

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/50K

Report Type:	Electrical and Photometric tests including: Luminous Flux, Power Factor, Chromaticity, Luminous Intensity Distribution
Test Engineer:	Hexy He <i>Hexy He</i>
Report Number:	RSZ201022505-10
Test Date:	2017-12-26 to 2017-12-27
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:

One sample was received on 2017-12-21 and used for testing.

#Model Tested: L10SA19DIM/50K
 #Manufacturer: Overdrive Electronics Pvt. Ltd.
 #Product Code: 734
 #Brand Name: Overdrive
 #Product Designation: LED LAMP
 #Burning Time Before Test: 0hour(For New Products)

Rated Values:

#Rated Voltage/Frequency: 120V/60Hz
 #Rated Power: 10 W
 #Nominal CCT: 5000K
 #Nominal Lumen Output: 1050lm

Note:

1. The applicant Overdrive Electronics Pvt. Ltd. declare that their products with model L10SA19DIM/50K are the same to the products in report#RSZ171221514-10-M1 and is authorized by original applicant to use their test data.
2. All the data in previous report (RSZ171221514-10-M1) 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	Calibration date	Calibration due date
1.5m temperature integrating sphere	SENSING	SPR-600	S09008	2017-07-11	2018-07-11
High-precision rapid spectral analysis system	EVERFINE	HAAS-2000	M112048CA1361125	2017-07-11	2018-07-11
Digital power meter	YOKOGAWA	WT310	13398	2017-12-05	2018-12-05
Programmable Precision DC Power Supply	ITECH	IT6154	0061 0417 6471 0010 19	2017-03-03	2018-03-03
thermometer	SENSING	NA	NA	2017-03-09	2018-03-09
Standard Light Source	SENSING	NA	LSD090808	2017-12-05	2018-12-05
Precision frequency power supply	ALL Power	APW-105N	970613	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

Device	Manufacture	Model No	Serial No	Calibration date	Calibration due date
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
Wireless Remote Sensor	N/A	433MHz	N/A	2017-03-20	2018-03-20
Standard Light Source	EVERFINE	D908	1012003	2017-12-17	2018-12-17

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=2.1% (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=2.1(K=2), at the 95% confidence level.

The uncertainty of power meter AC current U=0.19 % of rdg, AC Voltage U=0.17% of rdg, Power U=0.48%) (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**

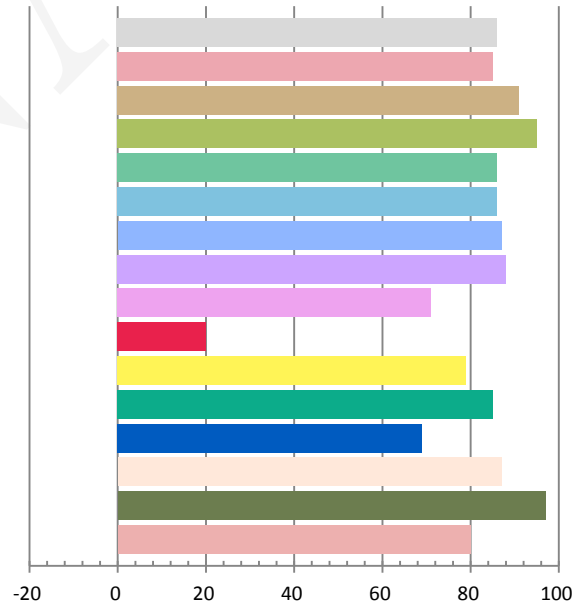
Photometric and Electrical Measurement Result

Voltage (V)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Luminous Flux(lm)	Efficacy (lm/W)
120.0	60	0.08876	9.887	0.9284	1098.6	111.12

Radiant Flux (W)	CCT (K)	Duv	x	y	u'	v'
3.5084	5057	0.00056	0.3436	0.3515	0.2104	0.4844

