

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: INFT6/850/DIM010UNV

Report Type:	Electrical and Photometric tests including: Luminous Flux, Chromaticity, Luminous Intensity Distribution
Test Engineer:	George Yang
Report Number:	PKS200825087-10
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: INFT6/850/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: 5000K
 Nominal Lumen Output: 1600lm

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**

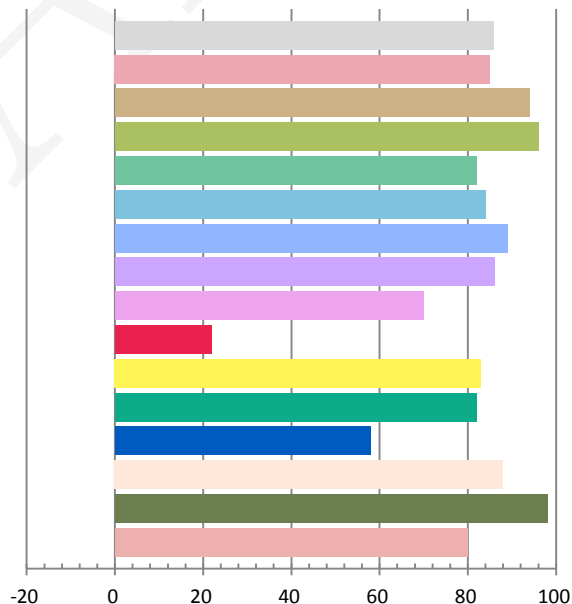
Photometric and Electrical Measurement Result

