



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/50K

Report Type:	Electrical and Photometric tests including: Luminous Flux, Chromaticity, Luminous Intensity Distribution
Test Engineer:	Hill Liu <i>Hill Liu</i>
Report Number:	RSZ180907511-10
Test Date:	2017-11-05
Report Date:	2018-09-11
Reviewed By:	Blake Zhang / EE Engineer <i>Blake Zhang</i>
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.

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 2017-11-03. One was tested in integrating sphere and the other was tested in goniophotometer

Model Tested: L15JA19OMDIM/50K
 Product Code: 698
 Brand Name: Overdrive
 Product Designation: Omnidirectional LED Lamp
 Burning Time Before Test: 0hour(For New Products)

Rated Values:

Rated Voltage/Frequency: 120V AC 60Hz
 Rated Power: 15W
 Nominal CCT: 5000K
 Nominal Lumen Output: 1600lm

Note:

1. The applicant Overdrive Electronics Pvt. Ltd. declares that their products with model L15JA19OMDIM/50K are the same to the products in report #RSZ171103503-10-1 and is authorized by original applicant to use their test data.
2. All the data in previous report (RSZ171103503-10-1) 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	Test Range	Calibration date	Calibration due date
2.0m integrating sphere	EVERFINE	R98	11010018	R98	2016-11-18	2017-11-18
spectroradiometer	EVERFINE	HAAS-2000	20140912	380-780nm	2016-11-18	2017-11-18
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	2016-11-18	2017-11-18
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	YG108492N10120001	1600mm,3000 W/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**

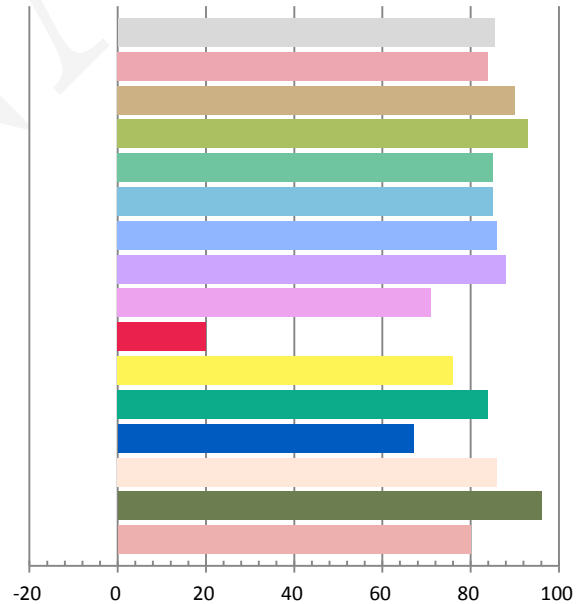
Photometric and Electrical Measurement Result

Voltage (V)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Luminous Flux(lm)	Efficacy (lm/W)
120.0	60	0.1265	14.89	0.9809	1725.0	115.84

Radiant Flux (W)	CCT (K)	Duv	x	y	u'	v'
5.5228	5040	0.000153	0.3440	0.3511	0.2109	0.4842

Color Rendering Index

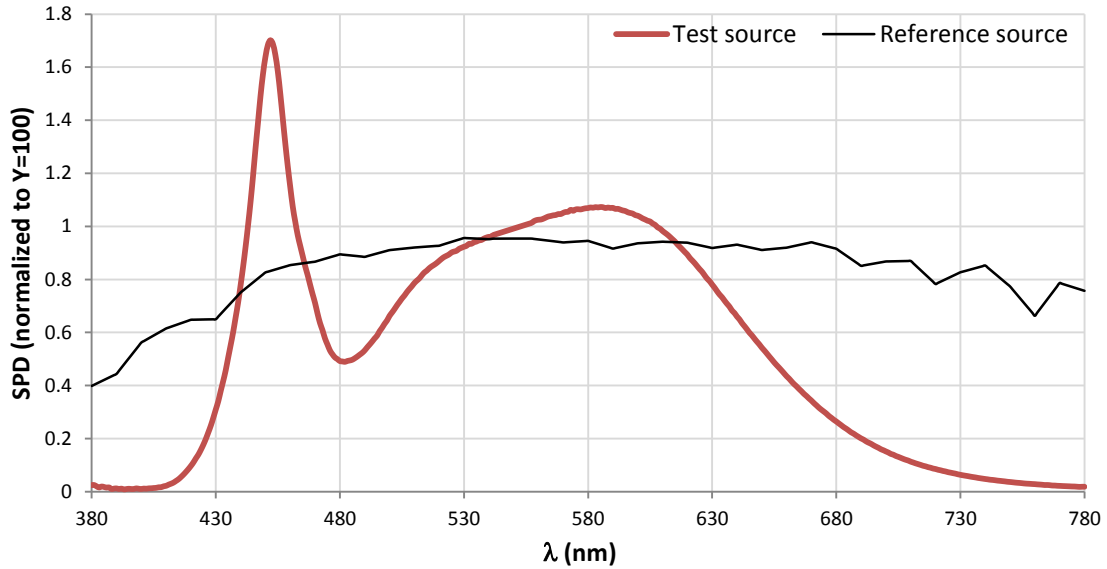
Ra			
85.4			
R1	R2	R3	R4
84	90	93	85
R5	R6	R7	R8
85	86	88	71
R9	R10	R11	R12
20	76	84	67
R13	R14	R15	
86	96	80	



