

# 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: MFR4/9CCT5S/DUALDIM/EXT**

<b>Report Type:</b>	Electrical and Photometric tests including: Luminous Flux, Chromaticity, Luminous Intensity Distribution
<b>Project Engineer:</b>	Bay Wang <i>Bay Wang</i>
<b>Report Number:</b>	RKSB220907007-10-2
<b>Test Date:</b>	2022-09-11 to 2022-09-17
<b>Report Date:</b>	2022-09-19
<b>Reviewed By:</b>	Seven Xia / EE Engineer <i>Seven Xia</i>
<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 2022-09-07 and used for testing.

Model Tested:	MFR4/9CCT5S/DUALDIM/EXT
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:	8W
Nominal CCT:	2700K/3000K/3500K/4000K/5000K
Nominal Lumen Output:	580lm/600lm/610lm/620lm/640lm

## 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
Integrating Sphere	INVENTFINE	Dia 1.5m	JWWCV090112	2021-11-02	2022-11-01
Power Meter	INVENTFINE	WT500	GSJWQ20009	2021-11-15	2022-11-14
Spectral photometer	INVENTFINE	CMS-3S	GSGSE100017	2021-11-02	2022-11-01
AC Power Supply	INVENTFINE	CHP500	JWJSD010071	2021-11-02	2022-11-01
Standard Light Source	Osram	24V/50W	JWWCR020104	2021-09-15	2023-09-14
Thermal Meter	ANYMETRE	TH-20E	N/A	2021-12-01	2022-11-30
DC Power Supply	INVENTFINE	WL3005	JWWCP020069	2021-11-02	2022-11-01
AC Power Supply	INVENTFINE	CHP-5KVA	900511765	2021-11-02	2022-11-01
DC Power Supply	INVENTFINE	WL3010	JWDMP030001	2021-11-02	2022-11-01
Power Meter	INVENTFINE	WT500	GSDSQ200007	2021-11-15	2022-11-14
Goniophotometer	INVENTFINE	GPM-1900	YWGCF120001	2021-11-15	2022-11-14

Device	Manufacture	Model No	Serial No	Calibration date	Calibration due date
Wireless Weather Station	ZHONGXING	KG218	N/A	2021-11-02	2022-11-01
Standard Light Source	INVENTFINE	N/A	JWBYR040008	2021-12-23	2022-12-22

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  $U_{rel}=2.6\%$  ( $k=2$ ), at the 95% confidence level. The uncertainty of the correlated color temperature measurements is  $U=34\text{K}$  ( $k=2$ ), 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  $U_{rel}=0.48\%$  of rdg, AC Voltage  $U_{rel}=0.25\%$  of rdg, Power  $U_{rel}=0.44\%$ , ( $k=2$ ), 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  $R_f$ ,  $R_g$  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**

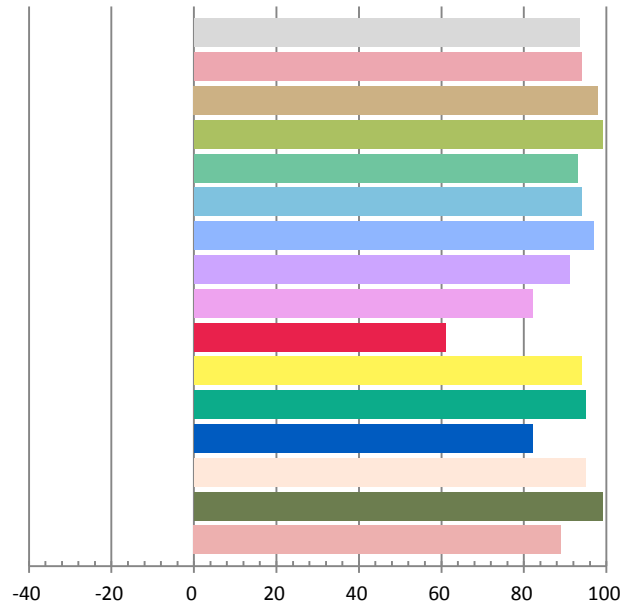
### Photometric and Electrical Measurement Result

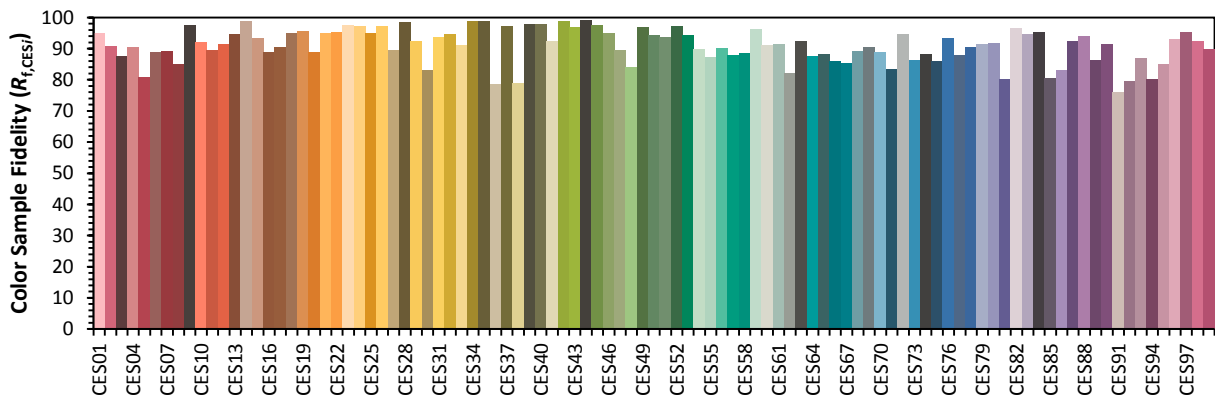
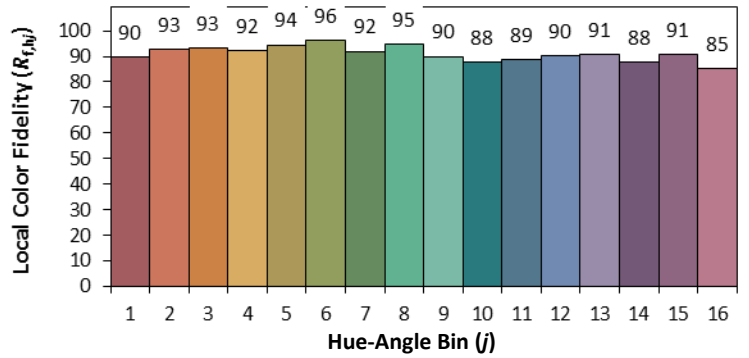
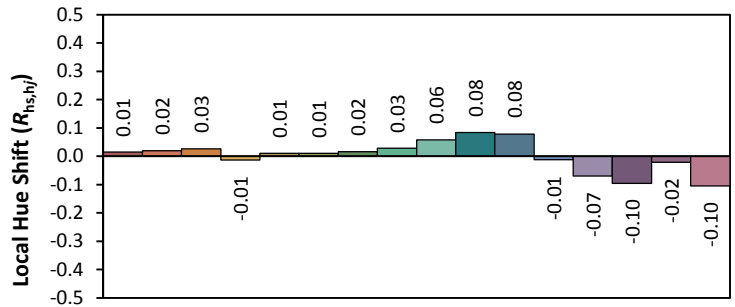
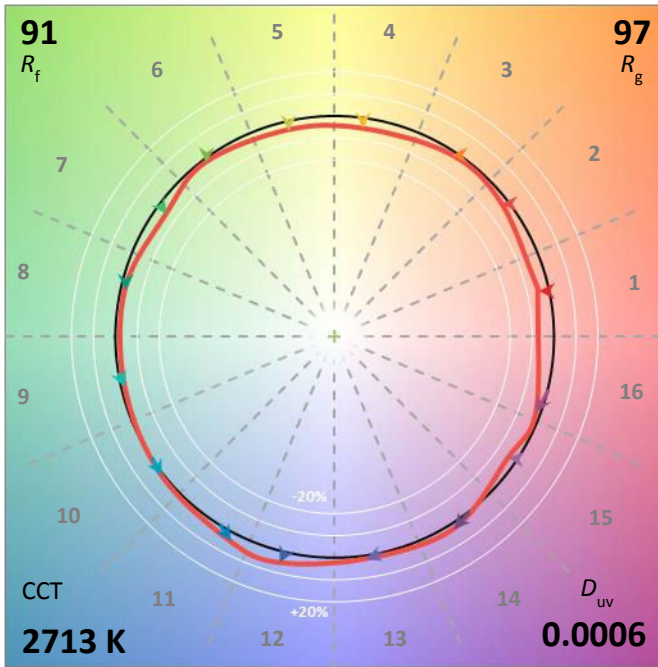
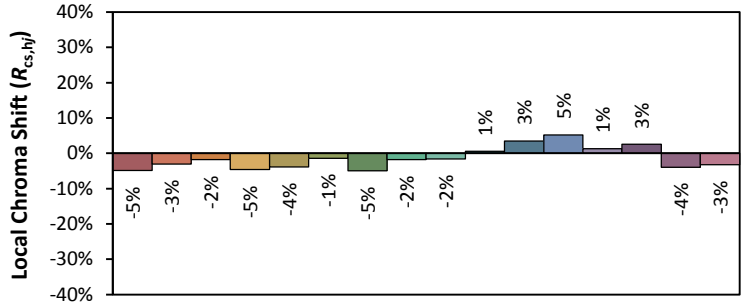
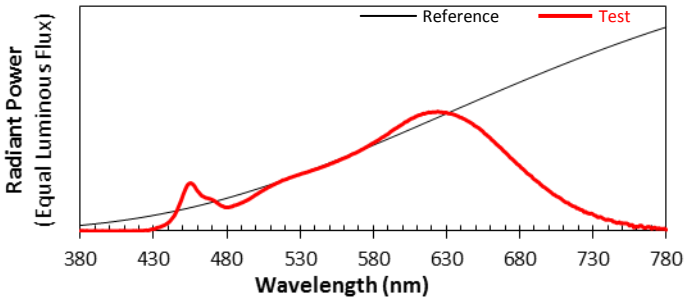
Voltage(V)	Frequency(Hz)	Current(A)	Power (W)	Power Factor	Luminous Flux(lm)	Efficacy(lm/W)
120.0	60	0.0659	7.71	0.9752	629.63	81.66