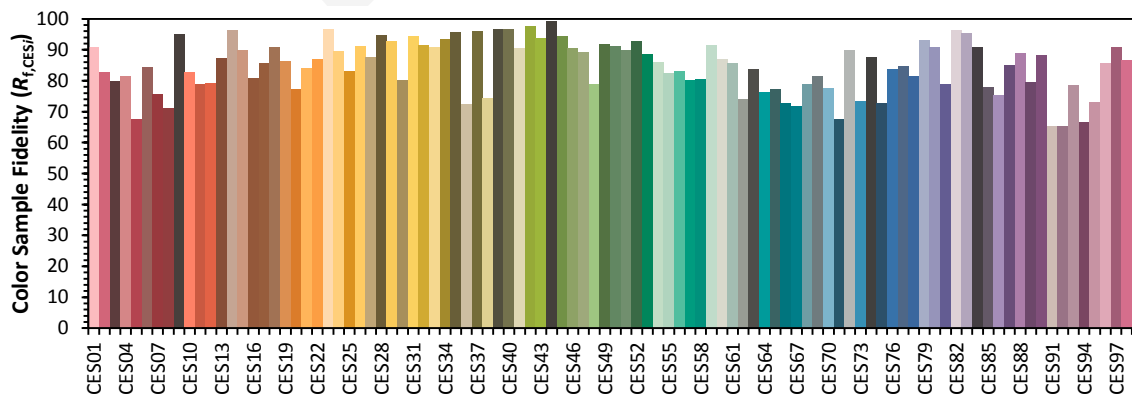
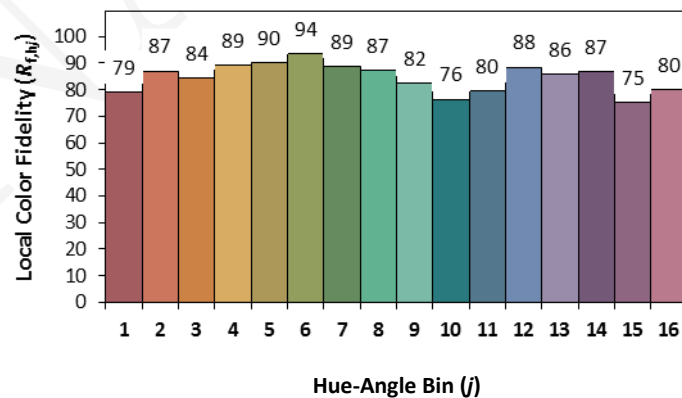
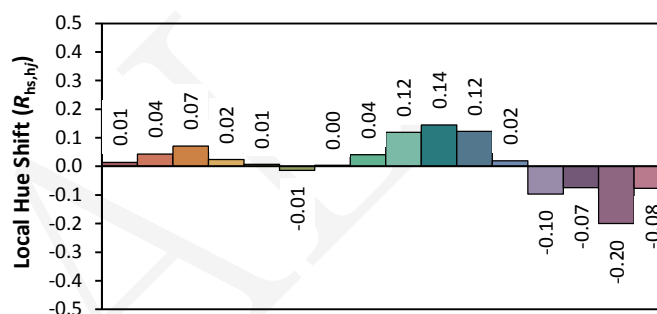
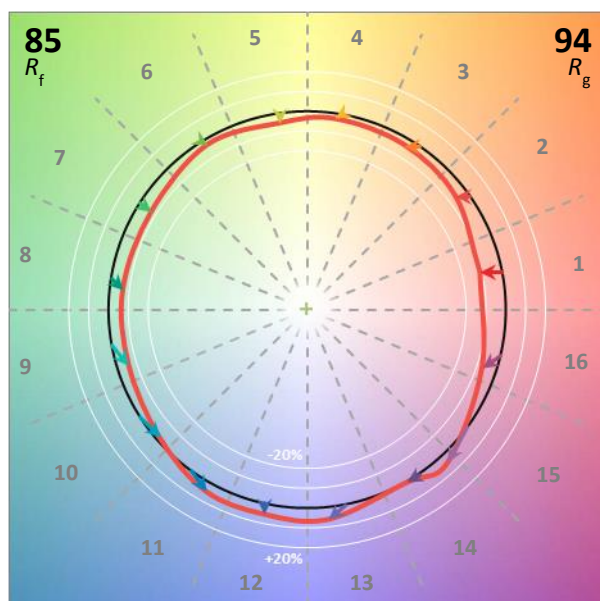
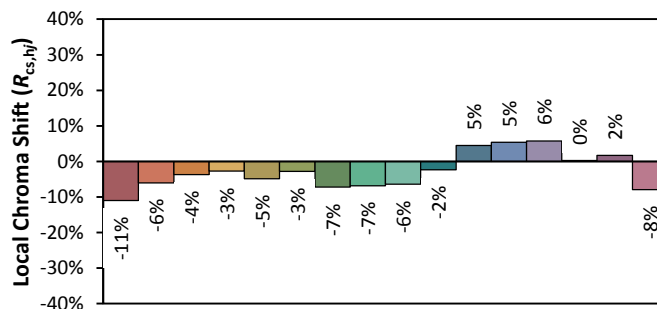
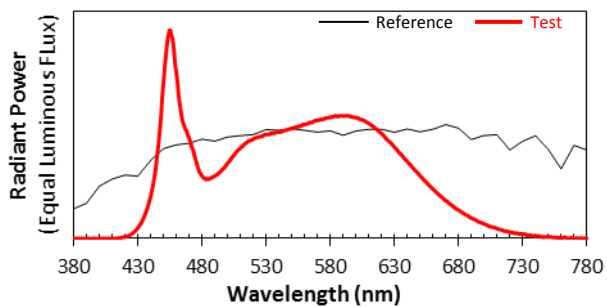
Voltage(V)	Frequency(Hz)	Current(A)	Power (W)	Power Factor	Luminous Flux(lm)	Efficacy(lm/W)
119.98	60	0.109	12.91	0.9873	1770.29	137.14

Radiant Flux (W)	CCT (K)	Duv	x	y	u'	v'
5.506	4837	0.00269	0.3506	0.3614	0.2113	0.4902