Color Rendering Index

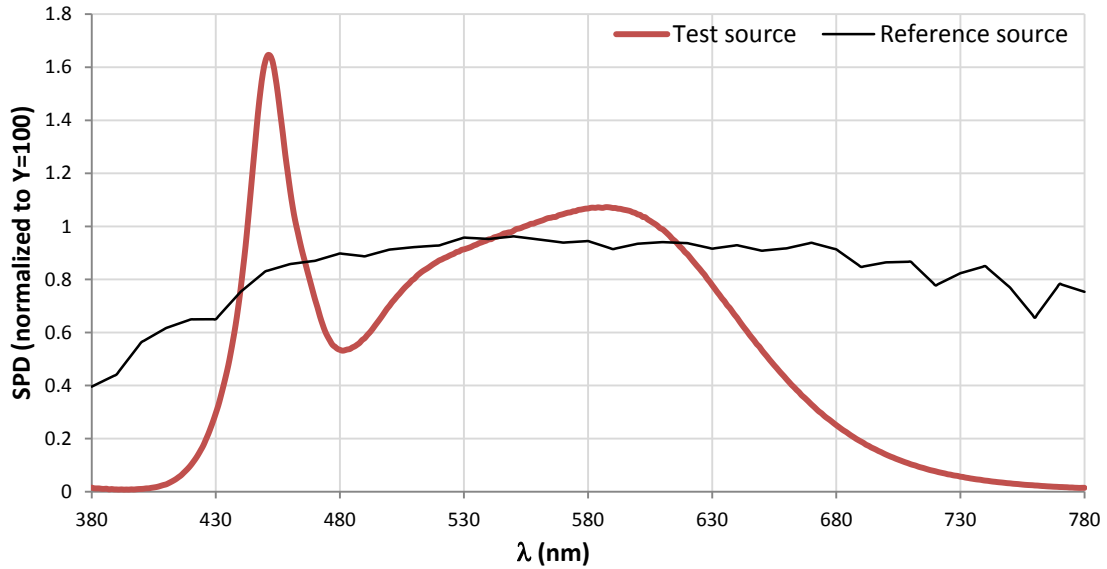
Ra			
85.9			
R1	R2	R3	R4
85	91	95	86
R5	R6	R7	R8
86	87	88	71
R9	R10	R11	R12
20	79	85	69
R13	R14	R15	
87	97	80	



