

IES LM-79-08


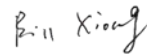
MEASUREMENT AND TEST REPORT

For

GREEN CREATIVE LTD

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

Test Model: 25HID/830/277V/E26/R

Report Type:	Electrical and Photometric tests including: Luminous Flux, Chromaticity, Luminous Intensity Distribution
Test Engineer:	Hill Liu 
Report Number:	R1KS181130082-10-2
Test Date:	2018-12-02 to 2018-12-14
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 2018-11-30 and used for testing.

Model Tested: 25HID/830/277V/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: 3000K
 Nominal Lumen Output: 3200lm

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**

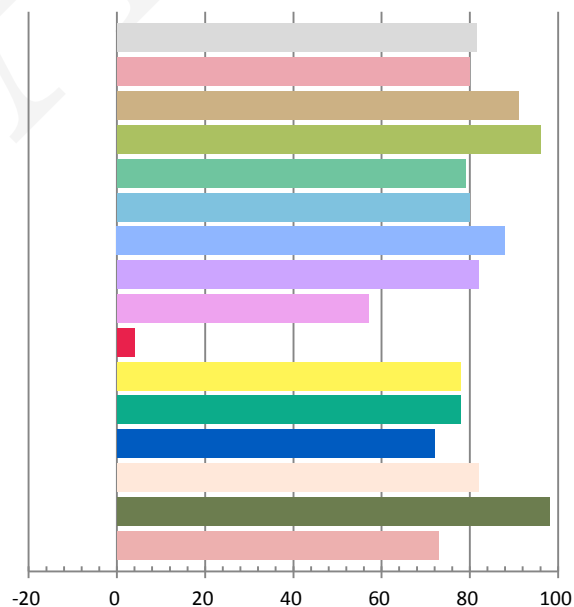
Photometric and Electrical Measurement Result

Voltage (V)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Luminous Flux(lm)	Efficacy (lm/W)
120.0	60	0.2026	24.16	0.9936	3297.4	136.48

Radiant Flux (W)	CCT (K)	Duv	x	y	u'	v'
9.926	3002	-0.00197	0.4340	0.3982	0.2512	0.5186

Color Rendering Index

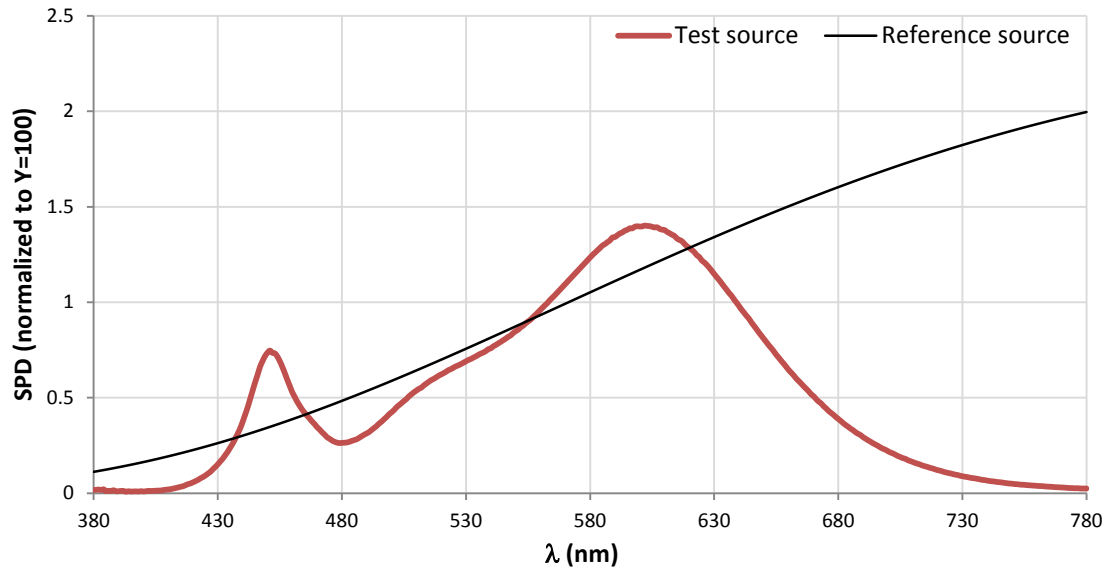
Ra			
81.6			
R1	R2	R3	R4
80	91	96	79
R5	R6	R7	R8
80	88	82	57
R9	R10	R11	R12
4	78	78	72
R13	R14	R15	
82	98	73	



