

IES LM-79-08


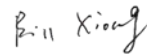
MEASUREMENT AND TEST REPORT

For

GREEN CREATIVE LTD

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

Test Model: 25HID/850/277V/E26/R

Report Type:	Electrical and Photometric tests including: Luminous Flux, Chromaticity, Luminous Intensity Distribution
Test Engineer:	Hill Liu 
Report Number:	R1KS181219082-10-1
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/850/277V/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: 5000K
 Nominal Lumen Output: 3400lm

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**

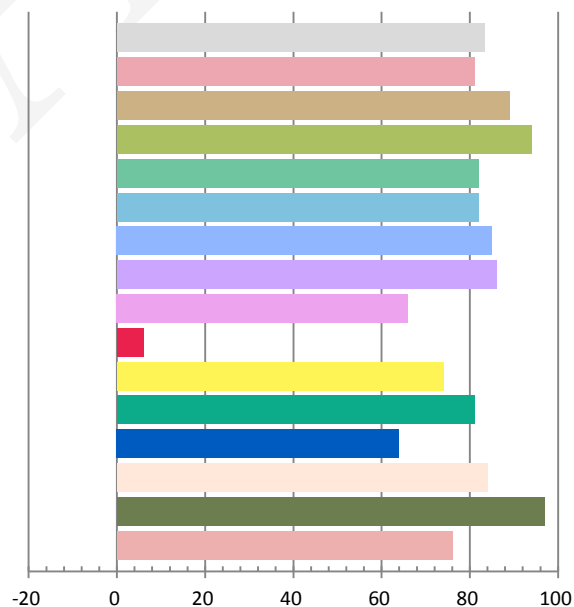
Photometric and Electrical Measurement Result

Voltage (V)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Luminous Flux(lm)	Efficacy (lm/W)
120	60	0.2008	23.95	0.9939	3518.2	146.90

Radiant Flux (W)	CCT (K)	Duv	x	y	u'	v'
94.000	5084	0.00177	0.3430	0.3535	0.2093	0.4853

Color Rendering Index

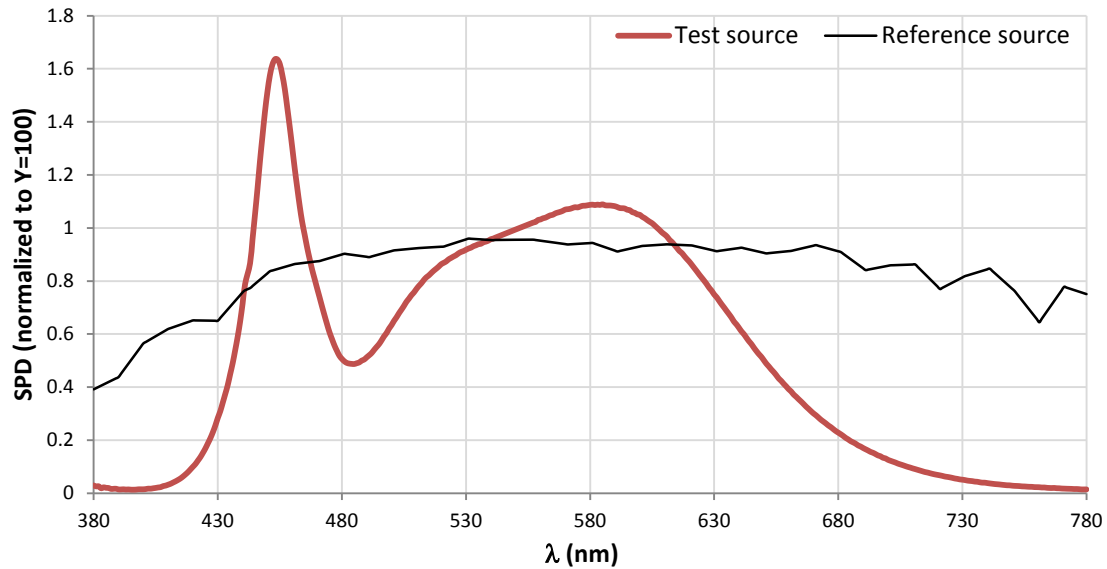
Ra			
83.3			
R1	R2	R3	R4
81	89	94	82
R5	R6	R7	R8
82	85	86	66
R9	R10	R11	R12
6	74	81	64
R13	R14	R15	
84	97	76	



