

# IES LM-79-08

## MEASUREMENT AND TEST REPORT

For

### GREEN CREATIVE LTD

Room 3603, Level 36, Tower 1, Enterprise Square Five, 38 Wang Chiu Road, Kowloon Bay, KL, Hong Kong

**Test Model: SLFT6HO/9CCT5S/DUALDIM**

<b>Report Type:</b>	Electrical and Photometric tests including: Luminous Flux, Chromaticity, Luminous Intensity Distribution
<b>Project Engineer:</b>	Bay Wang
<b>Report Number:</b>	RKSB221207003-10-2
<b>Test Date:</b>	2022-12-08 to 2022-12-09
<b>Report Date:</b>	2022-12-22
<b>Reviewed By:</b>	Seven Xia / EE Engineer
<b>Prepared By:</b>	Bay Area Compliance Laboratories Corp. (Kunshan). No. 248 Chenghu Road, Kunshan, Jiangsu, People's Republic of China Tel: +86-0512-86175000 Fax: +86-0512-88934268
<b>Accreditation:</b>	The IAS Accreditation Number TL-1044.

## 1. Product Description#

### General Information:

One sample was received on 2022-12-07 and used for testing.

Model Tested:	SLFT6HO/9CCT5S/DUALDIM
Manufacturer:	GREEN CREATIVE LTD
Brand Name:	GREEN CREATIVE
Product Designation:	LED Recessed Downlight
Burning Time Before Test:	0hour(For New Products)
Color Tunable:	White-Tunable
CCT Range:	2700K, 3000K, 3500K, 4000K, 5000K
Least Efficient Setting:	2700K
Most Consumptive Setting:	2700K
Default Setting:	3500K

### Rated Values:

Rated Voltage/Frequency:	120-277VAC 50/60Hz
Rated Power:	30W/24W/18W
Nominal CCT:	2700K/3000K/3500K/4000K/5000K
Nominal Lumen Output:	2650lm/2800lm/2900lm/2900lm/2900lm @30W

## 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-30-18\*: IES Method for Evaluating Light Source Color Rendition

## 3. Description of Test Equipment

Device	Manufacture	Model No	Serial No	Calibration date	Calibration due date
2.0m integrating sphere	EVERFINE	R98	G121960CS1361154D	2022-06-21	2023-06-20
spectroradiometer	EVERFINE	HAAS-2000	M12048CS1361148	2022-06-21	2023-06-20
Digital CC&CV DC Power Supply	EVERFINE	WY305	G115986CN1361134	2022-06-21	2023-06-20
Thermal Meter	ANYMETRE	TH-20E	N/A	2022-11-11	2023-11-10
Standard Light Source	Osram	24V/50W	JWWCR020106	2021-09-15	2023-09-14
Digital Power Meter	YOKOGAWA	WT210	91KB35700	2022-11-03	2023-11-02
Intelligence ac power supply	EVERFINE	DPS1005	G119890CS1361121	2022-06-21	2023-06-20
AC Power Supply	INVENTFINE	CHP-5KVA	900511765	2022-06-21	2023-06-20
DC Power Supply	INVENTFINE	WL3010	JWDMP030001	2022-06-21	2023-06-20
Power Meter	INVENTFINE	WT500	GSDSQ200007	2022-11-03	2023-11-02

Device	Manufacture	Model No	Serial No	Calibration date	Calibration due date
Goniophotometer	INVENTFINE	GPM-1900	YWGCF120001	2022-11-14	2023-11-13
Wireless Weather Station	ZHONGXING	KG218	N/A	2022-06-21	2023-06-20
Standard Light Source	INVENTFINE	N/A	JWBYR040008	2021-12-23	2023-12-22

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 $\pi$  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  $U_{rel}=2.7\%$  ( $k=2$ ), at the 95% confidence level. The uncertainty of the correlated color temperature measurements is  $U=27\text{K}$  ( $k=2$ ), at the 95% confidence level. The uncertainty of the CRI is  $U=2.7(k=2)$ , at the 95% confidence level.

The uncertainty of power meter AC current  $U_{rel}=0.27\%$  of rdg, AC Voltage  $U_{rel}=0.26\%$  of rdg, Power  $U_{rel}=0.41\%$  ( $k=2$ ), 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 ( $\gamma$ ) 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  $U_{rel}=2.6\%$  ( $k=2$ ), at the 95% confidence level.

### Fidelity Index and Gamut Index Calculation

The  $R_i$ ,  $R_g$  was calculated according to IES TM-30-18 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]

**Control Setting: 2700K**

Total operating time for integrating sphere test: **1.0 hour**

Test orientation: **Downward**

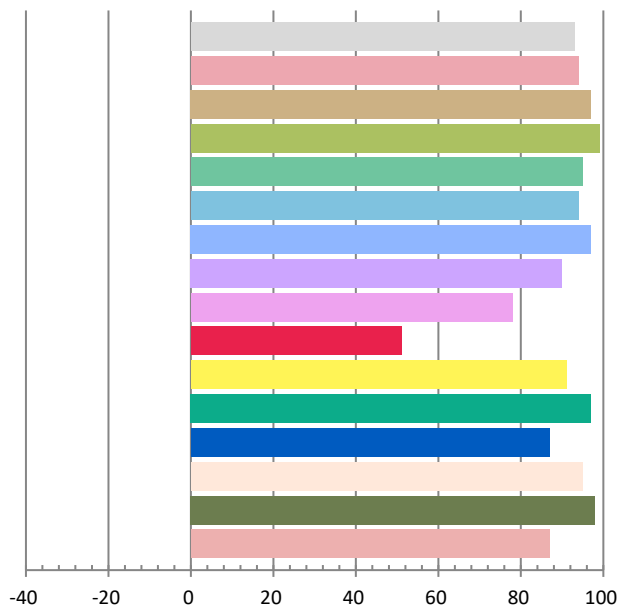
### Photometric and Electrical Measurement Result

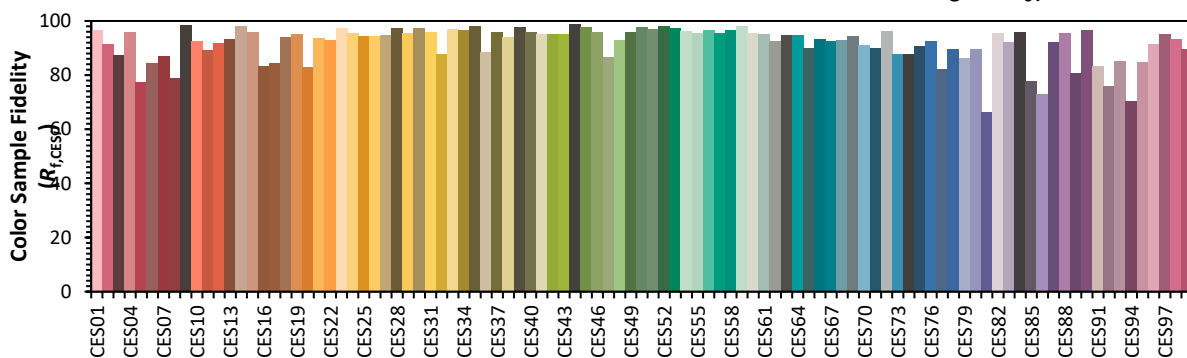
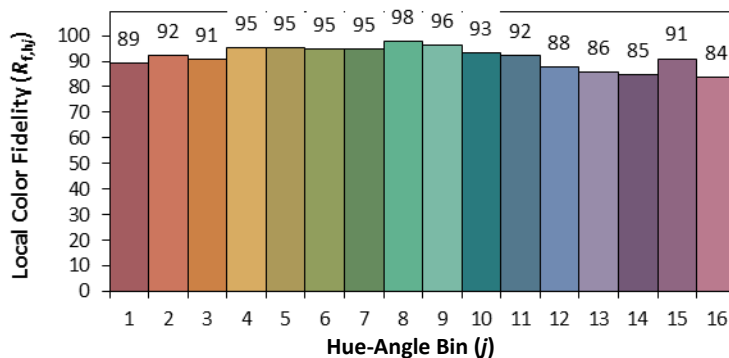
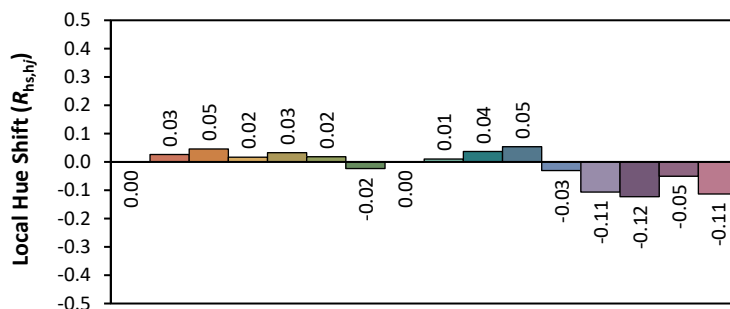
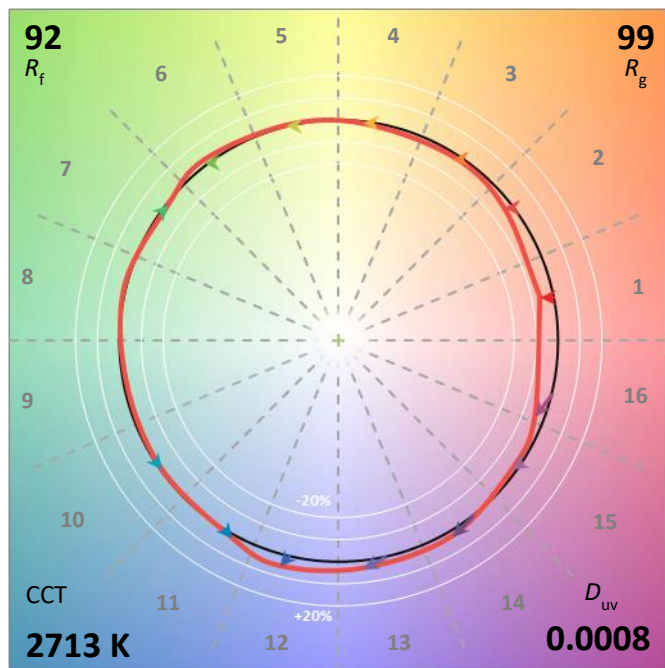
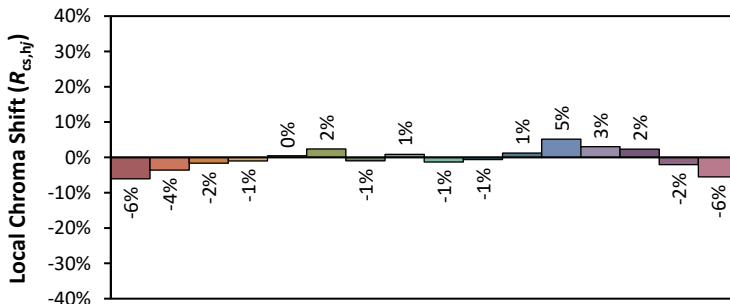
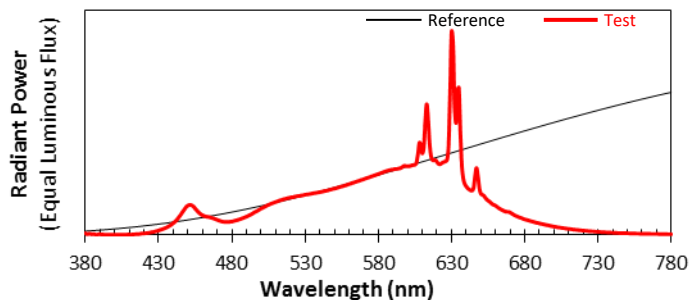
Voltage(V)	Frequency(Hz)	Current(A)	Power (W)	Power Factor	Luminous Flux(lm)	Efficacy(lm/W)
120.0	60	0.2452	29.07	0.988	3359.6	115.57

Radiant Flux (W)	CCT (K)	Duv	x	y	u'	v'
10.161	2715	0.000879	0.4602	0.4131	0.2616	0.5283

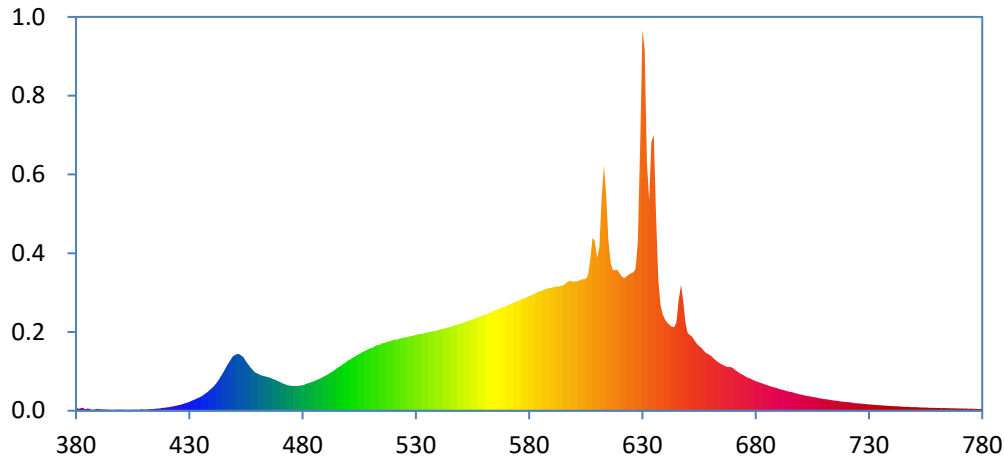
### Color Rendering Index

Ra			
93.0			
R1	R2	R3	R4
94	97	99	95
R5	R6	R7	R8
94	97	90	78
R9	R10	R11	R12
51	91	97	87
R13	R14	R15	
95	98	87	





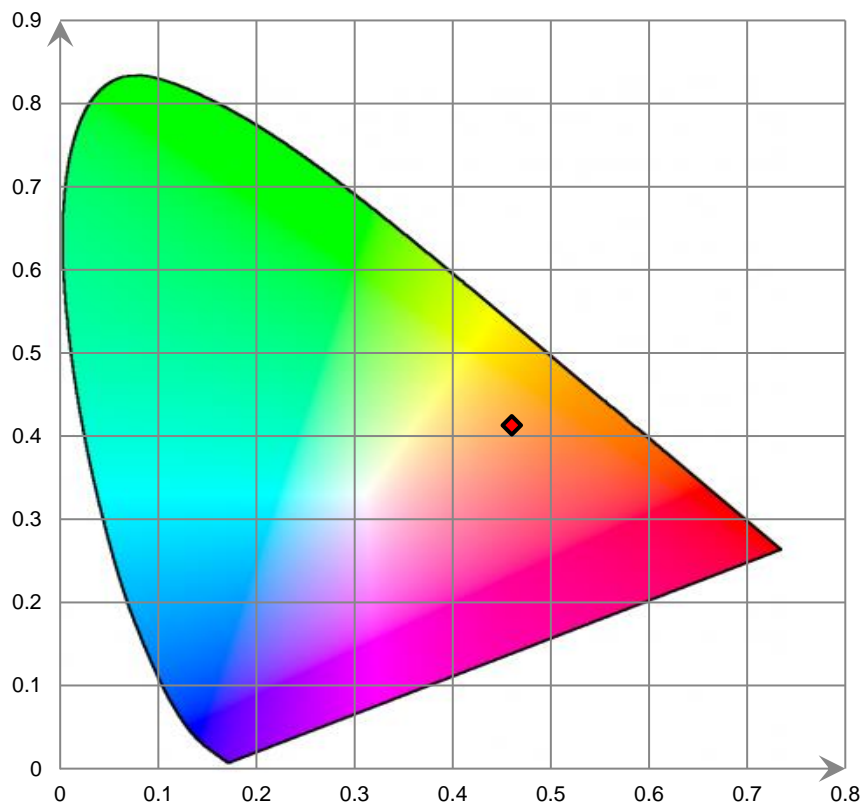
### Relative Spectral Power Distribution



