TL-749

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: INFT8/850/DIM120V

Report Type:	Electrical and Photometric tests including: Luminous Flux, Chromaticity, Luminous Intensity Distribution
Test Engineer:	George Yang
Report Number:	PKS200708091-10
Test Date:	2020-07-10 to 2020-07-15
Report Date:	2020-07-16
Reviewed By:	Ray Gao/ EE Engineer
Prepared By:	Bay Area Compliance Laboratories Corp. (Kunshan). No.248 Chenghu Road, Kunshan, Jiangsu province, China. Tel: +86-0512-86175000 Fax:+86-0512-88934268
Accreditation:	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:	INFT8/850/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:	17W
Nominal CCT:	5000K
Nominal Lumen Output:	2125lm

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°C±1°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.

4π 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 Urel=2.61% (k=2), at the 95% confidence level. The uncertainty of the correlated color temperature measurements is U=34K (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 (γ) 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_f, 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	60	0.1497	17.43	0.9703	2221.63	127.46

Radiant Flux (W)	CCT (K)	Duv	x	y	u'	v'
6.929	4976	0.00311	0.3464	0.3589	0.2095	0.4884

Color Rendering Index

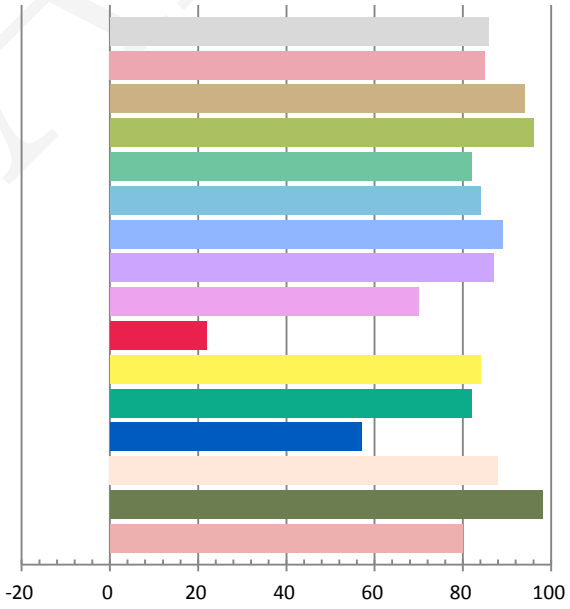
Ra
85.9

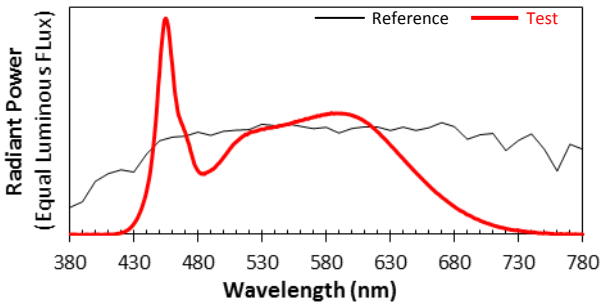
R1	R2	R3	R4
85	94	96	82

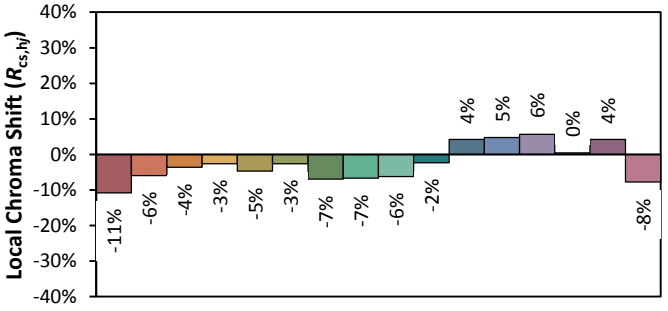
R5	R6	R7	R8
84	89	87	70

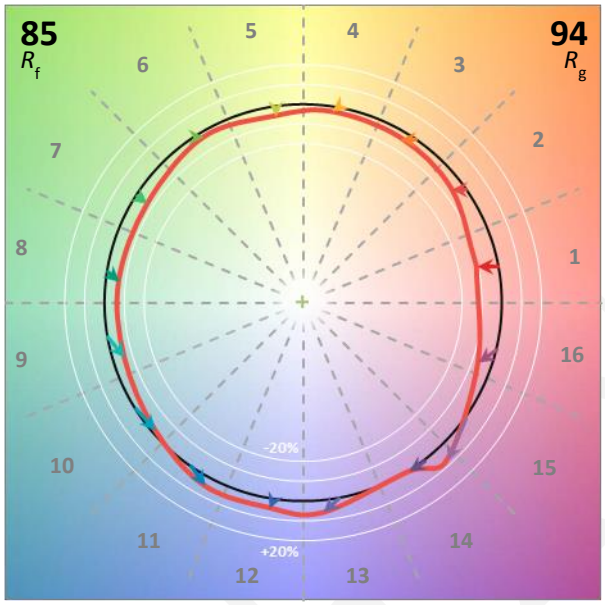
R9	R10	R11	R12
22	84	82	57

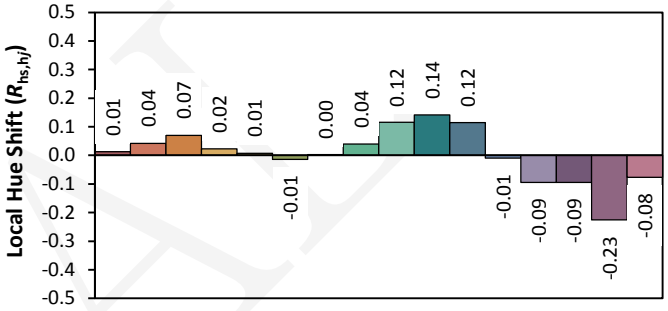
R13	R14	R15
88	98	80

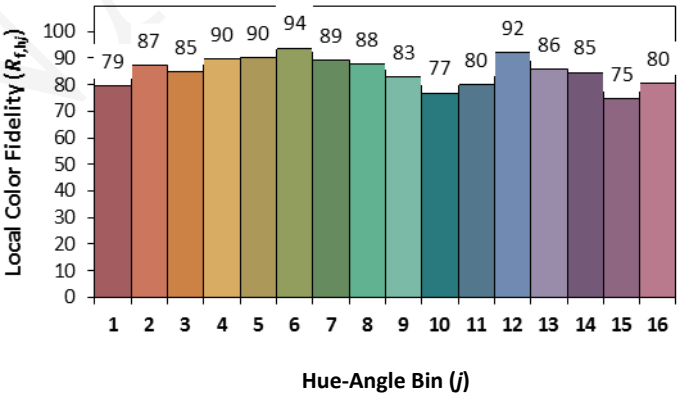


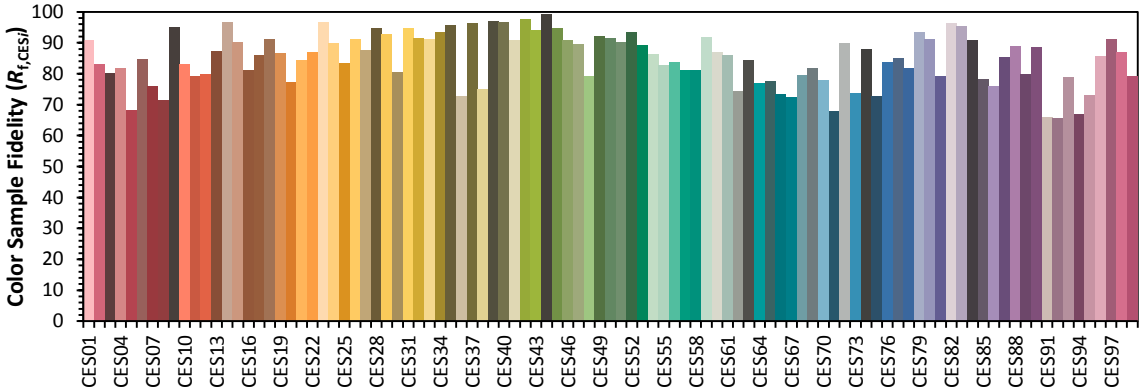

Reference
Test
Radiant Power
(Equal Luminous Flux)
380 430 480 530 580 630 680 730 780
Wavelength (nm)


Local Chroma Shift ($R_{cs,hj}$)
40% 30% 20% 10% 0% -10% -20% -30% -40%
-11% -6% -4% -3% -5% -3% -7% -7% -6% -2% 4% 5% 6% 0% 4% -8%