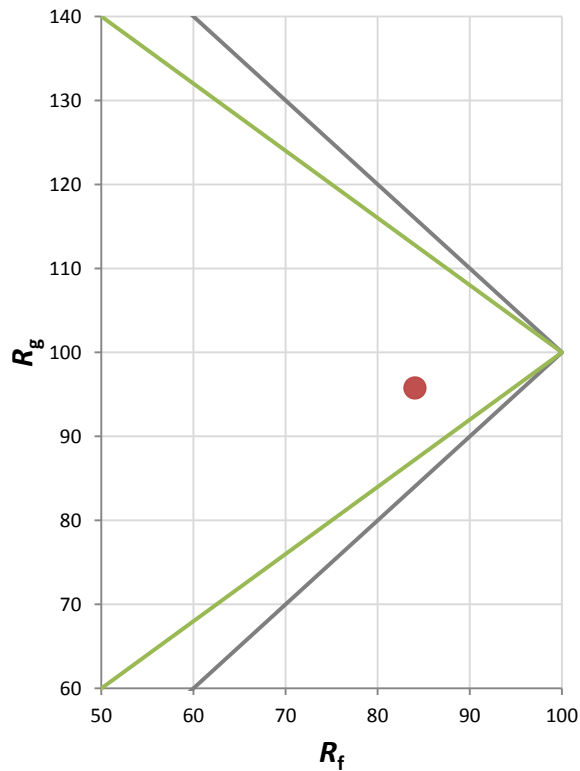
Fidelity Index and Gamut Index

Fidelity Index R_f	84
Gamut Index R_g	96

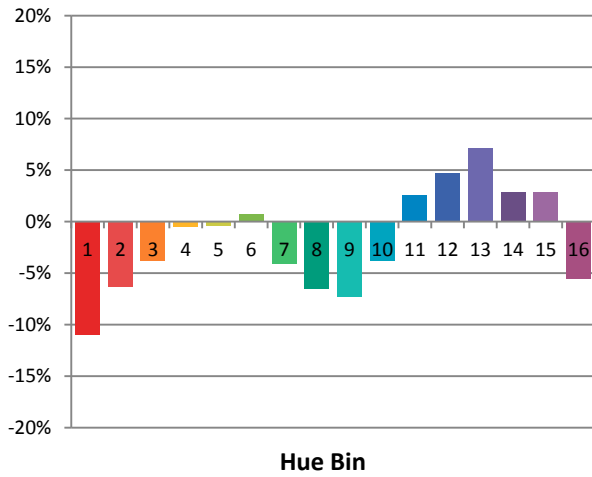
Spectral Power Distribution Comparison



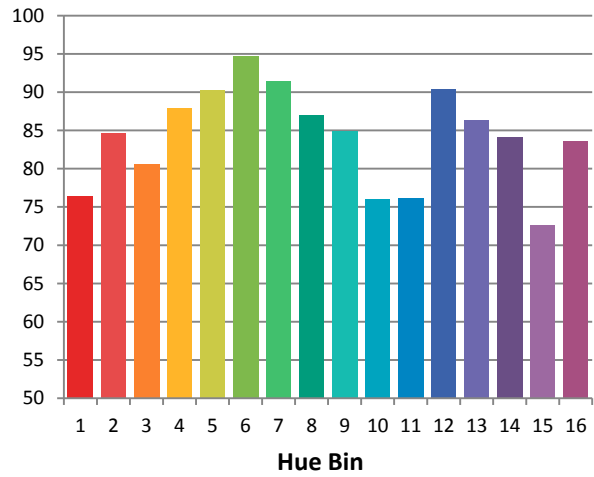
Plot of R_g versus R_f



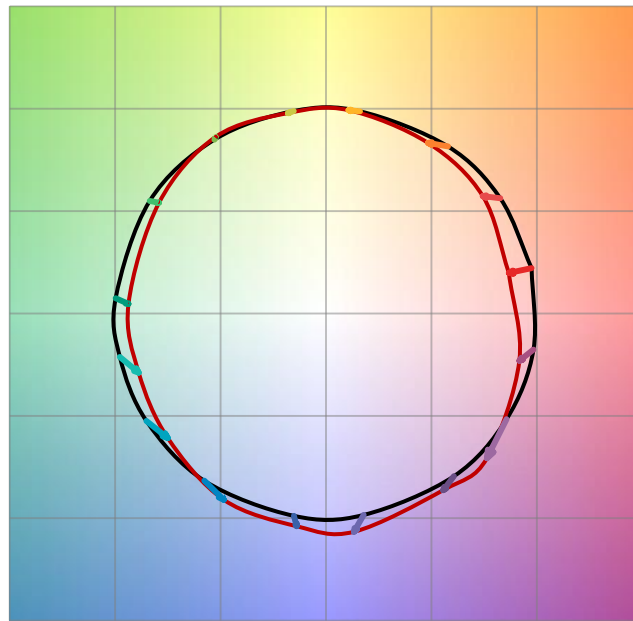
Chroma Shift by Hue



R_f by Hue

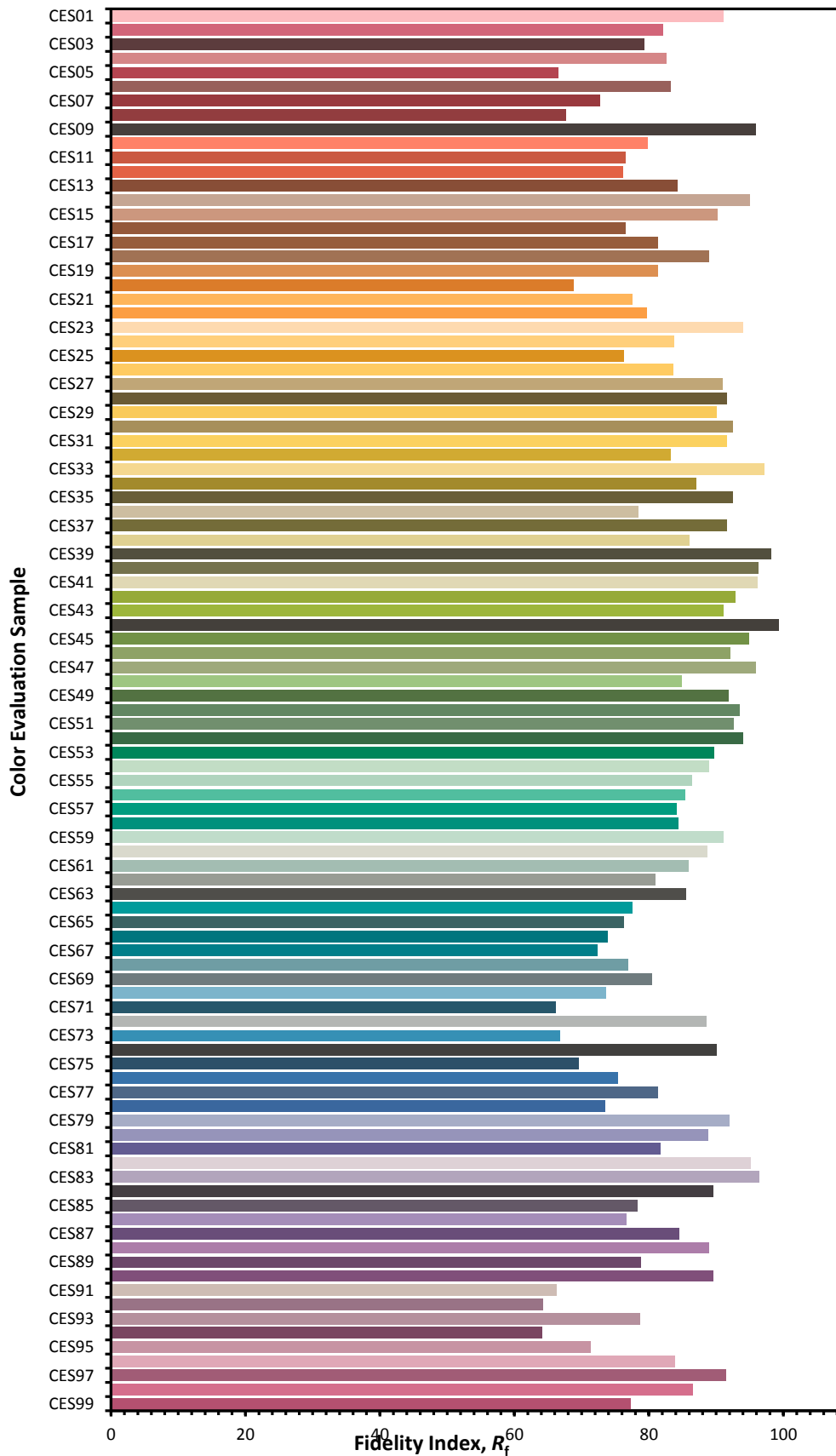


Color Vector Graphic

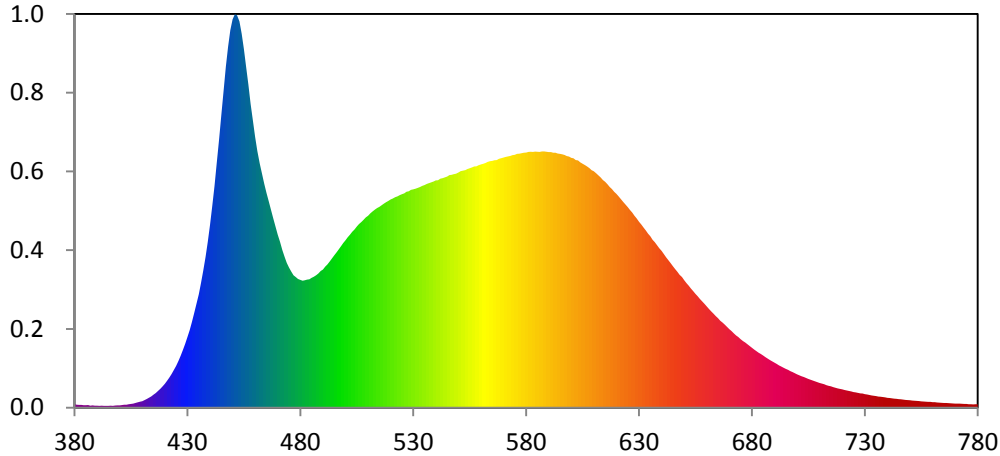


— Reference Illuminat — Test Source

Color Fidelity by CES Sample



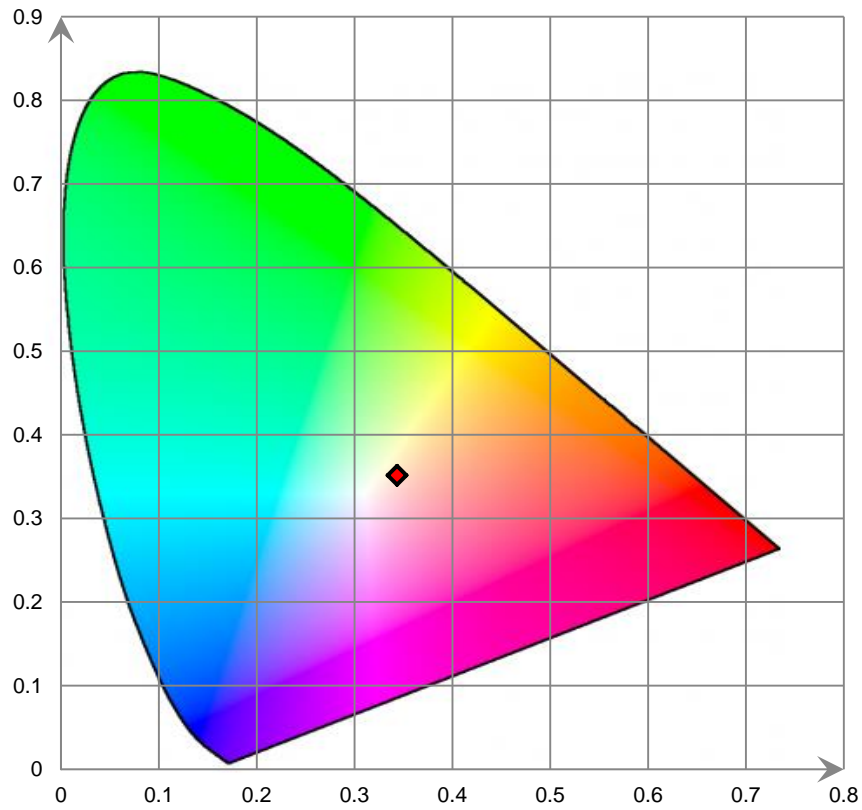
Relative Spectral Power Distribution



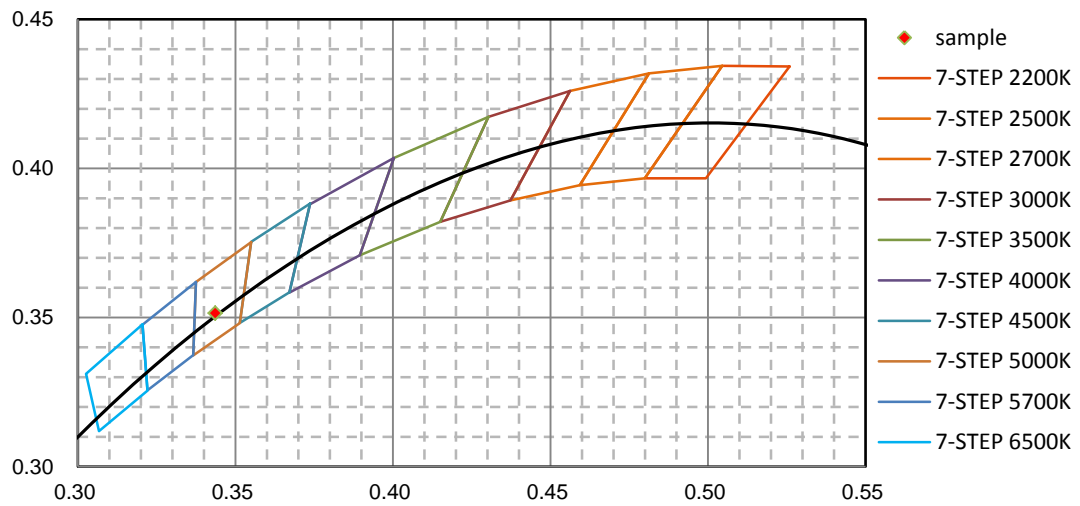
nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
380	2.469E-01	421	1.817E+00	462	1.642E+01	503	1.184E+01	544	1.550E+01
381	2.057E-01	422	2.030E+00	463	1.575E+01	504	1.200E+01	545	1.556E+01
382	1.972E-01	423	2.271E+00	464	1.507E+01	505	1.218E+01	546	1.565E+01
383	1.965E-01	424	2.535E+00	465	1.445E+01	506	1.235E+01	547	1.568E+01
384	1.734E-01	425	2.809E+00	466	1.389E+01	507	1.250E+01	548	1.572E+01
385	1.671E-01	426	3.157E+00	467	1.332E+01	508	1.264E+01	549	1.574E+01
386	1.795E-01	427	3.503E+00	468	1.276E+01	509	1.281E+01	550	1.582E+01
