

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: INFT6/830/DIM010UNV

Report Type:	Electrical and Photometric tests including: Luminous Flux, Chromaticity, Luminous Intensity Distribution
Test Engineer:	George Yang
Report Number:	PKS200825084-10
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: INFT6/830/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: 13W
 Nominal CCT: 3000K
 Nominal Lumen Output: 1535lm

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 $U_{rel}=2.61\%$ ($k=2$), 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 $U_{rel}=0.48\%$ 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_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**

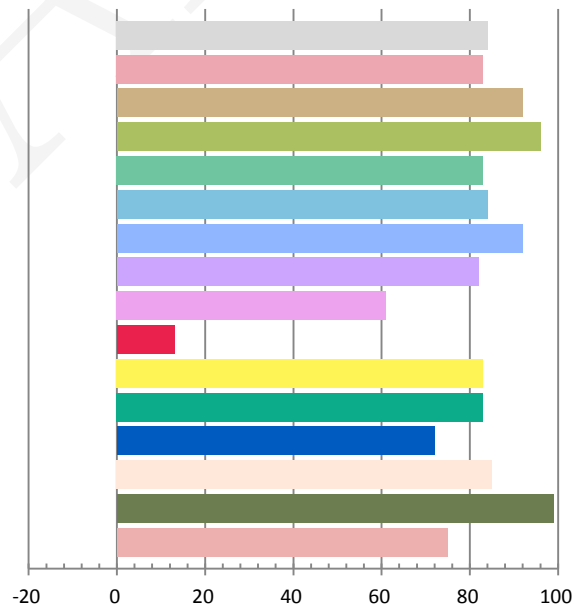
Photometric and Electrical Measurement Result