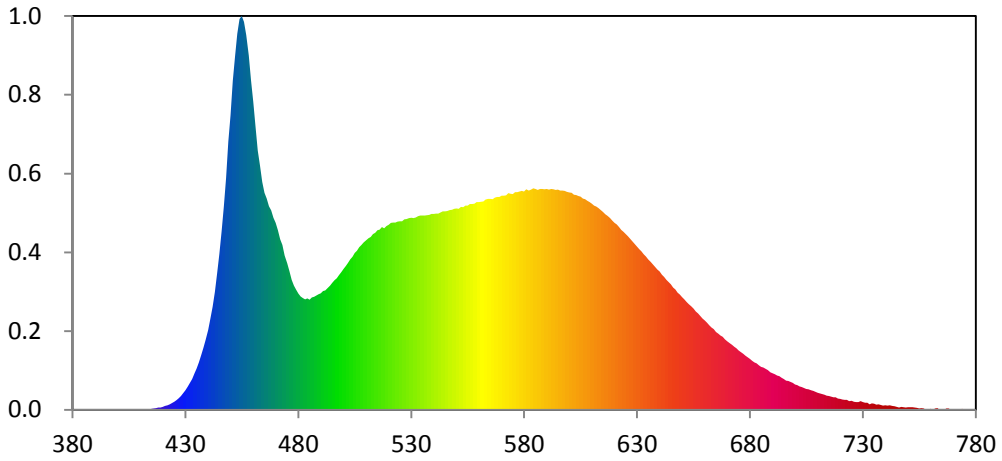

85
R_f
94
R_g
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
-20%
+20%


Local Hue Shift ($R_{hs,hj}$)
0.5 0.4 0.3 0.2 0.1 0.0 -0.1 -0.2 -0.3 -0.4 -0.5
0.01 0.04 0.07 0.02 0.01 -0.01 0.00 0.04 0.12 0.14 0.12 -0.01 -0.09 -0.09 -0.23 -0.08


Local Color Fidelity ($R_{f,hj}$)
100 90 80 70 60 50 40 30 20 10 0
79 87 85 90 90 94 89 88 83 77 80 92 86 85 75 80
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
Hue-Angle Bin (j)


Color Sample Fidelity ($R_{f,CESi}$)
100 90 80 70 60 50 40 30 20 10 0
CES01 CES04 CES07 CES10 CES13 CES16 CES19 CES22 CES25 CES28 CES31 CES34 CES37 CES40 CES43 CES46 CES49 CES52 CES55 CES58 CES61 CES64 CES67 CES70 CES73 CES76 CES79 CES82 CES85 CES88 CES91 CES94 CES97

