

# 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: INFT4/840/DIM120V**

<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>	PKS200708082-10
<b>Test Date:</b>	2020-07-09 to 2020-07-14
<b>Report Date:</b>	2020-07-16
<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 2020-07-08 and used for testing.

Model Tested: INFT4/840/DIM120V  
 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: 120VAC 60Hz  
 Rated Power: 10W  
 Nominal CCT: 4000K  
 Nominal Lumen Output: 1090lm

## 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  $U_{rel}=2.61\%$  ( $k=2$ ), 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  $U_{rel}=0.48\%$  of rdg, AC Voltage  $U_{rel}=0.25\%$  of rdg, Power  $U_{rel}=0.44\%$ , ( $k=2$ ), 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  $U_{rel}=2.6\%$  ( $k=2$ ), 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**

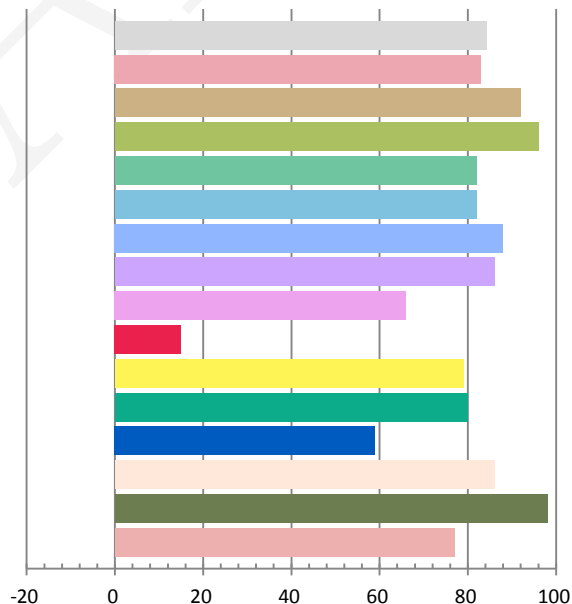
### Photometric and Electrical Measurement Result