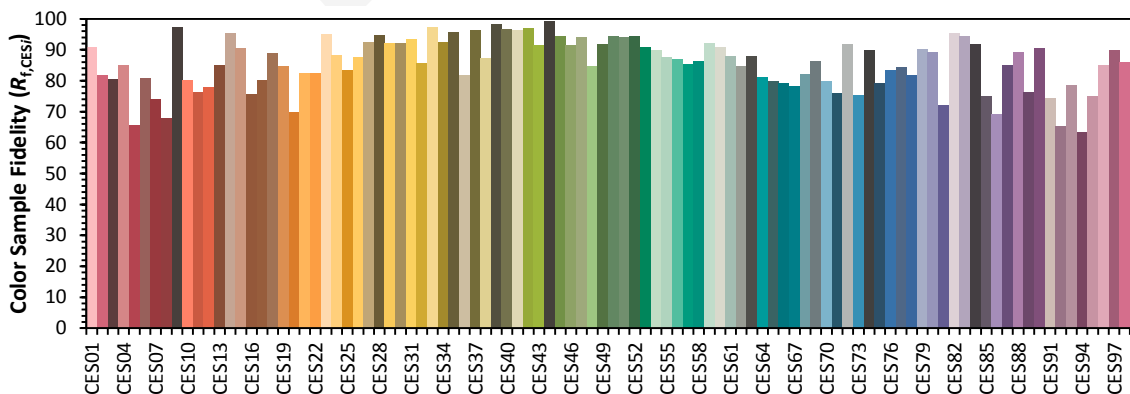
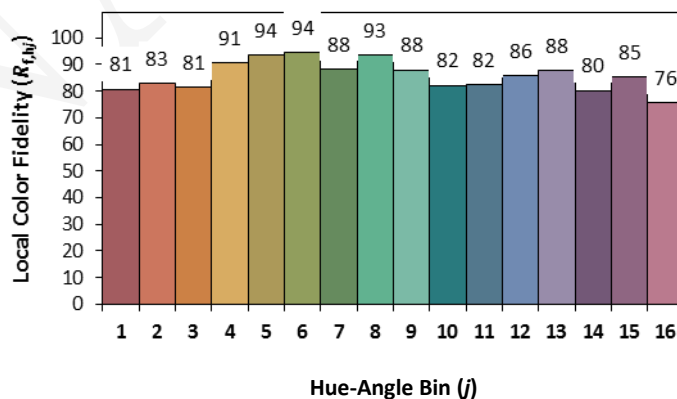
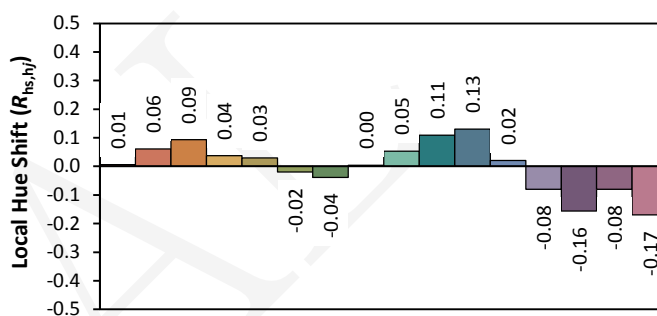
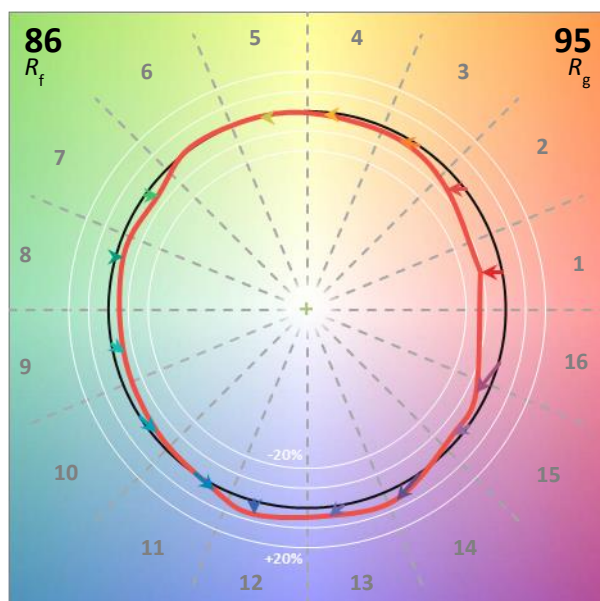
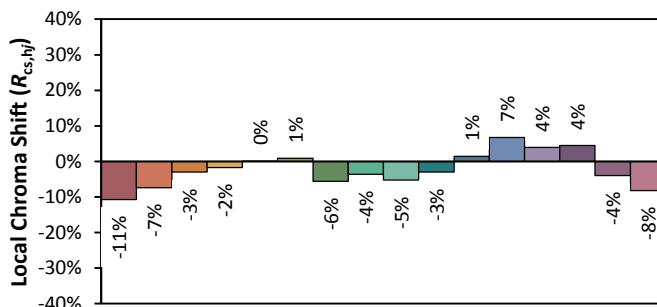
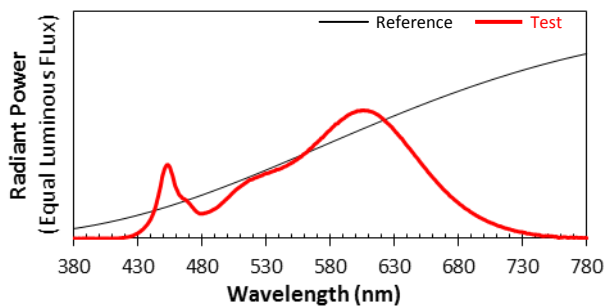
Voltage(V)	Frequency(Hz)	Current(A)	Power (W)	Power Factor	Luminous Flux(lm)	Efficacy(lm/W)
119.98	60	0.1064	12.6	0.9868	1635.18	129.79

Radiant Flux (W)	CCT (K)	Duv	x	y	u'	v'
4.961	2978	-0.00004	0.4385	0.4045	0.2514	0.5218