Radiant Flux (W)	CCT (K)	Duv	x	y	u'	v'
2.217	2714	0.00058	0.4598	0.4121	0.2617	0.5279

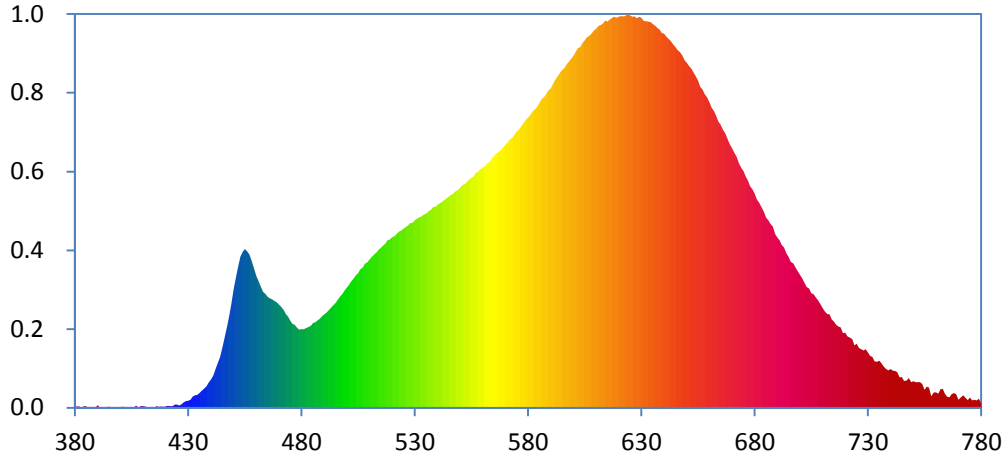
### Color Rendering Index

Ra			
<b>93.4</b>			
R1	R2	R3	R4
94	98	99	93
R5	R6	R7	R8
94	97	91	82
R9	R10	R11	R12
61	94	95	82
R13	R14	R15	
95	99	89	





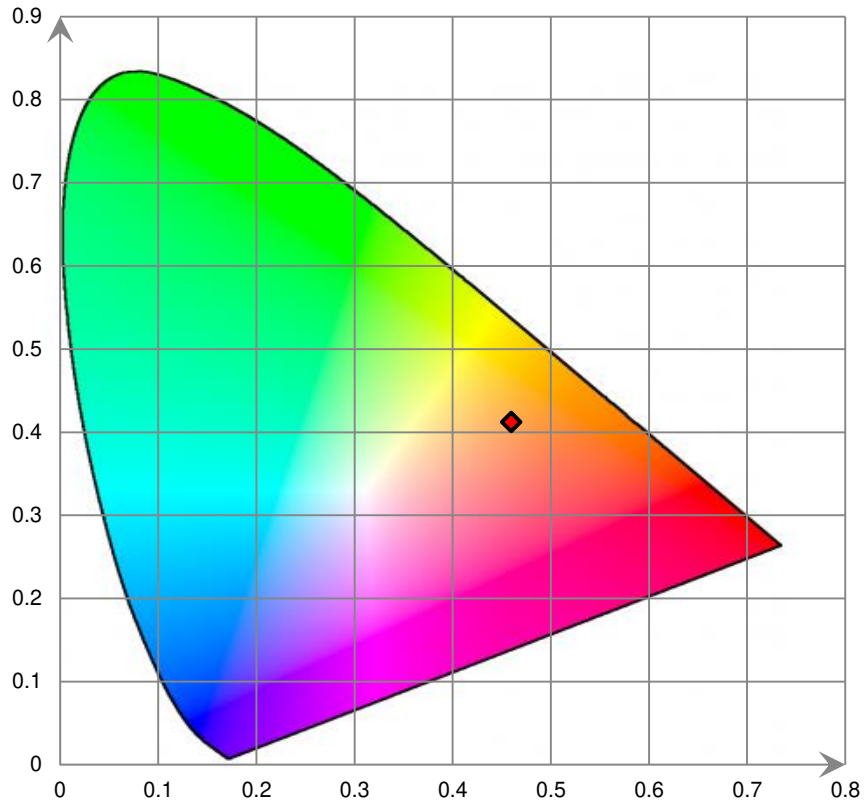
### Relative Spectral Power Distribution



