

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: INFT9.5/827/DIM010UNV

Report Type:	Electrical and Photometric tests including: Luminous Flux, Chromaticity, Luminous Intensity Distribution
Test Engineer:	Joker Gu
Report Number:	RKSB200515008-10-1
Test Date:	2020-06-06 to 2020-06-12
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: INFT9.5/827/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: 27W/21W/17W
 Nominal CCT: 2700K
 Nominal Lumen Output: 3240lm/2520lm/2040lm

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**

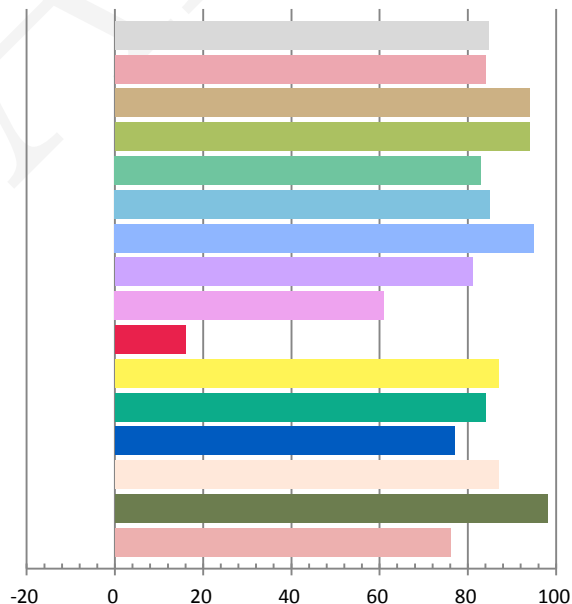
Photometric and Electrical Measurement Result