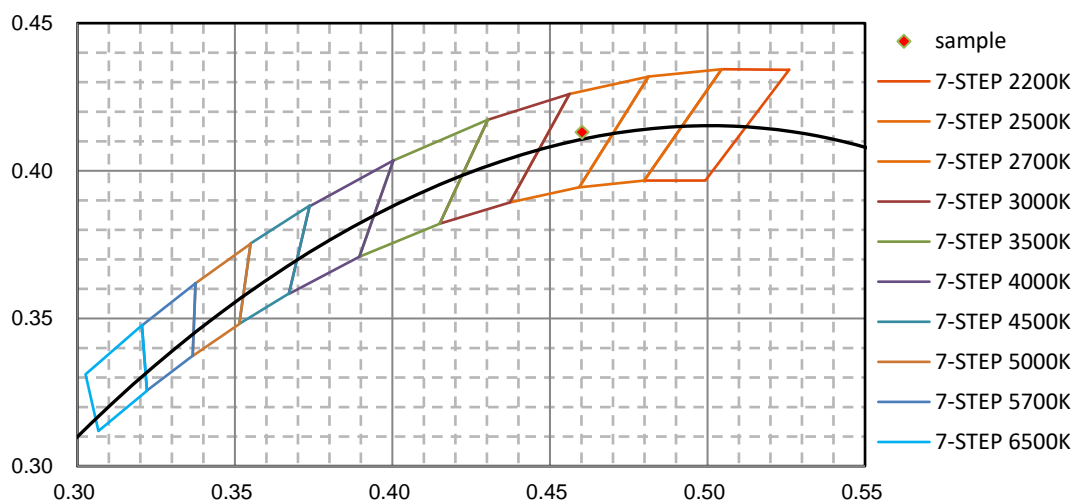
nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
380	1.757E+00	421	1.680E+00	462	1.640E+01	503	2.523E+01	544	3.878E+01
381	8.070E-01	422	1.834E+00	463	1.613E+01	504	2.597E+01	545	3.896E+01
382	1.124E+00	423	2.080E+00	464	1.592E+01	505	2.644E+01	546	3.935E+01
383	1.433E+00	424	2.298E+00	465	1.562E+01	506	2.707E+01	547	3.974E+01
384	7.013E-01	425	2.516E+00	466	1.523E+01	507	2.768E+01	548	4.007E+01
385	9.594E-01	426	2.779E+00	467	1.477E+01	508	2.810E+01	549	4.048E+01
386	9.067E-01	427	3.040E+00	468	1.437E+01	509	2.864E+01	550	4.074E+01
387	3.642E-01	428	3.437E+00	469	1.390E+01	510	2.908E+01	551	4.099E+01
388	4.648E-01	429	3.769E+00	470	1.341E+01	511	2.947E+01	552	4.154E+01
389	8.421E-01	430	4.101E+00	471	1.283E+01	512	3.012E+01	553	4.179E+01
390	8.389E-01	431	4.629E+00	472	1.246E+01	513	3.056E+01	554	4.228E+01
391	5.847E-01	432	4.980E+00	473	1.202E+01	514	3.067E+01	555	4.263E+01
392	5.991E-01	433	5.515E+00	474	1.180E+01	515	3.138E+01	556	4.286E+01
393	5.055E-01	434	5.968E+00	475	1.156E+01	516	3.158E+01	557	4.340E+01
394	4.598E-01	435	6.515E+00	476	1.154E+01	517	3.198E+01	558	4.371E+01
395	4.047E-01	436	7.188E+00	477	1.155E+01	518	3.227E+01	559	4.424E+01
396	3.841E-01	437	7.875E+00	478	1.156E+01	519	3.261E+01	560	4.468E+01
397	3.029E-01	438	8.633E+00	479	1.182E+01	520	3.292E+01	561	4.493E+01
398	4.977E-01	439	9.651E+00	480	1.187E+01	521	3.318E+01	562	4.554E+01
399	3.797E-01	440	1.057E+01	481	1.227E+01	522	3.322E+01	563	4.593E+01
400	4.224E-01	441	1.165E+01	482	1.266E+01	523	3.374E+01	564	4.631E+01
401	4.272E-01	442	1.289E+01	483	1.297E+01	524	3.393E+01	565	4.676E+01
402	4.084E-01	443	1.441E+01	484	1.334E+01	525	3.418E+01	566	4.725E+01
403	3.368E-01	444	1.615E+01	485	1.374E+01	526	3.426E+01	567	4.754E+01
404	3.999E-01	445	1.780E+01	486	1.426E+01	527	3.461E+01	568	4.816E+01
405	4.286E-01	446	1.979E+01	487	1.472E+01	528	3.479E+01	569	4.844E+01
406	3.726E-01	447	2.154E+01	488	1.517E+01	529	3.504E+01	570	4.890E+01
407	4.225E-01	448	2.333E+01	489	1.571E+01	530	3.544E+01	571	4.941E+01
408	3.911E-01	449	2.506E+01	490	1.625E+01	531	3.556E+01	572	4.994E+01
409	6.698E-01	450	2.589E+01	491	1.684E+01	532	3.572E+01	573	5.029E+01
410	5.547E-01	451	2.640E+01	492	1.756E+01	533	3.592E+01	574	5.065E+01
411	5.182E-01	452	2.639E+01	493	1.810E+01	534	3.621E+01	575	5.124E+01
412	6.753E-01	453	2.577E+01	494	1.888E+01	535	3.646E+01	576	5.158E+01
413	7.192E-01	454	2.478E+01	495	1.967E+01	536	3.679E+01	577	5.214E+01
414	8.412E-01	455	2.309E+01	496	2.036E+01	537	3.690E+01	578	5.252E+01
415	9.346E-01	456	2.163E+01	497	2.102E+01	538	3.719E+01	579	5.306E+01
416	1.030E+00	457	2.021E+01	498	2.178E+01	539	3.732E+01	580	5.339E+01
417	1.066E+00	458	1.912E+01	499	2.252E+01	540	3.764E+01	581	5.390E+01
418	1.328E+00	459	1.794E+01	500	2.340E+01	541	3.788E+01	582	5.439E+01
419	1.341E+00	460	1.741E+01	501	2.390E+01	542	3.818E+01	583	5.488E+01
420	1.577E+00	461	1.685E+01	502	2.461E+01	543	3.853E+01	584	5.540E+01

nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
585	5.585E+01	626	6.452E+01	667	2.054E+01	708	5.845E+00	749	1.678E+00
586	5.620E+01	627	6.622E+01	668	2.043E+01	709	5.697E+00	750	1.708E+00
587	5.666E+01	628	7.850E+01	669	2.037E+01	710	5.478E+00	751	1.619E+00
588	5.696E+01	629	1.244E+02	670	1.984E+01	711	5.391E+00	752	1.563E+00
589	5.720E+01	630	1.778E+02	671	1.898E+01	712	5.200E+00	753	1.520E+00
590	5.730E+01	631	1.683E+02	672	1.822E+01	713	5.023E+00	754	1.484E+00
591	5.773E+01	632	1.159E+02	673	1.745E+01	714	4.871E+00	755	1.473E+00
592	5.789E+01	633	9.792E+01	674	1.685E+01	715	4.730E+00	756	1.437E+00
593	5.792E+01	634	1.255E+02	675	1.632E+01	716	4.622E+00	757	1.380E+00
594	5.830E+01	635	1.287E+02	676	1.569E+01	717	4.400E+00	758	1.374E+00
595	5.845E+01	636	9.115E+01	677	1.525E+01	718	4.287E+00	759	1.319E+00
596	5.924E+01	637	6.101E+01	678	1.485E+01	719	4.159E+00	760	1.305E+00
597	6.015E+01	638	4.932E+01	679	1.426E+01	720	4.033E+00	761	1.309E+00
598	6.075E+01	639	4.482E+01	680	1.379E+01	721	3.927E+00	762	1.227E+00
599	6.021E+01	640	4.262E+01	681	1.344E+01	722	3.861E+00	763	1.251E+00
600	6.027E+01	641	4.094E+01	682	1.309E+01	723	3.674E+00	764	1.225E+00
601	6.029E+01	642	3.996E+01	683	1.277E+01	724	3.539E+00	765	1.199E+00
602	6.058E+01	643	3.920E+01	684	1.229E+01	725	3.474E+00	766	1.132E+00
603	6.109E+01	644	3.894E+01	685	1.196E+01	726	3.339E+00	767	1.108E+00
604	6.133E+01	645	4.111E+01	686	1.161E+01	727	3.298E+00	768	1.119E+00
605	6.152E+01	646	5.123E+01	687	1.122E+01	728	3.119E+00	769	1.057E+00
606	6.314E+01	647	5.874E+01	688	1.090E+01	729	3.054E+00	770	1.048E+00
607	7.076E+01	648	5.121E+01	689	1.067E+01	730	2.942E+00	771	1.066E+00
608	8.067E+01	649	4.088E+01	690	1.028E+01	731	2.918E+00	772	9.587E-01
609	7.915E+01	650	3.621E+01	691	9.954E+00	732	2.751E+00	773	1.035E+00
610	7.146E+01	651	3.534E+01	692	9.727E+00	733	2.721E+00	774	9.171E-01
611	7.633E+01	652	3.451E+01	693	9.400E+00	734	2.602E+00	775	9.905E-01
612	9.917E+01	653	3.278E+01	694	9.097E+00	735	2.552E+00	776	9.133E-01
613	1.145E+02	654	3.125E+01	695	8.820E+00	736	2.454E+00	777	9.247E-01
614	1.012E+02	655	3.011E+01	696	8.637E+00	737	2.365E+00	778	8.204E-01
615	7.966E+01	656	2.929E+01	697	8.330E+00	738	2.318E+00	779	8.220E-01
616	6.879E+01	657	2.809E+01	698	8.022E+00	739	2.241E+00	780	8.235E-01
617	6.554E+01	658	2.697E+01	699	7.726E+00	740	2.196E+00		
618	6.561E+01	659	2.641E+01	700	7.527E+00	741	2.107E+00		
619	6.562E+01	660	2.581E+01	701	7.289E+00	742	2.079E+00		
620	6.404E+01	661	2.485E+01	702	7.028E+00	743	1.980E+00		
621	6.243E+01	662	2.379E+01	703	6.825E+00	744	1.949E+00		
622	6.190E+01	663	2.295E+01	704	6.664E+00	745	1.848E+00		
623	6.263E+01	664	2.232E+01	705	6.498E+00	746	1.779E+00		
624	6.353E+01	665	2.163E+01	706	6.242E+00	747	1.830E+00		
625	6.409E+01	666	2.111E+01	707	6.113E+00	748	1.738E+00		

CIE 1931xy Chromaticity Diagram



7-Step Chromaticity Quadrangles





**Control Setting: 3000K**

Total operating time for integrating sphere test: **1.0 hour**

Test orientation: **Downward**

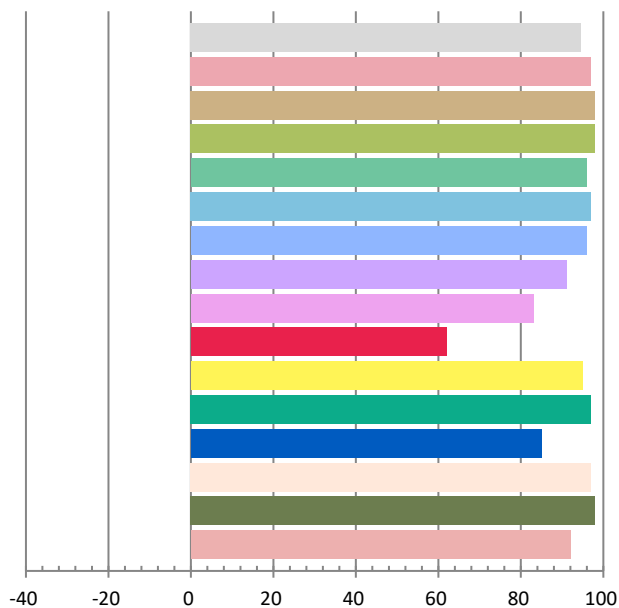
**Photometric and Electrical Measurement Result**

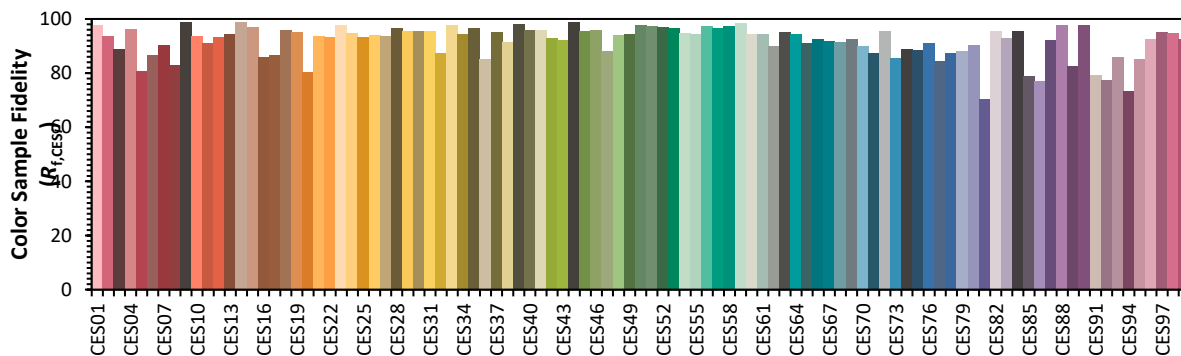
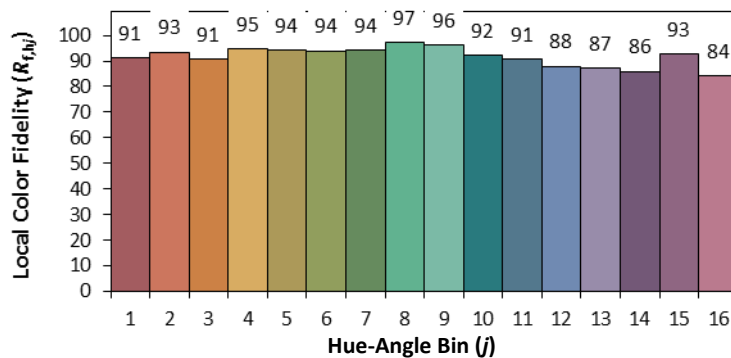
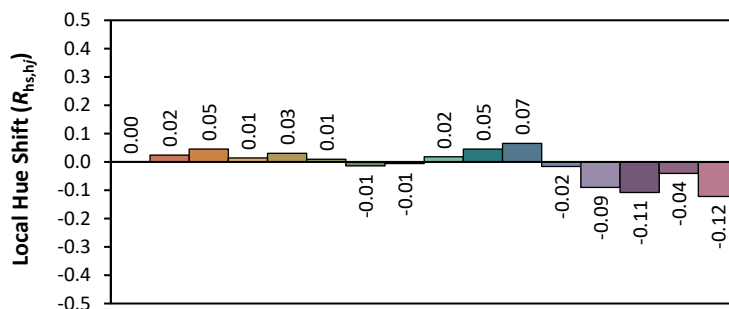
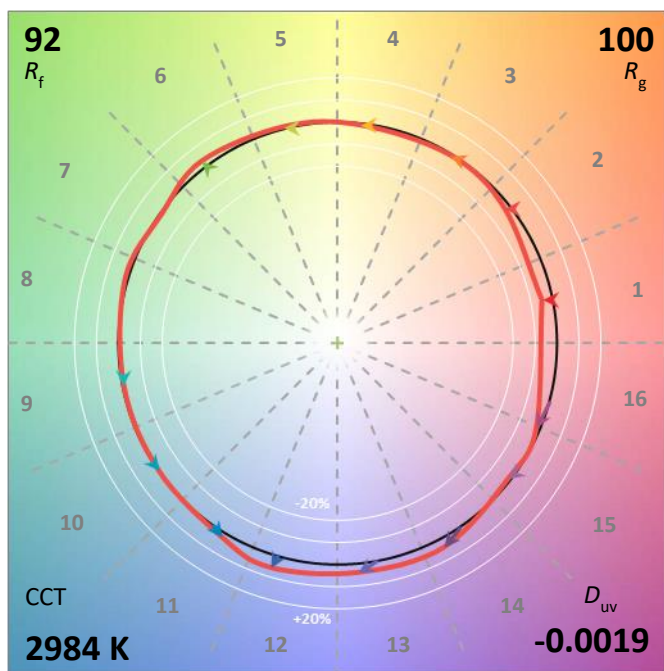
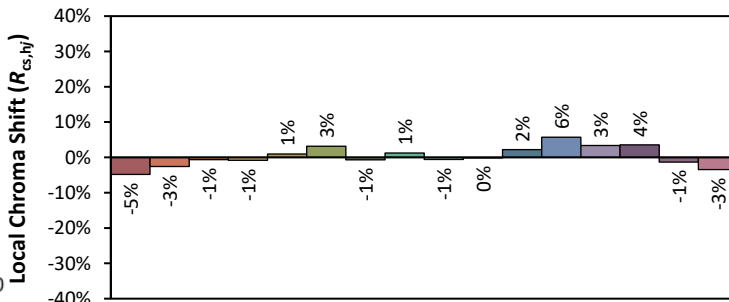
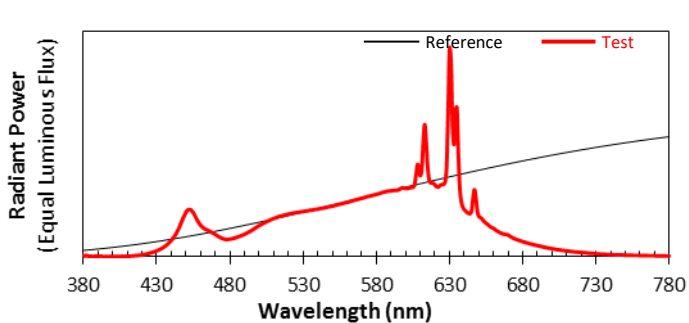
Voltage(V)	Frequency(Hz)	Current(A)	Power (W)	Power Factor	Luminous Flux(lm)	Efficacy(lm/W)
120.0	60	0.2398	28.43	0.988	3406.2	119.79

