

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: INFT8/827/DIM010UNV

Report Type:	Electrical and Photometric tests including: Luminous Flux, Chromaticity, Luminous Intensity Distribution
Test Engineer:	Joker Gu
Report Number:	RKSB200515007-10-1
Test Date:	2020-06-06 to 2020-06-11
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: INFT8/827/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: 17W/12W/8.5W
 Nominal CCT: 2700K
 Nominal Lumen Output: 2000lm/1415lm/1000lm

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.

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**

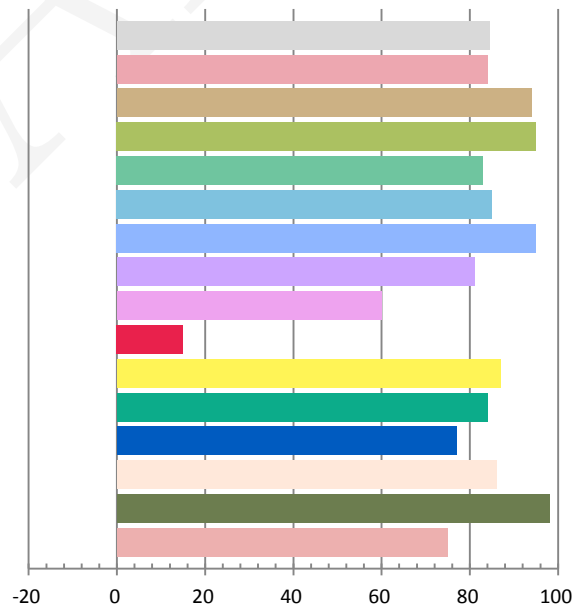
Photometric and Electrical Measurement Result