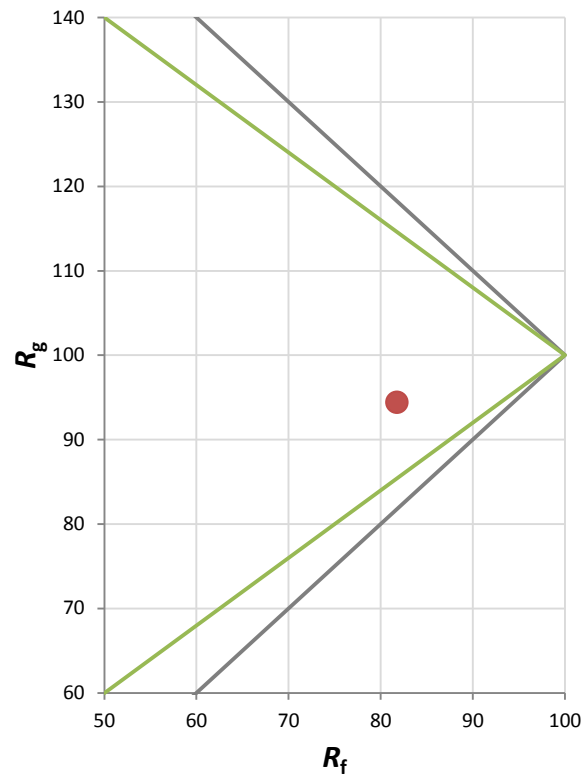
Fidelity Index and Gamut Index

Fidelity Index R_f	82
Gamut Index R_g	94

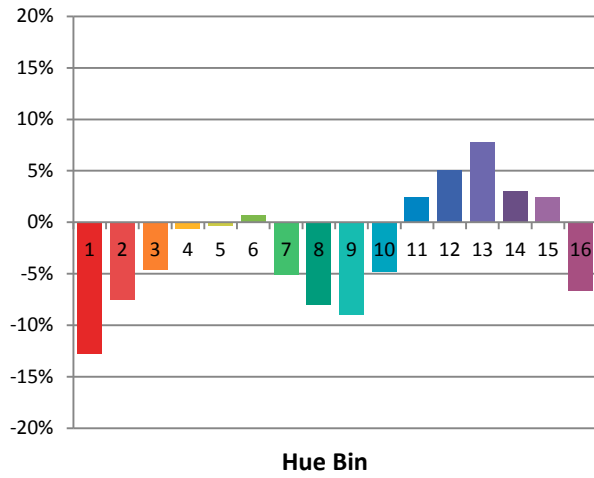
Spectral Power Distribution Comparison



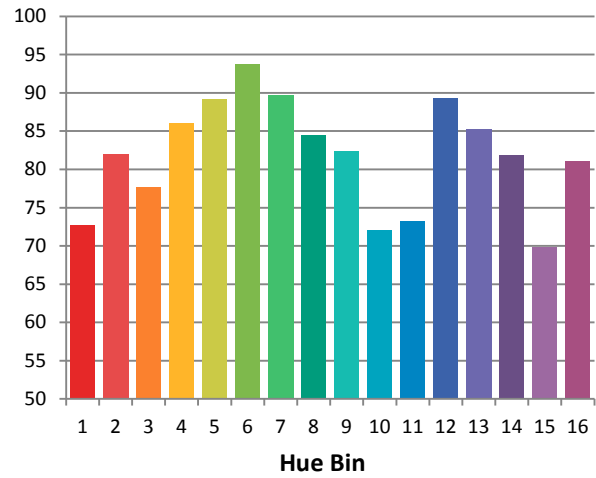
Plot of R_g versus R_f



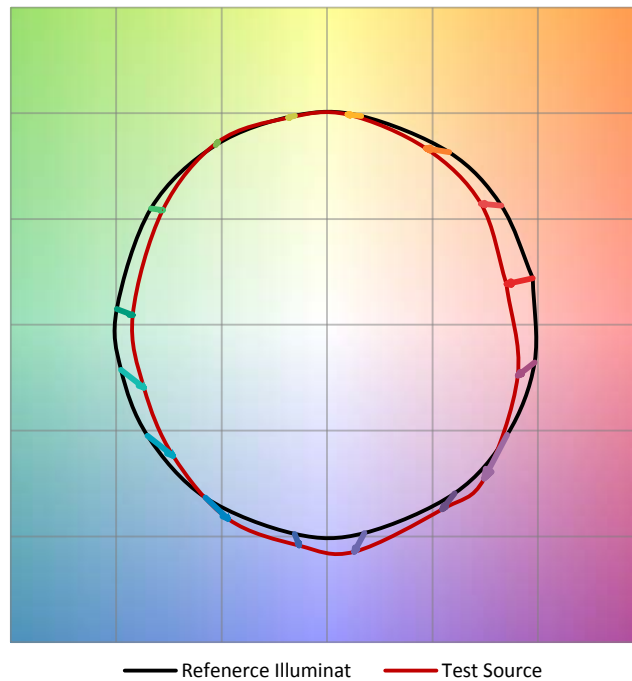
Chroma Shift by Hue



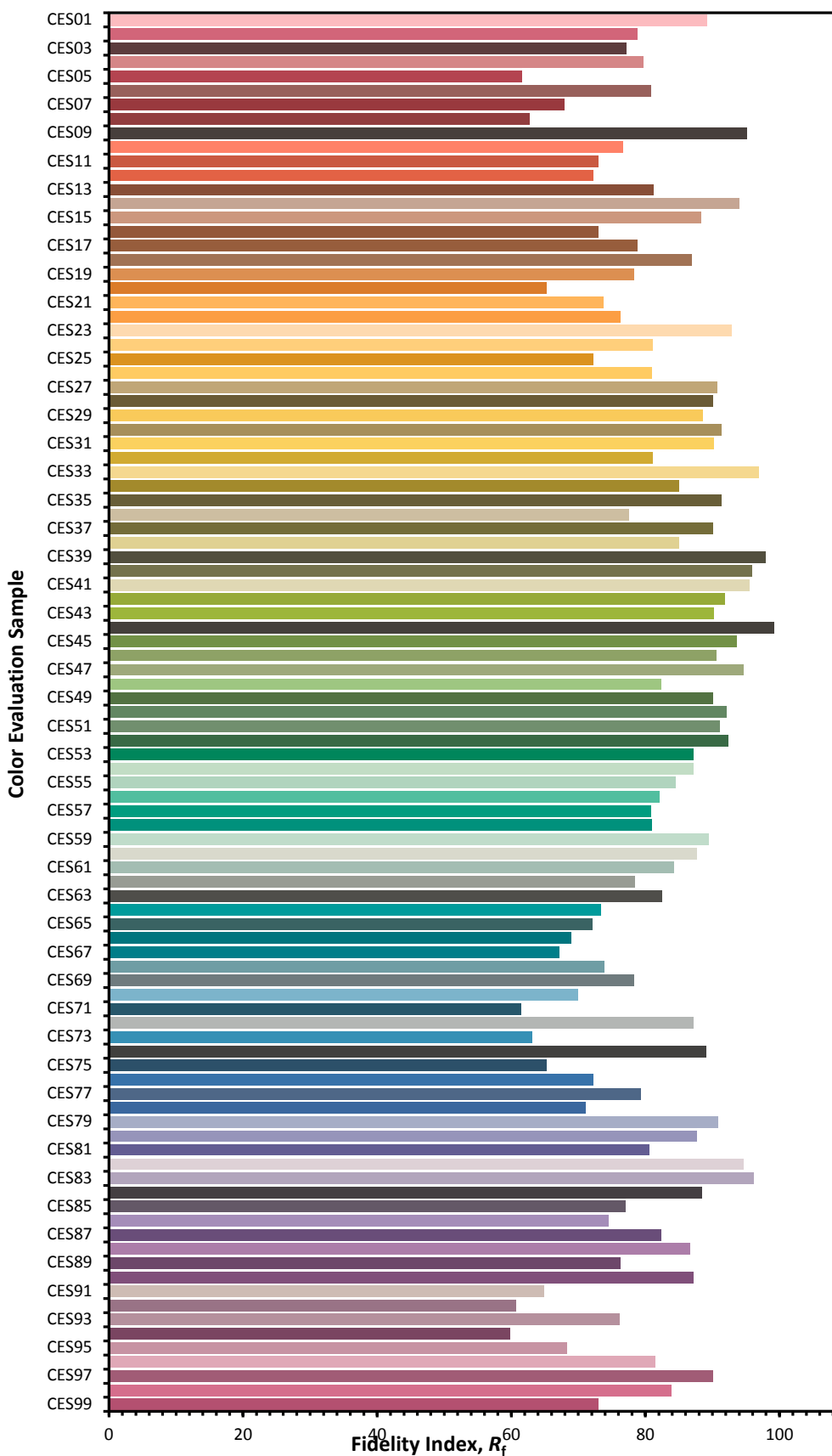
R_f by Hue



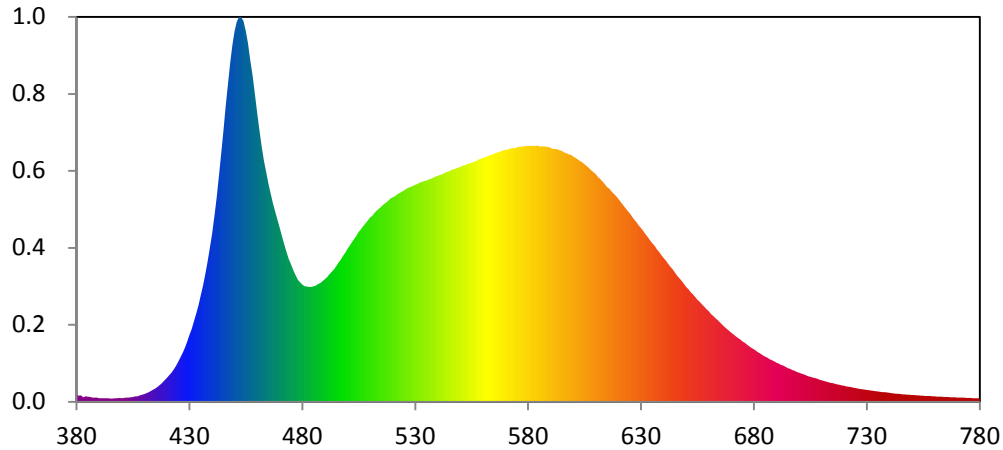
Color Vector Graphic



Color Fidelity by CES Sample



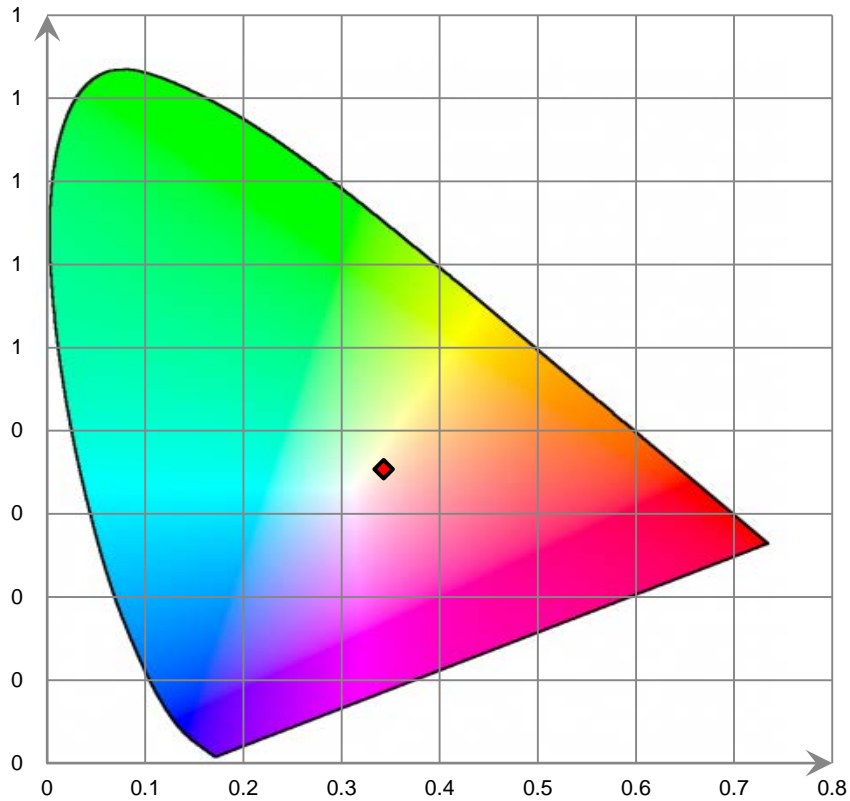
Relative Spectral Power Distribution



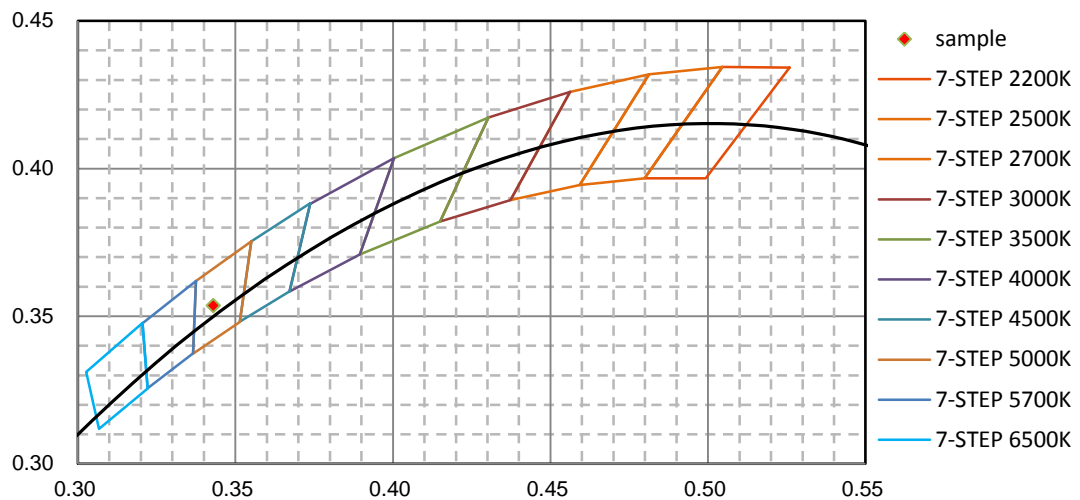
nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
380	1.519E+00	421	5.679E+00	462	5.580E+01	503	3.565E+01	544	5.032E+01
381	1.330E+00	422	6.355E+00	463	5.268E+01	504	3.638E+01	545	5.045E+01
382	1.356E+00	423	7.030E+00	464	5.021E+01	505	3.717E+01	546	5.074E+01
