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: INFT6/850/DIM120V

Report Type:	Electrical and Photometric tests including: Luminous Flux, Chromaticity, Luminous Intensity Distribution
Test Engineer:	George Yang
Report Number:	PKS200708087-10
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:	INFT6/850/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:	13W
Nominal CCT:	5000K
Nominal Lumen Output:	1600lm

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**

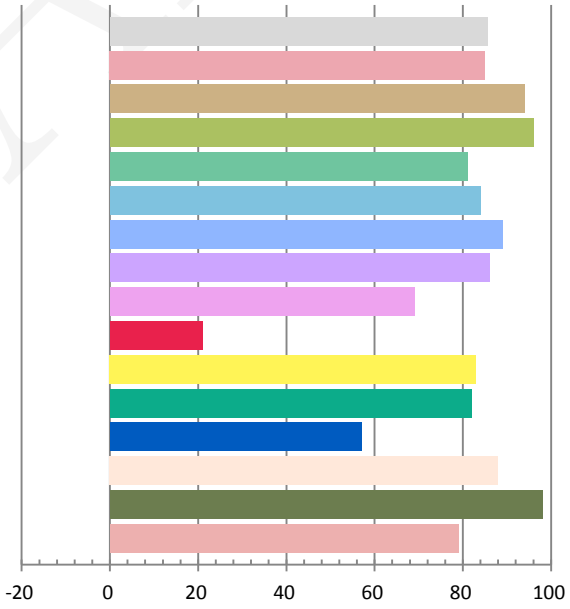
Photometric and Electrical Measurement Result

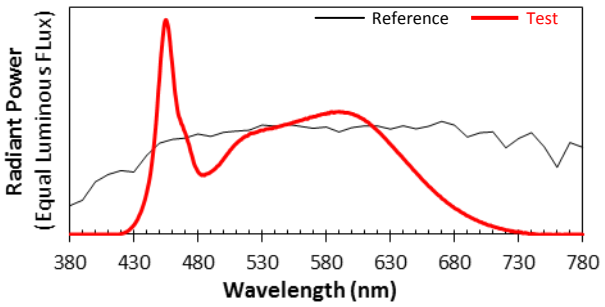
Voltage(V)	Frequency(Hz)	Current(A)	Power (W)	Power Factor	Luminous Flux(lm)	Efficacy(lm/W)
120.01	60	0.1167	13.42	0.9582	1726.77	128.67

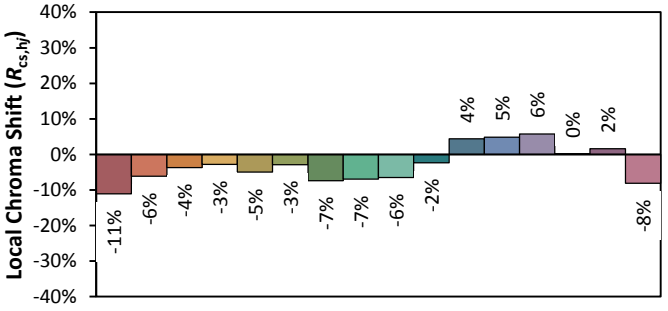
Radiant Flux (W)	CCT (K)	Duv	x	y	u'	v'
5.334	4891	0.00286	0.3489	0.3604	0.2106	0.4895