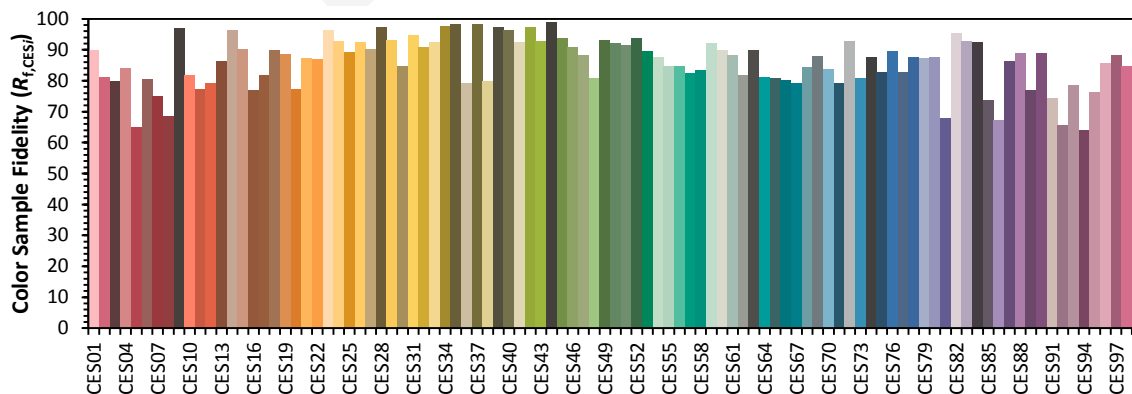
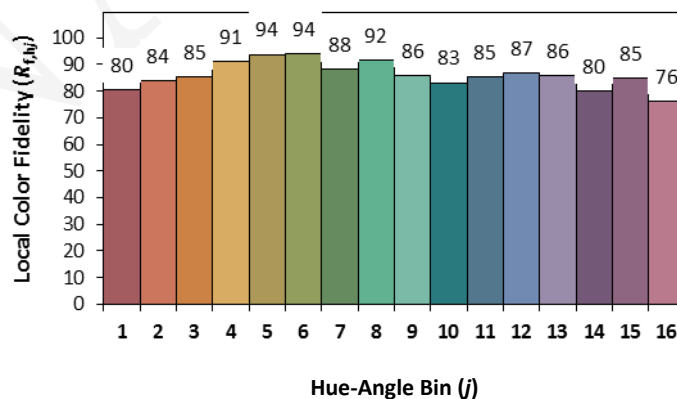
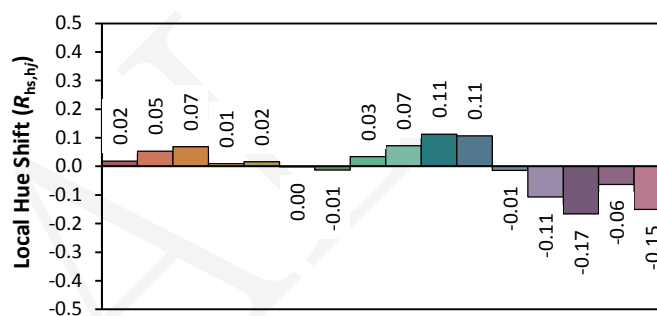
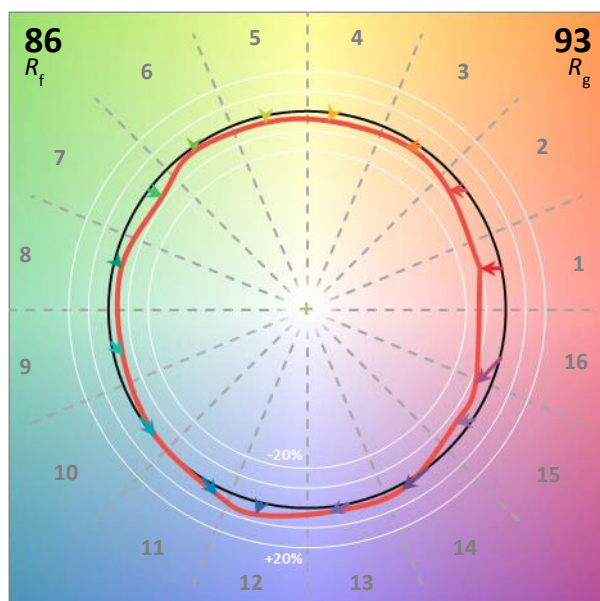
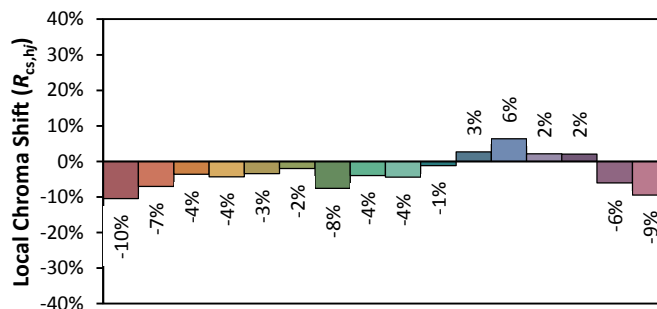
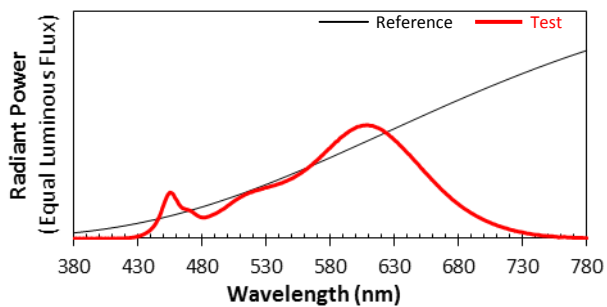
Voltage(V)	Frequency(Hz)	Current(A)	Power (W)	Power Factor	Luminous Flux(lm)	Efficacy(lm/W)
120.03	60	0.1548	18.13	0.9757	2143.71	118.24

Radiant Flux (W)	CCT (K)	Duv	x	y	u'	v'
6.604	2738	0.00129	0.4590	0.4139	0.2605	0.5285