383	9.679E-01	424	7.842E+00	465	4.772E+01	506	3.778E+01	547	5.095E+01
384	1.157E+00	425	8.696E+00	466	4.551E+01	507	3.845E+01	548	5.110E+01
385	1.053E+00	426	9.682E+00	467	4.344E+01	508	3.898E+01	549	5.128E+01
386	1.026E+00	427	1.068E+01	468	4.164E+01	509	3.965E+01	550	5.143E+01
387	8.407E-01	428	1.183E+01	469	3.983E+01	510	4.025E+01	551	5.173E+01
388	8.665E-01	429	1.313E+01	470	3.807E+01	511	4.077E+01	552	5.178E+01
389	8.779E-01	430	1.462E+01	471	3.627E+01	512	4.140E+01	553	5.204E+01
390	7.457E-01	431	1.592E+01	472	3.454E+01	513	4.192E+01	554	5.222E+01
391	7.411E-01	432	1.758E+01	473	3.286E+01	514	4.229E+01	555	5.235E+01
392	7.707E-01	433	1.926E+01	474	3.127E+01	515	4.276E+01	556	5.255E+01
393	7.247E-01	434	2.099E+01	475	2.996E+01	516	4.321E+01	557	5.266E+01
394	7.464E-01	435	2.314E+01	476	2.870E+01	517	4.360E+01	558	5.306E+01
395	6.990E-01	436	2.525E+01	477	2.765E+01	518	4.401E+01	559	5.316E+01
