

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: INFT6/827/DIM010UNV

Report Type:	Electrical and Photometric tests including: Luminous Flux, Chromaticity, Luminous Intensity Distribution
Test Engineer:	Joker Gu
Report Number:	RKSB200515006-10-1
Test Date:	2020-05-17 to 2020-06-06
Report Date:	2020-06-18
Reviewed By:	Seven Xia/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 2020-05-15 and used for testing.

Model Tested: INFT6/827/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: 120VAC 60Hz
 Rated Power: 13W/9W/6.5W
 Nominal CCT: 2700K
 Nominal Lumen Output: 1495lm/1035lm/745lm

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.

Note: All the UUTs were tested at Most Consumptive Settings

5. Test Result

[Integrating Sphere System]

Total operating time for integrating sphere test: **1.0 hour**

Test orientation: **Downward**

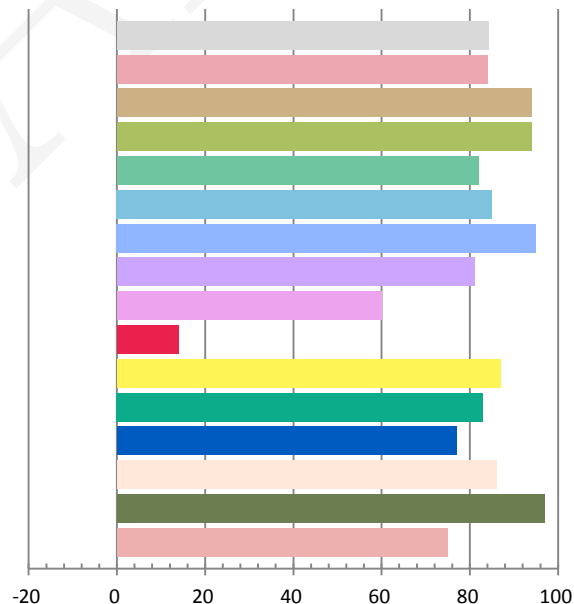
Photometric and Electrical Measurement Result

