IES LM-79-08

MEASUREMENT AND TEST REPORT

For

Overdrive Electronics Pvt. Ltd.

C-121 Hosiery Complex Phase-II Extension, Noida 201305 UP India.

#Test Model: L10SA19DIM/30K

Report Type:	Electrical and Photometric tests including: Luminous Flux, Chromaticity, Luminous Intensity Distribution
Test Engineer:	Hill Liu
Report Number:	RSZ201022504-10
Test Date:	2017-11-17 to 2017-11-18
Report Date:	2020-10-23
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:

Two samples were received on 2017-11-03. One was tested in integrating sphere and the other was tested in goniophotometer

#Model Tested:	L10SA19DIM/30K
#Manufacturer:	Overdrive Electronics Pvt. Ltd.
#Product Code:	733
#Brand Name:	Overdrive
#Product Designation:	LED Lamp
#Burning Time Before Test:	0hour(For New Products)

Rated Values:

#Rated Voltage/Frequency:	120V AC 60Hz
#Rated Power:	10 W
#Nominal CCT:	3000K
#Nominal Lumen Output:	950Im

Note:

1. The applicant Overdrive Electronics Pvt. Ltd. declare that their products with model L10SA19DIM/30K are the same to the products in report#RSZ171103517-10 and is authorized by original applicant to use their test data.
2. All the data in previous report (RSZ171103517-10) is shared in this report.

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	Test Range	Calibration date	Calibration due date
2.0m integrating sphere	EVERFINE	R98	11010018	R98	2017-11-18	2018-11-18
spectroradiometer	EVERFINE	HAAS-2000	20140912	380-780nm	2017-11-18	2018-11-18
Digital Power Meter	EVERFINE	PF2010A	1011004	600V/20A	2017-07-29	2018-07-29
Digital CC&CV DC Power Supply	EVERFINE	WY305-V1	1101047	30V/5A	2017-07-07	2018-07-07
Rapid Recording Photometer	EVERFINE	PHOTO-2000F	1007010	0.1lm—200klm	2017-11-18	2018-11-18
Standard Light Source	SENSING	N/A	LSD090808	N/A	2016-12-05	2017-12-05
Special zero-voltage synchronous switching AC	EVERFINE	DPS1010-YF	1011001T	0-150V，0-300V	2017-03-03	2018-03-03
AC POWER SUPPLY	EVERFINE	VPS1030 PWM	1012017	0-150V，0-300V	2017-03-03	2018-03-03
Digital CC&CV DC Power Supply	EVERFINE	WY12010	1009009	30V/5A	2017-03-03	2018-03-03

Device	Manufacture	Model No	Serial No	Test Range	Calibration date	Calibration due date
Digital power meter	YOKOGAWA	WT-210	91j926132	15/30/60/150/ 300/600 V	2017-03-03	2018-03-03
full-field speed goniophotometer	EVERFINE	GO-R5000	YG108492N10 120001	1600mm, 3000W/10A	2017-03-09	2018-03-09
Wireless Remote Sensor	N/A	433MHz	N/A	0°C~50°C; -20°C~60°C	2017-03-20	2018-03-20
Standard Light Source	EVERFINE	D908	1012003	N/A	2016-12-17	2017-12-17

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°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 U=1.9% (K=2), at the 95% confidence level. The uncertainty of the correlated color temperature measurements is U=25K (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_f, 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: **Base up**

Photometric and Electrical Measurement Result

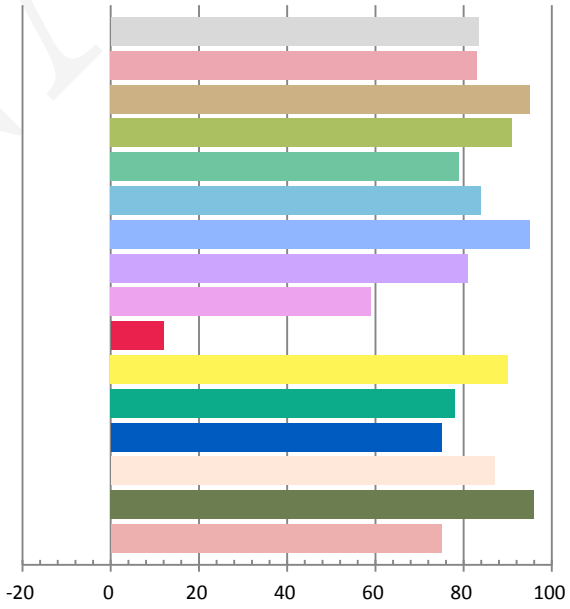
Voltage (V)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Luminous Flux(lm)	Efficacy (lm/W)
120.0	60	0.08816	9.902	0.9357	1003.6	101.35

Radiant Flux (W)	CCT (K)	Duv	x	y	u'	v'
3.0921	3080	0.00087	0.4326	0.4047	0.2475	0.5210

