

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: INFT9.5/850/DIM120V

Report Type:	Electrical and Photometric tests including: Luminous Flux, Chromaticity, Luminous Intensity Distribution
Test Engineer:	George Yang
Report Number:	PKS200708095-10
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: INFT9.5/850/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: 5000K
 Nominal Lumen Output: 3430lm

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**

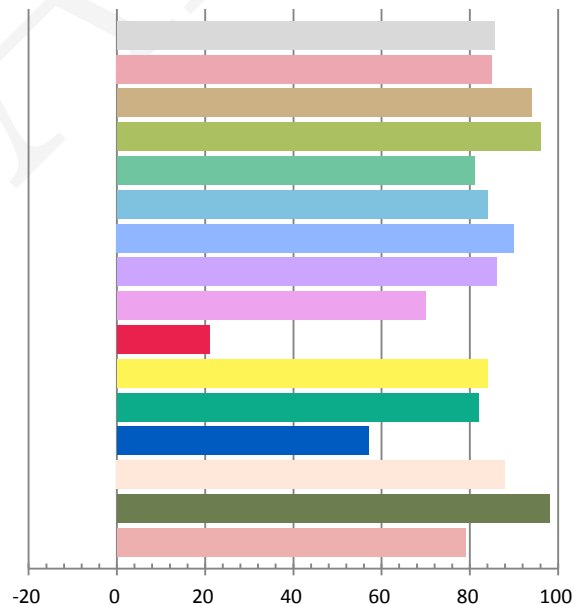
Photometric and Electrical Measurement Result

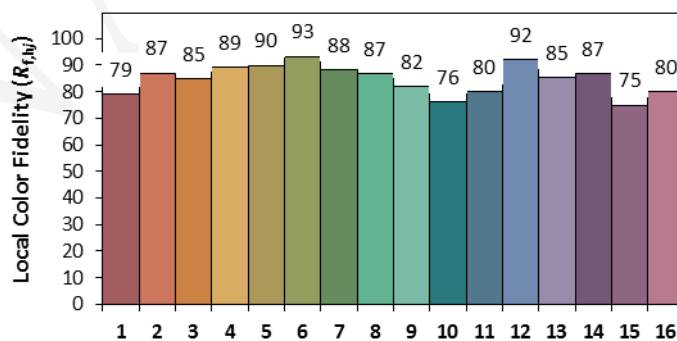
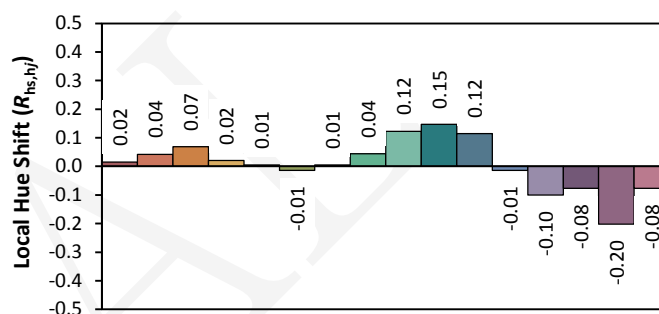
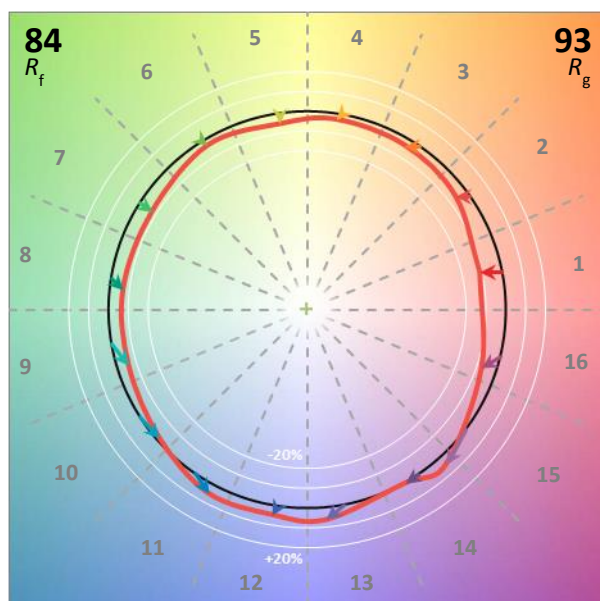
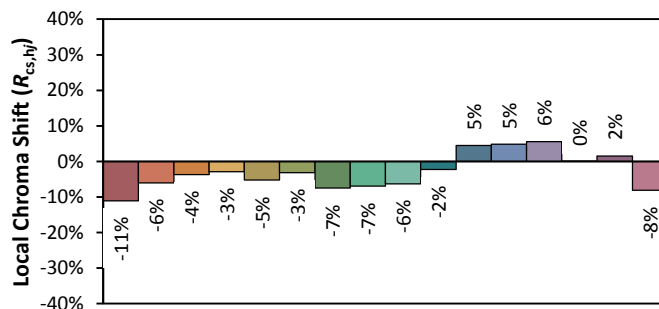
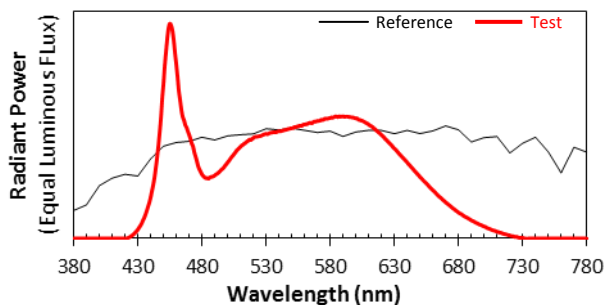
Voltage(V)	Frequency(Hz)	Current(A)	Power (W)	Power Factor	Luminous Flux(lm)	Efficacy(lm/W)
120.05	60	0.2315	27.25	0.9805	3486.2	127.93

