

IES LM-79-08


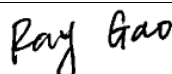
MEASUREMENT AND TEST REPORT

For

GREEN CREATIVE LTD

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

Test Model: 11SMDL6DIM/930

Report Type:	Electrical and Photometric tests including: Luminous Flux, Chromaticity, Luminous Intensity Distribution
Test Engineer:	Jack Shao 
Report Number:	RKS170628001-10
Test Date:	2017-06-30
Report Date:	2017-06-30
Reviewed By:	Ray Gao/EE Engineer 
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.

1. Product Description

General Information:

One sample was received on 2017-06-28 and used for testing.

Model Tested: 11SMDL6DIM/930
 Manufacturer: GREEN CREATIVE LTD
 Brand Name: GREEN CREATIVE
 Product Designation: 6" DOWNLIGHT
 Aging Time Before Test: 0hour(For New Products)

Rated Values:

Rated Voltage/Frequency: 120 V AC 60Hz
 Rated Power: 11 W
 Nominal CCT: 3000K
 Nominal Lumen Output: 720 lm

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℃	2016-10-17	2017-10-17
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℃, 20%~99%RH	2016-10-17	2017-10-17
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: **0.5 hour**

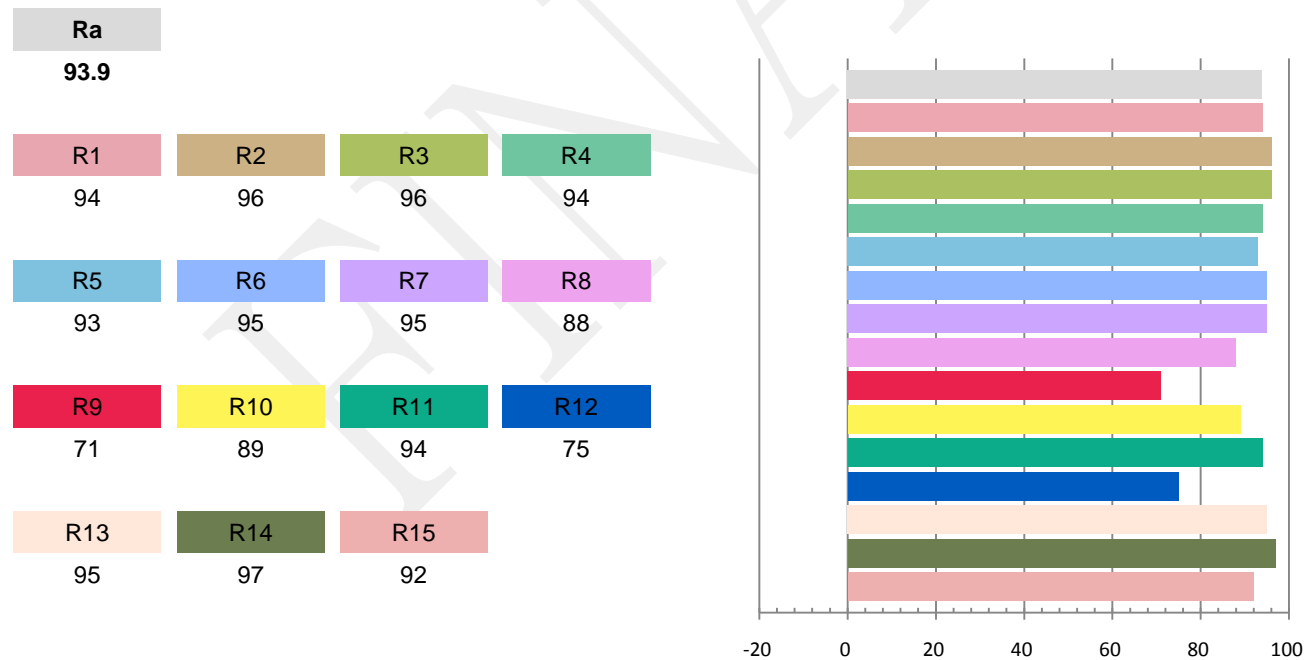
Test orientation: **Downward**

Photometric and Electrical Measurement Result

Voltage (V)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Luminous Flux(lm)	Efficacy (lm/W)
120.0	60	0.0977	10.83	0.9236	770.8	71.15

Radiant Flux (W)	CCT (K)	Duv	x	y	u'	v'
2.692	3124	0.00199	0.4311	0.4069	0.2456	0.5216

