



# IES LM-79-08


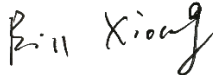
## MEASUREMENT AND TEST REPORT

For

### Overdrive Electronics Pvt. Ltd.

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

**Test Model: L9NAOMDIM/27K**

<b>Report Type:</b>	Electrical and Photometric tests including: Luminous Flux, Chromaticity, Luminous Intensity Distribution
<b>Test Engineer:</b>	Hill Liu 
<b>Report Number:</b>	RSZ180907507-10
<b>Test Date:</b>	2017-07-11 to 2017-07-12
<b>Report Date:</b>	2018-09-11
<b>Reviewed By:</b>	Bill Xiong / EE Engineer 
<b>Prepared By:</b>	Bay Area Compliance Laboratories Corp. (Dongguan). No.69,Pulongcun ,Puxinhu Industrial Area, Tangxia , Dongguan, Guangdong, China. Tel: +86-0769-86858888 Fax:+86-0769-86858588
<b>Accreditation:</b>	The IAS Accreditation Number TL-460.

**Note:** The test data was only valid for the test sample(s). This test report is prepared for the customer shown above and for the device described herein. It may not be duplicated or used in part without prior written consent from Bay Area Compliance Laboratories Corp. (Dongguan). This report is valid only with a valid digital signature. The digital signature may be available only under the Adobe software above version 7.0.

## 1. Product Description

### General Information:

Two samples were received on 2017-07-07. One was tested in integrating sphere and the other was tested in goniophotometer

Model Tested: L9NAOMDIM/27K  
 Product Code: 691  
 Brand Name: Overdrive  
 Product Designation: Omnidirectional LED Lamp  
 Burning Time Before Test: 0hour(For New Products)

### Rated Values:

Rated Voltage/Frequency: AC 120V 60 Hz  
 Rated Power: 9.8W  
 Nominal CCT: 2700 K  
 Nominal Lumen Output: 800 lm

### Note:

1. The applicant Overdrive Electronics Pvt. Ltd. declare that their products with model L9NAOMDIM/27K are the same to the products in report#RSZ170707502-10-1 and is authorized by original applicant to use their test data.
2. All the data in previous report (RSZ170707502-10-1) 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
2.0m integrating sphere	EVERFINE	R98	11010018	2016-11-18	2017-11-18
spectroradiometer	EVERFINE	HAAS-2000	20140912	2016-11-18	2017-11-18
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	2016-11-18	2017-11-18
Standard Light Source	SENSING	N/A	LSD090808	2016-12-05	2017-12-05
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

Device	Manufacture	Model No	Serial No	Calibration date	Calibration due date
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
Wireless Remote Sensor	N/A	433MHz	N/A	2017-03-20	2018-03-20
Standard Light Source	EVERFINE	D908	1012003	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  $25^{\circ}\text{C}\pm 1^{\circ}\text{C}$  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.

$4\pi$  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 ( $\gamma$ ) 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: **Base up**

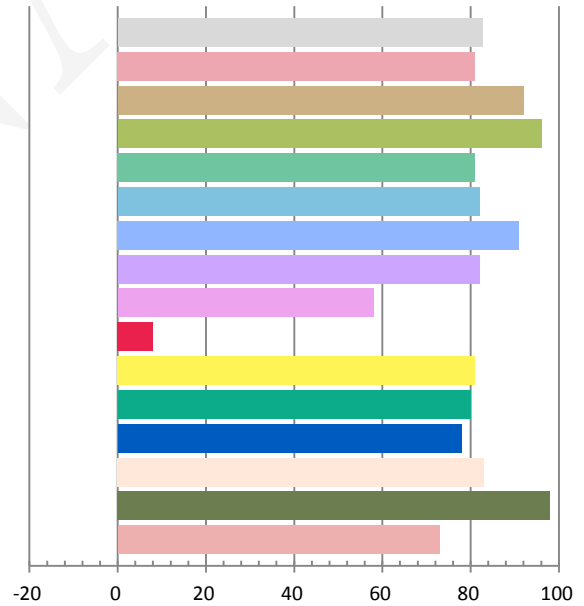
### Photometric and Electrical Measurement Result

Voltage (V)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Luminous Flux(lm)	Efficacy (lm/W)
120.0	60	0.08200	9.728	0.9888	813.80	83.66

Radiant Flux (W)	CCT (K)	Duv	x	y	u'	v'
2.5243	2794	0.000527	0.4532	0.4104	0.2583	0.5263