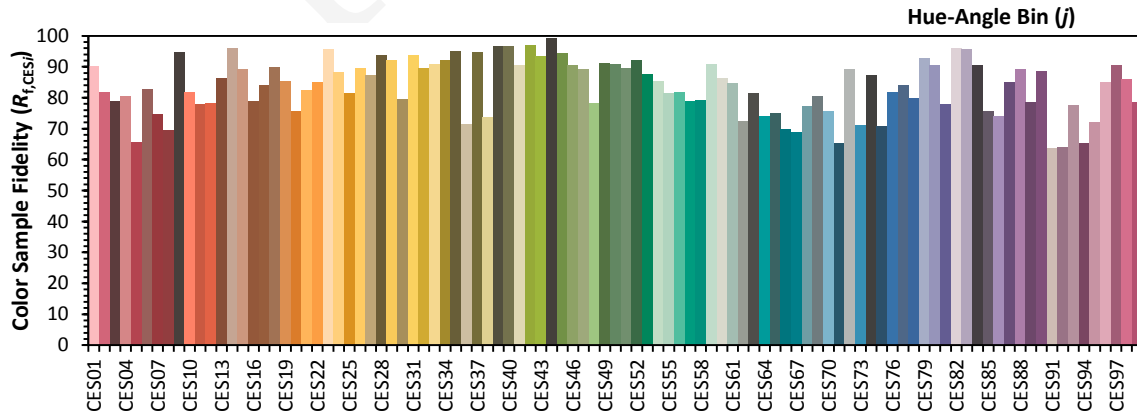
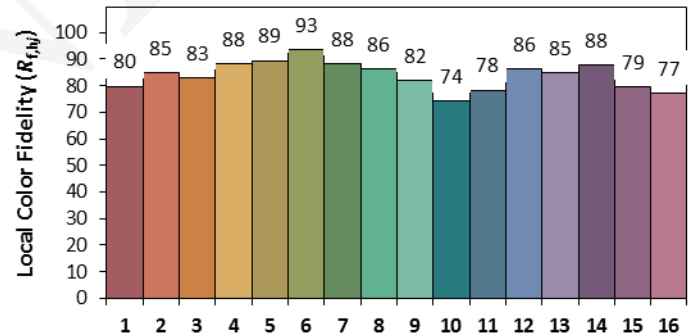
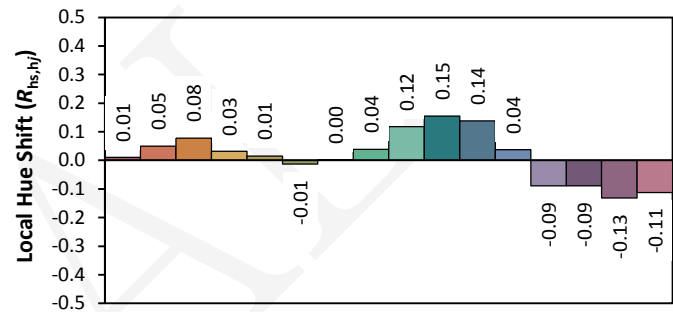
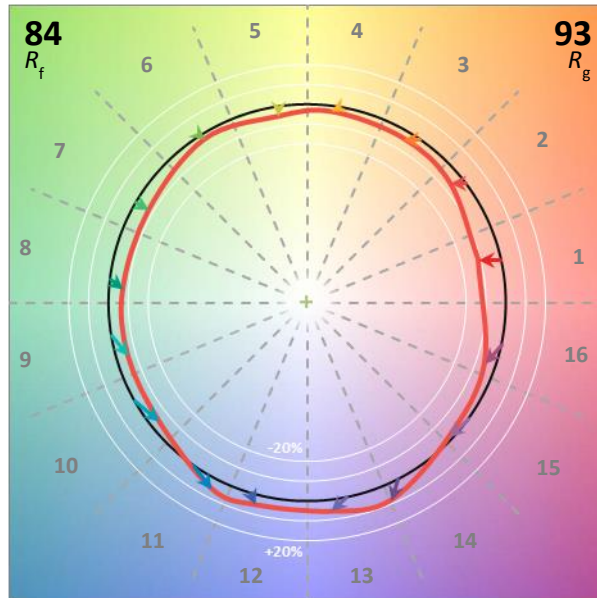
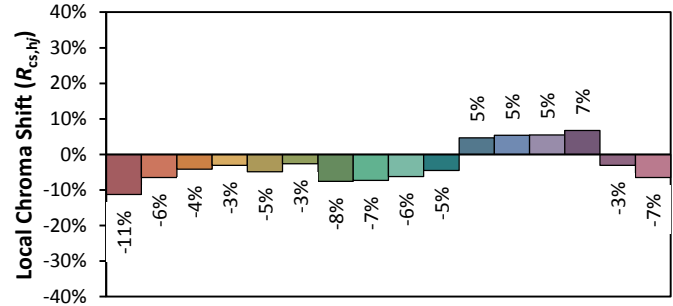
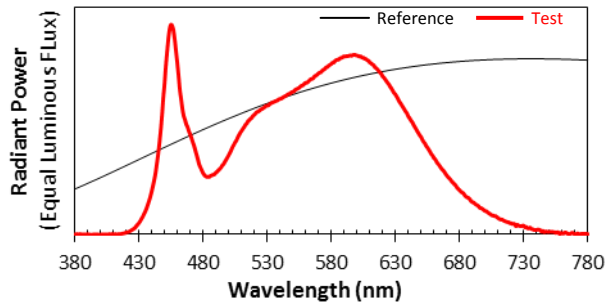
Voltage(V)	Frequency(Hz)	Current(A)	Power (W)	Power Factor	Luminous Flux(lm)	Efficacy(lm/W)
120.02	60	0.0877	10.02	0.9512	1162.91	116.1

Radiant Flux (W)	CCT (K)	Duv	x	y	u'	v'
3.510	3939	0.00190	0.3846	0.3834	0.2252	0.5051

