

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: INFT4/835/DIM120V

Report Type:	Electrical and Photometric tests including: Luminous Flux, Chromaticity, Luminous Intensity Distribution
Test Engineer:	George Yang
Report Number:	PKS200708081-10
Test Date:	2020-07-08 to 2020-07-14
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: INFT4/835/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: 10W
 Nominal CCT: 3500K
 Nominal Lumen Output: 1070lm

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**

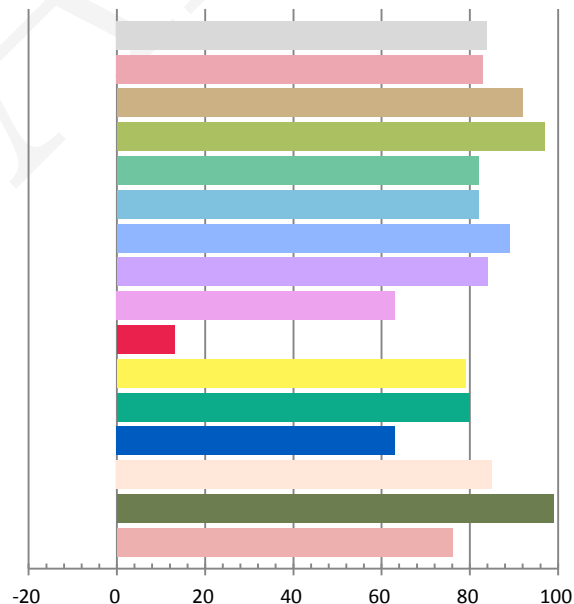
Photometric and Electrical Measurement Result