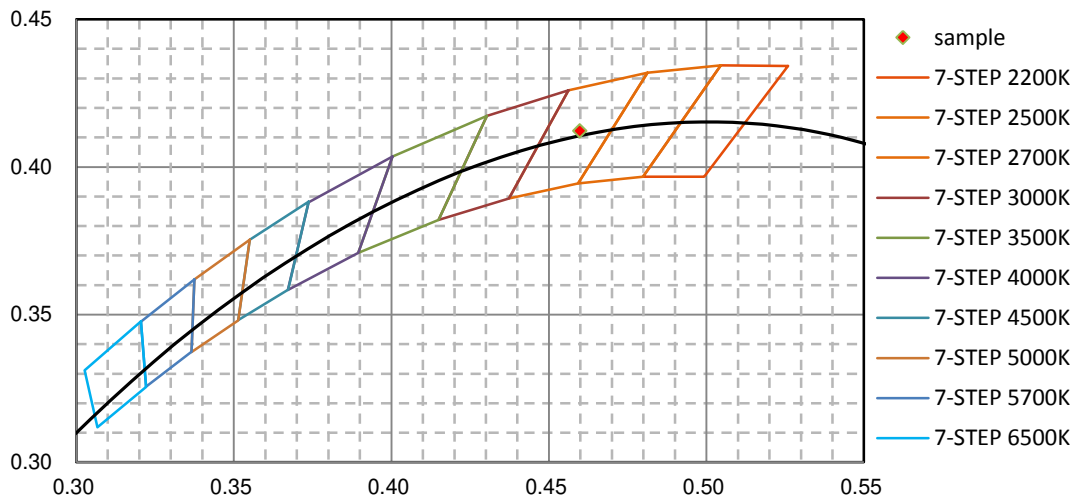
nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
380	4.140E-02	421	6.330E-02	462	4.210E+00	503	4.503E+00	544	7.291E+00
381	4.440E-02	422	5.400E-02	463	4.028E+00	504	4.619E+00	545	7.355E+00
382	4.630E-02	423	4.900E-02	464	3.967E+00	505	4.697E+00	546	7.410E+00
383	9.600E-03	424	1.062E-01	465	3.861E+00	506	4.822E+00	547	7.463E+00
384	5.900E-02	425	1.130E-01	466	3.807E+00	507	4.880E+00	548	7.549E+00
385	4.240E-02	426	7.580E-02	467	3.779E+00	508	5.011E+00	549	7.593E+00
386	2.000E-03	427	1.197E-01	468	3.725E+00	509	5.071E+00	550	7.672E+00
387	2.900E-02	428	1.889E-01	469	3.674E+00	510	5.166E+00	551	7.756E+00
388	1.710E-02	429	2.300E-01	470	3.599E+00	511	5.257E+00	552	7.788E+00
389	3.100E-03	430	2.409E-01	471	3.520E+00	512	5.340E+00	553	7.871E+00
390	8.420E-02	431	2.782E-01	472	3.413E+00	513	5.409E+00	554	7.949E+00
391	1.060E-02	432	3.835E-01	473	3.261E+00	514	5.509E+00	555	8.014E+00
392	4.900E-03	433	4.301E-01	474	3.174E+00	515	5.570E+00	556	8.058E+00
393	9.000E-04	434	4.492E-01	475	3.029E+00	516	5.646E+00	557	8.183E+00
394	2.250E-02	435	5.177E-01	476	2.925E+00	517	5.718E+00	558	8.228E+00
395	4.870E-02	436	6.033E-01	477	2.885E+00	518	5.843E+00	559	8.312E+00
396	1.310E-02	437	6.649E-01	478	2.782E+00	519	5.862E+00	560	8.373E+00
397	3.300E-03	438	7.457E-01	479	2.721E+00	520	5.936E+00	561	8.427E+00
398	4.200E-03	439	8.796E-01	480	2.740E+00	521	5.977E+00	562	8.515E+00
399	5.000E-04	440	9.791E-01	481	2.727E+00	522	6.063E+00	563	8.564E+00
400	0.000E+00	441	1.114E+00	482	2.770E+00	523	6.144E+00	564	8.687E+00
401	3.900E-02	442	1.332E+00	483	2.810E+00	524	6.175E+00	565	8.767E+00
402	2.040E-02	443	1.546E+00	484	2.850E+00	525	6.244E+00	566	8.865E+00
403	1.780E-02	444	1.749E+00	485	2.956E+00	526	6.297E+00	567	8.902E+00
404	1.270E-02	445	2.065E+00	486	2.974E+00	527	6.351E+00	568	8.972E+00
405	3.490E-02	446	2.403E+00	487	3.037E+00	528	6.429E+00	569	9.073E+00
406	9.900E-03	447	2.809E+00	488	3.097E+00	529	6.444E+00	570	9.150E+00
407	7.200E-02	448	3.199E+00	489	3.184E+00	530	6.525E+00	571	9.240E+00
408	3.700E-03	449	3.629E+00	490	3.257E+00	531	6.591E+00	572	9.345E+00
409	5.020E-02	450	4.128E+00	491	3.307E+00	532	6.636E+00	573	9.409E+00
410	5.830E-02	451	4.540E+00	492	3.398E+00	533	6.667E+00	574	9.522E+00
411	4.210E-02	452	4.920E+00	493	3.480E+00	534	6.728E+00	575	9.626E+00
412	1.610E-02	453	5.262E+00	494	3.563E+00	535	6.768E+00	576	9.701E+00
413	3.200E-03	454	5.432E+00	495	3.648E+00	536	6.842E+00	577	9.804E+00
414	2.720E-02	455	5.527E+00	496	3.761E+00	537	6.888E+00	578	9.922E+00
415	1.960E-02	456	5.452E+00	497	3.875E+00	538	6.985E+00	579	1.003E+01
416	5.270E-02	457	5.338E+00	498	3.967E+00	539	7.004E+00	580	1.011E+01
417	2.780E-02	458	5.122E+00	499	4.095E+00	540	7.071E+00	581	1.020E+01
418	4.610E-02	459	4.833E+00	500	4.190E+00	541	7.117E+00	582	1.032E+01
419	3.140E-02	460	4.584E+00	501	4.289E+00	542	7.166E+00	583	1.039E+01
420	4.850E-02	461	4.406E+00	502	4.410E+00	543	7.235E+00	584	1.049E+01

nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
585	1.063E+01	626	1.362E+01	667	9.558E+00	708	3.745E+00	749	8.874E-01
586	1.075E+01	627	1.363E+01	668	9.371E+00	709	3.603E+00	750	9.282E-01
587	1.082E+01	628	1.357E+01	669	9.182E+00	710	3.464E+00	751	8.955E-01
588	1.093E+01	629	1.362E+01	670	9.049E+00	711	3.347E+00	752	8.951E-01
589	1.105E+01	630	1.359E+01	671	8.891E+00	712	3.267E+00	753	8.948E-01
590	1.113E+01	631	1.348E+01	672	8.732E+00	713	3.249E+00	754	8.243E-01
591	1.128E+01	632	1.346E+01	673	8.512E+00	714	3.073E+00	755	6.224E-01
592	1.142E+01	633	1.345E+01	674	8.357E+00	715	2.997E+00	756	7.321E-01
593	1.153E+01	634	1.343E+01	675	8.242E+00	716	2.886E+00	757	6.992E-01
594	1.165E+01	635	1.336E+01	676	8.061E+00	717	2.830E+00	758	3.979E-01
595	1.176E+01	636	1.331E+01	677	7.913E+00	718	2.792E+00	759	5.297E-01
596	1.182E+01	637	1.323E+01	678	7.716E+00	719	2.600E+00	760	5.324E-01
597	1.197E+01	638	1.317E+01	679	7.616E+00	720	2.616E+00	761	4.846E-01
598	1.206E+01	639	1.305E+01	680	7.472E+00	721	2.486E+00	762	6.469E-01
599	1.216E+01	640	1.303E+01	681	7.252E+00	722	2.440E+00	763	6.527E-01
600	1.226E+01	641	1.293E+01	682	7.147E+00	723	2.391E+00	764	4.831E-01
601	1.241E+01	642	1.285E+01	683	6.996E+00	724	2.174E+00	765	3.746E-01
602	1.252E+01	643	1.277E+01	684	6.826E+00	725	2.227E+00	766	3.685E-01
603	1.256E+01	644	1.266E+01	685	6.623E+00	726	2.085E+00	767	4.811E-01
604	1.270E+01	645	1.258E+01	686	6.528E+00	727	2.039E+00	768	5.132E-01
605	1.280E+01	646	1.246E+01	687	6.397E+00	728	1.995E+00	769	4.664E-01
606	1.290E+01	647	1.238E+01	688	6.303E+00	729	2.036E+00	770	2.791E-01
607	1.295E+01	648	1.227E+01	689	6.055E+00	730	1.929E+00	771	3.607E-01
608	1.303E+01	649	1.210E+01	690	5.926E+00	731	1.807E+00	772	4.379E-01
609	1.314E+01	650	1.202E+01	691	5.826E+00	732	1.776E+00	773	3.462E-01
610	1.321E+01	651	1.191E+01	692	5.666E+00	733	1.614E+00	774	2.658E-01
611	1.330E+01	652	1.181E+01	693	5.582E+00	734	1.600E+00	775	3.549E-01
612	1.332E+01	653	1.168E+01	694	5.383E+00	735	1.639E+00	776	2.509E-01
613	1.338E+01	654	1.154E+01	695	5.261E+00	736	1.542E+00	777	2.814E-01
614	1.348E+01	655	1.140E+01	696	5.078E+00	737	1.431E+00	778	2.514E-01
615	1.345E+01	656	1.118E+01	697	5.024E+00	738	1.350E+00	779	3.083E-01
616	1.352E+01	657	1.109E+01	698	4.880E+00	739	1.299E+00	780	1.482E-01
617	1.357E+01	658	1.092E+01	699	4.749E+00	740	1.347E+00		
618	1.362E+01	659	1.080E+01	700	4.623E+00	741	1.296E+00		
619	1.358E+01	660	1.064E+01	701	4.500E+00	742	1.281E+00		
620	1.362E+01	661	1.044E+01	702	4.350E+00	743	1.237E+00		
621	1.364E+01	662	1.033E+01	703	4.201E+00	744	1.055E+00		
622	1.363E+01	663	1.017E+01	704	4.154E+00	745	1.067E+00		
623	1.365E+01	664	9.963E+00	705	3.995E+00	746	9.315E-01		
624	1.372E+01	665	9.850E+00	706	3.956E+00	747	9.472E-01		
625	1.366E+01	666	9.680E+00	707	3.847E+00	748	1.037E+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**

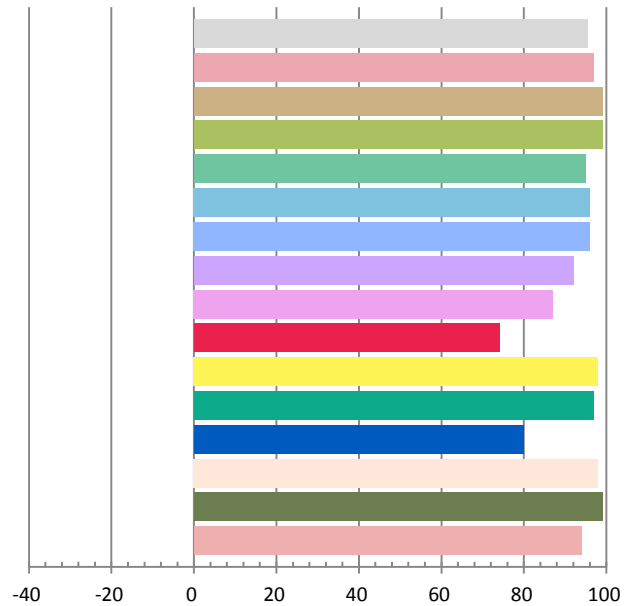
**Photometric and Electrical Measurement Result**

