

IES LM-79-08

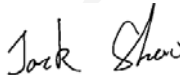
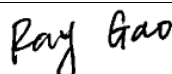
MEASUREMENT AND TEST REPORT

For

GREEN CREATIVE LTD

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

Test Model: 10SMPS5.5DIM/927

Report Type:	Electrical and Photometric tests including: Luminous Flux, Chromaticity, Luminous Intensity Distribution
Test Engineer:	Jack Shao 
Report Number:	RKS170510002-10
Test Date:	2017-05-11
Report Date:	2017-05-12
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 2017-05-10 and used for testing.

Model Tested: 10SMPS5.5DIM/927
 Manufacturer: GREEN CREATIVE LTD
 Brand Name: GREEN CREATIVE
 Product Designation: 5.5" DOWNLIGHT
 Aging Time Before Test: 0hour(For New Products)

Rated Values:

Rated Voltage/Frequency: 120 V AC 60Hz
 Rated Power: 10 W
 Nominal CCT: 2700K
 Nominal Lumen Output: 550 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.

4 π 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**

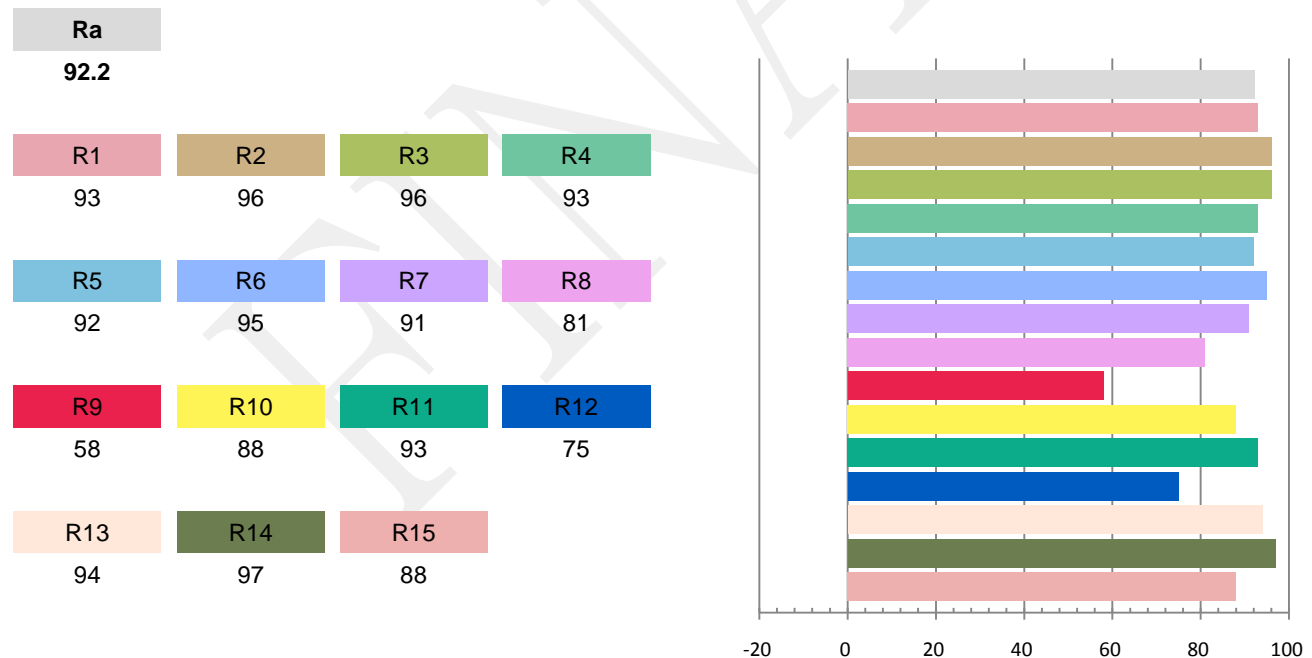
Test orientation: **Downward**

Photometric and Electrical Measurement Result

Voltage (V)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Luminous Flux(lm)	Efficacy (lm/W)
120.0	60	0.0919	9.95	0.9023	583.5	58.65

Radiant Flux (W)	CCT (K)	Duv	x	y	u'	v'
2.027	2636	0.00155	0.4680	0.4166	0.2650	0.5308