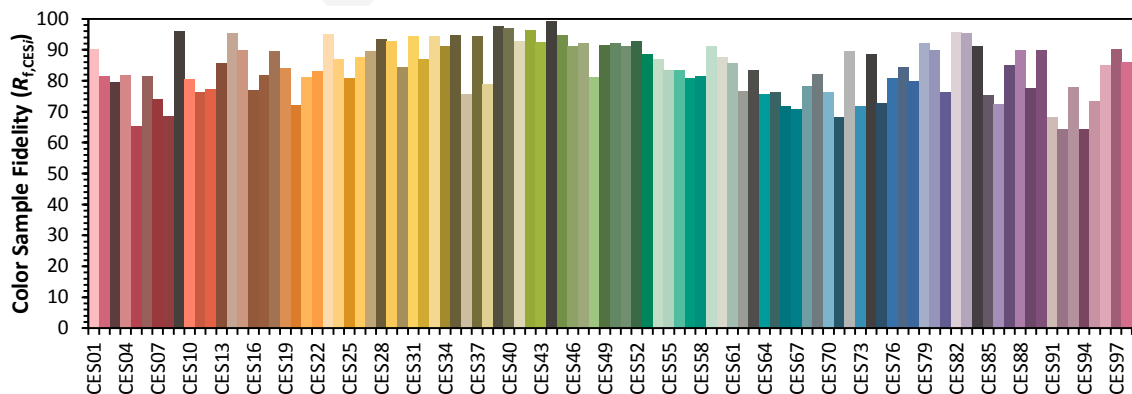
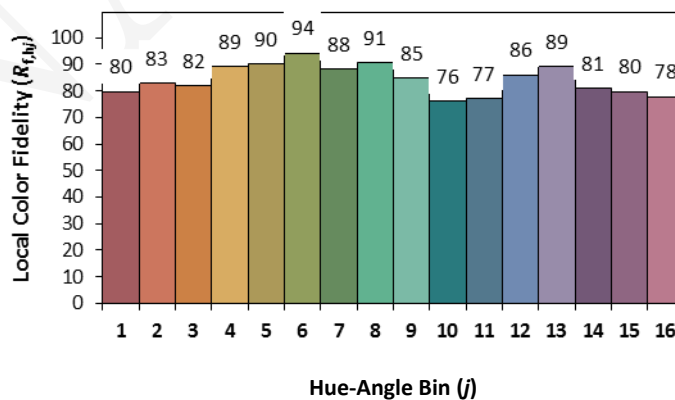
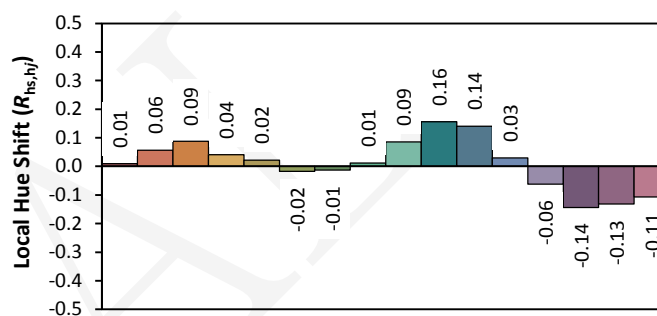
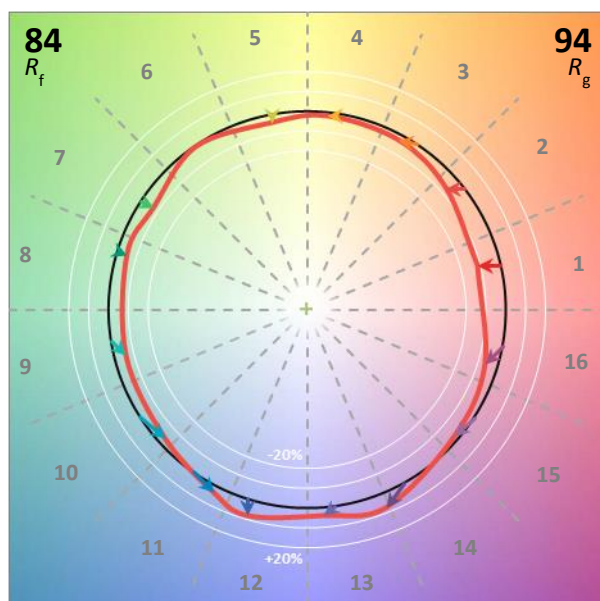
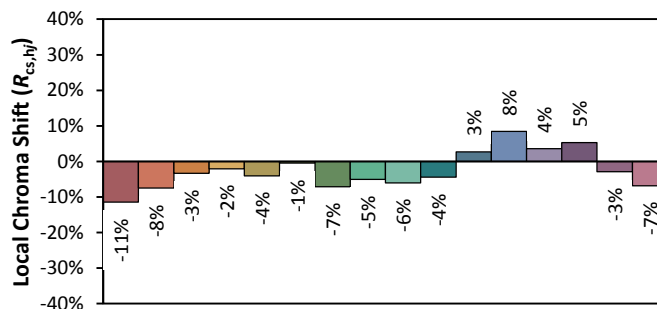
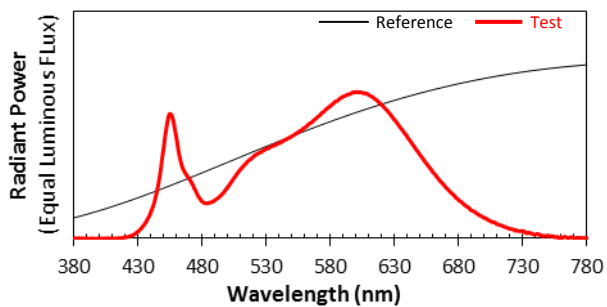
Voltage(V)	Frequency(Hz)	Current(A)	Power (W)	Power Factor	Luminous Flux(lm)	Efficacy(lm/W)
120.02	60	0.0872	9.97	0.9519	1153.57	115.73

Radiant Flux (W)	CCT (K)	Duv	x	y	u'	v'
3.466	3396	0.00078	0.4122	0.3959	0.2380	0.5144

