

IES LM-79-08

MEASUREMENT AND TEST REPORT

For

GREEN CREATIVE LTD

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

Test Model: 13PAR30DIM/930FL40/B

Report Type:	Electrical and Photometric tests including: Luminous Flux, Chromaticity, Luminous Intensity Distribution
Test Engineer:	Hill Liu <i>Hill Liu</i>
Report Number:	R1KS170413004-10A1
Test Date:	2017-04-18 to 2017-04-20
Report Date:	2017-04-21
Reviewed By:	Bill Xiong / EE Engineer <i>Bill Xiong</i>
Prepared By:	Bay Area Compliance Laboratories Corp. (Dongguan). No.69,Pulongcun ,Puxinhu Industrial Area, Tangxia , Dongguan, Guangdong, China. Tel: +86-0769-86858888 Fax:+86-0769-86858588
Accreditation:	The IAS Accreditation Number TL-460.

1. Product Description

General Information:

Two samples were received on 2017-04-13. One was tested in integrating sphere and the other was tested in goniophotometer

Model Tested: 13PAR30DIM/930FL40/B
Manufacturer: GREEN CREATIVE LTD
Brand Name: GREEN CREATIVE
Product Designation: Directional LED Lamp
Burning Time Before Test: 0hour(For New Products)

Rated Values:

Rated Voltage/Frequency: 120 VAC 60Hz
Rated Power: 13W
Nominal CCT: 3000K
Nominal Lumen Output: 1050lm

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 (This method is not in IAS accreditation scope)

3. Description of Test Equipment

Device	Manufacture	Model No	Serial No	Test Range	Calibration date	Calibration due date
Integrating Sphere	SENSING	N/A	N/A	25°C	2017-03-09	2018-03-08
Power Meter	SENSING	UI2008	908735	10.0-600.0V	2017-03-03	2018-03-02
Spectral photometer	SENSING	SPR3000	s0902024	350nm~800nm	2017-03-09	2018-03-08
AC Power Supply	ALL Power	APW-105N	970663	220V±10% 50Hz	2017-03-03	2018-03-02
Standard Light Source	EVERFINE	D204	G100283CA8351158	24V/100W	2016-08-26	2017-08-25
Thermal Meter	SENSING	N/A	N/A	25°C	2016-03-21	2017-03-20
DC Power Supply	ITECH	IT6154	0061 0417 6471 0010 19	0~32V	2017-03-03	2018-03-02
AC Power Supply	EVERFINE	VPS1030 PWM	1012017	0-150V, 0-300V	2017-03-03	2018-03-02
DC Power Supply	EVERFINE	WY12010	1009009	30V/5A	2017-03-03	2018-03-02
Power Meter	YOKOGAWA	WT-210	91KB35700	15/30/60/150/300/600 V	2017-03-03	2018-03-02
Goniophotometer	EVERFINE	GO-R5000	YG108492N10120001	1600mm,3000W/10A	2017-03-09	2018-03-08
Wireless Remote Sensor	N/A	433MHz	N/A	0°C~50°C;-20°C~60°C	2017-03-20	2018-03-19
Standard Light	EVERFINE	D908	1012003	N/A	2016-09-07	2017-09-06

Device	Manufacture	Model No	Serial No	Test Range	Calibration date	Calibration due date
Source						

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 $U=2.3\%$ ($K=2$), at the 95% confidence level. The uncertainty of the correlated color temperature measurements is $U=23\text{K}$ ($K=2$), at the 95% confidence level. The uncertainty of the CRI is $U=2.3(K=2)$, at the 95% confidence level.

The uncertainty of power meter AC current $U=0.19\%$ of rdg, AC Voltage $U=0.15\%$ of rdg, Power $U=0.20\%$ ($K=2$), 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 $U=1.6\%$ ($K=2$), 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: **Base up**

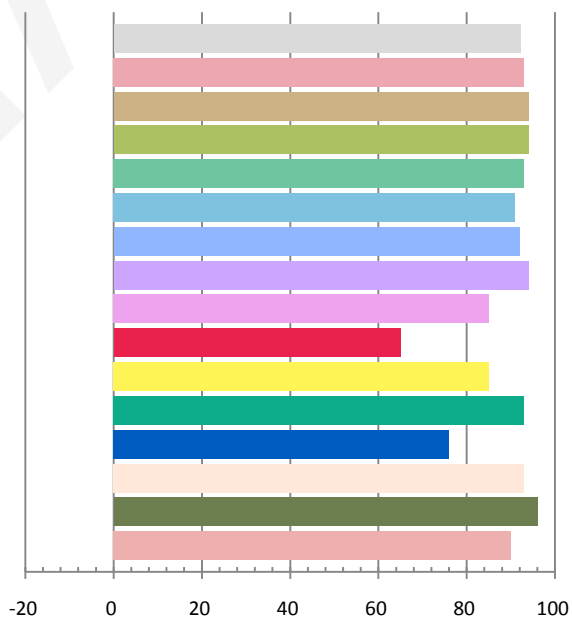
Photometric and Electrical Measurement Result

Voltage (V)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Luminous Flux(lm)	Efficacy (lm/W)
120.1	60	0.1135	12.87	0.9446	1080.5	83.93

