TL-749

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/DIM120V

Report Type:	Electrical and Photometric tests including: Luminous Flux, Chromaticity, Luminous Intensity Distribution
Test Engineer:	Joker Gu
Report Number:	RKSB200515003-10-1
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/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:	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°C±1°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 Urel=2.61% (k=2), at the 95% confidence level. The uncertainty of the correlated color temperature measurements is U=34K (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_f, 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	0.1563	18.15	0.9674	2197.72	121.09

Radiant Flux (W)	CCT (K)	Duv	x	y	u'	v'
6.770	2742	0.00117	0.4584	0.4134	0.2603	0.5282

Color Rendering Index

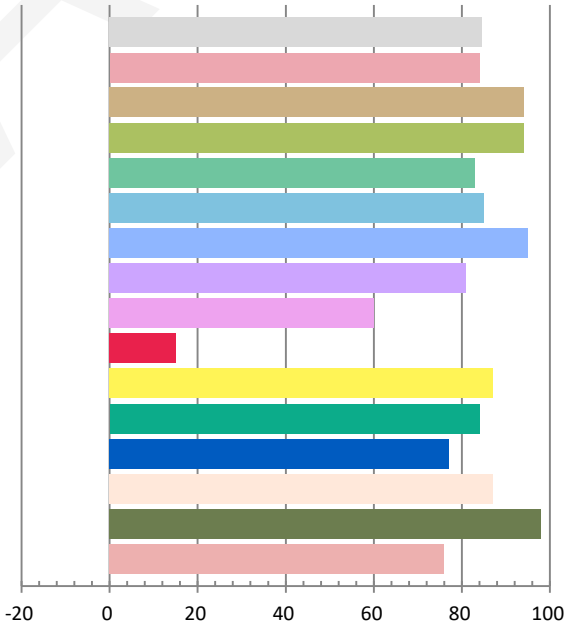
Ra
84.5

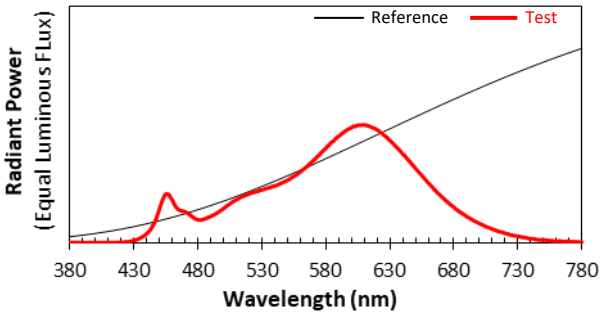
R1	R2	R3	R4
84	94	94	83

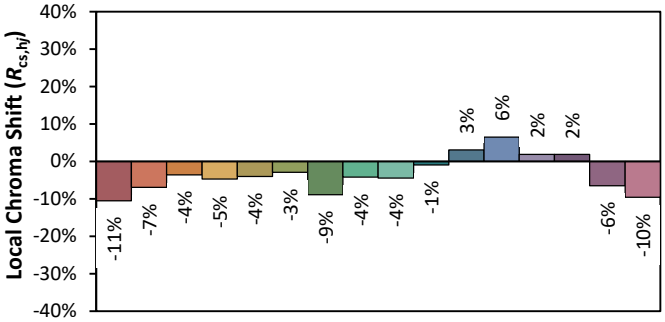
R5	R6	R7	R8
85	95	81	60

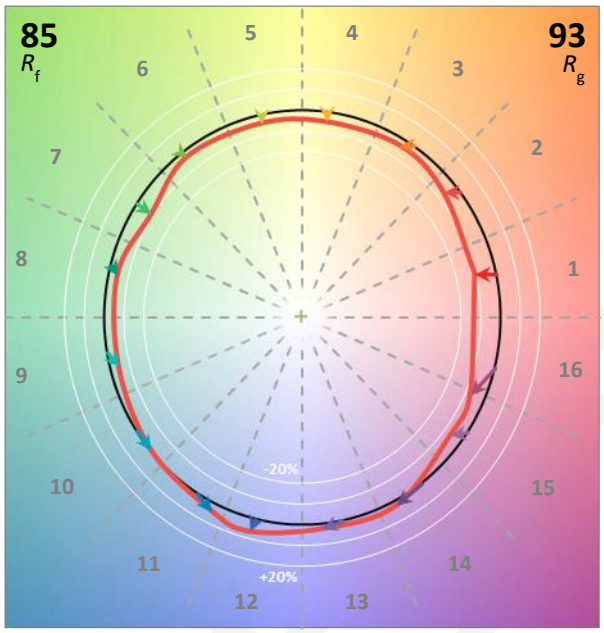
R9	R10	R11	R12
15	87	84	77

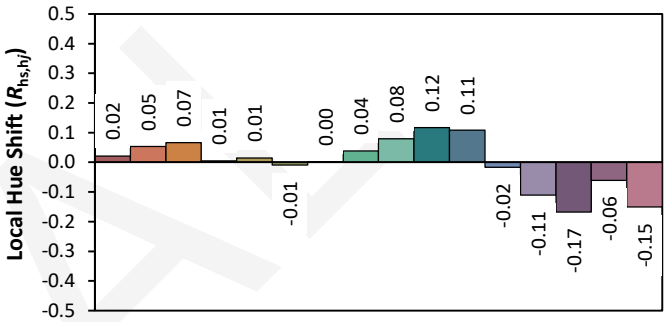
R13	R14	R15
87	98	76

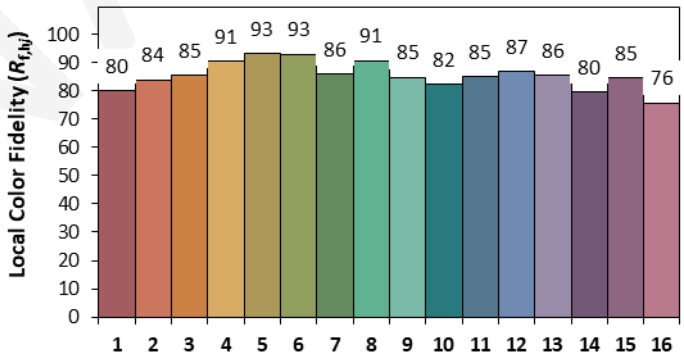


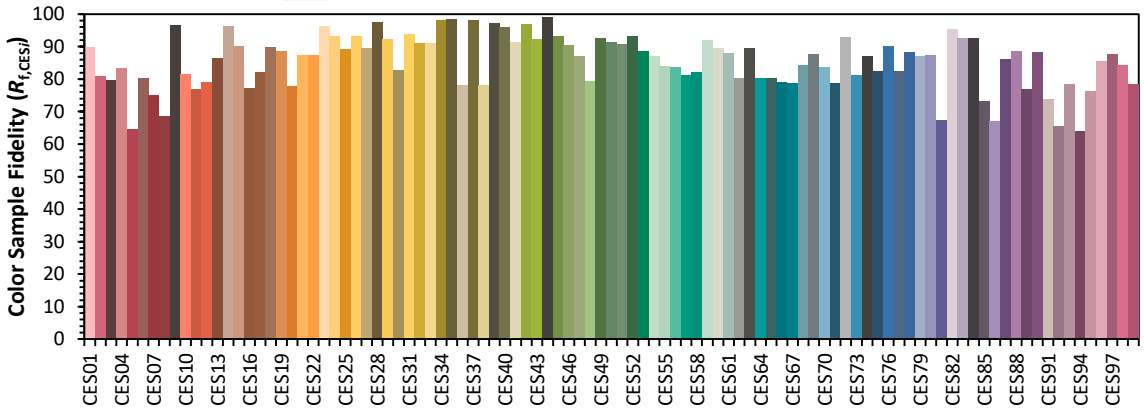

Reference
Test
Radiant Power
(Equal Luminous Flux)
380 430 480 530 580 630 680 730 780
Wavelength (nm)


Local Chroma Shift ($R_{cs,hj}$)
40% 30% 20% 10% 0% -10% -20% -30% -40%
-11% -7% -4% -5% -4% -3% -9% -4% -4% -1% 3% 6% 2% 2% -6% -10%