Radiant Flux (W)	CCT (K)	Duv	x	y	u'	v'
10.752	4926	0.00301	0.3479	0.3599	0.2101	0.4891

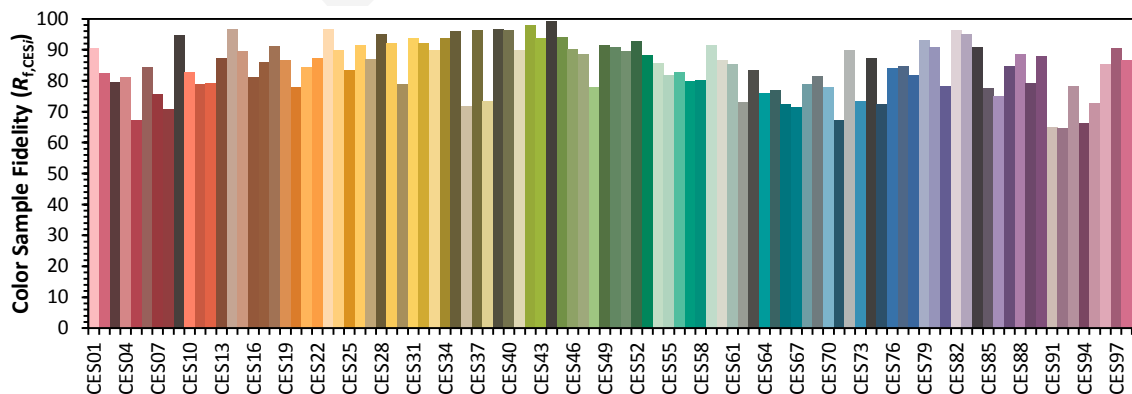
Color Rendering Index

Ra			
85.6			
R1	R2	R3	R4
85	94	96	81
R5	R6	R7	R8
84	90	86	70
R9	R10	R11	R12
21	84	82	57
R13	R14	R15	
88	98	79	

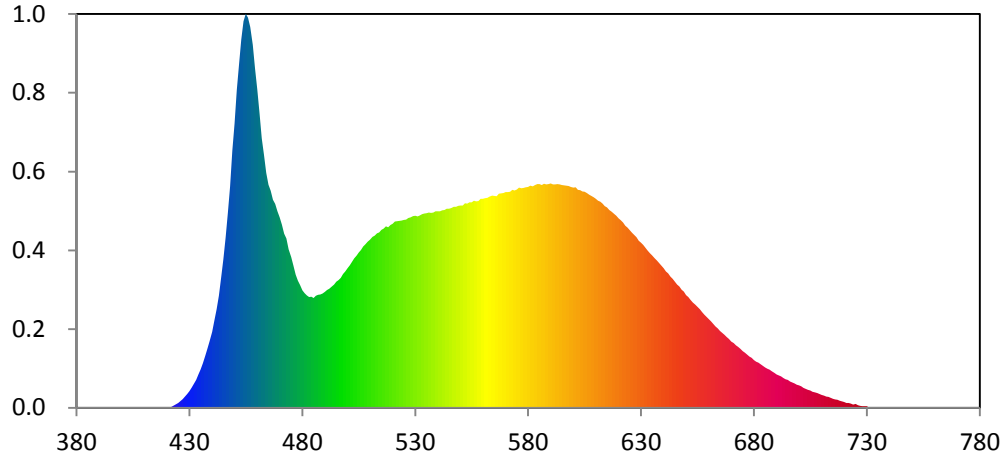




Hue-Angle Bin (j)



