

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: INFT6/835/DIM010UNV

Report Type:	Electrical and Photometric tests including: Luminous Flux, Chromaticity, Luminous Intensity Distribution
Test Engineer:	George Yang
Report Number:	PKS200825085-10
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: INFT6/835/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: 3500K
 Nominal Lumen Output: 1560lm

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**

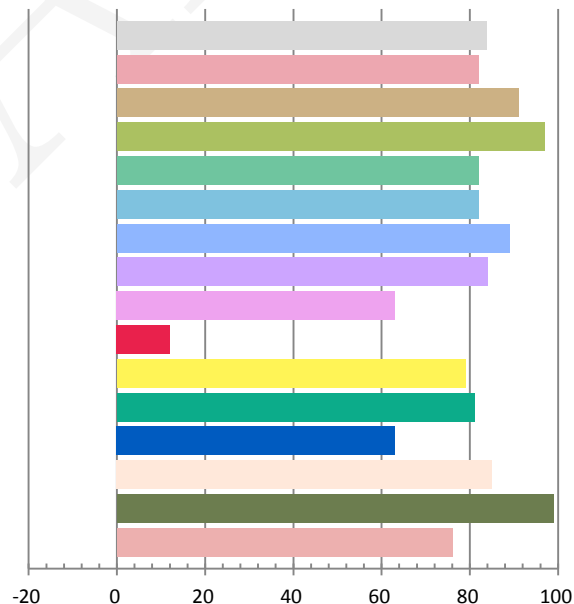
Photometric and Electrical Measurement Result