387	1.360E-01	428	3.897E+00	469	1.220E+01	510	1.291E+01	551	1.592E+01
388	1.597E-01	429	4.306E+00	470	1.165E+01	511	1.308E+01	552	1.595E+01
389	1.369E-01	430	4.756E+00	471	1.116E+01	512	1.321E+01	553	1.599E+01
390	1.362E-01	431	5.220E+00	472	1.062E+01	513	1.333E+01	554	1.606E+01
391	1.252E-01	432	5.772E+00	473	1.016E+01	514	1.343E+01	555	1.611E+01
392	1.378E-01	433	6.360E+00	474	9.741E+00	515	1.352E+01	556	1.617E+01
393	1.233E-01	434	6.971E+00	475	9.425E+00	516	1.362E+01	557	1.624E+01
394	1.303E-01	435	7.633E+00	476	9.159E+00	517	1.373E+01	558	1.625E+01
395	1.247E-01	436	8.401E+00	477	8.907E+00	518	1.383E+01	559	1.632E+01
396	1.400E-01	437	9.235E+00	478	8.788E+00	519	1.392E+01	560	1.637E+01
397	1.304E-01	438	1.012E+01	479	8.663E+00	520	1.402E+01	561	1.642E+01
398	1.475E-01	439	1.115E+01	480	8.601E+00	521	1.408E+01	562	1.647E+01
399	1.582E-01	440	1.229E+01	481	8.548E+00	522	1.416E+01	563	1.654E+01
400	1.641E-01	441	1.356E+01	482	8.574E+00	523	1.422E+01	564	1.659E+01
401	1.766E-01	442	1.489E+01	483	8.622E+00	524	1.430E+01	565	1.661E+01
402	1.985E-01	443	1.645E+01	484	8.646E+00	525	1.437E+01	566	1.665E+01
403	2.032E-01	444	1.807E+01	485	8.741E+00	526	1.443E+01	567	1.666E+01
