

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: INFT9.5/835/DIM120V

Report Type:	Electrical and Photometric tests including: Luminous Flux, Chromaticity, Luminous Intensity Distribution
Test Engineer:	George Yang
Report Number:	PKS200708093-10
Test Date:	2020-07-10 to 2020-07-15
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: INFT9.5/835/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: 27W
 Nominal CCT: 3500K
 Nominal Lumen Output: 3375lm

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**

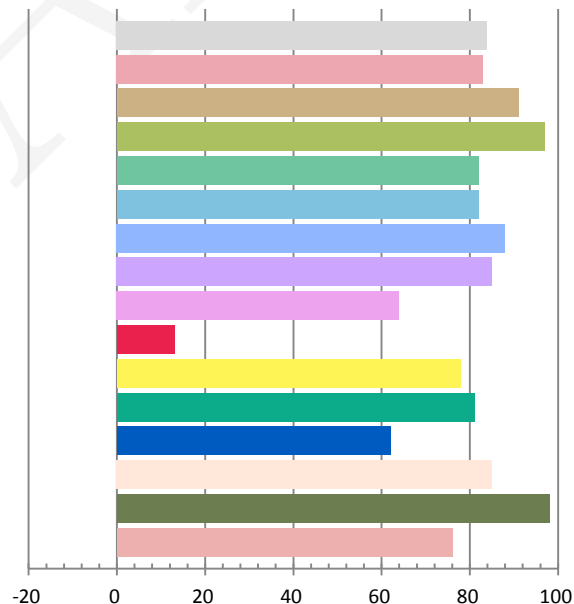
Photometric and Electrical Measurement Result