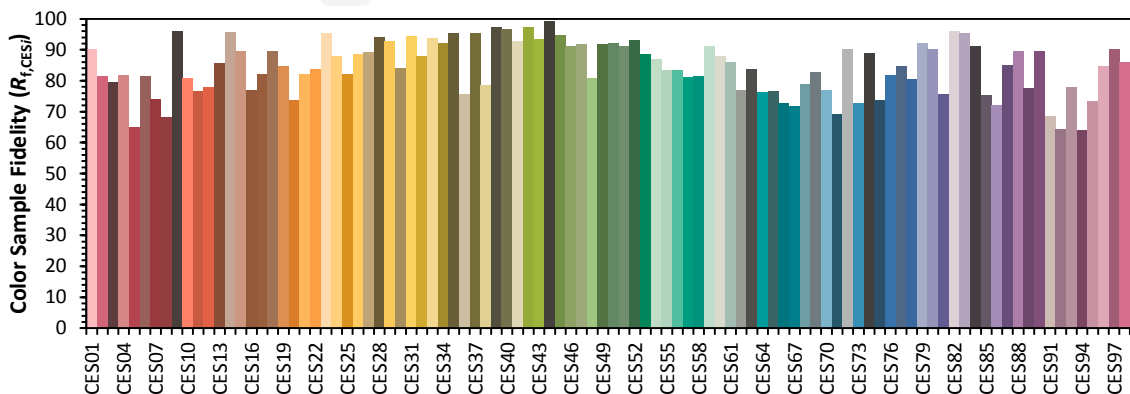
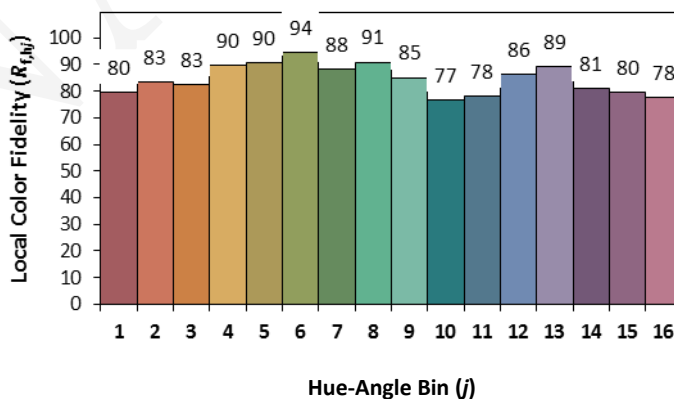
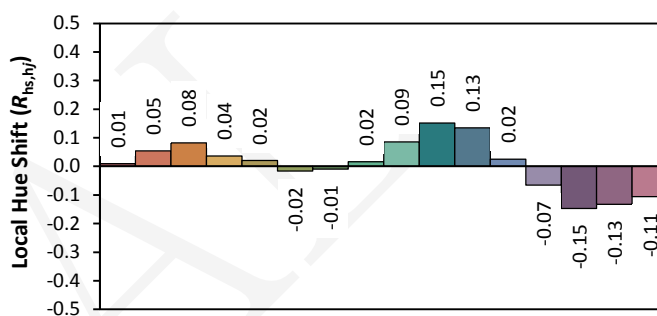
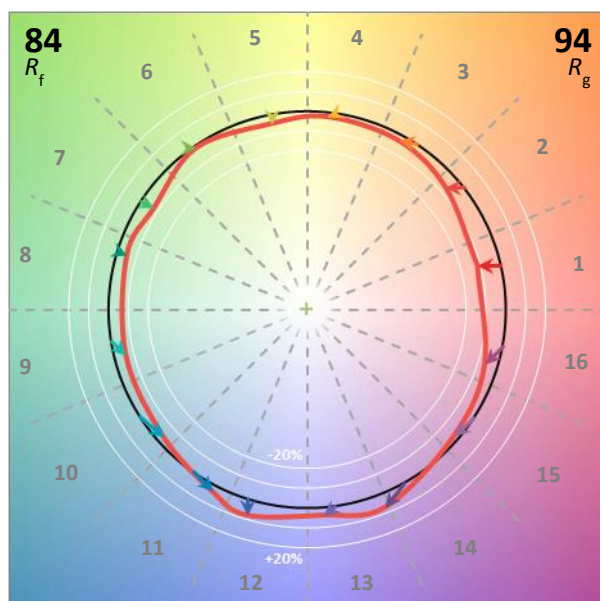
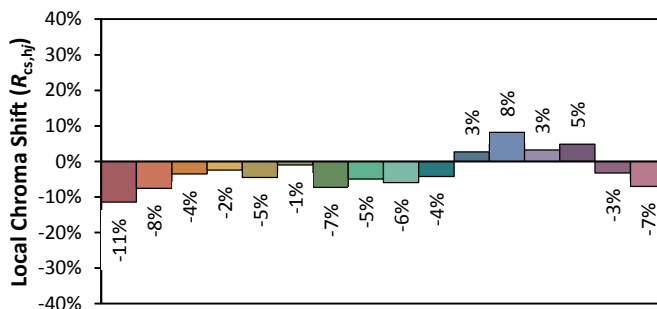
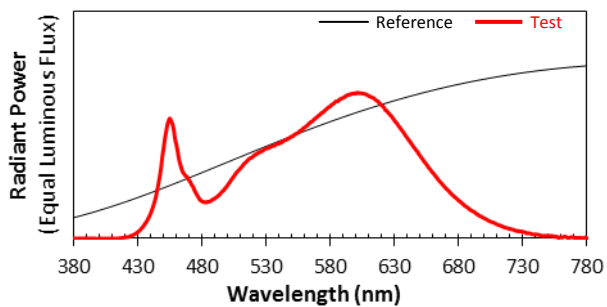
Voltage(V)	Frequency(Hz)	Current(A)	Power (W)	Power Factor	Luminous Flux(lm)	Efficacy(lm/W)
119.98	60	0.1041	12.31	0.9862	1678.84	136.33

Radiant Flux (W)	CCT (K)	Duv	x	y	u'	v'
5.017	3406	0.00188	0.4128	0.3988	0.2373	0.5157