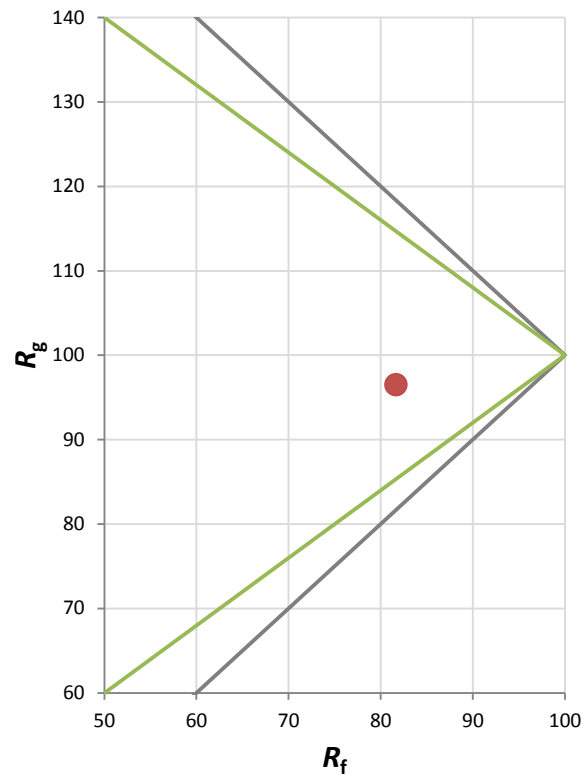
Fidelity Index and Gamut Index

Fidelity Index R_f	82
Gamut Index R_g	96

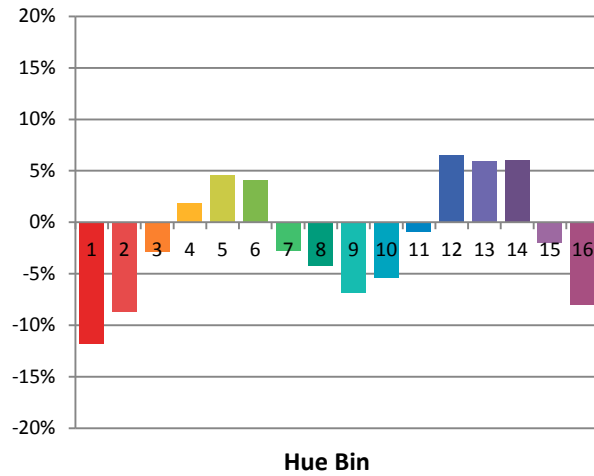
Spectral Power Distribution Comparison



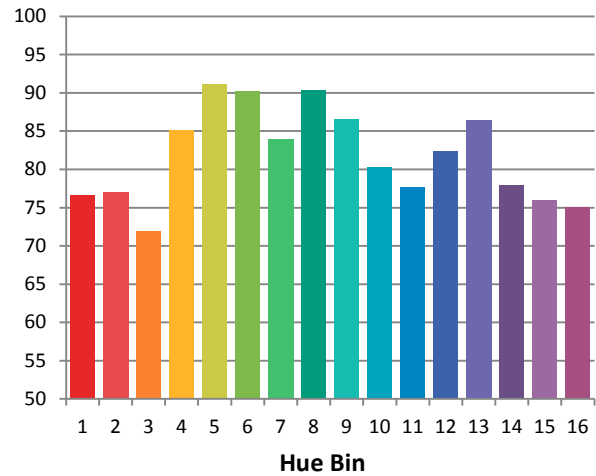
Plot of R_g versus R_f



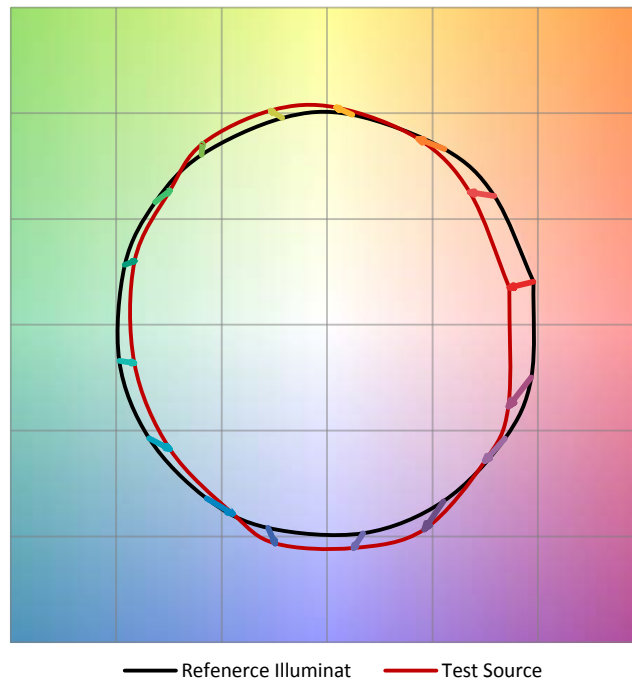
Chroma Shift by Hue



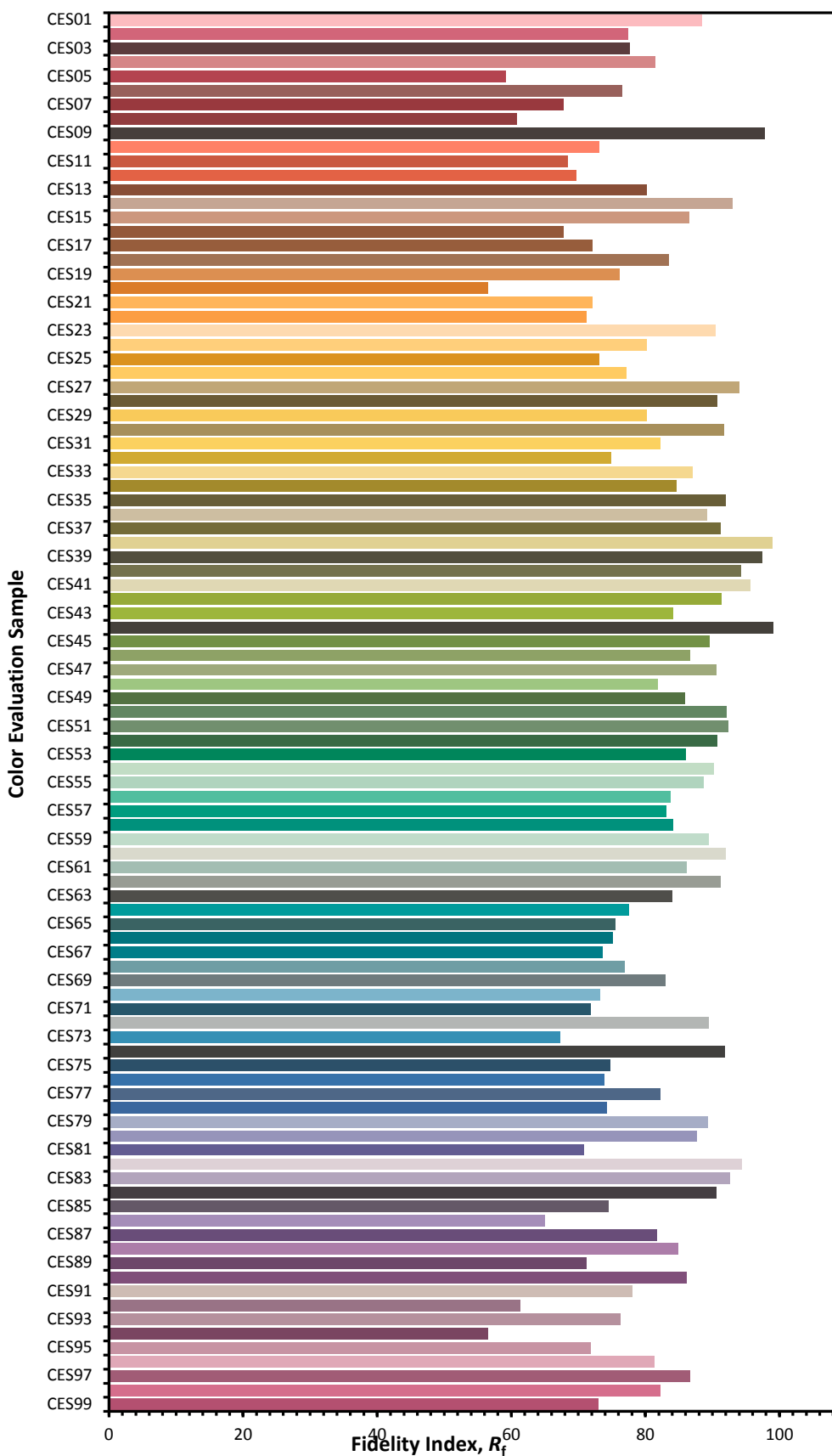
R_f by Hue



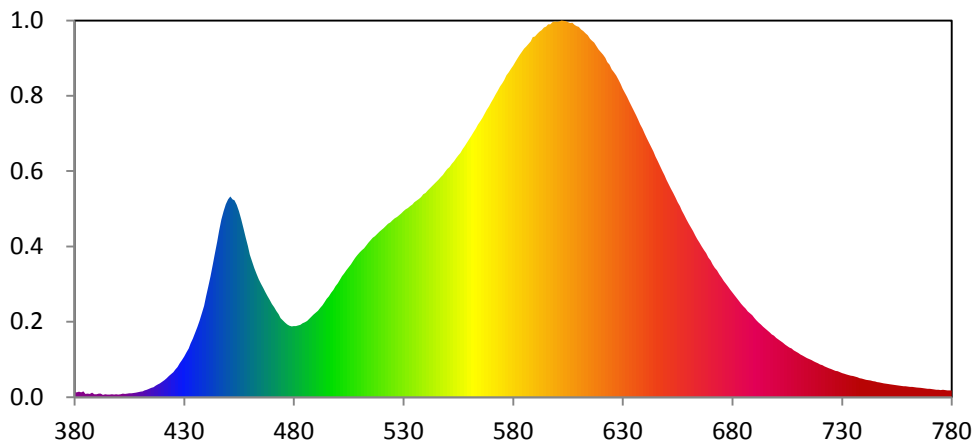
Color Vector Graphic



Color Fidelity by CES Sample



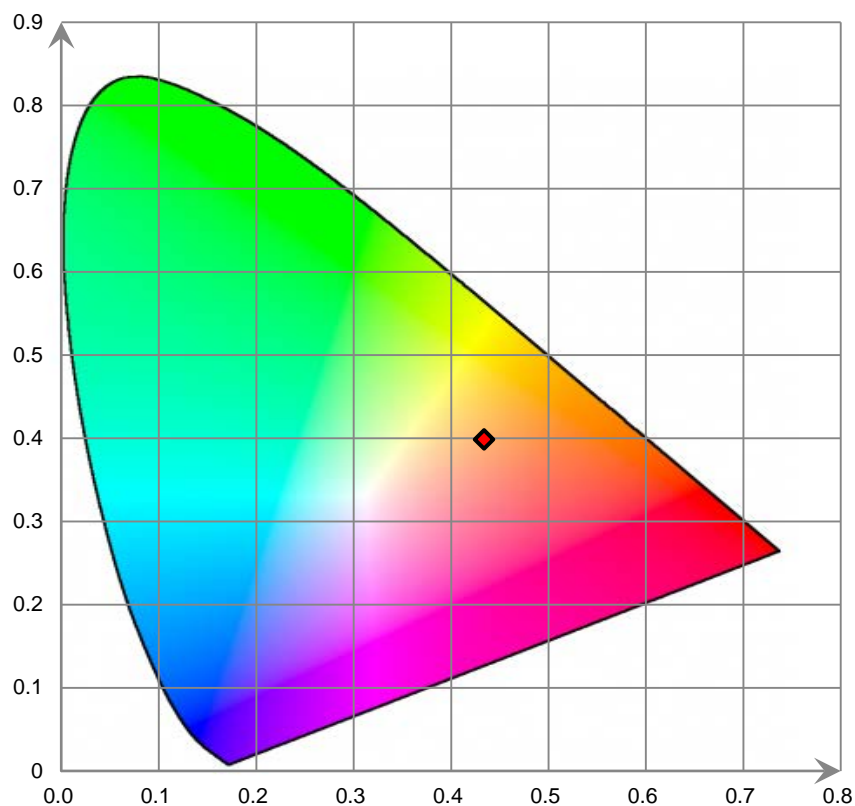
Relative Spectral Power Distribution



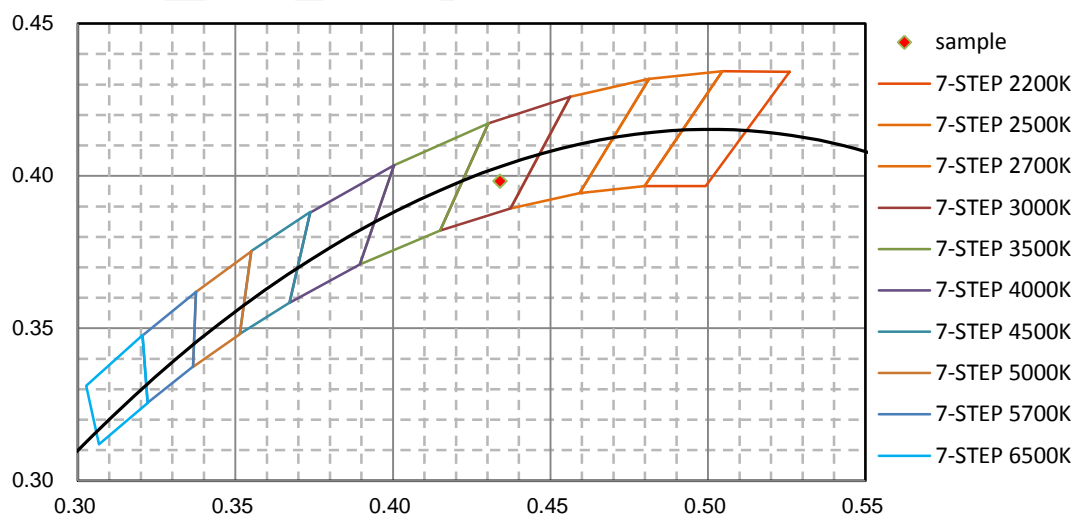
nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
380	8.239E-01	421	2.995E+00	462	2.268E+01	503	2.183E+01	544	3.752E+01
381	8.500E-01	422	3.300E+00	463	2.169E+01	504	2.233E+01	545	3.792E+01
382	9.247E-01	423	3.693E+00	464	2.072E+01	505	2.286E+01	546	3.832E+01