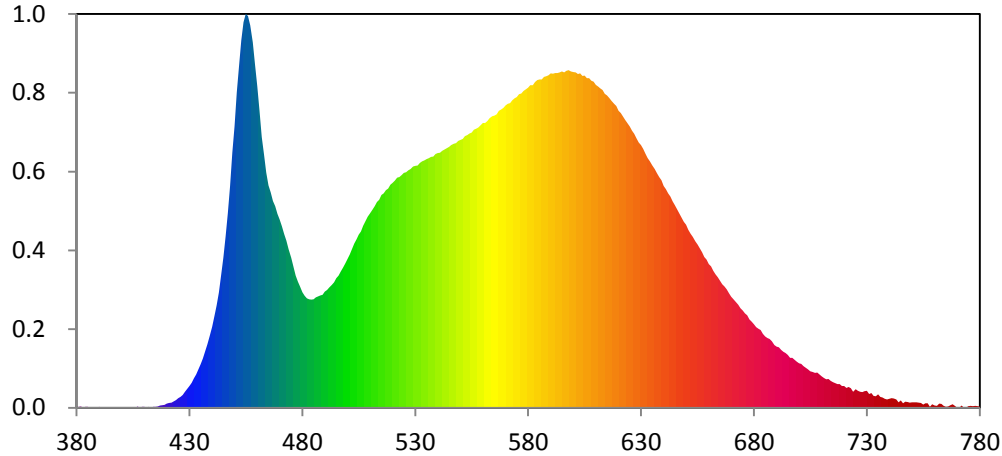
### Color Rendering Index

<b>Ra</b>			
84.3			
<b>R1</b>	<b>R2</b>	<b>R3</b>	<b>R4</b>
83	92	96	82
<b>R5</b>	<b>R6</b>	<b>R7</b>	<b>R8</b>
82	88	86	66
<b>R9</b>	<b>R10</b>	<b>R11</b>	<b>R12</b>
15	79	80	59
<b>R13</b>	<b>R14</b>	<b>R15</b>	
86	98	77	





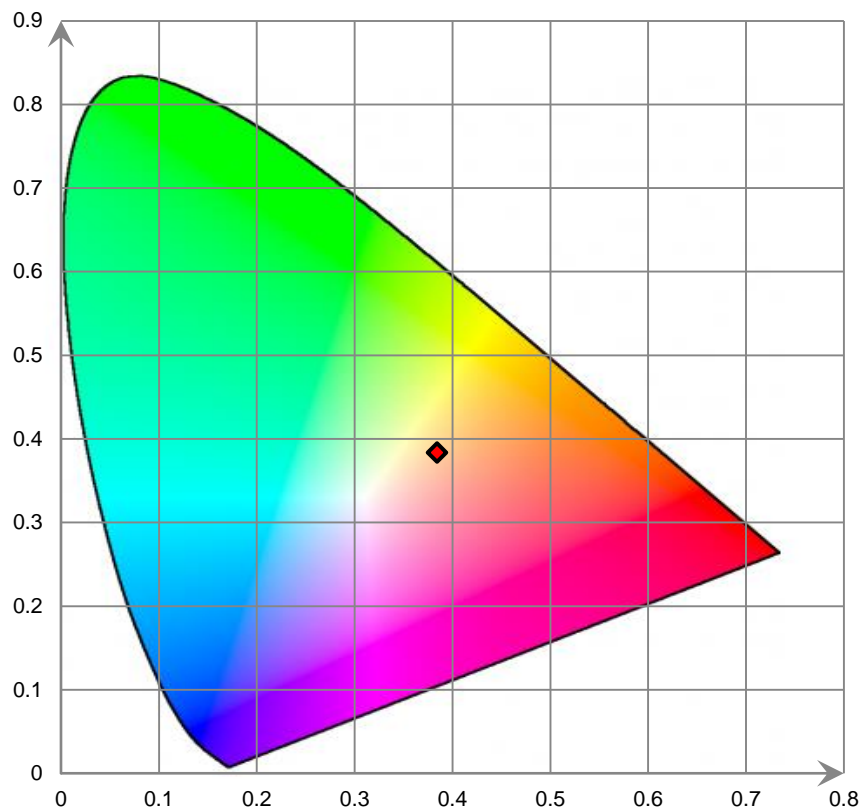
### Relative Spectral Power Distribution