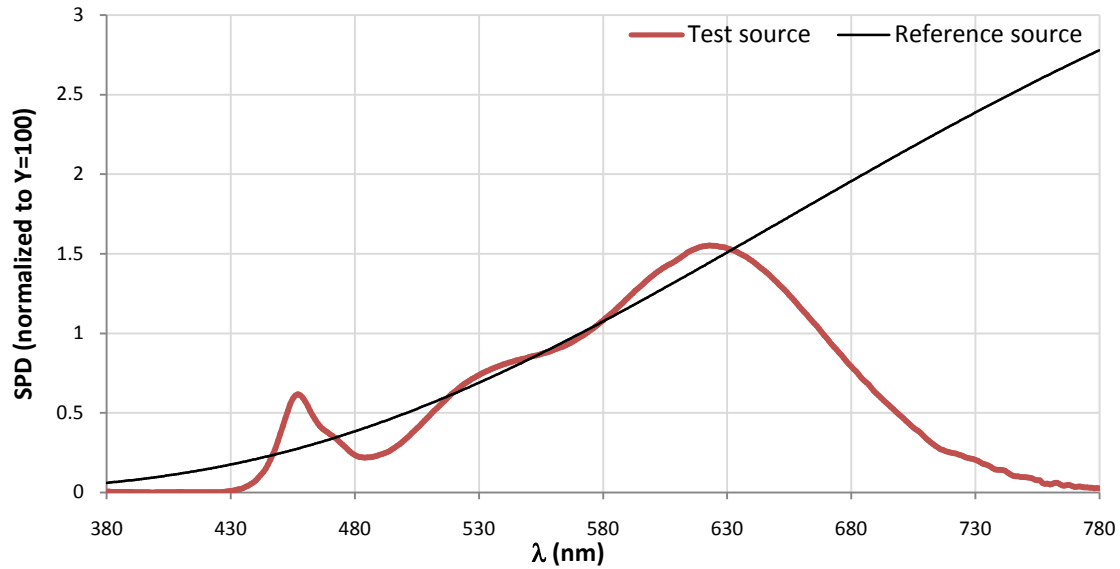
Color Rendering Index



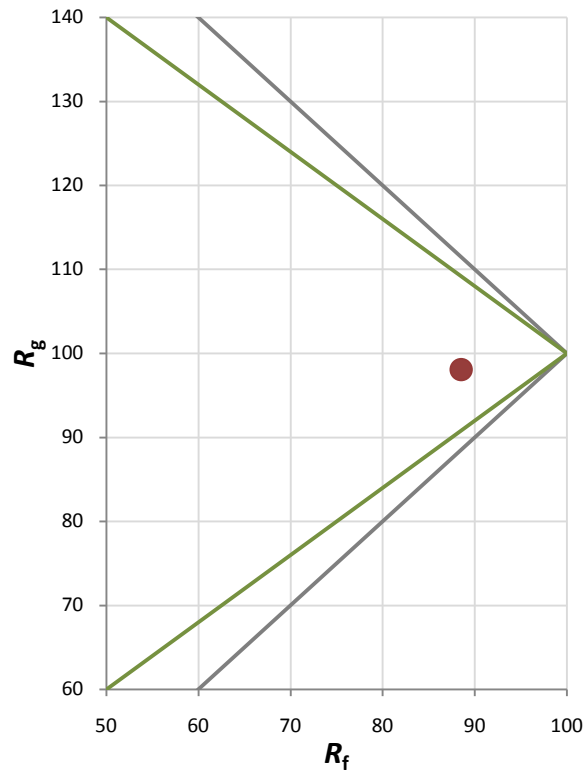
Fidelity Index and Gamut Index

Fidelity Index R_f	89
Gamut Index R_g	98

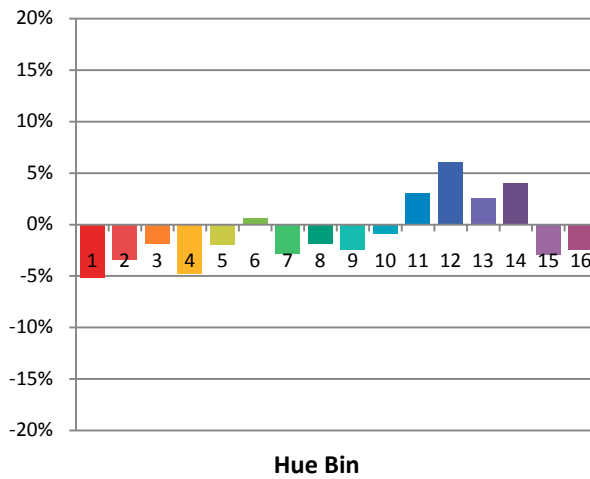
Spectral Power Distribution Comparison



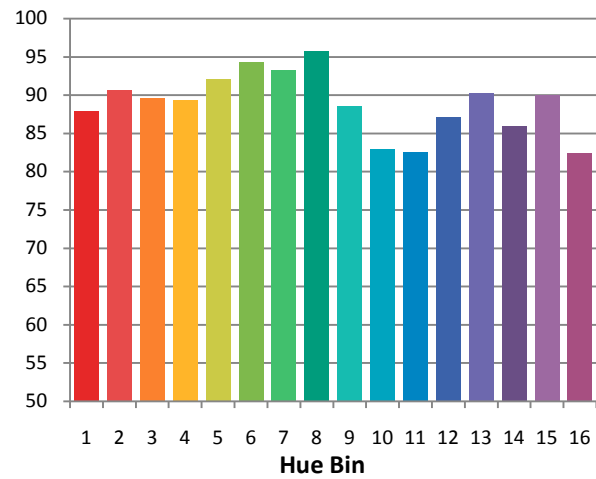
Plot of R_g versus R_f



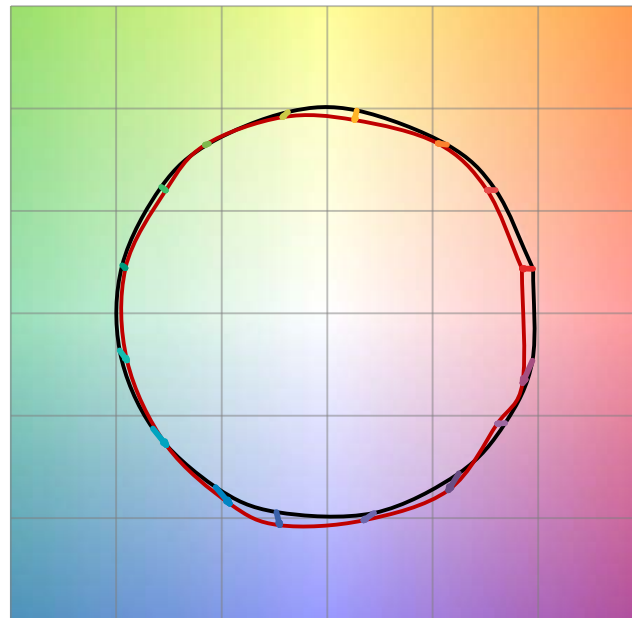
Chroma Shift by Hue



R_t by Hue

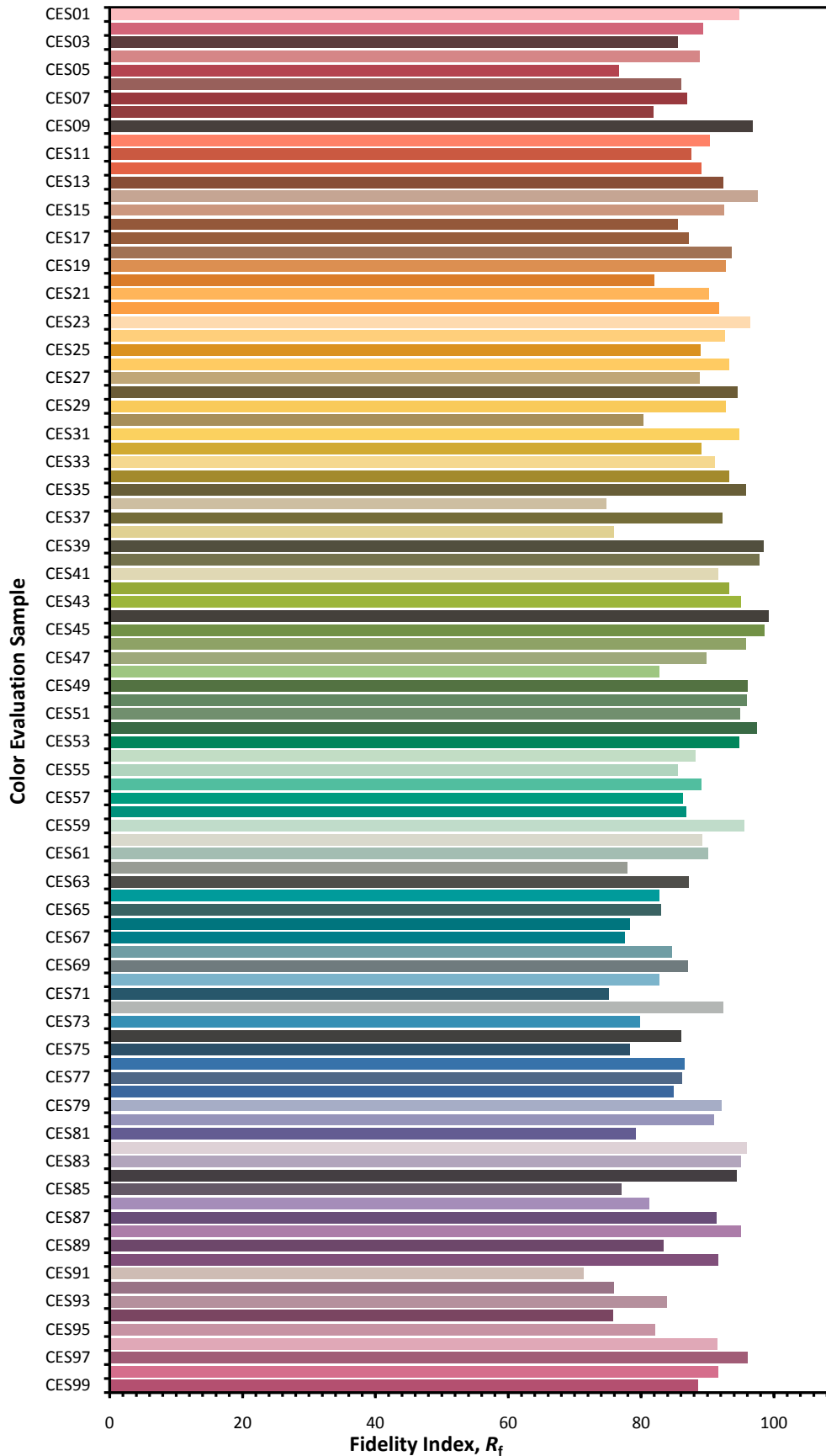


Color Vector Graphic

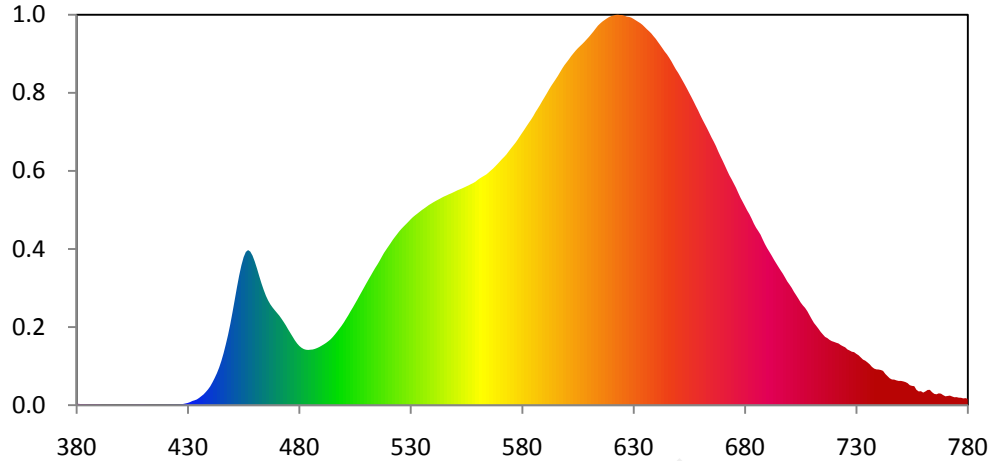


— Reference Illuminat — Test Source

Color Fidelity by CES Sample



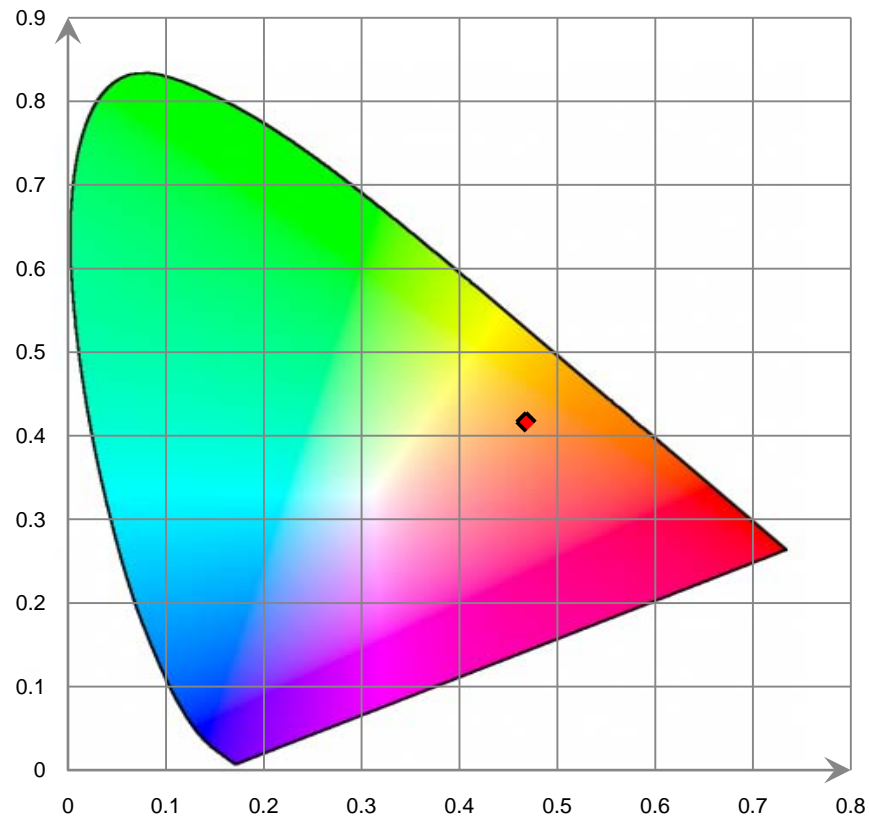
Relative Spectral Power Distribution



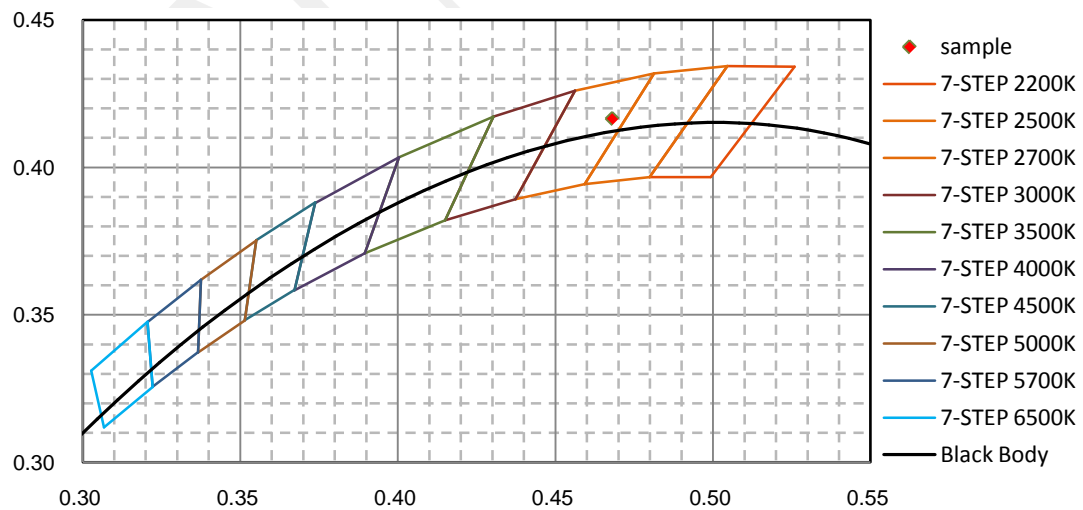
nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
380	4.620E-02	421	1.860E-02	462	4.381E+00	503	3.189E+00	544	7.047E+00
381	4.510E-02	422	1.460E-02	463	4.137E+00	504	3.314E+00	545	7.085E+00