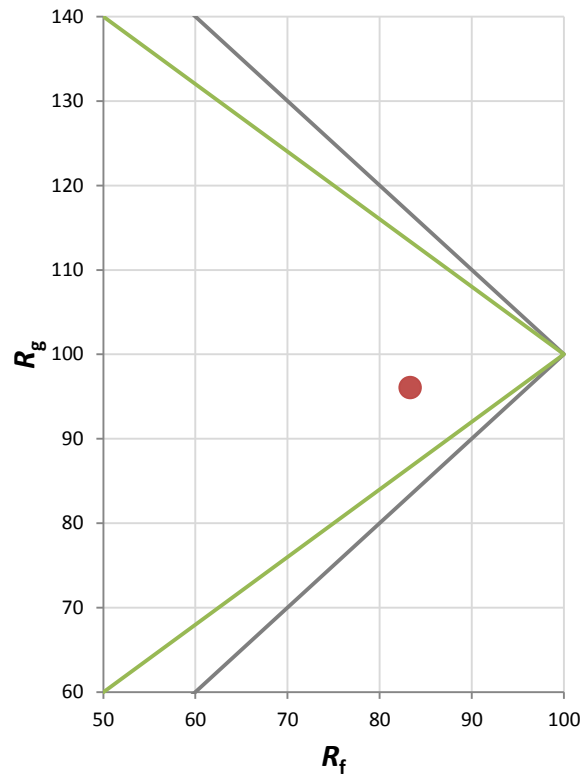
Fidelity Index and Gamut Index

Fidelity Index R_f	83
Gamut Index R_g	96

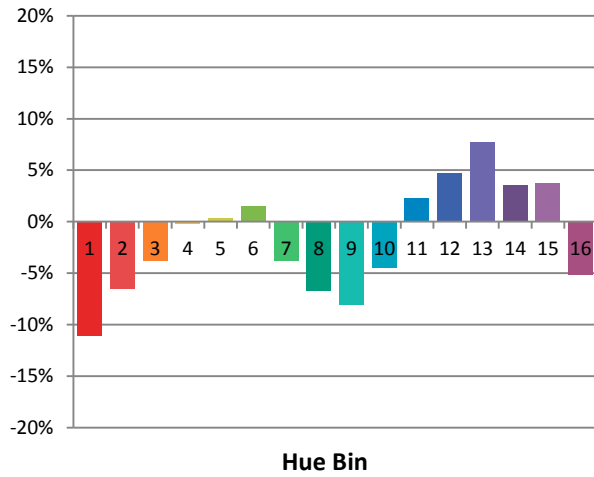
Spectral Power Distribution Comparison



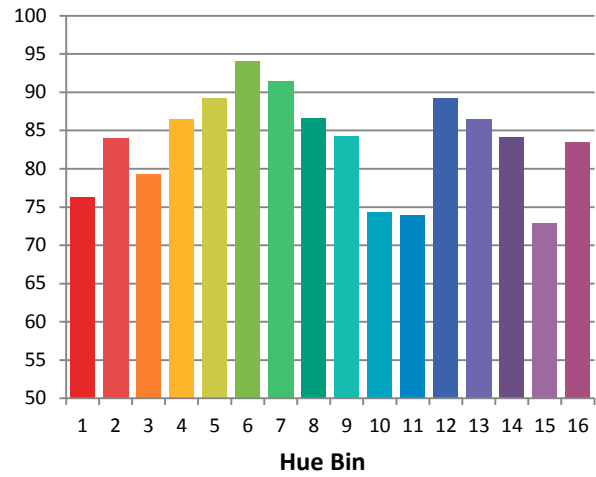
Plot of R_g versus R_f



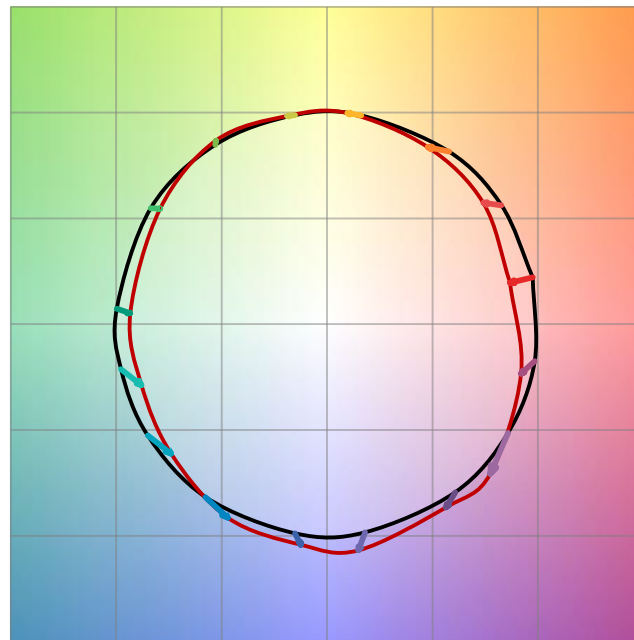
Chroma Shift by Hue



R_f by Hue

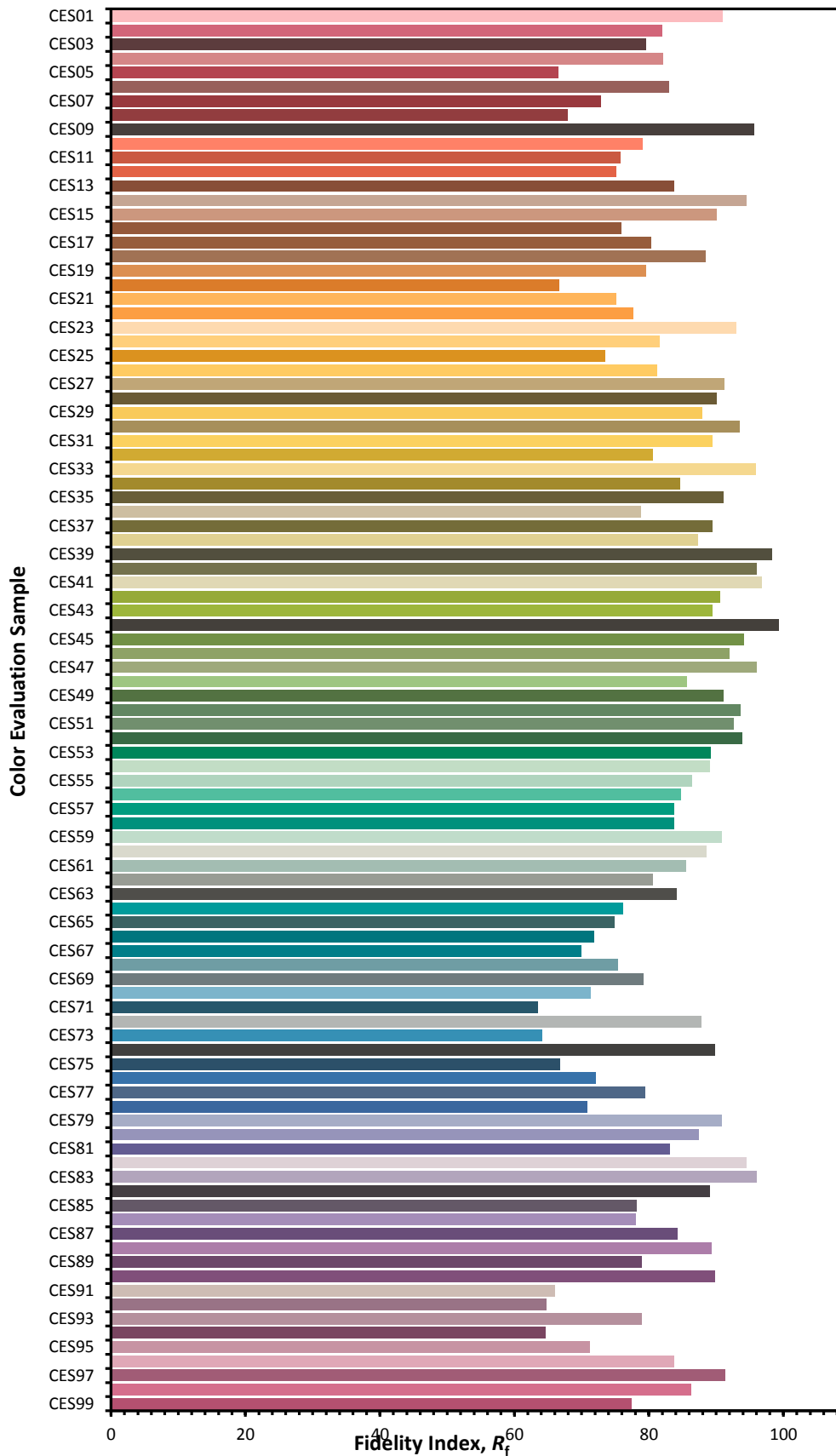


Color Vector Graphic

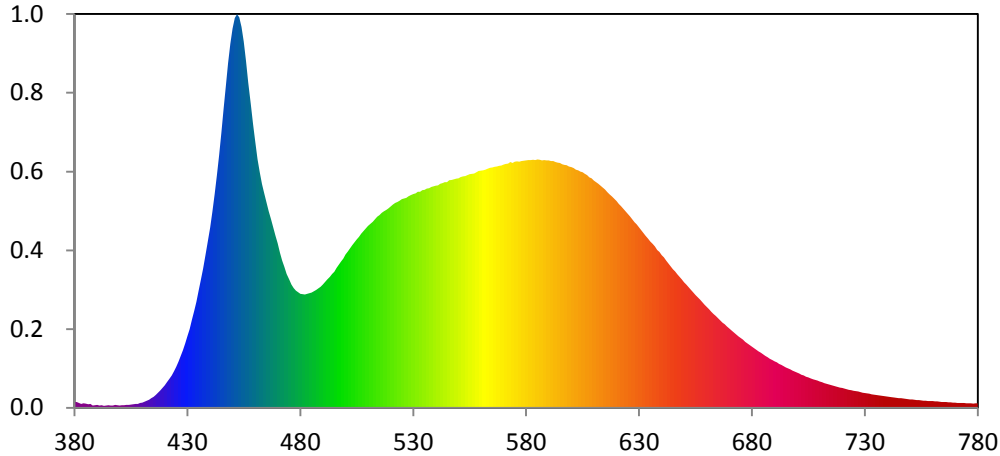


— Reference Illuminat — Test Source

Color Fidelity by CES Sample



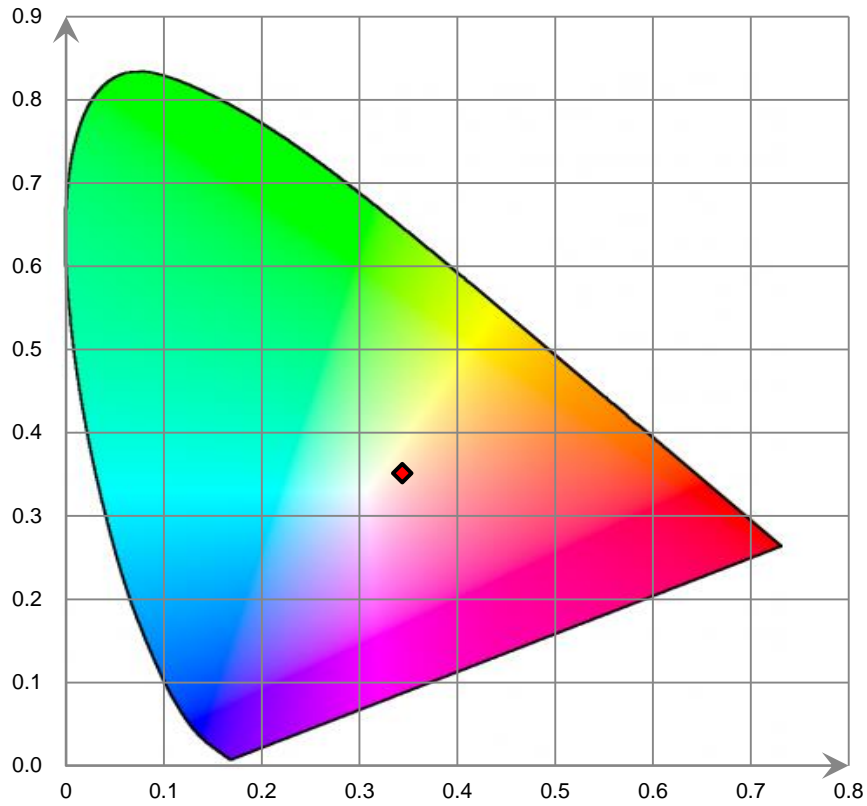
Relative Spectral Power Distribution



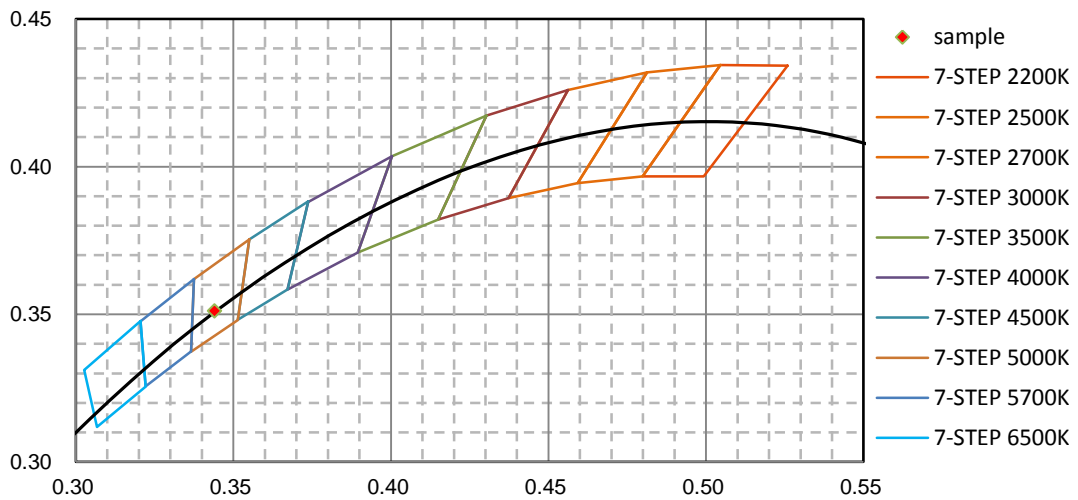
nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
380	6.217E-01	421	2.787E+00	462	2.572E+01	503	1.774E+01	544	2.463E+01
381	6.310E-01	422	3.179E+00	463	2.443E+01	504	1.806E+01	545	2.464E+01
382	5.014E-01	423	3.536E+00	464	2.342E+01	505	1.839E+01	546	2.483E+01
