

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: INFT4/830/DIM010UNV

Report Type:	Electrical and Photometric tests including: Luminous Flux, Chromaticity, Luminous Intensity Distribution
Test Engineer:	George Yang
Report Number:	PKS200825080-10
Test Date:	2020-08-27 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: INFT4/830/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: 3000K
 Nominal Lumen Output: 1050lm

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**

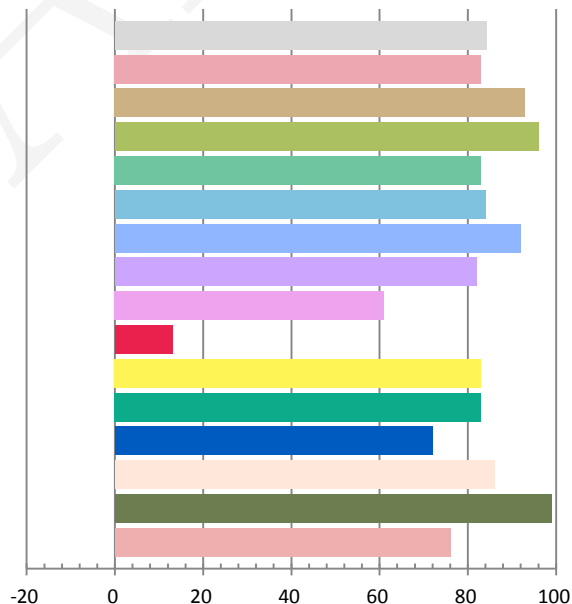
Photometric and Electrical Measurement Result

