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: INFT6/835/DIM120V

Report Type:	Electrical and Photometric tests including: Luminous Flux, Chromaticity, Luminous Intensity Distribution
Test Engineer:	George Yang
Report Number:	PKS200708085-10
Test Date:	2020-07-10 to 2020-07-14
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:	INFT6/835/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:	3500K
Nominal Lumen Output:	1560lm

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**

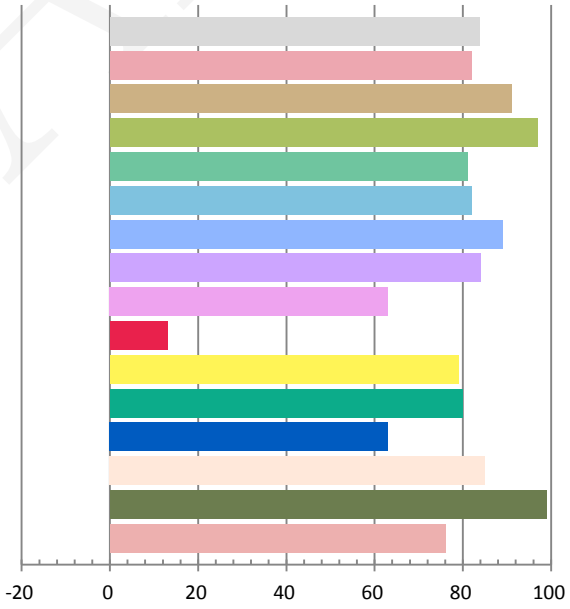
Photometric and Electrical Measurement Result

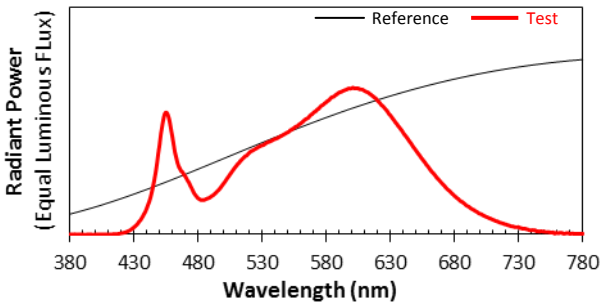
Voltage(V)	Frequency(Hz)	Current(A)	Power (W)	Power Factor	Luminous Flux(lm)	Efficacy(lm/W)
119.97	60	0.116	13.33	0.9579	1730.09	129.79

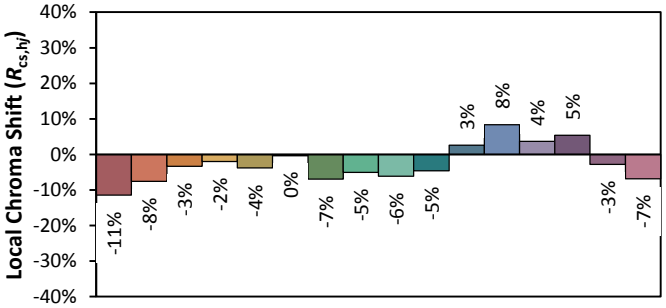
Radiant Flux (W)	CCT (K)	Duv	x	y	u'	v'
5.192	3384	0.00105	0.4132	0.3970	0.2383	0.5150

