

# 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: INFT9.5/830/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>	PKS200708092-10
<b>Test Date:</b>	2020-07-10 to 2020-07-15
<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: INFT9.5/830/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: 27W  
 Nominal CCT: 3000K  
 Nominal Lumen Output: 3320lm

## 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**

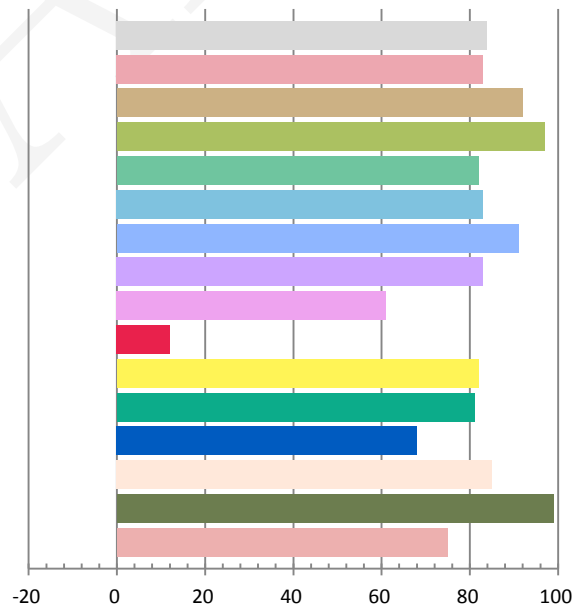
### Photometric and Electrical Measurement Result