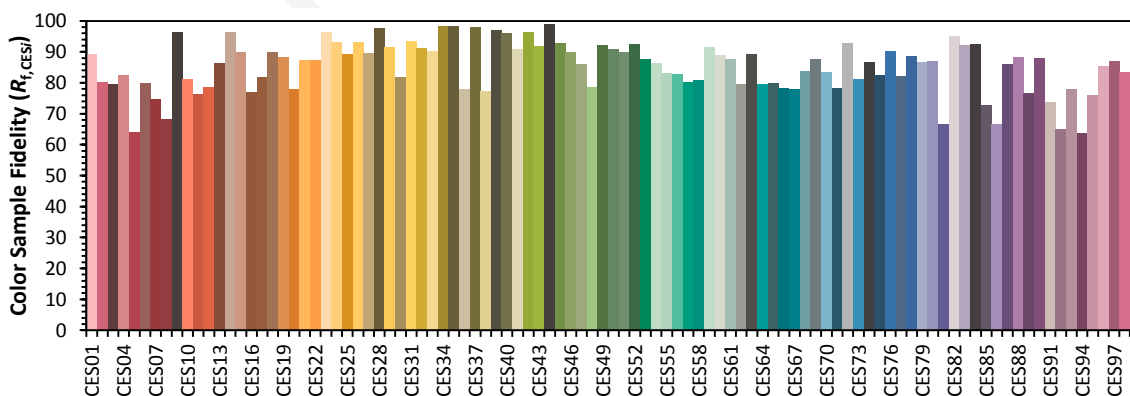
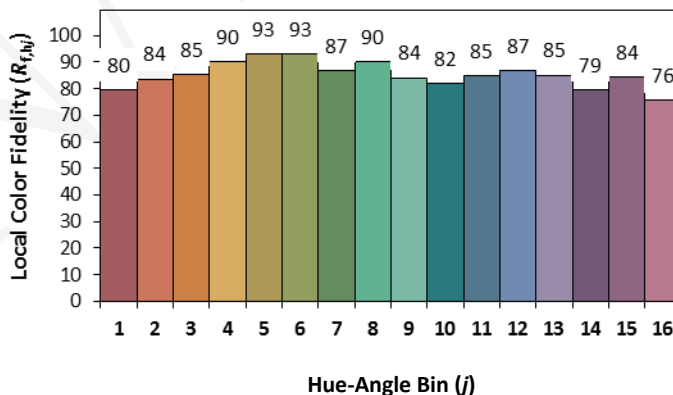
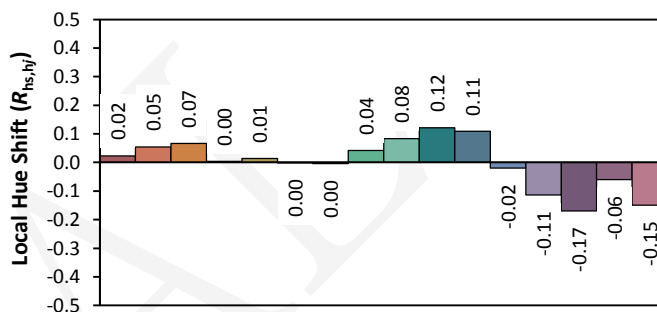
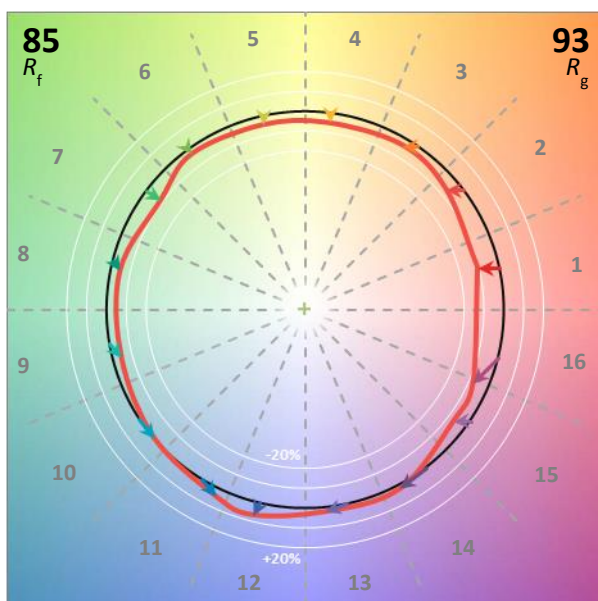
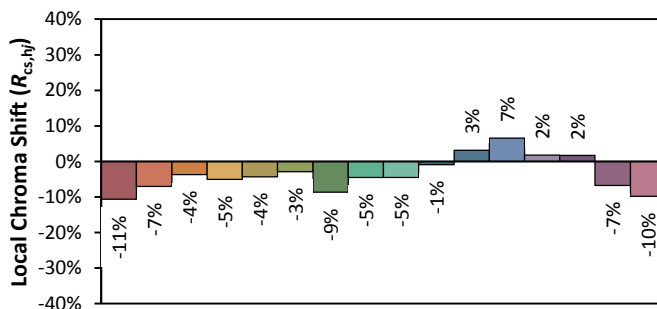
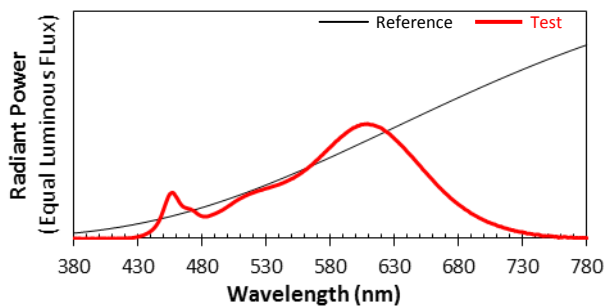
Voltage(V)	Frequency(Hz)	Current(A)	Power (W)	Power Factor	Luminous Flux(lm)	Efficacy(lm/W)
120.01	60	0.1074	12.68	0.9835	1505.24	118.71

Radiant Flux (W)	CCT (K)	Duv	x	y	u'	v'
4.639	2706	0.00112	0.4613	0.4140	0.2619	0.5289