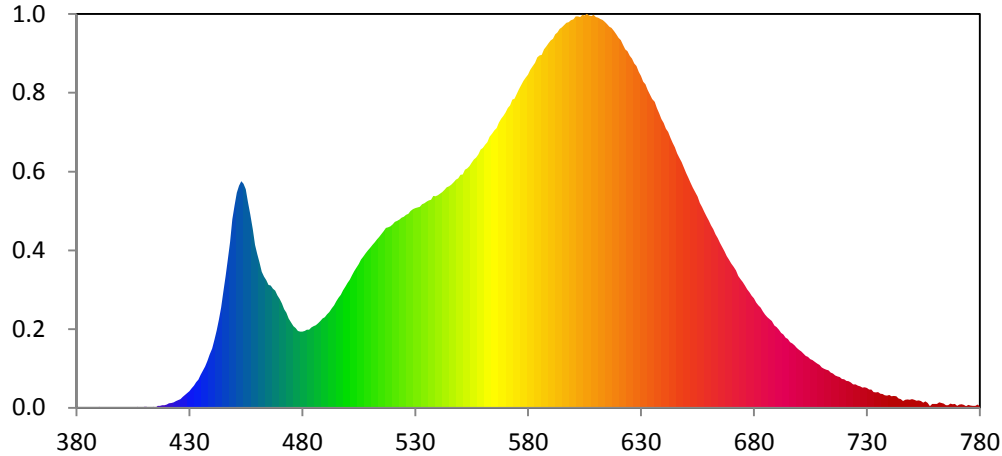
Color Rendering Index

Ra			
84.1			
R1	R2	R3	R4
83	92	96	83
R5	R6	R7	R8
84	92	82	61
R9	R10	R11	R12
13	83	83	72
R13	R14	R15	
85	99	75	





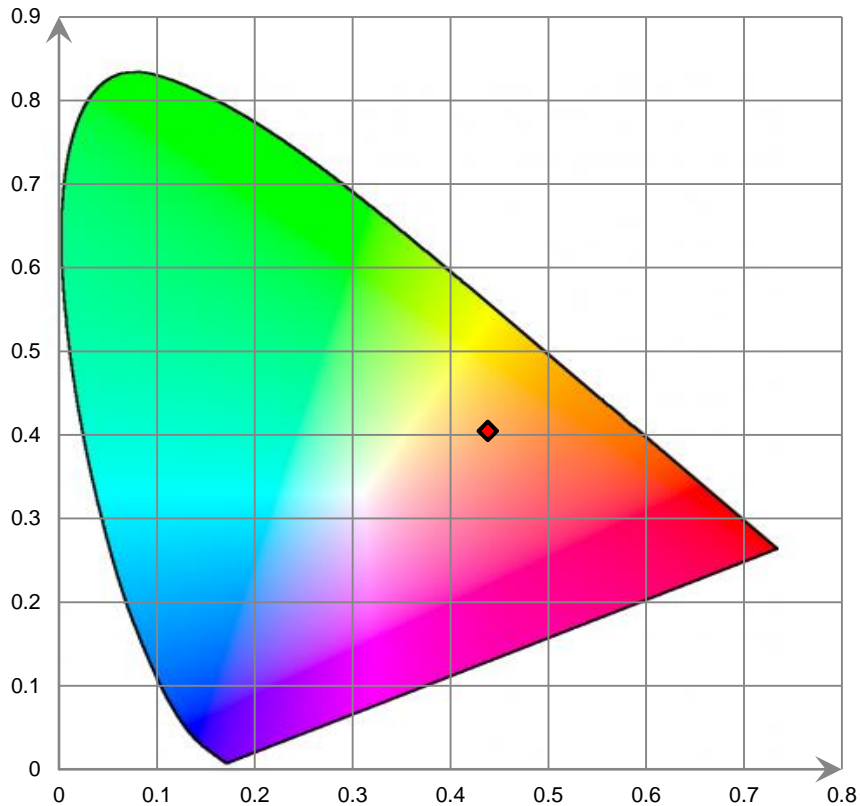
Relative Spectral Power Distribution



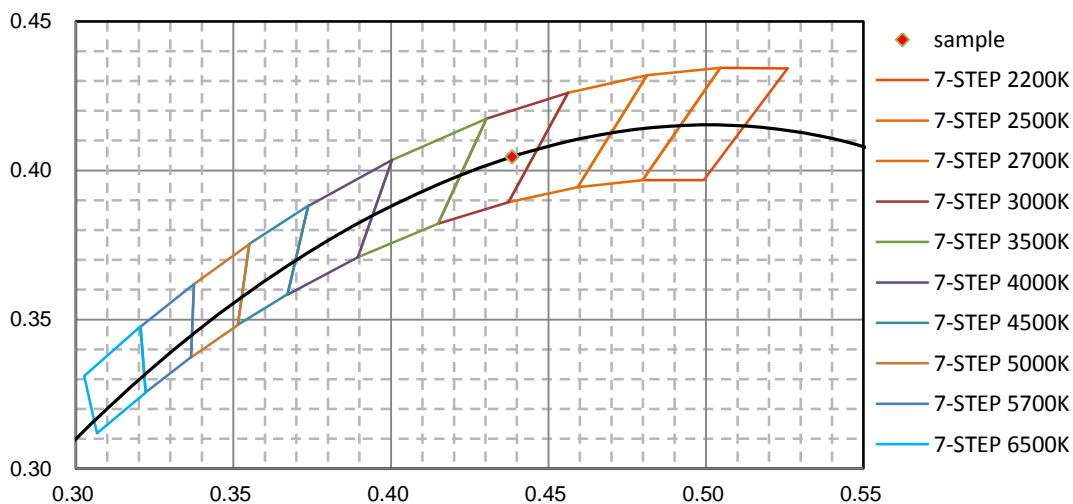
nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
380	4.660E-02	421	3.806E-01	462	1.166E+01	503	1.171E+01	544	1.891E+01
381	5.340E-02	422	4.037E-01	463	1.127E+01	504	1.204E+01	545	1.901E+01
382	3.380E-02	423	4.583E-01	464	1.096E+01	505	1.234E+01	546	1.914E+01
383	2.500E-03	424	5.802E-01	465	1.055E+01	506	1.272E+01	547	1.936E+01
384	5.910E-02	425	6.539E-01	466	1.048E+01	507	1.297E+01	548	1.959E+01
385	1.300E-02	426	7.439E-01	467	1.023E+01	508	1.323E+01	549	1.971E+01
386	1.000E-03	427	9.371E-01	468	1.007E+01	509	1.349E+01	550	2.000E+01
387	6.500E-02	428	1.101E+00	469	9.653E+00	510	1.372E+01	551	2.001E+01
388	3.900E-03	429	1.252E+00	470	9.343E+00	511	1.398E+01	552	2.044E+01
389	5.800E-03	430	1.430E+00	471	8.949E+00	512	1.419E+01	553	2.055E+01
390	8.650E-02	431	1.664E+00	472	8.466E+00	513	1.445E+01	554	2.074E+01
391	1.250E-02	432	1.890E+00	473	8.143E+00	514	1.466E+01	555	2.104E+01
392	9.600E-03	433	2.200E+00	474	7.654E+00	515	1.492E+01	556	2.130E+01
393	1.900E-03	434	2.428E+00	475	7.317E+00	516	1.517E+01	557	2.147E+01
394	1.910E-02	435	2.820E+00	476	7.001E+00	517	1.543E+01	558	2.174E+01
395	4.830E-02	436	3.196E+00	477	6.826E+00	518	1.548E+01	559	2.216E+01
396	3.410E-02	437	3.546E+00	478	6.579E+00	519	1.557E+01	560	2.231E+01
397	6.000E-03	438	4.016E+00	479	6.538E+00	520	1.573E+01	561	2.257E+01
