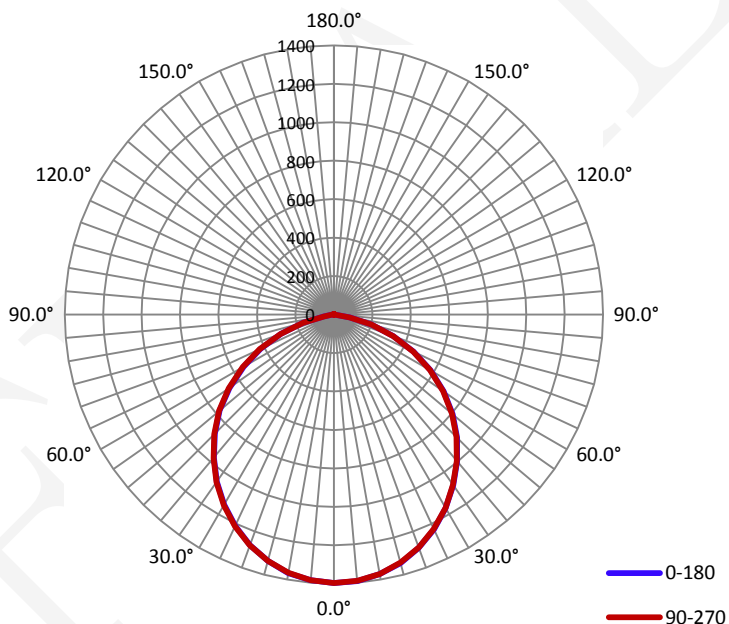
### Electrical Measurement

Input Voltage(V)	Frequency(Hz)	Input Current(A)	Power (W)	Power Factor
120.0	60	0.2360	27.94	0.9850

### Photometric Measurement

Luminous Flux(lm)	Efficacy(lm/W)	$I_{max}(cd)$	S/MH(C0/180)	S/MH(C90/270)
3695.1	132.30	1395.9	1.23	1.23

### Luminous Intensity Distribution



	C0/180	C45/225	C90/270	C135/315	AVG.
Beam Angle(50% $I_{max}$ ):	108.4	108.5	108.5	108.4	108.5
Field Angle(10% $I_{max}$ ):	153.8	153.8	153.8	153.9	153.8

**Luminous Intensity (cd) Distribution Data**

C y	0°	22.5°	45°	67.5°	90°	112.5°	135°	157.5°
0.0°	1396	1396	1396	1396	1396	1396	1396	1396
5.0°	1391	1391	1391	1390	1391	1392	1390	1387
10.0°	1371	1372	1373	1372	1370	1371	1368	1366
15.0°	1338	1338	1339	1338	1335	1335	1333	1330
20.0°	1291	1291	1294	1291	1290	1288	1284	1281
25.0°	1232	1234	1233	1233	1231	1230	1225	1220
30.0°	1163	1164	1165	1163	1160	1157	1153	1150
35.0°	1084	1086	1087	1084	1081	1079	1073	1069
40.0°	998	1000	999	998	995	991	986	981
45.0°	906	908	908	905	902	898	890	888
50.0°	805	808	809	806	802	798	791	785
55.0°	696	699	701	698	693	688	682	676
60.0°	580	582	585	581	577	572	565	558
65.0°	457	460	460	460	455	450	442	438
70.0°	328	333	334	332	330	325	317	310
75.0°	201	205	207	206	202	197	192	185
80.0°	84	87	89	87	83	79	75	70
85.0°	12	13	13	13	13	12	12	11
90.0°	0	0	0	0	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°	0	0	0	0	0	0	0	0
135.0°	0	0	0	0	0	0	0	0
140.0°	0	0	0	0	0	0	0	0
145.0°	0	1	1	1	1	2	1	1
150.0°	1	2	2	2	2	2	2	2
155.0°	2	2	3	2	3	3	3	2
160.0°	3	3	3	3	3	3	3	2
165.0°	3	3	3	3	4	3	3	3
170.0°	3	3	3	3	4	3	4	4
175.0°	4	4	4	4	4	4	4	4
180.0°	0	0	0	0	0	0	0	0

Luminous Intensity (cd) Distribution Data (cont.)

