

IES LM-79-08

MEASUREMENT AND TEST REPORT

For

Ledxens Technology (Shenzhen) Co., Ltd

907, Building 4, Jinglong Road 89, Luogang, Buji, Longgang District, Shenzhen, P.R. China

Test Model: CL-X11-1328

Report Type:	Electrical and Photometric tests including: Luminous Flux, Power Factor, Chromaticity, Luminous Intensity Distribution
Test Engineer:	Hexy He
Report Number:	RSZ180124527-10-1
Test Date:	2018-02-13
Report Date:	2018-03-02
Reviewed By:	Blake Zhang / EE Engineer
Prepared By:	Bay Area Compliance Laboratories Corp. (Dongguan). No.69,Pulongcun ,Puxinhu Industrial Area, Tangxia , Dongguan, Guangdong, China. Tel: +86-0769-86858888 Fax:+86-0769-86858588
Accreditation:	The IAS Accreditation Number TL-460.

1. Product Description

General Information:

One sample was received on 2018-01-24 and used for testing.

Model Tested: CL-X11-1328
Manufacturer: Zhongshan Shining Star Lighting Co., Ltd
Brand Name: LEDVIA
Product Designation: Ceiling Mount LED Luminaires
Burning Time Before Test: 0hour(For New Products)

Rated Values:

Rated Voltage/Frequency: 120V 60Hz
Rated Power: 28W
Nominal CCT: 3000K
Nominal Lumen Output: 1960 lm

2. Standards Used

- IES LM-79-08: Approved Method: Electrical & Photometric Measurement of Solid-state Lighting Products
- ANSI C82.77-2002: Harmonic Emission Limits – Related Power Quality Requirements for Lighting
- IES TM-30-15: IES Method for Evaluating Light Source Color Rendition (This method is not in IAS accreditation scope)

3. Description of Test Equipment

Device	Manufacture	Model No	Serial No	Calibration date	Calibration due date
2.0m integrating sphere	EVERFINE	R98	11010018	2017-11-18	2018-11-18
spectroradiometer	EVERFINE	HAAS-2000	20140912	2017-11-18	2018-11-18
Digital Power Meter	EVERFINE	PF2010A	1011004	2017-07-29	2018-07-29
Digital CC&CV DC Power Supply	EVERFINE	WY305-V1	1101047	2017-07-07	2018-07-07
Rapid Recording Photometer	EVERFINE	PHOTO-2000F	1007010	2017-11-18	2018-11-18
Standard Light Source	SENSING	N/A	LSD090808	2017-12-05	2018-12-05
Special zero-voltage synchronous switching AC	EVERFINE	DPS1010-YF	1011001T	2017-03-03	2018-03-03
AC POWER SUPPLY	EVERFINE	VPS1030 PWM	1012017	2017-03-03	2018-03-03
Digital CC&CV DC Power Supply	EVERFINE	WY12010	1009009	2017-03-03	2018-03-03
Digital power meter	YOKOGAWA	WT-210	91j926132	2017-03-03	2018-03-03
full-field speed goniophotometer	EVERFINE	GO-R5000	YG108492N10120001	2017-03-09	2018-03-09

Device	Manufacture	Model No	Serial No	Calibration date	Calibration due date
Wireless Remote Sensor	N/A	433MHz	N/A	2017-03-20	2018-03-20
Standard Light Source	EVERFINE	D908	1012003	2018-01-05	2019-01-05

Statement of Traceability: Bay Area Compliance Laboratories Corp. (Dongguan) 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 $U=1.9\%$ ($K=2$), at the 95% confidence level. The uncertainty of the correlated color temperature measurements is $U=25\text{K}$ ($K=2$), at the 95% confidence level. The uncertainty of the CRI is $U=1.9(K=2)$, at the 95% confidence level.

The uncertainty of power meter AC current $U=0.19\%$ of rdg, AC Voltage $U=0.18\%$ of rdg, Power $U=0.46\%$ ($K=2$), 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 intensity is $U=2.82\%$ ($K=2$), at the 95% confidence level.

Fidelity Index and Gamut Index Calculation

The R_i , R_g was calculated according to IES TM-30-15 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**

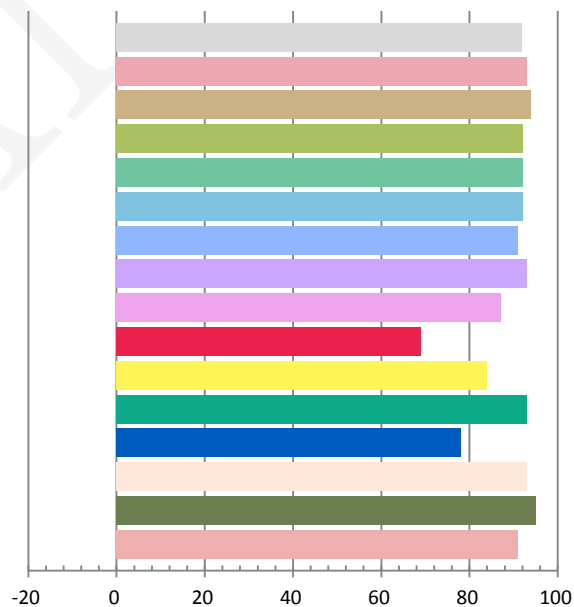
Photometric and Electrical Measurement Result

Voltage (V)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Luminous Flux(lm)	Efficacy (lm/W)
120	60	0.2409	28.33	0.9798	2009.2	70.92

