

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: INFT8/830/DIM010UNV

Report Type:	Electrical and Photometric tests including: Luminous Flux, Chromaticity, Luminous Intensity Distribution
Test Engineer:	George Yang
Report Number:	PKS200825088-10
Test Date:	2020-08-28 to 2020-09-05
Report Date:	2020-09-07
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 2020-08-25 and used for testing.

Model Tested: INFT8/830/DIM010UNV
 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: 120-277VAC 50/60Hz
 Rated Power: 17W
 Nominal CCT: 3000K
 Nominal Lumen Output: 2060lm

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.

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 $U_{re}=2.61\%$ ($k=2$), 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 $U_{re}=0.48\%$ of rdg, AC Voltage $U_{re}=0.25\%$ of rdg, Power $U_{re}=0.44\%$, ($k=2$), 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 $U_{re}=2.6\%$ ($k=2$), 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**

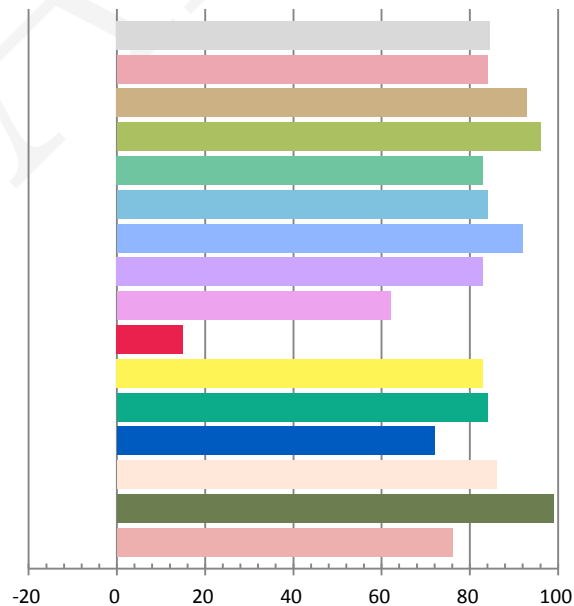
Photometric and Electrical Measurement Result