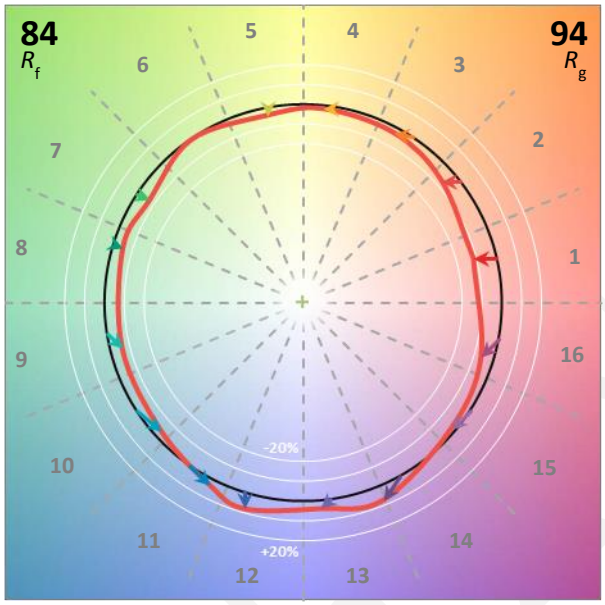
Color Rendering Index

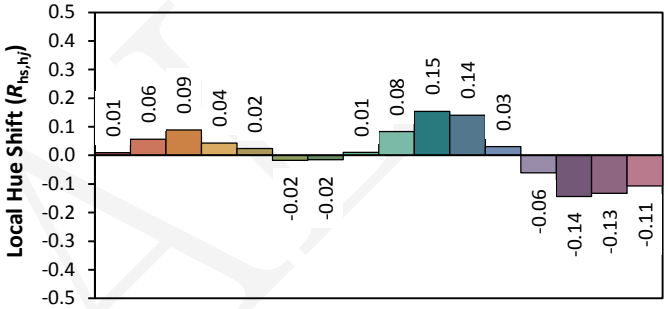
Ra			
83.7			
R1	R2	R3	R4
82	91	97	81
R5	R6	R7	R8
82	89	84	63
R9	R10	R11	R12
13	79	80	63
R13	R14	R15	
85	99	76	

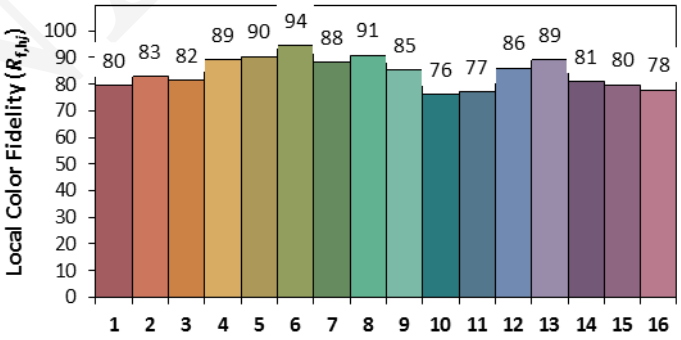


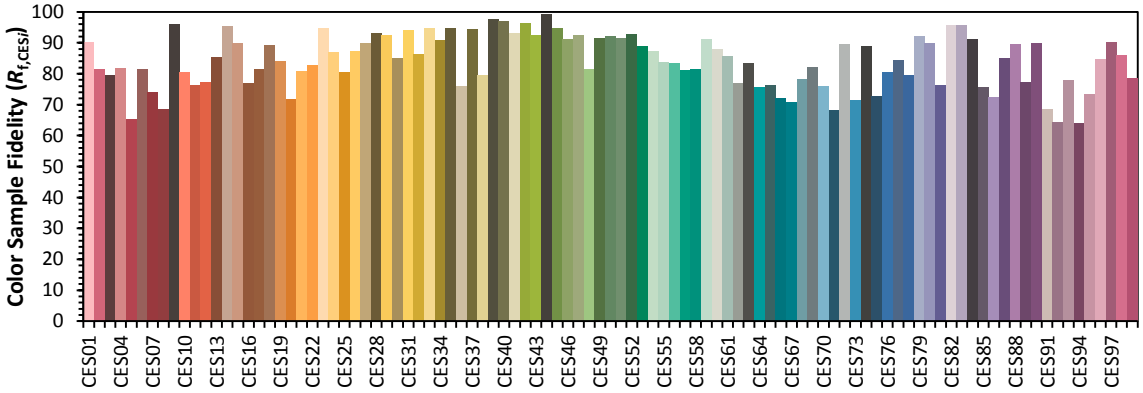

Reference
Test
Radiant Power
(Equal Luminous Flux)
380 430 480 530 580 630 680 730 780
Wavelength (nm)


