

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: INFT4/827/DIM010UNV

Report Type:	Electrical and Photometric tests including: Luminous Flux, Chromaticity, Luminous Intensity Distribution
Test Engineer:	Joker Gu
Report Number:	RKSB200515005-10-1
Test Date:	2020-05-18 to 2020-06-06
Report Date:	2020-06-18
Reviewed By:	Seven Xia/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 2020-05-15 and used for testing.

Model Tested: INFT4/827/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 60Hz
 Rated Power: 10W/7W/5W
 Nominal CCT: 2700K
 Nominal Lumen Output: 1020lm/715lm/510lm

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.

Note: All the UUTs were tested at Most Consumptive Settings

5. Test Result

[Integrating Sphere System]

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

Test orientation: **Downward**

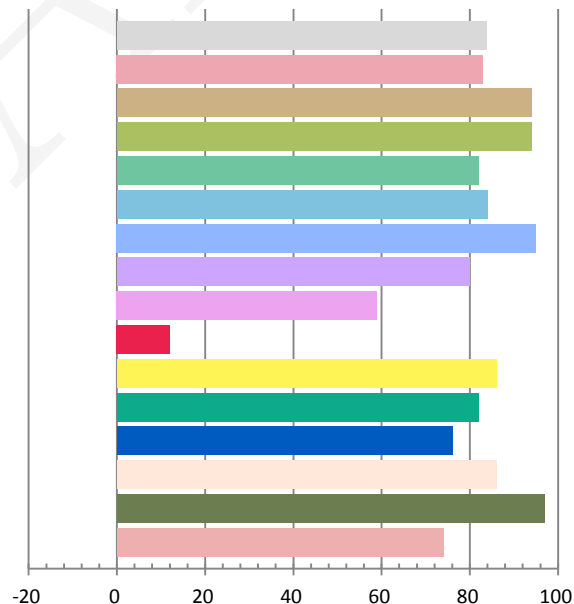
Photometric and Electrical Measurement Result