383	8.179E-01	424	4.012E+00	465	1.994E+01	506	2.335E+01	547	3.877E+01
384	9.792E-01	425	4.400E+00	466	1.921E+01	507	2.401E+01	548	3.912E+01
385	5.312E-01	426	4.856E+00	467	1.853E+01	508	2.451E+01	549	3.969E+01
386	6.181E-01	427	5.312E+00	468	1.777E+01	509	2.501E+01	550	4.016E+01
387	5.666E-01	428	5.937E+00	469	1.715E+01	510	2.544E+01	551	4.052E+01
388	7.583E-01	429	6.522E+00	470	1.639E+01	511	2.587E+01	552	4.110E+01
389	4.938E-01	430	7.154E+00	471	1.580E+01	512	2.618E+01	553	4.151E+01
390	5.096E-01	431	7.893E+00	472	1.512E+01	513	2.672E+01	554	4.210E+01
391	5.834E-01	432	8.579E+00	473	1.456E+01	514	2.717E+01	555	4.257E+01
392	5.847E-01	433	9.436E+00	474	1.390E+01	515	2.761E+01	556	4.301E+01
393	3.669E-01	434	1.030E+01	475	1.352E+01	516	2.804E+01	557	4.365E+01
394	5.089E-01	435	1.132E+01	476	1.309E+01	517	2.835E+01	558	4.422E+01
395	4.126E-01	436	1.230E+01	477	1.278E+01	518	2.873E+01	559	4.484E+01