398	6.000E-04	439	4.557E+00	480	6.550E+00	521	1.595E+01	562	2.280E+01
399	6.000E-04	440	5.071E+00	481	6.584E+00	522	1.604E+01	563	2.327E+01
400	0.000E+00	441	5.811E+00	482	6.709E+00	523	1.614E+01	564	2.355E+01
401	4.980E-02	442	6.625E+00	483	6.703E+00	524	1.632E+01	565	2.382E+01
402	3.540E-02	443	7.557E+00	484	6.878E+00	525	1.640E+01	566	2.400E+01
403	2.590E-02	444	8.583E+00	485	6.997E+00	526	1.657E+01	567	2.446E+01
404	4.660E-02	445	9.970E+00	486	7.088E+00	527	1.663E+01	568	2.480E+01
405	5.040E-02	446	1.129E+01	487	7.247E+00	528	1.689E+01	569	2.506E+01
406	1.770E-02	447	1.274E+01	488	7.451E+00	529	1.706E+01	570	2.536E+01
407	6.810E-02	448	1.423E+01	489	7.666E+00	530	1.715E+01	571	2.574E+01
408	3.400E-03	449	1.618E+01	490	7.782E+00	531	1.719E+01	572	2.597E+01
409	4.920E-02	450	1.735E+01	491	8.024E+00	532	1.724E+01	573	2.645E+01
410	8.830E-02	451	1.846E+01	492	8.215E+00	533	1.746E+01	574	2.655E+01
411	6.790E-02	452	1.907E+01	493	8.529E+00	534	1.756E+01	575	2.694E+01
412	2.790E-02	453	1.945E+01	494	8.787E+00	535	1.769E+01	576	2.735E+01
413	3.490E-02	454	1.923E+01	495	9.152E+00	536	1.778E+01	577	2.772E+01
414	7.100E-02	455	1.876E+01	496	9.450E+00	537	1.784E+01	578	2.807E+01
415	6.090E-02	456	1.762E+01	497	9.691E+00	538	1.818E+01	579	2.835E+01
416	1.478E-01	457	1.663E+01	498	1.007E+01	539	1.817E+01	580	2.859E+01
417	1.511E-01	458	1.533E+01	499	1.037E+01	540	1.823E+01	581	2.900E+01
418	2.235E-01	459	1.397E+01	500	1.070E+01	541	1.838E+01	582	2.934E+01
419	2.254E-01	460	1.319E+01	501	1.100E+01	542	1.851E+01	583	2.960E+01
420	2.822E-01	461	1.247E+01	502	1.136E+01	543	1.872E+01	584	3.009E+01

nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
585	3.024E+01	626	2.998E+01	667	1.344E+01	708	3.781E+00	749	6.716E-01
586	3.029E+01	627	2.957E+01	668	1.301E+01	709	3.665E+00	750	7.271E-01
587	3.076E+01	628	2.935E+01	669	1.271E+01	710	3.468E+00	751	6.810E-01
588	3.101E+01	629	2.885E+01	670	1.238E+01	711	3.353E+00	752	6.057E-01
589	3.127E+01	630	2.849E+01	671	1.209E+01	712	3.278E+00	753	6.410E-01
590	3.152E+01	631	2.800E+01	672	1.177E+01	713	3.221E+00	754	5.710E-01
591	3.168E+01	632	2.777E+01	673	1.132E+01	714	3.023E+00	755	4.332E-01
592	3.206E+01	633	2.727E+01	674	1.104E+01	715	2.925E+00	756	5.419E-01
593	3.222E+01	634	2.690E+01	675	1.080E+01	716	2.772E+00	757	4.235E-01
594	3.253E+01	635	2.650E+01	676	1.050E+01	717	2.679E+00	758	1.419E-01
595	3.266E+01	636	2.626E+01	677	1.016E+01	718	2.639E+00	759	3.270E-01
596	3.286E+01	637	2.572E+01	678	9.920E+00	719	2.460E+00	760	3.352E-01
597	3.304E+01	638	2.526E+01	679	9.609E+00	720	2.454E+00	761	3.159E-01
598	3.310E+01	639	2.478E+01	680	9.382E+00	721	2.317E+00	762	4.546E-01
599	3.327E+01	640	2.444E+01	681	9.041E+00	722	2.275E+00	763	4.211E-01
600	3.334E+01	641	2.395E+01	682	8.798E+00	723	2.159E+00	764	3.435E-01
601	3.358E+01	642	2.367E+01	683	8.586E+00	724	1.991E+00	765	2.224E-01
602	3.359E+01	643	2.318E+01	684	8.253E+00	725	1.993E+00	766	2.078E-01
603	3.354E+01	644	2.274E+01	685	8.002E+00	726	1.880E+00	767	3.444E-01
604	3.374E+01	645	2.236E+01	686	7.781E+00	727	1.827E+00	768	3.107E-01
605	3.369E+01	646	2.185E+01	687	7.599E+00	728	1.728E+00	769	3.176E-01
606	3.381E+01	647	2.146E+01	688	7.433E+00	729	1.758E+00	770	1.502E-01
607	3.367E+01	648	2.111E+01	689	7.064E+00	730	1.689E+00	771	2.722E-01
608	3.363E+01	649	2.063E+01	690	6.911E+00	731	1.568E+00	772	2.948E-01
609	3.372E+01	650	2.015E+01	691	6.693E+00	732	1.572E+00	773	2.388E-01
610	3.352E+01	651	1.974E+01	692	6.437E+00	733	1.331E+00	774	1.449E-01
611	3.347E+01	652	1.930E+01	693	6.295E+00	734	1.330E+00	775	2.394E-01
612	3.337E+01	653	1.890E+01	694	6.022E+00	735	1.353E+00	776	1.773E-01
613	3.330E+01	654	1.849E+01	695	5.916E+00	736	1.201E+00	777	1.691E-01
614	3.312E+01	655	1.812E+01	696	5.642E+00	737	1.186E+00	778	1.486E-01
615	3.294E+01	656	1.759E+01	697	5.512E+00	738	1.081E+00	779	2.640E-01
616	3.272E+01	657	1.723E+01	698	5.341E+00	739	1.028E+00	780	1.293E-01
617	3.260E+01	658	1.682E+01	699	5.131E+00	740	1.093E+00		
618	3.232E+01	659	1.642E+01	700	4.976E+00	741	9.829E-01		
619	3.206E+01	660	1.605E+01	701	4.837E+00	742	1.016E+00		
620	3.176E+01	661	1.567E+01	702	4.628E+00	743	9.883E-01		
621	3.155E+01	662	1.532E+01	703	4.456E+00	744	7.897E-01		
622	3.115E+01	663	1.488E+01	704	4.356E+00	745	7.480E-01		
623	3.077E+01	664	1.455E+01	705	4.175E+00	746	5.829E-01		
624	3.060E+01	665	1.415E+01	706	4.092E+00	747	6.807E-01		
625	3.021E+01	666	1.378E+01	707	3.939E+00	748	7.223E-01		

