

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/DIM120V

Report Type:	Electrical and Photometric tests including: Luminous Flux, Chromaticity, Luminous Intensity Distribution
Test Engineer:	George Yang
Report Number:	PKS200708084-10
Test Date:	2020-07-09 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: INFT6/830/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: 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**

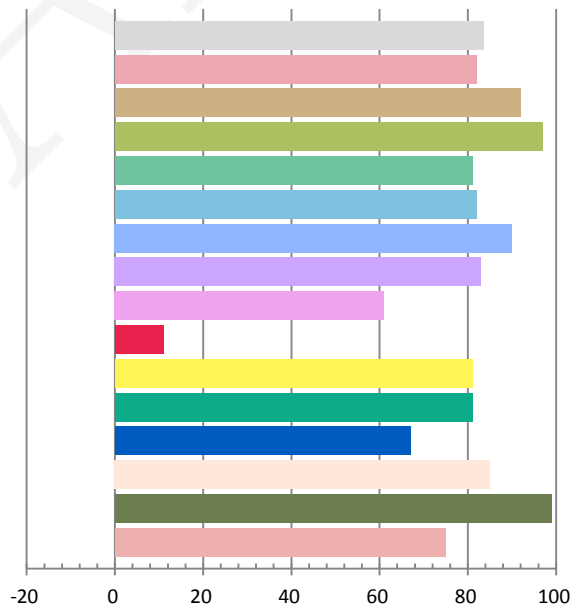
Photometric and Electrical Measurement Result

