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: INFT8/840/DIM120V

Report Type:	Electrical and Photometric tests including: Luminous Flux, Chromaticity, Luminous Intensity Distribution
Test Engineer:	George Yang
Report Number:	PKS200708090-10
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:	INFT8/840/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:	17W
Nominal CCT:	4000K
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	0.1483	17.28	0.971	2233.97	129.28

Radiant Flux (W)	CCT (K)	Duv	x	y	u'	v'
6.756	3991	0.00208	0.3823	0.3824	0.2241	0.5043

Color Rendering Index

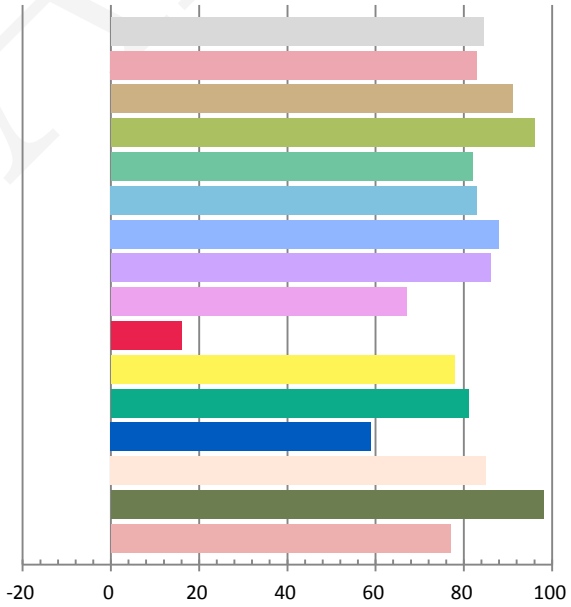
Ra
84.4

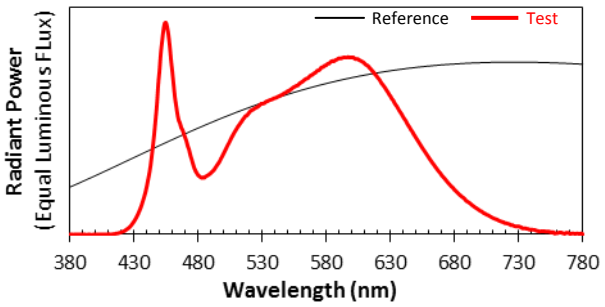
R1	R2	R3	R4
83	91	96	82

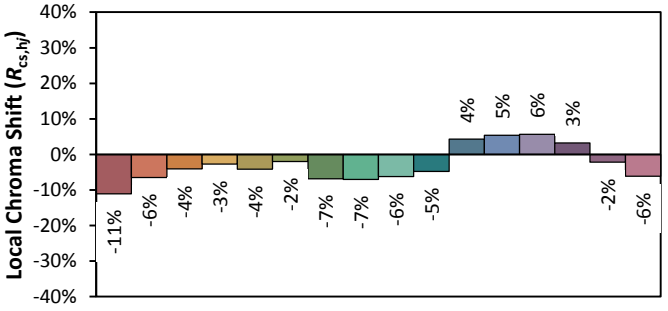
R5	R6	R7	R8
83	88	86	67

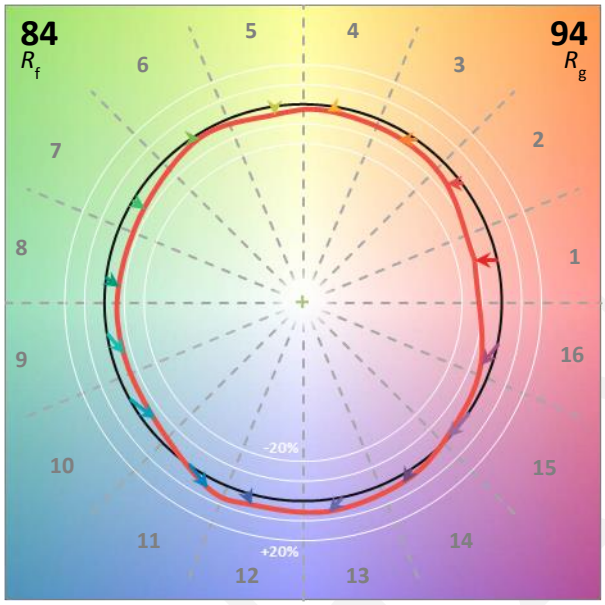
R9	R10	R11	R12
16	78	81	59

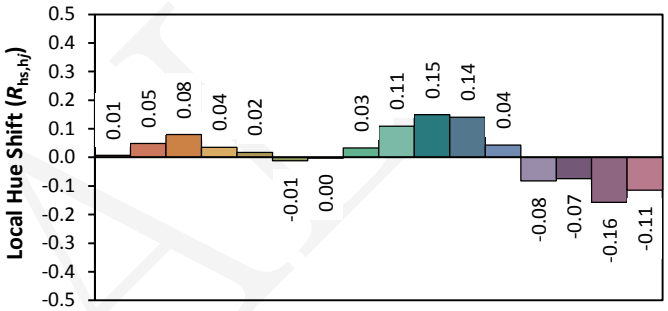
R13	R14	R15
85	98	77

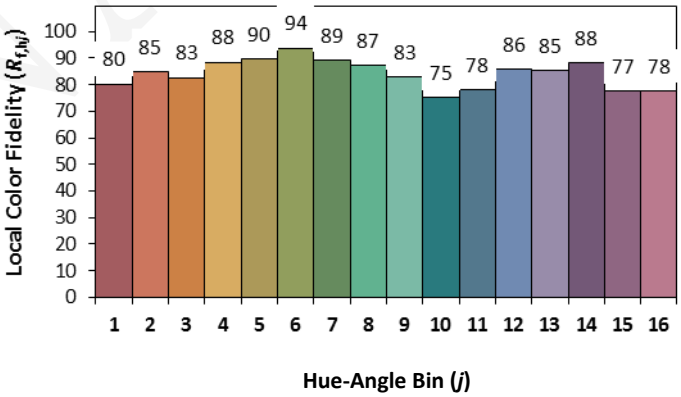


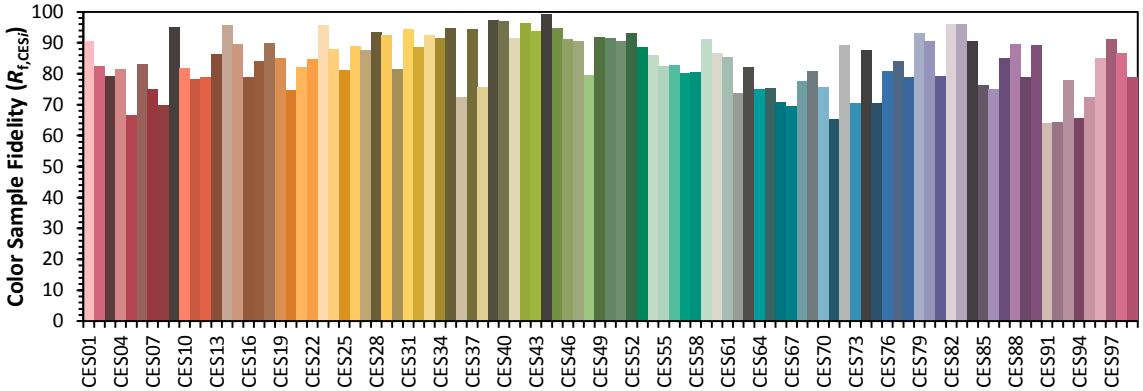

Reference
Test
Radiant Power
(Equal Luminous Flux)
380 430 480 530 580 630 680 730 780
Wavelength (nm)