### Color Rendering Index

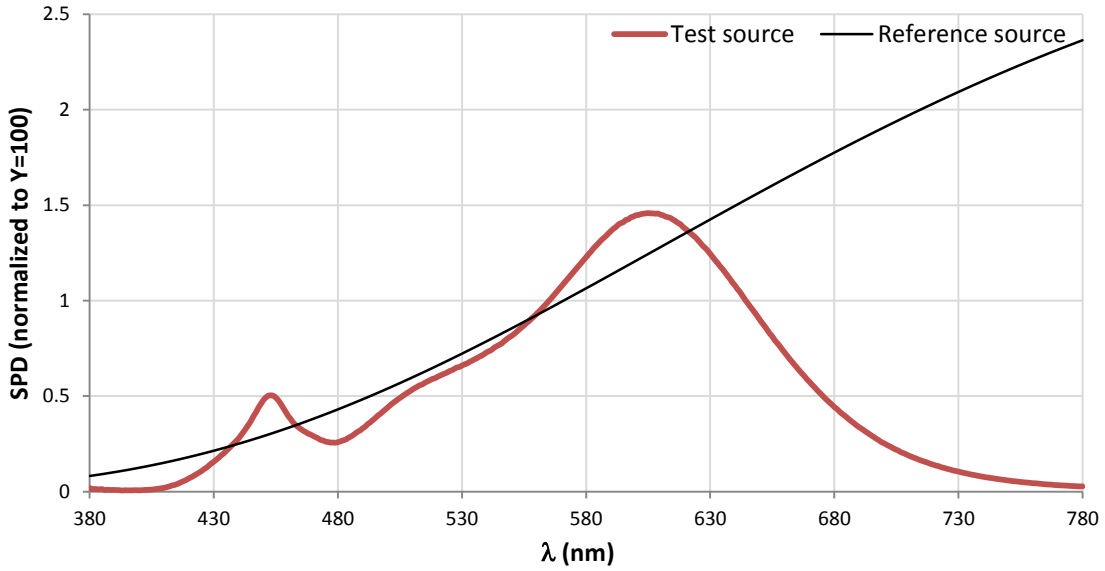
Ra			
82.7			
R1	R2	R3	R4
81	92	96	81
R5	R6	R7	R8
82	91	82	58
R9	R10	R11	R12
8	81	80	78
R13	R14	R15	
83	98	73	