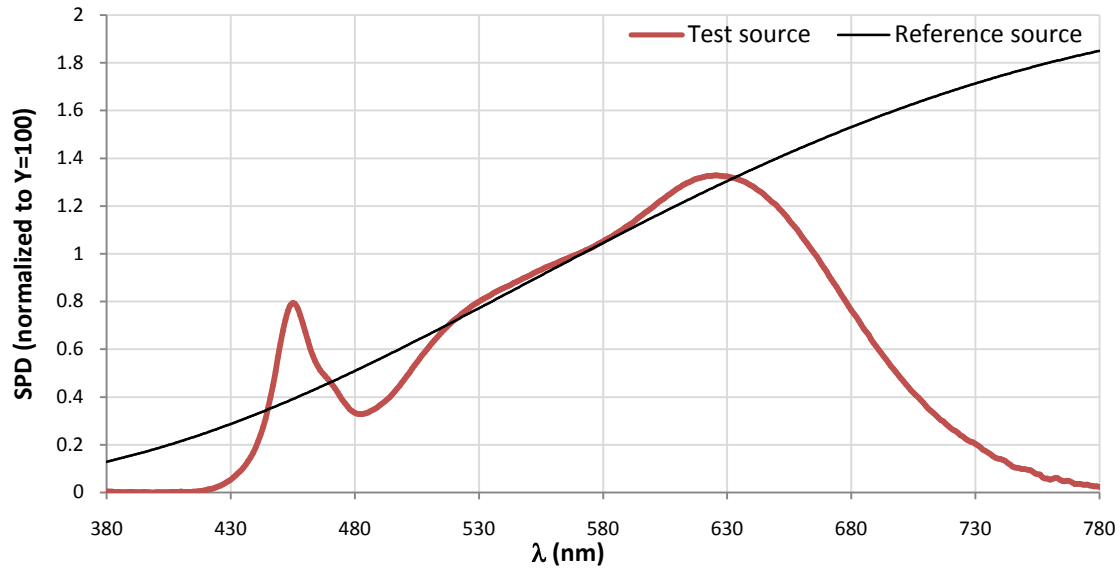
Color Rendering Index



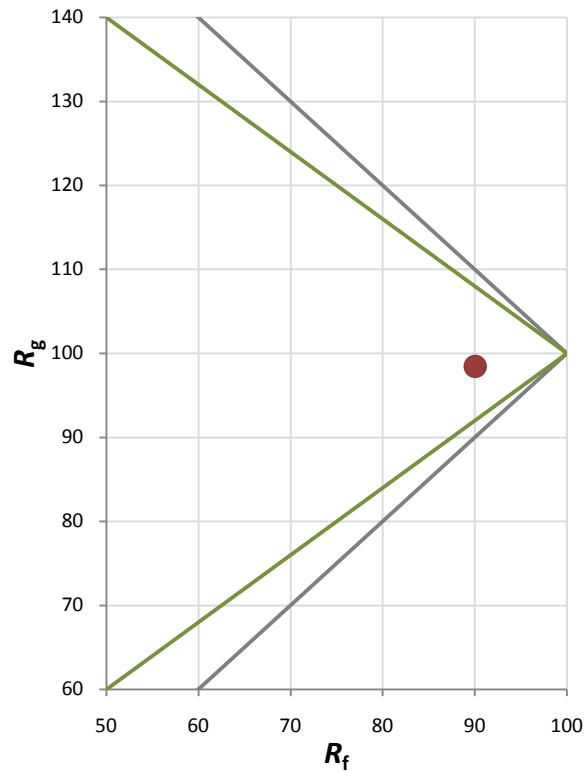
Fidelity Index and Gamut Index

Fidelity Index R_f	90
Gamut Index R_g	98

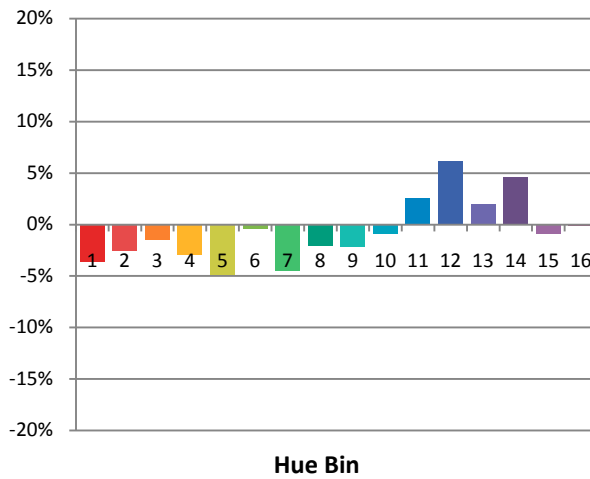
Spectral Power Distribution Comparison



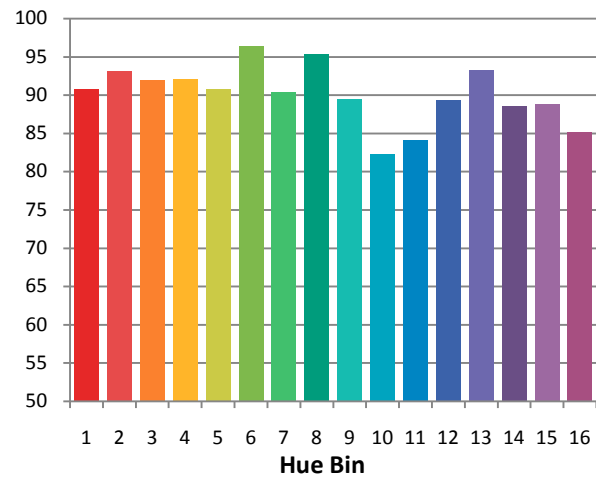
Plot of R_g versus R_f



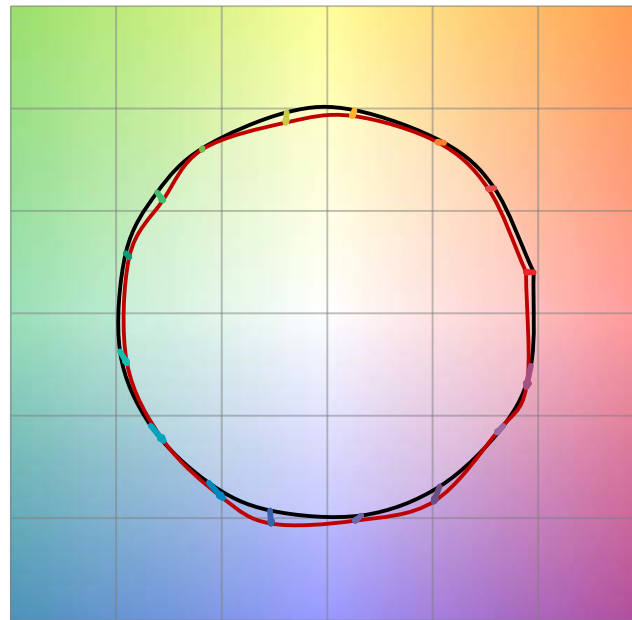
Chroma Shift by Hue



R_t by Hue

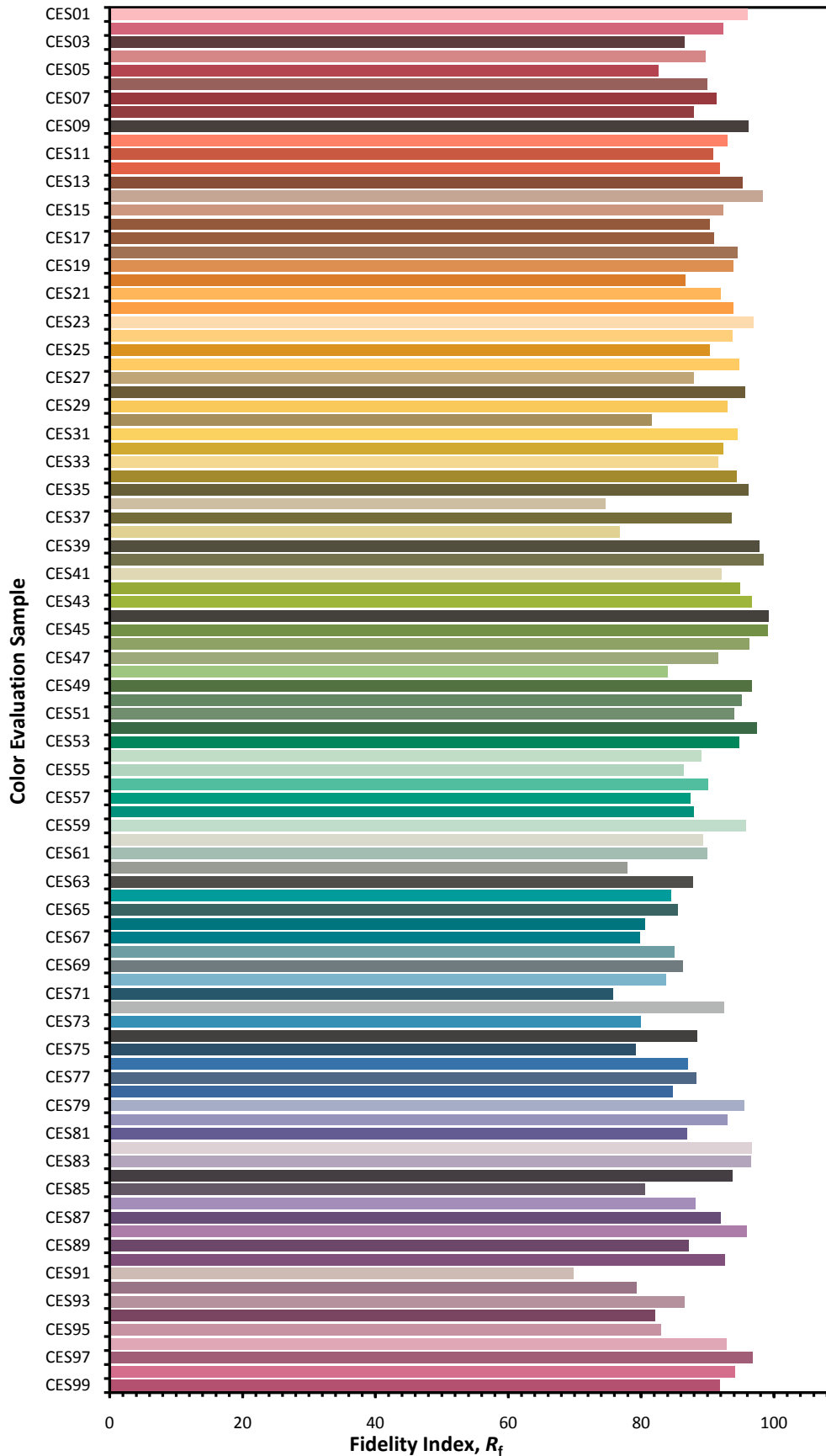


Color Vector Graphic

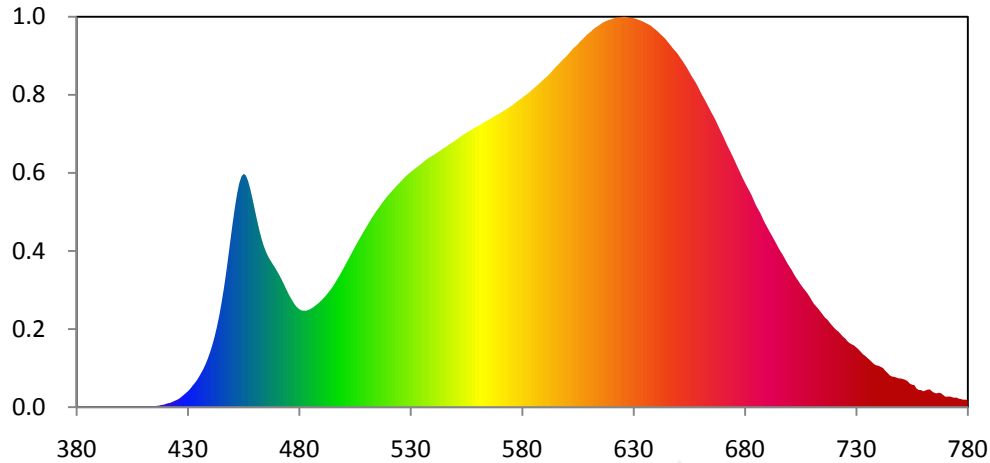


— Reference Illuminant — Test Source

Color Fidelity by CES Sample



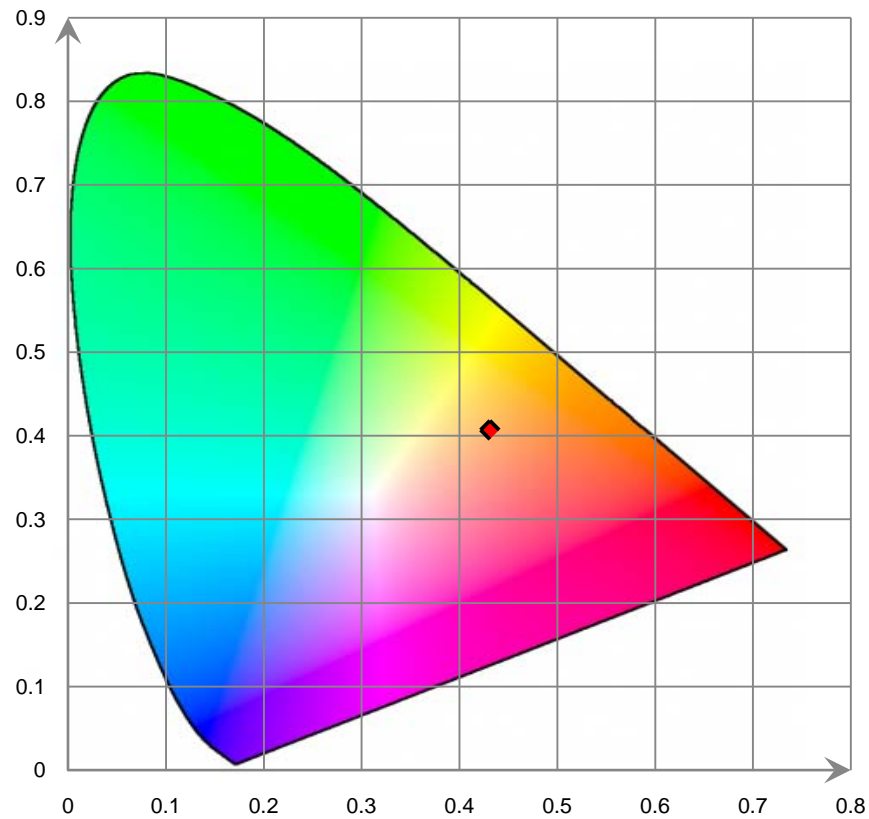
Relative Spectral Power Distribution



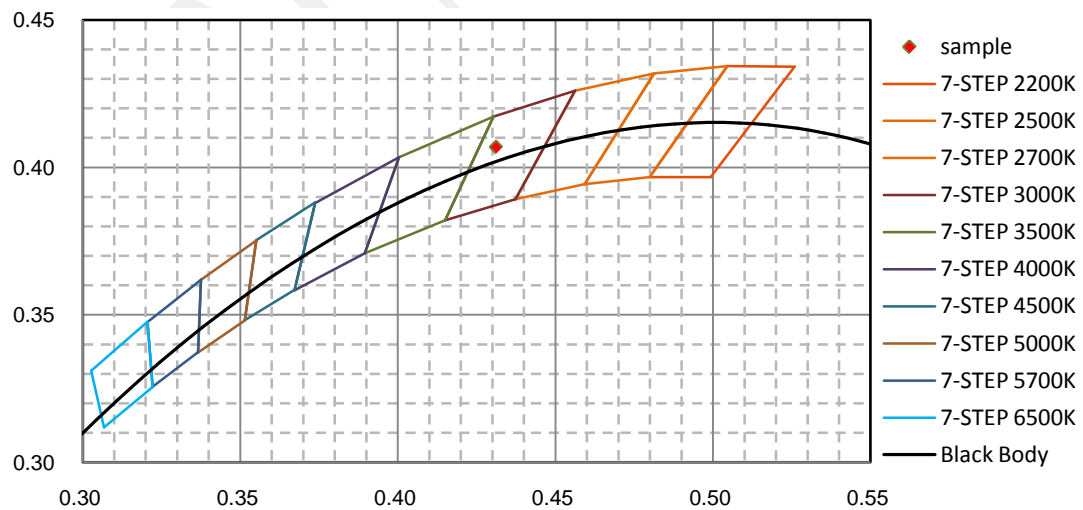
nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
380	5.210E-02	421	1.496E-01	462	6.816E+00	503	5.838E+00	544	9.900E+00
381	4.720E-02	422	1.653E-01	463	6.483E+00	504	6.001E+00	545	9.955E+00