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

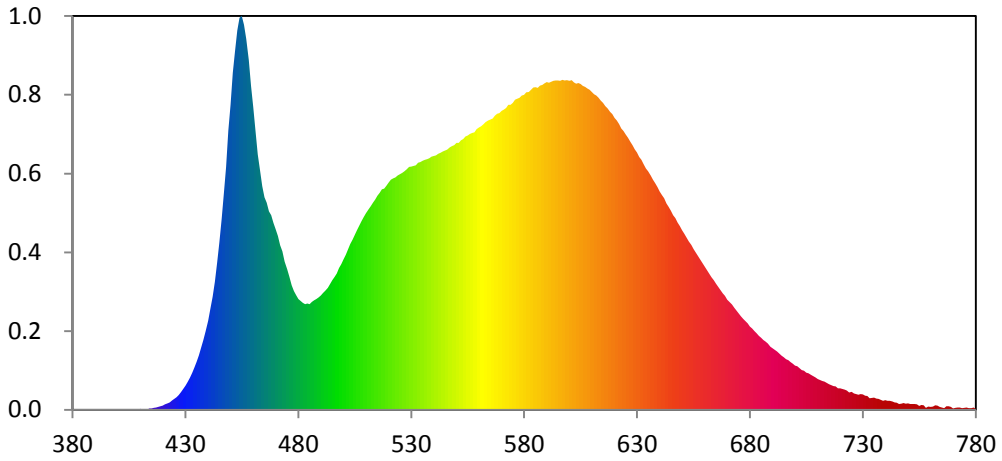

84
R_f
94
R_g
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
-20%
+20%


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 0.05 0.08 0.04 0.02 -0.01 0.00 0.03 0.11 0.15 0.14 0.04 -0.08 -0.07 -0.16 -0.11


Local Color Fidelity ($R_{f,hj}$)
100 90 80 70 60 50 40 30 20 10 0
80 85 83 88 90 94 89 87 83 75 78 86 85 88 77 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