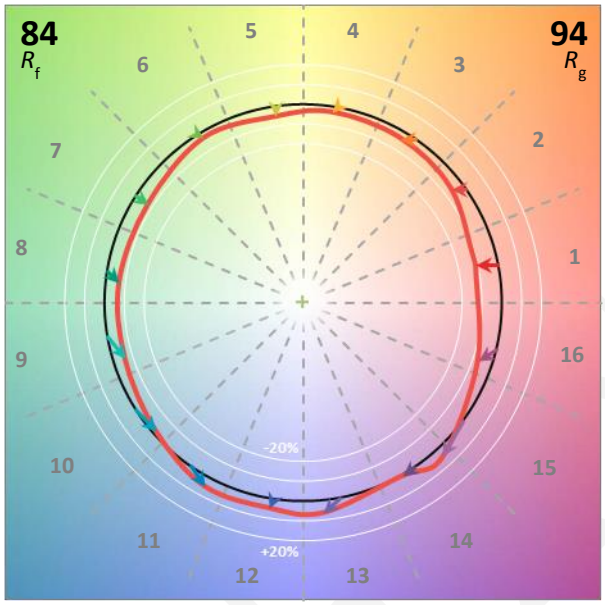
Color Rendering Index

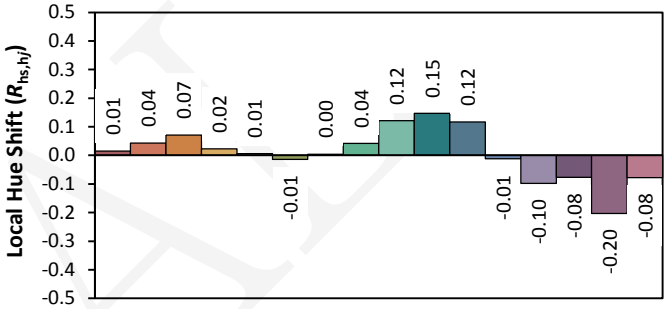
Ra			
85.6			
R1	R2	R3	R4
85	94	96	81
R5	R6	R7	R8
84	89	86	69
R9	R10	R11	R12
21	83	82	57
R13	R14	R15	
88	98	79	

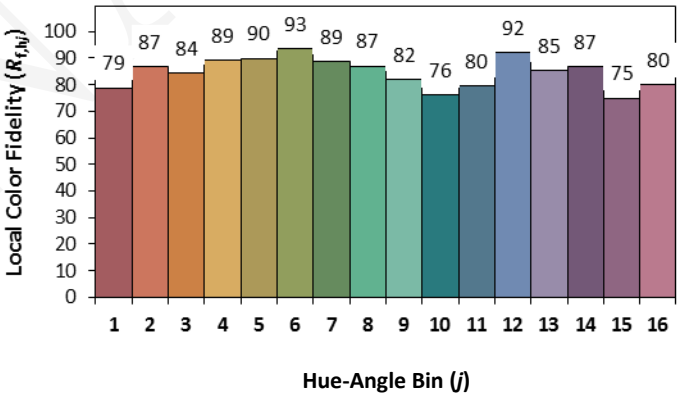


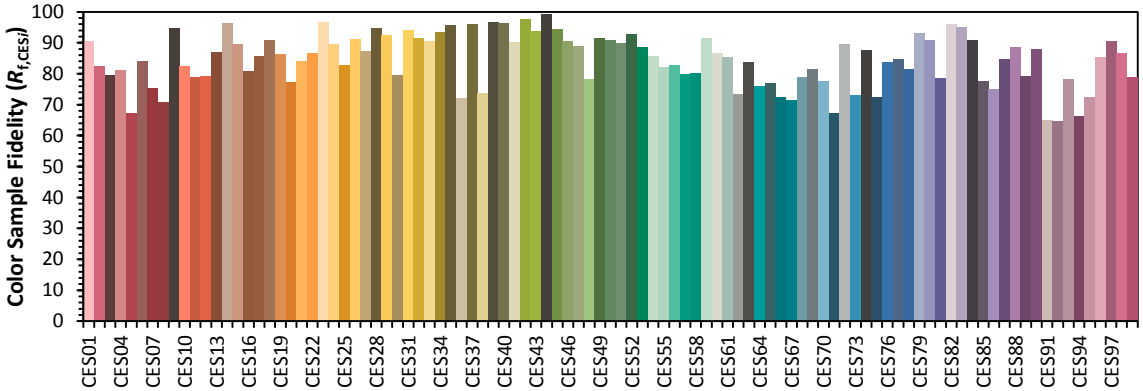

Reference
Test
Radiant Power
(Equal Luminous Flux)
380 430 480 530 580 630 680 730 780
Wavelength (nm)