382	4.030E-02	423	2.025E-01	464	6.201E+00	505	6.157E+00	546	1.001E+01
383	3.620E-02	424	2.409E-01	465	5.975E+00	506	6.315E+00	547	1.007E+01
384	3.350E-02	425	2.796E-01	466	5.788E+00	507	6.467E+00	548	1.013E+01
385	2.200E-02	426	3.245E-01	467	5.640E+00	508	6.613E+00	549	1.018E+01
386	2.080E-02	427	3.935E-01	468	5.504E+00	509	6.762E+00	550	1.024E+01
387	2.090E-02	428	4.632E-01	469	5.369E+00	510	6.905E+00	551	1.030E+01
388	1.930E-02	429	5.346E-01	470	5.227E+00	511	7.051E+00	552	1.037E+01
389	2.500E-02	430	6.116E-01	471	5.075E+00	512	7.191E+00	553	1.043E+01
390	2.570E-02	431	7.039E-01	472	4.914E+00	513	7.327E+00	554	1.048E+01
391	1.120E-02	432	8.142E-01	473	4.737E+00	514	7.461E+00	555	1.053E+01
392	7.200E-03	433	9.194E-01	474	4.555E+00	515	7.579E+00	556	1.059E+01
393	1.040E-02	434	1.032E+00	475	4.377E+00	516	7.698E+00	557	1.064E+01
394	1.730E-02	435	1.171E+00	476	4.215E+00	517	7.821E+00	558	1.069E+01
