

# 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: INFT4/830/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>	PKS200708080-10
<b>Test Date:</b>	2020-07-08 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: INFT4/830/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: 3000K  
 Nominal Lumen Output: 1050lm

## 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**

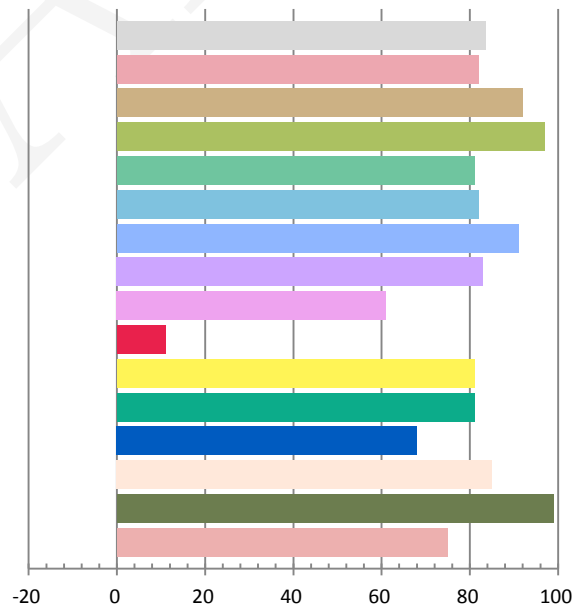
### Photometric and Electrical Measurement Result