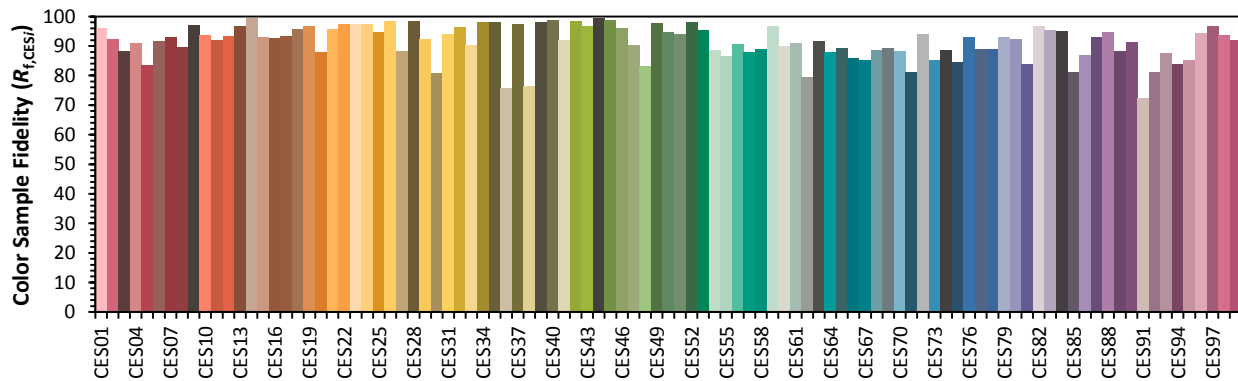
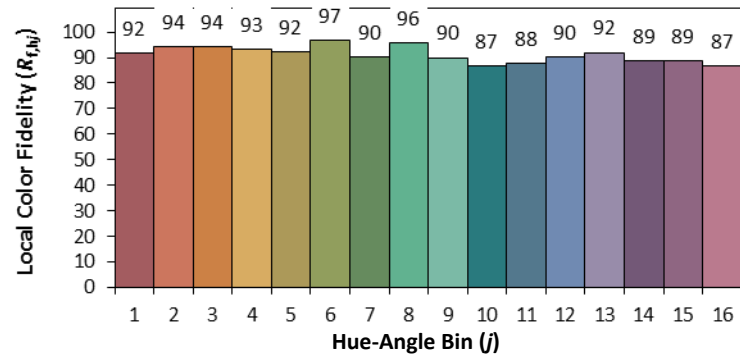
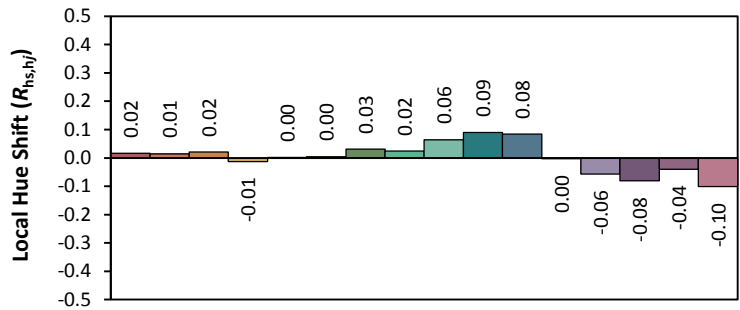
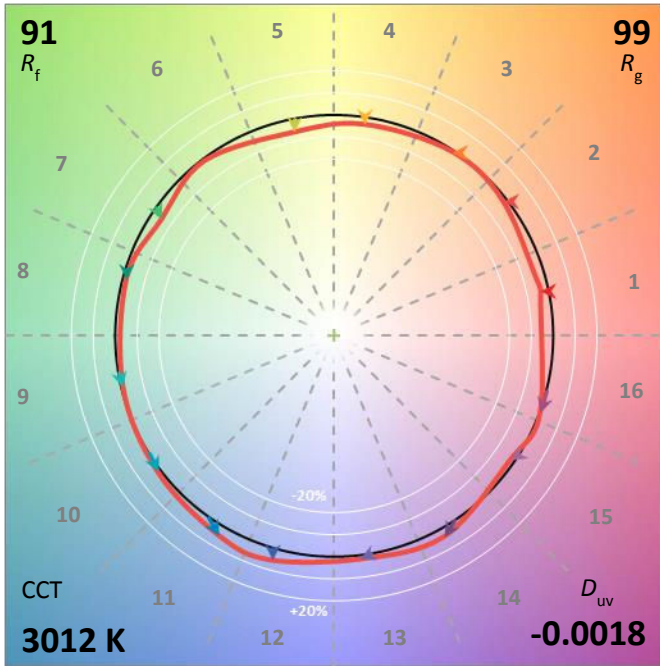
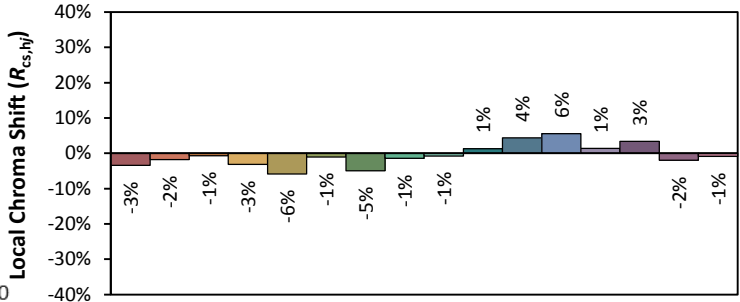
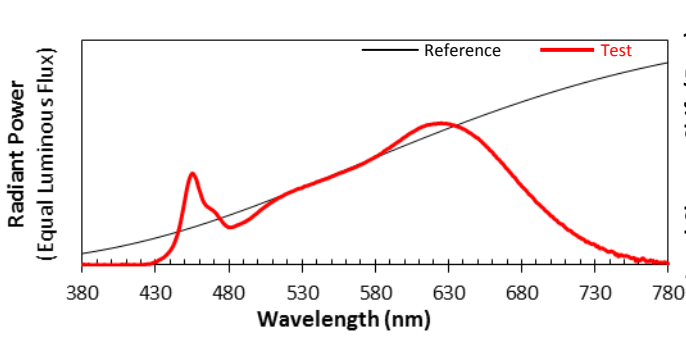
Voltage(V)	Frequency(Hz)	Current(A)	Power (W)	Power Factor	Luminous Flux(lm)	Efficacy(lm/W)
120.0	60	0.0653	7.64	0.9756	646.35	84.6

Radiant Flux (W)	CCT (K)	Duv	x	y	u'	v'
2.295	3012	-0.00178	0.4335	0.3985	0.2508	0.5187

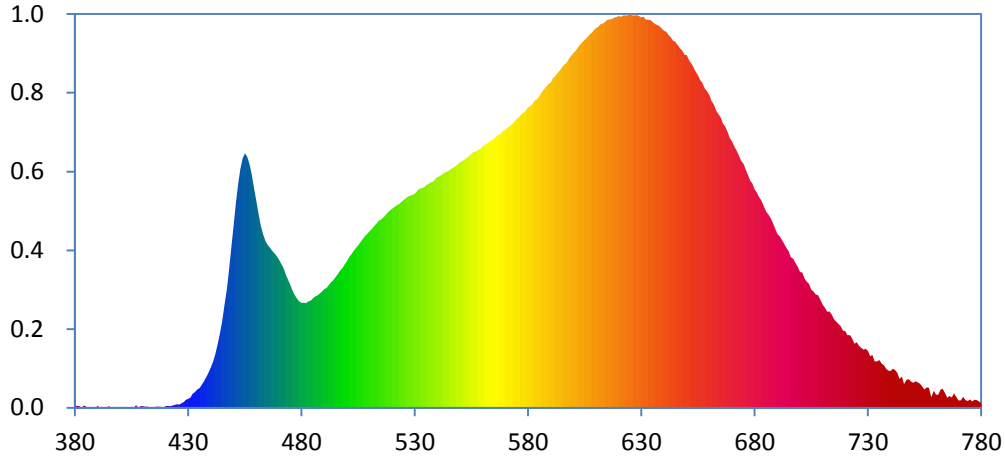
**Color Rendering Index**

<b>Ra</b>			
<b>95.3</b>			
<b>R1</b>	<b>R2</b>	<b>R3</b>	<b>R4</b>
97	99	99	95
<b>R5</b>	<b>R6</b>	<b>R7</b>	<b>R8</b>
96	96	92	87
<b>R9</b>	<b>R10</b>	<b>R11</b>	<b>R12</b>
74	98	97	80
<b>R13</b>	<b>R14</b>	<b>R15</b>	
98	99	94	





