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: L11JAOMDIM/50K

Report Type:	Electrical and Photometric tests including: Luminous Flux, Chromaticity, Luminous Intensity Distribution
Test Engineer:	Hill Liu
Report Number:	RSZ180907510-10
Test Date:	2017-09-14 to 2017-09-21
Report Date:	2018-09-11
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:

Two samples were received on 2017-09-12. One was tested in integrating sphere and the other was tested in goniophotometer

Model Tested:	L11JAOMDIM/50K
Product Code:	699
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:	11W
Nominal CCT:	5000K
Nominal Lumen Output:	1100lm

Note:

1. The applicant Overdrive Electronics Pvt. Ltd. declares that their products with model L11JAOMDIM/50K are the same to the products in report #RSZ170912512-10-1 and is authorized by original applicant to use their test data.
2. All the data in previous report (RSZ170912512-10-1) 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	YG108492N10 120001	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=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	0.09253	10.64	0.9586	1178.1	110.71

Radiant Flux (W)	CCT (K)	Duv	x	y	u'	v'
3.7965	5184	-0.0001070	0.3401	0.3474	0.2097	0.4819

Color Rendering Index

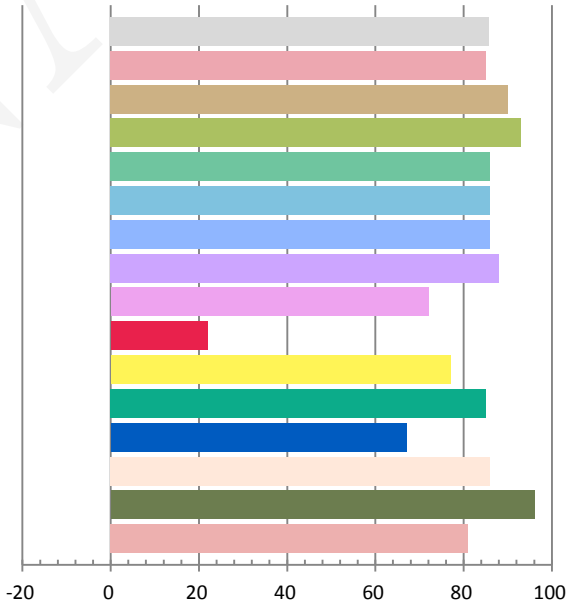
Ra
85.8

R1	R2	R3	R4
85	90	93	86

R5	R6	R7	R8
86	86	88	72

R9	R10	R11	R12
22	77	85	67

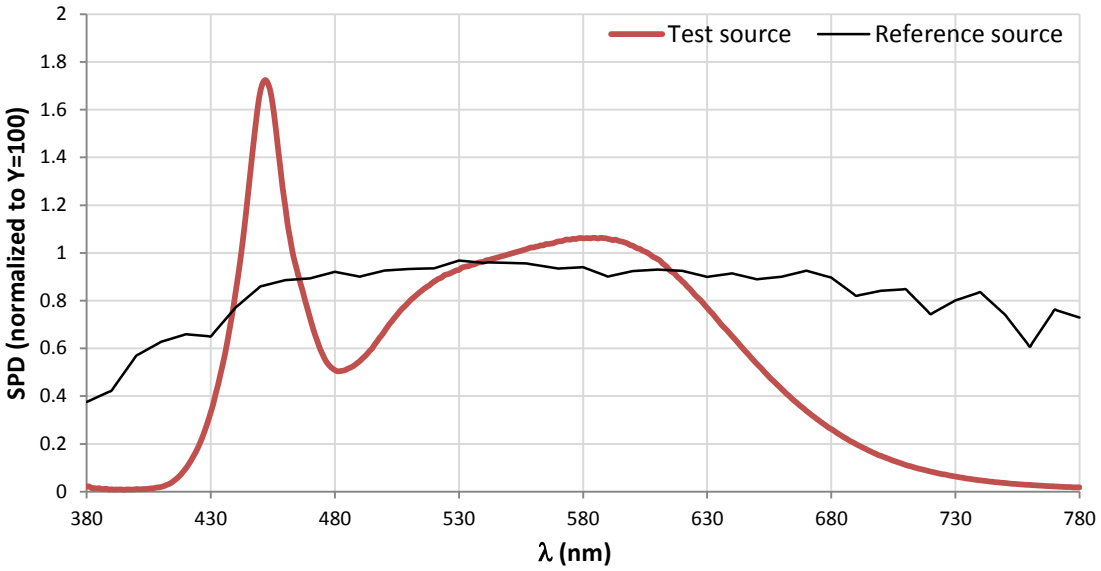
R13	R14	R15
86	96	81



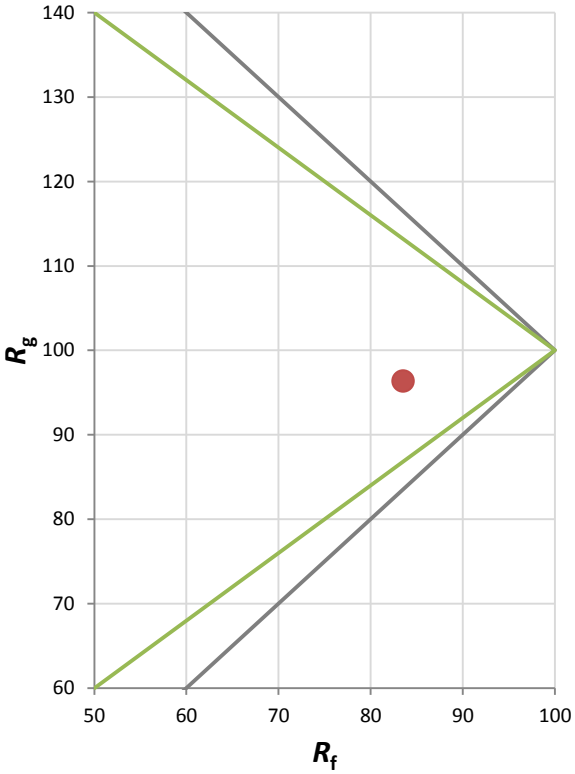
Fidelity Index and Gamut Index

Fidelity Index R_f	84
Gamut Index R_g	96

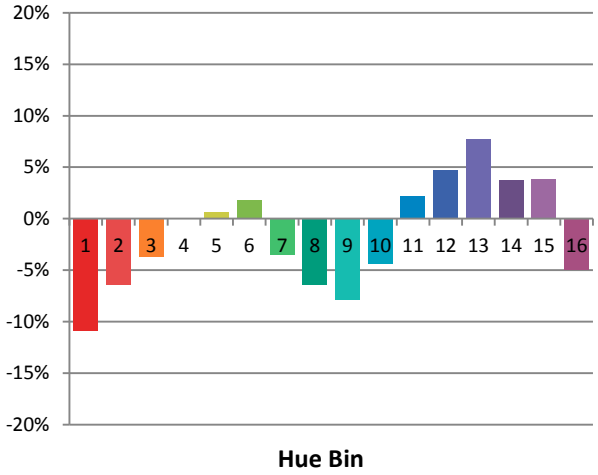
Spectral Power Distribution Comparison



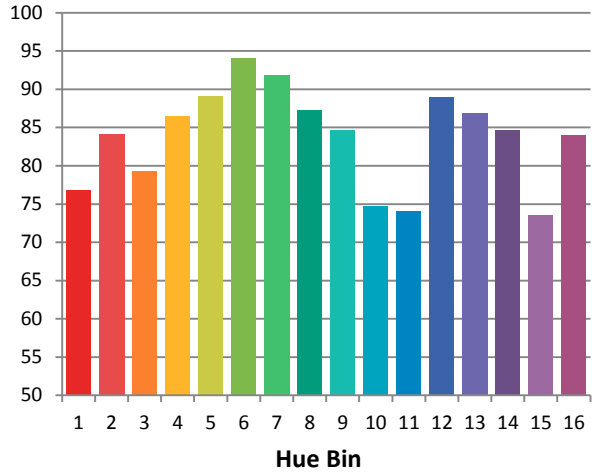
Plot of R_g versus R_f



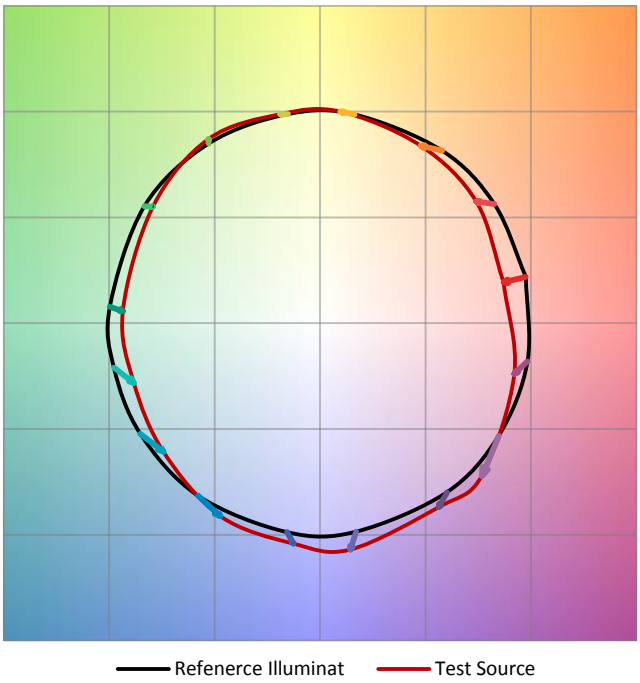
Chroma Shift by Hue



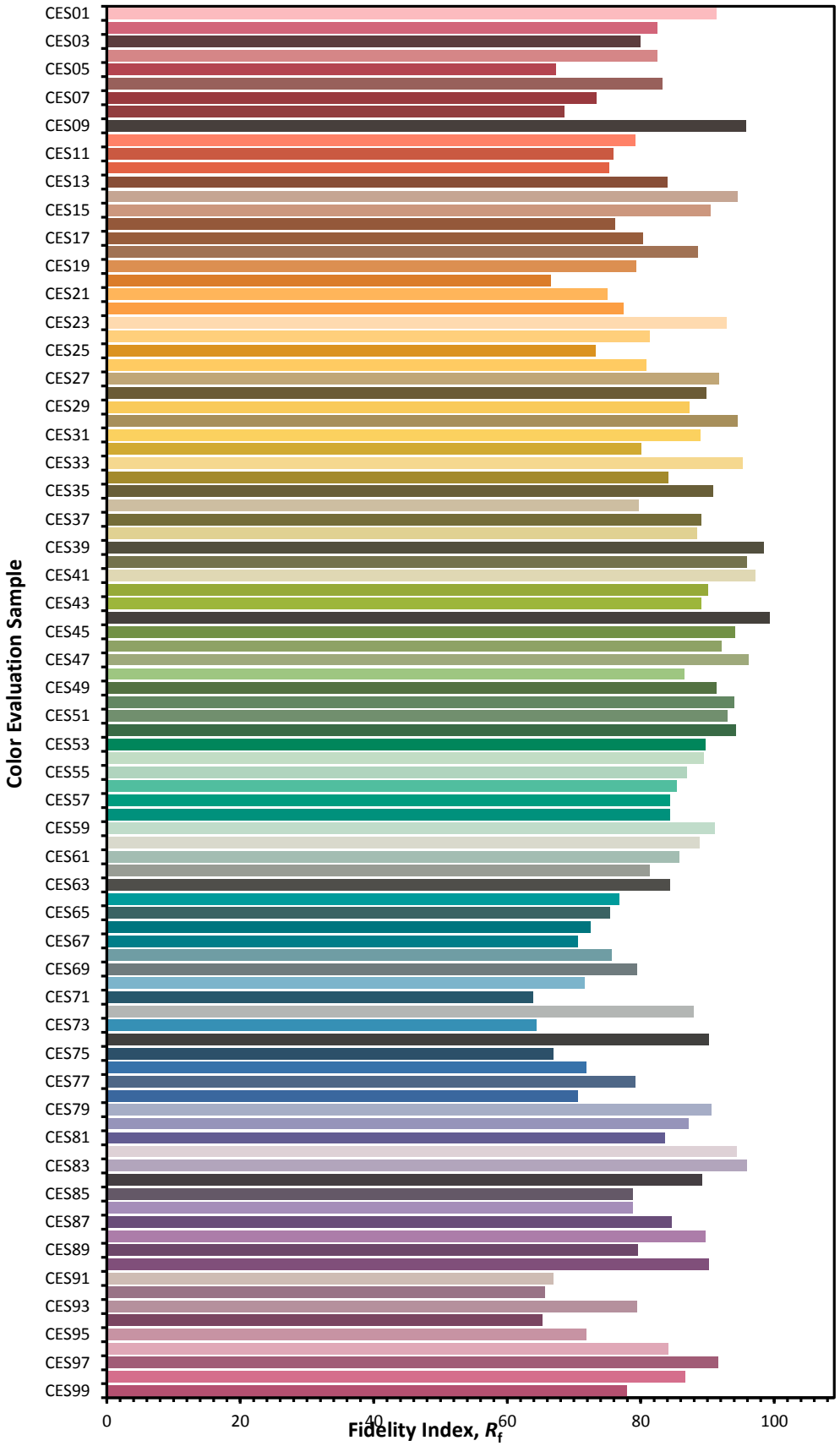
R_f by Hue



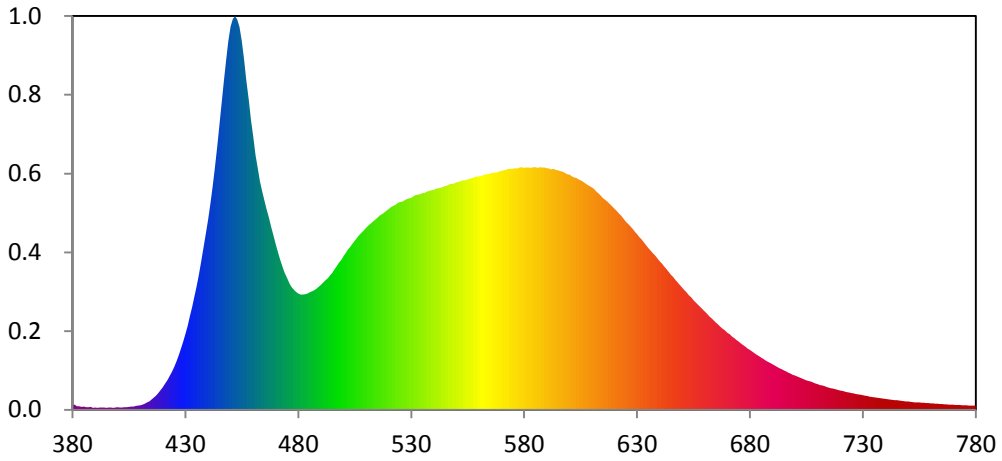
Color Vector Graphic



Color Fidelity by CES Sample



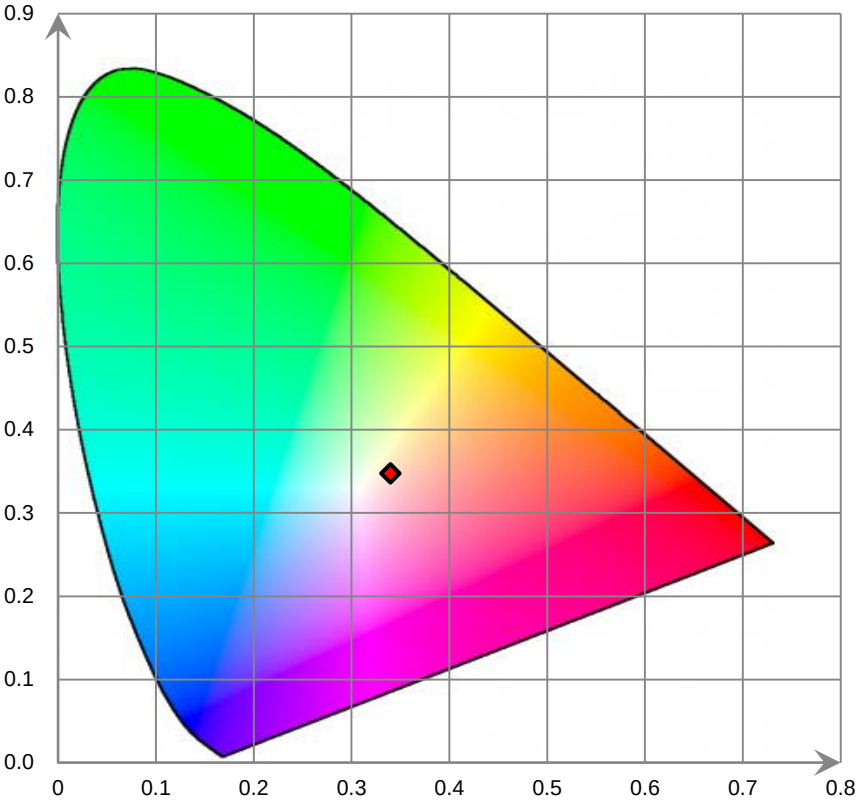
