

IES LM-79-08


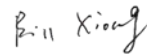
MEASUREMENT AND TEST REPORT

For

GREEN CREATIVE LTD

756 North Zhongshan Rd., Unit B301 Zhabei District, Shanghai, China

Test Model: 25HID/840/277V/E26/R

Report Type:	Electrical and Photometric tests including: Luminous Flux, Chromaticity, Luminous Intensity Distribution
Test Engineer:	Hill Liu 
Report Number:	R1KS181219081-10-1
Test Date:	2018-12-22 to 2018-12-29
Report Date:	2019-05-17
Reviewed By:	Bill Xiong / EE Engineer 
Prepared By:	Bay Area Compliance Laboratories Corp. (Dongguan). No.69, Pulongcun, Puxinhu Industry Area, Tangxia, Dongguan, Guangdong, China. Tel: +86-0769-86858888 Fax: +86-0769-86858588
Test Facility:	Test facility was located at No.69, Pulongcun, Puxinhu Industry Area, Tangxia, Dongguan, Guangdong, China.
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:

One sample was received on 2018-12-19 and used for testing.

Model Tested: 25HID/840/277V/E26/R
 Manufacturer: GREEN CREATIVE LTD
 Brand Name: GREEN CREATIVE
 Product Designation: Omnidirectional LED Lamp
 Aging Time Before Test: 0hour(For New Products)

Rated Values:

Rated Voltage/Frequency: 120-277VAC 50/60Hz
 Rated Power: 25W
 Nominal CCT: 4000K
 Nominal Lumen Output: 3300lm

2. Standards Used

- IES LM-79-08: Approved Method: Electrical & Photometric Measurement of Solid-state Lighting Products
- ANSI C82.77-10-2014: Harmonic Emission Limits – Related Power Quality Requirements for Lighting Equipment
- 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	2018-12-13	2019-12-13
spectroradiometer	EVERFINE	HAAS-2000	20140912	2018-12-13	2019-12-13
Digital Power Meter	EVERFINE	PF2010A	1011004	2018-07-28	2019-07-28
Digital CC&CV DC Power Supply	EVERFINE	WY305-V1	1101047	2018-06-15	2019-06-15
Rapid Recording Photometer	EVERFINE	PHOTO-2000F	1007010	2018-12-13	2019-12-13
Standard Light Source	EVERFINE	D204	G100283CJ6351178	2018-12-24	2019-12-24
Special zero-voltage synchronous switching AC	EVERFINE	DPS1010-YF	1011001T	2019-03-19	2020-03-18
AC POWER SUPPLY	EVERFINE	VPS1030 PWM	1012017	2019-03-19	2020-03-18
Digital CC&CV DC Power Supply	EVERFINE	WY12010	1009009	2019-03-26	2020-03-25
Digital power meter	YOKOGAWA	WT-210	91j926132	2019-03-26	2020-03-25
full-field speed goniophotometer	EVERFINE	GO-R5000	YG108492N10120001	2019-03-18	2020-03-17
Wireless Remote Sensor	N/A	433MHz	N/A	2019-03-17	2020-03-16
Standard Light Source	EVERFINE	D908	1012001	2018-12-24	2019-12-24

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.

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 $U=2.1\%$ ($K=2$), at the 95% confidence level. The uncertainty of the correlated color temperature measurements is $U=31\text{K}$ ($K=2$), at the 95% confidence level. The uncertainty of the CRI is $U=2.1(K=2)$, 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_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**

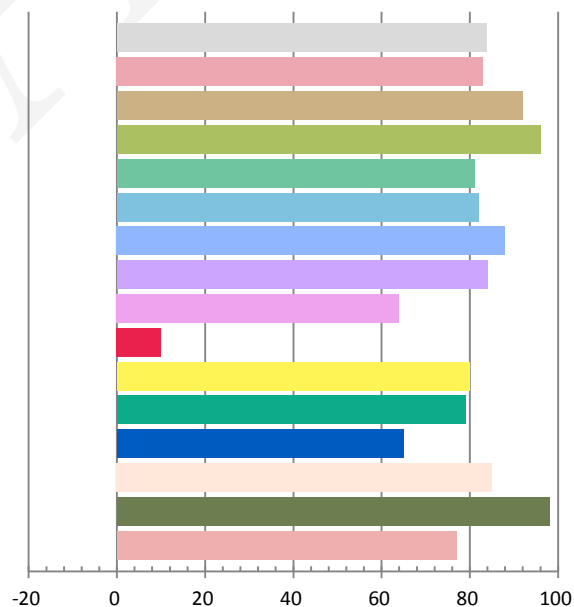
Photometric and Electrical Measurement Result

Voltage (V)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Luminous Flux(lm)	Efficacy (lm/W)
120.0	60	0.1973	23.53	0.9936	3423.1	145.49

Radiant Flux (W)	CCT (K)	Duv	x	y	u'	v'
96.000	3952	-0.00151	0.3815	0.3742	0.2268	0.5006