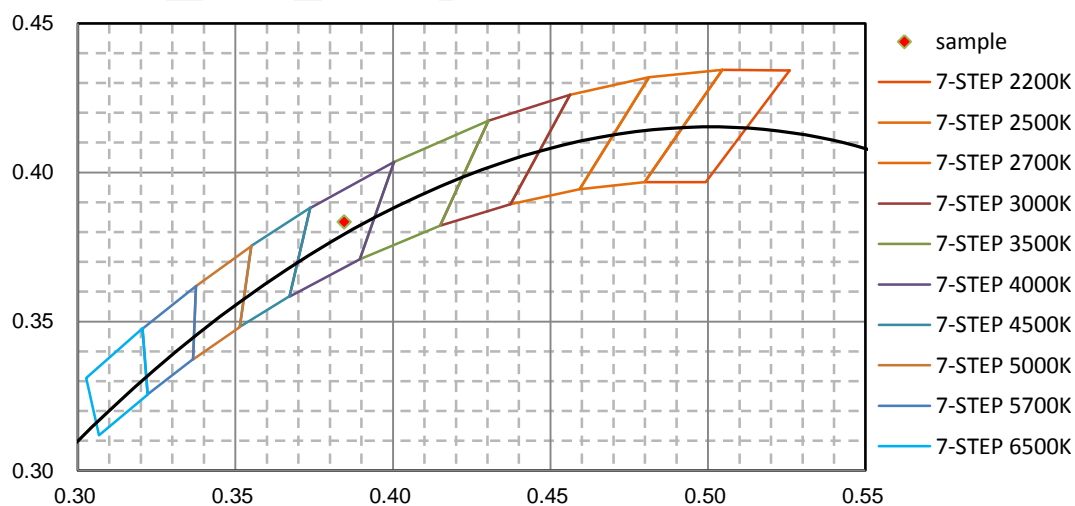
nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
380	3.750E-02	421	2.753E-01	462	1.620E+01	503	9.831E+00	544	1.554E+01
381	4.920E-02	422	3.108E-01	463	1.517E+01	504	1.007E+01	545	1.562E+01
382	7.450E-02	423	3.883E-01	464	1.408E+01	505	1.036E+01	546	1.573E+01
383	6.000E-03	424	4.661E-01	465	1.332E+01	506	1.056E+01	547	1.581E+01
384	5.180E-02	425	5.730E-01	466	1.289E+01	507	1.089E+01	548	1.584E+01
385	4.600E-02	426	6.498E-01	467	1.237E+01	508	1.116E+01	549	1.598E+01
386	5.000E-03	427	7.705E-01	468	1.207E+01	509	1.143E+01	550	1.603E+01
387	3.830E-02	428	9.580E-01	469	1.161E+01	510	1.163E+01	551	1.609E+01
388	1.960E-02	429	1.131E+00	470	1.127E+01	511	1.186E+01	552	1.627E+01
389	3.800E-03	430	1.296E+00	471	1.087E+01	512	1.206E+01	553	1.633E+01
390	5.270E-02	431	1.496E+00	472	1.040E+01	513	1.232E+01	554	1.641E+01
391	2.150E-02	432	1.758E+00	473	1.001E+01	514	1.246E+01	555	1.647E+01
392	9.300E-03	433	1.996E+00	474	9.473E+00	515	1.273E+01	556	1.664E+01
393	4.600E-03	434	2.306E+00	475	8.987E+00	516	1.284E+01	557	1.671E+01
394	3.000E-03	435	2.603E+00	476	8.453E+00	517	1.302E+01	558	1.678E+01
395	3.350E-02	436	2.947E+00	477	7.905E+00	518	1.311E+01	559	1.691E+01
396	2.470E-02	437	3.377E+00	478	7.549E+00	519	1.334E+01	560	1.705E+01
397	2.100E-02	438	3.799E+00	479	7.234E+00	520	1.346E+01	561	1.705E+01
398	1.640E-02	439	4.275E+00	480	6.921E+00	521	1.360E+01	562	1.716E+01
399	8.000E-04	440	4.852E+00	481	6.712E+00	522	1.376E+01	563	1.733E+01
400	0.000E+00	441	5.473E+00	482	6.556E+00	523	1.381E+01	564	1.745E+01
401	1.600E-02	442	6.134E+00	483	6.487E+00	524	1.392E+01	565	1.748E+01
402	3.220E-02	443	6.902E+00	484	6.480E+00	525	1.405E+01	566	1.757E+01
403	1.850E-02	444	7.936E+00	485	6.488E+00	526	1.410E+01	567	1.778E+01
404	1.110E-02	445	8.981E+00	486	6.609E+00	527	1.421E+01	568	1.784E+01
405	3.010E-02	446	1.024E+01	487	6.670E+00	528	1.430E+01	569	1.795E+01
406	8.900E-03	447	1.164E+01	488	6.728E+00	529	1.444E+01	570	1.809E+01
407	6.800E-02	448	1.328E+01	489	6.769E+00	530	1.447E+01	571	1.819E+01
408	1.730E-02	449	1.527E+01	490	6.948E+00	531	1.450E+01	572	1.824E+01
409	5.690E-02	450	1.686E+01	491	7.051E+00	532	1.464E+01	573	1.841E+01
410	5.160E-02	451	1.888E+01	492	7.199E+00	533	1.476E+01	574	1.852E+01
411	3.510E-02	452	2.046E+01	493	7.359E+00	534	1.481E+01	575	1.860E+01
412	5.520E-02	453	2.198E+01	494	7.509E+00	535	1.488E+01	576	1.878E+01
413	1.220E-02	454	2.307E+01	495	7.749E+00	536	1.494E+01	577	1.881E+01
414	5.460E-02	455	2.357E+01	496	7.901E+00	537	1.502E+01	578	1.897E+01
415	4.950E-02	456	2.344E+01	497	8.159E+00	538	1.504E+01	579	1.907E+01
416	7.080E-02	457	2.289E+01	498	8.395E+00	539	1.519E+01	580	1.916E+01
417	1.225E-01	458	2.186E+01	499	8.645E+00	540	1.524E+01	581	1.931E+01
418	1.473E-01	459	2.053E+01	500	8.901E+00	541	1.526E+01	582	1.930E+01
419	1.663E-01	460	1.924E+01	501	9.180E+00	542	1.537E+01	583	1.950E+01
420	2.523E-01	461	1.777E+01	502	9.495E+00	543	1.546E+01	584	1.960E+01

nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
585	1.964E+01	626	1.658E+01	667	7.252E+00	708	2.098E+00	749	2.974E-01
586	1.966E+01	627	1.639E+01	668	7.086E+00	709	1.990E+00	750	3.191E-01
587	1.980E+01	628	1.613E+01	669	6.847E+00	710	1.873E+00	751	3.326E-01
588	1.984E+01	629	1.588E+01	670	6.639E+00	711	1.771E+00	752	3.166E-01
589	1.991E+01	630	1.573E+01	671	6.464E+00	712	1.694E+00	753	3.000E-01
590	2.002E+01	631	1.549E+01	672	6.322E+00	713	1.713E+00	754	2.893E-01
591	1.999E+01	632	1.522E+01	673	6.156E+00	714	1.609E+00	755	1.957E-01
592	2.004E+01	633	1.494E+01	674	5.956E+00	715	1.524E+00	756	2.586E-01
593	2.004E+01	634	1.474E+01	675	5.828E+00	716	1.473E+00	757	2.580E-01
594	2.008E+01	635	1.451E+01	676	5.652E+00	717	1.416E+00	758	6.320E-02
595	2.012E+01	636	1.428E+01	677	5.527E+00	718	1.407E+00	759	2.101E-01
596	2.008E+01	637	1.404E+01	678	5.283E+00	719	1.298E+00	760	1.344E-01
597	2.016E+01	638	1.380E+01	679	5.142E+00	720	1.296E+00	761	1.170E-01
598	2.020E+01	639	1.362E+01	680	4.997E+00	721	1.191E+00	762	2.456E-01
599	2.014E+01	640	1.328E+01	681	4.833E+00	722	1.244E+00	763	2.326E-01
600	2.009E+01	641	1.308E+01	682	4.725E+00	723	1.173E+00	764	1.170E-01
601	2.008E+01	642	1.283E+01	683	4.645E+00	724	9.487E-01	765	6.330E-02
602	1.997E+01	643	1.263E+01	684	4.426E+00	725	1.109E+00	766	7.590E-02
603	2.001E+01	644	1.235E+01	685	4.264E+00	726	1.014E+00	767	1.605E-01
604	1.986E+01	645	1.211E+01	686	4.170E+00	727	9.642E-01	768	2.127E-01
605	1.988E+01	646	1.188E+01	687	4.124E+00	728	9.439E-01	769	1.196E-01
606	1.972E+01	647	1.162E+01	688	3.981E+00	729	1.000E+00	770	4.510E-02
607	1.973E+01	648	1.138E+01	689	3.757E+00	730	1.008E+00	771	4.570E-02
608	1.957E+01	649	1.113E+01	690	3.649E+00	731	8.204E-01	772	1.414E-01
609	1.952E+01	650	1.095E+01	691	3.620E+00	732	8.791E-01	773	4.110E-02
610	1.932E+01	651	1.065E+01	692	3.462E+00	733	7.095E-01	774	3.680E-02
611	1.922E+01	652	1.041E+01	693	3.359E+00	734	6.946E-01	775	8.730E-02
612	1.910E+01	653	1.024E+01	694	3.276E+00	735	7.937E-01	776	1.053E-01
613	1.902E+01	654	9.954E+00	695	3.159E+00	736	6.416E-01	777	9.900E-02
614	1.879E+01	655	9.767E+00	696	2.987E+00	737	6.097E-01	778	1.065E-01
615	1.869E+01	656	9.538E+00	697	2.976E+00	738	5.373E-01	779	8.680E-02
616	1.854E+01	657	9.300E+00	698	2.872E+00	739	5.053E-01	780	6.540E-02
617	1.837E+01	658	9.029E+00	699	2.754E+00	740	5.296E-01		
618	1.819E+01	659	8.871E+00	700	2.652E+00	741	5.759E-01		
619	1.806E+01	660	8.603E+00	701	2.625E+00	742	5.611E-01		
620	1.777E+01	661	8.463E+00	702	2.488E+00	743	4.873E-01		
621	1.763E+01	662	8.200E+00	703	2.390E+00	744	3.245E-01		
622	1.742E+01	663	7.983E+00	704	2.300E+00	745	4.328E-01		
623	1.722E+01	664	7.821E+00	705	2.190E+00	746	2.678E-01		
624	1.702E+01	665	7.610E+00	706	2.149E+00	747	3.561E-01		
625	1.684E+01	666	7.399E+00	707	2.089E+00	748	3.390E-01		

