

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: INFT4/840/DIM010UNV

Report Type:	Electrical and Photometric tests including: Luminous Flux, Chromaticity, Luminous Intensity Distribution
Test Engineer:	George Yang
Report Number:	PKS200825082-10
Test Date:	2020-08-28 to 2020-09-07
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: INFT4/840/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: 10W
 Nominal CCT: 4000K
 Nominal Lumen Output: 1090lm

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**

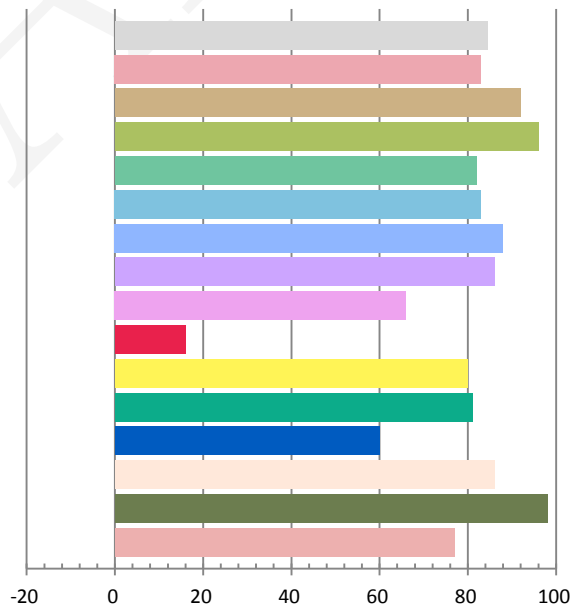
Photometric and Electrical Measurement Result