Color Rendering Index

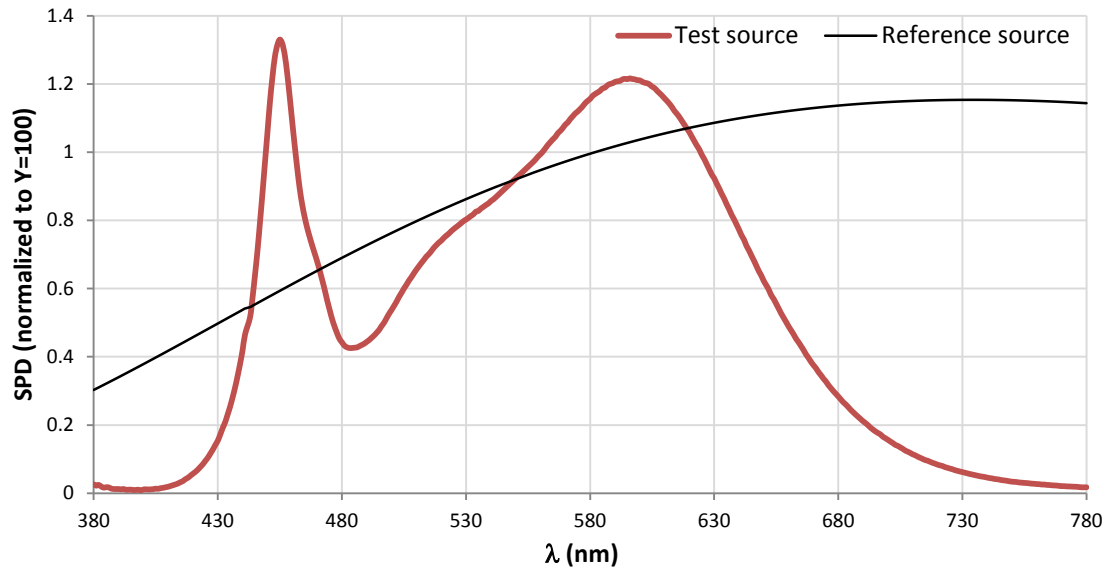
Ra			
83.7			
R1	R2	R3	R4
83	92	96	81
R5	R6	R7	R8
82	88	84	64
R9	R10	R11	R12
10	80	79	65
R13	R14	R15	
85	98	77	