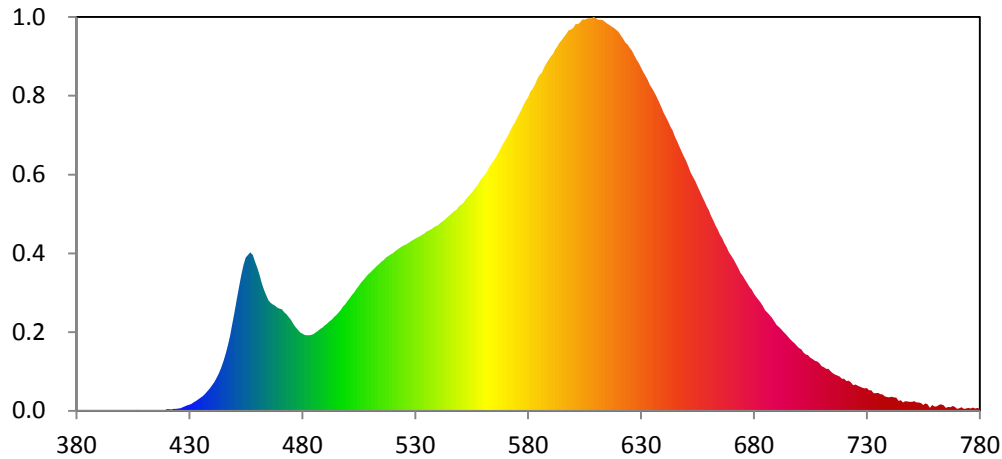
Color Rendering Index

Ra			
84.2			
R1	R2	R3	R4
84	94	94	82
R5	R6	R7	R8
85	95	81	60
R9	R10	R11	R12
14	87	83	77
R13	R14	R15	
86	97	75	





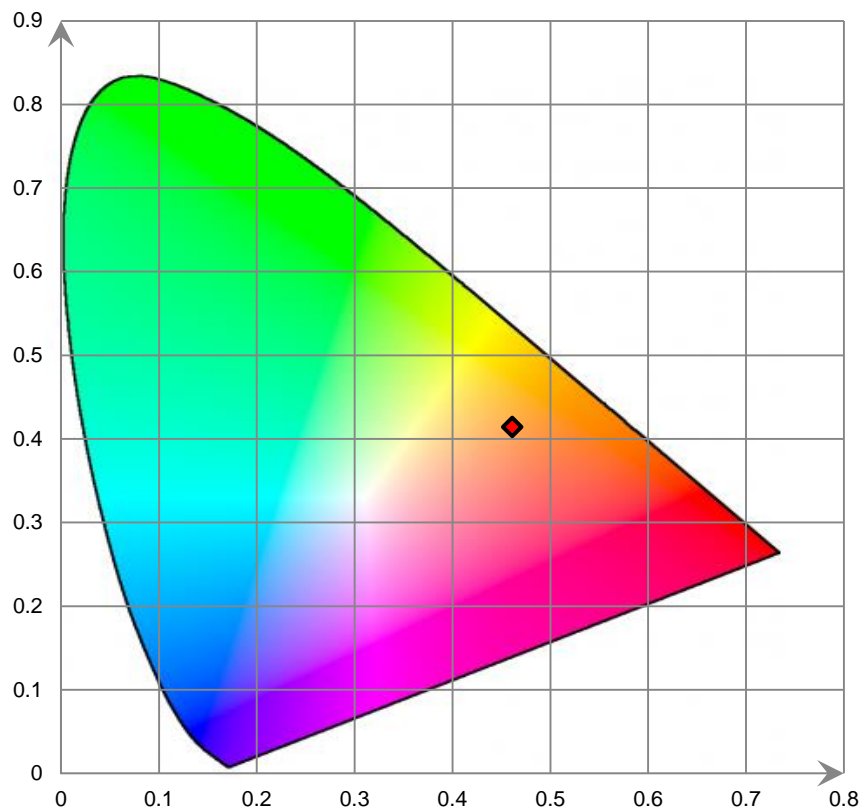
Relative Spectral Power Distribution



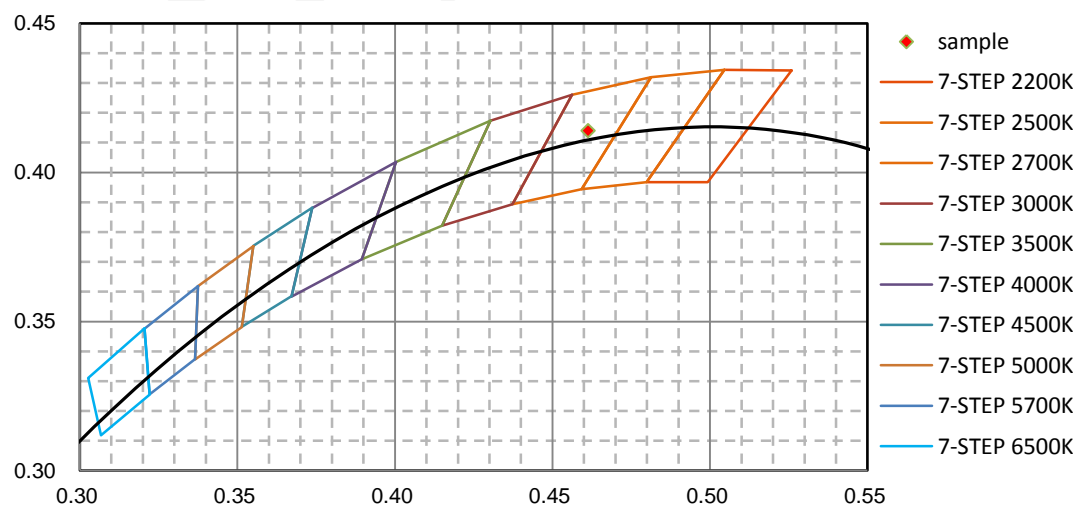
nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
380	3.420E-02	421	1.269E-01	462	1.081E+01	503	1.003E+01	544	1.634E+01
381	6.170E-02	422	1.008E-01	463	1.022E+01	504	1.033E+01	545	1.650E+01
382	4.800E-02	423	1.688E-01	464	9.786E+00	505	1.057E+01	546	1.666E+01
383	8.500E-03	424	1.627E-01	465	9.353E+00	506	1.082E+01	547	1.686E+01
384	6.890E-02	425	2.002E-01	466	9.137E+00	507	1.105E+01	548	1.699E+01
385	4.300E-02	426	2.250E-01	467	8.980E+00	508	1.128E+01	549	1.723E+01
386	2.700E-03	427	2.924E-01	468	8.881E+00	509	1.151E+01	550	1.742E+01
387	3.410E-02	428	3.754E-01	469	8.730E+00	510	1.166E+01	551	1.752E+01
388	1.080E-02	429	4.495E-01	470	8.645E+00	511	1.188E+01	552	1.780E+01
389	3.600E-03	430	5.088E-01	471	8.579E+00	512	1.207E+01	553	1.803E+01
390	4.990E-02	431	6.007E-01	472	8.335E+00	513	1.227E+01	554	1.826E+01
391	1.900E-02	432	7.360E-01	473	8.168E+00	514	1.243E+01	555	1.845E+01
392	8.200E-03	433	8.372E-01	474	7.945E+00	515	1.261E+01	556	1.872E+01
393	4.300E-03	434	9.647E-01	475	7.668E+00	516	1.276E+01	557	1.897E+01
394	7.000E-03	435	1.106E+00	476	7.342E+00	517	1.298E+01	558	1.921E+01
395	5.040E-02	436	1.253E+00	477	7.072E+00	518	1.307E+01	559	1.955E+01
396	1.800E-02	437	1.441E+00	478	6.843E+00	519	1.323E+01	560	1.977E+01
397	9.300E-03	438	1.653E+00	479	6.648E+00	520	1.334E+01	561	2.003E+01
