



# IES LM-79-08


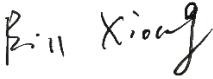
## MEASUREMENT AND TEST REPORT

For

### Overdrive Electronics Pvt. Ltd.

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

**Test Model: L15JA19OMDIM/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>	RSZ180907512-10
<b>Test Date:</b>	2017-07-03 to 2017-07-05
<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 2017-07-03. One was tested in integrating sphere and the other was tested in goniophotometer

Model Tested: L15JA19OMDIM/27K  
 Product Code: 695  
 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: 15 W  
 Nominal CCT: 2700 K  
 Nominal Lumen Output: 1600 lm

### Note:

1. The applicant Overdrive Electronics Pvt. Ltd. declare that their products with model L15JA19OMDIM/27K are the same to the products in report#RSZ170703506-10-1 and is authorized by original applicant to use their test data.
2. All the data in previous report (RSZ170703506-10-1) 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
1.5m integrating sphere	SENSING	1.5m	NA	2017-03-09	2018-03-09
Digital power meter	EVERFINE	PF9811	G135717CN1361159	2016-12-08	2017-12-08
High-precision rapid spectral radiometer	EVERFINE	HAAS-2000	N/A	2017-03-09	2018-03-09
Precision frequency power supply	ALL Power	APW-105N	970663	2017-03-03	2018-03-03
Standard Light Source	EVERFINE	D204	G100283CA8351158	2016-12-12	2017-12-12
thermometer	SENSING	NA	NA	2017-03-20	2018-03-20
Programmable Precision DC Power Supply	ITECH	IT6154	0061 0417 6471 0010 19	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	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  $U=24\text{K}$  ( $K=2$ ), 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  $U=0.17\%$  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 ( $\gamma$ ) 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  $R_f$ ,  $R_g$  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**

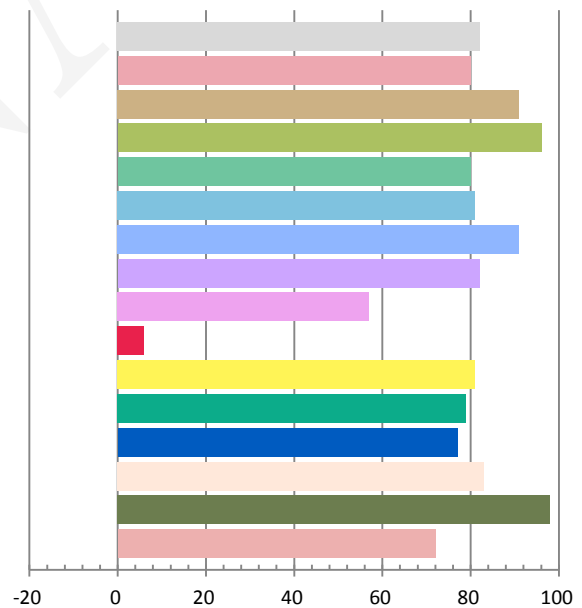
### Photometric and Electrical Measurement Result

Voltage (V)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Luminous Flux(lm)	Efficacy (lm/W)
120.0	60	0.1278	15.00	0.9783	1629.4	108.61

Radiant Flux (W)	CCT (K)	Duv	x	y	u'	v'
5.0443	2736	0.000761	0.4583	0.4123	0.2607	0.5278

### Color Rendering Index

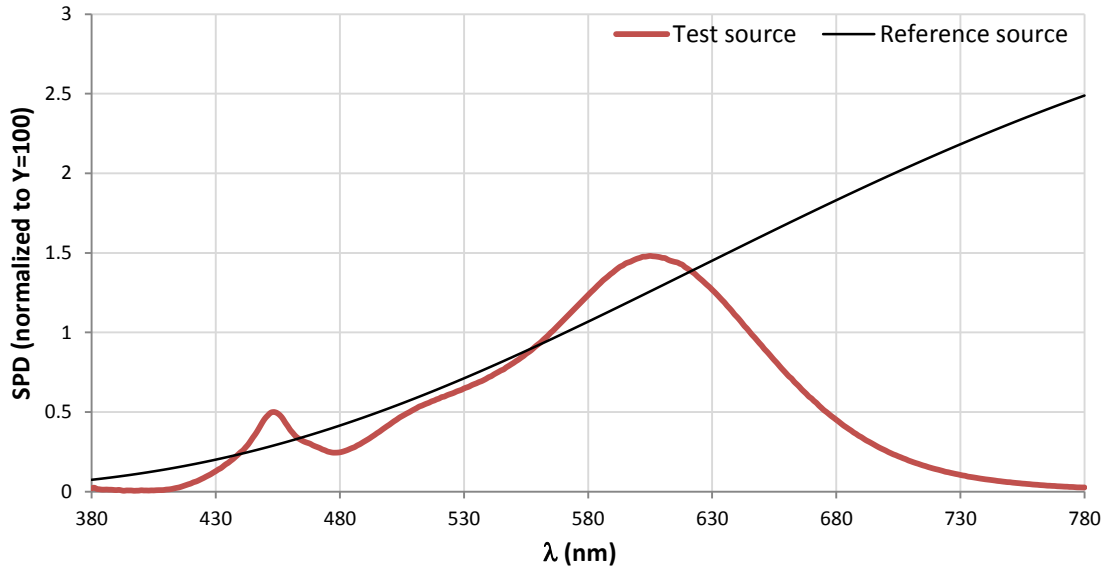
<b>Ra</b>			
82.2			
<b>R1</b>	<b>R2</b>	<b>R3</b>	<b>R4</b>
80	91	96	80
<b>R5</b>	<b>R6</b>	<b>R7</b>	<b>R8</b>
81	91	82	57
<b>R9</b>	<b>R10</b>	<b>R11</b>	<b>R12</b>
6	81	79	77
<b>R13</b>	<b>R14</b>	<b>R15</b>	
83	98	72	