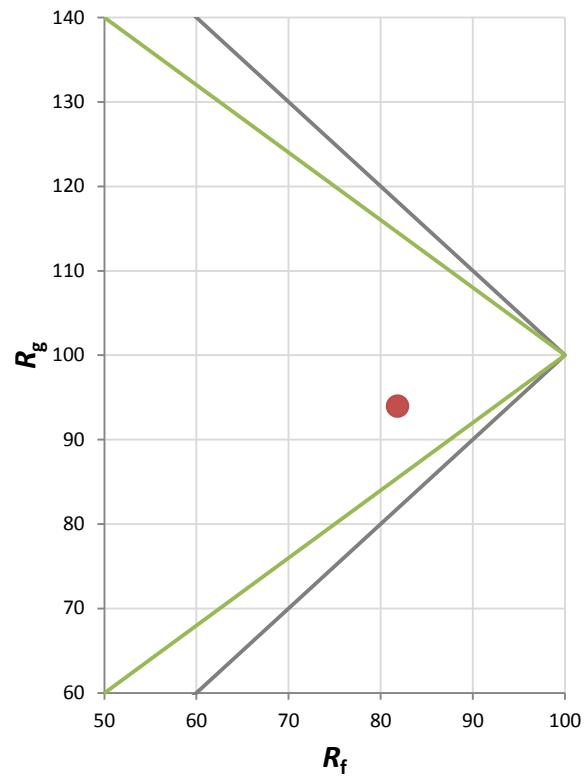
Fidelity Index and Gamut Index

Fidelity Index R_f	82
Gamut Index R_g	94

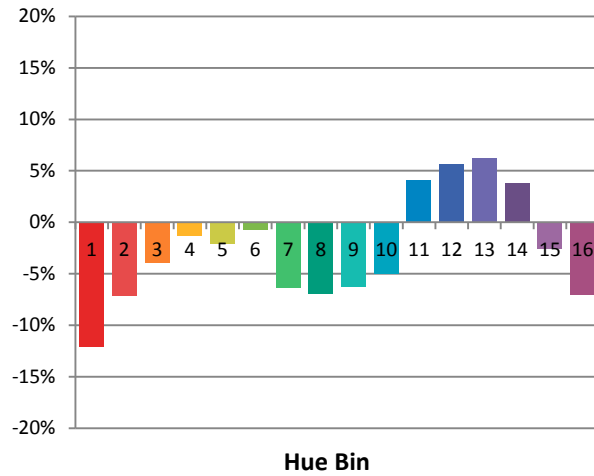
Spectral Power Distribution Comparison



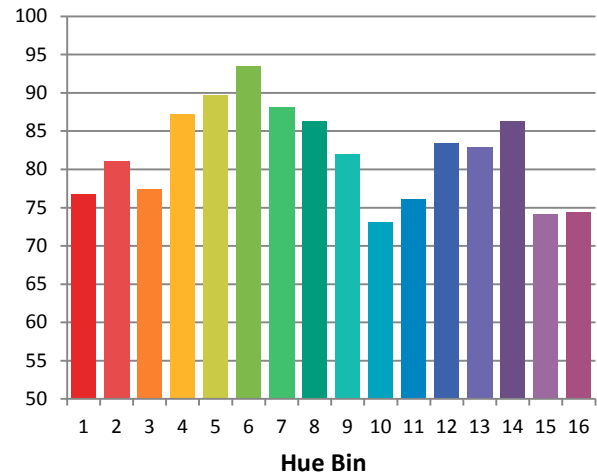
Plot of R_g versus R_f



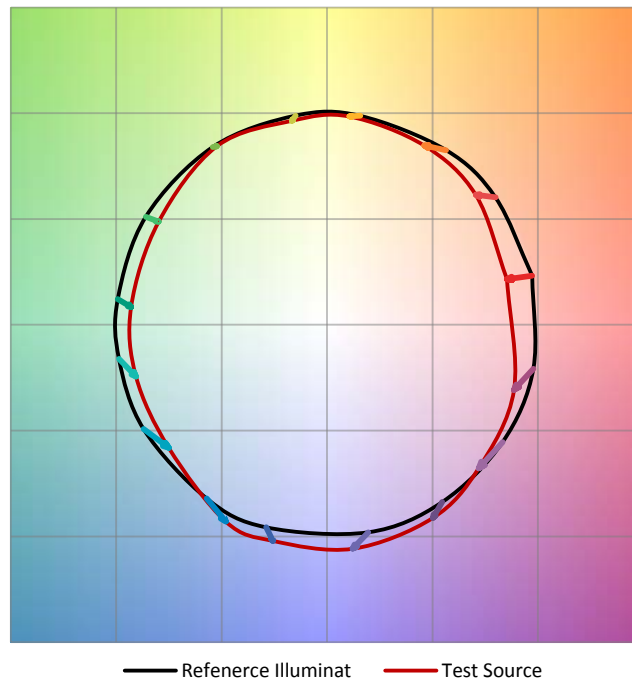
Chroma Shift by Hue



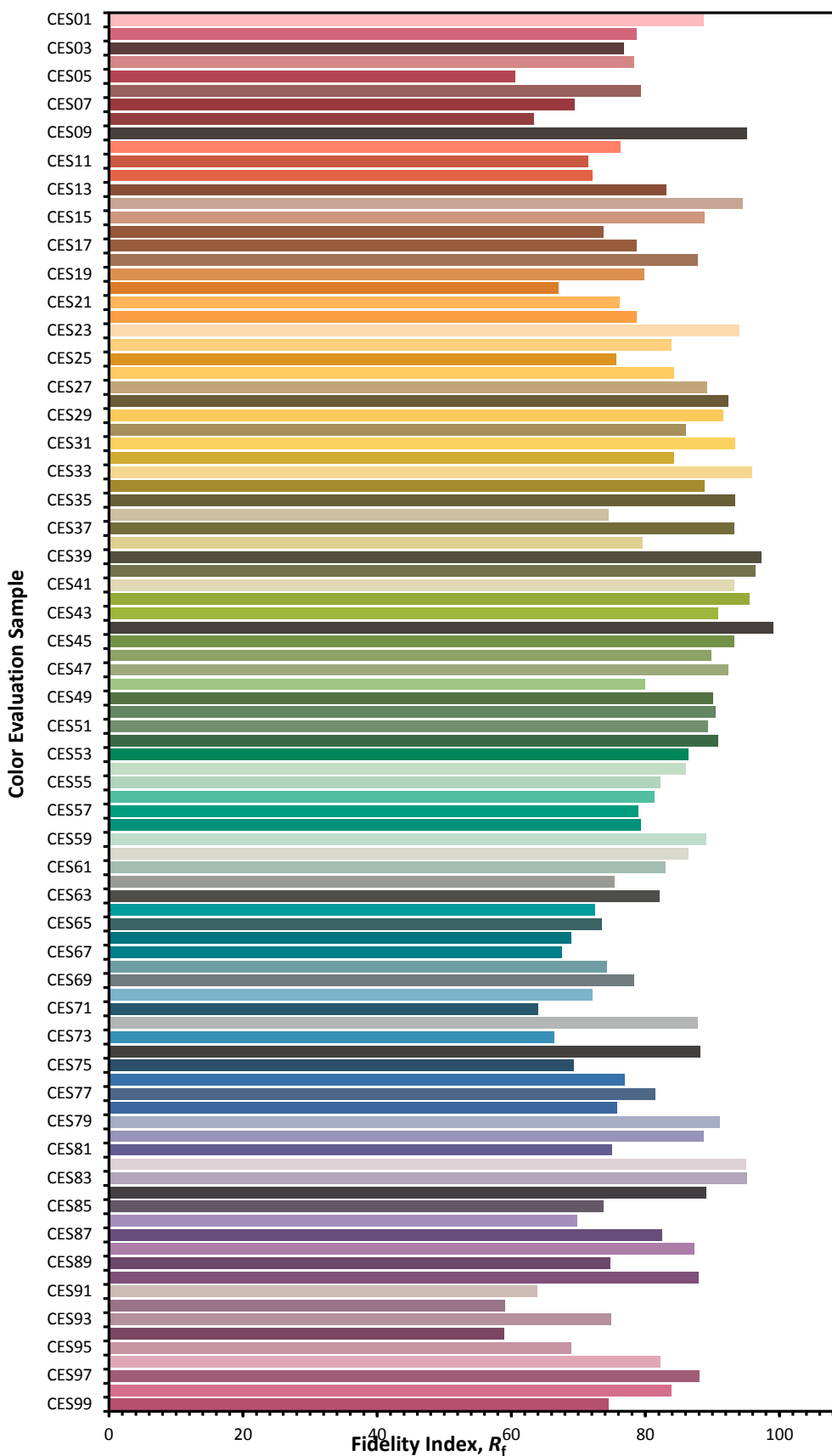
R_f by Hue



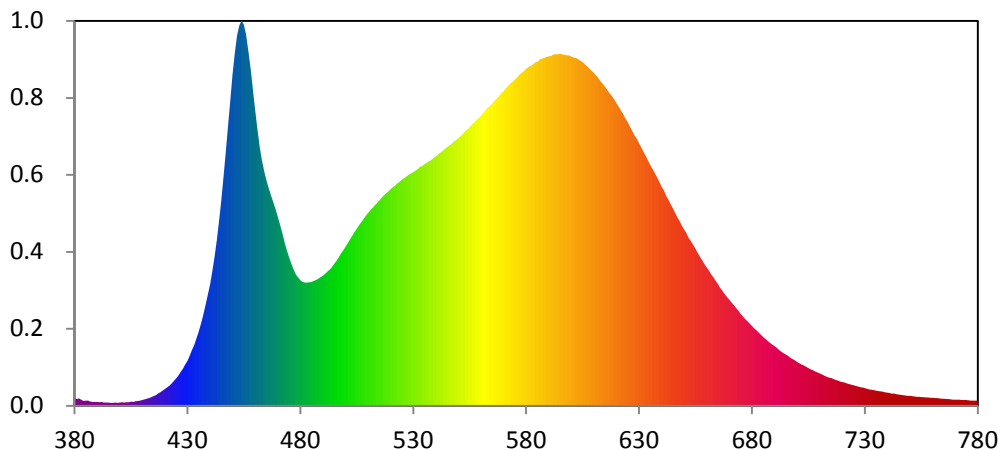
Color Vector Graphic



Color Fidelity by CES Sample



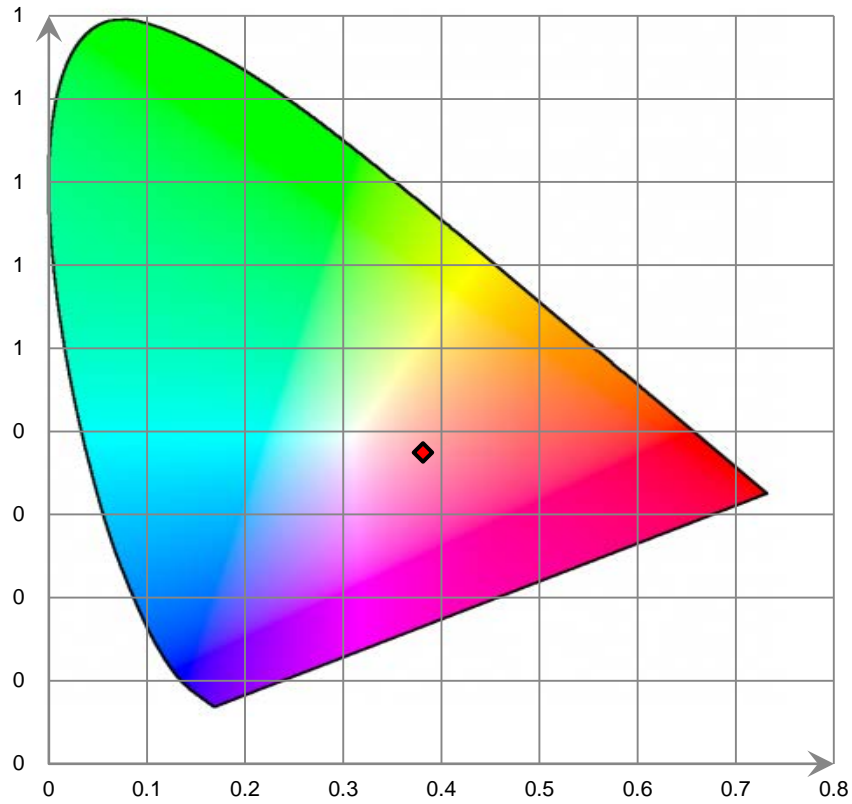
Relative Spectral Power Distribution



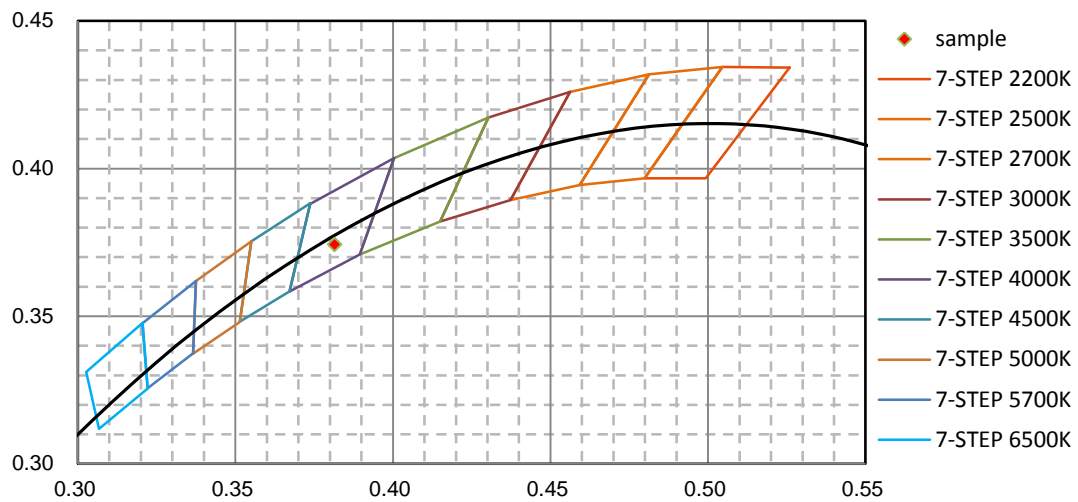
nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
380	1.319E+00	421	3.155E+00	462	4.479E+01	503	2.944E+01	544	4.446E+01
381	1.116E+00	422	3.487E+00	463	4.245E+01	504	3.008E+01	545	4.476E+01
382	1.228E+00	423	3.877E+00	464	4.059E+01	505	3.063E+01	546	4.507E+01
383	9.991E-01	424	4.274E+00	465	3.903E+01	506	3.124E+01	547	4.539E+01
384	8.239E-01	425	4.767E+00	466	3.769E+01	507	3.175E+01	548	4.577E+01
385	8.829E-01	426	5.232E+00	467	3.645E+01	508	3.232E+01	549	4.608E+01
386	8.698E-01	427	5.825E+00	468	3.529E+01	509	3.285E+01	550	4.640E+01
