

# 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: L9WNA19/50K**

<b>Report Type:</b>	Electrical and Photometric tests including: Luminous Flux, Power Factor, Chromaticity, Luminous Intensity Distribution
<b>Test Engineer:</b>	Hexy He <i>Hexy He</i>
<b>Report Number:</b>	RSZ201022509-10
<b>Test Date:</b>	2017-11-07
<b>Report Date:</b>	2020-10-23
<b>Reviewed By:</b>	Blake Zhang / EE Engineer
<b>Prepared By:</b>	Bay Area Compliance Laboratories Corp. (Dongguan). No.69,Pulongcun ,Puxihu Industrial Area, Tangxia , Dongguan, Guangdong, China. Tel: +86-0769-86858888 Fax:+86-0769-86858588
<b>Accreditation:</b>	The IAS Accreditation Number TL-460.

## 1. Product Description

### General Information:

One sample was received on 2017-11-03 and used for testing.

#Model Tested: L9WNA19/50K  
 #Manufacturer: Overdrive Electronics Pvt. Ltd.  
 #Product Code: 793G  
 #Brand Name: Overdrive  
 #Product Designation: LED Lamp  
 #Burning Time Before Test: 0hour(For New Products)

### Rated Values:

#Rated Voltage/Frequency: 120 V AC 60Hz  
 #Rated Power: 9.5 W  
 #Nominal CCT: 5000K  
 #Nominal Lumen Output: 980lm

### Note:

1. The applicant Overdrive Electronics Pvt. Ltd. declare that their products with model L9WNA19/50K are the same to the products in report#RSZ171103515-10 and is authorized by original applicant to use their test data.
2. All the data in previous report (RSZ171103515-10) 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
1.5m integrating sphere	SENSING	1.5m	NA	25°C	2017-03-09	2018-03-09
Digital power meter	EVERFINE	PF9811	G135717CN13 61159	N/A	2016-12-08	2017-12-08
High-precision rapid spectral radiometer	EVERFINE	HAAS-2000	N/A	N/A	2017-03-09	2018-03-09
Precision frequency power supply	ALL Power	APW-105N	970663	220V±10% 50HZ	2017-03-03	2018-03-03
Standard Light Source	EVERFINE	D204	G100283CA83 51158	24V/100W	2016-12-12	2017-12-12
thermometer	SENSING	NA	NA	25°C	2017-03-20	2018-03-20
Programmable Precision DC Power Supply	ITECH	IT6154	0061 0417 6471 0010 19	0~32V	2017-03-03	2018-03-03
AC POWER SUPPLY	EVERFINE	VPS1030 PWM	1012017	0-150V, 0- 300V	2017-03-03	2018-03-03

Device	Manufacture	Model No	Serial No	Test Range	Calibration date	Calibration due date
Digital CC&CV DC Power Supply	EVERFINE	WY12010	1009009	30V/5A	2017-03-03	2018-03-03
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	YG108492N10120001	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=24K (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=0.17% 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**

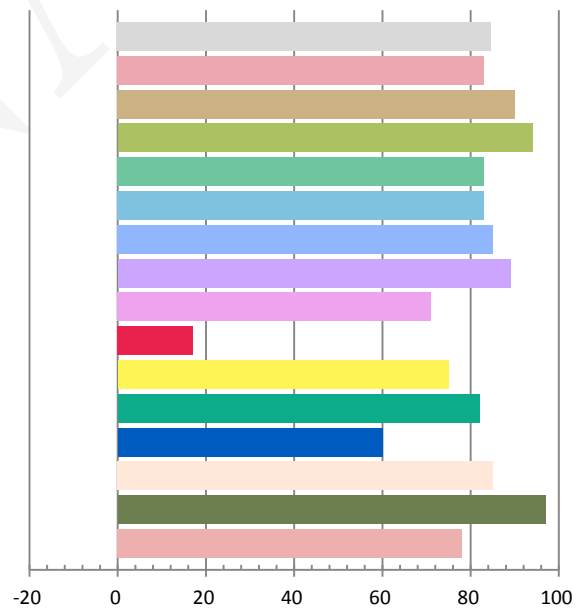
### Photometric and Electrical Measurement Result

Voltage (V)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Luminous Flux(lm)	Efficacy (lm/W)
120.1	60	0.09157	9.27	0.8431	1090.3	117.62

Radiant Flux (W)	CCT (K)	Duv	x	y	u'	v'
3.4474	4983	0.00222	0.3460	0.3568	0.2100	0.4873