398	8.000E-04	439	1.878E+00	480	6.515E+00	521	1.349E+01	562	2.031E+01
399	7.800E-03	440	2.157E+00	481	6.410E+00	522	1.363E+01	563	2.068E+01
400	2.000E-04	441	2.445E+00	482	6.376E+00	523	1.377E+01	564	2.099E+01
401	2.100E-02	442	2.781E+00	483	6.376E+00	524	1.390E+01	565	2.126E+01
402	2.720E-02	443	3.156E+00	484	6.409E+00	525	1.400E+01	566	2.155E+01
403	2.720E-02	444	3.631E+00	485	6.489E+00	526	1.408E+01	567	2.192E+01
404	1.510E-02	445	4.166E+00	486	6.644E+00	527	1.418E+01	568	2.230E+01
405	3.710E-02	446	4.793E+00	487	6.767E+00	528	1.434E+01	569	2.265E+01
406	9.900E-03	447	5.515E+00	488	6.925E+00	529	1.446E+01	570	2.294E+01
407	6.690E-02	448	6.332E+00	489	7.045E+00	530	1.456E+01	571	2.328E+01
408	6.200E-03	449	7.369E+00	490	7.222E+00	531	1.467E+01	572	2.366E+01
409	4.980E-02	450	8.372E+00	491	7.373E+00	532	1.476E+01	573	2.405E+01
410	5.820E-02	451	9.465E+00	492	7.556E+00	533	1.490E+01	574	2.436E+01
411	3.700E-02	452	1.049E+01	493	7.729E+00	534	1.501E+01	575	2.473E+01
412	5.200E-02	453	1.149E+01	494	7.943E+00	535	1.516E+01	576	2.512E+01
413	1.380E-02	454	1.235E+01	495	8.090E+00	536	1.524E+01	577	2.546E+01
414	4.890E-02	455	1.298E+01	496	8.319E+00	537	1.537E+01	578	2.585E+01
415	3.060E-02	456	1.319E+01	497	8.539E+00	538	1.549E+01	579	2.625E+01
416	3.330E-02	457	1.340E+01	498	8.825E+00	539	1.563E+01	580	2.652E+01
417	2.300E-02	458	1.320E+01	499	9.018E+00	540	1.568E+01	581	2.697E+01
418	5.870E-02	459	1.261E+01	500	9.277E+00	541	1.588E+01	582	2.727E+01
419	6.460E-02	460	1.210E+01	501	9.537E+00	542	1.601E+01	583	2.763E+01
420	1.212E-01	461	1.152E+01	502	9.790E+00	543	1.615E+01	584	2.808E+01

nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
585	2.842E+01	626	3.047E+01	667	1.417E+01	708	4.159E+00	749	7.587E-01
586	2.860E+01	627	3.011E+01	668	1.385E+01	709	3.996E+00	750	7.565E-01
587	2.904E+01	628	2.975E+01	669	1.340E+01	710	3.771E+00	751	8.003E-01
588	2.939E+01	629	2.943E+01	670	1.314E+01	711	3.669E+00	752	6.928E-01
589	2.968E+01	630	2.908E+01	671	1.278E+01	712	3.543E+00	753	6.931E-01
590	2.998E+01	631	2.869E+01	672	1.243E+01	713	3.540E+00	754	6.431E-01
591	3.021E+01	632	2.835E+01	673	1.207E+01	714	3.332E+00	755	4.907E-01
592	3.058E+01	633	2.801E+01	674	1.168E+01	715	3.154E+00	756	6.234E-01
593	3.086E+01	634	2.758E+01	675	1.143E+01	716	3.054E+00	757	5.344E-01
594	3.118E+01	635	2.727E+01	676	1.109E+01	717	2.973E+00	758	2.360E-01
595	3.139E+01	636	2.690E+01	677	1.082E+01	718	2.892E+00	759	4.906E-01
596	3.167E+01	637	2.651E+01	678	1.048E+01	719	2.714E+00	760	3.544E-01
597	3.192E+01	638	2.612E+01	679	1.026E+01	720	2.692E+00	761	3.776E-01
598	3.219E+01	639	2.568E+01	680	9.903E+00	721	2.502E+00	762	5.211E-01
599	3.226E+01	640	2.521E+01	681	9.655E+00	722	2.536E+00	763	5.450E-01
600	3.243E+01	641	2.486E+01	682	9.386E+00	723	2.418E+00	764	4.551E-01
601	3.274E+01	642	2.448E+01	683	9.151E+00	724	2.176E+00	765	2.546E-01
602	3.272E+01	643	2.405E+01	684	8.855E+00	725	2.222E+00	766	3.173E-01
603	3.288E+01	644	2.372E+01	685	8.506E+00	726	2.118E+00	767	2.979E-01
604	3.314E+01	645	2.322E+01	686	8.318E+00	727	2.021E+00	768	4.041E-01
605	3.311E+01	646	2.282E+01	687	8.106E+00	728	1.952E+00	769	3.126E-01
606	3.319E+01	647	2.237E+01	688	7.878E+00	729	1.905E+00	770	1.466E-01
607	3.324E+01	648	2.194E+01	689	7.556E+00	730	1.916E+00	771	2.155E-01
608	3.322E+01	649	2.154E+01	690	7.264E+00	731	1.726E+00	772	2.946E-01
609	3.334E+01	650	2.116E+01	691	7.102E+00	732	1.745E+00	773	1.644E-01
610	3.325E+01	651	2.070E+01	692	6.893E+00	733	1.501E+00	774	2.011E-01
611	3.311E+01	652	2.019E+01	693	6.679E+00	734	1.487E+00	775	2.361E-01
612	3.309E+01	653	1.982E+01	694	6.497E+00	735	1.514E+00	776	1.867E-01
613	3.307E+01	654	1.943E+01	695	6.289E+00	736	1.403E+00	777	2.635E-01
614	3.294E+01	655	1.900E+01	696	6.062E+00	737	1.379E+00	778	1.811E-01
615	3.278E+01	656	1.859E+01	697	5.867E+00	738	1.216E+00	779	2.411E-01
616	3.268E+01	657	1.814E+01	698	5.714E+00	739	1.162E+00	780	1.665E-01
617	3.253E+01	658	1.778E+01	699	5.498E+00	740	1.133E+00		
618	3.240E+01	659	1.734E+01	700	5.300E+00	741	1.198E+00		
619	3.224E+01	660	1.697E+01	701	5.207E+00	742	1.122E+00		
620	3.207E+01	661	1.650E+01	702	4.930E+00	743	1.114E+00		
621	3.177E+01	662	1.610E+01	703	4.777E+00	744	8.501E-01		
622	3.150E+01	663	1.569E+01	704	4.720E+00	745	8.988E-01		
623	3.119E+01	664	1.532E+01	705	4.506E+00	746	7.024E-01		
624	3.101E+01	665	1.489E+01	706	4.373E+00	747	8.016E-01		
625	3.071E+01	666	1.459E+01	707	4.231E+00	748	7.719E-01		