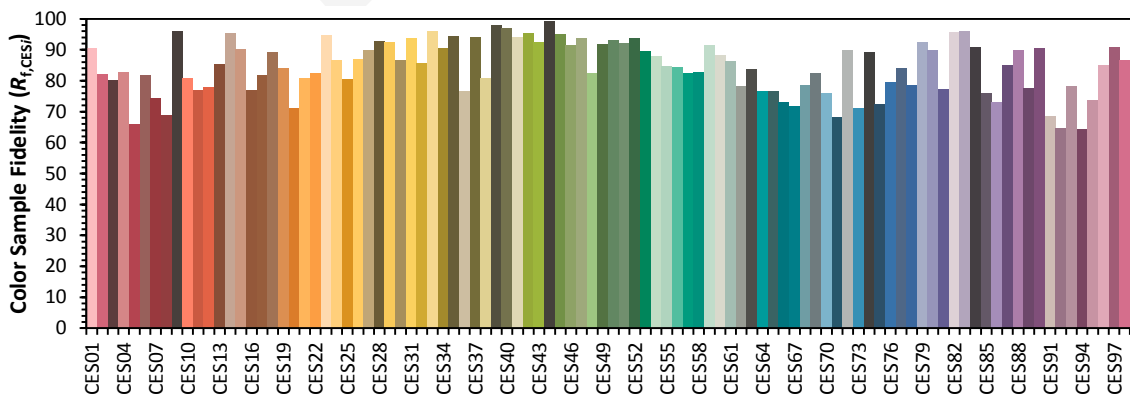
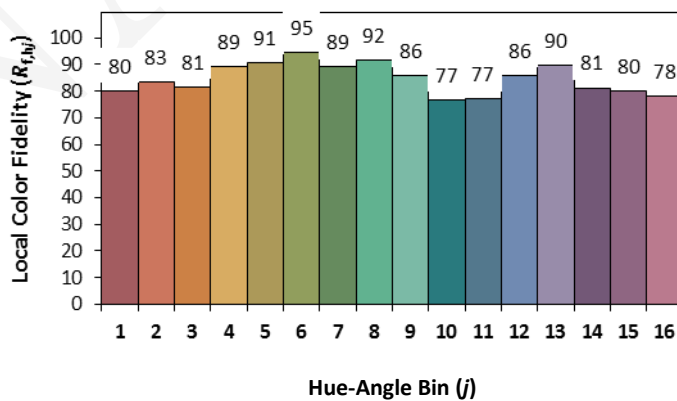
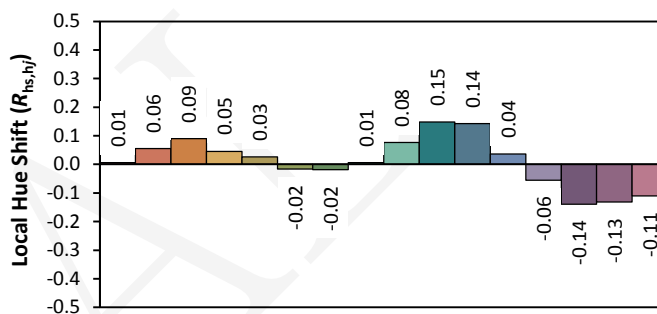
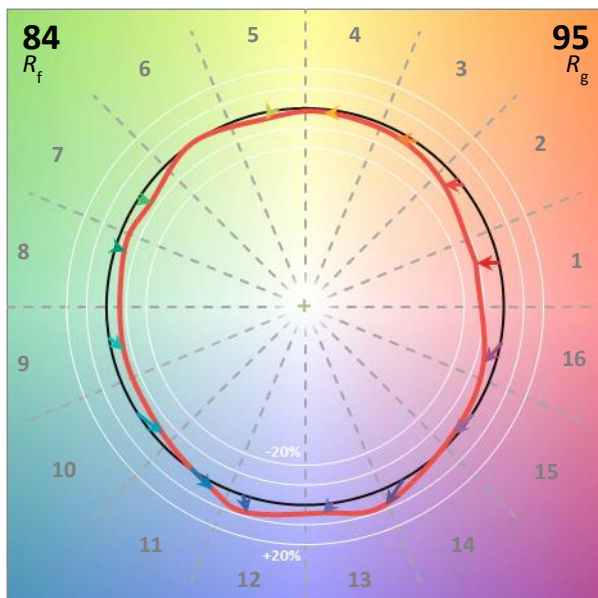
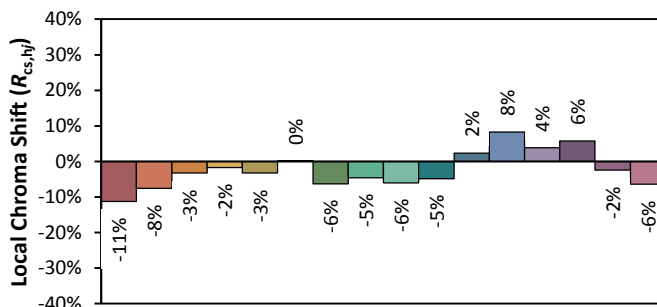
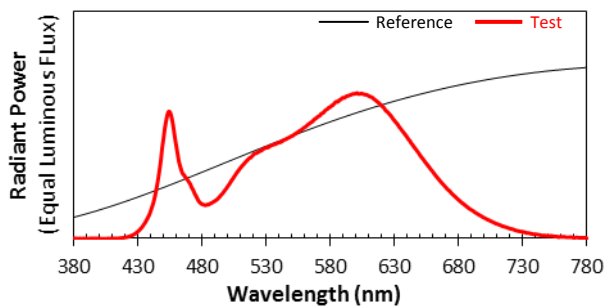
Voltage(V)	Frequency(Hz)	Current(A)	Power (W)	Power Factor	Luminous Flux(lm)	Efficacy(lm/W)
120.04	60	0.234	27.56	0.9812	3619.87	131.35

Radiant Flux (W)	CCT (K)	Duv	x	y	u'	v'
10.859	3422	0.00124	0.4112	0.3965	0.2371	0.5145