383	3.996E-01	424	3.987E+00	465	2.245E+01	506	1.867E+01	547	2.488E+01
384	4.887E-01	425	4.477E+00	466	2.147E+01	507	1.900E+01	548	2.495E+01
385	4.442E-01	426	5.029E+00	467	2.063E+01	508	1.929E+01	549	2.503E+01
386	3.851E-01	427	5.646E+00	468	1.970E+01	509	1.956E+01	550	2.504E+01
387	4.053E-01	428	6.288E+00	469	1.881E+01	510	1.986E+01	551	2.519E+01
388	2.518E-01	429	7.033E+00	470	1.796E+01	511	2.009E+01	552	2.527E+01
389	2.929E-01	430	7.823E+00	471	1.695E+01	512	2.030E+01	553	2.531E+01
390	3.094E-01	431	8.603E+00	472	1.605E+01	513	2.059E+01	554	2.539E+01
391	2.547E-01	432	9.597E+00	473	1.537E+01	514	2.086E+01	555	2.550E+01
392	2.896E-01	433	1.054E+01	474	1.459E+01	515	2.104E+01	556	2.555E+01
393	2.191E-01	434	1.155E+01	475	1.401E+01	516	2.127E+01	557	2.557E+01
394	2.486E-01	435	1.278E+01	476	1.344E+01	517	2.145E+01	558	2.573E+01
395	2.760E-01	436	1.397E+01	477	1.308E+01	518	2.160E+01	559	2.584E+01