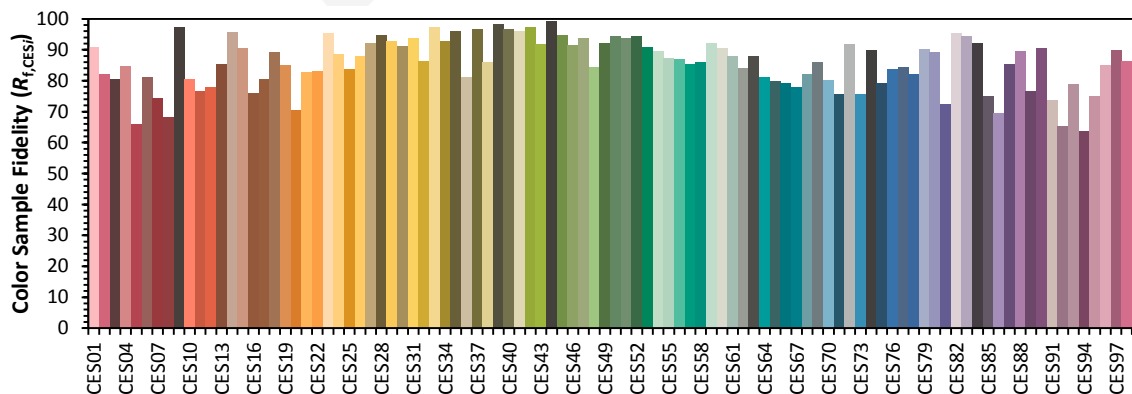
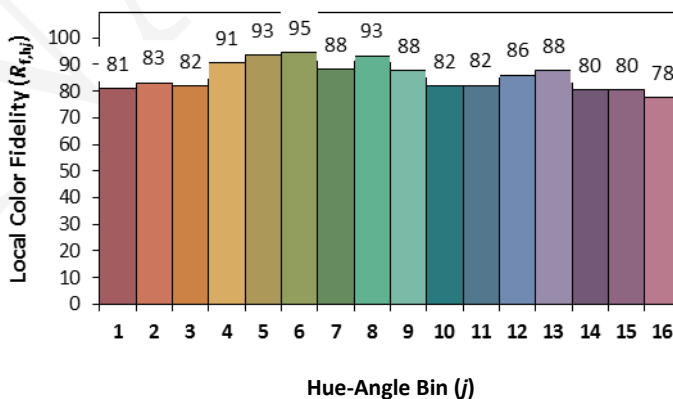
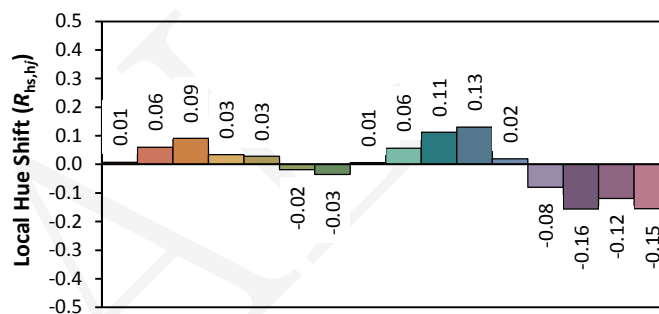
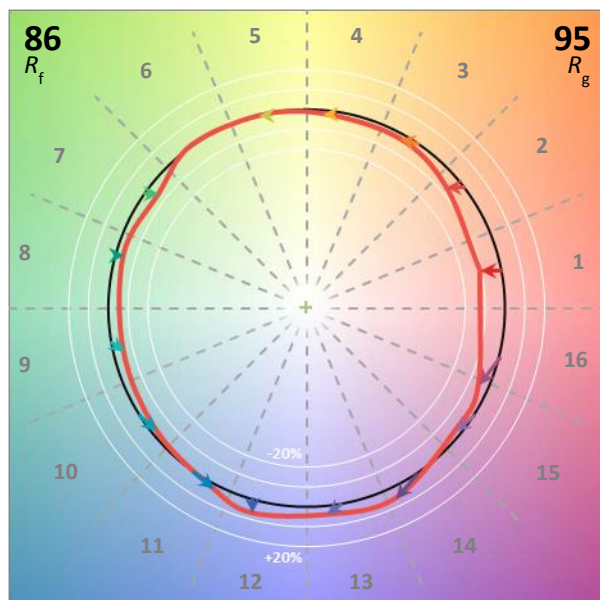
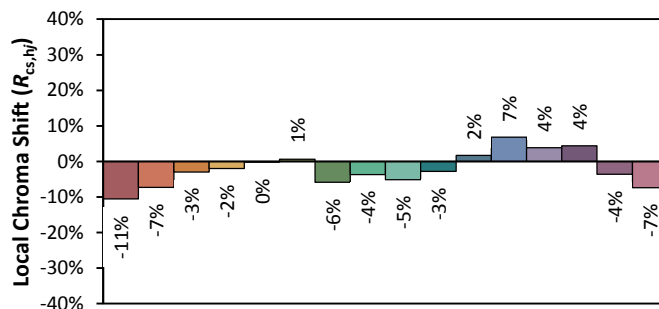
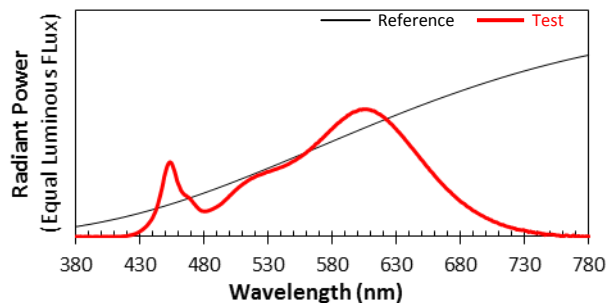
Voltage(V)	Frequency(Hz)	Current(A)	Power (W)	Power Factor	Luminous Flux(lm)	Efficacy(lm/W)
120.04	60	0.0874	10.37	0.9884	1130.33	109

Radiant Flux (W)	CCT (K)	Duv	x	y	u'	v'
3.435	2996	-0.00017	0.4370	0.4037	0.2508	0.5212

