



IES LM-79-08

MEASUREMENT AND TEST REPORT

For

GREEN CREATIVE LTD

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

Test Model: 8A19DIM/830

Report Type:	Electrical and Photometric tests including: Luminous Flux, Chromaticity, Luminous Intensity Distribution
Test Engineer:	George Yang <i>George Yang</i>
Report Number:	RKS171115080-10
Test Date:	2017-11-21
Report Date:	2017-11-22
Reviewed By:	Ray Gao/EE Engineer <i>Ray Gao</i>
Prepared By:	Bay Area Compliance Laboratories Corp. (Kunshan). No.248 Chenghu Road, Kunshan, Jiangsu province, China. Tel: +86-0512-86175000 Fax: +86-0512-88934268
Test Facility:	Test facility was located at No.248 Chenghu Road, Kunshan, Jiangsu province, China.
Accreditation:	The IAS Accreditation Number TL-749.

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. (Kunshan). 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 2017-11-20 and used for testing.

Model Tested: 8A19DIM/830
 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 VAC 60Hz
 Rated Power: 8 W
 Nominal CCT: 3000K
 Nominal Lumen Output: 810lm

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

3. Description of Test Equipment

Device	Manufacture	Model No	Serial No	Test Range	Calibration date	Calibration due date
Integrating Sphere	INVENTFINE	Dia 1.5m	JWWCV090112	Dia 1.5m	2017-01-25	2018-01-25
Power Meter	INVENTFINE	WT500	GSJWQ20009	20/40/80/150/300/600V	2017-03-23	2018-03-22
Spectral photometer	INVENTFINE	CMS-3S	GSGSE100017	380nm~780nm	2017-01-25	2018-01-25
AC Power Supply	INVENTFINE	CHP500	JWJSD010071	0~150V 4.2A/0~300V 2.1A	2017-03-23	2018-03-22
Standard Light Source	INVENTFINE	N/A	JWWCR020106	24V/50W	2017-01-26	2018-01-26
Thermal Meter	KEJIAN	TA298	N/A	0~60°C	2017-10-17	2018-10-17
DC Power Supply	INVENTFINE	WL3005	JWWCP020069	30V/5A	2017-03-23	2018-03-22
AC Power Supply	INVENTFINE	CHP-5KVA	900511765	0-150V, 0-300V, 5KVA	2017-03-23	2018-03-22
DC Power Supply	INVENTFINE	WL3010	JWDMP030001	30V/10A	2017-03-23	2018-03-22
Power Meter	INVENTFINE	WT500	GSDSQ200007	20/40/80/150/300/600V	2017-03-23	2018-03-22
Goniophotometer	INVENTFINE	GPM-1900	YWGCF120001	0.001lx-99999lx	2017-01-25	2018-01-25
Wireless Weather Station	ZHONGXING	KG218	N/A	-40~65°C, 20%~99%RH	2017-10-17	2018-10-17
Standard Light Source	INVENTFINE	N/A	JWBYR040007	24V/150W	2017-01-25	2018-01-25

Statement of Traceability: Bay Area Compliance Laboratories Corp. (Kunshan) 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 $U=2.6\%$ ($K=2$), at the 95% confidence level. The uncertainty of the correlated color temperature measurements is $U=24\text{K}$ ($K=2$), at the 95% confidence level. The uncertainty of the CRI is $U=2.5(K=2)$, at the 95% confidence level.

The uncertainty of power meter AC current $U=0.16\%$ of rdg, AC Voltage $U=0.18\%$ of rdg, Power $U=0.14\%$ ($K=2$), 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 flux is $U=2.6\%$ ($K=2$), 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: **Baseup**

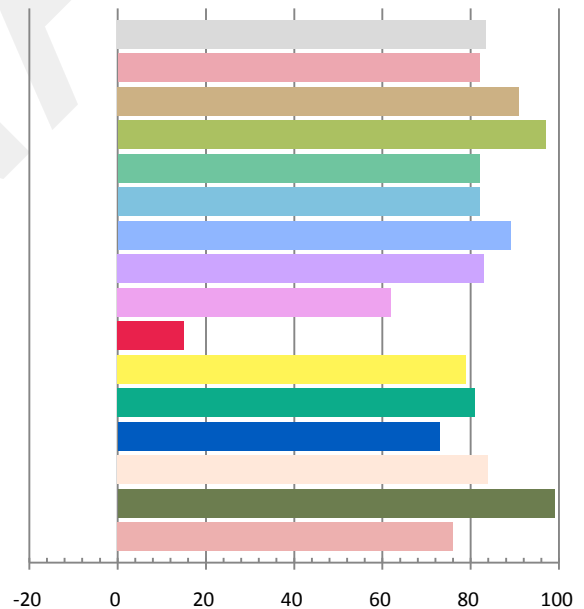
Photometric and Electrical Measurement Result

Voltage (V)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Luminous Flux(lm)	Efficacy (lm/W)
120.0	60	0.0682	7.81	0.9534	879.6	112.64