Relative Spectral Power Distribution



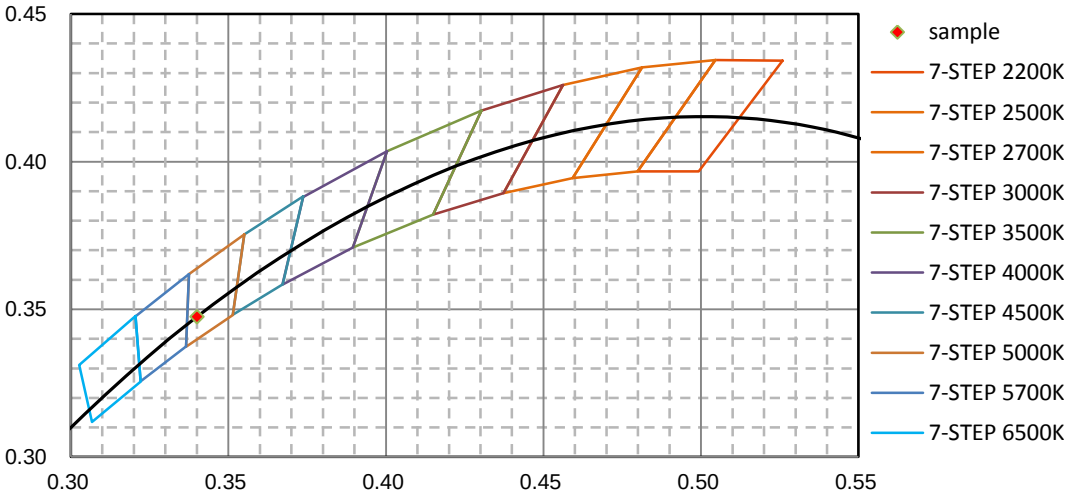
nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
380	3.710E-01	421	1.949E+00	462	1.826E+01	503	1.232E+01	544	1.684E+01
381	3.745E-01	422	2.246E+00	463	1.724E+01	504	1.256E+01	545	1.692E+01
382	2.596E-01	423	2.557E+00	464	1.650E+01	505	1.277E+01	546	1.695E+01
383	2.577E-01	424	2.874E+00	465	1.581E+01	506	1.300E+01	547	1.705E+01
384	2.253E-01	425	3.253E+00	466	1.512E+01	507	1.320E+01	548	1.708E+01
385	2.514E-01	426	3.662E+00	467	1.451E+01	508	1.337E+01	549	1.711E+01
386	1.913E-01	427	4.119E+00	468	1.381E+01	509	1.355E+01	550	1.719E+01
387	1.947E-01	428	4.617E+00	469	1.318E+01	510	1.375E+01	551	1.723E+01
388	2.071E-01	429	5.163E+00	470	1.254E+01	511	1.392E+01	552	1.729E+01
389	1.527E-01	430	5.738E+00	471	1.192E+01	512	1.407E+01	553	1.735E+01
390	1.681E-01	431	6.341E+00	472	1.134E+01	513	1.423E+01	554	1.734E+01
391	1.486E-01	432	7.094E+00	473	1.084E+01	514	1.438E+01	555	1.742E+01
392	1.550E-01	433	7.768E+00	474	1.034E+01	515	1.452E+01	556	1.746E+01