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

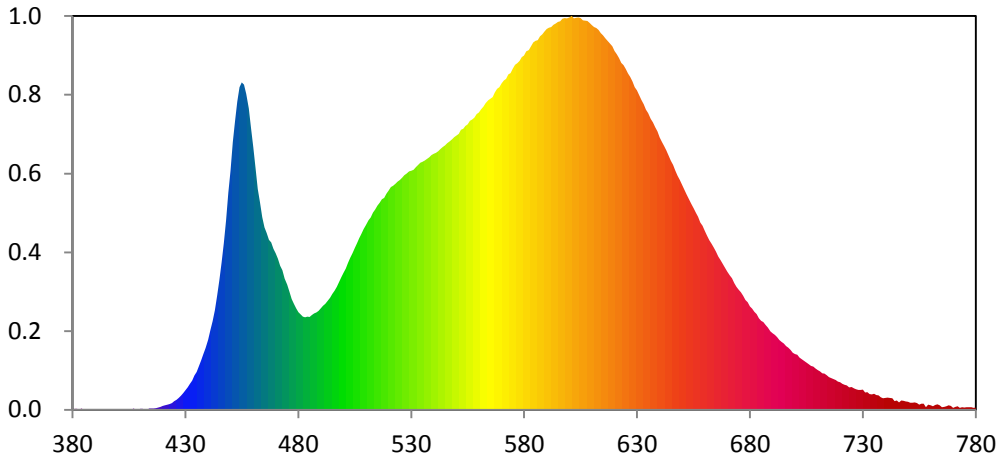

84
R_f
94
R_g
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
-20%
+20%


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 0.06 0.09 0.04 0.02 -0.02 -0.02 0.01 0.08 0.15 0.14 0.03 -0.06 -0.14 -0.13 -0.11


Local Color Fidelity ($R_{f,hj}$)
100 90 80 70 60 50 40 30 20 10 0
80 83 82 89 90 94 88 91 85 76 77 86 89 81 80 78
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