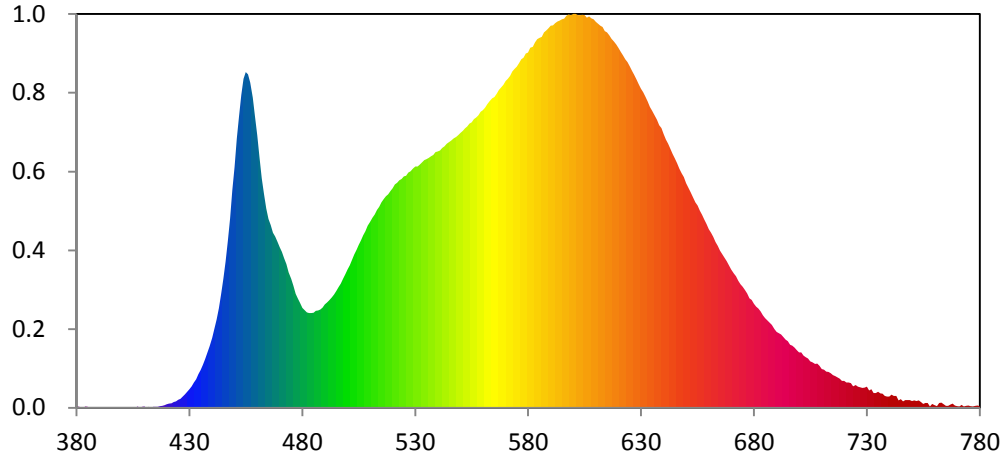
Color Rendering Index

Ra			
83.9			
R1	R2	R3	R4
83	92	97	82
R5	R6	R7	R8
82	89	84	63
R9	R10	R11	R12
13	79	80	63
R13	R14	R15	
85	99	76	





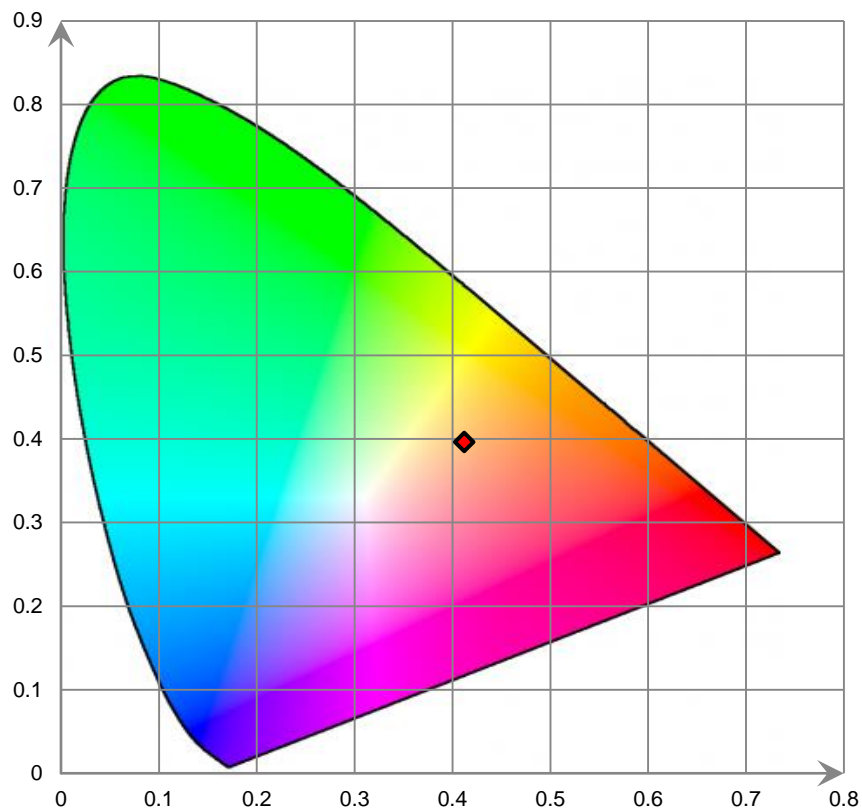
Relative Spectral Power Distribution



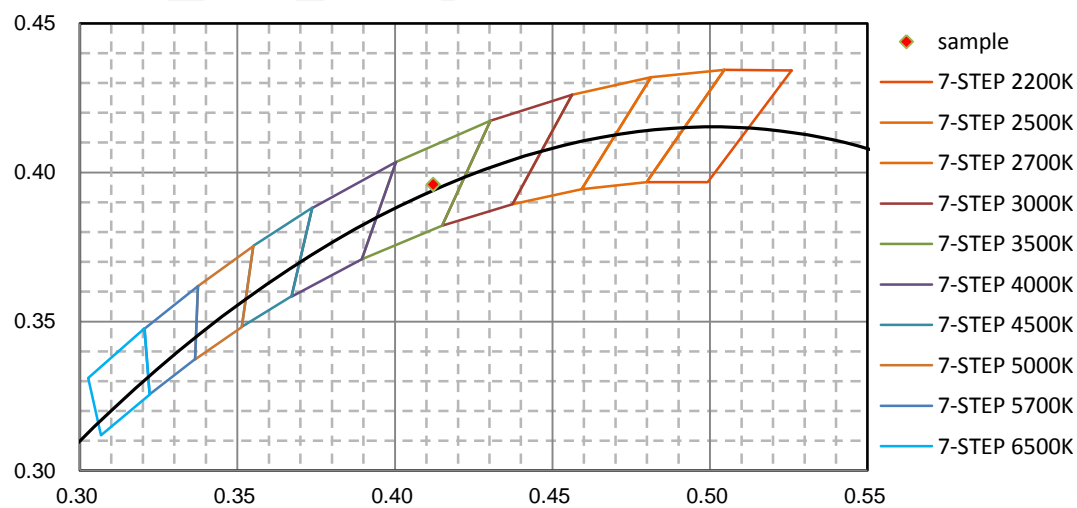
nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
380	3.100E-02	421	2.230E-01	462	1.269E+01	503	8.466E+00	544	1.458E+01
381	6.720E-02	422	2.406E-01	463	1.181E+01	504	8.718E+00	545	1.467E+01
382	3.440E-02	423	3.187E-01	464	1.101E+01	505	8.997E+00	546	1.476E+01
383	4.700E-03	424	3.601E-01	465	1.043E+01	506	9.256E+00	547	1.489E+01
384	7.080E-02	425	4.448E-01	466	1.010E+01	507	9.538E+00	548	1.496E+01
385	4.930E-02	426	4.951E-01	467	9.677E+00	508	9.767E+00	549	1.507E+01
386	5.900E-03	427	6.094E-01	468	9.467E+00	509	1.006E+01	550	1.520E+01
387	3.360E-02	428	7.386E-01	469	9.179E+00	510	1.025E+01	551	1.529E+01
388	4.200E-02	429	8.880E-01	470	8.882E+00	511	1.050E+01	552	1.543E+01
389	5.900E-03	430	1.027E+00	471	8.610E+00	512	1.069E+01	553	1.555E+01
390	3.470E-02	431	1.191E+00	472	8.248E+00	513	1.093E+01	554	1.569E+01
391	1.890E-02	432	1.400E+00	473	7.942E+00	514	1.110E+01	555	1.577E+01
392	1.000E-03	433	1.574E+00	474	7.471E+00	515	1.134E+01	556	1.595E+01
393	1.000E-04	434	1.851E+00	475	7.129E+00	516	1.153E+01	557	1.604E+01
394	8.300E-03	435	2.075E+00	476	6.732E+00	517	1.169E+01	558	1.616E+01
395	4.140E-02	436	2.363E+00	477	6.294E+00	518	1.179E+01	559	1.635E+01
396	1.740E-02	437	2.682E+00	478	6.032E+00	519	1.198E+01	560	1.644E+01
397	3.500E-03	438	3.043E+00	479	5.782E+00	520	1.214E+01	561	1.658E+01