393	1.579E-01	434	8.557E+00	475	9.941E+00	516	1.467E+01	557	1.751E+01
394	1.622E-01	435	9.339E+00	476	9.556E+00	517	1.479E+01	558	1.758E+01
395	1.345E-01	436	1.020E+01	477	9.274E+00	518	1.490E+01	559	1.764E+01
396	1.582E-01	437	1.117E+01	478	9.066E+00	519	1.505E+01	560	1.764E+01
397	1.598E-01	438	1.219E+01	479	8.905E+00	520	1.518E+01	561	1.770E+01
398	1.513E-01	439	1.321E+01	480	8.782E+00	521	1.530E+01	562	1.773E+01
399	1.548E-01	440	1.440E+01	481	8.700E+00	522	1.540E+01	563	1.780E+01
400	1.876E-01	441	1.558E+01	482	8.709E+00	523	1.547E+01	564	1.779E+01
401	1.751E-01	442	1.687E+01	483	8.732E+00	524	1.563E+01	565	1.789E+01
402	1.729E-01	443	1.828E+01	484	8.770E+00	525	1.569E+01	566	1.789E+01
403	1.902E-01	444	1.982E+01	485	8.866E+00	526	1.574E+01	567	1.792E+01
404	1.920E-01	445	2.148E+01	486	8.943E+00	527	1.582E+01	568	1.795E+01
405	2.135E-01	446	2.316E+01	487	9.027E+00	528	1.591E+01	569	1.802E+01
406	2.365E-01	447	2.482E+01	488	9.141E+00	529	1.599E+01	570	1.808E+01