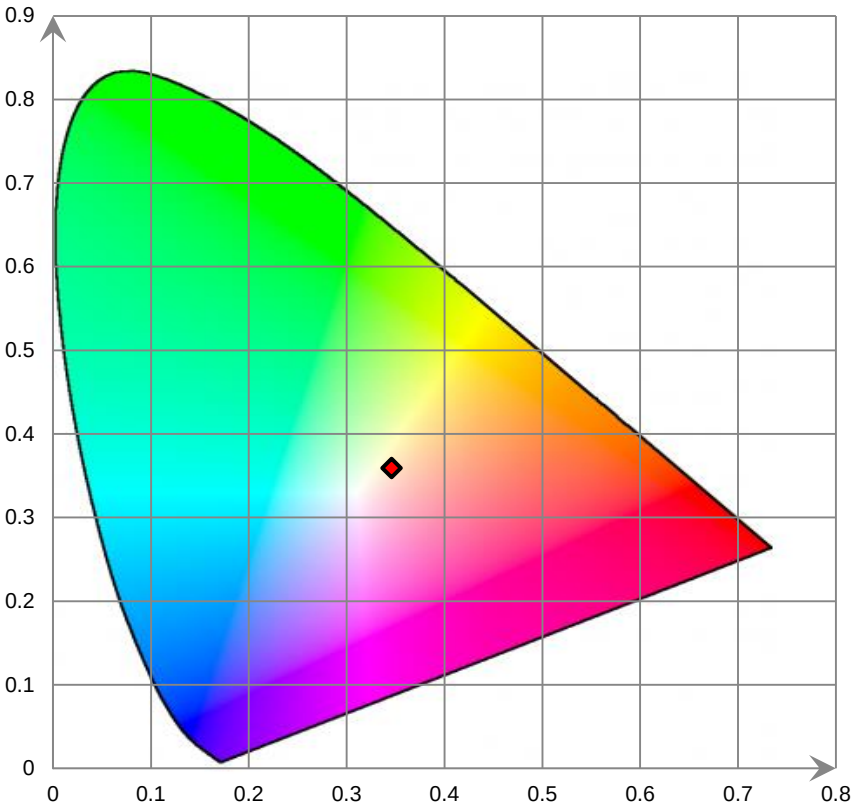
Relative Spectral Power Distribution



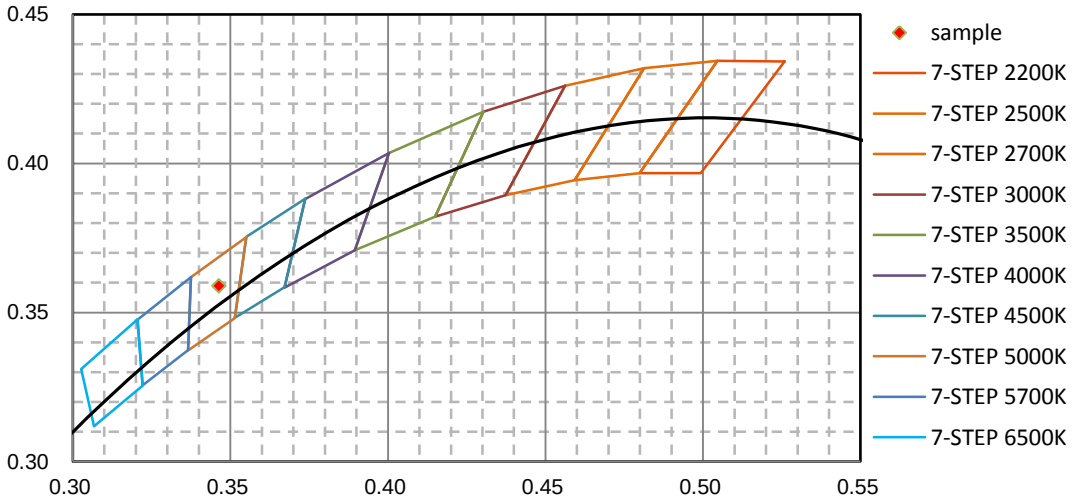
nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
380	2.460E-02	421	6.103E-01	462	4.069E+01	503	2.362E+01	544	3.113E+01
381	1.970E-02	422	6.713E-01	463	3.835E+01	504	2.403E+01	545	3.112E+01
382	5.150E-02	423	8.285E-01	464	3.574E+01	505	2.463E+01	546	3.118E+01
383	1.420E-02	424	1.046E+00	465	3.404E+01	506	2.498E+01	547	3.134E+01
384	7.610E-02	425	1.264E+00	466	3.316E+01	507	2.554E+01	548	3.140E+01
385	4.680E-02	426	1.477E+00	467	3.195E+01	508	2.589E+01	549	3.153E+01
386	2.700E-03	427	1.822E+00	468	3.127E+01	509	2.628E+01	550	3.159E+01
387	2.250E-02	428	2.163E+00	469	3.013E+01	510	2.656E+01	551	3.155E+01
388	1.600E-03	429	2.596E+00	470	2.931E+01	511	2.694E+01	552	3.184E+01
389	1.000E-04	430	3.067E+00	471	2.816E+01	512	2.715E+01	553	3.181E+01
390	2.710E-02	431	3.623E+00	472	2.677E+01	513	2.758E+01	554	3.206E+01
391	9.300E-03	432	4.195E+00	473	2.588E+01	514	2.777E+01	555	3.207E+01
392	3.000E-04	433	4.844E+00	474	2.421E+01	515	2.816E+01	556	3.230E+01
393	0.000E+00	434	5.670E+00	475	2.300E+01	516	2.827E+01	557	3.229E+01
394	0.000E+00	435	6.498E+00	476	2.176E+01	517	2.866E+01	558	3.234E+01
395	2.840E-02	436	7.437E+00	477	2.039E+01	518	2.850E+01	559	3.259E+01
396	9.000E-04	437	8.526E+00	478	1.948E+01	519	2.885E+01	560	3.258E+01
397	0.000E+00	438	9.702E+00	479	1.885E+01	520	2.903E+01	561	3.267E+01
398	0.000E+00	439	1.095E+01	480	1.825E+01	521	2.932E+01	562	3.270E+01
