

# 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: INFT4/850/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>	PKS200708083-10
<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: INFT4/850/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: 5000K  
 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**

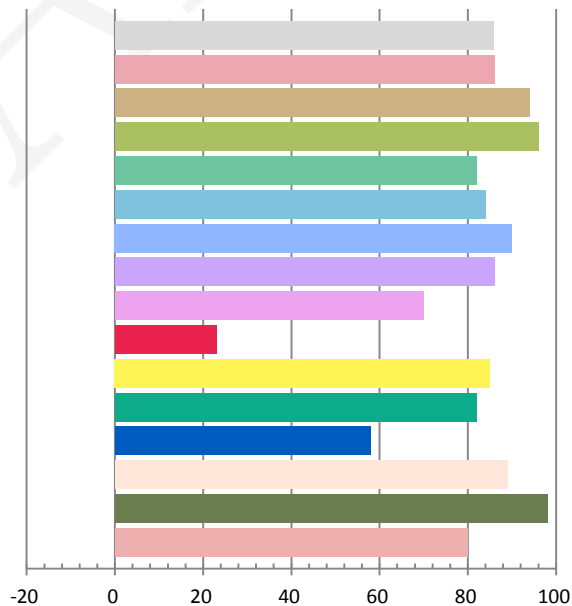
### Photometric and Electrical Measurement Result

