

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/DIM010UNV

Report Type:	Electrical and Photometric tests including: Luminous Flux, Chromaticity, Luminous Intensity Distribution
Test Engineer:	George Yang
Report Number:	PKS200825093-10
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: INFT9.5/835/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: 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 $U_{re}=2.61\%$ ($k=2$), 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.

5. Test Result

[Integrating Sphere System]

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

Test orientation: **Downward**

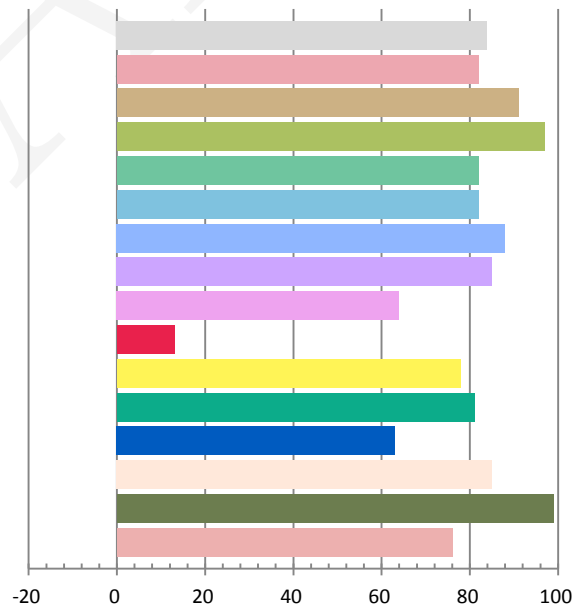
Photometric and Electrical Measurement Result