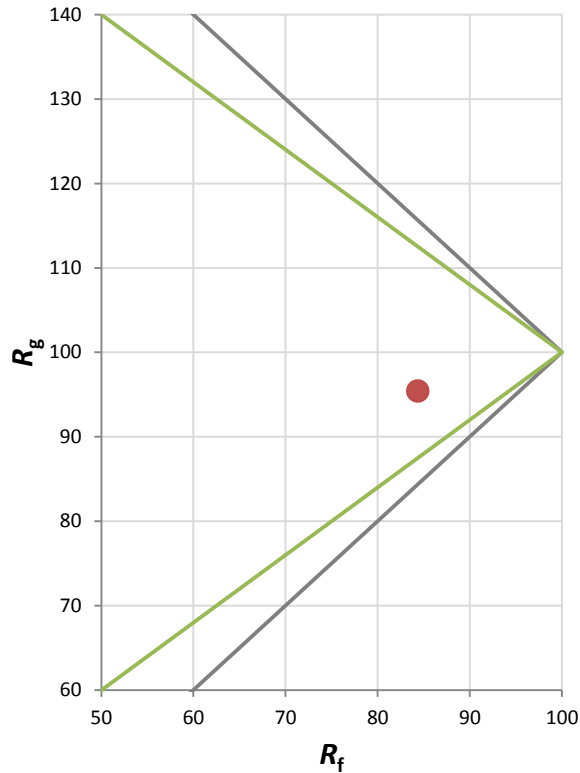
Fidelity Index and Gamut Index

Fidelity Index $R_f$	84
Gamut Index $R_g$	95

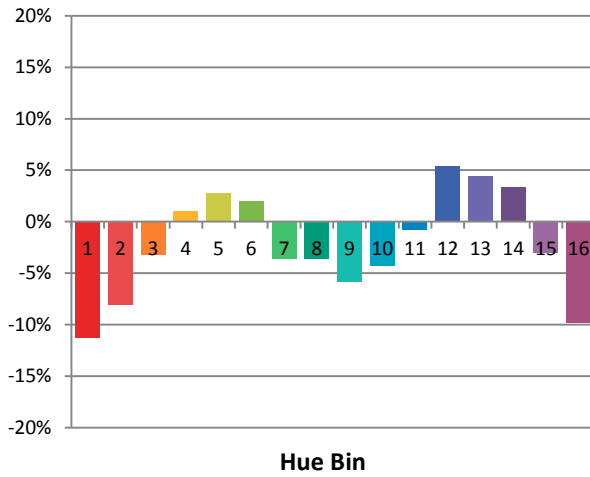
Spectral Power Distribution Comparison



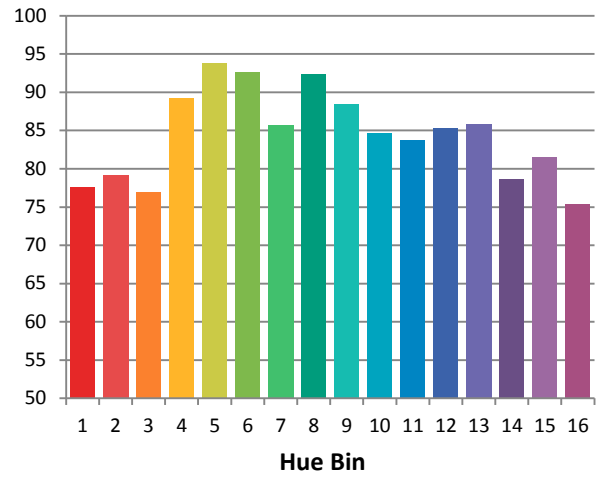
Plot of  $R_g$  versus  $R_f$



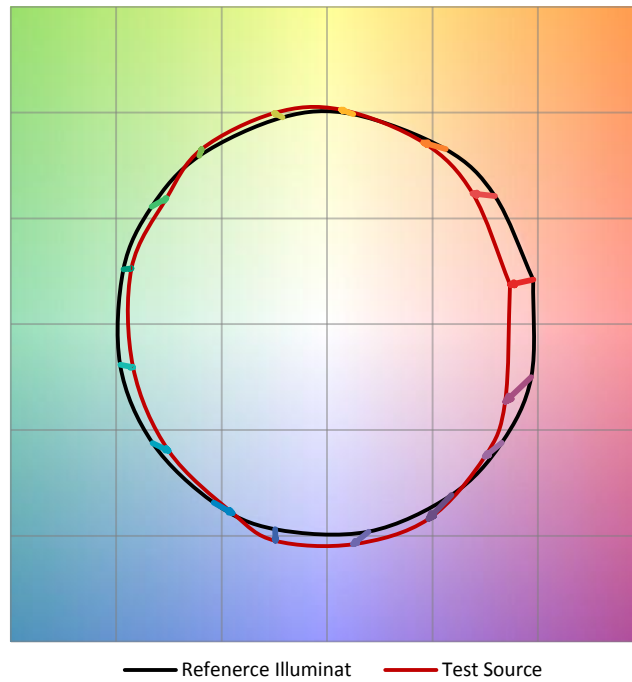
Chroma Shift by Hue



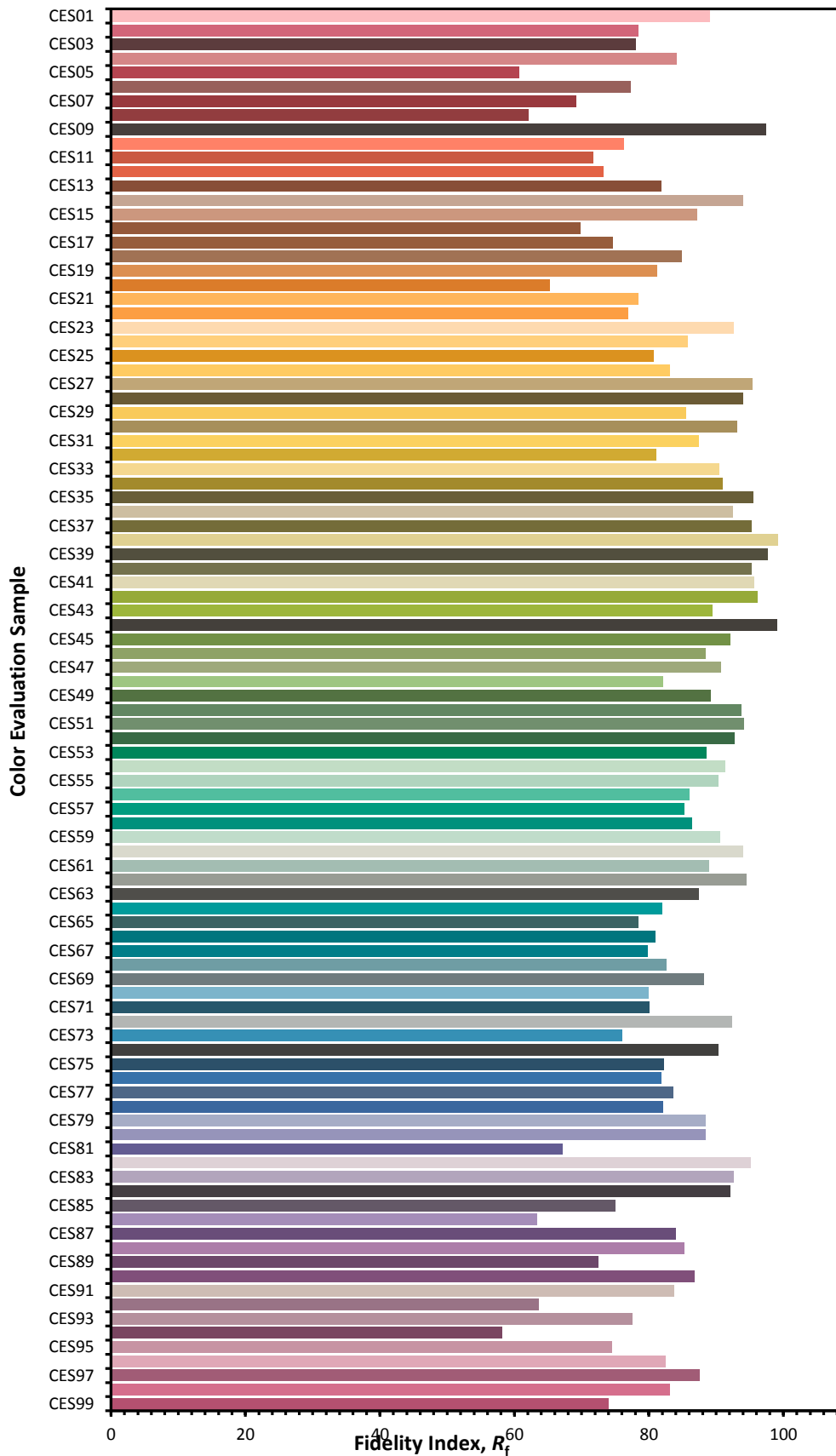
$R_f$  by Hue



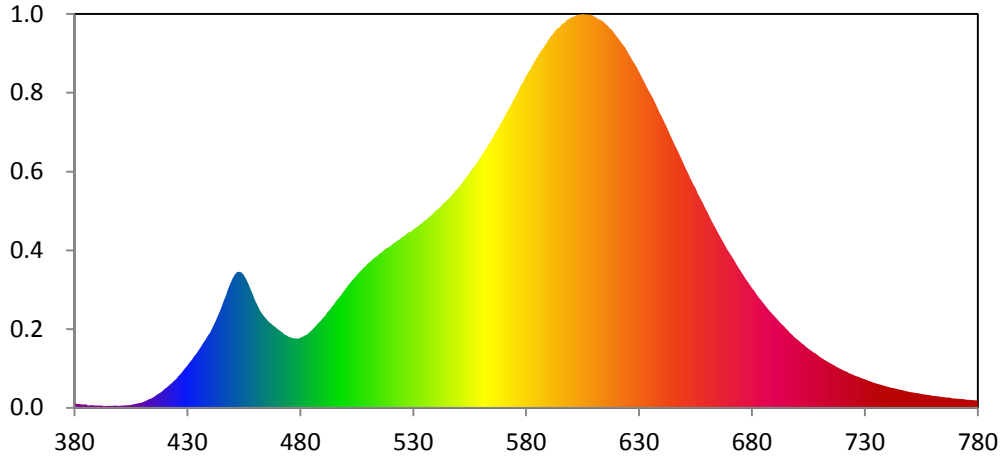
Color Vector Graphic



**Color Fidelity by CES Sample**



Relative Spectral Power Distribution

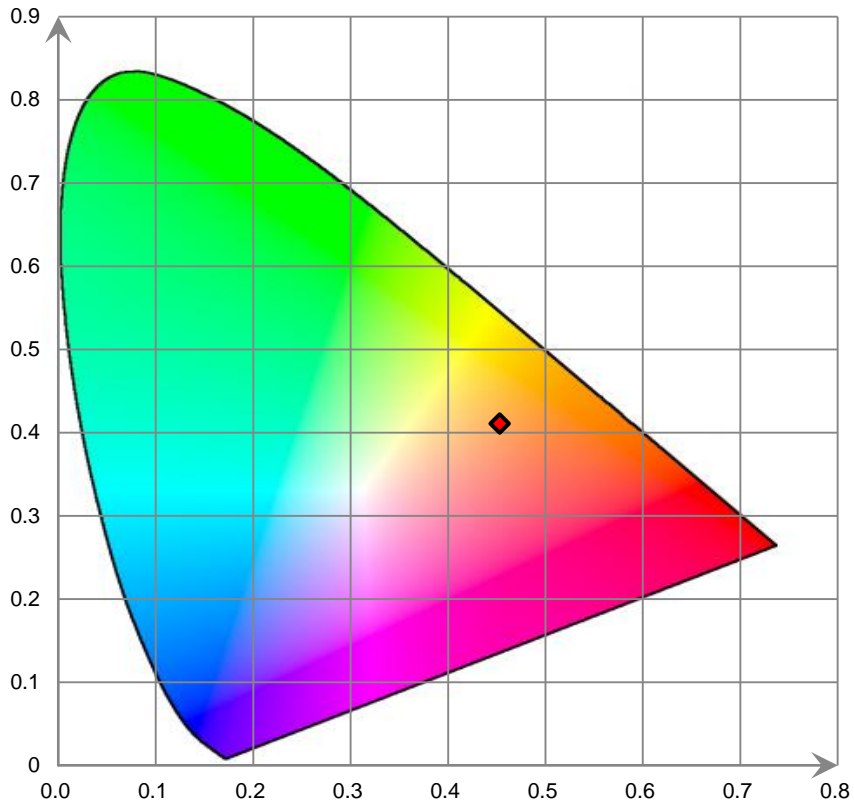


nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
380	2.267E-01	421	9.068E-01	462	4.312E+00	503	5.623E+00	544	9.076E+00
381	1.686E-01	422	9.971E-01	463	4.151E+00	504	5.736E+00	545	9.161E+00
382	1.655E-01	423	1.088E+00	464	4.030E+00	505	5.853E+00	546	9.246E+00
383	1.509E-01	424	1.184E+00	465	3.914E+00	506	5.956E+00	547	9.386E+00
384	1.446E-01	425	1.275E+00	466	3.806E+00	507	6.064E+00	548	9.509E+00
385	1.557E-01	426	1.397E+00	467	3.719E+00	508	6.166E+00	549	9.623E+00
386	1.046E-01	427	1.493E+00	468	3.623E+00	509	6.258E+00	550	9.719E+00
387	1.154E-01	428	1.624E+00	469	3.561E+00	510	6.369E+00	551	9.837E+00