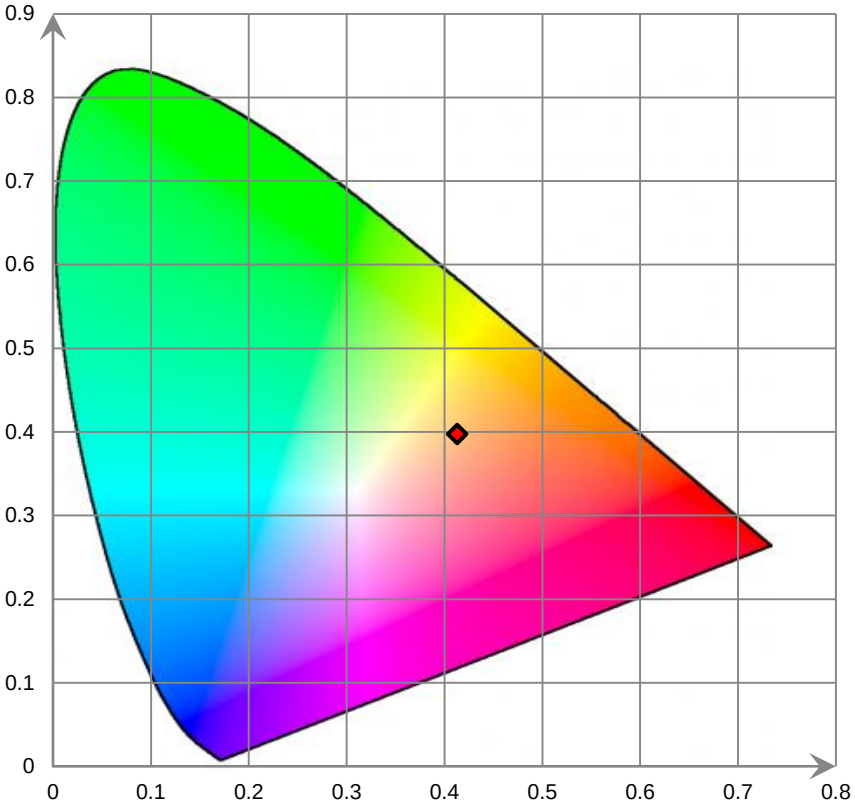
Relative Spectral Power Distribution



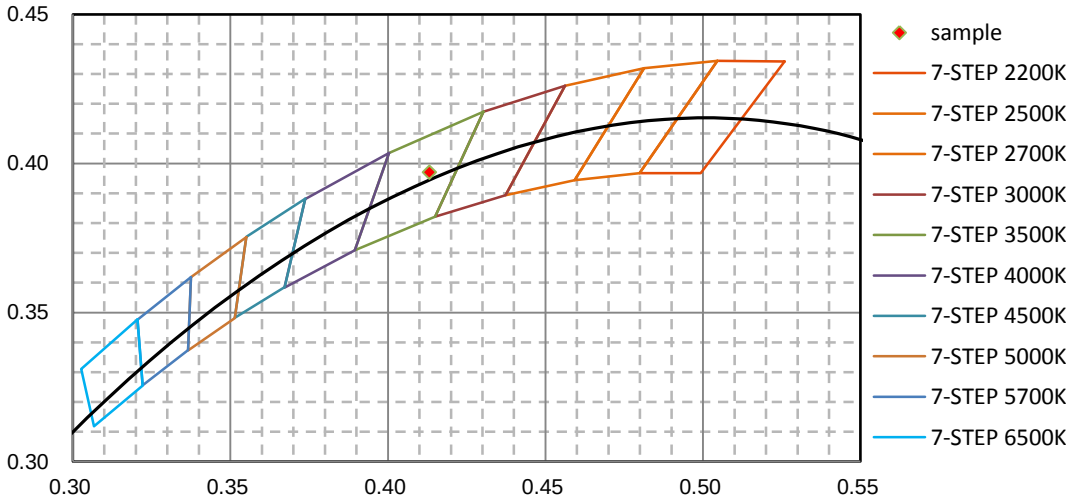
nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
380	5.470E-02	421	3.577E-01	462	1.836E+01	503	1.263E+01	544	2.184E+01
381	7.870E-02	422	4.222E-01	463	1.723E+01	504	1.301E+01	545	2.197E+01
382	6.660E-02	423	4.837E-01	464	1.601E+01	505	1.344E+01	546	2.216E+01
383	1.290E-02	424	5.612E-01	465	1.517E+01	506	1.383E+01	547	2.231E+01
384	1.000E-01	425	7.143E-01	466	1.468E+01	507	1.425E+01	548	2.247E+01
385	5.720E-02	426	8.310E-01	467	1.412E+01	508	1.464E+01	549	2.266E+01
386	9.200E-03	427	9.766E-01	468	1.391E+01	509	1.502E+01	550	2.278E+01
387	5.100E-02	428	1.167E+00	469	1.338E+01	510	1.536E+01	551	2.292E+01
388	2.210E-02	429	1.386E+00	470	1.301E+01	511	1.575E+01	552	2.328E+01
389	3.510E-02	430	1.620E+00	471	1.254E+01	512	1.599E+01	553	2.335E+01
390	5.480E-02	431	1.868E+00	472	1.197E+01	513	1.639E+01	554	2.359E+01
391	2.780E-02	432	2.141E+00	473	1.159E+01	514	1.664E+01	555	2.373E+01
392	2.700E-03	433	2.425E+00	474	1.091E+01	515	1.697E+01	556	2.401E+01
393	9.000E-04	434	2.852E+00	475	1.040E+01	516	1.721E+01	557	2.412E+01
394	2.490E-02	435	3.143E+00	476	9.802E+00	517	1.751E+01	558	2.428E+01
395	6.310E-02	436	3.603E+00	477	9.205E+00	518	1.761E+01	559	2.458E+01
396	2.190E-02	437	4.086E+00	478	8.797E+00	519	1.796E+01	560	2.472E+01
397	1.690E-02	438	4.628E+00	479	8.442E+00	520	1.821E+01	561	2.497E+01
398	7.500E-03	439	5.134E+00	480	8.103E+00	521	1.851E+01	562	2.519E+01
399	9.500E-03	440	5.830E+00	481	7.912E+00	522	1.863E+01	563	2.547E+01
400	6.000E-04	441	6.619E+00	482	7.732E+00	523	1.877E+01	564	2.571E+01
401	1.370E-02	442	7.354E+00	483	7.697E+00	524	1.897E+01	565	2.584E+01
402	1.990E-02	443	8.282E+00	484	7.728E+00	525	1.911E+01	566	2.599E+01
403	2.010E-02	444	9.467E+00	485	7.715E+00	526	1.929E+01	567	2.638E+01
404	2.340E-02	445	1.077E+01	486	7.873E+00	527	1.949E+01	568	2.669E+01
405	4.070E-02	446	1.222E+01	487	8.010E+00	528	1.961E+01	569	2.682E+01
406	1.370E-02	447	1.385E+01	488	8.089E+00	529	1.980E+01	570	2.714E+01
407	9.180E-02	448	1.574E+01	489	8.212E+00	530	1.987E+01	571	2.736E+01
408	7.300E-03	449	1.802E+01	490	8.419E+00	531	1.994E+01	572	2.750E+01
409	5.960E-02	450	1.990E+01	491	8.643E+00	532	2.015E+01	573	2.789E+01
410	7.080E-02	451	2.223E+01	492	8.800E+00	533	2.036E+01	574	2.799E+01
411	6.800E-02	452	2.399E+01	493	9.066E+00	534	2.052E+01	575	2.835E+01
412	6.250E-02	453	2.562E+01	494	9.320E+00	535	2.062E+01	576	2.867E+01
413	3.050E-02	454	2.682E+01	495	9.638E+00	536	2.071E+01	577	2.881E+01
414	1.049E-01	455	2.720E+01	496	9.895E+00	537	2.085E+01	578	2.900E+01
415	1.106E-01	456	2.702E+01	497	1.022E+01	538	2.098E+01	579	2.931E+01
416	9.020E-02	457	2.626E+01	498	1.060E+01	539	2.118E+01	580	2.945E+01
417	1.329E-01	458	2.506E+01	499	1.100E+01	540	2.129E+01	581	2.979E+01
418	1.830E-01	459	2.340E+01	500	1.138E+01	541	2.137E+01	582	2.989E+01
419	2.399E-01	460	2.184E+01	501	1.174E+01	542	2.150E+01	583	3.023E+01
420	3.279E-01	461	2.012E+01	502	1.221E+01	543	2.168E+01	584	3.053E+01

nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
585	3.067E+01	626	2.797E+01	667	1.246E+01	708	3.595E+00	749	6.898E-01
586	3.071E+01	627	2.765E+01	668	1.213E+01	709	3.430E+00	750	6.700E-01
587	3.103E+01	628	2.729E+01	669	1.181E+01	710	3.295E+00	751	5.928E-01
588	3.119E+01	629	2.681E+01	670	1.148E+01	711	3.200E+00	752	5.835E-01
589	3.143E+01	630	2.656E+01	671	1.117E+01	712	3.038E+00	753	5.988E-01
590	3.164E+01	631	2.614E+01	672	1.092E+01	713	2.998E+00	754	5.449E-01
591	3.175E+01	632	2.575E+01	673	1.053E+01	714	2.868E+00	755	4.291E-01
592	3.181E+01	633	2.539E+01	674	1.021E+01	715	2.715E+00	756	4.928E-01
593	3.199E+01	634	2.496E+01	675	9.961E+00	716	2.634E+00	757	5.054E-01
594	3.210E+01	635	2.465E+01	676	9.762E+00	717	2.546E+00	758	2.129E-01
595	3.225E+01	636	2.418E+01	677	9.466E+00	718	2.466E+00	759	4.369E-01
596	3.229E+01	637	2.389E+01	678	9.133E+00	719	2.335E+00	760	3.578E-01
597	3.249E+01	638	2.349E+01	679	8.928E+00	720	2.294E+00	761	2.875E-01
598	3.255E+01	639	2.315E+01	680	8.595E+00	721	2.147E+00	762	4.082E-01
599	3.252E+01	640	2.265E+01	681	8.396E+00	722	2.079E+00	763	4.533E-01
600	3.261E+01	641	2.226E+01	682	8.124E+00	723	2.015E+00	764	3.576E-01
601	3.274E+01	642	2.191E+01	683	7.941E+00	724	1.849E+00	765	2.042E-01
602	3.253E+01	643	2.153E+01	684	7.611E+00	725	1.883E+00	766	2.429E-01
603	3.257E+01	644	2.112E+01	685	7.394E+00	726	1.782E+00	767	2.977E-01
604	3.261E+01	645	2.070E+01	686	7.295E+00	727	1.690E+00	768	3.632E-01
605	3.257E+01	646	2.035E+01	687	7.050E+00	728	1.647E+00	769	3.076E-01
606	3.238E+01	647	1.988E+01	688	6.845E+00	729	1.654E+00	770	1.523E-01
607	3.234E+01	648	1.944E+01	689	6.528E+00	730	1.662E+00	771	2.395E-01
608	3.232E+01	649	1.909E+01	690	6.367E+00	731	1.436E+00	772	2.799E-01
609	3.215E+01	650	1.868E+01	691	6.232E+00	732	1.472E+00	773	1.475E-01
610	3.197E+01	651	1.829E+01	692	6.028E+00	733	1.292E+00	774	2.178E-01
611	3.181E+01	652	1.789E+01	693	5.794E+00	734	1.287E+00	775	1.881E-01
612	3.173E+01	653	1.753E+01	694	5.628E+00	735	1.327E+00	776	2.022E-01
613	3.156E+01	654	1.709E+01	695	5.493E+00	736	1.227E+00	777	2.164E-01
614	3.130E+01	655	1.675E+01	696	5.285E+00	737	1.184E+00	778	2.077E-01
615	3.111E+01	656	1.638E+01	697	5.147E+00	738	1.021E+00	779	1.675E-01
616	3.088E+01	657	1.604E+01	698	4.973E+00	739	9.487E-01	780	1.965E-01
617	3.066E+01	658	1.557E+01	699	4.740E+00	740	9.698E-01		
618	3.042E+01	659	1.528E+01	700	4.619E+00	741	1.016E+00		
619	3.021E+01	660	1.487E+01	701	4.561E+00	742	9.721E-01		
620	2.982E+01	661	1.447E+01	702	4.323E+00	743	9.555E-01		
621	2.954E+01	662	1.410E+01	703	4.197E+00	744	7.210E-01		
622	2.923E+01	663	1.380E+01	704	4.057E+00	745	7.665E-01		
623	2.883E+01	664	1.349E+01	705	3.923E+00	746	6.218E-01		
624	2.865E+01	665	1.313E+01	706	3.811E+00	747	7.642E-01		
625	2.833E+01	666	1.274E+01	707	3.655E+00	748	7.366E-01		