387	6.956E-01	428	6.413E+00	469	3.412E+01	510	3.334E+01	551	4.671E+01
388	6.270E-01	429	7.099E+00	470	3.283E+01	511	3.383E+01	552	4.714E+01
389	6.189E-01	430	7.724E+00	471	3.143E+01	512	3.428E+01	553	4.754E+01
390	6.218E-01	431	8.637E+00	472	3.002E+01	513	3.477E+01	554	4.783E+01
391	5.775E-01	432	9.612E+00	473	2.845E+01	514	3.513E+01	555	4.825E+01
392	6.293E-01	433	1.046E+01	474	2.704E+01	515	3.557E+01	556	4.866E+01
393	5.107E-01	434	1.161E+01	475	2.567E+01	516	3.605E+01	557	4.904E+01
394	5.247E-01	435	1.277E+01	476	2.455E+01	517	3.644E+01	558	4.947E+01
395	5.306E-01	436	1.413E+01	477	2.357E+01	518	3.681E+01	559	4.982E+01
396	4.833E-01	437	1.559E+01	478	2.271E+01	519	3.711E+01	560	5.022E+01
397	4.847E-01	438	1.725E+01	479	2.219E+01	520	3.750E+01	561	5.070E+01
398	5.231E-01	439	1.905E+01	480	2.170E+01	521	3.783E+01	562	5.119E+01
399	4.443E-01	440	2.104E+01	481	2.146E+01	522	3.813E+01	563	5.160E+01
400	5.452E-01	441	2.336E+01	482	2.135E+01	523	3.849E+01	564	5.201E+01
401	5.859E-01	442	2.586E+01	483	2.134E+01	524	3.881E+01	565	5.237E+01
402	5.557E-01	443	2.875E+01	484	2.139E+01	525	3.910E+01	566	5.290E+01
403	5.775E-01	444	3.209E+01	485	2.143E+01	526	3.938E+01	567	5.325E+01