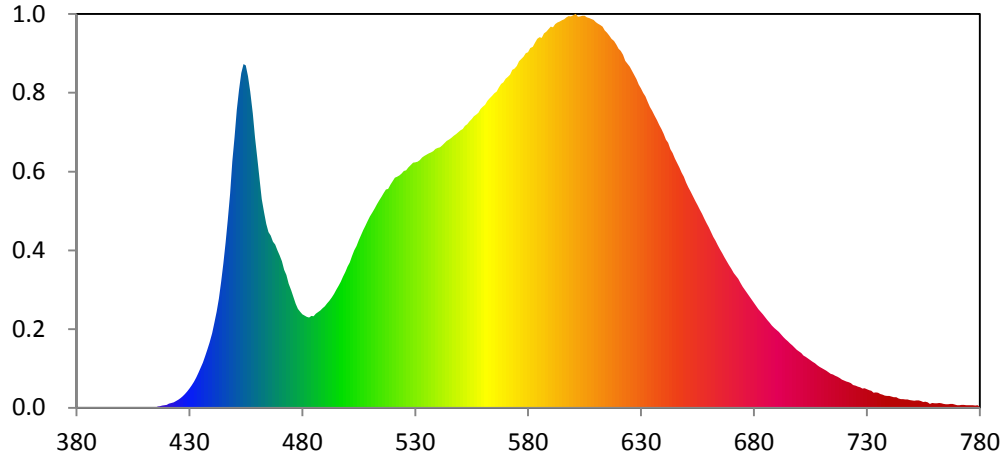
Color Rendering Index

Ra			
83.9			
R1	R2	R3	R4
83	91	97	82
R5	R6	R7	R8
82	88	85	64
R9	R10	R11	R12
13	78	81	62
R13	R14	R15	
85	98	76	





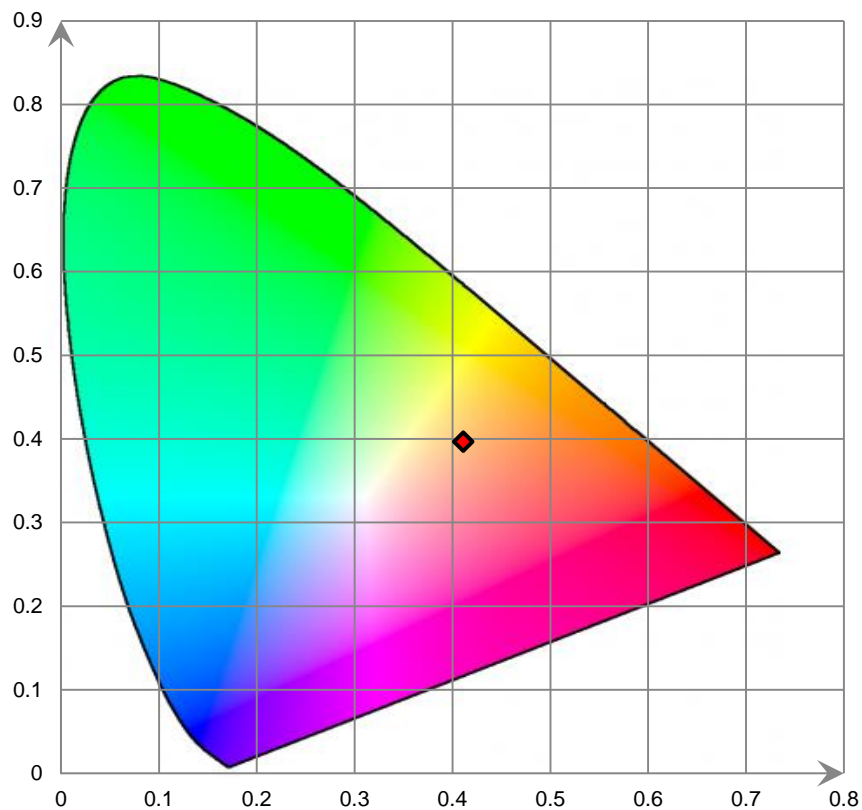
Relative Spectral Power Distribution



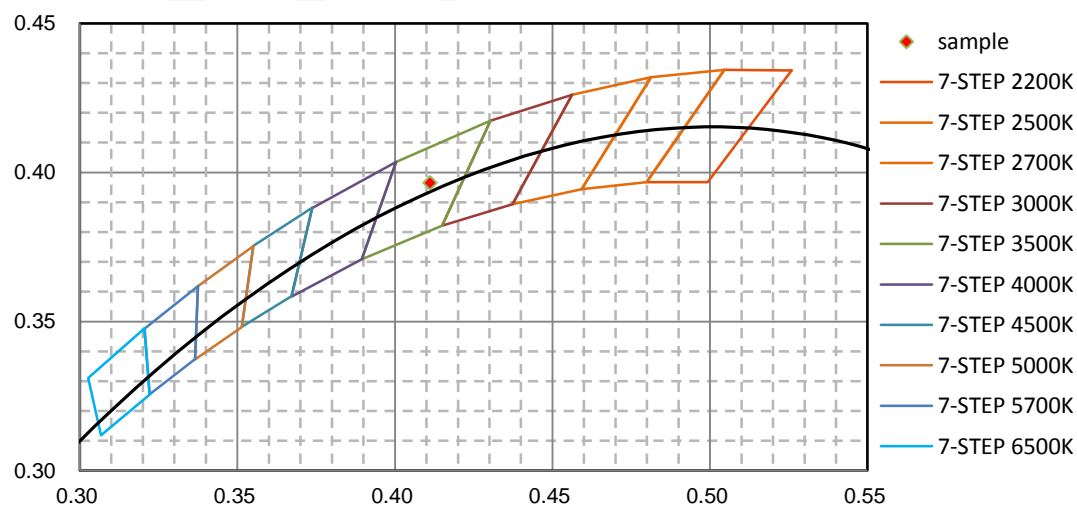
nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
380	7.350E-02	421	6.841E-01	462	3.596E+01	503	2.710E+01	544	4.598E+01
381	3.920E-02	422	7.926E-01	463	3.375E+01	504	2.783E+01	545	4.619E+01
382	7.300E-02	423	9.462E-01	464	3.167E+01	505	2.882E+01	546	4.648E+01
383	3.300E-03	424	1.169E+00	465	3.024E+01	506	2.970E+01	547	4.685E+01
384	3.550E-02	425	1.377E+00	466	2.967E+01	507	3.059E+01	548	4.713E+01
385	2.250E-02	426	1.659E+00	467	2.858E+01	508	3.138E+01	549	4.748E+01
386	2.100E-03	427	2.001E+00	468	2.810E+01	509	3.219E+01	550	4.779E+01
387	3.940E-02	428	2.367E+00	469	2.709E+01	510	3.295E+01	551	4.802E+01
388	4.950E-02	429	2.822E+00	470	2.625E+01	511	3.371E+01	552	4.859E+01
389	1.380E-02	430	3.310E+00	471	2.524E+01	512	3.433E+01	553	4.886E+01
390	4.810E-02	431	3.848E+00	472	2.376E+01	513	3.505E+01	554	4.935E+01
391	1.140E-02	432	4.484E+00	473	2.287E+01	514	3.571E+01	555	4.970E+01
392	4.000E-04	433	5.157E+00	474	2.136E+01	515	3.635E+01	556	5.021E+01
393	0.000E+00	434	5.997E+00	475	2.021E+01	516	3.696E+01	557	5.052E+01
394	1.030E-02	435	6.860E+00	476	1.905E+01	517	3.757E+01	558	5.082E+01
395	1.770E-02	436	7.774E+00	477	1.788E+01	518	3.771E+01	559	5.151E+01
396	1.950E-02	437	8.897E+00	478	1.704E+01	519	3.840E+01	560	5.185E+01
397	7.300E-03	438	1.004E+01	479	1.650E+01	520	3.900E+01	561	5.219E+01