396	6.955E-01	437	2.774E+01	478	2.670E+01	519	4.447E+01	560	5.339E+01
397	7.111E-01	438	3.036E+01	479	2.610E+01	520	4.474E+01	561	5.351E+01
398	7.680E-01	439	3.333E+01	480	2.562E+01	521	4.501E+01	562	5.375E+01
399	7.718E-01	440	3.683E+01	481	2.531E+01	522	4.542E+01	563	5.397E+01
400	7.711E-01	441	4.061E+01	482	2.518E+01	523	4.570E+01	564	5.408E+01
401	8.156E-01	442	4.463E+01	483	2.512E+01	524	4.598E+01	565	5.435E+01
402	8.980E-01	443	4.934E+01	484	2.510E+01	525	4.623E+01	566	5.451E+01
403	8.886E-01	444	5.415E+01	485	2.525E+01	526	4.659E+01	567	5.465E+01
404	9.695E-01	445	5.916E+01	486	2.541E+01	527	4.685E+01	568	5.484E+01
405	1.036E+00	446	6.451E+01	487	2.576E+01	528	4.703E+01	569	5.509E+01
406	1.125E+00	447	6.933E+01	488	2.597E+01	529	4.728E+01	570	5.516E+01
407	1.190E+00	448	7.402E+01	489	2.640E+01	530	4.752E+01	571	5.524E+01