Radiant Flux (W)	CCT (K)	Duv	x	y	u'	v'
10.431	2985	-0.00181	0.4354	0.3990	0.2517	0.5191

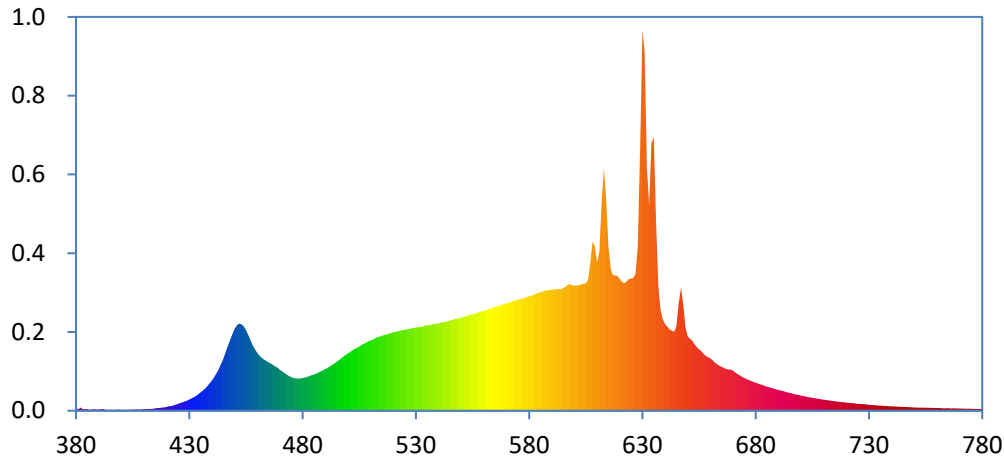
**Color Rendering Index**

<b>Ra</b>			
<b>94.6</b>			
<b>R1</b>	<b>R2</b>	<b>R3</b>	<b>R4</b>
97	98	98	96
<b>R5</b>	<b>R6</b>	<b>R7</b>	<b>R8</b>
97	96	91	83
<b>R9</b>	<b>R10</b>	<b>R11</b>	<b>R12</b>
62	95	97	85
<b>R13</b>	<b>R14</b>	<b>R15</b>	
97	98	92	





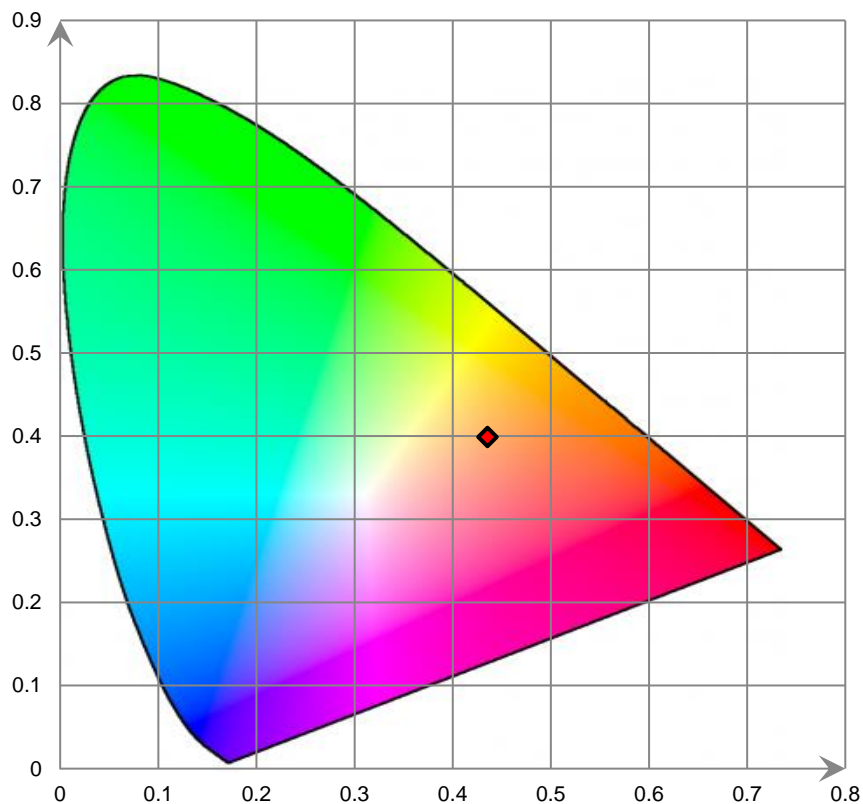
### Relative Spectral Power Distribution



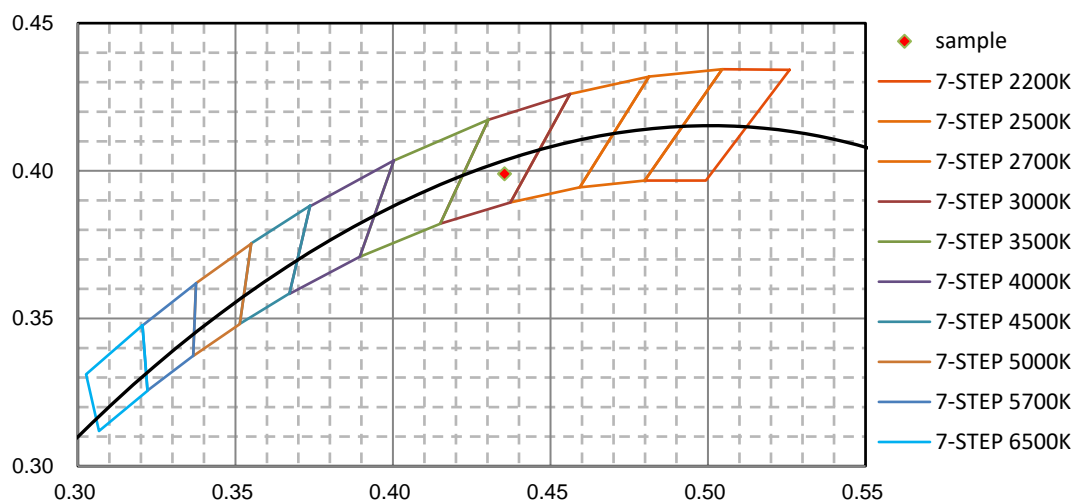
nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
380	1.336E+00	421	2.018E+00	462	2.419E+01	503	2.830E+01	544	4.107E+01
381	6.030E-01	422	2.120E+00	463	2.351E+01	504	2.893E+01	545	4.138E+01
382	1.474E+00	423	2.457E+00	464	2.285E+01	505	2.947E+01	546	4.157E+01
383	6.498E-01	424	2.772E+00	465	2.223E+01	506	3.017E+01	547	4.201E+01
384	7.013E-01	425	3.117E+00	466	2.167E+01	507	3.070E+01	548	4.220E+01
385	7.315E-01	426	3.544E+00	467	2.101E+01	508	3.131E+01	549	4.244E+01
386	3.951E-01	427	3.818E+00	468	2.025E+01	509	3.185E+01	550	4.266E+01
387	4.954E-01	428	4.248E+00	469	1.975E+01	510	3.223E+01	551	4.294E+01
388	6.804E-01	429	4.621E+00	470	1.880E+01	511	3.270E+01	552	4.334E+01
389	5.725E-01	430	5.122E+00	471	1.805E+01	512	3.318E+01	553	4.365E+01
390	5.439E-01	431	5.640E+00	472	1.723E+01	513	3.370E+01	554	4.411E+01
391	7.540E-01	432	6.194E+00	473	1.659E+01	514	3.403E+01	555	4.424E+01
392	8.183E-01	433	6.857E+00	474	1.595E+01	515	3.437E+01	556	4.449E+01
393	4.602E-01	434	7.565E+00	475	1.545E+01	516	3.470E+01	557	4.484E+01
394	9.130E-02	435	8.458E+00	476	1.498E+01	517	3.492E+01	558	4.529E+01
395	3.484E-01	436	9.264E+00	477	1.479E+01	518	3.540E+01	559	4.557E+01
396	3.385E-01	437	1.022E+01	478	1.471E+01	519	3.564E+01	560	4.580E+01
397	2.255E-01	438	1.133E+01	479	1.481E+01	520	3.595E+01	561	4.612E+01
398	4.205E-01	439	1.257E+01	480	1.497E+01	521	3.617E+01	562	4.661E+01
399	4.974E-01	440	1.384E+01	481	1.517E+01	522	3.643E+01	563	4.688E+01
400	3.080E-01	441	1.551E+01	482	1.555E+01	523	3.673E+01	564	4.713E+01
401	2.962E-01	442	1.716E+01	483	1.582E+01	524	3.693E+01	565	4.770E+01
402	3.970E-01	443	1.909E+01	484	1.628E+01	525	3.716E+01	566	4.794E+01
403	4.528E-01	444	2.142E+01	485	1.657E+01	526	3.738E+01	567	4.821E+01
404	4.042E-01	445	2.371E+01	486	1.705E+01	527	3.752E+01	568	4.856E+01
405	5.139E-01	446	2.667E+01	487	1.749E+01	528	3.771E+01	569	4.899E+01
406	4.848E-01	447	2.952E+01	488	1.802E+01	529	3.799E+01	570	4.924E+01
407	5.935E-01	448	3.248E+01	489	1.852E+01	530	3.813E+01	571	4.947E+01
408	4.724E-01	449	3.510E+01	490	1.908E+01	531	3.835E+01	572	4.990E+01
409	6.363E-01	450	3.757E+01	491	1.961E+01	532	3.856E+01	573	5.030E+01
410	6.496E-01	451	3.916E+01	492	2.032E+01	533	3.864E+01	574	5.071E+01
411	7.184E-01	452	3.994E+01	493	2.098E+01	534	3.903E+01	575	5.083E+01
412	7.983E-01	453	3.975E+01	494	2.157E+01	535	3.915E+01	576	5.123E+01
413	7.786E-01	454	3.873E+01	495	2.238E+01	536	3.925E+01	577	5.143E+01
414	9.278E-01	455	3.702E+01	496	2.317E+01	537	3.958E+01	578	5.189E+01
415	1.094E+00	456	3.487E+01	497	2.396E+01	538	3.984E+01	579	5.214E+01
416	1.234E+00	457	3.239E+01	498	2.481E+01	539	3.989E+01	580	5.250E+01
417	1.268E+00	458	3.014E+01	499	2.552E+01	540	4.009E+01	581	5.281E+01
418	1.464E+00	459	2.819E+01	500	2.631E+01	541	4.038E+01	582	5.322E+01
419	1.525E+00	460	2.651E+01	501	2.692E+01	542	4.071E+01	583	5.362E+01
420	1.793E+00	461	2.525E+01	502	2.767E+01	543	4.086E+01	584	5.405E+01

nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
585	5.431E+01	626	6.091E+01	667	1.914E+01	708	5.430E+00	749	1.558E+00
586	5.468E+01	627	6.287E+01	668	1.886E+01	709	5.199E+00	750	1.448E+00
587	5.505E+01	628	7.546E+01	669	1.887E+01	710	5.103E+00	751	1.505E+00
588	5.518E+01	629	1.217E+02	670	1.839E+01	711	4.936E+00	752	1.427E+00
589	5.545E+01	630	1.750E+02	671	1.754E+01	712	4.794E+00	753	1.403E+00
590	5.545E+01	631	1.642E+02	672	1.682E+01	713	4.642E+00	754	1.408E+00
591	5.566E+01	632	1.115E+02	673	1.614E+01	714	4.494E+00	755	1.381E+00
592	5.581E+01	633	9.436E+01	674	1.552E+01	715	4.343E+00	756	1.312E+00
593	5.581E+01	634	1.228E+02	675	1.497E+01	716	4.216E+00	757	1.357E+00
594	5.580E+01	635	1.255E+02	676	1.451E+01	717	4.123E+00	758	1.303E+00
595	5.621E+01	636	8.707E+01	677	1.409E+01	718	3.924E+00	759	1.280E+00
596	5.682E+01	637	5.749E+01	678	1.367E+01	719	3.872E+00	760	1.230E+00
597	5.771E+01	638	4.632E+01	679	1.323E+01	720	3.737E+00	761	1.248E+00
598	5.809E+01	639	4.202E+01	680	1.286E+01	721	3.612E+00	762	1.217E+00
599	5.756E+01	640	3.978E+01	681	1.247E+01	722	3.518E+00	763	1.142E+00
600	5.739E+01	641	3.856E+01	682	1.209E+01	723	3.500E+00	764	1.126E+00
601	5.744E+01	642	3.727E+01	683	1.180E+01	724	3.341E+00	765	1.155E+00
602	5.766E+01	643	3.670E+01	684	1.143E+01	725	3.178E+00	766	1.047E+00
603	5.790E+01	644	3.622E+01	685	1.102E+01	726	3.106E+00	767	1.106E+00
604	5.830E+01	645	3.862E+01	686	1.073E+01	727	3.049E+00	768	1.034E+00
605	5.835E+01	646	4.893E+01	687	1.040E+01	728	2.977E+00	769	1.013E+00
606	6.009E+01	647	5.646E+01	688	1.010E+01	729	2.834E+00	770	1.007E+00
607	6.789E+01	648	4.885E+01	689	9.814E+00	730	2.733E+00	771	9.470E-01
608	7.743E+01	649	3.812E+01	690	9.525E+00	731	2.622E+00	772	9.486E-01
609	7.573E+01	650	3.405E+01	691	9.265E+00	732	2.600E+00	773	8.885E-01
610	6.813E+01	651	3.313E+01	692	9.039E+00	733	2.482E+00	774	9.539E-01
611	7.307E+01	652	3.217E+01	693	8.724E+00	734	2.388E+00	775	8.407E-01
612	9.607E+01	653	3.056E+01	694	8.404E+00	735	2.329E+00	776	8.516E-01
613	1.111E+02	654	2.919E+01	695	8.206E+00	736	2.281E+00	777	8.397E-01
614	9.724E+01	655	2.822E+01	696	7.929E+00	737	2.156E+00	778	7.859E-01
615	7.567E+01	656	2.731E+01	697	7.591E+00	738	2.134E+00	779	7.874E-01
616	6.506E+01	657	2.614E+01	698	7.382E+00	739	2.069E+00	780	7.888E-01
617	6.212E+01	658	2.509E+01	699	7.178E+00	740	2.011E+00		
618	6.213E+01	659	2.454E+01	700	6.936E+00	741	1.964E+00		
619	6.185E+01	660	2.403E+01	701	6.790E+00	742	1.914E+00		
620	6.048E+01	661	2.311E+01	702	6.514E+00	743	1.809E+00		
621	5.914E+01	662	2.200E+01	703	6.259E+00	744	1.799E+00		
622	5.854E+01	663	2.131E+01	704	6.085E+00	745	1.746E+00		
623	5.930E+01	664	2.063E+01	705	5.957E+00	746	1.714E+00		
624	6.045E+01	665	2.009E+01	706	5.772E+00	747	1.663E+00		
625	6.063E+01	666	1.960E+01	707	5.584E+00	748	1.636E+00		