382	3.730E-02	423	1.880E-02	464	3.915E+00	505	3.446E+00	546	7.118E+00
383	3.650E-02	424	1.810E-02	465	3.715E+00	506	3.579E+00	547	7.154E+00
384	3.810E-02	425	1.560E-02	466	3.553E+00	507	3.716E+00	548	7.186E+00
385	2.870E-02	426	1.790E-02	467	3.421E+00	508	3.852E+00	549	7.220E+00
386	2.680E-02	427	2.770E-02	468	3.315E+00	509	3.988E+00	550	7.258E+00
387	3.070E-02	428	4.400E-02	469	3.221E+00	510	4.125E+00	551	7.295E+00
388	2.870E-02	429	6.030E-02	470	3.130E+00	511	4.258E+00	552	7.326E+00
389	3.490E-02	430	7.870E-02	471	3.041E+00	512	4.388E+00	553	7.357E+00
390	3.280E-02	431	1.056E-01	472	2.935E+00	513	4.521E+00	554	7.392E+00
391	1.530E-02	432	1.430E-01	473	2.822E+00	514	4.651E+00	555	7.427E+00
392	9.400E-03	433	1.655E-01	474	2.703E+00	515	4.769E+00	556	7.463E+00
393	1.190E-02	434	1.945E-01	475	2.570E+00	516	4.898E+00	557	7.503E+00
394	1.570E-02	435	2.448E-01	476	2.447E+00	517	5.035E+00	558	7.539E+00