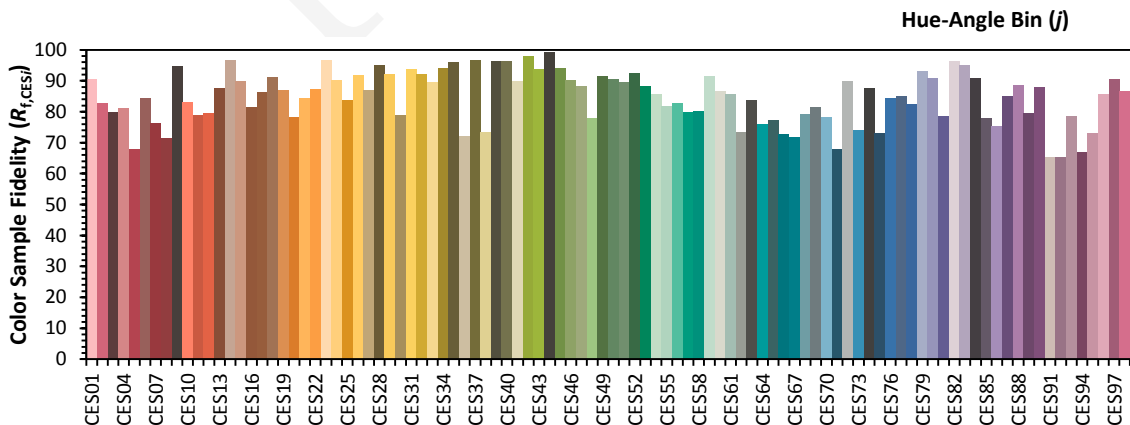
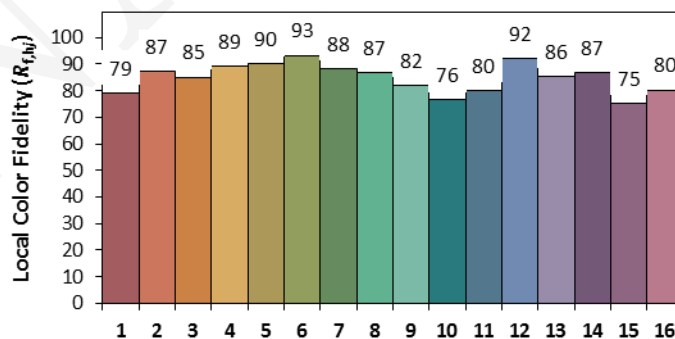
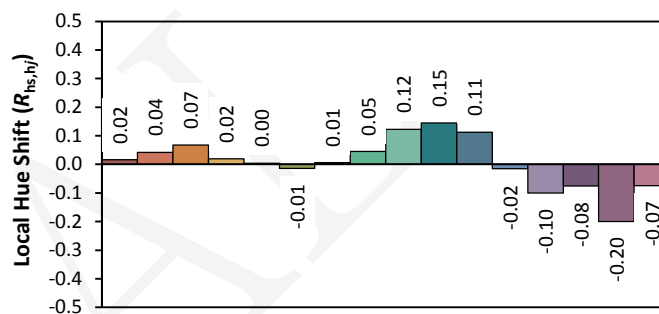
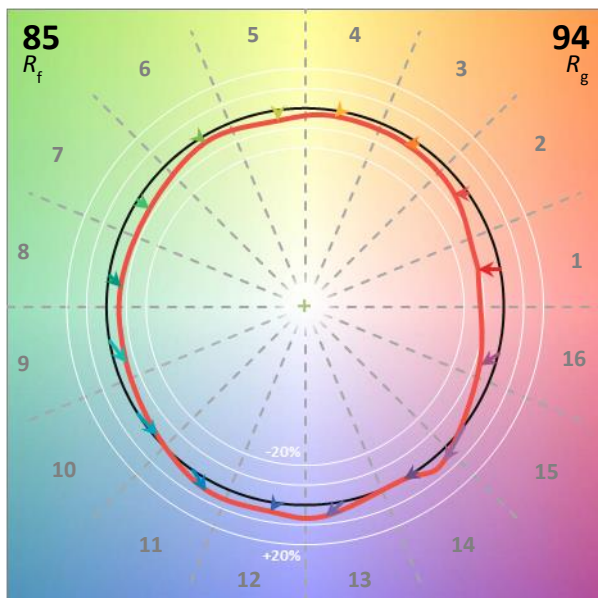
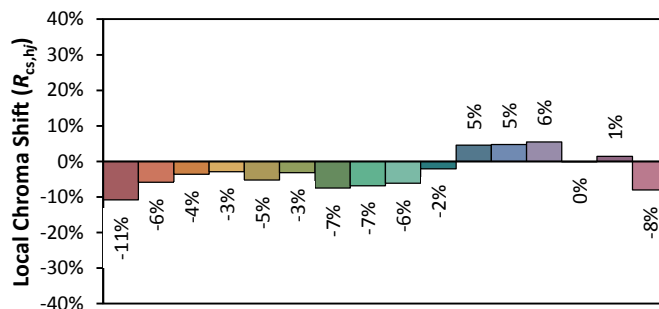
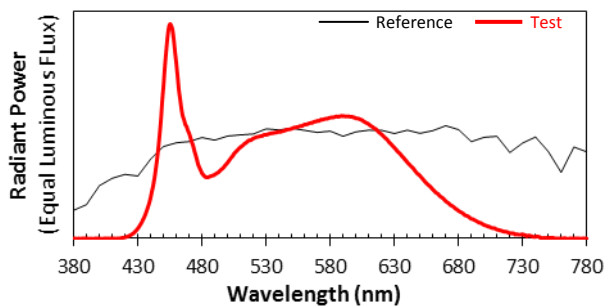
Voltage(V)	Frequency(Hz)	Current(A)	Power (W)	Power Factor	Luminous Flux(lm)	Efficacy(lm/W)
120.02	60	0.0878	10.03	0.9518	1149.57	114.61

Radiant Flux (W)	CCT (K)	Duv	x	y	u'	v'
3.582	4914	0.00256	0.3482	0.3592	0.2106	0.4888