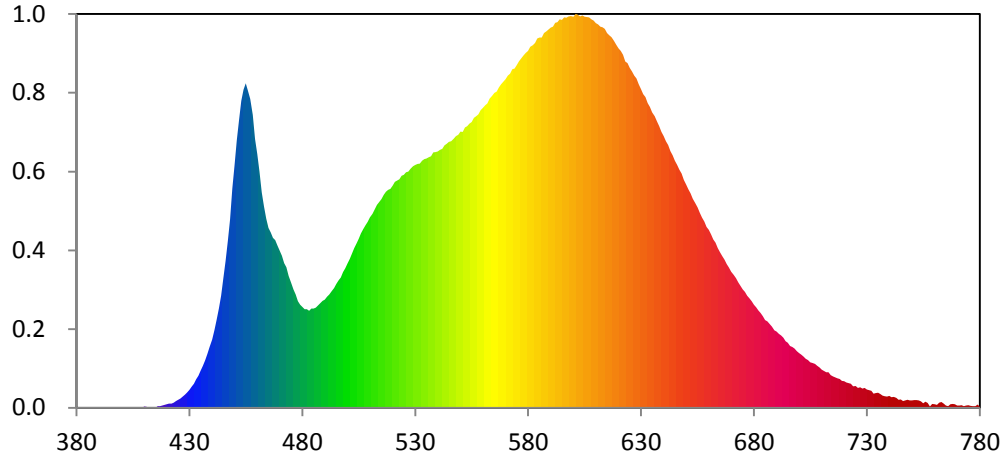
Color Rendering Index

Ra			
83.8			
R1	R2	R3	R4
82	91	97	82
R5	R6	R7	R8
82	89	84	63
R9	R10	R11	R12
12	79	81	63
R13	R14	R15	
85	99	76	





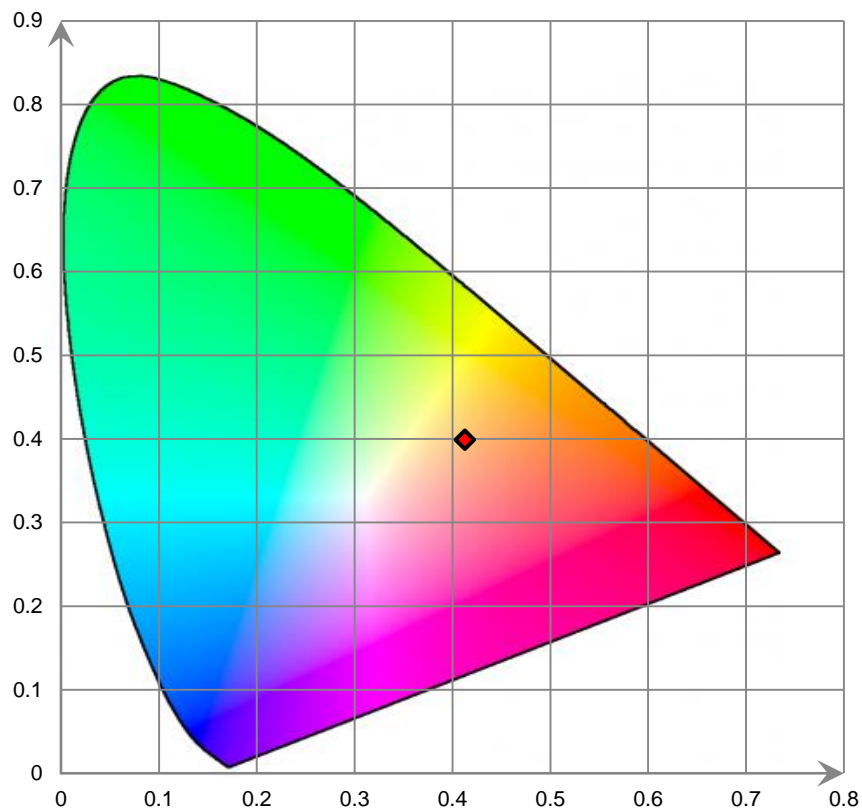
Relative Spectral Power Distribution



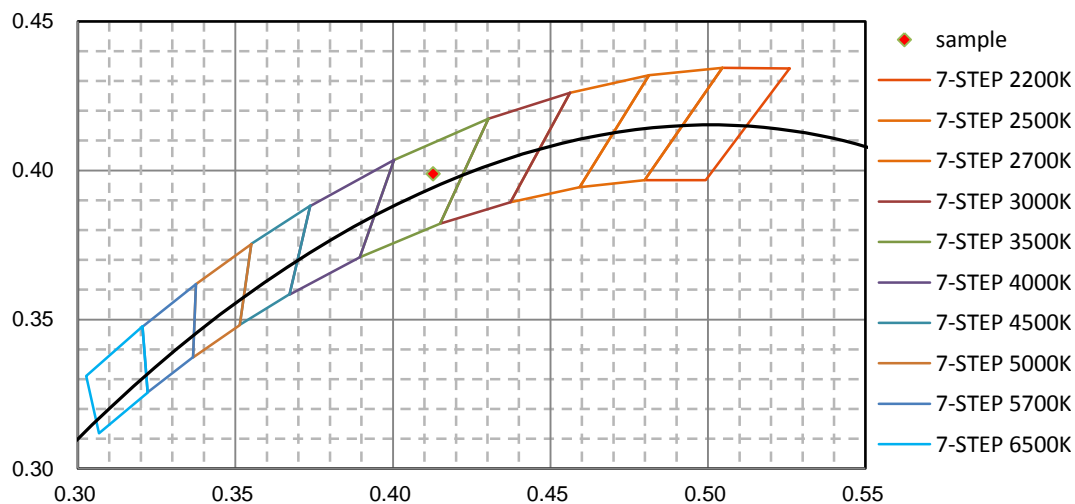
nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
380	3.970E-02	421	3.373E-01	462	1.724E+01	503	1.280E+01	544	2.116E+01
381	3.380E-02	422	3.347E-01	463	1.613E+01	504	1.314E+01	545	2.131E+01
382	2.970E-02	423	4.093E-01	464	1.515E+01	505	1.353E+01	546	2.137E+01
383	9.000E-04	424	5.315E-01	465	1.440E+01	506	1.396E+01	547	2.157E+01
384	5.760E-02	425	6.436E-01	466	1.405E+01	507	1.431E+01	548	2.177E+01
385	8.100E-03	426	7.285E-01	467	1.360E+01	508	1.461E+01	549	2.186E+01
386	3.000E-04	427	8.895E-01	468	1.344E+01	509	1.491E+01	550	2.212E+01
387	4.210E-02	428	1.042E+00	469	1.301E+01	510	1.524E+01	551	2.210E+01
388	2.640E-02	429	1.235E+00	470	1.257E+01	511	1.552E+01	552	2.247E+01
389	2.240E-02	430	1.428E+00	471	1.218E+01	512	1.590E+01	553	2.257E+01
390	5.970E-02	431	1.681E+00	472	1.157E+01	513	1.625E+01	554	2.275E+01
391	9.000E-03	432	1.913E+00	473	1.125E+01	514	1.647E+01	555	2.290E+01
392	3.000E-04	433	2.267E+00	474	1.055E+01	515	1.671E+01	556	2.322E+01
393	0.000E+00	434	2.557E+00	475	1.001E+01	516	1.706E+01	557	2.334E+01
394	3.050E-02	435	2.981E+00	476	9.481E+00	517	1.730E+01	558	2.350E+01
395	4.260E-02	436	3.365E+00	477	9.061E+00	518	1.746E+01	559	2.385E+01
396	3.420E-02	437	3.791E+00	478	8.521E+00	519	1.753E+01	560	2.402E+01
397	1.450E-02	438	4.306E+00	479	8.254E+00	520	1.779E+01	561	2.423E+01