Color Rendering Index

Ra
83.4

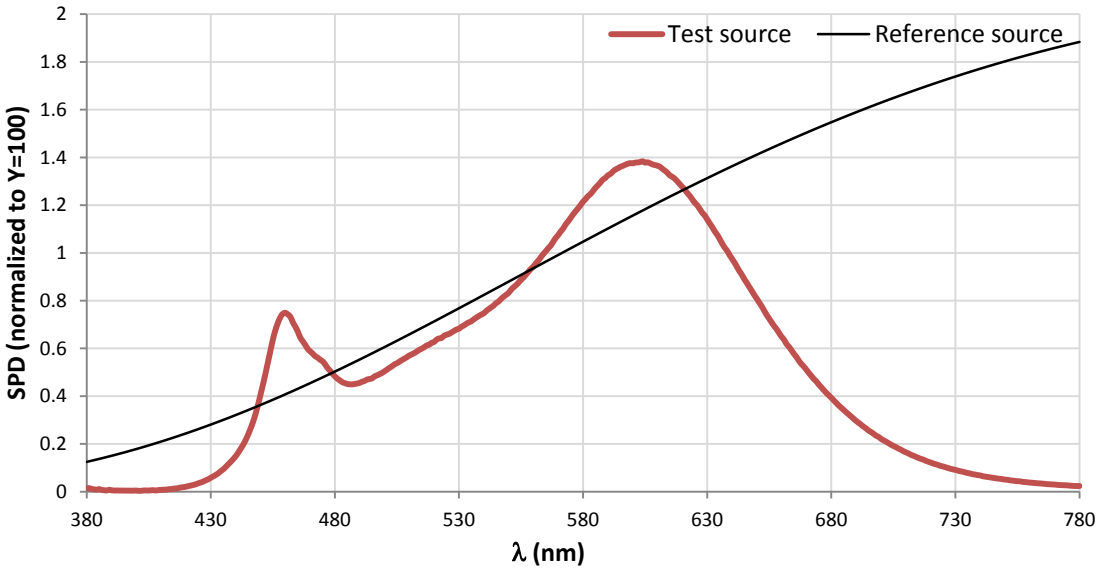
R1	R2	R3	R4
83	95	91	79
R5	R6	R7	R8
84	95	81	59
R9	R10	R11	R12
12	90	78	75
R13	R14	R15	
87	96	75	