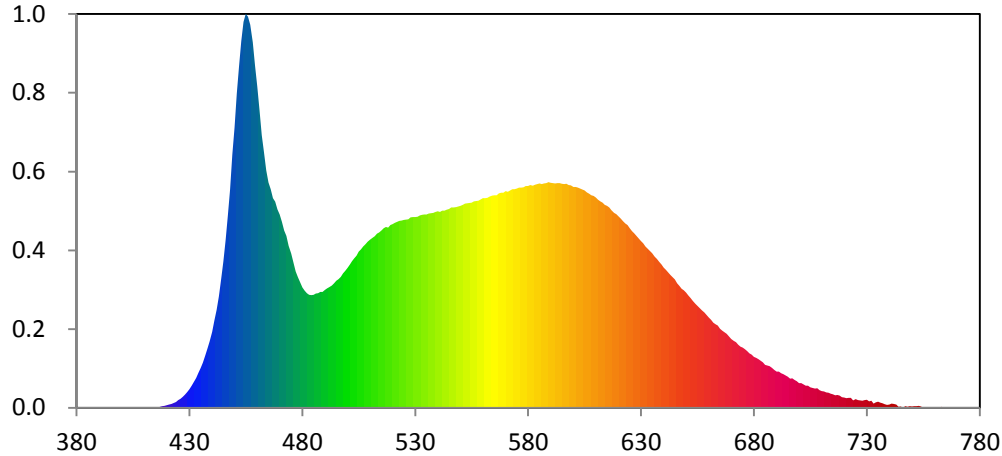
### Color Rendering Index

<b>Ra</b>			
85.9			
<b>R1</b>	<b>R2</b>	<b>R3</b>	<b>R4</b>
86	94	96	82
<b>R5</b>	<b>R6</b>	<b>R7</b>	<b>R8</b>
84	90	86	70
<b>R9</b>	<b>R10</b>	<b>R11</b>	<b>R12</b>
23	85	82	58
<b>R13</b>	<b>R14</b>	<b>R15</b>	
89	98	80	





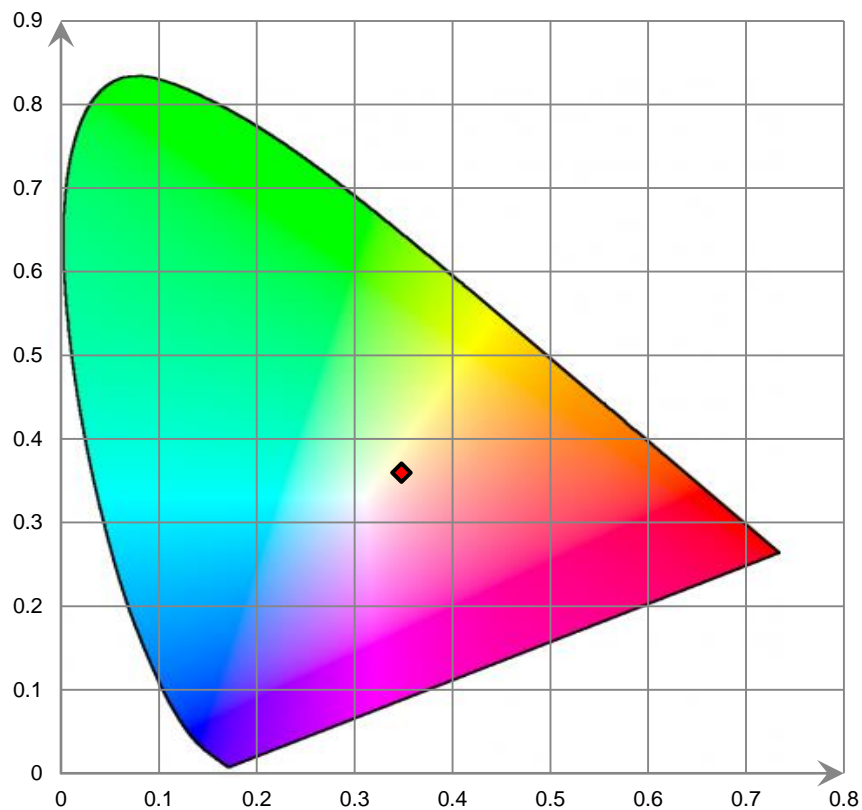
### Relative Spectral Power Distribution