### Color Rendering Index

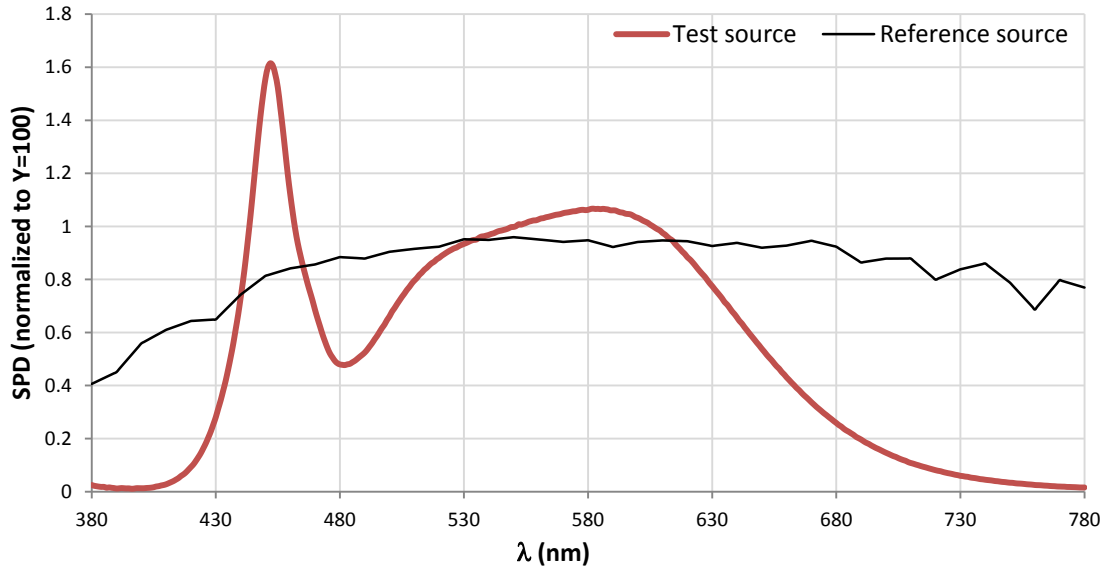
Ra			
<b>84.6</b>			
R1	R2	R3	R4
83	90	94	83
R5	R6	R7	R8
83	85	89	71
R9	R10	R11	R12
17	75	82	60
R13	R14	R15	
85	97	78	