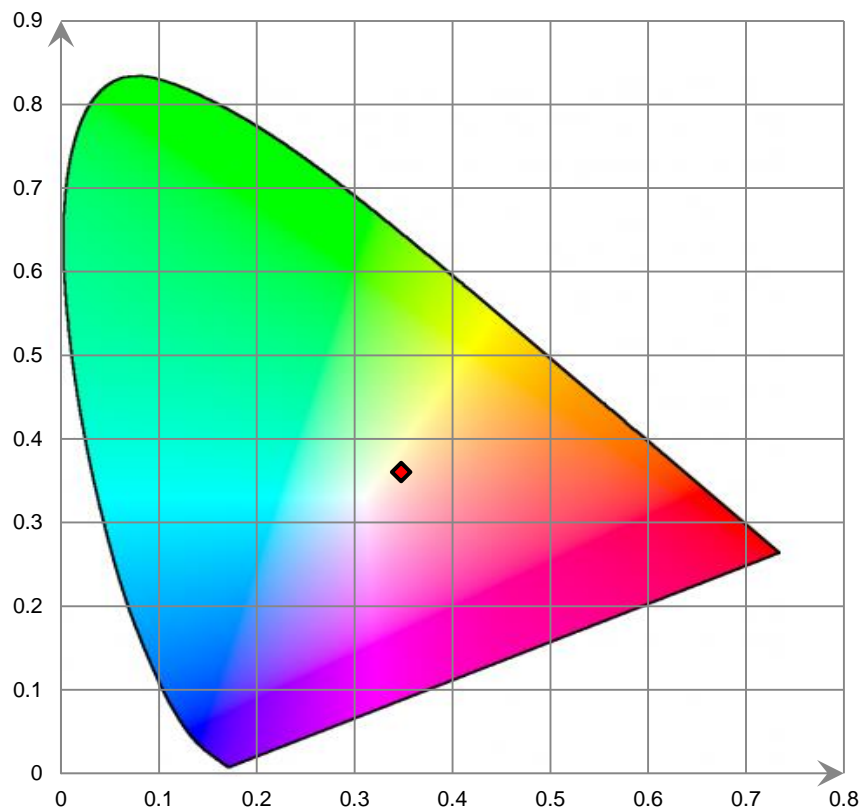
Relative Spectral Power Distribution



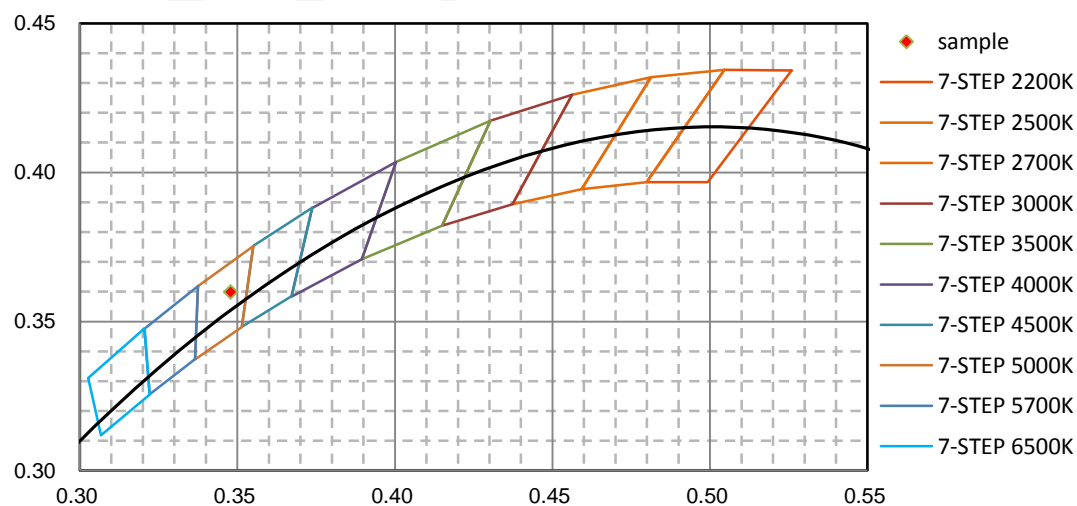
nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
380	0.000E+00	421	6.310E-02	462	6.598E+01	503	3.656E+01	544	4.873E+01
381	0.000E+00	422	2.211E-01	463	6.195E+01	504	3.719E+01	545	4.878E+01
382	0.000E+00	423	5.068E-01	464	5.755E+01	505	3.799E+01	546	4.890E+01
383	0.000E+00	424	8.206E-01	465	5.461E+01	506	3.865E+01	547	4.921E+01
384	0.000E+00	425	1.188E+00	466	5.310E+01	507	3.953E+01	548	4.925E+01
385	0.000E+00	426	1.625E+00	467	5.092E+01	508	4.008E+01	549	4.947E+01
386	0.000E+00	427	2.142E+00	468	4.991E+01	509	4.067E+01	550	4.954E+01
387	0.000E+00	428	2.696E+00	469	4.809E+01	510	4.118E+01	551	4.955E+01
388	0.000E+00	429	3.338E+00	470	4.660E+01	511	4.182E+01	552	5.008E+01
389	0.000E+00	430	4.093E+00	471	4.485E+01	512	4.214E+01	553	5.002E+01
390	0.000E+00	431	4.961E+00	472	4.266E+01	513	4.268E+01	554	5.027E+01
391	0.000E+00	432	5.842E+00	473	4.144E+01	514	4.297E+01	555	5.030E+01
392	0.000E+00	433	6.834E+00	474	3.882E+01	515	4.360E+01	556	5.071E+01
393	0.000E+00	434	8.173E+00	475	3.693E+01	516	4.386E+01	557	5.054E+01
394	0.000E+00	435	9.405E+00	476	3.479E+01	517	4.443E+01	558	5.063E+01
395	0.000E+00	436	1.086E+01	477	3.256E+01	518	4.421E+01	559	5.117E+01
396	0.000E+00	437	1.259E+01	478	3.109E+01	519	4.472E+01	560	5.119E+01
397	0.000E+00	438	1.444E+01	479	3.001E+01	520	4.509E+01	561	5.133E+01
398	0.000E+00	439	1.630E+01	480	2.876E+01	521	4.561E+01	562	5.142E+01