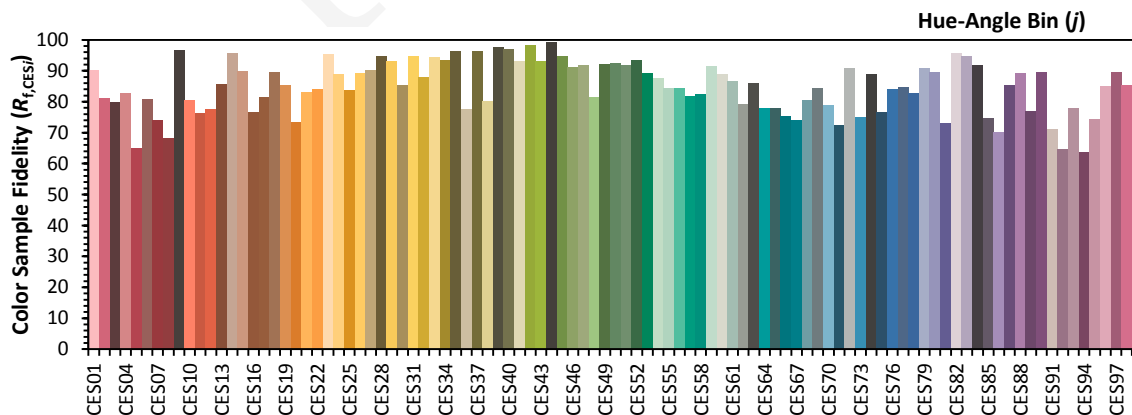
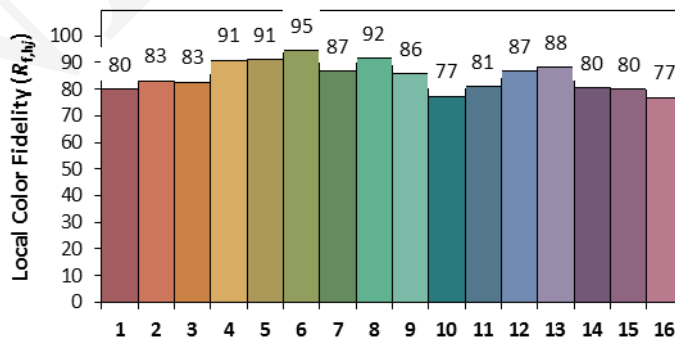
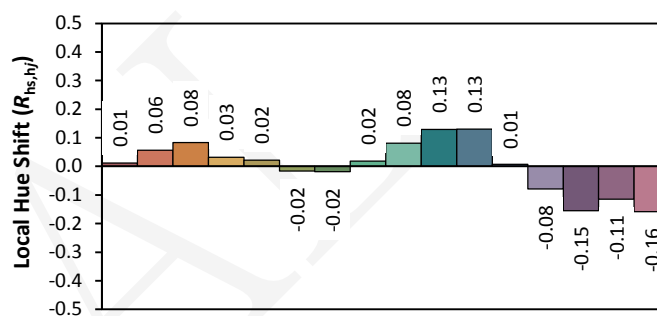
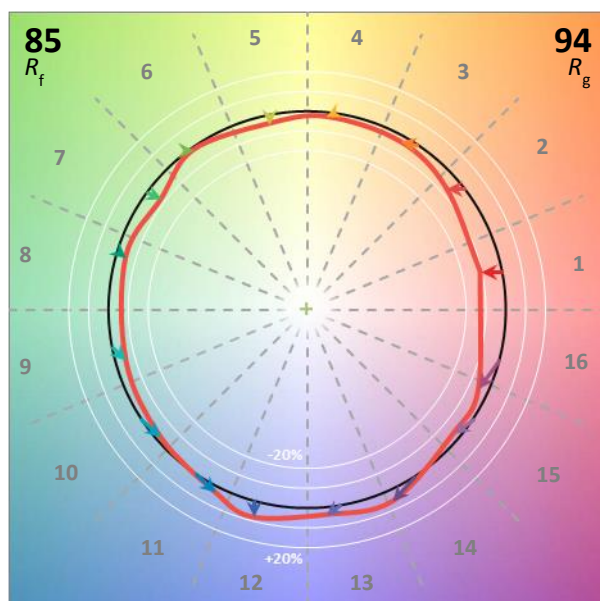
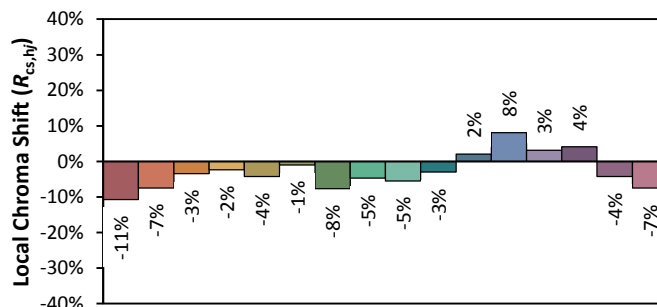
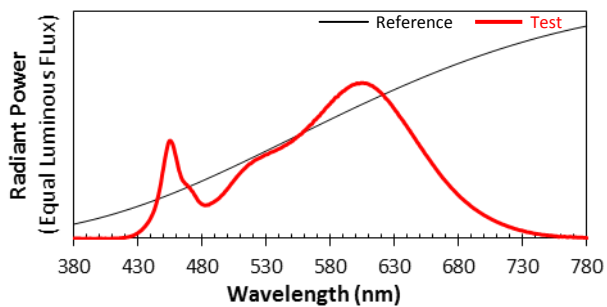
Voltage(V)	Frequency(Hz)	Current(A)	Power (W)	Power Factor	Luminous Flux(lm)	Efficacy(lm/W)
119.99	60	0.2319	27.32	0.9818	3500.9	128.14

Radiant Flux (W)	CCT (K)	Duv	x	y	u'	v'
10.561	3090	0.00119	0.4323	0.4054	0.2470	0.5212