396	4.520E-01	437	1.349E+01	478	1.256E+01	519	2.914E+01	560	4.547E+01
397	4.684E-01	438	1.473E+01	479	1.244E+01	520	2.945E+01	561	4.608E+01
398	4.253E-01	439	1.606E+01	480	1.249E+01	521	2.977E+01	562	4.668E+01
399	5.141E-01	440	1.766E+01	481	1.252E+01	522	3.013E+01	563	4.729E+01
400	4.510E-01	441	1.945E+01	482	1.259E+01	523	3.053E+01	564	4.799E+01
401	4.998E-01	442	2.123E+01	483	1.275E+01	524	3.078E+01	565	4.858E+01
402	5.958E-01	443	2.328E+01	484	1.298E+01	525	3.115E+01	566	4.921E+01
403	5.628E-01	444	2.536E+01	485	1.318E+01	526	3.147E+01	567	4.990E+01
404	5.925E-01	445	2.741E+01	486	1.339E+01	527	3.173E+01	568	5.065E+01
405	6.386E-01	446	2.929E+01	487	1.376E+01	528	3.203E+01	569	5.120E+01
406	6.559E-01	447	3.128E+01	488	1.414E+01	529	3.236E+01	570	5.188E+01
407	6.876E-01	448	3.271E+01	489	1.451E+01	530	3.271E+01	571	5.255E+01