399	0.000E+00	440	1.250E+01	481	1.778E+01	522	2.939E+01	563	3.298E+01
400	0.000E+00	441	1.431E+01	482	1.755E+01	523	2.936E+01	564	3.312E+01
401	3.040E-02	442	1.615E+01	483	1.734E+01	524	2.953E+01	565	3.308E+01
402	3.510E-02	443	1.847E+01	484	1.750E+01	525	2.958E+01	566	3.306E+01
403	2.430E-02	444	2.137E+01	485	1.729E+01	526	2.960E+01	567	3.330E+01
404	8.000E-03	445	2.444E+01	486	1.763E+01	527	2.987E+01	568	3.341E+01
405	2.350E-02	446	2.797E+01	487	1.775E+01	528	2.993E+01	569	3.341E+01
406	3.400E-03	447	3.192E+01	488	1.791E+01	529	3.008E+01	570	3.363E+01
407	6.590E-02	448	3.637E+01	489	1.814E+01	530	3.014E+01	571	3.363E+01
408	1.440E-02	449	4.209E+01	490	1.826E+01	531	3.010E+01	572	3.366E+01
409	5.790E-02	450	4.628E+01	491	1.863E+01	532	3.019E+01	573	3.400E+01
410	7.690E-02	451	5.164E+01	492	1.875E+01	533	3.041E+01	574	3.389E+01
411	5.620E-02	452	5.547E+01	493	1.914E+01	534	3.048E+01	575	3.387E+01
412	2.360E-02	453	5.903E+01	494	1.950E+01	535	3.048E+01	576	3.418E+01
413	3.350E-02	454	6.134E+01	495	1.994E+01	536	3.049E+01	577	3.417E+01
414	9.560E-02	455	6.183E+01	496	2.032E+01	537	3.052E+01	578	3.427E+01
415	1.268E-01	456	6.087E+01	497	2.063E+01	538	3.060E+01	579	3.438E+01
416	1.978E-01	457	5.882E+01	498	2.116E+01	539	3.075E+01	580	3.426E+01
417	2.382E-01	458	5.561E+01	499	2.160E+01	540	3.073E+01	581	3.459E+01
418	3.345E-01	459	5.169E+01	500	2.211E+01	541	3.077E+01	582	3.443E+01
419	3.610E-01	460	4.834E+01	501	2.255E+01	542	3.082E+01	583	3.454E+01
420	4.333E-01	461	4.446E+01	502	2.307E+01	543	3.097E+01	584	3.475E+01

nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
585	3.467E+01	626	2.720E+01	667	1.165E+01	708	2.939E+00	749	3.288E-01
586	3.452E+01	627	2.683E+01	668	1.145E+01	709	2.794E+00	750	4.084E-01
587	3.465E+01	628	2.641E+01	669	1.103E+01	710	2.668E+00	751	3.897E-01
588	3.467E+01	629	2.601E+01	670	1.076E+01	711	2.547E+00	752	3.960E-01
589	3.461E+01	630	2.561E+01	671	1.043E+01	712	2.468E+00	753	3.476E-01
590	3.464E+01	631	2.520E+01	672	1.021E+01	713	2.380E+00	754	3.136E-01
591	3.458E+01	632	2.485E+01	673	9.891E+00	714	2.203E+00	755	1.989E-01
592	3.466E+01	633	2.443E+01	674	9.655E+00	715	2.145E+00	756	2.562E-01
593	3.459E+01	634	2.406E+01	675	9.271E+00	716	2.050E+00	757	2.166E-01
594	3.451E+01	635	2.362E+01	676	9.059E+00	717	1.946E+00	758	1.970E-02
595	3.455E+01	636	2.321E+01	677	8.800E+00	718	1.958E+00	759	1.100E-01
596	3.443E+01	637	2.280E+01	678	8.466E+00	719	1.763E+00	760	1.242E-01
597	3.440E+01	638	2.243E+01	679	8.233E+00	720	1.698E+00	761	1.107E-01
598	3.436E+01	639	2.202E+01	680	7.964E+00	721	1.607E+00	762	1.951E-01
599	3.421E+01	640	2.170E+01	681	7.682E+00	722	1.555E+00	763	2.376E-01
600	3.412E+01	641	2.117E+01	682	7.450E+00	723	1.536E+00	764	9.240E-02
601	3.404E+01	642	2.084E+01	683	7.258E+00	724	1.327E+00	765	9.330E-02
602	3.375E+01	643	2.040E+01	684	6.979E+00	725	1.411E+00	766	6.470E-02
603	3.373E+01	644	2.003E+01	685	6.728E+00	726	1.265E+00	767	1.811E-01
604	3.355E+01	645	1.967E+01	686	6.648E+00	727	1.224E+00	768	1.980E-01
605	3.346E+01	646	1.921E+01	687	6.414E+00	728	1.180E+00	769	1.063E-01
606	3.317E+01	647	1.889E+01	688	6.236E+00	729	1.327E+00	770	6.440E-02
607	3.308E+01	648	1.840E+01	689	5.876E+00	730	1.194E+00	771	1.047E-01
608	3.283E+01	649	1.807E+01	690	5.737E+00	731	1.114E+00	772	1.180E-01
609	3.261E+01	650	1.769E+01	691	5.572E+00	732	1.083E+00	773	7.980E-02
610	3.235E+01	651	1.732E+01	692	5.376E+00	733	8.639E-01	774	1.384E-01
611	3.207E+01	652	1.693E+01	693	5.260E+00	734	9.813E-01	775	1.179E-01
612	3.191E+01	653	1.658E+01	694	5.011E+00	735	9.312E-01	776	3.860E-02
613	3.166E+01	654	1.620E+01	695	4.807E+00	736	8.064E-01	777	7.500E-02
614	3.133E+01	655	1.585E+01	696	4.584E+00	737	8.310E-01	778	5.540E-02
615	3.102E+01	656	1.544E+01	697	4.499E+00	738	7.207E-01	779	8.820E-02
616	3.070E+01	657	1.509E+01	698	4.372E+00	739	6.390E-01	780	6.550E-02
617	3.042E+01	658	1.473E+01	699	4.205E+00	740	6.945E-01		
618	3.009E+01	659	1.434E+01	700	3.949E+00	741	6.370E-01		
619	2.969E+01	660	1.401E+01	701	3.879E+00	742	6.946E-01		
620	2.936E+01	661	1.368E+01	702	3.659E+00	743	5.994E-01		
621	2.910E+01	662	1.325E+01	703	3.560E+00	744	5.487E-01		
622	2.868E+01	663	1.292E+01	704	3.405E+00	745	4.300E-01		
623	2.822E+01	664	1.266E+01	705	3.261E+00	746	3.712E-01		
624	2.791E+01	665	1.220E+01	706	3.215E+00	747	4.265E-01		
625	2.759E+01	666	1.197E+01	707	3.046E+00	748	4.031E-01		