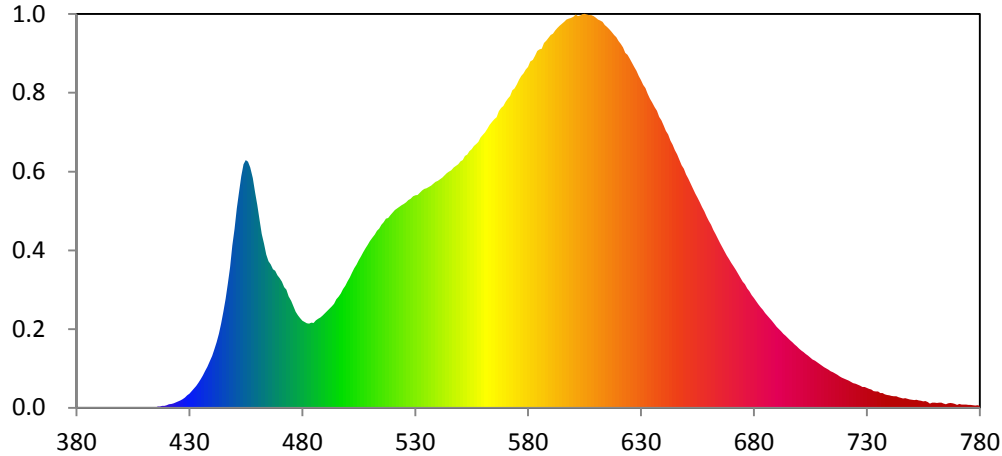
### Color Rendering Index

<b>Ra</b>			
83.9			
<b>R1</b>	<b>R2</b>	<b>R3</b>	<b>R4</b>
83	92	97	82
<b>R5</b>	<b>R6</b>	<b>R7</b>	<b>R8</b>
83	91	83	61
<b>R9</b>	<b>R10</b>	<b>R11</b>	<b>R12</b>
12	82	81	68
<b>R13</b>	<b>R14</b>	<b>R15</b>	
85	99	75	





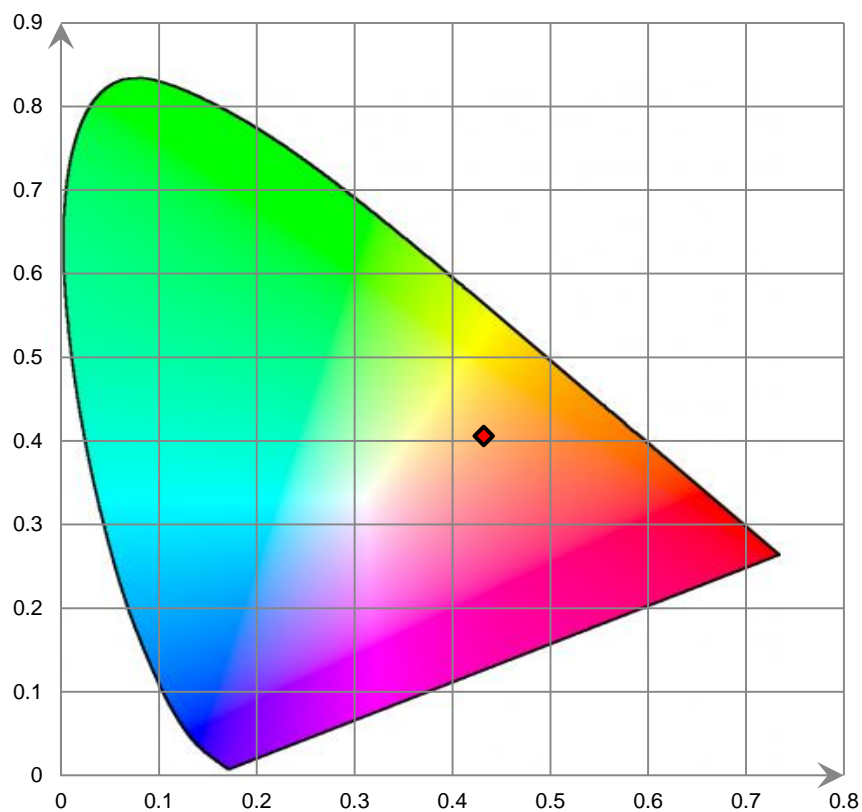
### Relative Spectral Power Distribution