CIE 1931xy Chromaticity Diagram



7-Step Chromaticity Quadrangles



**Control Setting: 3500K**

Total operating time for integrating sphere test: **1.0 hour**

Test orientation: **Downward**

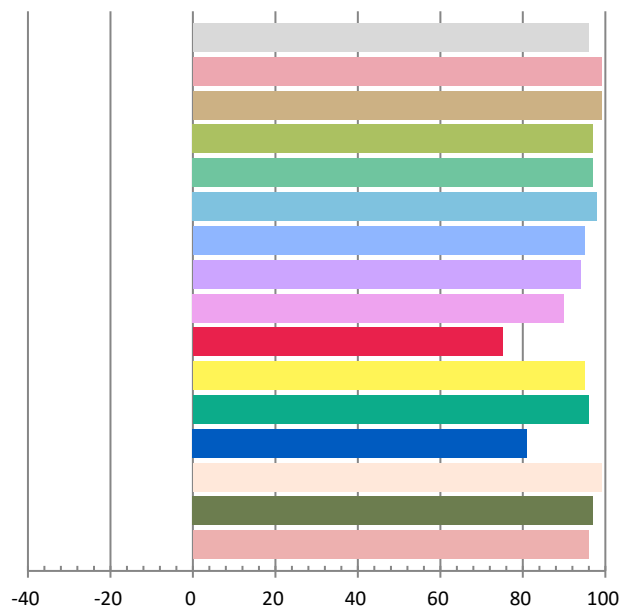
**Photometric and Electrical Measurement Result**

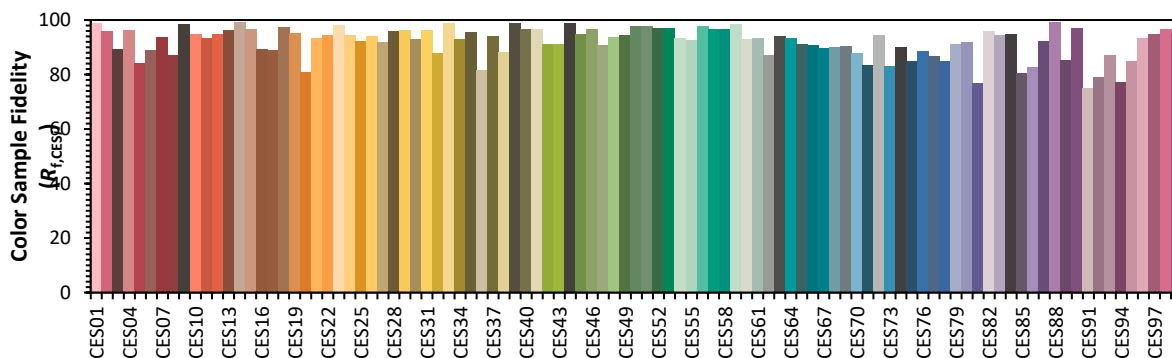
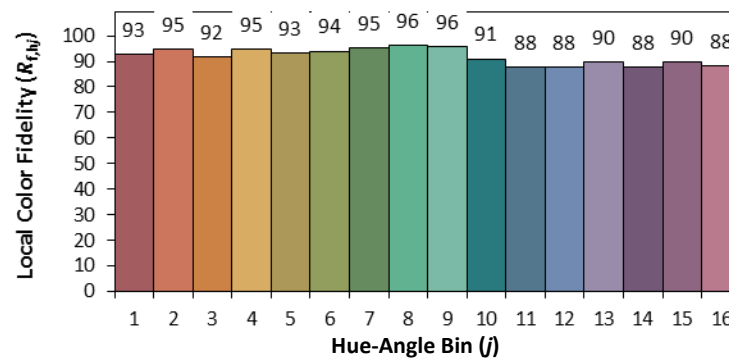
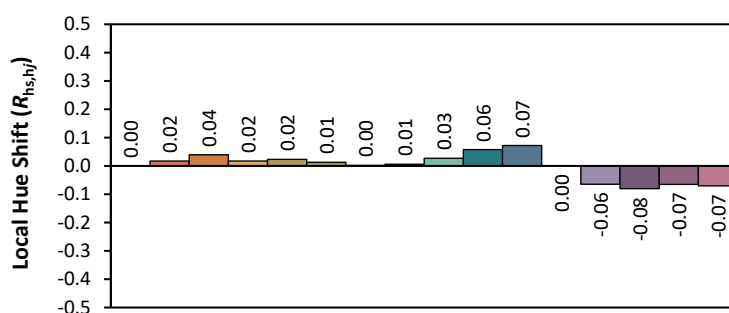
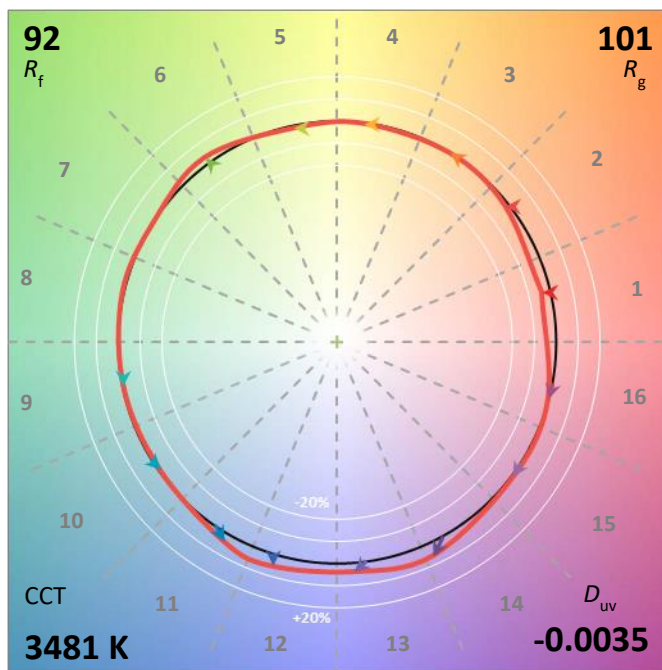
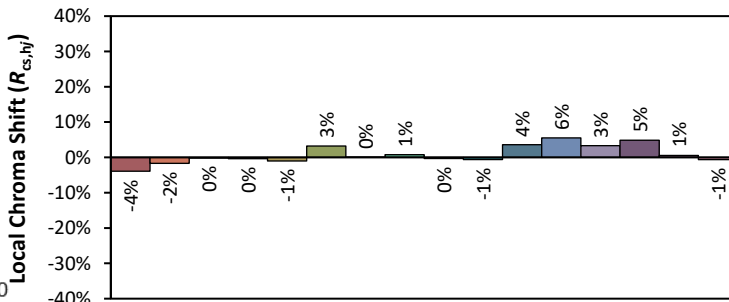
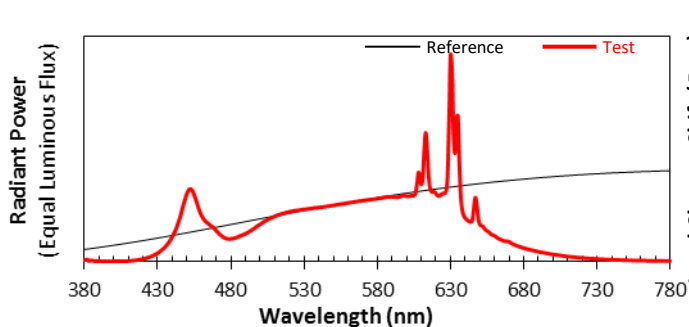
Voltage(V)	Frequency(Hz)	Current(A)	Power (W)	Power Factor	Luminous Flux(lm)	Efficacy(lm/W)
120.0	60	0.2348	27.82	0.9874	3437.6	123.56

Radiant Flux (W)	CCT (K)	Duv	x	y	u'	v'
10.682	3482	-0.00348	0.4027	0.3816	0.2378	0.5070

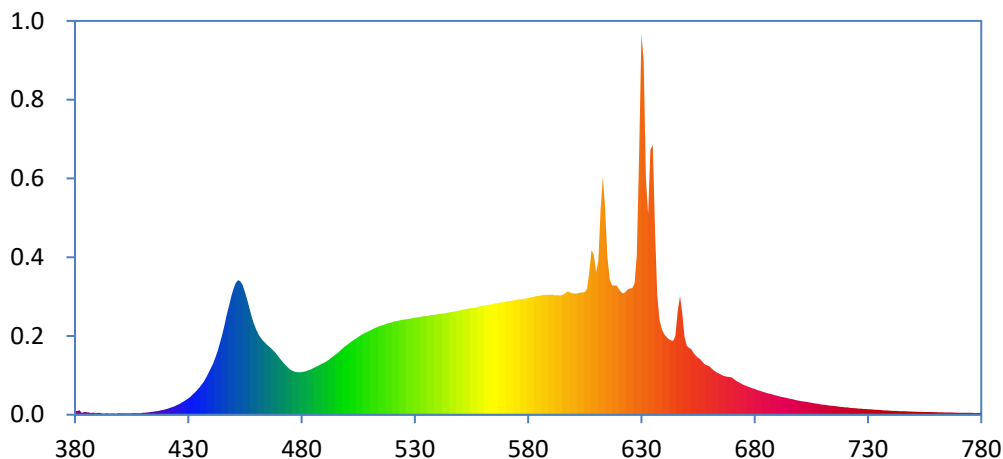
**Color Rendering Index**

<b>Ra</b>			
<b>96.0</b>			
<b>R1</b>	<b>R2</b>	<b>R3</b>	<b>R4</b>
99	99	97	97
<b>R5</b>	<b>R6</b>	<b>R7</b>	<b>R8</b>
98	95	94	90
<b>R9</b>	<b>R10</b>	<b>R11</b>	<b>R12</b>
75	95	96	81
<b>R13</b>	<b>R14</b>	<b>R15</b>	
99	97	96	





### Relative Spectral Power Distribution

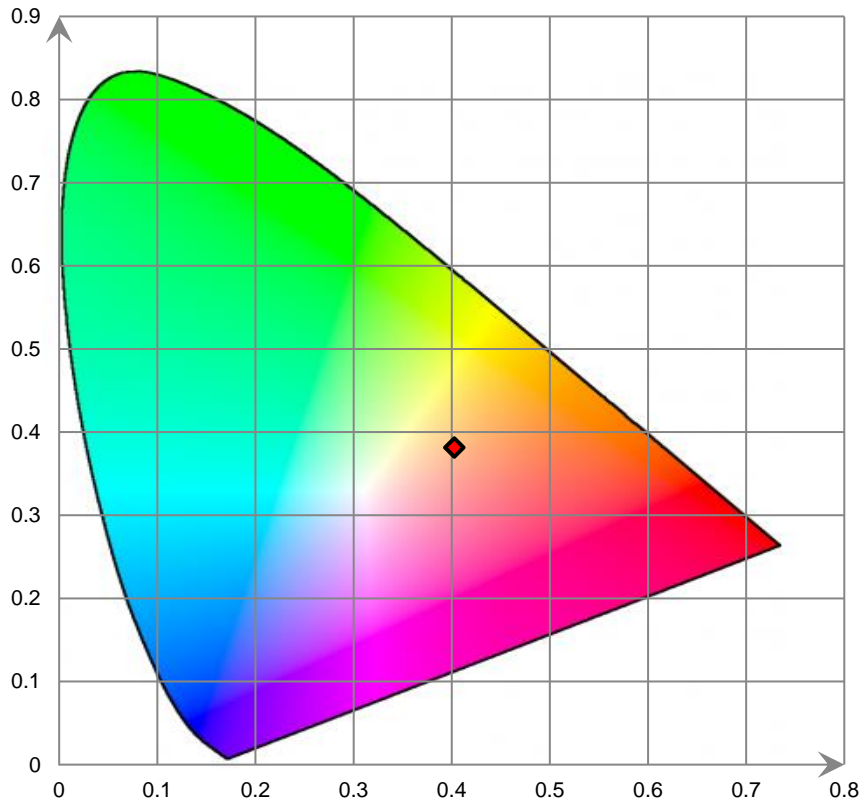


nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
380	1.515E+00	421	2.629E+00	462	3.343E+01	503	3.246E+01	544	4.427E+01
381	1.698E+00	422	2.960E+00	463	3.213E+01	504	3.316E+01	545	4.447E+01
382	1.946E+00	423	3.376E+00	464	3.124E+01	505	3.379E+01	546	4.470E+01
383	7.588E-01	424	3.705E+00	465	3.023E+01	506	3.447E+01	547	4.481E+01
384	1.203E+00	425	4.237E+00	466	2.936E+01	507	3.502E+01	548	4.497E+01
385	1.125E+00	426	4.608E+00	467	2.840E+01	508	3.554E+01	549	4.524E+01
386	1.070E+00	427	5.194E+00	468	2.752E+01	509	3.608E+01	550	4.538E+01
387	6.888E-01	428	5.772E+00	469	2.629E+01	510	3.654E+01	551	4.552E+01
388	9.556E-01	429	6.458E+00	470	2.501E+01	511	3.705E+01	552	4.591E+01
389	5.354E-01	430	7.079E+00	471	2.377E+01	512	3.757E+01	553	4.601E+01
390	8.131E-01	431	7.845E+00	472	2.254E+01	513	3.792E+01	554	4.621E+01
391	7.554E-01	432	8.837E+00	473	2.149E+01	514	3.831E+01	555	4.639E+01
392	5.216E-01	433	9.730E+00	474	2.054E+01	515	3.878E+01	556	4.656E+01
393	4.482E-01	434	1.079E+01	475	1.963E+01	516	3.895E+01	557	4.660E+01
394	6.323E-01	435	1.200E+01	476	1.916E+01	517	3.936E+01	558	4.693E+01
395	4.535E-01	436	1.330E+01	477	1.871E+01	518	3.973E+01	559	4.718E+01
396	5.048E-01	437	1.464E+01	478	1.849E+01	519	3.993E+01	560	4.732E+01
397	5.545E-01	438	1.636E+01	479	1.842E+01	520	4.024E+01	561	4.759E+01
398	3.779E-01	439	1.830E+01	480	1.852E+01	521	4.053E+01	562	4.769E+01
399	6.158E-01	440	2.026E+01	481	1.875E+01	522	4.069E+01	563	4.791E+01
400	6.473E-01	441	2.244E+01	482	1.893E+01	523	4.097E+01	564	4.805E+01
401	5.277E-01	442	2.508E+01	483	1.938E+01	524	4.120E+01	565	4.834E+01
402	5.599E-01	443	2.783E+01	484	1.966E+01	525	4.132E+01	566	4.845E+01
403	5.714E-01	444	3.133E+01	485	2.021E+01	526	4.144E+01	567	4.866E+01
404	5.908E-01	445	3.485E+01	486	2.071E+01	527	4.160E+01	568	4.885E+01
405	5.664E-01	446	3.887E+01	487	2.110E+01	528	4.179E+01	569	4.894E+01
406	6.927E-01	447	4.347E+01	488	2.161E+01	529	4.202E+01	570	4.913E+01
407	5.927E-01	448	4.753E+01	489	2.218E+01	530	4.218E+01	571	4.935E+01
408	6.526E-01	449	5.156E+01	490	2.262E+01	531	4.229E+01	572	4.941E+01
409	6.345E-01	450	5.489E+01	491	2.324E+01	532	4.247E+01	573	4.970E+01
410	8.233E-01	451	5.734E+01	492	2.389E+01	533	4.263E+01	574	4.978E+01
411	9.244E-01	452	5.853E+01	493	2.471E+01	534	4.283E+01	575	4.995E+01
412	9.813E-01	453	5.805E+01	494	2.540E+01	535	4.289E+01	576	5.014E+01
413	1.100E+00	454	5.627E+01	495	2.616E+01	536	4.304E+01	577	5.025E+01
414	1.240E+00	455	5.339E+01	496	2.684E+01	537	4.337E+01	578	5.041E+01
415	1.366E+00	456	5.001E+01	497	2.786E+01	538	4.335E+01	579	5.052E+01
416	1.558E+00	457	4.637E+01	498	2.872E+01	539	4.347E+01	580	5.077E+01
417	1.683E+00	458	4.265E+01	499	2.956E+01	540	4.371E+01	581	5.102E+01
418	1.932E+00	459	3.961E+01	500	3.024E+01	541	4.384E+01	582	5.112E+01
419	2.123E+00	460	3.698E+01	501	3.104E+01	542	4.397E+01	583	5.140E+01
420	2.405E+00	461	3.493E+01	502	3.184E+01	543	4.407E+01	584	5.165E+01