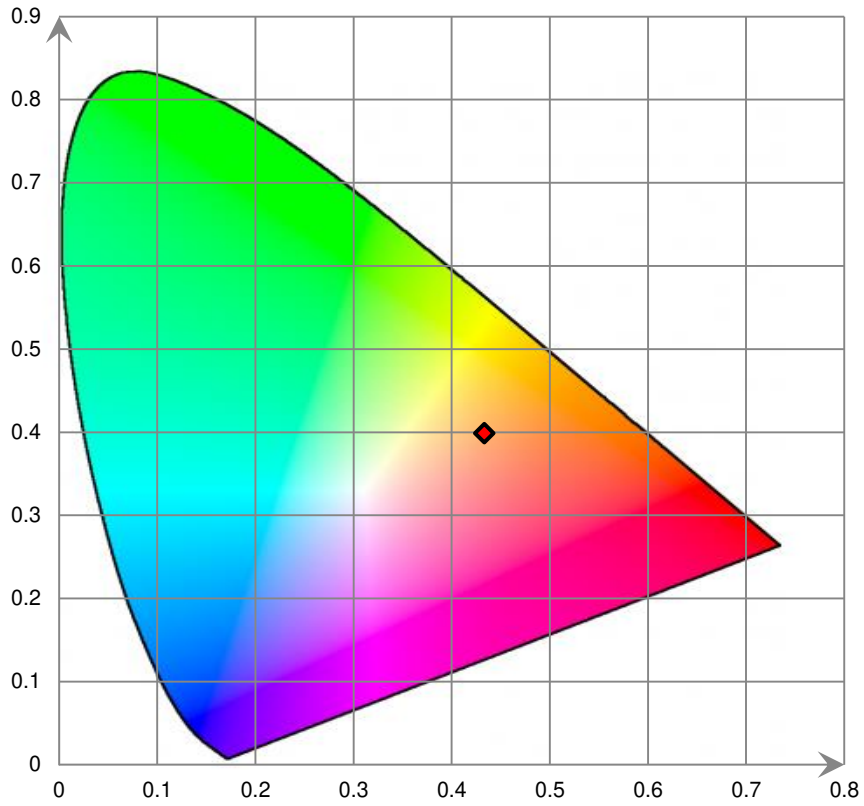
### Relative Spectral Power Distribution



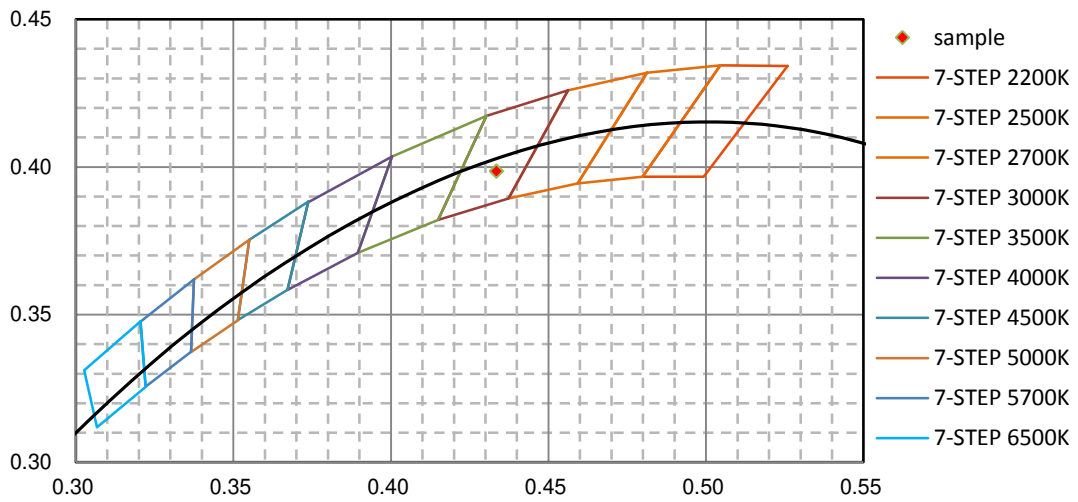
nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
380	4.670E-02	421	6.010E-02	462	6.063E+00	503	5.233E+00	544	7.867E+00
381	6.700E-02	422	4.880E-02	463	5.782E+00	504	5.330E+00	545	7.914E+00
382	5.190E-02	423	7.870E-02	464	5.576E+00	505	5.428E+00	546	7.966E+00
383	2.520E-02	424	9.100E-02	465	5.430E+00	506	5.519E+00	547	8.013E+00
384	7.640E-02	425	1.153E-01	466	5.350E+00	507	5.623E+00	548	8.059E+00
385	3.300E-02	426	1.033E-01	467	5.246E+00	508	5.724E+00	549	8.135E+00
386	2.900E-03	427	1.441E-01	468	5.156E+00	509	5.807E+00	550	8.184E+00
387	2.670E-02	428	1.922E-01	469	5.074E+00	510	5.888E+00	551	8.234E+00
388	7.200E-03	429	2.655E-01	470	4.953E+00	511	5.971E+00	552	8.283E+00
389	6.900E-03	430	2.970E-01	471	4.817E+00	512	6.067E+00	553	8.338E+00
390	6.690E-02	431	3.394E-01	472	4.649E+00	513	6.137E+00	554	8.399E+00
391	1.910E-02	432	4.641E-01	473	4.438E+00	514	6.233E+00	555	8.478E+00
392	7.800E-03	433	5.223E-01	474	4.271E+00	515	6.280E+00	556	8.528E+00
393	4.000E-03	434	6.042E-01	475	4.100E+00	516	6.342E+00	557	8.555E+00
394	1.780E-02	435	6.572E-01	476	3.902E+00	517	6.417E+00	558	8.608E+00
395	5.450E-02	436	7.753E-01	477	3.761E+00	518	6.507E+00	559	8.646E+00
396	1.470E-02	437	8.911E-01	478	3.645E+00	519	6.576E+00	560	8.720E+00
397	3.400E-03	438	1.032E+00	479	3.542E+00	520	6.636E+00	561	8.774E+00
398	1.700E-03	439	1.179E+00	480	3.503E+00	521	6.692E+00	562	8.826E+00
399	1.000E-04	440	1.351E+00	481	3.500E+00	522	6.755E+00	563	8.883E+00
400	0.000E+00	441	1.549E+00	482	3.489E+00	523	6.797E+00	564	8.928E+00
401	2.000E-02	442	1.803E+00	483	3.544E+00	524	6.861E+00	565	8.974E+00
402	3.000E-02	443	2.123E+00	484	3.571E+00	525	6.926E+00	566	9.048E+00
403	2.020E-02	444	2.481E+00	485	3.656E+00	526	6.990E+00	567	9.103E+00
404	1.400E-02	445	2.881E+00	486	3.716E+00	527	7.045E+00	568	9.144E+00
405	2.700E-02	446	3.409E+00	487	3.748E+00	528	7.082E+00	569	9.231E+00
406	5.300E-03	447	3.970E+00	488	3.815E+00	529	7.104E+00	570	9.273E+00
407	8.110E-02	448	4.658E+00	489	3.878E+00	530	7.141E+00	571	9.351E+00
408	6.900E-03	449	5.377E+00	490	3.956E+00	531	7.226E+00	572	9.409E+00
409	5.530E-02	450	6.096E+00	491	3.994E+00	532	7.307E+00	573	9.474E+00
410	5.620E-02	451	6.840E+00	492	4.086E+00	533	7.322E+00	574	9.558E+00
411	2.680E-02	452	7.464E+00	493	4.181E+00	534	7.354E+00	575	9.642E+00
412	4.350E-02	453	7.976E+00	494	4.244E+00	535	7.431E+00	576	9.700E+00
413	4.600E-03	454	8.317E+00	495	4.353E+00	536	7.472E+00	577	9.785E+00
414	2.550E-02	455	8.483E+00	496	4.449E+00	537	7.516E+00	578	9.847E+00
415	2.550E-02	456	8.379E+00	497	4.578E+00	538	7.534E+00	579	9.916E+00
416	3.630E-02	457	8.149E+00	498	4.668E+00	539	7.635E+00	580	1.001E+01
417	2.610E-02	458	7.818E+00	499	4.784E+00	540	7.694E+00	581	1.006E+01
418	3.350E-02	459	7.306E+00	500	4.884E+00	541	7.729E+00	582	1.014E+01
419	2.310E-02	460	6.889E+00	501	5.028E+00	542	7.779E+00	583	1.025E+01
420	5.590E-02	461	6.460E+00	502	5.123E+00	543	7.836E+00	584	1.030E+01

nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
585	1.041E+01	626	1.309E+01	667	9.388E+00	708	3.754E+00	749	8.759E-01
586	1.054E+01	627	1.308E+01	668	9.215E+00	709	3.585E+00	750	8.338E-01
587	1.062E+01	628	1.310E+01	669	9.010E+00	710	3.438E+00	751	8.862E-01
588	1.072E+01	629	1.307E+01	670	8.890E+00	711	3.331E+00	752	8.388E-01
589	1.080E+01	630	1.303E+01	671	8.735E+00	712	3.206E+00	753	7.981E-01
590	1.085E+01	631	1.305E+01	672	8.575E+00	713	3.215E+00	754	6.988E-01
591	1.101E+01	632	1.295E+01	673	8.412E+00	714	3.102E+00	755	6.045E-01
592	1.106E+01	633	1.295E+01	674	8.227E+00	715	2.951E+00	756	6.864E-01
593	1.117E+01	634	1.293E+01	675	8.144E+00	716	2.877E+00	757	6.582E-01
594	1.126E+01	635	1.286E+01	676	7.954E+00	717	2.797E+00	758	3.536E-01
595	1.136E+01	636	1.280E+01	677	7.775E+00	718	2.721E+00	759	5.652E-01
596	1.145E+01	637	1.277E+01	678	7.576E+00	719	2.575E+00	760	4.413E-01
597	1.152E+01	638	1.273E+01	679	7.483E+00	720	2.564E+00	761	4.375E-01
598	1.165E+01	639	1.265E+01	680	7.292E+00	721	2.425E+00	762	6.104E-01
599	1.174E+01	640	1.258E+01	681	7.170E+00	722	2.419E+00	763	6.318E-01
600	1.184E+01	641	1.255E+01	682	7.021E+00	723	2.308E+00	764	4.864E-01
601	1.191E+01	642	1.244E+01	683	6.919E+00	724	2.130E+00	765	3.282E-01
602	1.203E+01	643	1.237E+01	684	6.721E+00	725	2.183E+00	766	3.980E-01
603	1.212E+01	644	1.225E+01	685	6.543E+00	726	2.070E+00	767	3.457E-01
604	1.221E+01	645	1.221E+01	686	6.449E+00	727	1.992E+00	768	4.803E-01
605	1.227E+01	646	1.210E+01	687	6.328E+00	728	1.939E+00	769	3.627E-01
606	1.234E+01	647	1.199E+01	688	6.169E+00	729	1.967E+00	770	2.421E-01
607	1.243E+01	648	1.192E+01	689	5.979E+00	730	1.899E+00	771	2.498E-01
608	1.250E+01	649	1.178E+01	690	5.802E+00	731	1.723E+00	772	3.594E-01
609	1.259E+01	650	1.176E+01	691	5.719E+00	732	1.759E+00	773	2.509E-01
610	1.267E+01	651	1.160E+01	692	5.602E+00	733	1.551E+00	774	2.273E-01
611	1.272E+01	652	1.149E+01	693	5.475E+00	734	1.548E+00	775	2.768E-01
612	1.280E+01	653	1.136E+01	694	5.337E+00	735	1.585E+00	776	2.157E-01
613	1.283E+01	654	1.121E+01	695	5.233E+00	736	1.475E+00	777	2.633E-01
614	1.288E+01	655	1.110E+01	696	5.029E+00	737	1.422E+00	778	2.591E-01
615	1.294E+01	656	1.094E+01	697	4.966E+00	738	1.303E+00	779	2.084E-01
616	1.297E+01	657	1.084E+01	698	4.828E+00	739	1.237E+00	780	1.512E-01
617	1.297E+01	658	1.065E+01	699	4.701E+00	740	1.226E+00		
618	1.302E+01	659	1.055E+01	700	4.526E+00	741	1.299E+00		
619	1.303E+01	660	1.042E+01	701	4.511E+00	742	1.257E+00		
620	1.307E+01	661	1.022E+01	702	4.310E+00	743	1.162E+00		
621	1.305E+01	662	1.011E+01	703	4.203E+00	744	9.645E-01		
622	1.309E+01	663	9.911E+00	704	4.128E+00	745	1.040E+00		
623	1.309E+01	664	9.802E+00	705	3.936E+00	746	7.929E-01		
624	1.309E+01	665	9.680E+00	706	3.874E+00	747	9.387E-01		
625	1.314E+01	666	9.479E+00	707	3.774E+00	748	9.487E-01		

CIE 1931xy Chromaticity Diagram



7-Step Chromaticity Quadrangles



**Control Setting: 3500K**

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

Test orientation: **Downward**

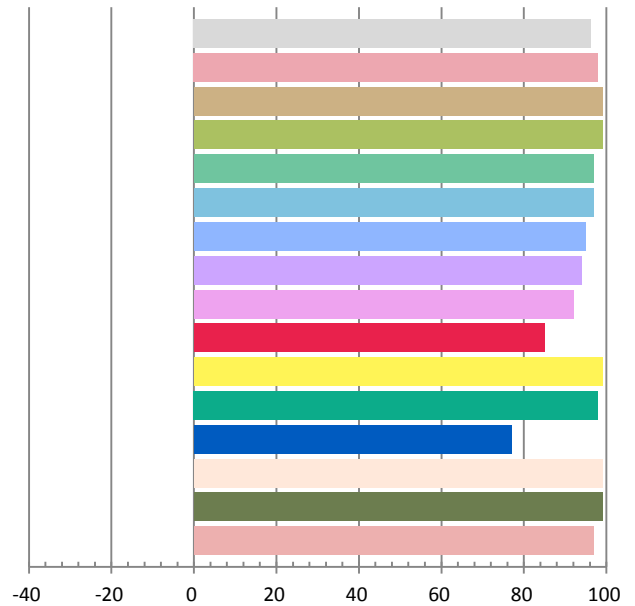
**Photometric and Electrical Measurement Result**

Voltage(V)	Frequency(Hz)	Current(A)	Power (W)	Power Factor	Luminous Flux(lm)	Efficacy(lm/W)
120.0	60	0.0653	7.65	0.9769	665.4	86.98

Radiant Flux (W)	CCT (K)	Duv	x	y	u'	v'
2.374	3406	-0.00283	0.4076	0.3854	0.2394	0.5094

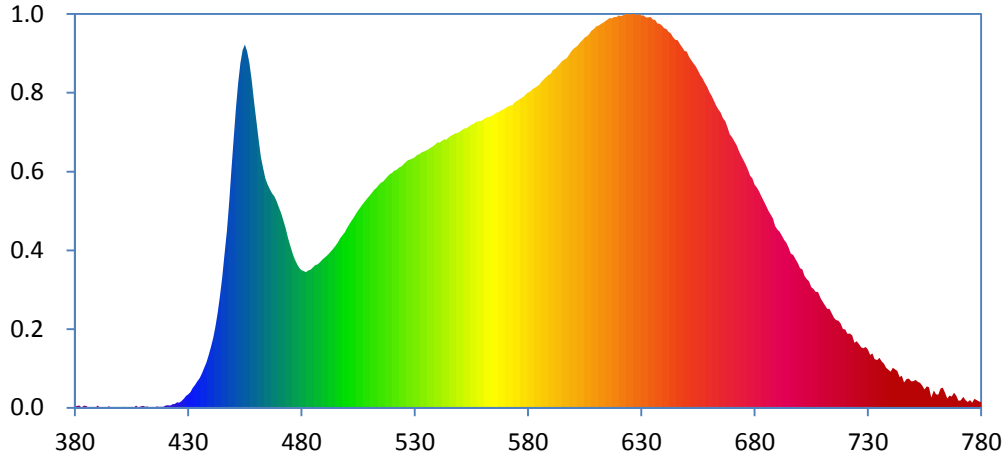
**Color Rendering Index**

<b>Ra</b>			
<b>96.3</b>			
<b>R1</b>	<b>R2</b>	<b>R3</b>	<b>R4</b>
98	99	99	97
<b>R5</b>	<b>R6</b>	<b>R7</b>	<b>R8</b>
97	95	94	92
<b>R9</b>	<b>R10</b>	<b>R11</b>	<b>R12</b>
85	99	98	77
<b>R13</b>	<b>R14</b>	<b>R15</b>	
99	99	97	