Radiant Flux (mW)	CCT (K)	Duv	x	y	u'	v'
3815.3	2947	0.00094	0.4422	0.4082	0.2522	0.5238

Color Rendering Index

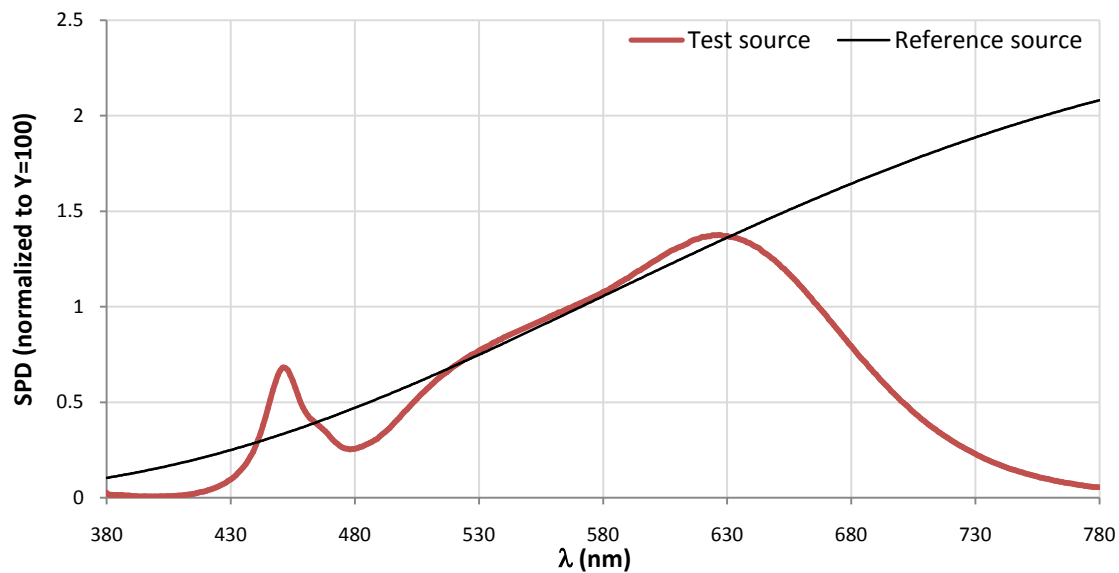
Ra			
92.2			
R1	R2	R3	R4
93	94	94	93
R5	R6	R7	R8
91	92	94	85
R9	R10	R11	R12
65	85	93	76
R13	R14	R15	
93	96	90	