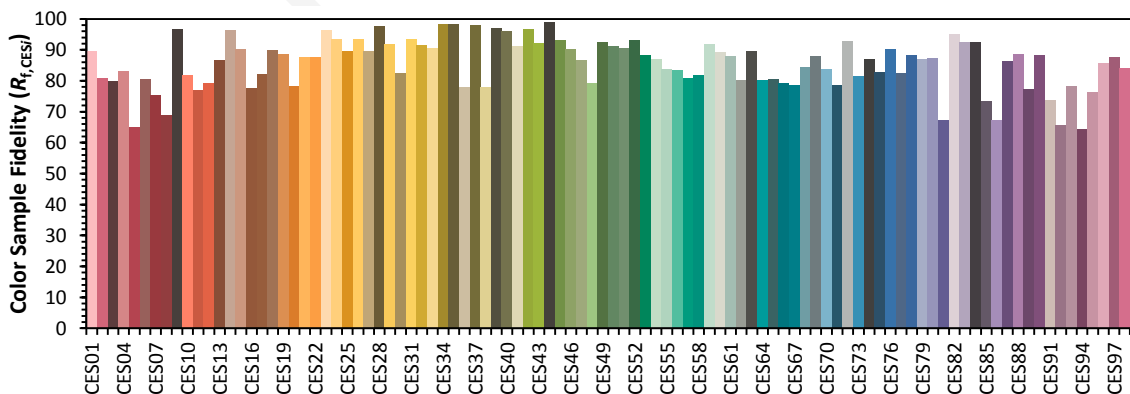
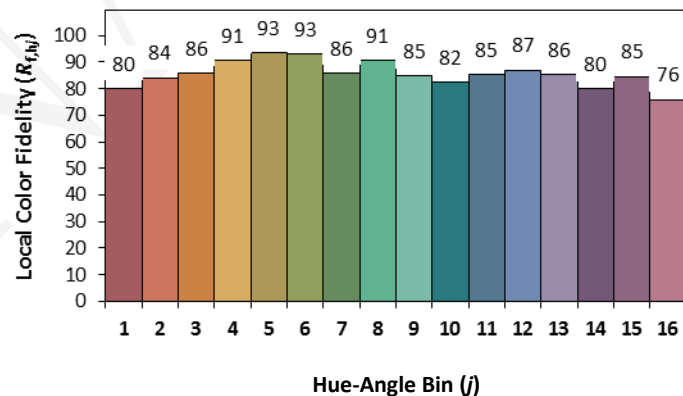
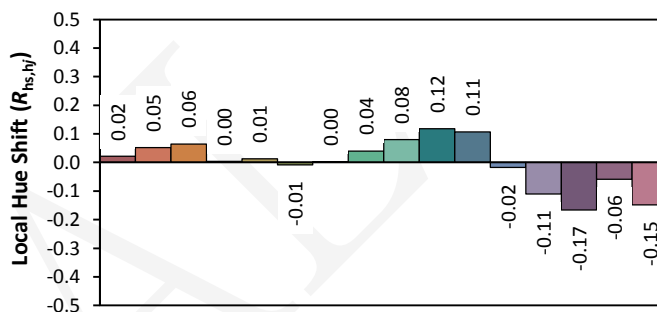
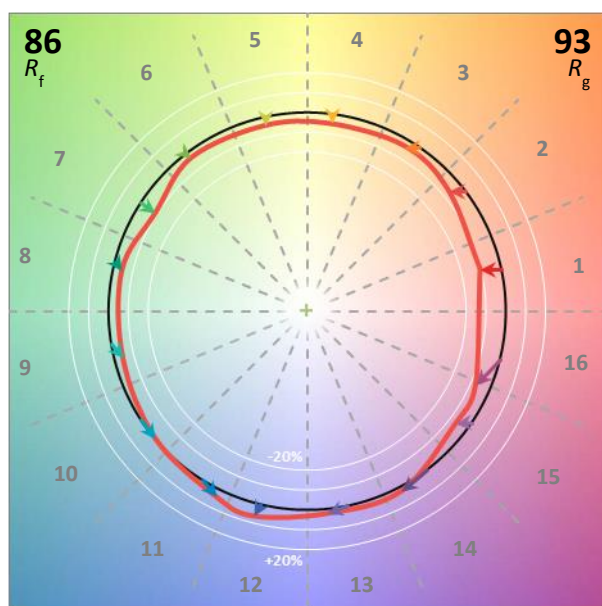
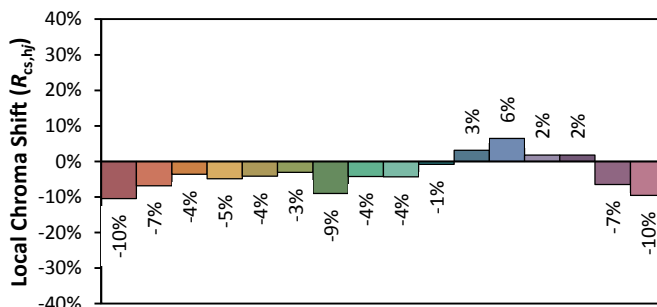
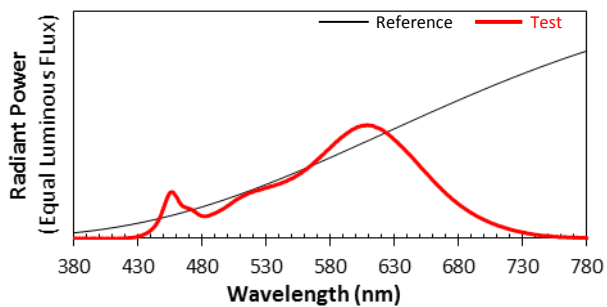
Voltage(V)	Frequency(Hz)	Current(A)	Power (W)	Power Factor	Luminous Flux(lm)	Efficacy(lm/W)
119.98	60	0.2333	27.55	0.9842	3506.96	127.29

Radiant Flux (W)	CCT (K)	Duv	x	y	u'	v'
10.835	2741	0.00116	0.4585	0.4134	0.2604	0.5282