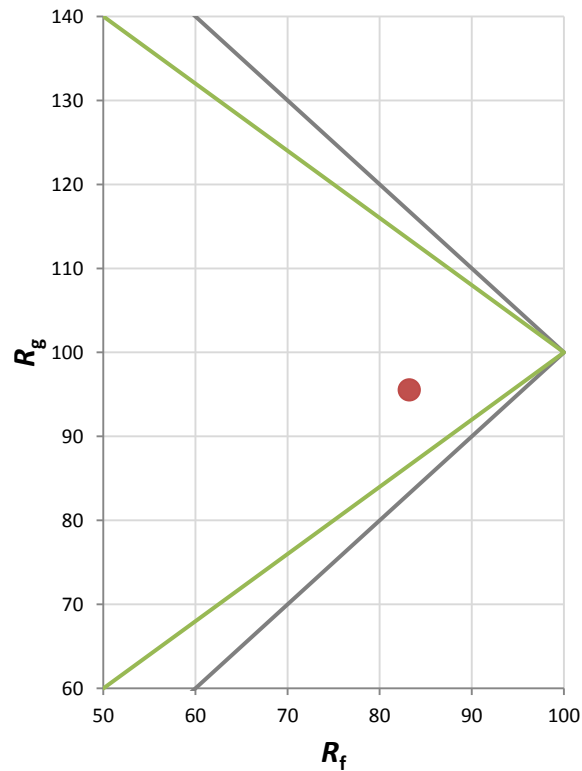
Fidelity Index and Gamut Index

Fidelity Index $R_f$	83
Gamut Index $R_g$	96

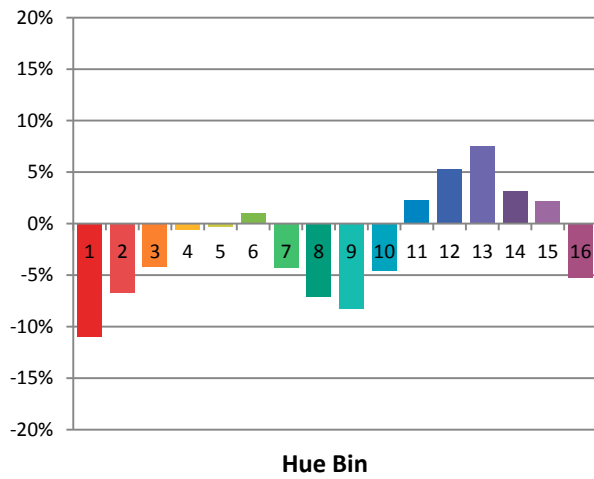
Spectral Power Distribution Comparison



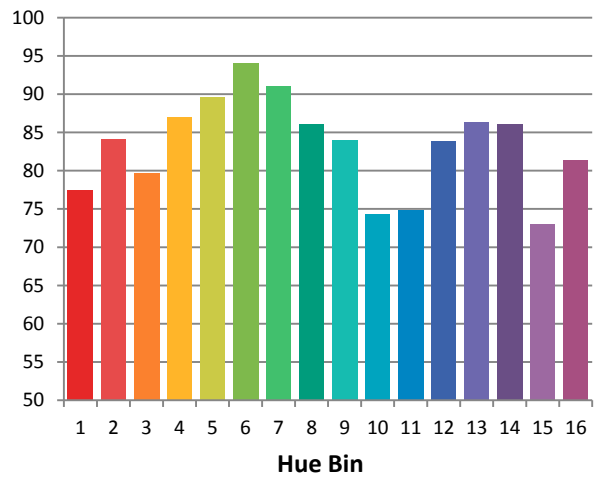
Plot of  $R_g$  versus  $R_f$



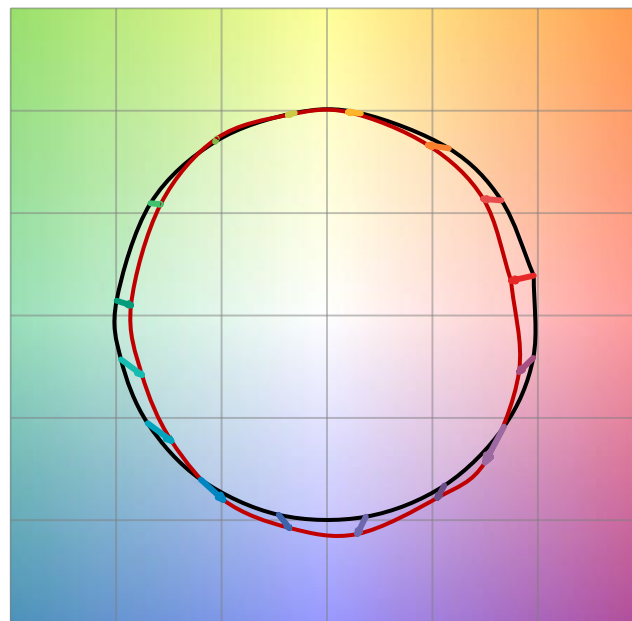
Chroma Shift by Hue



$R_f$  by Hue

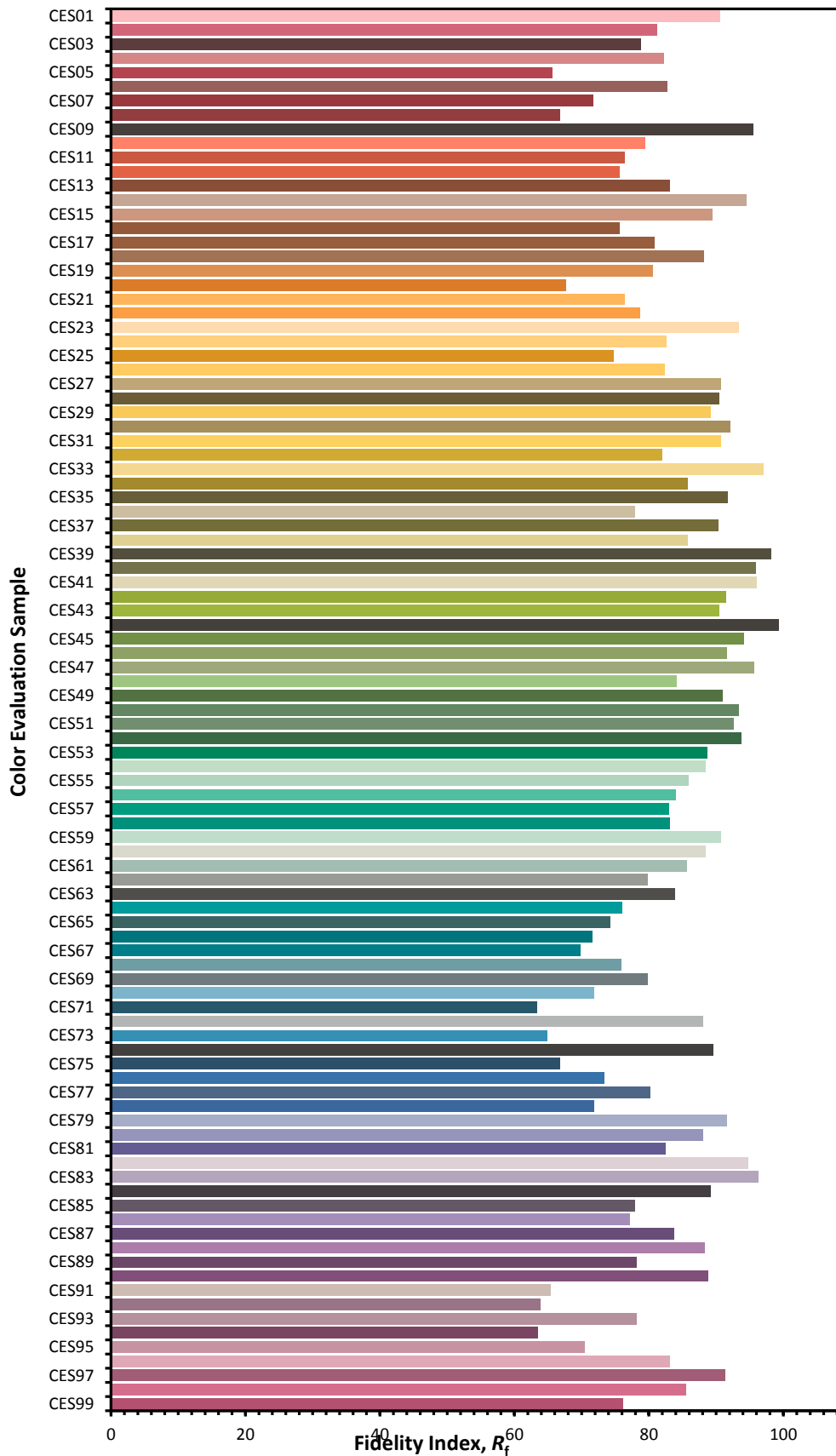


Color Vector Graphic

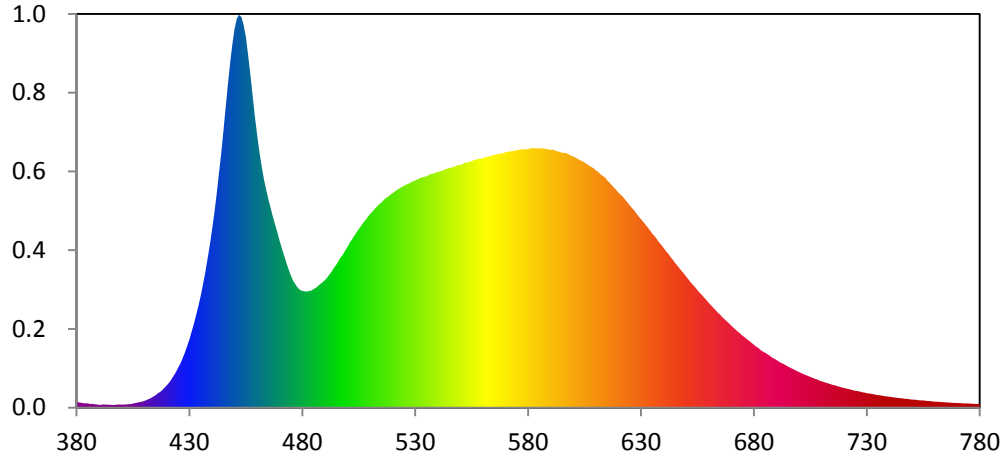


— Reference Illuminat — Test Source

**Color Fidelity by CES Sample**



**Relative Spectral Power Distribution**

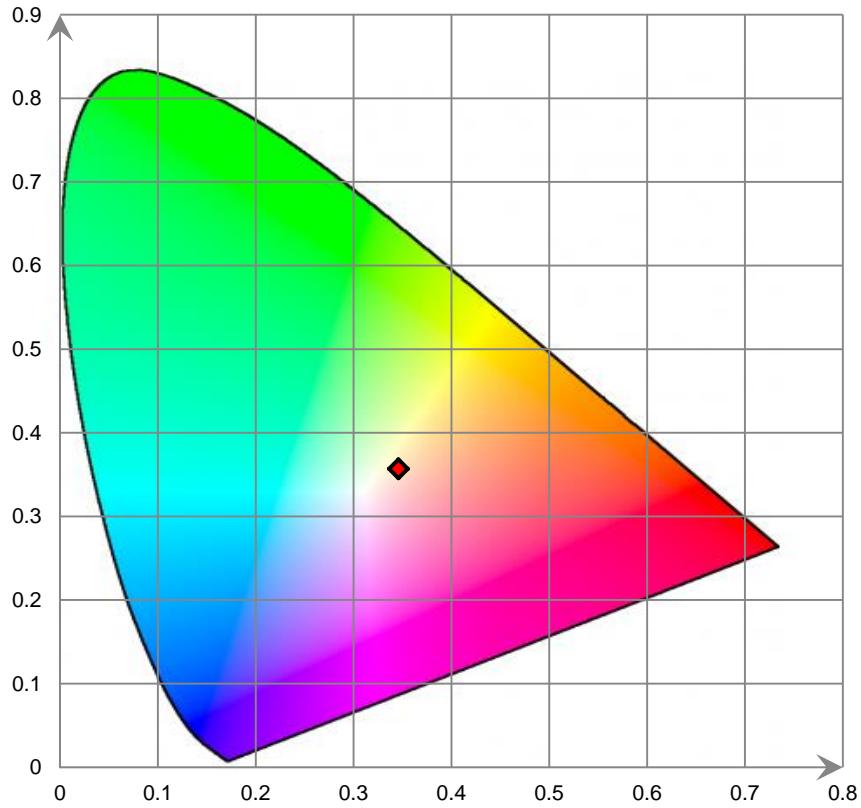


nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
380	4.007E-01	421	1.645E+00	462	1.579E+01	503	1.128E+01	544	1.568E+01
381	3.536E-01	422	1.856E+00	463	1.496E+01	504	1.150E+01	545	1.571E+01
382	3.263E-01	423	2.082E+00	464	1.428E+01	505	1.172E+01	546	1.575E+01
383	3.012E-01	424	2.326E+00	465	1.365E+01	506	1.192E+01	547	1.579E+01
384	2.849E-01	425	2.617E+00	466	1.308E+01	507	1.214E+01	548	1.585E+01
385	2.876E-01	426	2.917E+00	467	1.251E+01	508	1.232E+01	549	1.592E+01
386	2.340E-01	427	3.263E+00	468	1.200E+01	509	1.253E+01	550	1.593E+01