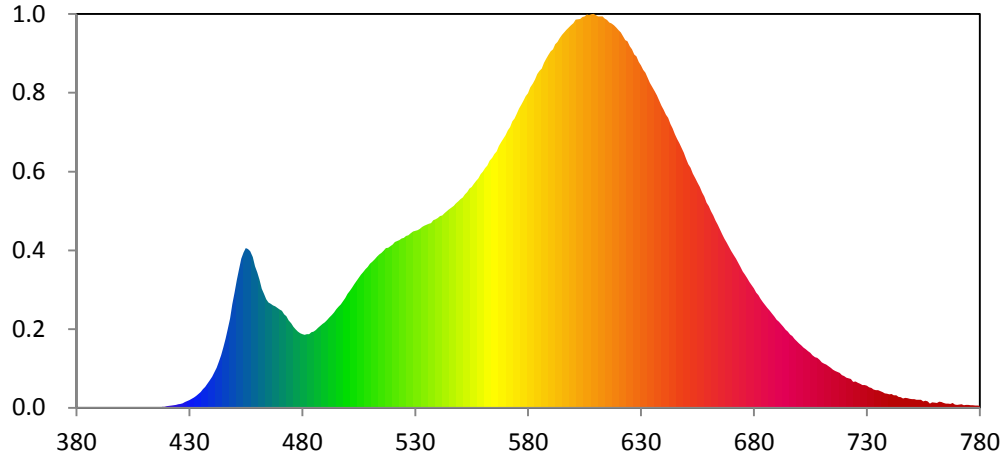
Color Rendering Index

Ra			
84.5			
R1	R2	R3	R4
84	94	95	83
R5	R6	R7	R8
85	95	81	60
R9	R10	R11	R12
15	87	84	77
R13	R14	R15	
86	98	75	





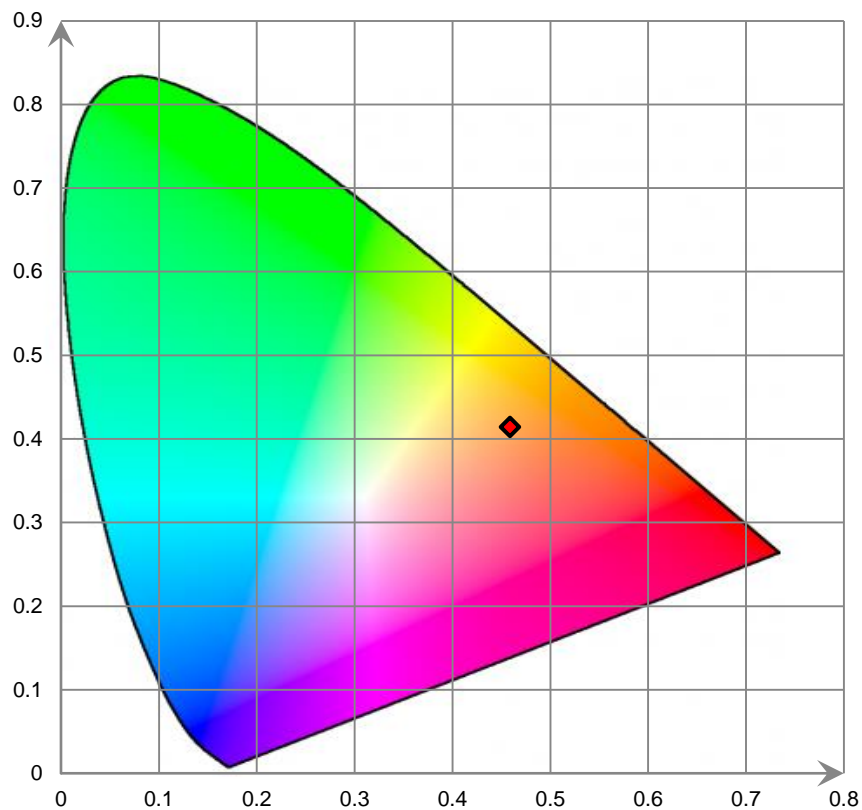
Relative Spectral Power Distribution



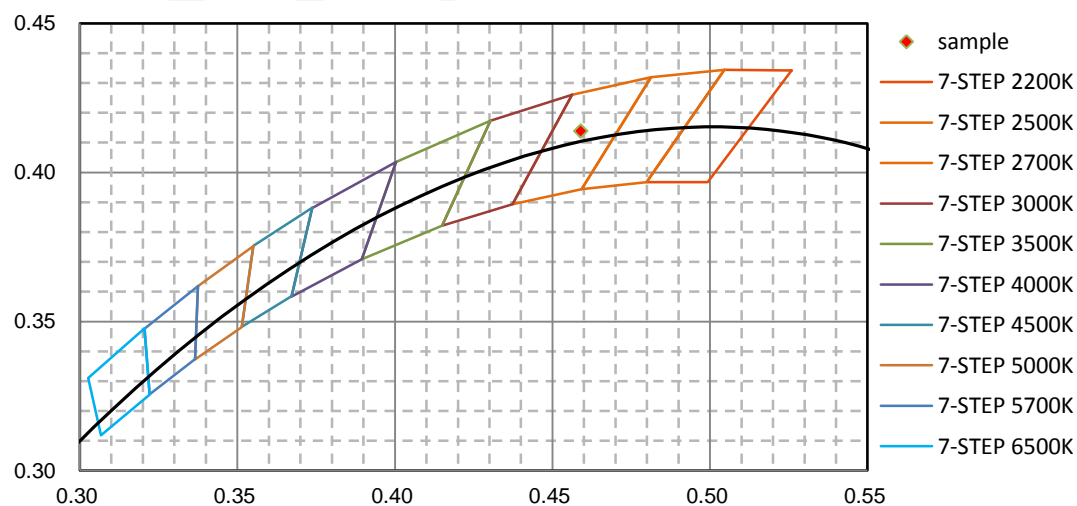
nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
380	1.210E-02	421	2.387E-01	462	1.422E+01	503	1.475E+01	544	2.346E+01
381	5.000E-02	422	2.436E-01	463	1.360E+01	504	1.511E+01	545	2.368E+01
382	6.700E-02	423	2.846E-01	464	1.294E+01	505	1.550E+01	546	2.388E+01
383	9.200E-03	424	3.226E-01	465	1.257E+01	506	1.588E+01	547	2.411E+01
384	3.860E-02	425	4.124E-01	466	1.242E+01	507	1.619E+01	548	2.440E+01
385	2.530E-02	426	4.582E-01	467	1.220E+01	508	1.654E+01	549	2.462E+01
386	1.800E-03	427	5.453E-01	468	1.210E+01	509	1.681E+01	550	2.489E+01
387	3.290E-02	428	6.665E-01	469	1.191E+01	510	1.718E+01	551	2.508E+01
388	4.650E-02	429	7.932E-01	470	1.173E+01	511	1.746E+01	552	2.548E+01
389	1.230E-02	430	9.216E-01	471	1.156E+01	512	1.771E+01	553	2.574E+01
390	4.400E-02	431	1.057E+00	472	1.116E+01	513	1.802E+01	554	2.617E+01
391	3.740E-02	432	1.218E+00	473	1.092E+01	514	1.830E+01	555	2.636E+01
392	3.600E-03	433	1.419E+00	474	1.041E+01	515	1.848E+01	556	2.673E+01
393	3.000E-03	434	1.649E+00	475	1.007E+01	516	1.875E+01	557	2.706E+01
394	1.150E-02	435	1.886E+00	476	9.670E+00	517	1.906E+01	558	2.737E+01
395	3.900E-02	436	2.204E+00	477	9.357E+00	518	1.911E+01	559	2.786E+01
396	1.130E-02	437	2.485E+00	478	9.079E+00	519	1.927E+01	560	2.819E+01
397	1.410E-02	438	2.843E+00	479	8.892E+00	520	1.947E+01	561	2.860E+01
