

# 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: INFT9.5/840/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>	PKS200708094-10
<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: INFT9.5/840/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: 27W  
 Nominal CCT: 4000K  
 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  $U_{rel}=2.61\%$  ( $k=2$ ), 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**

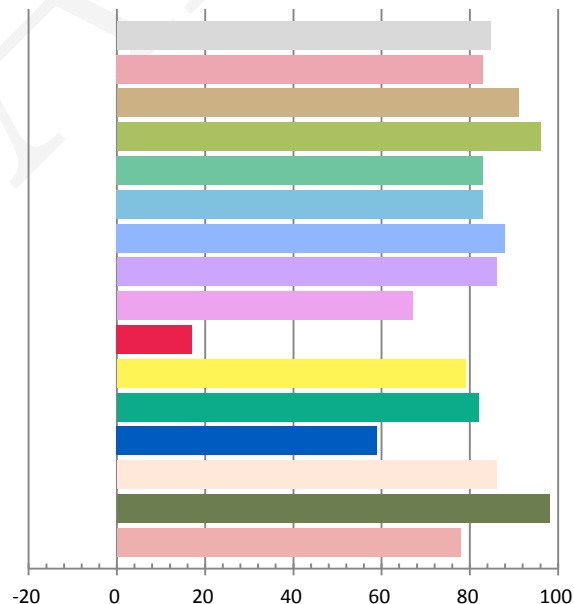
### Photometric and Electrical Measurement Result