CIE 1931xy Chromaticity Diagram



7-Step Chromaticity Quadrangles



[Goniophotometer System]

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

Test orientation: **Downward**

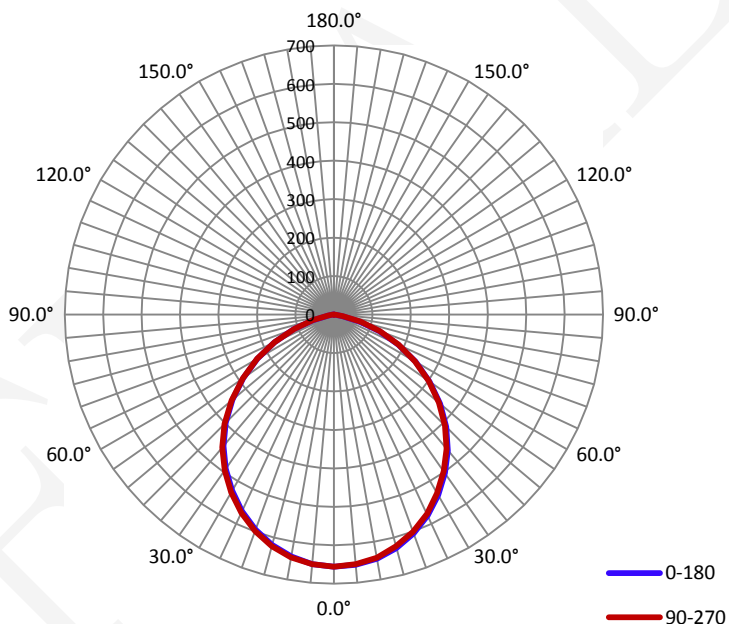
Electrical Measurement

Input Voltage(V)	Frequency(Hz)	Input Current(A)	Power (W)	Power Factor
120.0	60	0.1060	12.65	0.9910