### Relative Spectral Power Distribution

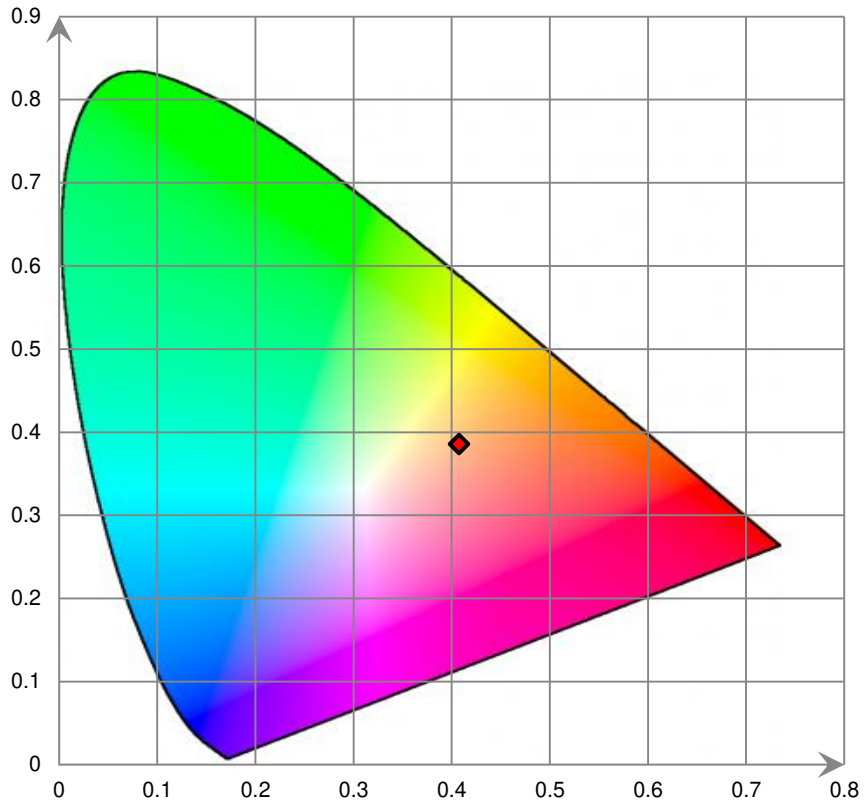


nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
380	4.160E-02	421	8.160E-02	462	7.926E+00	503	6.012E+00	544	8.472E+00
381	6.040E-02	422	6.970E-02	463	7.580E+00	504	6.127E+00	545	8.550E+00
382	6.970E-02	423	1.134E-01	464	7.251E+00	505	6.236E+00	546	8.596E+00
383	4.700E-03	424	1.248E-01	465	7.060E+00	506	6.335E+00	547	8.643E+00
384	6.620E-02	425	1.698E-01	466	6.910E+00	507	6.436E+00	548	8.676E+00
385	4.810E-02	426	1.634E-01	467	6.779E+00	508	6.522E+00	549	8.685E+00
386	3.800E-03	427	2.072E-01	468	6.687E+00	509	6.622E+00	550	8.738E+00
387	3.090E-02	428	2.840E-01	469	6.530E+00	510	6.704E+00	551	8.789E+00
388	1.350E-02	429	3.728E-01	470	6.348E+00	511	6.795E+00	552	8.829E+00
389	4.100E-03	430	4.271E-01	471	6.158E+00	512	6.885E+00	553	8.839E+00
390	6.780E-02	431	4.964E-01	472	5.902E+00	513	6.948E+00	554	8.900E+00
391	1.740E-02	432	6.267E-01	473	5.654E+00	514	7.036E+00	555	8.956E+00
392	6.200E-03	433	7.220E-01	474	5.363E+00	515	7.111E+00	556	8.975E+00
393	3.100E-03	434	8.303E-01	475	5.118E+00	516	7.150E+00	557	9.035E+00
394	1.720E-02	435	9.370E-01	476	4.887E+00	517	7.236E+00	558	9.057E+00
395	5.290E-02	436	1.095E+00	477	4.698E+00	518	7.315E+00	559	9.062E+00
396	1.700E-02	437	1.260E+00	478	4.542E+00	519	7.384E+00	560	9.108E+00
397	6.900E-03	438	1.434E+00	479	4.419E+00	520	7.424E+00	561	9.156E+00
398	3.000E-04	439	1.669E+00	480	4.347E+00	521	7.500E+00	562	9.182E+00
399	0.000E+00	440	1.919E+00	481	4.319E+00	522	7.530E+00	563	9.193E+00
400	0.000E+00	441	2.200E+00	482	4.291E+00	523	7.596E+00	564	9.240E+00
401	1.860E-02	442	2.565E+00	483	4.344E+00	524	7.632E+00	565	9.272E+00
402	3.220E-02	443	2.999E+00	484	4.373E+00	525	7.701E+00	566	9.331E+00
403	2.060E-02	444	3.515E+00	485	4.440E+00	526	7.769E+00	567	9.351E+00
404	1.160E-02	445	4.111E+00	486	4.515E+00	527	7.834E+00	568	9.397E+00
405	2.820E-02	446	4.812E+00	487	4.533E+00	528	7.853E+00	569	9.426E+00
406	5.200E-03	447	5.608E+00	488	4.597E+00	529	7.882E+00	570	9.467E+00
407	7.230E-02	448	6.506E+00	489	4.674E+00	530	7.922E+00	571	9.515E+00
408	6.400E-03	449	7.540E+00	490	4.735E+00	531	7.991E+00	572	9.552E+00
409	4.220E-02	450	8.505E+00	491	4.791E+00	532	8.014E+00	573	9.570E+00
410	6.050E-02	451	9.470E+00	492	4.867E+00	533	8.068E+00	574	9.651E+00
411	3.200E-02	452	1.026E+01	493	4.947E+00	534	8.099E+00	575	9.702E+00
412	4.410E-02	453	1.090E+01	494	5.032E+00	535	8.136E+00	576	9.746E+00
413	4.100E-03	454	1.131E+01	495	5.122E+00	536	8.176E+00	577	9.792E+00
414	2.580E-02	455	1.149E+01	496	5.222E+00	537	8.229E+00	578	9.834E+00
415	2.180E-02	456	1.127E+01	497	5.357E+00	538	8.267E+00	579	9.912E+00
416	3.890E-02	457	1.090E+01	498	5.457E+00	539	8.322E+00	580	9.962E+00
417	2.760E-02	458	1.039E+01	499	5.548E+00	540	8.382E+00	581	1.001E+01
418	3.380E-02	459	9.655E+00	500	5.673E+00	541	8.386E+00	582	1.007E+01
419	3.100E-02	460	9.059E+00	501	5.801E+00	542	8.439E+00	583	1.012E+01
420	7.450E-02	461	8.475E+00	502	5.906E+00	543	8.489E+00	584	1.017E+01