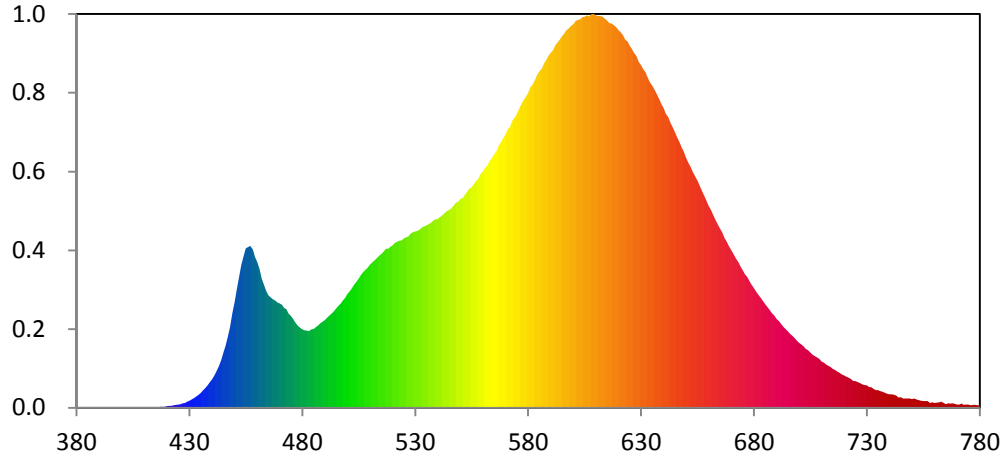
Color Rendering Index

Ra			
84.7			
R1	R2	R3	R4
84	94	94	83
R5	R6	R7	R8
85	95	81	61
R9	R10	R11	R12
16	87	84	77
R13	R14	R15	
87	98	76	





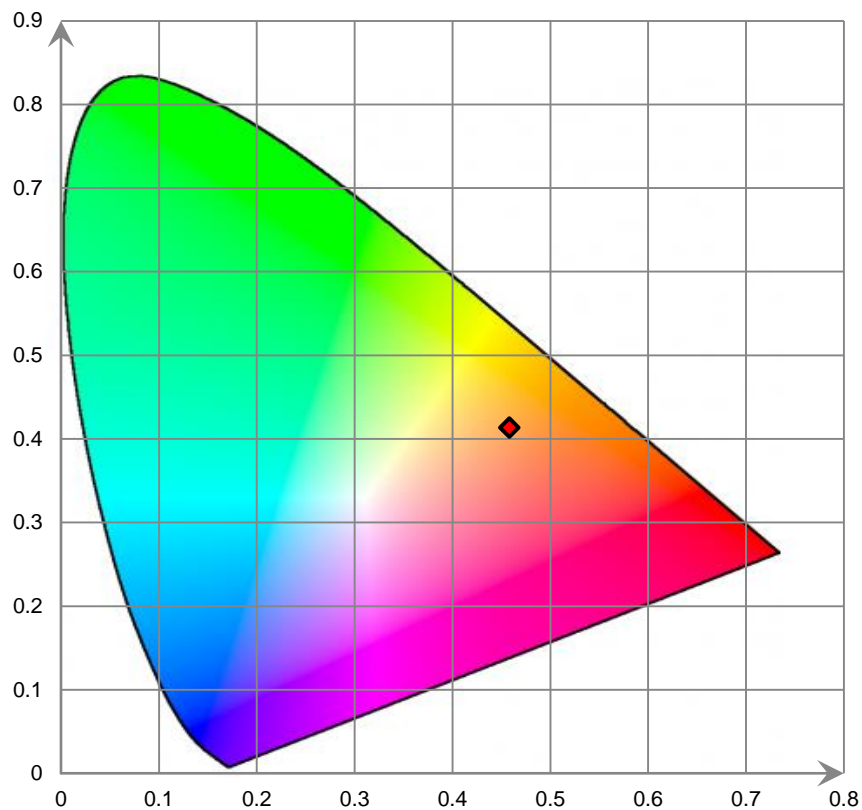
Relative Spectral Power Distribution



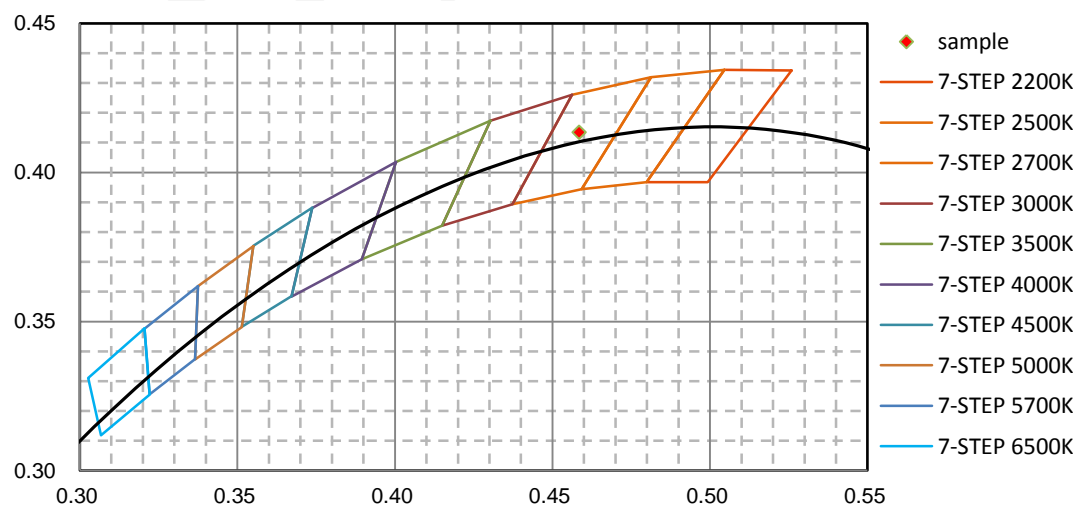
nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
380	5.170E-02	421	3.369E-01	462	2.519E+01	503	2.404E+01	544	3.834E+01
381	1.134E-01	422	3.829E-01	463	2.397E+01	504	2.460E+01	545	3.863E+01
382	1.009E-01	423	4.768E-01	464	2.280E+01	505	2.525E+01	546	3.893E+01
383	6.800E-03	424	5.457E-01	465	2.195E+01	506	2.593E+01	547	3.948E+01
384	1.076E-01	425	6.391E-01	466	2.157E+01	507	2.650E+01	548	4.005E+01
385	1.134E-01	426	7.076E-01	467	2.116E+01	508	2.693E+01	549	4.024E+01
386	1.860E-02	427	8.477E-01	468	2.094E+01	509	2.736E+01	550	4.083E+01
387	1.081E-01	428	9.584E-01	469	2.057E+01	510	2.794E+01	551	4.091E+01
388	8.800E-02	429	1.206E+00	470	2.038E+01	511	2.841E+01	552	4.165E+01
389	7.050E-02	430	1.393E+00	471	2.009E+01	512	2.881E+01	553	4.218E+01
390	1.010E-01	431	1.596E+00	472	1.946E+01	513	2.927E+01	554	4.277E+01
391	4.610E-02	432	1.863E+00	473	1.922E+01	514	2.965E+01	555	4.307E+01
392	1.670E-02	433	2.172E+00	474	1.837E+01	515	3.004E+01	556	4.370E+01
393	1.070E-02	434	2.513E+00	475	1.785E+01	516	3.051E+01	557	4.429E+01
394	3.950E-02	435	2.891E+00	476	1.723E+01	517	3.106E+01	558	4.473E+01
395	6.830E-02	436	3.336E+00	477	1.657E+01	518	3.106E+01	559	4.567E+01
396	5.150E-02	437	3.779E+00	478	1.597E+01	519	3.142E+01	560	4.615E+01
397	5.860E-02	438	4.332E+00	479	1.559E+01	520	3.177E+01	561	4.687E+01