404	2.313E-01	445	1.972E+01	486	8.811E+00	527	1.453E+01	568	1.675E+01
405	2.537E-01	446	2.133E+01	487	8.916E+00	528	1.456E+01	569	1.679E+01
406	2.775E-01	447	2.294E+01	488	9.028E+00	529	1.466E+01	570	1.683E+01
407	3.141E-01	448	2.429E+01	489	9.199E+00	530	1.469E+01	571	1.688E+01
408	3.601E-01	449	2.540E+01	490	9.304E+00	531	1.474E+01	572	1.692E+01
409	4.059E-01	450	2.612E+01	491	9.489E+00	532	1.479E+01	573	1.694E+01
410	4.435E-01	451	2.647E+01	492	9.646E+00	533	1.485E+01	574	1.700E+01
411	5.153E-01	452	2.641E+01	493	9.832E+00	534	1.493E+01	575	1.701E+01
412	5.927E-01	453	2.600E+01	494	1.004E+01	535	1.498E+01	576	1.708E+01
413	6.751E-01	454	2.517E+01	495	1.024E+01	536	1.506E+01	577	1.710E+01
414	7.664E-01	455	2.413E+01	496	1.044E+01	537	1.511E+01	578	1.713E+01
415	8.780E-01	456	2.292E+01	497	1.065E+01	538	1.517E+01	579	1.716E+01
416	9.867E-01	457	2.173E+01	498	1.087E+01	539	1.522E+01	580	1.717E+01
417	1.135E+00	458	2.044E+01	499	1.109E+01	540	1.530E+01	581	1.721E+01
418	1.282E+00	459	1.933E+01	500	1.127E+01	541	1.531E+01	582	1.722E+01
419	1.437E+00	460	1.823E+01	501	1.148E+01	542	1.541E+01	583	1.721E+01
420	1.615E+00	461	1.726E+01	502	1.165E+01	543	1.545E+01	584	1.724E+01

nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
585	1.722E+01	626	1.331E+01	667	5.723E+00	708	1.770E+00	749	5.136E-01
586	1.721E+01	627	1.314E+01	668	5.584E+00	709	1.721E+00	750	5.040E-01
587	1.725E+01	628	1.291E+01	669	5.438E+00	710	1.662E+00	751	4.856E-01
588	1.725E+01	629	1.273E+01	670	5.285E+00	711	1.619E+00	752	4.712E-01
589	1.723E+01	630	1.252E+01	671	5.151E+00	712	1.578E+00	753	4.625E-01
590	1.720E+01	631	1.232E+01	672	5.005E+00	713	1.519E+00	754	4.468E-01
591	1.720E+01	632	1.211E+01	673	4.865E+00	714	1.475E+00	755	4.305E-01
592	1.716E+01	633	1.192E+01	674	4.758E+00	715	1.438E+00	756	4.161E-01
593	1.715E+01	634	1.171E+01	675	4.616E+00	716	1.391E+00	757	4.064E-01
594	1.711E+01	635	1.154E+01	676	4.491E+00	717	1.343E+00	758	3.969E-01
595	1.708E+01	636	1.131E+01	677	4.387E+00	718	1.302E+00	759	3.912E-01
596	1.705E+01	637	1.115E+01	678	4.271E+00	719	1.269E+00	760	3.745E-01
597	1.701E+01	638	1.094E+01	679	4.148E+00	720	1.233E+00	761	3.706E-01
598	1.694E+01	639	1.073E+01	680	4.033E+00	721	1.191E+00	762	3.563E-01
599	1.690E+01	640	1.055E+01	681	3.922E+00	722	1.157E+00	763	3.427E-01
600	1.681E+01	641	1.033E+01	682	3.809E+00	723	1.126E+00	764	3.338E-01
601	1.678E+01	642	1.012E+01	683	3.705E+00	724	1.093E+00	765	3.225E-01
602	1.666E+01	643	9.920E+00	684	3.615E+00	725	1.051E+00	766	3.145E-01
603	1.664E+01	644	9.731E+00	685	3.506E+00	726	1.033E+00	767	3.058E-01
604	1.651E+01	645	9.521E+00	686	3.400E+00	727	9.938E-01	768	2.969E-01
605	1.642E+01	646	9.333E+00	687	3.307E+00	728	9.704E-01	769	2.925E-01
606	1.632E+01	647	9.148E+00	688	3.205E+00	729	9.514E-01	770	2.820E-01
607	1.623E+01	648	8.939E+00	689	3.118E+00	730	9.081E-01	771	2.797E-01
608	1.612E+01	649	8.792E+00	690	3.034E+00	731	8.916E-01	772	2.717E-01
609	1.598E+01	650	8.576E+00	691	2.951E+00	732	8.554E-01	773	2.668E-01
610	1.591E+01	651	8.388E+00	692	2.845E+00	733	8.326E-01	774	2.526E-01
611	1.578E+01	652	8.212E+00	693	2.779E+00	734	8.041E-01	775	2.519E-01
612	1.564E+01	653	8.020E+00	694	2.688E+00	735	7.804E-01	776	2.392E-01
613	1.549E+01	654	7.842E+00	695	2.617E+00	736	7.563E-01	777	2.339E-01
614	1.532E+01	655	7.663E+00	696	2.547E+00	737	7.369E-01	778	2.277E-01
615	1.520E+01	656	7.496E+00	697	2.464E+00	738	7.234E-01	779	2.326E-01
616	1.504E+01	657	7.317E+00	698	2.401E+00	739	6.936E-01	780	2.330E-01
617	1.486E+01	658	7.148E+00	699	2.323E+00	740	6.701E-01		
618	1.472E+01	659	6.987E+00	700	2.250E+00	741	6.587E-01		
619	1.453E+01	660	6.810E+00	701	2.185E+00	742	6.331E-01		
620	1.440E+01	661	6.645E+00	702	2.120E+00	743	6.127E-01		
621	1.422E+01	662	6.475E+00	703	2.064E+00	744	5.977E-01		
622	1.403E+01	663	6.332E+00	704	1.996E+00	745	5.780E-01		
623	1.385E+01	664	6.169E+00	705	1.940E+00	746	5.637E-01		
624	1.367E+01	665	6.031E+00	706	1.883E+00	747	5.504E-01		
625	1.350E+01	666	5.852E+00	707	1.825E+00	748	5.312E-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**