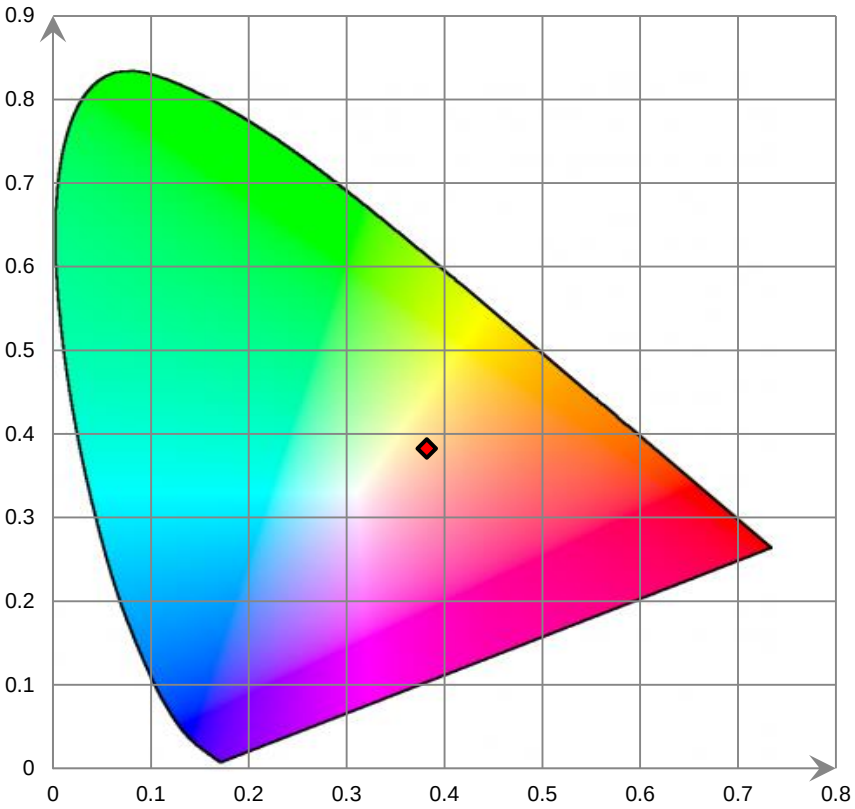
Relative Spectral Power Distribution



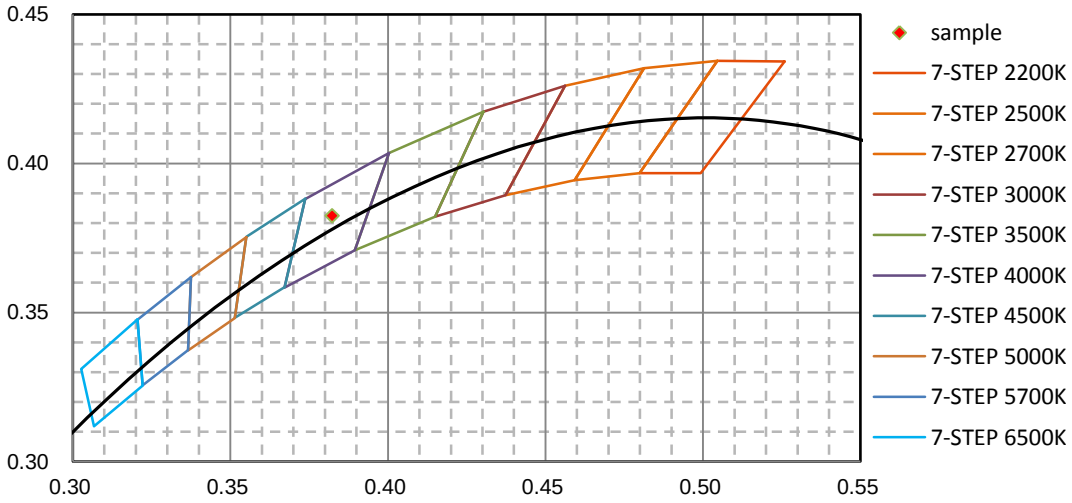
nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
380	2.510E-02	421	6.224E-01	462	2.964E+01	503	1.924E+01	544	2.998E+01
381	4.880E-02	422	7.202E-01	463	2.780E+01	504	1.970E+01	545	3.009E+01
382	4.110E-02	423	8.414E-01	464	2.596E+01	505	2.027E+01	546	3.020E+01
383	8.300E-03	424	1.055E+00	465	2.465E+01	506	2.084E+01	547	3.046E+01
384	5.870E-02	425	1.251E+00	466	2.401E+01	507	2.135E+01	548	3.060E+01
385	5.060E-02	426	1.427E+00	467	2.301E+01	508	2.186E+01	549	3.070E+01
386	4.700E-03	427	1.719E+00	468	2.256E+01	509	2.234E+01	550	3.098E+01
387	8.320E-02	428	2.032E+00	469	2.169E+01	510	2.279E+01	551	3.098E+01
388	6.900E-03	429	2.414E+00	470	2.095E+01	511	2.325E+01	552	3.127E+01
389	1.400E-03	430	2.790E+00	471	2.017E+01	512	2.361E+01	553	3.140E+01
390	8.090E-02	431	3.247E+00	472	1.910E+01	513	2.404E+01	554	3.170E+01
391	1.580E-02	432	3.715E+00	473	1.838E+01	514	2.439E+01	555	3.182E+01
392	1.340E-02	433	4.258E+00	474	1.720E+01	515	2.485E+01	556	3.200E+01
393	2.600E-03	434	4.891E+00	475	1.632E+01	516	2.517E+01	557	3.212E+01
394	1.970E-02	435	5.572E+00	476	1.540E+01	517	2.558E+01	558	3.221E+01
395	3.670E-02	436	6.313E+00	477	1.446E+01	518	2.566E+01	559	3.255E+01
396	1.190E-02	437	7.194E+00	478	1.379E+01	519	2.599E+01	560	3.276E+01
397	5.000E-04	438	8.102E+00	479	1.330E+01	520	2.635E+01	561	3.290E+01
398	0.000E+00	439	9.095E+00	480	1.284E+01	521	2.668E+01	562	3.312E+01