CIE 1931xy Chromaticity Diagram



7-Step Chromaticity Quadrangles



[Goniophotometer System]

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

Test orientation: **Downward**

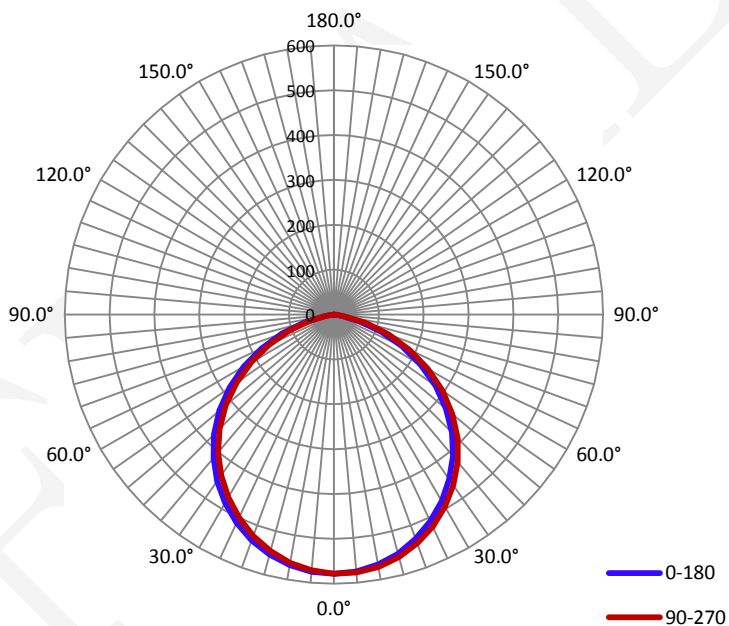
Electrical Measurement

Input Voltage(V)	Frequency(Hz)	Input Current(A)	Power (W)	Power Factor
120.0	60	0.1080	12.79	0.9880