388	1.099E-01	429	1.755E+00	470	3.478E+00	511	6.460E+00	552	9.970E+00
389	1.041E-01	430	1.866E+00	471	3.403E+00	512	6.548E+00	553	1.011E+01
390	1.048E-01	431	1.997E+00	472	3.327E+00	513	6.641E+00	554	1.024E+01
391	9.694E-02	432	2.120E+00	473	3.233E+00	514	6.689E+00	555	1.037E+01
392	9.355E-02	433	2.269E+00	474	3.196E+00	515	6.789E+00	556	1.052E+01
393	6.791E-02	434	2.383E+00	475	3.122E+00	516	6.869E+00	557	1.064E+01
394	8.769E-02	435	2.543E+00	476	3.099E+00	517	6.946E+00	558	1.080E+01
395	8.204E-02	436	2.687E+00	477	3.061E+00	518	7.027E+00	559	1.093E+01
396	8.123E-02	437	2.846E+00	478	3.064E+00	519	7.072E+00	560	1.109E+01
397	8.115E-02	438	2.999E+00	479	3.052E+00	520	7.153E+00	561	1.124E+01
398	9.199E-02	439	3.159E+00	480	3.088E+00	521	7.229E+00	562	1.139E+01
399	8.933E-02	440	3.321E+00	481	3.134E+00	522	7.299E+00	563	1.156E+01
400	8.548E-02	441	3.525E+00	482	3.197E+00	523	7.368E+00	564	1.172E+01
401	9.372E-02	442	3.734E+00	483	3.238E+00	524	7.433E+00	565	1.190E+01
402	1.037E-01	443	3.954E+00	484	3.334E+00	525	7.523E+00	566	1.207E+01
403	1.115E-01	444	4.180E+00	485	3.422E+00	526	7.576E+00	567	1.226E+01