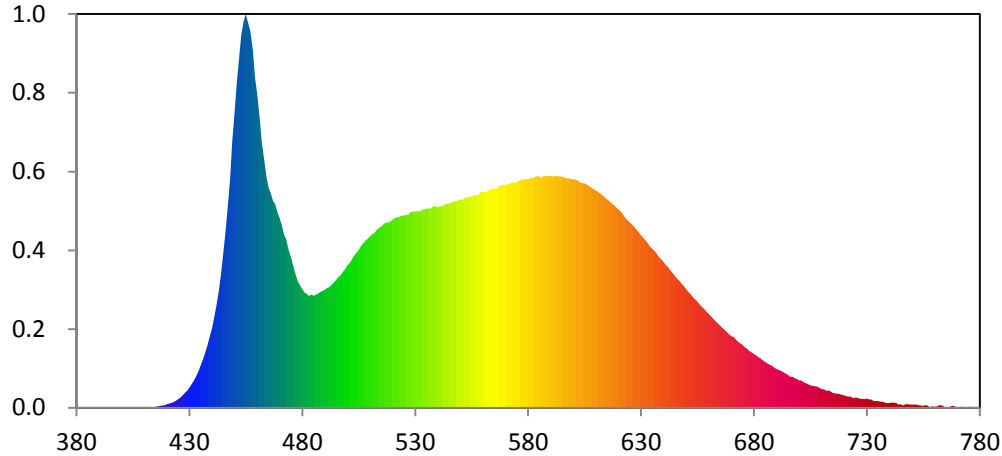
Color Rendering Index

Ra			
85.8			
R1	R2	R3	R4
85	94	96	82
R5	R6	R7	R8
84	89	86	70
R9	R10	R11	R12
22	83	82	58
R13	R14	R15	
88	98	80	





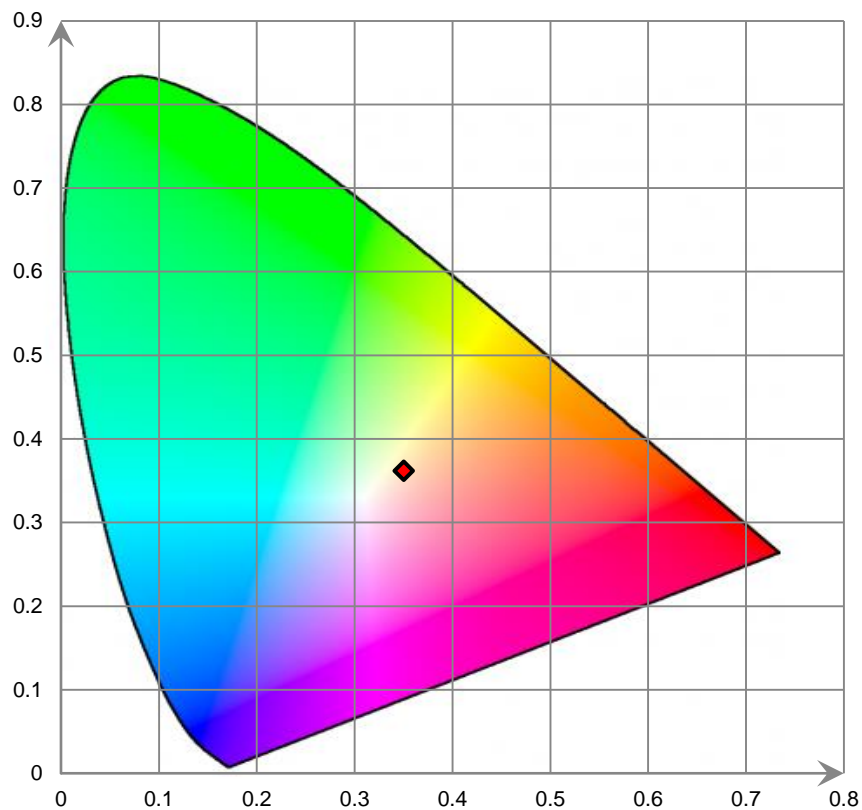
Relative Spectral Power Distribution



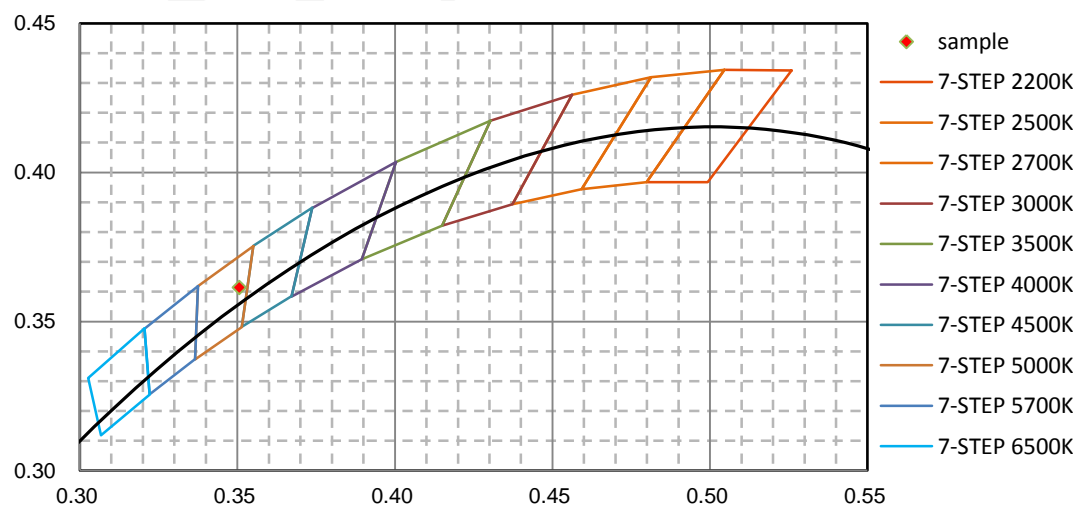
nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
380	1.510E-02	421	4.883E-01	462	3.208E+01	503	1.833E+01	544	2.462E+01
381	6.280E-02	422	5.798E-01	463	3.010E+01	504	1.870E+01	545	2.466E+01
382	3.160E-02	423	6.962E-01	464	2.808E+01	505	1.903E+01	546	2.474E+01
383	1.700E-03	424	8.539E-01	465	2.660E+01	506	1.949E+01	547	2.487E+01
384	6.130E-02	425	1.021E+00	466	2.591E+01	507	1.983E+01	548	2.496E+01
385	5.610E-02	426	1.224E+00	467	2.497E+01	508	2.016E+01	549	2.501E+01
386	1.060E-02	427	1.490E+00	468	2.455E+01	509	2.039E+01	550	2.516E+01
387	3.520E-02	428	1.790E+00	469	2.359E+01	510	2.066E+01	551	2.506E+01
388	9.900E-03	429	2.055E+00	470	2.286E+01	511	2.095E+01	552	2.535E+01
389	1.060E-02	430	2.426E+00	471	2.201E+01	512	2.114E+01	553	2.537E+01
390	3.960E-02	431	2.839E+00	472	2.086E+01	513	2.152E+01	554	2.547E+01
391	2.020E-02	432	3.275E+00	473	2.029E+01	514	2.169E+01	555	2.548E+01
392	1.240E-02	433	3.784E+00	474	1.903E+01	515	2.189E+01	556	2.569E+01
393	6.100E-03	434	4.361E+00	475	1.805E+01	516	2.217E+01	557	2.565E+01
394	8.300E-03	435	5.076E+00	476	1.703E+01	517	2.238E+01	558	2.573E+01
395	5.660E-02	436	5.787E+00	477	1.606E+01	518	2.235E+01	559	2.603E+01
396	2.480E-02	437	6.588E+00	478	1.522E+01	519	2.247E+01	560	2.601E+01
397	3.510E-02	438	7.500E+00	479	1.474E+01	520	2.269E+01	561	2.606E+01