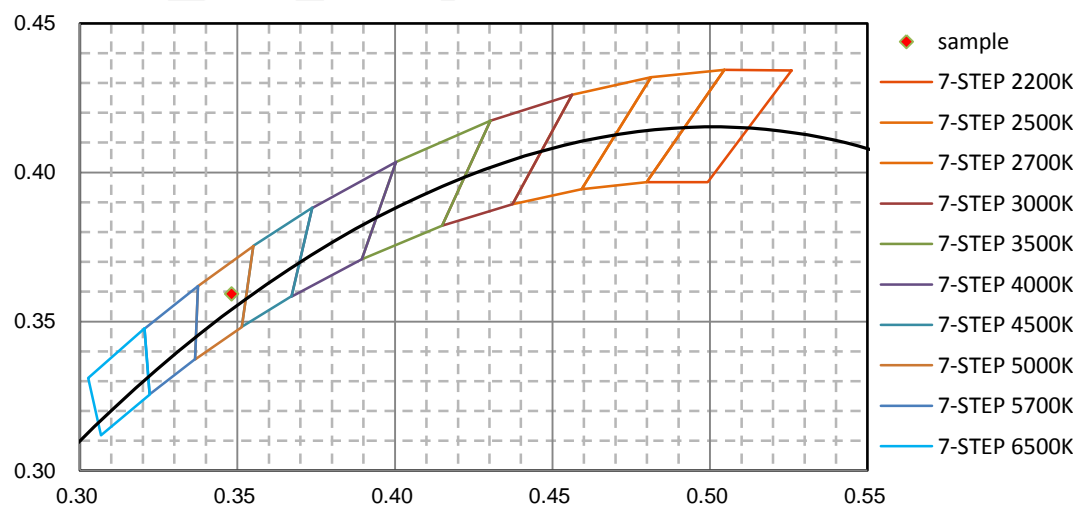
nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
380	1.100E-03	421	2.538E-01	462	2.196E+01	503	1.204E+01	544	1.596E+01
381	3.000E-03	422	3.109E-01	463	2.059E+01	504	1.224E+01	545	1.601E+01
382	7.600E-03	423	3.941E-01	464	1.914E+01	505	1.258E+01	546	1.613E+01
383	4.000E-04	424	4.744E-01	465	1.815E+01	506	1.276E+01	547	1.614E+01
384	2.040E-02	425	6.126E-01	466	1.760E+01	507	1.299E+01	548	1.616E+01
385	1.600E-03	426	7.165E-01	467	1.689E+01	508	1.317E+01	549	1.622E+01
386	1.000E-04	427	8.703E-01	468	1.660E+01	509	1.338E+01	550	1.627E+01
387	0.000E+00	428	1.056E+00	469	1.598E+01	510	1.353E+01	551	1.636E+01
388	0.000E+00	429	1.265E+00	470	1.558E+01	511	1.369E+01	552	1.645E+01
389	0.000E+00	430	1.501E+00	471	1.498E+01	512	1.383E+01	553	1.647E+01
390	8.900E-03	431	1.772E+00	472	1.429E+01	513	1.403E+01	554	1.650E+01
391	1.340E-02	432	2.094E+00	473	1.383E+01	514	1.412E+01	555	1.652E+01
392	6.000E-04	433	2.390E+00	474	1.305E+01	515	1.429E+01	556	1.663E+01
393	0.000E+00	434	2.804E+00	475	1.242E+01	516	1.446E+01	557	1.666E+01
394	8.600E-03	435	3.193E+00	476	1.172E+01	517	1.458E+01	558	1.667E+01
395	2.500E-03	436	3.636E+00	477	1.098E+01	518	1.452E+01	559	1.678E+01
396	1.000E-04	437	4.182E+00	478	1.052E+01	519	1.471E+01	560	1.689E+01
397	0.000E+00	438	4.747E+00	479	1.009E+01	520	1.479E+01	561	1.689E+01
398	0.000E+00	439	5.344E+00	480	9.682E+00	521	1.491E+01	562	1.691E+01
399	0.000E+00	440	6.112E+00	481	9.426E+00	522	1.499E+01	563	1.701E+01
400	0.000E+00	441	7.032E+00	482	9.228E+00	523	1.505E+01	564	1.709E+01
401	9.100E-03	442	7.882E+00	483	9.090E+00	524	1.507E+01	565	1.712E+01
402	6.500E-03	443	8.985E+00	484	9.085E+00	525	1.514E+01	566	1.711E+01
403	3.000E-04	444	1.034E+01	485	9.090E+00	526	1.517E+01	567	1.726E+01
404	0.000E+00	445	1.179E+01	486	9.193E+00	527	1.519E+01	568	1.731E+01
405	7.000E-04	446	1.349E+01	487	9.233E+00	528	1.533E+01	569	1.733E+01
406	1.000E-04	447	1.546E+01	488	9.323E+00	529	1.537E+01	570	1.745E+01
407	3.740E-02	448	1.760E+01	489	9.343E+00	530	1.536E+01	571	1.740E+01
408	3.100E-03	449	2.039E+01	490	9.489E+00	531	1.540E+01	572	1.750E+01
409	2.820E-02	450	2.260E+01	491	9.610E+00	532	1.550E+01	573	1.762E+01
410	2.430E-02	451	2.533E+01	492	9.712E+00	533	1.553E+01	574	1.760E+01
411	1.390E-02	452	2.752E+01	493	9.836E+00	534	1.558E+01	575	1.765E+01
412	1.070E-02	453	2.956E+01	494	1.002E+01	535	1.558E+01	576	1.773E+01
413	4.000E-04	454	3.109E+01	495	1.023E+01	536	1.565E+01	577	1.775E+01
414	2.900E-02	455	3.173E+01	496	1.036E+01	537	1.568E+01	578	1.775E+01
415	2.040E-02	456	3.152E+01	497	1.055E+01	538	1.570E+01	579	1.787E+01
416	4.910E-02	457	3.086E+01	498	1.082E+01	539	1.577E+01	580	1.788E+01
417	7.920E-02	458	2.945E+01	499	1.103E+01	540	1.582E+01	581	1.795E+01
418	1.310E-01	459	2.757E+01	500	1.126E+01	541	1.578E+01	582	1.790E+01
419	1.493E-01	460	2.590E+01	501	1.151E+01	542	1.587E+01	583	1.797E+01
420	2.063E-01	461	2.398E+01	502	1.180E+01	543	1.588E+01	584	1.803E+01

nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
585	1.808E+01	626	1.423E+01	667	6.092E+00	708	1.563E+00	749	1.179E-01
586	1.802E+01	627	1.405E+01	668	5.951E+00	709	1.427E+00	750	9.450E-02
587	1.809E+01	628	1.384E+01	669	5.747E+00	710	1.339E+00	751	1.173E-01
588	1.810E+01	629	1.364E+01	670	5.545E+00	711	1.305E+00	752	1.272E-01
589	1.817E+01	630	1.344E+01	671	5.396E+00	712	1.230E+00	753	1.439E-01
590	1.811E+01	631	1.326E+01	672	5.287E+00	713	1.214E+00	754	1.049E-01
591	1.811E+01	632	1.298E+01	673	5.085E+00	714	1.122E+00	755	4.910E-02
592	1.809E+01	633	1.282E+01	674	4.924E+00	715	1.069E+00	756	4.280E-02
593	1.809E+01	634	1.264E+01	675	4.844E+00	716	1.017E+00	757	3.780E-02
594	1.809E+01	635	1.244E+01	676	4.710E+00	717	1.026E+00	758	1.400E-03
595	1.806E+01	636	1.216E+01	677	4.551E+00	718	9.748E-01	759	4.130E-02
596	1.802E+01	637	1.200E+01	678	4.378E+00	719	8.432E-01	760	4.500E-03
597	1.804E+01	638	1.175E+01	679	4.285E+00	720	8.312E-01	761	3.700E-03
598	1.794E+01	639	1.156E+01	680	4.095E+00	721	7.819E-01	762	5.810E-02
599	1.792E+01	640	1.130E+01	681	4.007E+00	722	7.833E-01	763	7.340E-02
600	1.779E+01	641	1.111E+01	682	3.909E+00	723	7.970E-01	764	1.070E-02
601	1.778E+01	642	1.090E+01	683	3.788E+00	724	5.951E-01	765	8.000E-04
602	1.775E+01	643	1.070E+01	684	3.653E+00	725	6.921E-01	766	0.000E+00
603	1.767E+01	644	1.053E+01	685	3.454E+00	726	6.178E-01	767	4.270E-02
604	1.759E+01	645	1.034E+01	686	3.390E+00	727	5.886E-01	768	4.490E-02
605	1.751E+01	646	1.004E+01	687	3.344E+00	728	5.698E-01	769	6.000E-03
606	1.734E+01	647	9.827E+00	688	3.230E+00	729	6.234E-01	770	1.500E-03
607	1.725E+01	648	9.589E+00	689	3.051E+00	730	6.519E-01	771	0.000E+00
608	1.712E+01	649	9.472E+00	690	2.917E+00	731	5.101E-01	772	1.880E-02
609	1.706E+01	650	9.272E+00	691	2.902E+00	732	5.524E-01	773	2.040E-02
610	1.693E+01	651	9.057E+00	692	2.780E+00	733	3.308E-01	774	2.130E-02
611	1.675E+01	652	8.840E+00	693	2.707E+00	734	4.411E-01	775	4.900E-03
612	1.663E+01	653	8.620E+00	694	2.599E+00	735	4.840E-01	776	2.000E-04
613	1.652E+01	654	8.384E+00	695	2.490E+00	736	4.014E-01	777	0.000E+00
614	1.634E+01	655	8.189E+00	696	2.345E+00	737	3.551E-01	778	0.000E+00
615	1.626E+01	656	8.009E+00	697	2.357E+00	738	2.857E-01	779	2.680E-02
616	1.613E+01	657	7.846E+00	698	2.233E+00	739	2.398E-01	780	1.020E-02
617	1.590E+01	658	7.689E+00	699	2.132E+00	740	2.654E-01		
618	1.571E+01	659	7.465E+00	700	1.992E+00	741	3.327E-01		
619	1.559E+01	660	7.269E+00	701	1.971E+00	742	2.994E-01		
620	1.542E+01	661	7.085E+00	702	1.881E+00	743	2.604E-01		
621	1.524E+01	662	6.852E+00	703	1.784E+00	744	7.720E-02		
622	1.504E+01	663	6.723E+00	704	1.780E+00	745	1.102E-01		
623	1.486E+01	664	6.621E+00	705	1.659E+00	746	5.630E-02		
624	1.472E+01	665	6.380E+00	706	1.602E+00	747	1.153E-01		
625	1.447E+01	666	6.213E+00	707	1.532E+00	748	7.870E-02		