CIE 1931xy Chromaticity Diagram



7-StepChromaticity Quadrangles



[Goniophotometer System]

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

Test orientation: **Downward**

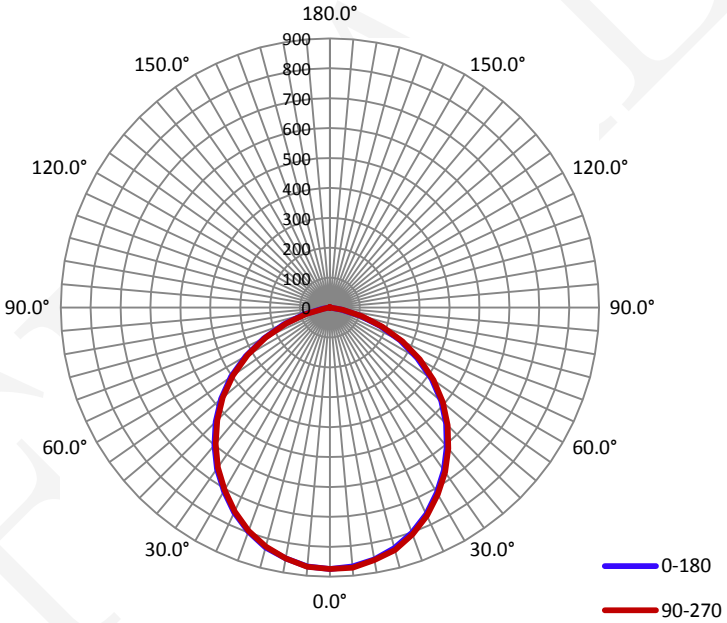
Electrical Measurement

Input Voltage(V)	Frequency(Hz)	Input Current(A)	Power (W)	Power Factor
120.0	60	0.1490	17.49	0.9760