399	0.000E+00	440	1.861E+01	481	2.805E+01	522	4.569E+01	563	5.176E+01
400	0.000E+00	441	2.136E+01	482	2.753E+01	523	4.573E+01	564	5.196E+01
401	0.000E+00	442	2.415E+01	483	2.712E+01	524	4.587E+01	565	5.190E+01
402	0.000E+00	443	2.747E+01	484	2.722E+01	525	4.600E+01	566	5.181E+01
403	0.000E+00	444	3.182E+01	485	2.688E+01	526	4.609E+01	567	5.242E+01
404	0.000E+00	445	3.640E+01	486	2.742E+01	527	4.644E+01	568	5.247E+01
405	0.000E+00	446	4.162E+01	487	2.767E+01	528	4.665E+01	569	5.256E+01
406	0.000E+00	447	4.767E+01	488	2.777E+01	529	4.694E+01	570	5.281E+01
407	0.000E+00	448	5.417E+01	489	2.798E+01	530	4.700E+01	571	5.283E+01
408	0.000E+00	449	6.292E+01	490	2.839E+01	531	4.687E+01	572	5.289E+01
409	0.000E+00	450	6.959E+01	491	2.885E+01	532	4.713E+01	573	5.337E+01
410	0.000E+00	451	7.782E+01	492	2.919E+01	533	4.743E+01	574	5.321E+01
411	0.000E+00	452	8.408E+01	493	2.968E+01	534	4.756E+01	575	5.342E+01
412	0.000E+00	453	9.018E+01	494	3.021E+01	535	4.767E+01	576	5.390E+01
413	0.000E+00	454	9.467E+01	495	3.086E+01	536	4.779E+01	577	5.379E+01
414	0.000E+00	455	9.646E+01	496	3.130E+01	537	4.770E+01	578	5.381E+01
415	0.000E+00	456	9.551E+01	497	3.183E+01	538	4.777E+01	579	5.403E+01
416	0.000E+00	457	9.323E+01	498	3.272E+01	539	4.811E+01	580	5.409E+01
417	0.000E+00	458	8.887E+01	499	3.341E+01	540	4.816E+01	581	5.438E+01
418	0.000E+00	459	8.309E+01	500	3.417E+01	541	4.808E+01	582	5.422E+01
419	0.000E+00	460	7.800E+01	501	3.487E+01	542	4.833E+01	583	5.454E+01
420	0.000E+00	461	7.220E+01	502	3.575E+01	543	4.845E+01	584	5.481E+01

nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
585	5.477E+01	626	4.289E+01	667	1.788E+01	708	3.594E+00	749	0.000E+00
586	5.453E+01	627	4.230E+01	668	1.727E+01	709	3.361E+00	750	0.000E+00
587	5.489E+01	628	4.175E+01	669	1.681E+01	710	3.121E+00	751	0.000E+00
588	5.468E+01	629	4.093E+01	670	1.621E+01	711	2.974E+00	752	0.000E+00
589	5.478E+01	630	4.041E+01	671	1.586E+01	712	2.750E+00	753	0.000E+00
590	5.492E+01	631	3.989E+01	672	1.530E+01	713	2.658E+00	754	0.000E+00
591	5.467E+01	632	3.921E+01	673	1.490E+01	714	2.392E+00	755	0.000E+00
592	5.474E+01	633	3.851E+01	674	1.440E+01	715	2.187E+00	756	0.000E+00
593	5.475E+01	634	3.785E+01	675	1.387E+01	716	2.026E+00	757	0.000E+00
594	5.468E+01	635	3.727E+01	676	1.346E+01	717	1.928E+00	758	0.000E+00
595	5.457E+01	636	3.661E+01	677	1.304E+01	718	1.736E+00	759	0.000E+00
596	5.450E+01	637	3.606E+01	678	1.254E+01	719	1.531E+00	760	0.000E+00
597	5.441E+01	638	3.544E+01	679	1.218E+01	720	1.404E+00	761	0.000E+00
598	5.435E+01	639	3.481E+01	680	1.170E+01	721	1.206E+00	762	0.000E+00
599	5.412E+01	640	3.415E+01	681	1.131E+01	722	1.148E+00	763	0.000E+00
600	5.392E+01	641	3.339E+01	682	1.104E+01	723	1.011E+00	764	0.000E+00
601	5.400E+01	642	3.288E+01	683	1.066E+01	724	7.473E-01	765	0.000E+00
602	5.335E+01	643	3.214E+01	684	1.022E+01	725	9.184E-01	766	0.000E+00
603	5.325E+01	644	3.155E+01	685	9.832E+00	726	6.101E-01	767	0.000E+00
604	5.300E+01	645	3.087E+01	686	9.570E+00	727	4.487E-01	768	0.000E+00
605	5.289E+01	646	3.018E+01	687	9.285E+00	728	3.810E-01	769	0.000E+00
606	5.255E+01	647	2.966E+01	688	8.917E+00	729	3.879E-01	770	0.000E+00
607	5.223E+01	648	2.888E+01	689	8.550E+00	730	3.629E-01	771	0.000E+00
608	5.185E+01	649	2.842E+01	690	8.160E+00	731	1.656E-01	772	0.000E+00
609	5.161E+01	650	2.760E+01	691	7.919E+00	732	8.190E-02	773	0.000E+00
610	5.115E+01	651	2.709E+01	692	7.659E+00	733	2.200E-03	774	0.000E+00
611	5.068E+01	652	2.643E+01	693	7.290E+00	734	0.000E+00	775	0.000E+00
612	5.044E+01	653	2.578E+01	694	7.002E+00	735	0.000E+00	776	0.000E+00
613	5.004E+01	654	2.526E+01	695	6.806E+00	736	0.000E+00	777	0.000E+00
614	4.941E+01	655	2.469E+01	696	6.383E+00	737	0.000E+00	778	0.000E+00
615	4.906E+01	656	2.411E+01	697	6.195E+00	738	0.000E+00	779	0.000E+00
616	4.845E+01	657	2.342E+01	698	5.947E+00	739	0.000E+00	780	0.000E+00
617	4.800E+01	658	2.283E+01	699	5.663E+00	740	0.000E+00		
618	4.747E+01	659	2.228E+01	700	5.437E+00	741	0.000E+00		
619	4.706E+01	660	2.168E+01	701	5.269E+00	742	0.000E+00		
620	4.643E+01	661	2.116E+01	702	4.849E+00	743	0.000E+00		
621	4.595E+01	662	2.056E+01	703	4.594E+00	744	0.000E+00		
622	4.535E+01	663	1.993E+01	704	4.393E+00	745	0.000E+00		
623	4.458E+01	664	1.940E+01	705	4.188E+00	746	0.000E+00		
624	4.415E+01	665	1.883E+01	706	3.892E+00	747	0.000E+00		
625	4.348E+01	666	1.836E+01	707	3.736E+00	748	0.000E+00		