CIE 1931xy Chromaticity Diagram



7-Step Chromaticity Quadrangles





### [Goniophotometer System]

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

Test orientation: **Downward**

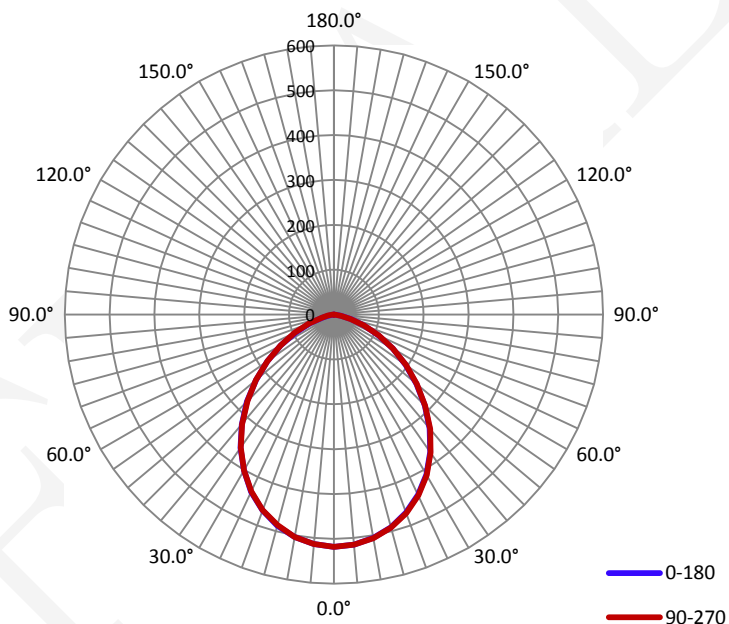
### Electrical Measurement

Input Voltage(V)	Frequency(Hz)	Input Current(A)	Power (W)	Power Factor
120.0	60	0.0870	10.02	0.9570