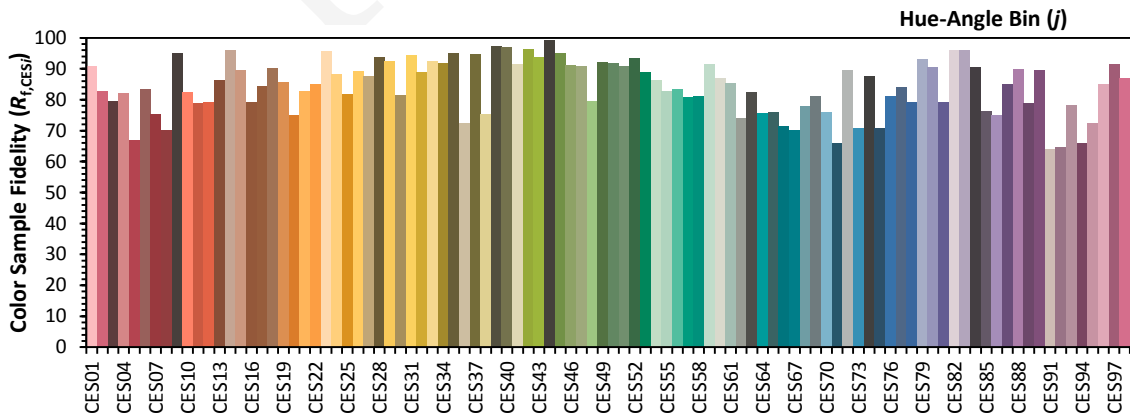
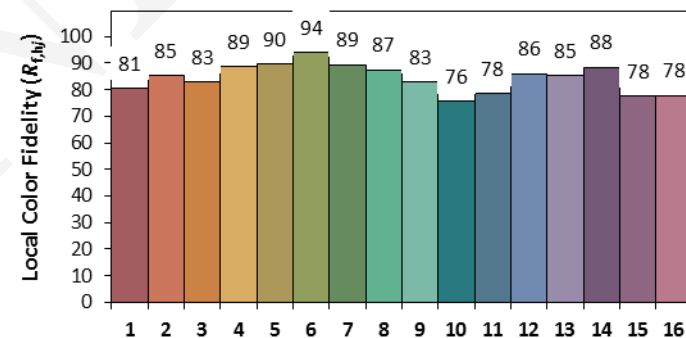
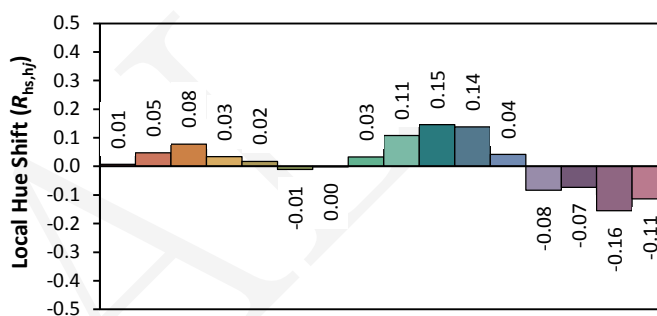
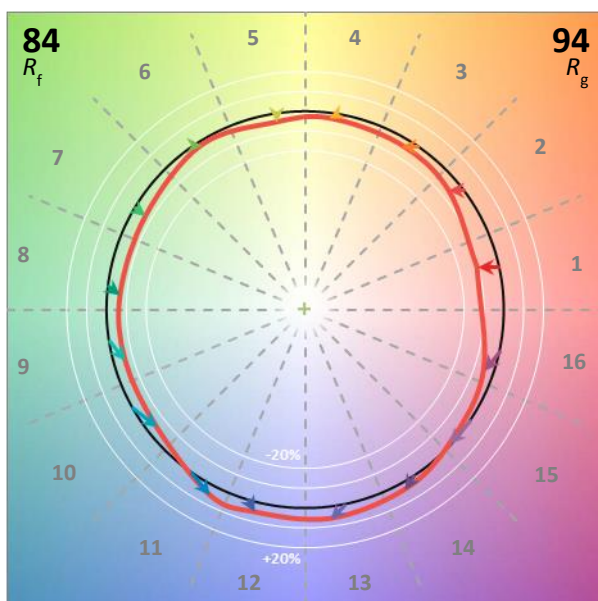
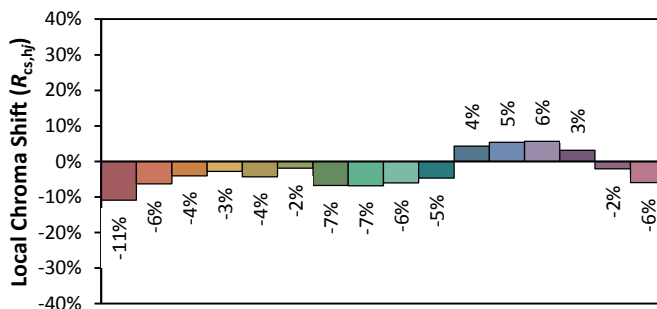
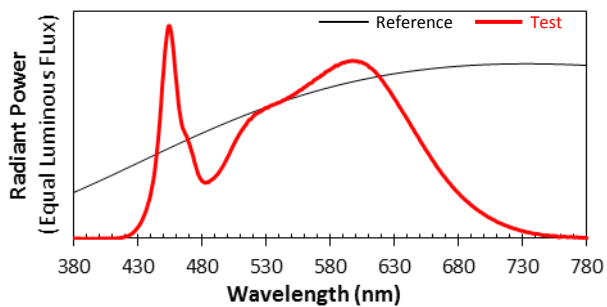
Voltage(V)	Frequency(Hz)	Current(A)	Power (W)	Power Factor	Luminous Flux(lm)	Efficacy(lm/W)
119.99	60	0.2334	27.46	0.9805	3619.35	131.8

Radiant Flux (W)	CCT (K)	Duv	x	y	u'	v'
10.936	3955	0.00223	0.3841	0.3838	0.2247	0.5052