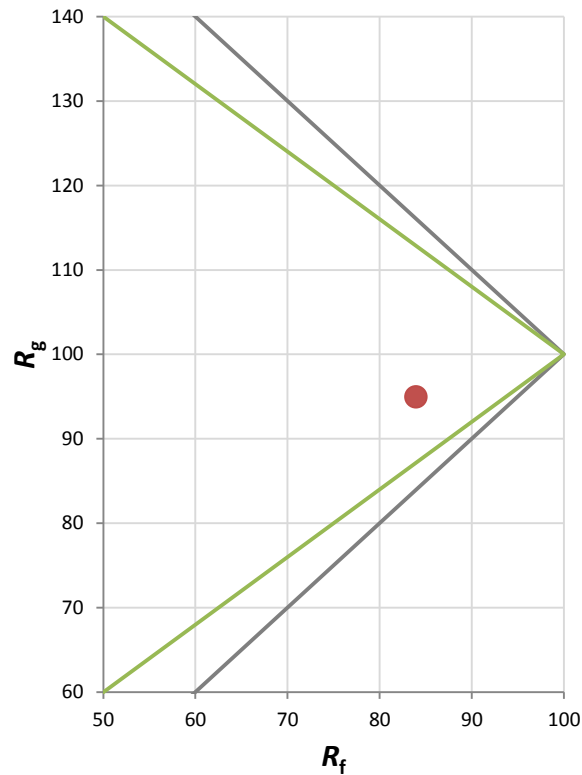
Fidelity Index and Gamut Index

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

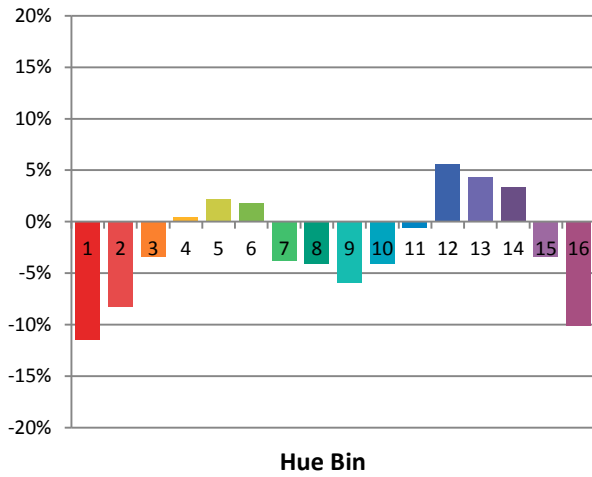
Spectral Power Distribution Comparison



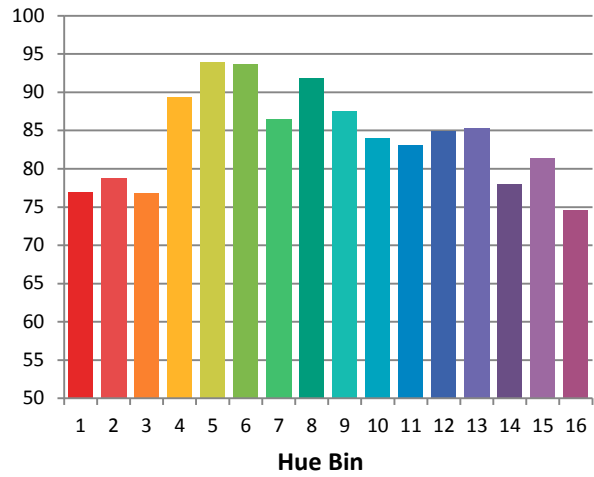
Plot of  $R_g$  versus  $R_f$



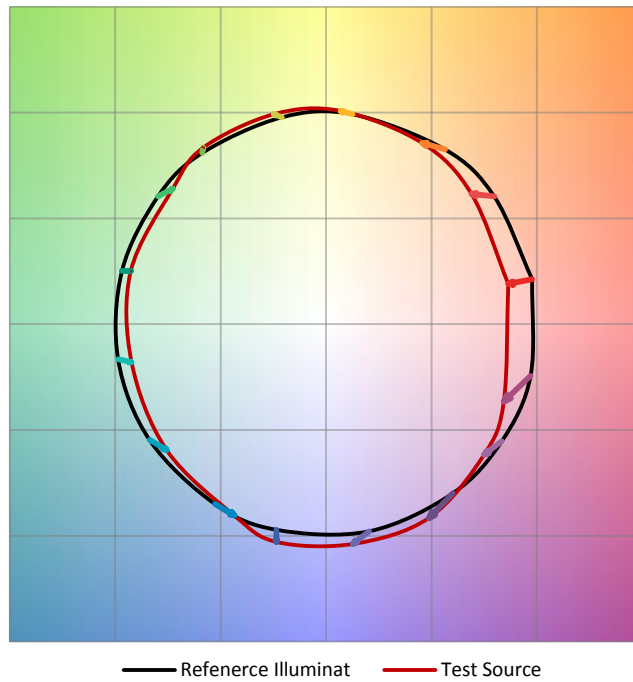
Chroma Shift by Hue



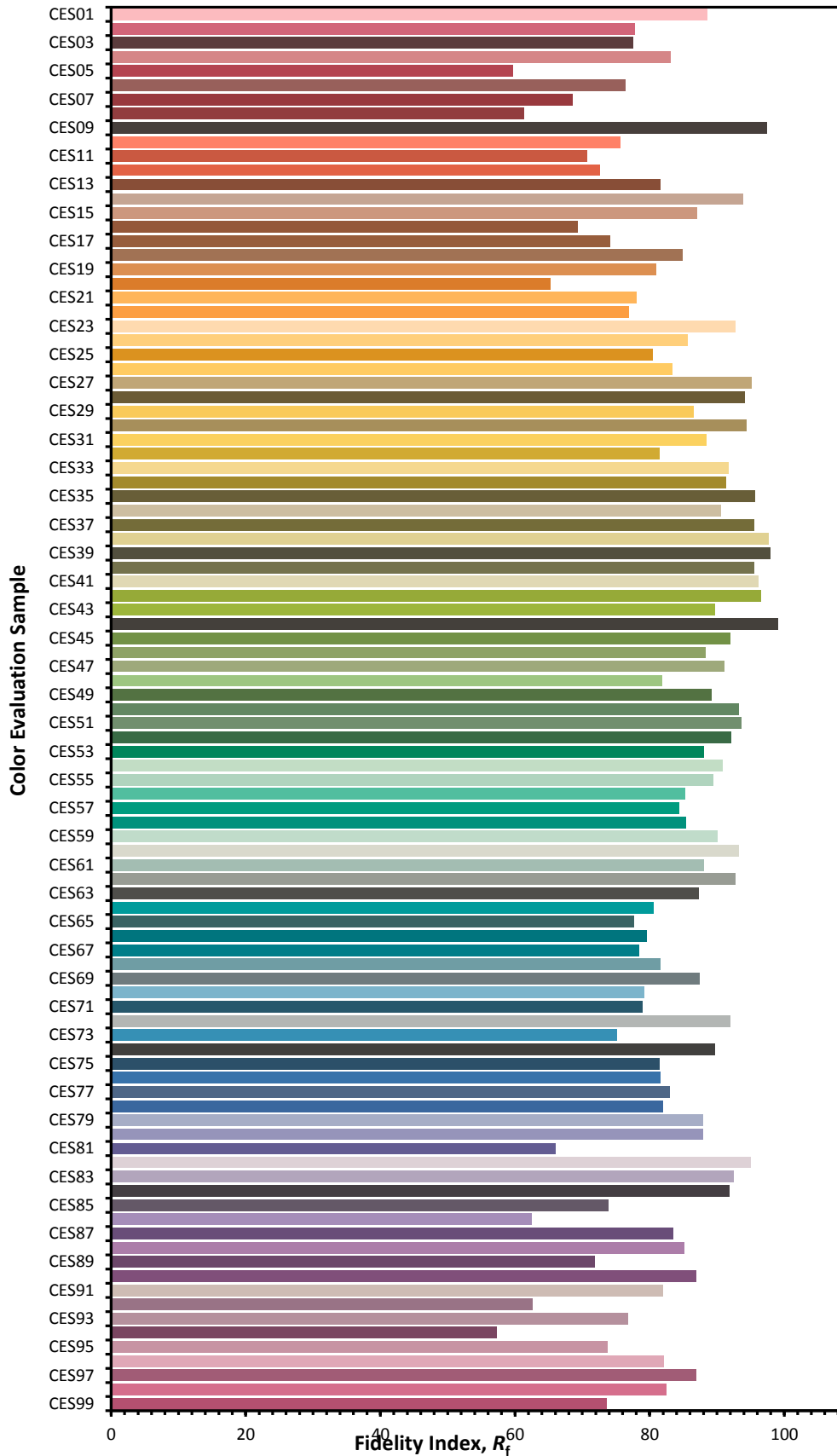
$R_f$  by Hue



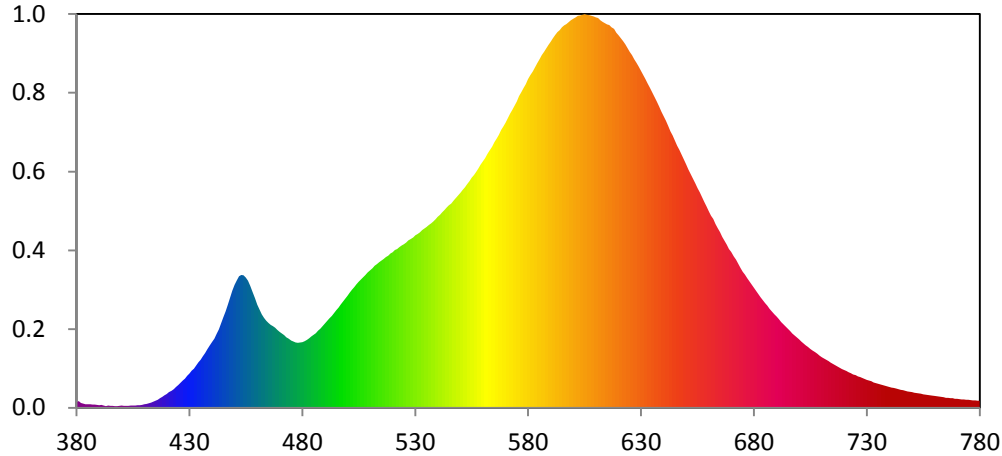
Color Vector Graphic



**Color Fidelity by CES Sample**



**Relative Spectral Power Distribution**

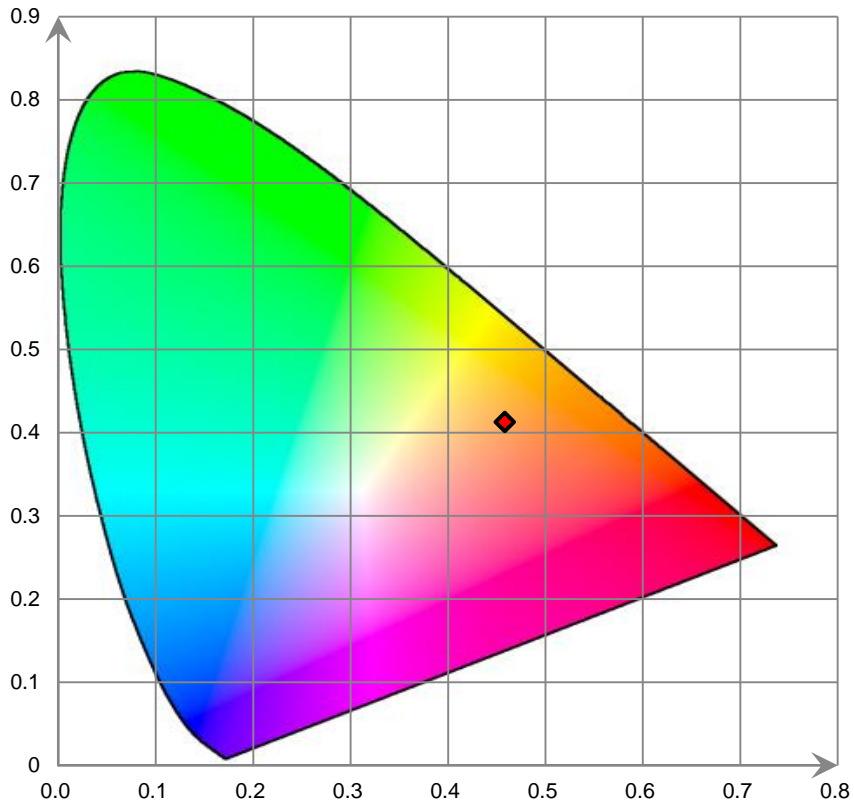


nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
380	4.832E-01	421	1.401E+00	462	8.379E+00	503	1.083E+01	544	1.797E+01
381	6.030E-01	422	1.514E+00	463	8.058E+00	504	1.110E+01	545	1.818E+01
382	4.138E-01	423	1.674E+00	464	7.827E+00	505	1.131E+01	546	1.833E+01