395	2.220E-02	436	1.321E+00	477	4.069E+00	518	7.934E+00	559	1.074E+01
396	1.550E-02	437	1.480E+00	478	3.936E+00	519	8.046E+00	560	1.079E+01
397	9.000E-03	438	1.668E+00	479	3.834E+00	520	8.151E+00	561	1.083E+01
398	5.400E-03	439	1.881E+00	480	3.762E+00	521	8.241E+00	562	1.089E+01
399	2.700E-03	440	2.125E+00	481	3.716E+00	522	8.340E+00	563	1.095E+01
400	1.270E-02	441	2.403E+00	482	3.703E+00	523	8.436E+00	564	1.099E+01
401	1.530E-02	442	2.717E+00	483	3.705E+00	524	8.525E+00	565	1.104E+01
402	1.420E-02	443	3.079E+00	484	3.731E+00	525	8.616E+00	566	1.109E+01
403	1.330E-02	444	3.489E+00	485	3.771E+00	526	8.707E+00	567	1.114E+01
404	1.360E-02	445	3.962E+00	486	3.822E+00	527	8.797E+00	568	1.119E+01
405	1.760E-02	446	4.487E+00	487	3.886E+00	528	8.884E+00	569	1.124E+01
406	2.500E-02	447	5.068E+00	488	3.953E+00	529	8.959E+00	570	1.129E+01
407	2.730E-02	448	5.704E+00	489	4.028E+00	530	9.026E+00	571	1.134E+01