387	2.562E-01	428	3.624E+00	469	1.149E+01	510	1.270E+01	551	1.598E+01
388	2.331E-01	429	4.046E+00	470	1.093E+01	511	1.285E+01	552	1.609E+01
389	2.165E-01	430	4.477E+00	471	1.042E+01	512	1.304E+01	553	1.607E+01
390	1.890E-01	431	5.004E+00	472	9.943E+00	513	1.318E+01	554	1.612E+01
391	1.997E-01	432	5.508E+00	473	9.461E+00	514	1.335E+01	555	1.617E+01
392	2.160E-01	433	6.089E+00	474	9.040E+00	515	1.347E+01	556	1.624E+01
393	2.072E-01	434	6.678E+00	475	8.647E+00	516	1.362E+01	557	1.628E+01
394	1.952E-01	435	7.367E+00	476	8.313E+00	517	1.375E+01	558	1.632E+01
395	1.995E-01	436	8.097E+00	477	8.081E+00	518	1.384E+01	559	1.633E+01
396	1.750E-01	437	8.872E+00	478	7.866E+00	519	1.398E+01	560	1.638E+01
397	1.829E-01	438	9.756E+00	479	7.728E+00	520	1.407E+01	561	1.644E+01
398	2.084E-01	439	1.064E+01	480	7.658E+00	521	1.419E+01	562	1.646E+01
399	2.089E-01	440	1.166E+01	481	7.632E+00	522	1.429E+01	563	1.651E+01
400	2.054E-01	441	1.271E+01	482	7.616E+00	523	1.439E+01	564	1.654E+01
401	2.060E-01	442	1.391E+01	483	7.662E+00	524	1.448E+01	565	1.658E+01
402	2.202E-01	443	1.524E+01	484	7.689E+00	525	1.456E+01	566	1.662E+01
403	2.278E-01	444	1.662E+01	485	7.782E+00	526	1.464E+01	567	1.666E+01