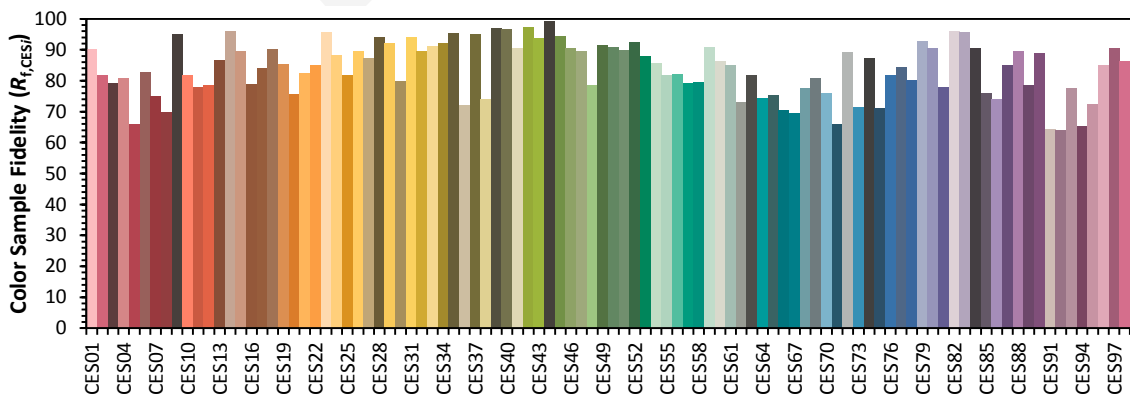
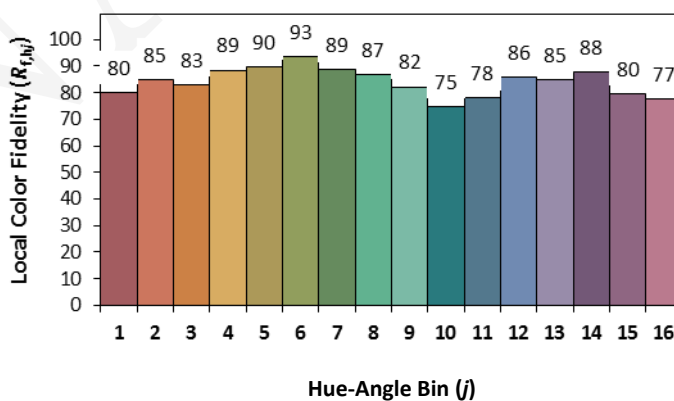
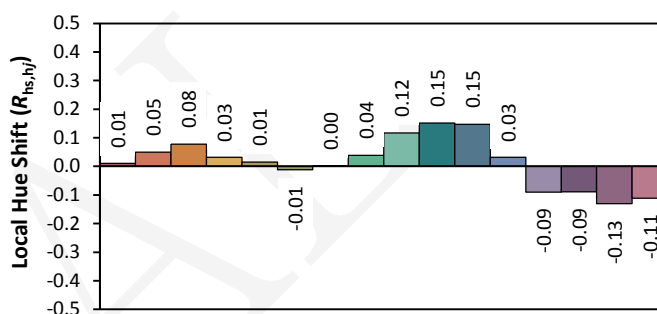
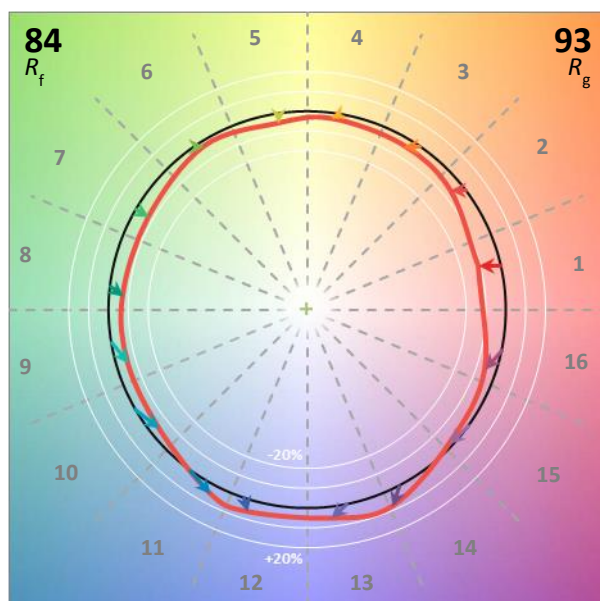
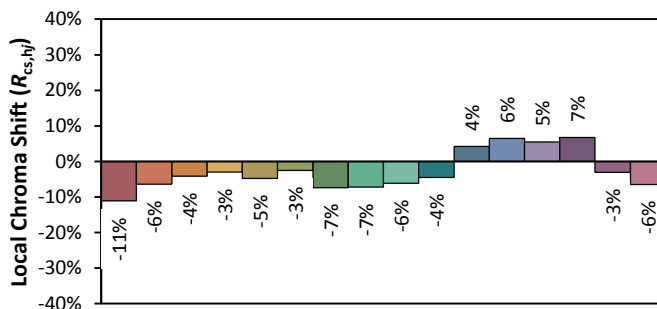
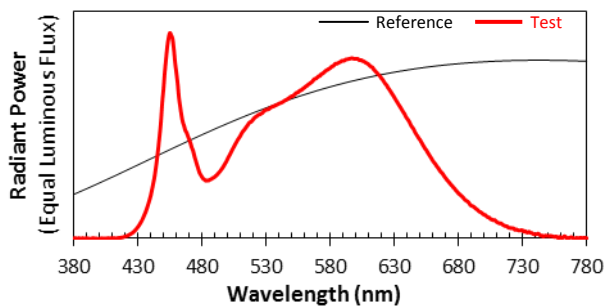
Voltage(V)	Frequency(Hz)	Current(A)	Power (W)	Power Factor	Luminous Flux(lm)	Efficacy(lm/W)
120.04	60	0.0871	10.33	0.988	1166.04	112.86

Radiant Flux (W)	CCT (K)	Duv	x	y	u'	v'
3.521	3903	0.00178	0.3862	0.3841	0.2259	0.5056