399	0.000E+00	440	1.031E+01	481	1.262E+01	522	2.685E+01	563	3.337E+01
400	0.000E+00	441	1.173E+01	482	1.239E+01	523	2.696E+01	564	3.355E+01
401	4.150E-02	442	1.312E+01	483	1.223E+01	524	2.719E+01	565	3.367E+01
402	2.910E-02	443	1.485E+01	484	1.233E+01	525	2.735E+01	566	3.379E+01
403	3.800E-02	444	1.705E+01	485	1.227E+01	526	2.746E+01	567	3.413E+01
404	3.640E-02	445	1.943E+01	486	1.252E+01	527	2.767E+01	568	3.436E+01
405	5.210E-02	446	2.204E+01	487	1.268E+01	528	2.789E+01	569	3.442E+01
406	1.300E-02	447	2.505E+01	488	1.284E+01	529	2.818E+01	570	3.468E+01
407	7.670E-02	448	2.816E+01	489	1.305E+01	530	2.822E+01	571	3.485E+01
408	1.380E-02	449	3.236E+01	490	1.327E+01	531	2.828E+01	572	3.502E+01
409	5.840E-02	450	3.540E+01	491	1.357E+01	532	2.837E+01	573	3.538E+01
410	9.790E-02	451	3.910E+01	492	1.379E+01	533	2.867E+01	574	3.541E+01
411	8.080E-02	452	4.163E+01	493	1.416E+01	534	2.876E+01	575	3.559E+01
412	3.780E-02	453	4.401E+01	494	1.459E+01	535	2.890E+01	576	3.598E+01
413	6.650E-02	454	4.550E+01	495	1.502E+01	536	2.901E+01	577	3.611E+01
414	1.386E-01	455	4.570E+01	496	1.541E+01	537	2.909E+01	578	3.619E+01
415	1.546E-01	456	4.467E+01	497	1.583E+01	538	2.919E+01	579	3.646E+01
416	2.202E-01	457	4.303E+01	498	1.644E+01	539	2.937E+01	580	3.653E+01
417	2.438E-01	458	4.058E+01	499	1.690E+01	540	2.944E+01	581	3.684E+01
418	3.395E-01	459	3.757E+01	500	1.746E+01	541	2.954E+01	582	3.686E+01
419	4.081E-01	460	3.508E+01	501	1.799E+01	542	2.970E+01	583	3.712E+01
420	4.861E-01	461	3.235E+01	502	1.862E+01	543	2.981E+01	584	3.738E+01

nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
585	3.745E+01	626	3.157E+01	667	1.387E+01	708	3.895E+00	749	6.938E-01
586	3.736E+01	627	3.110E+01	668	1.353E+01	709	3.731E+00	750	7.237E-01
587	3.761E+01	628	3.072E+01	669	1.322E+01	710	3.570E+00	751	6.698E-01
588	3.769E+01	629	3.022E+01	670	1.278E+01	711	3.457E+00	752	6.690E-01
589	3.789E+01	630	2.985E+01	671	1.247E+01	712	3.348E+00	753	6.566E-01
590	3.802E+01	631	2.933E+01	672	1.220E+01	713	3.278E+00	754	6.396E-01
591	3.796E+01	632	2.901E+01	673	1.184E+01	714	3.103E+00	755	4.461E-01
592	3.805E+01	633	2.849E+01	674	1.151E+01	715	2.955E+00	756	5.561E-01
593	3.817E+01	634	2.801E+01	675	1.116E+01	716	2.871E+00	757	5.304E-01
594	3.821E+01	635	2.765E+01	676	1.086E+01	717	2.763E+00	758	2.143E-01
595	3.820E+01	636	2.717E+01	677	1.056E+01	718	2.708E+00	759	3.652E-01
596	3.817E+01	637	2.668E+01	678	1.029E+01	719	2.492E+00	760	3.193E-01
597	3.828E+01	638	2.629E+01	679	1.004E+01	720	2.488E+00	761	3.820E-01
598	3.821E+01	639	2.585E+01	680	9.648E+00	721	2.409E+00	762	5.082E-01
599	3.824E+01	640	2.534E+01	681	9.425E+00	722	2.320E+00	763	4.867E-01
600	3.818E+01	641	2.490E+01	682	9.120E+00	723	2.231E+00	764	3.481E-01
601	3.824E+01	642	2.453E+01	683	8.868E+00	724	2.016E+00	765	2.622E-01
602	3.799E+01	643	2.394E+01	684	8.568E+00	725	2.060E+00	766	1.973E-01
603	3.783E+01	644	2.353E+01	685	8.357E+00	726	1.903E+00	767	4.068E-01
604	3.791E+01	645	2.311E+01	686	8.101E+00	727	1.828E+00	768	3.951E-01
605	3.779E+01	646	2.259E+01	687	7.924E+00	728	1.734E+00	769	3.418E-01
606	3.758E+01	647	2.224E+01	688	7.669E+00	729	1.825E+00	770	1.561E-01
607	3.746E+01	648	2.173E+01	689	7.306E+00	730	1.776E+00	771	2.317E-01
608	3.729E+01	649	2.131E+01	690	7.136E+00	731	1.642E+00	772	2.707E-01
609	3.715E+01	650	2.084E+01	691	6.952E+00	732	1.603E+00	773	2.412E-01
610	3.687E+01	651	2.042E+01	692	6.769E+00	733	1.320E+00	774	1.828E-01
611	3.660E+01	652	1.997E+01	693	6.528E+00	734	1.366E+00	775	2.345E-01
612	3.648E+01	653	1.953E+01	694	6.284E+00	735	1.395E+00	776	2.423E-01
613	3.622E+01	654	1.910E+01	695	6.101E+00	736	1.281E+00	777	1.673E-01
614	3.587E+01	655	1.863E+01	696	5.871E+00	737	1.244E+00	778	1.891E-01
615	3.561E+01	656	1.824E+01	697	5.736E+00	738	1.127E+00	779	2.614E-01
616	3.525E+01	657	1.784E+01	698	5.518E+00	739	1.049E+00	780	9.650E-02
617	3.498E+01	658	1.741E+01	699	5.343E+00	740	1.125E+00		
618	3.457E+01	659	1.700E+01	700	5.117E+00	741	1.049E+00		
619	3.431E+01	660	1.660E+01	701	5.034E+00	742	1.052E+00		
620	3.388E+01	661	1.618E+01	702	4.809E+00	743	9.630E-01		
621	3.358E+01	662	1.578E+01	703	4.605E+00	744	8.348E-01		
622	3.317E+01	663	1.537E+01	704	4.518E+00	745	8.046E-01		
623	3.264E+01	664	1.504E+01	705	4.303E+00	746	6.712E-01		
624	3.235E+01	665	1.463E+01	706	4.221E+00	747	7.171E-01		
625	3.195E+01	666	1.427E+01	707	4.045E+00	748	7.583E-01		