404	2.428E-01	445	1.812E+01	486	7.871E+00	527	1.469E+01	568	1.668E+01
405	2.670E-01	446	1.966E+01	487	7.989E+00	528	1.478E+01	569	1.671E+01
406	3.100E-01	447	2.117E+01	488	8.115E+00	529	1.485E+01	570	1.676E+01
407	3.302E-01	448	2.258E+01	489	8.235E+00	530	1.491E+01	571	1.679E+01
408	3.716E-01	449	2.382E+01	490	8.369E+00	531	1.497E+01	572	1.681E+01
409	4.008E-01	450	2.485E+01	491	8.540E+00	532	1.504E+01	573	1.684E+01
410	4.445E-01	451	2.553E+01	492	8.741E+00	533	1.511E+01	574	1.687E+01
411	5.065E-01	452	2.578E+01	493	8.936E+00	534	1.515E+01	575	1.688E+01
412	5.727E-01	453	2.562E+01	494	9.167E+00	535	1.517E+01	576	1.692E+01
413	6.424E-01	454	2.509E+01	495	9.374E+00	536	1.527E+01	577	1.695E+01
414	7.296E-01	455	2.431E+01	496	9.614E+00	537	1.535E+01	578	1.696E+01
415	8.206E-01	456	2.311E+01	497	9.851E+00	538	1.537E+01	579	1.694E+01
416	9.427E-01	457	2.184E+01	498	1.006E+01	539	1.541E+01	580	1.696E+01
417	1.041E+00	458	2.047E+01	499	1.033E+01	540	1.545E+01	581	1.701E+01
418	1.166E+00	459	1.910E+01	500	1.055E+01	541	1.551E+01	582	1.703E+01
419	1.324E+00	460	1.790E+01	501	1.083E+01	542	1.555E+01	583	1.701E+01
420	1.482E+00	461	1.680E+01	502	1.104E+01	543	1.562E+01	584	1.702E+01