398	3.700E-03	439	4.924E+00	480	1.530E+01	521	3.218E+01	562	4.730E+01
399	4.000E-04	440	5.541E+00	481	1.513E+01	522	3.241E+01	563	4.817E+01
400	8.900E-03	441	6.317E+00	482	1.507E+01	523	3.258E+01	564	4.889E+01
401	3.270E-02	442	7.173E+00	483	1.502E+01	524	3.271E+01	565	4.955E+01
402	4.930E-02	443	8.096E+00	484	1.532E+01	525	3.305E+01	566	5.017E+01
403	4.130E-02	444	9.251E+00	485	1.540E+01	526	3.331E+01	567	5.127E+01
404	2.540E-02	445	1.071E+01	486	1.572E+01	527	3.345E+01	568	5.195E+01
405	5.490E-02	446	1.211E+01	487	1.605E+01	528	3.402E+01	569	5.270E+01
406	3.660E-02	447	1.384E+01	488	1.648E+01	529	3.432E+01	570	5.345E+01
407	1.323E-01	448	1.577E+01	489	1.680E+01	530	3.440E+01	571	5.434E+01
408	1.140E-02	449	1.841E+01	490	1.710E+01	531	3.457E+01	572	5.486E+01
409	6.240E-02	450	2.058E+01	491	1.754E+01	532	3.484E+01	573	5.605E+01
410	8.830E-02	451	2.312E+01	492	1.799E+01	533	3.522E+01	574	5.663E+01
411	7.500E-02	452	2.552E+01	493	1.845E+01	534	3.546E+01	575	5.736E+01
412	8.100E-02	453	2.788E+01	494	1.889E+01	535	3.560E+01	576	5.836E+01
413	3.110E-02	454	2.955E+01	495	1.943E+01	536	3.586E+01	577	5.923E+01
414	6.050E-02	455	3.110E+01	496	1.990E+01	537	3.610E+01	578	6.003E+01
415	1.114E-01	456	3.134E+01	497	2.037E+01	538	3.656E+01	579	6.069E+01
416	1.161E-01	457	3.159E+01	498	2.100E+01	539	3.678E+01	580	6.143E+01
417	1.550E-01	458	3.091E+01	499	2.151E+01	540	3.688E+01	581	6.253E+01
418	2.072E-01	459	2.943E+01	500	2.225E+01	541	3.722E+01	582	6.316E+01
419	2.035E-01	460	2.844E+01	501	2.274E+01	542	3.758E+01	583	6.407E+01
420	2.993E-01	461	2.709E+01	502	2.339E+01	543	3.798E+01	584	6.503E+01

nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
585	6.574E+01	626	7.007E+01	667	3.316E+01	708	9.812E+00	749	1.824E+00
586	6.616E+01	627	6.923E+01	668	3.244E+01	709	9.488E+00	750	1.680E+00
587	6.725E+01	628	6.870E+01	669	3.158E+01	710	9.007E+00	751	1.777E+00
588	6.793E+01	629	6.754E+01	670	3.078E+01	711	8.797E+00	752	1.617E+00
589	6.874E+01	630	6.692E+01	671	2.993E+01	712	8.447E+00	753	1.496E+00
590	6.931E+01	631	6.609E+01	672	2.911E+01	713	8.204E+00	754	1.382E+00
591	6.982E+01	632	6.555E+01	673	2.848E+01	714	7.938E+00	755	1.296E+00
592	7.072E+01	633	6.448E+01	674	2.762E+01	715	7.555E+00	756	1.310E+00
593	7.131E+01	634	6.355E+01	675	2.685E+01	716	7.337E+00	757	1.331E+00
594	7.187E+01	635	6.292E+01	676	2.605E+01	717	7.044E+00	758	9.201E-01
595	7.255E+01	636	6.207E+01	677	2.553E+01	718	6.808E+00	759	1.084E+00
596	7.306E+01	637	6.116E+01	678	2.477E+01	719	6.485E+00	760	9.119E-01
597	7.375E+01	638	6.028E+01	679	2.402E+01	720	6.297E+00	761	9.753E-01
598	7.403E+01	639	5.929E+01	680	2.339E+01	721	6.027E+00	762	1.057E+00
599	7.454E+01	640	5.846E+01	681	2.265E+01	722	5.850E+00	763	1.173E+00
600	7.491E+01	641	5.739E+01	682	2.203E+01	723	5.615E+00	764	9.348E-01
601	7.557E+01	642	5.678E+01	683	2.146E+01	724	5.265E+00	765	6.838E-01
602	7.576E+01	643	5.567E+01	684	2.087E+01	725	5.163E+00	766	8.672E-01
603	7.586E+01	644	5.481E+01	685	2.027E+01	726	4.986E+00	767	7.928E-01
604	7.632E+01	645	5.385E+01	686	1.966E+01	727	4.774E+00	768	8.823E-01
605	7.635E+01	646	5.281E+01	687	1.912E+01	728	4.555E+00	769	7.345E-01
606	7.664E+01	647	5.193E+01	688	1.846E+01	729	4.417E+00	770	6.209E-01
607	7.640E+01	648	5.089E+01	689	1.798E+01	730	4.363E+00	771	6.280E-01
608	7.688E+01	649	4.997E+01	690	1.733E+01	731	4.032E+00	772	8.071E-01
609	7.691E+01	650	4.883E+01	691	1.694E+01	732	3.967E+00	773	5.318E-01
610	7.664E+01	651	4.785E+01	692	1.640E+01	733	3.674E+00	774	6.224E-01
611	7.650E+01	652	4.704E+01	693	1.583E+01	734	3.450E+00	775	6.148E-01
612	7.646E+01	653	4.608E+01	694	1.538E+01	735	3.417E+00	776	5.150E-01
613	7.636E+01	654	4.508E+01	695	1.491E+01	736	3.218E+00	777	5.696E-01
614	7.597E+01	655	4.431E+01	696	1.442E+01	737	3.101E+00	778	5.546E-01
615	7.564E+01	656	4.330E+01	697	1.405E+01	738	2.898E+00	779	5.215E-01
616	7.514E+01	657	4.232E+01	698	1.359E+01	739	2.711E+00	780	4.119E-01
617	7.503E+01	658	4.134E+01	699	1.313E+01	740	2.632E+00		
618	7.465E+01	659	4.035E+01	700	1.270E+01	741	2.607E+00		
619	7.432E+01	660	3.939E+01	701	1.234E+01	742	2.533E+00		
620	7.372E+01	661	3.862E+01	702	1.198E+01	743	2.367E+00		
621	7.331E+01	662	3.758E+01	703	1.151E+01	744	2.015E+00		
622	7.276E+01	663	3.670E+01	704	1.121E+01	745	2.066E+00		
623	7.184E+01	664	3.578E+01	705	1.079E+01	746	1.829E+00		
624	7.158E+01	665	3.498E+01	706	1.037E+01	747	1.834E+00		
625	7.065E+01	666	3.422E+01	707	1.003E+01	748	1.782E+00		