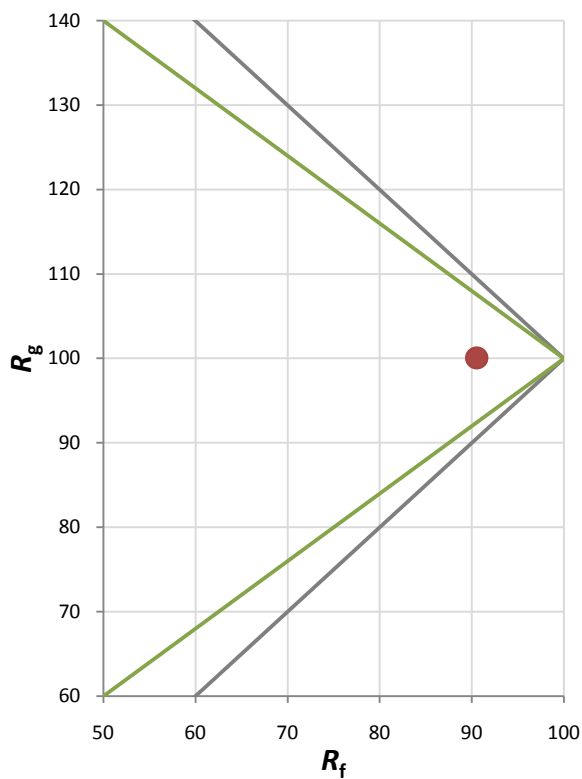
Fidelity Index and Gamut Index

Fidelity Index R_f	91
Gamut Index R_g	100

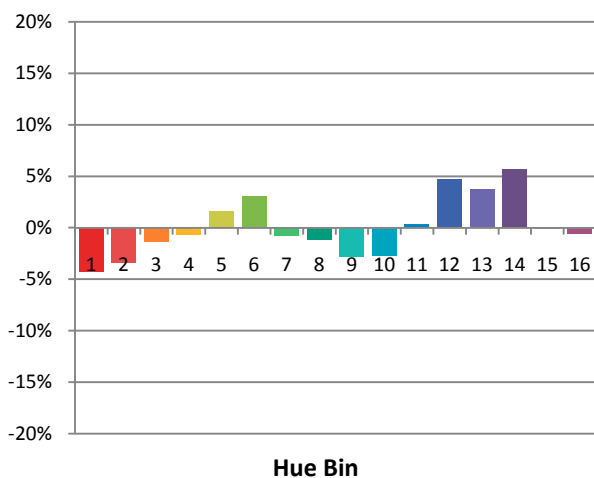
Spectral Power Distribution Comparison



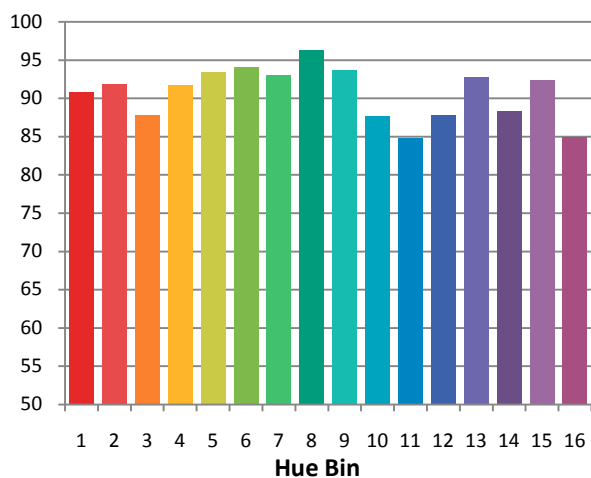
Plot of R_g versus R_f



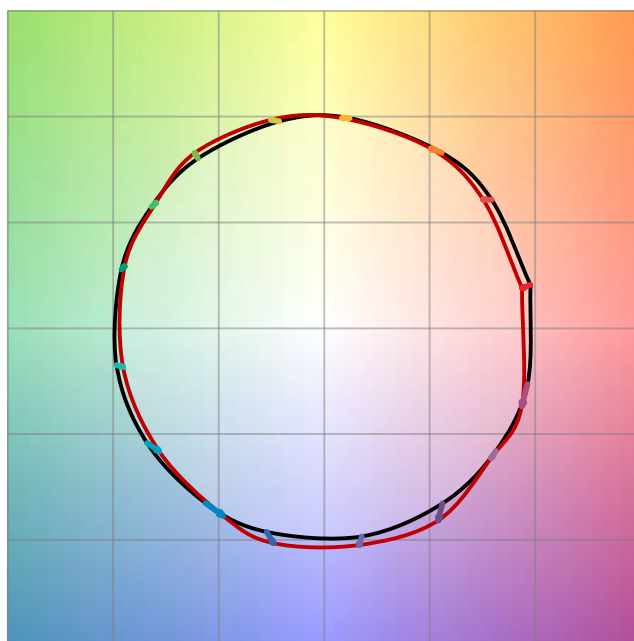
Chroma Shift by Hue



R_f by Hue

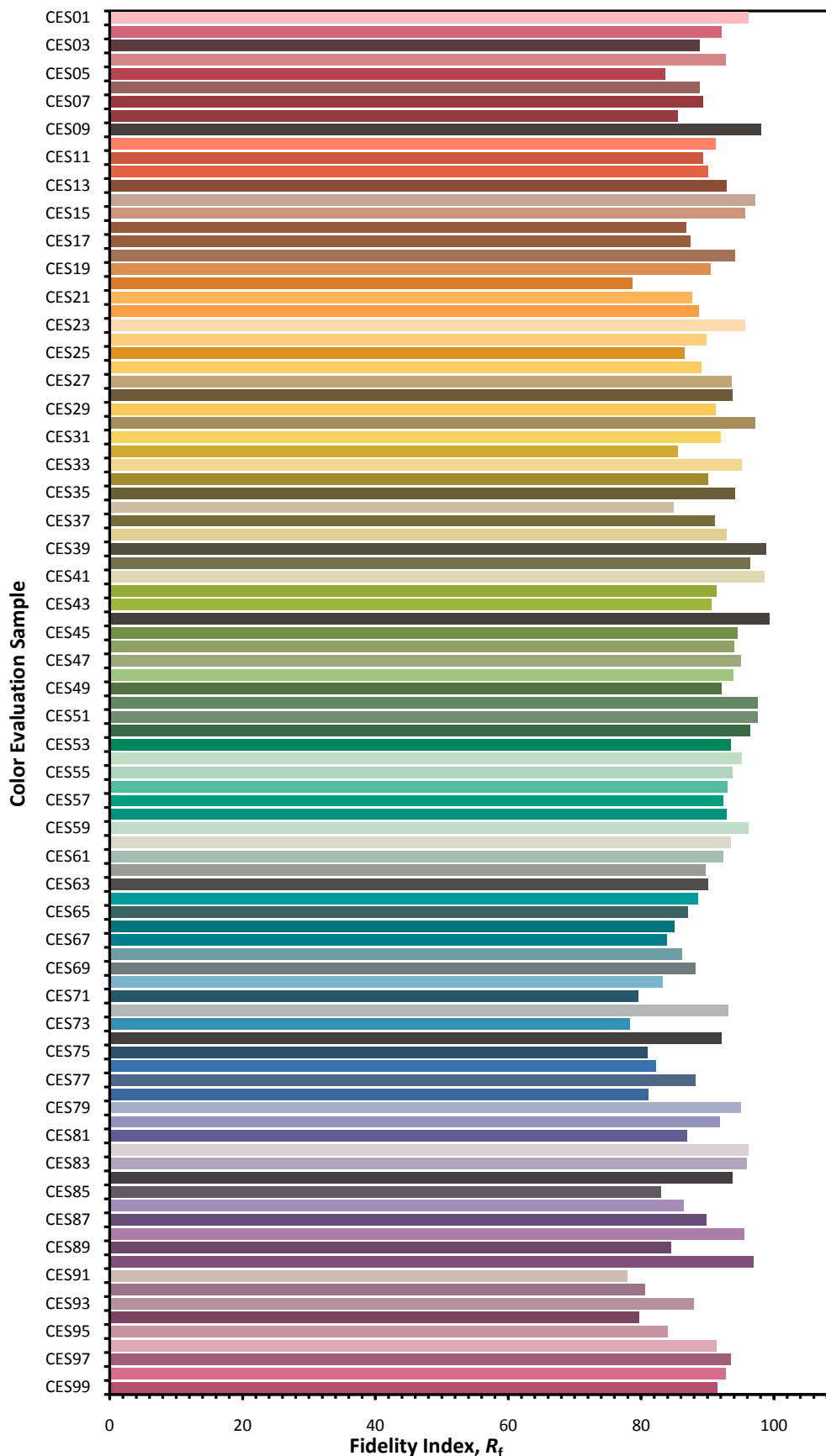


Color Vector Graphic

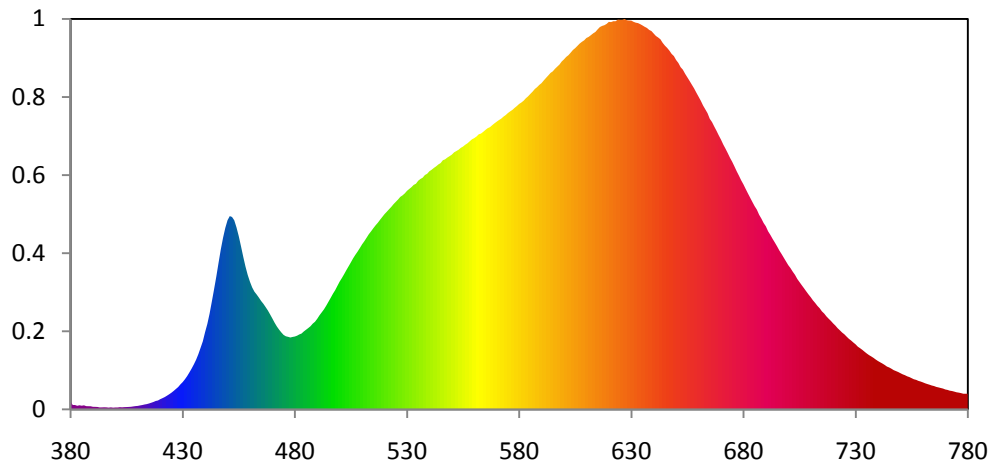


— Reference Illuminat — Test Source

Color Fidelity by CES Sample



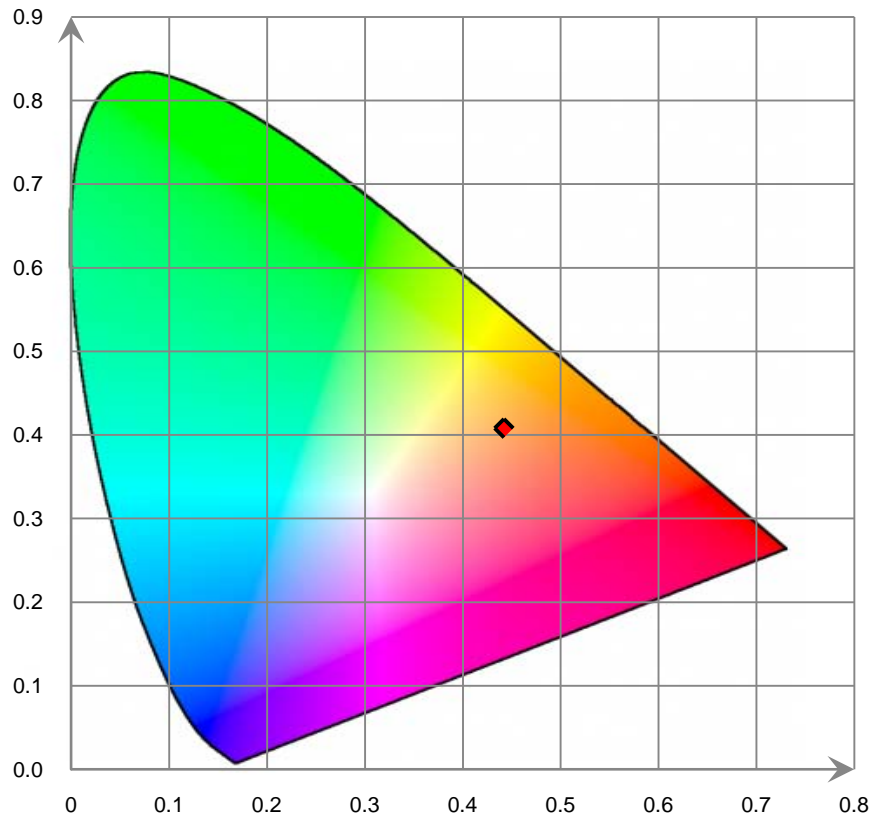
Relative Spectral Power Distribution



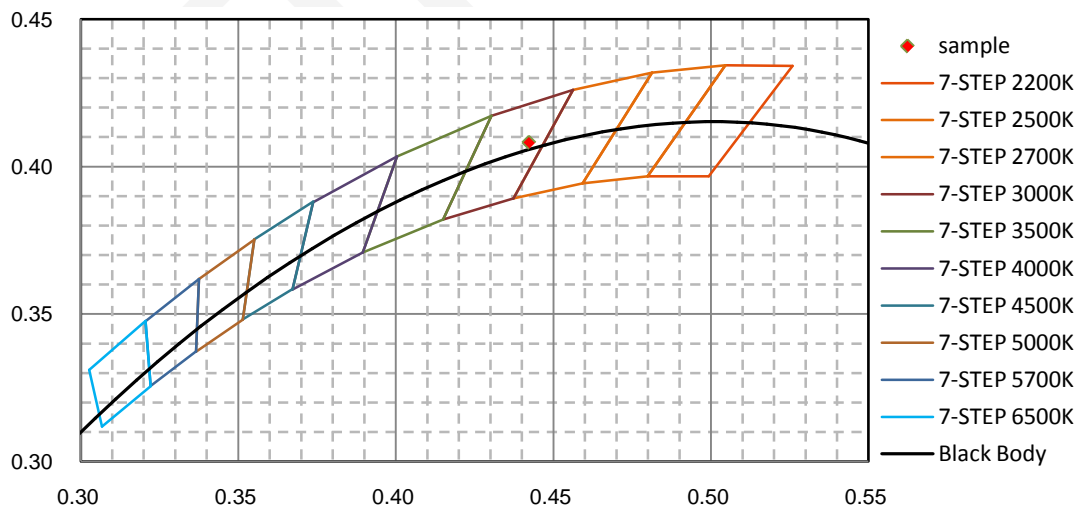
nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
380	4.335E-01	421	6.255E-01	462	6.563E+00	503	7.768E+00	544	1.366E+01
381	2.441E-01	422	6.849E-01	463	6.404E+00	504	7.981E+00	545	1.374E+01
382	2.429E-01	423	7.630E-01	464	6.229E+00	505	8.200E+00	546	1.389E+01
383	2.006E-01	424	8.418E-01	465	6.042E+00	506	8.424E+00	547	1.394E+01
384	2.281E-01	425	9.302E-01	466	5.886E+00	507	8.619E+00	548	1.404E+01
385	2.042E-01	426	1.030E+00	467	5.703E+00	508	8.801E+00	549	1.412E+01
386	2.262E-01	427	1.139E+00	468	5.512E+00	509	8.997E+00	550	1.421E+01