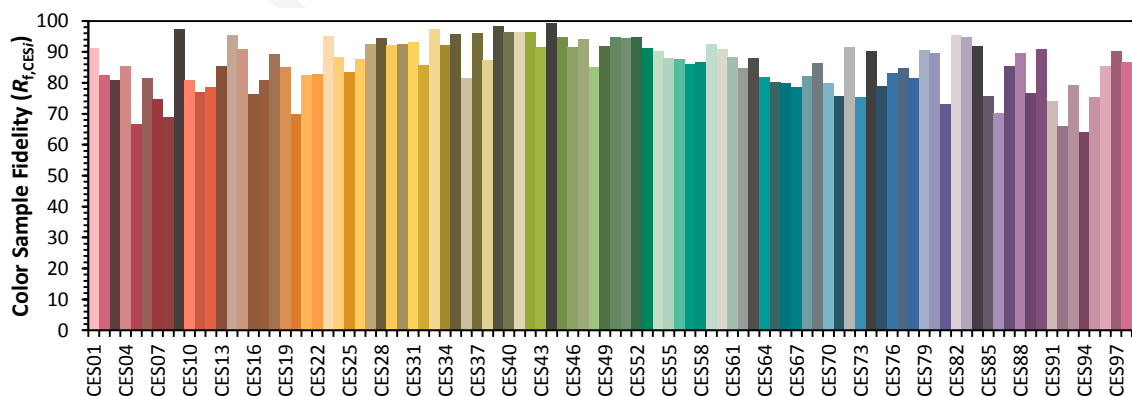
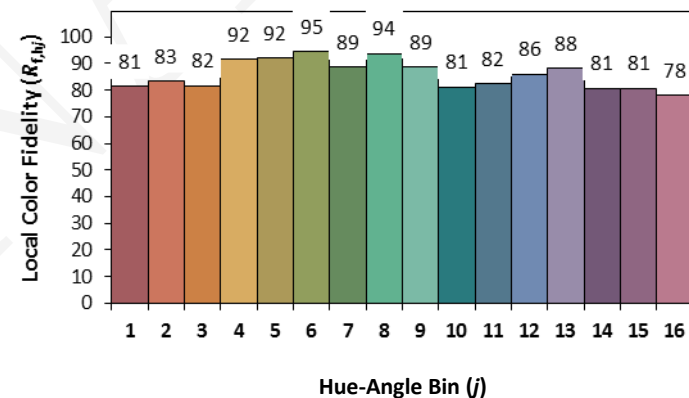
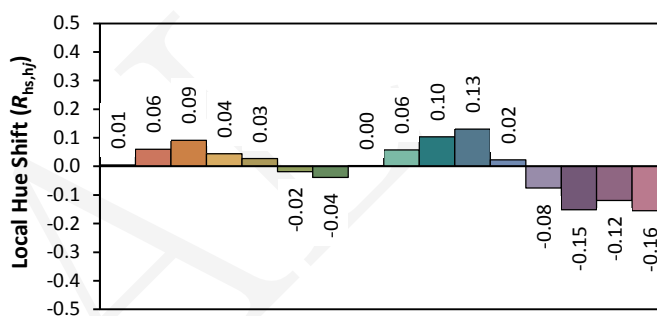
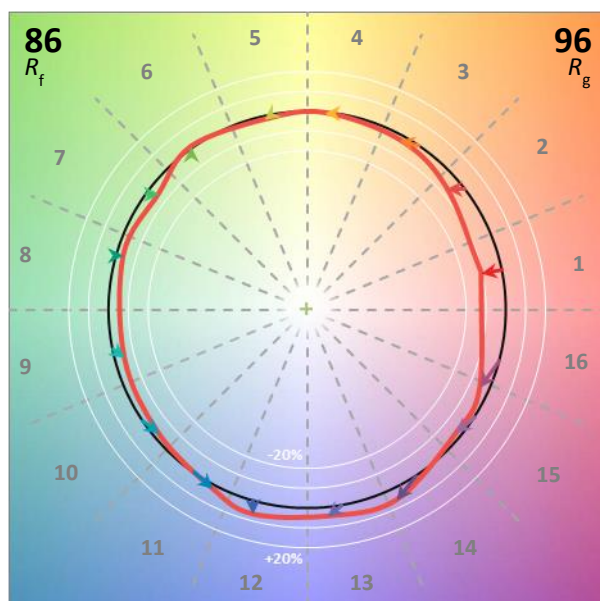
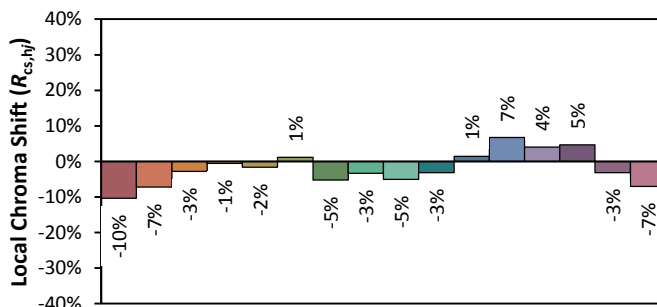
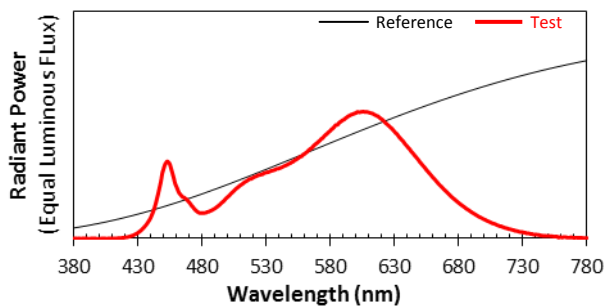
Voltage(V)	Frequency(Hz)	Current(A)	Power (W)	Power Factor	Luminous Flux(lm)	Efficacy(lm/W)
120	60	0.1502	17.53	0.9726	2163.55	123.42

Radiant Flux (W)	CCT (K)	Duv	x	y	u'	v'
6.595	3028	-0.00030	0.4346	0.4025	0.2497	0.5204