CIE 1931xy Chromaticity Diagram



7-Step Chromaticity Quadrangles



[Goniophotometer System]

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

Test orientation: **Downward**

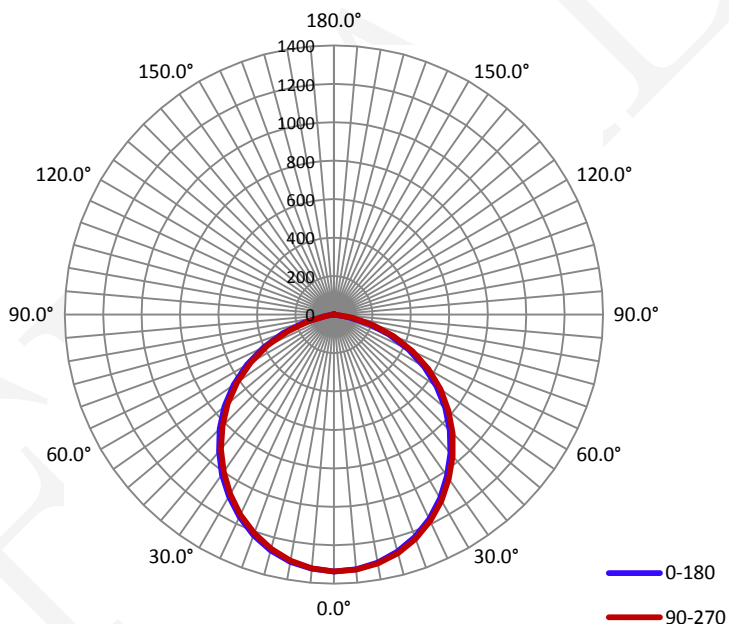
Electrical Measurement

Input Voltage(V)	Frequency(Hz)	Input Current(A)	Power (W)	Power Factor
120.0	60	0.2330	27.58	0.9880

Photometric Measurement

Luminous Flux(lm)	Efficacy(lm/W)	$I_{max}(cd)$	S/MH(C0/180)	S/MH(C90/270)
3511.1	127.36	1335.7	1.22	1.22

Luminous Intensity Distribution



	C0/180	C45/225	C90/270	C135/315	AVG.
Beam Angle(50% I_{max}):	107.8	107.9	107.8	108.0	107.9
Field Angle(10% I_{max}):	153.7	153.7	153.6	153.7	153.7