404	1.190E-01	445	4.420E+00	486	3.512E+00	527	7.670E+00	568	1.240E+01
405	1.291E-01	446	4.709E+00	487	3.631E+00	528	7.746E+00	569	1.260E+01
406	1.482E-01	447	4.949E+00	488	3.741E+00	529	7.786E+00	570	1.276E+01
407	1.719E-01	448	5.240E+00	489	3.823E+00	530	7.865E+00	571	1.296E+01
408	1.934E-01	449	5.478E+00	490	3.953E+00	531	7.938E+00	572	1.314E+01
409	2.145E-01	450	5.711E+00	491	4.057E+00	532	7.995E+00	573	1.331E+01
410	2.417E-01	451	5.877E+00	492	4.212E+00	533	8.092E+00	574	1.351E+01
411	2.781E-01	452	5.986E+00	493	4.320E+00	534	8.167E+00	575	1.369E+01
412	3.222E-01	453	6.006E+00	494	4.458E+00	535	8.253E+00	576	1.387E+01
413	3.749E-01	454	5.978E+00	495	4.583E+00	536	8.327E+00	577	1.408E+01
414	4.125E-01	455	5.866E+00	496	4.732E+00	537	8.421E+00	578	1.428E+01
415	4.621E-01	456	5.693E+00	497	4.846E+00	538	8.493E+00	579	1.443E+01
416	5.296E-01	457	5.477E+00	498	4.976E+00	539	8.589E+00	580	1.465E+01
417	6.026E-01	458	5.218E+00	499	5.112E+00	540	8.697E+00	581	1.481E+01
418	6.692E-01	459	4.972E+00	500	5.240E+00	541	8.769E+00	582	1.498E+01
419	7.397E-01	460	4.720E+00	501	5.381E+00	542	8.854E+00	583	1.518E+01
420	8.297E-01	461	4.526E+00	502	5.508E+00	543	8.985E+00	584	1.534E+01