396	2.508E-01	437	1.520E+01	478	1.278E+01	519	2.177E+01	560	2.589E+01
397	2.593E-01	438	1.660E+01	479	1.262E+01	520	2.197E+01	561	2.591E+01
398	3.126E-01	439	1.801E+01	480	1.243E+01	521	2.217E+01	562	2.599E+01
399	2.758E-01	440	1.966E+01	481	1.240E+01	522	2.234E+01	563	2.610E+01
400	2.568E-01	441	2.140E+01	482	1.236E+01	523	2.246E+01	564	2.620E+01
401	2.935E-01	442	2.330E+01	483	1.244E+01	524	2.259E+01	565	2.625E+01
402	2.821E-01	443	2.536E+01	484	1.249E+01	525	2.277E+01	566	2.631E+01
403	3.145E-01	444	2.757E+01	485	1.256E+01	526	2.286E+01	567	2.634E+01
404	3.221E-01	445	3.002E+01	486	1.270E+01	527	2.293E+01	568	2.643E+01
405	3.463E-01	446	3.265E+01	487	1.286E+01	528	2.311E+01	569	2.643E+01
406	3.649E-01	447	3.511E+01	488	1.304E+01	529	2.322E+01	570	2.655E+01
407	4.172E-01	448	3.761E+01	489	1.322E+01	530	2.332E+01	571	2.663E+01