398	3.000E-04	439	3.389E+00	480	5.517E+00	521	1.234E+01	562	1.678E+01
399	0.000E+00	440	3.861E+00	481	5.400E+00	522	1.243E+01	563	1.695E+01
400	0.000E+00	441	4.359E+00	482	5.268E+00	523	1.258E+01	564	1.709E+01
401	1.850E-02	442	4.871E+00	483	5.236E+00	524	1.265E+01	565	1.718E+01
402	2.570E-02	443	5.495E+00	484	5.240E+00	525	1.279E+01	566	1.734E+01
403	1.540E-02	444	6.282E+00	485	5.253E+00	526	1.281E+01	567	1.756E+01
404	2.470E-02	445	7.122E+00	486	5.363E+00	527	1.299E+01	568	1.769E+01
405	3.460E-02	446	8.075E+00	487	5.369E+00	528	1.307E+01	569	1.784E+01
406	6.000E-03	447	9.204E+00	488	5.434E+00	529	1.322E+01	570	1.806E+01
407	7.390E-02	448	1.045E+01	489	5.528E+00	530	1.333E+01	571	1.817E+01
408	6.000E-03	449	1.202E+01	490	5.714E+00	531	1.334E+01	572	1.833E+01
409	5.200E-02	450	1.329E+01	491	5.814E+00	532	1.344E+01	573	1.858E+01
410	6.010E-02	451	1.486E+01	492	5.948E+00	533	1.357E+01	574	1.872E+01
411	3.340E-02	452	1.610E+01	493	6.093E+00	534	1.368E+01	575	1.884E+01
412	4.930E-02	453	1.728E+01	494	6.255E+00	535	1.374E+01	576	1.905E+01
413	1.520E-02	454	1.817E+01	495	6.450E+00	536	1.380E+01	577	1.925E+01
414	4.570E-02	455	1.855E+01	496	6.657E+00	537	1.390E+01	578	1.935E+01
415	4.340E-02	456	1.843E+01	497	6.861E+00	538	1.397E+01	579	1.957E+01
416	4.550E-02	457	1.797E+01	498	7.118E+00	539	1.413E+01	580	1.962E+01
417	8.240E-02	458	1.714E+01	499	7.369E+00	540	1.417E+01	581	1.988E+01
418	1.118E-01	459	1.608E+01	500	7.633E+00	541	1.421E+01	582	1.995E+01
419	1.342E-01	460	1.504E+01	501	7.865E+00	542	1.436E+01	583	2.019E+01
420	1.881E-01	461	1.383E+01	502	8.174E+00	543	1.444E+01	584	2.037E+01

nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
585	2.043E+01	626	1.862E+01	667	8.295E+00	708	2.443E+00	749	4.165E-01
586	2.049E+01	627	1.838E+01	668	8.093E+00	709	2.319E+00	750	3.605E-01
587	2.073E+01	628	1.814E+01	669	7.864E+00	710	2.139E+00	751	3.978E-01
588	2.084E+01	629	1.788E+01	670	7.635E+00	711	2.105E+00	752	3.767E-01
589	2.096E+01	630	1.764E+01	671	7.434E+00	712	1.998E+00	753	3.978E-01
590	2.111E+01	631	1.744E+01	672	7.264E+00	713	1.986E+00	754	3.185E-01
591	2.112E+01	632	1.718E+01	673	7.026E+00	714	1.913E+00	755	2.056E-01
592	2.125E+01	633	1.692E+01	674	6.827E+00	715	1.795E+00	756	2.550E-01
593	2.135E+01	634	1.661E+01	675	6.680E+00	716	1.753E+00	757	2.725E-01
594	2.139E+01	635	1.640E+01	676	6.499E+00	717	1.677E+00	758	6.110E-02
595	2.146E+01	636	1.615E+01	677	6.313E+00	718	1.614E+00	759	2.121E-01
596	2.151E+01	637	1.592E+01	678	6.041E+00	719	1.491E+00	760	1.318E-01
597	2.166E+01	638	1.561E+01	679	5.950E+00	720	1.485E+00	761	9.180E-02
598	2.173E+01	639	1.545E+01	680	5.738E+00	721	1.389E+00	762	2.660E-01
599	2.169E+01	640	1.511E+01	681	5.580E+00	722	1.396E+00	763	2.755E-01
600	2.176E+01	641	1.482E+01	682	5.477E+00	723	1.357E+00	764	1.932E-01
601	2.176E+01	642	1.459E+01	683	5.312E+00	724	1.175E+00	765	9.890E-02
602	2.170E+01	643	1.431E+01	684	5.113E+00	725	1.258E+00	766	1.063E-01
603	2.170E+01	644	1.403E+01	685	4.953E+00	726	1.161E+00	767	1.765E-01
604	2.171E+01	645	1.377E+01	686	4.820E+00	727	1.124E+00	768	2.339E-01
605	2.169E+01	646	1.352E+01	687	4.696E+00	728	1.100E+00	769	1.170E-01
606	2.155E+01	647	1.321E+01	688	4.586E+00	729	1.112E+00	770	8.420E-02
607	2.162E+01	648	1.296E+01	689	4.346E+00	730	1.169E+00	771	7.470E-02
608	2.152E+01	649	1.274E+01	690	4.179E+00	731	9.439E-01	772	1.569E-01
609	2.147E+01	650	1.242E+01	691	4.126E+00	732	1.028E+00	773	6.020E-02
610	2.133E+01	651	1.217E+01	692	4.049E+00	733	8.070E-01	774	1.029E-01
611	2.122E+01	652	1.192E+01	693	3.906E+00	734	8.155E-01	775	1.138E-01
612	2.111E+01	653	1.166E+01	694	3.758E+00	735	8.893E-01	776	8.970E-02
613	2.103E+01	654	1.136E+01	695	3.672E+00	736	8.011E-01	777	7.160E-02
614	2.082E+01	655	1.117E+01	696	3.481E+00	737	7.760E-01	778	1.017E-01
615	2.073E+01	656	1.089E+01	697	3.432E+00	738	6.526E-01	779	1.206E-01
616	2.057E+01	657	1.065E+01	698	3.325E+00	739	6.083E-01	780	9.140E-02
617	2.039E+01	658	1.039E+01	699	3.187E+00	740	6.083E-01		
618	2.023E+01	659	1.015E+01	700	3.060E+00	741	7.167E-01		
619	2.006E+01	660	9.859E+00	701	3.061E+00	742	6.470E-01		
620	1.988E+01	661	9.676E+00	702	2.886E+00	743	6.497E-01		
621	1.967E+01	662	9.439E+00	703	2.784E+00	744	4.086E-01		
622	1.947E+01	663	9.165E+00	704	2.716E+00	745	4.695E-01		
623	1.925E+01	664	8.944E+00	705	2.560E+00	746	3.600E-01		
624	1.909E+01	665	8.688E+00	706	2.507E+00	747	4.211E-01		
625	1.887E+01	666	8.478E+00	707	2.427E+00	748	4.252E-01		