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% 2% -8%

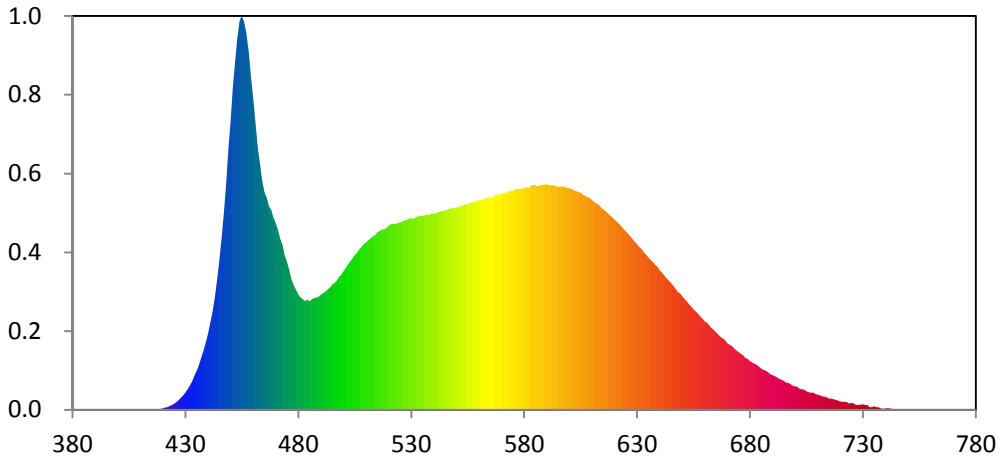

84
R_f
94
R_g
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
-20%
+20%


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 0.15 0.12 -0.01 -0.10 -0.08 -0.20 -0.08


Local Color Fidelity ($R_{f,hj}$)
100 90 80 70 60 50 40 30 20 10 0
79 87 84 89 90 93 89 87 82 76 80 92 85 87 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