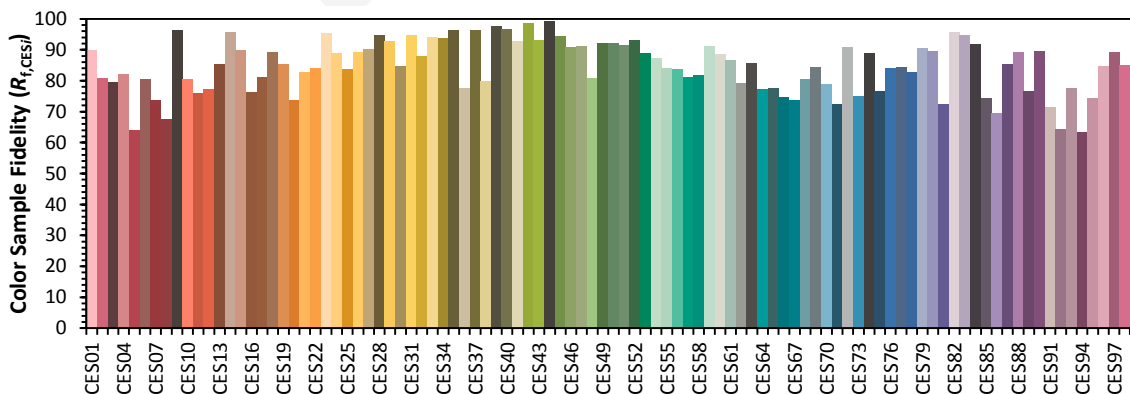
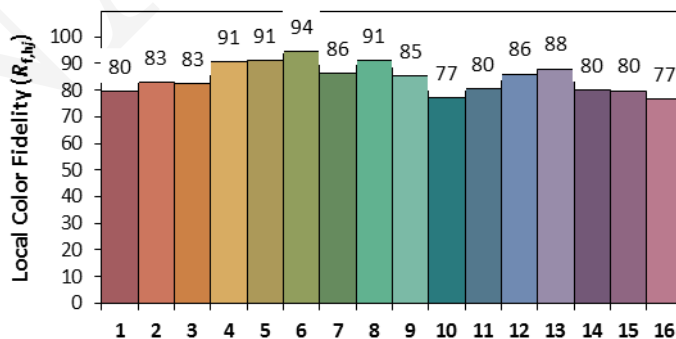
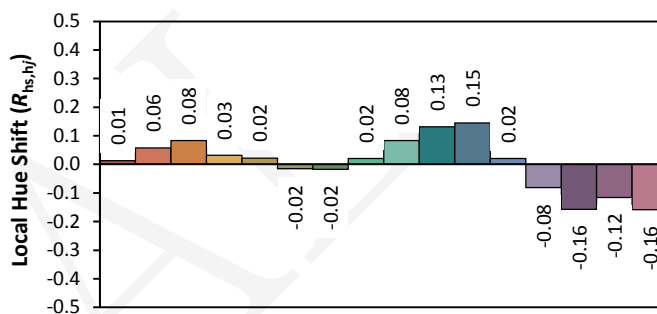
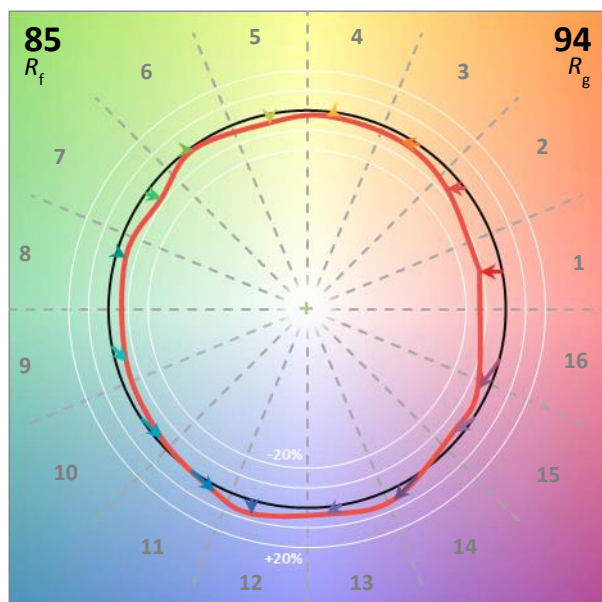
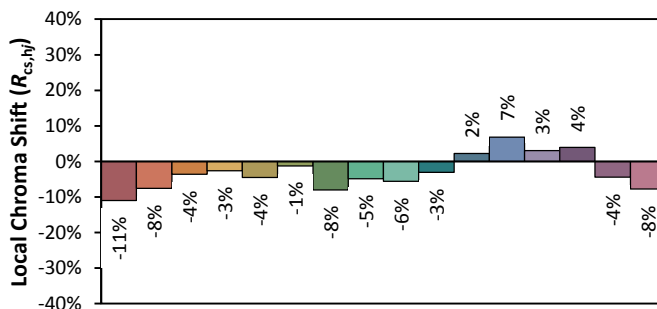
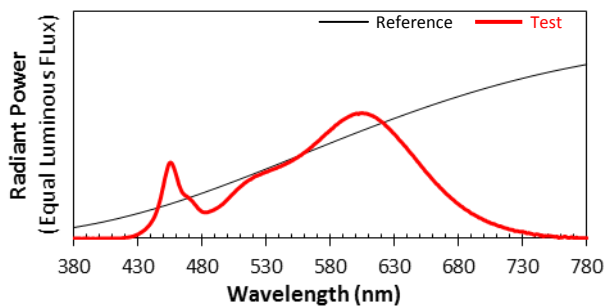
Voltage(V)	Frequency(Hz)	Current(A)	Power (W)	Power Factor	Luminous Flux(lm)	Efficacy(lm/W)
119.97	60	0.0872	9.95	0.9507	1114.35	112.03

Radiant Flux (W)	CCT (K)	Duv	x	y	u'	v'
3.350	3058	0.00150	0.4350	0.4072	0.2480	0.5223