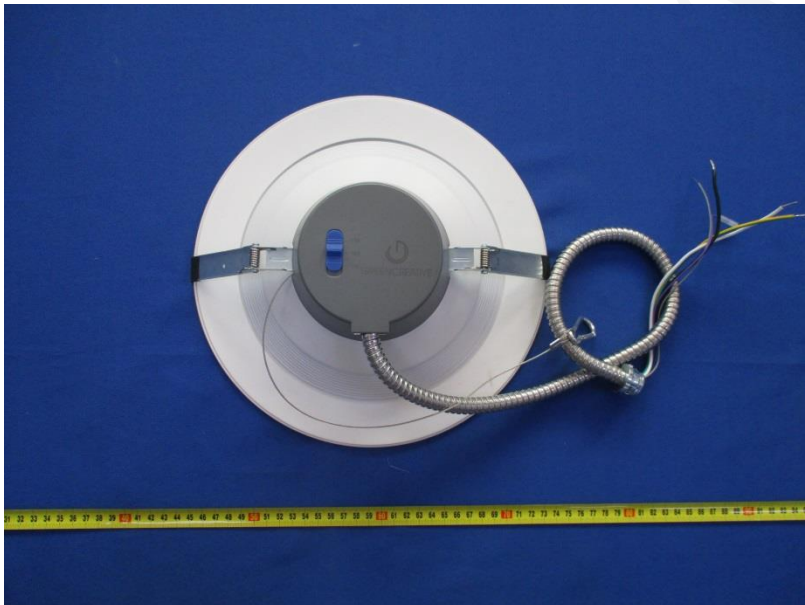
C y	180°	202.5°	225°	247.5°	270°	292.5°	315°	337.5°
0.0°	1396	1396	1396	1396	1396	1396	1396	1396
5.0°	1387	1386	1387	1387	1387	1390	1388	1389
10.0°	1365	1363	1364	1363	1363	1367	1368	1368
15.0°	1326	1325	1326	1325	1327	1331	1331	1333
20.0°	1276	1276	1275	1276	1278	1282	1283	1286
25.0°	1214	1212	1213	1214	1216	1220	1222	1225
30.0°	1142	1141	1141	1141	1145	1150	1151	1155
35.0°	1061	1059	1060	1061	1064	1068	1072	1076
40.0°	971	970	971	973	975	981	985	988
45.0°	876	876	876	877	881	887	889	895
50.0°	775	774	774	775	781	787	789	795
55.0°	663	663	662	664	669	672	678	685
60.0°	543	540	542	545	547	553	561	566
65.0°	421	416	418	420	426	430	437	443
70.0°	292	290	288	291	296	302	306	312
75.0°	166	163	161	164	167	174	178	184
80.0°	55	50	50	51	53	57	63	69
85.0°	9	8	9	9	9	9	10	11
90.0°	0	0	0	0	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°	0	0	0	0	0	0	0	0
135.0°	0	0	0	0	0	0	0	0
140.0°	0	0	0	0	0	0	0	0
145.0°	0	0	0	1	1	1	1	1
150.0°	0	2	1	2	2	1	2	2
155.0°	1	2	2	3	2	2	3	3
160.0°	2	3	2	3	3	3	3	3
165.0°	3	3	3	3	3	3	3	4
170.0°	3	3	4	4	3	4	4	4
175.0°	3	4	4	4	4	4	4	4
180.0°	0	0	0	0	0	0	0	0

**Zonal Lumen Density Measurement**

Deg	Flux (lm)	%
0-5	33.3	0.90
5-10	98.6	2.67
10-15	160.1	4.33
15-20	215.6	5.83
20-25	262.9	7.12
25-30	300.7	8.14
30-35	327.7	8.87
35-40	343.3	9.29
40-45	347.4	9.40
45-50	339.9	9.20
50-55	319.9	8.66
55-60	287.3	7.77
60-65	243.5	6.59
65-70	190.2	5.15
70-75	129.7	3.51
75-80	67.8	1.83
80-85	21.6	0.58
85-90	2.9	0.08
90-95	0.0	0.00
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	0.0	0.00
120-125	0.0	0.00
125-130	0.0	0.00
130-135	0.0	0.00
135-140	0.0	0.00
140-145	0.1	0.00
145-150	0.3	0.01
150-155	0.5	0.01
155-160	0.5	0.01
160-165	0.5	0.01
165-170	0.4	0.01
170-175	0.3	0.01
175-180	0.0	0.00

Deg	Flux (lm)	%
0-5	33.3	0.90
0-10	131.9	3.57
0-15	292.0	7.90
0-20	507.6	13.74
0-25	770.5	20.85
0-30	1071.2	28.99
0-35	1398.8	37.86
0-40	1742.2	47.15
0-45	2089.6	56.55
0-50	2429.5	65.75
0-55	2749.4	74.41
0-60	3036.7	82.18
0-65	3280.2	88.77
0-70	3470.4	93.92
0-75	3600.1	97.43
0-80	3667.9	99.26
0-85	3689.5	99.85
0-90	3692.4	99.93
0-95	3692.4	99.93
0-100	3692.4	99.93
0-105	3692.4	99.93
0-110	3692.4	99.93
0-115	3692.4	99.93
0-120	3692.4	99.93
0-125	3692.4	99.93
0-130	3692.4	99.93
0-135	3692.4	99.93
0-140	3692.4	99.93
0-145	3692.5	99.93
0-150	3692.9	99.94
0-155	3693.3	99.95
0-160	3693.9	99.97
0-165	3694.4	99.98
0-170	3694.8	99.99
0-175	3695.0	100.00
0-180	3695.1	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.
5. This report cannot be reproduced except in full, without prior written approval of the Company.
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\*\*\*\*\*END OF REPORT\*\*\*\*\*