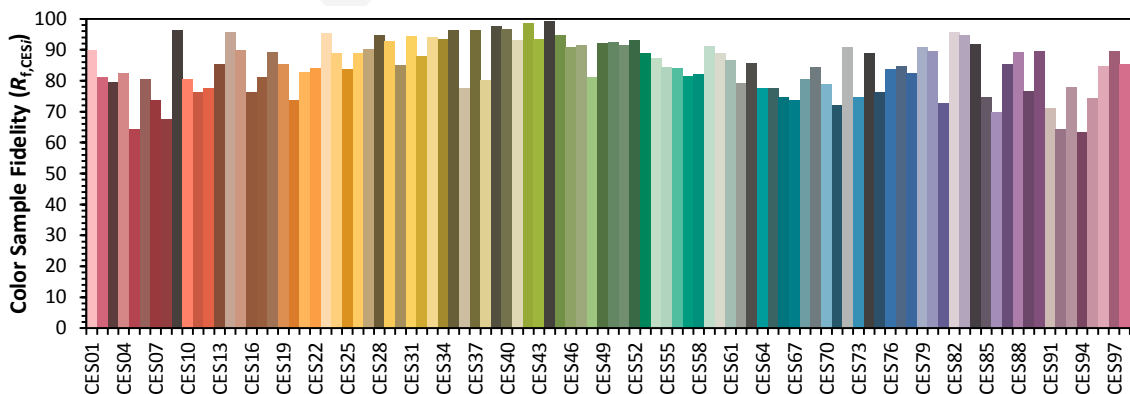
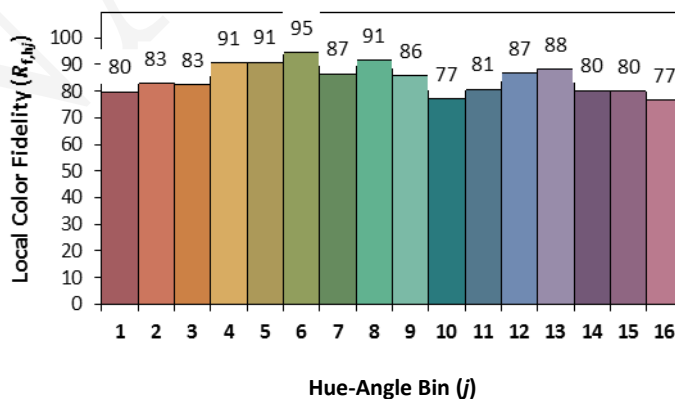
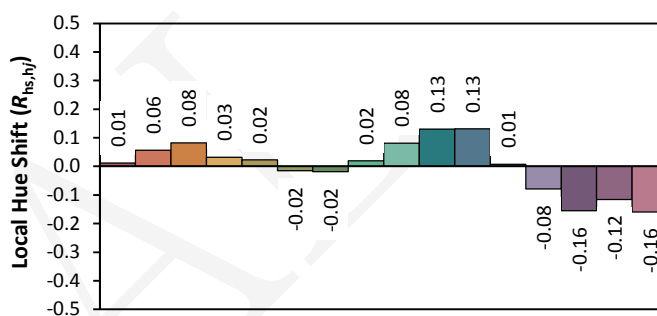
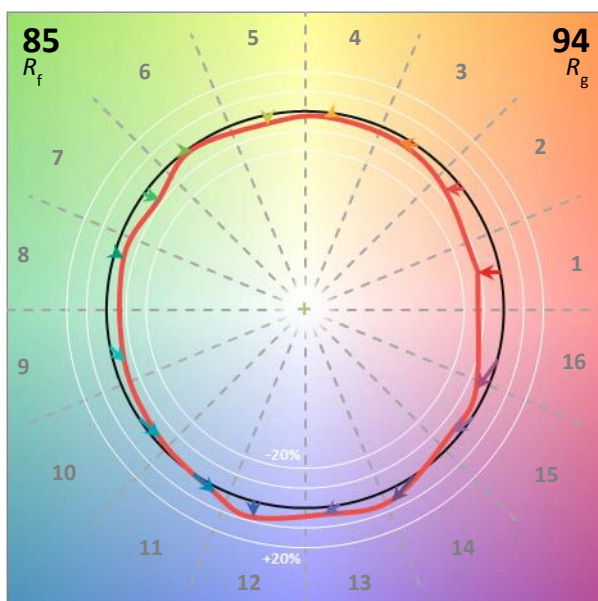
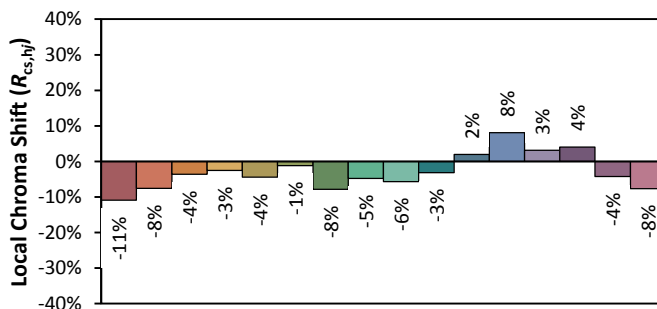
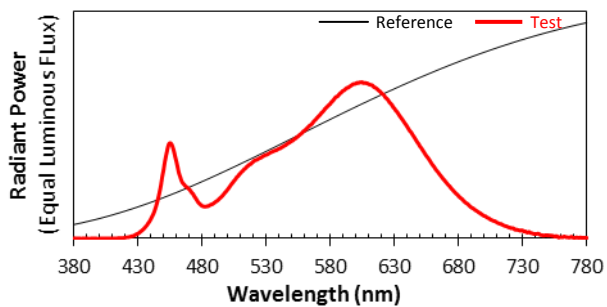
Voltage(V)	Frequency(Hz)	Current(A)	Power (W)	Power Factor	Luminous Flux(lm)	Efficacy(lm/W)
119.97	60	0.1167	13.41	0.9578	1689.04	125.95

Radiant Flux (W)	CCT (K)	Duv	x	y	u'	v'
5.063	3068	0.00181	0.4347	0.4078	0.2475	0.5225