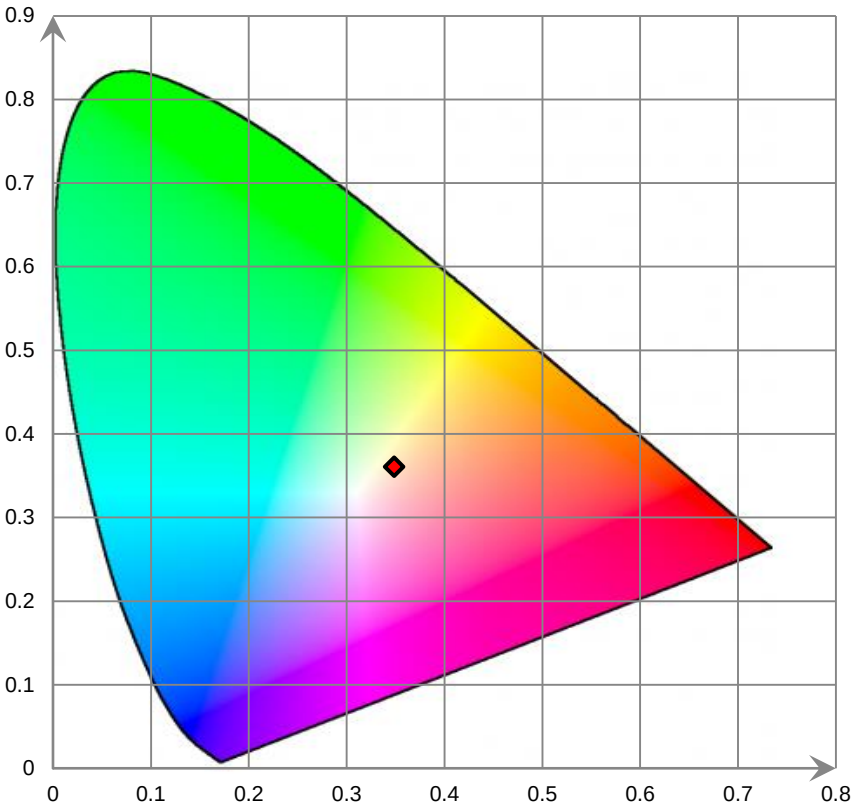
Relative Spectral Power Distribution



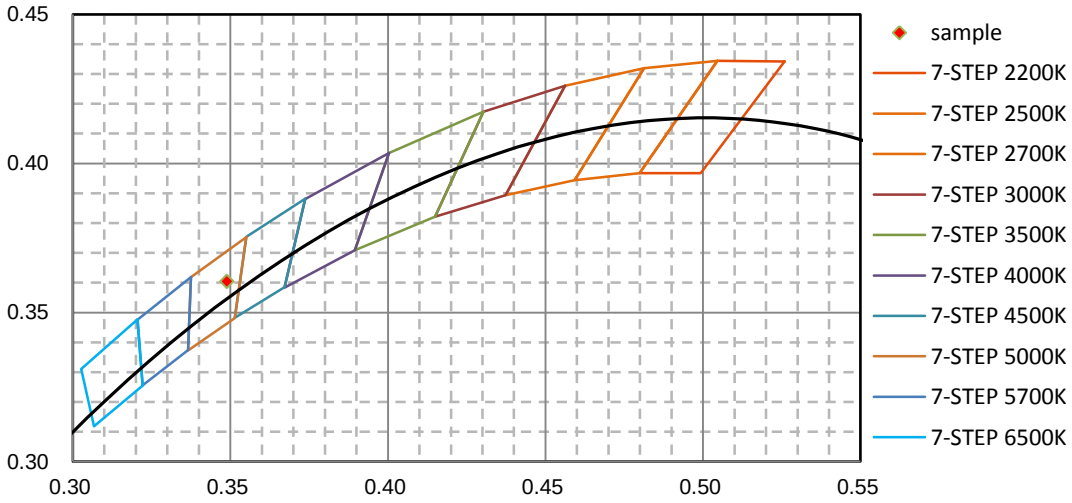
nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
380	0.000E+00	421	2.553E-01	462	3.182E+01	503	1.798E+01	544	2.407E+01
381	0.000E+00	422	3.083E-01	463	2.981E+01	504	1.830E+01	545	2.415E+01
382	0.000E+00	423	4.501E-01	464	2.778E+01	505	1.874E+01	546	2.422E+01
383	0.000E+00	424	5.829E-01	465	2.637E+01	506	1.901E+01	547	2.437E+01
384	0.000E+00	425	7.509E-01	466	2.572E+01	507	1.942E+01	548	2.444E+01
385	0.000E+00	426	9.298E-01	467	2.467E+01	508	1.973E+01	549	2.447E+01
386	0.000E+00	427	1.173E+00	468	2.423E+01	509	2.004E+01	550	2.453E+01
387	0.000E+00	428	1.467E+00	469	2.331E+01	510	2.028E+01	551	2.454E+01
388	0.000E+00	429	1.754E+00	470	2.266E+01	511	2.057E+01	552	2.472E+01
389	0.000E+00	430	2.087E+00	471	2.183E+01	512	2.080E+01	553	2.476E+01
390	0.000E+00	431	2.491E+00	472	2.073E+01	513	2.104E+01	554	2.493E+01
391	0.000E+00	432	2.960E+00	473	2.006E+01	514	2.118E+01	555	2.493E+01
392	0.000E+00	433	3.442E+00	474	1.877E+01	515	2.151E+01	556	2.508E+01
393	0.000E+00	434	4.092E+00	475	1.786E+01	516	2.165E+01	557	2.514E+01
394	0.000E+00	435	4.686E+00	476	1.684E+01	517	2.188E+01	558	2.518E+01
395	0.000E+00	436	5.386E+00	477	1.573E+01	518	2.184E+01	559	2.532E+01
396	0.000E+00	437	6.246E+00	478	1.508E+01	519	2.203E+01	560	2.537E+01
397	0.000E+00	438	7.112E+00	479	1.452E+01	520	2.229E+01	561	2.540E+01
398	0.000E+00	439	8.061E+00	480	1.397E+01	521	2.249E+01	562	2.556E+01
399	0.000E+00	440	9.258E+00	481	1.363E+01	522	2.251E+01	563	2.568E+01
400	0.000E+00	441	1.059E+01	482	1.340E+01	523	2.255E+01	564	2.578E+01
401	0.000E+00	442	1.195E+01	483	1.321E+01	524	2.260E+01	565	2.569E+01
402	0.000E+00	443	1.365E+01	484	1.332E+01	525	2.273E+01	566	2.574E+01
403	0.000E+00	444	1.578E+01	485	1.316E+01	526	2.277E+01	567	2.603E+01
404	0.000E+00	445	1.813E+01	486	1.339E+01	527	2.295E+01	568	2.610E+01
405	0.000E+00	446	2.077E+01	487	1.352E+01	528	2.301E+01	569	2.609E+01
406	0.000E+00	447	2.381E+01	488	1.358E+01	529	2.318E+01	570	2.621E+01
407	2.600E-03	448	2.723E+01	489	1.370E+01	530	2.319E+01	571	2.621E+01
408	3.000E-04	449	3.153E+01	490	1.393E+01	531	2.317E+01	572	2.628E+01
409	0.000E+00	450	3.485E+01	491	1.410E+01	532	2.332E+01	573	2.646E+01
410	0.000E+00	451	3.904E+01	492	1.431E+01	533	2.345E+01	574	2.652E+01
411	0.000E+00	452	4.208E+01	493	1.455E+01	534	2.347E+01	575	2.655E+01
412	0.000E+00	453	4.499E+01	494	1.480E+01	535	2.351E+01	576	2.672E+01
413	0.000E+00	454	4.711E+01	495	1.517E+01	536	2.356E+01	577	2.674E+01
414	0.000E+00	455	4.774E+01	496	1.535E+01	537	2.361E+01	578	2.678E+01
415	0.000E+00	456	4.707E+01	497	1.563E+01	538	2.359E+01	579	2.686E+01
416	3.000E-03	457	4.572E+01	498	1.609E+01	539	2.380E+01	580	2.681E+01
417	8.500E-03	458	4.338E+01	499	1.638E+01	540	2.379E+01	581	2.704E+01
418	6.120E-02	459	4.035E+01	500	1.680E+01	541	2.379E+01	582	2.689E+01
419	9.420E-02	460	3.771E+01	501	1.719E+01	542	2.396E+01	583	2.715E+01
420	1.691E-01	461	3.479E+01	502	1.759E+01	543	2.401E+01	584	2.726E+01

nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
585	2.721E+01	626	2.135E+01	667	8.857E+00	708	2.085E+00	749	5.420E-02
586	2.706E+01	627	2.104E+01	668	8.631E+00	709	1.912E+00	750	2.700E-03
587	2.722E+01	628	2.073E+01	669	8.470E+00	710	1.809E+00	751	1.300E-03
588	2.725E+01	629	2.036E+01	670	8.072E+00	711	1.742E+00	752	1.900E-03
589	2.727E+01	630	2.010E+01	671	7.857E+00	712	1.622E+00	753	6.400E-03
590	2.734E+01	631	1.975E+01	672	7.699E+00	713	1.601E+00	754	4.200E-03
591	2.721E+01	632	1.952E+01	673	7.455E+00	714	1.494E+00	755	3.000E-04
592	2.721E+01	633	1.914E+01	674	7.157E+00	715	1.349E+00	756	1.660E-02
593	2.724E+01	634	1.883E+01	675	6.961E+00	716	1.335E+00	757	2.000E-04
594	2.711E+01	635	1.849E+01	676	6.785E+00	717	1.288E+00	758	0.000E+00
595	2.703E+01	636	1.816E+01	677	6.579E+00	718	1.184E+00	759	4.100E-03
596	2.703E+01	637	1.792E+01	678	6.290E+00	719	1.105E+00	760	1.000E-04
597	2.708E+01	638	1.757E+01	679	6.181E+00	720	1.015E+00	761	0.000E+00
598	2.700E+01	639	1.733E+01	680	5.876E+00	721	9.616E-01	762	0.000E+00
599	2.690E+01	640	1.691E+01	681	5.719E+00	722	9.563E-01	763	1.700E-02
600	2.684E+01	641	1.663E+01	682	5.601E+00	723	9.102E-01	764	2.000E-04
601	2.679E+01	642	1.630E+01	683	5.448E+00	724	7.286E-01	765	0.000E+00
602	2.656E+01	643	1.593E+01	684	5.234E+00	725	8.310E-01	766	0.000E+00
603	2.651E+01	644	1.567E+01	685	5.015E+00	726	7.388E-01	767	0.000E+00
604	2.638E+01	645	1.539E+01	686	4.846E+00	727	5.911E-01	768	0.000E+00
605	2.632E+01	646	1.505E+01	687	4.733E+00	728	5.919E-01	769	0.000E+00
606	2.605E+01	647	1.470E+01	688	4.582E+00	729	6.291E-01	770	0.000E+00
607	2.596E+01	648	1.432E+01	689	4.287E+00	730	6.609E-01	771	0.000E+00
608	2.575E+01	649	1.411E+01	690	4.190E+00	731	5.580E-01	772	0.000E+00
609	2.568E+01	650	1.378E+01	691	4.065E+00	732	5.657E-01	773	0.000E+00
610	2.543E+01	651	1.344E+01	692	3.928E+00	733	3.194E-01	774	0.000E+00
611	2.517E+01	652	1.317E+01	693	3.734E+00	734	3.010E-01	775	0.000E+00
612	2.503E+01	653	1.284E+01	694	3.633E+00	735	4.295E-01	776	0.000E+00
613	2.489E+01	654	1.249E+01	695	3.494E+00	736	2.946E-01	777	0.000E+00
614	2.454E+01	655	1.218E+01	696	3.295E+00	737	2.925E-01	778	0.000E+00
615	2.434E+01	656	1.189E+01	697	3.270E+00	738	1.439E-01	779	0.000E+00
616	2.410E+01	657	1.162E+01	698	3.112E+00	739	1.135E-01	780	0.000E+00
617	2.384E+01	658	1.133E+01	699	2.914E+00	740	1.503E-01		
618	2.356E+01	659	1.102E+01	700	2.819E+00	741	1.729E-01		
619	2.335E+01	660	1.069E+01	701	2.784E+00	742	1.437E-01		
620	2.303E+01	661	1.054E+01	702	2.574E+00	743	1.028E-01		
621	2.282E+01	662	1.023E+01	703	2.487E+00	744	1.400E-02		
622	2.253E+01	663	9.904E+00	704	2.432E+00	745	2.920E-02		
623	2.226E+01	664	9.694E+00	705	2.241E+00	746	2.400E-03		
624	2.192E+01	665	9.372E+00	706	2.117E+00	747	4.000E-03		
625	2.166E+01	666	9.126E+00	707	2.058E+00	748	3.540E-02		