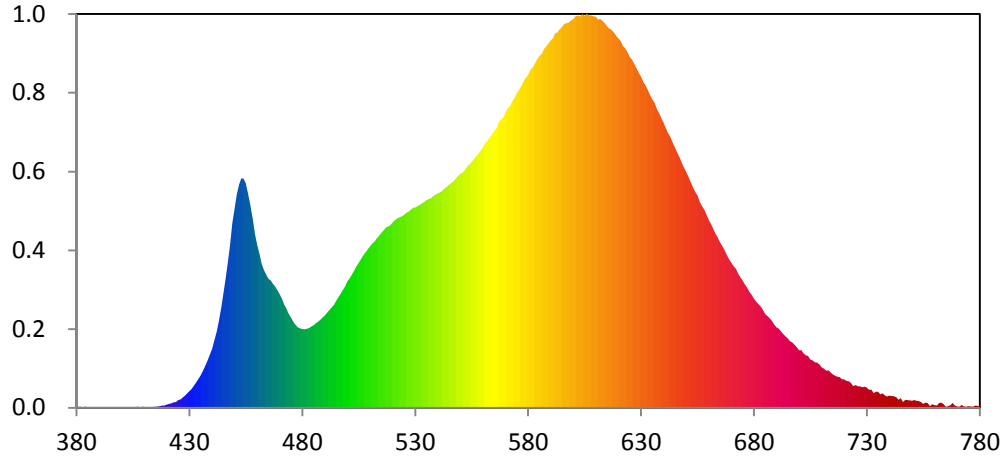
Color Rendering Index

Ra			
84.3			
R1	R2	R3	R4
83	93	96	83
R5	R6	R7	R8
84	92	82	61
R9	R10	R11	R12
13	83	83	72
R13	R14	R15	
86	99	76	





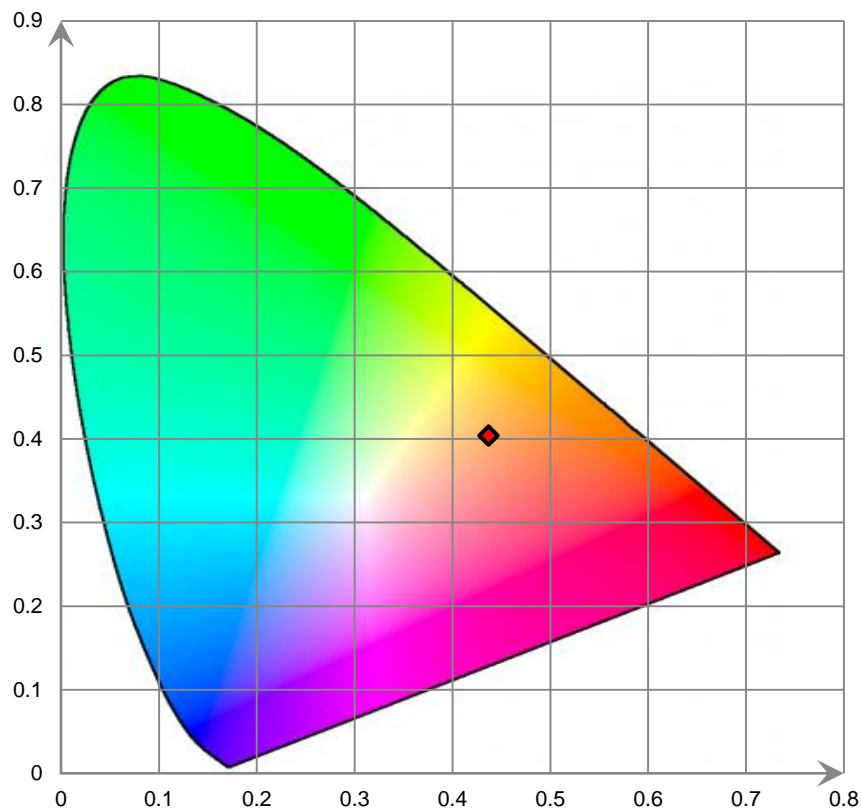
Relative Spectral Power Distribution



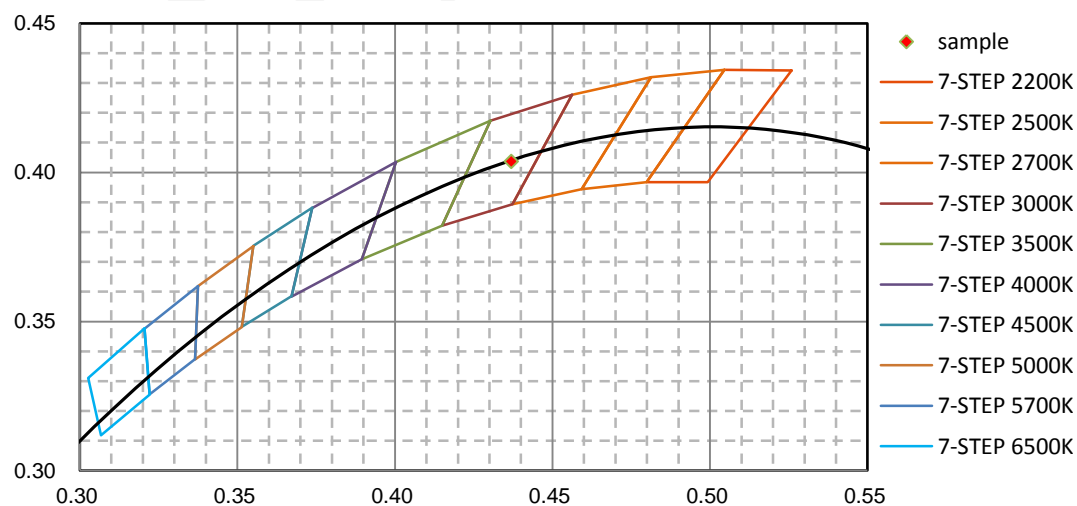
nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
380	3.280E-02	421	2.198E-01	462	8.512E+00	503	8.136E+00	544	1.307E+01
381	5.280E-02	422	2.552E-01	463	8.147E+00	504	8.366E+00	545	1.320E+01
382	6.240E-02	423	3.141E-01	464	7.872E+00	505	8.591E+00	546	1.330E+01
383	1.690E-02	424	3.480E-01	465	7.629E+00	506	8.787E+00	547	1.341E+01
384	7.640E-02	425	4.572E-01	466	7.538E+00	507	9.009E+00	548	1.359E+01
385	1.770E-02	426	4.982E-01	467	7.331E+00	508	9.183E+00	549	1.373E+01
386	8.000E-04	427	6.035E-01	468	7.184E+00	509	9.371E+00	550	1.385E+01
387	5.170E-02	428	7.123E-01	469	6.957E+00	510	9.540E+00	551	1.392E+01
388	2.330E-02	429	8.518E-01	470	6.717E+00	511	9.742E+00	552	1.408E+01
389	1.890E-02	430	9.811E-01	471	6.455E+00	512	9.854E+00	553	1.428E+01
390	6.200E-02	431	1.122E+00	472	6.110E+00	513	1.005E+01	554	1.442E+01
391	2.250E-02	432	1.306E+00	473	5.880E+00	514	1.019E+01	555	1.454E+01
392	5.200E-03	433	1.496E+00	474	5.565E+00	515	1.036E+01	556	1.473E+01
393	2.500E-03	434	1.695E+00	475	5.321E+00	516	1.050E+01	557	1.490E+01
394	1.610E-02	435	1.913E+00	476	5.071E+00	517	1.068E+01	558	1.504E+01
395	5.240E-02	436	2.170E+00	477	4.897E+00	518	1.072E+01	559	1.521E+01
396	6.400E-03	437	2.466E+00	478	4.748E+00	519	1.082E+01	560	1.541E+01
397	3.260E-02	438	2.760E+00	479	4.690E+00	520	1.097E+01	561	1.566E+01