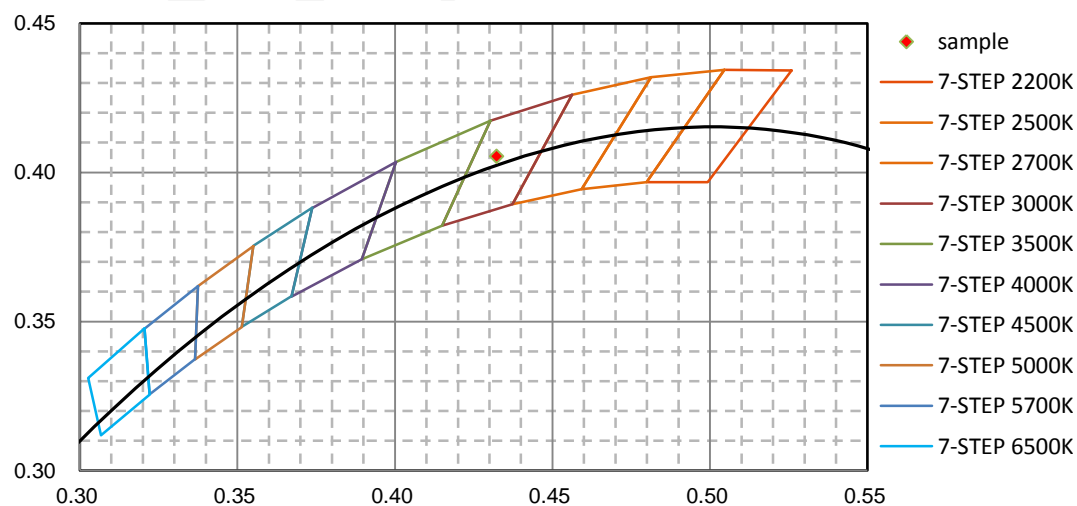
nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
380	7.900E-03	421	5.975E-01	462	3.097E+01	503	2.485E+01	544	4.180E+01
381	1.350E-02	422	6.607E-01	463	2.922E+01	504	2.547E+01	545	4.208E+01
382	1.000E-02	423	7.980E-01	464	2.731E+01	505	2.629E+01	546	4.229E+01
383	3.000E-04	424	9.749E-01	465	2.610E+01	506	2.698E+01	547	4.280E+01
384	3.220E-02	425	1.132E+00	466	2.555E+01	507	2.773E+01	548	4.309E+01
385	6.540E-02	426	1.315E+00	467	2.471E+01	508	2.839E+01	549	4.338E+01
386	4.900E-03	427	1.560E+00	468	2.437E+01	509	2.904E+01	550	4.390E+01
387	4.550E-02	428	1.842E+00	469	2.360E+01	510	2.970E+01	551	4.411E+01
388	9.900E-03	429	2.213E+00	470	2.311E+01	511	3.034E+01	552	4.490E+01
389	5.800E-03	430	2.524E+00	471	2.247E+01	512	3.086E+01	553	4.512E+01
390	7.790E-02	431	2.971E+00	472	2.151E+01	513	3.152E+01	554	4.575E+01
391	1.530E-02	432	3.422E+00	473	2.104E+01	514	3.193E+01	555	4.607E+01
392	1.170E-02	433	3.879E+00	474	1.983E+01	515	3.263E+01	556	4.665E+01
393	8.500E-03	434	4.453E+00	475	1.902E+01	516	3.309E+01	557	4.696E+01
394	5.030E-02	435	5.082E+00	476	1.804E+01	517	3.371E+01	558	4.737E+01
395	1.800E-02	436	5.765E+00	477	1.709E+01	518	3.379E+01	559	4.817E+01
396	3.570E-02	437	6.524E+00	478	1.648E+01	519	3.429E+01	560	4.866E+01
397	1.570E-02	438	7.295E+00	479	1.594E+01	520	3.476E+01	561	4.911E+01
398	7.000E-04	439	8.203E+00	480	1.548E+01	521	3.523E+01	562	4.970E+01
399	1.100E-03	440	9.250E+00	481	1.525E+01	522	3.551E+01	563	5.040E+01
400	4.000E-04	441	1.045E+01	482	1.506E+01	523	3.581E+01	564	5.099E+01
401	4.370E-02	442	1.169E+01	483	1.502E+01	524	3.608E+01	565	5.142E+01
402	2.890E-02	443	1.315E+01	484	1.515E+01	525	3.635E+01	566	5.177E+01
403	1.440E-02	444	1.502E+01	485	1.509E+01	526	3.661E+01	567	5.283E+01
404	3.040E-02	445	1.709E+01	486	1.556E+01	527	3.698E+01	568	5.343E+01
405	3.660E-02	446	1.939E+01	487	1.584E+01	528	3.724E+01	569	5.378E+01
406	7.700E-03	447	2.214E+01	488	1.609E+01	529	3.770E+01	570	5.454E+01
407	5.540E-02	448	2.502E+01	489	1.639E+01	530	3.788E+01	571	5.508E+01
408	6.600E-03	449	2.890E+01	490	1.683E+01	531	3.791E+01	572	5.554E+01
409	5.620E-02	450	3.189E+01	491	1.721E+01	532	3.831E+01	573	5.655E+01
410	1.018E-01	451	3.552E+01	492	1.764E+01	533	3.874E+01	574	5.692E+01
411	8.310E-02	452	3.843E+01	493	1.807E+01	534	3.898E+01	575	5.759E+01
412	2.750E-02	453	4.127E+01	494	1.855E+01	535	3.912E+01	576	5.846E+01
413	3.430E-02	454	4.337E+01	495	1.931E+01	536	3.933E+01	577	5.912E+01
414	1.078E-01	455	4.415E+01	496	1.980E+01	537	3.958E+01	578	5.959E+01
415	1.063E-01	456	4.382E+01	497	2.033E+01	538	3.989E+01	579	6.030E+01
416	2.187E-01	457	4.282E+01	498	2.115E+01	539	4.026E+01	580	6.075E+01
417	2.264E-01	458	4.092E+01	499	2.174E+01	540	4.043E+01	581	6.170E+01
418	3.214E-01	459	3.843E+01	500	2.250E+01	541	4.070E+01	582	6.195E+01
419	3.551E-01	460	3.612E+01	501	2.318E+01	542	4.098E+01	583	6.274E+01
420	4.457E-01	461	3.352E+01	502	2.407E+01	543	4.139E+01	584	6.356E+01

nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
585	6.385E+01	626	6.149E+01	667	2.788E+01	708	8.081E+00	749	1.491E+00
586	6.400E+01	627	6.071E+01	668	2.711E+01	709	7.792E+00	750	1.422E+00
587	6.499E+01	628	6.006E+01	669	2.651E+01	710	7.525E+00	751	1.379E+00
588	6.542E+01	629	5.910E+01	670	2.581E+01	711	7.245E+00	752	1.413E+00
589	6.592E+01	630	5.840E+01	671	2.515E+01	712	7.004E+00	753	1.310E+00
590	6.645E+01	631	5.755E+01	672	2.450E+01	713	6.788E+00	754	1.248E+00
591	6.664E+01	632	5.695E+01	673	2.382E+01	714	6.472E+00	755	1.125E+00
592	6.724E+01	633	5.594E+01	674	2.315E+01	715	6.317E+00	756	1.196E+00
593	6.766E+01	634	5.507E+01	675	2.246E+01	716	6.075E+00	757	1.005E+00
594	6.806E+01	635	5.441E+01	676	2.199E+01	717	5.847E+00	758	7.422E-01
595	6.843E+01	636	5.357E+01	677	2.129E+01	718	5.605E+00	759	8.932E-01
596	6.874E+01	637	5.288E+01	678	2.073E+01	719	5.355E+00	760	9.180E-01
597	6.917E+01	638	5.185E+01	679	2.004E+01	720	5.209E+00	761	8.476E-01
598	6.934E+01	639	5.119E+01	680	1.956E+01	721	5.032E+00	762	9.278E-01
599	6.945E+01	640	5.029E+01	681	1.896E+01	722	4.838E+00	763	8.953E-01
600	6.965E+01	641	4.933E+01	682	1.840E+01	723	4.598E+00	764	7.589E-01
601	7.009E+01	642	4.868E+01	683	1.791E+01	724	4.373E+00	765	6.087E-01
602	6.978E+01	643	4.762E+01	684	1.744E+01	725	4.283E+00	766	7.675E-01
603	6.990E+01	644	4.686E+01	685	1.685E+01	726	4.089E+00	767	8.465E-01
604	7.015E+01	645	4.593E+01	686	1.639E+01	727	3.921E+00	768	7.738E-01
605	7.018E+01	646	4.515E+01	687	1.594E+01	728	3.723E+00	769	6.700E-01
606	7.008E+01	647	4.419E+01	688	1.549E+01	729	3.720E+00	770	5.339E-01
607	6.998E+01	648	4.323E+01	689	1.494E+01	730	3.516E+00	771	6.842E-01
608	6.996E+01	649	4.259E+01	690	1.444E+01	731	3.373E+00	772	5.827E-01
609	6.978E+01	650	4.156E+01	691	1.403E+01	732	3.259E+00	773	5.515E-01
610	6.953E+01	651	4.080E+01	692	1.362E+01	733	2.969E+00	774	5.840E-01
611	6.914E+01	652	3.998E+01	693	1.319E+01	734	2.919E+00	775	4.968E-01
612	6.901E+01	653	3.912E+01	694	1.283E+01	735	2.885E+00	776	5.175E-01
613	6.877E+01	654	3.813E+01	695	1.241E+01	736	2.631E+00	777	4.671E-01
614	6.821E+01	655	3.742E+01	696	1.200E+01	737	2.619E+00	778	4.080E-01
615	6.785E+01	656	3.660E+01	697	1.167E+01	738	2.415E+00	779	4.787E-01
616	6.747E+01	657	3.577E+01	698	1.129E+01	739	2.258E+00	780	3.055E-01
617	6.700E+01	658	3.503E+01	699	1.092E+01	740	2.233E+00		
618	6.641E+01	659	3.410E+01	700	1.053E+01	741	2.108E+00		
619	6.604E+01	660	3.332E+01	701	1.022E+01	742	2.065E+00		
620	6.533E+01	661	3.263E+01	702	9.946E+00	743	2.042E+00		
621	6.481E+01	662	3.169E+01	703	9.570E+00	744	1.870E+00		
622	6.419E+01	663	3.096E+01	704	9.274E+00	745	1.760E+00		
623	6.325E+01	664	3.018E+01	705	8.949E+00	746	1.640E+00		
624	6.287E+01	665	2.935E+01	706	8.614E+00	747	1.686E+00		
625	6.222E+01	666	2.864E+01	707	8.354E+00	748	1.612E+00		