407	2.490E-01	448	2.640E+01	489	9.293E+00	530	1.602E+01	571	1.809E+01
408	2.953E-01	449	2.788E+01	490	9.424E+00	531	1.617E+01	572	1.813E+01
409	3.124E-01	450	2.895E+01	491	9.604E+00	532	1.623E+01	573	1.821E+01
410	3.453E-01	451	2.954E+01	492	9.772E+00	533	1.627E+01	574	1.821E+01
411	3.952E-01	452	2.974E+01	493	9.950E+00	534	1.630E+01	575	1.821E+01
412	4.674E-01	453	2.950E+01	494	1.017E+01	535	1.638E+01	576	1.827E+01
413	5.405E-01	454	2.893E+01	495	1.035E+01	536	1.641E+01	577	1.825E+01
414	6.303E-01	455	2.789E+01	496	1.062E+01	537	1.649E+01	578	1.830E+01
415	7.678E-01	456	2.653E+01	497	1.086E+01	538	1.656E+01	579	1.833E+01
416	9.045E-01	457	2.495E+01	498	1.112E+01	539	1.658E+01	580	1.830E+01
417	1.066E+00	458	2.343E+01	499	1.133E+01	540	1.662E+01	581	1.831E+01
418	1.249E+00	459	2.188E+01	500	1.160E+01	541	1.672E+01	582	1.832E+01
419	1.467E+00	460	2.064E+01	501	1.186E+01	542	1.674E+01	583	1.830E+01
420	1.691E+00	461	1.927E+01	502	1.211E+01	543	1.678E+01	584	1.834E+01

nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
585	1.833E+01	626	1.405E+01	667	6.270E+00	708	2.057E+00	749	6.359E-01
586	1.829E+01	627	1.389E+01	668	6.130E+00	709	1.990E+00	750	6.237E-01
587	1.834E+01	628	1.370E+01	669	5.987E+00	710	1.927E+00	751	6.062E-01
588	1.832E+01	629	1.348E+01	670	5.825E+00	711	1.871E+00	752	5.831E-01
589	1.831E+01	630	1.328E+01	671	5.695E+00	712	1.832E+00	753	5.646E-01
590	1.826E+01	631	1.307E+01	672	5.541E+00	713	1.777E+00	754	5.612E-01
591	1.823E+01	632	1.289E+01	673	5.414E+00	714	1.721E+00	755	5.438E-01
592	1.817E+01	633	1.267E+01	674	5.277E+00	715	1.674E+00	756	5.276E-01
593	1.821E+01	634	1.245E+01	675	5.143E+00	716	1.629E+00	757	5.199E-01
594	1.814E+01	635	1.223E+01	676	5.010E+00	717	1.590E+00	758	5.010E-01
595	1.809E+01	636	1.201E+01	677	4.878E+00	718	1.546E+00	759	4.961E-01
596	1.805E+01	637	1.183E+01	678	4.753E+00	719	1.497E+00	760	4.859E-01
597	1.799E+01	638	1.165E+01	679	4.618E+00	720	1.450E+00	761	4.711E-01
598	1.792E+01	639	1.144E+01	680	4.520E+00	721	1.416E+00	762	4.601E-01
599	1.781E+01	640	1.124E+01	681	4.408E+00	722	1.371E+00	763	4.483E-01
600	1.777E+01	641	1.105E+01	682	4.281E+00	723	1.330E+00	764	4.372E-01
601	1.766E+01	642	1.084E+01	683	4.163E+00	724	1.291E+00	765	4.279E-01
602	1.757E+01	643	1.063E+01	684	4.057E+00	725	1.256E+00	766	4.149E-01
603	1.753E+01	644	1.042E+01	685	3.935E+00	726	1.238E+00	767	4.037E-01
604	1.741E+01	645	1.022E+01	686	3.841E+00	727	1.189E+00	768	3.927E-01
605	1.734E+01	646	1.003E+01	687	3.726E+00	728	1.156E+00	769	3.906E-01
606	1.725E+01	647	9.827E+00	688	3.622E+00	729	1.124E+00	770	3.757E-01
607	1.713E+01	648	9.624E+00	689	3.535E+00	730	1.093E+00	771	3.689E-01
608	1.699E+01	649	9.431E+00	690	3.430E+00	731	1.061E+00	772	3.593E-01
609	1.690E+01	650	9.232E+00	691	3.338E+00	732	1.031E+00	773	3.500E-01
610	1.680E+01	651	9.054E+00	692	3.251E+00	733	1.000E+00	774	3.370E-01
611	1.669E+01	652	8.876E+00	693	3.153E+00	734	9.657E-01	775	3.346E-01
612	1.649E+01	653	8.659E+00	694	3.071E+00	735	9.389E-01	776	3.367E-01
613	1.636E+01	654	8.480E+00	695	2.978E+00	736	9.181E-01	777	3.191E-01
614	1.619E+01	655	8.280E+00	696	2.895E+00	737	8.875E-01	778	3.091E-01
615	1.598E+01	656	8.102E+00	697	2.809E+00	738	8.658E-01	779	3.126E-01
616	1.586E+01	657	7.944E+00	698	2.731E+00	739	8.356E-01	780	3.130E-01
617	1.573E+01	658	7.763E+00	699	2.644E+00	740	8.197E-01		
618	1.552E+01	659	7.599E+00	700	2.584E+00	741	7.941E-01		
619	1.537E+01	660	7.414E+00	701	2.516E+00	742	7.765E-01		
620	1.519E+01	661	7.251E+00	702	2.447E+00	743	7.530E-01		
621	1.503E+01	662	7.066E+00	703	2.379E+00	744	7.271E-01		
622	1.482E+01	663	6.920E+00	704	2.305E+00	745	7.156E-01		
623	1.465E+01	664	6.741E+00	705	2.234E+00	746	6.869E-01		
624	1.444E+01	665	6.578E+00	706	2.177E+00	747	6.734E-01		
625	1.423E+01	666	6.437E+00	707	2.116E+00	748	6.551E-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**