Radiant Flux (W)	CCT (K)	Duv	x	y	u'	v'
7.2238	2984	-0.00150	0.4359	0.4000	0.2517	0.5196

Color Rendering Index

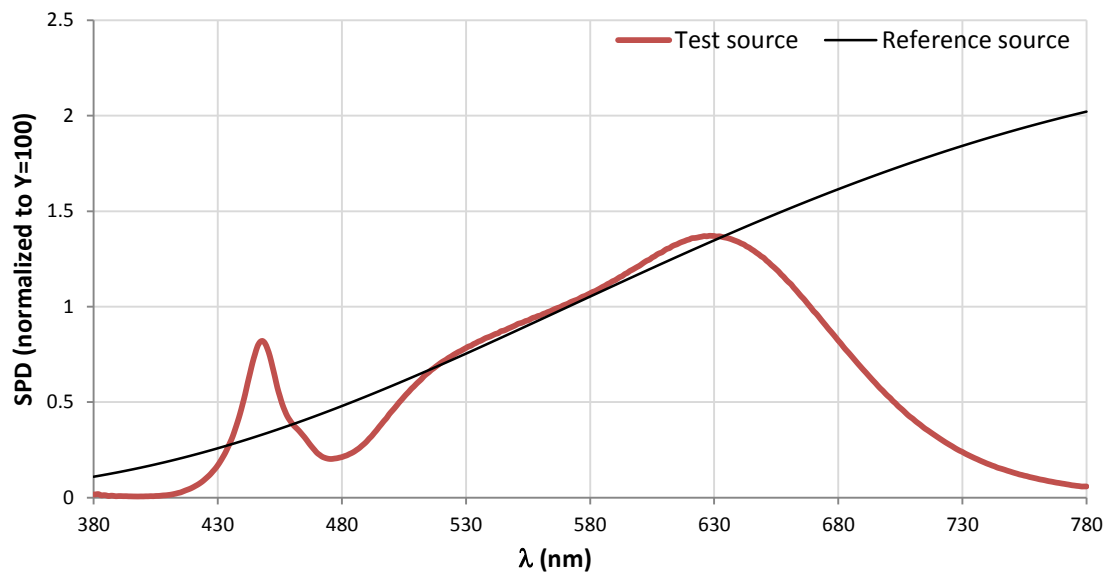
Ra			
91.9			
R1	R2	R3	R4
93	94	92	92
R5	R6	R7	R8
92	91	93	87
R9	R10	R11	R12
69	84	93	78
R13	R14	R15	
93	95	91	