398	8.300E-03	439	1.126E+01	480	1.606E+01	521	3.963E+01	562	5.283E+01
399	5.000E-04	440	1.286E+01	481	1.586E+01	522	3.979E+01	563	5.332E+01
400	0.000E+00	441	1.465E+01	482	1.563E+01	523	4.001E+01	564	5.373E+01
401	3.310E-02	442	1.651E+01	483	1.555E+01	524	4.037E+01	565	5.418E+01
402	2.030E-02	443	1.881E+01	484	1.583E+01	525	4.077E+01	566	5.448E+01
403	3.630E-02	444	2.165E+01	485	1.577E+01	526	4.093E+01	567	5.517E+01
404	1.690E-02	445	2.486E+01	486	1.620E+01	527	4.138E+01	568	5.578E+01
405	2.770E-02	446	2.843E+01	487	1.647E+01	528	4.180E+01	569	5.604E+01
406	8.300E-03	447	3.247E+01	488	1.674E+01	529	4.220E+01	570	5.666E+01
407	8.620E-02	448	3.683E+01	489	1.716E+01	530	4.229E+01	571	5.700E+01
408	4.500E-03	449	4.244E+01	490	1.748E+01	531	4.239E+01	572	5.738E+01
409	6.880E-02	450	4.662E+01	491	1.796E+01	532	4.264E+01	573	5.821E+01
410	9.640E-02	451	5.132E+01	492	1.838E+01	533	4.312E+01	574	5.841E+01
411	9.200E-02	452	5.477E+01	493	1.899E+01	534	4.341E+01	575	5.890E+01
412	3.200E-02	453	5.765E+01	494	1.960E+01	535	4.358E+01	576	5.970E+01
413	5.580E-02	454	5.919E+01	495	2.036E+01	536	4.384E+01	577	6.009E+01
414	1.277E-01	455	5.897E+01	496	2.098E+01	537	4.399E+01	578	6.045E+01
415	1.273E-01	456	5.713E+01	497	2.173E+01	538	4.424E+01	579	6.106E+01
416	2.141E-01	457	5.447E+01	498	2.262E+01	539	4.462E+01	580	6.126E+01
417	2.468E-01	458	5.072E+01	499	2.335E+01	540	4.474E+01	581	6.198E+01
418	3.514E-01	459	4.651E+01	500	2.430E+01	541	4.488E+01	582	6.216E+01
419	4.487E-01	460	4.303E+01	501	2.505E+01	542	4.519E+01	583	6.288E+01
420	5.162E-01	461	3.945E+01	502	2.610E+01	543	4.561E+01	584	6.354E+01

nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
585	6.381E+01	626	5.806E+01	667	2.589E+01	708	7.342E+00	749	1.331E+00
586	6.370E+01	627	5.734E+01	668	2.527E+01	709	7.028E+00	750	1.260E+00
587	6.448E+01	628	5.660E+01	669	2.458E+01	710	6.850E+00	751	1.222E+00
588	6.478E+01	629	5.569E+01	670	2.395E+01	711	6.594E+00	752	1.264E+00
589	6.523E+01	630	5.501E+01	671	2.323E+01	712	6.362E+00	753	1.251E+00
590	6.568E+01	631	5.421E+01	672	2.268E+01	713	6.134E+00	754	1.132E+00
591	6.551E+01	632	5.364E+01	673	2.219E+01	714	5.847E+00	755	9.783E-01
592	6.609E+01	633	5.269E+01	674	2.149E+01	715	5.713E+00	756	1.046E+00
593	6.639E+01	634	5.182E+01	675	2.085E+01	716	5.523E+00	757	9.076E-01
594	6.653E+01	635	5.114E+01	676	2.027E+01	717	5.329E+00	758	6.675E-01
595	6.675E+01	636	5.027E+01	677	1.972E+01	718	5.125E+00	759	8.508E-01
596	6.695E+01	637	4.955E+01	678	1.918E+01	719	4.873E+00	760	7.674E-01
597	6.726E+01	638	4.872E+01	679	1.861E+01	720	4.671E+00	761	7.487E-01
598	6.746E+01	639	4.798E+01	680	1.807E+01	721	4.506E+00	762	8.120E-01
599	6.743E+01	640	4.716E+01	681	1.754E+01	722	4.420E+00	763	7.824E-01
600	6.764E+01	641	4.621E+01	682	1.697E+01	723	4.234E+00	764	6.592E-01
601	6.785E+01	642	4.564E+01	683	1.654E+01	724	3.921E+00	765	6.173E-01
602	6.733E+01	643	4.452E+01	684	1.609E+01	725	3.798E+00	766	5.985E-01
603	6.741E+01	644	4.385E+01	685	1.559E+01	726	3.611E+00	767	6.625E-01
604	6.754E+01	645	4.296E+01	686	1.512E+01	727	3.516E+00	768	6.291E-01
605	6.753E+01	646	4.214E+01	687	1.464E+01	728	3.298E+00	769	5.202E-01
606	6.727E+01	647	4.138E+01	688	1.418E+01	729	3.350E+00	770	4.247E-01
607	6.713E+01	648	4.053E+01	689	1.374E+01	730	3.189E+00	771	4.600E-01
608	6.700E+01	649	3.977E+01	690	1.337E+01	731	3.047E+00	772	5.122E-01
609	6.683E+01	650	3.879E+01	691	1.304E+01	732	2.898E+00	773	4.899E-01
610	6.641E+01	651	3.797E+01	692	1.261E+01	733	2.594E+00	774	4.160E-01
611	6.618E+01	652	3.728E+01	693	1.216E+01	734	2.634E+00	775	4.190E-01
612	6.592E+01	653	3.651E+01	694	1.181E+01	735	2.557E+00	776	4.208E-01
613	6.563E+01	654	3.560E+01	695	1.144E+01	736	2.376E+00	777	4.293E-01
614	6.501E+01	655	3.490E+01	696	1.107E+01	737	2.278E+00	778	4.079E-01
615	6.461E+01	656	3.411E+01	697	1.075E+01	738	2.081E+00	779	4.230E-01
616	6.408E+01	657	3.339E+01	698	1.037E+01	739	2.028E+00	780	1.764E-01
617	6.356E+01	658	3.256E+01	699	9.994E+00	740	2.027E+00		
618	6.317E+01	659	3.180E+01	700	9.691E+00	741	1.944E+00		
619	6.258E+01	660	3.110E+01	701	9.429E+00	742	1.827E+00		
620	6.187E+01	661	3.027E+01	702	9.006E+00	743	1.799E+00		
621	6.146E+01	662	2.945E+01	703	8.749E+00	744	1.582E+00		
622	6.080E+01	663	2.875E+01	704	8.500E+00	745	1.473E+00		
623	5.978E+01	664	2.801E+01	705	8.188E+00	746	1.467E+00		
624	5.928E+01	665	2.728E+01	706	7.960E+00	747	1.425E+00		
625	5.877E+01	666	2.660E+01	707	7.630E+00	748	1.406E+00		