Photometric Measurement

Luminous Flux(lm)	Efficacy(lm/W)	$I_{max}(cd)$	S/MH(C0/180)	S/MH(C90/270)
1518.8	118.80	577.5	1.24	1.24

Luminous Intensity Distribution



	C0/180	C45/225	C90/270	C135/315	AVG.
Beam Angle(50% I_{max}):	108.3	108.1	108.2	108.2	108.2
Field Angle(10% I_{max}):	151.6	151.8	151.6	151.7	151.7

Luminous Intensity (cd) Distribution Data

C y	0°	22.5°	45°	67.5°	90°	112.5°	135°	157.5°
0.0°	578	578	578	578	578	578	578	578
5.0°	575	575	576	577	577	577	577	576
10.0°	566	567	569	570	571	571	571	570
15.0°	552	555	557	559	560	560	560	558
20.0°	532	536	539	541	543	544	542	541
25.0°	509	513	517	519	522	522	521	518
30.0°	480	485	489	492	495	496	494	491
35.0°	448	453	458	461	464	464	463	461
40.0°	413	418	423	427	429	430	429	427
45.0°	372	377	383	387	390	391	391	387
50.0°	326	331	336	342	345	346	345	344
55.0°	277	281	286	291	295	296	296	294
60.0°	224	228	232	238	241	243	244	242
65.0°	168	173	177	182	187	189	189	187
70.0°	114	118	122	126	130	132	133	132
75.0°	60	64	68	72	75	78	78	77
80.0°	19	22	24	26	28	30	30	29
85.0°	6	7	8	8	9	9	9	9
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.)