383	3.637E-01	424	1.860E+00	465	7.614E+00	506	1.152E+01	547	1.862E+01
384	3.097E-01	425	2.036E+00	466	7.444E+00	507	1.173E+01	548	1.884E+01
385	3.016E-01	426	2.236E+00	467	7.313E+00	508	1.192E+01	549	1.908E+01
386	3.179E-01	427	2.427E+00	468	7.186E+00	509	1.214E+01	550	1.931E+01
387	2.955E-01	428	2.617E+00	469	6.971E+00	510	1.234E+01	551	1.957E+01
388	2.908E-01	429	2.857E+00	470	6.807E+00	511	1.254E+01	552	1.980E+01
389	2.516E-01	430	3.073E+00	471	6.668E+00	512	1.276E+01	553	2.008E+01
390	2.317E-01	431	3.324E+00	472	6.513E+00	513	1.289E+01	554	2.033E+01
391	2.689E-01	432	3.509E+00	473	6.323E+00	514	1.306E+01	555	2.065E+01
392	1.898E-01	433	3.798E+00	474	6.201E+00	515	1.321E+01	556	2.090E+01
393	1.312E-01	434	4.092E+00	475	6.025E+00	516	1.335E+01	557	2.117E+01
394	1.825E-01	435	4.322E+00	476	5.935E+00	517	1.354E+01	558	2.150E+01
395	1.783E-01	436	4.624E+00	477	5.856E+00	518	1.366E+01	559	2.183E+01