CIE 1931xy Chromaticity Diagram



7-Step Chromaticity Quadrangles





### [Goniophotometer System]

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

Test orientation: **Downward**

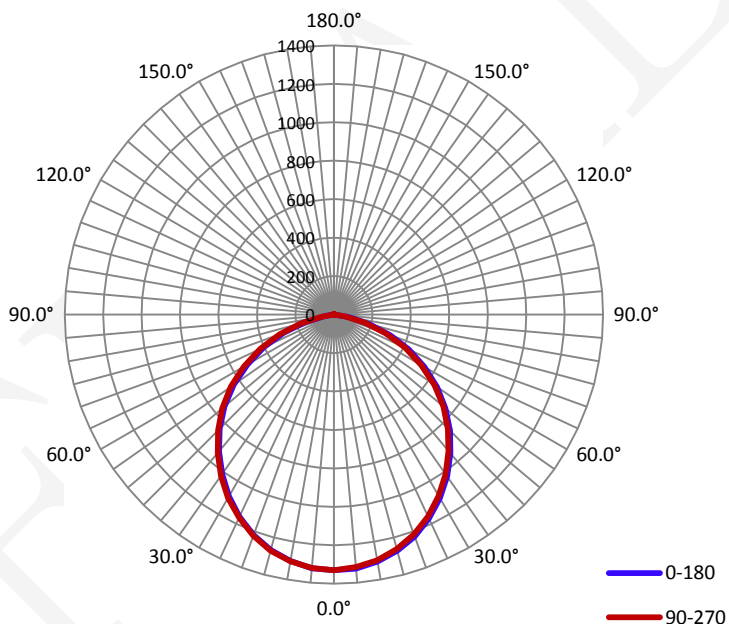
### Electrical Measurement

Input Voltage(V)	Frequency(Hz)	Input Current(A)	Power (W)	Power Factor
120.0	60	0.2310	27.37	0.9850

### Photometric Measurement

Luminous Flux(lm)	Efficacy(lm/W)	$I_{max}(cd)$	S/MH(C0/180)	S/MH(C90/270)
3503.5	128.06	1329.3	1.23	1.23

### Luminous Intensity Distribution



	C0/180	C45/225	C90/270	C135/315	AVG.
Beam Angle(50% $I_{max}$ ):	108.1	108.1	108.2	108.0	108.1
Field Angle(10% $I_{max}$ ):	153.7	153.7	153.7	153.7	153.7