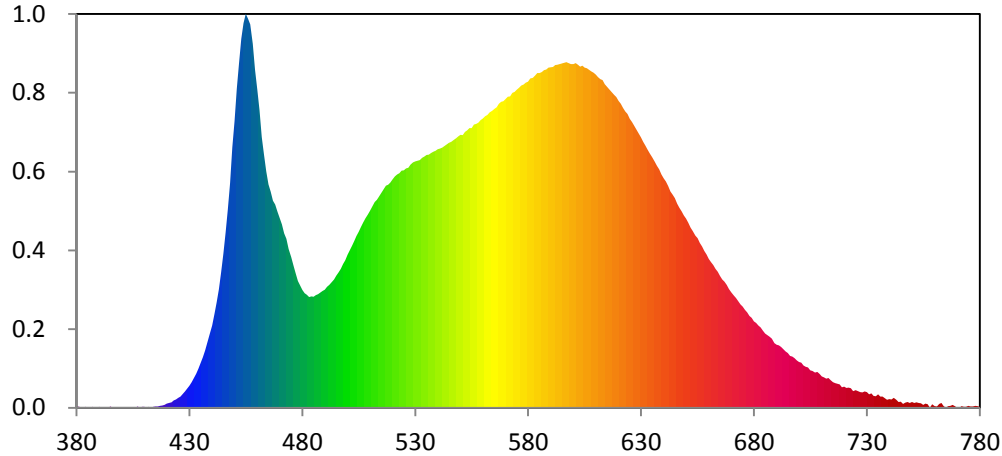
Color Rendering Index

Ra			
84.5			
R1	R2	R3	R4
83	92	96	82
R5	R6	R7	R8
83	88	86	66
R9	R10	R11	R12
16	80	81	60
R13	R14	R15	
86	98	77	





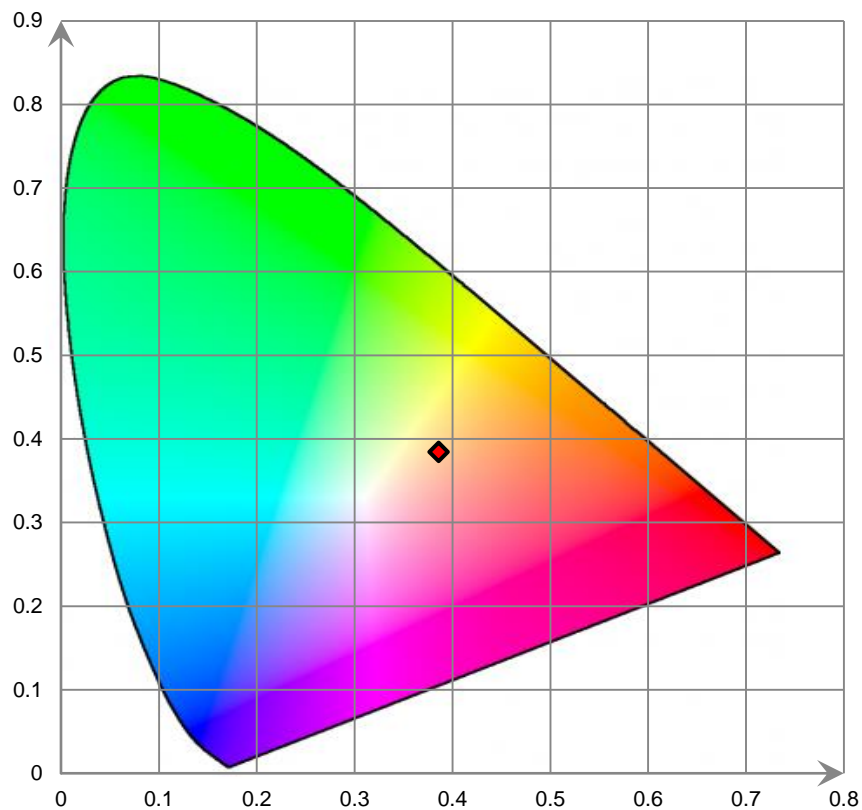
Relative Spectral Power Distribution



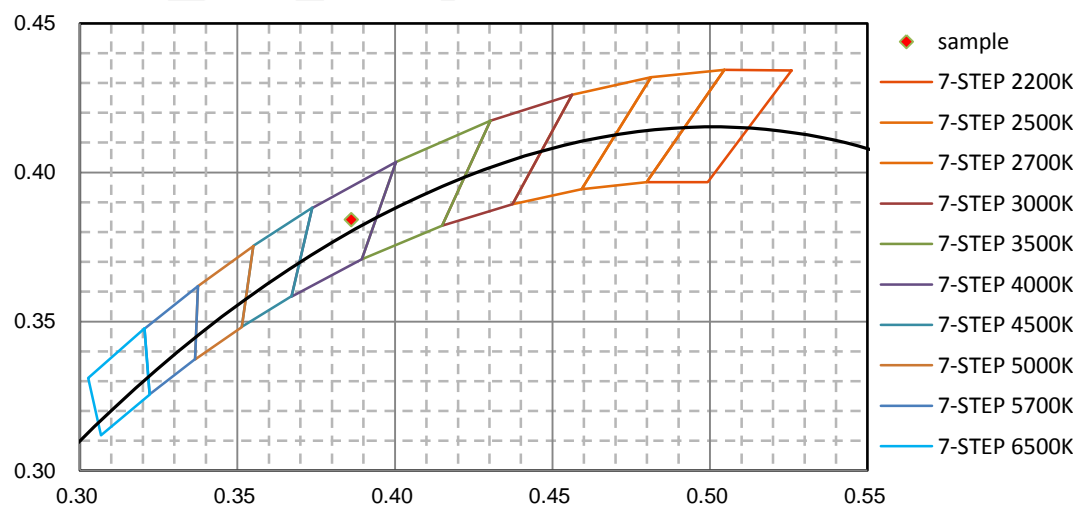
nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
380	1.630E-02	421	2.830E-01	462	1.591E+01	503	9.804E+00	544	1.549E+01
381	6.670E-02	422	3.215E-01	463	1.488E+01	504	1.010E+01	545	1.557E+01
382	3.780E-02	423	4.207E-01	464	1.390E+01	505	1.035E+01	546	1.564E+01
383	1.240E-02	424	4.786E-01	465	1.314E+01	506	1.063E+01	547	1.574E+01
384	5.160E-02	425	5.738E-01	466	1.271E+01	507	1.088E+01	548	1.583E+01
385	3.610E-02	426	6.643E-01	467	1.217E+01	508	1.115E+01	549	1.595E+01
386	3.800E-03	427	8.059E-01	468	1.196E+01	509	1.135E+01	550	1.604E+01
387	5.170E-02	428	9.560E-01	469	1.154E+01	510	1.157E+01	551	1.602E+01
388	1.650E-02	429	1.118E+00	470	1.115E+01	511	1.186E+01	552	1.621E+01
389	1.430E-02	430	1.303E+00	471	1.078E+01	512	1.209E+01	553	1.631E+01