398	8.600E-03	439	3.241E+00	480	8.780E+00	521	1.978E+01	562	2.890E+01
399	1.510E-02	440	3.686E+00	481	8.716E+00	522	1.991E+01	563	2.947E+01
400	1.200E-03	441	4.221E+00	482	8.769E+00	523	2.002E+01	564	2.983E+01
401	2.390E-02	442	4.774E+00	483	8.784E+00	524	2.019E+01	565	3.030E+01
402	2.980E-02	443	5.484E+00	484	8.990E+00	525	2.027E+01	566	3.061E+01
403	1.760E-02	444	6.261E+00	485	9.097E+00	526	2.049E+01	567	3.126E+01
404	2.250E-02	445	7.224E+00	486	9.270E+00	527	2.056E+01	568	3.169E+01
405	3.370E-02	446	8.236E+00	487	9.539E+00	528	2.082E+01	569	3.213E+01
406	7.100E-03	447	9.435E+00	488	9.765E+00	529	2.105E+01	570	3.256E+01
407	7.580E-02	448	1.065E+01	489	1.000E+01	530	2.110E+01	571	3.311E+01
408	1.240E-02	449	1.238E+01	490	1.020E+01	531	2.118E+01	572	3.351E+01
409	4.950E-02	450	1.374E+01	491	1.047E+01	532	2.135E+01	573	3.419E+01
410	6.390E-02	451	1.525E+01	492	1.076E+01	533	2.158E+01	574	3.453E+01
411	4.900E-02	452	1.653E+01	493	1.107E+01	534	2.172E+01	575	3.509E+01
412	5.700E-02	453	1.780E+01	494	1.139E+01	535	2.184E+01	576	3.569E+01
413	1.520E-02	454	1.853E+01	495	1.176E+01	536	2.197E+01	577	3.617E+01
414	6.640E-02	455	1.906E+01	496	1.206E+01	537	2.204E+01	578	3.665E+01
415	5.100E-02	456	1.894E+01	497	1.233E+01	538	2.238E+01	579	3.721E+01
416	4.240E-02	457	1.869E+01	498	1.273E+01	539	2.250E+01	580	3.754E+01
417	8.990E-02	458	1.800E+01	499	1.311E+01	540	2.264E+01	581	3.823E+01
418	1.155E-01	459	1.687E+01	500	1.359E+01	541	2.286E+01	582	3.867E+01
419	1.288E-01	460	1.615E+01	501	1.395E+01	542	2.295E+01	583	3.920E+01
420	1.995E-01	461	1.528E+01	502	1.433E+01	543	2.321E+01	584	3.983E+01

nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
585	4.021E+01	626	4.277E+01	667	2.017E+01	708	5.941E+00	749	1.066E+00
586	4.047E+01	627	4.215E+01	668	1.969E+01	709	5.737E+00	750	1.014E+00
587	4.118E+01	628	4.193E+01	669	1.921E+01	710	5.439E+00	751	1.025E+00
588	4.168E+01	629	4.128E+01	670	1.870E+01	711	5.279E+00	752	9.419E-01
589	4.211E+01	630	4.087E+01	671	1.823E+01	712	5.142E+00	753	9.437E-01
590	4.253E+01	631	4.034E+01	672	1.777E+01	713	4.951E+00	754	9.405E-01
591	4.279E+01	632	3.999E+01	673	1.731E+01	714	4.768E+00	755	7.621E-01
592	4.338E+01	633	3.938E+01	674	1.679E+01	715	4.552E+00	756	8.229E-01
593	4.366E+01	634	3.877E+01	675	1.627E+01	716	4.403E+00	757	7.488E-01
594	4.409E+01	635	3.832E+01	676	1.587E+01	717	4.291E+00	758	4.816E-01
595	4.449E+01	636	3.778E+01	677	1.548E+01	718	4.153E+00	759	6.522E-01
596	4.479E+01	637	3.726E+01	678	1.500E+01	719	3.896E+00	760	5.992E-01
597	4.510E+01	638	3.668E+01	679	1.461E+01	720	3.776E+00	761	5.656E-01
598	4.536E+01	639	3.607E+01	680	1.425E+01	721	3.606E+00	762	7.242E-01
599	4.562E+01	640	3.554E+01	681	1.375E+01	722	3.517E+00	763	6.886E-01
600	4.591E+01	641	3.497E+01	682	1.344E+01	723	3.442E+00	764	5.820E-01
601	4.631E+01	642	3.460E+01	683	1.300E+01	724	3.099E+00	765	4.874E-01
602	4.637E+01	643	3.388E+01	684	1.262E+01	725	3.128E+00	766	5.060E-01
603	4.639E+01	644	3.335E+01	685	1.226E+01	726	2.963E+00	767	4.620E-01
604	4.664E+01	645	3.265E+01	686	1.192E+01	727	2.851E+00	768	5.712E-01
605	4.670E+01	646	3.209E+01	687	1.161E+01	728	2.702E+00	769	3.806E-01
606	4.692E+01	647	3.159E+01	688	1.127E+01	729	2.705E+00	770	3.265E-01
607	4.685E+01	648	3.100E+01	689	1.088E+01	730	2.641E+00	771	3.599E-01
608	4.697E+01	649	3.045E+01	690	1.051E+01	731	2.438E+00	772	4.056E-01
609	4.700E+01	650	2.971E+01	691	1.029E+01	732	2.370E+00	773	2.995E-01
610	4.687E+01	651	2.906E+01	692	9.949E+00	733	2.182E+00	774	3.250E-01
611	4.672E+01	652	2.865E+01	693	9.656E+00	734	2.092E+00	775	3.579E-01
612	4.672E+01	653	2.795E+01	694	9.302E+00	735	2.101E+00	776	3.207E-01
613	4.671E+01	654	2.738E+01	695	9.072E+00	736	1.969E+00	777	2.987E-01
614	4.644E+01	655	2.684E+01	696	8.755E+00	737	1.871E+00	778	2.716E-01
615	4.629E+01	656	2.635E+01	697	8.557E+00	738	1.711E+00	779	2.535E-01
616	4.599E+01	657	2.571E+01	698	8.220E+00	739	1.665E+00	780	2.386E-01
617	4.587E+01	658	2.519E+01	699	7.956E+00	740	1.612E+00		
618	4.563E+01	659	2.449E+01	700	7.679E+00	741	1.634E+00		
619	4.537E+01	660	2.404E+01	701	7.452E+00	742	1.491E+00		
620	4.507E+01	661	2.344E+01	702	7.179E+00	743	1.486E+00		
621	4.479E+01	662	2.293E+01	703	6.988E+00	744	1.289E+00		
622	4.433E+01	663	2.232E+01	704	6.749E+00	745	1.262E+00		
623	4.387E+01	664	2.185E+01	705	6.546E+00	746	1.120E+00		
624	4.374E+01	665	2.128E+01	706	6.276E+00	747	1.176E+00		
625	4.316E+01	666	2.068E+01	707	6.034E+00	748	1.132E+00		