### Photometric Measurement

Luminous Flux(lm)	Efficacy(lm/W)	$I_{max}(cd)$	S/MH(C0/180)	S/MH(C90/270)
1151	114.92	517.5	1.17	1.18

### Luminous Intensity Distribution



	C0/180	C45/225	C90/270	C135/315	AVG.
Beam Angle(50% $I_{max}$ ):	94.6	94.7	94.6	94.6	94.6
Field Angle(10% $I_{max}$ ):	143.6	143.8	144.2	144.4	144.0

**Luminous Intensity (cd) Distribution Data**

C y	0°	22.5°	45°	67.5°	90°	112.5°	135°	157.5°
0.0°	518	518	518	518	518	518	518	518
5.0°	515	515	516	515	515	515	515	516
10.0°	506	506	506	506	506	506	506	507
15.0°	491	491	492	492	492	492	491	492
20.0°	470	471	471	472	471	471	470	471
25.0°	443	445	445	446	445	445	444	443
30.0°	412	413	414	414	414	414	411	410
35.0°	374	376	377	377	376	375	373	371
40.0°	331	333	334	334	334	332	330	329
45.0°	286	288	289	288	287	286	284	283
50.0°	240	241	243	242	241	240	238	237
55.0°	195	196	197	197	196	194	193	192
60.0°	152	152	152	153	152	150	149	147
65.0°	109	111	111	112	110	109	106	105
70.0°	71	72	73	72	72	70	68	65
75.0°	39	40	40	40	38	36	34	32
80.0°	17	17	17	17	16	15	15	14
85.0°	6	6	7	6	5	4	4	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

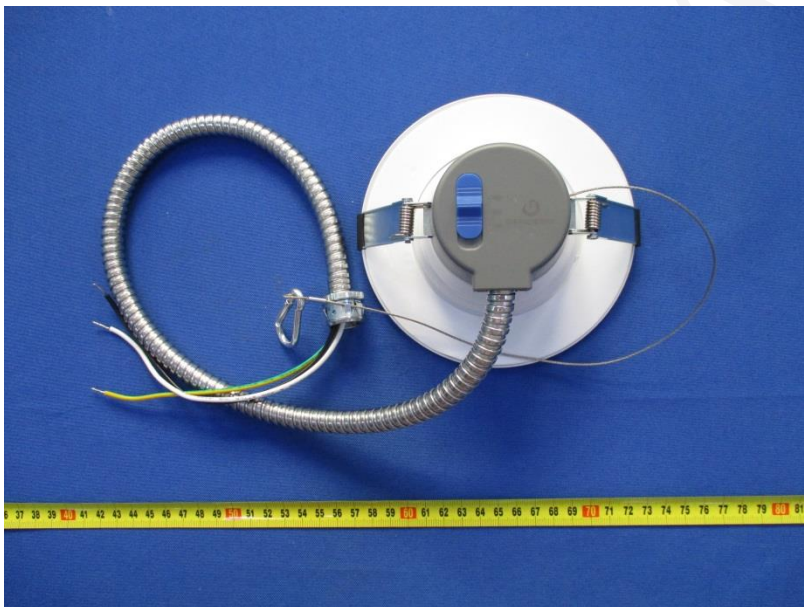
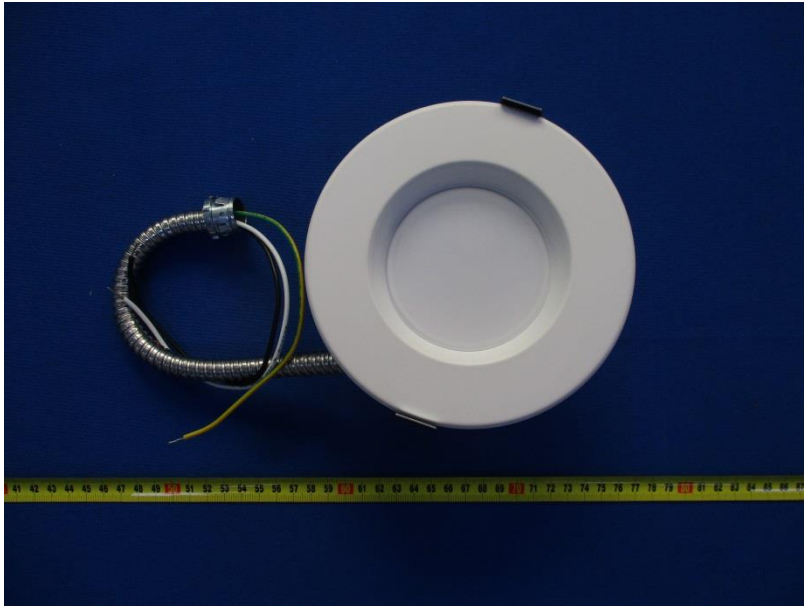
Luminous Intensity (cd) Distribution Data (cont.)