Radiant Flux (W)	CCT (K)	Duv	x	y	u'	v'
2.741	2965	-0.00004	0.4394	0.4048	0.2518	0.5220

Color Rendering Index

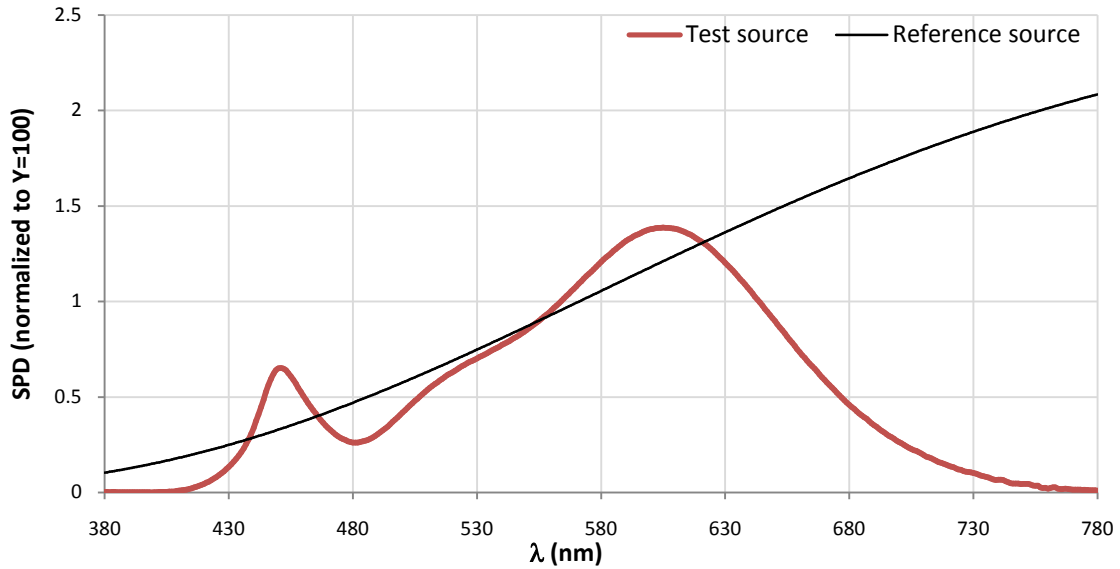
Ra			
83.5			
R1	R2	R3	R4
82	91	97	82
R5	R6	R7	R8
82	89	83	62
R9	R10	R11	R12
15	79	81	73
R13	R14	R15	
84	99	76	