408	1.390E+00	449	7.796E+01	490	2.680E+01	531	4.769E+01	572	5.541E+01
409	1.491E+00	450	8.116E+01	491	2.724E+01	532	4.797E+01	573	5.555E+01
410	1.665E+00	451	8.323E+01	492	2.785E+01	533	4.814E+01	574	5.550E+01
411	1.842E+00	452	8.425E+01	493	2.842E+01	534	4.836E+01	575	5.567E+01
412	2.085E+00	453	8.424E+01	494	2.898E+01	535	4.844E+01	576	5.582E+01
413	2.321E+00	454	8.333E+01	495	2.970E+01	536	4.872E+01	577	5.584E+01
414	2.592E+00	455	8.121E+01	496	3.048E+01	537	4.886E+01	578	5.592E+01
415	2.888E+00	456	7.848E+01	497	3.112E+01	538	4.905E+01	579	5.600E+01
416	3.256E+00	457	7.486E+01	498	3.197E+01	539	4.933E+01	580	5.604E+01
417	3.668E+00	458	7.110E+01	499	3.265E+01	540	4.946E+01	581	5.596E+01
418	4.112E+00	459	6.713E+01	500	3.347E+01	541	4.967E+01	582	5.605E+01
419	4.632E+00	460	6.306E+01	501	3.416E+01	542	4.979E+01	583	5.598E+01
420	5.158E+00	461	5.936E+01	502	3.495E+01	543	5.013E+01	584	5.611E+01

nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
585	5.593E+01	626	4.060E+01	667	1.640E+01	708	4.985E+00	749	1.477E+00
586	5.588E+01	627	3.989E+01	668	1.594E+01	709	4.825E+00	750	1.438E+00
587	5.588E+01	628	3.931E+01	669	1.551E+01	710	4.690E+00	751	1.418E+00
588	5.582E+01	629	3.860E+01	670	1.514E+01	711	4.544E+00	752	1.391E+00
589	5.574E+01	630	3.806E+01	671	1.471E+01	712	4.403E+00	753	1.339E+00
590	5.557E+01	631	3.737E+01	672	1.428E+01	713	4.254E+00	754	1.322E+00
591	5.538E+01	632	3.669E+01	673	1.392E+01	714	4.115E+00	755	1.286E+00
592	5.535E+01	633	3.606E+01	674	1.356E+01	715	4.019E+00	756	1.256E+00
593	5.529E+01	634	3.540E+01	675	1.316E+01	716	3.886E+00	757	1.247E+00
594	5.504E+01	635	3.476E+01	676	1.284E+01	717	3.763E+00	758	1.197E+00
595	5.497E+01	636	3.409E+01	677	1.245E+01	718	3.655E+00	759	1.185E+00
596	5.459E+01	637	3.332E+01	678	1.208E+01	719	3.565E+00	760	1.170E+00
597	5.446E+01	638	3.277E+01	679	1.177E+01	720	3.473E+00	761	1.119E+00
598	5.416E+01	639	3.211E+01	680	1.146E+01	721	3.367E+00	762	1.122E+00
599	5.408E+01	640	3.143E+01	681	1.112E+01	722	3.244E+00	763	1.063E+00
600	5.369E+01	641	3.088E+01	682	1.075E+01	723	3.174E+00	764	1.031E+00
601	5.342E+01	642	3.019E+01	683	1.046E+01	724	3.086E+00	765	1.015E+00
602	5.306E+01	643	2.953E+01	684	1.012E+01	725	2.983E+00	766	1.034E+00
603	5.273E+01	644	2.896E+01	685	9.880E+00	726	2.866E+00	767	9.804E-01
604	5.243E+01	645	2.826E+01	686	9.620E+00	727	2.793E+00	768	9.677E-01
605	5.200E+01	646	2.762E+01	687	9.288E+00	728	2.688E+00	769	9.192E-01
606	5.155E+01	647	2.702E+01	688	9.074E+00	729	2.635E+00	770	9.019E-01
607	5.111E+01	648	2.649E+01	689	8.790E+00	730	2.564E+00	771	8.805E-01
608	5.063E+01	649	2.583E+01	690	8.541E+00	731	2.463E+00	772	8.658E-01
609	5.026E+01	650	2.517E+01	691	8.302E+00	732	2.403E+00	773	8.510E-01
610	4.983E+01	651	2.463E+01	692	8.036E+00	733	2.354E+00	774	8.205E-01
611	4.921E+01	652	2.404E+01	693	7.859E+00	734	2.266E+00	775	8.237E-01
612	4.878E+01	653	2.352E+01	694	7.610E+00	735	2.232E+00	776	7.937E-01
613	4.821E+01	654	2.293E+01	695	7.346E+00	736	2.134E+00	777	7.448E-01
614	4.764E+01	655	2.229E+01	696	7.188E+00	737	2.062E+00	778	7.475E-01
615	4.704E+01	656	2.182E+01	697	6.895E+00	738	2.056E+00	779	7.485E-01
616	4.664E+01	657	2.126E+01	698	6.775E+00	739	1.981E+00	780	7.494E-01
617	4.604E+01	658	2.076E+01	699	6.499E+00	740	1.912E+00		
618	4.548E+01	659	2.021E+01	700	6.313E+00	741	1.852E+00		
619	4.496E+01	660	1.977E+01	701	6.139E+00	742	1.790E+00		
620	4.435E+01	661	1.918E+01	702	5.972E+00	743	1.751E+00		
621	4.372E+01	662	1.875E+01	703	5.766E+00	744	1.708E+00		
622	4.310E+01	663	1.827E+01	704	5.606E+00	745	1.648E+00		
623	4.245E+01	664	1.782E+01	705	5.452E+00	746	1.598E+00		
624	4.185E+01	665	1.734E+01	706	5.282E+00	747	1.550E+00		
625	4.124E+01	666	1.684E+01	707	5.121E+00	748	1.538E+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**