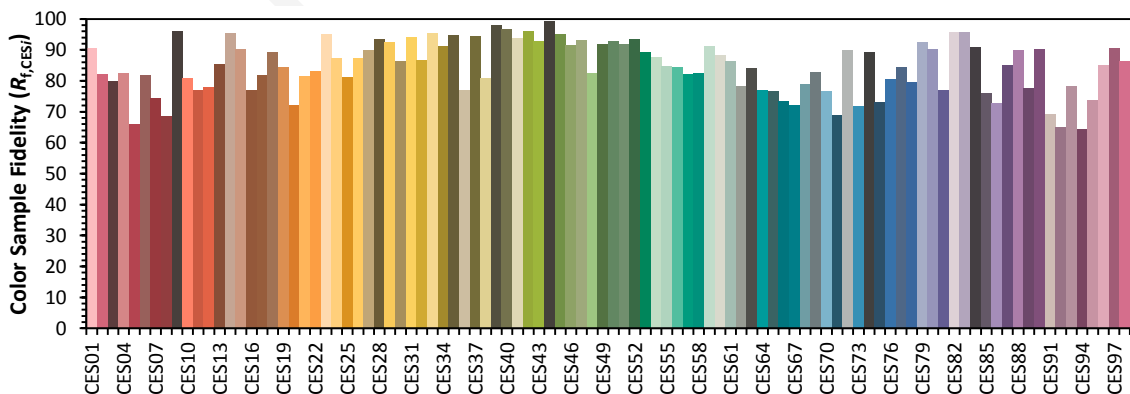
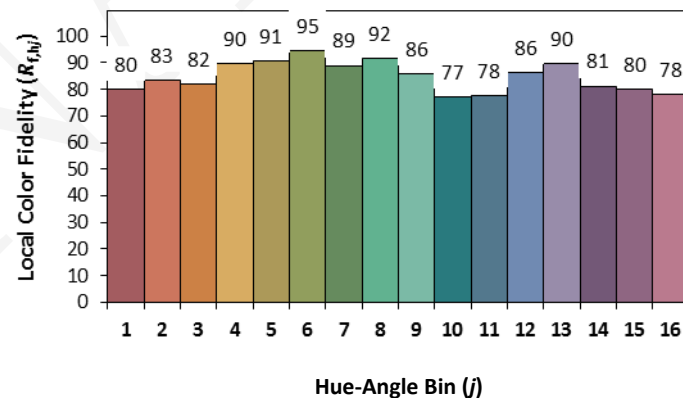
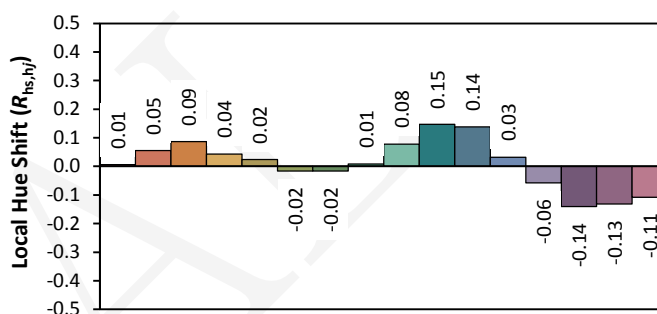
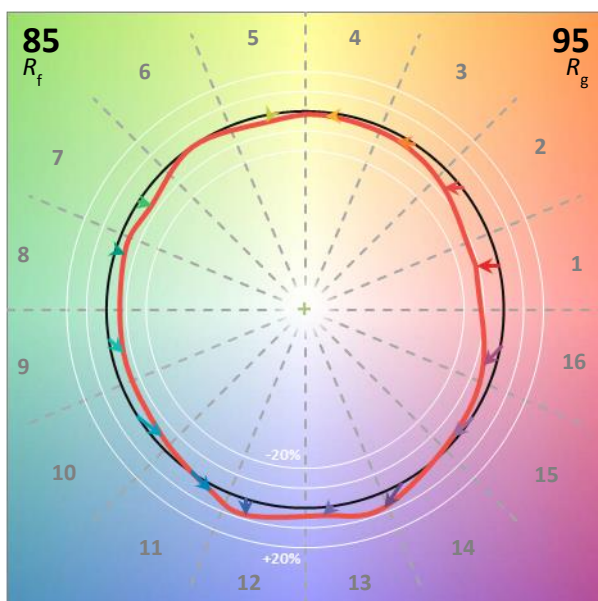
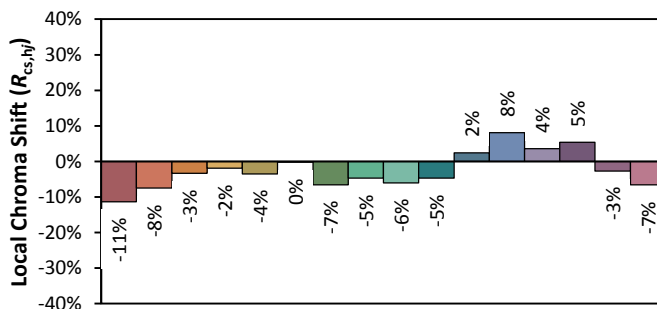
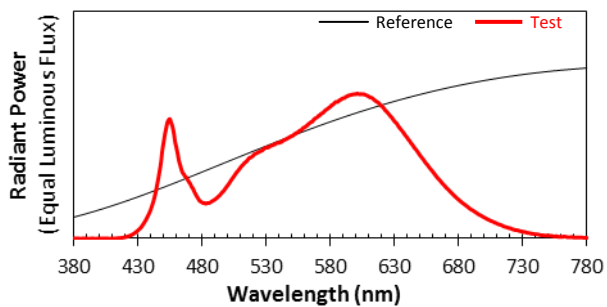
Voltage(V)	Frequency(Hz)	Current(A)	Power (W)	Power Factor	Luminous Flux(lm)	Efficacy(lm/W)
120	60	0.2255	26.52	0.98	3582.97	135.1

Radiant Flux (W)	CCT (K)	Duv	x	y	u'	v'
10.756	3427	0.00165	0.4113	0.3975	0.2368	0.5149