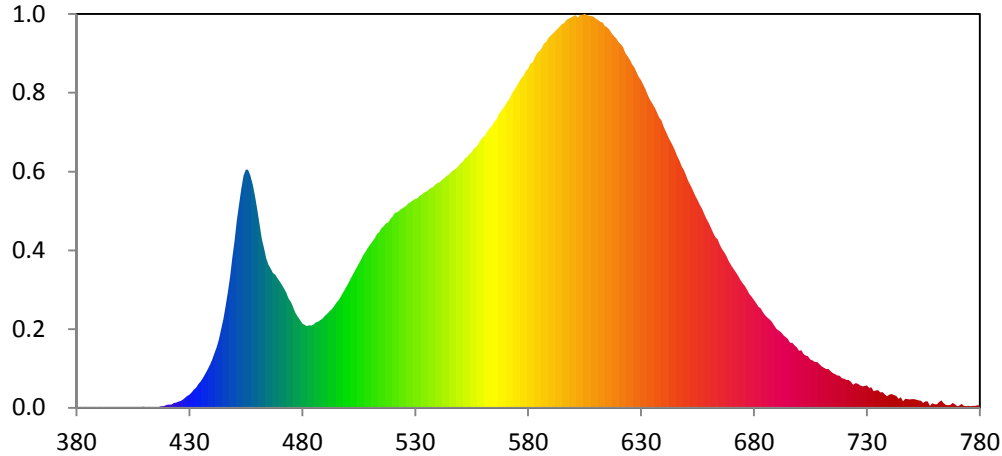
### Color Rendering Index

<b>Ra</b>			
83.6			
<b>R1</b>	<b>R2</b>	<b>R3</b>	<b>R4</b>
82	92	97	81
<b>R5</b>	<b>R6</b>	<b>R7</b>	<b>R8</b>
82	91	83	61
<b>R9</b>	<b>R10</b>	<b>R11</b>	<b>R12</b>
11	81	81	68
<b>R13</b>	<b>R14</b>	<b>R15</b>	
85	99	75	





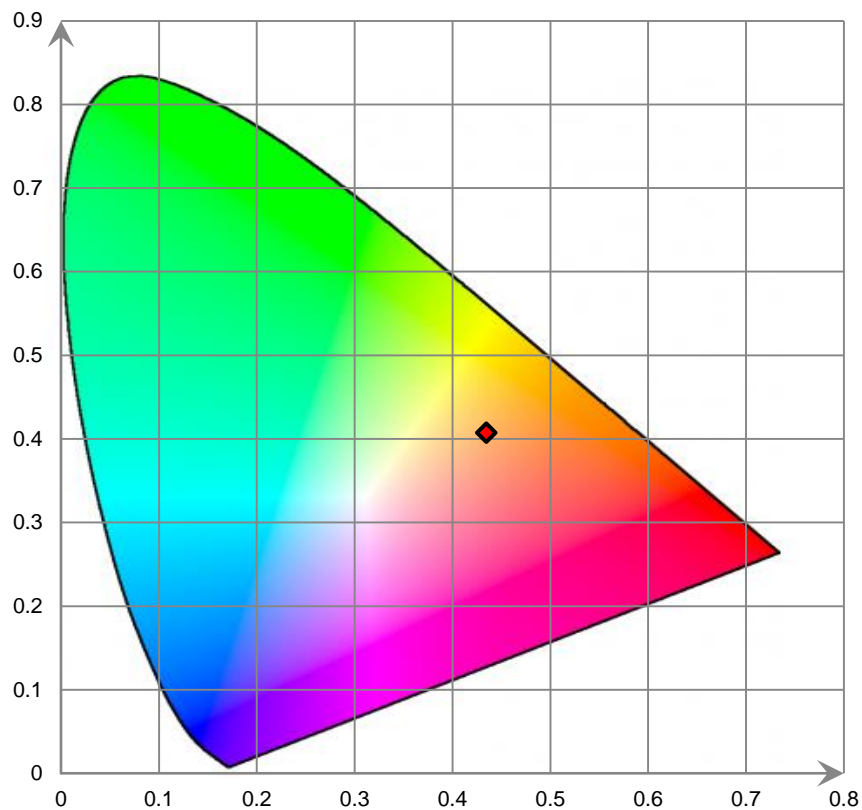
### Relative Spectral Power Distribution