Luminous Intensity (cd) Distribution Data

C y	0°	22.5°	45°	67.5°	90°	112.5°	135°	157.5°
0.0°	1336	1336	1336	1336	1336	1336	1336	1336
5.0°	1330	1331	1332	1333	1332	1331	1330	1330
10.0°	1310	1313	1314	1316	1315	1315	1313	1311
15.0°	1276	1280	1283	1285	1285	1282	1280	1276
20.0°	1230	1234	1238	1241	1241	1240	1236	1231
25.0°	1173	1178	1182	1184	1184	1182	1180	1172
30.0°	1104	1110	1115	1118	1118	1117	1112	1104
35.0°	1025	1033	1039	1043	1042	1041	1036	1028
40.0°	943	950	955	961	962	957	952	945
45.0°	852	861	867	871	873	869	864	854
50.0°	756	764	773	777	778	773	769	759
55.0°	653	663	672	677	676	672	667	657
60.0°	543	553	561	567	566	562	553	544
65.0°	428	439	447	451	452	446	438	426
70.0°	307	318	329	333	331	327	318	306
75.0°	188	199	207	213	212	205	197	187
80.0°	76	86	93	99	98	93	85	77
85.0°	11	13	14	15	15	14	13	11
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	1	0	1	1	1	1
150.0°	0	1	1	1	1	2	2	1
155.0°	2	2	2	2	2	2	2	2
160.0°	2	2	3	3	2	3	3	3
165.0°	3	3	3	3	3	2	3	3
170.0°	3	3	3	3	3	3	3	3
175.0°	3	4	4	3	4	4	4	4
180.0°	0	0	0	0	0	0	0	0

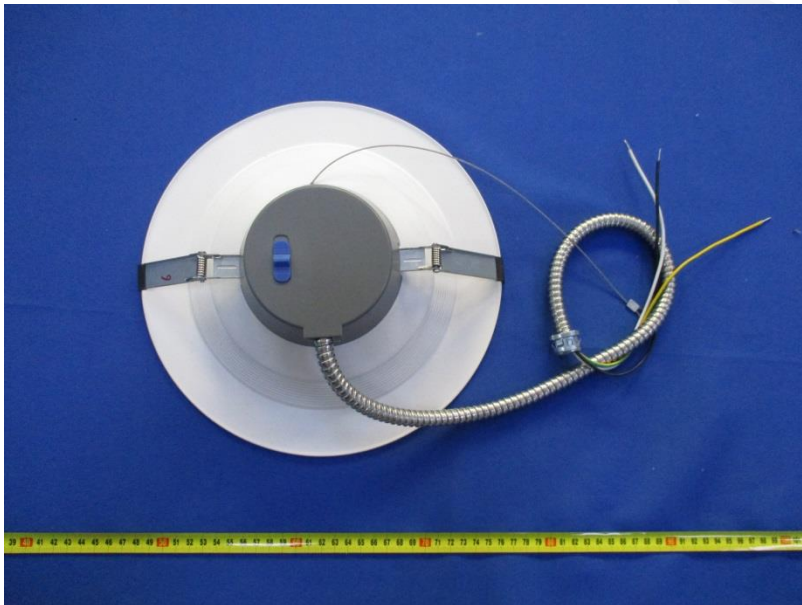
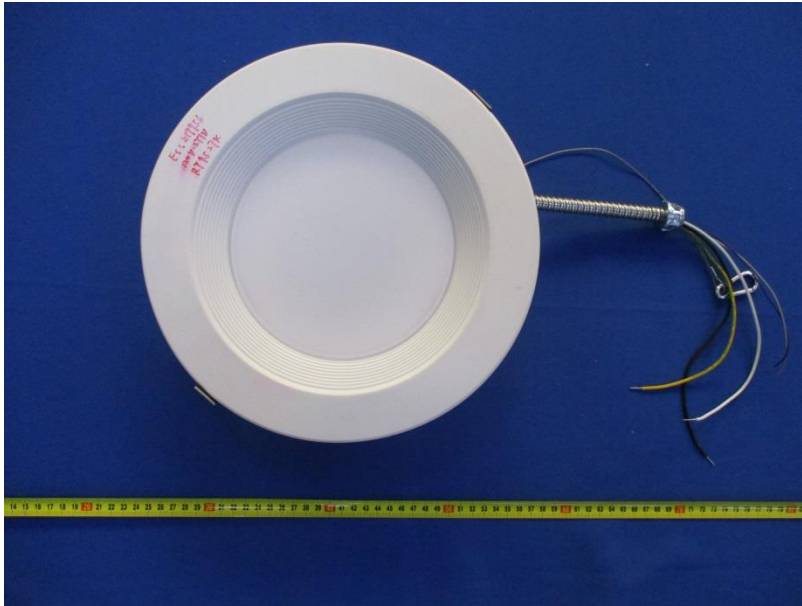
Luminous Intensity (cd) Distribution Data (cont.)