CIE 1931xy Chromaticity Diagram



7-Step Chromaticity Quadrangles



[Goniophotometer System]

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

Test orientation: **Downward**

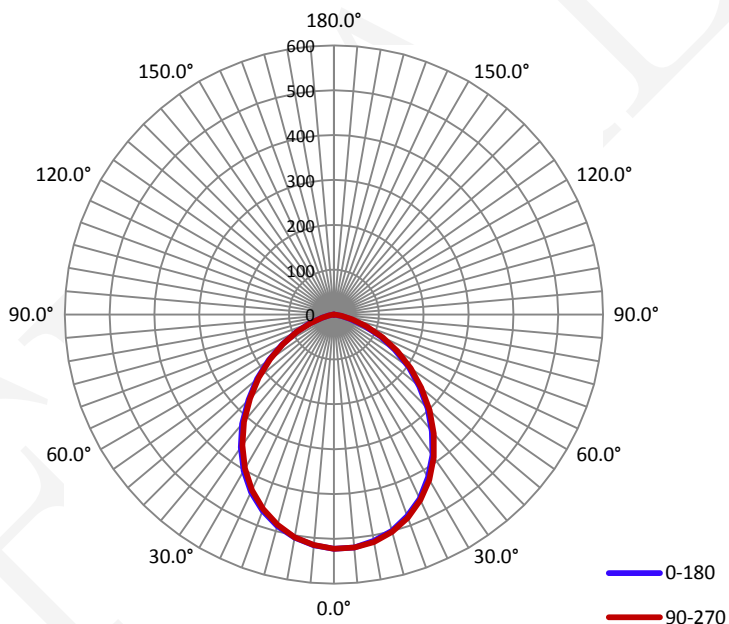
Electrical Measurement

Input Voltage(V)	Frequency(Hz)	Input Current(A)	Power (W)	Power Factor
120.0	60	0.0870	10.04	0.9560