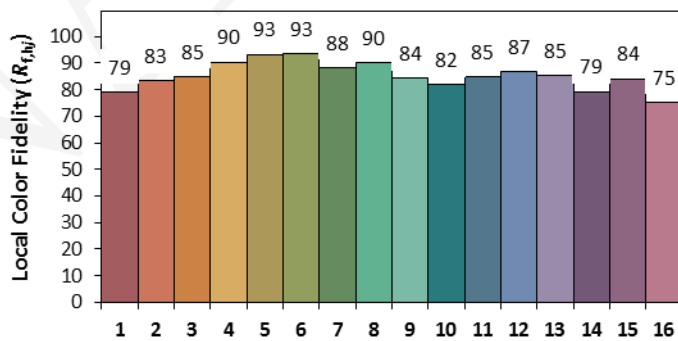
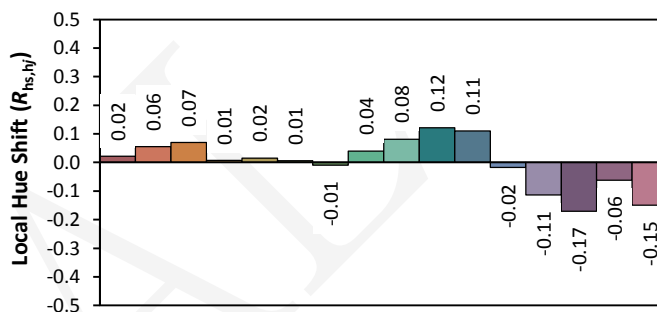
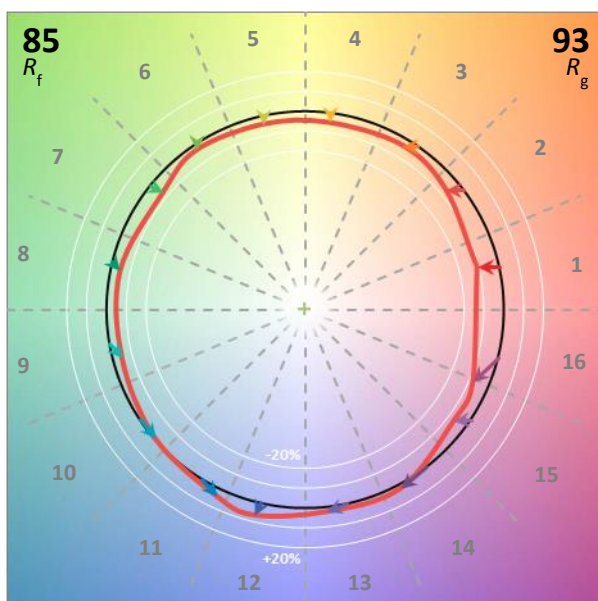
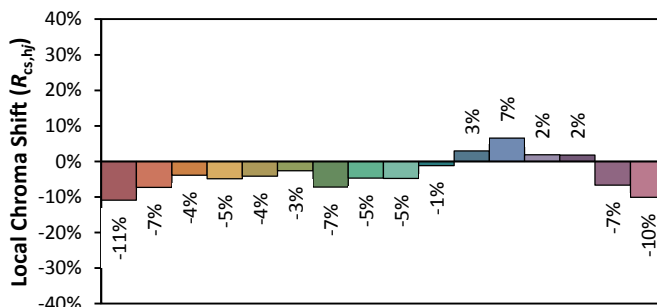
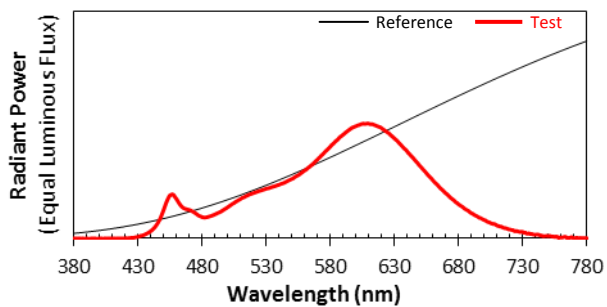
Voltage(V)	Frequency(Hz)	Current(A)	Power (W)	Power Factor	Luminous Flux(lm)	Efficacy(lm/W)
120	60	0.0887	10.52	0.9884	1080.01	102.66

Radiant Flux (W)	CCT (K)	Duv	x	y	u'	v'
3.323	2685	0.00130	0.4634	0.4149	0.2628	0.5295