CIE 1931xy Chromaticity Diagram



7-Step Chromaticity Quadrangles



[Goniophotometer System]

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

Test orientation: **Downward**

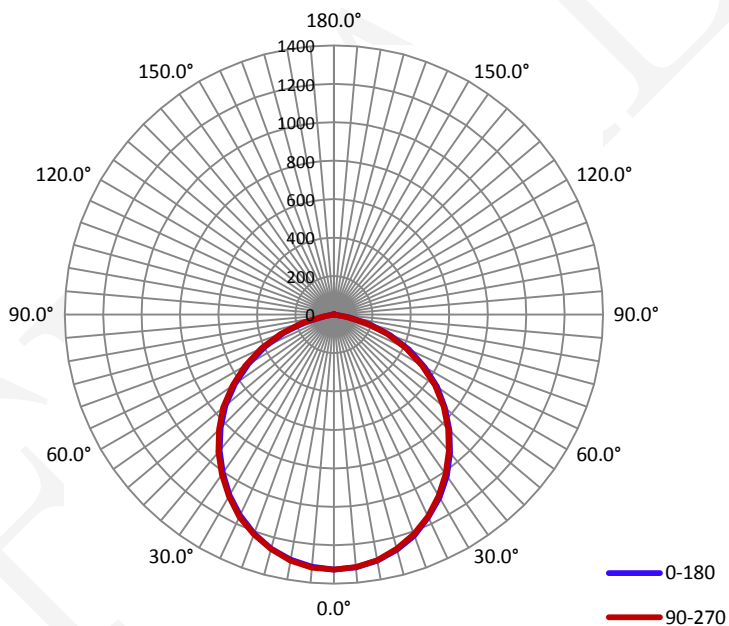
Electrical Measurement

Input Voltage(V)	Frequency(Hz)	Input Current(A)	Power (W)	Power Factor
120.0	60	0.2310	27.3	0.9840

Photometric Measurement

Luminous Flux(lm)	Efficacy(lm/W)	$I_{max}(cd)$	S/MH(C0/180)	S/MH(C90/270)
3493.4	128.01	1326.7	1.22	1.22