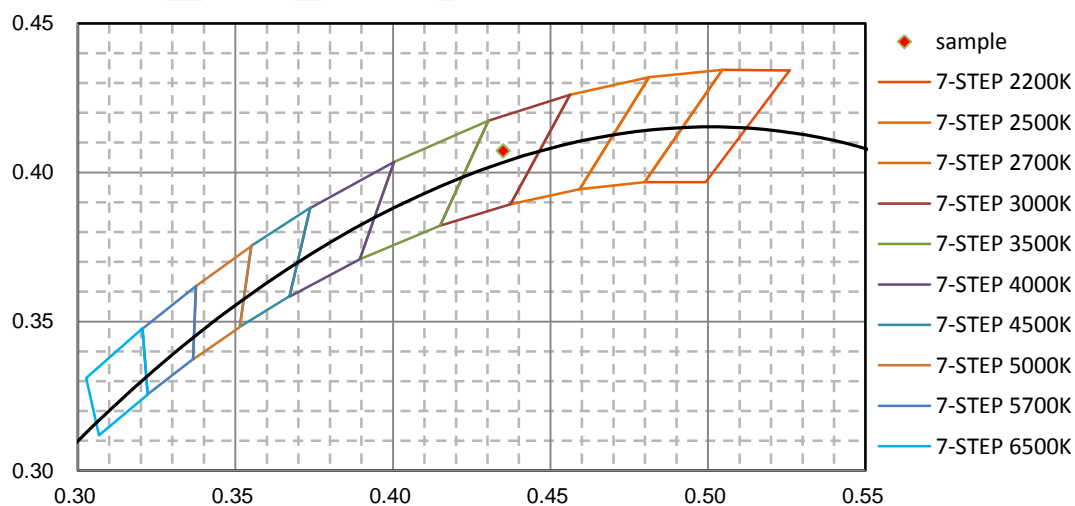
nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
380	2.520E-02	421	1.870E-01	462	9.684E+00	503	7.763E+00	544	1.326E+01
381	3.580E-02	422	1.894E-01	463	9.133E+00	504	8.000E+00	545	1.334E+01
382	4.580E-02	423	2.659E-01	464	8.548E+00	505	8.228E+00	546	1.349E+01
383	1.780E-02	424	2.888E-01	465	8.177E+00	506	8.447E+00	547	1.360E+01
384	6.010E-02	425	3.409E-01	466	7.951E+00	507	8.726E+00	548	1.366E+01
385	2.410E-02	426	3.883E-01	467	7.710E+00	508	8.909E+00	549	1.382E+01
386	2.200E-03	427	4.614E-01	468	7.614E+00	509	9.124E+00	550	1.396E+01
387	2.070E-02	428	5.699E-01	469	7.409E+00	510	9.315E+00	551	1.406E+01
388	2.400E-02	429	6.741E-01	470	7.233E+00	511	9.508E+00	552	1.425E+01
389	2.650E-02	430	7.526E-01	471	7.031E+00	512	9.687E+00	553	1.435E+01
390	6.110E-02	431	8.804E-01	472	6.812E+00	513	9.932E+00	554	1.450E+01
391	2.260E-02	432	1.049E+00	473	6.575E+00	514	1.005E+01	555	1.462E+01
392	9.100E-03	433	1.149E+00	474	6.244E+00	515	1.026E+01	556	1.483E+01
393	4.500E-03	434	1.350E+00	475	6.015E+00	516	1.038E+01	557	1.492E+01
394	4.300E-03	435	1.497E+00	476	5.715E+00	517	1.055E+01	558	1.510E+01
395	3.380E-02	436	1.692E+00	477	5.399E+00	518	1.060E+01	559	1.531E+01
396	1.230E-02	437	1.919E+00	478	5.193E+00	519	1.080E+01	560	1.546E+01
397	4.500E-03	438	2.150E+00	479	5.005E+00	520	1.094E+01	561	1.557E+01
398	1.000E-04	439	2.422E+00	480	4.821E+00	521	1.114E+01	562	1.581E+01
399	0.000E+00	440	2.736E+00	481	4.741E+00	522	1.119E+01	563	1.597E+01
400	0.000E+00	441	3.102E+00	482	4.674E+00	523	1.127E+01	564	1.615E+01
401	1.760E-02	442	3.462E+00	483	4.711E+00	524	1.139E+01	565	1.636E+01
402	3.110E-02	443	3.897E+00	484	4.700E+00	525	1.145E+01	566	1.650E+01
403	1.340E-02	444	4.474E+00	485	4.764E+00	526	1.154E+01	567	1.679E+01
404	1.990E-02	445	5.066E+00	486	4.876E+00	527	1.170E+01	568	1.696E+01
405	2.990E-02	446	5.793E+00	487	4.923E+00	528	1.175E+01	569	1.716E+01
406	1.290E-02	447	6.598E+00	488	5.016E+00	529	1.187E+01	570	1.735E+01
407	5.690E-02	448	7.477E+00	489	5.100E+00	530	1.195E+01	571	1.754E+01
408	9.200E-03	449	8.589E+00	490	5.260E+00	531	1.199E+01	572	1.773E+01
409	5.260E-02	450	9.541E+00	491	5.360E+00	532	1.214E+01	573	1.800E+01
410	5.210E-02	451	1.070E+01	492	5.516E+00	533	1.222E+01	574	1.822E+01
411	2.000E-02	452	1.161E+01	493	5.640E+00	534	1.231E+01	575	1.841E+01
412	4.580E-02	453	1.251E+01	494	5.798E+00	535	1.238E+01	576	1.864E+01
413	1.590E-02	454	1.327E+01	495	5.996E+00	536	1.248E+01	577	1.885E+01
414	4.100E-02	455	1.361E+01	496	6.146E+00	537	1.257E+01	578	1.899E+01
415	3.330E-02	456	1.362E+01	497	6.352E+00	538	1.263E+01	579	1.925E+01
416	3.820E-02	457	1.330E+01	498	6.595E+00	539	1.277E+01	580	1.937E+01
417	6.300E-02	458	1.276E+01	499	6.810E+00	540	1.287E+01	581	1.968E+01
418	9.620E-02	459	1.209E+01	500	7.035E+00	541	1.290E+01	582	1.976E+01
419	1.132E-01	460	1.132E+01	501	7.286E+00	542	1.305E+01	583	2.005E+01
420	1.683E-01	461	1.052E+01	502	7.528E+00	543	1.314E+01	584	2.030E+01

nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
585	2.041E+01	626	1.966E+01	667	8.873E+00	708	2.624E+00	749	4.698E-01
586	2.057E+01	627	1.946E+01	668	8.644E+00	709	2.481E+00	750	4.941E-01
587	2.083E+01	628	1.919E+01	669	8.367E+00	710	2.364E+00	751	4.911E-01
588	2.094E+01	629	1.892E+01	670	8.150E+00	711	2.286E+00	752	4.598E-01
589	2.115E+01	630	1.874E+01	671	7.914E+00	712	2.211E+00	753	4.192E-01
590	2.128E+01	631	1.848E+01	672	7.735E+00	713	2.206E+00	754	4.042E-01
591	2.141E+01	632	1.823E+01	673	7.546E+00	714	2.085E+00	755	2.776E-01
592	2.155E+01	633	1.790E+01	674	7.295E+00	715	1.980E+00	756	3.620E-01
593	2.167E+01	634	1.761E+01	675	7.112E+00	716	1.923E+00	757	3.568E-01
594	2.180E+01	635	1.742E+01	676	6.960E+00	717	1.853E+00	758	1.061E-01
595	2.195E+01	636	1.716E+01	677	6.727E+00	718	1.832E+00	759	2.550E-01
596	2.200E+01	637	1.690E+01	678	6.498E+00	719	1.677E+00	760	2.056E-01
597	2.217E+01	638	1.660E+01	679	6.354E+00	720	1.656E+00	761	2.060E-01
598	2.225E+01	639	1.644E+01	680	6.162E+00	721	1.592E+00	762	3.333E-01
599	2.231E+01	640	1.606E+01	681	5.977E+00	722	1.596E+00	763	4.128E-01
600	2.241E+01	641	1.578E+01	682	5.784E+00	723	1.488E+00	764	2.561E-01
601	2.245E+01	642	1.550E+01	683	5.689E+00	724	1.309E+00	765	1.558E-01
602	2.231E+01	643	1.525E+01	684	5.466E+00	725	1.407E+00	766	1.518E-01
603	2.248E+01	644	1.501E+01	685	5.283E+00	726	1.364E+00	767	1.655E-01
604	2.247E+01	645	1.474E+01	686	5.154E+00	727	1.280E+00	768	2.801E-01
605	2.252E+01	646	1.440E+01	687	5.042E+00	728	1.223E+00	769	2.070E-01
606	2.246E+01	647	1.415E+01	688	4.924E+00	729	1.239E+00	770	9.630E-02
607	2.241E+01	648	1.381E+01	689	4.687E+00	730	1.274E+00	771	1.329E-01
608	2.241E+01	649	1.360E+01	690	4.507E+00	731	1.136E+00	772	2.132E-01
609	2.236E+01	650	1.328E+01	691	4.417E+00	732	1.163E+00	773	1.034E-01
610	2.226E+01	651	1.296E+01	692	4.323E+00	733	9.479E-01	774	9.230E-02
611	2.218E+01	652	1.271E+01	693	4.153E+00	734	9.885E-01	775	1.029E-01
612	2.207E+01	653	1.244E+01	694	4.033E+00	735	1.011E+00	776	9.580E-02
613	2.203E+01	654	1.211E+01	695	3.933E+00	736	8.761E-01	777	9.960E-02
614	2.184E+01	655	1.187E+01	696	3.717E+00	737	8.893E-01	778	1.142E-01
615	2.176E+01	656	1.159E+01	697	3.712E+00	738	7.641E-01	779	1.374E-01
616	2.164E+01	657	1.138E+01	698	3.569E+00	739	6.601E-01	780	1.204E-01
617	2.143E+01	658	1.107E+01	699	3.451E+00	740	7.448E-01		
618	2.126E+01	659	1.080E+01	700	3.260E+00	741	7.855E-01		
619	2.112E+01	660	1.055E+01	701	3.295E+00	742	7.385E-01		
620	2.092E+01	661	1.028E+01	702	3.078E+00	743	6.722E-01		
621	2.080E+01	662	9.994E+00	703	2.974E+00	744	5.119E-01		
622	2.062E+01	663	9.755E+00	704	2.950E+00	745	6.115E-01		
623	2.030E+01	664	9.618E+00	705	2.761E+00	746	3.689E-01		
624	2.011E+01	665	9.301E+00	706	2.709E+00	747	5.178E-01		
625	1.991E+01	666	9.065E+00	707	2.618E+00	748	4.948E-01		