CIE 1931xy Chromaticity Diagram



7-Step Chromaticity Quadrangles



[Goniophotometer System]

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

Test orientation: **Downward**

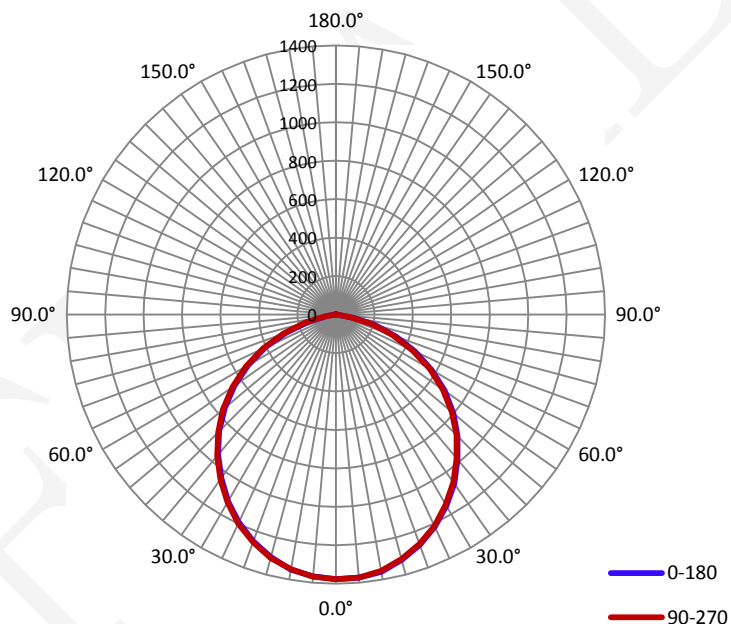
Electrical Measurement

Input Voltage(V)	Frequency(Hz)	Input Current(A)	Power (W)	Power Factor
120.0	60	0.2340	27.6	0.9830

Photometric Measurement

Luminous Flux(lm)	Efficacy(lm/W)	$I_{max}(cd)$	S/MH(C0/180)	S/MH(C90/270)
3625.4	131.40	1376.8	1.23	1.23

Luminous Intensity Distribution



	C0/180	C45/225	C90/270	C135/315	AVG.
Beam Angle(50% I_{max}):	108.1	108.0	108.1	108.2	108.1
Field Angle(10% I_{max}):	153.6	153.6	153.7	153.6	153.6