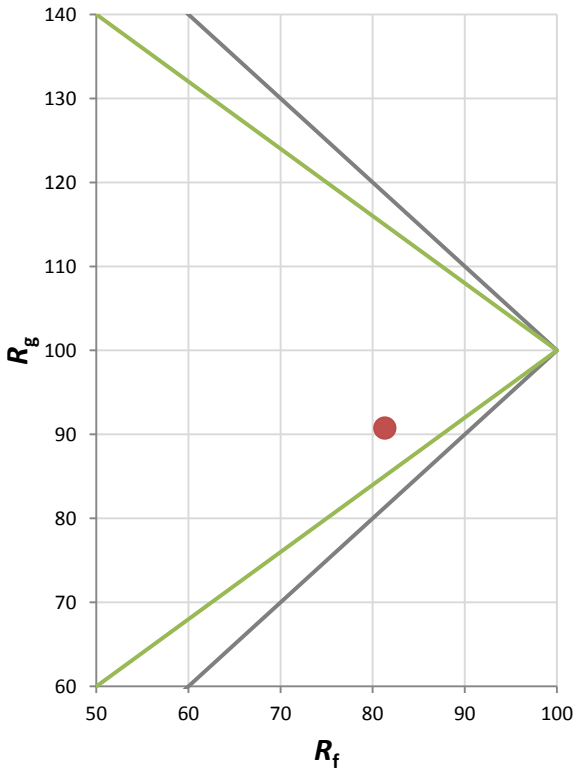
Fidelity Index and Gamut Index

Fidelity Index R_f	81
Gamut Index R_g	91

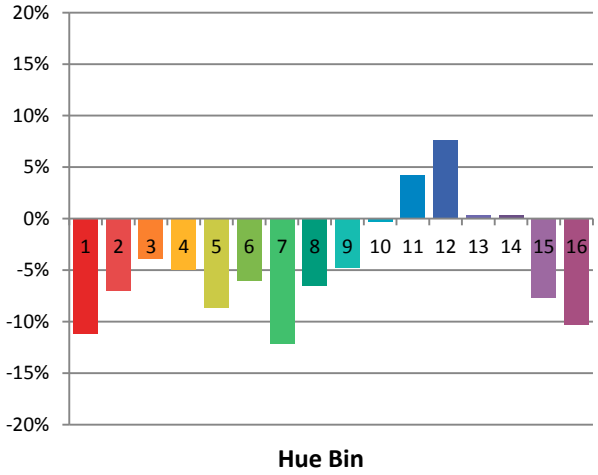
Spectral Power Distribution Comparison



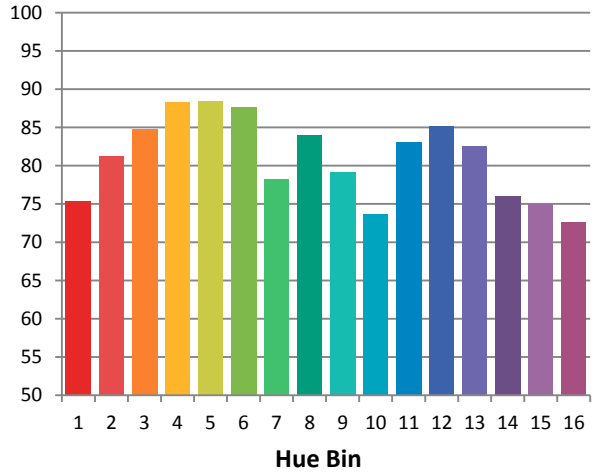
Plot of R_g versus R_f



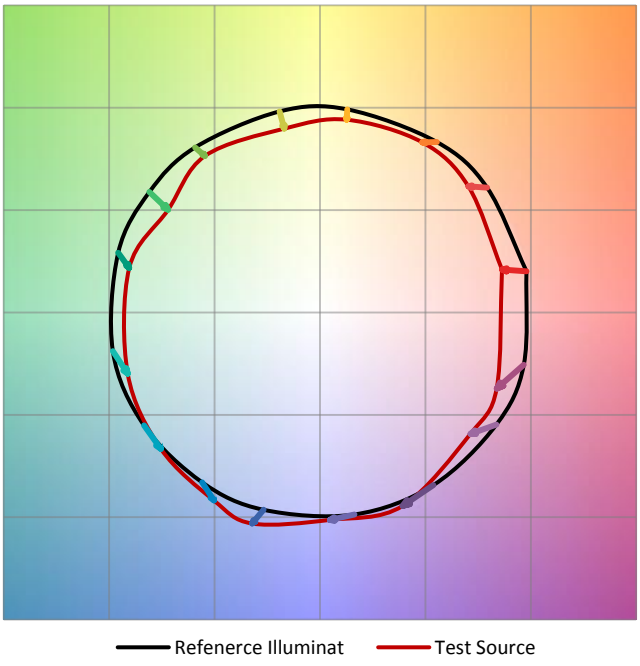
Chroma Shift by Hue



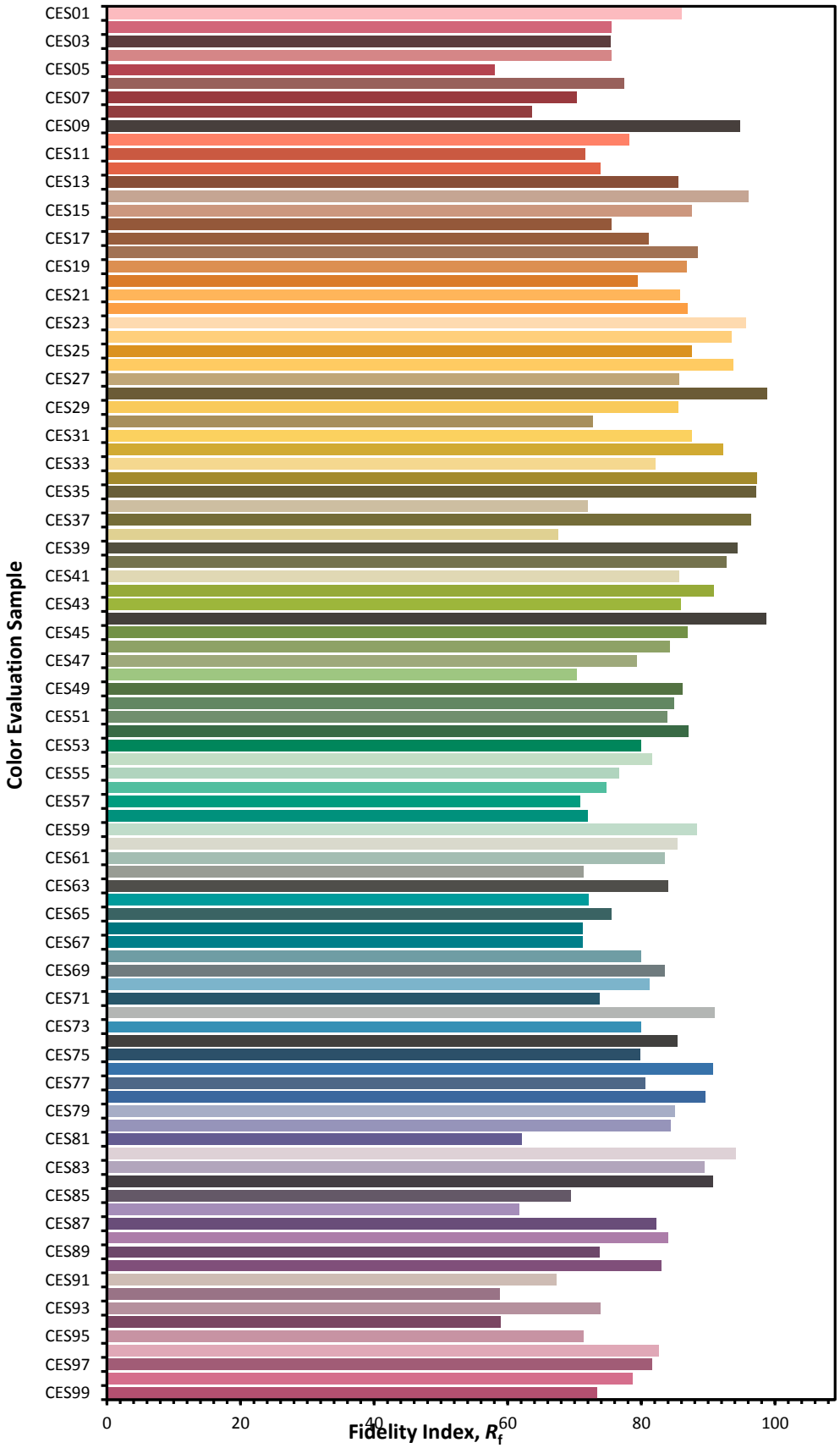
R_f by Hue



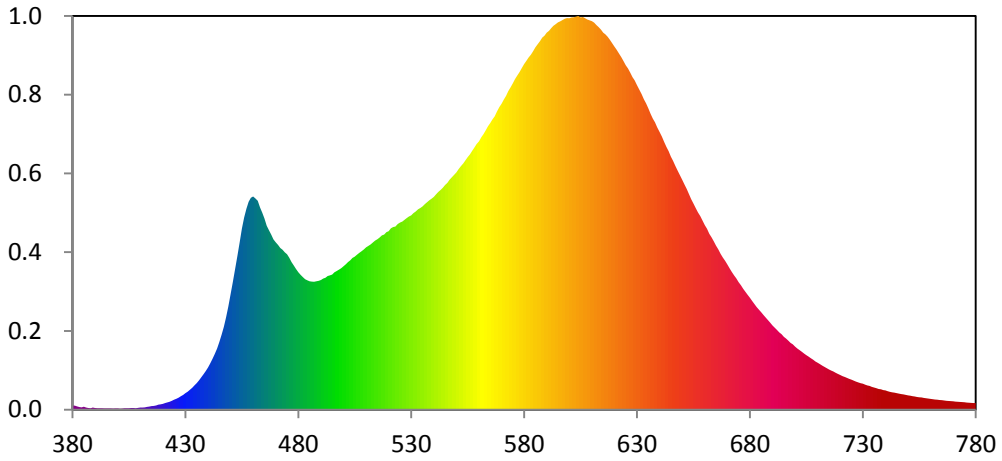
Color Vector Graphic



Color Fidelity by CES Sample



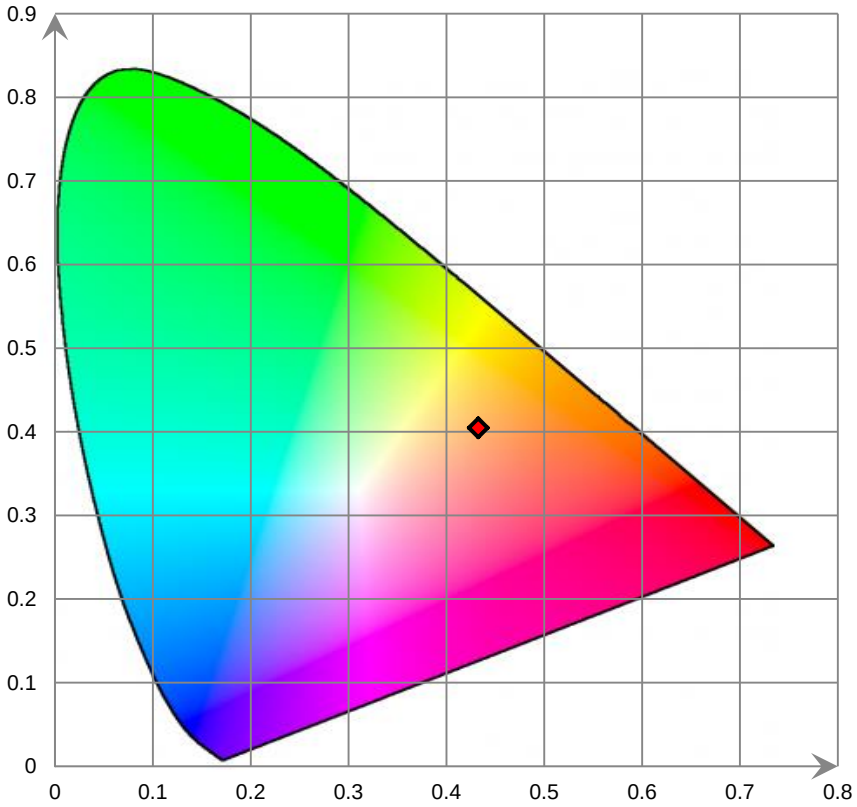
Relative Spectral Power Distribution



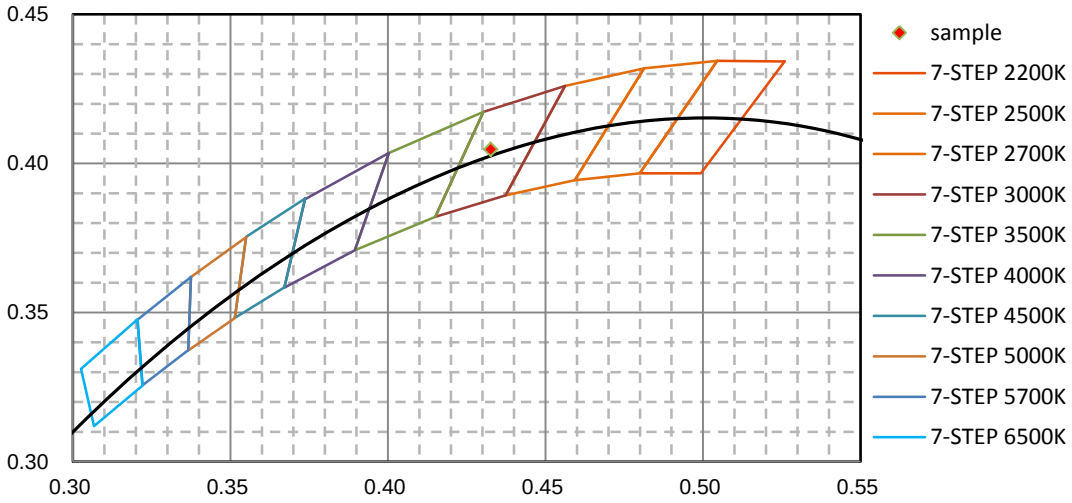
nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
380	2.129E-01	421	3.439E-01	462	1.078E+01	503	7.715E+00	544	1.146E+01
381	2.108E-01	422	3.779E-01	463	1.044E+01	504	7.833E+00	545	1.161E+01
382	1.712E-01	423	4.135E-01	464	1.017E+01	505	7.901E+00	546	1.171E+01
383	1.417E-01	424	4.608E-01	465	9.871E+00	506	8.001E+00	547	1.187E+01
384	1.228E-01	425	5.160E-01	466	9.497E+00	507	8.101E+00	548	1.200E+01
385	1.571E-01	426	5.666E-01	467	9.267E+00	508	8.185E+00	549	1.212E+01
386	1.121E-01	427	6.274E-01	468	9.047E+00	509	8.277E+00	550	1.224E+01