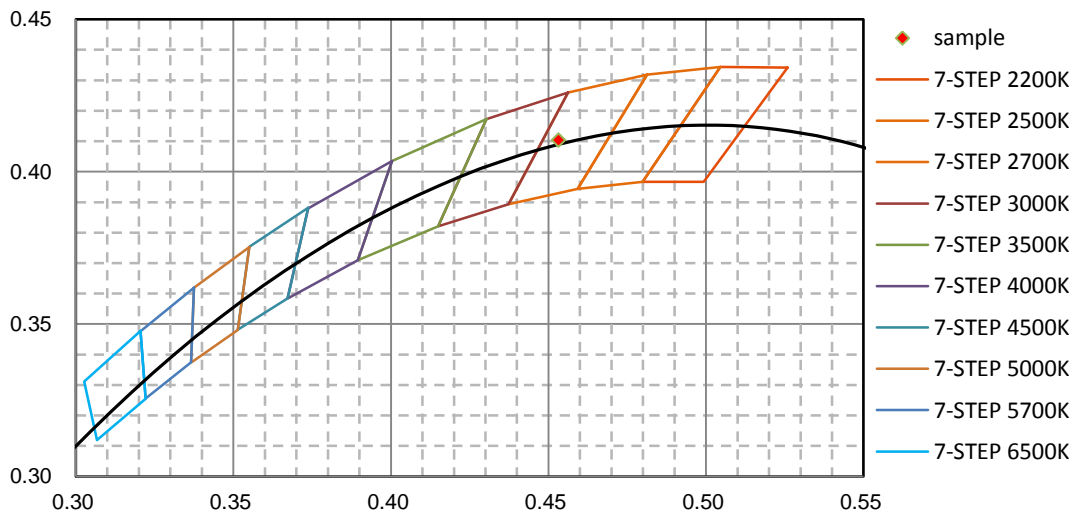


nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
585	1.550E+01	626	1.553E+01	667	7.368E+00	708	2.394E+00	749	7.195E-01
586	1.567E+01	627	1.534E+01	668	7.196E+00	709	2.326E+00	750	6.967E-01
587	1.581E+01	628	1.520E+01	669	7.011E+00	710	2.247E+00	751	6.783E-01
588	1.595E+01	629	1.503E+01	670	6.852E+00	711	2.185E+00	752	6.561E-01
589	1.611E+01	630	1.484E+01	671	6.675E+00	712	2.124E+00	753	6.440E-01
590	1.626E+01	631	1.464E+01	672	6.521E+00	713	2.066E+00	754	6.275E-01
591	1.640E+01	632	1.444E+01	673	6.348E+00	714	2.002E+00	755	6.082E-01
592	1.651E+01	633	1.426E+01	674	6.189E+00	715	1.944E+00	756	5.914E-01
593	1.666E+01	634	1.406E+01	675	6.028E+00	716	1.889E+00	757	5.740E-01
594	1.675E+01	635	1.388E+01	676	5.870E+00	717	1.842E+00	758	5.614E-01
595	1.681E+01	636	1.368E+01	677	5.720E+00	718	1.782E+00	759	5.478E-01
596	1.695E+01	637	1.347E+01	678	5.578E+00	719	1.727E+00	760	5.272E-01
597	1.699E+01	638	1.327E+01	679	5.434E+00	720	1.677E+00	761	5.229E-01
598	1.711E+01	639	1.304E+01	680	5.280E+00	721	1.627E+00	762	5.085E-01
599	1.716E+01	640	1.286E+01	681	5.167E+00	722	1.590E+00	763	4.921E-01
600	1.724E+01	641	1.264E+01	682	5.010E+00	723	1.530E+00	764	4.743E-01
601	1.726E+01	642	1.245E+01	683	4.876E+00	724	1.489E+00	765	4.610E-01
602	1.731E+01	643	1.222E+01	684	4.762E+00	725	1.447E+00	766	4.489E-01
603	1.734E+01	644	1.199E+01	685	4.637E+00	726	1.403E+00	767	4.447E-01
604	1.736E+01	645	1.178E+01	686	4.500E+00	727	1.365E+00	768	4.294E-01
605	1.738E+01	646	1.157E+01	687	4.379E+00	728	1.319E+00	769	4.138E-01
606	1.736E+01	647	1.137E+01	688	4.261E+00	729	1.286E+00	770	4.068E-01
607	1.736E+01	648	1.116E+01	689	4.136E+00	730	1.255E+00	771	3.937E-01
608	1.734E+01	649	1.095E+01	690	4.023E+00	731	1.215E+00	772	3.898E-01
609	1.735E+01	650	1.072E+01	691	3.921E+00	732	1.174E+00	773	3.792E-01
610	1.728E+01	651	1.051E+01	692	3.813E+00	733	1.148E+00	774	3.741E-01
611	1.724E+01	652	1.031E+01	693	3.707E+00	734	1.108E+00	775	3.583E-01
612	1.716E+01	653	1.009E+01	694	3.609E+00	735	1.075E+00	776	3.532E-01
613	1.712E+01	654	9.863E+00	695	3.499E+00	736	1.047E+00	777	3.425E-01
614	1.707E+01	655	9.684E+00	696	3.407E+00	737	1.020E+00	778	3.338E-01
615	1.697E+01	656	9.453E+00	697	3.291E+00	738	9.851E-01	779	3.293E-01
616	1.688E+01	657	9.272E+00	698	3.205E+00	739	9.562E-01	780	3.299E-01
617	1.677E+01	658	9.085E+00	699	3.087E+00	740	9.281E-01		
618	1.668E+01	659	8.876E+00	700	3.022E+00	741	9.002E-01		
619	1.652E+01	660	8.681E+00	701	2.936E+00	742	8.796E-01		
620	1.640E+01	661	8.483E+00	702	2.852E+00	743	8.548E-01		
621	1.627E+01	662	8.282E+00	703	2.778E+00	744	8.341E-01		
622	1.613E+01	663	8.099E+00	704	2.680E+00	745	8.049E-01		
623	1.600E+01	664	7.911E+00	705	2.616E+00	746	7.834E-01		
624	1.587E+01	665	7.728E+00	706	2.543E+00	747	7.600E-01		
625	1.570E+01	666	7.546E+00	707	2.451E+00	748	7.394E-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**