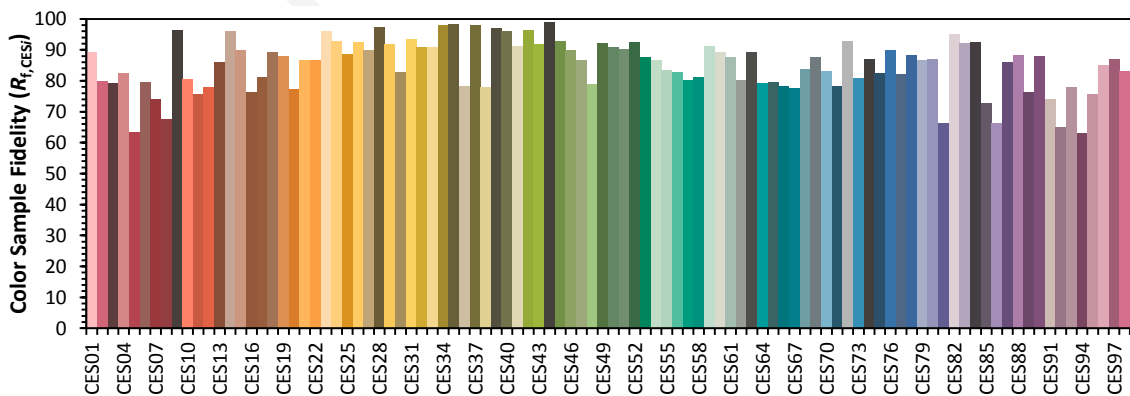
Color Rendering Index

Ra			
83.8			
R1	R2	R3	R4
83	94	94	82
R5	R6	R7	R8
84	95	80	59
R9	R10	R11	R12
12	86	82	76
R13	R14	R15	
86	97	74	

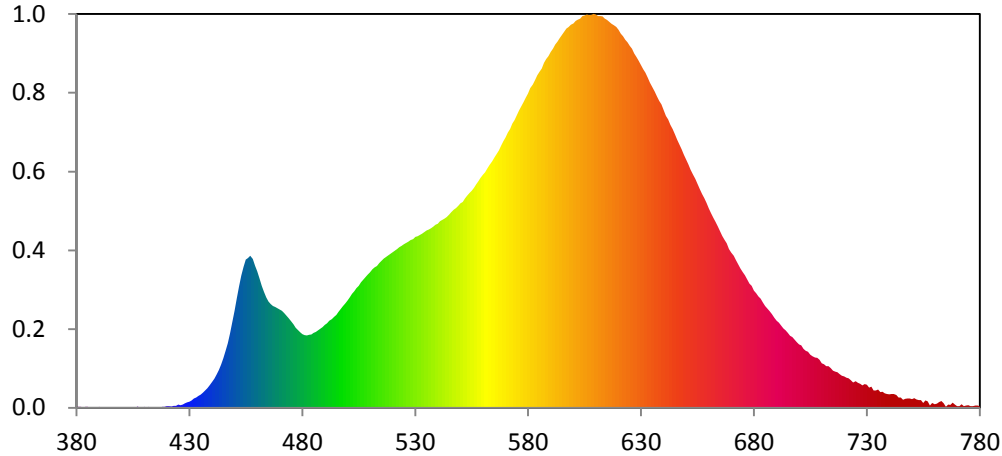




Hue-Angle Bin (j)