387	8.881E-02	428	6.996E-01	469	8.799E+00	510	8.378E+00	551	1.243E+01
388	7.425E-02	429	7.636E-01	470	8.644E+00	511	8.453E+00	552	1.258E+01
389	1.158E-01	430	8.576E-01	471	8.505E+00	512	8.530E+00	553	1.271E+01
390	8.801E-02	431	9.360E-01	472	8.347E+00	513	8.625E+00	554	1.287E+01
391	7.027E-02	432	1.031E+00	473	8.255E+00	514	8.725E+00	555	1.304E+01
392	7.140E-02	433	1.127E+00	474	8.126E+00	515	8.801E+00	556	1.318E+01
393	6.913E-02	434	1.257E+00	475	8.026E+00	516	8.890E+00	557	1.336E+01
394	6.769E-02	435	1.374E+00	476	7.847E+00	517	9.000E+00	558	1.354E+01
395	6.527E-02	436	1.516E+00	477	7.622E+00	518	9.046E+00	559	1.372E+01
396	6.329E-02	437	1.678E+00	478	7.451E+00	519	9.163E+00	560	1.386E+01
397	6.418E-02	438	1.831E+00	479	7.267E+00	520	9.214E+00	561	1.406E+01
398	5.864E-02	439	1.994E+00	480	7.093E+00	521	9.361E+00	562	1.423E+01
399	6.483E-02	440	2.175E+00	481	6.958E+00	522	9.430E+00	563	1.443E+01
400	6.512E-02	441	2.391E+00	482	6.847E+00	523	9.459E+00	564	1.463E+01
401	5.138E-02	442	2.629E+00	483	6.739E+00	524	9.592E+00	565	1.480E+01
402	5.475E-02	443	2.875E+00	484	6.679E+00	525	9.662E+00	566	1.499E+01
403	7.214E-02	444	3.163E+00	485	6.631E+00	526	9.709E+00	567	1.515E+01