408	4.274E-01	449	3.974E+01	490	1.345E+01	531	2.340E+01	572	2.665E+01
409	5.113E-01	450	4.139E+01	491	1.374E+01	532	2.359E+01	573	2.683E+01
410	5.581E-01	451	4.254E+01	492	1.401E+01	533	2.360E+01	574	2.674E+01
411	6.693E-01	452	4.298E+01	493	1.429E+01	534	2.374E+01	575	2.687E+01
412	7.598E-01	453	4.263E+01	494	1.459E+01	535	2.381E+01	576	2.689E+01
413	8.690E-01	454	4.159E+01	495	1.486E+01	536	2.392E+01	577	2.687E+01
414	1.026E+00	455	3.999E+01	496	1.527E+01	537	2.396E+01	578	2.693E+01
415	1.187E+00	456	3.787E+01	497	1.560E+01	538	2.409E+01	579	2.698E+01
416	1.398E+00	457	3.551E+01	498	1.598E+01	539	2.419E+01	580	2.700E+01
417	1.629E+00	458	3.317E+01	499	1.630E+01	540	2.426E+01	581	2.706E+01
418	1.886E+00	459	3.099E+01	500	1.673E+01	541	2.428E+01	582	2.703E+01
419	2.159E+00	460	2.902E+01	501	1.705E+01	542	2.445E+01	583	2.709E+01
420	2.457E+00	461	2.716E+01	502	1.738E+01	543	2.451E+01	584	2.706E+01

nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
585	2.710E+01	626	2.091E+01	667	9.306E+00	708	3.033E+00	749	9.411E-01
586	2.708E+01	627	2.058E+01	668	9.102E+00	709	2.960E+00	750	9.205E-01
587	2.700E+01	628	2.027E+01	669	8.874E+00	710	2.855E+00	751	8.968E-01
588	2.705E+01	629	2.003E+01	670	8.666E+00	711	2.777E+00	752	8.673E-01
589	2.701E+01	630	1.971E+01	671	8.428E+00	712	2.693E+00	753	8.453E-01
590	2.702E+01	631	1.941E+01	672	8.218E+00	713	2.620E+00	754	8.272E-01
591	2.692E+01	632	1.907E+01	673	7.995E+00	714	2.546E+00	755	8.015E-01
592	2.693E+01	633	1.876E+01	674	7.802E+00	715	2.464E+00	756	7.756E-01
593	2.685E+01	634	1.850E+01	675	7.621E+00	716	2.410E+00	757	7.601E-01
594	2.677E+01	635	1.818E+01	676	7.433E+00	717	2.331E+00	758	7.459E-01
595	2.672E+01	636	1.788E+01	677	7.209E+00	718	2.278E+00	759	7.273E-01
596	2.660E+01	637	1.760E+01	678	7.033E+00	719	2.200E+00	760	7.151E-01
597	2.653E+01	638	1.724E+01	679	6.843E+00	720	2.156E+00	761	6.927E-01
598	2.647E+01	639	1.700E+01	680	6.680E+00	721	2.085E+00	762	6.780E-01
599	2.633E+01	640	1.667E+01	681	6.498E+00	722	2.036E+00	763	6.572E-01
600	2.627E+01	641	1.640E+01	682	6.325E+00	723	1.971E+00	764	6.321E-01
601	2.615E+01	642	1.605E+01	683	6.143E+00	724	1.925E+00	765	6.340E-01
602	2.601E+01	643	1.576E+01	684	5.995E+00	725	1.857E+00	766	6.167E-01
603	2.591E+01	644	1.546E+01	685	5.823E+00	726	1.812E+00	767	5.854E-01
604	2.579E+01	645	1.514E+01	686	5.650E+00	727	1.761E+00	768	5.818E-01
605	2.572E+01	646	1.488E+01	687	5.520E+00	728	1.715E+00	769	5.609E-01
606	2.553E+01	647	1.458E+01	688	5.358E+00	729	1.653E+00	770	5.507E-01
607	2.540E+01	648	1.429E+01	689	5.214E+00	730	1.605E+00	771	5.379E-01
608	2.517E+01	649	1.402E+01	690	5.067E+00	731	1.558E+00	772	5.271E-01
609	2.504E+01	650	1.371E+01	691	4.949E+00	732	1.519E+00	773	5.181E-01
610	2.482E+01	651	1.344E+01	692	4.790E+00	733	1.480E+00	774	5.068E-01
611	2.464E+01	652	1.316E+01	693	4.667E+00	734	1.434E+00	775	4.946E-01
612	2.446E+01	653	1.287E+01	694	4.555E+00	735	1.394E+00	776	4.894E-01
613	2.425E+01	654	1.259E+01	695	4.413E+00	736	1.358E+00	777	4.719E-01
614	2.403E+01	655	1.230E+01	696	4.287E+00	737	1.313E+00	778	4.559E-01
615	2.381E+01	656	1.204E+01	697	4.174E+00	738	1.276E+00	779	4.672E-01
616	2.354E+01	657	1.179E+01	698	4.038E+00	739	1.240E+00	780	4.681E-01
617	2.330E+01	658	1.153E+01	699	3.942E+00	740	1.205E+00		
618	2.306E+01	659	1.126E+01	700	3.829E+00	741	1.174E+00		
619	2.281E+01	660	1.099E+01	701	3.725E+00	742	1.136E+00		
620	2.257E+01	661	1.076E+01	702	3.593E+00	743	1.116E+00		
621	2.225E+01	662	1.049E+01	703	3.518E+00	744	1.087E+00		
622	2.200E+01	663	1.024E+01	704	3.398E+00	745	1.051E+00		
623	2.174E+01	664	1.002E+01	705	3.312E+00	746	1.029E+00		
624	2.145E+01	665	9.777E+00	706	3.216E+00	747	1.001E+00		
625	2.117E+01	666	9.551E+00	707	3.120E+00	748	9.745E-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**