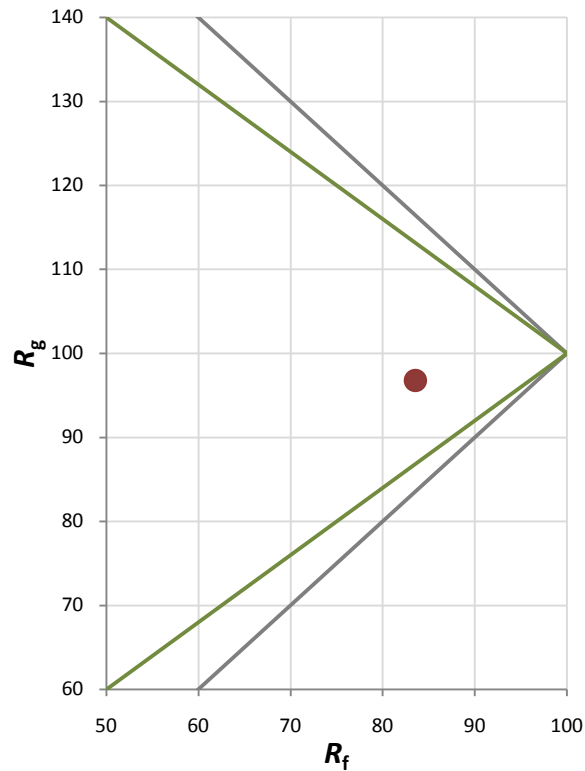
Fidelity Index and Gamut Index

Fidelity Index R_f	84
Gamut Index R_g	97

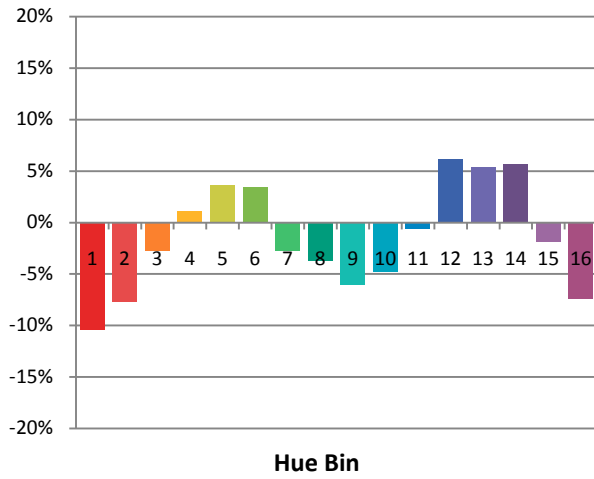
Spectral Power Distribution Comparison



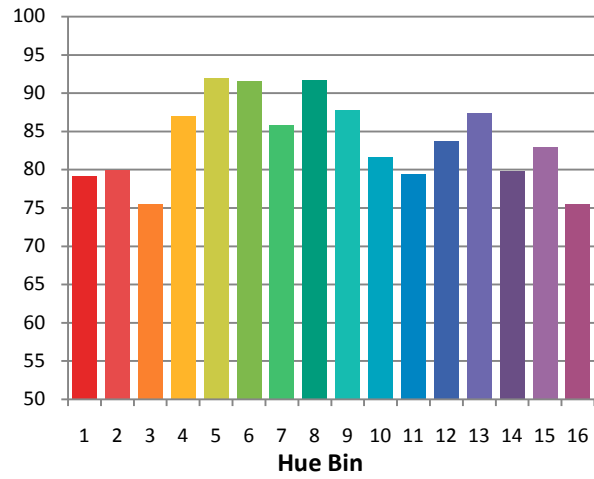
Plot of R_g versus R_f



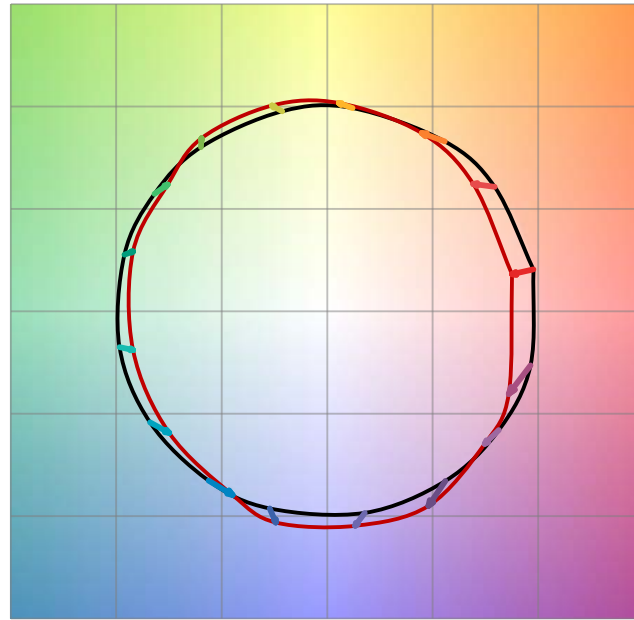
Chroma Shift by Hue



R_f by Hue

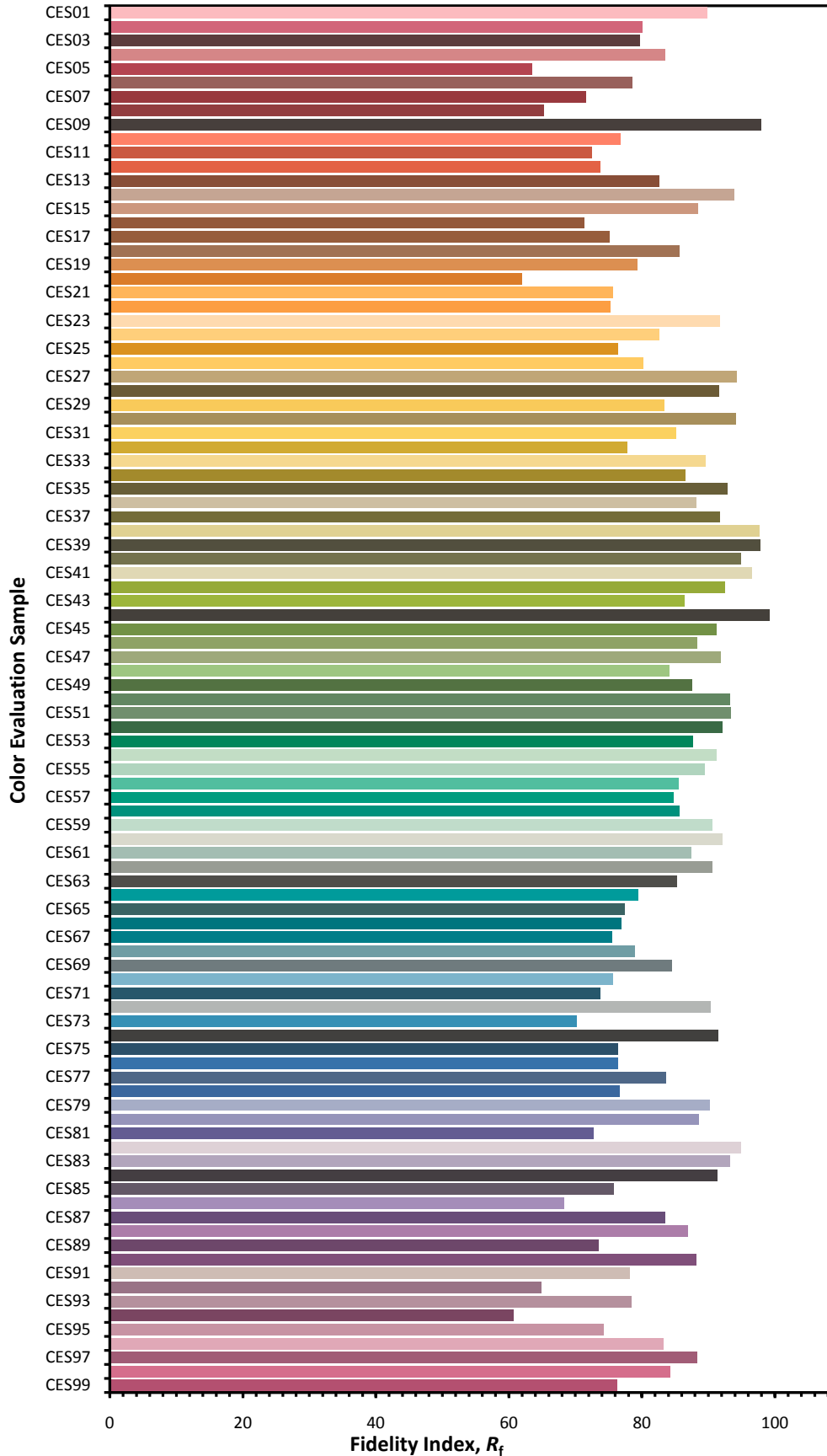


Color Vector Graphic

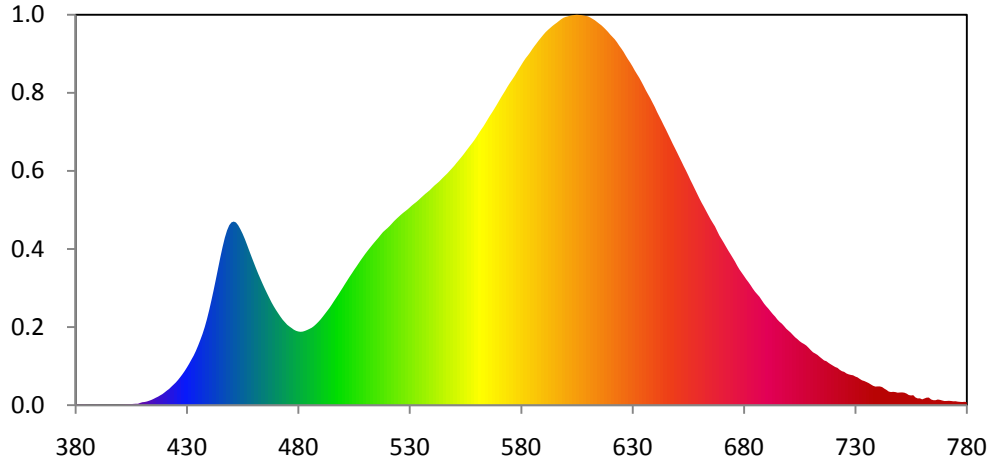


— Reference Illuminat — Test Source

Color Fidelity by CES Sample



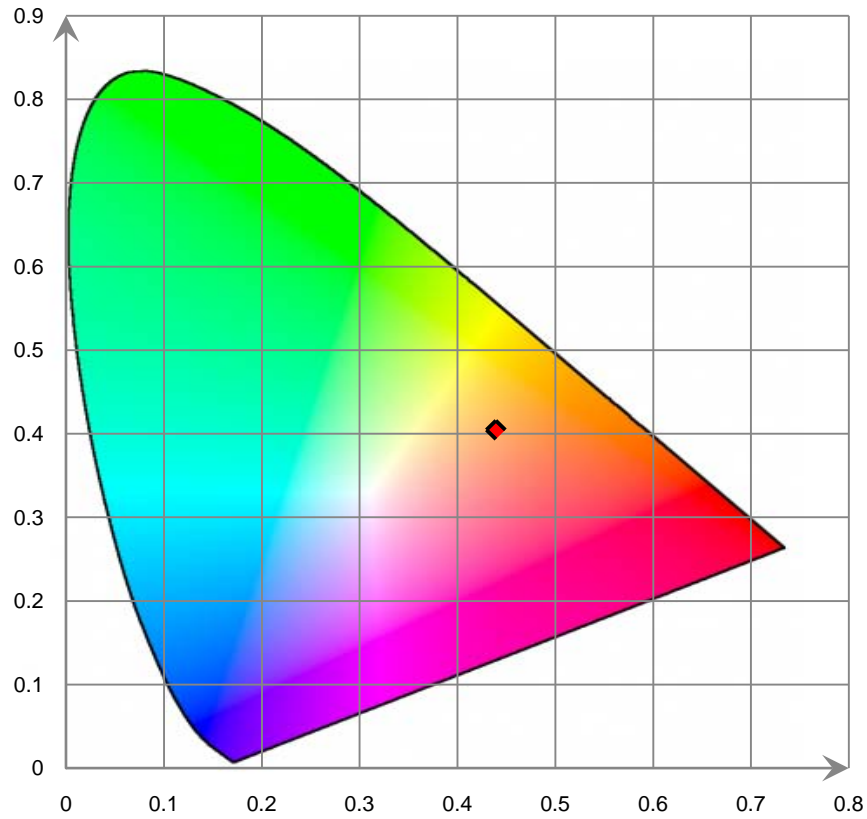
Relative Spectral Power Distribution



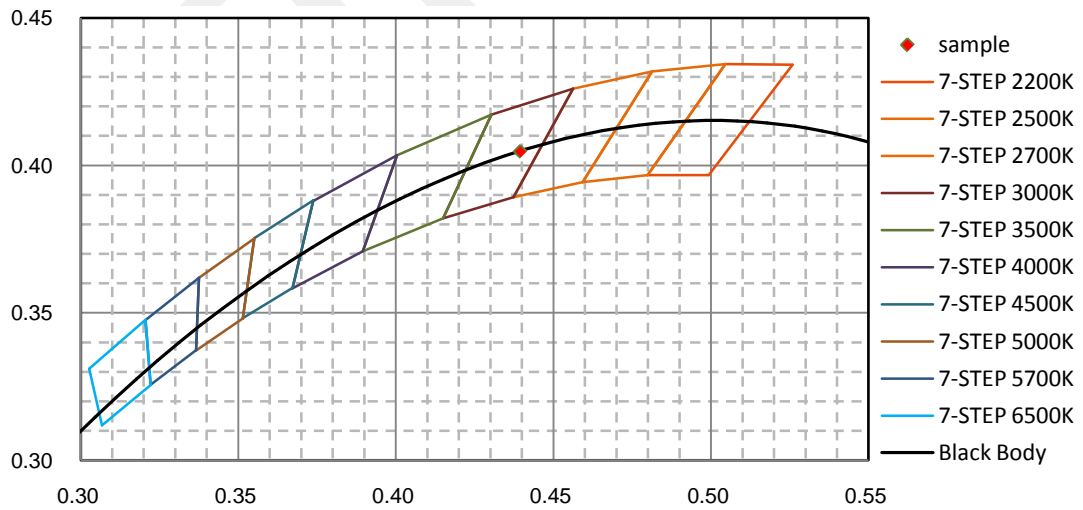
nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
380	3.920E-02	421	6.687E-01	462	6.010E+00	503	5.873E+00	544	1.031E+01
381	3.100E-02	422	7.429E-01	463	5.776E+00	504	6.024E+00	545	1.042E+01
382	2.340E-02	423	8.427E-01	464	5.545E+00	505	6.182E+00	546	1.052E+01
383	3.110E-02	424	9.390E-01	465	5.321E+00	506	6.329E+00	547	1.062E+01
384	3.560E-02	425	1.038E+00	466	5.108E+00	507	6.481E+00	548	1.073E+01
385	2.050E-02	426	1.154E+00	467	4.902E+00	508	6.631E+00	549	1.084E+01
386	1.750E-02	427	1.283E+00	468	4.698E+00	509	6.775E+00	550	1.095E+01