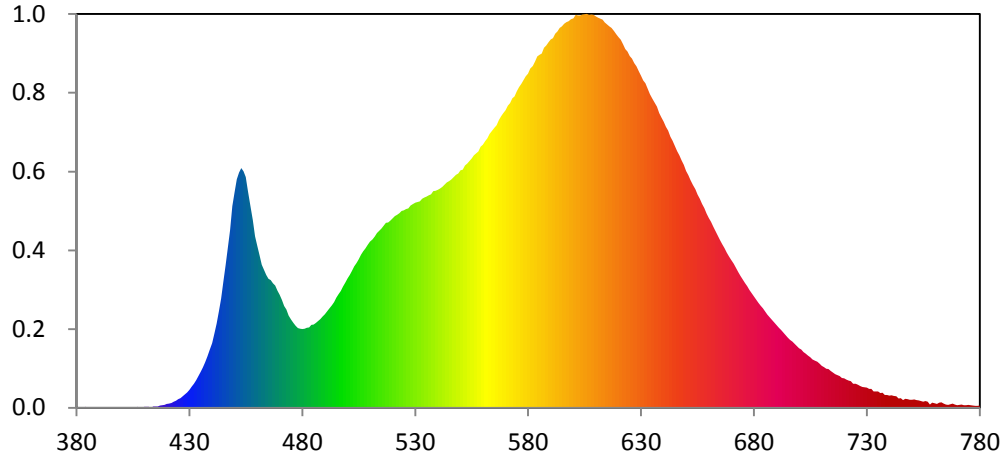
Color Rendering Index

Ra			
84.6			
R1	R2	R3	R4
84	93	96	83
R5	R6	R7	R8
84	92	83	62
R9	R10	R11	R12
15	83	84	72
R13	R14	R15	
86	99	76	





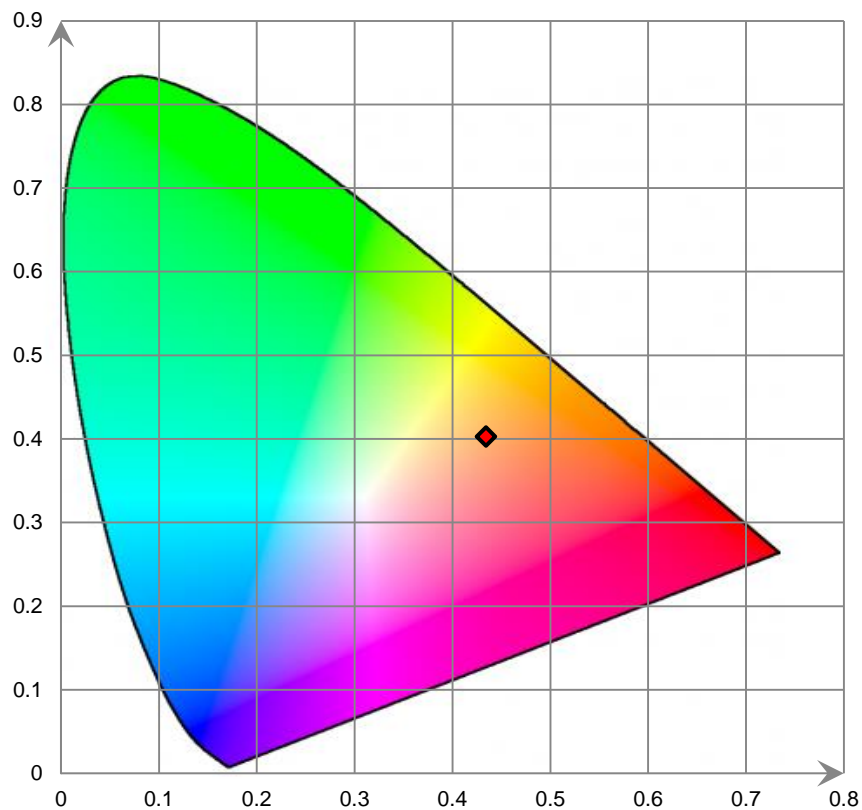
Relative Spectral Power Distribution



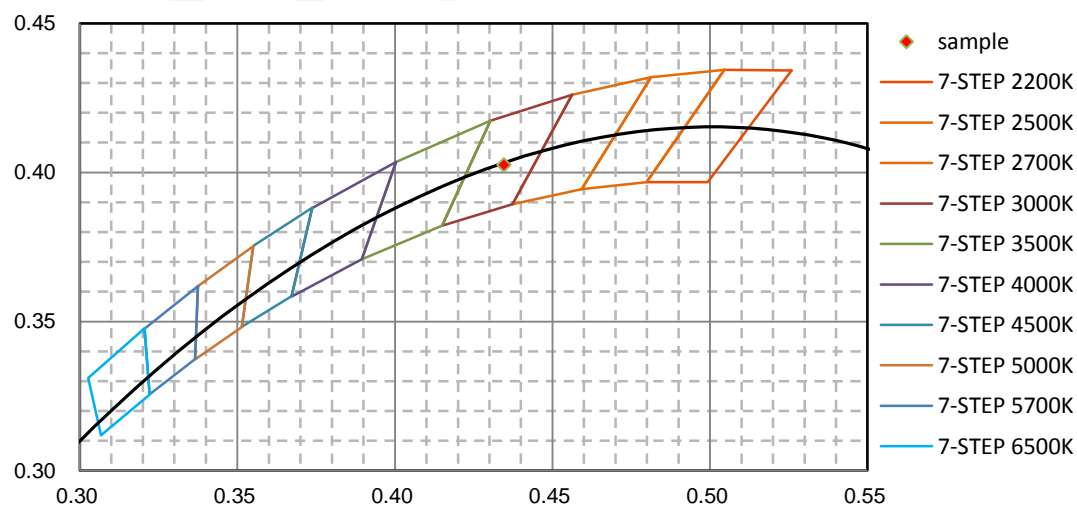
nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
380	4.460E-02	421	4.774E-01	462	1.603E+01	503	1.587E+01	544	2.527E+01
381	7.330E-02	422	5.384E-01	463	1.547E+01	504	1.624E+01	545	2.542E+01
382	6.890E-02	423	6.661E-01	464	1.490E+01	505	1.667E+01	546	2.561E+01
383	8.200E-03	424	7.979E-01	465	1.448E+01	506	1.714E+01	547	2.589E+01
384	9.610E-02	425	9.500E-01	466	1.434E+01	507	1.754E+01	548	2.612E+01
385	2.550E-02	426	1.065E+00	467	1.395E+01	508	1.786E+01	549	2.628E+01
386	3.900E-03	427	1.288E+00	468	1.371E+01	509	1.827E+01	550	2.665E+01
387	8.220E-02	428	1.505E+00	469	1.315E+01	510	1.864E+01	551	2.672E+01
388	5.510E-02	429	1.738E+00	470	1.266E+01	511	1.889E+01	552	2.719E+01
389	2.130E-02	430	2.019E+00	471	1.210E+01	512	1.922E+01	553	2.738E+01
390	5.080E-02	431	2.357E+00	472	1.142E+01	513	1.961E+01	554	2.769E+01
391	1.990E-02	432	2.701E+00	473	1.100E+01	514	1.985E+01	555	2.798E+01
392	8.000E-04	433	3.095E+00	474	1.035E+01	515	2.012E+01	556	2.833E+01
393	0.000E+00	434	3.547E+00	475	9.878E+00	516	2.043E+01	557	2.854E+01
394	1.840E-02	435	4.032E+00	476	9.520E+00	517	2.074E+01	558	2.875E+01
395	6.710E-02	436	4.537E+00	477	9.200E+00	518	2.077E+01	559	2.929E+01
396	4.070E-02	437	5.088E+00	478	8.932E+00	519	2.098E+01	560	2.950E+01
397	3.140E-02	438	5.758E+00	479	8.866E+00	520	2.126E+01	561	2.991E+01