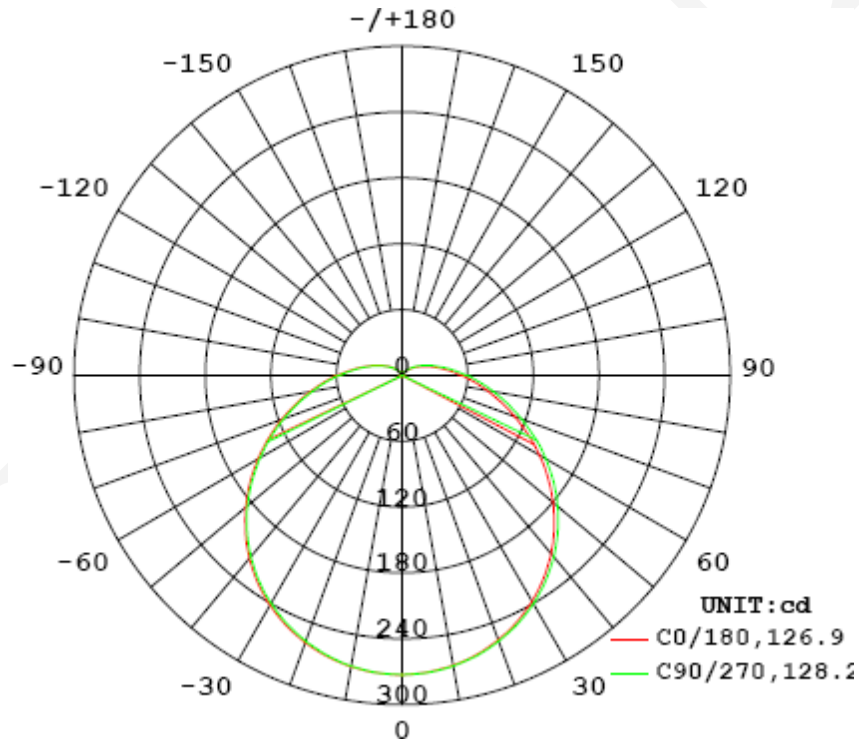
Electrical Measurement

Input Voltage (V)	Frequency (Hz)	Input Current (A)	Power (W)	Power Factor
120.0	60	0.0880	9.79	0.9272

Photometric Measurement

Luminous Flux (lm)	Efficacy (lm/W)	I_{max} (cd)	S/MH (C0/180)	S/MH (C90/270)
1106.25	113.00	272.7	1.30	1.31

Luminous Intensity Distribution



	C0/180	C45/225	C90/270	C135/315	AVG.
Beam Angle (50% I_{max}):	126.9	127.8	128.2	128.1	127.8
Field Angle (10% I_{max}):	217.0	218.0	218.4	218.5	218.0

Luminous Intensity (cd) Distribution Data

C γ	0°	22.5°	45°	67.5°	90°	112.5°	135°	157.5°
0.0°	273	273	273	273	273	273	273	273
5.0°	272	272	272	272	272	271	271	271
10.0°	269	270	269	269	269	268	268	268
15.0°	265	265	265	265	264	264	263	263
20.0°	259	259	259	258	258	257	257	256
25.0°	251	251	251	250	250	249	248	248
30.0°	242	242	241	241	240	239	238	237
35.0°	230	230	230	229	229	227	226	225
40.0°	217	217	217	216	215	214	213	212
45.0°	203	203	203	202	201	199	198	196
50.0°	187	187	187	186	185	183	181	180
55.0°	170	170	170	169	168	166	164	162
60.0°	152	153	152	152	150	149	147	145
65.0°	135	135	135	134	132	131	129	127
70.0°	117	118	117	117	115	114	112	110
75.0°	101	101	101	100	99	97	96	94
80.0°	85	86	86	85	83	82	81	79
85.0°	72	72	72	71	70	69	68	66
90.0°	60	60	60	59	58	57	56	55
95.0°	49	49	49	49	48	47	46	45
100.0°	40	41	40	40	39	39	38	37
105.0°	33	33	33	33	32	31	31	30
110.0°	27	27	27	26	26	26	25	24
115.0°	22	22	22	21	21	21	20	20
120.0°	17	17	17	17	17	16	16	16
125.0°	14	14	14	14	13	13	13	12
130.0°	11	11	11	11	10	10	10	10
135.0°	8	8	8	8	8	8	8	7
140.0°	6	6	6	6	6	6	6	6
145.0°	5	5	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°	1	1	1	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