396	1.803E-01	437	4.907E+00	478	5.843E+00	519	1.384E+01	560	2.212E+01
397	1.334E-01	438	5.246E+00	479	5.855E+00	520	1.396E+01	561	2.241E+01
398	1.473E-01	439	5.568E+00	480	5.897E+00	521	1.417E+01	562	2.278E+01
399	1.564E-01	440	5.917E+00	481	5.981E+00	522	1.424E+01	563	2.311E+01
400	2.125E-01	441	6.203E+00	482	6.100E+00	523	1.442E+01	564	2.345E+01
401	1.768E-01	442	6.636E+00	483	6.230E+00	524	1.457E+01	565	2.385E+01
402	1.805E-01	443	7.052E+00	484	6.394E+00	525	1.469E+01	566	2.417E+01
403	1.647E-01	444	7.584E+00	485	6.552E+00	526	1.483E+01	567	2.450E+01
404	1.928E-01	445	8.136E+00	486	6.690E+00	527	1.501E+01	568	2.493E+01
405	1.851E-01	446	8.650E+00	487	6.928E+00	528	1.514E+01	569	2.524E+01
406	2.137E-01	447	9.242E+00	488	7.097E+00	529	1.527E+01	570	2.560E+01
407	2.277E-01	448	9.880E+00	489	7.332E+00	530	1.547E+01	571	2.600E+01