387	1.530E-02	428	1.419E+00	469	4.517E+00	510	6.918E+00	551	1.108E+01
388	1.660E-02	429	1.565E+00	470	4.350E+00	511	7.051E+00	552	1.120E+01
389	2.740E-02	430	1.726E+00	471	4.196E+00	512	7.180E+00	553	1.133E+01
390	2.600E-02	431	1.897E+00	472	4.045E+00	513	7.308E+00	554	1.145E+01
391	1.310E-02	432	2.082E+00	473	3.907E+00	514	7.432E+00	555	1.159E+01
392	1.040E-02	433	2.264E+00	474	3.792E+00	515	7.550E+00	556	1.172E+01
393	1.050E-02	434	2.478E+00	475	3.679E+00	516	7.668E+00	557	1.186E+01
394	1.240E-02	435	2.721E+00	476	3.600E+00	517	7.796E+00	558	1.199E+01
395	1.460E-02	436	2.981E+00	477	3.528E+00	518	7.917E+00	559	1.213E+01
396	1.380E-02	437	3.258E+00	478	3.452E+00	519	8.011E+00	560	1.228E+01
397	1.230E-02	438	3.575E+00	479	3.401E+00	520	8.100E+00	561	1.244E+01
398	9.900E-03	439	3.942E+00	480	3.370E+00	521	8.198E+00	562	1.259E+01
399	6.400E-03	440	4.352E+00	481	3.357E+00	522	8.308E+00	563	1.274E+01
400	1.890E-02	441	4.801E+00	482	3.368E+00	523	8.422E+00	564	1.290E+01
401	2.420E-02	442	5.269E+00	483	3.399E+00	524	8.521E+00	565	1.308E+01
402	3.130E-02	443	5.762E+00	484	3.442E+00	525	8.614E+00	566	1.324E+01
403	3.870E-02	444	6.266E+00	485	3.490E+00	526	8.708E+00	567	1.340E+01