408	2.200E-02	449	6.363E+00	490	4.110E+00	531	9.100E+00	572	1.139E+01
409	3.460E-02	450	7.018E+00	491	4.199E+00	532	9.166E+00	573	1.145E+01
410	4.150E-02	451	7.631E+00	492	4.294E+00	533	9.227E+00	574	1.150E+01
411	3.220E-02	452	8.160E+00	493	4.400E+00	534	9.293E+00	575	1.156E+01
412	2.670E-02	453	8.591E+00	494	4.508E+00	535	9.363E+00	576	1.162E+01
413	2.540E-02	454	8.854E+00	495	4.624E+00	536	9.437E+00	577	1.168E+01
414	3.060E-02	455	8.960E+00	496	4.763E+00	537	9.504E+00	578	1.175E+01
415	4.070E-02	456	8.898E+00	497	4.907E+00	538	9.563E+00	579	1.182E+01
416	5.060E-02	457	8.686E+00	498	5.049E+00	539	9.617E+00	580	1.188E+01
417	6.120E-02	458	8.374E+00	499	5.199E+00	540	9.670E+00	581	1.195E+01
418	8.200E-02	459	7.996E+00	500	5.360E+00	541	9.724E+00	582	1.201E+01
419	9.510E-02	460	7.589E+00	501	5.521E+00	542	9.778E+00	583	1.207E+01
420	1.216E-01	461	7.190E+00	502	5.674E+00	543	9.833E+00	584	1.215E+01

nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
585	1.223E+01	626	1.499E+01	667	1.099E+01	708	4.377E+00	749	1.105E+00
586	1.230E+01	627	1.498E+01	668	1.080E+01	709	4.246E+00	750	1.100E+00
587	1.237E+01	628	1.495E+01	669	1.062E+01	710	4.101E+00	751	1.078E+00
588	1.245E+01	629	1.494E+01	670	1.045E+01	711	3.965E+00	752	1.051E+00
589	1.253E+01	630	1.494E+01	671	1.025E+01	712	3.869E+00	753	9.977E-01
590	1.261E+01	631	1.491E+01	672	1.007E+01	713	3.771E+00	754	9.076E-01
591	1.269E+01	632	1.488E+01	673	9.894E+00	714	3.656E+00	755	8.641E-01
592	1.276E+01	633	1.485E+01	674	9.720E+00	715	3.545E+00	756	8.514E-01
593	1.286E+01	634	1.482E+01	675	9.538E+00	716	3.432E+00	757	7.182E-01
594	1.296E+01	635	1.477E+01	676	9.351E+00	717	3.366E+00	758	6.603E-01
595	1.305E+01	636	1.473E+01	677	9.163E+00	718	3.254E+00	759	6.579E-01
596	1.314E+01	637	1.468E+01	678	8.981E+00	719	3.148E+00	760	6.115E-01
597	1.323E+01	638	1.463E+01	679	8.798E+00	720	3.051E+00	761	6.402E-01
598	1.332E+01	639	1.455E+01	680	8.626E+00	721	2.964E+00	762	6.732E-01
599	1.340E+01	640	1.449E+01	681	8.460E+00	722	2.901E+00	763	6.804E-01
600	1.349E+01	641	1.442E+01	682	8.304E+00	723	2.806E+00	764	6.062E-01
601	1.358E+01	642	1.433E+01	683	8.136E+00	724	2.711E+00	765	5.506E-01
602	1.369E+01	643	1.425E+01	684	7.939E+00	725	2.639E+00	766	5.292E-01
603	1.378E+01	644	1.417E+01	685	7.744E+00	726	2.535E+00	767	5.542E-01
604	1.386E+01	645	1.407E+01	686	7.587E+00	727	2.458E+00	768	5.337E-01
605	1.394E+01	646	1.396E+01	687	7.437E+00	728	2.409E+00	769	4.668E-01
606	1.404E+01	647	1.385E+01	688	7.244E+00	729	2.369E+00	770	4.022E-01
607	1.412E+01	648	1.374E+01	689	7.069E+00	730	2.292E+00	771	4.064E-01
608	1.420E+01	649	1.365E+01	690	6.910E+00	731	2.219E+00	772	4.098E-01
609	1.430E+01	650	1.354E+01	691	6.752E+00	732	2.125E+00	773	3.829E-01
610	1.436E+01	651	1.342E+01	692	6.602E+00	733	2.029E+00	774	3.625E-01
611	1.443E+01	652	1.329E+01	693	6.447E+00	734	1.971E+00	775	3.696E-01
612	1.452E+01	653	1.316E+01	694	6.289E+00	735	1.890E+00	776	3.268E-01
613	1.458E+01	654	1.302E+01	695	6.125E+00	736	1.814E+00	777	3.098E-01
614	1.463E+01	655	1.287E+01	696	5.979E+00	737	1.731E+00	778	2.857E-01
615	1.469E+01	656	1.272E+01	697	5.845E+00	738	1.651E+00	779	2.912E-01
616	1.475E+01	657	1.258E+01	698	5.691E+00	739	1.606E+00	780	2.532E-01
617	1.480E+01	658	1.245E+01	699	5.532E+00	740	1.589E+00		
618	1.484E+01	659	1.229E+01	700	5.397E+00	741	1.546E+00		
619	1.487E+01	660	1.212E+01	701	5.267E+00	742	1.502E+00		
620	1.489E+01	661	1.195E+01	702	5.107E+00	743	1.397E+00		
621	1.492E+01	662	1.180E+01	703	4.969E+00	744	1.316E+00		
622	1.495E+01	663	1.164E+01	704	4.845E+00	745	1.224E+00		
623	1.496E+01	664	1.147E+01	705	4.711E+00	746	1.175E+00		
624	1.497E+01	665	1.131E+01	706	4.593E+00	747	1.168E+00		
625	1.499E+01	666	1.115E+01	707	4.487E+00	748	1.136E+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: **Downward**