CIE 1931xy Chromaticity Diagram



7-Step Chromaticity Quadrangles



[Goniophotometer System]

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

Test orientation: **Downward**

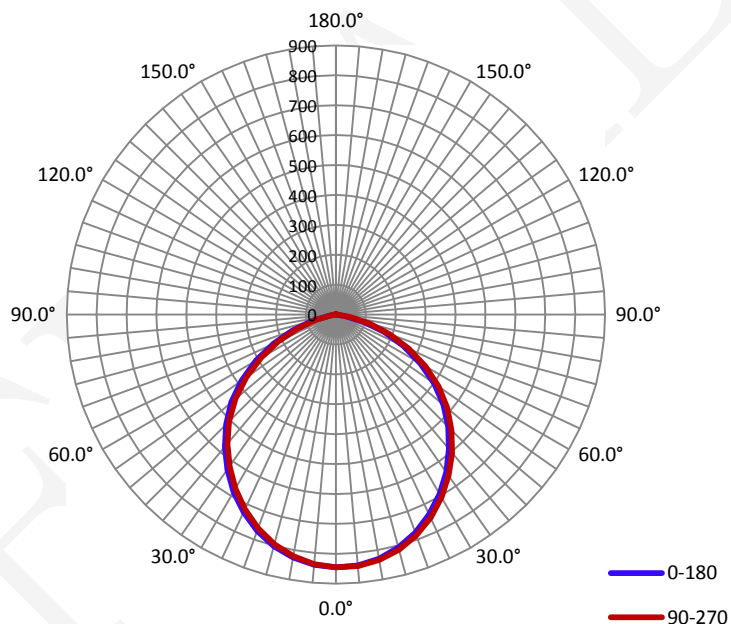
Electrical Measurement

Input Voltage(V)	Frequency(Hz)	Input Current(A)	Power (W)	Power Factor
120.0	60	0.1540	18.15	0.9820

Photometric Measurement

Luminous Flux(lm)	Efficacy(lm/W)	$I_{max}(cd)$	S/MH(C0/180)	S/MH(C90/270)
2148.5	118.42	845.3	1.21	1.21

Luminous Intensity Distribution



	C0/180	C45/225	C90/270	C135/315	AVG.
Beam Angle(50% I_{max}):	105.8	105.8	105.8	105.9	105.8
Field Angle(10% I_{max}):	151.1	151.1	151.2	151.1	151.1