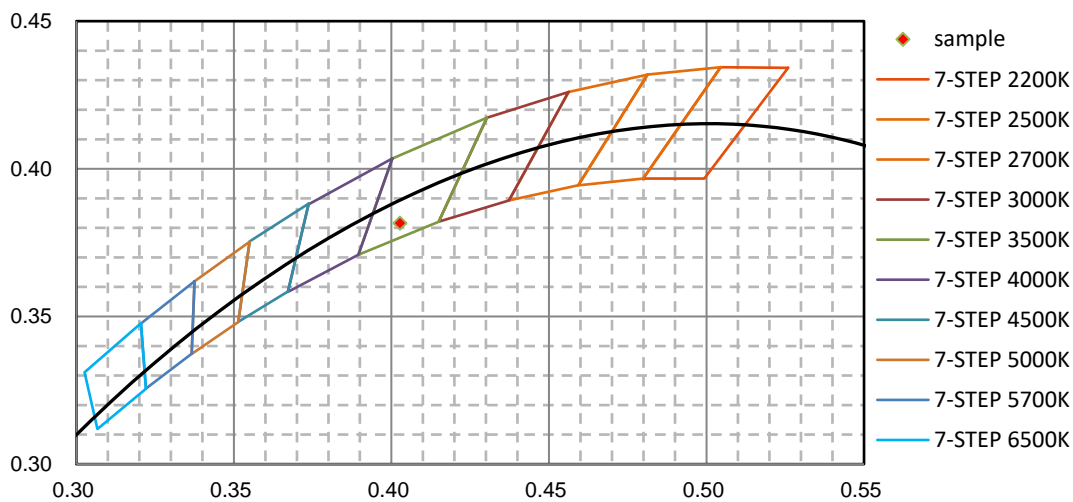


nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
585	5.168E+01	626	5.514E+01	667	1.667E+01	708	4.719E+00	749	1.394E+00
586	5.200E+01	627	5.706E+01	668	1.647E+01	709	4.558E+00	750	1.353E+00
587	5.205E+01	628	6.937E+01	669	1.644E+01	710	4.427E+00	751	1.311E+00
588	5.216E+01	629	1.147E+02	670	1.616E+01	711	4.295E+00	752	1.241E+00
589	5.214E+01	630	1.658E+02	671	1.537E+01	712	4.160E+00	753	1.257E+00
590	5.220E+01	631	1.539E+02	672	1.464E+01	713	3.998E+00	754	1.247E+00
591	5.218E+01	632	1.030E+02	673	1.409E+01	714	3.901E+00	755	1.214E+00
592	5.194E+01	633	8.720E+01	674	1.359E+01	715	3.799E+00	756	1.162E+00
593	5.199E+01	634	1.154E+02	675	1.302E+01	716	3.660E+00	757	1.171E+00
594	5.188E+01	635	1.173E+02	676	1.266E+01	717	3.555E+00	758	1.160E+00
595	5.208E+01	636	7.986E+01	677	1.224E+01	718	3.411E+00	759	1.143E+00
596	5.254E+01	637	5.187E+01	678	1.193E+01	719	3.358E+00	760	1.114E+00
597	5.341E+01	638	4.132E+01	679	1.150E+01	720	3.210E+00	761	1.077E+00
598	5.352E+01	639	3.729E+01	680	1.119E+01	721	3.185E+00	762	1.050E+00
599	5.296E+01	640	3.516E+01	681	1.077E+01	722	3.018E+00	763	1.029E+00
600	5.273E+01	641	3.387E+01	682	1.053E+01	723	2.925E+00	764	9.935E-01
601	5.269E+01	642	3.296E+01	683	1.014E+01	724	2.869E+00	765	9.589E-01
602	5.282E+01	643	3.233E+01	684	9.881E+00	725	2.768E+00	766	9.807E-01
603	5.313E+01	644	3.213E+01	685	9.530E+00	726	2.666E+00	767	9.516E-01
604	5.318E+01	645	3.433E+01	686	9.284E+00	727	2.652E+00	768	9.329E-01
605	5.330E+01	646	4.457E+01	687	9.056E+00	728	2.513E+00	769	8.949E-01
606	5.471E+01	647	5.164E+01	688	8.748E+00	729	2.497E+00	770	8.768E-01
607	6.217E+01	648	4.424E+01	689	8.504E+00	730	2.406E+00	771	8.363E-01
608	7.158E+01	649	3.406E+01	690	8.211E+00	731	2.351E+00	772	8.523E-01
609	6.959E+01	650	3.004E+01	691	7.970E+00	732	2.285E+00	773	8.289E-01
610	6.205E+01	651	2.909E+01	692	7.735E+00	733	2.166E+00	774	7.965E-01
611	6.722E+01	652	2.853E+01	693	7.555E+00	734	2.141E+00	775	8.131E-01
612	8.965E+01	653	2.695E+01	694	7.318E+00	735	2.078E+00	776	8.048E-01
613	1.035E+02	654	2.561E+01	695	7.085E+00	736	2.041E+00	777	7.106E-01
614	8.981E+01	655	2.479E+01	696	6.834E+00	737	1.903E+00	778	7.871E-01
615	6.885E+01	656	2.411E+01	697	6.672E+00	738	1.882E+00	779	7.886E-01
616	5.898E+01	657	2.290E+01	698	6.418E+00	739	1.789E+00	780	7.901E-01
617	5.629E+01	658	2.195E+01	699	6.220E+00	740	1.732E+00		
618	5.618E+01	659	2.151E+01	700	5.992E+00	741	1.687E+00		
619	5.621E+01	660	2.104E+01	701	5.839E+00	742	1.665E+00		
620	5.481E+01	661	2.015E+01	702	5.693E+00	743	1.607E+00		
621	5.335E+01	662	1.924E+01	703	5.554E+00	744	1.553E+00		
622	5.275E+01	663	1.853E+01	704	5.395E+00	745	1.558E+00		
623	5.344E+01	664	1.809E+01	705	5.236E+00	746	1.525E+00		
624	5.455E+01	665	1.754E+01	706	4.984E+00	747	1.490E+00		
625	5.491E+01	666	1.698E+01	707	4.890E+00	748	1.422E+00		

CIE 1931xy Chromaticity Diagram



7-Step Chromaticity Quadrangles



**Control Setting: 4000K**

Total operating time for integrating sphere test: **1.0 hour**

Test orientation: **Downward**

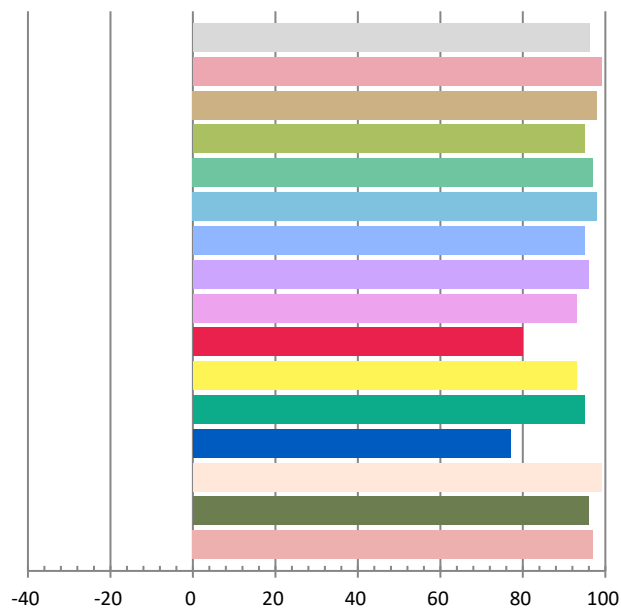
**Photometric and Electrical Measurement Result**

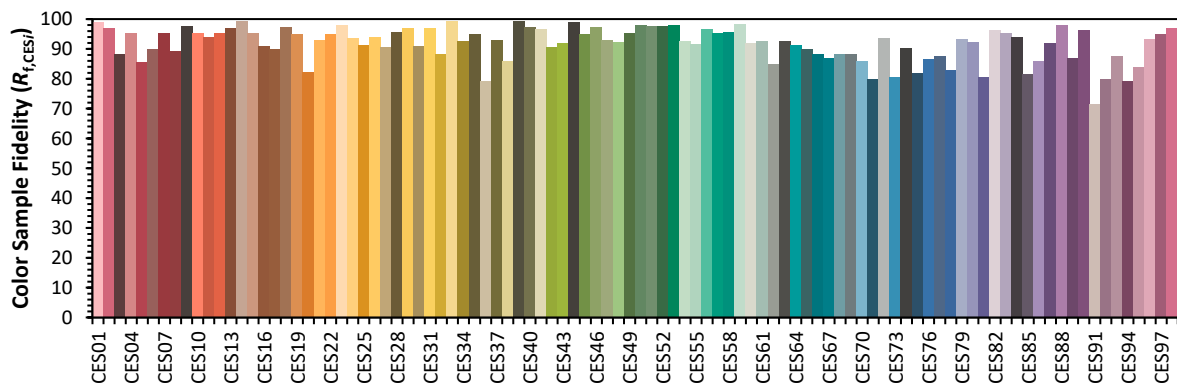
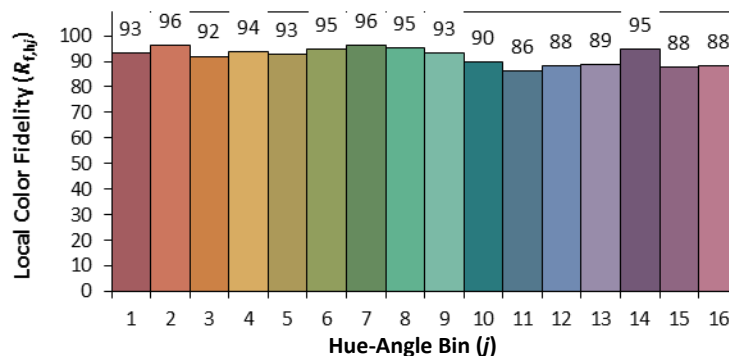
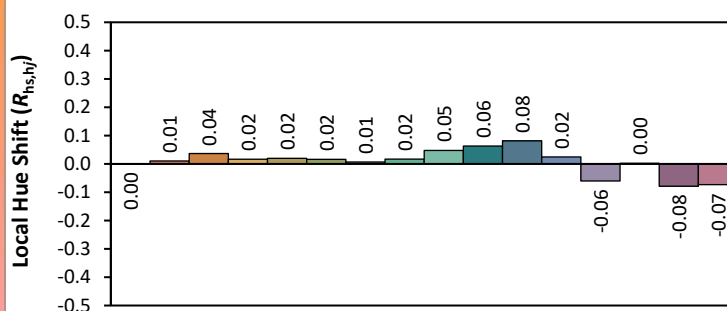
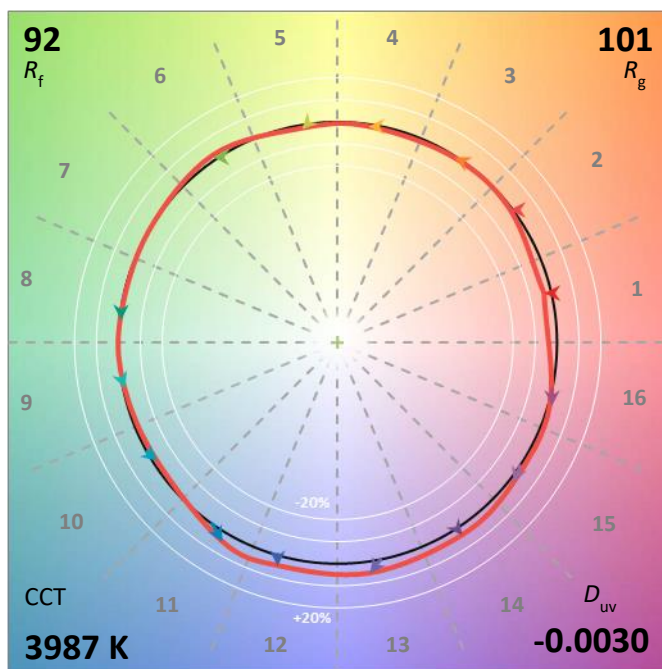
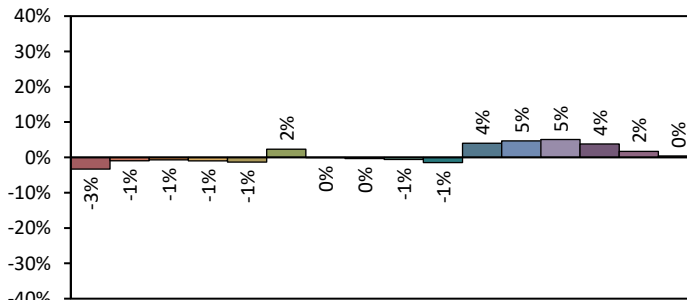
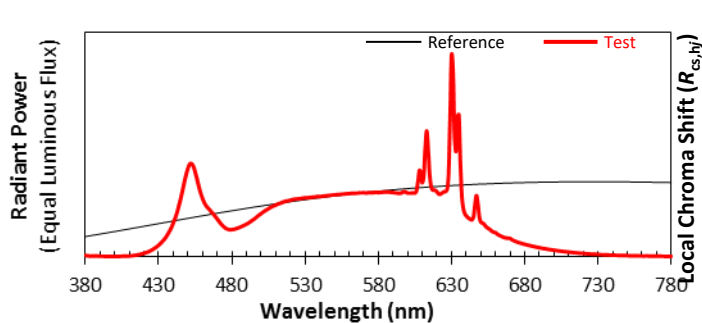
Voltage(V)	Frequency(Hz)	Current(A)	Power (W)	Power Factor	Luminous Flux(lm)	Efficacy(lm/W)
120.0	60	0.2349	27.84	0.9876	3442.4	123.65

Radiant Flux (W)	CCT (K)	Duv	x	y	u'	v'
10.792	3987	-0.00296	0.3790	0.3696	0.2270	0.4982