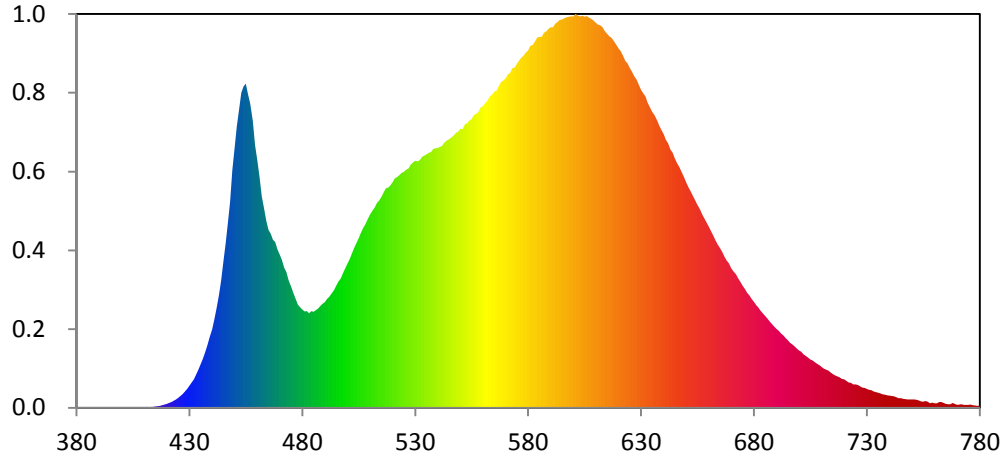
Color Rendering Index

Ra			
83.9			
R1	R2	R3	R4
82	91	97	82
R5	R6	R7	R8
82	88	85	64
R9	R10	R11	R12
13	78	81	63
R13	R14	R15	
85	99	76	





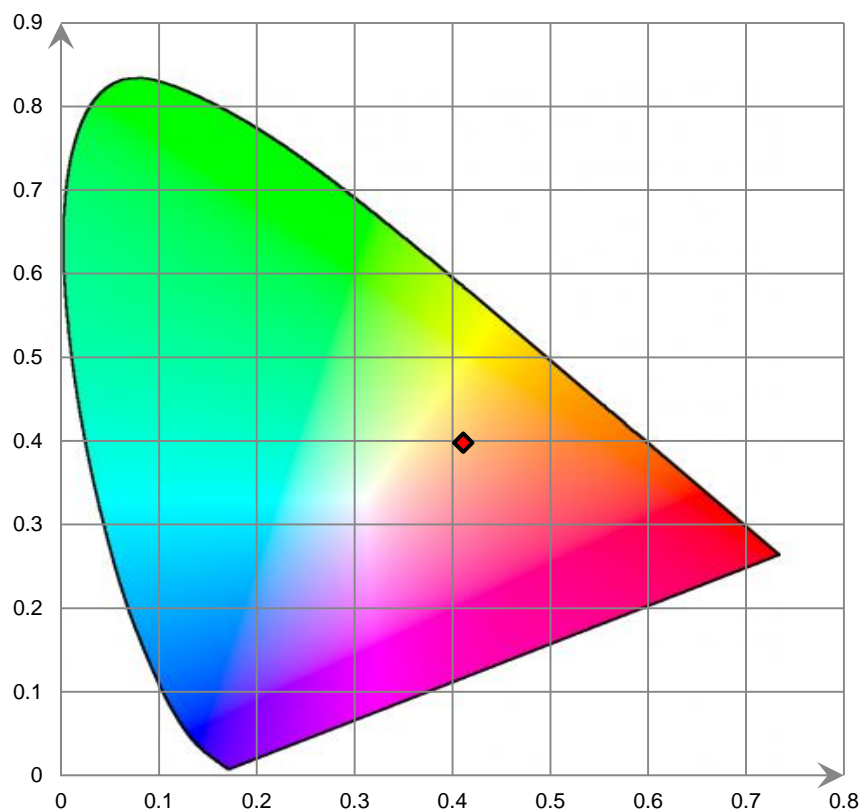
Relative Spectral Power Distribution



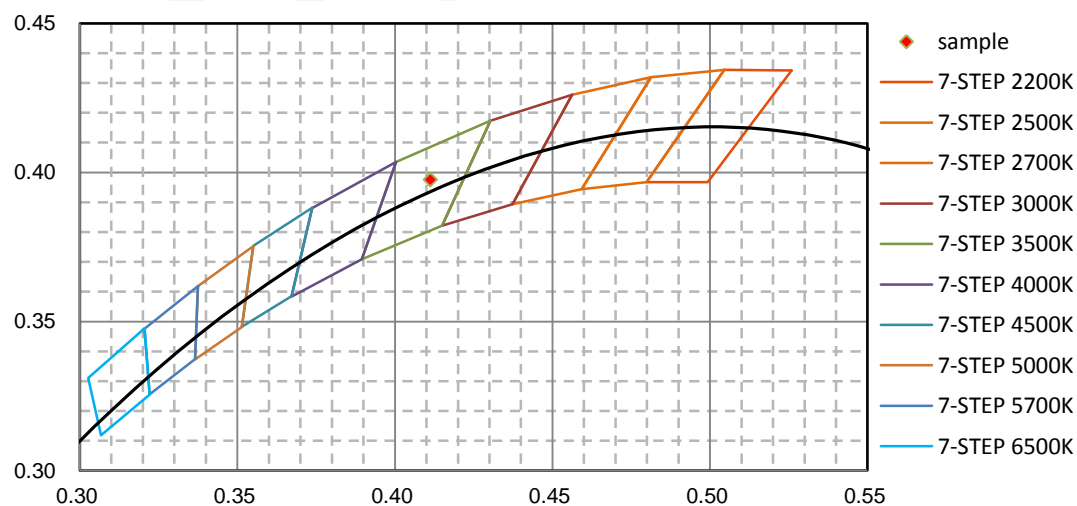
nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
380	4.400E-02	421	8.117E-01	462	3.598E+01	503	2.719E+01	544	4.543E+01
381	6.090E-02	422	9.793E-01	463	3.393E+01	504	2.800E+01	545	4.567E+01
382	4.050E-02	423	1.179E+00	464	3.183E+01	505	2.884E+01	546	4.592E+01
383	5.690E-02	424	1.405E+00	465	3.028E+01	506	2.975E+01	547	4.633E+01
384	8.120E-02	425	1.654E+00	466	2.960E+01	507	3.059E+01	548	4.674E+01
385	2.050E-02	426	1.991E+00	467	2.854E+01	508	3.126E+01	549	4.698E+01
386	1.500E-03	427	2.335E+00	468	2.819E+01	509	3.204E+01	550	4.743E+01
387	1.104E-01	428	2.790E+00	469	2.695E+01	510	3.279E+01	551	4.742E+01
388	6.740E-02	429	3.218E+00	470	2.606E+01	511	3.353E+01	552	4.821E+01
389	3.020E-02	430	3.737E+00	471	2.512E+01	512	3.405E+01	553	4.840E+01
390	8.030E-02	431	4.318E+00	472	2.381E+01	513	3.484E+01	554	4.889E+01
391	2.390E-02	432	4.841E+00	473	2.306E+01	514	3.529E+01	555	4.911E+01
392	2.400E-03	433	5.651E+00	474	2.163E+01	515	3.584E+01	556	4.978E+01
393	8.000E-04	434	6.449E+00	475	2.055E+01	516	3.664E+01	557	4.998E+01
394	2.690E-02	435	7.416E+00	476	1.947E+01	517	3.731E+01	558	5.029E+01
395	7.050E-02	436	8.319E+00	477	1.851E+01	518	3.742E+01	559	5.112E+01
396	4.420E-02	437	9.417E+00	478	1.753E+01	519	3.780E+01	560	5.127E+01
397	2.180E-02	438	1.062E+01	479	1.709E+01	520	3.834E+01	561	5.180E+01