CIE 1931xy Chromaticity Diagram



7-StepChromaticity Quadrangles



[Goniophotometer System]

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

Test orientation: **Downward**

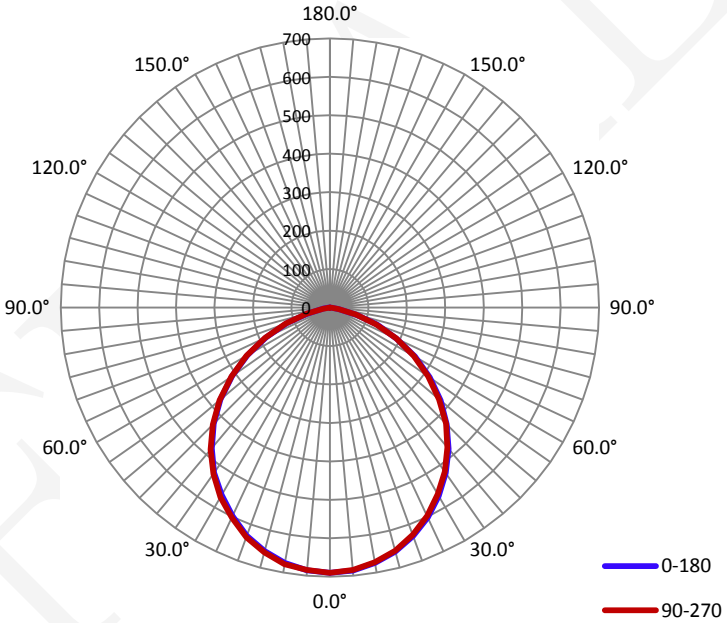
Electrical Measurement

Input Voltage(V)	Frequency(Hz)	Input Current(A)	Power (W)	Power Factor
120.0	60	0.1160	13.48	0.9640