398	2.600E-03	439	8.539E+00	480	1.427E+01	521	2.291E+01	562	2.613E+01
399	1.000E-04	440	9.595E+00	481	1.391E+01	522	2.299E+01	563	2.632E+01
400	0.000E+00	441	1.104E+01	482	1.376E+01	523	2.305E+01	564	2.642E+01
401	2.700E-02	442	1.248E+01	483	1.348E+01	524	2.318E+01	565	2.648E+01
402	4.090E-02	443	1.415E+01	484	1.365E+01	525	2.321E+01	566	2.645E+01
403	2.550E-02	444	1.623E+01	485	1.351E+01	526	2.330E+01	567	2.671E+01
404	2.240E-02	445	1.878E+01	486	1.362E+01	527	2.329E+01	568	2.687E+01
405	4.270E-02	446	2.133E+01	487	1.378E+01	528	2.358E+01	569	2.687E+01
406	6.900E-03	447	2.433E+01	488	1.398E+01	529	2.366E+01	570	2.692E+01
407	6.120E-02	448	2.756E+01	489	1.410E+01	530	2.372E+01	571	2.703E+01
408	5.700E-03	449	3.223E+01	490	1.425E+01	531	2.372E+01	572	2.703E+01
409	5.440E-02	450	3.557E+01	491	1.444E+01	532	2.370E+01	573	2.725E+01
410	6.310E-02	451	3.924E+01	492	1.457E+01	533	2.391E+01	574	2.713E+01
411	5.640E-02	452	4.213E+01	493	1.486E+01	534	2.394E+01	575	2.728E+01
412	6.230E-02	453	4.500E+01	494	1.515E+01	535	2.401E+01	576	2.739E+01
413	2.030E-02	454	4.656E+01	495	1.545E+01	536	2.405E+01	577	2.750E+01
414	8.250E-02	455	4.753E+01	496	1.579E+01	537	2.407E+01	578	2.753E+01
415	1.045E-01	456	4.652E+01	497	1.599E+01	538	2.432E+01	579	2.761E+01
416	1.357E-01	457	4.549E+01	498	1.639E+01	539	2.433E+01	580	2.754E+01
417	2.281E-01	458	4.331E+01	499	1.674E+01	540	2.423E+01	581	2.777E+01
418	2.766E-01	459	3.987E+01	500	1.719E+01	541	2.428E+01	582	2.770E+01
419	3.085E-01	460	3.778E+01	501	1.751E+01	542	2.433E+01	583	2.785E+01
420	4.272E-01	461	3.521E+01	502	1.793E+01	543	2.451E+01	584	2.797E+01

nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
585	2.790E+01	626	2.214E+01	667	9.428E+00	708	2.536E+00	749	3.744E-01
586	2.777E+01	627	2.182E+01	668	9.161E+00	709	2.396E+00	750	3.834E-01
587	2.798E+01	628	2.152E+01	669	8.895E+00	710	2.237E+00	751	3.824E-01
588	2.794E+01	629	2.119E+01	670	8.664E+00	711	2.221E+00	752	3.910E-01
589	2.795E+01	630	2.082E+01	671	8.518E+00	712	2.055E+00	753	3.134E-01
590	2.795E+01	631	2.052E+01	672	8.227E+00	713	2.071E+00	754	2.768E-01
591	2.790E+01	632	2.025E+01	673	7.936E+00	714	1.947E+00	755	2.233E-01
592	2.800E+01	633	1.984E+01	674	7.766E+00	715	1.784E+00	756	2.926E-01
593	2.793E+01	634	1.948E+01	675	7.563E+00	716	1.725E+00	757	2.548E-01
594	2.797E+01	635	1.921E+01	676	7.295E+00	717	1.687E+00	758	8.150E-02
595	2.789E+01	636	1.893E+01	677	7.096E+00	718	1.672E+00	759	1.983E-01
596	2.782E+01	637	1.853E+01	678	6.831E+00	719	1.549E+00	760	1.047E-01
597	2.770E+01	638	1.815E+01	679	6.687E+00	720	1.511E+00	761	1.641E-01
598	2.767E+01	639	1.790E+01	680	6.473E+00	721	1.394E+00	762	3.030E-01
599	2.762E+01	640	1.758E+01	681	6.315E+00	722	1.349E+00	763	3.010E-01
600	2.754E+01	641	1.721E+01	682	6.104E+00	723	1.339E+00	764	1.680E-01
601	2.757E+01	642	1.695E+01	683	5.944E+00	724	1.158E+00	765	2.510E-02
602	2.738E+01	643	1.658E+01	684	5.723E+00	725	1.249E+00	766	6.290E-02
603	2.720E+01	644	1.625E+01	685	5.537E+00	726	1.198E+00	767	1.341E-01
604	2.712E+01	645	1.593E+01	686	5.361E+00	727	1.077E+00	768	2.114E-01
605	2.705E+01	646	1.556E+01	687	5.231E+00	728	1.076E+00	769	1.329E-01
606	2.693E+01	647	1.533E+01	688	5.105E+00	729	1.048E+00	770	6.150E-02
607	2.678E+01	648	1.499E+01	689	4.841E+00	730	1.101E+00	771	7.280E-02
608	2.656E+01	649	1.467E+01	690	4.667E+00	731	9.938E-01	772	1.492E-01
609	2.640E+01	650	1.434E+01	691	4.542E+00	732	1.012E+00	773	7.640E-02
610	2.624E+01	651	1.399E+01	692	4.421E+00	733	7.929E-01	774	3.890E-02
611	2.606E+01	652	1.372E+01	693	4.284E+00	734	7.963E-01	775	1.138E-01
612	2.583E+01	653	1.337E+01	694	4.125E+00	735	8.241E-01	776	1.116E-01
613	2.565E+01	654	1.305E+01	695	3.959E+00	736	7.165E-01	777	5.510E-02
614	2.540E+01	655	1.279E+01	696	3.743E+00	737	7.419E-01	778	6.020E-02
615	2.512E+01	656	1.244E+01	697	3.735E+00	738	6.127E-01	779	1.192E-01
616	2.494E+01	657	1.215E+01	698	3.573E+00	739	5.740E-01	780	6.390E-02
617	2.468E+01	658	1.189E+01	699	3.468E+00	740	5.828E-01		
618	2.443E+01	659	1.159E+01	700	3.314E+00	741	6.176E-01		
619	2.415E+01	660	1.132E+01	701	3.283E+00	742	6.339E-01		
620	2.393E+01	661	1.104E+01	702	3.081E+00	743	5.896E-01		
621	2.368E+01	662	1.074E+01	703	2.951E+00	744	3.983E-01		
622	2.334E+01	663	1.048E+01	704	2.847E+00	745	4.348E-01		
623	2.290E+01	664	1.019E+01	705	2.685E+00	746	2.741E-01		
624	2.263E+01	665	9.909E+00	706	2.653E+00	747	4.182E-01		
625	2.235E+01	666	9.665E+00	707	2.567E+00	748	4.227E-01		