398	6.000E-04	439	4.875E+00	480	8.070E+00	521	1.809E+01	562	2.439E+01
399	0.000E+00	440	5.453E+00	481	7.897E+00	522	1.820E+01	563	2.476E+01
400	0.000E+00	441	6.199E+00	482	7.900E+00	523	1.831E+01	564	2.499E+01
401	3.610E-02	442	7.034E+00	483	7.774E+00	524	1.858E+01	565	2.523E+01
402	3.010E-02	443	7.947E+00	484	7.943E+00	525	1.866E+01	566	2.533E+01
403	8.000E-03	444	8.982E+00	485	7.943E+00	526	1.886E+01	567	2.565E+01
404	2.650E-02	445	1.038E+01	486	8.021E+00	527	1.891E+01	568	2.591E+01
405	2.150E-02	446	1.177E+01	487	8.195E+00	528	1.914E+01	569	2.611E+01
406	6.300E-03	447	1.335E+01	488	8.371E+00	529	1.936E+01	570	2.632E+01
407	4.160E-02	448	1.509E+01	489	8.567E+00	530	1.946E+01	571	2.660E+01
408	2.400E-03	449	1.755E+01	490	8.652E+00	531	1.953E+01	572	2.676E+01
409	4.780E-02	450	1.942E+01	491	8.898E+00	532	1.957E+01	573	2.713E+01
410	8.810E-02	451	2.143E+01	492	9.067E+00	533	1.978E+01	574	2.717E+01
411	6.230E-02	452	2.305E+01	493	9.344E+00	534	1.992E+01	575	2.745E+01
412	2.220E-02	453	2.459E+01	494	9.587E+00	535	1.998E+01	576	2.775E+01
413	3.900E-03	454	2.549E+01	495	9.921E+00	536	2.007E+01	577	2.799E+01
414	5.510E-02	455	2.598E+01	496	1.021E+01	537	2.015E+01	578	2.823E+01
415	4.020E-02	456	2.539E+01	497	1.044E+01	538	2.047E+01	579	2.844E+01
416	1.180E-01	457	2.474E+01	498	1.087E+01	539	2.048E+01	580	2.858E+01
417	1.153E-01	458	2.345E+01	499	1.117E+01	540	2.052E+01	581	2.891E+01
418	1.817E-01	459	2.154E+01	500	1.157E+01	541	2.067E+01	582	2.905E+01
419	2.244E-01	460	2.032E+01	501	1.193E+01	542	2.074E+01	583	2.923E+01
420	2.696E-01	461	1.889E+01	502	1.235E+01	543	2.102E+01	584	2.959E+01

nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
585	2.966E+01	626	2.695E+01	667	1.187E+01	708	3.368E+00	749	5.868E-01
586	2.967E+01	627	2.660E+01	668	1.152E+01	709	3.224E+00	750	5.805E-01
587	3.003E+01	628	2.637E+01	669	1.124E+01	710	3.059E+00	751	6.123E-01
588	3.016E+01	629	2.591E+01	670	1.089E+01	711	2.952E+00	752	6.255E-01
589	3.029E+01	630	2.552E+01	671	1.064E+01	712	2.833E+00	753	5.982E-01
590	3.045E+01	631	2.513E+01	672	1.039E+01	713	2.838E+00	754	5.027E-01
591	3.053E+01	632	2.490E+01	673	1.005E+01	714	2.617E+00	755	3.614E-01
592	3.083E+01	633	2.441E+01	674	9.768E+00	715	2.517E+00	756	4.722E-01
593	3.089E+01	634	2.411E+01	675	9.486E+00	716	2.426E+00	757	3.900E-01
594	3.111E+01	635	2.367E+01	676	9.267E+00	717	2.351E+00	758	1.065E-01
595	3.108E+01	636	2.335E+01	677	8.984E+00	718	2.300E+00	759	3.093E-01
596	3.127E+01	637	2.295E+01	678	8.761E+00	719	2.156E+00	760	2.887E-01
597	3.124E+01	638	2.255E+01	679	8.536E+00	720	2.130E+00	761	2.394E-01
598	3.136E+01	639	2.211E+01	680	8.256E+00	721	2.024E+00	762	4.179E-01
599	3.137E+01	640	2.178E+01	681	8.042E+00	722	1.981E+00	763	4.482E-01
600	3.133E+01	641	2.134E+01	682	7.797E+00	723	1.931E+00	764	3.290E-01
601	3.155E+01	642	2.105E+01	683	7.579E+00	724	1.715E+00	765	1.709E-01
602	3.149E+01	643	2.055E+01	684	7.332E+00	725	1.745E+00	766	1.136E-01
603	3.135E+01	644	2.023E+01	685	7.034E+00	726	1.592E+00	767	2.817E-01
604	3.144E+01	645	1.979E+01	686	6.913E+00	727	1.632E+00	768	3.150E-01
605	3.132E+01	646	1.945E+01	687	6.715E+00	728	1.530E+00	769	2.713E-01
606	3.130E+01	647	1.906E+01	688	6.508E+00	729	1.579E+00	770	1.845E-01
607	3.127E+01	648	1.876E+01	689	6.213E+00	730	1.459E+00	771	1.693E-01
608	3.111E+01	649	1.825E+01	690	6.089E+00	731	1.419E+00	772	1.936E-01
609	3.102E+01	650	1.790E+01	691	5.909E+00	732	1.343E+00	773	1.330E-01
610	3.081E+01	651	1.750E+01	692	5.792E+00	733	1.131E+00	774	1.725E-01
611	3.072E+01	652	1.717E+01	693	5.614E+00	734	1.176E+00	775	1.928E-01
612	3.054E+01	653	1.675E+01	694	5.329E+00	735	1.193E+00	776	1.422E-01
613	3.047E+01	654	1.637E+01	695	5.196E+00	736	1.098E+00	777	1.233E-01
614	3.034E+01	655	1.604E+01	696	4.953E+00	737	9.714E-01	778	1.362E-01
615	3.002E+01	656	1.561E+01	697	4.855E+00	738	9.308E-01	779	2.537E-01
616	2.983E+01	657	1.523E+01	698	4.746E+00	739	8.872E-01	780	8.910E-02
617	2.968E+01	658	1.493E+01	699	4.545E+00	740	9.390E-01		
618	2.937E+01	659	1.449E+01	700	4.379E+00	741	8.438E-01		
619	2.906E+01	660	1.424E+01	701	4.257E+00	742	8.743E-01		
620	2.879E+01	661	1.389E+01	702	4.111E+00	743	7.861E-01		
621	2.859E+01	662	1.349E+01	703	3.923E+00	744	6.358E-01		
622	2.827E+01	663	1.322E+01	704	3.819E+00	745	6.601E-01		
623	2.773E+01	664	1.279E+01	705	3.640E+00	746	5.225E-01		
624	2.760E+01	665	1.245E+01	706	3.591E+00	747	5.854E-01		
625	2.723E+01	666	1.214E+01	707	3.500E+00	748	6.499E-01		