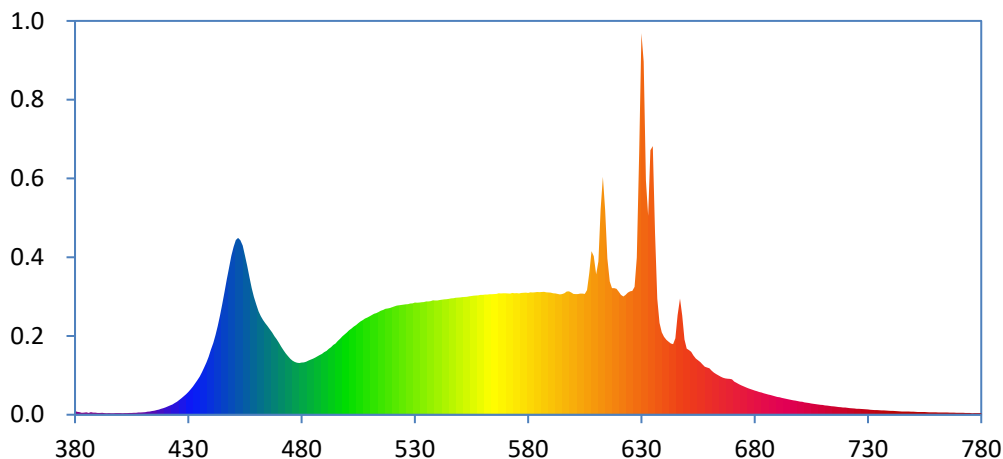
**Color Rendering Index**

<b>Ra</b>			
<b>96.2</b>			
<b>R1</b>	<b>R2</b>	<b>R3</b>	<b>R4</b>
99	98	95	97
<b>R5</b>	<b>R6</b>	<b>R7</b>	<b>R8</b>
98	95	96	93
<b>R9</b>	<b>R10</b>	<b>R11</b>	<b>R12</b>
80	93	95	77
<b>R13</b>	<b>R14</b>	<b>R15</b>	
99	96	97	





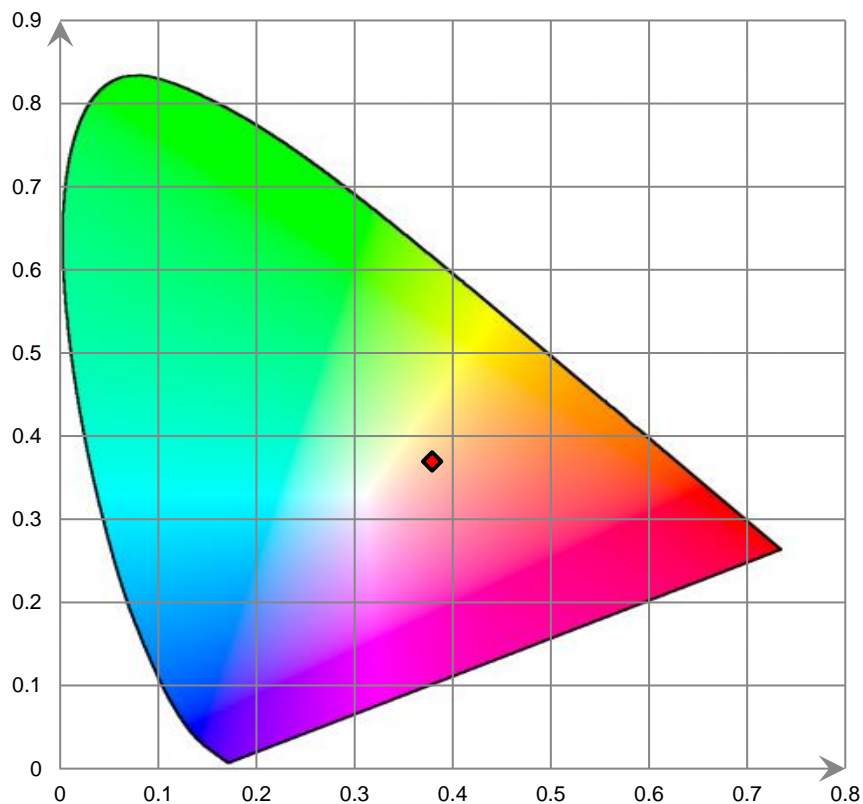
### Relative Spectral Power Distribution



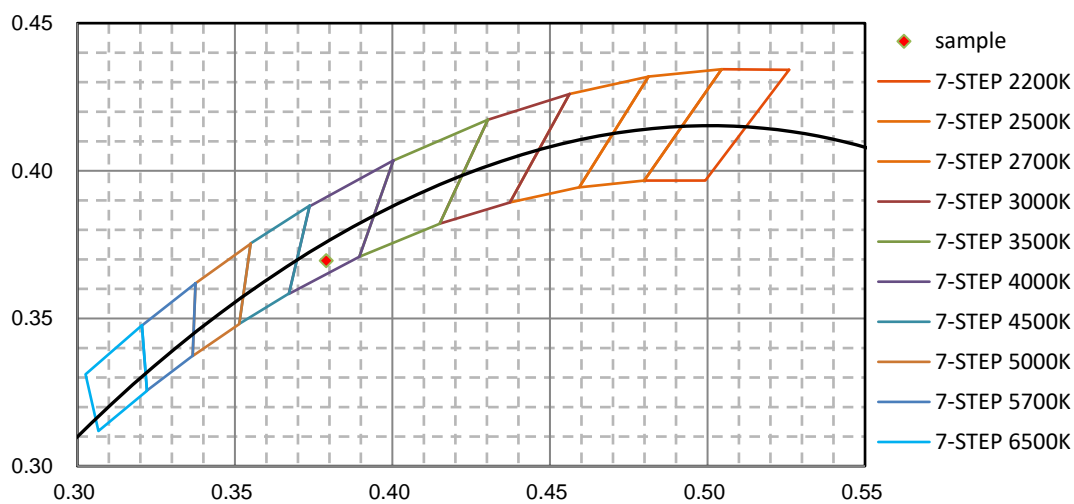
nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
380	1.476E+00	421	3.335E+00	462	3.976E+01	503	3.556E+01	544	4.667E+01
381	1.143E+00	422	3.752E+00	463	3.823E+01	504	3.619E+01	545	4.678E+01
382	1.047E+00	423	4.128E+00	464	3.696E+01	505	3.698E+01	546	4.698E+01
383	8.100E-01	424	4.712E+00	465	3.578E+01	506	3.765E+01	547	4.705E+01
384	8.698E-01	425	5.242E+00	466	3.441E+01	507	3.820E+01	548	4.722E+01
385	9.902E-01	426	5.913E+00	467	3.323E+01	508	3.882E+01	549	4.729E+01
386	7.060E-01	427	6.683E+00	468	3.172E+01	509	3.924E+01	550	4.733E+01
387	1.041E+00	428	7.418E+00	469	3.051E+01	510	3.972E+01	551	4.750E+01
388	8.575E-01	429	8.244E+00	470	2.904E+01	511	4.026E+01	552	4.752E+01
389	8.723E-01	430	9.178E+00	471	2.752E+01	512	4.075E+01	553	4.764E+01
390	7.271E-01	431	1.021E+01	472	2.606E+01	513	4.106E+01	554	4.780E+01
391	7.030E-01	432	1.131E+01	473	2.476E+01	514	4.147E+01	555	4.793E+01
392	7.413E-01	433	1.258E+01	474	2.363E+01	515	4.199E+01	556	4.806E+01
393	6.154E-01	434	1.388E+01	475	2.262E+01	516	4.230E+01	557	4.813E+01
394	6.022E-01	435	1.540E+01	476	2.184E+01	517	4.275E+01	558	4.822E+01
395	6.282E-01	436	1.712E+01	477	2.134E+01	518	4.289E+01	559	4.838E+01
396	5.903E-01	437	1.904E+01	478	2.097E+01	519	4.312E+01	560	4.839E+01
397	5.866E-01	438	2.106E+01	479	2.085E+01	520	4.340E+01	561	4.854E+01
398	6.289E-01	439	2.340E+01	480	2.107E+01	521	4.374E+01	562	4.854E+01
399	6.173E-01	440	2.622E+01	481	2.115E+01	522	4.403E+01	563	4.867E+01
400	6.689E-01	441	2.896E+01	482	2.142E+01	523	4.416E+01	564	4.867E+01
401	5.658E-01	442	3.218E+01	483	2.183E+01	524	4.430E+01	565	4.873E+01
402	6.313E-01	443	3.584E+01	484	2.220E+01	525	4.441E+01	566	4.874E+01
403	6.223E-01	444	4.003E+01	485	2.259E+01	526	4.457E+01	567	4.901E+01
404	6.980E-01	445	4.465E+01	486	2.305E+01	527	4.465E+01	568	4.898E+01
405	6.989E-01	446	4.946E+01	487	2.357E+01	528	4.487E+01	569	4.902E+01
406	7.677E-01	447	5.452E+01	488	2.408E+01	529	4.499E+01	570	4.901E+01
407	7.712E-01	448	5.951E+01	489	2.455E+01	530	4.526E+01	571	4.897E+01
408	8.917E-01	449	6.418E+01	490	2.526E+01	531	4.522E+01	572	4.888E+01
409	8.893E-01	450	6.778E+01	491	2.576E+01	532	4.529E+01	573	4.914E+01
410	9.468E-01	451	7.052E+01	492	2.662E+01	533	4.544E+01	574	4.904E+01
411	1.022E+00	452	7.137E+01	493	2.726E+01	534	4.547E+01	575	4.913E+01
412	1.212E+00	453	7.045E+01	494	2.818E+01	535	4.572E+01	576	4.894E+01
413	1.318E+00	454	6.828E+01	495	2.877E+01	536	4.574E+01	577	4.919E+01
414	1.490E+00	455	6.424E+01	496	2.977E+01	537	4.588E+01	578	4.920E+01
415	1.642E+00	456	6.011E+01	497	3.067E+01	538	4.617E+01	579	4.932E+01
416	1.912E+00	457	5.558E+01	498	3.163E+01	539	4.612E+01	580	4.915E+01
417	2.045E+00	458	5.117E+01	499	3.246E+01	540	4.612E+01	581	4.940E+01
418	2.392E+00	459	4.757E+01	500	3.318E+01	541	4.630E+01	582	4.935E+01
419	2.642E+00	460	4.445E+01	501	3.409E+01	542	4.647E+01	583	4.943E+01
420	2.980E+00	461	4.172E+01	502	3.479E+01	543	4.657E+01	584	4.957E+01

nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
585	4.948E+01	626	5.000E+01	667	1.468E+01	708	4.145E+00	749	1.220E+00
586	4.956E+01	627	5.164E+01	668	1.452E+01	709	4.010E+00	750	1.239E+00
587	4.959E+01	628	6.346E+01	669	1.449E+01	710	3.919E+00	751	1.151E+00
588	4.943E+01	629	1.061E+02	670	1.426E+01	711	3.764E+00	752	1.124E+00
589	4.934E+01	630	1.540E+02	671	1.339E+01	712	3.690E+00	753	1.104E+00
590	4.931E+01	631	1.425E+02	672	1.286E+01	713	3.561E+00	754	1.074E+00
591	4.902E+01	632	9.458E+01	673	1.235E+01	714	3.413E+00	755	1.111E+00
592	4.893E+01	633	8.032E+01	674	1.191E+01	715	3.369E+00	756	1.061E+00
593	4.876E+01	634	1.068E+02	675	1.147E+01	716	3.260E+00	757	1.005E+00
594	4.859E+01	635	1.084E+02	676	1.114E+01	717	3.136E+00	758	1.005E+00
595	4.871E+01	636	7.323E+01	677	1.075E+01	718	3.029E+00	759	9.670E-01
596	4.900E+01	637	4.685E+01	678	1.043E+01	719	2.927E+00	760	9.981E-01
597	4.973E+01	638	3.709E+01	679	1.009E+01	720	2.892E+00	761	8.965E-01
598	4.980E+01	639	3.330E+01	680	9.771E+00	721	2.782E+00	762	9.364E-01
599	4.937E+01	640	3.144E+01	681	9.524E+00	722	2.670E+00	763	9.315E-01
600	4.879E+01	641	3.024E+01	682	9.150E+00	723	2.614E+00	764	9.315E-01
601	4.868E+01	642	2.943E+01	683	9.003E+00	724	2.524E+00	765	9.072E-01
602	4.871E+01	643	2.873E+01	684	8.652E+00	725	2.424E+00	766	8.707E-01
603	4.889E+01	644	2.850E+01	685	8.409E+00	726	2.362E+00	767	8.268E-01
604	4.887E+01	645	3.087E+01	686	8.177E+00	727	2.310E+00	768	8.475E-01
605	4.878E+01	646	4.016E+01	687	7.948E+00	728	2.260E+00	769	8.048E-01
606	5.032E+01	647	4.692E+01	688	7.670E+00	729	2.189E+00	770	7.864E-01
607	5.720E+01	648	3.998E+01	689	7.461E+00	730	2.133E+00	771	7.759E-01
608	6.604E+01	649	3.037E+01	690	7.196E+00	731	2.034E+00	772	7.597E-01
609	6.400E+01	650	2.671E+01	691	7.060E+00	732	1.936E+00	773	7.280E-01
610	5.667E+01	651	2.607E+01	692	6.796E+00	733	1.884E+00	774	7.132E-01
611	6.186E+01	652	2.538E+01	693	6.573E+00	734	1.875E+00	775	6.931E-01
612	8.298E+01	653	2.388E+01	694	6.396E+00	735	1.838E+00	776	6.060E-01
613	9.604E+01	654	2.270E+01	695	6.199E+00	736	1.732E+00	777	6.611E-01
614	8.281E+01	655	2.195E+01	696	6.023E+00	737	1.720E+00	778	6.341E-01
615	6.313E+01	656	2.125E+01	697	5.812E+00	738	1.658E+00	779	6.353E-01
616	5.379E+01	657	2.031E+01	698	5.668E+00	739	1.621E+00	780	6.365E-01
617	5.110E+01	658	1.940E+01	699	5.507E+00	740	1.567E+00		
618	5.107E+01	659	1.905E+01	700	5.300E+00	741	1.556E+00		
619	5.087E+01	660	1.874E+01	701	5.214E+00	742	1.474E+00		
620	4.969E+01	661	1.777E+01	702	4.974E+00	743	1.454E+00		
621	4.838E+01	662	1.699E+01	703	4.852E+00	744	1.358E+00		
622	4.773E+01	663	1.640E+01	704	4.728E+00	745	1.324E+00		
623	4.838E+01	664	1.590E+01	705	4.508E+00	746	1.294E+00		
624	4.928E+01	665	1.538E+01	706	4.398E+00	747	1.319E+00		
625	4.979E+01	666	1.493E+01	707	4.267E+00	748	1.289E+00		

CIE 1931xy Chromaticity Diagram



7-Step Chromaticity Quadrangles



**Control Setting: 5000K**

Total operating time for integrating sphere test: **1.0 hour**

Test orientation: **Downward**

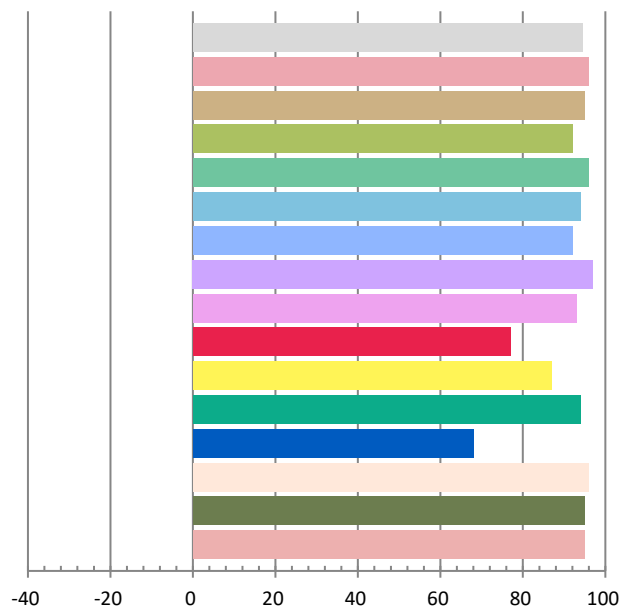
**Photometric and Electrical Measurement Result**

Voltage(V)	Frequency(Hz)	Current(A)	Power (W)	Power Factor	Luminous Flux(lm)	Efficacy(lm/W)
120.0	60	0.235	27.87	0.9881	3449.1	123.78