408	2.314E-01	449	1.052E+01	490	7.556E+00	531	1.561E+01	572	2.641E+01
409	2.481E-01	450	1.105E+01	491	7.772E+00	532	1.574E+01	573	2.674E+01
410	3.122E-01	451	1.144E+01	492	8.003E+00	533	1.594E+01	574	2.713E+01
411	3.388E-01	452	1.180E+01	493	8.257E+00	534	1.610E+01	575	2.749E+01
412	3.877E-01	453	1.193E+01	494	8.502E+00	535	1.624E+01	576	2.797E+01
413	4.660E-01	454	1.190E+01	495	8.775E+00	536	1.642E+01	577	2.832E+01
414	5.529E-01	455	1.171E+01	496	9.005E+00	537	1.655E+01	578	2.871E+01
415	6.185E-01	456	1.140E+01	497	9.286E+00	538	1.673E+01	579	2.906E+01
416	7.262E-01	457	1.094E+01	498	9.550E+00	539	1.693E+01	580	2.951E+01
417	8.549E-01	458	1.034E+01	499	9.808E+00	540	1.716E+01	581	2.984E+01
418	9.810E-01	459	9.821E+00	500	1.005E+01	541	1.731E+01	582	3.019E+01
419	1.111E+00	460	9.250E+00	501	1.033E+01	542	1.756E+01	583	3.056E+01
420	1.225E+00	461	8.820E+00	502	1.059E+01	543	1.777E+01	584	3.094E+01