387	1.817E-01	428	1.246E+00	469	5.292E+00	510	9.203E+00	551	1.433E+01
388	1.773E-01	429	1.393E+00	470	5.066E+00	511	9.378E+00	552	1.440E+01
389	1.739E-01	430	1.520E+00	471	4.831E+00	512	9.572E+00	553	1.448E+01
390	1.446E-01	431	1.677E+00	472	4.623E+00	513	9.770E+00	554	1.458E+01
391	1.405E-01	432	1.852E+00	473	4.445E+00	514	9.928E+00	555	1.466E+01
392	1.349E-01	433	2.059E+00	474	4.289E+00	515	1.010E+01	556	1.476E+01
393	1.098E-01	434	2.275E+00	475	4.153E+00	516	1.026E+01	557	1.484E+01
394	1.110E-01	435	2.510E+00	476	4.075E+00	517	1.040E+01	558	1.495E+01
395	1.175E-01	436	2.770E+00	477	4.045E+00	518	1.057E+01	559	1.506E+01
396	1.139E-01	437	3.080E+00	478	4.008E+00	519	1.073E+01	560	1.513E+01
397	9.905E-02	438	3.436E+00	479	4.040E+00	520	1.089E+01	561	1.521E+01
398	1.127E-01	439	3.799E+00	480	4.064E+00	521	1.102E+01	562	1.534E+01
399	9.484E-02	440	4.306E+00	481	4.109E+00	522	1.116E+01	563	1.538E+01
400	1.073E-01	441	4.765E+00	482	4.179E+00	523	1.129E+01	564	1.548E+01
401	1.064E-01	442	5.334E+00	483	4.228E+00	524	1.144E+01	565	1.559E+01
402	1.246E-01	443	6.005E+00	484	4.344E+00	525	1.157E+01	566	1.568E+01
403	1.158E-01	444	6.693E+00	485	4.439E+00	526	1.170E+01	567	1.574E+01