Luminous Intensity (cd) Distribution Data

C y	0°	22.5°	45°	67.5°	90°	112.5°	135°	157.5°
0.0°	845	845	845	845	845	845	845	845
5.0°	842	843	843	844	844	844	843	842
10.0°	829	831	832	833	834	833	831	829
15.0°	806	810	813	813	814	812	810	806
20.0°	776	780	783	786	786	784	782	777
25.0°	738	742	747	750	750	747	743	738
30.0°	693	698	703	706	706	703	700	694
35.0°	643	648	654	657	657	654	650	643
40.0°	588	595	601	603	604	601	596	588
45.0°	530	538	543	547	546	545	539	531
50.0°	469	476	482	486	486	483	478	470
55.0°	401	408	415	420	419	416	410	401
60.0°	327	335	341	345	345	341	334	326
65.0°	249	259	265	267	268	264	257	248
70.0°	173	180	187	190	190	185	180	171
75.0°	100	107	113	117	116	112	106	99
80.0°	36	42	47	51	50	47	42	36
85.0°	7	9	9	10	10	9	9	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	1	0	0	0
155.0°	0	0	1	1	1	1	0	0
160.0°	1	1	1	1	1	1	1	1
165.0°	1	1	1	1	1	1	1	1
170.0°	1	1	2	2	2	1	1	1
175.0°	2	2	1	2	2	2	2	2
180.0°	0	0	0	0	0	0	0	0

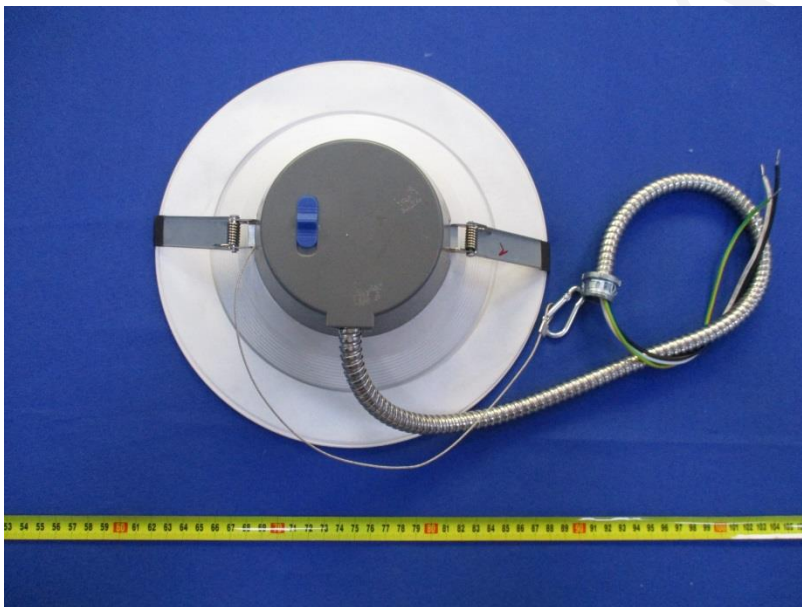
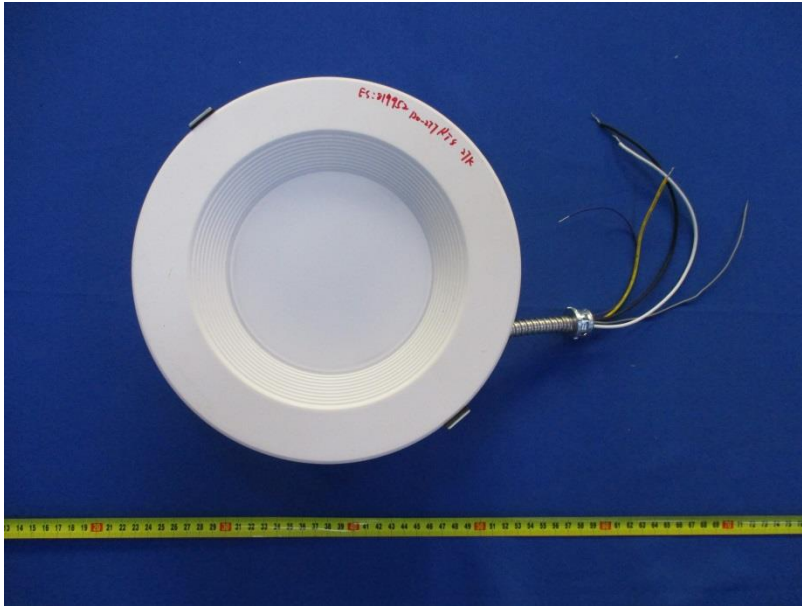
Luminous Intensity (cd) Distribution Data (cont.)