390	6.180E-02	431	1.513E+00	472	1.025E+01	513	1.224E+01	554	1.645E+01
391	2.340E-02	432	1.756E+00	473	9.929E+00	514	1.244E+01	555	1.645E+01
392	3.300E-03	433	2.001E+00	474	9.333E+00	515	1.265E+01	556	1.664E+01
393	2.400E-03	434	2.295E+00	475	8.855E+00	516	1.284E+01	557	1.669E+01
394	1.700E-02	435	2.633E+00	476	8.375E+00	517	1.307E+01	558	1.676E+01
395	6.530E-02	436	2.976E+00	477	7.905E+00	518	1.311E+01	559	1.692E+01
396	2.580E-02	437	3.373E+00	478	7.456E+00	519	1.324E+01	560	1.700E+01
397	3.570E-02	438	3.827E+00	479	7.184E+00	520	1.343E+01	561	1.714E+01
398	5.200E-03	439	4.299E+00	480	6.932E+00	521	1.360E+01	562	1.722E+01
399	2.000E-04	440	4.830E+00	481	6.728E+00	522	1.371E+01	563	1.737E+01
400	0.000E+00	441	5.494E+00	482	6.643E+00	523	1.379E+01	564	1.745E+01
401	2.370E-02	442	6.196E+00	483	6.508E+00	524	1.394E+01	565	1.757E+01
402	4.140E-02	443	6.958E+00	484	6.554E+00	525	1.397E+01	566	1.767E+01
403	1.670E-02	444	7.953E+00	485	6.518E+00	526	1.407E+01	567	1.787E+01
404	1.720E-02	445	9.058E+00	486	6.630E+00	527	1.412E+01	568	1.799E+01
405	2.070E-02	446	1.030E+01	487	6.681E+00	528	1.430E+01	569	1.802E+01