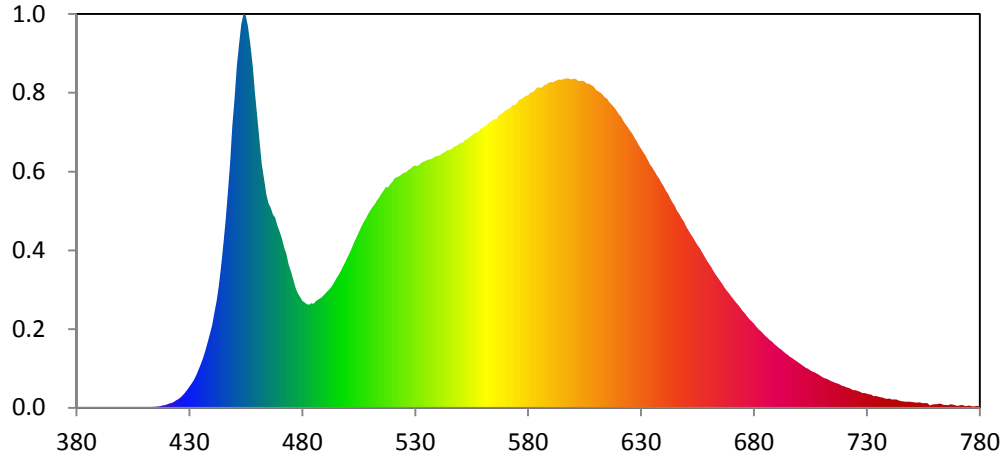
### Color Rendering Index

<b>Ra</b>			
84.7			
<b>R1</b>	<b>R2</b>	<b>R3</b>	<b>R4</b>
83	91	96	83
<b>R5</b>	<b>R6</b>	<b>R7</b>	<b>R8</b>
83	88	86	67
<b>R9</b>	<b>R10</b>	<b>R11</b>	<b>R12</b>
17	79	82	59
<b>R13</b>	<b>R14</b>	<b>R15</b>	
86	98	78	





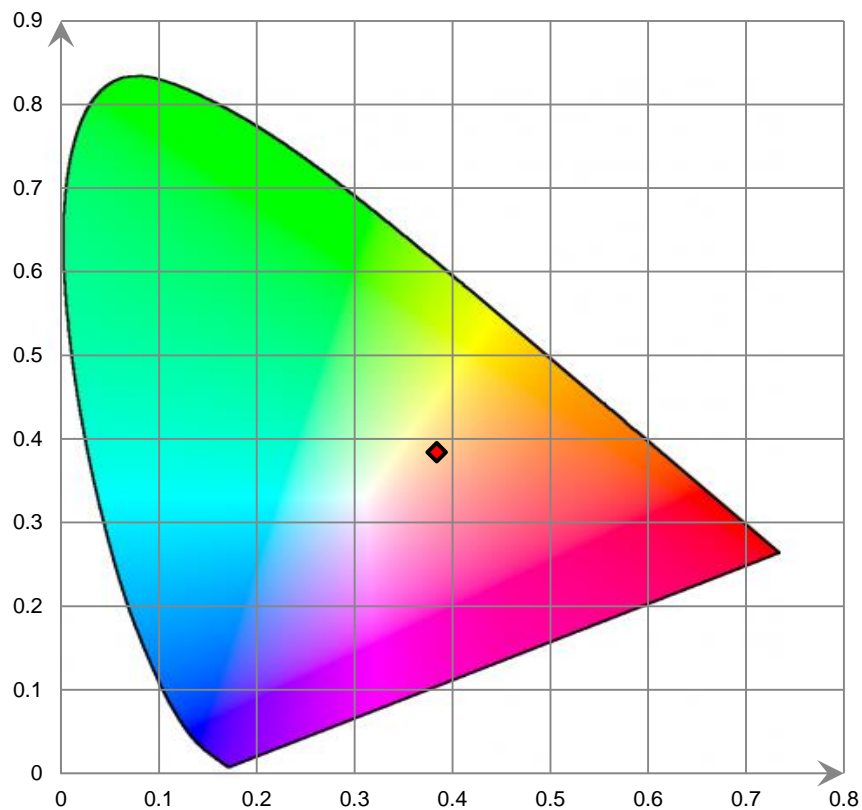
### Relative Spectral Power Distribution