CIE 1931xy Chromaticity Diagram



7-Step Chromaticity Quadrangles





### [Goniophotometer System]

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

Test orientation: **Downward**

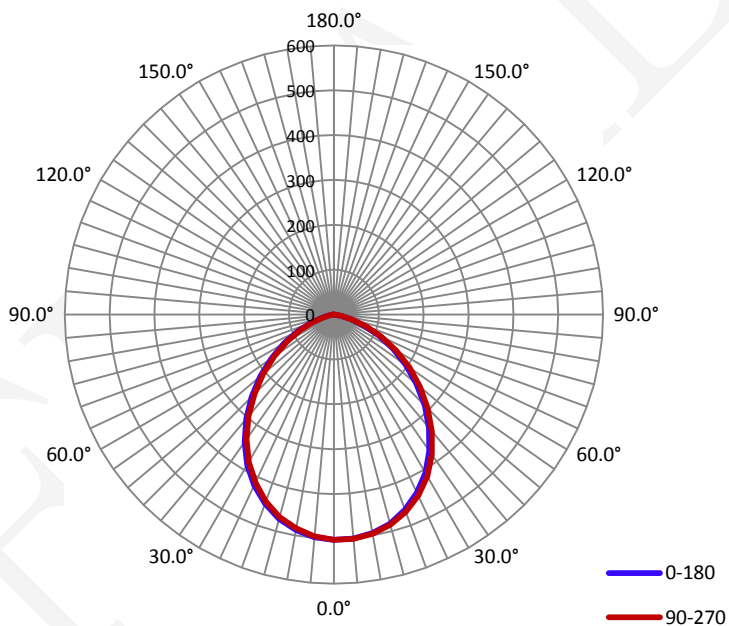
### Electrical Measurement

Input Voltage(V)	Frequency(Hz)	Input Current(A)	Power (W)	Power Factor
120.0	60	0.0870	10	0.9560