404	6.069E-01	445	3.567E+01	486	2.160E+01	527	3.968E+01	568	5.367E+01
405	6.721E-01	446	3.980E+01	487	2.179E+01	528	3.999E+01	569	5.416E+01
406	6.553E-01	447	4.407E+01	488	2.198E+01	529	4.022E+01	570	5.449E+01
407	7.476E-01	448	4.856E+01	489	2.225E+01	530	4.047E+01	571	5.498E+01
408	8.002E-01	449	5.296E+01	490	2.252E+01	531	4.075E+01	572	5.539E+01
409	8.839E-01	450	5.745E+01	491	2.285E+01	532	4.100E+01	573	5.580E+01
410	9.591E-01	451	6.108E+01	492	2.319E+01	533	4.138E+01	574	5.610E+01
411	1.072E+00	452	6.412E+01	493	2.359E+01	534	4.149E+01	575	5.646E+01
412	1.192E+00	453	6.586E+01	494	2.401E+01	535	4.183E+01	576	5.685E+01
413	1.305E+00	454	6.667E+01	495	2.457E+01	536	4.208E+01	577	5.731E+01
414	1.448E+00	455	6.605E+01	496	2.507E+01	537	4.235E+01	578	5.765E+01
415	1.633E+00	456	6.438E+01	497	2.573E+01	538	4.258E+01	579	5.795E+01
416	1.802E+00	457	6.158E+01	498	2.637E+01	539	4.292E+01	580	5.838E+01
417	2.083E+00	458	5.819E+01	499	2.693E+01	540	4.318E+01	581	5.866E+01
418	2.285E+00	459	5.456E+01	500	2.753E+01	541	4.350E+01	582	5.889E+01
419	2.588E+00	460	5.106E+01	501	2.815E+01	542	4.384E+01	583	5.913E+01
420	2.871E+00	461	4.779E+01	502	2.884E+01	543	4.412E+01	584	5.948E+01

nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
585	5.961E+01	626	4.835E+01	667	1.989E+01	708	5.929E+00	749	1.705E+00
586	5.995E+01	627	4.761E+01	668	1.932E+01	709	5.722E+00	750	1.680E+00
587	6.014E+01	628	4.685E+01	669	1.882E+01	710	5.577E+00	751	1.639E+00
588	6.024E+01	629	4.629E+01	670	1.838E+01	711	5.377E+00	752	1.584E+00
589	6.044E+01	630	4.551E+01	671	1.782E+01	712	5.213E+00	753	1.553E+00
590	6.054E+01	631	4.480E+01	672	1.736E+01	713	5.046E+00	754	1.519E+00
591	6.059E+01	632	4.400E+01	673	1.686E+01	714	4.881E+00	755	1.496E+00
592	6.081E+01	633	4.331E+01	674	1.643E+01	715	4.778E+00	756	1.456E+00
593	6.090E+01	634	4.248E+01	675	1.590E+01	716	4.624E+00	757	1.411E+00
594	6.085E+01	635	4.175E+01	676	1.546E+01	717	4.472E+00	758	1.392E+00
595	6.097E+01	636	4.093E+01	677	1.502E+01	718	4.349E+00	759	1.349E+00
596	6.087E+01	637	4.025E+01	678	1.462E+01	719	4.204E+00	760	1.336E+00
597	6.083E+01	638	3.950E+01	679	1.422E+01	720	4.093E+00	761	1.282E+00
598	6.071E+01	639	3.874E+01	680	1.380E+01	721	4.003E+00	762	1.281E+00
599	6.068E+01	640	3.791E+01	681	1.338E+01	722	3.842E+00	763	1.229E+00
600	6.048E+01	641	3.727E+01	682	1.305E+01	723	3.738E+00	764	1.213E+00
601	6.032E+01	642	3.637E+01	683	1.267E+01	724	3.627E+00	765	1.168E+00
602	6.025E+01	643	3.570E+01	684	1.226E+01	725	3.528E+00	766	1.150E+00
603	6.006E+01	644	3.493E+01	685	1.191E+01	726	3.395E+00	767	1.128E+00
604	5.975E+01	645	3.420E+01	686	1.156E+01	727	3.296E+00	768	1.084E+00
605	5.953E+01	646	3.342E+01	687	1.123E+01	728	3.197E+00	769	1.047E+00
606	5.914E+01	647	3.263E+01	688	1.090E+01	729	3.112E+00	770	1.045E+00
607	5.879E+01	648	3.197E+01	689	1.058E+01	730	3.019E+00	771	1.012E+00
608	5.843E+01	649	3.118E+01	690	1.030E+01	731	2.928E+00	772	9.980E-01
609	5.803E+01	650	3.056E+01	691	9.986E+00	732	2.829E+00	773	9.862E-01
610	5.764E+01	651	2.991E+01	692	9.644E+00	733	2.755E+00	774	9.601E-01
611	5.722E+01	652	2.909E+01	693	9.353E+00	734	2.670E+00	775	9.555E-01
612	5.674E+01	653	2.853E+01	694	9.083E+00	735	2.590E+00	776	9.076E-01
613	5.618E+01	654	2.783E+01	695	8.858E+00	736	2.506E+00	777	8.784E-01
614	5.575E+01	655	2.713E+01	696	8.636E+00	737	2.444E+00	778	8.746E-01
615	5.526E+01	656	2.641E+01	697	8.308E+00	738	2.387E+00	779	8.757E-01
616	5.471E+01	657	2.578E+01	698	8.086E+00	739	2.303E+00	780	8.767E-01
617	5.415E+01	658	2.515E+01	699	7.853E+00	740	2.234E+00		
618	5.359E+01	659	2.451E+01	700	7.597E+00	741	2.181E+00		
619	5.306E+01	660	2.393E+01	701	7.374E+00	742	2.095E+00		
620	5.239E+01	661	2.335E+01	702	7.109E+00	743	2.060E+00		
621	5.175E+01	662	2.270E+01	703	6.957E+00	744	1.995E+00		
622	5.110E+01	663	2.219E+01	704	6.733E+00	745	1.919E+00		
623	5.052E+01	664	2.162E+01	705	6.527E+00	746	1.882E+00		
624	4.974E+01	665	2.105E+01	706	6.272E+00	747	1.824E+00		
625	4.911E+01	666	2.041E+01	707	6.109E+00	748	1.756E+00		