395	1.780E-02	436	3.053E-01	477	2.323E+00	518	5.169E+00	559	7.582E+00
396	1.370E-02	437	3.649E-01	478	2.200E+00	519	5.281E+00	560	7.643E+00
397	8.600E-03	438	4.457E-01	479	2.096E+00	520	5.393E+00	561	7.699E+00
398	4.900E-03	439	5.334E-01	480	2.010E+00	521	5.504E+00	562	7.746E+00
399	2.600E-03	440	6.372E-01	481	1.948E+00	522	5.618E+00	563	7.791E+00
400	1.280E-02	441	7.732E-01	482	1.904E+00	523	5.719E+00	564	7.835E+00
401	1.630E-02	442	9.206E-01	483	1.882E+00	524	5.817E+00	565	7.900E+00
402	1.550E-02	443	1.084E+00	484	1.875E+00	525	5.915E+00	566	7.969E+00
403	1.300E-02	444	1.275E+00	485	1.884E+00	526	6.000E+00	567	8.035E+00
404	1.460E-02	445	1.501E+00	486	1.890E+00	527	6.078E+00	568	8.112E+00
405	1.740E-02	446	1.763E+00	487	1.911E+00	528	6.154E+00	569	8.191E+00
406	2.030E-02	447	2.062E+00	488	1.940E+00	529	6.230E+00	570	8.274E+00
407	2.160E-02	448	2.383E+00	489	1.976E+00	530	6.311E+00	571	8.356E+00