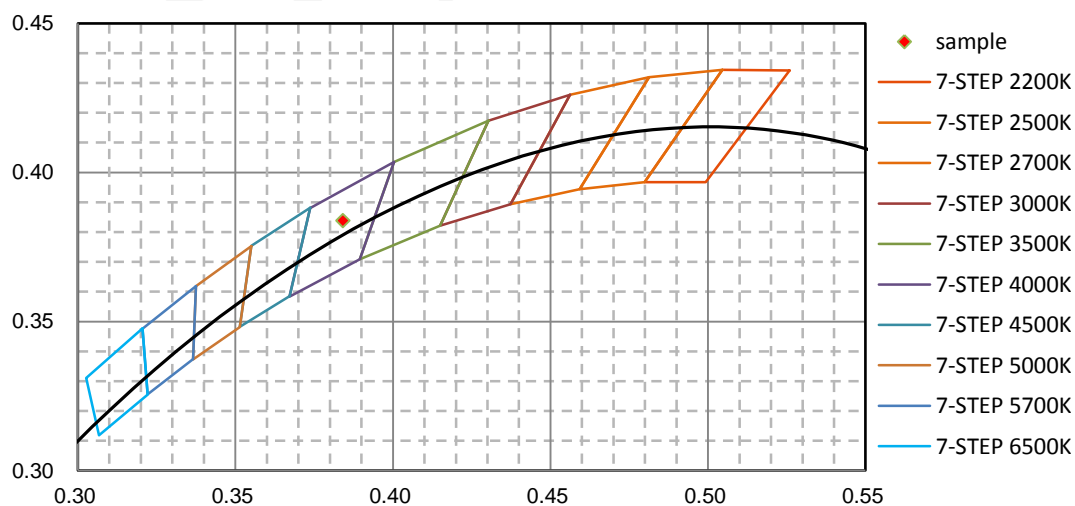
nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
380	2.360E-02	421	7.691E-01	462	4.604E+01	503	3.131E+01	544	4.855E+01
381	3.460E-02	422	9.033E-01	463	4.323E+01	504	3.212E+01	545	4.864E+01
382	3.280E-02	423	1.107E+00	464	4.041E+01	505	3.308E+01	546	4.881E+01
383	1.510E-02	424	1.364E+00	465	3.856E+01	506	3.397E+01	547	4.922E+01
384	9.710E-02	425	1.634E+00	466	3.776E+01	507	3.487E+01	548	4.939E+01
385	6.460E-02	426	1.948E+00	467	3.646E+01	508	3.560E+01	549	4.964E+01
386	8.100E-03	427	2.360E+00	468	3.585E+01	509	3.642E+01	550	5.000E+01
387	3.410E-02	428	2.811E+00	469	3.438E+01	510	3.714E+01	551	5.001E+01
388	1.350E-02	429	3.378E+00	470	3.324E+01	511	3.785E+01	552	5.053E+01
389	8.300E-03	430	3.951E+00	471	3.191E+01	512	3.842E+01	553	5.068E+01
390	4.470E-02	431	4.574E+00	472	3.026E+01	513	3.915E+01	554	5.108E+01
391	1.140E-02	432	5.255E+00	473	2.905E+01	514	3.965E+01	555	5.131E+01
392	1.940E-02	433	6.067E+00	474	2.703E+01	515	4.039E+01	556	5.178E+01
393	1.430E-02	434	7.120E+00	475	2.562E+01	516	4.101E+01	557	5.194E+01
394	2.240E-02	435	8.141E+00	476	2.409E+01	517	4.166E+01	558	5.208E+01
395	2.520E-02	436	9.306E+00	477	2.256E+01	518	4.159E+01	559	5.268E+01
396	1.170E-02	437	1.063E+01	478	2.154E+01	519	4.221E+01	560	5.285E+01
397	2.020E-02	438	1.212E+01	479	2.087E+01	520	4.267E+01	561	5.320E+01
398	9.100E-03	439	1.371E+01	480	2.014E+01	521	4.334E+01	562	5.348E+01
399	3.000E-04	440	1.558E+01	481	1.984E+01	522	4.355E+01	563	5.391E+01
400	0.000E+00	441	1.791E+01	482	1.958E+01	523	4.373E+01	564	5.417E+01
401	5.200E-02	442	2.019E+01	483	1.947E+01	524	4.401E+01	565	5.445E+01
402	6.550E-02	443	2.309E+01	484	1.977E+01	525	4.434E+01	566	5.447E+01
403	1.950E-02	444	2.677E+01	485	1.965E+01	526	4.446E+01	567	5.519E+01
404	2.570E-02	445	3.089E+01	486	2.008E+01	527	4.488E+01	568	5.546E+01
405	3.950E-02	446	3.536E+01	487	2.041E+01	528	4.513E+01	569	5.575E+01
406	1.930E-02	447	4.060E+01	488	2.066E+01	529	4.558E+01	570	5.609E+01
407	7.770E-02	448	4.614E+01	489	2.103E+01	530	4.569E+01	571	5.634E+01
408	2.030E-02	449	5.324E+01	490	2.141E+01	531	4.560E+01	572	5.651E+01
409	4.160E-02	450	5.837E+01	491	2.194E+01	532	4.599E+01	573	5.711E+01
410	1.003E-01	451	6.442E+01	492	2.237E+01	533	4.634E+01	574	5.709E+01
411	9.110E-02	452	6.857E+01	493	2.294E+01	534	4.649E+01	575	5.749E+01
412	3.700E-02	453	7.236E+01	494	2.361E+01	535	4.670E+01	576	5.810E+01
413	3.890E-02	454	7.433E+01	495	2.439E+01	536	4.687E+01	577	5.825E+01
414	1.525E-01	455	7.406E+01	496	2.505E+01	537	4.695E+01	578	5.852E+01
415	1.639E-01	456	7.192E+01	497	2.578E+01	538	4.718E+01	579	5.886E+01
416	2.331E-01	457	6.874E+01	498	2.668E+01	539	4.746E+01	580	5.895E+01
417	3.194E-01	458	6.446E+01	499	2.748E+01	540	4.751E+01	581	5.946E+01
418	4.205E-01	459	5.926E+01	500	2.845E+01	541	4.765E+01	582	5.954E+01
419	4.754E-01	460	5.491E+01	501	2.924E+01	542	4.801E+01	583	5.996E+01
420	6.130E-01	461	5.037E+01	502	3.027E+01	543	4.817E+01	584	6.048E+01

nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
585	6.044E+01	626	5.180E+01	667	2.270E+01	708	6.410E+00	749	1.145E+00
586	6.037E+01	627	5.105E+01	668	2.211E+01	709	6.149E+00	750	1.071E+00
587	6.087E+01	628	5.039E+01	669	2.164E+01	710	5.845E+00	751	1.016E+00
588	6.098E+01	629	4.960E+01	670	2.099E+01	711	5.623E+00	752	9.810E-01
589	6.131E+01	630	4.891E+01	671	2.040E+01	712	5.463E+00	753	9.948E-01
590	6.147E+01	631	4.823E+01	672	1.988E+01	713	5.321E+00	754	9.760E-01
591	6.142E+01	632	4.759E+01	673	1.938E+01	714	5.052E+00	755	8.470E-01
592	6.169E+01	633	4.678E+01	674	1.886E+01	715	4.870E+00	756	9.291E-01
593	6.185E+01	634	4.593E+01	675	1.823E+01	716	4.699E+00	757	8.223E-01
594	6.194E+01	635	4.536E+01	676	1.779E+01	717	4.568E+00	758	4.349E-01
595	6.190E+01	636	4.458E+01	677	1.719E+01	718	4.421E+00	759	5.996E-01
596	6.210E+01	637	4.387E+01	678	1.674E+01	719	4.142E+00	760	6.556E-01
597	6.215E+01	638	4.322E+01	679	1.632E+01	720	4.022E+00	761	6.615E-01
598	6.216E+01	639	4.244E+01	680	1.586E+01	721	3.836E+00	762	7.490E-01
599	6.198E+01	640	4.178E+01	681	1.535E+01	722	3.723E+00	763	7.315E-01
600	6.207E+01	641	4.095E+01	682	1.484E+01	723	3.582E+00	764	5.421E-01
601	6.211E+01	642	4.034E+01	683	1.448E+01	724	3.326E+00	765	5.123E-01
602	6.170E+01	643	3.942E+01	684	1.407E+01	725	3.346E+00	766	4.633E-01
603	6.168E+01	644	3.874E+01	685	1.357E+01	726	3.144E+00	767	6.460E-01
604	6.171E+01	645	3.805E+01	686	1.323E+01	727	3.024E+00	768	6.040E-01
605	6.156E+01	646	3.716E+01	687	1.282E+01	728	2.778E+00	769	4.817E-01
606	6.119E+01	647	3.653E+01	688	1.248E+01	729	2.787E+00	770	3.809E-01
607	6.115E+01	648	3.576E+01	689	1.203E+01	730	2.672E+00	771	4.412E-01
608	6.085E+01	649	3.518E+01	690	1.166E+01	731	2.551E+00	772	5.390E-01
609	6.062E+01	650	3.421E+01	691	1.131E+01	732	2.481E+00	773	4.313E-01
610	6.005E+01	651	3.350E+01	692	1.097E+01	733	2.176E+00	774	3.136E-01
611	5.971E+01	652	3.281E+01	693	1.063E+01	734	2.210E+00	775	3.870E-01
612	5.947E+01	653	3.216E+01	694	1.027E+01	735	2.127E+00	776	3.282E-01
613	5.915E+01	654	3.132E+01	695	9.964E+00	736	2.010E+00	777	2.495E-01
614	5.858E+01	655	3.067E+01	696	9.594E+00	737	1.946E+00	778	2.992E-01
615	5.833E+01	656	3.008E+01	697	9.368E+00	738	1.753E+00	779	3.647E-01
616	5.767E+01	657	2.937E+01	698	9.072E+00	739	1.697E+00	780	2.398E-01
617	5.724E+01	658	2.862E+01	699	8.751E+00	740	1.752E+00		
618	5.669E+01	659	2.788E+01	700	8.463E+00	741	1.589E+00		
619	5.619E+01	660	2.726E+01	701	8.157E+00	742	1.590E+00		
620	5.543E+01	661	2.665E+01	702	7.843E+00	743	1.538E+00		
621	5.500E+01	662	2.583E+01	703	7.538E+00	744	1.384E+00		
622	5.426E+01	663	2.520E+01	704	7.342E+00	745	1.268E+00		
623	5.356E+01	664	2.457E+01	705	7.087E+00	746	1.182E+00		
624	5.304E+01	665	2.398E+01	706	6.810E+00	747	1.137E+00		
625	5.235E+01	666	2.338E+01	707	6.607E+00	748	1.120E+00		