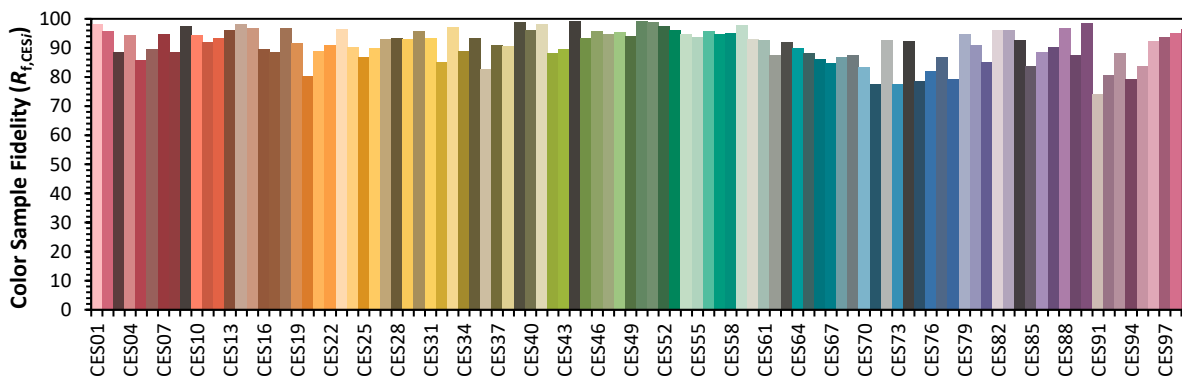
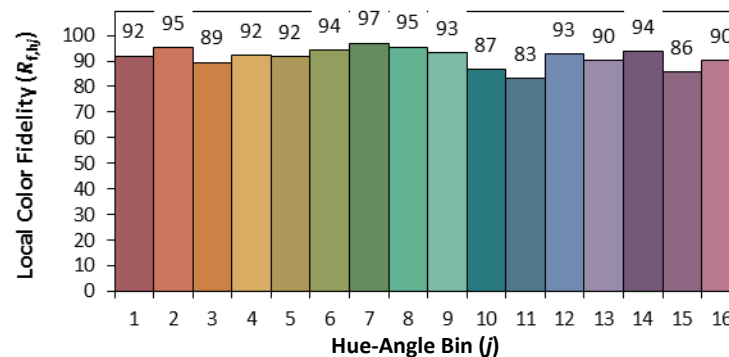
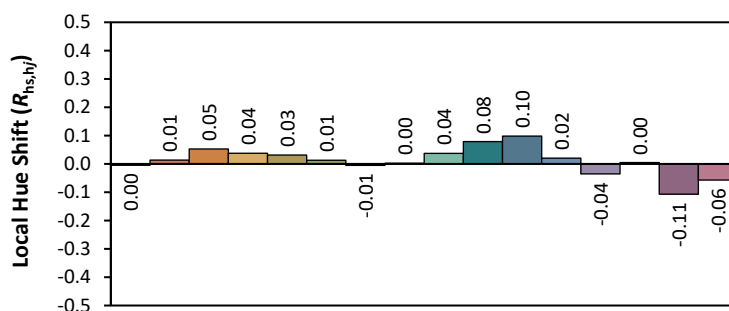
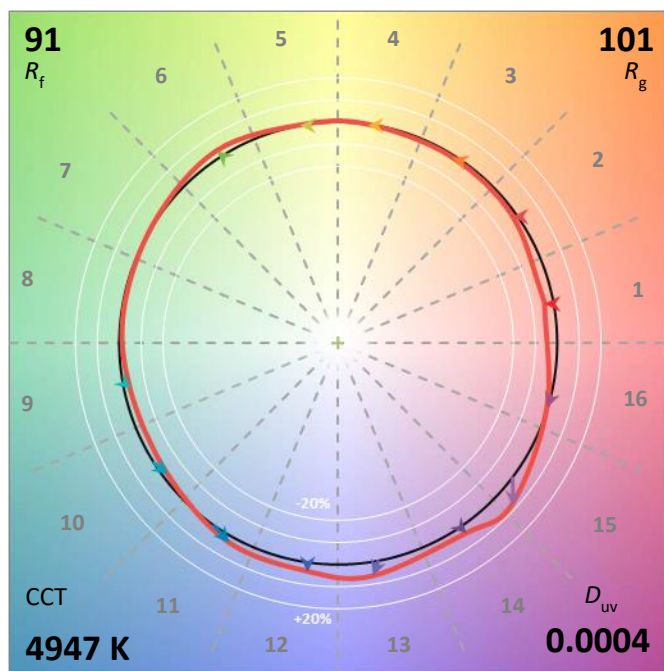
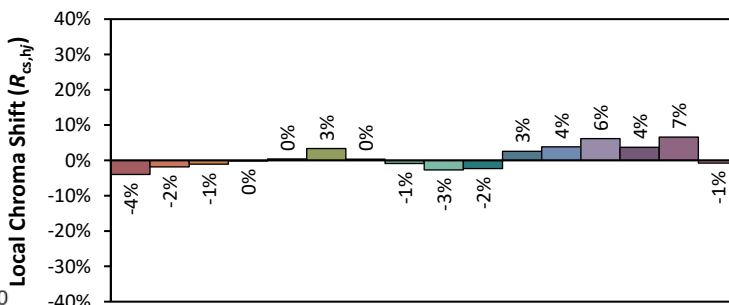
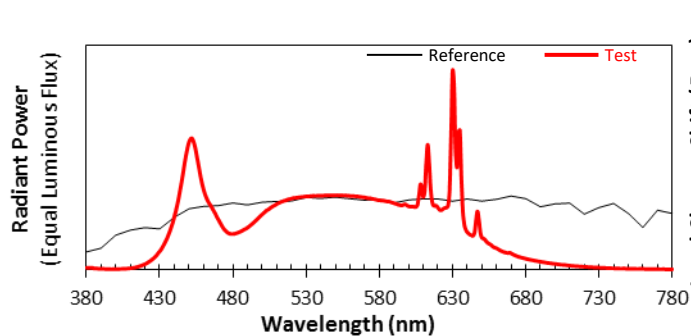
Radiant Flux (W)	CCT (K)	Duv	x	y	u'	v'
10.938	4945	0.00044	0.3467	0.3538	0.2117	0.4860

**Color Rendering Index**

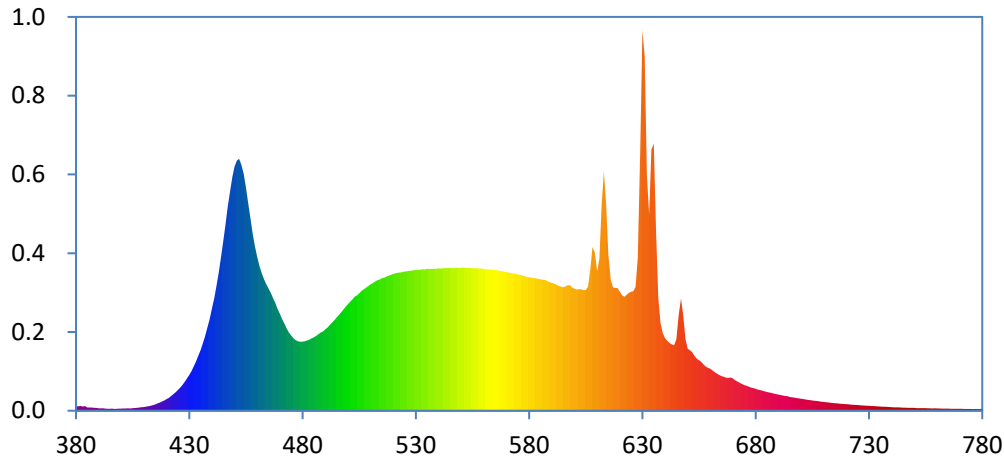
<b>Ra</b>			
<b>94.5</b>			
<b>R1</b>	<b>R2</b>	<b>R3</b>	<b>R4</b>
96	95	92	96
<b>R5</b>	<b>R6</b>	<b>R7</b>	<b>R8</b>
94	92	97	93
<b>R9</b>	<b>R10</b>	<b>R11</b>	<b>R12</b>
77	87	94	68
<b>R13</b>	<b>R14</b>	<b>R15</b>	
96	95	95	







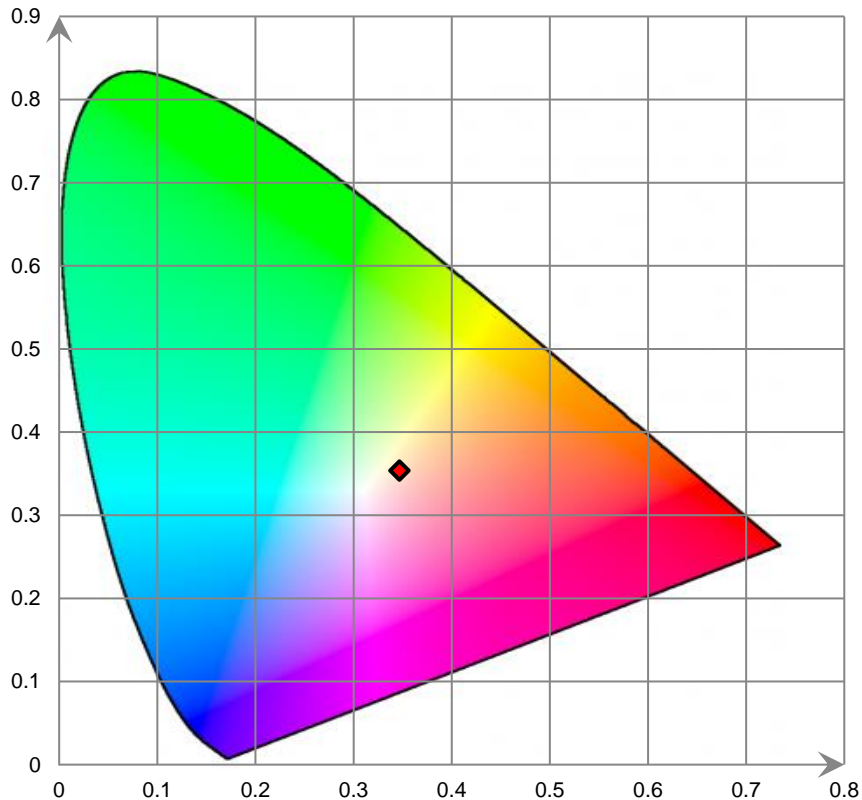
### Relative Spectral Power Distribution



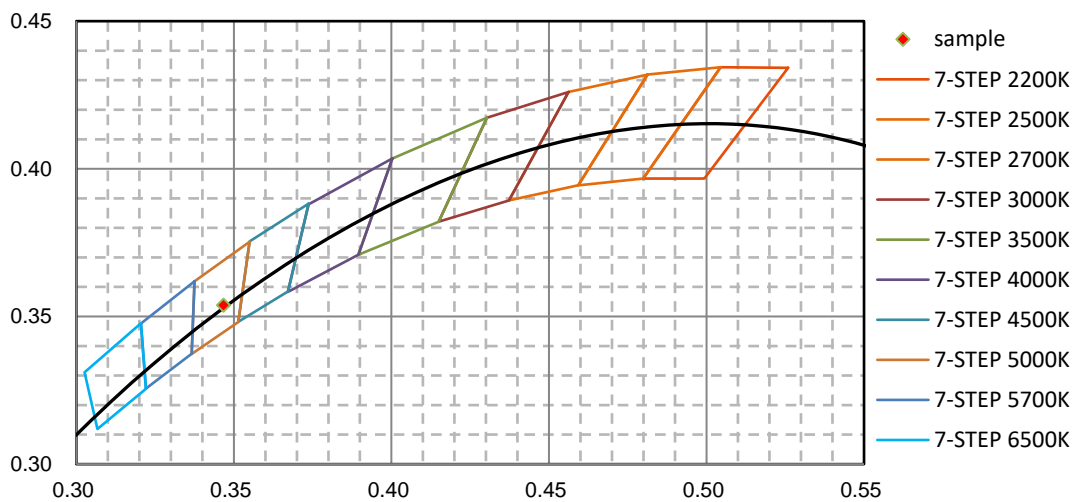
nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
380	1.620E+00	421	4.543E+00	462	4.847E+01	503	4.019E+01	544	5.025E+01
381	1.516E+00	422	5.208E+00	463	4.628E+01	504	4.068E+01	545	5.031E+01
382	1.685E+00	423	5.846E+00	464	4.462E+01	505	4.140E+01	546	5.025E+01
383	1.453E+00	424	6.554E+00	465	4.311E+01	506	4.219E+01	547	5.028E+01
384	1.665E+00	425	7.355E+00	466	4.145E+01	507	4.281E+01	548	5.040E+01
385	1.151E+00	426	8.124E+00	467	3.962E+01	508	4.338E+01	549	5.032E+01
386	1.125E+00	427	9.093E+00	468	3.796E+01	509	4.389E+01	550	5.039E+01
387	1.128E+00	428	1.017E+01	469	3.581E+01	510	4.458E+01	551	5.046E+01
388	1.000E+00	429	1.147E+01	470	3.417E+01	511	4.502E+01	552	5.035E+01
389	9.949E-01	430	1.265E+01	471	3.230E+01	512	4.555E+01	553	5.029E+01
390	8.306E-01	431	1.400E+01	472	3.062E+01	513	4.595E+01	554	5.034E+01
391	8.267E-01	432	1.567E+01	473	2.891E+01	514	4.627E+01	555	5.027E+01
392	8.716E-01	433	1.739E+01	474	2.751E+01	515	4.670E+01	556	5.020E+01
393	7.579E-01	434	1.936E+01	475	2.650E+01	516	4.690E+01	557	5.028E+01
394	6.710E-01	435	2.142E+01	476	2.552E+01	517	4.735E+01	558	5.013E+01
395	6.921E-01	436	2.385E+01	477	2.491E+01	518	4.762E+01	559	5.014E+01
396	7.656E-01	437	2.635E+01	478	2.448E+01	519	4.788E+01	560	4.993E+01
397	6.221E-01	438	2.932E+01	479	2.431E+01	520	4.817E+01	561	4.992E+01
398	7.097E-01	439	3.226E+01	480	2.438E+01	521	4.845E+01	562	4.987E+01
399	7.288E-01	440	3.596E+01	481	2.445E+01	522	4.861E+01	563	4.977E+01
400	7.254E-01	441	3.969E+01	482	2.473E+01	523	4.873E+01	564	4.968E+01
401	7.958E-01	442	4.411E+01	483	2.508E+01	524	4.883E+01	565	4.962E+01
402	8.002E-01	443	4.874E+01	484	2.549E+01	525	4.906E+01	566	4.953E+01
403	8.319E-01	444	5.410E+01	485	2.590E+01	526	4.915E+01	567	4.926E+01
404	8.100E-01	445	5.970E+01	486	2.638E+01	527	4.930E+01	568	4.918E+01
405	9.189E-01	446	6.557E+01	487	2.696E+01	528	4.938E+01	569	4.903E+01
406	9.628E-01	447	7.189E+01	488	2.749E+01	529	4.950E+01	570	4.892E+01
407	9.970E-01	448	7.744E+01	489	2.794E+01	530	4.962E+01	571	4.869E+01
408	1.111E+00	449	8.239E+01	490	2.869E+01	531	4.971E+01	572	4.851E+01
409	1.232E+00	450	8.612E+01	491	2.931E+01	532	4.971E+01	573	4.834E+01
410	1.288E+00	451	8.817E+01	492	3.020E+01	533	4.986E+01	574	4.830E+01
411	1.476E+00	452	8.878E+01	493	3.103E+01	534	4.981E+01	575	4.801E+01
412	1.592E+00	453	8.673E+01	494	3.187E+01	535	5.005E+01	576	4.788E+01
413	1.754E+00	454	8.349E+01	495	3.282E+01	536	4.995E+01	577	4.771E+01
414	1.995E+00	455	7.869E+01	496	3.365E+01	537	4.994E+01	578	4.738E+01
415	2.226E+00	456	7.315E+01	497	3.469E+01	538	5.002E+01	579	4.718E+01
416	2.590E+00	457	6.784E+01	498	3.565E+01	539	5.002E+01	580	4.705E+01
417	2.869E+00	458	6.246E+01	499	3.665E+01	540	5.019E+01	581	4.691E+01
418	3.248E+00	459	5.796E+01	500	3.749E+01	541	5.009E+01	582	4.675E+01
419	3.641E+00	460	5.401E+01	501	3.844E+01	542	5.020E+01	583	4.670E+01
420	4.139E+00	461	5.084E+01	502	3.922E+01	543	5.034E+01	584	4.650E+01

nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
585	4.629E+01	626	4.212E+01	667	1.165E+01	708	3.315E+00	749	1.007E+00
586	4.617E+01	627	4.368E+01	668	1.156E+01	709	3.184E+00	750	1.014E+00
587	4.611E+01	628	5.388E+01	669	1.175E+01	710	3.093E+00	751	9.182E-01
588	4.570E+01	629	9.133E+01	670	1.132E+01	711	2.969E+00	752	8.941E-01
589	4.536E+01	630	1.341E+02	671	1.075E+01	712	2.936E+00	753	8.944E-01
590	4.508E+01	631	1.249E+02	672	1.025E+01	713	2.835E+00	754	8.906E-01
591	4.480E+01	632	8.286E+01	673	9.848E+00	714	2.722E+00	755	8.825E-01
592	4.444E+01	633	6.910E+01	674	9.392E+00	715	2.666E+00	756	8.280E-01
593	4.402E+01	634	9.209E+01	675	9.036E+00	716	2.586E+00	757	8.383E-01
594	4.380E+01	635	9.412E+01	676	8.786E+00	717	2.464E+00	758	8.255E-01
595	4.356E+01	636	6.337E+01	677	8.477E+00	718	2.435E+00	759	8.453E-01
596	4.376E+01	637	3.974E+01	678	8.209E+00	719	2.393E+00	760	8.081E-01
597	4.427E+01	638	3.090E+01	679	7.978E+00	720	2.284E+00	761	8.234E-01
598	4.422E+01	639	2.735E+01	680	7.711E+00	721	2.265E+00	762	7.371E-01
599	4.342E+01	640	2.563E+01	681	7.445E+00	722	2.152E+00	763	7.662E-01
600	4.297E+01	641	2.459E+01	682	7.260E+00	723	2.068E+00	764	7.598E-01
601	4.276E+01	642	2.383E+01	683	7.044E+00	724	2.042E+00	765	7.269E-01
602	4.278E+01	643	2.338E+01	684	6.811E+00	725	2.008E+00	766	7.104E-01
603	4.282E+01	644	2.313E+01	685	6.621E+00	726	1.905E+00	767	7.033E-01
604	4.253E+01	645	2.523E+01	686	6.451E+00	727	1.868E+00	768	7.025E-01
605	4.251E+01	646	3.346E+01	687	6.249E+00	728	1.792E+00	769	6.727E-01
606	4.378E+01	647	3.958E+01	688	6.039E+00	729	1.754E+00	770	6.547E-01
607	4.984E+01	648	3.355E+01	689	5.880E+00	730	1.743E+00	771	6.563E-01
608	5.774E+01	649	2.517E+01	690	5.716E+00	731	1.642E+00	772	6.217E-01
609	5.585E+01	650	2.183E+01	691	5.529E+00	732	1.654E+00	773	6.201E-01
610	4.920E+01	651	2.133E+01	692	5.386E+00	733	1.554E+00	774	6.014E-01
611	5.354E+01	652	2.064E+01	693	5.179E+00	734	1.532E+00	775	6.141E-01
612	7.234E+01	653	1.937E+01	694	5.112E+00	735	1.455E+00	776	5.736E-01
613	8.439E+01	654	1.832E+01	695	4.873E+00	736	1.433E+00	777	5.927E-01
614	7.276E+01	655	1.776E+01	696	4.746E+00	737	1.382E+00	778	5.579E-01
615	5.493E+01	656	1.722E+01	697	4.646E+00	738	1.345E+00	779	5.590E-01
616	4.619E+01	657	1.631E+01	698	4.449E+00	739	1.284E+00	780	5.601E-01
617	4.342E+01	658	1.556E+01	699	4.351E+00	740	1.266E+00		
618	4.333E+01	659	1.513E+01	700	4.241E+00	741	1.211E+00		
619	4.326E+01	660	1.480E+01	701	4.101E+00	742	1.178E+00		
620	4.201E+01	661	1.418E+01	702	3.949E+00	743	1.196E+00		
621	4.080E+01	662	1.352E+01	703	3.837E+00	744	1.122E+00		
622	4.019E+01	663	1.302E+01	704	3.710E+00	745	1.055E+00		
623	4.082E+01	664	1.261E+01	705	3.605E+00	746	1.050E+00		
624	4.158E+01	665	1.221E+01	706	3.481E+00	747	1.036E+00		
625	4.193E+01	666	1.195E+01	707	3.447E+00	748	1.026E+00		

CIE 1931xy Chromaticity Diagram



7-Step Chromaticity Quadrangles



## [Goniophotometer System]

**Control Setting: 2700K**

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

Test orientation: **Downward**

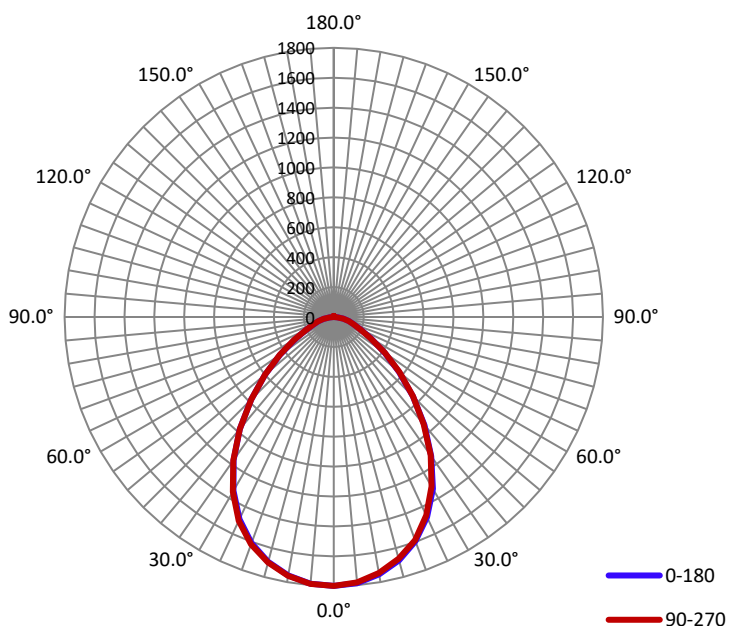
### Electrical Measurement

Input Voltage(V)	Frequency(Hz)	Input Current(A)	Power (W)	Power Factor
120.0	60	0.2450	29.11	0.9890

### Photometric Measurement

Luminous Flux(lm)	Efficacy(lm/W)	$I_{max}(cd)$	S/MH(C0/180)	S/MH(C90/270)
3365.3	115.66	1801.0	1.12	1.12

### Luminous Intensity Distribution



	C0/180	C45/225	C90/270	C135/315	AVG.
Beam Angle(50% $I_{max}$ ):	83.0	82.8	82.9	83.1	83.0
Field Angle(10% $I_{max}$ ):	132.8	133.0	132.9	132.9	132.9

**Luminous Intensity (cd) Distribution Data**

C y	0°	22.5°	45°	67.5°	90°	112.5°	135°	157.5°
0.0°	1798	1798	1798	1798	1798	1798	1798	1798
5.0°	1787	1776	1779	1779	1781	1781	1782	1784
10.0°	1747	1743	1738	1736	1738	1738	1743	1746
15.0°	1684	1679	1671	1671	1673	1676	1680	1685
20.0°	1596	1588	1585	1585	1588	1591	1596	1602
25.0°	1477	1468	1462	1460	1463	1470	1479	1486
30.0°	1326	1313	1303	1302	1308	1315	1327	1339
35.0°	1136	1125	1119	1120	1129	1139	1150	1163
40.0°	944	931	929	930	935	951	962	972
45.0°	749	741	739	741	748	759	768	781
50.0°	569	565	567	570	574	579	590	601
55.0°	414	412	414	415	416	418	426	436
60.0°	287	285	283	284	284	286	290	299
65.0°	198	195	193	193	195	196	199	205
70.0°	142	140	141	140	140	141	143	145
75.0°	106	104	103	103	103	104	106	108
80.0°	67	65	63	63	63	64	66	68
85.0°	27	25	22	23	21	22	22	23
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	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°	1	0	0	1	0	1	0	0
140.0°	2	1	1	2	1	2	2	1
145.0°	3	3	3	3	2	3	3	3
150.0°	4	3	4	4	4	4	4	3
155.0°	4	5	4	4	4	5	5	5
160.0°	5	5	6	5	5	6	5	6
165.0°	6	6	6	6	6	6	6	5
170.0°	6	7	6	6	7	7	6	6
175.0°	7	7	7	8	7	7	7	8
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°	1798	1798	1798	1798	1798	1798	1798	1798
5.0°	1791	1787	1788	1792	1791	1789	1788	1786
10.0°	1754	1755	1756	1758	1757	1752	1749	1747
15.0°	1694	1697	1698	1700	1698	1694	1690	1685
20.0°	1609	1611	1618	1620	1618	1612	1607	1600
25.0°	1492	1501	1504	1505	1504	1498	1489	1477
30.0°	1342	1348	1352	1354	1350	1345	1336	1322
35.0°	1167	1171	1175	1174	1172	1165	1153	1142
40.0°	977	982	980	980	978	967	957	945
45.0°	780	790	792	790	781	771	760	750
50.0°	600	611	616	612	600	589	578	565
55.0°	436	448	455	450	442	430	419	407
60.0°	300	306	311	313	308	297	288	282
65.0°	203	206	209	211	209	203	198	194
70.0°	142	144	146	147	146	144	141	138
75.0°	105	107	109	109	109	108	106	103
80.0°	66	68	70	71	71	69	67	65
85.0°	26	29	31	31	31	29	27	26
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	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	1	1	1	1	1	1	1
145.0°	1	2	2	2	2	2	3	2
150.0°	2	3	3	4	3	3	3	3
155.0°	4	4	4	4	4	4	4	5
160.0°	4	5	5	5	5	5	5	5
165.0°	5	5	6	6	6	6	6	6
170.0°	6	6	7	7	6	7	7	7
175.0°	7	7	8	7	8	8	7	7
180.0°	0	0	0	0	0	0	0	0

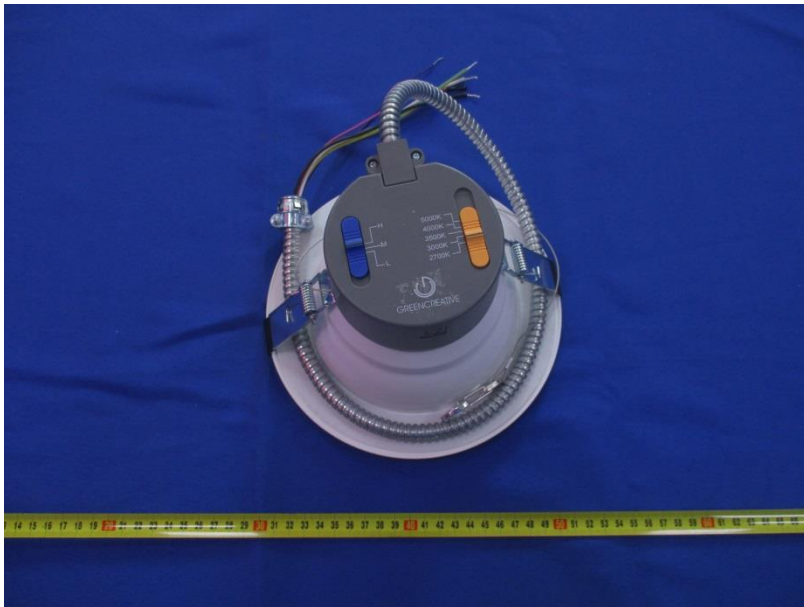
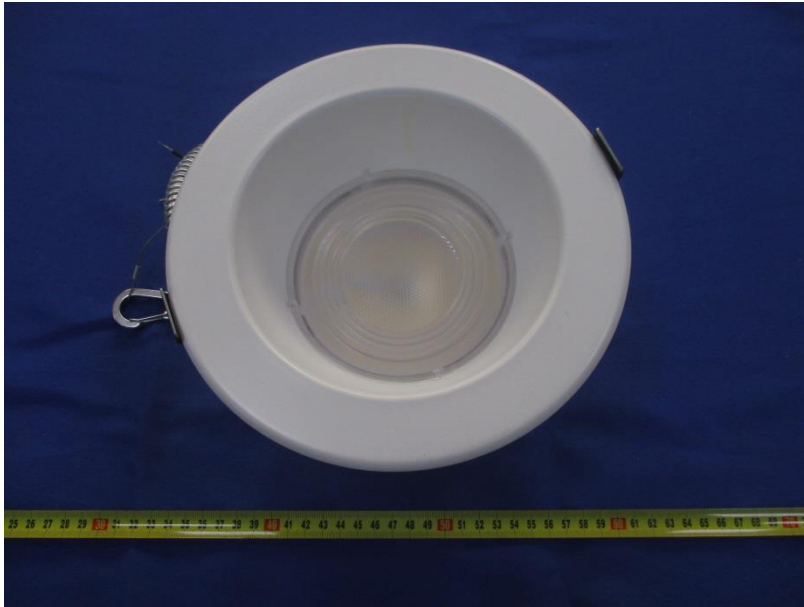
**Zonal Lumen Density Measurement**

Deg	Flux (lm)	%
0-5	17.4	0.90
5-10	51.4	2.59
10-15	83.5	4.23
15-20	112.4	5.69
20-25	137.3	6.96
25-30	157.3	7.96
30-35	171.7	8.68
35-40	180.0	9.10
40-45	182.2	9.23
45-50	178.4	9.02
50-55	168.8	8.52
55-60	152.7	7.74
60-65	131.2	6.64
65-70	105.5	5.34
70-75	77.2	3.90
75-80	47.8	2.41
80-85	19.9	1.01
85-90	1.4	0.07
90-95	0.0	0.00
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	17.4	0.88
0-10	68.8	3.48
0-15	152.4	7.71
0-20	264.9	13.40
0-25	402.3	20.35
0-30	559.7	28.31
0-35	731.3	36.99
0-40	911.3	46.10
0-45	1093.6	55.32
0-50	1271.9	64.34
0-55	1440.6	72.87
0-60	1593.5	80.61
0-65	1724.8	87.25
0-70	1830.4	92.59
0-75	1907.6	96.50
0-80	1955.4	98.92
0-85	1975.4	99.92
0-90	1976.8	100.00
0-95	1976.8	100.00
0-100	1976.8	100.00
0-105	1976.8	100.00
0-110	1976.8	100.00
0-115	1976.8	100.00
0-120	1976.8	100.00
0-125	1976.8	100.00
0-130	1976.8	100.00
0-135	1976.8	100.00
0-140	1976.8	100.00
0-145	1976.8	100.00
0-150	1976.8	100.00
0-155	1976.8	100.00
0-160	1976.8	100.00
0-165	1976.8	100.00
0-170	1976.8	100.00
0-175	1976.9	100.00
0-180	1976.9	100.00



## 6. Product Photo



## Directions

1. The information marked "superscript #" is provided by the applicant, the laboratory is not responsible for its authenticity and this information can affect the validity of the result in the test report.
2. This report may contain data that are not covered by the accreditation scope and shall be marked with an asterisk "★".
3. Unless otherwise stated the results shown in this test report refer only to the sample(s) tested.
4. Otherwise required by the applicant or Product Regulations, Decision Rule in this report did not consider the uncertainty.
5. The extended uncertainty given in this report is obtained by combining the standard uncertainty times the coverage factor K with the 95% confidence interval.
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\*\*\*\*\*END OF REPORT\*\*\*\*\*