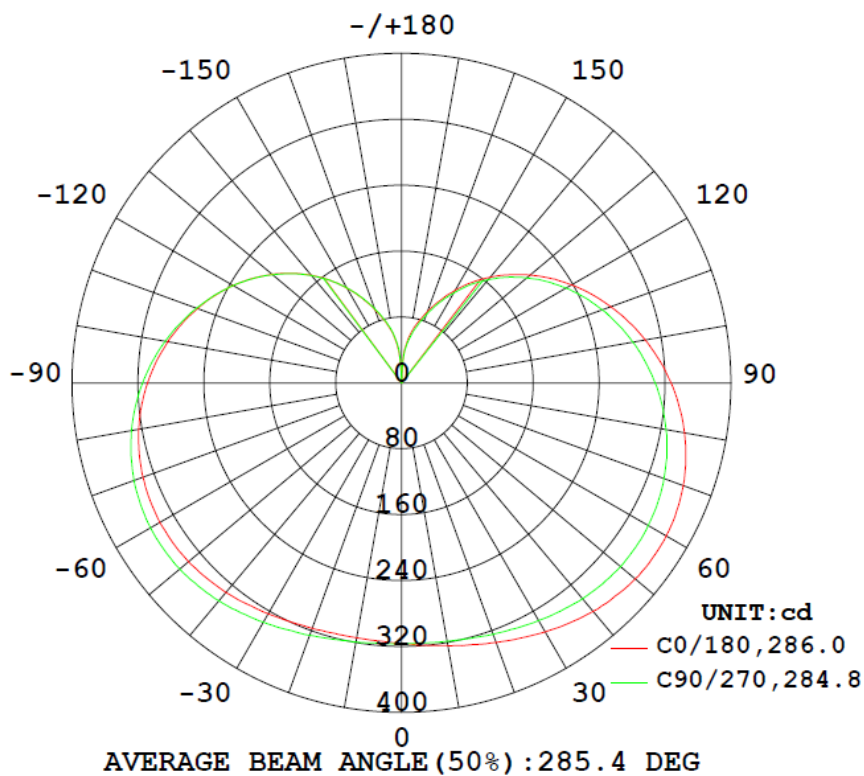
Electrical Measurement

Input Voltage (V)	Frequency (Hz)	Input Current (A)	Power (W)	Power Factor
120.0	60	0.2003	23.96	0.9968

Photometric Measurement

Luminous Flux (lm)	Efficacy (lm/W)	I _{max} (cd)	S/MH (C0/180)	S/MH (C90/270)
3524.39	147.09	371.8	1.72	1.64

Luminous Intensity Distribution



	C0/180	C45/225	C90/270	C135/315	AVG.
Beam Angle (50% I _{max}):	286.0	284.9	284.8	286.0	285.4
Field Angle (10% I _{max}):	351.9	351.9	352.0	351.2	351.8

Luminous Intensity (cd) Distribution Data

$\gamma \backslash C$	0°	22.5°	45°	67.5°	90°	112.5°	135°	157.5°
0.0°	317	317	317	317	317	317	317	317
5.0°	315	315	315	316	317	318	319	320
10.0°	314	315	316	317	319	321	323	324
15.0°	315	316	317	319	322	325	327	329
20.0°	317	318	319	322	326	330	333	335
25.0°	320	321	323	326	330	335	339	342
30.0°	324	324	326	330	335	341	346	349
35.0°	328	328	330	335	341	347	352	356
40.0°	332	332	335	339	345	352	358	362
45.0°	335	336	338	342	349	357	363	367
50.0°	338	338	340	345	352	360	367	370
55.0°	339	339	341	346	353	361	369	372
60.0°	339	339	340	345	352	360	368	371
65.0°	337	338	338	343	350	358	366	369
70.0°	334	335	335	340	346	354	362	364
75.0°	330	330	330	335	340	348	355	357
80.0°	324	325	324	328	333	340	348	348
85.0°	317	317	316	320	324	330	338	339
90.0°	309	309	307	311	314	320	327	327
95.0°	299	299	298	301	304	308	314	314
100.0°	288	289	287	290	292	295	301	300
105.0°	276	277	275	278	279	282	287	286
110.0°	264	265	263	265	265	268	271	271
115.0°	251	251	250	251	251	253	256	255
120.0°	236	237	236	237	236	238	240	239
125.0°	221	222	221	221	221	222	223	222
130.0°	205	206	205	205	205	205	206	204
135.0°	188	189	188	189	188	188	188	187
140.0°	171	172	171	171	170	170	170	168
145.0°	152	153	153	153	152	152	152	150
150.0°	133	134	134	134	133	133	133	131
155.0°	114	115	115	115	114	114	114	112
160.0°	95	96	97	97	96	96	95	94
165.0°	77	78	79	79	79	78	78	77
170.0°	60	61	62	62	62	62	61	60
175.0°	39	40	38	42	42	39	40	38
180.0°	0	0	0	0	0	0	0	1

Luminous Intensity (cd) Distribution Data (cont.)