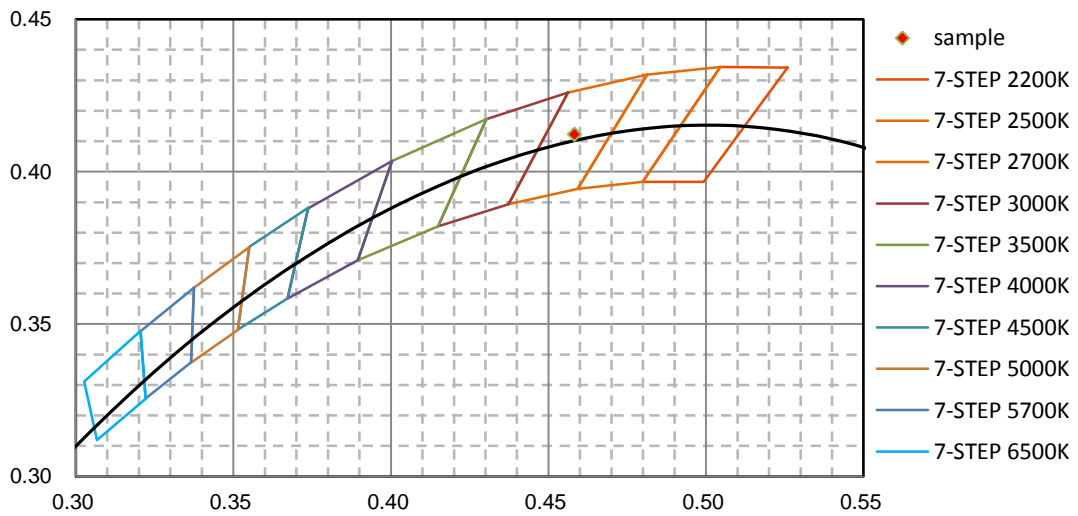


nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
585	3.129E+01	626	3.165E+01	667	1.499E+01	708	4.862E+00	749	1.429E+00
586	3.166E+01	627	3.130E+01	668	1.464E+01	709	4.686E+00	750	1.415E+00
587	3.196E+01	628	3.096E+01	669	1.424E+01	710	4.551E+00	751	1.357E+00
588	3.226E+01	629	3.064E+01	670	1.398E+01	711	4.418E+00	752	1.324E+00
589	3.259E+01	630	3.026E+01	671	1.360E+01	712	4.294E+00	753	1.285E+00
590	3.286E+01	631	2.990E+01	672	1.331E+01	713	4.179E+00	754	1.255E+00
591	3.318E+01	632	2.952E+01	673	1.291E+01	714	4.050E+00	755	1.209E+00
592	3.347E+01	633	2.912E+01	674	1.257E+01	715	3.924E+00	756	1.186E+00
593	3.374E+01	634	2.872E+01	675	1.222E+01	716	3.824E+00	757	1.150E+00
594	3.391E+01	635	2.834E+01	676	1.195E+01	717	3.691E+00	758	1.123E+00
595	3.418E+01	636	2.788E+01	677	1.164E+01	718	3.585E+00	759	1.079E+00
596	3.434E+01	637	2.748E+01	678	1.133E+01	719	3.479E+00	760	1.049E+00
597	3.446E+01	638	2.705E+01	679	1.106E+01	720	3.381E+00	761	1.029E+00
598	3.464E+01	639	2.657E+01	680	1.077E+01	721	3.297E+00	762	9.889E-01
599	3.481E+01	640	2.619E+01	681	1.049E+01	722	3.199E+00	763	9.679E-01
600	3.495E+01	641	2.577E+01	682	1.019E+01	723	3.094E+00	764	9.391E-01
601	3.506E+01	642	2.531E+01	683	9.897E+00	724	2.978E+00	765	9.007E-01
602	3.521E+01	643	2.483E+01	684	9.654E+00	725	2.917E+00	766	8.893E-01
603	3.522E+01	644	2.445E+01	685	9.397E+00	726	2.827E+00	767	8.622E-01
604	3.528E+01	645	2.400E+01	686	9.156E+00	727	2.746E+00	768	8.494E-01
605	3.534E+01	646	2.354E+01	687	8.868E+00	728	2.663E+00	769	8.116E-01
606	3.529E+01	647	2.315E+01	688	8.652E+00	729	2.592E+00	770	7.949E-01
607	3.526E+01	648	2.272E+01	689	8.385E+00	730	2.506E+00	771	7.747E-01
608	3.521E+01	649	2.228E+01	690	8.189E+00	731	2.426E+00	772	7.492E-01
609	3.514E+01	650	2.187E+01	691	7.942E+00	732	2.373E+00	773	7.415E-01
610	3.504E+01	651	2.139E+01	692	7.698E+00	733	2.260E+00	774	7.081E-01
611	3.501E+01	652	2.101E+01	693	7.511E+00	734	2.211E+00	775	7.049E-01
612	3.480E+01	653	2.059E+01	694	7.311E+00	735	2.152E+00	776	6.808E-01
613	3.464E+01	654	2.015E+01	695	7.097E+00	736	2.096E+00	777	6.454E-01
614	3.453E+01	655	1.972E+01	696	6.884E+00	737	2.032E+00	778	6.420E-01
615	3.443E+01	656	1.933E+01	697	6.675E+00	738	1.967E+00	779	6.304E-01
616	3.435E+01	657	1.889E+01	698	6.487E+00	739	1.912E+00	780	6.316E-01
617	3.416E+01	658	1.846E+01	699	6.314E+00	740	1.856E+00		
618	3.401E+01	659	1.806E+01	700	6.139E+00	741	1.810E+00		
619	3.368E+01	660	1.765E+01	701	5.934E+00	742	1.765E+00		
620	3.345E+01	661	1.725E+01	702	5.769E+00	743	1.718E+00		
621	3.318E+01	662	1.695E+01	703	5.592E+00	744	1.665E+00		
622	3.292E+01	663	1.649E+01	704	5.458E+00	745	1.606E+00		
623	3.265E+01	664	1.613E+01	705	5.290E+00	746	1.570E+00		
624	3.229E+01	665	1.577E+01	706	5.150E+00	747	1.520E+00		
625	3.196E+01	666	1.535E+01	707	4.993E+00	748	1.473E+00		