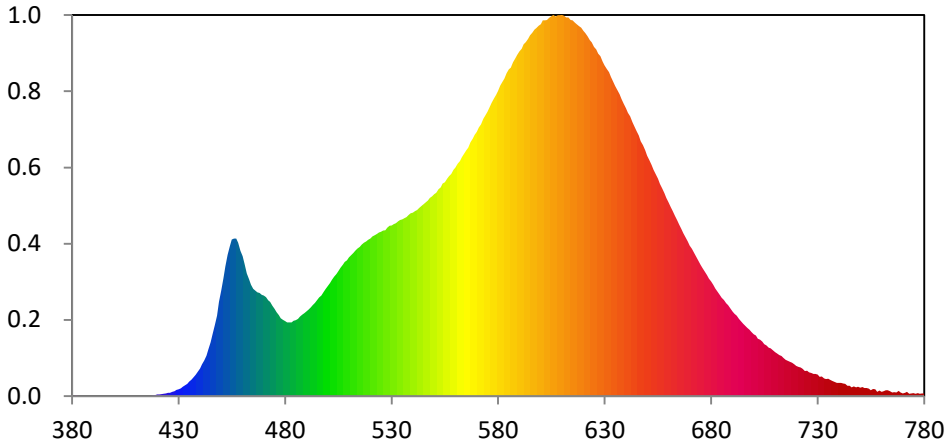

85
R_f
93
R_g
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
-20%
+20%


Local Hue Shift ($R_{hs,hj}$)
0.5 0.4 0.3 0.2 0.1 0.0 -0.1 -0.2 -0.3 -0.4 -0.5
0.02 0.05 0.07 0.01 0.01 -0.01 0.00 0.04 0.08 0.12 0.11 -0.02 -0.11 -0.17 -0.06 -0.15


Local Color Fidelity ($R_{f,hj}$)
100 90 80 70 60 50 40 30 20 10 0
80 84 85 91 93 93 86 91 85 82 85 87 86 80 85 76
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
Hue-Angle Bin (j)


Color Sample Fidelity ($R_{f,CESi}$)
100 90 80 70 60 50 40 30 20 10 0
CES01 CES04 CES07 CES10 CES13 CES16 CES19 CES22 CES25 CES28 CES31 CES34 CES37 CES40 CES43 CES46 CES49 CES52 CES55 CES58 CES61 CES64 CES67 CES70 CES73 CES76 CES79 CES82 CES85 CES88 CES91 CES94 CES97