398	1.840E-02	439	3.101E+00	480	4.658E+00	521	1.110E+01	562	1.578E+01
399	9.000E-04	440	3.492E+00	481	4.648E+00	522	1.120E+01	563	1.600E+01
400	0.000E+00	441	4.004E+00	482	4.686E+00	523	1.128E+01	564	1.620E+01
401	2.000E-02	442	4.496E+00	483	4.725E+00	524	1.134E+01	565	1.641E+01
402	4.410E-02	443	5.128E+00	484	4.807E+00	525	1.141E+01	566	1.656E+01
403	1.470E-02	444	5.865E+00	485	4.885E+00	526	1.153E+01	567	1.691E+01
404	1.170E-02	445	6.743E+00	486	4.993E+00	527	1.159E+01	568	1.707E+01
405	2.730E-02	446	7.642E+00	487	5.104E+00	528	1.171E+01	569	1.719E+01
406	4.600E-03	447	8.605E+00	488	5.210E+00	529	1.184E+01	570	1.749E+01
407	7.060E-02	448	9.641E+00	489	5.336E+00	530	1.187E+01	571	1.773E+01
408	1.410E-02	449	1.093E+01	490	5.455E+00	531	1.193E+01	572	1.787E+01
409	5.450E-02	450	1.176E+01	491	5.629E+00	532	1.200E+01	573	1.816E+01
410	4.630E-02	451	1.264E+01	492	5.769E+00	533	1.211E+01	574	1.834E+01
411	3.700E-02	452	1.321E+01	493	5.941E+00	534	1.218E+01	575	1.863E+01
412	5.400E-02	453	1.358E+01	494	6.102E+00	535	1.229E+01	576	1.884E+01
413	1.410E-02	454	1.357E+01	495	6.345E+00	536	1.235E+01	577	1.905E+01
414	4.850E-02	455	1.331E+01	496	6.561E+00	537	1.241E+01	578	1.932E+01
415	6.230E-02	456	1.269E+01	497	6.770E+00	538	1.252E+01	579	1.953E+01
416	7.300E-02	457	1.202E+01	498	6.998E+00	539	1.263E+01	580	1.969E+01
417	9.650E-02	458	1.118E+01	499	7.193E+00	540	1.270E+01	581	1.998E+01
418	1.231E-01	459	1.026E+01	500	7.498E+00	541	1.274E+01	582	2.016E+01
419	1.203E-01	460	9.628E+00	501	7.672E+00	542	1.285E+01	583	2.039E+01
420	1.845E-01	461	9.108E+00	502	7.905E+00	543	1.297E+01	584	2.065E+01

nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
585	2.084E+01	626	2.062E+01	667	9.344E+00	708	2.673E+00	749	4.267E-01
586	2.096E+01	627	2.037E+01	668	9.055E+00	709	2.549E+00	750	4.105E-01
587	2.123E+01	628	2.010E+01	669	8.803E+00	710	2.383E+00	751	4.492E-01
588	2.141E+01	629	1.983E+01	670	8.606E+00	711	2.302E+00	752	4.077E-01
589	2.156E+01	630	1.961E+01	671	8.370E+00	712	2.190E+00	753	3.897E-01
590	2.174E+01	631	1.930E+01	672	8.214E+00	713	2.222E+00	754	3.431E-01
591	2.188E+01	632	1.910E+01	673	7.945E+00	714	2.080E+00	755	2.222E-01
592	2.218E+01	633	1.883E+01	674	7.714E+00	715	1.969E+00	756	3.004E-01
593	2.221E+01	634	1.854E+01	675	7.521E+00	716	1.897E+00	757	2.865E-01
594	2.241E+01	635	1.829E+01	676	7.290E+00	717	1.838E+00	758	9.740E-02
595	2.256E+01	636	1.804E+01	677	7.098E+00	718	1.817E+00	759	2.008E-01
596	2.272E+01	637	1.768E+01	678	6.865E+00	719	1.686E+00	760	1.563E-01
597	2.278E+01	638	1.743E+01	679	6.690E+00	720	1.676E+00	761	1.374E-01
598	2.281E+01	639	1.713E+01	680	6.455E+00	721	1.589E+00	762	2.845E-01
599	2.292E+01	640	1.685E+01	681	6.282E+00	722	1.564E+00	763	3.040E-01
600	2.303E+01	641	1.653E+01	682	6.143E+00	723	1.471E+00	764	2.029E-01
601	2.319E+01	642	1.626E+01	683	6.009E+00	724	1.289E+00	765	6.330E-02
602	2.322E+01	643	1.602E+01	684	5.799E+00	725	1.337E+00	766	8.780E-02
603	2.316E+01	644	1.571E+01	685	5.558E+00	726	1.274E+00	767	1.577E-01
604	2.330E+01	645	1.542E+01	686	5.430E+00	727	1.262E+00	768	2.861E-01
605	2.322E+01	646	1.512E+01	687	5.298E+00	728	1.207E+00	769	1.388E-01
606	2.332E+01	647	1.484E+01	688	5.147E+00	729	1.252E+00	770	8.180E-02
607	2.323E+01	648	1.452E+01	689	4.898E+00	730	1.186E+00	771	6.210E-02
608	2.323E+01	649	1.422E+01	690	4.754E+00	731	1.052E+00	772	1.717E-01
609	2.317E+01	650	1.399E+01	691	4.670E+00	732	1.079E+00	773	6.970E-02
610	2.316E+01	651	1.369E+01	692	4.517E+00	733	8.680E-01	774	5.300E-02
611	2.298E+01	652	1.337E+01	693	4.351E+00	734	9.543E-01	775	9.100E-02
612	2.301E+01	653	1.307E+01	694	4.225E+00	735	9.416E-01	776	7.230E-02
613	2.291E+01	654	1.277E+01	695	4.096E+00	736	7.954E-01	777	5.020E-02
614	2.277E+01	655	1.257E+01	696	3.938E+00	737	8.482E-01	778	1.237E-01
615	2.258E+01	656	1.219E+01	697	3.862E+00	738	7.380E-01	779	1.166E-01
616	2.244E+01	657	1.194E+01	698	3.727E+00	739	6.634E-01	780	9.420E-02
617	2.238E+01	658	1.173E+01	699	3.569E+00	740	7.111E-01		
618	2.221E+01	659	1.142E+01	700	3.416E+00	741	7.075E-01		
619	2.201E+01	660	1.112E+01	701	3.399E+00	742	6.788E-01		
620	2.187E+01	661	1.087E+01	702	3.226E+00	743	6.243E-01		
621	2.170E+01	662	1.059E+01	703	3.112E+00	744	4.680E-01		
622	2.140E+01	663	1.030E+01	704	3.071E+00	745	5.584E-01		
623	2.127E+01	664	1.008E+01	705	2.856E+00	746	3.314E-01		
624	2.105E+01	665	9.804E+00	706	2.800E+00	747	4.678E-01		
625	2.077E+01	666	9.584E+00	707	2.679E+00	748	4.462E-01		