### Photometric Measurement

Luminous Flux(lm)	Efficacy(lm/W)	$I_{max}(cd)$	S/MH(C0/180)	S/MH(C90/270)
1120.6	112.11	503.0	1.18	1.18

### Luminous Intensity Distribution



	C0/180	C45/225	C90/270	C135/315	AVG.
Beam Angle(50% $I_{max}$ ):	94.7	94.7	94.9	94.7	94.8
Field Angle(10% $I_{max}$ ):	143.8	143.5	143.7	144.1	143.8

**Luminous Intensity (cd) Distribution Data**

C y	0°	22.5°	45°	67.5°	90°	112.5°	135°	157.5°
0.0°	502	502	502	502	502	502	502	502
5.0°	501	502	503	503	502	501	500	499
10.0°	494	495	497	498	496	495	493	490
15.0°	483	484	486	486	485	484	480	476
20.0°	463	466	468	470	468	465	460	456
25.0°	438	442	445	446	445	441	435	429
30.0°	408	412	416	417	416	411	405	397
35.0°	371	377	381	383	381	375	368	359
40.0°	330	337	341	342	339	335	326	317
45.0°	287	293	298	299	295	290	282	273
50.0°	240	248	252	252	251	245	236	229
55.0°	196	203	207	207	205	200	192	185
60.0°	152	159	161	162	161	156	149	142
65.0°	110	115	118	119	117	114	109	102
70.0°	70	74	76	78	76	74	70	65
75.0°	37	39	41	41	41	39	36	33
80.0°	15	16	17	17	17	17	16	14
85.0°	4	6	6	5	6	6	5	4
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.)