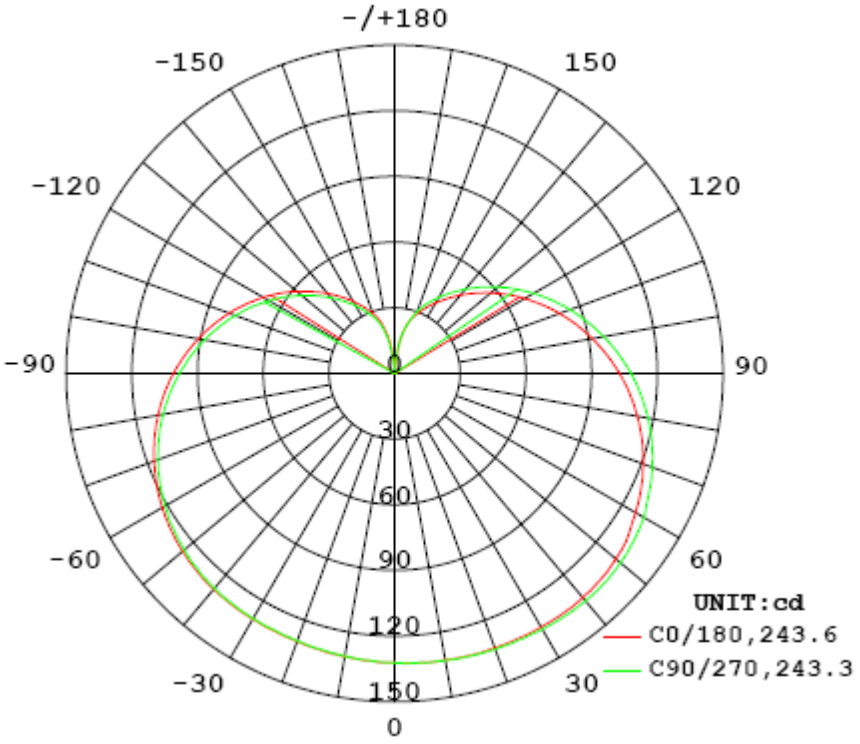
Electrical Measurement

Input Voltage (V)	Frequency (Hz)	Input Current (A)	Power (W)	Power Factor
120.0	60	0.0924	10.65	0.9604

Photometric Measurement

Luminous Flux (lm)	Efficacy (lm/W)	I_{max} (cd)	S/MH (C0/180)	S/MH (C90/270)
1190.74	111.83	136.4	1.55	1.57

Luminous Intensity Distribution



	C0/180	C45/225	C90/270	C135/315	AVG.
Beam Angle (50% I_{max}):	243.6	241.7	243.3	245.9	243.6
Field Angle (10% I_{max}):	342.6	341.8	341.8	340.9	341.8