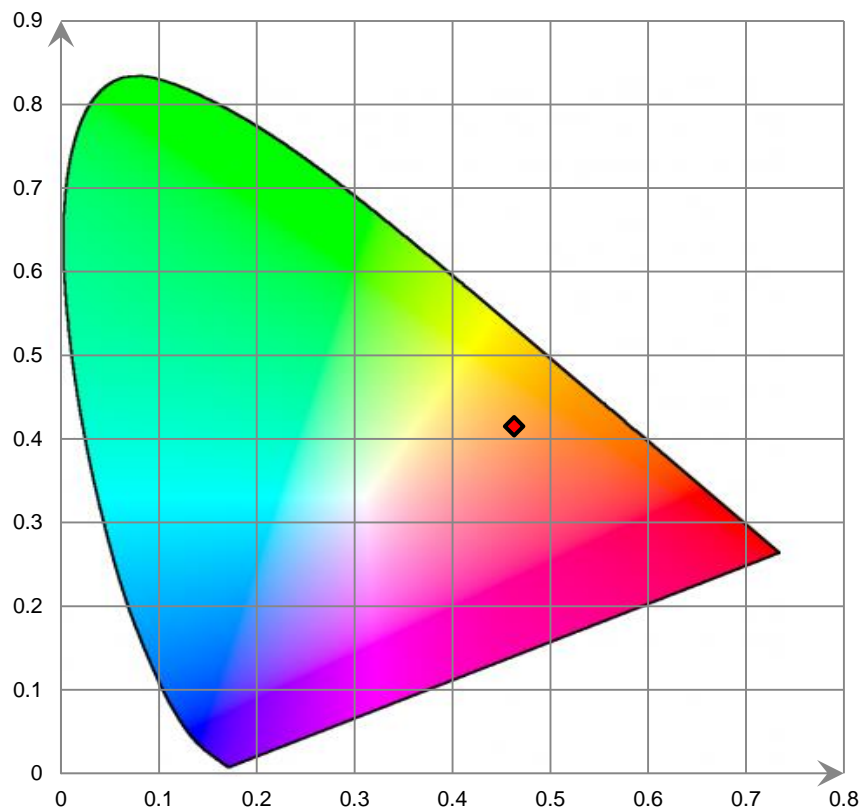
Relative Spectral Power Distribution



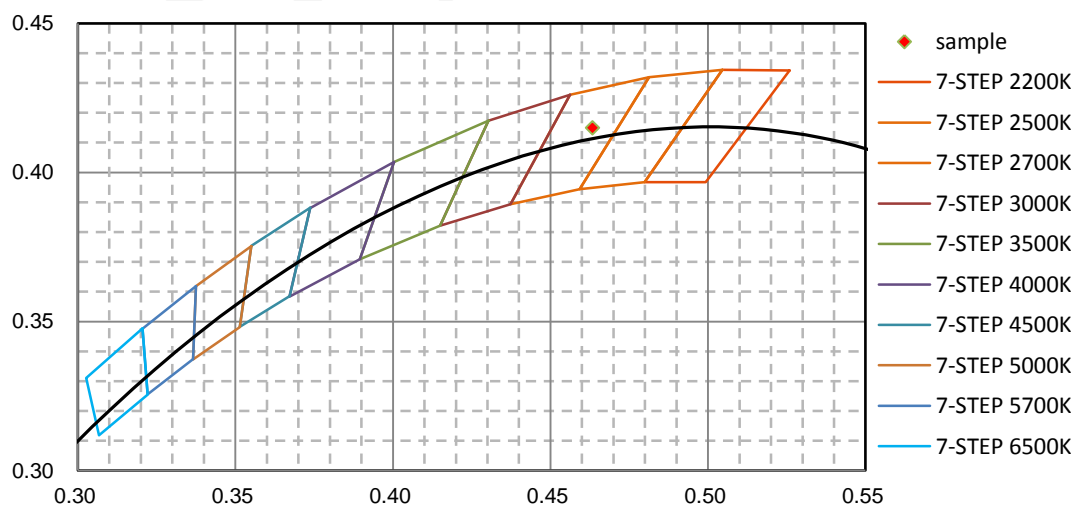
nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
380	4.940E-02	421	9.010E-02	462	7.428E+00	503	7.107E+00	544	1.162E+01
381	5.880E-02	422	6.780E-02	463	7.056E+00	504	7.294E+00	545	1.176E+01
382	5.810E-02	423	1.137E-01	464	6.732E+00	505	7.430E+00	546	1.191E+01
383	4.000E-03	424	1.187E-01	465	6.473E+00	506	7.638E+00	547	1.206E+01
384	5.020E-02	425	1.866E-01	466	6.326E+00	507	7.792E+00	548	1.216E+01
385	4.750E-02	426	1.527E-01	467	6.202E+00	508	7.957E+00	549	1.231E+01
386	5.800E-03	427	1.991E-01	468	6.146E+00	509	8.111E+00	550	1.246E+01
387	3.620E-02	428	2.632E-01	469	6.056E+00	510	8.251E+00	551	1.254E+01
388	1.840E-02	429	3.378E-01	470	5.992E+00	511	8.435E+00	552	1.276E+01
389	8.800E-03	430	3.744E-01	471	5.905E+00	512	8.554E+00	553	1.293E+01
390	5.710E-02	431	4.384E-01	472	5.763E+00	513	8.643E+00	554	1.309E+01
391	2.250E-02	432	5.687E-01	473	5.621E+00	514	8.824E+00	555	1.322E+01
392	6.200E-03	433	6.140E-01	474	5.457E+00	515	8.941E+00	556	1.339E+01
393	1.100E-03	434	7.099E-01	475	5.274E+00	516	9.079E+00	557	1.361E+01
394	1.260E-02	435	7.955E-01	476	5.096E+00	517	9.189E+00	558	1.380E+01
395	4.420E-02	436	9.126E-01	477	4.875E+00	518	9.288E+00	559	1.401E+01
396	1.750E-02	437	1.055E+00	478	4.729E+00	519	9.389E+00	560	1.419E+01
397	1.650E-02	438	1.191E+00	479	4.609E+00	520	9.482E+00	561	1.435E+01
398	4.900E-03	439	1.362E+00	480	4.492E+00	521	9.577E+00	562	1.459E+01