CIE 1931xy Chromaticity Diagram



7-Step Chromaticity Quadrangles



[Goniophotometer System]

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

Test orientation: **Downward**

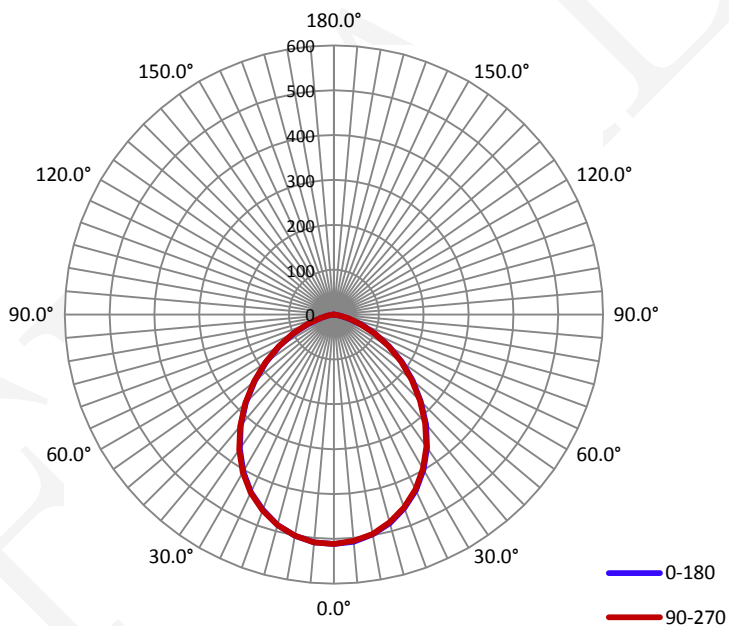
Electrical Measurement

Input Voltage(V)	Frequency(Hz)	Input Current(A)	Power (W)	Power Factor
120.0	60	0.0870	10.39	0.9920