404	4.580E-02	445	6.770E+00	486	3.543E+00	527	8.794E+00	568	1.356E+01
405	4.990E-02	446	7.238E+00	487	3.617E+00	528	8.873E+00	569	1.373E+01
406	5.980E-02	447	7.657E+00	488	3.710E+00	529	8.953E+00	570	1.390E+01
407	6.690E-02	448	7.993E+00	489	3.811E+00	530	9.045E+00	571	1.408E+01
408	6.690E-02	449	8.231E+00	490	3.924E+00	531	9.138E+00	572	1.425E+01
409	1.032E-01	450	8.363E+00	491	4.051E+00	532	9.219E+00	573	1.441E+01
410	1.359E-01	451	8.398E+00	492	4.184E+00	533	9.298E+00	574	1.459E+01
411	1.462E-01	452	8.358E+00	493	4.318E+00	534	9.389E+00	575	1.475E+01
412	1.673E-01	453	8.230E+00	494	4.452E+00	535	9.484E+00	576	1.489E+01
413	2.018E-01	454	8.049E+00	495	4.601E+00	536	9.578E+00	577	1.505E+01
414	2.389E-01	455	7.839E+00	496	4.761E+00	537	9.667E+00	578	1.522E+01
415	2.865E-01	456	7.600E+00	497	4.911E+00	538	9.750E+00	579	1.539E+01
416	3.387E-01	457	7.332E+00	498	5.065E+00	539	9.837E+00	580	1.555E+01
417	3.876E-01	458	7.058E+00	499	5.228E+00	540	9.938E+00	581	1.571E+01
418	4.484E-01	459	6.789E+00	500	5.387E+00	541	1.004E+01	582	1.587E+01
419	5.070E-01	460	6.525E+00	501	5.553E+00	542	1.013E+01	583	1.599E+01
420	5.859E-01	461	6.263E+00	502	5.713E+00	543	1.021E+01	584	1.613E+01

nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
585	1.629E+01	626	1.616E+01	667	8.179E+00	708	2.727E+00	749	5.719E-01
586	1.643E+01	627	1.598E+01	668	7.966E+00	709	2.628E+00	750	5.802E-01
587	1.656E+01	628	1.582E+01	669	7.759E+00	710	2.518E+00	751	5.844E-01
588	1.670E+01	629	1.566E+01	670	7.591E+00	711	2.421E+00	752	5.724E-01
589	1.682E+01	630	1.549E+01	671	7.421E+00	712	2.363E+00	753	5.304E-01
590	1.695E+01	631	1.531E+01	672	7.242E+00	713	2.301E+00	754	4.652E-01
591	1.706E+01	632	1.514E+01	673	7.068E+00	714	2.211E+00	755	4.453E-01
592	1.716E+01	633	1.498E+01	674	6.905E+00	715	2.130E+00	756	4.572E-01
593	1.725E+01	634	1.480E+01	675	6.737E+00	716	2.047E+00	757	3.539E-01
594	1.734E+01	635	1.460E+01	676	6.568E+00	717	2.012E+00	758	3.089E-01
595	1.742E+01	636	1.440E+01	677	6.378E+00	718	1.935E+00	759	3.133E-01
596	1.749E+01	637	1.422E+01	678	6.207E+00	719	1.869E+00	760	2.667E-01
597	1.758E+01	638	1.404E+01	679	6.060E+00	720	1.806E+00	761	3.062E-01
598	1.766E+01	639	1.384E+01	680	5.916E+00	721	1.744E+00	762	3.452E-01
599	1.772E+01	640	1.364E+01	681	5.765E+00	722	1.706E+00	763	3.485E-01
600	1.776E+01	641	1.342E+01	682	5.632E+00	723	1.618E+00	764	2.626E-01
601	1.779E+01	642	1.321E+01	683	5.487E+00	724	1.554E+00	765	2.286E-01
602	1.782E+01	643	1.301E+01	684	5.329E+00	725	1.523E+00	766	2.271E-01
603	1.784E+01	644	1.281E+01	685	5.188E+00	726	1.452E+00	767	2.581E-01
604	1.785E+01	645	1.260E+01	686	5.072E+00	727	1.411E+00	768	2.425E-01
605	1.786E+01	646	1.239E+01	687	4.956E+00	728	1.383E+00	769	2.146E-01
606	1.785E+01	647	1.218E+01	688	4.802E+00	729	1.367E+00	770	1.897E-01
607	1.784E+01	648	1.196E+01	689	4.652E+00	730	1.312E+00	771	1.923E-01
608	1.783E+01	649	1.176E+01	690	4.526E+00	731	1.272E+00	772	1.996E-01
609	1.781E+01	650	1.156E+01	691	4.413E+00	732	1.201E+00	773	1.916E-01
610	1.779E+01	651	1.135E+01	692	4.286E+00	733	1.137E+00	774	1.777E-01
611	1.774E+01	652	1.114E+01	693	4.162E+00	734	1.106E+00	775	1.799E-01
612	1.768E+01	653	1.093E+01	694	4.053E+00	735	1.060E+00	776	1.604E-01
613	1.761E+01	654	1.073E+01	695	3.921E+00	736	1.011E+00	777	1.521E-01
614	1.754E+01	655	1.052E+01	696	3.814E+00	737	9.472E-01	778	1.448E-01
615	1.746E+01	656	1.030E+01	697	3.731E+00	738	8.863E-01	779	1.556E-01
616	1.738E+01	657	1.009E+01	698	3.620E+00	739	8.498E-01	780	1.360E-01
617	1.728E+01	658	9.883E+00	699	3.499E+00	740	8.578E-01		
618	1.718E+01	659	9.673E+00	700	3.408E+00	741	8.570E-01		
619	1.708E+01	660	9.463E+00	701	3.319E+00	742	8.304E-01		
620	1.695E+01	661	9.265E+00	702	3.210E+00	743	7.582E-01		
621	1.685E+01	662	9.083E+00	703	3.105E+00	744	6.983E-01		
622	1.674E+01	663	8.889E+00	704	3.021E+00	745	6.242E-01		
623	1.661E+01	664	8.698E+00	705	2.927E+00	746	6.006E-01		
624	1.645E+01	665	8.510E+00	706	2.855E+00	747	6.105E-01		
625	1.631E+01	666	8.341E+00	707	2.797E+00	748	5.981E-01		