CIE 1931xy Chromaticity Diagram



7-Step Chromaticity Quadrangles





### [Goniophotometer System]

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

Test orientation: **Downward**

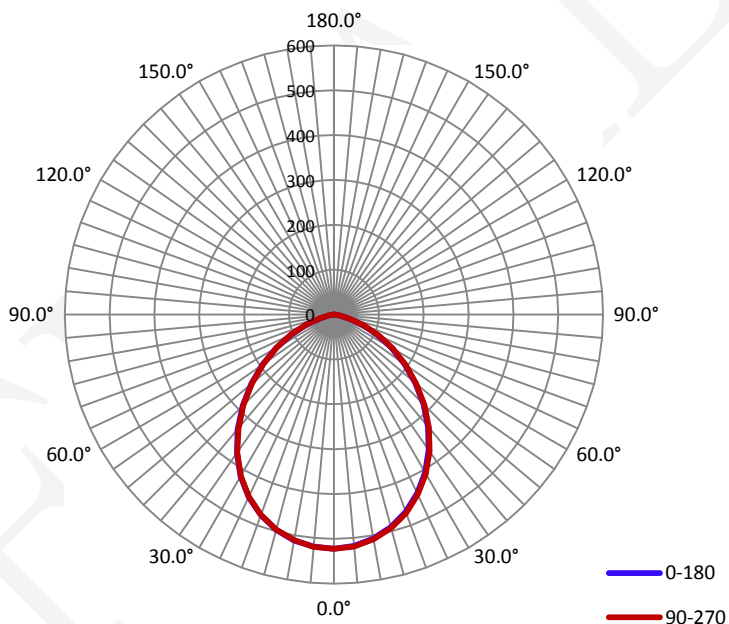
### Electrical Measurement

Input Voltage(V)	Frequency(Hz)	Input Current(A)	Power (W)	Power Factor
120.0	60	0.0880	10.09	0.9560

### Photometric Measurement

Luminous Flux(lm)	Efficacy(lm/W)	$I_{max}(cd)$	S/MH(C0/180)	S/MH(C90/270)
1171.7	116.17	522.2	1.18	1.18