CIE 1931 x y Chromaticity Diagram



7-Step Chromaticity Quadrangles



[Goniophotometer System]

Total operating time for luminous intensity distribution: **1.0 hours**

Test orientation: **Base Up**

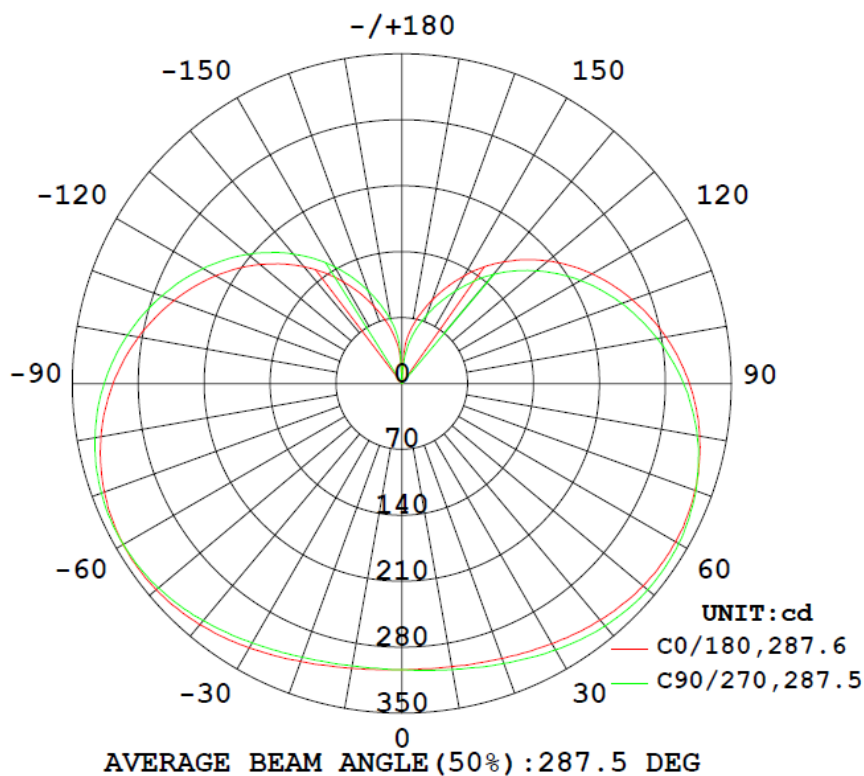
Electrical Measurement

Input Voltage (V)	Frequency (Hz)	Input Current (A)	Power (W)	Power Factor
120.1	60	0.1962	23.4	0.9933

Photometric Measurement

Luminous Flux (lm)	Efficacy (lm/W)	I_{max} (cd)	S/MH (C0/180)	S/MH (C90/270)
3424.93	146.36	343.4	1.64	1.67

Luminous Intensity Distribution



	C0/180	C45/225	C90/270	C135/315	AVG.
Beam Angle (50% I_{max}):	287.6	287.5	287.5	287.5	287.5
Field Angle (10% I_{max}):	351.8	352.4	350.4	349.2	351.0

Luminous Intensity (cd) Distribution Data

$\gamma \backslash C$	0°	22.5°	45°	67.5°	90°	112.5°	135°	157.5°
0.0°	304	304	304	304	304	304	304	304
5.0°	305	305	304	304	303	304	304	304
10.0°	307	306	305	305	304	304	304	305
15.0°	310	309	308	307	306	306	306	307
20.0°	314	313	311	310	309	309	309	310
25.0°	319	317	316	314	313	313	313	314
30.0°	324	322	321	319	318	318	318	318
35.0°	329	327	326	324	323	323	322	323
40.0°	334	332	330	329	329	328	327	328
45.0°	338	336	335	334	334	333	332	332
50.0°	341	339	338	338	338	337	336	335
55.0°	342	341	340	341	340	340	338	336
60.0°	342	341	340	342	342	342	339	337
65.0°	340	339	339	342	342	341	338	335
70.0°	336	336	336	340	340	340	336	333
75.0°	331	331	332	336	336	336	333	329
80.0°	325	325	327	331	331	331	328	323
85.0°	316	317	320	324	325	325	321	316
90.0°	307	308	311	316	316	317	313	307
95.0°	296	298	301	307	307	307	304	298
100.0°	284	287	290	296	296	297	293	287
105.0°	271	275	278	284	285	285	282	276
110.0°	258	261	266	271	272	272	269	263
115.0°	244	248	252	257	258	259	256	250
120.0°	229	233	238	243	244	245	242	236
125.0°	213	218	223	228	229	230	227	222
130.0°	197	202	207	212	213	214	211	206
135.0°	180	185	191	195	197	197	195	190
140.0°	162	167	173	178	180	180	178	173
145.0°	144	150	155	160	162	162	160	155
150.0°	125	131	137	141	143	143	141	137
155.0°	106	112	118	122	124	124	122	118
160.0°	88	93	99	103	105	105	103	99
165.0°	70	76	81	84	86	86	84	82
170.0°	53	59	63	67	68	68	67	64
175.0°	35	38	43	47	49	48	47	44
180.0°	0	0	0	0	0	0	0	0

Luminous Intensity (cd) Distribution Data (cont.)