**Luminous Intensity (cd) Distribution Data**

C y	0°	22.5°	45°	67.5°	90°	112.5°	135°	157.5°
0.0°	1329	1329	1329	1329	1329	1329	1329	1329
5.0°	1327	1323	1322	1321	1319	1323	1321	1321
10.0°	1305	1301	1302	1299	1297	1299	1300	1300
15.0°	1271	1269	1268	1263	1263	1265	1264	1267
20.0°	1229	1222	1221	1218	1217	1218	1217	1218
25.0°	1169	1161	1163	1158	1159	1157	1155	1160
30.0°	1102	1098	1095	1091	1089	1089	1090	1092
35.0°	1026	1021	1017	1015	1013	1011	1013	1015
40.0°	943	939	934	930	928	929	928	932
45.0°	854	848	845	841	838	837	838	841
50.0°	757	753	749	744	743	742	741	745
55.0°	655	651	646	640	637	637	634	638
60.0°	545	540	535	528	523	523	521	524
65.0°	430	423	420	414	407	403	404	407
70.0°	310	306	299	292	288	284	281	286
75.0°	191	185	181	173	169	165	163	164
80.0°	80	75	71	64	61	58	56	56
85.0°	12	12	12	11	10	10	9	9
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	1	0	0	0
150.0°	0	1	1	1	1	1	1	1
155.0°	1	1	2	1	2	2	2	1
160.0°	1	2	3	2	2	2	2	2
165.0°	1	2	3	2	3	2	3	2
170.0°	2	2	3	2	3	3	3	3
175.0°	3	3	3	3	3	4	3	3
180.0°	0	0	0	0	0	0	0	0

Luminous Intensity (cd) Distribution Data (cont.)

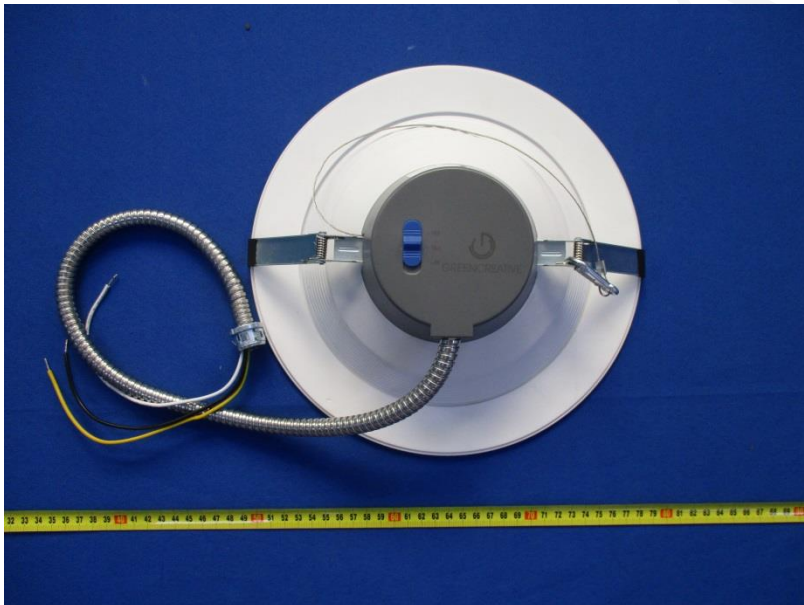
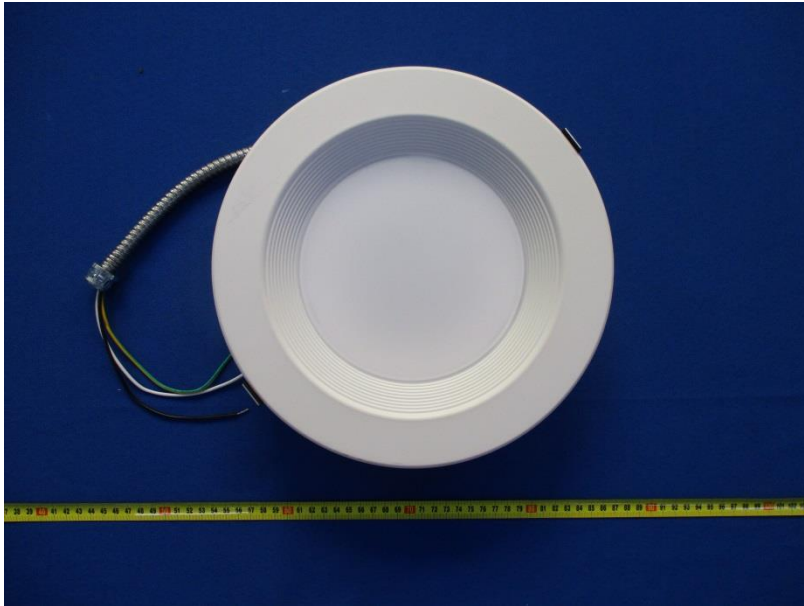
C y	180°	202.5°	225°	247.5°	270°	292.5°	315°	337.5°
0.0°	1329	1329	1329	1329	1329	1329	1329	1329
5.0°	1324	1321	1323	1321	1324	1324	1323	1323
10.0°	1301	1301	1303	1303	1303	1305	1303	1304
15.0°	1268	1266	1269	1268	1271	1272	1270	1269
20.0°	1220	1220	1222	1221	1224	1228	1225	1222
25.0°	1160	1161	1165	1166	1166	1169	1168	1167
30.0°	1092	1090	1095	1100	1101	1102	1101	1099
35.0°	1013	1015	1021	1024	1025	1027	1024	1021
40.0°	929	930	936	941	941	944	943	938
45.0°	839	843	847	851	852	855	853	851
50.0°	743	747	751	755	758	759	757	754
55.0°	635	637	644	650	654	654	653	651
60.0°	519	525	531	537	539	543	542	540
65.0°	402	406	413	420	422	425	425	424
70.0°	277	284	289	296	301	304	303	302
75.0°	156	162	167	174	179	181	183	183
80.0°	48	51	57	63	67	71	73	73
85.0°	6	7	8	9	10	10	11	12
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	1	0	0	0
150.0°	0	0	1	1	1	1	1	1
155.0°	0	0	2	1	1	1	2	1
160.0°	1	1	2	2	2	2	2	2
165.0°	2	2	2	3	3	2	3	3
170.0°	2	3	3	3	3	3	4	3
175.0°	2	3	3	3	3	3	3	3
180.0°	0	0	0	0	0	0	0	0