### Luminous Intensity Distribution



	C0/180	C45/225	C90/270	C135/315	AVG.
Beam Angle(50% $I_{max}$ ):	95.1	95.2	95.2	95.0	95.1
Field Angle(10% $I_{max}$ ):	144.4	144.7	145.0	144.9	144.8

**Luminous Intensity (cd) Distribution Data**

C y	0°	22.5°	45°	67.5°	90°	112.5°	135°	157.5°
0.0°	522	522	522	522	522	522	522	522
5.0°	518	518	517	518	519	519	519	520
10.0°	507	507	507	507	508	510	511	512
15.0°	491	491	490	491	493	495	496	499
20.0°	468	468	468	469	471	474	475	478
25.0°	440	439	439	440	443	446	448	452
30.0°	407	406	405	407	410	413	415	419
35.0°	368	368	367	370	372	375	377	380
40.0°	327	326	327	328	330	332	335	338
45.0°	282	282	282	284	285	287	289	292
50.0°	236	237	237	238	239	242	244	246
55.0°	192	192	193	194	195	197	198	200
60.0°	148	149	150	150	151	153	154	155
65.0°	107	108	109	110	111	111	112	112
70.0°	70	71	71	71	72	72	71	70
75.0°	37	38	38	38	38	38	37	35
80.0°	16	17	17	17	17	16	15	14
85.0°	6	7	7	7	6	5	5	3
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	0	0	0	0	0
150.0°	0	0	0	0	0	0	0	0
155.0°	0	0	0	0	0	0	0	0
160.0°	0	0	0	0	0	0	0	0
165.0°	0	0	0	0	0	0	0	0
170.0°	0	0	0	0	0	0	0	0
175.0°	0	0	0	0	0	0	0	0
180.0°	0	0	0	0	0	0	0	0

Luminous Intensity (cd) Distribution Data (cont.)

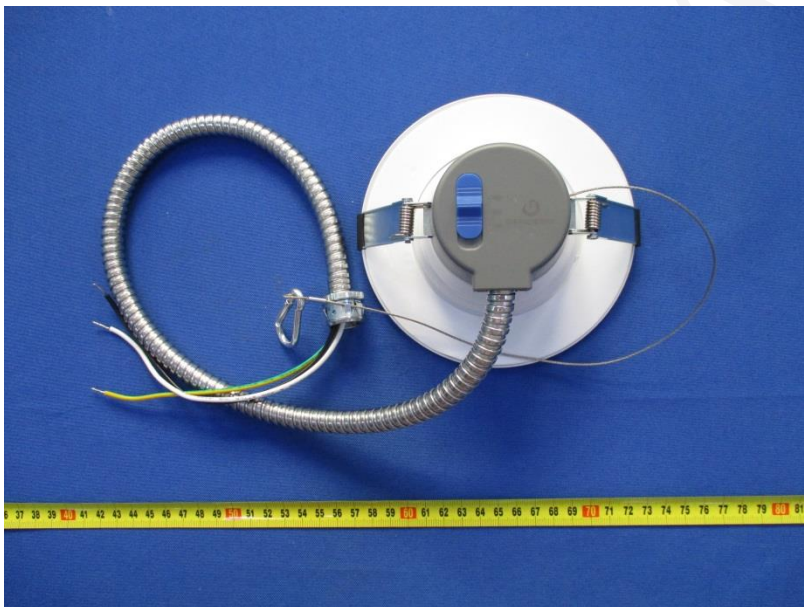
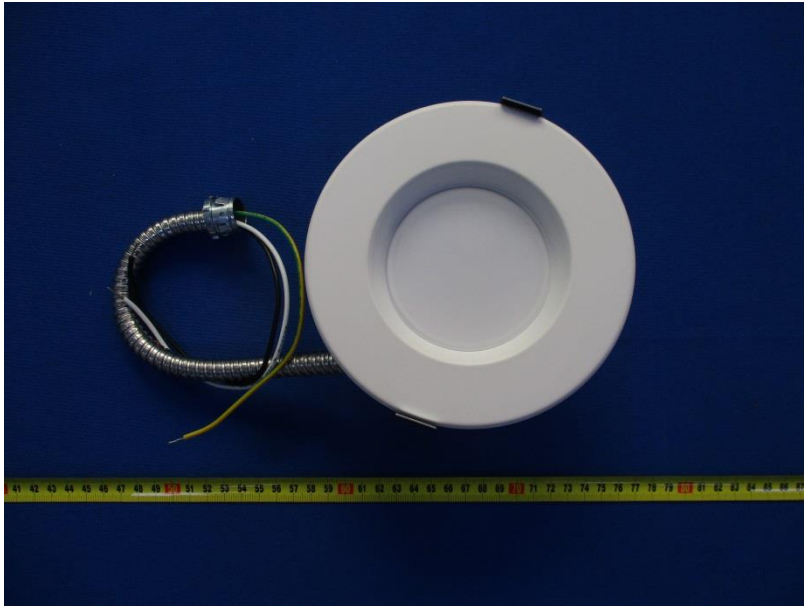
C y	180°	202.5°	225°	247.5°	270°	292.5°	315°	337.5°
0.0°	522	522	522	522	522	522	522	522
5.0°	519	520	520	520	520	519	518	518
10.0°	511	512	512	512	511	510	508	507
15.0°	497	498	497	498	496	495	492	490
20.0°	476	477	477	476	475	473	469	467
25.0°	449	451	450	450	448	445	441	439
30.0°	416	418	417	417	415	412	408	405
35.0°	377	379	379	378	375	373	369	366
40.0°	334	335	335	334	331	329	326	323
45.0°	287	289	289	287	285	283	279	277
50.0°	240	241	241	240	239	236	233	231
55.0°	193	194	193	193	192	191	188	186
60.0°	147	147	147	148	147	146	144	143
65.0°	104	103	105	105	105	104	104	103
70.0°	63	64	65	65	66	66	66	66
75.0°	30	31	31	32	33	34	35	35
80.0°	12	12	12	13	13	14	15	16
85.0°	0	1	2	2	2	3	5	5
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	0	0	0	0	0
150.0°	0	0	0	0	0	0	0	0
155.0°	0	0	0	0	0	0	0	0
160.0°	0	0	0	0	0	0	0	0
165.0°	0	0	0	0	0	0	0	0
170.0°	0	0	0	0	0	0	0	0
175.0°	0	0	0	0	0	0	0	0
180.0°	0	0	0	0	0	0	0	0