408	7.885E-01	449	3.395E+01	490	1.484E+01	531	3.305E+01	572	5.334E+01
409	8.704E-01	450	3.481E+01	491	1.519E+01	532	3.328E+01	573	5.397E+01
410	9.508E-01	451	3.536E+01	492	1.571E+01	533	3.363E+01	574	5.472E+01
411	1.021E+00	452	3.480E+01	493	1.618E+01	534	3.393E+01	575	5.527E+01
412	1.151E+00	453	3.467E+01	494	1.667E+01	535	3.430E+01	576	5.583E+01
413	1.300E+00	454	3.387E+01	495	1.728E+01	536	3.462E+01	577	5.671E+01
414	1.438E+00	455	3.272E+01	496	1.775E+01	537	3.489E+01	578	5.722E+01
415	1.600E+00	456	3.132E+01	497	1.835E+01	538	3.523E+01	579	5.783E+01
416	1.738E+00	457	2.978E+01	498	1.890E+01	539	3.570E+01	580	5.839E+01
417	2.002E+00	458	2.813E+01	499	1.956E+01	540	3.592E+01	581	5.907E+01
418	2.256E+00	459	2.659E+01	500	2.007E+01	541	3.640E+01	582	5.962E+01
419	2.438E+00	460	2.505E+01	501	2.061E+01	542	3.674E+01	583	6.022E+01
420	2.706E+00	461	2.387E+01	502	2.130E+01	543	3.715E+01	584	6.079E+01

nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
585	6.138E+01	626	5.721E+01	667	2.593E+01	708	8.206E+00	749	2.409E+00
586	6.176E+01	627	5.661E+01	668	2.532E+01	709	7.974E+00	750	2.371E+00
587	6.224E+01	628	5.590E+01	669	2.458E+01	710	7.750E+00	751	2.280E+00
588	6.266E+01	629	5.513E+01	670	2.408E+01	711	7.505E+00	752	2.244E+00
589	6.337E+01	630	5.434E+01	671	2.339E+01	712	7.308E+00	753	2.172E+00
590	6.350E+01	631	5.357E+01	672	2.277E+01	713	7.103E+00	754	2.110E+00
591	6.394E+01	632	5.284E+01	673	2.231E+01	714	6.856E+00	755	2.093E+00
592	6.437E+01	633	5.204E+01	674	2.163E+01	715	6.683E+00	756	2.009E+00
593	6.464E+01	634	5.121E+01	675	2.109E+01	716	6.506E+00	757	1.983E+00
594	6.507E+01	635	5.045E+01	676	2.046E+01	717	6.295E+00	758	1.925E+00
595	6.529E+01	636	4.962E+01	677	1.995E+01	718	6.136E+00	759	1.888E+00
596	6.566E+01	637	4.894E+01	678	1.948E+01	719	5.932E+00	760	1.833E+00
597	6.564E+01	638	4.803E+01	679	1.891E+01	720	5.732E+00	761	1.793E+00
598	6.605E+01	639	4.725E+01	680	1.842E+01	721	5.596E+00	762	1.778E+00
599	6.616E+01	640	4.640E+01	681	1.792E+01	722	5.403E+00	763	1.716E+00
600	6.610E+01	641	4.553E+01	682	1.738E+01	723	5.217E+00	764	1.659E+00
601	6.614E+01	642	4.477E+01	683	1.689E+01	724	5.073E+00	765	1.626E+00
602	6.633E+01	643	4.398E+01	684	1.647E+01	725	4.944E+00	766	1.594E+00
603	6.625E+01	644	4.327E+01	685	1.599E+01	726	4.791E+00	767	1.538E+00
604	6.620E+01	645	4.234E+01	686	1.560E+01	727	4.633E+00	768	1.499E+00
605	6.603E+01	646	4.153E+01	687	1.511E+01	728	4.527E+00	769	1.466E+00
606	6.587E+01	647	4.070E+01	688	1.474E+01	729	4.360E+00	770	1.438E+00
607	6.592E+01	648	3.985E+01	689	1.440E+01	730	4.217E+00	771	1.398E+00
608	6.553E+01	649	3.907E+01	690	1.390E+01	731	4.106E+00	772	1.352E+00
609	6.532E+01	650	3.826E+01	691	1.352E+01	732	4.006E+00	773	1.302E+00
610	6.523E+01	651	3.748E+01	692	1.312E+01	733	3.864E+00	774	1.289E+00
611	6.478E+01	652	3.667E+01	693	1.278E+01	734	3.768E+00	775	1.245E+00
612	6.445E+01	653	3.597E+01	694	1.239E+01	735	3.695E+00	776	1.252E+00
613	6.408E+01	654	3.518E+01	695	1.207E+01	736	3.570E+00	777	1.224E+00
614	6.376E+01	655	3.433E+01	696	1.173E+01	737	3.458E+00	778	1.173E+00
615	6.313E+01	656	3.361E+01	697	1.135E+01	738	3.310E+00	779	1.174E+00
616	6.278E+01	657	3.283E+01	698	1.103E+01	739	3.265E+00	780	1.175E+00
617	6.246E+01	658	3.212E+01	699	1.078E+01	740	3.135E+00		
618	6.181E+01	659	3.135E+01	700	1.043E+01	741	3.037E+00		
619	6.123E+01	660	3.056E+01	701	1.011E+01	742	2.964E+00		
620	6.078E+01	661	2.990E+01	702	9.878E+00	743	2.896E+00		
621	6.031E+01	662	2.924E+01	703	9.559E+00	744	2.788E+00		
622	5.975E+01	663	2.847E+01	704	9.233E+00	745	2.743E+00		
623	5.900E+01	664	2.785E+01	705	8.974E+00	746	2.663E+00		
624	5.854E+01	665	2.722E+01	706	8.712E+00	747	2.565E+00		
625	5.770E+01	666	2.655E+01	707	8.540E+00	748	2.487E+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**