Luminous Intensity (cd) Distribution Data

C y	0°	22.5°	45°	67.5°	90°	112.5°	135°	157.5°
0.0°	1377	1377	1377	1377	1377	1377	1377	1377
5.0°	1374	1375	1369	1371	1373	1371	1369	1366
10.0°	1358	1355	1349	1354	1354	1347	1348	1345
15.0°	1321	1321	1317	1321	1317	1314	1310	1309
20.0°	1275	1280	1273	1273	1270	1265	1260	1262
25.0°	1217	1221	1214	1216	1214	1207	1201	1197
30.0°	1148	1150	1144	1147	1141	1136	1131	1128
35.0°	1072	1073	1068	1068	1064	1057	1050	1047
40.0°	984	988	984	982	977	971	965	958
45.0°	895	895	892	892	886	876	872	867
50.0°	798	797	793	793	787	778	775	768
55.0°	691	692	688	684	679	668	664	658
60.0°	575	578	573	568	562	552	543	540
65.0°	456	459	454	448	439	431	422	416
70.0°	333	333	328	323	313	303	295	291
75.0°	208	208	203	196	189	179	171	168
80.0°	91	90	85	79	75	67	60	55
85.0°	13	13	13	12	11	10	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	1	0	1	1	0	0
150.0°	0	1	1	1	2	1	1	1
155.0°	1	1	2	2	2	2	2	2
160.0°	2	2	3	2	2	2	2	2
165.0°	2	2	2	2	3	3	2	3
170.0°	2	2	3	3	3	3	3	3
175.0°	3	3	3	3	4	3	3	3
180.0°	0	0	0	0	0	0	0	0

Luminous Intensity (cd) Distribution Data (cont.)

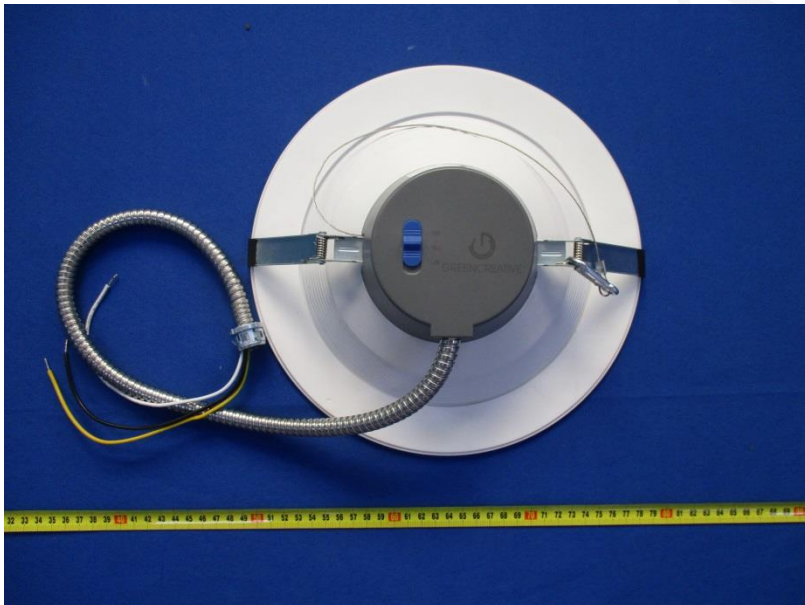
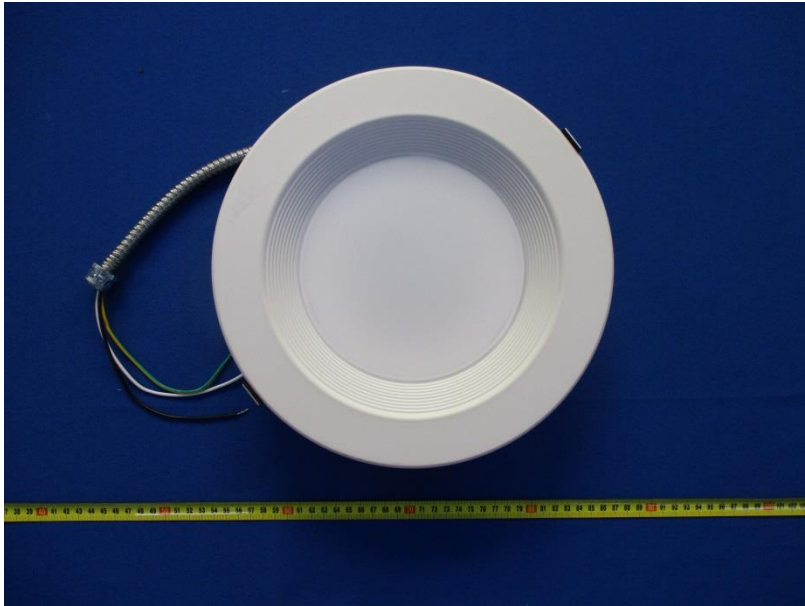
C y	180°	202.5°	225°	247.5°	270°	292.5°	315°	337.5°
0.0°	1377	1377	1377	1377	1377	1377	1377	1377
5.0°	1367	1368	1362	1368	1369	1367	1370	1370
10.0°	1347	1344	1340	1344	1345	1344	1349	1349
15.0°	1306	1304	1301	1307	1311	1309	1314	1315
20.0°	1255	1254	1249	1259	1259	1261	1267	1267
25.0°	1194	1191	1190	1194	1200	1201	1205	1209
30.0°	1121	1119	1118	1120	1127	1130	1134	1138
35.0°	1039	1041	1034	1040	1047	1051	1056	1061
40.0°	953	952	948	954	959	967	969	975
45.0°	858	855	855	861	866	871	878	884
50.0°	754	755	754	760	766	772	779	786
55.0°	644	644	644	652	656	662	673	675
60.0°	526	526	525	532	540	547	554	561
65.0°	403	403	406	410	419	428	433	441
70.0°	277	276	279	286	292	302	311	317
75.0°	150	152	156	163	170	178	187	193
80.0°	42	44	48	53	60	67	72	76
85.0°	6	6	8	8	10	11	13	13
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	1	0	0	0	0
150.0°	0	0	0	1	1	1	1	1
155.0°	0	1	1	2	2	2	2	1
160.0°	1	2	2	2	2	2	2	2
165.0°	2	2	2	3	3	3	3	3
170.0°	2	3	3	3	3	3	4	3
175.0°	2	3	3	4	4	3	4	4
180.0°	0	0	0	0	0	0	0	0