**Zonal Lumen Density Measurement**

Deg	Flux (lm)	%
0-5	12.4	1.06
5-10	36.8	3.14
10-15	59.5	5.08
15-20	79.7	6.80
20-25	96.2	8.21
25-30	108.4	9.25
30-35	115.6	9.87
35-40	117.4	10.02
40-45	114.0	9.73
45-50	105.8	9.03
50-55	93.9	8.01
55-60	79.0	6.74
60-65	62.2	5.31
65-70	44.3	3.78
70-75	26.9	2.30
75-80	13.3	1.14
80-85	5.1	0.44
85-90	1.1	0.09
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	0.0	0.00
145-150	0.0	0.00
150-155	0.0	0.00
155-160	0.0	0.00
160-165	0.0	0.00
165-170	0.0	0.00
170-175	0.0	0.00
175-180	0.0	0.00

Deg	Flux (lm)	%
0-5	12.4	1.06
0-10	49.2	4.20
0-15	108.8	9.28
0-20	188.4	16.08
0-25	284.7	24.30
0-30	393.1	33.55
0-35	508.7	43.41
0-40	626.1	53.44
0-45	740.1	63.17
0-50	845.9	72.20
0-55	939.8	80.21
0-60	1018.8	86.95
0-65	1080.9	92.25
0-70	1125.3	96.04
0-75	1152.2	98.33
0-80	1165.5	99.47
0-85	1170.6	99.91
0-90	1171.7	100.00
0-95	1171.7	100.00
0-100	1171.7	100.00
0-105	1171.7	100.00
0-110	1171.7	100.00
0-115	1171.7	100.00
0-120	1171.7	100.00
0-125	1171.7	100.00
0-130	1171.7	100.00
0-135	1171.7	100.00
0-140	1171.7	100.00
0-145	1171.7	100.00
0-150	1171.7	100.00
0-155	1171.7	100.00
0-160	1171.7	100.00
0-165	1171.7	100.00
0-170	1171.7	100.00
0-175	1171.7	100.00
0-180	1171.7	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\*\*\*\*\*