Photometric Measurement

Luminous Flux(lm)	Efficacy(lm/W)	$I_{max}(cd)$	S/MH(C0/180)	S/MH(C90/270)
1162.3	115.82	522.0	1.18	1.18

Luminous Intensity Distribution



	C0/180	C45/225	C90/270	C135/315	AVG.
Beam Angle(50% I_{max}):	94.7	94.8	94.7	94.7	94.7
Field Angle(10% I_{max}):	143.6	143.8	144.2	144.4	144.0

Luminous Intensity (cd) Distribution Data

C y	0°	22.5°	45°	67.5°	90°	112.5°	135°	157.5°
0.0°	522	522	522	522	522	522	522	522
5.0°	521	521	522	521	521	520	519	519
10.0°	512	514	515	515	515	513	511	509
15.0°	499	501	503	502	501	499	496	493
20.0°	478	483	484	483	482	479	476	472
25.0°	453	456	458	458	457	453	449	444
30.0°	419	424	426	427	426	421	417	412
35.0°	383	387	390	390	388	384	379	373
40.0°	340	345	348	349	346	341	336	329
45.0°	296	300	303	303	302	296	290	283
50.0°	249	254	257	258	255	250	243	236
55.0°	203	207	211	211	209	204	197	190
60.0°	157	162	164	165	163	158	153	146
65.0°	114	118	120	121	120	116	112	106
70.0°	73	76	79	79	78	76	72	67
75.0°	37	39	42	43	42	40	38	35
80.0°	16	17	18	18	18	17	16	15
85.0°	5	6	6	7	6	6	5	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

Luminous Intensity (cd) Distribution Data (cont.)