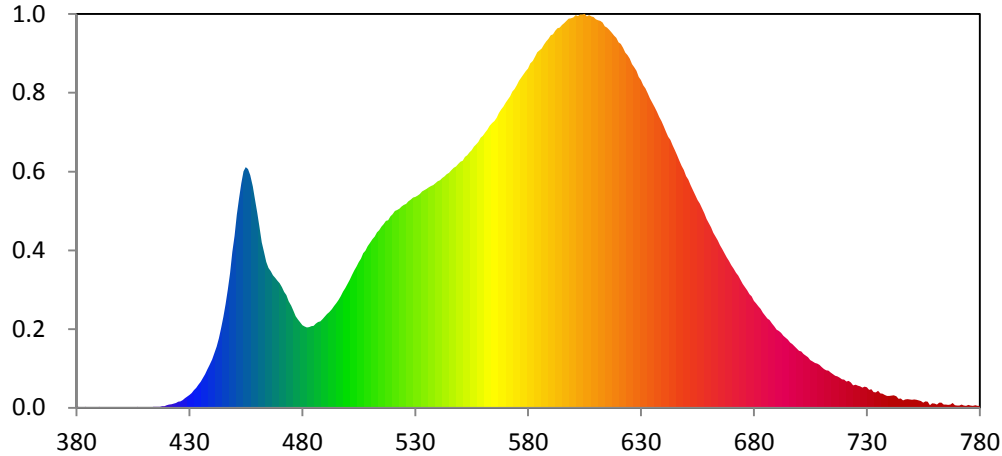
Color Rendering Index

Ra			
83.6			
R1	R2	R3	R4
82	92	97	81
R5	R6	R7	R8
82	90	83	61
R9	R10	R11	R12
11	81	81	67
R13	R14	R15	
85	99	75	





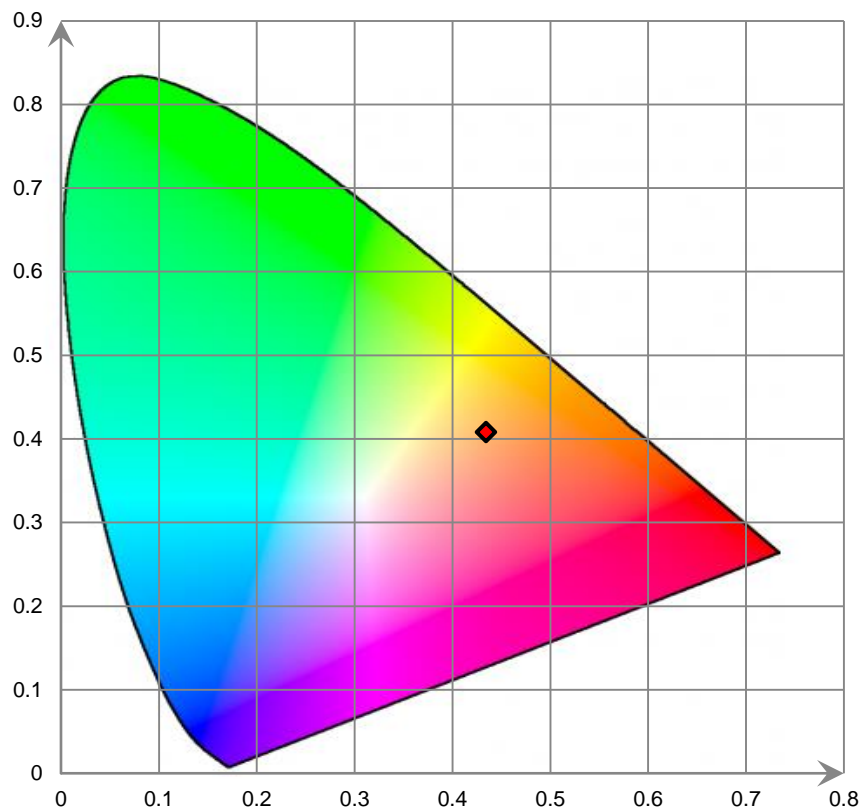
Relative Spectral Power Distribution



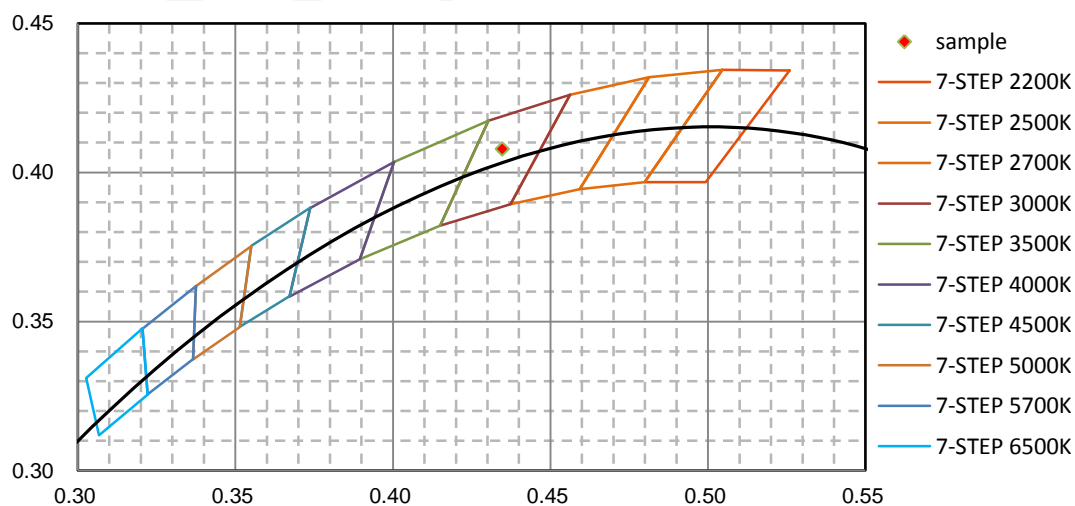
nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
380	2.200E-02	421	2.868E-01	462	1.428E+01	503	1.186E+01	544	2.016E+01
381	8.780E-02	422	2.992E-01	463	1.347E+01	504	1.219E+01	545	2.029E+01
382	5.990E-02	423	3.573E-01	464	1.260E+01	505	1.258E+01	546	2.051E+01
383	2.970E-02	424	3.999E-01	465	1.208E+01	506	1.287E+01	547	2.072E+01
384	7.740E-02	425	5.110E-01	466	1.179E+01	507	1.333E+01	548	2.084E+01
385	4.470E-02	426	5.441E-01	467	1.145E+01	508	1.356E+01	549	2.106E+01
386	4.400E-03	427	6.542E-01	468	1.122E+01	509	1.395E+01	550	2.124E+01
387	3.980E-02	428	8.169E-01	469	1.098E+01	510	1.423E+01	551	2.133E+01
388	5.730E-02	429	9.765E-01	470	1.075E+01	511	1.456E+01	552	2.166E+01
389	1.110E-02	430	1.091E+00	471	1.042E+01	512	1.479E+01	553	2.179E+01
390	7.320E-02	431	1.261E+00	472	1.000E+01	513	1.513E+01	554	2.205E+01
391	3.380E-02	432	1.517E+00	473	9.728E+00	514	1.532E+01	555	2.225E+01
392	3.100E-03	433	1.708E+00	474	9.204E+00	515	1.565E+01	556	2.255E+01
393	3.700E-03	434	1.976E+00	475	8.821E+00	516	1.587E+01	557	2.273E+01
394	2.350E-02	435	2.231E+00	476	8.378E+00	517	1.613E+01	558	2.297E+01
395	5.470E-02	436	2.565E+00	477	7.910E+00	518	1.619E+01	559	2.331E+01
396	3.030E-02	437	2.889E+00	478	7.615E+00	519	1.652E+01	560	2.350E+01
397	3.140E-02	438	3.305E+00	479	7.377E+00	520	1.672E+01	561	2.376E+01