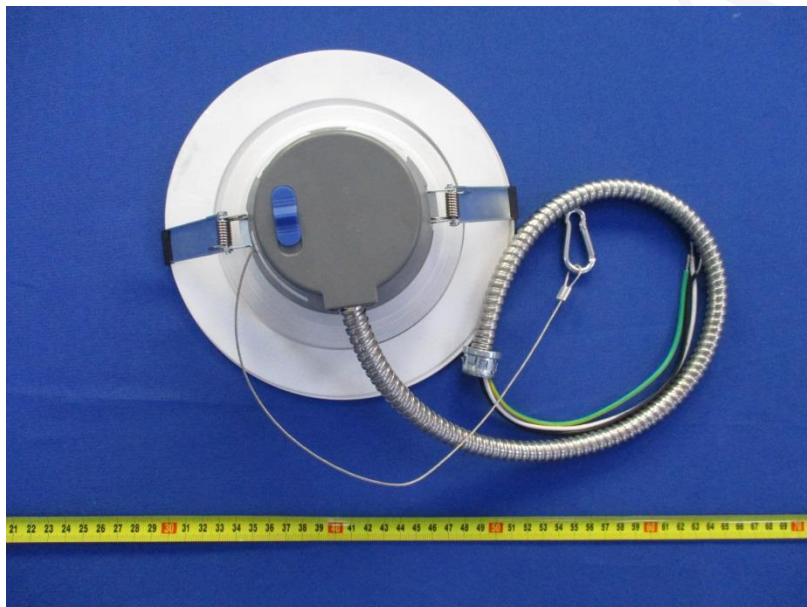
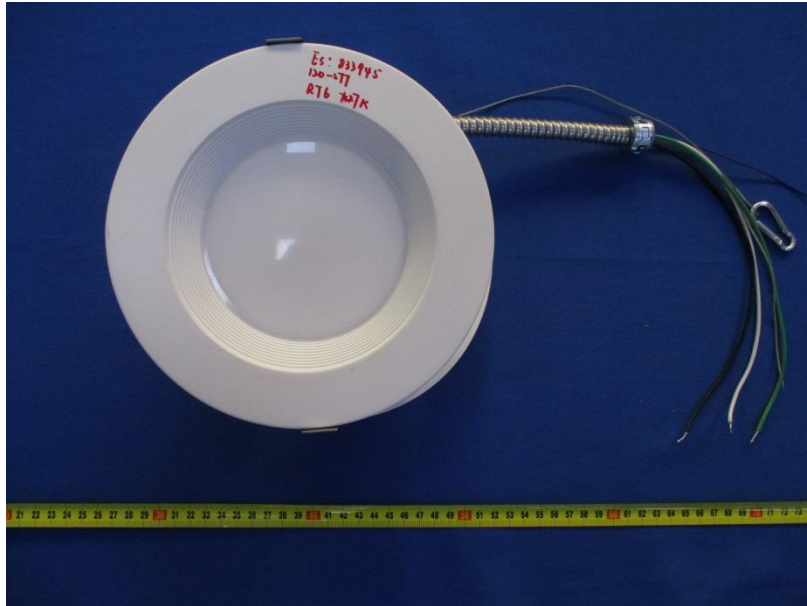
C y	180°	202.5°	225°	247.5°	270°	292.5°	315°	337.5°
0.0°	578	578	578	578	578	578	578	578
5.0°	576	574	573	573	572	572	572	573
10.0°	567	565	564	563	562	562	562	563
15.0°	554	552	549	547	546	545	546	548
20.0°	536	532	529	527	525	524	525	527
25.0°	512	509	504	502	500	499	500	503
30.0°	485	480	476	472	470	470	470	473
35.0°	453	448	443	440	438	437	438	441
40.0°	418	413	408	404	401	401	401	404
45.0°	378	374	367	363	360	360	360	363
50.0°	333	328	323	317	314	313	314	316
55.0°	284	279	273	268	265	264	264	266
60.0°	232	227	222	216	213	211	212	213
65.0°	178	174	168	163	160	158	158	159
70.0°	123	120	114	110	107	105	104	105
75.0°	69	66	63	59	56	54	53	54
80.0°	24	23	21	18	17	16	16	16
85.0°	6	7	7	7	6	5	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

Zonal Lumen Density Measurement

Deg	Flux (lm)	%
0-5	13.8	0.91
5-10	40.8	2.69
10-15	66.4	4.37
15-20	89.6	5.90
20-25	109.5	7.21
25-30	125.7	8.27
30-35	137.4	9.05
35-40	144.5	9.51
40-45	146.4	9.64
45-50	142.4	9.38
50-55	132.5	8.73
55-60	117.3	7.72
60-65	97.4	6.41
65-70	73.8	4.86
70-75	48.0	3.16
75-80	23.5	1.55
80-85	8.0	0.53
85-90	1.9	0.13
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	13.8	0.91
0-10	54.6	3.59
0-15	121.0	7.97
0-20	210.6	13.86
0-25	320.1	21.08
0-30	445.8	29.35
0-35	583.2	38.40
0-40	727.7	47.91
0-45	874.0	57.55
0-50	1016.4	66.92
0-55	1149.0	75.65
0-60	1266.2	83.37
0-65	1363.6	89.78
0-70	1437.4	94.64
0-75	1485.4	97.80
0-80	1508.9	99.35
0-85	1516.9	99.87
0-90	1518.8	100.00
0-95	1518.8	100.00
0-100	1518.8	100.00
0-105	1518.8	100.00
0-110	1518.8	100.00
0-115	1518.8	100.00
0-120	1518.8	100.00
0-125	1518.8	100.00
0-130	1518.8	100.00
0-135	1518.8	100.00
0-140	1518.8	100.00
0-145	1518.8	100.00
0-150	1518.8	100.00
0-155	1518.8	100.00
0-160	1518.8	100.00
0-165	1518.8	100.00
0-170	1518.8	100.00
0-175	1518.8	100.00
0-180	1518.8	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*****