406	5.800E-03	447	1.167E+01	488	6.771E+00	529	1.444E+01	570	1.816E+01
407	7.950E-02	448	1.321E+01	489	6.864E+00	530	1.449E+01	571	1.829E+01
408	1.210E-02	449	1.531E+01	490	6.947E+00	531	1.453E+01	572	1.831E+01
409	4.710E-02	450	1.686E+01	491	7.101E+00	532	1.456E+01	573	1.852E+01
410	5.480E-02	451	1.877E+01	492	7.220E+00	533	1.470E+01	574	1.857E+01
411	4.110E-02	452	2.026E+01	493	7.395E+00	534	1.478E+01	575	1.869E+01
412	5.410E-02	453	2.169E+01	494	7.551E+00	535	1.486E+01	576	1.882E+01
413	2.140E-02	454	2.262E+01	495	7.764E+00	536	1.489E+01	577	1.894E+01
414	5.570E-02	455	2.316E+01	496	7.949E+00	537	1.498E+01	578	1.901E+01
415	7.920E-02	456	2.287E+01	497	8.171E+00	538	1.505E+01	579	1.912E+01
416	8.020E-02	457	2.253E+01	498	8.438E+00	539	1.511E+01	580	1.918E+01
417	1.184E-01	458	2.140E+01	499	8.667E+00	540	1.520E+01	581	1.935E+01
418	1.336E-01	459	1.987E+01	500	8.986E+00	541	1.525E+01	582	1.940E+01
419	1.755E-01	460	1.872E+01	501	9.250E+00	542	1.530E+01	583	1.952E+01
420	2.499E-01	461	1.749E+01	502	9.517E+00	543	1.539E+01	584	1.969E+01

nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
585	1.968E+01	626	1.680E+01	667	7.409E+00	708	2.109E+00	749	2.876E-01
586	1.974E+01	627	1.657E+01	668	7.220E+00	709	1.987E+00	750	3.309E-01
587	1.984E+01	628	1.635E+01	669	6.986E+00	710	1.844E+00	751	2.797E-01
588	1.989E+01	629	1.613E+01	670	6.800E+00	711	1.783E+00	752	3.186E-01
589	2.001E+01	630	1.590E+01	671	6.605E+00	712	1.702E+00	753	2.726E-01
590	2.002E+01	631	1.564E+01	672	6.453E+00	713	1.739E+00	754	2.523E-01
591	2.003E+01	632	1.542E+01	673	6.262E+00	714	1.607E+00	755	1.747E-01
592	2.015E+01	633	1.517E+01	674	6.080E+00	715	1.508E+00	756	2.464E-01
593	2.017E+01	634	1.494E+01	675	5.947E+00	716	1.442E+00	757	1.998E-01
594	2.020E+01	635	1.473E+01	676	5.752E+00	717	1.408E+00	758	2.150E-02
595	2.024E+01	636	1.447E+01	677	5.611E+00	718	1.373E+00	759	2.038E-01
596	2.028E+01	637	1.423E+01	678	5.404E+00	719	1.210E+00	760	9.870E-02
597	2.032E+01	638	1.402E+01	679	5.278E+00	720	1.241E+00	761	6.840E-02
598	2.027E+01	639	1.371E+01	680	5.077E+00	721	1.164E+00	762	2.185E-01
599	2.021E+01	640	1.350E+01	681	4.978E+00	722	1.183E+00	763	2.771E-01
600	2.022E+01	641	1.330E+01	682	4.836E+00	723	1.147E+00	764	9.280E-02
601	2.026E+01	642	1.305E+01	683	4.719E+00	724	9.839E-01	765	2.450E-02
602	2.017E+01	643	1.273E+01	684	4.541E+00	725	1.041E+00	766	8.610E-02
603	2.006E+01	644	1.252E+01	685	4.367E+00	726	9.747E-01	767	1.081E-01
604	2.011E+01	645	1.233E+01	686	4.272E+00	727	9.146E-01	768	1.730E-01
605	2.000E+01	646	1.201E+01	687	4.179E+00	728	9.026E-01	769	8.690E-02
606	1.997E+01	647	1.176E+01	688	4.056E+00	729	9.546E-01	770	3.650E-02
607	1.987E+01	648	1.155E+01	689	3.803E+00	730	9.207E-01	771	2.720E-02
608	1.977E+01	649	1.130E+01	690	3.705E+00	731	7.822E-01	772	8.930E-02
609	1.970E+01	650	1.112E+01	691	3.660E+00	732	8.472E-01	773	5.340E-02
610	1.959E+01	651	1.087E+01	692	3.568E+00	733	6.970E-01	774	6.090E-02
611	1.944E+01	652	1.060E+01	693	3.441E+00	734	6.816E-01	775	1.032E-01
612	1.933E+01	653	1.038E+01	694	3.317E+00	735	7.798E-01	776	6.810E-02
613	1.927E+01	654	1.012E+01	695	3.210E+00	736	6.603E-01	777	7.710E-02
614	1.903E+01	655	9.965E+00	696	3.050E+00	737	6.476E-01	778	1.101E-01
615	1.888E+01	656	9.686E+00	697	3.001E+00	738	5.538E-01	779	8.770E-02
616	1.872E+01	657	9.474E+00	698	2.909E+00	739	4.758E-01	780	5.420E-02
617	1.856E+01	658	9.224E+00	699	2.774E+00	740	5.013E-01		
618	1.840E+01	659	9.020E+00	700	2.681E+00	741	4.953E-01		
619	1.826E+01	660	8.756E+00	701	2.650E+00	742	5.723E-01		
620	1.804E+01	661	8.569E+00	702	2.478E+00	743	4.680E-01		
621	1.787E+01	662	8.391E+00	703	2.410E+00	744	3.321E-01		
622	1.763E+01	663	8.157E+00	704	2.364E+00	745	3.620E-01		
623	1.742E+01	664	7.990E+00	705	2.194E+00	746	2.238E-01		
624	1.726E+01	665	7.752E+00	706	2.157E+00	747	3.015E-01		
625	1.698E+01	666	7.536E+00	707	2.066E+00	748	3.432E-01		