CIE 1931xy Chromaticity Diagram



7-Step Chromaticity Quadrangles





### [Goniophotometer System]

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

Test orientation: **Downward**

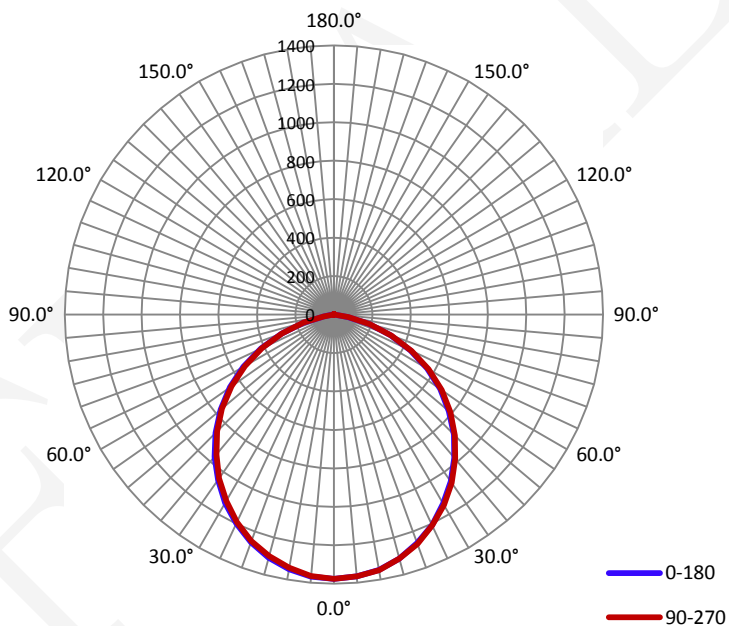
### Electrical Measurement

Input Voltage(V)	Frequency(Hz)	Input Current(A)	Power (W)	Power Factor
120.0	60	0.2330	27.47	0.9820

### Photometric Measurement

Luminous Flux(lm)	Efficacy(lm/W)	$I_{max}(cd)$	S/MH(C0/180)	S/MH(C90/270)
3623.2	131.95	1374.2	1.23	1.23

### Luminous Intensity Distribution



	C0/180	C45/225	C90/270	C135/315	AVG.
Beam Angle(50% $I_{max}$ ):	108.1	108.2	108.2	108.1	108.2
Field Angle(10% $I_{max}$ ):	153.5	153.6	153.6	153.6	153.6