CIE 1931xy Chromaticity Diagram



7-Step Chromaticity Quadrangles



[Goniophotometer System]

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

Test orientation: **Downward**

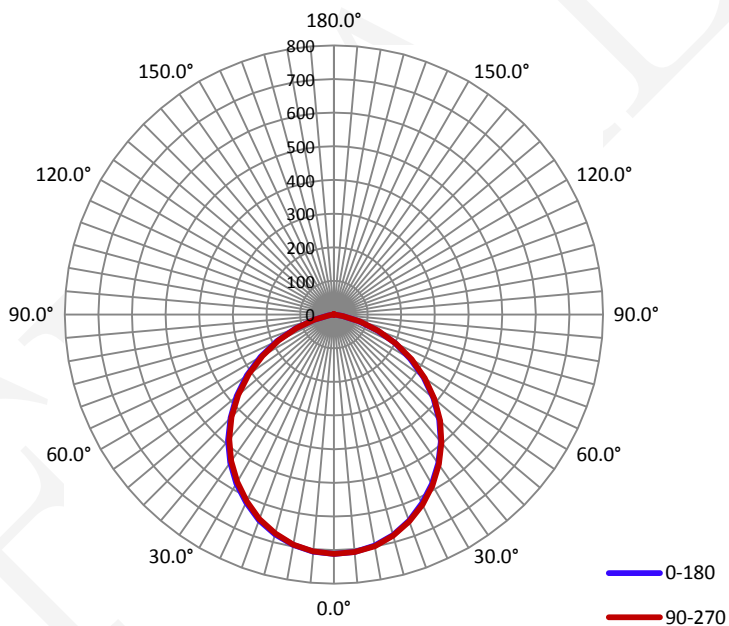
Electrical Measurement

Input Voltage(V)	Frequency(Hz)	Input Current(A)	Power (W)	Power Factor
120.0	60	0.1090	12.97	0.9910