404	1.272E-01	445	7.406E+00	486	4.536E+00	527	1.185E+01	568	1.585E+01
405	1.305E-01	446	8.169E+00	487	4.639E+00	528	1.193E+01	569	1.595E+01
406	1.377E-01	447	8.917E+00	488	4.782E+00	529	1.204E+01	570	1.604E+01
407	1.468E-01	448	9.565E+00	489	4.885E+00	530	1.219E+01	571	1.613E+01
408	1.656E-01	449	1.012E+01	490	5.052E+00	531	1.229E+01	572	1.621E+01
409	1.837E-01	450	1.055E+01	491	5.245E+00	532	1.239E+01	573	1.632E+01
410	1.946E-01	451	1.078E+01	492	5.410E+00	533	1.252E+01	574	1.641E+01
411	2.197E-01	452	1.073E+01	493	5.579E+00	534	1.258E+01	575	1.652E+01
412	2.416E-01	453	1.054E+01	494	5.781E+00	535	1.275E+01	576	1.662E+01
413	2.711E-01	454	1.015E+01	495	6.001E+00	536	1.285E+01	577	1.670E+01
414	2.946E-01	455	9.665E+00	496	6.220E+00	537	1.292E+01	578	1.681E+01
415	3.278E-01	456	9.102E+00	497	6.446E+00	538	1.307E+01	579	1.691E+01
416	3.697E-01	457	8.515E+00	498	6.647E+00	539	1.314E+01	580	1.703E+01
417	4.130E-01	458	7.968E+00	499	6.889E+00	540	1.328E+01	581	1.711E+01
418	4.691E-01	459	7.500E+00	500	7.129E+00	541	1.336E+01	582	1.721E+01
419	4.960E-01	460	7.118E+00	501	7.326E+00	542	1.346E+01	583	1.735E+01
420	5.680E-01	461	6.797E+00	502	7.543E+00	543	1.355E+01	584	1.746E+01

nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
585	1.759E+01	626	2.173E+01	667	1.577E+01	708	6.583E+00	749	2.084E+00
586	1.772E+01	627	2.177E+01	668	1.553E+01	709	6.412E+00	750	2.018E+00
587	1.787E+01	628	2.170E+01	669	1.528E+01	710	6.256E+00	751	1.956E+00
588	1.797E+01	629	2.168E+01	670	1.504E+01	711	6.080E+00	752	1.908E+00
589	1.809E+01	630	2.168E+01	671	1.477E+01	712	5.933E+00	753	1.844E+00
590	1.819E+01	631	2.161E+01	672	1.454E+01	713	5.770E+00	754	1.801E+00
591	1.834E+01	632	2.156E+01	673	1.429E+01	714	5.639E+00	755	1.740E+00
592	1.849E+01	633	2.154E+01	674	1.403E+01	715	5.465E+00	756	1.680E+00
593	1.862E+01	634	2.148E+01	675	1.381E+01	716	5.346E+00	757	1.646E+00
594	1.876E+01	635	2.141E+01	676	1.355E+01	717	5.185E+00	758	1.590E+00
595	1.885E+01	636	2.133E+01	677	1.328E+01	718	5.055E+00	759	1.551E+00
596	1.899E+01	637	2.127E+01	678	1.303E+01	719	4.933E+00	760	1.507E+00
597	1.911E+01	638	2.116E+01	679	1.277E+01	720	4.793E+00	761	1.455E+00
598	1.923E+01	639	2.110E+01	680	1.255E+01	721	4.671E+00	762	1.414E+00
599	1.940E+01	640	2.096E+01	681	1.229E+01	722	4.527E+00	763	1.374E+00
600	1.952E+01	641	2.082E+01	682	1.204E+01	723	4.409E+00	764	1.331E+00
601	1.965E+01	642	2.074E+01	683	1.180E+01	724	4.284E+00	765	1.299E+00
602	1.975E+01	643	2.064E+01	684	1.156E+01	725	4.188E+00	766	1.252E+00
603	1.989E+01	644	2.044E+01	685	1.133E+01	726	4.059E+00	767	1.224E+00
604	2.004E+01	645	2.028E+01	686	1.113E+01	727	3.937E+00	768	1.190E+00
605	2.014E+01	646	2.016E+01	687	1.085E+01	728	3.841E+00	769	1.160E+00
606	2.027E+01	647	2.001E+01	688	1.064E+01	729	3.729E+00	770	1.111E+00
607	2.040E+01	648	1.982E+01	689	1.039E+01	730	3.628E+00	771	1.084E+00
608	2.050E+01	649	1.970E+01	690	1.021E+01	731	3.497E+00	772	1.043E+00
609	2.058E+01	650	1.948E+01	691	9.930E+00	732	3.412E+00	773	1.023E+00
610	2.071E+01	651	1.932E+01	692	9.732E+00	733	3.320E+00	774	9.896E-01
611	2.077E+01	652	1.908E+01	693	9.510E+00	734	3.215E+00	775	9.533E-01
612	2.087E+01	653	1.894E+01	694	9.305E+00	735	3.115E+00	776	9.351E-01
613	2.097E+01	654	1.872E+01	695	9.092E+00	736	3.027E+00	777	9.074E-01
614	2.105E+01	655	1.852E+01	696	8.863E+00	737	2.953E+00	778	8.724E-01
615	2.119E+01	656	1.831E+01	697	8.667E+00	738	2.872E+00	779	8.714E-01
616	2.132E+01	657	1.811E+01	698	8.458E+00	739	2.779E+00	780	8.730E-01
617	2.138E+01	658	1.790E+01	699	8.248E+00	740	2.695E+00		
618	2.142E+01	659	1.766E+01	700	8.041E+00	741	2.624E+00		
619	2.149E+01	660	1.744E+01	701	7.875E+00	742	2.554E+00		
620	2.161E+01	661	1.721E+01	702	7.677E+00	743	2.475E+00		
621	2.160E+01	662	1.695E+01	703	7.501E+00	744	2.386E+00		
622	2.164E+01	663	1.673E+01	704	7.275E+00	745	2.336E+00		
623	2.164E+01	664	1.652E+01	705	7.099E+00	746	2.266E+00		
624	2.173E+01	665	1.620E+01	706	6.926E+00	747	2.187E+00		
625	2.173E+01	666	1.602E+01	707	6.756E+00	748	2.137E+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**