408	1.930E-02	449	2.746E+00	490	2.020E+00	531	6.384E+00	572	8.432E+00
409	2.980E-02	450	3.151E+00	491	2.065E+00	532	6.447E+00	573	8.515E+00
410	2.910E-02	451	3.575E+00	492	2.114E+00	533	6.505E+00	574	8.618E+00
411	2.000E-02	452	4.001E+00	493	2.171E+00	534	6.564E+00	575	8.717E+00
412	1.630E-02	453	4.402E+00	494	2.234E+00	535	6.624E+00	576	8.811E+00
413	1.200E-02	454	4.749E+00	495	2.313E+00	536	6.675E+00	577	8.907E+00
414	1.260E-02	455	5.024E+00	496	2.403E+00	537	6.730E+00	578	9.013E+00
415	1.300E-02	456	5.203E+00	497	2.498E+00	538	6.787E+00	579	9.131E+00
416	1.230E-02	457	5.264E+00	498	2.597E+00	539	6.833E+00	580	9.243E+00
417	1.080E-02	458	5.213E+00	499	2.698E+00	540	6.880E+00	581	9.354E+00
418	1.400E-02	459	5.076E+00	500	2.810E+00	541	6.924E+00	582	9.469E+00
419	1.220E-02	460	4.875E+00	501	2.933E+00	542	6.965E+00	583	9.583E+00
420	1.470E-02	461	4.639E+00	502	3.055E+00	543	7.005E+00	584	9.693E+00

nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
585	9.812E+00	626	1.322E+01	667	8.794E+00	708	3.192E+00	749	8.234E-01
586	9.947E+00	627	1.319E+01	668	8.617E+00	709	3.054E+00	750	8.247E-01
587	1.007E+01	628	1.318E+01	669	8.454E+00	710	2.917E+00	751	8.082E-01
588	1.019E+01	629	1.316E+01	670	8.298E+00	711	2.790E+00	752	7.855E-01
589	1.032E+01	630	1.311E+01	671	8.136E+00	712	2.695E+00	753	7.492E-01
590	1.045E+01	631	1.306E+01	672	7.968E+00	713	2.595E+00	754	6.789E-01
591	1.057E+01	632	1.302E+01	673	7.808E+00	714	2.487E+00	755	6.546E-01
592	1.071E+01	633	1.297E+01	674	7.671E+00	715	2.401E+00	756	6.455E-01
593	1.083E+01	634	1.291E+01	675	7.525E+00	716	2.317E+00	757	5.215E-01
594	1.094E+01	635	1.284E+01	676	7.379E+00	717	2.277E+00	758	4.671E-01
595	1.106E+01	636	1.276E+01	677	7.209E+00	718	2.216E+00	759	4.744E-01
596	1.117E+01	637	1.269E+01	678	7.044E+00	719	2.174E+00	760	4.264E-01
597	1.130E+01	638	1.262E+01	679	6.902E+00	720	2.149E+00	761	4.669E-01
598	1.143E+01	639	1.252E+01	680	6.758E+00	721	2.119E+00	762	5.174E-01
599	1.154E+01	640	1.243E+01	681	6.613E+00	722	2.096E+00	763	5.214E-01
600	1.164E+01	641	1.233E+01	682	6.484E+00	723	2.041E+00	764	4.396E-01
601	1.174E+01	642	1.222E+01	683	6.333E+00	724	2.000E+00	765	3.826E-01
602	1.185E+01	643	1.211E+01	684	6.166E+00	725	1.964E+00	766	3.703E-01
603	1.194E+01	644	1.200E+01	685	6.025E+00	726	1.892E+00	767	4.016E-01
604	1.203E+01	645	1.191E+01	686	5.910E+00	727	1.856E+00	768	3.911E-01
605	1.211E+01	646	1.179E+01	687	5.789E+00	728	1.814E+00	769	3.408E-01
606	1.219E+01	647	1.167E+01	688	5.624E+00	729	1.800E+00	770	3.006E-01
607	1.226E+01	648	1.153E+01	689	5.466E+00	730	1.743E+00	771	3.128E-01
608	1.234E+01	649	1.140E+01	690	5.327E+00	731	1.695E+00	772	3.250E-01
609	1.242E+01	650	1.129E+01	691	5.204E+00	732	1.620E+00	773	2.958E-01
610	1.250E+01	651	1.115E+01	692	5.078E+00	733	1.548E+00	774	2.689E-01
611	1.259E+01	652	1.102E+01	693	4.943E+00	734	1.510E+00	775	2.733E-01
612	1.269E+01	653	1.088E+01	694	4.821E+00	735	1.452E+00	776	2.550E-01
613	1.279E+01	654	1.074E+01	695	4.698E+00	736	1.388E+00	777	2.515E-01
614	1.288E+01	655	1.060E+01	696	4.580E+00	737	1.300E+00	778	2.299E-01
615	1.295E+01	656	1.046E+01	697	4.466E+00	738	1.242E+00	779	2.402E-01
616	1.302E+01	657	1.031E+01	698	4.335E+00	739	1.215E+00	780	2.151E-01
617	1.308E+01	658	1.015E+01	699	4.201E+00	740	1.211E+00		
618	1.313E+01	659	1.000E+01	700	4.096E+00	741	1.195E+00		
619	1.317E+01	660	9.841E+00	701	3.982E+00	742	1.164E+00		
620	1.321E+01	661	9.688E+00	702	3.849E+00	743	1.062E+00		
621	1.323E+01	662	9.545E+00	703	3.733E+00	744	9.864E-01		
622	1.325E+01	663	9.398E+00	704	3.614E+00	745	9.121E-01		
623	1.325E+01	664	9.245E+00	705	3.488E+00	746	8.719E-01		
624	1.324E+01	665	9.090E+00	706	3.387E+00	747	8.678E-01		
625	1.324E+01	666	8.948E+00	707	3.302E+00	748	8.423E-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: **Downward**