404	7.527E-02	445	3.497E+00	486	6.610E+00	527	9.800E+00	568	1.539E+01
405	7.020E-02	446	3.873E+00	487	6.605E+00	528	9.891E+00	569	1.562E+01
406	8.584E-02	447	4.279E+00	488	6.628E+00	529	9.979E+00	570	1.580E+01
407	8.815E-02	448	4.768E+00	489	6.657E+00	530	1.003E+01	571	1.602E+01
408	7.388E-02	449	5.327E+00	490	6.699E+00	531	1.015E+01	572	1.620E+01
409	9.880E-02	450	5.953E+00	491	6.770E+00	532	1.023E+01	573	1.645E+01
410	1.101E-01	451	6.578E+00	492	6.816E+00	533	1.034E+01	574	1.664E+01
411	1.182E-01	452	7.245E+00	493	6.901E+00	534	1.042E+01	575	1.685E+01
412	1.248E-01	453	7.952E+00	494	6.934E+00	535	1.049E+01	576	1.707E+01
413	1.511E-01	454	8.649E+00	495	6.976E+00	536	1.061E+01	577	1.726E+01
414	1.597E-01	455	9.352E+00	496	7.096E+00	537	1.071E+01	578	1.744E+01
415	1.850E-01	456	9.923E+00	497	7.157E+00	538	1.081E+01	579	1.764E+01
416	1.977E-01	457	1.037E+01	498	7.232E+00	539	1.090E+01	580	1.785E+01
417	2.245E-01	458	1.073E+01	499	7.310E+00	540	1.098E+01	581	1.801E+01
418	2.606E-01	459	1.094E+01	500	7.408E+00	541	1.112E+01	582	1.819E+01
419	2.786E-01	460	1.101E+01	501	7.509E+00	542	1.124E+01	583	1.832E+01
420	3.056E-01	461	1.091E+01	502	7.623E+00	543	1.135E+01	584	1.851E+01

nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
585	1.870E+01	626	1.762E+01	667	8.045E+00	708	2.586E+00	749	7.670E-01
586	1.886E+01	627	1.740E+01	668	7.852E+00	709	2.497E+00	750	7.422E-01
587	1.903E+01	628	1.717E+01	669	7.688E+00	710	2.426E+00	751	7.287E-01
588	1.921E+01	629	1.700E+01	670	7.497E+00	711	2.357E+00	752	6.987E-01
589	1.931E+01	630	1.676E+01	671	7.300E+00	712	2.278E+00	753	6.817E-01
590	1.947E+01	631	1.652E+01	672	7.114E+00	713	2.214E+00	754	6.635E-01
591	1.955E+01	632	1.629E+01	673	6.933E+00	714	2.149E+00	755	6.425E-01
592	1.970E+01	633	1.603E+01	674	6.782E+00	715	2.081E+00	756	6.359E-01
593	1.982E+01	634	1.582E+01	675	6.587E+00	716	2.023E+00	757	6.089E-01
594	1.990E+01	635	1.556E+01	676	6.421E+00	717	1.976E+00	758	5.926E-01
595	1.999E+01	636	1.528E+01	677	6.241E+00	718	1.906E+00	759	5.769E-01
596	2.005E+01	637	1.503E+01	678	6.082E+00	719	1.846E+00	760	5.575E-01
597	2.012E+01	638	1.483E+01	679	5.925E+00	720	1.793E+00	761	5.459E-01
598	2.018E+01	639	1.457E+01	680	5.779E+00	721	1.737E+00	762	5.313E-01
599	2.022E+01	640	1.433E+01	681	5.617E+00	722	1.690E+00	763	5.191E-01
600	2.021E+01	641	1.410E+01	682	5.460E+00	723	1.645E+00	764	5.059E-01
601	2.025E+01	642	1.383E+01	683	5.304E+00	724	1.589E+00	765	4.954E-01
602	2.026E+01	643	1.357E+01	684	5.166E+00	725	1.550E+00	766	4.794E-01
603	2.029E+01	644	1.334E+01	685	5.029E+00	726	1.503E+00	767	4.613E-01
604	2.033E+01	645	1.307E+01	686	4.887E+00	727	1.456E+00	768	4.553E-01
605	2.025E+01	646	1.284E+01	687	4.758E+00	728	1.410E+00	769	4.439E-01
606	2.027E+01	647	1.259E+01	688	4.624E+00	729	1.373E+00	770	4.365E-01
607	2.021E+01	648	1.235E+01	689	4.491E+00	730	1.341E+00	771	4.196E-01
608	2.014E+01	649	1.210E+01	690	4.355E+00	731	1.294E+00	772	4.085E-01
609	2.010E+01	650	1.187E+01	691	4.238E+00	732	1.253E+00	773	4.015E-01
610	2.006E+01	651	1.163E+01	692	4.122E+00	733	1.228E+00	774	3.936E-01
611	1.999E+01	652	1.140E+01	693	3.997E+00	734	1.183E+00	775	3.879E-01
612	1.986E+01	653	1.113E+01	694	3.893E+00	735	1.145E+00	776	3.723E-01
613	1.975E+01	654	1.087E+01	695	3.764E+00	736	1.116E+00	777	3.606E-01
614	1.962E+01	655	1.064E+01	696	3.671E+00	737	1.072E+00	778	3.503E-01
615	1.946E+01	656	1.041E+01	697	3.566E+00	738	1.053E+00	779	3.480E-01
616	1.937E+01	657	1.019E+01	698	3.450E+00	739	1.017E+00	780	3.486E-01
617	1.925E+01	658	9.993E+00	699	3.374E+00	740	9.991E-01		
618	1.909E+01	659	9.758E+00	700	3.258E+00	741	9.528E-01		
619	1.892E+01	660	9.532E+00	701	3.162E+00	742	9.248E-01		
620	1.875E+01	661	9.343E+00	702	3.082E+00	743	9.029E-01		
621	1.858E+01	662	9.082E+00	703	2.991E+00	744	8.815E-01		
622	1.838E+01	663	8.903E+00	704	2.896E+00	745	8.540E-01		
623	1.820E+01	664	8.695E+00	705	2.816E+00	746	8.323E-01		
624	1.799E+01	665	8.470E+00	706	2.742E+00	747	8.054E-01		
625	1.778E+01	666	8.282E+00	707	2.659E+00	748	7.902E-01		

CIE 1931 x y Chromaticity Diagram



7-Step Chromaticity Quadrangles



[Goniophotometer System]