399	2.000E-04	440	1.569E+00	481	4.428E+00	522	9.678E+00	563	1.481E+01
400	0.000E+00	441	1.769E+00	482	4.406E+00	523	9.787E+00	564	1.502E+01
401	1.740E-02	442	2.018E+00	483	4.438E+00	524	9.865E+00	565	1.525E+01
402	2.170E-02	443	2.298E+00	484	4.473E+00	525	9.974E+00	566	1.546E+01
403	6.900E-03	444	2.633E+00	485	4.555E+00	526	1.003E+01	567	1.568E+01
404	3.350E-02	445	3.014E+00	486	4.630E+00	527	1.011E+01	568	1.598E+01
405	3.360E-02	446	3.460E+00	487	4.721E+00	528	1.021E+01	569	1.625E+01
406	6.700E-03	447	3.939E+00	488	4.819E+00	529	1.029E+01	570	1.648E+01
407	6.780E-02	448	4.535E+00	489	4.922E+00	530	1.042E+01	571	1.678E+01
408	1.620E-02	449	5.219E+00	490	5.041E+00	531	1.045E+01	572	1.700E+01
409	4.300E-02	450	5.899E+00	491	5.156E+00	532	1.053E+01	573	1.732E+01
410	6.210E-02	451	6.670E+00	492	5.303E+00	533	1.060E+01	574	1.753E+01
411	3.330E-02	452	7.393E+00	493	5.400E+00	534	1.070E+01	575	1.782E+01
412	5.600E-02	453	8.054E+00	494	5.544E+00	535	1.081E+01	576	1.811E+01
413	1.800E-03	454	8.578E+00	495	5.654E+00	536	1.087E+01	577	1.837E+01
414	3.240E-02	455	9.027E+00	496	5.856E+00	537	1.094E+01	578	1.863E+01
415	1.900E-02	456	9.134E+00	497	6.021E+00	538	1.104E+01	579	1.891E+01
416	3.080E-02	457	9.253E+00	498	6.193E+00	539	1.115E+01	580	1.915E+01
417	2.050E-02	458	9.073E+00	499	6.362E+00	540	1.121E+01	581	1.949E+01
418	5.940E-02	459	8.664E+00	500	6.526E+00	541	1.136E+01	582	1.970E+01
419	5.440E-02	460	8.302E+00	501	6.719E+00	542	1.144E+01	583	1.997E+01
420	9.180E-02	461	7.889E+00	502	6.937E+00	543	1.153E+01	584	2.026E+01

nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
585	2.047E+01	626	2.189E+01	667	1.024E+01	708	3.047E+00	749	5.606E-01
586	2.068E+01	627	2.159E+01	668	1.002E+01	709	2.914E+00	750	5.188E-01
587	2.102E+01	628	2.137E+01	669	9.681E+00	710	2.716E+00	751	5.906E-01
588	2.127E+01	629	2.114E+01	670	9.464E+00	711	2.644E+00	752	4.970E-01
589	2.144E+01	630	2.089E+01	671	9.256E+00	712	2.531E+00	753	4.594E-01
590	2.168E+01	631	2.063E+01	672	8.993E+00	713	2.537E+00	754	4.632E-01
591	2.188E+01	632	2.043E+01	673	8.743E+00	714	2.407E+00	755	3.012E-01
592	2.214E+01	633	2.014E+01	674	8.473E+00	715	2.263E+00	756	4.473E-01
593	2.231E+01	634	1.981E+01	675	8.265E+00	716	2.205E+00	757	3.945E-01
594	2.253E+01	635	1.956E+01	676	8.077E+00	717	2.170E+00	758	1.268E-01
595	2.273E+01	636	1.926E+01	677	7.828E+00	718	2.050E+00	759	2.812E-01
596	2.292E+01	637	1.898E+01	678	7.558E+00	719	1.939E+00	760	2.131E-01
597	2.311E+01	638	1.871E+01	679	7.424E+00	720	1.911E+00	761	2.540E-01
598	2.321E+01	639	1.849E+01	680	7.142E+00	721	1.825E+00	762	3.439E-01
599	2.334E+01	640	1.815E+01	681	6.988E+00	722	1.790E+00	763	4.090E-01
600	2.343E+01	641	1.780E+01	682	6.793E+00	723	1.683E+00	764	2.651E-01
601	2.357E+01	642	1.756E+01	683	6.641E+00	724	1.532E+00	765	5.220E-02
602	2.366E+01	643	1.723E+01	684	6.415E+00	725	1.608E+00	766	1.858E-01
603	2.371E+01	644	1.699E+01	685	6.198E+00	726	1.528E+00	767	1.790E-01
604	2.388E+01	645	1.668E+01	686	6.039E+00	727	1.453E+00	768	3.191E-01
605	2.392E+01	646	1.635E+01	687	5.886E+00	728	1.374E+00	769	1.915E-01
606	2.397E+01	647	1.606E+01	688	5.720E+00	729	1.443E+00	770	9.260E-02
607	2.392E+01	648	1.576E+01	689	5.475E+00	730	1.406E+00	771	1.025E-01
608	2.396E+01	649	1.542E+01	690	5.296E+00	731	1.223E+00	772	2.203E-01
609	2.400E+01	650	1.512E+01	691	5.179E+00	732	1.293E+00	773	1.038E-01
610	2.397E+01	651	1.485E+01	692	5.007E+00	733	1.050E+00	774	1.243E-01
611	2.388E+01	652	1.451E+01	693	4.831E+00	734	1.044E+00	775	1.600E-01
612	2.387E+01	653	1.424E+01	694	4.715E+00	735	1.104E+00	776	9.250E-02
613	2.385E+01	654	1.395E+01	695	4.559E+00	736	9.605E-01	777	9.530E-02
614	2.372E+01	655	1.363E+01	696	4.388E+00	737	9.700E-01	778	1.339E-01
615	2.364E+01	656	1.331E+01	697	4.317E+00	738	8.772E-01	779	1.384E-01
616	2.351E+01	657	1.303E+01	698	4.155E+00	739	8.325E-01	780	9.540E-02
617	2.340E+01	658	1.277E+01	699	4.006E+00	740	8.121E-01		
618	2.331E+01	659	1.248E+01	700	3.870E+00	741	8.442E-01		
619	2.322E+01	660	1.214E+01	701	3.805E+00	742	8.357E-01		
620	2.304E+01	661	1.185E+01	702	3.588E+00	743	7.744E-01		
621	2.280E+01	662	1.158E+01	703	3.464E+00	744	6.248E-01		
622	2.264E+01	663	1.133E+01	704	3.415E+00	745	6.318E-01		
623	2.242E+01	664	1.105E+01	705	3.233E+00	746	4.820E-01		
624	2.228E+01	665	1.076E+01	706	3.139E+00	747	5.361E-01		
625	2.205E+01	666	1.047E+01	707	3.061E+00	748	5.568E-01		