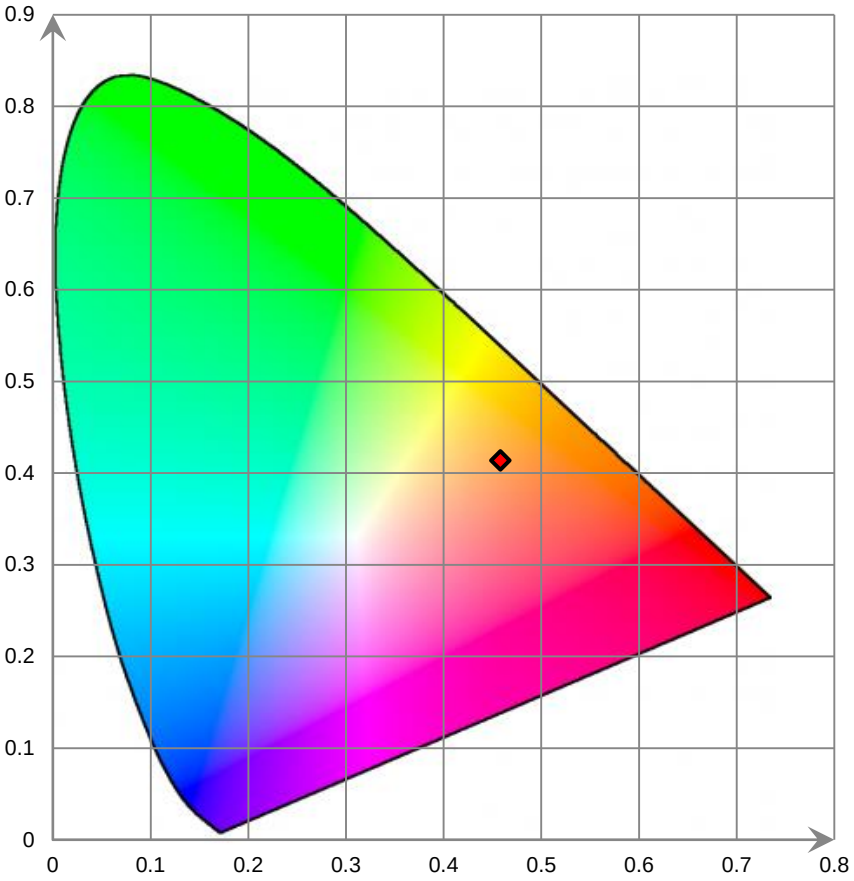
Relative Spectral Power Distribution



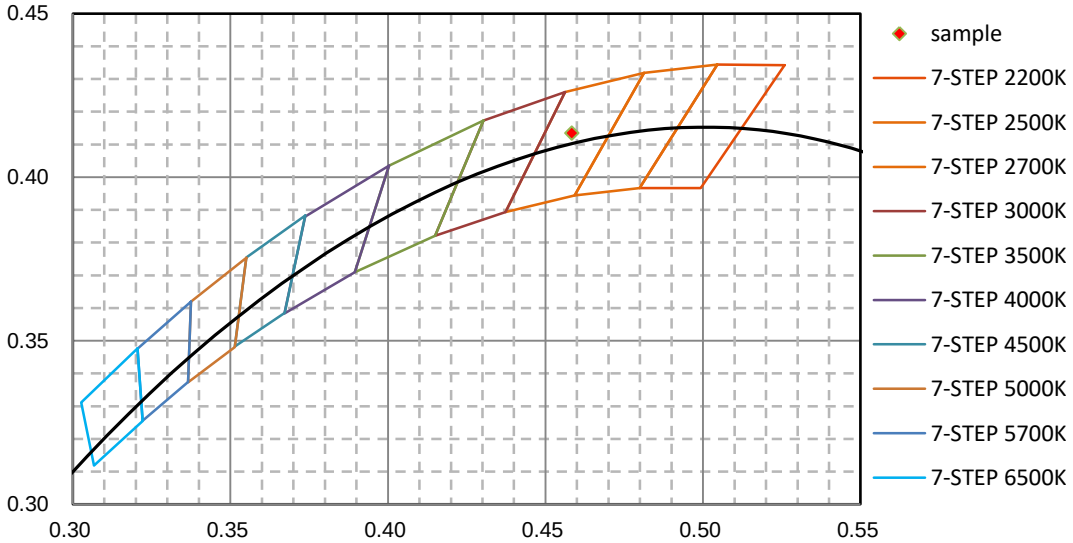
nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
380	1.370E-02	421	2.092E-01	462	1.551E+01	503	1.507E+01	544	2.401E+01
381	8.900E-02	422	2.184E-01	463	1.477E+01	504	1.540E+01	545	2.423E+01
382	1.067E-01	423	2.846E-01	464	1.405E+01	505	1.576E+01	546	2.446E+01
383	1.540E-02	424	3.115E-01	465	1.352E+01	506	1.622E+01	547	2.473E+01
384	4.620E-02	425	3.771E-01	466	1.329E+01	507	1.657E+01	548	2.502E+01
385	5.580E-02	426	4.046E-01	467	1.308E+01	508	1.694E+01	549	2.524E+01
386	4.400E-03	427	5.012E-01	468	1.300E+01	509	1.715E+01	550	2.553E+01
387	4.950E-02	428	6.105E-01	469	1.279E+01	510	1.751E+01	551	2.567E+01
388	3.340E-02	429	7.468E-01	470	1.268E+01	511	1.780E+01	552	2.615E+01
389	1.870E-02	430	8.394E-01	471	1.248E+01	512	1.807E+01	553	2.637E+01
390	7.280E-02	431	9.659E-01	472	1.209E+01	513	1.837E+01	554	2.686E+01
391	2.200E-02	432	1.163E+00	473	1.190E+01	514	1.866E+01	555	2.701E+01
392	4.600E-03	433	1.344E+00	474	1.139E+01	515	1.884E+01	556	2.747E+01
393	2.100E-03	434	1.526E+00	475	1.101E+01	516	1.912E+01	557	2.777E+01
394	8.600E-03	435	1.802E+00	476	1.061E+01	517	1.938E+01	558	2.805E+01
395	2.500E-02	436	2.068E+00	477	1.022E+01	518	1.953E+01	559	2.862E+01
396	3.230E-02	437	2.371E+00	478	9.836E+00	519	1.973E+01	560	2.889E+01
397	2.040E-02	438	2.655E+00	479	9.621E+00	520	1.992E+01	561	2.937E+01
398	2.060E-02	439	3.077E+00	480	9.443E+00	521	2.020E+01	562	2.970E+01