**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**

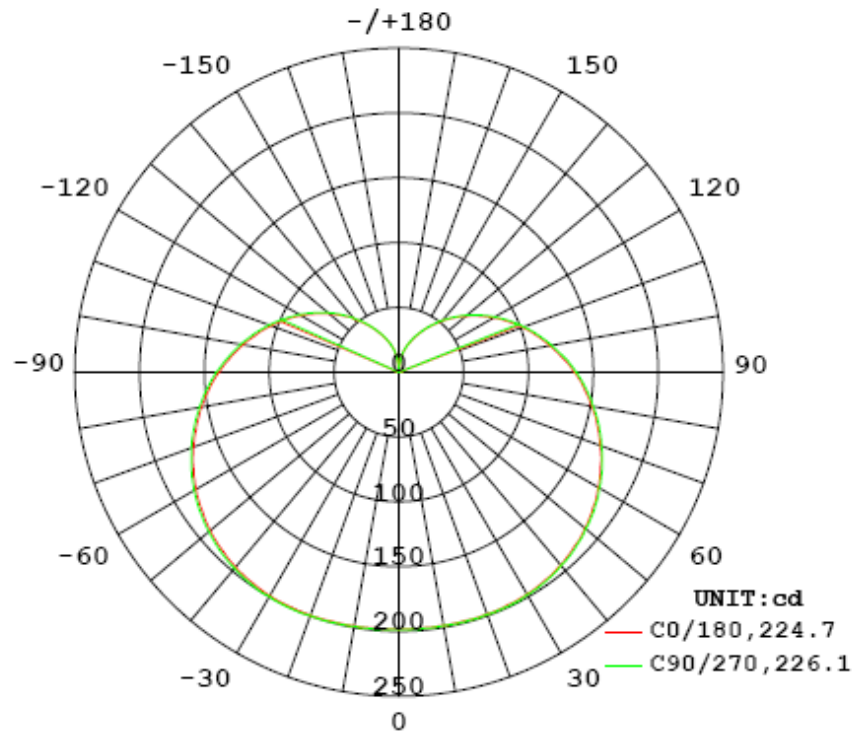
**Electrical Measurement**

Input Voltage (V)	Frequency (Hz)	Input Current (A)	Power (W)	Power Factor
120.0	60	0.1265	14.86	0.9785

**Photometric Measurement**

Luminous Flux (lm)	Efficacy (lm/W)	$I_{max}$ (cd)	S/MH (C0/180)	S/MH (C90/270)
1631.04	109.76	201.0	1.52	1.52

**Luminous Intensity Distribution**



	C0/180	C45/225	C90/270	C135/315	AVG.
Beam Angle (50% $I_{max}$ ):	224.7	226.2	226.1	224.7	225.4
Field Angle (10% $I_{max}$ ):	330.0	329.8	330.1	329.8	329.9