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

Test orientation: **Base up**

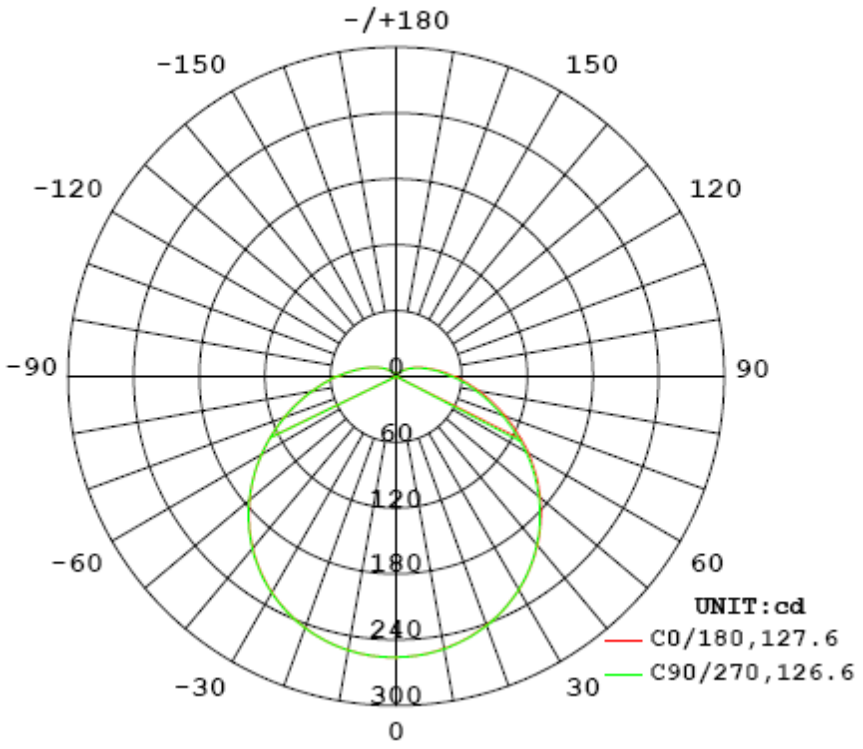
Electrical Measurement

Input Voltage (V)	Frequency (Hz)	Input Current (A)	Power (W)	Power Factor
120.0	60	0.0868	9.826	0.9433

Photometric Measurement

Luminous Flux (lm)	Efficacy (lm/W)	I_{max} (cd)	S/MH (C0/180)	S/MH (C90/270)
1032.41	105.07	256.1	1.31	1.30

Luminous Intensity Distribution



	C0/180	C45/225	C90/270	C135/315	AVG.
Beam Angle (50% I_{max}):	127.6	127.0	126.6	127.5	127.2
Field Angle (10% I_{max}):	217.0	216.4	215.8	216.8	216.5

Luminous Intensity (cd) Distribution Data

C / γ	0°	22.5°	45°	67.5°	90°	112.5°	135°	157.5°
0.0°	256	256	256	256	256	256	256	256
5.0°	255	256	256	256	255	255	255	255
10.0°	253	254	254	254	253	253	252	252
15.0°	249	250	250	250	249	249	248	248
20.0°	244	244	245	244	244	243	242	242
25.0°	236	237	237	237	237	236	235	234
30.0°	227	228	228	228	228	227	226	225
35.0°	217	217	218	218	217	216	215	214
40.0°	204	205	206	205	205	204	203	202
45.0°	190	191	192	192	191	190	189	188
50.0°	175	176	176	176	176	175	174	173
55.0°	159	160	160	160	159	159	158	157
60.0°	142	143	143	143	142	142	141	140
65.0°	125	126	126	125	125	125	124	124
70.0°	109	110	110	109	109	109	108	107
75.0°	93	94	94	93	93	93	92	92
80.0°	79	79	79	78	78	78	78	77
85.0°	66	66	66	65	65	66	65	65
90.0°	54	55	55	54	54	54	54	53
95.0°	45	45	45	44	44	45	44	44
100.0°	36	37	37	36	36	37	36	36
105.0°	30	30	30	30	30	30	30	29
110.0°	24	24	24	24	24	24	24	24
115.0°	19	20	20	19	19	20	19	19
120.0°	16	16	16	16	16	16	16	16
125.0°	12	12	12	12	12	12	12	12
130.0°	10	10	10	10	10	10	10	10
135.0°	7	7	7	7	8	7	7	7
140.0°	5	6	6	6	6	6	6	6
145.0°	4	4	4	4	4	4	4	4
150.0°	3	3	3	3	3	3	3	3
155.0°	2	2	2	2	2	2	2	2
160.0°	1	1	1	1	1	1	1	1
165.0°	1	1	1	1	1	1	1	1
170.0°	0	0	0	0	0	1	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.)