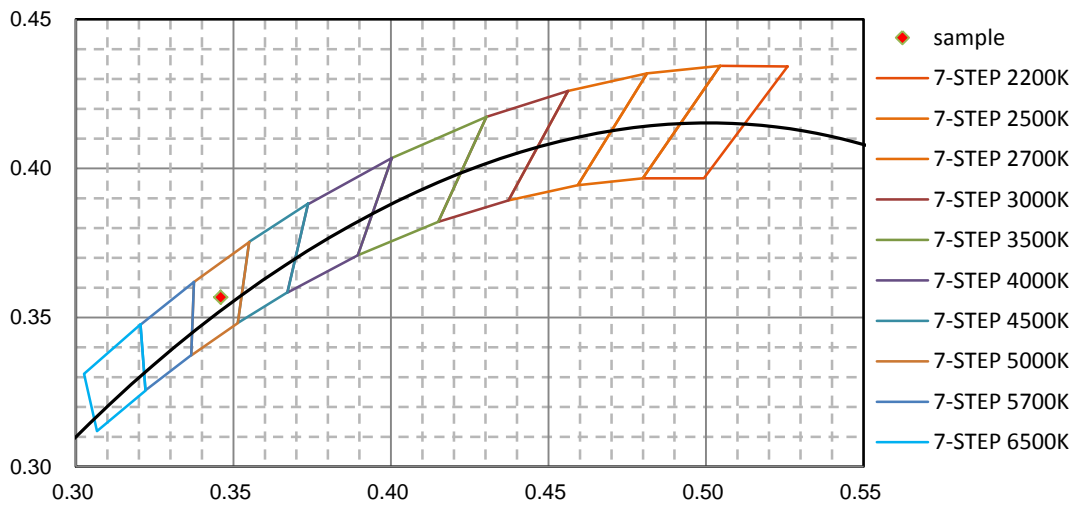


nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
585	1.700E+01	626	1.310E+01	667	5.799E+00	708	1.852E+00	749	5.534E-01
586	1.702E+01	627	1.294E+01	668	5.667E+00	709	1.776E+00	750	5.377E-01
587	1.700E+01	628	1.274E+01	669	5.527E+00	710	1.725E+00	751	5.308E-01
588	1.698E+01	629	1.254E+01	670	5.378E+00	711	1.685E+00	752	5.084E-01
589	1.693E+01	630	1.237E+01	671	5.243E+00	712	1.635E+00	753	4.927E-01
590	1.693E+01	631	1.218E+01	672	5.103E+00	713	1.593E+00	754	4.859E-01
591	1.692E+01	632	1.200E+01	673	4.979E+00	714	1.544E+00	755	4.750E-01
592	1.686E+01	633	1.182E+01	674	4.853E+00	715	1.501E+00	756	4.585E-01
593	1.681E+01	634	1.163E+01	675	4.722E+00	716	1.461E+00	757	4.424E-01
594	1.679E+01	635	1.141E+01	676	4.610E+00	717	1.416E+00	758	4.335E-01
595	1.673E+01	636	1.126E+01	677	4.485E+00	718	1.374E+00	759	4.208E-01
596	1.671E+01	637	1.106E+01	678	4.370E+00	719	1.332E+00	760	4.010E-01
597	1.669E+01	638	1.085E+01	679	4.246E+00	720	1.292E+00	761	3.929E-01
598	1.662E+01	639	1.068E+01	680	4.134E+00	721	1.257E+00	762	3.889E-01
599	1.653E+01	640	1.048E+01	681	4.011E+00	722	1.230E+00	763	3.770E-01
600	1.648E+01	641	1.027E+01	682	3.919E+00	723	1.184E+00	764	3.635E-01
601	1.641E+01	642	1.011E+01	683	3.790E+00	724	1.147E+00	765	3.581E-01
602	1.632E+01	643	9.901E+00	684	3.687E+00	725	1.114E+00	766	3.433E-01
603	1.625E+01	644	9.714E+00	685	3.606E+00	726	1.087E+00	767	3.344E-01
604	1.618E+01	645	9.520E+00	686	3.508E+00	727	1.053E+00	768	3.275E-01
605	1.607E+01	646	9.338E+00	687	3.415E+00	728	1.016E+00	769	3.129E-01
606	1.598E+01	647	9.154E+00	688	3.296E+00	729	9.921E-01	770	3.079E-01
607	1.588E+01	648	8.966E+00	689	3.219E+00	730	9.538E-01	771	3.019E-01
608	1.579E+01	649	8.790E+00	690	3.135E+00	731	9.351E-01	772	2.980E-01
609	1.571E+01	650	8.596E+00	691	3.036E+00	732	9.064E-01	773	2.834E-01
610	1.557E+01	651	8.419E+00	692	2.946E+00	733	8.915E-01	774	2.819E-01
611	1.547E+01	652	8.230E+00	693	2.880E+00	734	8.529E-01	775	2.755E-01
612	1.533E+01	653	8.062E+00	694	2.789E+00	735	8.313E-01	776	2.713E-01
613	1.521E+01	654	7.901E+00	695	2.708E+00	736	8.136E-01	777	2.635E-01
614	1.511E+01	655	7.716E+00	696	2.629E+00	737	7.860E-01	778	2.539E-01
615	1.492E+01	656	7.540E+00	697	2.563E+00	738	7.561E-01	779	2.512E-01
616	1.476E+01	657	7.397E+00	698	2.489E+00	739	7.416E-01	780	2.517E-01
617	1.461E+01	658	7.205E+00	699	2.414E+00	740	7.177E-01		
618	1.444E+01	659	7.054E+00	700	2.342E+00	741	6.989E-01		
619	1.430E+01	660	6.876E+00	701	2.277E+00	742	6.856E-01		
620	1.411E+01	661	6.722E+00	702	2.207E+00	743	6.646E-01		
621	1.398E+01	662	6.558E+00	703	2.141E+00	744	6.389E-01		
622	1.382E+01	663	6.409E+00	704	2.089E+00	745	6.267E-01		
623	1.364E+01	664	6.244E+00	705	2.017E+00	746	6.040E-01		
624	1.345E+01	665	6.112E+00	706	1.955E+00	747	5.855E-01		
625	1.327E+01	666	5.949E+00	707	1.900E+00	748	5.747E-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**