CIE 1931xy Chromaticity Diagram



7-Step Chromaticity Quadrangles



[Goniophotometer System]

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

Test orientation: **Downward**

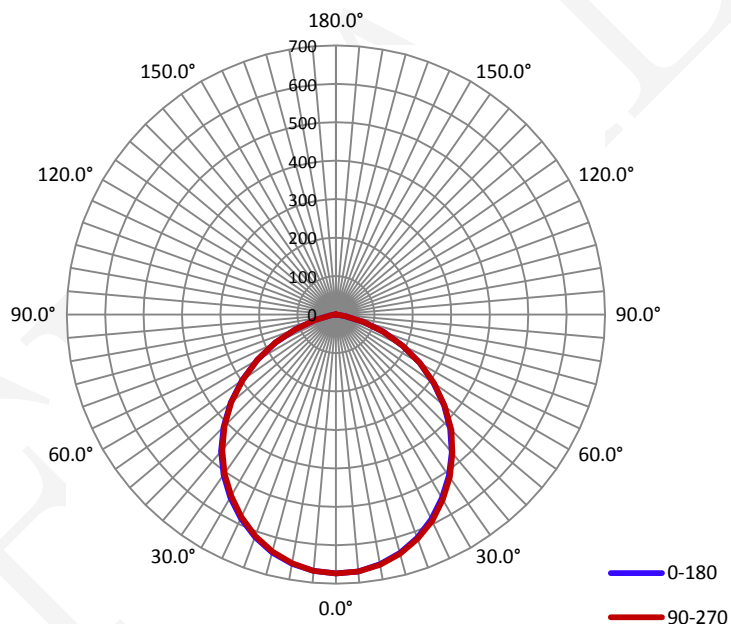
Electrical Measurement

Input Voltage(V)	Frequency(Hz)	Input Current(A)	Power (W)	Power Factor
120.0	60	0.1040	12.36	0.9900