CIE 1931xy Chromaticity Diagram



7-Step Chromaticity Quadrangles



[Goniophotometer System]

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

Test orientation: **Downward**

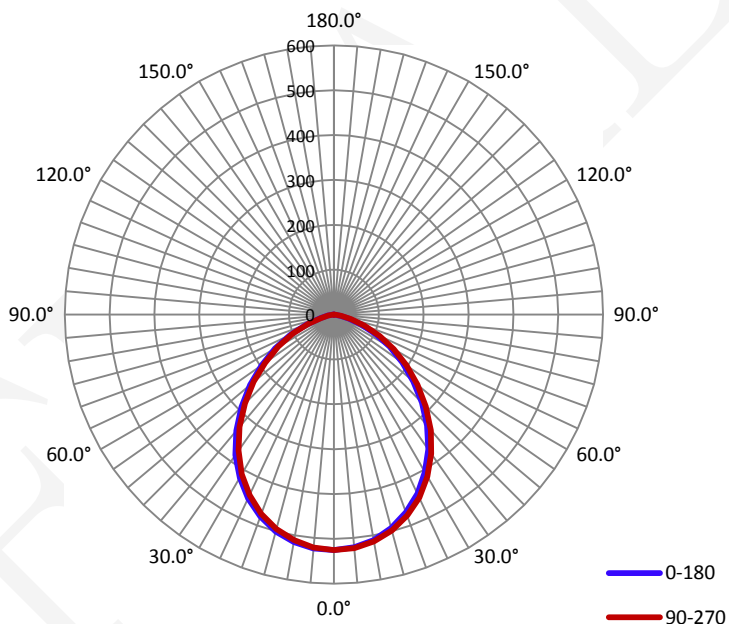
Electrical Measurement

Input Voltage(V)	Frequency(Hz)	Input Current(A)	Power (W)	Power Factor
120.0	60	0.0870	10.38	0.9920

Photometric Measurement

Luminous Flux(lm)	Efficacy(lm/W)	$I_{max}(cd)$	S/MH(C0/180)	S/MH(C90/270)
1171.6	112.92	525.2	1.17	1.18

Luminous Intensity Distribution



	C0/180	C45/225	C90/270	C135/315	AVG.
Beam Angle(50% I_{max}):	94.7	94.8	94.8	95.1	94.9
Field Angle(10% I_{max}):	143.9	144.0	144.3	144.5	144.2

Luminous Intensity (cd) Distribution Data

C y	0°	22.5°	45°	67.5°	90°	112.5°	135°	157.5°
0.0°	525	525	525	525	525	525	525	525
5.0°	521	522	521	521	522	522	523	525
10.0°	510	511	510	511	513	515	516	516
15.0°	493	493	493	495	499	500	502	502
20.0°	469	470	471	473	477	479	482	483
25.0°	441	442	444	446	450	453	456	457
30.0°	406	409	409	413	417	421	424	425
35.0°	366	368	371	374	379	383	386	387
40.0°	323	326	327	331	337	340	344	345
45.0°	278	280	282	284	290	295	298	300
50.0°	231	233	236	239	243	247	252	253
55.0°	187	187	191	194	198	202	206	207
60.0°	143	144	146	150	154	158	160	161
65.0°	103	104	105	109	113	115	117	117
70.0°	64	65	68	70	73	75	76	75
75.0°	33	35	36	37	39	40	40	39
80.0°	15	15	16	17	17	17	17	16
85.0°	5	5	6	6	6	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	0	0	0	0
180.0°	0	0	0	0	0	0	0	0

Luminous Intensity (cd) Distribution Data (cont.)