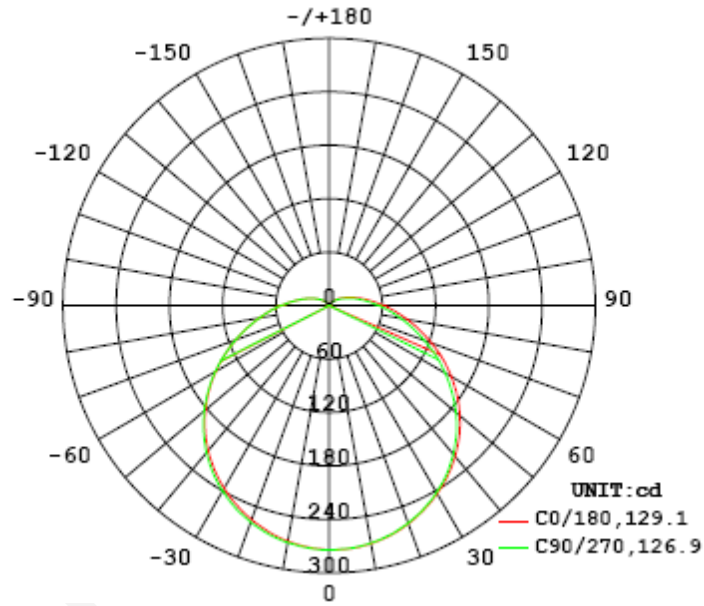
**Electrical Measurement**

Input Voltage (V)	Frequency (Hz)	Input Current (A)	Power (W)	Power Factor
120.0	60	0.0916	9.287	0.8449

**Photometric Measurement**

Luminous Flux (lm)	Efficacy (lm/W)	I <sub>max</sub> (cd)	S/MH (C0/180)	S/MH (C90/270)
1103.74	118.85	274.2	1.33	1.32

**Luminous Intensity Distribution**



	C0/180	C45/225	C90/270	C135/315	AVG.
Beam Angle (50% I <sub>max</sub> ):	129.1	129.1	126.9	126.9	128.0
Field Angle (10% I <sub>max</sub> ):	216.8	216.8	214.2	214.2	215.5