CIE 1931 x y Chromaticity Diagram



7-Step Chromaticity Quadrangles



[Goniophotometer System]

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

Test orientation: **Baseup**

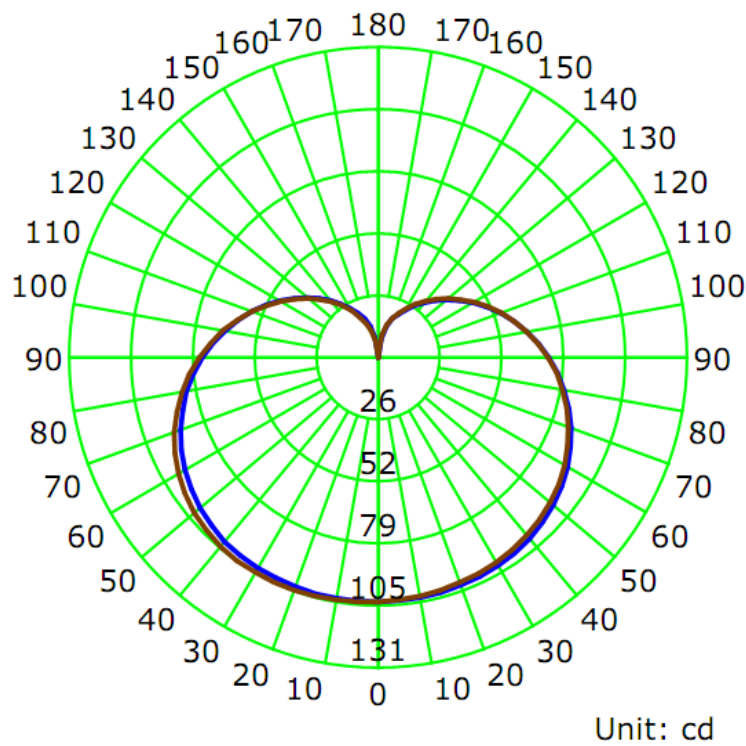
Electrical Measurement

Input Voltage (V)	Frequency (Hz)	Input Current (A)	Power (W)	Power Factor
120.0	60	0.0680	7.86	0.9600

Photometric Measurement

Luminous Flux (lm)	Efficacy (lm/W)	I _{max} (cd)	S/MH (C0/180)	S/MH (C90/270)
874.2	111.22	105.6	1.51	1.51

Luminous Intensity Distribution



	C0/180	C45/225	C90/270	C135/315	AVG.
Beam Angle (50% I _{max}):	230.4	228.5	228.9	230.8	229.7
Field Angle (10% I _{max}):	336.5	336.2	336.0	338.0	336.7