$\gamma \backslash C$	180°	202.5°	225°	247.5°	270°	292.5°	315°	337.5°
0.0°	304	304	304	304	304	304	304	304
5.0°	304	305	305	306	306	306	305	305
10.0°	305	306	307	308	308	309	308	308
15.0°	307	309	310	311	312	312	312	311
20.0°	311	312	314	315	316	317	316	316
25.0°	314	317	318	320	321	322	321	320
30.0°	319	321	323	325	326	327	327	326
35.0°	323	326	328	330	332	332	332	331
40.0°	328	330	332	334	336	337	337	336
45.0°	331	334	336	338	339	340	340	340
50.0°	334	336	338	340	341	342	342	342
55.0°	336	337	338	340	341	343	343	343
60.0°	336	336	337	339	340	342	342	342
65.0°	334	334	335	337	337	339	340	339
70.0°	331	331	331	333	332	334	336	336
75.0°	327	326	325	327	326	328	330	330
80.0°	321	319	318	320	318	321	323	323
85.0°	314	311	310	311	309	312	314	314
90.0°	306	302	300	301	299	301	303	304
95.0°	296	292	289	290	288	290	292	292
100.0°	285	281	278	278	276	277	279	280
105.0°	273	269	265	265	262	264	266	267
110.0°	260	256	252	251	249	250	252	254
115.0°	247	242	238	237	234	235	237	239
120.0°	233	228	224	222	219	220	222	224
125.0°	218	213	208	206	203	204	206	208
130.0°	203	197	192	189	186	187	189	192
135.0°	186	180	175	172	169	169	171	174
140.0°	169	163	157	154	151	151	153	156
145.0°	151	146	139	136	132	132	134	137
150.0°	132	127	121	116	113	113	114	117
155.0°	113	109	103	98	95	94	95	98
160.0°	94	92	86	81	77	75	77	79
165.0°	77	76	70	65	61	59	60	62
170.0°	60	60	53	48	44	42	41	45
175.0°	40	41	35	27	22	18	17	21
180.0°	1	1	1	1	1	1	1	1

Zonal Lumen Density Measurement

Deg	Flux (lm)	%
0-5	7.3	0.21
5-10	21.9	0.85
10-15	36.5	1.92
15-20	51.2	3.41
20-25	66.1	5.34
25-30	80.9	7.70
30-35	95.6	10.49
35-40	109.9	13.70
40-45	123.6	17.31
45-50	136.3	21.29
50-55	147.6	25.60
55-60	157.2	30.19
60-65	164.9	35.01
65-70	170.6	39.99
70-75	174.0	45.07
75-80	175.1	50.18
80-85	174.0	55.26
85-90	170.7	60.24
90-95	165.4	65.07
95-100	158.2	69.69
100-105	149.4	74.05
105-110	139.2	78.12
110-115	128.1	81.86
115-120	116.1	85.25
120-125	103.5	88.27
125-130	90.5	90.91
130-135	77.4	93.17
135-140	64.6	95.05
140-145	52.3	96.58
145-150	40.6	97.77
150-155	30.1	98.65
155-160	21.1	99.26
160-165	13.6	99.66
165-170	7.8	99.89
170-175	3.4	99.99
175-180	0.5	100.00

Deg	Flux (lm)	%
0-5	7.3	0.21
0-10	29.1	0.85
0-15	65.6	1.92
0-20	116.9	3.41
0-25	182.9	5.34
0-30	263.8	7.70
0-35	359.4	10.49
0-40	469.3	13.70
0-45	592.9	17.31
0-50	729.2	21.29
0-55	876.8	25.60
0-60	1034.0	30.19
0-65	1199.0	35.01
0-70	1369.5	39.99
0-75	1543.5	45.07
0-80	1718.6	50.18
0-85	1892.6	55.26
0-90	2063.3	60.24
0-95	2228.7	65.07
0-100	2386.8	69.69
0-105	2536.2	74.05
0-110	2675.5	78.12
0-115	2803.5	81.86
0-120	2919.6	85.25
0-125	3023.1	88.27
0-130	3113.5	90.91
0-135	3190.9	93.17
0-140	3255.5	95.05
0-145	3307.8	96.58
0-150	3348.4	97.77
0-155	3378.6	98.65
0-160	3399.6	99.26
0-165	3413.2	99.66
0-170	3421.0	99.89
0-175	3424.5	99.99
0-180	3424.9	100.00

6. Product Photo



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