Photometric Measurement

Luminous Flux(lm)	Efficacy(lm/W)	$I_{max}(cd)$	S/MH(C0/180)	S/MH(C90/270)
1133.6	109.15	511.1	1.17	1.17

Luminous Intensity Distribution



	C0/180	C45/225	C90/270	C135/315	AVG.
Beam Angle(50% I_{max}):	94.3	94.4	94.3	94.5	94.4
Field Angle(10% I_{max}):	143.7	143.8	144.0	144.3	144.0

Luminous Intensity (cd) Distribution Data

C y	0°	22.5°	45°	67.5°	90°	112.5°	135°	157.5°
0.0°	511	511	511	511	511	511	511	511
5.0°	508	508	506	507	506	508	509	509
10.0°	498	496	496	497	497	498	499	500
15.0°	481	480	479	480	480	482	483	485
20.0°	459	457	456	457	458	460	462	464
25.0°	433	429	428	428	430	433	435	438
30.0°	399	397	396	396	397	400	402	405
35.0°	362	359	357	358	359	362	365	368
40.0°	319	316	315	315	317	320	322	326
45.0°	274	272	271	270	272	274	277	281
50.0°	229	226	226	226	227	229	232	236
55.0°	185	183	182	182	183	185	188	190
60.0°	142	141	139	140	141	143	144	147
65.0°	103	101	100	100	101	103	103	105
70.0°	65	65	64	64	64	66	66	66
75.0°	35	34	34	34	34	34	34	34
80.0°	15	15	16	15	16	15	15	15
85.0°	5	5	6	5	5	4	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.)