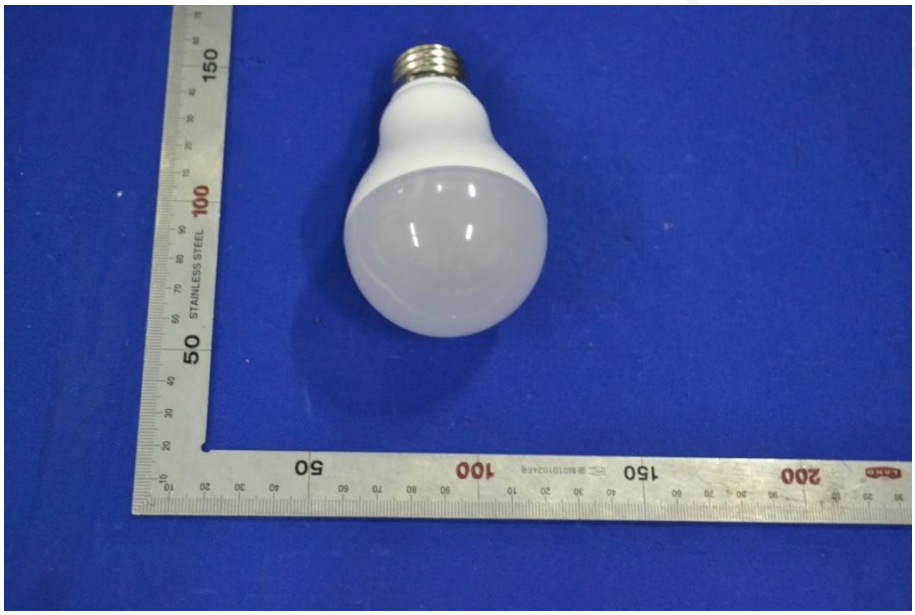
C / γ	180°	202.5°	225°	247.5°	270°	292.5°	315°	337.5°
0.0°	256	256	256	256	256	256	256	256
5.0°	255	255	255	255	255	255	255	255
10.0°	252	252	252	252	252	252	253	253
15.0°	247	247	247	247	248	248	249	249
20.0°	241	241	241	241	242	242	243	244
25.0°	234	233	233	233	234	234	236	236
30.0°	224	224	223	224	224	225	226	227
35.0°	213	213	212	212	213	214	216	217
40.0°	201	200	200	199	200	201	203	204
45.0°	187	186	185	185	186	187	189	191
50.0°	172	171	170	169	170	172	174	175
55.0°	156	155	154	153	154	155	157	159
60.0°	140	139	137	136	137	139	141	143
65.0°	122	121	120	119	119	121	123	125
70.0°	106	105	104	102	103	105	107	108
75.0°	91	90	89	87	88	89	91	93
80.0°	77	76	75	73	74	75	77	78
85.0°	64	64	62	61	62	63	64	65
90.0°	53	53	52	51	51	52	53	54
95.0°	44	44	43	42	42	43	44	45
100.0°	36	36	35	34	34	35	36	37
105.0°	29	29	29	28	28	29	29	30
110.0°	24	24	23	23	23	23	24	24
115.0°	19	19	19	18	18	19	19	20
120.0°	15	15	15	15	15	15	15	16
125.0°	12	12	12	12	12	12	12	12
130.0°	10	9	9	9	9	9	9	10
135.0°	7	7	7	7	7	7	7	7
140.0°	5	5	5	5	5	5	5	5
145.0°	4	4	4	4	4	4	4	4
150.0°	3	3	3	2	2	2	3	3
155.0°	2	2	2	2	2	2	2	2
160.0°	1	1	1	1	1	1	1	1
165.0°	1	1	1	1	1	1	1	1
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	6.1	0.59
5-10	18.2	1.76
10-15	29.7	2.88
15-20	40.5	3.92
20-25	50.1	4.86
25-30	58.4	5.65
30-35	65.0	6.29
35-40	69.7	6.75
40-45	72.5	7.02
45-50	73.1	7.09
50-55	71.9	6.96
55-60	68.8	6.66
60-65	64.1	6.21
65-70	58.2	5.63
70-75	51.7	5.01
75-80	45.0	4.36
80-85	38.4	3.71
85-90	32.2	3.12
90-95	26.5	2.57
95-100	21.6	2.09
100-105	17.4	1.69
105-110	13.8	1.34
110-115	10.9	1.05
115-120	8.4	0.81
120-125	6.4	0.62
125-130	4.7	0.45
130-135	3.4	0.33
135-140	2.3	0.23
140-145	1.6	0.15
145-150	1.0	0.09
150-155	0.6	0.06
155-160	0.3	0.03
160-165	0.1	0.01
165-170	0.1	0.01
170-175	0.0	0.00
175-180	0.0	0.00

Deg	Flux (lm)	%
0-5	6.1	0.59
0-10	24.3	2.35
0-15	54.0	5.23
0-20	94.5	9.15
0-25	144.6	14.01
0-30	203.0	19.66
0-35	267.9	25.95
0-40	337.6	32.70
0-45	410.1	39.72
0-50	483.2	46.81
0-55	555.1	53.77
0-60	623.9	60.43
0-65	688.0	66.64
0-70	746.2	72.27
0-75	797.9	77.28
0-80	842.9	81.64
0-85	881.2	85.35
0-90	913.4	88.47
0-95	939.9	91.04
0-100	961.5	93.13
0-105	978.9	94.82
0-110	992.8	96.16
0-115	1003.6	97.21
0-120	1012.0	98.02
0-125	1018.3	98.64
0-130	1023.0	99.09
0-135	1026.4	99.42
0-140	1028.8	99.65
0-145	1030.3	99.80
0-150	1031.3	99.89
0-155	1031.9	99.95
0-160	1032.2	99.98
0-165	1032.3	99.99
0-170	1032.4	100.00
0-175	1032.4	100.00
0-180	1032.4	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**********