398	1.100E-02	439	3.689E+00	480	7.121E+00	521	1.700E+01	562	2.401E+01
399	3.200E-03	440	4.184E+00	481	7.028E+00	522	1.708E+01	563	2.433E+01
400	4.000E-04	441	4.732E+00	482	6.927E+00	523	1.718E+01	564	2.460E+01
401	1.470E-02	442	5.289E+00	483	6.959E+00	524	1.737E+01	565	2.475E+01
402	1.660E-02	443	5.997E+00	484	7.044E+00	525	1.752E+01	566	2.504E+01
403	2.990E-02	444	6.883E+00	485	7.074E+00	526	1.760E+01	567	2.544E+01
404	3.860E-02	445	7.843E+00	486	7.265E+00	527	1.783E+01	568	2.575E+01
405	4.120E-02	446	8.939E+00	487	7.396E+00	528	1.796E+01	569	2.599E+01
406	1.580E-02	447	1.023E+01	488	7.468E+00	529	1.814E+01	570	2.634E+01
407	7.630E-02	448	1.164E+01	489	7.648E+00	530	1.821E+01	571	2.660E+01
408	6.800E-03	449	1.344E+01	490	7.884E+00	531	1.832E+01	572	2.688E+01
409	5.540E-02	450	1.484E+01	491	8.090E+00	532	1.847E+01	573	2.729E+01
410	5.120E-02	451	1.666E+01	492	8.260E+00	533	1.866E+01	574	2.753E+01
411	4.200E-02	452	1.807E+01	493	8.506E+00	534	1.879E+01	575	2.784E+01
412	5.640E-02	453	1.936E+01	494	8.784E+00	535	1.890E+01	576	2.825E+01
413	2.290E-02	454	2.042E+01	495	9.028E+00	536	1.904E+01	577	2.851E+01
414	7.220E-02	455	2.078E+01	496	9.305E+00	537	1.915E+01	578	2.878E+01
415	7.190E-02	456	2.060E+01	497	9.651E+00	538	1.923E+01	579	2.907E+01
416	9.180E-02	457	2.009E+01	498	1.002E+01	539	1.940E+01	580	2.928E+01
417	8.800E-02	458	1.913E+01	499	1.033E+01	540	1.955E+01	581	2.972E+01
418	1.239E-01	459	1.795E+01	500	1.068E+01	541	1.963E+01	582	2.994E+01
419	1.330E-01	460	1.683E+01	501	1.104E+01	542	1.984E+01	583	3.031E+01
420	2.232E-01	461	1.558E+01	502	1.147E+01	543	1.997E+01	584	3.069E+01

nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
585	3.086E+01	626	2.968E+01	667	1.334E+01	708	3.821E+00	749	7.280E-01
586	3.102E+01	627	2.941E+01	668	1.298E+01	709	3.685E+00	750	6.813E-01
587	3.137E+01	628	2.909E+01	669	1.267E+01	710	3.501E+00	751	7.103E-01
588	3.164E+01	629	2.856E+01	670	1.233E+01	711	3.355E+00	752	6.847E-01
589	3.186E+01	630	2.829E+01	671	1.198E+01	712	3.242E+00	753	6.180E-01
590	3.217E+01	631	2.786E+01	672	1.166E+01	713	3.199E+00	754	5.834E-01
591	3.224E+01	632	2.758E+01	673	1.141E+01	714	3.046E+00	755	4.472E-01
592	3.255E+01	633	2.715E+01	674	1.104E+01	715	2.895E+00	756	5.603E-01
593	3.277E+01	634	2.671E+01	675	1.070E+01	716	2.773E+00	757	5.130E-01
594	3.283E+01	635	2.635E+01	676	1.040E+01	717	2.719E+00	758	2.194E-01
595	3.304E+01	636	2.596E+01	677	1.013E+01	718	2.596E+00	759	3.757E-01
596	3.321E+01	637	2.555E+01	678	9.799E+00	719	2.459E+00	760	3.506E-01
597	3.342E+01	638	2.511E+01	679	9.603E+00	720	2.422E+00	761	2.742E-01
598	3.359E+01	639	2.475E+01	680	9.239E+00	721	2.262E+00	762	4.410E-01
599	3.362E+01	640	2.431E+01	681	9.000E+00	722	2.307E+00	763	4.386E-01
600	3.371E+01	641	2.383E+01	682	8.751E+00	723	2.185E+00	764	2.841E-01
601	3.389E+01	642	2.341E+01	683	8.542E+00	724	1.942E+00	765	2.786E-01
602	3.383E+01	643	2.312E+01	684	8.193E+00	725	1.976E+00	766	2.506E-01
603	3.396E+01	644	2.265E+01	685	7.943E+00	726	1.910E+00	767	2.666E-01
604	3.396E+01	645	2.225E+01	686	7.721E+00	727	1.843E+00	768	4.156E-01
605	3.401E+01	646	2.179E+01	687	7.571E+00	728	1.729E+00	769	2.285E-01
606	3.378E+01	647	2.133E+01	688	7.304E+00	729	1.810E+00	770	2.007E-01
607	3.389E+01	648	2.089E+01	689	7.004E+00	730	1.765E+00	771	1.930E-01
608	3.379E+01	649	2.053E+01	690	6.746E+00	731	1.546E+00	772	2.712E-01
609	3.374E+01	650	2.002E+01	691	6.642E+00	732	1.604E+00	773	2.051E-01
610	3.355E+01	651	1.969E+01	692	6.462E+00	733	1.354E+00	774	1.531E-01
611	3.346E+01	652	1.922E+01	693	6.210E+00	734	1.314E+00	775	2.555E-01
612	3.339E+01	653	1.882E+01	694	6.036E+00	735	1.471E+00	776	1.818E-01
613	3.328E+01	654	1.834E+01	695	5.872E+00	736	1.228E+00	777	1.643E-01
614	3.293E+01	655	1.794E+01	696	5.626E+00	737	1.212E+00	778	2.196E-01
615	3.283E+01	656	1.761E+01	697	5.504E+00	738	1.091E+00	779	1.601E-01
616	3.263E+01	657	1.722E+01	698	5.293E+00	739	1.010E+00	780	1.540E-01
617	3.240E+01	658	1.679E+01	699	5.098E+00	740	1.007E+00		
618	3.212E+01	659	1.630E+01	700	4.920E+00	741	1.054E+00		
619	3.194E+01	660	1.594E+01	701	4.860E+00	742	1.078E+00		
620	3.155E+01	661	1.559E+01	702	4.632E+00	743	9.786E-01		
621	3.141E+01	662	1.512E+01	703	4.490E+00	744	7.773E-01		
622	3.109E+01	663	1.477E+01	704	4.363E+00	745	7.880E-01		
623	3.068E+01	664	1.445E+01	705	4.124E+00	746	6.454E-01		
624	3.044E+01	665	1.405E+01	706	4.016E+00	747	7.210E-01		
625	3.014E+01	666	1.369E+01	707	3.876E+00	748	7.394E-01		