$\begin{matrix} C \\ \backslash \\ \gamma \end{matrix}$	180°	202.5°	225°	247.5°	270°	292.5°	315°	337.5°
0.0°	317	317	317	317	317	317	317	317
5.0°	320	319	319	318	317	316	315	315
10.0°	324	323	322	321	319	317	315	314
15.0°	329	328	327	324	321	318	316	315
20.0°	335	334	332	328	325	321	318	317
25.0°	342	341	337	333	329	325	321	320
30.0°	349	347	343	338	333	329	325	324
35.0°	356	354	349	344	338	333	330	328
40.0°	362	359	355	348	342	337	333	332
45.0°	367	364	359	352	345	340	337	335
50.0°	370	367	361	354	347	341	339	337
55.0°	372	369	362	355	347	342	340	338
60.0°	371	368	361	354	346	341	340	339
65.0°	369	365	358	351	343	339	338	337
70.0°	364	360	353	346	339	335	335	334
75.0°	357	354	346	340	333	330	330	329
80.0°	349	346	338	332	326	323	324	323
85.0°	339	336	328	323	318	315	317	316
90.0°	327	324	317	312	308	306	308	308
95.0°	314	312	304	301	297	296	299	298
100.0°	301	298	291	288	285	285	288	288
105.0°	286	283	277	275	273	273	276	276
110.0°	271	268	262	261	259	260	263	264
115.0°	255	252	247	246	246	246	250	250
120.0°	238	236	232	231	231	232	235	236
125.0°	221	219	215	215	215	216	220	221
130.0°	204	202	198	198	198	200	204	205
135.0°	186	184	180	181	182	183	187	188
140.0°	168	166	163	163	164	166	169	170
145.0°	149	147	144	144	146	147	150	152
150.0°	130	128	125	124	126	127	130	132
155.0°	110	109	107	106	107	108	110	112
160.0°	92	92	89	88	88	90	91	93
165.0°	76	75	73	71	71	73	74	75
170.0°	59	59	57	55	54	56	57	58
175.0°	37	38	36	33	35	34	33	34
180.0°	1	1	1	1	1	1	1	1

Zonal Lumen Density Measurement

Deg	Flux (lm)	%	Deg	Flux (lm)	%
0-5	7.6	0.21	0-5	7.6	0.21
5-10	22.8	0.86	0-10	30.3	0.86
10-15	38.0	1.94	0-15	68.3	1.94
15-20	53.4	3.45	0-20	121.7	3.45
20-25	68.8	5.41	0-25	190.5	5.41
25-30	84.2	7.80	0-30	274.7	7.80
30-35	99.5	10.62	0-35	374.2	10.62
35-40	114.4	13.87	0-40	488.7	13.87
40-45	128.6	17.51	0-45	617.2	17.51
45-50	141.6	21.53	0-50	758.9	21.53
50-55	153.2	25.88	0-55	912.0	25.88
55-60	163.0	30.50	0-60	1075.0	30.50
60-65	170.7	35.35	0-65	1245.7	35.35
65-70	176.2	40.35	0-70	1421.9	40.35
70-75	179.4	45.44	0-75	1601.3	45.44
75-80	180.2	50.55	0-80	1781.5	50.55
80-85	178.7	55.62	0-85	1960.3	55.62
85-90	175.1	60.59	0-90	2135.4	60.59
90-95	169.3	65.39	0-95	2304.7	65.39
95-100	161.8	69.98	0-100	2466.5	69.98
100-105	152.6	74.31	0-105	2619.1	74.31
105-110	142.1	78.35	0-110	2761.2	78.35
110-115	130.6	82.05	0-115	2891.8	82.05
115-120	118.2	85.41	0-120	3010.0	85.41
120-125	105.3	88.39	0-125	3115.3	88.39
125-130	92.0	91.00	0-130	3207.3	91.00
130-135	78.7	93.24	0-135	3286.0	93.24
135-140	65.6	95.10	0-140	3351.6	95.10
140-145	53.1	96.60	0-145	3404.7	96.60
145-150	41.4	97.78	0-150	3446.1	97.78
150-155	30.7	98.65	0-155	3476.8	98.65
155-160	21.5	99.26	0-160	3498.2	99.26
160-165	14.0	99.65	0-165	3512.2	99.65
165-170	8.1	99.88	0-170	3520.3	99.88
170-175	3.6	99.98	0-175	3523.9	99.98
175-180	0.5	100.00	0-180	3524.4	100.00

6. Product Photo



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