399	6.600E-03	440	3.479E+00	481	9.310E+00	522	2.030E+01	563	3.019E+01
400	2.000E-04	441	3.990E+00	482	9.283E+00	523	2.046E+01	564	3.063E+01
401	2.840E-02	442	4.465E+00	483	9.299E+00	524	2.065E+01	565	3.105E+01
402	3.030E-02	443	5.103E+00	484	9.483E+00	525	2.075E+01	566	3.140E+01
403	1.500E-02	444	5.876E+00	485	9.584E+00	526	2.091E+01	567	3.207E+01
404	3.360E-02	445	6.793E+00	486	9.749E+00	527	2.094E+01	568	3.253E+01
405	3.570E-02	446	7.782E+00	487	1.000E+01	528	2.126E+01	569	3.301E+01
406	1.500E-02	447	8.950E+00	488	1.025E+01	529	2.151E+01	570	3.342E+01
407	7.390E-02	448	1.016E+01	489	1.047E+01	530	2.156E+01	571	3.395E+01
408	1.380E-02	449	1.187E+01	490	1.066E+01	531	2.171E+01	572	3.434E+01
409	7.180E-02	450	1.331E+01	491	1.091E+01	532	2.185E+01	573	3.504E+01
410	6.330E-02	451	1.490E+01	492	1.119E+01	533	2.207E+01	574	3.544E+01
411	5.190E-02	452	1.639E+01	493	1.149E+01	534	2.222E+01	575	3.592E+01
412	6.140E-02	453	1.784E+01	494	1.175E+01	535	2.235E+01	576	3.653E+01
413	3.040E-02	454	1.894E+01	495	1.209E+01	536	2.249E+01	577	3.706E+01
414	3.390E-02	455	1.979E+01	496	1.244E+01	537	2.262E+01	578	3.759E+01
415	4.660E-02	456	1.989E+01	497	1.270E+01	538	2.291E+01	579	3.809E+01
416	5.590E-02	457	1.989E+01	498	1.312E+01	539	2.310E+01	580	3.854E+01
417	5.720E-02	458	1.938E+01	499	1.349E+01	540	2.318E+01	581	3.923E+01
418	1.081E-01	459	1.834E+01	500	1.388E+01	541	2.337E+01	582	3.974E+01
419	1.176E-01	460	1.767E+01	501	1.426E+01	542	2.351E+01	583	4.014E+01
420	1.805E-01	461	1.670E+01	502	1.467E+01	543	2.379E+01	584	4.082E+01

nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
585	4.132E+01	626	4.381E+01	667	2.059E+01	708	6.002E+00	749	1.156E+00
586	4.152E+01	627	4.328E+01	668	2.007E+01	709	5.756E+00	750	1.053E+00
587	4.220E+01	628	4.297E+01	669	1.955E+01	710	5.547E+00	751	1.109E+00
588	4.266E+01	629	4.229E+01	670	1.902E+01	711	5.358E+00	752	1.007E+00
589	4.313E+01	630	4.178E+01	671	1.859E+01	712	5.172E+00	753	9.953E-01
590	4.356E+01	631	4.134E+01	672	1.807E+01	713	5.034E+00	754	9.039E-01
591	4.388E+01	632	4.094E+01	673	1.758E+01	714	4.794E+00	755	7.209E-01
592	4.445E+01	633	4.035E+01	674	1.709E+01	715	4.558E+00	756	8.974E-01
593	4.473E+01	634	3.971E+01	675	1.660E+01	716	4.448E+00	757	8.189E-01
594	4.514E+01	635	3.922E+01	676	1.617E+01	717	4.337E+00	758	5.014E-01
595	4.560E+01	636	3.867E+01	677	1.573E+01	718	4.187E+00	759	6.721E-01
596	4.594E+01	637	3.817E+01	678	1.530E+01	719	3.977E+00	760	5.191E-01
597	4.630E+01	638	3.754E+01	679	1.485E+01	720	3.803E+00	761	5.860E-01
598	4.652E+01	639	3.695E+01	680	1.447E+01	721	3.660E+00	762	7.008E-01
599	4.679E+01	640	3.636E+01	681	1.404E+01	722	3.600E+00	763	7.167E-01
600	4.702E+01	641	3.582E+01	682	1.359E+01	723	3.444E+00	764	5.805E-01
601	4.748E+01	642	3.538E+01	683	1.320E+01	724	3.148E+00	765	4.160E-01
602	4.748E+01	643	3.463E+01	684	1.278E+01	725	3.170E+00	766	4.575E-01
603	4.755E+01	644	3.409E+01	685	1.240E+01	726	2.964E+00	767	4.478E-01
604	4.782E+01	645	3.348E+01	686	1.214E+01	727	2.902E+00	768	6.222E-01
605	4.801E+01	646	3.291E+01	687	1.174E+01	728	2.784E+00	769	4.160E-01
606	4.817E+01	647	3.221E+01	688	1.147E+01	729	2.765E+00	770	3.096E-01
607	4.800E+01	648	3.169E+01	689	1.108E+01	730	2.697E+00	771	3.700E-01
608	4.815E+01	649	3.108E+01	690	1.067E+01	731	2.428E+00	772	5.101E-01
609	4.816E+01	650	3.037E+01	691	1.040E+01	732	2.451E+00	773	2.857E-01
610	4.817E+01	651	2.981E+01	692	1.015E+01	733	2.211E+00	774	2.986E-01
611	4.805E+01	652	2.921E+01	693	9.756E+00	734	2.122E+00	775	3.662E-01
612	4.788E+01	653	2.860E+01	694	9.462E+00	735	2.169E+00	776	2.613E-01
613	4.787E+01	654	2.802E+01	695	9.151E+00	736	2.026E+00	777	3.470E-01
614	4.754E+01	655	2.747E+01	696	8.852E+00	737	1.894E+00	778	2.498E-01
615	4.749E+01	656	2.683E+01	697	8.609E+00	738	1.767E+00	779	2.931E-01
616	4.720E+01	657	2.623E+01	698	8.372E+00	739	1.663E+00	780	2.971E-01
617	4.697E+01	658	2.564E+01	699	8.071E+00	740	1.632E+00		
618	4.679E+01	659	2.504E+01	700	7.785E+00	741	1.634E+00		
619	4.657E+01	660	2.447E+01	701	7.616E+00	742	1.566E+00		
620	4.618E+01	661	2.386E+01	702	7.245E+00	743	1.525E+00		
621	4.590E+01	662	2.336E+01	703	7.092E+00	744	1.276E+00		
622	4.548E+01	663	2.278E+01	704	6.871E+00	745	1.289E+00		
623	4.499E+01	664	2.220E+01	705	6.548E+00	746	1.077E+00		
624	4.472E+01	665	2.169E+01	706	6.388E+00	747	1.203E+00		
625	4.414E+01	666	2.110E+01	707	6.111E+00	748	1.084E+00		