CIE 1931xy Chromaticity Diagram



7-Step Chromaticity Quadrangles



[Goniophotometer System]

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

Test orientation: **Downward**

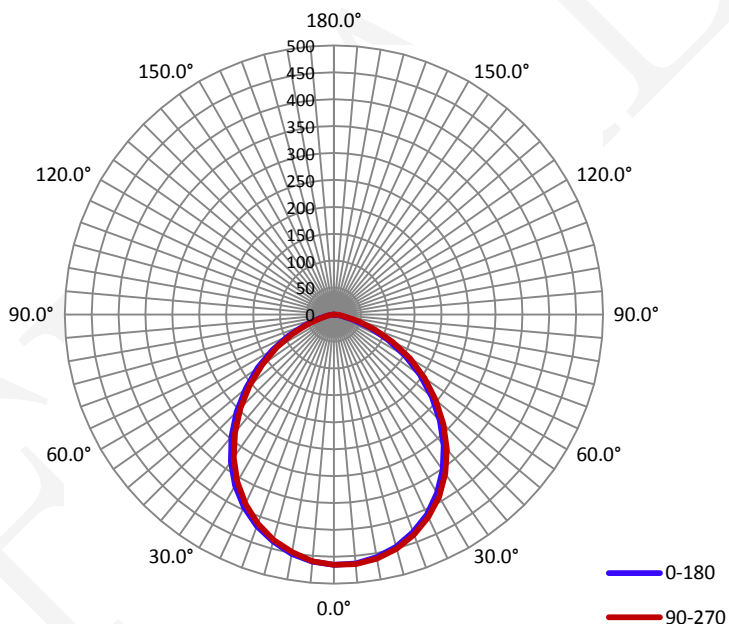
Electrical Measurement

Input Voltage(V)	Frequency(Hz)	Input Current(A)	Power (W)	Power Factor
120.0	60	0.0890	10.57	0.9910

Photometric Measurement

Luminous Flux(lm)	Efficacy(lm/W)	$I_{max}(cd)$	S/MH(C0/180)	S/MH(C90/270)
1085.6	102.76	465.2	1.20	1.20

Luminous Intensity Distribution



	C0/180	C45/225	C90/270	C135/315	AVG.
Beam Angle(50% I_{max}):	98.4	98.3	98.3	98.1	98.3
Field Angle(10% I_{max}):	145.6	145.5	145.7	145.9	145.7

Luminous Intensity (cd) Distribution Data

C y	0°	22.5°	45°	67.5°	90°	112.5°	135°	157.5°
0.0°	465	465	465	465	465	465	465	465
5.0°	464	464	465	465	465	464	463	462
10.0°	458	459	461	461	461	458	457	454
15.0°	447	449	451	451	450	448	445	442
20.0°	430	434	436	436	435	432	428	424
25.0°	410	414	416	416	415	412	408	402
30.0°	383	388	392	393	391	387	382	376
35.0°	352	358	361	362	361	356	351	344
40.0°	317	323	327	328	327	321	316	307
45.0°	278	285	289	290	288	282	275	268
50.0°	238	244	248	249	247	242	234	226
55.0°	195	201	206	207	205	200	192	184
60.0°	153	159	163	164	163	158	151	144
65.0°	111	117	121	122	121	117	111	104
70.0°	71	77	80	82	81	79	73	68
75.0°	37	40	44	46	46	44	41	37
80.0°	16	18	19	20	20	19	18	16
85.0°	7	7	9	9	9	9	8	7
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.)