Luminous Intensity Distribution



	C0/180	C45/225	C90/270	C135/315	AVG.
Beam Angle(50% I_{max}):	107.8	108.1	108.0	107.9	108.0
Field Angle(10% I_{max}):	153.7	153.8	153.8	153.8	153.8

Luminous Intensity (cd) Distribution Data

C y	0°	22.5°	45°	67.5°	90°	112.5°	135°	157.5°
0.0°	1327	1327	1327	1327	1327	1327	1327	1327
5.0°	1320	1323	1321	1320	1317	1318	1317	1318
10.0°	1300	1302	1299	1297	1297	1297	1299	1300
15.0°	1267	1270	1267	1263	1262	1263	1259	1261
20.0°	1224	1224	1221	1219	1216	1216	1213	1217
25.0°	1162	1165	1164	1157	1159	1160	1156	1158
30.0°	1099	1097	1094	1092	1090	1088	1088	1086
35.0°	1024	1023	1017	1016	1014	1011	1009	1014
40.0°	940	939	934	932	928	930	928	928
45.0°	851	849	847	845	840	839	835	838
50.0°	755	756	751	748	745	743	740	741
55.0°	653	655	650	643	643	639	636	635
60.0°	545	542	540	533	528	526	522	522
65.0°	430	427	424	418	413	408	406	407
70.0°	310	309	304	297	294	289	285	284
75.0°	192	191	185	180	174	172	167	166
80.0°	82	80	76	70	65	63	60	58
85.0°	13	12	13	12	11	11	10	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	1	1	1
150.0°	0	1	1	1	1	1	2	1
155.0°	1	2	2	2	2	2	2	2
160.0°	2	2	2	2	2	2	2	2
165.0°	2	2	2	2	3	3	2	3
170.0°	3	3	3	3	3	3	3	3
175.0°	3	3	3	3	3	3	4	4
180.0°	0	0	0	0	0	0	0	0

Luminous Intensity (cd) Distribution Data (cont.)