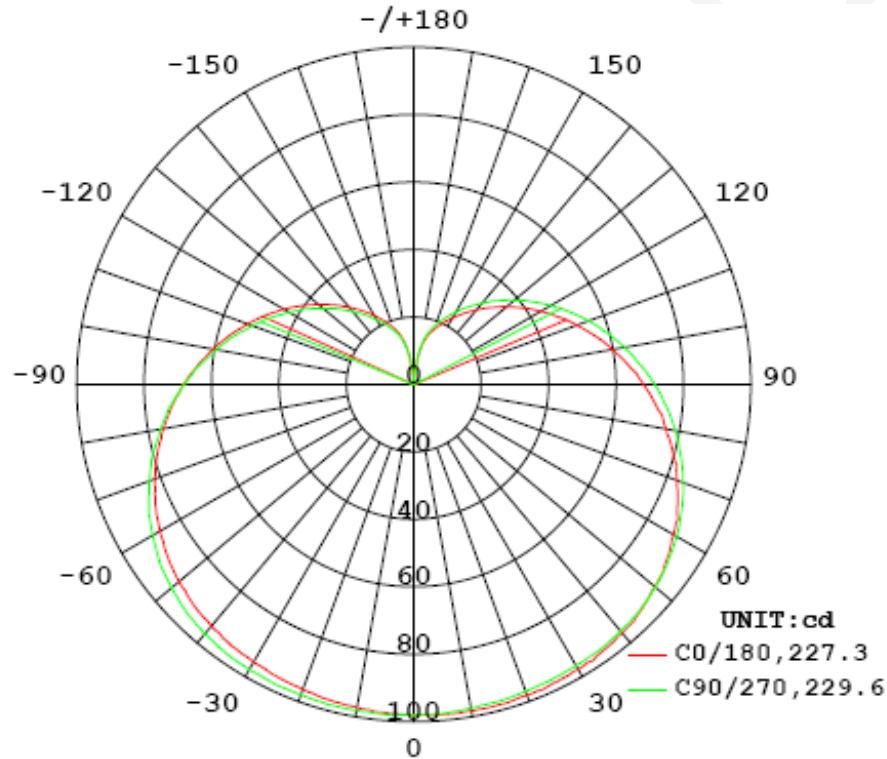
**Electrical Measurement**

Input Voltage (V)	Frequency (Hz)	Input Current (A)	Power (W)	Power Factor
120.0	60	0.0821	9.783	0.9928

**Photometric Measurement**

Luminous Flux (lm)	Efficacy (lm/W)	I <sub>max</sub> (cd)	S/MH (C0/180)	S/MH (C90/270)
818.305	83.65	98.89	1.52	1.51

**Luminous Intensity Distribution**



	C0/180	C45/225	C90/270	C135/315	AVG.
Beam Angle (50% I <sub>max</sub> ):	227.3	228.4	229.6	227.3	228.2
Field Angle (10% I <sub>max</sub> ):	339.9	340.6	340.8	340.4	340.4