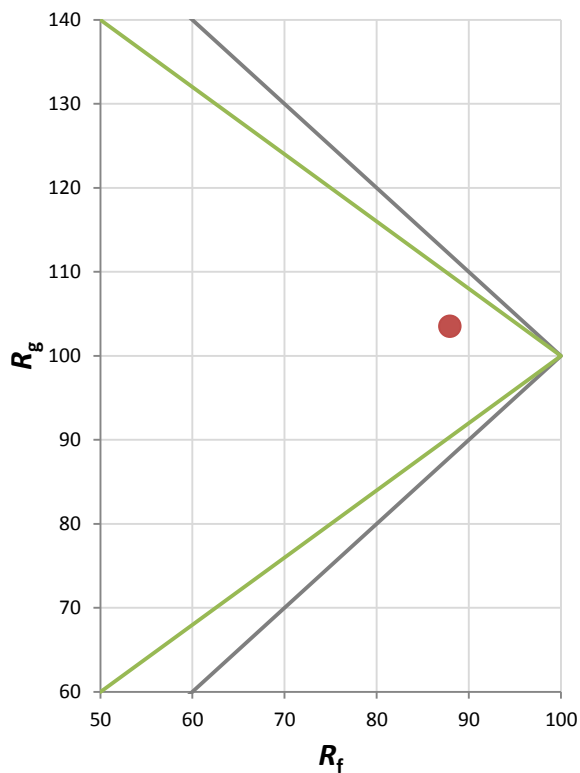
Fidelity Index and Gamut Index

Fidelity Index R_f	88
Gamut Index R_g	104

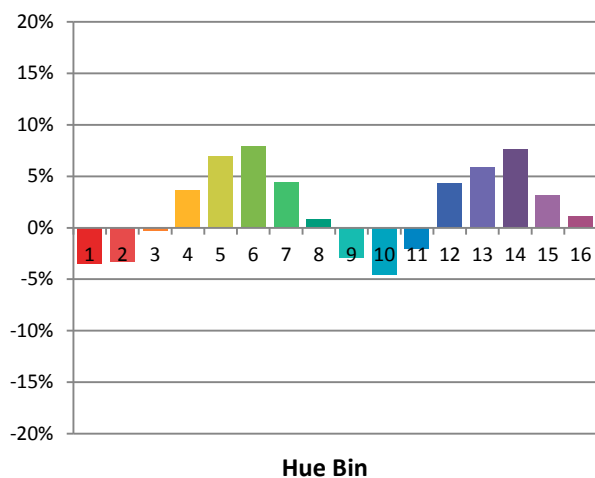
Spectral Power Distribution Comparison



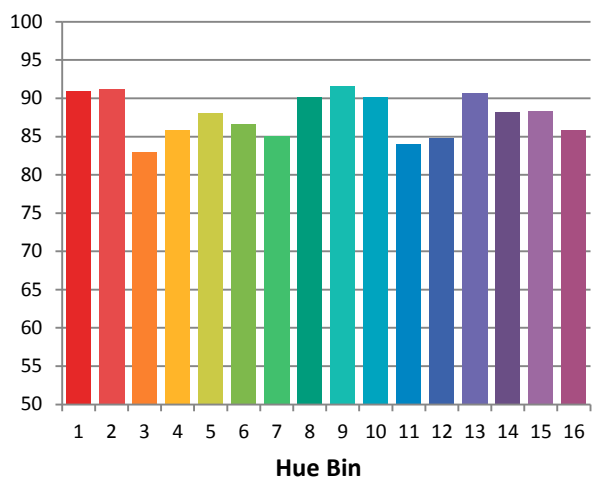
Plot of R_g versus R_f



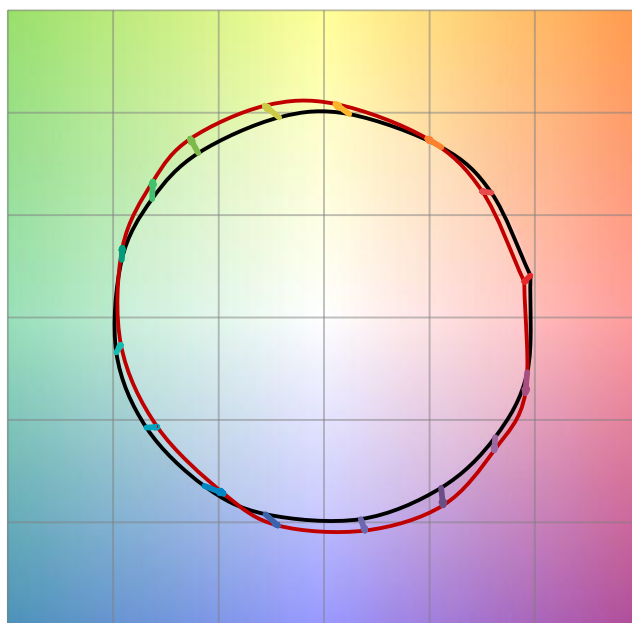
Chroma Shift by Hue



R_f by Hue

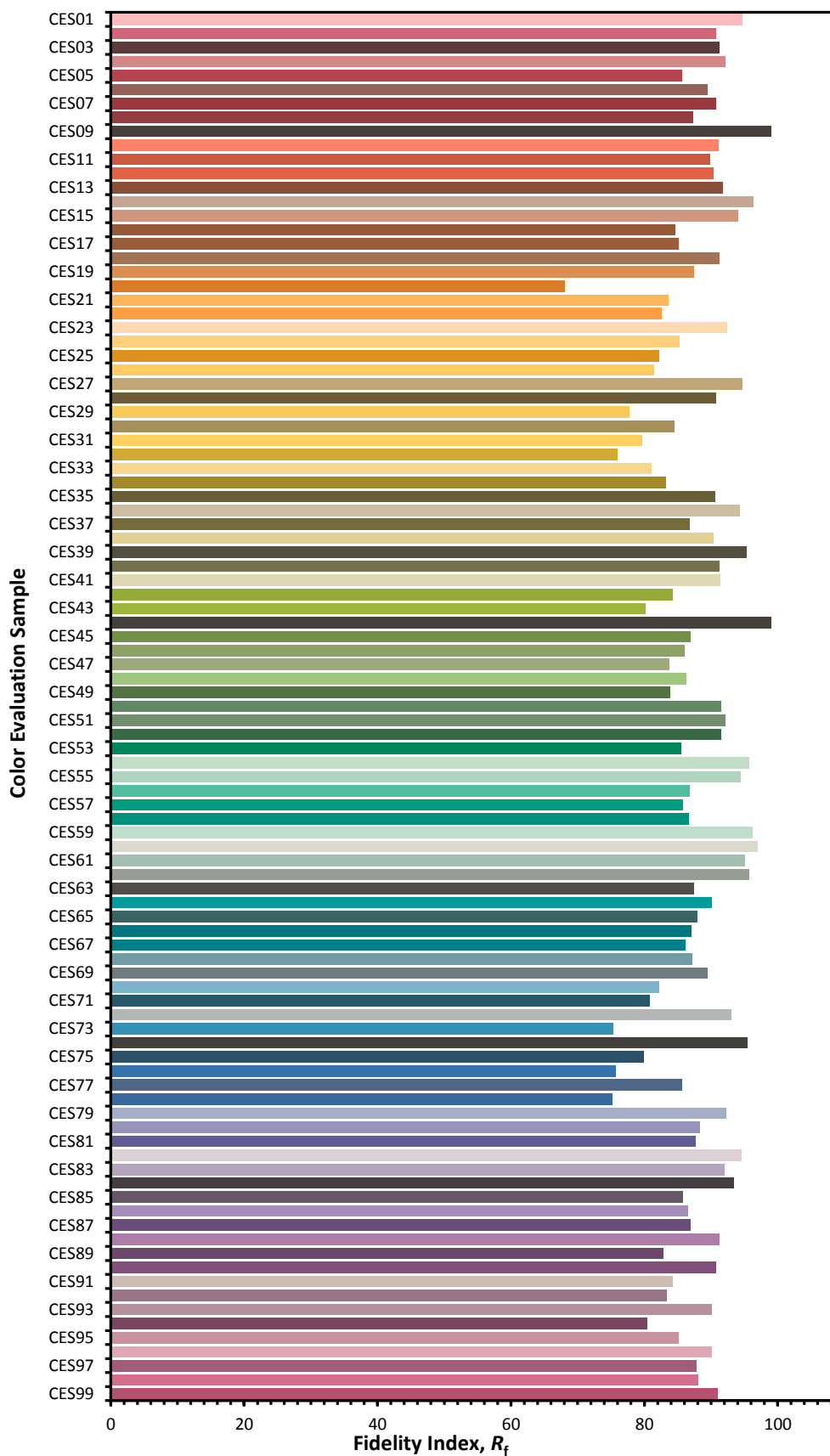


Color Vector Graphic

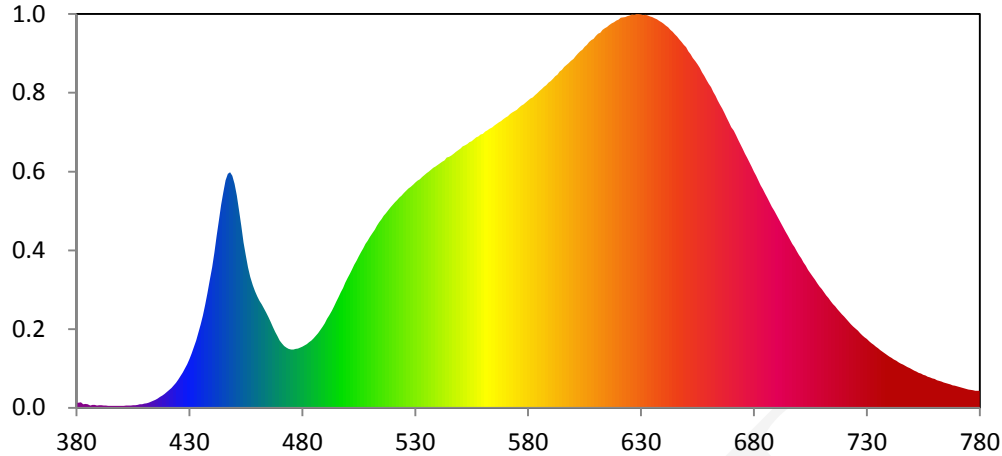


— Reference Illuminat — Test Source

Color Fidelity by CES Sample



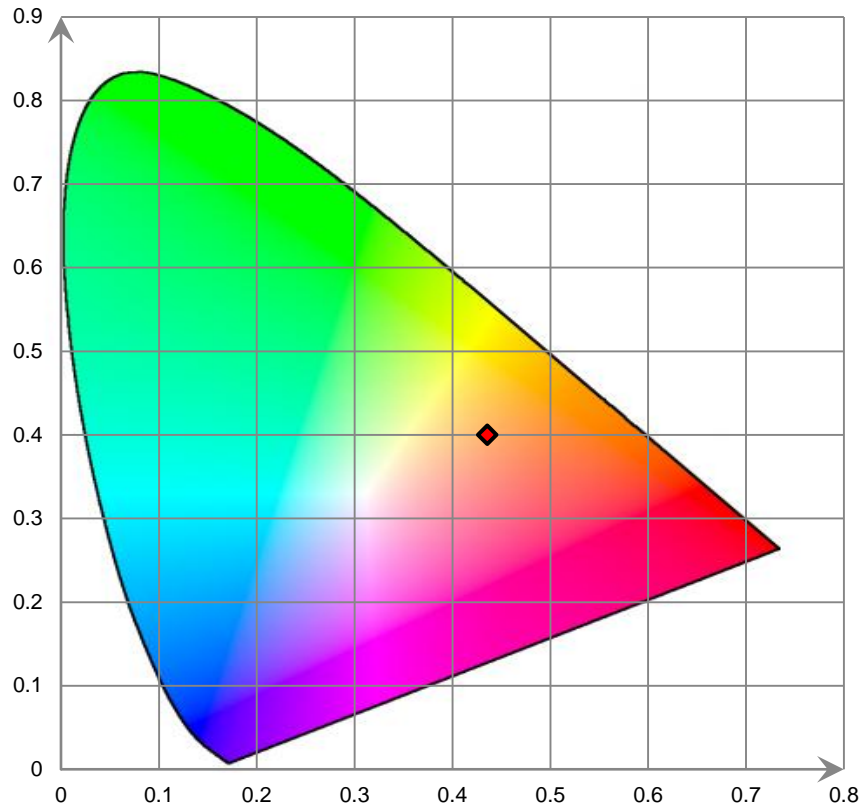
Relative Spectral Power Distribution



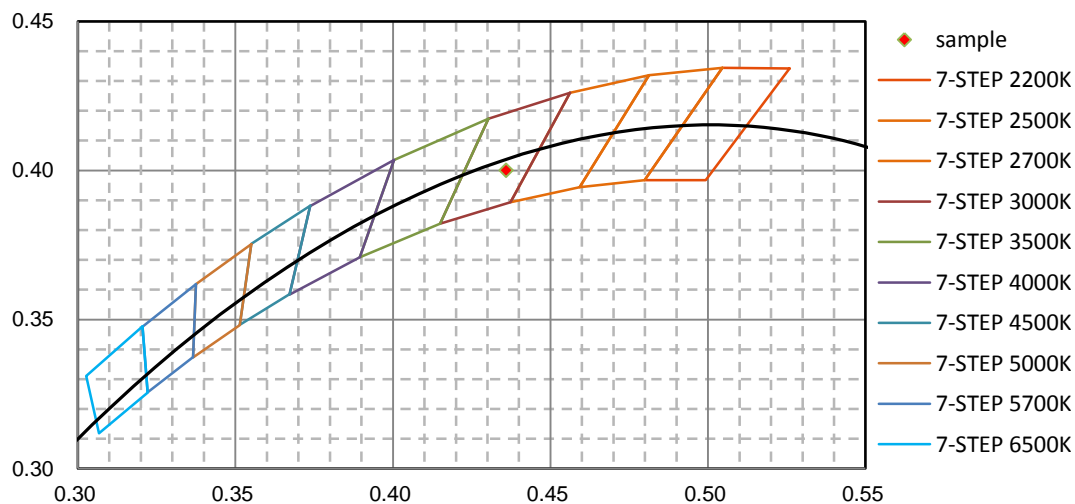
nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
380	4.875E-01	421	1.806E+00	462	1.059E+01	503	1.464E+01	544	2.562E+01
381	5.155E-01	422	2.024E+00	463	1.018E+01	504	1.506E+01	545	2.571E+01
382	5.452E-01	423	2.277E+00	464	9.728E+00	505	1.551E+01	546	2.585E+01
383	3.513E-01	424	2.560E+00	465	9.281E+00	506	1.594E+01	547	2.605E+01
384	3.839E-01	425	2.893E+00	466	8.775E+00	507	1.633E+01	548	2.621E+01
385	3.543E-01	426	3.231E+00	467	8.257E+00	508	1.677E+01	549	2.638E+01
386	2.431E-01	427	3.596E+00	468	7.782E+00	509	1.712E+01	550	2.656E+01