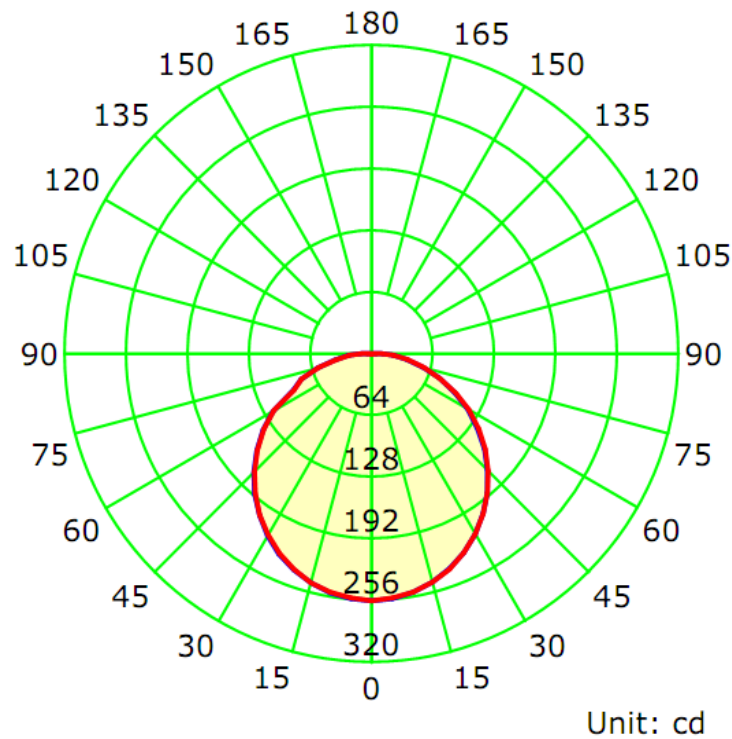
Electrical Measurement

Input Voltage (V)	Frequency (Hz)	Input Current (A)	Power (W)	Power Factor
120.0	60	0.0980	10.86	0.9260

Photometric Measurement

Luminous Flux (lm)	Efficacy (lm/W)	I_{max} (cd)	S/MH (C0/180)	S/MH (C90/270)
773.1	71.19	256.5	1.26	1.26

Luminous Intensity Distribution



	C0/180	C45/225	C90/270	C135/315	AVG.
Beam Angle (50% I_{max}):	114.6	114.7	114.6	114.7	114.7
Field Angle (10% I_{max}):	168.5	168.4	168.3	168.5	168.4