Photometric Measurement

Luminous Flux(lm)	Efficacy(lm/W)	$I_{max}(cd)$	S/MH(C0/180)	S/MH(C90/270)
1685.6	136.43	672.8	1.22	1.22

Luminous Intensity Distribution



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

Luminous Intensity (cd) Distribution Data

C y	0°	22.5°	45°	67.5°	90°	112.5°	135°	157.5°
0.0°	673	673	673	673	673	673	673	673
5.0°	670	671	670	670	671	670	670	670
10.0°	659	660	659	660	661	661	660	660
15.0°	642	642	642	644	644	644	643	643
20.0°	619	618	619	620	621	621	619	618
25.0°	587	588	589	590	592	590	589	589
30.0°	552	553	554	554	555	555	554	553
35.0°	512	513	513	515	516	516	513	512
40.0°	469	469	470	472	472	471	470	468
45.0°	420	422	422	423	425	423	421	419
50.0°	368	368	370	370	370	369	366	364
55.0°	310	312	313	313	312	311	308	305
60.0°	252	253	252	253	252	249	248	244
65.0°	192	193	193	193	191	189	186	184
70.0°	132	133	134	133	131	129	126	123
75.0°	74	75	77	76	74	72	69	66
80.0°	24	25	26	26	25	24	23	20
85.0°	6	7	7	7	8	6	6	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	1	0	0	0
180.0°	0	0	0	0	0	0	0	0

Luminous Intensity (cd) Distribution Data (cont.)