CIE 1931xy Chromaticity Diagram



7-Step Chromaticity Quadrangles



[Goniophotometer System]

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

Test orientation: **Downward**

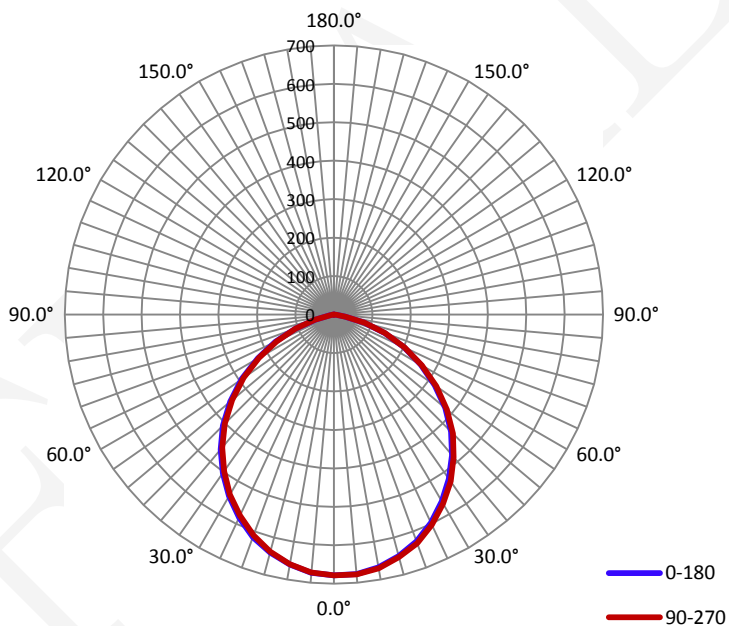
Electrical Measurement

Input Voltage(V)	Frequency(Hz)	Input Current(A)	Power (W)	Power Factor
120.1	60	0.1160	13.44	0.9630