Zonal Lumen Density Measurement

Deg	Flux (lm)	%
0-5	32.8	0.91
5-10	97.2	2.68
10-15	157.8	4.35
15-20	212.4	5.86
20-25	258.9	7.14
25-30	295.8	8.16
30-35	322.1	8.89
35-40	337.4	9.31
40-45	341.3	9.41
45-50	333.6	9.20
50-55	313.7	8.65
55-60	281.3	7.76
60-65	238.0	6.57
65-70	185.5	5.12
70-75	126.3	3.48
75-80	65.8	1.81
80-85	20.9	0.58
85-90	2.8	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	0.1	0.00
150-155	0.3	0.01
155-160	0.4	0.01
160-165	0.4	0.01
165-170	0.3	0.01
170-175	0.2	0.01
175-180	0.0	0.00

Deg	Flux (lm)	%
0-5	32.8	0.91
0-10	130.0	3.59
0-15	287.8	7.94
0-20	500.2	13.80
0-25	759.1	20.94
0-30	1055.0	29.10
0-35	1377.1	37.98
0-40	1714.5	47.29
0-45	2055.7	56.70
0-50	2389.3	65.91
0-55	2703.1	74.56
0-60	2984.4	82.32
0-65	3222.4	88.88
0-70	3407.9	94.00
0-75	3534.2	97.48
0-80	3600.0	99.30
0-85	3620.8	99.87
0-90	3623.7	99.95
0-95	3623.7	99.95
0-100	3623.7	99.95
0-105	3623.7	99.95
0-110	3623.7	99.95
0-115	3623.7	99.95
0-120	3623.7	99.95
0-125	3623.7	99.95
0-130	3623.7	99.95
0-135	3623.7	99.95
0-140	3623.7	99.95
0-145	3623.7	99.95
0-150	3623.8	99.96
0-155	3624.1	99.96
0-160	3624.5	99.97
0-165	3624.8	99.98
0-170	3625.1	99.99
0-175	3625.4	100.00
0-180	3625.4	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*****