Luminous Intensity (cd) Distribution Data

C γ	0°	22.5°	45°	67.5°	90°	112.5°	135°	157.5°
0.0°	257	257	257	257	257	257	257	257
5.0°	255	255	255	255	255	256	256	256
10.0°	252	252	252	252	252	252	253	253
15.0°	246	246	246	246	246	247	247	247
20.0°	238	238	238	238	238	239	239	240
25.0°	228	228	228	228	229	229	230	230
30.0°	216	216	216	216	217	217	218	219
35.0°	203	203	203	203	203	204	205	206
40.0°	188	188	188	188	189	190	191	191
45.0°	172	171	172	172	172	173	175	175
50.0°	155	154	154	154	155	156	157	158
55.0°	136	135	136	136	137	138	139	140
60.0°	117	116	116	116	117	118	120	121
65.0°	96	96	96	96	97	98	100	101
70.0°	76	76	75	76	77	78	79	81
75.0°	56	55	55	56	57	58	59	60
80.0°	38	37	37	38	38	39	40	41
85.0°	23	22	22	22	23	24	25	25
90.0°	11	11	11	11	11	12	13	10
95.0°	5	5	5	5	5	5	5	5
100.0°	2	2	0	1	2	1	0	2
105.0°	1	0	0	0	0	0	0	0
110.0°	0	0	0	0	0	0	0	0
115.0°	0	0	0	0	0	0	0	0
120.0°	0	0	0	0	0	0	0	0
125.0°	0	0	0	0	0	0	0	0
130.0°	0	0	0	0	0	0	0	0
135.0°	0	0	0	0	0	0	0	0
140.0°	0	0	0	0	0	0	0	0
145.0°	0	0	0	0	0	0	0	0
150.0°	0	0	0	0	0	0	0	0
155.0°	0	0	0	0	0	0	0	0
160.0°	0	0	0	0	0	0	0	0
165.0°	0	0	0	0	0	0	0	0
170.0°	0	0	0	0	0	0	0	0
175.0°	0	0	0	0	0	0	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°	257	257	257	257	257	257	257	257
5.0°	256	256	256	255	255	255	255	255
10.0°	253	253	252	252	252	252	252	251
15.0°	247	247	247	247	246	246	246	245
20.0°	239	239	239	239	239	238	238	237
25.0°	230	230	230	229	229	228	228	227
30.0°	218	219	218	218	217	217	216	216
35.0°	205	205	205	205	204	204	203	202
40.0°	191	191	191	190	189	189	188	187
45.0°	174	174	174	174	174	172	172	171
50.0°	157	157	157	157	156	155	154	153
55.0°	139	139	139	139	138	137	136	135
60.0°	120	120	120	119	118	117	116	115
65.0°	90	92	99	99	90	97	96	88
70.0°	79	79	79	79	78	77	76	75
75.0°	59	59	59	59	58	57	56	54
80.0°	40	41	41	40	39	38	37	37
85.0°	24	25	24	24	23	23	22	21
90.0°	12	13	13	12	12	12	11	11
95.0°	5	5	5	5	5	5	5	5
100.0°	2	1	0	2	2	1	0	2
105.0°	0	0	0	1	1	1	0	0
110.0°	0	0	0	0	0	0	0	0
115.0°	0	0	0	0	0	0	0	0
120.0°	0	0	0	0	0	0	0	0
125.0°	0	0	0	0	0	0	0	0
130.0°	0	0	0	0	0	0	0	0
135.0°	0	0	0	0	0	0	0	0
140.0°	0	0	0	0	0	0	0	0
145.0°	0	0	0	0	0	0	0	0
150.0°	0	0	0	0	0	0	0	0
155.0°	0	0	0	0	0	0	0	0
160.0°	0	0	0	0	0	0	0	0
165.0°	0	0	0	0	0	0	0	0
170.0°	0	0	0	0	0	0	0	0
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	6.1	0.79	0-5	6.1	0.79
5-10	18.1	2.35	0-10	24.3	3.14
10-15	29.6	3.82	0-15	53.8	6.96
15-20	40.0	5.17	0-20	93.8	12.13
20-25	49.0	6.34	0-25	142.8	18.47
25-30	56.4	7.30	0-30	199.2	25.77
30-35	62.0	8.02	0-35	261.2	33.79
35-40	65.6	8.48	0-40	326.8	42.28
40-45	67.0	8.67	0-45	393.9	50.95
45-50	66.4	8.59	0-50	460.3	59.53
50-55	63.7	8.23	0-55	523.9	67.77
55-60	58.9	7.62	0-60	582.9	75.39
60-65	51.9	6.72	0-65	634.8	82.11
65-70	43.8	5.67	0-70	678.6	87.78
70-75	35.2	4.55	0-75	713.8	92.33
75-80	25.7	3.33	0-80	739.5	95.65
80-85	16.8	2.18	0-85	756.3	97.83
85-90	9.5	1.23	0-90	765.9	99.06
90-95	4.5	0.59	0-95	770.4	99.65
95-100	1.7	0.22	0-100	772.1	99.87
100-105	0.4	0.05	0-105	772.5	99.92
105-110	0.1	0.01	0-110	772.6	99.93
110-115	0.1	0.01	0-115	772.6	99.94
115-120	0.1	0.01	0-120	772.7	99.95
120-125	0.1	0.01	0-125	772.8	99.96
125-130	0.1	0.01	0-130	772.8	99.96
130-135	0.1	0.01	0-135	772.9	99.97
135-140	0.0	0.01	0-140	772.9	99.98
140-145	0.0	0.01	0-145	773.0	99.98
145-150	0.0	0.00	0-150	773.0	99.99
150-155	0.0	0.00	0-155	773.0	99.99
155-160	0.0	0.00	0-160	773.1	99.99
160-165	0.0	0.00	0-165	773.1	100.00
165-170	0.0	0.00	0-170	773.1	100.00
170-175	0.0	0.00	0-175	773.1	100.00
175-180	0.0	0.00	0-180	773.1	100.00

6. Product Photo



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