398	6.600E-03	439	6.471E+00	480	8.841E+00	521	2.152E+01	562	3.022E+01
399	1.850E-02	440	7.263E+00	481	8.878E+00	522	2.165E+01	563	3.073E+01
400	6.000E-04	441	8.336E+00	482	8.974E+00	523	2.183E+01	564	3.109E+01
401	2.520E-02	442	9.449E+00	483	8.999E+00	524	2.209E+01	565	3.142E+01
402	5.600E-02	443	1.078E+01	484	9.280E+00	525	2.215E+01	566	3.169E+01
403	6.060E-02	444	1.226E+01	485	9.318E+00	526	2.230E+01	567	3.229E+01
404	4.530E-02	445	1.415E+01	486	9.513E+00	527	2.235E+01	568	3.270E+01
405	3.660E-02	446	1.597E+01	487	9.718E+00	528	2.268E+01	569	3.306E+01
406	1.040E-02	447	1.794E+01	488	9.946E+00	529	2.288E+01	570	3.338E+01
407	8.930E-02	448	1.993E+01	489	1.024E+01	530	2.302E+01	571	3.387E+01
408	2.440E-02	449	2.262E+01	490	1.047E+01	531	2.310E+01	572	3.416E+01
409	5.280E-02	450	2.415E+01	491	1.081E+01	532	2.316E+01	573	3.473E+01
410	8.730E-02	451	2.562E+01	492	1.112E+01	533	2.342E+01	574	3.493E+01
411	8.710E-02	452	2.638E+01	493	1.150E+01	534	2.359E+01	575	3.549E+01
412	8.850E-02	453	2.690E+01	494	1.186E+01	535	2.370E+01	576	3.598E+01
413	2.450E-02	454	2.651E+01	495	1.235E+01	536	2.384E+01	577	3.632E+01
414	1.274E-01	455	2.588E+01	496	1.272E+01	537	2.395E+01	578	3.676E+01
415	1.218E-01	456	2.426E+01	497	1.309E+01	538	2.430E+01	579	3.720E+01
416	1.556E-01	457	2.277E+01	498	1.361E+01	539	2.435E+01	580	3.749E+01
417	2.328E-01	458	2.109E+01	499	1.405E+01	540	2.443E+01	581	3.806E+01
418	2.949E-01	459	1.924E+01	500	1.449E+01	541	2.461E+01	582	3.833E+01
419	3.142E-01	460	1.817E+01	501	1.489E+01	542	2.477E+01	583	3.883E+01
420	4.170E-01	461	1.712E+01	502	1.538E+01	543	2.502E+01	584	3.941E+01

nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
585	3.959E+01	626	3.916E+01	667	1.792E+01	708	5.157E+00	749	8.978E-01
586	3.973E+01	627	3.865E+01	668	1.742E+01	709	4.957E+00	750	9.055E-01
587	4.039E+01	628	3.832E+01	669	1.696E+01	710	4.713E+00	751	9.199E-01
588	4.065E+01	629	3.778E+01	670	1.657E+01	711	4.571E+00	752	8.716E-01
589	4.101E+01	630	3.728E+01	671	1.614E+01	712	4.384E+00	753	8.367E-01
590	4.132E+01	631	3.673E+01	672	1.567E+01	713	4.329E+00	754	7.450E-01
591	4.148E+01	632	3.640E+01	673	1.522E+01	714	4.108E+00	755	6.652E-01
592	4.195E+01	633	3.578E+01	674	1.479E+01	715	3.942E+00	756	7.315E-01
593	4.222E+01	634	3.519E+01	675	1.438E+01	716	3.776E+00	757	6.931E-01
594	4.261E+01	635	3.470E+01	676	1.399E+01	717	3.676E+00	758	3.380E-01
595	4.280E+01	636	3.423E+01	677	1.363E+01	718	3.549E+00	759	5.788E-01
596	4.307E+01	637	3.376E+01	678	1.321E+01	719	3.337E+00	760	4.859E-01
597	4.325E+01	638	3.307E+01	679	1.285E+01	720	3.312E+00	761	4.089E-01
598	4.338E+01	639	3.257E+01	680	1.249E+01	721	3.172E+00	762	5.766E-01
599	4.360E+01	640	3.211E+01	681	1.212E+01	722	3.046E+00	763	6.008E-01
600	4.370E+01	641	3.151E+01	682	1.178E+01	723	2.964E+00	764	4.635E-01
601	4.408E+01	642	3.110E+01	683	1.146E+01	724	2.679E+00	765	3.535E-01
602	4.401E+01	643	3.040E+01	684	1.115E+01	725	2.699E+00	766	3.351E-01
603	4.400E+01	644	2.994E+01	685	1.081E+01	726	2.594E+00	767	3.846E-01
604	4.412E+01	645	2.938E+01	686	1.046E+01	727	2.443E+00	768	4.689E-01
605	4.416E+01	646	2.878E+01	687	1.016E+01	728	2.325E+00	769	3.725E-01
606	4.418E+01	647	2.833E+01	688	9.876E+00	729	2.306E+00	770	2.748E-01
607	4.407E+01	648	2.775E+01	689	9.548E+00	730	2.272E+00	771	3.258E-01
608	4.412E+01	649	2.724E+01	690	9.273E+00	731	2.103E+00	772	3.423E-01
609	4.407E+01	650	2.656E+01	691	8.975E+00	732	2.099E+00	773	2.957E-01
610	4.391E+01	651	2.608E+01	692	8.716E+00	733	1.830E+00	774	2.687E-01
611	4.376E+01	652	2.553E+01	693	8.440E+00	734	1.838E+00	775	3.175E-01
612	4.364E+01	653	2.503E+01	694	8.146E+00	735	1.816E+00	776	2.728E-01
613	4.354E+01	654	2.452E+01	695	7.874E+00	736	1.644E+00	777	2.351E-01
614	4.324E+01	655	2.390E+01	696	7.591E+00	737	1.682E+00	778	1.977E-01
615	4.301E+01	656	2.343E+01	697	7.426E+00	738	1.449E+00	779	2.234E-01
616	4.278E+01	657	2.288E+01	698	7.185E+00	739	1.428E+00	780	2.338E-01
617	4.262E+01	658	2.239E+01	699	6.933E+00	740	1.372E+00		
618	4.225E+01	659	2.181E+01	700	6.683E+00	741	1.386E+00		
619	4.191E+01	660	2.127E+01	701	6.541E+00	742	1.315E+00		
620	4.157E+01	661	2.087E+01	702	6.250E+00	743	1.282E+00		
621	4.129E+01	662	2.031E+01	703	6.067E+00	744	1.024E+00		
622	4.077E+01	663	1.983E+01	704	5.858E+00	745	1.061E+00		
623	4.024E+01	664	1.930E+01	705	5.658E+00	746	8.752E-01		
624	3.996E+01	665	1.880E+01	706	5.417E+00	747	1.003E+00		
625	3.947E+01	666	1.833E+01	707	5.262E+00	748	9.657E-01		