Photometric Measurement

Luminous Flux(lm)	Efficacy(lm/W)	I_{max}(cd)	S/MH(C0/180)	S/MH(C90/270)
1734	128.69	689.4	1.22	1.22

Luminous Intensity Distribution



	C0/180	C45/225	C90/270	C135/315	AVG.
Beam Angle(50%I_{max}):	104.8	104.8	104.7	105.0	104.8
Field Angle(10%I_{max}):	149.7	149.6	149.6	149.6	149.6

Luminous Intensity (cd) Distribution Data

C / γ	0°	22.5°	45°	67.5°	90°	112.5°	135°	157.5°
0.0°	689	689	689	689	689	689	689	689
5.0°	686	686	686	685	685	686	687	686
10.0°	674	675	676	674	672	674	675	676
15.0°	658	658	655	654	655	656	657	657
20.0°	632	632	631	629	629	631	633	633
25.0°	602	600	599	598	598	598	600	602
30.0°	566	565	564	562	560	561	565	563
35.0°	526	525	521	520	521	522	524	524
40.0°	481	477	478	475	475	476	478	479
45.0°	429	430	428	426	427	426	429	429
50.0°	376	374	373	371	371	371	375	374
55.0°	317	316	313	313	312	313	314	314
60.0°	255	254	252	252	251	250	251	253
65.0°	192	193	192	190	190	189	189	189
70.0°	132	131	132	130	129	127	128	127
75.0°	73	73	72	72	71	69	68	69
80.0°	23	24	24	25	23	23	22	21
85.0°	7	7	8	8	7	7	6	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	0	0	0	0	0
170.0°	0	0	0	0	0	0	0	0
175.0°	0	0	0	0	0	0	0	1
180.0°	0	0	0	0	0	0	0	0

Luminous Intensity (cd) Distribution Data (cont.)

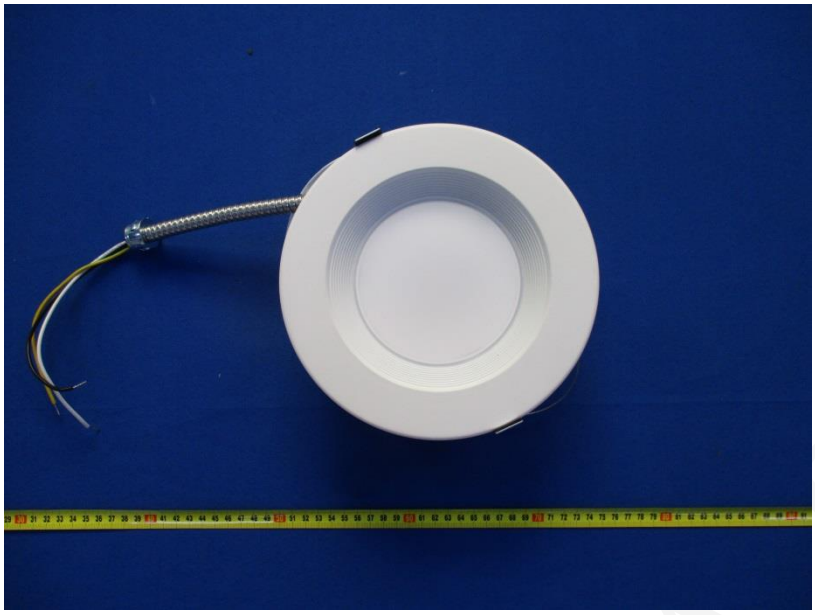
C / γ	180°	202.5°	225°	247.5°	270°	292.5°	315°	337.5°
0.0°	689	689	689	689	689	689	689	689
5.0°	686	686	686	685	685	687	687	685
10.0°	674	677	678	676	678	678	675	675
15.0°	656	659	661	661	659	658	658	657
20.0°	631	634	636	635	636	633	634	632
25.0°	599	604	605	605	603	603	603	599
30.0°	563	568	570	569	569	566	567	564
35.0°	524	527	528	527	528	528	525	524
40.0°	478	481	483	484	482	482	481	478
45.0°	427	430	431	433	431	431	431	428
50.0°	372	373	375	376	375	374	375	372
55.0°	310	312	313	315	313	313	315	312
60.0°	247	248	250	250	251	251	250	250
65.0°	182	184	185	186	186	187	188	187
70.0°	120	120	120	122	122	123	125	125
75.0°	61	60	61	62	62	64	65	66
80.0°	17	17	17	18	18	19	19	20
85.0°	4	4	5	4	5	6	6	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