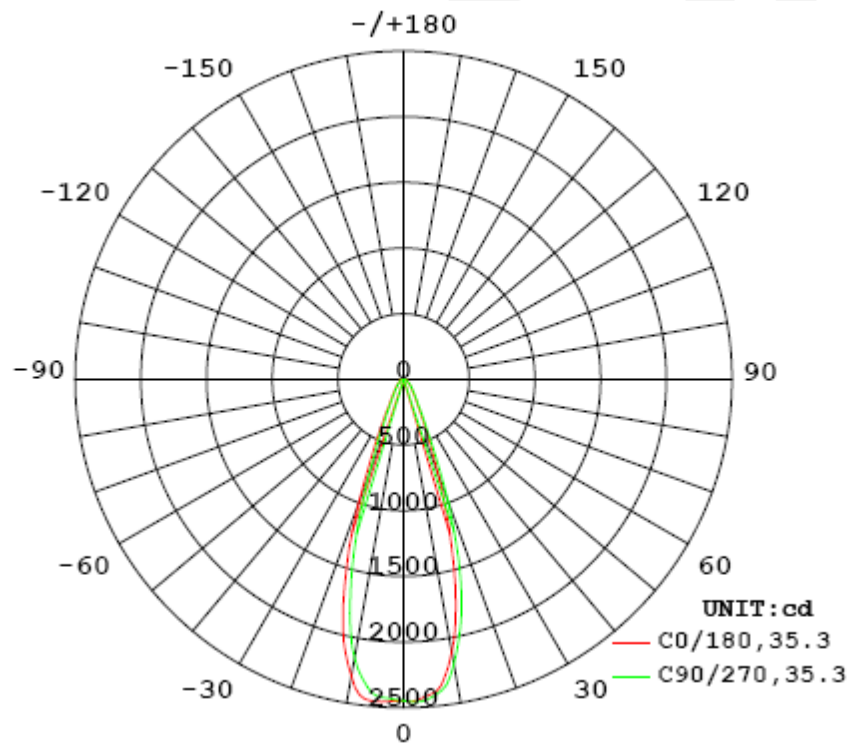
Electrical Measurement

Input Voltage (V)	Frequency (Hz)	Input Current (A)	Power (W)	Power Factor
120.0	60	0.1109	12.59	0.9460

Photometric Measurement

Luminous Flux (lm)	Efficacy (lm/W)	I_{max} (cd)	S/MH (C0/180)	S/MH (C90/270)
1084.22	86.12	2463	0.52	0.56

Luminous Intensity Distribution



	C0/180	C45/225	C90/270	C135/315	AVG.
Beam Angle (50% I_{max}):	35.3	33.9	35.3	34.4	34.7
Field Angle (10% I_{max}):	57.1	58.1	56.6	58.5	57.6

Luminous Intensity (cd) Distribution Data

C y	0°	22.5°	45°	67.5°	90°	112.5°	135°	157.5°
0.0°	2447.0	2447.0	2447.0	2447.0	2447.0	2447.0	2447.0	2447.0
5.0°	2460.5	2427.4	2386.2	2392.8	2416.6	2380.4	2338.6	2345.1
10.0°	2295.1	2267.0	2092.0	2070.7	2153.9	2085.4	1986.6	2006.1
15.0°	1779.9	1768.2	1607.0	1491.9	1534.1	1483.3	1372.3	1362.8
20.0°	1012.2	986.6	798.0	712.3	777.6	770.5	672.5	650.0
25.0°	447.1	412.1	390.8	379.1	340.4	339.9	369.2	355.2
30.0°	219.7	211.2	225.5	230.6	187.5	187.4	217.9	220.2
35.0°	144.0	141.4	144.7	144.5	126.9	128.2	138.7	143.0
40.0°	105.2	104.2	102.9	99.3	92.9	92.1	97.8	101.1
45.0°	81.3	80.9	79.3	76.2	72.1	71.5	75.8	77.7
50.0°	65.3	65.5	64.4	61.4	58.2	57.2	60.8	61.9
55.0°	49.4	48.8	47.7	45.9	43.6	42.7	44.0	46.3
60.0°	37.8	37.0	35.8	34.6	33.7	33.0	33.8	35.0
65.0°	29.5	28.7	27.6	26.9	26.0	25.7	26.1	26.8
70.0°	22.5	21.7	20.7	20.3	19.2	19.0	19.2	19.8
75.0°	16.0	15.3	14.5	14.1	13.1	12.8	12.9	13.3
80.0°	10.0	9.5	8.8	8.3	7.6	7.3	7.2	7.4
85.0°	4.7	4.2	3.7	3.4	2.8	2.6	2.5	2.6
90.0°	0.8	0.6	0.3	0.1	0.1	0.0	0.0	0.0
95.0°	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0
100.0°	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
105.0°	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
110.0°	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
115.0°	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
120.0°	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
125.0°	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
130.0°	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
135.0°	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
140.0°	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
145.0°	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
150.0°	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
155.0°	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
160.0°	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
165.0°	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
170.0°	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
175.0°	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
180.0°	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Luminous Intensity (cd) Distribution Data (cont.)