Photometric Measurement

Luminous Flux(lm)	Efficacy(lm/W)	$I_{max}(cd)$	S/MH(C0/180)	S/MH(C90/270)
1778.9	137.21	711.7	1.22	1.21

Luminous Intensity Distribution



	C0/180	C45/225	C90/270	C135/315	AVG.
Beam Angle(50% I_{max}):	104.2	104.2	104.1	104.3	104.2
Field Angle(10% I_{max}):	149.7	149.8	149.9	149.9	149.8

Luminous Intensity (cd) Distribution Data

C y	0°	22.5°	45°	67.5°	90°	112.5°	135°	157.5°
0.0°	712	712	712	712	712	712	712	712
5.0°	708	708	709	709	708	708	709	709
10.0°	697	698	699	698	699	698	698	698
15.0°	678	678	680	679	680	680	680	680
20.0°	652	653	655	654	655	654	655	654
25.0°	619	621	622	623	624	622	623	622
30.0°	582	583	586	585	587	585	586	584
35.0°	540	542	544	544	544	544	544	542
40.0°	494	496	498	498	498	498	497	496
45.0°	443	446	447	447	446	446	446	443
50.0°	386	389	391	390	390	390	389	387
55.0°	325	326	329	330	330	329	329	325
60.0°	262	264	266	267	267	265	265	262
65.0°	199	202	203	205	204	203	200	199
70.0°	136	138	141	141	141	139	138	135
75.0°	75	78	79	81	81	79	77	74
80.0°	24	26	27	29	28	27	25	23
85.0°	6	7	8	8	8	8	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	0	0	0	0	0	0	0
175.0°	0	0	1	0	1	1	0	1
180.0°	0	0	0	0	0	0	0	0

Luminous Intensity (cd) Distribution Data (cont.)