Photometric Measurement

Luminous Flux(lm)	Efficacy(lm/W)	$I_{max}(cd)$	S/MH(C0/180)	S/MH(C90/270)
1696.2	126.25	678.6	1.21	1.22

Luminous Intensity Distribution



	C0/180	C45/225	C90/270	C135/315	AVG.
Beam Angle(50% I_{max}):	104.5	104.5	104.3	104.1	104.4
Field Angle(10% I_{max}):	149.7	149.9	150.0	149.6	149.8

Luminous Intensity (cd) Distribution Data

C y	0°	22.5°	45°	67.5°	90°	112.5°	135°	157.5°
0.0°	678	678	678	678	678	678	678	678
5.0°	677	677	678	677	679	677	675	674
10.0°	667	669	670	670	670	668	665	662
15.0°	650	654	655	654	653	652	649	645
20.0°	627	631	633	632	633	628	625	620
25.0°	598	601	604	603	603	599	593	589
30.0°	561	566	570	569	568	562	558	552
35.0°	522	527	529	530	529	522	518	511
40.0°	478	485	487	486	485	479	474	467
45.0°	431	436	438	439	437	431	425	417
50.0°	378	384	387	385	384	376	370	361
55.0°	320	327	329	327	325	318	311	302
60.0°	260	268	270	268	264	258	250	241
65.0°	201	206	209	206	203	195	188	180
70.0°	141	146	148	146	142	135	127	120
75.0°	81	87	88	87	84	77	69	62
80.0°	28	33	35	34	31	27	22	17
85.0°	7	9	9	9	8	7	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	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

Luminous Intensity (cd) Distribution Data (cont.)