$\begin{matrix} C \\ \backslash \\ y \end{matrix}$	180°	202.5°	225°	247.5°	270°	292.5°	315°	337.5°
0.0°	2447.0	2447.0	2447.0	2447.0	2447.0	2447.0	2447.0	2447.0
5.0°	2404.9	2443.4	2433.8	2423.4	2430.2	2462.8	2451.6	2456.9
10.0°	2110.2	2139.9	2101.9	2135.1	2200.7	2334.0	2242.2	2217.2
15.0°	1476.4	1455.1	1462.1	1536.0	1703.6	1877.8	1744.2	1703.2
20.0°	767.9	764.7	746.4	811.6	991.3	1096.8	1010.7	948.5
25.0°	360.5	356.3	375.2	415.3	428.2	455.5	447.4	455.6
30.0°	204.3	200.2	221.3	244.3	223.7	225.9	239.4	273.3
35.0°	135.7	134.5	145.2	154.4	151.1	151.1	155.5	164.6
40.0°	97.0	96.8	101.7	105.6	107.7	109.0	109.9	111.1
45.0°	75.9	76.4	79.3	80.1	82.2	83.3	84.3	84.3
50.0°	60.2	61.0	65.9	66.5	66.8	68.8	69.7	67.9
55.0°	45.3	45.5	47.3	50.0	49.9	51.1	51.5	52.8
60.0°	35.2	35.5	36.4	37.5	37.7	38.3	38.6	39.8
65.0°	27.2	27.6	28.4	29.2	29.5	29.9	30.2	31.0
70.0°	20.2	20.6	21.4	22.3	22.5	22.9	23.2	23.7
75.0°	13.8	14.2	14.9	15.8	16.0	16.5	16.8	17.1
80.0°	8.0	8.3	8.9	9.7	10.0	10.4	10.7	10.9
85.0°	3.1	3.4	3.8	4.5	4.8	5.2	5.4	5.5
90.0°	0.1	0.2	0.4	0.7	0.9	1.1	1.2	1.2
95.0°	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1
100.0°	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
105.0°	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
110.0°	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
115.0°	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
120.0°	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
125.0°	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
130.0°	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
135.0°	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
140.0°	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
145.0°	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
150.0°	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
155.0°	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
160.0°	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
165.0°	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
170.0°	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
175.0°	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
180.0°	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Zonal Lumen Density Measurement

Deg	Flux (lm)	%
0-5	58.2	5.37
5-10	164.6	15.18
10-15	222.6	20.52
15-20	196.9	18.17
20-25	121.8	11.23
25-30	74.2	6.84
30-35	52.2	4.82
35-40	40.3	3.72
40-45	33.1	3.05
45-50	28.7	2.64
50-55	24.2	2.23
55-60	19.2	1.77
60-65	15.6	1.43
65-70	12.5	1.15
70-75	9.4	0.87
75-80	6.3	0.58
80-85	3.4	0.32
85-90	1.1	0.10
90-95	0.1	0.01
95-100	0.0	0.00
100-105	0.0	0.00
105-110	0.0	0.00
110-115	0.0	0.00
115-120	0.0	0.00
120-125	0.0	0.00
125-130	0.0	0.00
130-135	0.0	0.00
135-140	0.0	0.00
140-145	0.0	0.00
145-150	0.0	0.00
150-155	0.0	0.00
155-160	0.0	0.00
160-165	0.0	0.00
165-170	0.0	0.00
170-175	0.0	0.00
175-180	0.0	0.00

Deg	Flux (lm)	%
0-5	58.2	5.37
0-10	222.8	20.55
0-15	445.3	41.07
0-20	642.3	59.24
0-25	764.0	70.47
0-30	838.2	77.31
0-35	890.4	82.13
0-40	930.8	85.85
0-45	963.9	88.90
0-50	992.5	91.54
0-55	1016.7	93.77
0-60	1035.9	95.54
0-65	1051.4	96.97
0-70	1063.9	98.12
0-75	1073.3	98.99
0-80	1079.6	99.57
0-85	1083.0	99.89
0-90	1084.1	99.99
0-95	1084.2	100.00
0-100	1084.2	100.00
0-105	1084.2	100.00
0-110	1084.2	100.00
0-115	1084.2	100.00
0-120	1084.2	100.00
0-125	1084.2	100.00
0-130	1084.2	100.00
0-135	1084.2	100.00
0-140	1084.2	100.00
0-145	1084.2	100.00
0-150	1084.2	100.00
0-155	1084.2	100.00
0-160	1084.2	100.00
0-165	1084.2	100.00
0-170	1084.2	100.00
0-175	1084.2	100.00
0-180	1084.2	100.00

6. Product Photo



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