CIE 1931xy Chromaticity Diagram



7-StepChromaticity Quadrangles



[Goniophotometer System]

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

Test orientation: **Downward**

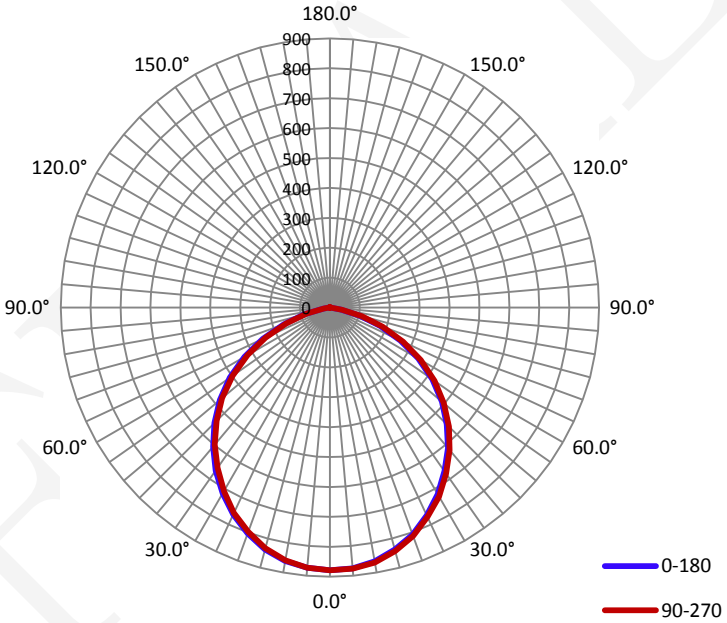
Electrical Measurement

Input Voltage(V)	Frequency(Hz)	Input Current(A)	Power (W)	Power Factor
120.0	60	0.1480	17.35	0.9760