387	3.077E-01	428	4.040E+00	469	7.336E+00	510	1.752E+01	551	2.678E+01
388	2.771E-01	429	4.471E+00	470	6.891E+00	511	1.788E+01	552	2.688E+01
389	2.171E-01	430	4.989E+00	471	6.603E+00	512	1.823E+01	553	2.701E+01
390	2.468E-01	431	5.572E+00	472	6.326E+00	513	1.867E+01	554	2.720E+01
391	2.442E-01	432	6.212E+00	473	6.155E+00	514	1.901E+01	555	2.730E+01
392	2.251E-01	433	6.888E+00	474	6.038E+00	515	1.930E+01	556	2.750E+01
393	2.316E-01	434	7.692E+00	475	5.969E+00	516	1.966E+01	557	2.770E+01
394	2.063E-01	435	8.523E+00	476	5.964E+00	517	1.993E+01	558	2.780E+01
395	2.006E-01	436	9.430E+00	477	6.022E+00	518	2.023E+01	559	2.798E+01
396	1.894E-01	437	1.054E+01	478	6.069E+00	519	2.051E+01	560	2.806E+01
397	1.841E-01	438	1.170E+01	479	6.164E+00	520	2.080E+01	561	2.828E+01
398	1.791E-01	439	1.297E+01	480	6.247E+00	521	2.104E+01	562	2.841E+01
399	1.925E-01	440	1.440E+01	481	6.392E+00	522	2.126E+01	563	2.859E+01
400	1.892E-01	441	1.590E+01	482	6.515E+00	523	2.154E+01	564	2.872E+01
401	2.073E-01	442	1.760E+01	483	6.710E+00	524	2.175E+01	565	2.892E+01
402	2.101E-01	443	1.918E+01	484	6.884E+00	525	2.201E+01	566	2.909E+01
403	2.355E-01	444	2.078E+01	485	7.102E+00	526	2.223E+01	567	2.923E+01