CIE 1931xy Chromaticity Diagram



7-StepChromaticity Quadrangles



[Goniophotometer System]

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

Test orientation: **Downward**

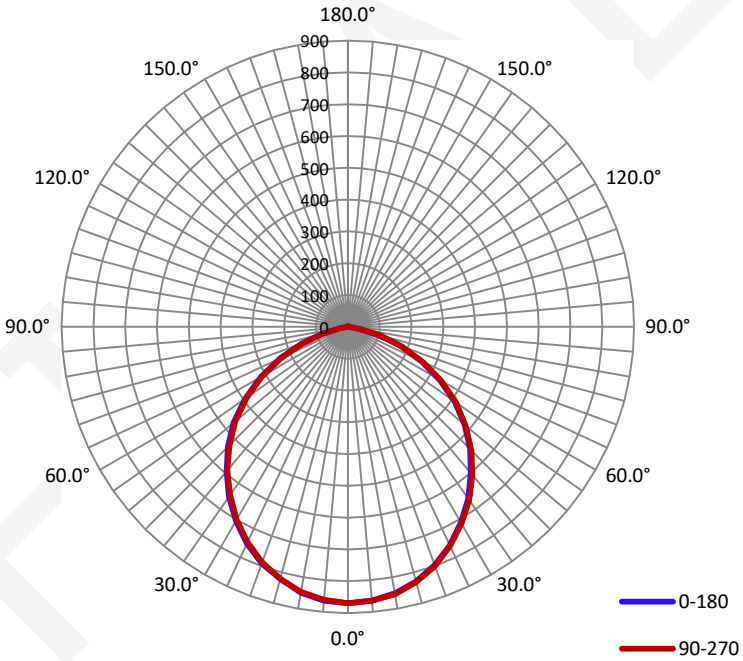
Electrical Measurement

Input Voltage(V)	Frequency(Hz)	Input Current(A)	Power (W)	Power Factor
120.0	60	0.1560	18.2	0.9730