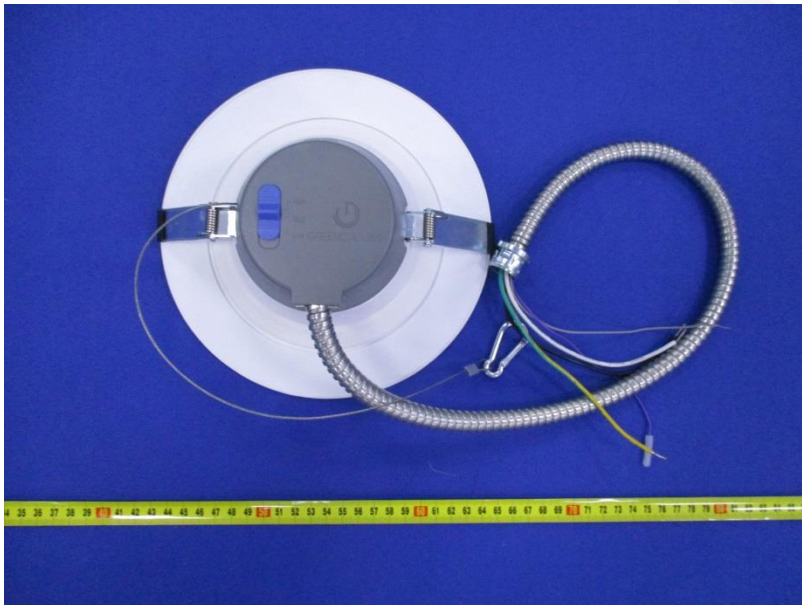
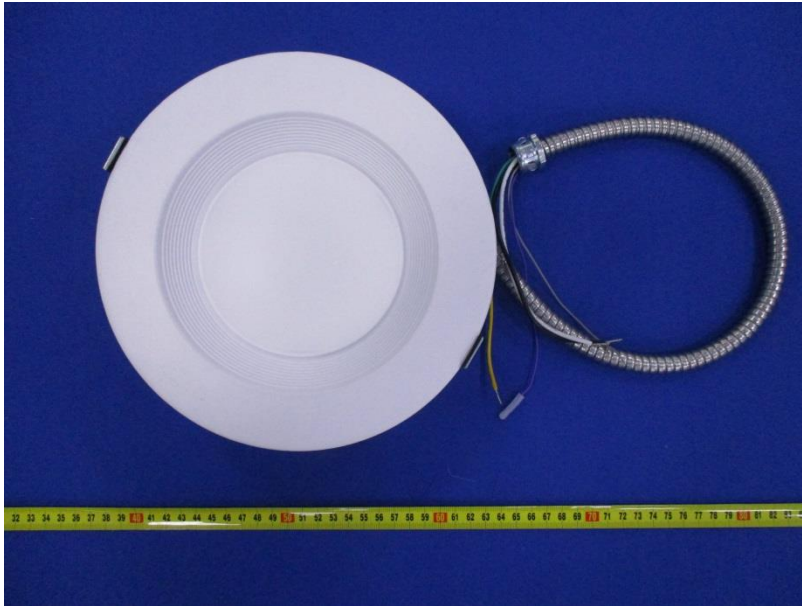
C y	180°	202.5°	225°	247.5°	270°	292.5°	315°	337.5°
0.0°	712	712	712	712	712	712	712	712
5.0°	707	707	708	707	707	706	707	707
10.0°	696	694	695	694	694	692	693	695
15.0°	676	676	675	674	673	673	674	675
20.0°	650	648	649	647	646	645	647	648
25.0°	617	616	615	613	613	613	614	616
30.0°	580	578	577	574	574	574	576	578
35.0°	537	535	533	531	532	531	533	535
40.0°	489	485	484	483	484	483	486	489
45.0°	435	433	431	429	430	431	434	436
50.0°	378	375	373	370	371	372	376	378
55.0°	315	313	311	308	309	310	314	316
60.0°	251	250	246	244	245	245	249	253
65.0°	187	185	182	181	182	181	185	189
70.0°	123	120	119	117	118	119	122	125
75.0°	63	61	60	59	60	61	63	66
80.0°	17	17	16	16	17	16	18	19
85.0°	3	4	4	4	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	0	0	1	0	0	0	0
170.0°	0	0	0	0	1	0	1	0
175.0°	0	0	0	1	1	0	1	0
180.0°	0	0	0	0	0	0	0	0

Zonal Lumen Density Measurement

Deg	Flux (lm)	%
0-5	17.0	0.95
5-10	50.2	2.82
10-15	81.4	4.58
15-20	109.4	6.15
20-25	133.1	7.48
25-30	151.7	8.53
30-35	164.7	9.26
35-40	171.7	9.65
40-45	172.2	9.68
45-50	165.8	9.32
50-55	152.5	8.57
55-60	133.2	7.49
60-65	109.2	6.14
65-70	81.6	4.59
70-75	52.0	2.92
75-80	24.4	1.37
80-85	7.4	0.41
85-90	1.5	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	17.0	0.95
0-10	67.2	3.78
0-15	148.6	8.35
0-20	258.1	14.51
0-25	391.1	21.99
0-30	542.8	30.51
0-35	707.5	39.77
0-40	879.2	49.42
0-45	1051.4	59.10
0-50	1217.2	68.42
0-55	1369.7	76.99
0-60	1502.9	84.48
0-65	1612.0	90.62
0-70	1693.6	95.20
0-75	1745.6	98.13
0-80	1770.0	99.50
0-85	1777.4	99.91
0-90	1778.9	100.00
0-95	1778.9	100.00
0-100	1778.9	100.00
0-105	1778.9	100.00
0-110	1778.9	100.00
0-115	1778.9	100.00
0-120	1778.9	100.00
0-125	1778.9	100.00
0-130	1778.9	100.00
0-135	1778.9	100.00
0-140	1778.9	100.00
0-145	1778.9	100.00
0-150	1778.9	100.00
0-155	1778.9	100.00
0-160	1778.9	100.00
0-165	1778.9	100.00
0-170	1778.9	100.00
0-175	1778.9	100.00
0-180	1778.9	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*****