404	2.201E-01	445	2.211E+01	486	7.366E+00	527	2.245E+01	568	2.936E+01
405	2.567E-01	446	2.331E+01	487	7.631E+00	528	2.262E+01	569	2.958E+01
406	2.679E-01	447	2.396E+01	488	7.969E+00	529	2.285E+01	570	2.973E+01
407	2.991E-01	448	2.414E+01	489	8.292E+00	530	2.306E+01	571	2.987E+01
408	3.461E-01	449	2.378E+01	490	8.657E+00	531	2.328E+01	572	3.009E+01
409	3.644E-01	450	2.293E+01	491	9.098E+00	532	2.340E+01	573	3.025E+01
410	4.104E-01	451	2.176E+01	492	9.473E+00	533	2.365E+01	574	3.039E+01
411	4.585E-01	452	2.022E+01	493	9.948E+00	534	2.382E+01	575	3.053E+01
412	5.345E-01	453	1.864E+01	494	1.039E+01	535	2.404E+01	576	3.075E+01
413	6.165E-01	454	1.696E+01	495	1.089E+01	536	2.418E+01	577	3.096E+01
414	7.180E-01	455	1.563E+01	496	1.135E+01	537	2.439E+01	578	3.108E+01
415	8.063E-01	456	1.438E+01	497	1.183E+01	538	2.459E+01	579	3.128E+01
416	9.568E-01	457	1.340E+01	498	1.225E+01	539	2.472E+01	580	3.147E+01
417	1.112E+00	458	1.255E+01	499	1.281E+01	540	2.487E+01	581	3.168E+01
418	1.253E+00	459	1.194E+01	500	1.326E+01	541	2.506E+01	582	3.181E+01
419	1.405E+00	460	1.140E+01	501	1.369E+01	542	2.523E+01	583	3.202E+01
420	1.594E+00	461	1.096E+01	502	1.415E+01	543	2.534E+01	584	3.223E+01

nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
585	3.246E+01	626	4.029E+01	667	3.019E+01	708	1.274E+01	749	4.049E+00
586	3.264E+01	627	4.025E+01	668	2.971E+01	709	1.243E+01	750	3.927E+00
587	3.289E+01	628	4.033E+01	669	2.926E+01	710	1.216E+01	751	3.805E+00
588	3.307E+01	629	4.032E+01	670	2.875E+01	711	1.182E+01	752	3.700E+00
589	3.332E+01	630	4.030E+01	671	2.838E+01	712	1.152E+01	753	3.574E+00
590	3.348E+01	631	4.022E+01	672	2.793E+01	713	1.124E+01	754	3.489E+00
591	3.372E+01	632	4.026E+01	673	2.744E+01	714	1.092E+01	755	3.385E+00
592	3.397E+01	633	4.018E+01	674	2.697E+01	715	1.062E+01	756	3.308E+00
593	3.414E+01	634	4.009E+01	675	2.651E+01	716	1.038E+01	757	3.190E+00
594	3.444E+01	635	4.002E+01	676	2.603E+01	717	1.011E+01	758	3.106E+00
595	3.462E+01	636	3.992E+01	677	2.559E+01	718	9.845E+00	759	3.018E+00
596	3.491E+01	637	3.979E+01	678	2.514E+01	719	9.584E+00	760	2.934E+00
597	3.510E+01	638	3.964E+01	679	2.467E+01	720	9.328E+00	761	2.834E+00
598	3.532E+01	639	3.950E+01	680	2.419E+01	721	9.068E+00	762	2.762E+00
599	3.554E+01	640	3.934E+01	681	2.376E+01	722	8.819E+00	763	2.695E+00
600	3.575E+01	641	3.914E+01	682	2.326E+01	723	8.567E+00	764	2.603E+00
601	3.603E+01	642	3.899E+01	683	2.280E+01	724	8.334E+00	765	2.523E+00
602	3.630E+01	643	3.871E+01	684	2.239E+01	725	8.108E+00	766	2.461E+00
603	3.652E+01	644	3.853E+01	685	2.195E+01	726	7.884E+00	767	2.382E+00
604	3.668E+01	645	3.826E+01	686	2.150E+01	727	7.638E+00	768	2.307E+00
605	3.698E+01	646	3.802E+01	687	2.105E+01	728	7.419E+00	769	2.254E+00
606	3.718E+01	647	3.773E+01	688	2.060E+01	729	7.217E+00	770	2.183E+00
607	3.746E+01	648	3.747E+01	689	2.017E+01	730	7.042E+00	771	2.126E+00
608	3.765E+01	649	3.716E+01	690	1.973E+01	731	6.819E+00	772	2.057E+00
609	3.780E+01	650	3.693E+01	691	1.932E+01	732	6.625E+00	773	1.997E+00
610	3.809E+01	651	3.653E+01	692	1.889E+01	733	6.438E+00	774	1.916E+00
611	3.832E+01	652	3.622E+01	693	1.846E+01	734	6.257E+00	775	1.872E+00
612	3.844E+01	653	3.584E+01	694	1.804E+01	735	6.079E+00	776	1.819E+00
613	3.871E+01	654	3.552E+01	695	1.764E+01	736	5.913E+00	777	1.782E+00
614	3.889E+01	655	3.517E+01	696	1.720E+01	737	5.735E+00	778	1.721E+00
615	3.902E+01	656	3.481E+01	697	1.680E+01	738	5.566E+00	779	1.723E+00
616	3.922E+01	657	3.437E+01	698	1.644E+01	739	5.403E+00	780	1.726E+00
617	3.938E+01	658	3.401E+01	699	1.602E+01	740	5.239E+00		
618	3.951E+01	659	3.357E+01	700	1.565E+01	741	5.100E+00		
619	3.967E+01	660	3.319E+01	701	1.532E+01	742	4.943E+00		
620	3.978E+01	661	3.286E+01	702	1.488E+01	743	4.818E+00		
621	3.996E+01	662	3.237E+01	703	1.456E+01	744	4.639E+00		
622	3.999E+01	663	3.195E+01	704	1.414E+01	745	4.524E+00		
623	4.004E+01	664	3.149E+01	705	1.381E+01	746	4.417E+00		
624	4.013E+01	665	3.104E+01	706	1.348E+01	747	4.300E+00		
625	4.020E+01	666	3.065E+01	707	1.311E+01	748	4.163E+00		

CIE 1931 x y Chromaticity Diagram



7-Step Chromaticity Quadrangles



[Goniophotometer System]