Photometric Measurement

Luminous Flux(lm)	Efficacy(lm/W)	I_{max}(cd)	S/MH(C0/180)	S/MH(C90/270)
2203.7	121.13	869.6	1.21	1.21

Luminous Intensity Distribution



	C0/180	C45/225	C90/270	C135/315	AVG.
Beam Angle(50%I_{max}):	105.5	105.7	105.4	105.6	105.6
Field Angle(10%I_{max}):	150.8	151.0	150.8	150.8	150.9

Luminous Intensity (cd) Distribution Data

C / γ	0°	22.5°	45°	67.5°	90°	112.5°	135°	157.5°
0.0°	870	870	870	870	870	870	870	870
5.0°	864	866	868	863	864	869	865	866
10.0°	851	852	853	854	854	857	853	852
15.0°	829	832	831	832	831	833	830	829
20.0°	797	800	802	802	801	803	799	798
25.0°	759	759	762	764	761	764	760	759
30.0°	711	714	716	717	714	716	712	711
35.0°	661	663	665	666	665	666	662	659
40.0°	602	603	609	610	610	609	607	604
45.0°	544	548	550	550	550	551	546	542
50.0°	481	483	487	487	484	486	482	479
55.0°	410	413	418	417	416	414	411	406
60.0°	334	337	341	341	338	337	332	327
65.0°	256	259	261	262	260	257	252	248
70.0°	177	181	183	182	180	178	173	167
75.0°	102	105	108	107	105	102	99	94
80.0°	37	39	42	42	40	38	35	31
85.0°	7	8	9	8	8	8	8	6
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	1	1	1	1	1	1
160.0°	1	1	1	1	1	1	1	1
165.0°	1	1	2	2	1	1	2	1
170.0°	1	1	1	1	1	1	2	2
175.0°	1	2	2	2	2	2	2	2
180.0°	0	0	0	0	0	0	0	0

Luminous Intensity (cd) Distribution Data (cont.)

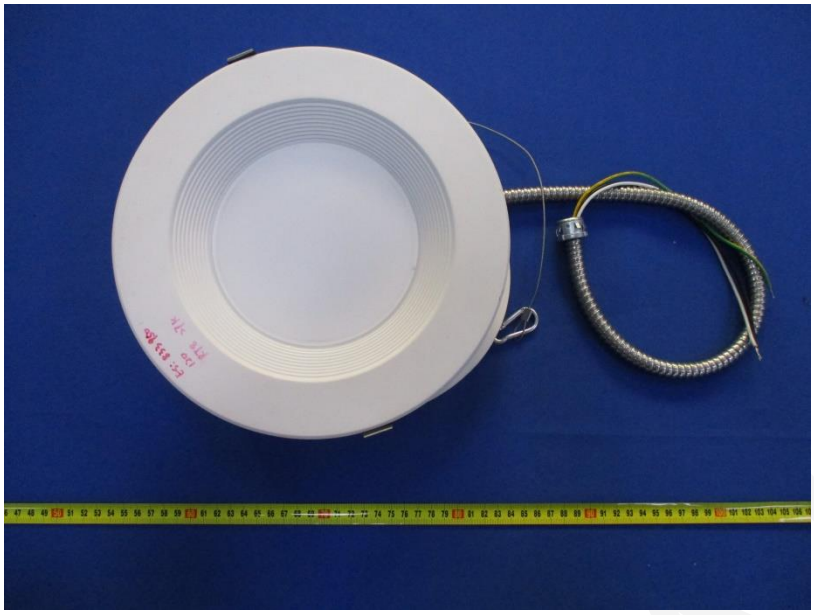
C / γ	180°	202.5°	225°	247.5°	270°	292.5°	315°	337.5°
0.0°	870	870	870	870	870	870	870	870
5.0°	864	863	864	861	862	865	865	866
10.0°	849	847	848	848	847	850	848	850
15.0°	820	823	822	822	821	824	825	827
20.0°	792	790	788	788	788	791	790	794
25.0°	751	749	743	746	747	751	747	754
30.0°	703	701	700	701	699	703	705	708
35.0°	651	650	646	646	645	651	650	656
40.0°	593	592	590	589	590	593	594	599
45.0°	534	530	529	529	526	533	535	539
50.0°	468	466	465	463	462	467	468	473
55.0°	394	392	390	388	388	393	395	400
60.0°	316	313	310	309	311	313	317	324
65.0°	235	231	229	230	231	233	238	244
70.0°	155	153	151	150	151	156	159	164
75.0°	81	79	78	78	79	82	85	89
80.0°	23	21	20	21	22	23	26	28
85.0°	4	5	4	4	4	5	5	6
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	1	1	1
160.0°	0	0	1	1	1	1	1	1
165.0°	0	1	1	1	1	1	2	1
170.0°	1	1	2	2	2	2	2	2
175.0°	1	1	2	2	2	2	2	2
180.0°	0	0	0	0	0	0	0	0