Photometric Measurement

Luminous Flux(lm)	Efficacy(lm/W)	I_{max}(cd)	S/MH(C0/180)	S/MH(C90/270)
2231.2	127.62	874.2	1.21	1.21

Luminous Intensity Distribution



	C0/180	C45/225	C90/270	C135/315	AVG.
Beam Angle(50%I_{max}):	106.1	106.3	106.2	106.4	106.3
Field Angle(10%I_{max}):	151.3	151.4	151.4	151.4	151.4

Luminous Intensity (cd) Distribution Data

C / γ	0°	22.5°	45°	67.5°	90°	112.5°	135°	157.5°
0.0°	874	874	874	874	874	874	874	874
5.0°	869	870	872	869	873	870	873	868
10.0°	855	857	859	857	858	858	859	855
15.0°	833	836	837	835	839	837	836	831
20.0°	802	804	805	804	807	804	808	801
25.0°	763	765	765	766	768	764	765	760
30.0°	716	722	724	720	722	721	720	714
35.0°	664	668	670	671	671	670	669	662
40.0°	608	613	615	615	616	613	612	608
45.0°	549	553	556	556	557	554	553	547
50.0°	485	489	493	493	493	491	489	485
55.0°	415	419	424	424	424	420	421	415
60.0°	337	342	345	347	347	345	343	337
65.0°	259	263	266	268	268	264	262	258
70.0°	178	183	186	187	187	186	183	177
75.0°	103	106	109	112	111	108	107	102
80.0°	37	39	41	44	43	41	39	36
85.0°	6	8	8	8	8	8	8	6
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	1	0	0	0	0
170.0°	0	1	0	1	1	0	0	0
175.0°	1	1	1	1	1	0	1	0
180.0°	0	0	0	0	0	0	0	0

Luminous Intensity (cd) Distribution Data (cont.)

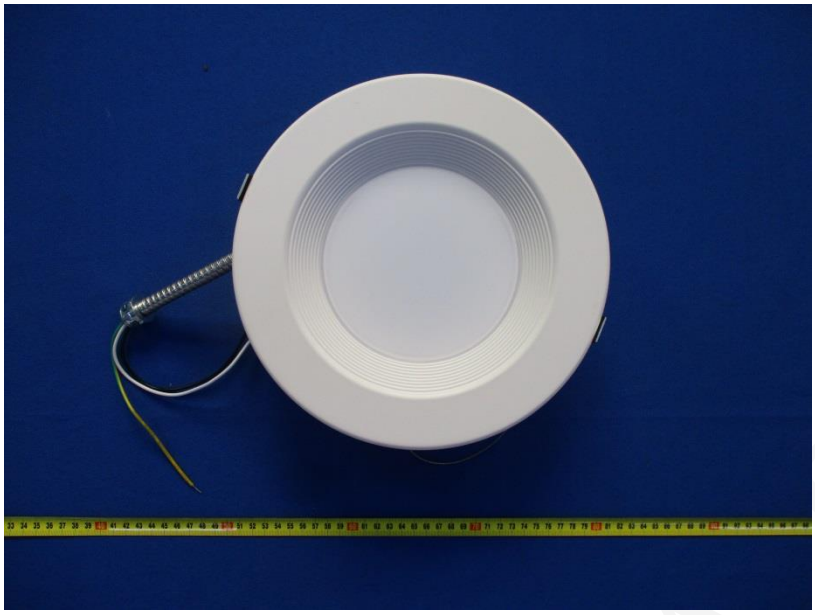
C / γ	180°	202.5°	225°	247.5°	270°	292.5°	315°	337.5°
0.0°	874	874	874	874	874	874	874	874
5.0°	869	868	869	865	870	867	872	867
10.0°	852	851	854	851	852	852	856	854
15.0°	831	829	829	824	828	828	832	829
20.0°	797	798	796	791	795	792	800	796
25.0°	757	754	754	749	753	754	756	757
30.0°	709	708	707	704	704	704	711	708
35.0°	659	658	654	651	653	652	655	658
40.0°	601	599	597	594	594	593	599	602
45.0°	540	538	537	533	533	534	539	540
50.0°	475	474	471	466	468	469	475	475
55.0°	403	400	398	394	396	396	401	402
60.0°	325	322	319	316	318	317	321	324
65.0°	245	243	239	236	237	237	241	245
70.0°	165	162	159	157	156	158	162	165
75.0°	89	85	84	82	82	84	87	90
80.0°	26	24	22	21	22	24	25	28
85.0°	4	4	4	4	4	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	1	0	1	0	0	0
170.0°	0	0	1	1	1	1	0	0
175.0°	0	1	1	1	1	1	1	1
180.0°	0	0	0	0	0	0	0	0