398	1.600E-03	439	1.196E+01	480	1.671E+01	521	3.902E+01	562	5.216E+01
399	2.800E-03	440	1.330E+01	481	1.639E+01	522	3.923E+01	563	5.288E+01
400	1.000E-04	441	1.508E+01	482	1.641E+01	523	3.953E+01	564	5.329E+01
401	2.800E-02	442	1.695E+01	483	1.608E+01	524	3.992E+01	565	5.377E+01
402	6.440E-02	443	1.911E+01	484	1.645E+01	525	4.008E+01	566	5.392E+01
403	5.640E-02	444	2.163E+01	485	1.632E+01	526	4.048E+01	567	5.473E+01
404	5.340E-02	445	2.481E+01	486	1.657E+01	527	4.067E+01	568	5.538E+01
405	7.350E-02	446	2.785E+01	487	1.687E+01	528	4.131E+01	569	5.569E+01
406	4.270E-02	447	3.136E+01	488	1.729E+01	529	4.174E+01	570	5.602E+01
407	9.200E-02	448	3.498E+01	489	1.765E+01	530	4.200E+01	571	5.672E+01
408	1.530E-02	449	4.038E+01	490	1.795E+01	531	4.192E+01	572	5.693E+01
409	5.410E-02	450	4.408E+01	491	1.850E+01	532	4.213E+01	573	5.775E+01
410	1.159E-01	451	4.784E+01	492	1.889E+01	533	4.264E+01	574	5.783E+01
411	1.388E-01	452	5.065E+01	493	1.947E+01	534	4.286E+01	575	5.843E+01
412	1.178E-01	453	5.353E+01	494	2.004E+01	535	4.309E+01	576	5.906E+01
413	9.820E-02	454	5.465E+01	495	2.077E+01	536	4.338E+01	577	5.953E+01
414	1.719E-01	455	5.514E+01	496	2.150E+01	537	4.345E+01	578	5.988E+01
415	2.110E-01	456	5.333E+01	497	2.201E+01	538	4.405E+01	579	6.040E+01
416	2.428E-01	457	5.169E+01	498	2.292E+01	539	4.413E+01	580	6.074E+01
417	3.447E-01	458	4.883E+01	499	2.370E+01	540	4.416E+01	581	6.153E+01
418	4.193E-01	459	4.469E+01	500	2.452E+01	541	4.436E+01	582	6.173E+01
419	5.197E-01	460	4.213E+01	501	2.528E+01	542	4.459E+01	583	6.229E+01
420	6.657E-01	461	3.931E+01	502	2.631E+01	543	4.511E+01	584	6.296E+01

nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
585	6.309E+01	626	5.713E+01	667	2.571E+01	708	7.463E+00	749	1.405E+00
586	6.305E+01	627	5.636E+01	668	2.505E+01	709	7.250E+00	750	1.410E+00
587	6.379E+01	628	5.585E+01	669	2.452E+01	710	6.898E+00	751	1.391E+00
588	6.402E+01	629	5.495E+01	670	2.375E+01	711	6.657E+00	752	1.346E+00
589	6.443E+01	630	5.411E+01	671	2.312E+01	712	6.484E+00	753	1.240E+00
590	6.470E+01	631	5.350E+01	672	2.268E+01	713	6.312E+00	754	1.083E+00
591	6.472E+01	632	5.297E+01	673	2.198E+01	714	5.998E+00	755	1.023E+00
592	6.532E+01	633	5.189E+01	674	2.138E+01	715	5.697E+00	756	1.137E+00
593	6.558E+01	634	5.109E+01	675	2.076E+01	716	5.498E+00	757	1.054E+00
594	6.597E+01	635	5.036E+01	676	2.017E+01	717	5.322E+00	758	7.486E-01
595	6.603E+01	636	4.969E+01	677	1.955E+01	718	5.143E+00	759	8.698E-01
596	6.625E+01	637	4.892E+01	678	1.908E+01	719	4.910E+00	760	7.460E-01
597	6.638E+01	638	4.799E+01	679	1.850E+01	720	4.815E+00	761	7.461E-01
598	6.652E+01	639	4.723E+01	680	1.803E+01	721	4.567E+00	762	9.543E-01
599	6.656E+01	640	4.652E+01	681	1.745E+01	722	4.320E+00	763	9.605E-01
600	6.657E+01	641	4.556E+01	682	1.701E+01	723	4.243E+00	764	7.885E-01
601	6.698E+01	642	4.493E+01	683	1.649E+01	724	3.953E+00	765	6.595E-01
602	6.666E+01	643	4.394E+01	684	1.608E+01	725	3.963E+00	766	5.873E-01
603	6.658E+01	644	4.336E+01	685	1.562E+01	726	3.855E+00	767	6.185E-01
604	6.669E+01	645	4.238E+01	686	1.519E+01	727	3.650E+00	768	7.964E-01
605	6.652E+01	646	4.156E+01	687	1.471E+01	728	3.433E+00	769	6.471E-01
606	6.662E+01	647	4.093E+01	688	1.423E+01	729	3.372E+00	770	4.908E-01
607	6.636E+01	648	4.008E+01	689	1.379E+01	730	3.230E+00	771	5.396E-01
608	6.612E+01	649	3.927E+01	690	1.337E+01	731	3.026E+00	772	5.685E-01
609	6.585E+01	650	3.835E+01	691	1.308E+01	732	2.991E+00	773	4.938E-01
610	6.548E+01	651	3.757E+01	692	1.264E+01	733	2.777E+00	774	4.965E-01
611	6.515E+01	652	3.684E+01	693	1.229E+01	734	2.652E+00	775	5.000E-01
612	6.502E+01	653	3.609E+01	694	1.187E+01	735	2.567E+00	776	5.401E-01
613	6.471E+01	654	3.523E+01	695	1.146E+01	736	2.438E+00	777	4.587E-01
614	6.407E+01	655	3.446E+01	696	1.103E+01	737	2.306E+00	778	3.933E-01
615	6.363E+01	656	3.379E+01	697	1.076E+01	738	2.221E+00	779	3.163E-01
616	6.318E+01	657	3.294E+01	698	1.045E+01	739	2.116E+00	780	3.869E-01
617	6.291E+01	658	3.223E+01	699	1.008E+01	740	2.074E+00		
618	6.234E+01	659	3.151E+01	700	9.757E+00	741	2.010E+00		
619	6.171E+01	660	3.078E+01	701	9.517E+00	742	1.929E+00		
620	6.110E+01	661	3.002E+01	702	9.109E+00	743	1.789E+00		
621	6.065E+01	662	2.925E+01	703	8.788E+00	744	1.606E+00		
622	5.985E+01	663	2.846E+01	704	8.539E+00	745	1.602E+00		
623	5.901E+01	664	2.775E+01	705	8.200E+00	746	1.529E+00		
624	5.857E+01	665	2.714E+01	706	8.036E+00	747	1.485E+00		
625	5.781E+01	666	2.648E+01	707	7.716E+00	748	1.388E+00		