**Luminous Intensity (cd) Distribution Data**

C y	0°	22.5°	45°	67.5°	90°	112.5°	135°	157.5°
0.0°	1374	1374	1374	1374	1374	1374	1374	1374
5.0°	1367	1371	1371	1369	1367	1372	1368	1365
10.0°	1348	1352	1352	1352	1351	1352	1348	1345
15.0°	1315	1318	1318	1319	1315	1321	1317	1313
20.0°	1264	1270	1269	1272	1270	1270	1268	1266
25.0°	1208	1210	1211	1213	1210	1214	1209	1205
30.0°	1136	1143	1146	1144	1144	1145	1142	1139
35.0°	1060	1062	1067	1068	1068	1066	1062	1058
40.0°	974	977	981	982	981	981	978	974
45.0°	882	885	889	892	890	891	885	881
50.0°	781	789	791	793	791	792	787	781
55.0°	674	681	684	686	684	686	680	673
60.0°	559	564	568	570	568	566	563	557
65.0°	439	443	445	450	447	444	441	435
70.0°	312	318	320	321	320	319	313	307
75.0°	188	193	195	195	194	193	188	182
80.0°	75	76	79	79	77	75	73	69
85.0°	11	12	12	12	12	11	11	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	0	1	0	0	1
150.0°	0	1	1	1	1	1	1	1
155.0°	1	1	2	2	2	2	2	2
160.0°	2	2	2	2	3	2	2	2
165.0°	2	2	2	3	3	3	3	3
170.0°	3	3	3	3	3	3	3	3
175.0°	3	3	3	3	4	4	4	4
180.0°	0	0	0	0	0	0	0	0

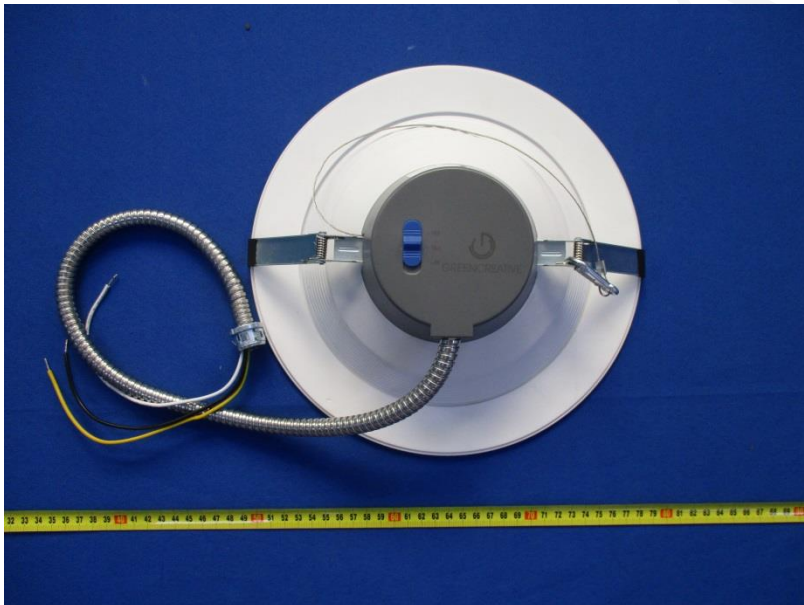
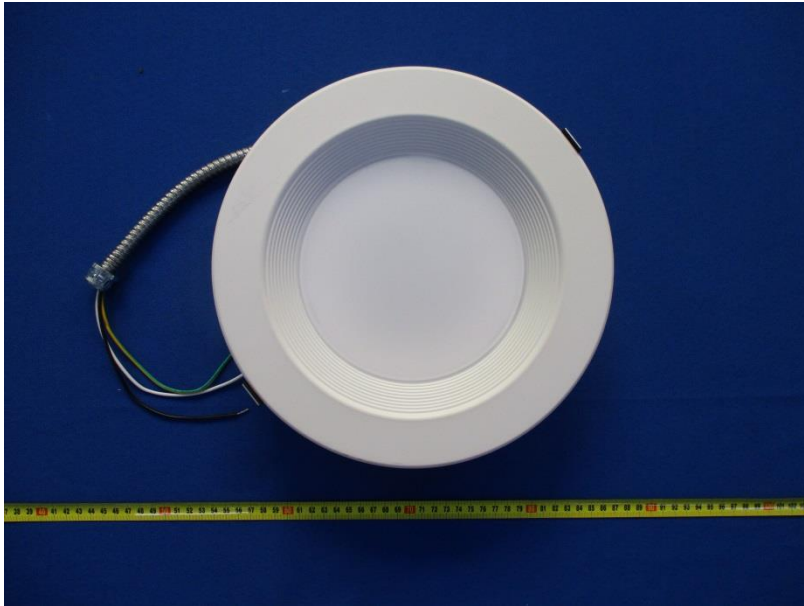
Luminous Intensity (cd) Distribution Data (cont.)