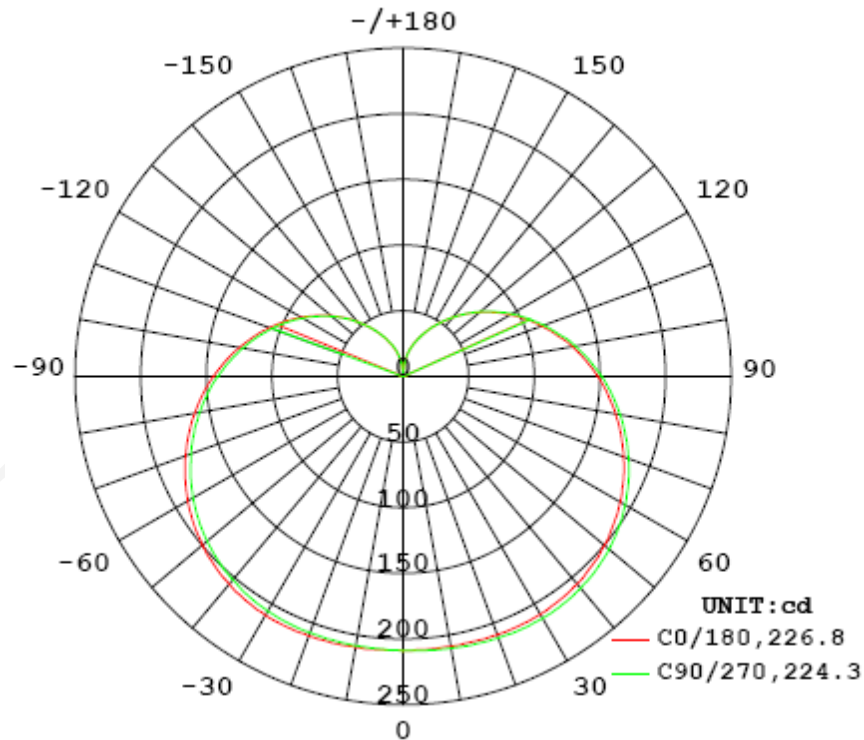
Electrical Measurement

Input Voltage (V)	Frequency (Hz)	Input Current (A)	Power (W)	Power Factor
120.1	60	0.1267	14.93	0.9815

Photometric Measurement

Luminous Flux (lm)	Efficacy (lm/W)	I _{max} (cd)	S/MH (C0/180)	S/MH (C90/270)
1729.18	115.83	212.8	1.53	1.55

Luminous Intensity Distribution



	C0/180	C45/225	C90/270	C135/315	AVG.
Beam Angle (50% I _{max}):	226.8	226.1	224.3	225.5	225.7
Field Angle (10% I _{max}):	330.5	330.6	330.2	330.3	330.4