Total operating time for luminous intensity distribution: **1.5 hours**

Test orientation: **Downward**

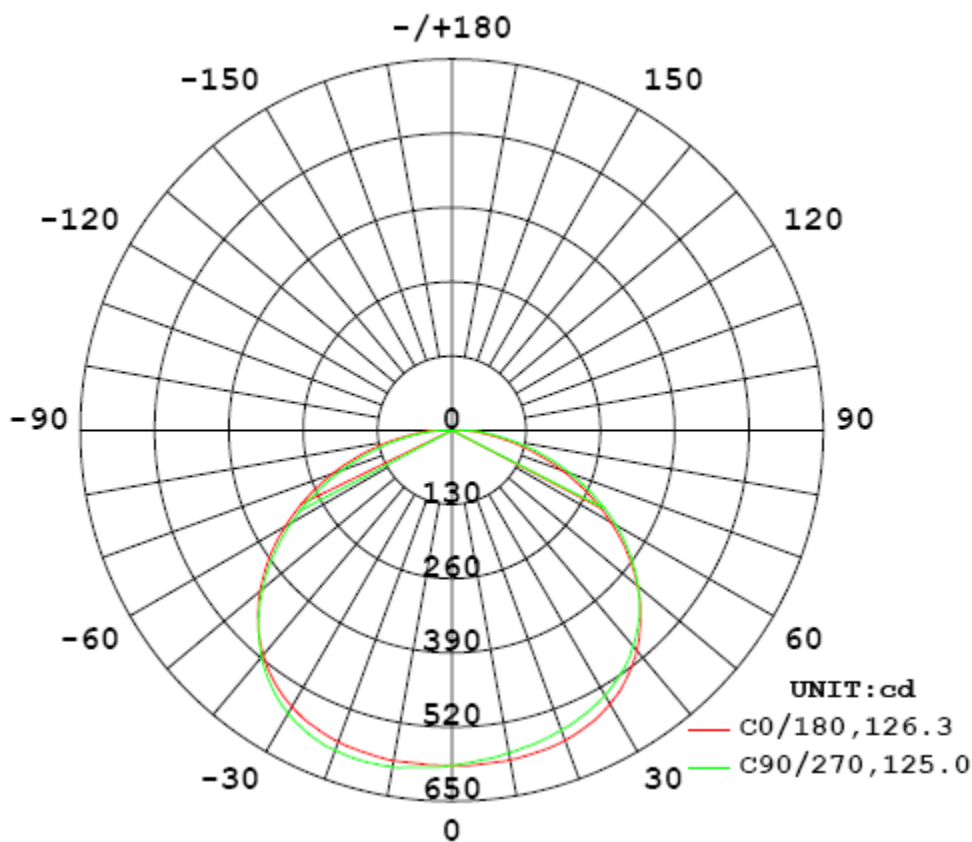
Electrical Measurement

Input Voltage (V)	Frequency (Hz)	Input Current (A)	Power (W)	Power Factor
120.0	60	0.2421	0.9792	28.45

Photometric Measurement

Luminous Flux (lm)	Efficacy (lm/W)	I_{max} (cd)	S/MH (C0/180)	S/MH (C90/270)
2029.46	71.34	600.1	1.40	1.36

Luminous Intensity Distribution



	C0/180	C45/225	C90/270	C135/315	AVG.
Beam Angle (50% I_{max}):	126.3	125.2	125.0	125.6	125.5
Field Angle (10% I_{max}):	168.8	168.5	168.6	168.8	168.7

Luminous Intensity (cd) Distribution Data

C γ	0°	22.5°	45°	67.5°	90°	112.5°	135°	157.5°
0.0°	587	587	587	587	587	587	587	587
5.0°	587	589	590	592	592	593	592	589
10.0°	587	591	595	598	598	598	597	593
15.0°	584	590	595	598	600	599	597	593
20.0°	581	587	592	596	597	597	594	589
25.0°	572	579	584	588	588	588	586	579
30.0°	559	565	570	573	573	572	569	564
35.0°	540	545	548	550	549	549	546	541
40.0°	514	517	518	520	518	517	515	510
45.0°	479	481	481	481	479	477	475	472
50.0°	438	438	437	435	432	431	429	426
55.0°	390	389	386	384	380	378	377	375
60.0°	337	335	331	328	324	322	320	320
65.0°	280	277	273	269	265	263	262	261
70.0°	222	218	214	209	206	203	202	201
75.0°	163	159	155	151	147	145	143	143
80.0°	108	105	100	96	93	91	90	89
85.0°	60	56	53	50	47	45	45	44
90.0°	23	21	19	18	17	16	15	15
95.0°	5	4	4	3	3	3	2	2
100.0°	1	1	1	1	1	1	1	1
105.0°	1	1	1	1	1	1	1	1
110.0°	0	0	0	1	1	1	1	1
115.0°	0	0	0	0	0	0	0	0
120.0°	0	0	0	0	0	0	0	0
125.0°	0	1	1	0	0	0	0	1
130.0°	1	1	1	0	0	0	1	1
135.0°	1	1	1	1	0	1	1	1
140.0°	1	1	1	1	0	1	1	1
145.0°	1	1	1	1	0	1	1	1
150.0°	1	1	1	1	1	1	1	1
155.0°	1	1	1	1	1	1	1	1
160.0°	1	1	1	1	1	1	1	1
165.0°	1	1	1	0	1	1	1	1
170.0°	1	1	1	0	1	0	1	1
175.0°	0	1	1	0	1	0	0	0
180.0°	0	0	0	0	0	0	0	0

Luminous Intensity (cd) Distribution Data (cont.)