CIE 1931xy Chromaticity Diagram



7-Step Chromaticity Quadrangles



[Goniophotometer System]

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

Test orientation: **Downward**

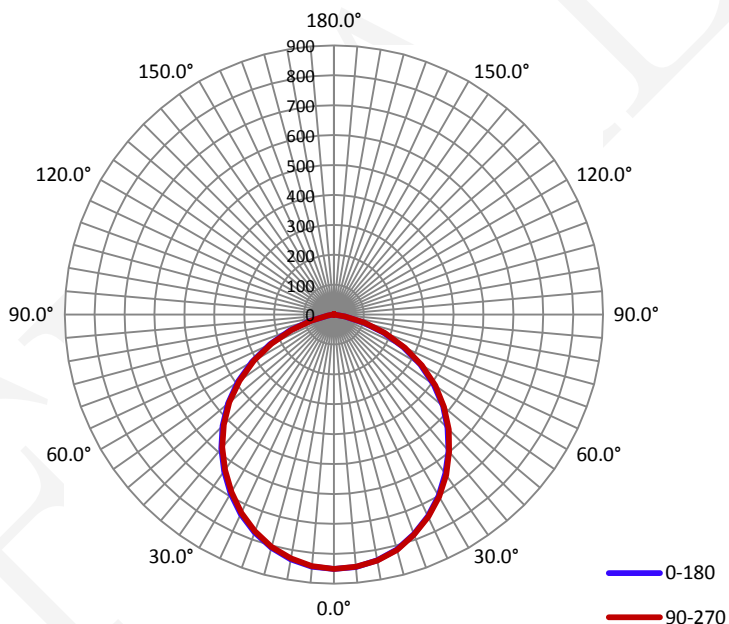
Electrical Measurement

Input Voltage(V)	Frequency(Hz)	Input Current(A)	Power (W)	Power Factor
120.0	60	0.1500	17.62	0.9770

Photometric Measurement

Luminous Flux(lm)	Efficacy(lm/W)	$I_{max}(cd)$	S/MH(C0/180)	S/MH(C90/270)
2175.4	123.51	850.6	1.22	1.22