Luminous Intensity (cd) Distribution Data

C \ γ	0°	22.5°	45°	67.5°	90°	112.5°	135°	157.5°
0.0°	209	209	209	209	209	209	209	209
5.0°	209	209	209	208	208	208	208	209
10.0°	209	209	209	208	208	208	208	208
15.0°	210	209	209	208	208	208	208	209
20.0°	210	210	208	208	208	208	208	209
25.0°	210	210	208	207	207	207	208	209
30.0°	210	208	207	207	206	207	207	208
35.0°	209	207	206	205	205	205	206	207
40.0°	207	205	203	202	202	203	204	205
45.0°	204	202	200	200	199	200	201	202
50.0°	200	198	196	195	195	196	197	199
55.0°	195	193	191	190	190	191	193	195
60.0°	190	188	186	185	185	186	188	190
65.0°	183	182	180	179	179	180	182	184
70.0°	177	175	173	172	172	173	175	177
75.0°	169	167	165	165	165	166	168	170
80.0°	161	159	158	157	157	159	161	163
85.0°	153	151	150	149	149	151	153	155
90.0°	145	143	141	141	141	143	145	147
95.0°	136	134	133	132	133	134	136	138
100.0°	127	125	124	124	124	126	128	130
105.0°	118	116	115	115	115	117	119	121
110.0°	109	107	106	106	107	108	110	112
115.0°	99	98	97	97	98	99	101	103
120.0°	90	89	88	88	89	90	92	93
125.0°	81	80	79	79	80	81	83	84
130.0°	72	71	70	70	71	72	74	75
135.0°	63	62	62	62	63	64	65	66
140.0°	54	54	53	53	54	55	57	58
145.0°	46	46	45	46	46	47	48	49
150.0°	39	38	38	38	39	40	41	42
155.0°	32	32	31	32	32	33	34	35
160.0°	26	25	25	26	26	27	28	28
165.0°	20	19	19	19	20	21	21	22
170.0°	12	12	12	12	13	14	14	16
175.0°	0	0	0	2	1	3	5	4
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°	209	209	209	209	209	209	209	209
5.0°	209	209	209	209	209	209	209	209
10.0°	209	209	210	210	210	210	210	210
15.0°	209	210	210	211	211	211	211	211
20.0°	209	210	211	211	212	212	212	211
25.0°	209	211	211	212	212	213	212	212
30.0°	209	210	211	212	213	213	212	211
35.0°	208	210	210	211	212	212	212	211
40.0°	206	207	209	210	211	210	210	209
45.0°	204	205	206	207	208	208	207	206
50.0°	200	202	203	204	205	205	204	203
55.0°	196	198	199	200	200	200	200	198
60.0°	191	192	194	195	195	195	194	193
65.0°	185	187	188	189	189	189	188	187
70.0°	179	180	182	182	183	182	182	180
75.0°	172	174	175	176	175	175	174	173
80.0°	164	166	167	167	168	167	167	165
85.0°	156	158	159	160	160	159	158	157
90.0°	148	150	151	151	151	151	150	148
95.0°	140	141	142	142	142	142	141	139
100.0°	131	132	133	133	133	133	132	130
105.0°	122	123	123	123	123	123	122	120
110.0°	113	114	114	114	114	113	112	111
115.0°	103	104	105	105	105	104	103	102
120.0°	94	95	95	96	95	94	94	92
125.0°	85	86	86	86	86	85	84	83
130.0°	76	77	77	77	77	76	75	74
135.0°	67	68	68	68	68	67	66	65
140.0°	59	59	59	59	59	58	57	56
145.0°	50	51	51	51	50	50	49	48
150.0°	43	43	43	43	43	42	41	40
155.0°	35	36	36	36	35	35	34	33
160.0°	29	29	29	29	29	28	28	27
165.0°	23	23	23	23	23	22	21	21
170.0°	16	16	16	16	16	15	15	14
175.0°	5	6	5	1	5	4	2	1
180.0°	0	0	0	0	0	0	0	0

Zonal Lumen Density Measurement

Deg	Flux (lm)	%	Deg	Flux (lm)	%
0-5	5.0	0.29	0-5	5.0	0.29
5-10	15.0	0.86	0-10	19.9	1.15
10-15	24.8	1.44	0-15	44.8	2.59
15-20	34.6	2.00	0-20	79.3	4.59
20-25	44.0	2.54	0-25	123.4	7.13
25-30	53.1	3.08	0-30	176.5	10.21
30-35	61.6	3.55	0-35	238.0	13.76
35-40	69.2	4.01	0-40	307.2	17.77
40-45	76.0	4.39	0-45	383.2	22.16
45-50	81.6	4.72	0-50	464.8	26.88
50-55	86.0	4.98	0-55	550.8	31.86
55-60	89.2	5.16	0-60	640.1	37.02
60-65	91.1	5.26	0-65	731.2	42.28
65-70	91.7	5.31	0-70	822.9	47.59
70-75	91.1	5.26	0-75	914.0	52.85
75-80	89.3	5.17	0-80	1003.2	58.02
80-85	86.4	4.99	0-85	1089.6	63.01
85-90	82.6	4.78	0-90	1172.2	67.79
90-95	77.9	4.51	0-95	1250.1	72.30
95-100	72.5	4.19	0-100	1322.7	76.49
100-105	66.6	3.85	0-105	1389.3	80.34
105-110	60.2	3.48	0-110	1449.5	83.82
110-115	53.7	3.11	0-115	1503.2	86.93
115-120	47.1	2.72	0-120	1550.2	89.65
120-125	40.5	2.35	0-125	1590.8	92.00
125-130	34.2	1.97	0-130	1624.9	93.97
130-135	28.2	1.63	0-135	1653.1	95.60
135-140	22.6	1.31	0-140	1675.7	96.91
140-145	17.5	1.01	0-145	1693.2	97.92
145-150	13.2	0.76	0-150	1706.4	98.68
150-155	9.5	0.55	0-155	1715.8	99.23
155-160	6.4	0.37	0-160	1722.2	99.60
160-165	4.0	0.23	0-165	1726.3	99.83
165-170	2.2	0.13	0-170	1728.4	99.96
170-175	0.7	0.04	0-175	1729.2	100.00
175-180	0.0	0.00	0-180	1729.2	100.00

6. Product Photo



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