C y	180°	202.5°	225°	247.5°	270°	292.5°	315°	337.5°
0.0°	845	845	845	845	845	845	845	845
5.0°	840	838	838	837	838	838	839	840
10.0°	825	823	821	820	820	822	823	825
15.0°	802	798	795	794	795	796	798	801
20.0°	770	765	762	760	760	762	765	769
25.0°	730	724	721	719	719	722	725	729
30.0°	684	678	674	672	671	674	679	684
35.0°	633	626	623	619	620	622	628	632
40.0°	578	571	567	563	564	567	571	578
45.0°	519	511	507	505	505	507	513	520
50.0°	456	448	442	439	438	442	449	456
55.0°	386	376	370	366	366	370	377	386
60.0°	309	300	294	289	289	294	301	309
65.0°	231	222	216	212	212	217	225	232
70.0°	155	145	139	136	137	140	147	156
75.0°	83	75	70	67	68	70	76	83
80.0°	24	20	17	15	15	16	20	24
85.0°	5	4	3	3	3	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	1	0	0	0
155.0°	0	0	0	1	0	0	0	1
160.0°	0	1	1	1	1	1	1	1
165.0°	1	1	1	1	1	1	1	2
170.0°	1	2	2	1	2	2	2	2
175.0°	1	2	2	2	2	2	2	2
180.0°	0	0	0	0	0	0	0	0

Zonal Lumen Density Measurement

Deg	Flux (lm)	%	Deg	Flux (lm)	%
0-5	20.2	0.94	0-5	20.2	0.94
5-10	59.7	2.78	0-10	79.8	3.71
10-15	96.7	4.50	0-15	176.5	8.22
15-20	130.0	6.05	0-20	306.5	14.27
20-25	158.0	7.36	0-25	464.6	21.62
25-30	180.0	8.38	0-30	644.6	30.00
30-35	195.4	9.09	0-35	840.0	39.10
35-40	203.8	9.49	0-40	1043.8	48.58
40-45	205.3	9.56	0-45	1249.1	58.14
45-50	199.6	9.29	0-50	1448.7	67.43
50-55	186.0	8.66	0-55	1634.7	76.09
55-60	164.2	7.64	0-60	1798.9	83.73
60-65	135.6	6.31	0-65	1934.4	90.04
65-70	102.2	4.76	0-70	2036.6	94.79
70-75	66.6	3.10	0-75	2103.1	97.89
75-80	32.8	1.53	0-80	2136.0	99.42
80-85	10.2	0.47	0-85	2146.2	99.89
85-90	1.7	0.08	0-90	2147.9	99.97
90-95	0.0	0.00	0-95	2147.9	99.97
95-100	0.0	0.00	0-100	2147.9	99.97
100-105	0.0	0.00	0-105	2147.9	99.97
105-110	0.0	0.00	0-110	2147.9	99.97
110-115	0.0	0.00	0-115	2147.9	99.97
115-120	0.0	0.00	0-120	2147.9	99.97
120-125	0.0	0.00	0-125	2147.9	99.97
125-130	0.0	0.00	0-130	2147.9	99.97
130-135	0.0	0.00	0-135	2147.9	99.97
135-140	0.0	0.00	0-140	2147.9	99.97
140-145	0.0	0.00	0-145	2147.9	99.97
145-150	0.0	0.00	0-150	2147.9	99.97
150-155	0.0	0.00	0-155	2147.9	99.97
155-160	0.1	0.01	0-160	2148.0	99.98
160-165	0.2	0.01	0-165	2148.2	99.99
165-170	0.2	0.01	0-170	2148.4	99.99
170-175	0.1	0.01	0-175	2148.5	100.00
175-180	0.0	0.00	0-180	2148.5	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*****