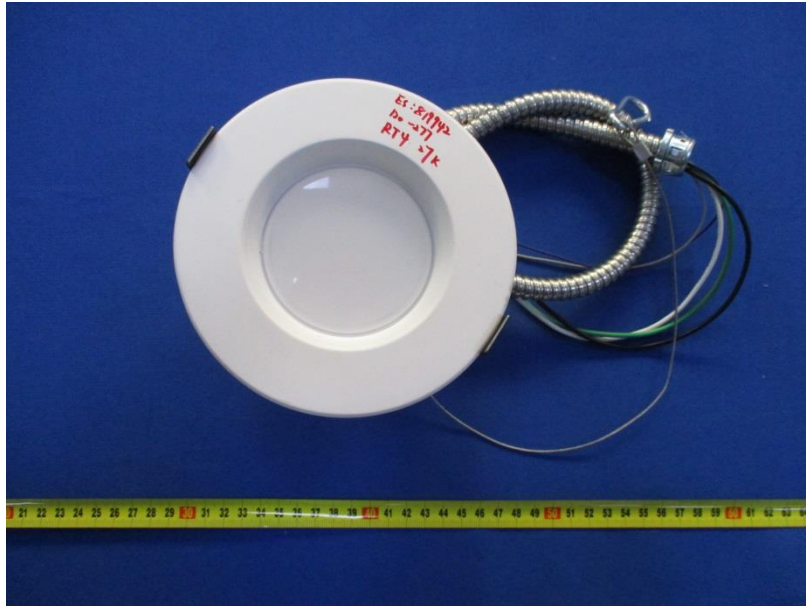
C y	180°	202.5°	225°	247.5°	270°	292.5°	315°	337.5°
0.0°	465	465	465	465	465	465	465	465
5.0°	461	459	459	459	460	460	461	462
10.0°	451	449	448	448	448	449	453	455
15.0°	437	434	432	431	433	435	439	441
20.0°	418	414	413	411	413	415	419	424
25.0°	395	390	388	387	388	392	396	401
30.0°	367	362	358	357	359	362	367	374
35.0°	333	328	324	323	325	328	334	341
40.0°	296	290	286	284	286	290	297	304
45.0°	256	250	245	243	246	250	257	264
50.0°	214	207	204	201	204	208	216	223
55.0°	172	166	163	162	163	168	174	182
60.0°	132	126	123	122	123	127	133	141
65.0°	94	88	85	83	85	89	94	100
70.0°	58	54	51	49	51	53	57	61
75.0°	30	27	25	24	24	25	27	30
80.0°	14	13	12	11	11	12	13	15
85.0°	5	4	4	2	2	2	4	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

Zonal Lumen Density Measurement

Deg	Flux (lm)	%
0-5	11.1	1.02
5-10	32.8	3.02
10-15	53.1	4.90
15-20	71.3	6.57
20-25	86.6	7.98
25-30	98.3	9.05
30-35	105.6	9.73
35-40	108.2	9.97
40-45	106.0	9.77
45-50	99.4	9.15
50-55	88.9	8.19
55-60	75.5	6.95
60-65	59.6	5.49
65-70	42.5	3.92
70-75	26.0	2.39
75-80	13.3	1.22
80-85	5.8	0.53
85-90	1.6	0.14
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	11.1	1.02
0-10	43.9	4.04
0-15	97.0	8.94
0-20	168.3	15.51
0-25	254.9	23.48
0-30	353.2	32.54
0-35	458.8	42.26
0-40	567.0	52.23
0-45	673.1	62.00
0-50	772.4	71.15
0-55	861.4	79.35
0-60	936.8	86.30
0-65	996.5	91.79
0-70	1039.0	95.71
0-75	1065.0	98.10
0-80	1078.3	99.32
0-85	1084.0	99.86
0-90	1085.6	100.00
0-95	1085.6	100.00
0-100	1085.6	100.00
0-105	1085.6	100.00
0-110	1085.6	100.00
0-115	1085.6	100.00
0-120	1085.6	100.00
0-125	1085.6	100.00
0-130	1085.6	100.00
0-135	1085.6	100.00
0-140	1085.6	100.00
0-145	1085.6	100.00
0-150	1085.6	100.00
0-155	1085.6	100.00
0-160	1085.6	100.00
0-165	1085.6	100.00
0-170	1085.6	100.00
0-175	1085.6	100.00
0-180	1085.6	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*****