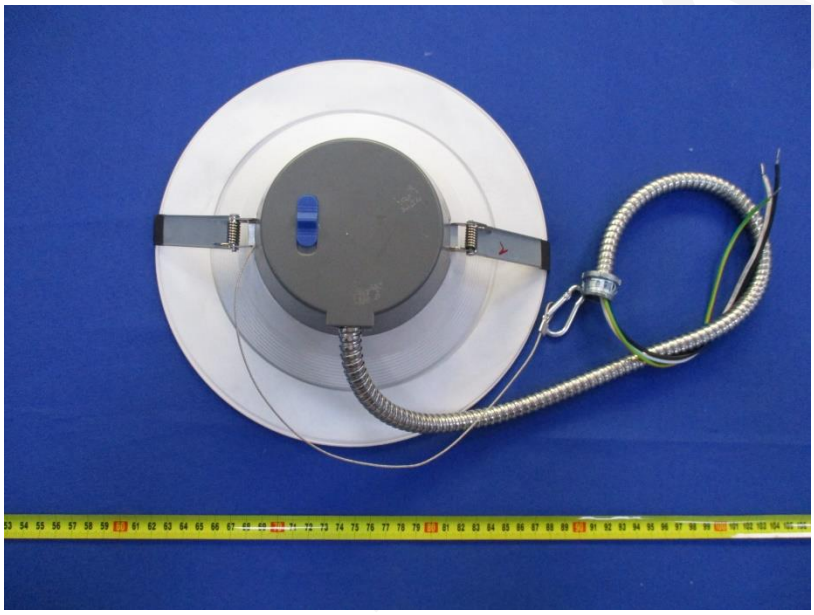
Zonal Lumen Density Measurement

Deg	Flux (lm)	%
0-5	20.7	0.94
5-10	61.4	2.78
10-15	99.5	4.52
15-20	133.7	6.07
20-25	162.5	7.38
25-30	185.1	8.40
30-35	200.9	9.12
35-40	209.5	9.51
40-45	210.9	9.57
45-50	205.0	9.30
50-55	190.8	8.66
55-60	168.2	7.63
60-65	138.6	6.29
65-70	104.2	4.73
70-75	67.5	3.06
75-80	32.8	1.49
80-85	9.9	0.45
85-90	1.7	0.08
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	0.1	0.00
155-160	0.1	0.01
160-165	0.2	0.01
165-170	0.2	0.01
170-175	0.1	0.01
175-180	0.0	0.00

Deg	Flux (lm)	%
0-5	20.7	0.94
0-10	82.1	3.73
0-15	181.6	8.24
0-20	315.3	14.31
0-25	477.9	21.68
0-30	663.0	30.08
0-35	863.9	39.20
0-40	1073.4	48.71
0-45	1284.3	58.28
0-50	1489.4	67.59
0-55	1680.2	76.24
0-60	1848.3	83.88
0-65	1987.0	90.17
0-70	2091.1	94.89
0-75	2158.6	97.96
0-80	2191.4	99.44
0-85	2201.3	99.89
0-90	2203.0	99.97
0-95	2203.0	99.97
0-100	2203.0	99.97
0-105	2203.0	99.97
0-110	2203.0	99.97
0-115	2203.0	99.97
0-120	2203.0	99.97
0-125	2203.0	99.97
0-130	2203.0	99.97
0-135	2203.0	99.97
0-140	2203.0	99.97
0-145	2203.0	99.97
0-150	2203.0	99.97
0-155	2203.1	99.97
0-160	2203.2	99.98
0-165	2203.4	99.99
0-170	2203.5	99.99
0-175	2203.6	100.00
0-180	2203.7	100.00

6. Product Photo





**********END OF REPORT**********