CIE 1931xy Chromaticity Diagram



7-Step Chromaticity Quadrangles



[Goniophotometer System]

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

Test orientation: **Downward**

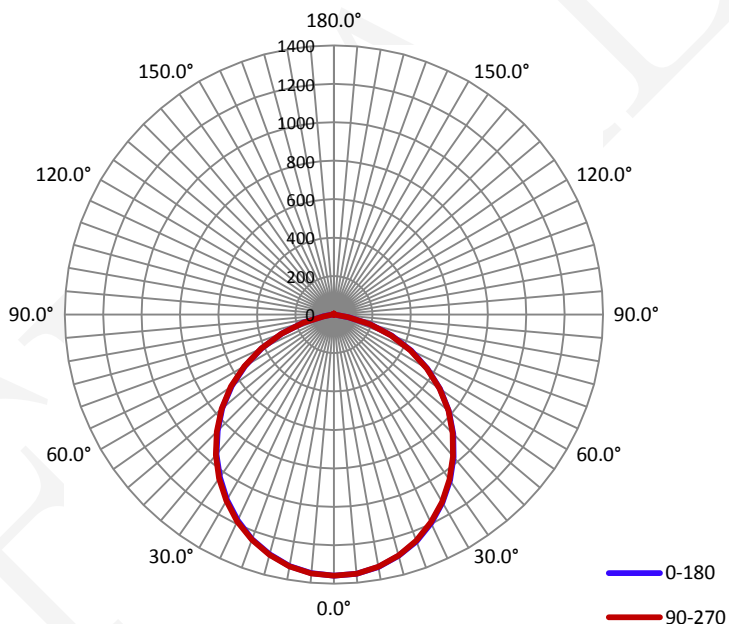
Electrical Measurement

Input Voltage(V)	Frequency(Hz)	Input Current(A)	Power (W)	Power Factor
120.0	60	0.2250	26.6	0.9850