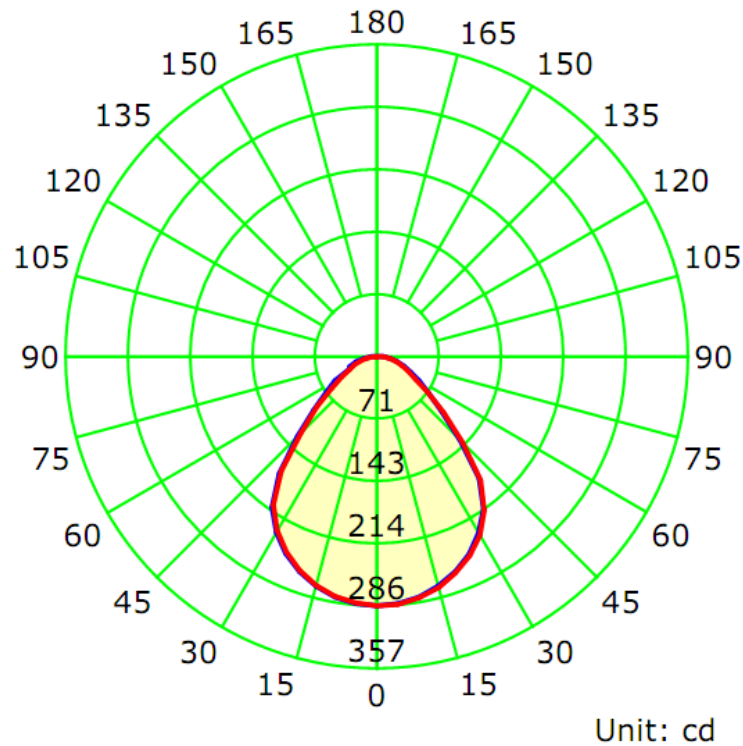
Electrical Measurement

Input Voltage (V)	Frequency (Hz)	Input Current (A)	Power (W)	Power Factor
120.0	60	0.0920	9.98	0.9070

Photometric Measurement

Luminous Flux (lm)	Efficacy (lm/W)	I_{max} (cd)	S/MH (C0/180)	S/MH (C90/270)
591.4	59.26	286.3	1.21	1.21

Luminous Intensity Distribution



	C0/180	C45/225	C90/270	C135/315	AVG.
Beam Angle (50% I_{max}):	87.7	87.6	87.6	87.6	87.6
Field Angle (10% I_{max}):	145.7	144.3	140.8	144.4	143.8

Luminous Intensity (cd) Distribution Data

C γ	0°	22.5°	45°	67.5°	90°	112.5°	135°	157.5°
0.0°	286	286	286	286	286	286	286	286
5.0°	284	285	285	285	285	285	285	285
10.0°	280	280	281	281	281	281	281	281
15.0°	273	273	274	274	274	274	274	274
20.0°	263	264	264	265	264	264	264	264
25.0°	251	251	251	252	252	252	252	252
30.0°	234	235	235	236	237	236	236	236
35.0°	214	215	215	216	216	216	215	215
40.0°	183	184	185	185	185	184	183	181
45.0°	135	137	139	139	139	139	138	137
50.0°	97	99	100	101	101	101	100	99
55.0°	73	71	73	74	72	74	73	71
60.0°	56	52	54	57	52	57	55	52
65.0°	44	39	42	44	39	45	43	41
70.0°	33	31	33	35	31	35	34	33
75.0°	24	24	25	26	24	26	26	25
80.0°	16	16	17	17	16	17	17	17
85.0°	9	8	8	8	8	8	8	8
90.0°	0	1	0	0	0	0	0	1
95.0°	0	0	0	0	0	0	0	0
100.0°	0	0	0	0	0	0	0	0
105.0°	0	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