Luminous Intensity (cd) Distribution Data (cont.)

C γ	180°	202.5°	225°	247.5°	270°	292.5°	315°	337.5°
0.0°	273	273	273	273	273	273	273	273
5.0°	271	271	271	272	272	272	272	272
10.0°	268	268	268	269	269	269	269	270
15.0°	263	263	264	264	264	265	265	265
20.0°	257	257	257	257	258	258	259	259
25.0°	248	248	249	249	250	250	251	251
30.0°	238	238	238	239	240	241	241	242
35.0°	226	226	227	228	229	230	230	231
40.0°	212	212	213	214	216	217	218	218
45.0°	197	197	198	200	201	203	203	204
50.0°	180	181	182	184	186	187	188	188
55.0°	163	164	165	167	169	171	171	171
60.0°	145	146	148	150	152	153	154	154
65.0°	126	128	130	132	134	136	137	137
70.0°	109	111	112	114	116	118	119	118
75.0°	93	95	96	98	100	102	103	102
80.0°	79	80	81	83	85	87	87	87
85.0°	66	67	68	70	71	73	74	73
90.0°	55	56	57	58	59	61	61	61
95.0°	45	46	47	48	49	50	51	50
100.0°	37	38	38	39	40	41	42	41
105.0°	30	31	31	32	33	34	34	34
110.0°	24	25	25	26	27	28	28	28
115.0°	20	20	21	21	22	22	23	22
120.0°	16	16	16	17	17	18	18	18
125.0°	13	13	13	13	14	14	14	14
130.0°	10	10	10	10	11	11	11	11
135.0°	7	8	8	8	8	8	9	9
140.0°	6	6	6	6	6	6	6	6
145.0°	4	4	4	4	4	5	5	5
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	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)	%	Deg	Flux (lm)	%
0-5	6.5	0.59	0-5	6.5	0.59
5-10	19.3	1.75	0-10	25.8	2.34
10-15	31.6	2.85	0-15	57.5	5.19
15-20	43.0	3.89	0-20	100.5	9.08
20-25	53.2	4.81	0-25	153.7	13.89
25-30	61.9	5.60	0-30	215.6	19.49
30-35	68.9	6.23	0-35	284.6	25.72
35-40	74.0	6.69	0-40	358.6	32.41
40-45	77.0	6.96	0-45	435.5	39.37
45-50	77.8	7.03	0-50	513.3	46.40
50-55	76.5	6.92	0-55	589.8	53.32
55-60	73.4	6.63	0-60	663.2	59.95
60-65	68.6	6.20	0-65	731.8	66.15
65-70	62.5	5.65	0-70	794.3	71.80
70-75	55.7	5.04	0-75	850.0	76.84
75-80	48.7	4.40	0-80	898.7	81.24
80-85	41.7	3.77	0-85	940.4	85.01
85-90	35.1	3.17	0-90	975.5	88.18
90-95	29.0	2.62	0-95	1004.5	90.80
95-100	23.7	2.15	0-100	1028.2	92.95
100-105	19.1	1.72	0-105	1047.3	94.67
105-110	15.2	1.38	0-110	1062.6	96.05
110-115	11.9	1.08	0-115	1074.5	97.13
115-120	9.2	0.84	0-120	1083.7	97.97
120-125	7.0	0.63	0-125	1090.7	98.60
125-130	5.2	0.47	0-130	1095.9	99.07
130-135	3.7	0.33	0-135	1099.6	99.40
135-140	2.6	0.24	0-140	1102.2	99.64
140-145	1.7	0.15	0-145	1103.9	99.79
145-150	1.1	0.10	0-150	1105.0	99.89
150-155	0.6	0.06	0-155	1105.7	99.95
155-160	0.3	0.03	0-160	1106.0	99.98
160-165	0.2	0.01	0-165	1106.1	99.99
165-170	0.1	0.01	0-170	1106.2	100.00
170-175	0.0	0.00	0-175	1106.2	100.00
175-180	0.0	0.00	0-180	1106.3	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*****