Photometric Measurement

Luminous Flux(lm)	Efficacy(lm/W)	$I_{max}(cd)$	S/MH(C0/180)	S/MH(C90/270)
3594.7	135.19	1358.3	1.23	1.23

Luminous Intensity Distribution



	C0/180	C45/225	C90/270	C135/315	AVG.
Beam Angle(50% I_{max}):	108.4	108.4	108.5	108.4	108.4
Field Angle(10% I_{max}):	153.9	153.9	153.8	154.0	153.9

Luminous Intensity (cd) Distribution Data

C y	0°	22.5°	45°	67.5°	90°	112.5°	135°	157.5°
0.0°	1358	1358	1358	1358	1358	1358	1358	1358
5.0°	1354	1353	1353	1352	1353	1352	1351	1350
10.0°	1333	1333	1332	1332	1332	1331	1329	1329
15.0°	1299	1300	1300	1298	1298	1297	1294	1294
20.0°	1255	1255	1254	1253	1252	1249	1248	1245
25.0°	1197	1197	1196	1195	1193	1192	1188	1186
30.0°	1130	1129	1128	1126	1125	1122	1120	1117
35.0°	1053	1052	1052	1050	1049	1045	1042	1038
40.0°	968	969	967	967	964	961	958	955
45.0°	877	880	878	876	873	870	866	863
50.0°	781	782	782	779	777	772	770	766
55.0°	675	676	676	674	671	667	663	658
60.0°	561	563	564	561	558	553	549	545
65.0°	444	446	445	444	440	434	428	426
70.0°	320	322	323	321	316	312	307	301
75.0°	198	200	200	198	193	188	185	180
80.0°	82	85	83	80	75	73	72	67
85.0°	12	13	13	13	12	12	11	11
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°	1	1	1	1	1	1	1	1
150.0°	1	1	2	2	2	2	2	2
155.0°	2	2	3	2	2	3	3	2
160.0°	2	3	3	3	3	3	3	3
165.0°	3	3	3	3	3	3	3	3
170.0°	3	4	3	3	4	3	4	3
175.0°	4	4	4	4	4	4	5	4
180.0°	0	0	0	0	0	0	0	0

Luminous Intensity (cd) Distribution Data (cont.)