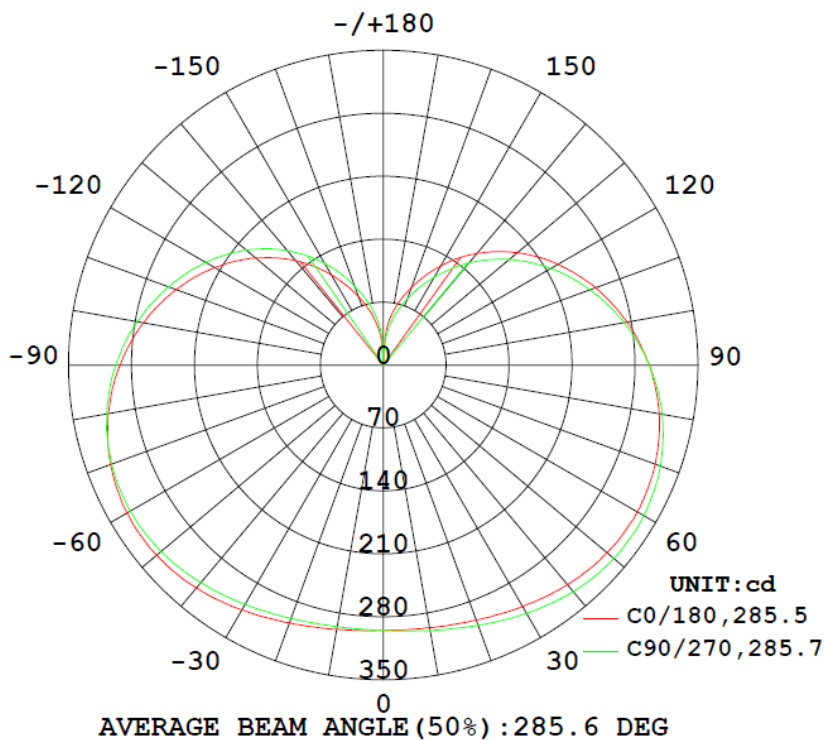
Electrical Measurement

Input Voltage (V)	Frequency (Hz)	Input Current (A)	Power (W)	Power Factor
120.0	60	0.2023	24.11	0.9932

Photometric Measurement

Luminous Flux (lm)	Efficacy (lm/W)	I_{max} (cd)	S/MH (C0/180)	S/MH (C90/270)
3300.45	136.89	136.9	1.64	1.68

Luminous Intensity Distribution



	C0/180	C45/225	C90/270	C135/315	AVG.
Beam Angle (50% I_{max}):	285.5	285.9	285.7	286.2	285.6
Field Angle (10% I_{max}):	351.4	352.0	351.4	349.9	351.2