CIE 1931xy Chromaticity Diagram



7-StepChromaticity Quadrangles



[Goniophotometer System]

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

Test orientation: **Downward**

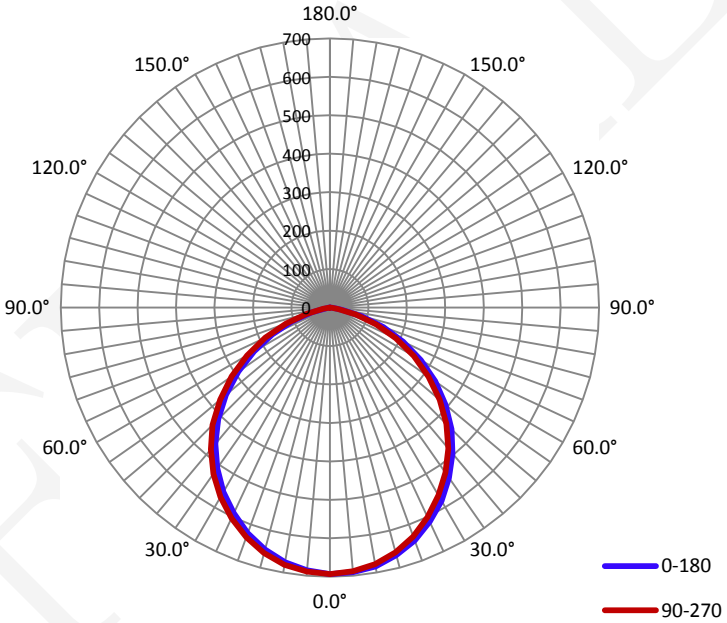
Electrical Measurement

Input Voltage(V)	Frequency(Hz)	Input Current(A)	Power (W)	Power Factor
120.0	60	0.1150	13.35	0.9640