Luminous Intensity (cd) Distribution Data

C Y	0°	22.5°	45°	67.5°	90°	112.5°	135°	157.5°
0.0°	104	104	104	104	104	104	104	104
5.0°	104	103	103	103	103	104	103	104
10.0°	104	103	103	103	103	103	103	104
15.0°	103	103	102	102	102	103	103	103
20.0°	103	102	102	102	102	102	103	103
25.0°	103	102	101	101	101	102	102	103
30.0°	102	101	100	100	101	101	102	103
35.0°	102	100	100	99	100	101	101	102
40.0°	101	99	98	98	99	100	101	101
45.0°	99	98	97	97	98	99	99	100
50.0°	98	96	95	95	96	97	98	99
55.0°	96	94	93	93	94	95	96	97
60.0°	93	92	91	91	92	93	94	95
65.0°	91	89	88	88	89	91	92	93
70.0°	88	86	86	85	86	88	89	90
75.0°	84	83	82	82	83	85	86	87
80.0°	81	80	79	79	80	81	82	83
85.0°	77	76	75	75	76	78	79	79
90.0°	73	72	72	72	73	74	75	75
95.0°	69	68	68	68	69	70	71	71
100.0°	64	64	63	64	65	66	66	67
105.0°	60	59	59	60	60	61	62	62
110.0°	56	55	55	55	56	57	58	58
115.0°	51	51	51	51	52	53	53	53
120.0°	47	47	47	47	48	48	49	49
125.0°	43	42	42	43	43	44	44	45
130.0°	39	38	38	39	39	40	40	40
135.0°	35	34	34	35	35	36	36	36
140.0°	31	31	31	31	31	32	32	32
145.0°	27	27	27	27	28	28	28	28
150.0°	24	24	24	24	24	25	25	25
155.0°	21	21	21	21	21	22	22	22
160.0°	18	18	18	18	18	19	19	18
165.0°	14	14	14	15	15	15	15	15
170.0°	8	9	10	10	10	11	11	10
175.0°	0	0	0	1	2	1	0	0
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°	104	104	104	104	104	104	104	104
5.0°	104	104	104	104	104	104	104	104
10.0°	104	104	104	105	105	105	104	104
15.0°	104	104	105	105	105	105	104	104
20.0°	104	104	105	105	105	105	105	104
25.0°	104	104	105	105	106	105	105	104
30.0°	103	104	105	105	106	105	105	103
35.0°	103	104	104	105	106	105	104	103
40.0°	102	103	104	105	105	105	104	102
45.0°	101	102	103	104	104	104	103	101
50.0°	100	100	101	102	103	102	101	99
55.0°	98	99	100	100	101	101	99	97
60.0°	96	96	97	98	99	98	97	95
65.0°	93	94	95	95	96	96	94	92
70.0°	90	91	92	92	93	93	91	89
75.0°	87	87	88	89	89	89	88	86
80.0°	83	84	84	85	85	85	84	82
85.0°	79	80	80	81	81	81	80	78
90.0°	75	76	76	76	77	76	75	74
95.0°	71	71	72	72	72	72	71	70
100.0°	67	67	67	67	67	67	66	65
105.0°	62	62	62	62	62	62	62	61
110.0°	58	58	58	58	58	57	57	56
115.0°	53	53	53	53	53	53	52	51
120.0°	49	48	48	48	48	48	48	47
125.0°	44	44	44	44	44	44	43	43
130.0°	40	40	39	39	39	39	39	38
135.0°	36	35	35	35	35	35	35	34
140.0°	32	32	31	31	31	31	31	31
145.0°	28	28	26	27	27	27	27	27
150.0°	24	24	22	24	23	23	24	24
155.0°	21	20	19	19	19	19	20	20
160.0°	18	17	16	15	15	16	17	17
165.0°	14	13	13	12	12	12	14	13
170.0°	9	6	7	7	7	7	8	8
175.0°	0	0	0	0	0	0	0	0
180.0°	0	0	0	0	0	0	0	0

Zonal Lumen Density Measurement

Deg	Flux (lm)	%	Deg	Flux (lm)	%
0-5	2.5	0.28	0-5	2.5	0.28
5-10	7.4	0.85	0-10	9.9	1.13
10-15	12.3	1.41	0-15	22.2	2.54
15-20	17.1	1.95	0-20	39.3	4.49
20-25	21.7	2.48	0-25	60.9	6.97
25-30	26.1	2.98	0-30	87.0	9.96
30-35	30.2	3.46	0-35	117.3	13.41
35-40	34.0	3.89	0-40	151.3	17.31
40-45	37.4	4.28	0-45	188.7	21.58
45-50	40.3	4.61	0-50	229.0	26.19
50-55	42.6	4.87	0-55	271.6	31.07
55-60	44.4	5.07	0-60	315.9	36.14
60-65	45.5	5.20	0-65	361.4	41.34
65-70	45.9	5.25	0-70	407.3	46.60
70-75	45.8	5.24	0-75	453.1	51.83
75-80	45.0	5.15	0-80	498.1	56.98
80-85	43.7	5.00	0-85	541.8	61.98
85-90	41.9	4.79	0-90	583.7	66.77
90-95	39.6	4.53	0-95	623.2	71.29
95-100	36.9	4.22	0-100	660.1	75.51
100-105	34.0	3.89	0-105	694.1	79.40
105-110	30.8	3.53	0-110	724.9	82.93
110-115	27.6	3.16	0-115	752.5	86.08
115-120	24.3	2.78	0-120	776.8	88.86
120-125	21.1	2.41	0-125	797.9	91.27
125-130	17.9	2.05	0-130	815.9	93.33
130-135	15.0	1.72	0-135	830.8	95.04
135-140	12.3	1.40	0-140	843.1	96.44
140-145	9.8	1.12	0-145	852.9	97.56
145-150	7.6	0.86	0-150	860.4	98.42
150-155	5.6	0.64	0-155	866.0	99.07
155-160	4.0	0.45	0-160	870.0	99.52
160-165	2.6	0.29	0-165	872.5	99.81
165-170	1.3	0.15	0-170	873.9	99.96
170-175	0.3	0.04	0-175	874.2	100.00
175-180	0.0	0.00	0-180	874.2	100.00

6. Product Photo



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