Luminous Intensity (cd) Distribution Data

C γ	0°	22.5°	45°	67.5°	90°	112.5°	135°	157.5°
0.0°	274	274	274	274	274	274	274	274
5.0°	272	272	272	272	273	273	273	273
10.0°	269	268	269	269	270	270	271	271
15.0°	263	263	263	264	265	266	266	266
20.0°	256	256	256	257	259	260	260	260
25.0°	247	247	247	249	250	251	252	252
30.0°	237	237	237	238	240	242	243	243
35.0°	225	225	226	227	229	230	231	232
40.0°	212	213	213	214	215	217	218	219
45.0°	198	198	199	199	200	202	204	205
50.0°	182	183	183	183	184	185	187	190
55.0°	165	166	166	166	166	167	170	173
60.0°	148	148	148	149	148	149	152	156
65.0°	130	130	130	130	130	130	134	138
70.0°	112	113	113	113	112	112	116	120
75.0°	95	96	96	96	95	95	99	103
80.0°	80	80	81	81	80	80	83	87
85.0°	67	67	67	67	66	66	69	73
90.0°	55	55	55	55	55	54	57	60
95.0°	45	45	45	45	45	44	47	49
100.0°	36	37	37	37	36	36	38	40
105.0°	29	30	30	30	29	29	31	33
110.0°	24	24	24	24	24	24	25	26
115.0°	19	19	19	19	19	19	20	21
120.0°	15	15	15	15	15	15	16	17
125.0°	12	12	12	12	12	12	13	13
130.0°	9	9	9	9	9	10	10	11
135.0°	7	7	7	7	7	7	8	8
140.0°	5	5	5	5	5	5	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	1	1
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 Y	180°	202.5°	225°	247.5°	270°	292.5°	315°	337.5°
0.0°	274	274	274	274	274	274	274	274
5.0°	274	273	273	273	273	273	273	272
10.0°	271	271	271	271	271	270	270	269
15.0°	267	266	266	266	266	265	265	263
20.0°	261	260	260	260	260	259	258	257
25.0°	253	252	252	252	252	251	249	248
30.0°	243	243	243	243	242	241	240	238
35.0°	233	233	232	231	231	229	228	226
40.0°	221	221	220	219	217	216	214	213
45.0°	207	207	206	205	203	200	199	198
50.0°	192	193	191	189	186	184	183	182
55.0°	176	176	175	172	169	166	165	165
60.0°	159	159	158	155	151	147	147	148
65.0°	141	142	140	137	133	128	128	129
70.0°	123	123	122	119	114	110	110	111
75.0°	105	106	104	102	97	93	94	95
80.0°	89	90	88	86	82	78	79	80
85.0°	75	75	74	72	68	65	65	66
90.0°	62	62	61	59	56	53	54	55
95.0°	51	51	50	49	46	44	44	45
100.0°	42	42	41	40	38	35	36	36
105.0°	34	34	34	32	31	29	29	29
110.0°	27	28	27	26	25	23	23	24
115.0°	22	22	22	21	20	19	19	19
120.0°	18	18	18	17	16	15	15	15
125.0°	14	14	14	13	13	12	12	12
130.0°	11	11	11	10	10	9	9	9
135.0°	8	8	8	8	7	7	7	7
140.0°	6	6	6	6	6	5	5	5
145.0°	5	5	5	4	4	4	4	4
150.0°	3	3	3	3	3	3	2	2
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	19.4	1.76	0-10	26.0	2.35
10-15	31.7	2.88	0-15	57.7	5.23
15-20	43.2	3.91	0-20	100.9	9.14
20-25	53.4	4.83	0-25	154.2	13.97
25-30	62.1	5.63	0-30	216.3	19.60
30-35	69.2	6.27	0-35	285.5	25.87
35-40	74.4	6.74	0-40	359.9	32.61
40-45	77.5	7.02	0-45	437.4	39.63
45-50	78.4	7.10	0-50	515.8	46.73
50-55	77.2	7.00	0-55	593.0	53.73
55-60	74.0	6.71	0-60	667.0	60.44
60-65	69.2	6.26	0-65	736.2	66.70
65-70	62.8	5.69	0-70	799.1	72.39
70-75	55.7	5.05	0-75	854.8	77.44
75-80	48.3	4.38	0-80	903.1	81.82
80-85	41.1	3.73	0-85	944.2	85.55
85-90	34.3	3.11	0-90	978.6	88.66
90-95	28.2	2.55	0-95	1006.7	91.21
95-100	22.9	2.07	0-100	1029.6	93.28
100-105	18.3	1.67	0-105	1048.0	94.95
105-110	14.5	1.31	0-110	1062.5	96.26
110-115	11.4	1.03	0-115	1073.8	97.29
115-120	8.7	0.79	0-120	1082.6	98.08
120-125	6.6	0.60	0-125	1089.2	98.68
125-130	4.9	0.44	0-130	1094.0	99.12
130-135	3.5	0.32	0-135	1097.5	99.44
135-140	2.4	0.22	0-140	1100.0	99.66
140-145	1.6	0.14	0-145	1101.6	99.80
145-150	1.0	0.09	0-150	1102.6	99.89
150-155	0.6	0.06	0-155	1103.2	99.95
155-160	0.3	0.03	0-160	1103.5	99.98
160-165	0.2	0.01	0-165	1103.6	99.99
165-170	0.1	0.01	0-170	1103.7	100.00
170-175	0.0	0.00	0-175	1103.7	100.00
175-180	0.0	0.00	0-180	1103.7	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.
5. This report cannot be reproduced except in full, without prior written approval of the Company.
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\*\*\*\*\*END OF REPORT\*\*\*\*\*