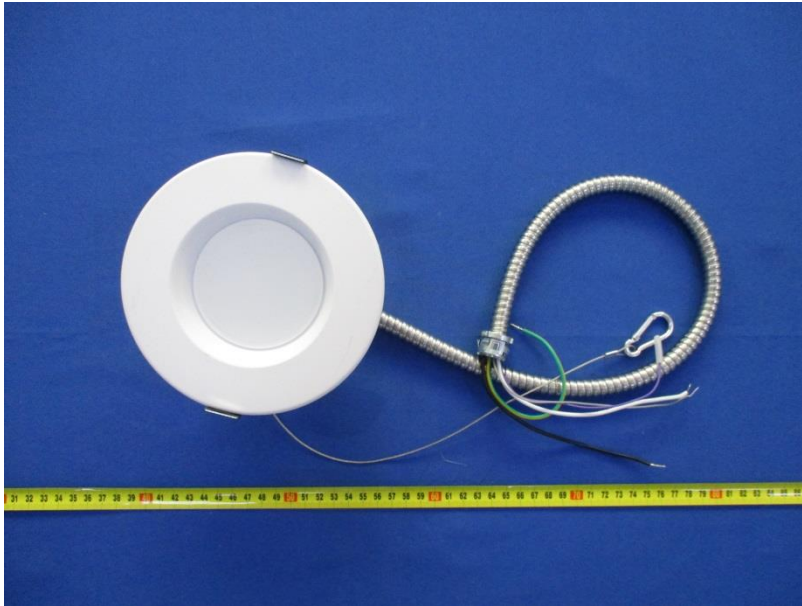
C y	180°	202.5°	225°	247.5°	270°	292.5°	315°	337.5°
0.0°	525	525	525	525	525	525	525	525
5.0°	523	524	522	521	522	520	521	520
10.0°	515	515	512	512	511	510	509	509
15.0°	501	499	498	496	495	493	492	491
20.0°	479	479	478	474	473	469	469	466
25.0°	453	451	449	446	444	441	440	439
30.0°	420	419	416	412	411	407	406	403
35.0°	383	380	377	373	370	367	366	363
40.0°	338	338	334	330	327	322	321	319
45.0°	292	290	288	285	280	277	275	272
50.0°	244	243	241	237	234	230	229	226
55.0°	197	196	194	190	187	185	182	180
60.0°	152	150	147	145	143	140	138	137
65.0°	107	106	104	102	100	99	98	97
70.0°	66	64	64	62	61	61	60	60
75.0°	32	31	27	30	30	30	30	30
80.0°	14	12	11	12	13	13	13	14
85.0°	2	2	1	1	2	3	3	4
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	0	0	0
180.0°	0	0	0	0	0	0	0	0

Zonal Lumen Density Measurement

Deg	Flux (lm)	%
0-5	12.5	1.07
5-10	37.0	3.16
10-15	59.8	5.11
15-20	80.0	6.83
20-25	96.6	8.25
25-30	108.9	9.29
30-35	116.1	9.91
35-40	117.8	10.05
40-45	114.2	9.75
45-50	105.9	9.04
50-55	93.7	8.00
55-60	78.7	6.72
60-65	61.7	5.26
65-70	43.6	3.72
70-75	26.2	2.23
75-80	12.9	1.10
80-85	5.0	0.42
85-90	1.0	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	12.5	1.07
0-10	49.5	4.23
0-15	109.3	9.33
0-20	189.3	16.16
0-25	286.0	24.41
0-30	394.8	33.70
0-35	510.9	43.61
0-40	628.7	53.66
0-45	742.9	63.41
0-50	848.7	72.45
0-55	942.5	80.45
0-60	1021.2	87.16
0-65	1082.8	92.43
0-70	1126.5	96.15
0-75	1152.6	98.39
0-80	1165.5	99.49
0-85	1170.5	99.91
0-90	1171.6	100.00
0-95	1171.6	100.00
0-100	1171.6	100.00
0-105	1171.6	100.00
0-110	1171.6	100.00
0-115	1171.6	100.00
0-120	1171.6	100.00
0-125	1171.6	100.00
0-130	1171.6	100.00
0-135	1171.6	100.00
0-140	1171.6	100.00
0-145	1171.6	100.00
0-150	1171.6	100.00
0-155	1171.6	100.00
0-160	1171.6	100.00
0-165	1171.6	100.00
0-170	1171.6	100.00
0-175	1171.6	100.00
0-180	1171.6	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*****