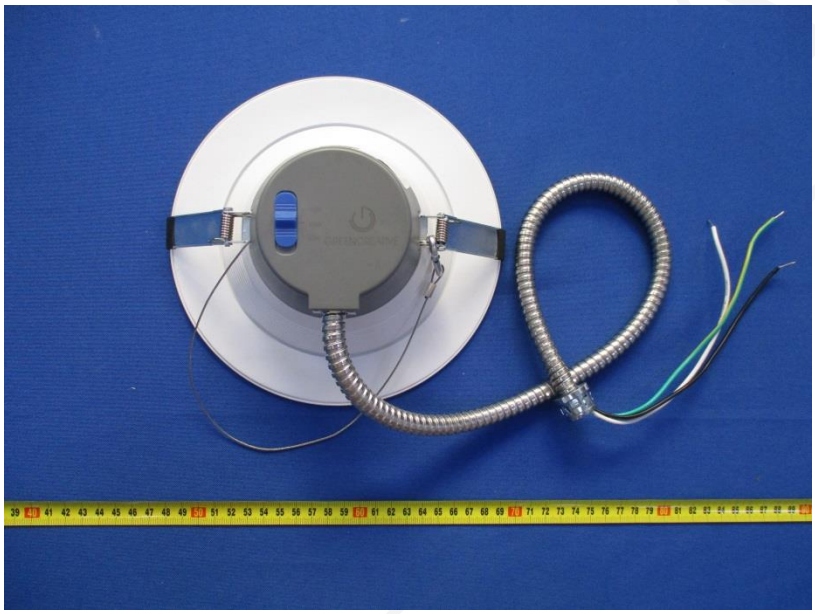
Zonal Lumen Density Measurement

Deg	Flux (lm)	%
0-5	16.4	0.95
5-10	48.7	2.81
10-15	79.1	4.56
15-20	106.3	6.13
20-25	129.4	7.46
25-30	147.6	8.51
30-35	160.5	9.25
35-40	167.5	9.66
40-45	168.2	9.70
45-50	162.2	9.35
50-55	149.3	8.61
55-60	130.4	7.52
60-65	106.7	6.16
65-70	79.5	4.58
70-75	50.3	2.90
75-80	23.3	1.35
80-85	7.2	0.41
85-90	1.6	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	16.4	0.95
0-10	65.1	3.76
0-15	144.2	8.32
0-20	250.5	14.45
0-25	379.9	21.91
0-30	527.5	30.42
0-35	687.9	39.67
0-40	855.4	49.33
0-45	1023.6	59.03
0-50	1185.8	68.38
0-55	1335.1	76.99
0-60	1465.5	84.51
0-65	1572.2	90.67
0-70	1651.7	95.25
0-75	1702.0	98.15
0-80	1725.3	99.50
0-85	1732.4	99.91
0-90	1734.0	100.00
0-95	1734.0	100.00
0-100	1734.0	100.00
0-105	1734.0	100.00
0-110	1734.0	100.00
0-115	1734.0	100.00
0-120	1734.0	100.00
0-125	1734.0	100.00
0-130	1734.0	100.00
0-135	1734.0	100.00
0-140	1734.0	100.00
0-145	1734.0	100.00
0-150	1734.0	100.00
0-155	1734.0	100.00
0-160	1734.0	100.00
0-165	1734.0	100.00
0-170	1734.0	100.00
0-175	1734.0	100.00
0-180	1734.0	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**********