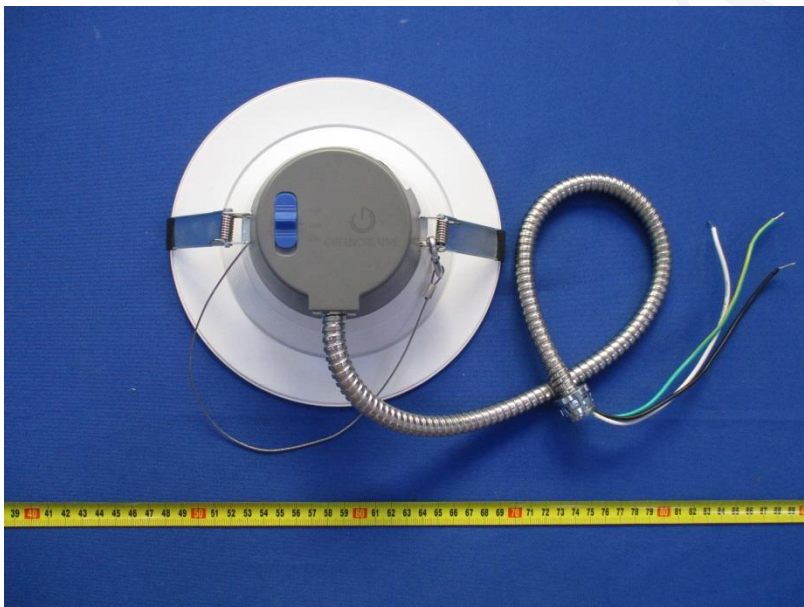
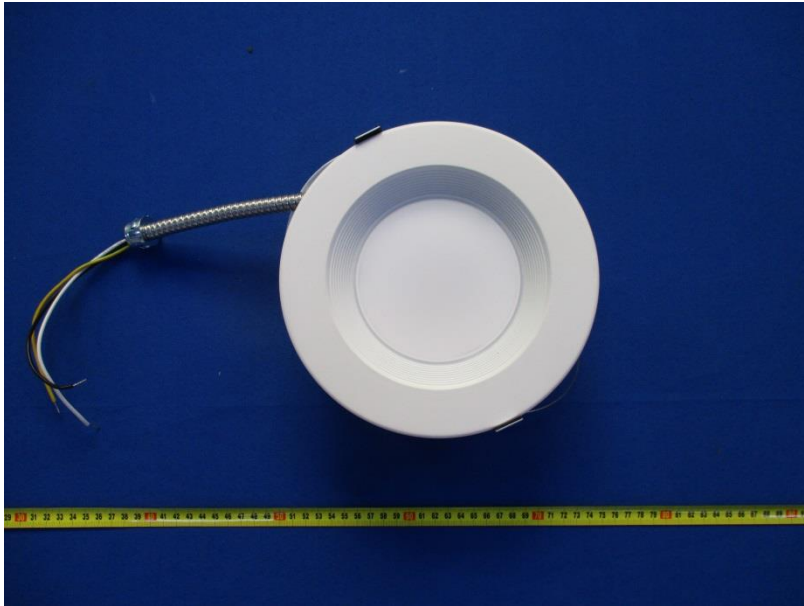
C y	180°	202.5°	225°	247.5°	270°	292.5°	315°	337.5°
0.0°	678	678	678	678	678	678	678	678
5.0°	674	673	673	669	673	671	673	674
10.0°	660	659	659	655	659	659	662	661
15.0°	641	638	637	636	639	638	642	645
20.0°	616	613	611	608	611	612	615	618
25.0°	583	579	576	575	578	580	583	587
30.0°	545	541	539	538	541	542	547	552
35.0°	504	500	498	495	498	501	505	511
40.0°	458	454	450	449	452	455	461	467
45.0°	408	403	399	398	401	405	411	419
50.0°	352	345	343	342	346	351	356	364
55.0°	292	285	283	283	286	291	298	306
60.0°	229	225	222	222	225	231	238	246
65.0°	168	163	161	161	165	171	178	186
70.0°	106	103	100	101	106	112	119	127
75.0°	50	48	46	47	51	56	62	69
80.0°	11	10	11	11	12	14	17	20
85.0°	1	1	2	2	2	4	5	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	0
180.0°	0	0	0	0	0	0	0	0

Zonal Lumen Density Measurement

Deg	Flux (lm)	%
0-5	16.2	0.95
5-10	47.9	2.82
10-15	77.6	4.58
15-20	104.3	6.15
20-25	126.9	7.48
25-30	144.6	8.52
30-35	156.9	9.25
35-40	163.5	9.64
40-45	164.1	9.68
45-50	158.1	9.32
50-55	145.5	8.58
55-60	127.1	7.50
60-65	104.2	6.14
65-70	77.8	4.59
70-75	49.6	2.93
75-80	23.3	1.37
80-85	7.0	0.41
85-90	1.4	0.08
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	16.2	0.95
0-10	64.0	3.77
0-15	141.7	8.35
0-20	246.0	14.50
0-25	372.9	21.99
0-30	517.5	30.51
0-35	674.4	39.76
0-40	837.9	49.40
0-45	1002.1	59.08
0-50	1160.2	68.40
0-55	1305.7	76.98
0-60	1432.9	84.48
0-65	1537.0	90.62
0-70	1614.8	95.20
0-75	1664.5	98.13
0-80	1687.8	99.50
0-85	1694.8	99.92
0-90	1696.2	100.00
0-95	1696.2	100.00
0-100	1696.2	100.00
0-105	1696.2	100.00
0-110	1696.2	100.00
0-115	1696.2	100.00
0-120	1696.2	100.00
0-125	1696.2	100.00
0-130	1696.2	100.00
0-135	1696.2	100.00
0-140	1696.2	100.00
0-145	1696.2	100.00
0-150	1696.2	100.00
0-155	1696.2	100.00
0-160	1696.2	100.00
0-165	1696.2	100.00
0-170	1696.2	100.00
0-175	1696.2	100.00
0-180	1696.2	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*****