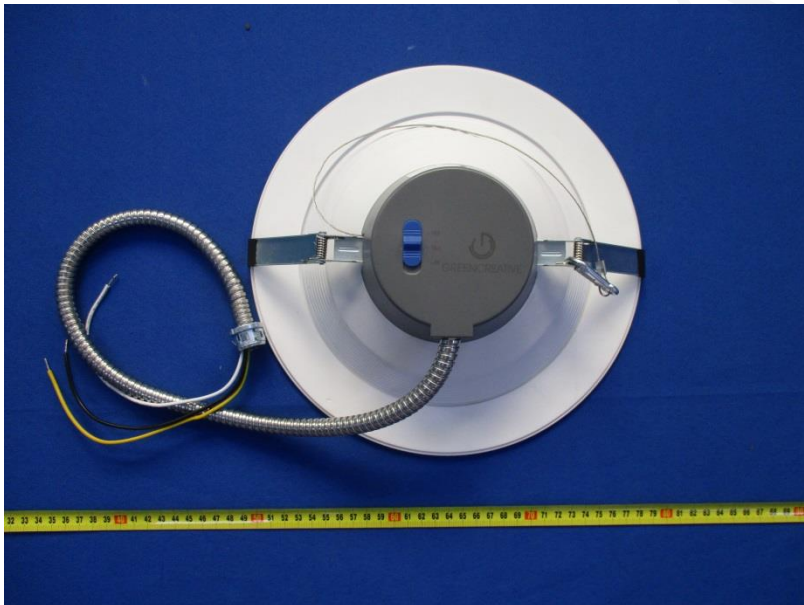
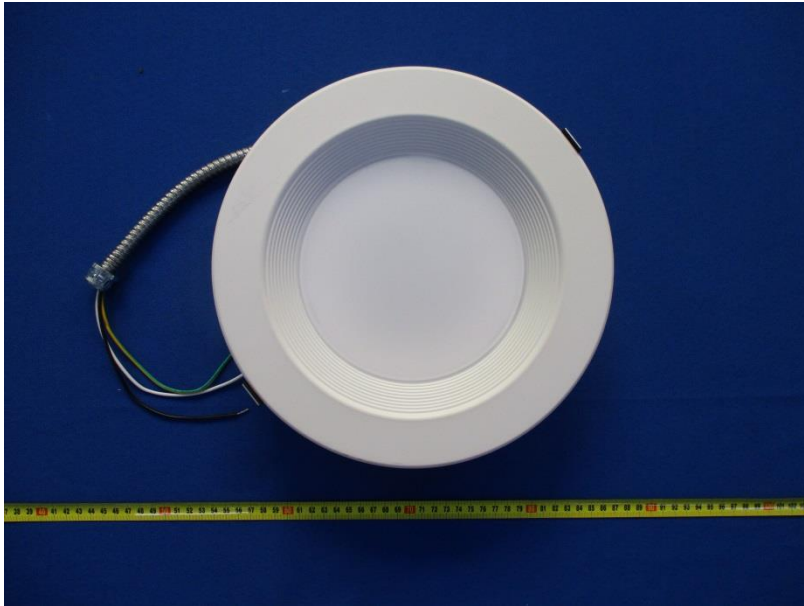
C y	180°	202.5°	225°	247.5°	270°	292.5°	315°	337.5°
0.0°	1327	1327	1327	1327	1327	1327	1327	1327
5.0°	1317	1319	1318	1320	1321	1320	1317	1317
10.0°	1294	1298	1299	1294	1299	1303	1298	1299
15.0°	1261	1263	1265	1265	1263	1265	1263	1266
20.0°	1213	1218	1218	1215	1217	1222	1221	1219
25.0°	1153	1158	1157	1160	1161	1161	1164	1161
30.0°	1085	1088	1091	1092	1092	1093	1094	1094
35.0°	1008	1011	1014	1014	1015	1017	1019	1019
40.0°	923	926	930	932	935	936	935	937
45.0°	832	840	841	842	844	845	846	847
50.0°	736	740	745	747	751	751	750	751
55.0°	627	633	638	641	643	647	647	648
60.0°	513	521	525	529	531	535	537	536
65.0°	395	403	407	413	415	420	421	419
70.0°	275	281	284	290	296	297	299	301
75.0°	154	158	163	168	175	178	180	181
80.0°	46	49	54	57	63	68	71	70
85.0°	6	7	8	8	9	10	11	12
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	1	0	0	0
150.0°	0	0	1	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	3	3	3	3	2	3
170.0°	2	3	3	3	3	3	3	3
175.0°	2	3	3	3	4	3	3	3
180.0°	0	0	0	0	0	0	0	0

Zonal Lumen Density Measurement

Deg	Flux (lm)	%
0-5	31.6	0.91
5-10	93.6	2.68
10-15	152.0	4.35
15-20	204.6	5.86
20-25	249.4	7.14
25-30	284.9	8.16
30-35	310.2	8.88
35-40	324.9	9.30
40-45	328.6	9.41
45-50	321.1	9.19
50-55	302.0	8.65
55-60	271.0	7.76
60-65	229.6	6.57
65-70	179.1	5.13
70-75	122.1	3.50
75-80	63.8	1.83
80-85	20.3	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	0.2	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	31.6	0.91
0-10	125.3	3.59
0-15	277.2	7.94
0-20	481.8	13.79
0-25	731.2	20.93
0-30	1016.1	29.09
0-35	1326.4	37.97
0-40	1651.3	47.27
0-45	1979.8	56.67
0-50	2301.0	65.87
0-55	2603.0	74.51
0-60	2874.0	82.27
0-65	3103.6	88.84
0-70	3282.7	93.97
0-75	3404.8	97.46
0-80	3468.6	99.29
0-85	3488.9	99.87
0-90	3491.7	99.95
0-95	3491.7	99.95
0-100	3491.7	99.95
0-105	3491.7	99.95
0-110	3491.7	99.95
0-115	3491.7	99.95
0-120	3491.7	99.95
0-125	3491.7	99.95
0-130	3491.7	99.95
0-135	3491.7	99.95
0-140	3491.7	99.95
0-145	3491.7	99.95
0-150	3491.8	99.95
0-155	3492.1	99.96
0-160	3492.5	99.97
0-165	3492.9	99.98
0-170	3493.2	99.99
0-175	3493.4	100.00
0-180	3493.4	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*****