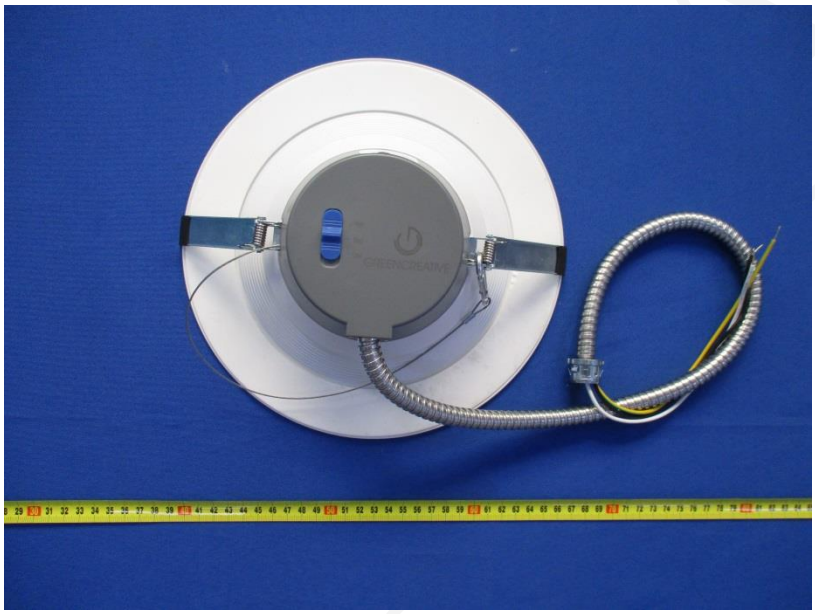
Zonal Lumen Density Measurement

Deg	Flux (lm)	%
0-5	20.8	0.93
5-10	61.7	2.76
10-15	100.1	4.48
15-20	134.5	6.03
20-25	163.5	7.33
25-30	186.4	8.35
30-35	202.5	9.07
35-40	211.3	9.47
40-45	212.9	9.54
45-50	207.2	9.29
50-55	193.6	8.67
55-60	171.3	7.68
60-65	141.8	6.36
65-70	107.3	4.81
70-75	70.1	3.14
75-80	34.3	1.54
80-85	10.2	0.46
85-90	1.6	0.07
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	20.8	0.93
0-10	82.5	3.70
0-15	182.6	8.18
0-20	317.1	14.21
0-25	480.6	21.54
0-30	667.0	29.89
0-35	869.4	38.97
0-40	1080.7	48.44
0-45	1293.7	57.98
0-50	1500.9	67.27
0-55	1694.5	75.94
0-60	1865.7	83.62
0-65	2007.6	89.98
0-70	2114.9	94.79
0-75	2185.0	97.93
0-80	2219.3	99.47
0-85	2229.5	99.93
0-90	2231.1	100.00
0-95	2231.1	100.00
0-100	2231.1	100.00
0-105	2231.1	100.00
0-110	2231.1	100.00
0-115	2231.1	100.00
0-120	2231.1	100.00
0-125	2231.1	100.00
0-130	2231.1	100.00
0-135	2231.1	100.00
0-140	2231.1	100.00
0-145	2231.1	100.00
0-150	2231.1	100.00
0-155	2231.1	100.00
0-160	2231.1	100.00
0-165	2231.1	100.00
0-170	2231.1	100.00
0-175	2231.2	100.00
0-180	2231.2	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**********