Photometric Measurement

Luminous Flux(lm)	Efficacy(lm/W)	I_{max}(cd)	S/MH(C0/180)	S/MH(C90/270)
2244.6	129.42	878.5	1.22	1.22

Luminous Intensity Distribution



	C0/180	C45/225	C90/270	C135/315	AVG.
Beam Angle(50%I_{max}):	106.4	106.2	106.3	106.2	106.3
Field Angle(10%I_{max}):	151.1	151.2	151.1	151.1	151.1

Luminous Intensity (cd) Distribution Data

C / γ	0°	22.5°	45°	67.5°	90°	112.5°	135°	157.5°
0.0°	879	879	879	879	879	879	879	879
5.0°	875	874	874	875	876	877	876	873
10.0°	861	863	862	865	866	866	862	861
15.0°	838	839	842	843	843	843	840	839
20.0°	808	808	812	814	813	813	808	808
25.0°	766	768	771	775	772	774	770	769
30.0°	721	724	726	727	730	728	725	722
35.0°	668	672	673	677	678	677	672	669
40.0°	614	616	620	621	623	620	617	614
45.0°	552	557	559	561	562	560	556	554
50.0°	489	494	496	497	498	497	493	490
55.0°	418	423	425	428	427	427	422	418
60.0°	341	344	349	351	351	350	345	340
65.0°	260	263	268	271	270	267	265	260
70.0°	178	183	186	188	188	186	182	177
75.0°	102	105	109	111	110	109	105	101
80.0°	36	38	42	43	42	41	38	34
85.0°	6	7	7	8	8	7	7	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	1	1	1	1	0	1	1
175.0°	1	1	1	1	1	1	1	1
180.0°	0	0	0	0	0	0	0	0

Luminous Intensity (cd) Distribution Data (cont.)

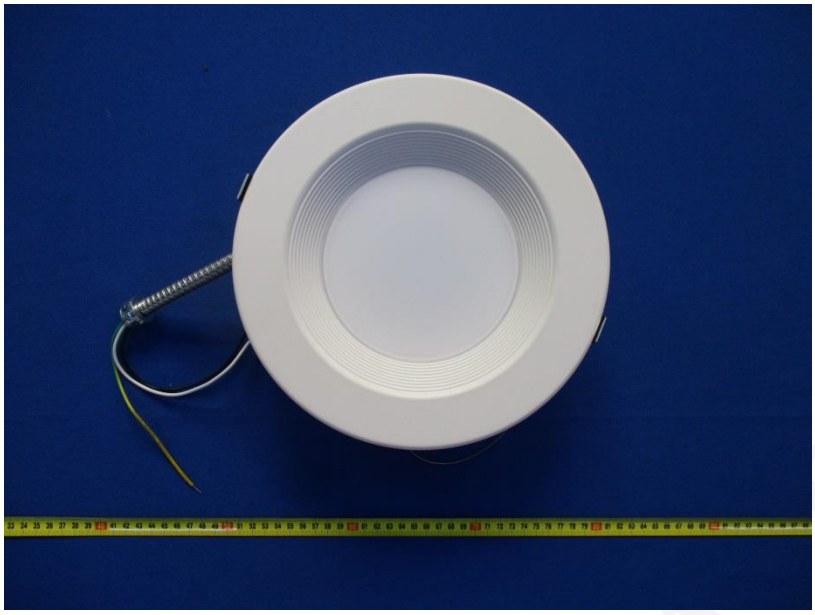
C / γ	180°	202.5°	225°	247.5°	270°	292.5°	315°	337.5°
0.0°	879	879	879	879	879	879	879	879
5.0°	873	875	871	871	873	874	874	872
10.0°	861	858	859	857	858	857	858	860
15.0°	837	833	832	831	833	833	831	834
20.0°	804	800	801	798	798	798	798	802
25.0°	763	761	757	757	758	757	759	761
30.0°	717	713	709	709	709	711	711	714
35.0°	666	660	656	657	654	657	658	663
40.0°	608	603	599	598	598	600	602	605
45.0°	546	542	538	537	536	539	540	544
50.0°	481	476	472	471	471	473	474	480
55.0°	408	403	398	398	397	399	402	407
60.0°	330	324	320	319	317	320	322	328
65.0°	248	242	238	237	237	239	241	247
70.0°	165	162	158	155	156	158	160	165
75.0°	88	85	83	80	80	82	85	89
80.0°	25	22	21	21	21	22	24	27
85.0°	4	4	4	3	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	1	0	0	0	1	0	1
170.0°	0	1	1	1	1	1	1	1
175.0°	0	1	1	1	1	1	1	1
180.0°	0	0	0	0	0	0	0	0