Luminous Intensity Distribution



	C0/180	C45/225	C90/270	C135/315	AVG.
Beam Angle(50% I_{max}):	106.4	106.5	106.4	106.5	106.5
Field Angle(10% I_{max}):	151.1	151.3	151.1	151.2	151.2

Luminous Intensity (cd) Distribution Data

C y	0°	22.5°	45°	67.5°	90°	112.5°	135°	157.5°
0.0°	851	851	851	851	851	851	851	851
5.0°	847	848	848	849	847	848	847	846
10.0°	834	835	836	838	835	835	835	832
15.0°	813	814	816	816	815	814	813	811
20.0°	781	784	786	787	783	784	783	779
25.0°	743	746	748	748	747	747	744	741
30.0°	700	702	704	705	703	703	700	696
35.0°	649	652	655	655	654	653	650	646
40.0°	596	599	600	601	600	599	596	591
45.0°	538	541	543	543	543	541	538	534
50.0°	476	479	482	482	481	479	477	472
55.0°	408	411	415	416	414	412	409	403
60.0°	333	337	339	342	340	337	333	328
65.0°	255	259	262	263	262	259	255	250
70.0°	176	179	184	185	183	179	176	170
75.0°	102	106	109	109	107	104	102	97
80.0°	37	40	41	41	39	37	36	33
85.0°	7	7	7	7	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	1	0	0	0	0
160.0°	0	0	0	1	1	0	0	0
165.0°	0	1	1	1	1	1	1	1
170.0°	1	1	1	1	2	1	1	1
175.0°	1	1	2	2	2	2	2	1
180.0°	0	0	0	0	0	0	0	0

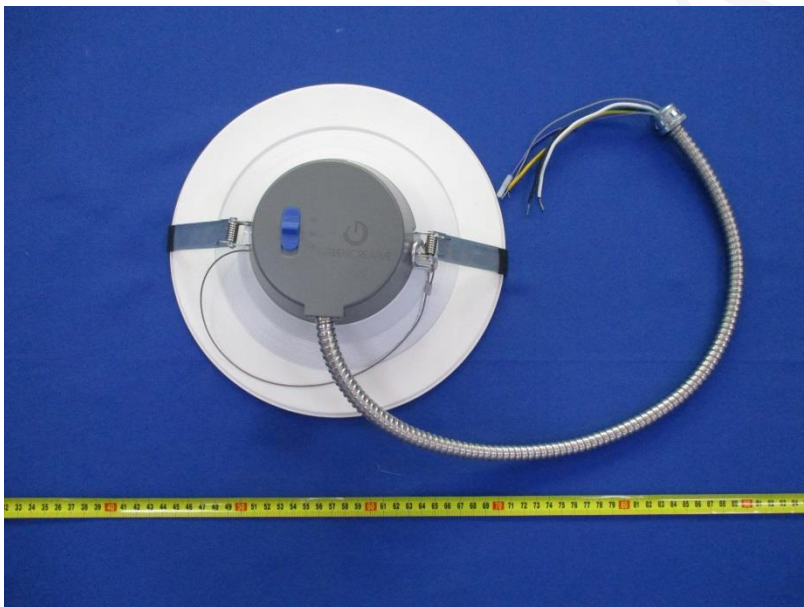
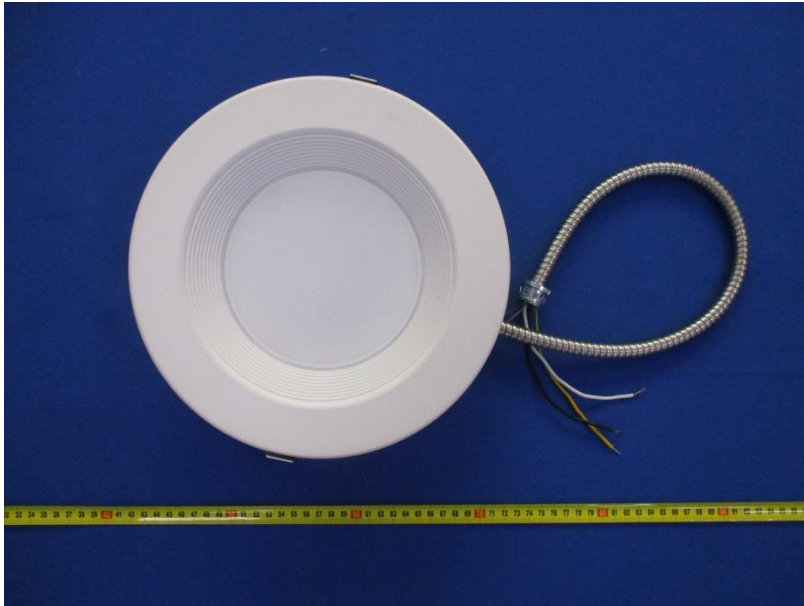
Luminous Intensity (cd) Distribution Data (cont.)