Photometric Measurement

Luminous Flux(lm)	Efficacy(lm/W)	I_{max}(cd)	S/MH(C0/180)	S/MH(C90/270)
1736.1	130.09	692.9	1.22	1.22

Luminous Intensity Distribution



	C0/180	C45/225	C90/270	C135/315	AVG.
Beam Angle(50%I_{max}):	104.4	104.4	104.4	104.4	104.4
Field Angle(10%I_{max}):	149.7	149.7	149.6	149.7	149.7

Luminous Intensity (cd) Distribution Data

C / γ	0°	22.5°	45°	67.5°	90°	112.5°	135°	157.5°
0.0°	693	693	693	693	693	693	693	693
5.0°	691	691	688	690	689	687	688	687
10.0°	684	681	681	679	678	676	676	675
15.0°	667	667	665	660	659	654	653	654
20.0°	645	644	641	636	634	630	628	628
25.0°	614	614	610	603	602	597	595	593
30.0°	581	579	575	570	564	559	556	555
35.0°	540	539	534	529	524	517	515	514
40.0°	496	495	489	484	479	471	469	466
45.0°	448	445	442	435	428	420	418	416
50.0°	392	391	386	380	372	364	361	360
55.0°	334	333	327	321	313	305	301	300
60.0°	273	272	266	259	251	244	239	237
65.0°	210	208	204	196	189	182	177	174
70.0°	148	146	141	136	128	122	118	114
75.0°	86	86	82	76	71	64	60	57
80.0°	32	32	30	26	23	19	17	16
85.0°	8	9	9	8	7	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	1
180.0°	0	0	0	0	0	0	0	0

Luminous Intensity (cd) Distribution Data (cont.)

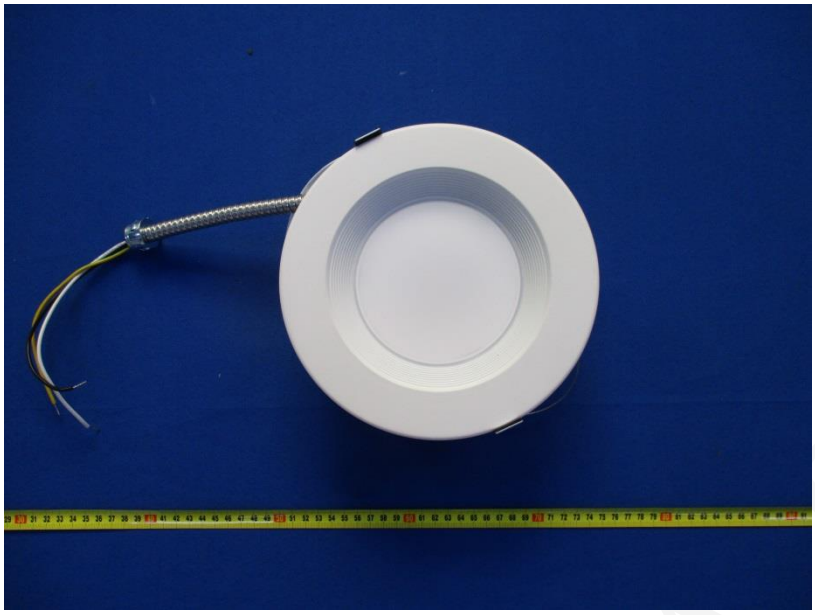
C / γ	180°	202.5°	225°	247.5°	270°	292.5°	315°	337.5°
0.0°	693	693	693	693	693	693	693	693
5.0°	686	687	686	687	689	689	692	692
10.0°	672	674	675	676	679	679	683	681
15.0°	651	651	654	657	661	663	665	668
20.0°	624	625	628	632	636	639	641	644
25.0°	591	593	597	599	605	607	613	614
30.0°	553	556	559	564	569	571	577	579
35.0°	510	514	517	522	528	533	536	538
40.0°	463	466	468	476	481	487	491	494
45.0°	411	412	417	424	432	434	441	444
50.0°	353	355	359	367	373	378	384	389
55.0°	291	293	299	306	312	318	325	328
60.0°	228	230	236	241	249	255	262	265
65.0°	165	167	172	177	185	192	198	202
70.0°	105	105	109	116	122	129	135	140
75.0°	49	49	53	58	63	70	75	78
80.0°	12	13	14	16	19	22	25	27
85.0°	2	2	3	4	5	7	7	8
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