Luminous Intensity (cd) Distribution Data

C γ	0°	22.5°	45°	67.5°	90°	112.5°	135°	157.5°
0.0°	198	198	198	198	198	198	198	198
5.0°	198	199	199	199	199	199	198	198
10.0°	199	199	199	199	199	199	199	198
15.0°	199	200	200	200	200	199	199	198
20.0°	200	200	200	200	200	200	199	199
25.0°	199	200	200	201	201	200	199	198
30.0°	199	200	200	200	200	199	199	198
35.0°	198	199	199	200	199	198	197	196
40.0°	196	197	198	198	197	196	195	194
45.0°	193	195	195	195	195	194	192	191
50.0°	190	191	192	192	191	190	189	188
55.0°	186	188	188	188	187	186	184	183
60.0°	181	182	183	183	182	181	179	178
65.0°	175	177	177	178	177	175	173	172
70.0°	169	170	171	171	170	169	167	166
75.0°	162	164	164	165	164	162	160	158
80.0°	155	156	157	157	156	154	153	151
85.0°	147	149	150	150	149	147	145	143
90.0°	139	141	142	142	141	139	137	136
95.0°	131	133	133	133	132	130	129	127
100.0°	122	124	125	125	124	122	120	119
105.0°	114	115	116	116	115	114	112	111
110.0°	105	106	107	107	107	105	103	102
115.0°	96	98	98	99	98	96	94	93
120.0°	88	89	90	90	89	87	86	85
125.0°	79	80	81	81	80	79	77	76
130.0°	70	71	72	72	72	70	69	68
135.0°	62	63	63	64	63	62	61	60
140.0°	54	55	55	55	55	53	52	52
145.0°	46	47	47	47	47	46	45	44
150.0°	39	39	40	40	39	39	38	37
155.0°	32	33	33	33	33	32	31	31
160.0°	26	27	27	27	26	26	25	25
165.0°	21	21	21	21	21	20	20	19
170.0°	14	14	14	14	14	14	13	12
175.0°	3	3	5	5	3	3	3	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°	198	198	198	198	198	198	198	198
5.0°	198	198	198	198	199	198	198	198
10.0°	198	198	198	198	198	199	198	199
15.0°	198	199	198	199	199	199	199	199
20.0°	198	199	199	199	199	199	199	199
25.0°	198	199	198	199	199	199	199	199
30.0°	198	198	198	198	198	198	198	199
35.0°	196	196	196	197	197	197	197	197
40.0°	194	194	194	195	194	195	195	196
45.0°	191	191	192	192	192	192	192	192
50.0°	187	187	188	188	188	188	189	189
55.0°	183	183	183	184	184	184	184	184
60.0°	178	178	178	178	178	179	179	180
65.0°	172	172	172	173	173	173	173	174
70.0°	165	166	166	166	166	167	167	168
75.0°	158	158	159	159	160	160	160	161
80.0°	151	151	152	152	152	152	153	154
85.0°	143	143	144	144	145	145	145	146
90.0°	135	136	136	137	137	137	137	138
95.0°	127	127	128	128	129	128	129	130
100.0°	118	119	119	119	120	120	120	121
105.0°	110	110	111	111	111	111	112	112
110.0°	102	102	102	102	103	103	103	104
115.0°	93	93	93	94	94	94	94	95
120.0°	84	85	85	85	85	86	86	87
125.0°	76	76	76	77	77	77	77	78
130.0°	68	68	68	68	69	69	69	70
135.0°	59	60	60	60	60	60	61	61
140.0°	52	52	52	52	52	52	53	53
145.0°	44	44	44	44	45	45	45	46
150.0°	37	37	37	37	38	38	38	38
155.0°	31	31	31	31	31	31	31	32
160.0°	25	25	25	25	25	25	25	26
165.0°	19	19	18	19	19	20	20	20
170.0°	12	12	11	13	13	13	14	14
175.0°	0	0	1	1	2	3	4	4
180.0°	0	0	0	0	0	0	0	0

Zonal Lumen Density Measurement

Deg	Flux (lm)	%	Deg	Flux (lm)	%
0-5	4.7	0.29	0-5	4.7	0.29
5-10	14.2	0.87	0-10	18.9	1.16
10-15	23.6	1.45	0-15	42.5	2.61
15-20	32.8	2.01	0-20	75.4	4.62
20-25	41.8	2.56	0-25	117.2	7.18
25-30	50.4	3.09	0-30	167.5	10.27
30-35	58.4	3.58	0-35	225.9	13.85
35-40	65.6	4.02	0-40	291.5	17.87
40-45	71.9	4.42	0-45	363.5	22.29
45-50	77.2	4.73	0-50	440.7	27.02
50-55	81.4	4.99	0-55	522.1	32.01
55-60	84.3	5.17	0-60	606.4	37.18
60-65	86.0	5.27	0-65	692.5	42.45
65-70	86.5	5.31	0-70	779.0	47.76
70-75	85.9	5.27	0-75	864.9	53.03
75-80	84.1	5.15	0-80	949.0	58.18
80-85	81.4	4.99	0-85	1030.4	63.17
85-90	77.8	4.77	0-90	1108.1	67.94
90-95	73.3	4.50	0-95	1181.4	72.44
95-100	68.1	4.17	0-100	1249.5	76.61
100-105	62.5	3.83	0-105	1312.0	80.44
105-110	56.6	3.47	0-110	1368.6	83.91
110-115	50.4	3.09	0-115	1419.1	87.00
115-120	44.2	2.72	0-120	1463.3	89.72
120-125	38.0	2.33	0-125	1501.3	92.05
125-130	32.1	1.96	0-130	1533.4	94.01
130-135	26.4	1.62	0-135	1559.8	95.63
135-140	21.2	1.30	0-140	1581.0	96.93
140-145	16.4	1.01	0-145	1597.4	97.94
145-150	12.3	0.76	0-150	1609.8	98.70
150-155	8.9	0.54	0-155	1618.6	99.24
155-160	6.0	0.37	0-160	1624.6	99.61
160-165	3.8	0.23	0-165	1628.4	99.84
165-170	2.0	0.12	0-170	1630.4	99.96
170-175	0.6	0.04	0-175	1631.0	100.00
175-180	0.0	0.00	0-180	1631.0	100.00

6. Product Photo



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