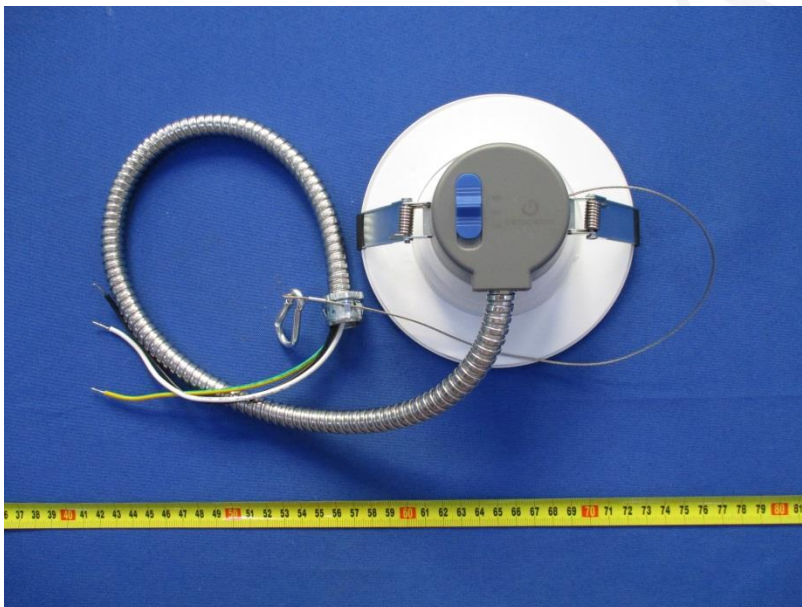
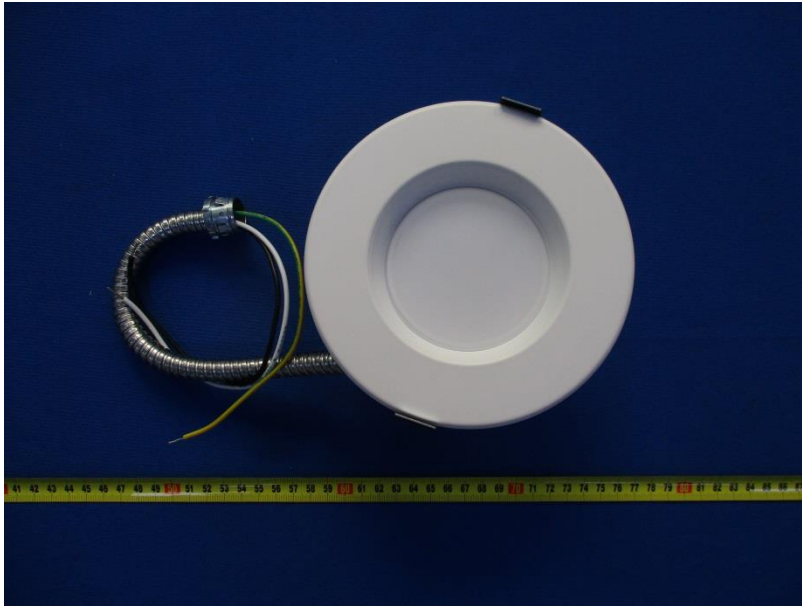
C y	180°	202.5°	225°	247.5°	270°	292.5°	315°	337.5°
0.0°	522	522	522	522	522	522	522	522
5.0°	516	516	515	515	516	516	518	519
10.0°	505	504	502	503	504	505	507	510
15.0°	488	486	483	484	485	487	491	494
20.0°	465	461	460	459	461	463	468	472
25.0°	436	433	430	430	432	434	439	444
30.0°	402	398	395	394	396	399	404	410
35.0°	362	357	355	354	356	359	365	371
40.0°	318	312	310	309	312	314	321	328
45.0°	270	266	263	262	264	269	276	282
50.0°	223	218	217	216	218	223	228	235
55.0°	177	173	171	170	173	177	183	190
60.0°	133	130	128	128	131	134	139	145
65.0°	93	91	89	89	92	94	99	104
70.0°	57	55	54	54	56	58	62	64
75.0°	28	27	26	26	27	28	30	31
80.0°	12	12	12	12	12	13	14	15
85.0°	1	1	1	1	2	2	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	12.4	1.07
5-10	36.8	3.16
10-15	59.4	5.11
15-20	79.5	6.84
20-25	96.0	8.26
25-30	108.2	9.31
30-35	115.2	9.92
35-40	116.9	10.06
40-45	113.2	9.74
45-50	104.9	9.02
50-55	92.8	7.98
55-60	77.8	6.69
60-65	60.9	5.24
65-70	43.2	3.72
70-75	26.0	2.24
75-80	12.9	1.11
80-85	5.0	0.43
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	12.4	1.07
0-10	49.2	4.23
0-15	108.6	9.35
0-20	188.1	16.19
0-25	284.2	24.45
0-30	392.4	33.76
0-35	507.6	43.67
0-40	624.5	53.73
0-45	737.7	63.47
0-50	842.6	72.49
0-55	935.4	80.48
0-60	1013.2	87.17
0-65	1074.1	92.41
0-70	1117.3	96.13
0-75	1143.3	98.37
0-80	1156.2	99.48
0-85	1161.3	99.91
0-90	1162.3	100.00
0-95	1162.3	100.00
0-100	1162.3	100.00
0-105	1162.3	100.00
0-110	1162.3	100.00
0-115	1162.3	100.00
0-120	1162.3	100.00
0-125	1162.3	100.00
0-130	1162.3	100.00
0-135	1162.3	100.00
0-140	1162.3	100.00
0-145	1162.3	100.00
0-150	1162.3	100.00
0-155	1162.3	100.00
0-160	1162.3	100.00
0-165	1162.3	100.00
0-170	1162.3	100.00
0-175	1162.3	100.00
0-180	1162.3	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*****