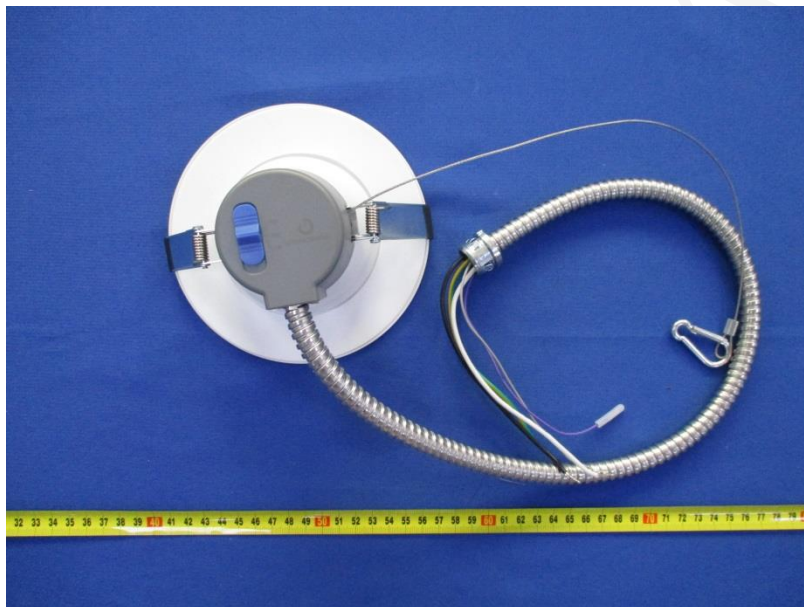
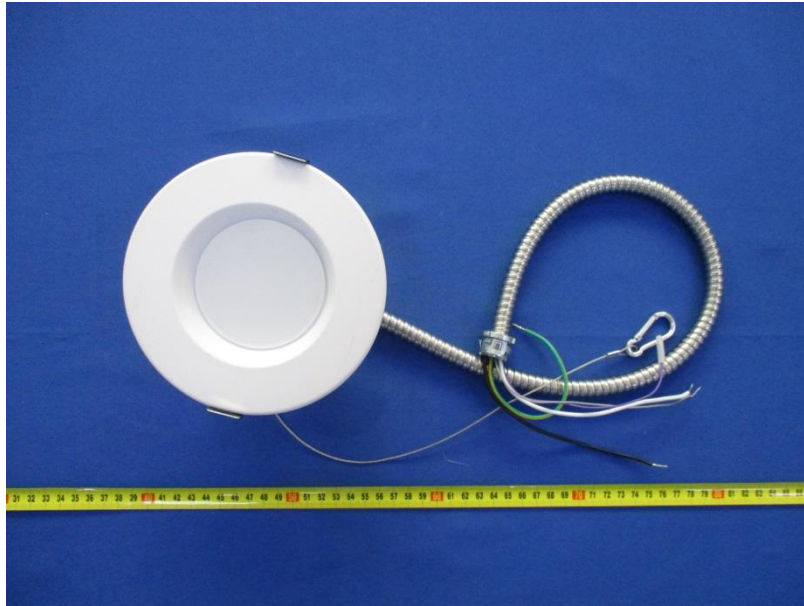
C y	180°	202.5°	225°	247.5°	270°	292.5°	315°	337.5°
0.0°	511	511	511	511	511	511	511	511
5.0°	510	509	509	509	510	509	508	507
10.0°	501	501	501	501	500	500	498	497
15.0°	486	486	487	487	486	485	483	481
20.0°	463	465	466	466	465	464	462	459
25.0°	437	439	439	439	438	438	434	431
30.0°	404	406	407	407	406	405	402	398
35.0°	365	368	369	369	368	366	363	360
40.0°	323	325	326	326	325	323	320	317
45.0°	277	279	281	281	279	278	275	270
50.0°	230	233	234	234	233	232	229	225
55.0°	185	187	188	188	187	186	184	181
60.0°	140	142	143	143	144	143	140	138
65.0°	99	100	101	101	101	102	100	99
70.0°	60	60	62	63	63	63	63	62
75.0°	29	29	30	30	31	31	33	32
80.0°	12	13	13	13	14	14	14	14
85.0°	2	2	2	3	2	3	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	12.2	1.07
5-10	36.0	3.18
10-15	58.2	5.14
15-20	77.8	6.87
20-25	93.9	8.29
25-30	105.8	9.33
30-35	112.7	9.94
35-40	114.2	10.08
40-45	110.5	9.75
45-50	102.2	9.02
50-55	90.3	7.97
55-60	75.6	6.67
60-65	59.0	5.21
65-70	41.6	3.67
70-75	25.0	2.20
75-80	12.4	1.10
80-85	4.9	0.43
85-90	1.1	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	12.2	1.07
0-10	48.2	4.25
0-15	106.4	9.39
0-20	184.3	16.26
0-25	278.2	24.54
0-30	384.0	33.88
0-35	496.7	43.82
0-40	610.9	53.89
0-45	721.4	63.64
0-50	823.6	72.66
0-55	913.9	80.62
0-60	989.5	87.29
0-65	1048.5	92.50
0-70	1090.2	96.17
0-75	1115.2	98.38
0-80	1127.6	99.47
0-85	1132.5	99.91
0-90	1133.6	100.00
0-95	1133.6	100.00
0-100	1133.6	100.00
0-105	1133.6	100.00
0-110	1133.6	100.00
0-115	1133.6	100.00
0-120	1133.6	100.00
0-125	1133.6	100.00
0-130	1133.6	100.00
0-135	1133.6	100.00
0-140	1133.6	100.00
0-145	1133.6	100.00
0-150	1133.6	100.00
0-155	1133.6	100.00
0-160	1133.6	100.00
0-165	1133.6	100.00
0-170	1133.6	100.00
0-175	1133.6	100.00
0-180	1133.6	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*****