C y	180°	202.5°	225°	247.5°	270°	292.5°	315°	337.5°
0.0°	851	851	851	851	851	851	851	851
5.0°	846	845	843	845	844	845	846	845
10.0°	831	829	829	830	828	830	831	831
15.0°	807	806	805	806	805	806	807	809
20.0°	776	774	773	773	771	774	777	778
25.0°	737	735	734	733	732	735	736	738
30.0°	690	689	687	687	685	689	692	694
35.0°	640	638	636	637	635	637	640	644
40.0°	586	583	581	581	580	582	586	589
45.0°	526	523	522	522	521	524	527	530
50.0°	463	460	458	457	456	460	464	467
55.0°	392	389	387	386	386	389	394	396
60.0°	316	312	309	309	309	311	316	321
65.0°	236	233	230	229	230	232	237	242
70.0°	157	153	152	152	151	154	159	162
75.0°	83	79	78	77	78	81	84	88
80.0°	23	21	20	20	20	22	24	27
85.0°	4	3	3	3	3	4	4	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	1	0	1	1	1	1
165.0°	0	1	1	1	1	1	1	1
170.0°	1	1	1	2	2	2	2	2
175.0°	1	1	2	2	2	2	1	1
180.0°	0	0	0	0	0	0	0	0

Zonal Lumen Density Measurement

Deg	Flux (lm)	%	Deg	Flux (lm)	%
0-5	20.3	0.93	0-5	20.3	0.93
5-10	60.0	2.76	0-10	80.3	3.69
10-15	97.4	4.48	0-15	177.8	8.17
15-20	130.9	6.02	0-20	308.7	14.19
20-25	159.3	7.32	0-25	468.0	21.51
25-30	181.7	8.35	0-30	649.7	29.87
30-35	197.4	9.07	0-35	847.1	38.94
35-40	206.1	9.48	0-40	1053.2	48.41
40-45	207.9	9.55	0-45	1261.0	57.97
45-50	202.4	9.30	0-50	1463.5	67.27
50-55	189.1	8.69	0-55	1652.6	75.97
55-60	167.5	7.70	0-60	1820.1	83.67
60-65	138.6	6.37	0-65	1958.8	90.04
65-70	104.5	4.80	0-70	2063.3	94.85
70-75	67.8	3.12	0-75	2131.1	97.96
75-80	32.8	1.51	0-80	2163.9	99.47
80-85	9.6	0.44	0-85	2173.5	99.91
85-90	1.5	0.07	0-90	2175.0	99.98
90-95	0.0	0.00	0-95	2175.0	99.98
95-100	0.0	0.00	0-100	2175.0	99.98
100-105	0.0	0.00	0-105	2175.0	99.98
105-110	0.0	0.00	0-110	2175.0	99.98
110-115	0.0	0.00	0-115	2175.0	99.98
115-120	0.0	0.00	0-120	2175.0	99.98
120-125	0.0	0.00	0-125	2175.0	99.98
125-130	0.0	0.00	0-130	2175.0	99.98
130-135	0.0	0.00	0-135	2175.0	99.98
135-140	0.0	0.00	0-140	2175.0	99.98
140-145	0.0	0.00	0-145	2175.0	99.98
145-150	0.0	0.00	0-150	2175.0	99.98
150-155	0.0	0.00	0-155	2175.0	99.98
155-160	0.0	0.00	0-160	2175.0	99.98
160-165	0.1	0.00	0-165	2175.1	99.99
165-170	0.1	0.01	0-170	2175.2	99.99
170-175	0.1	0.00	0-175	2175.3	100.00
175-180	0.0	0.00	0-180	2175.4	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*****