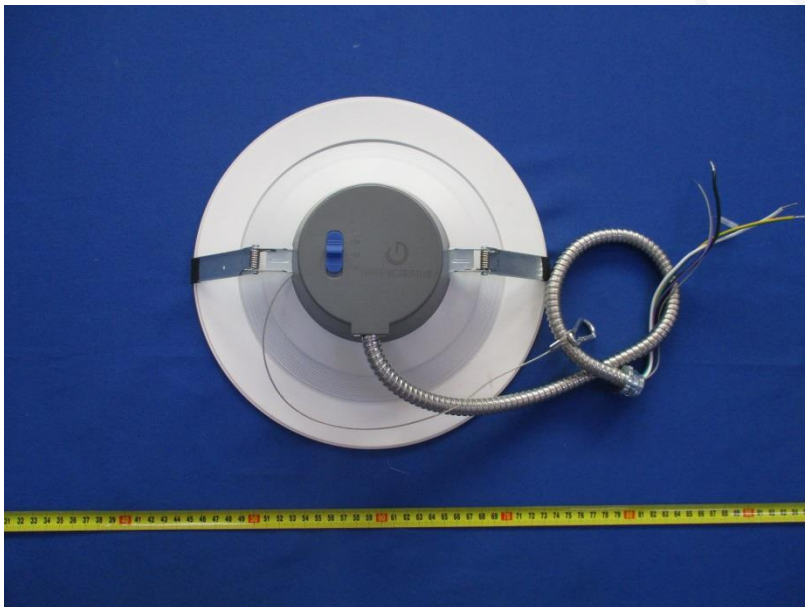
C y	180°	202.5°	225°	247.5°	270°	292.5°	315°	337.5°
0.0°	1358	1358	1358	1358	1358	1358	1358	1358
5.0°	1351	1350	1350	1350	1352	1352	1352	1351
10.0°	1328	1328	1328	1328	1330	1329	1331	1331
15.0°	1291	1291	1291	1293	1295	1295	1296	1296
20.0°	1243	1243	1244	1244	1246	1248	1249	1250
25.0°	1183	1183	1182	1184	1188	1189	1189	1191
30.0°	1113	1114	1113	1114	1118	1120	1121	1123
35.0°	1034	1033	1034	1036	1040	1041	1043	1047
40.0°	949	947	948	950	955	955	959	961
45.0°	855	855	857	859	862	864	868	869
50.0°	757	757	758	759	763	766	768	772
55.0°	648	648	647	650	654	658	660	664
60.0°	533	530	531	533	538	540	545	550
65.0°	412	409	411	413	417	419	425	431
70.0°	287	286	286	286	291	296	302	306
75.0°	163	162	162	162	167	172	176	182
80.0°	52	49	50	52	56	58	63	68
85.0°	8	8	8	9	8	10	10	11
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	1	1	1	1
150.0°	0	1	1	2	2	1	2	2
155.0°	1	2	2	2	2	2	2	2
160.0°	2	2	2	3	3	3	3	3
165.0°	2	3	3	3	3	3	3	4
170.0°	3	3	4	4	4	4	4	4
175.0°	3	4	4	4	5	4	4	4
180.0°	0	0	0	0	0	0	0	0

Zonal Lumen Density Measurement

Deg	Flux (lm)	%
0-5	32.4	0.90
5-10	95.9	2.67
10-15	155.8	4.33
15-20	209.7	5.83
20-25	255.7	7.11
25-30	292.4	8.13
30-35	318.6	8.86
35-40	333.9	9.29
40-45	338.0	9.40
45-50	330.6	9.20
50-55	311.1	8.66
55-60	279.4	7.77
60-65	237.0	6.59
65-70	185.2	5.15
70-75	126.6	3.52
75-80	66.1	1.84
80-85	20.9	0.58
85-90	2.9	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	0.1	0.00
145-150	0.3	0.01
150-155	0.5	0.01
155-160	0.5	0.01
160-165	0.5	0.01
165-170	0.4	0.01
170-175	0.3	0.01
175-180	0.0	0.00

Deg	Flux (lm)	%
0-5	32.4	0.90
0-10	128.3	3.57
0-15	284.1	7.90
0-20	493.8	13.74
0-25	749.5	20.85
0-30	1041.8	28.98
0-35	1360.5	37.85
0-40	1694.3	47.13
0-45	2032.3	56.54
0-50	2362.9	65.73
0-55	2674.0	74.39
0-60	2953.5	82.16
0-65	3190.4	88.75
0-70	3375.6	93.91
0-75	3502.2	97.43
0-80	3568.3	99.26
0-85	3589.2	99.85
0-90	3592.1	99.93
0-95	3592.1	99.93
0-100	3592.1	99.93
0-105	3592.1	99.93
0-110	3592.1	99.93
0-115	3592.1	99.93
0-120	3592.1	99.93
0-125	3592.1	99.93
0-130	3592.1	99.93
0-135	3592.1	99.93
0-140	3592.1	99.93
0-145	3592.2	99.93
0-150	3592.6	99.94
0-155	3593.0	99.95
0-160	3593.5	99.97
0-165	3594.0	99.98
0-170	3594.4	99.99
0-175	3594.7	100.00
0-180	3594.7	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*****