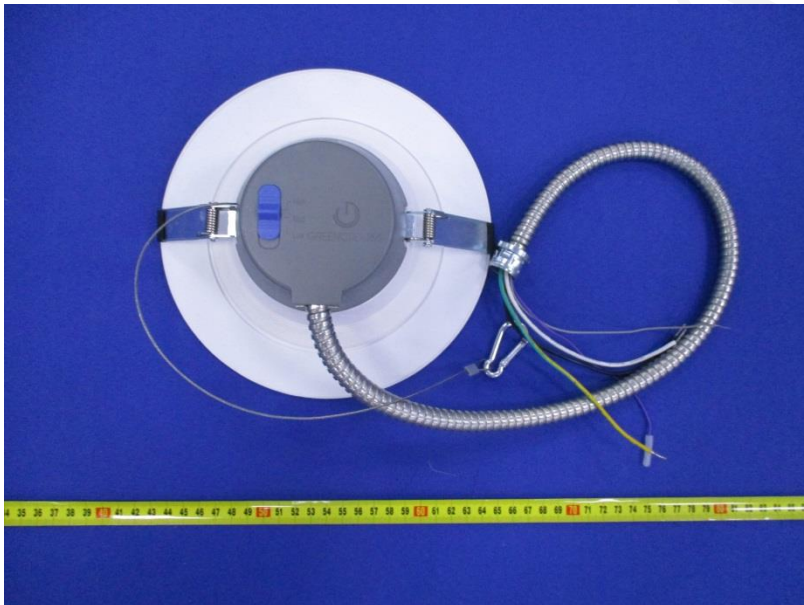
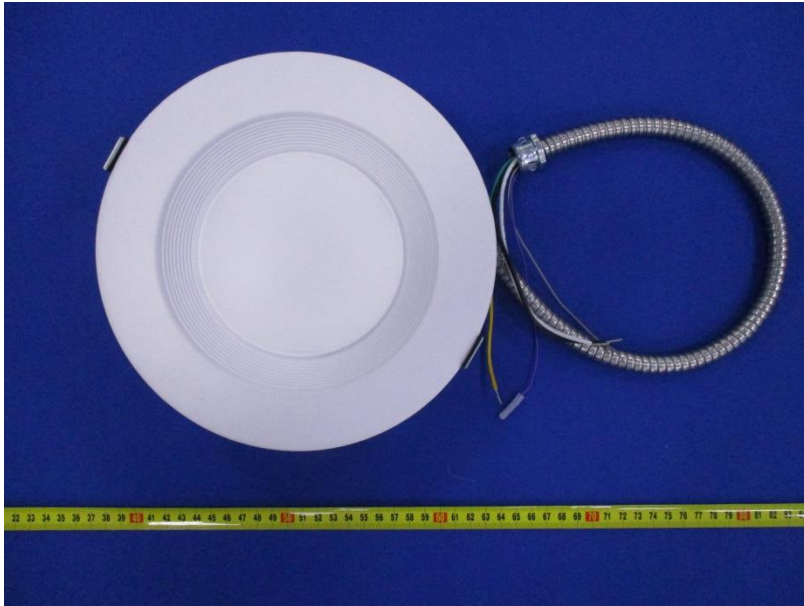
C y	180°	202.5°	225°	247.5°	270°	292.5°	315°	337.5°
0.0°	673	673	673	673	673	673	673	673
5.0°	669	669	668	668	669	668	668	669
10.0°	659	657	657	656	657	656	656	657
15.0°	641	639	638	637	638	638	637	639
20.0°	616	615	613	613	613	613	613	613
25.0°	585	584	581	581	581	581	581	582
30.0°	549	547	546	545	545	545	545	547
35.0°	509	506	505	505	505	504	505	507
40.0°	464	461	460	459	460	459	461	462
45.0°	413	412	411	409	410	411	412	413
50.0°	357	356	354	354	355	356	357	359
55.0°	298	296	294	295	296	297	299	302
60.0°	236	234	233	233	235	237	239	243
65.0°	174	171	171	173	174	176	179	182
70.0°	112	111	111	111	113	116	118	122
75.0°	56	55	56	56	58	60	62	65
80.0°	15	14	15	15	16	17	18	19
85.0°	3	3	4	4	4	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	1	0	0
180.0°	0	0	0	0	0	0	0	0

Zonal Lumen Density Measurement

Deg	Flux (lm)	%
0-5	16.0	0.95
5-10	47.5	2.82
10-15	77.1	4.57
15-20	103.6	6.15
20-25	126.1	7.48
25-30	143.7	8.52
30-35	156.0	9.26
35-40	162.7	9.65
40-45	163.3	9.69
45-50	157.3	9.33
50-55	144.7	8.59
55-60	126.4	7.50
60-65	103.5	6.14
65-70	77.2	4.58
70-75	49.1	2.92
75-80	23.0	1.36
80-85	6.9	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	16.0	0.95
0-10	63.6	3.77
0-15	140.6	8.34
0-20	244.2	14.49
0-25	370.3	21.97
0-30	514.0	30.49
0-35	670.0	39.75
0-40	832.7	49.40
0-45	996.0	59.09
0-50	1153.3	68.42
0-55	1298.1	77.01
0-60	1424.5	84.51
0-65	1528.0	90.65
0-70	1605.1	95.23
0-75	1654.3	98.14
0-80	1677.2	99.50
0-85	1684.1	99.91
0-90	1685.6	100.00
0-95	1685.6	100.00
0-100	1685.6	100.00
0-105	1685.6	100.00
0-110	1685.6	100.00
0-115	1685.6	100.00
0-120	1685.6	100.00
0-125	1685.6	100.00
0-130	1685.6	100.00
0-135	1685.6	100.00
0-140	1685.6	100.00
0-145	1685.6	100.00
0-150	1685.6	100.00
0-155	1685.6	100.00
0-160	1685.6	100.00
0-165	1685.6	100.00
0-170	1685.6	100.00
0-175	1685.6	100.00
0-180	1685.6	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*****