Photometric Measurement

Luminous Flux(lm)	Efficacy(lm/W)	$I_{max}(cd)$	S/MH(C0/180)	S/MH(C90/270)
1642.4	129.88	655.6	1.22	1.22

Luminous Intensity Distribution



	C0/180	C45/225	C90/270	C135/315	AVG.
Beam Angle(50% I_{max}):	104.3	104.3	104.3	104.5	104.4
Field Angle(10% I_{max}):	149.6	149.7	149.7	149.6	149.7

Luminous Intensity (cd) Distribution Data

C y	0°	22.5°	45°	67.5°	90°	112.5°	135°	157.5°
0.0°	656	656	656	656	656	656	656	656
5.0°	654	655	653	653	652	652	653	652
10.0°	645	644	643	643	642	642	642	640
15.0°	629	628	628	626	624	624	625	623
20.0°	605	606	603	603	601	599	601	598
25.0°	576	576	575	574	572	570	570	568
30.0°	542	542	540	539	537	535	535	533
35.0°	503	503	501	500	498	497	496	494
40.0°	461	461	459	458	456	454	453	452
45.0°	413	414	412	411	409	407	407	404
50.0°	361	361	360	360	357	355	355	352
55.0°	304	304	303	303	301	299	299	297
60.0°	245	245	245	245	243	241	240	239
65.0°	185	186	186	185	186	184	183	181
70.0°	126	127	128	128	127	127	126	123
75.0°	69	71	71	72	72	70	68	67
80.0°	22	24	24	25	24	23	21	21
85.0°	6	7	7	7	7	6	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	1	0	0	0	0	0
180.0°	0	0	0	0	0	0	0	0

Luminous Intensity (cd) Distribution Data (cont.)