C γ	180°	202.5°	225°	247.5°	270°	292.5°	315°	337.5°
0.0°	1374	1374	1374	1374	1374	1374	1374	1374
5.0°	1368	1369	1365	1366	1365	1366	1364	1364
10.0°	1346	1344	1343	1343	1337	1342	1344	1343
15.0°	1310	1310	1307	1304	1301	1305	1306	1305
20.0°	1261	1259	1256	1254	1253	1256	1256	1257
25.0°	1199	1198	1193	1193	1192	1194	1195	1196
30.0°	1132	1126	1123	1121	1120	1123	1126	1126
35.0°	1050	1048	1042	1044	1040	1042	1044	1050
40.0°	966	960	955	956	951	956	957	961
45.0°	871	865	862	860	859	863	866	868
50.0°	770	766	762	759	760	763	764	769
55.0°	659	656	651	651	649	653	654	659
60.0°	543	536	534	533	534	535	539	543
65.0°	419	413	411	412	413	414	418	422
70.0°	291	288	287	285	286	291	292	295
75.0°	165	164	163	162	164	167	168	172
80.0°	54	51	51	52	54	55	57	61
85.0°	8	9	9	9	9	10	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	0	0	0	0	0
150.0°	0	0	1	1	1	1	1	1
155.0°	1	1	1	2	1	2	1	1
160.0°	1	2	2	2	2	2	2	2
165.0°	2	2	3	3	2	3	2	3
170.0°	2	3	3	3	3	3	3	3
175.0°	2	3	4	4	3	4	3	3
180.0°	0	0	0	0	0	0	0	0

### Zonal Lumen Density Measurement

Deg	Flux (lm)	%	Deg	Flux (lm)	%
0-5	32.8	0.90	0-5	32.8	0.90
5-10	97.1	2.68	0-10	129.9	3.58
10-15	157.7	4.35	0-15	287.5	7.94
15-20	212.1	5.85	0-20	499.6	13.79
20-25	258.5	7.14	0-25	758.2	20.93
25-30	295.6	8.16	0-30	1053.8	29.08
30-35	322.2	8.89	0-35	1376.0	37.98
35-40	337.5	9.31	0-40	1713.4	47.29
40-45	341.4	9.42	0-45	2054.8	56.71
45-50	333.7	9.21	0-50	2388.5	65.92
50-55	313.9	8.66	0-55	2702.4	74.59
55-60	281.6	7.77	0-60	2984.0	82.36
60-65	238.2	6.57	0-65	3222.1	88.93
65-70	185.3	5.11	0-70	3407.4	94.05
70-75	125.7	3.47	0-75	3533.1	97.51
75-80	65.0	1.80	0-80	3598.2	99.31
80-85	20.4	0.56	0-85	3618.6	99.87
85-90	2.8	0.08	0-90	3621.4	99.95
90-95	0.0	0.00	0-95	3621.4	99.95
95-100	0.0	0.00	0-100	3621.4	99.95
100-105	0.0	0.00	0-105	3621.4	99.95
105-110	0.0	0.00	0-110	3621.4	99.95
110-115	0.0	0.00	0-115	3621.4	99.95
115-120	0.0	0.00	0-120	3621.4	99.95
120-125	0.0	0.00	0-125	3621.4	99.95
125-130	0.0	0.00	0-130	3621.4	99.95
130-135	0.0	0.00	0-135	3621.4	99.95
135-140	0.0	0.00	0-140	3621.4	99.95
140-145	0.0	0.00	0-145	3621.5	99.95
145-150	0.1	0.00	0-150	3621.6	99.96
150-155	0.3	0.01	0-155	3621.9	99.96
155-160	0.4	0.01	0-160	3622.3	99.97
160-165	0.4	0.01	0-165	3622.6	99.98
165-170	0.3	0.01	0-170	3622.9	99.99
170-175	0.2	0.01	0-175	3623.1	100.00
175-180	0.0	0.00	0-180	3623.2	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\*\*\*\*\*