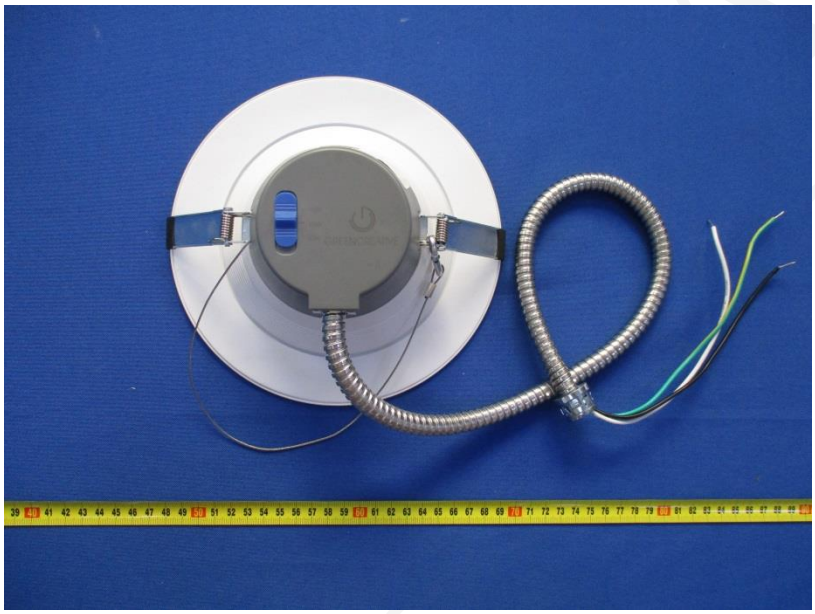
Zonal Lumen Density Measurement

Deg	Flux (lm)	%
0-5	16.5	0.95
5-10	48.9	2.82
10-15	79.3	4.57
15-20	106.6	6.14
20-25	129.8	7.48
25-30	148.0	8.52
30-35	160.8	9.26
35-40	167.7	9.66
40-45	168.3	9.69
45-50	162.0	9.33
50-55	149.0	8.58
55-60	130.2	7.50
60-65	106.4	6.13
65-70	79.3	4.57
70-75	50.4	2.90
75-80	23.7	1.36
80-85	7.4	0.43
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	16.5	0.95
0-10	65.4	3.77
0-15	144.7	8.34
0-20	251.4	14.48
0-25	381.2	21.96
0-30	529.2	30.48
0-35	690.0	39.75
0-40	857.7	49.41
0-45	1026.0	59.10
0-50	1188.0	68.43
0-55	1337.1	77.02
0-60	1467.2	84.51
0-65	1573.7	90.65
0-70	1653.0	95.21
0-75	1703.4	98.12
0-80	1727.1	99.48
0-85	1734.5	99.91
0-90	1736.1	100.00
0-95	1736.1	100.00
0-100	1736.1	100.00
0-105	1736.1	100.00
0-110	1736.1	100.00
0-115	1736.1	100.00
0-120	1736.1	100.00
0-125	1736.1	100.00
0-130	1736.1	100.00
0-135	1736.1	100.00
0-140	1736.1	100.00
0-145	1736.1	100.00
0-150	1736.1	100.00
0-155	1736.1	100.00
0-160	1736.1	100.00
0-165	1736.1	100.00
0-170	1736.1	100.00
0-175	1736.1	100.00
0-180	1736.1	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**********