Luminous Intensity (cd) Distribution Data

C \ γ	0°	22.5°	45°	67.5°	90°	112.5°	135°	157.5°
0.0°	98	98	98	98	98	98	98	98
5.0°	98	98	98	98	98	98	98	98
10.0°	97	97	98	98	98	98	98	98
15.0°	97	97	97	98	98	98	99	98
20.0°	96	96	97	98	98	98	98	98
25.0°	96	96	97	97	98	98	98	98
30.0°	95	95	96	97	98	98	98	98
35.0°	94	95	96	97	97	98	98	97
40.0°	94	94	95	96	96	97	97	96
45.0°	92	93	94	95	95	96	96	95
50.0°	91	91	92	93	94	94	94	94
55.0°	89	89	90	91	92	92	92	92
60.0°	87	87	88	89	89	90	89	89
65.0°	85	84	85	86	87	87	87	86
70.0°	82	82	82	83	84	84	83	83
75.0°	79	78	79	80	80	80	80	79
80.0°	75	75	75	76	76	76	76	76
85.0°	72	71	72	72	72	72	72	72
90.0°	68	68	68	68	68	68	68	68
95.0°	64	64	64	64	64	64	63	63
100.0°	61	60	60	60	60	59	59	59
105.0°	57	56	56	55	55	55	55	55
110.0°	53	52	51	51	51	51	51	51
115.0°	49	48	47	47	47	46	46	47
120.0°	45	44	43	43	43	42	42	43
125.0°	41	40	40	39	39	39	38	39
130.0°	37	36	36	36	35	35	35	35
135.0°	33	33	32	32	32	31	31	32
140.0°	30	29	29	29	28	28	28	28
145.0°	27	26	26	25	25	25	25	25
150.0°	24	23	23	23	22	22	22	22
155.0°	21	20	20	20	20	19	19	20
160.0°	18	18	17	17	17	17	17	17
165.0°	15	14	14	14	14	14	14	14
170.0°	10	10	10	10	10	9	9	10
175.0°	0	0	0	1	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°	98	98	98	98	98	98	98	98
5.0°	98	98	98	98	98	98	98	98
10.0°	98	98	98	98	97	97	97	97
15.0°	98	98	98	97	97	97	97	97
20.0°	98	98	97	97	97	97	96	96
25.0°	98	97	97	97	97	96	96	96
30.0°	98	97	97	97	96	96	95	95
35.0°	97	97	97	96	96	96	95	94
40.0°	96	96	96	96	95	95	94	94
45.0°	95	95	95	95	95	94	93	93
50.0°	93	93	94	94	93	93	92	91
55.0°	91	91	92	92	92	92	90	90
60.0°	89	89	89	90	90	89	88	87
65.0°	86	86	87	88	88	87	86	85
70.0°	83	83	84	85	85	84	83	82
75.0°	80	80	81	82	82	82	81	80
80.0°	76	76	77	79	79	78	77	76
85.0°	72	73	74	75	75	75	74	73
90.0°	68	69	70	71	71	71	70	69
95.0°	64	65	66	67	68	68	66	65
100.0°	60	61	62	63	63	63	62	62
105.0°	56	56	58	59	59	59	58	57
110.0°	52	52	54	55	55	55	54	53
115.0°	47	48	49	51	51	51	50	49
120.0°	43	44	46	46	47	47	46	46
125.0°	40	40	42	42	43	43	42	42
130.0°	36	37	38	39	39	39	38	38
135.0°	32	33	34	35	35	35	35	34
140.0°	29	30	31	31	32	31	31	31
145.0°	26	26	27	28	28	28	28	27
150.0°	23	23	24	24	25	25	25	24
155.0°	20	20	21	21	22	22	22	21
160.0°	17	18	18	18	19	19	19	19
165.0°	15	14	15	15	16	16	16	16
170.0°	10	10	10	11	11	11	11	10
175.0°	1	1	1	1	1	1	1	1
180.0°	0	0	0	0	0	0	0	0

Zonal Lumen Density Measurement

Deg	Flux (lm)	%	Deg	Flux (lm)	%
0-5	2.3	0.29	0-5	2.3	0.29
5-10	7.0	0.85	0-10	9.3	1.14
10-15	11.6	1.42	0-15	20.9	2.56
15-20	16.1	1.96	0-20	37.0	4.52
20-25	20.4	2.49	0-25	57.4	7.01
25-30	24.5	2.99	0-30	81.9	10.00
30-35	28.4	3.47	0-35	110.2	13.47
35-40	32.0	3.91	0-40	142.2	17.38
40-45	35.1	4.29	0-45	177.3	21.67
45-50	37.8	4.62	0-50	215.2	26.29
50-55	40.0	4.89	0-55	255.2	31.18
55-60	41.6	5.08	0-60	296.8	36.26
60-65	42.6	5.21	0-65	339.3	41.47
65-70	42.9	5.24	0-70	382.3	46.71
70-75	42.7	5.22	0-75	425.0	51.93
75-80	41.9	5.12	0-80	466.9	57.05
80-85	40.6	4.96	0-85	507.5	62.01
85-90	38.8	4.75	0-90	546.3	66.76
90-95	36.7	4.48	0-95	583.0	71.24
95-100	34.2	4.18	0-100	617.1	75.42
100-105	31.4	3.84	0-105	648.6	79.26
105-110	28.5	3.49	0-110	677.1	82.75
110-115	25.6	3.12	0-115	702.7	85.87
115-120	22.6	2.76	0-120	725.2	88.63
120-125	19.6	2.40	0-125	744.9	91.03
125-130	16.8	2.05	0-130	761.7	93.08
130-135	14.1	1.72	0-135	775.8	94.80
135-140	11.6	1.42	0-140	787.4	96.22
140-145	9.4	1.15	0-145	796.7	97.37
145-150	7.3	0.89	0-150	804.1	98.26
150-155	5.6	0.68	0-155	809.6	98.94
155-160	4.0	0.49	0-160	813.6	99.43
160-165	2.7	0.33	0-165	816.3	99.76
165-170	1.5	0.18	0-170	817.8	99.94
170-175	0.5	0.06	0-175	818.3	100.00
175-180	0.0	0.00	0-180	818.3	100.00

## 6. Product Photo



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