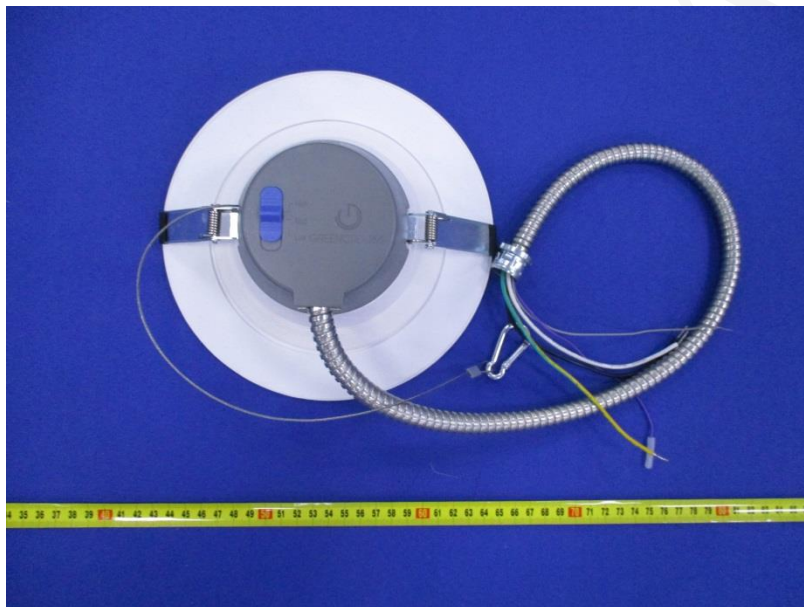
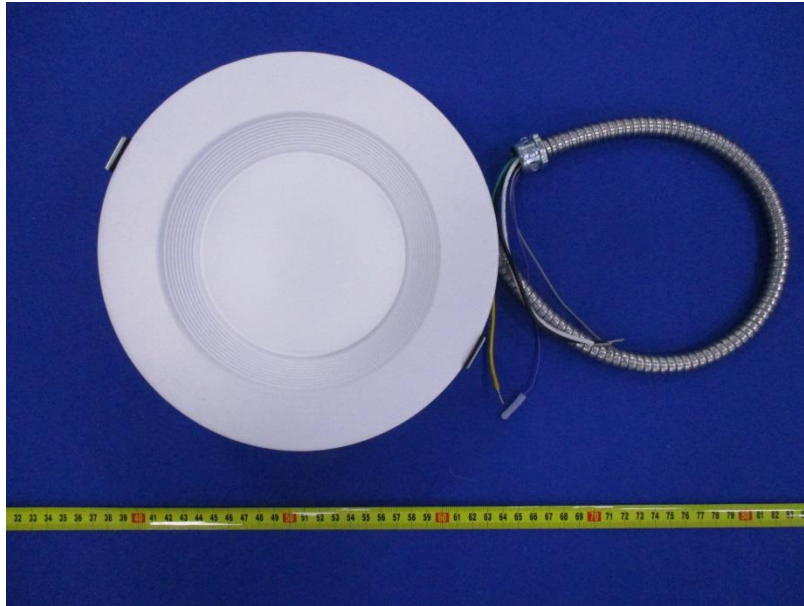
C y	180°	202.5°	225°	247.5°	270°	292.5°	315°	337.5°
0.0°	656	656	656	656	656	656	656	656
5.0°	651	652	652	651	652	653	653	653
10.0°	639	640	639	641	641	642	644	643
15.0°	620	622	622	623	624	625	627	626
20.0°	595	597	597	599	599	602	603	602
25.0°	565	566	567	569	569	572	573	573
30.0°	529	531	532	533	534	536	539	539
35.0°	490	492	491	494	495	497	499	500
40.0°	446	448	448	450	451	453	456	456
45.0°	397	399	399	402	402	405	408	408
50.0°	344	345	346	347	348	351	352	354
55.0°	287	288	288	288	290	293	295	296
60.0°	229	230	229	229	230	232	235	237
65.0°	171	170	169	169	170	171	173	176
70.0°	112	111	111	110	110	112	113	115
75.0°	56	56	56	56	56	57	58	60
80.0°	14	15	15	15	15	16	16	17
85.0°	4	3	4	4	4	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	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	15.6	0.95
5-10	46.3	2.82
10-15	75.1	4.57
15-20	101.0	6.15
20-25	122.9	7.48
25-30	140.1	8.53
30-35	152.1	9.26
35-40	158.6	9.66
40-45	159.2	9.70
45-50	153.4	9.34
50-55	141.1	8.59
55-60	123.2	7.50
60-65	100.8	6.14
65-70	75.1	4.58
70-75	47.7	2.90
75-80	22.1	1.35
80-85	6.6	0.40
85-90	1.4	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	15.6	0.95
0-10	61.9	3.77
0-15	137.1	8.35
0-20	238.0	14.49
0-25	360.9	21.98
0-30	501.0	30.50
0-35	653.1	39.76
0-40	811.7	49.42
0-45	970.9	59.12
0-50	1124.3	68.46
0-55	1265.4	77.04
0-60	1388.6	84.55
0-65	1489.4	90.69
0-70	1564.6	95.26
0-75	1612.3	98.17
0-80	1634.4	99.51
0-85	1641.0	99.91
0-90	1642.4	100.00
0-95	1642.4	100.00
0-100	1642.4	100.00
0-105	1642.4	100.00
0-110	1642.4	100.00
0-115	1642.4	100.00
0-120	1642.4	100.00
0-125	1642.4	100.00
0-130	1642.4	100.00
0-135	1642.4	100.00
0-140	1642.4	100.00
0-145	1642.4	100.00
0-150	1642.4	100.00
0-155	1642.4	100.00
0-160	1642.4	100.00
0-165	1642.4	100.00
0-170	1642.4	100.00
0-175	1642.4	100.00
0-180	1642.4	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*****