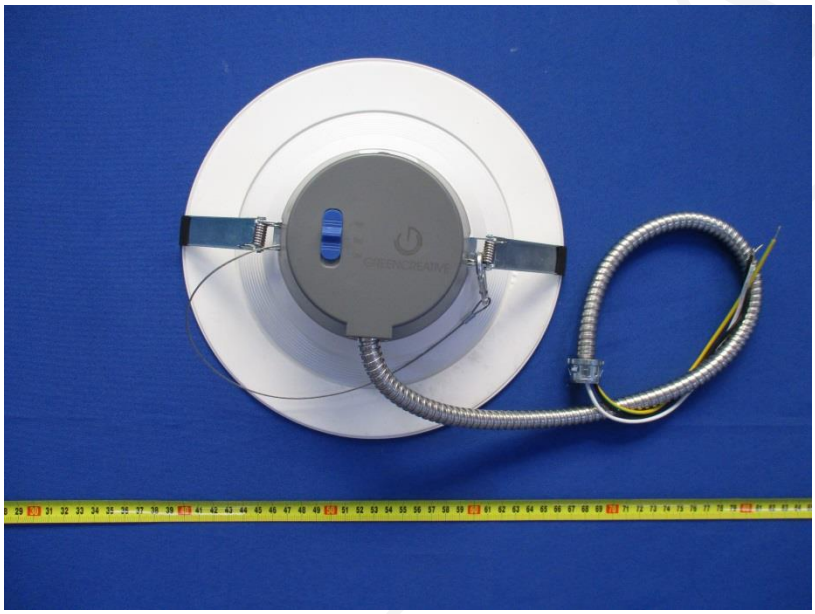
Zonal Lumen Density Measurement

Deg	Flux (lm)	%
0-5	20.9	0.93
5-10	62.1	2.76
10-15	100.7	4.49
15-20	135.3	6.03
20-25	164.7	7.34
25-30	187.7	8.36
30-35	203.9	9.08
35-40	212.8	9.48
40-45	214.5	9.56
45-50	208.8	9.30
50-55	195.0	8.69
55-60	172.6	7.69
60-65	142.9	6.37
65-70	107.6	4.79
70-75	69.7	3.11
75-80	33.8	1.50
80-85	9.9	0.44
85-90	1.5	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	0.1	0.00
170-175	0.1	0.00
175-180	0.0	0.00

Deg	Flux (lm)	%
0-5	20.9	0.93
0-10	83.0	3.70
0-15	183.7	8.18
0-20	319.0	14.21
0-25	483.7	21.55
0-30	671.4	29.91
0-35	875.3	39.00
0-40	1088.1	48.48
0-45	1302.7	58.04
0-50	1511.5	67.34
0-55	1706.5	76.03
0-60	1879.1	83.72
0-65	2021.9	90.08
0-70	2129.5	94.88
0-75	2199.3	97.98
0-80	2233.0	99.49
0-85	2242.9	99.93
0-90	2244.4	99.99
0-95	2244.4	99.99
0-100	2244.4	99.99
0-105	2244.4	99.99
0-110	2244.4	99.99
0-115	2244.4	99.99
0-120	2244.4	99.99
0-125	2244.4	99.99
0-130	2244.4	99.99
0-135	2244.4	99.99
0-140	2244.4	99.99
0-145	2244.4	99.99
0-150	2244.4	99.99
0-155	2244.4	99.99
0-160	2244.4	99.99
0-165	2244.4	99.99
0-170	2244.5	100.00
0-175	2244.5	100.00
0-180	2244.6	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**********