C y	180°	202.5°	225°	247.5°	270°	292.5°	315°	337.5°
0.0°	518	518	518	518	518	518	518	518
5.0°	513	513	514	514	513	514	513	515
10.0°	503	503	503	503	503	504	503	504
15.0°	487	487	487	486	486	487	488	489
20.0°	465	464	464	464	464	465	465	467
25.0°	436	435	435	434	435	437	437	439
30.0°	401	401	401	399	401	403	405	406
35.0°	363	362	361	360	362	364	365	367
40.0°	320	318	317	318	319	320	322	325
45.0°	274	272	272	272	273	274	277	278
50.0°	227	226	226	225	227	229	229	232
55.0°	181	180	180	179	181	183	185	186
60.0°	136	136	135	136	138	140	142	143
65.0°	94	93	93	95	97	99	101	103
70.0°	55	55	55	57	59	61	64	65
75.0°	25	25	25	26	28	31	34	35
80.0°	11	11	12	12	14	14	15	16
85.0°	0	0	1	2	3	4	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)	%	Deg	Flux (lm)	%
0-5	12.3	1.07	0-5	12.3	1.07
5-10	36.5	3.17	0-10	48.8	4.24
10-15	59.0	5.12	0-15	107.7	9.36
15-20	78.9	6.85	0-20	186.6	16.21
20-25	95.2	8.27	0-25	281.8	24.49
25-30	107.3	9.32	0-30	389.1	33.80
30-35	114.3	9.93	0-35	503.4	43.73
35-40	115.9	10.07	0-40	619.3	53.80
40-45	112.2	9.75	0-45	731.5	63.55
45-50	103.9	9.03	0-50	835.4	72.58
50-55	91.8	7.98	0-55	927.2	80.56
55-60	76.9	6.68	0-60	1004.1	87.24
60-65	60.1	5.23	0-65	1064.3	92.47
65-70	42.4	3.69	0-70	1106.7	96.15
70-75	25.5	2.22	0-75	1132.2	98.37
75-80	12.7	1.10	0-80	1144.9	99.47
80-85	5.0	0.43	0-85	1149.9	99.91
85-90	1.1	0.09	0-90	1151.0	100.00
90-95	0.0	0.00	0-95	1151.0	100.00
95-100	0.0	0.00	0-100	1151.0	100.00
100-105	0.0	0.00	0-105	1151.0	100.00
105-110	0.0	0.00	0-110	1151.0	100.00
110-115	0.0	0.00	0-115	1151.0	100.00
115-120	0.0	0.00	0-120	1151.0	100.00
120-125	0.0	0.00	0-125	1151.0	100.00
125-130	0.0	0.00	0-130	1151.0	100.00
130-135	0.0	0.00	0-135	1151.0	100.00
135-140	0.0	0.00	0-140	1151.0	100.00
140-145	0.0	0.00	0-145	1151.0	100.00
145-150	0.0	0.00	0-150	1151.0	100.00
150-155	0.0	0.00	0-155	1151.0	100.00
155-160	0.0	0.00	0-160	1151.0	100.00
160-165	0.0	0.00	0-165	1151.0	100.00
165-170	0.0	0.00	0-170	1151.0	100.00
170-175	0.0	0.00	0-175	1151.0	100.00
175-180	0.0	0.00	0-180	1151.0	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\*\*\*\*\*