Luminous Intensity (cd) Distribution Data

C / γ	0°	22.5°	45°	67.5°	90°	112.5°	135°	157.5°
0.0°	132	132	132	132	132	132	132	132
5.0°	132	132	132	132	132	132	132	133
10.0°	131	131	131	131	131	131	132	132
15.0°	131	130	130	130	130	131	132	133
20.0°	130	130	129	130	130	131	131	133
25.0°	130	129	129	129	129	130	131	133
30.0°	130	129	129	129	129	130	131	132
35.0°	129	128	128	128	129	130	131	132
40.0°	129	128	127	127	128	129	130	132
45.0°	128	127	126	126	127	128	129	131
50.0°	126	125	125	125	126	126	128	130
55.0°	125	123	123	123	123	124	126	128
60.0°	123	121	120	121	121	122	123	125
65.0°	120	119	118	118	118	119	120	122
70.0°	117	115	115	115	115	116	117	119
75.0°	114	112	111	111	111	112	113	115
80.0°	110	108	107	107	107	108	109	111
85.0°	106	104	103	103	103	104	104	106
90.0°	101	100	98	98	98	99	99	101
95.0°	96	95	94	93	93	94	94	96
100.0°	91	90	89	88	88	88	89	90
105.0°	86	84	83	83	83	83	84	84
110.0°	80	79	78	78	77	78	78	79
115.0°	75	74	73	72	72	72	72	73
120.0°	69	68	67	67	66	67	67	67
125.0°	64	63	62	61	61	61	61	62
130.0°	58	57	56	56	55	55	56	56
135.0°	53	52	51	50	50	50	50	51
140.0°	48	47	46	45	45	45	45	46
145.0°	43	42	41	41	40	40	40	41
150.0°	38	37	37	36	36	36	36	36
155.0°	34	33	32	32	31	31	32	32
160.0°	29	28	28	27	27	27	27	28
165.0°	24	24	22	22	22	22	22	22
170.0°	16	16	14	14	14	13	14	14
175.0°	3	3	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°	132	132	132	132	132	132	132	132
5.0°	133	133	133	133	133	133	132	132
10.0°	133	133	134	133	133	133	132	132
15.0°	133	134	134	134	134	133	132	132
20.0°	133	134	135	134	134	133	132	131
25.0°	134	135	135	135	134	133	132	131
30.0°	134	135	136	136	135	134	132	131
35.0°	134	135	136	136	135	134	132	130
40.0°	134	135	136	136	136	134	132	130
45.0°	133	135	136	136	135	134	132	129
50.0°	132	134	135	135	135	133	130	128
55.0°	130	132	134	134	133	132	128	126
60.0°	127	130	132	132	132	129	126	124
65.0°	124	127	128	129	128	127	124	122
70.0°	121	123	125	126	125	124	121	119
75.0°	117	119	121	122	122	120	118	115
80.0°	113	115	117	118	118	116	114	112
85.0°	108	110	112	113	113	112	109	107
90.0°	103	105	107	108	108	107	105	103
95.0°	97	99	101	102	103	102	100	98
100.0°	92	94	95	96	97	96	95	93
105.0°	86	88	89	91	91	91	89	88
110.0°	80	82	83	85	85	85	84	82
115.0°	74	76	77	78	79	79	78	77
120.0°	69	70	71	72	73	73	72	71
125.0°	63	64	65	67	67	67	67	66
130.0°	57	58	60	61	61	62	61	60
135.0°	52	53	54	55	56	56	55	55
140.0°	47	48	49	50	50	50	50	49
145.0°	42	43	43	44	45	45	45	44
150.0°	37	38	39	39	40	40	40	39
155.0°	33	33	34	35	35	36	35	35
160.0°	29	29	30	30	30	31	31	30
165.0°	24	24	25	25	24	26	26	24
170.0°	16	16	17	18	17	16	15	16
175.0°	0	1	1	3	4	2	2	3
180.0°	0	0	0	0	0	0	0	0

Zonal Lumen Density Measurement

Deg	Flux (lm)	%
0-5	3.2	0.27
5-10	9.5	0.79
10-15	15.7	1.32
15-20	21.8	1.82
20-25	27.7	2.33
25-30	33.4	2.80
30-35	38.8	3.26
35-40	43.9	3.69
40-45	48.6	4.08
45-50	52.6	4.42
50-55	56.0	4.70
55-60	58.6	4.91
60-65	60.3	5.07
65-70	61.3	5.15
70-75	61.5	5.16
75-80	60.9	5.12
80-85	59.5	5.00
85-90	57.4	4.82
90-95	54.7	4.59
95-100	51.4	4.32
100-105	47.7	4.01
105-110	43.7	3.67
110-115	39.5	3.32
115-120	35.1	2.95
120-125	30.8	2.59
125-130	26.5	2.22
130-135	22.4	1.88
135-140	18.5	1.56
140-145	15.0	1.26
145-150	11.8	0.99
150-155	9.0	0.76
155-160	6.5	0.55
160-165	4.4	0.36
165-170	2.4	0.20
170-175	0.7	0.06
175-180	0.0	0.00

Deg	Flux (lm)	%
0-5	3.2	0.27
0-10	12.6	1.06
0-15	28.3	2.38
0-20	50.1	4.20
0-25	77.7	6.53
0-30	111.1	9.33
0-35	149.9	12.59
0-40	193.9	16.28
0-45	242.4	20.36
0-50	295.0	24.78
0-55	351.0	29.48
0-60	409.5	34.39
0-65	469.9	39.46
0-70	531.2	44.61
0-75	592.7	49.77
0-80	653.6	54.89
0-85	713.1	59.89
0-90	770.5	64.71
0-95	825.2	69.30
0-100	876.7	73.62
0-105	924.4	77.63
0-110	968.1	81.30
0-115	1007.6	84.62
0-120	1042.8	87.57
0-125	1073.5	90.16
0-130	1100.0	92.38
0-135	1122.4	94.26
0-140	1141.0	95.82
0-145	1156.0	97.08
0-150	1167.8	98.07
0-155	1176.8	98.83
0-160	1183.3	99.38
0-165	1187.7	99.74
0-170	1190.1	99.94
0-175	1190.7	100.00
0-180	1190.7	100.00

6. Product Photo

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