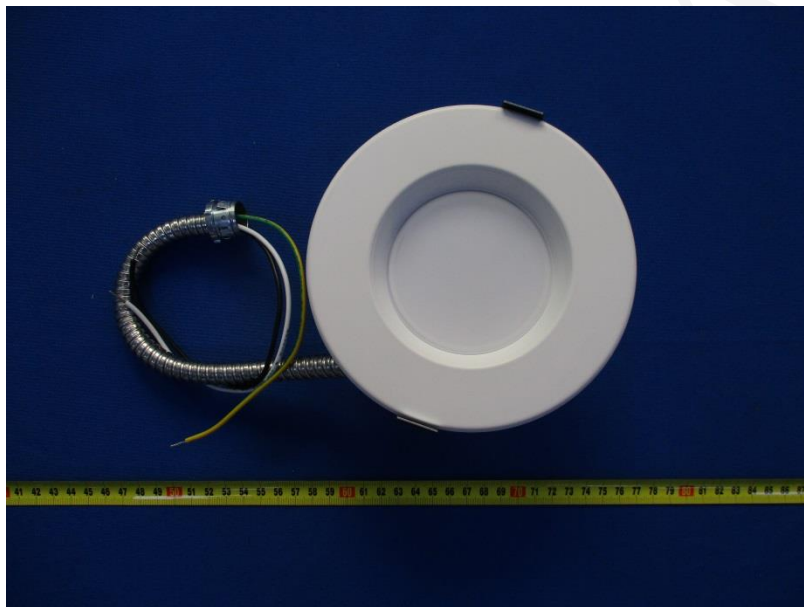
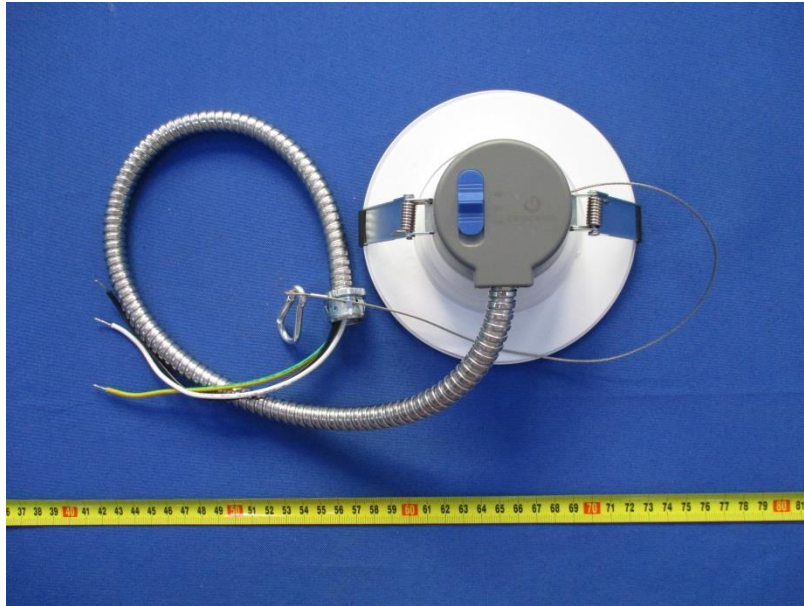
C y	180°	202.5°	225°	247.5°	270°	292.5°	315°	337.5°
0.0°	502	502	502	502	502	502	502	502
5.0°	498	496	496	496	496	496	498	499
10.0°	487	485	484	483	484	485	488	490
15.0°	472	468	466	466	467	469	472	476
20.0°	449	444	443	442	444	446	450	455
25.0°	420	415	413	413	414	418	423	429
30.0°	387	380	377	377	380	384	389	396
35.0°	347	341	338	338	340	345	351	357
40.0°	304	297	294	293	296	301	308	315
45.0°	259	253	248	248	251	255	262	271
50.0°	214	207	204	203	206	210	217	226
55.0°	170	163	160	160	162	167	174	181
60.0°	128	123	120	120	121	126	132	138
65.0°	90	85	83	82	83	88	93	98
70.0°	55	52	49	49	50	53	57	62
75.0°	27	26	24	24	24	26	28	31
80.0°	12	12	12	12	12	12	13	13
85.0°	2	2	2	3	2	2	2	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

**Zonal Lumen Density Measurement**

Deg	Flux (lm)	%
0-5	12.0	1.07
5-10	35.4	3.16
10-15	57.3	5.12
15-20	76.8	6.85
20-25	92.8	8.28
25-30	104.5	9.33
30-35	111.4	9.94
35-40	112.9	10.07
40-45	109.2	9.75
45-50	101.0	9.02
50-55	89.3	7.97
55-60	74.8	6.68
60-65	58.6	5.23
65-70	41.4	3.69
70-75	25.0	2.23
75-80	12.4	1.11
80-85	4.9	0.43
85-90	1.0	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	12.0	1.07
0-10	47.4	4.23
0-15	104.7	9.34
0-20	181.5	16.19
0-25	274.2	24.47
0-30	378.8	33.80
0-35	490.2	43.74
0-40	603.0	53.81
0-45	712.2	63.56
0-50	813.3	72.58
0-55	902.6	80.54
0-60	977.4	87.22
0-65	1035.9	92.44
0-70	1077.3	96.14
0-75	1102.3	98.36
0-80	1114.7	99.47
0-85	1119.6	99.91
0-90	1120.6	100.00
0-95	1120.6	100.00
0-100	1120.6	100.00
0-105	1120.6	100.00
0-110	1120.6	100.00
0-115	1120.6	100.00
0-120	1120.6	100.00
0-125	1120.6	100.00
0-130	1120.6	100.00
0-135	1120.6	100.00
0-140	1120.6	100.00
0-145	1120.6	100.00
0-150	1120.6	100.00
0-155	1120.6	100.00
0-160	1120.6	100.00
0-165	1120.6	100.00
0-170	1120.6	100.00
0-175	1120.6	100.00
0-180	1120.6	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\*\*\*\*\*