**Zonal Lumen Density Measurement**

Deg	Flux (lm)	%
0-5	31.7	0.90
5-10	93.9	2.68
10-15	152.4	4.35
15-20	205.1	5.85
20-25	250.0	7.14
25-30	285.8	8.16
30-35	311.3	8.89
35-40	326.0	9.31
40-45	329.7	9.41
45-50	322.3	9.20
50-55	303.2	8.65
55-60	272.0	7.76
60-65	230.4	6.58
65-70	179.6	5.13
70-75	122.1	3.49
75-80	63.5	1.81
80-85	20.1	0.57
85-90	2.7	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	0.0	0.00
145-150	0.1	0.00
150-155	0.3	0.01
155-160	0.3	0.01
160-165	0.3	0.01
165-170	0.3	0.01
170-175	0.2	0.01
175-180	0.0	0.00

Deg	Flux (lm)	%
0-5	31.7	0.90
0-10	125.6	3.58
0-15	278.0	7.93
0-20	483.1	13.79
0-25	733.1	20.93
0-30	1018.9	29.08
0-35	1330.2	37.97
0-40	1656.2	47.27
0-45	1986.0	56.68
0-50	2308.3	65.89
0-55	2611.5	74.54
0-60	2883.5	82.30
0-65	3113.9	88.88
0-70	3293.5	94.00
0-75	3415.6	97.49
0-80	3479.1	99.30
0-85	3499.2	99.88
0-90	3501.9	99.95
0-95	3501.9	99.95
0-100	3501.9	99.95
0-105	3501.9	99.95
0-110	3501.9	99.95
0-115	3501.9	99.95
0-120	3501.9	99.95
0-125	3501.9	99.95
0-130	3501.9	99.95
0-135	3501.9	99.95
0-140	3501.9	99.95
0-145	3501.9	99.95
0-150	3502.0	99.96
0-155	3502.3	99.96
0-160	3502.6	99.97
0-165	3503.0	99.98
0-170	3503.3	99.99
0-175	3503.5	100.00
0-180	3503.5	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\*\*\*\*\*