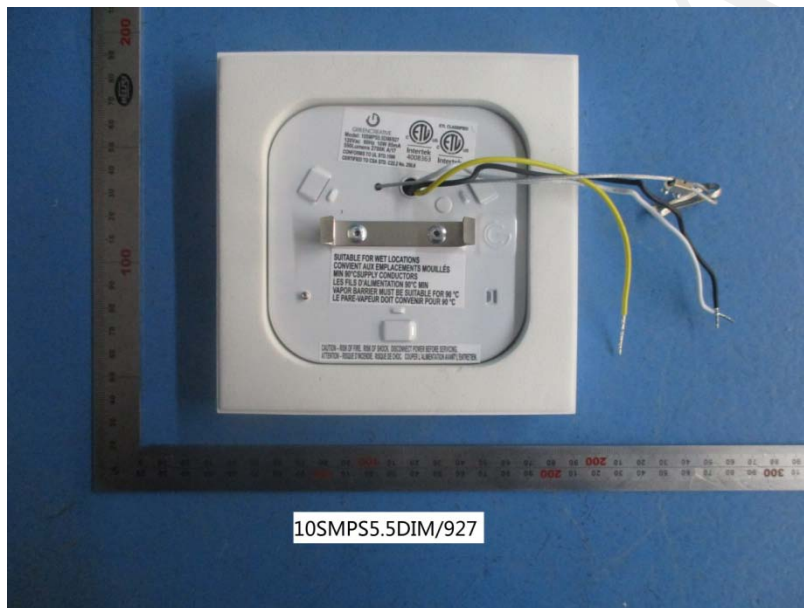
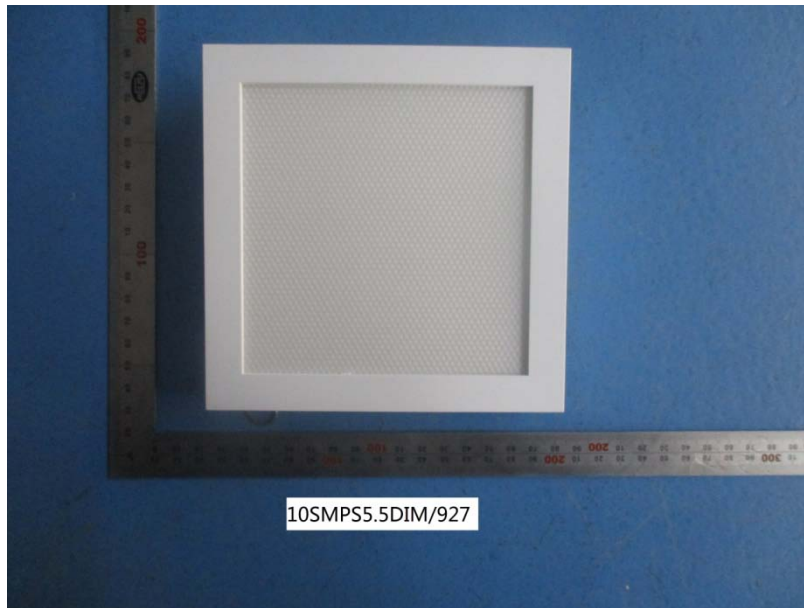
Luminous Intensity (cd) Distribution Data (cont.)

C Y	180°	202.5°	225°	247.5°	270°	292.5°	315°	337.5°
0.0°	286	286	286	286	286	286	286	286
5.0°	285	284	285	285	284	284	285	285
10.0°	280	280	280	280	279	279	279	279
15.0°	273	272	272	272	271	271	272	272
20.0°	263	262	261	261	261	261	261	262
25.0°	250	248	248	248	247	247	248	248
30.0°	233	232	231	231	230	230	231	232
35.0°	211	209	208	208	208	208	209	210
40.0°	176	173	172	171	171	172	173	175
45.0°	130	128	126	126	125	125	126	128
50.0°	95	93	92	91	90	91	91	92
55.0°	72	66	67	68	64	67	67	66
60.0°	57	49	51	53	46	51	51	48
65.0°	35	33	38	40	34	35	40	30
70.0°	34	31	31	31	28	30	31	29
75.0°	25	24	23	22	20	21	22	22
80.0°	16	15	14	13	12	13	14	14
85.0°	7	6	5	4	4	4	5	6
90.0°	0	0	0	0	0	0	0	0
95.0°	0	0	0	0	0	0	0	0
100.0°	0	0	0	0	0	0	0	0
105.0°	0	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	1	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	6.8	1.15	0-5	6.8	1.15
5-10	20.2	3.42	0-10	27.0	4.57
10-15	32.8	5.55	0-15	59.8	10.12
15-20	44.1	7.46	0-20	104.0	17.58
20-25	53.7	9.09	0-25	157.7	26.67
25-30	61.1	10.34	0-30	218.8	37.00
30-35	65.6	11.09	0-35	284.4	48.09
35-40	65.1	11.01	0-40	349.5	59.10
40-45	57.5	9.73	0-45	407.1	68.83
45-50	46.1	7.79	0-50	453.1	76.62
50-55	36.0	6.09	0-55	489.1	82.71
55-60	28.3	4.78	0-60	517.4	87.49
60-65	22.2	3.76	0-65	539.6	91.24
65-70	17.9	3.03	0-70	557.5	94.27
70-75	14.5	2.45	0-75	572.0	96.73
75-80	10.4	1.76	0-80	582.4	98.48
80-85	6.0	1.01	0-85	588.4	99.50
85-90	1.9	0.32	0-90	590.3	99.82
90-95	0.1	0.01	0-95	590.4	99.83
95-100	0.1	0.01	0-100	590.5	99.84
100-105	0.1	0.01	0-105	590.5	99.85
105-110	0.1	0.01	0-110	590.6	99.87
110-115	0.1	0.01	0-115	590.7	99.88
115-120	0.1	0.02	0-120	590.8	99.90
120-125	0.1	0.01	0-125	590.9	99.91
125-130	0.1	0.01	0-130	591.0	99.93
130-135	0.1	0.01	0-135	591.1	99.94
135-140	0.1	0.01	0-140	591.1	99.95
140-145	0.1	0.01	0-145	591.2	99.96
145-150	0.1	0.01	0-150	591.3	99.98
150-155	0.1	0.01	0-155	591.3	99.98
155-160	0.0	0.01	0-160	591.4	99.99
160-165	0.0	0.00	0-165	591.4	100.00
165-170	0.0	0.00	0-170	591.4	100.00
170-175	0.0	0.00	0-175	591.4	100.00
175-180	0.0	0.00	0-180	591.4	100.00

6. Product Photo



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