Luminous Intensity (cd) Distribution Data

$\gamma \backslash C$	0°	22.5°	45°	67.5°	90°	112.5°	135°	157.5°
0.0°	295	295	295	295	295	295	295	295
5.0°	296	296	295	295	295	294	295	295
10.0°	298	298	297	296	295	295	295	296
15.0°	301	300	299	298	297	297	297	297
20.0°	305	304	302	301	300	299	299	300
25.0°	310	308	306	305	303	302	302	304
30.0°	314	312	311	309	307	306	306	308
35.0°	319	317	315	313	312	310	310	312
40.0°	323	321	320	318	316	315	314	316
45.0°	327	325	323	322	319	318	318	319
50.0°	329	328	326	325	323	321	321	322
55.0°	330	329	328	327	324	323	322	323
60.0°	329	329	327	327	325	323	323	323
65.0°	327	327	326	326	324	322	322	321
70.0°	323	324	323	323	321	320	319	319
75.0°	318	319	318	319	318	316	316	314
80.0°	310	313	312	314	312	310	311	309
85.0°	302	305	305	307	306	304	304	302
90.0°	293	296	296	299	298	296	296	294
95.0°	283	286	287	289	288	287	287	284
100.0°	271	275	276	279	278	277	277	274
105.0°	259	263	264	267	266	266	266	263
110.0°	245	250	252	255	254	254	254	251
115.0°	232	236	239	242	242	241	241	239
120.0°	217	222	225	228	228	228	228	225
125.0°	201	207	210	214	214	214	214	211
130.0°	185	191	194	198	199	199	199	196
135.0°	169	174	178	182	183	183	183	181
140.0°	152	157	161	165	166	167	167	164
145.0°	134	139	143	147	149	149	151	148
150.0°	116	121	125	130	131	132	133	131
155.0°	98	103	107	111	112	114	115	113
160.0°	81	85	89	92	94	96	97	96
165.0°	65	68	72	75	76	78	79	79
170.0°	49	53	55	57	59	61	62	61
175.0°	31	32	37	40	41	41	43	42
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°	295	295	295	295	295	295	295	295
5.0°	295	296	296	297	297	297	297	296
10.0°	297	298	299	299	299	299	299	299
15.0°	299	300	302	303	303	303	303	302
20.0°	302	304	306	307	308	308	307	306
25.0°	306	308	311	313	313	313	312	311
30.0°	310	313	316	318	319	318	317	316
35.0°	315	318	321	324	324	323	322	320
40.0°	319	322	326	328	329	328	327	325
45.0°	322	326	330	333	332	331	330	328
50.0°	325	329	332	335	335	333	332	330
55.0°	326	331	334	337	335	333	333	331
60.0°	326	331	334	336	335	332	332	330
65.0°	325	329	332	334	332	330	329	327
70.0°	322	326	328	331	328	325	325	323
75.0°	317	322	323	326	322	319	319	317
80.0°	312	315	316	318	315	312	312	310
85.0°	304	308	308	310	306	303	303	301
90.0°	296	299	298	300	296	292	293	291
95.0°	286	288	287	288	284	281	282	280
100.0°	276	277	275	276	272	269	270	269
105.0°	263	265	262	262	259	256	257	255
110.0°	252	252	249	248	245	242	243	242
115.0°	238	238	235	234	230	228	229	227
120.0°	225	223	220	218	215	213	214	213
125.0°	210	208	204	202	199	198	199	197
130.0°	195	192	188	186	183	181	182	181
135.0°	179	176	171	169	166	165	166	165
140.0°	162	159	155	152	149	147	148	147
145.0°	145	142	138	134	130	129	130	129
150.0°	127	124	119	115	113	111	111	111
155.0°	109	107	102	98	96	94	93	93
160.0°	92	91	86	81	79	77	76	76
165.0°	76	75	70	66	63	62	61	60
170.0°	59	59	54	50	48	46	44	44
175.0°	39	39	35	31	27	24	22	22
180.0°	0	0	0	0	0	0	0	0

Zonal Lumen Density Measurement

Deg	Flux (lm)	%	Deg	Flux (lm)	%
0-5	7.1	0.21	0-5	7.1	0.21
5-10	21.2	0.86	0-10	28.3	0.86
10-15	35.4	1.93	0-15	63.7	1.93
15-20	49.8	3.44	0-20	113.5	3.44
20-25	64.1	5.38	0-25	177.6	5.38
25-30	78.5	7.76	0-30	256.1	7.76
30-35	92.7	10.57	0-35	348.9	10.57
35-40	106.6	13.80	0-40	455.5	13.80
40-45	119.8	17.43	0-45	575.3	17.43
45-50	132.0	21.43	0-50	707.4	21.43
50-55	142.9	25.76	0-55	850.2	25.76
55-60	152.1	30.37	0-60	1002.4	30.37
60-65	159.5	35.20	0-65	1161.9	35.20
65-70	164.8	40.20	0-70	1326.7	40.20
70-75	168.0	45.29	0-75	1494.7	45.29
75-80	169.0	50.41	0-80	1663.7	50.41
80-85	167.8	55.49	0-85	1831.5	55.49
85-90	164.5	60.48	0-90	1996.0	60.48
90-95	159.2	65.30	0-95	2155.2	65.30
95-100	152.2	69.91	0-100	2307.4	69.91
100-105	143.6	74.26	0-105	2451.0	74.26
105-110	133.7	78.32	0-110	2584.8	78.32
110-115	122.8	82.04	0-115	2707.6	82.04
115-120	111.2	85.41	0-120	2818.8	85.41
120-125	98.9	88.40	0-125	2917.7	88.40
125-130	86.4	91.02	0-130	3004.1	91.02
130-135	73.8	93.26	0-135	3077.9	93.26
135-140	61.5	95.12	0-140	3139.3	95.12
140-145	49.7	96.62	0-145	3189.0	96.62
145-150	38.6	97.79	0-150	3227.6	97.79
150-155	28.6	98.66	0-155	3256.2	98.66
155-160	20.1	99.27	0-160	3276.3	99.27
160-165	13.0	99.66	0-165	3289.3	99.66
165-170	7.4	99.89	0-170	3296.7	99.89
170-175	3.3	99.99	0-175	3300.0	99.99
175-180	0.5	100.00	0-180	3300.4	100.00

6. Product Photo



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