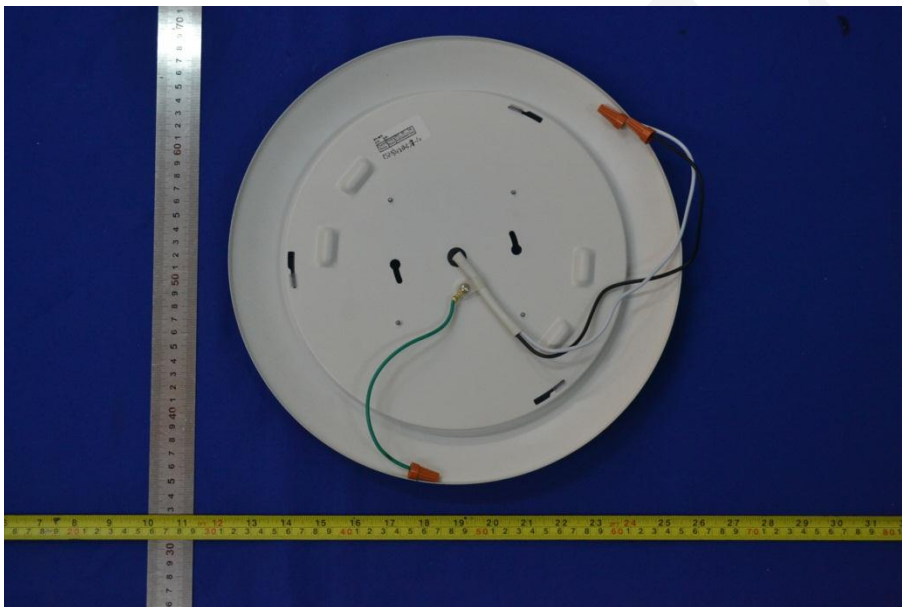
C y	180°	202.5°	225°	247.5°	270°	292.5°	315°	337.5°
0.0°	587	587	587	587	587	587	587	587
5.0°	587	585	582	582	580	581	583	583
10.0°	586	581	578	575	573	575	577	580
15.0°	583	578	572	569	567	568	571	575
20.0°	578	571	565	562	559	560	565	569
25.0°	568	561	555	551	549	551	555	561
30.0°	553	547	541	538	536	538	543	549
35.0°	532	526	521	519	517	520	526	531
40.0°	504	498	496	494	493	498	502	508
45.0°	467	464	462	462	464	467	472	478
50.0°	424	422	422	423	425	430	434	437
55.0°	375	374	376	378	381	386	390	392
60.0°	321	322	324	328	331	336	339	341
65.0°	264	265	268	273	277	282	285	285
70.0°	205	207	211	216	221	225	228	228
75.0°	148	150	154	159	164	168	171	170
80.0°	94	96	100	105	109	113	115	114
85.0°	48	50	53	57	61	64	65	65
90.0°	18	19	20	22	25	27	28	27
95.0°	3	3	4	5	6	6	6	6
100.0°	1	1	2	1	1	1	1	1
105.0°	1	1	1	1	1	1	1	1
110.0°	1	1	1	1	1	1	1	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	1	0	0	0	0	0
130.0°	0	1	1	1	0	1	0	1
135.0°	1	1	1	1	1	1	0	1
140.0°	0	1	1	0	1	1	0	1
145.0°	0	0	1	1	1	1	1	1
150.0°	0	0	1	1	1	1	1	1
155.0°	0	0	0	1	1	1	1	1
160.0°	1	1	1	1	1	1	1	1
165.0°	1	1	0	1	1	1	1	0
170.0°	1	1	1	1	1	1	1	0
175.0°	0	0	0	0	1	1	0	0
180.0°	0	0	0	0	0	0	0	0

Zonal Lumen Density Measurement

Deg	Flux (lm)	%
0-5	14.0	0.69
5-10	42.0	2.07
10-15	69.4	3.42
15-20	95.8	4.72
20-25	120.5	5.94
25-30	142.5	7.02
30-35	160.7	7.92
35-40	174.1	8.58
40-45	181.5	8.95
45-50	182.5	8.99
50-55	176.7	8.71
55-60	164.3	8.09
60-65	146.0	7.20
65-70	122.9	6.05
70-75	96.4	4.75
75-80	68.4	3.38
80-85	41.7	2.05
85-90	19.6	0.97
90-95	6.1	0.30
95-100	1.1	0.05
100-105	0.6	0.03
105-110	0.4	0.02
110-115	0.2	0.01
115-120	0.1	0.00
120-125	0.2	0.01
125-130	0.2	0.01
130-135	0.2	0.01
135-140	0.2	0.01
140-145	0.2	0.01
145-150	0.2	0.01
150-155	0.2	0.01
155-160	0.2	0.01
160-165	0.1	0.00
165-170	0.1	0.01
170-175	0.0	0.00
175-180	0.0	0.00

Deg	Flux (lm)	%
0-5	14.0	0.69
0-10	56.0	2.76
0-15	125.4	6.18
0-20	221.3	10.90
0-25	341.8	16.84
0-30	484.3	23.86
0-35	645.0	31.78
0-40	819.1	40.36
0-45	1000.6	49.31
0-50	1183.2	58.30
0-55	1359.9	67.01
0-60	1524.2	75.10
0-65	1670.2	82.30
0-70	1793.1	88.35
0-75	1889.5	93.10
0-80	1957.9	96.48
0-85	1999.6	98.53
0-90	2019.2	99.50
0-95	2025.3	99.80
0-100	2026.4	99.85
0-105	2027.0	99.88
0-110	2027.4	99.90
0-115	2027.6	99.91
0-120	2027.7	99.91
0-125	2027.9	99.92
0-130	2028.1	99.93
0-135	2028.3	99.94
0-140	2028.5	99.95
0-145	2028.7	99.96
0-150	2028.9	99.97
0-155	2029.1	99.98
0-160	2029.2	99.99
0-165	2029.3	99.99
0-170	2029.4	100.00
0-175	2029.5	100.00
0-180	2029.5	100.00

6. Product Photo



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