C y	180°	202.5°	225°	247.5°	270°	292.5°	315°	337.5°
0.0°	1336	1336	1336	1336	1336	1336	1336	1336
5.0°	1327	1327	1325	1325	1325	1325	1326	1327
10.0°	1306	1303	1300	1300	1300	1300	1303	1305
15.0°	1270	1266	1264	1262	1261	1262	1266	1268
20.0°	1222	1217	1213	1212	1210	1213	1217	1219
25.0°	1161	1157	1152	1150	1149	1152	1155	1160
30.0°	1092	1086	1082	1080	1078	1081	1085	1090
35.0°	1015	1008	1002	999	999	1001	1006	1013
40.0°	930	923	916	913	914	914	921	928
45.0°	841	831	825	822	820	823	830	835
50.0°	742	733	727	721	722	726	732	738
55.0°	636	626	619	613	613	617	625	633
60.0°	523	513	503	499	499	501	509	520
65.0°	404	395	384	380	380	385	391	403
70.0°	281	270	263	259	256	261	270	280
75.0°	160	150	142	137	137	142	151	161
80.0°	54	46	39	36	36	41	46	54
85.0°	7	6	6	5	6	6	7	9
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	1	0	1
150.0°	0	0	1	1	1	1	1	1
155.0°	1	1	2	2	2	2	2	2
160.0°	1	2	2	3	2	3	2	2
165.0°	2	2	3	3	2	3	3	3
170.0°	2	3	3	4	3	3	4	3
175.0°	3	3	4	4	4	4	4	4
180.0°	0	0	0	0	0	0	0	0

Zonal Lumen Density Measurement

Deg	Flux (lm)	%	Deg	Flux (lm)	%
0-5	31.8	0.91	0-5	31.8	0.91
5-10	94.3	2.69	0-10	126.1	3.59
10-15	153.1	4.36	0-15	279.2	7.95
15-20	205.9	5.86	0-20	485.1	13.82
20-25	251.0	7.15	0-25	736.1	20.96
25-30	286.7	8.16	0-30	1022.7	29.13
30-35	312.0	8.89	0-35	1334.7	38.01
35-40	326.5	9.30	0-40	1661.2	47.31
40-45	330.1	9.40	0-45	1991.3	56.71
45-50	322.4	9.18	0-50	2313.7	65.90
50-55	303.1	8.63	0-55	2616.8	74.53
55-60	272.0	7.75	0-60	2888.8	82.28
60-65	230.4	6.56	0-65	3119.2	88.84
65-70	179.7	5.12	0-70	3298.9	93.96
70-75	122.4	3.49	0-75	3421.3	97.44
75-80	64.3	1.83	0-80	3485.6	99.27
80-85	20.7	0.59	0-85	3506.3	99.86
85-90	2.7	0.08	0-90	3509.0	99.94
90-95	0.0	0.00	0-95	3509.0	99.94
95-100	0.0	0.00	0-100	3509.0	99.94
100-105	0.0	0.00	0-105	3509.0	99.94
105-110	0.0	0.00	0-110	3509.0	99.94
110-115	0.0	0.00	0-115	3509.0	99.94
115-120	0.0	0.00	0-120	3509.0	99.94
120-125	0.0	0.00	0-125	3509.0	99.94
125-130	0.0	0.00	0-130	3509.0	99.94
130-135	0.0	0.00	0-135	3509.0	99.94
135-140	0.0	0.00	0-140	3509.0	99.94
140-145	0.1	0.00	0-145	3509.1	99.94
145-150	0.2	0.01	0-150	3509.3	99.95
150-155	0.4	0.01	0-155	3509.7	99.96
155-160	0.4	0.01	0-160	3510.1	99.97
160-165	0.4	0.01	0-165	3510.5	99.98
165-170	0.3	0.01	0-170	3510.8	99.99
170-175	0.2	0.01	0-175	3511.1	100.00
175-180	0.0	0.00	0-180	3511.1	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*****