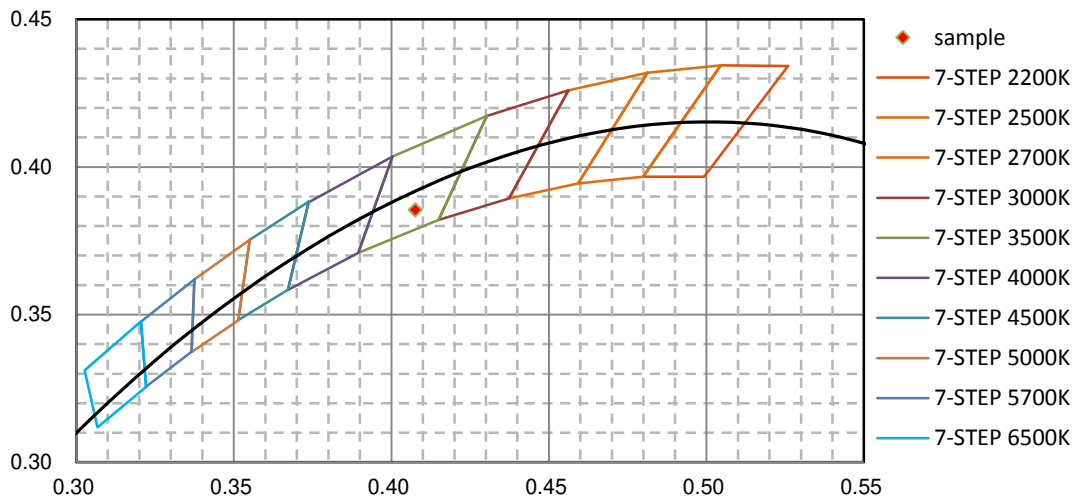


nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
585	1.023E+01	626	1.245E+01	667	9.066E+00	708	3.657E+00	749	8.375E-01
586	1.032E+01	627	1.245E+01	668	8.870E+00	709	3.470E+00	750	8.350E-01
587	1.039E+01	628	1.241E+01	669	8.651E+00	710	3.345E+00	751	8.819E-01
588	1.046E+01	629	1.245E+01	670	8.560E+00	711	3.237E+00	752	8.221E-01
589	1.052E+01	630	1.240E+01	671	8.433E+00	712	3.130E+00	753	7.895E-01
590	1.056E+01	631	1.241E+01	672	8.296E+00	713	3.126E+00	754	6.943E-01
591	1.069E+01	632	1.234E+01	673	8.111E+00	714	2.981E+00	755	5.770E-01
592	1.071E+01	633	1.234E+01	674	7.957E+00	715	2.840E+00	756	6.799E-01
593	1.079E+01	634	1.235E+01	675	7.834E+00	716	2.771E+00	757	6.431E-01
594	1.088E+01	635	1.227E+01	676	7.689E+00	717	2.746E+00	758	3.265E-01
595	1.096E+01	636	1.226E+01	677	7.521E+00	718	2.664E+00	759	5.420E-01
596	1.101E+01	637	1.215E+01	678	7.338E+00	719	2.492E+00	760	4.278E-01
597	1.106E+01	638	1.214E+01	679	7.249E+00	720	2.476E+00	761	4.121E-01
598	1.116E+01	639	1.209E+01	680	7.052E+00	721	2.335E+00	762	6.034E-01
599	1.127E+01	640	1.200E+01	681	6.958E+00	722	2.347E+00	763	6.388E-01
600	1.135E+01	641	1.197E+01	682	6.839E+00	723	2.284E+00	764	4.706E-01
601	1.140E+01	642	1.188E+01	683	6.690E+00	724	2.048E+00	765	2.913E-01
602	1.146E+01	643	1.183E+01	684	6.529E+00	725	2.107E+00	766	3.779E-01
603	1.155E+01	644	1.171E+01	685	6.383E+00	726	2.013E+00	767	3.558E-01
604	1.163E+01	645	1.163E+01	686	6.234E+00	727	1.914E+00	768	4.739E-01
605	1.170E+01	646	1.162E+01	687	6.114E+00	728	1.880E+00	769	3.845E-01
606	1.175E+01	647	1.149E+01	688	5.992E+00	729	1.918E+00	770	2.219E-01
607	1.181E+01	648	1.139E+01	689	5.750E+00	730	1.843E+00	771	2.314E-01
608	1.192E+01	649	1.128E+01	690	5.635E+00	731	1.668E+00	772	3.388E-01
609	1.198E+01	650	1.126E+01	691	5.561E+00	732	1.718E+00	773	2.433E-01
610	1.206E+01	651	1.110E+01	692	5.446E+00	733	1.536E+00	774	1.803E-01
611	1.208E+01	652	1.098E+01	693	5.308E+00	734	1.506E+00	775	2.432E-01
612	1.213E+01	653	1.088E+01	694	5.218E+00	735	1.575E+00	776	1.647E-01
613	1.217E+01	654	1.079E+01	695	5.064E+00	736	1.466E+00	777	2.848E-01
614	1.222E+01	655	1.066E+01	696	4.872E+00	737	1.396E+00	778	2.411E-01
615	1.228E+01	656	1.052E+01	697	4.823E+00	738	1.264E+00	779	2.039E-01
616	1.232E+01	657	1.042E+01	698	4.695E+00	739	1.205E+00	780	1.680E-01
617	1.231E+01	658	1.027E+01	699	4.575E+00	740	1.146E+00		
618	1.235E+01	659	1.014E+01	700	4.413E+00	741	1.263E+00		
619	1.235E+01	660	9.974E+00	701	4.379E+00	742	1.215E+00		
620	1.241E+01	661	9.851E+00	702	4.165E+00	743	1.161E+00		
621	1.238E+01	662	9.701E+00	703	4.062E+00	744	9.690E-01		
622	1.241E+01	663	9.547E+00	704	3.999E+00	745	1.015E+00		
623	1.245E+01	664	9.433E+00	705	3.816E+00	746	7.999E-01		
624	1.244E+01	665	9.323E+00	706	3.754E+00	747	9.055E-01		
625	1.245E+01	666	9.158E+00	707	3.665E+00	748	9.214E-01		

CIE 1931xy Chromaticity Diagram



7-Step Chromaticity Quadrangles



**Control Setting: 4000K**

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

Test orientation: **Downward**

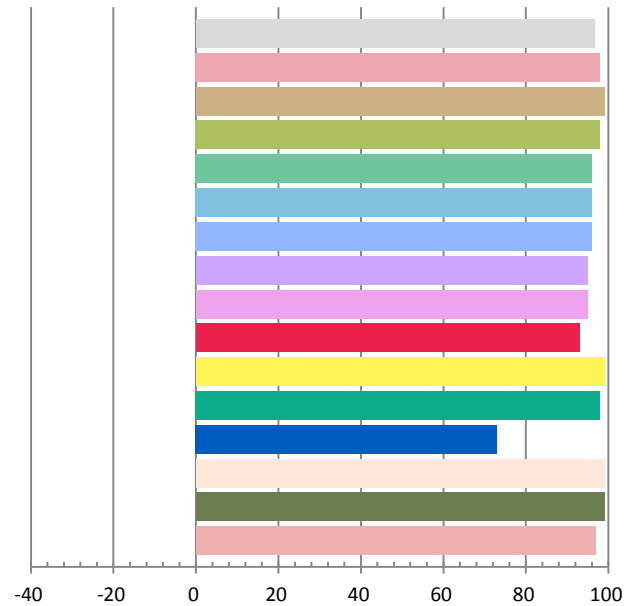
**Photometric and Electrical Measurement Result**

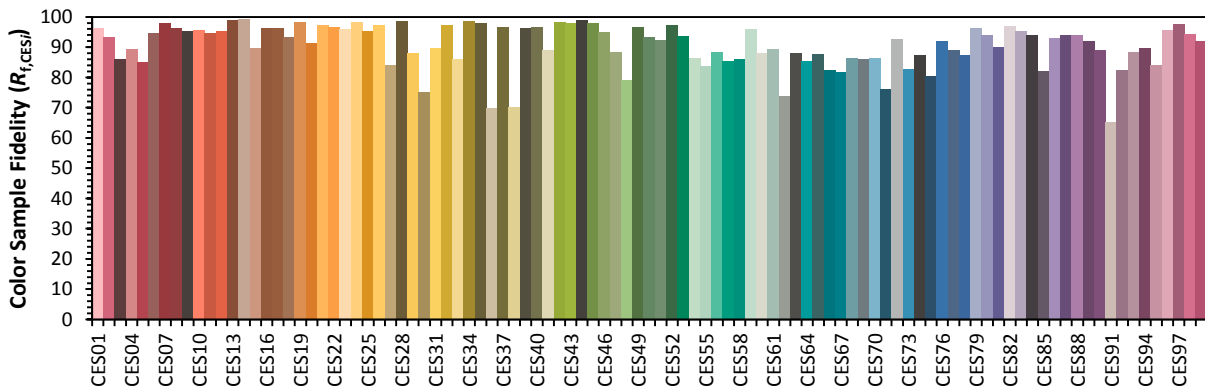
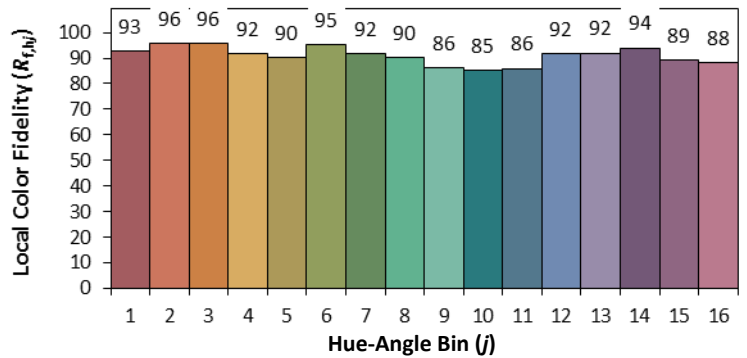
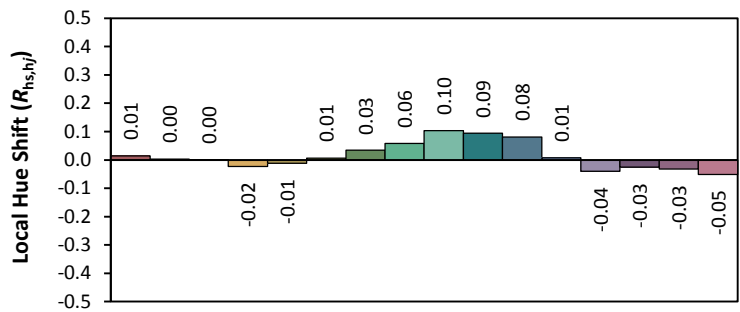
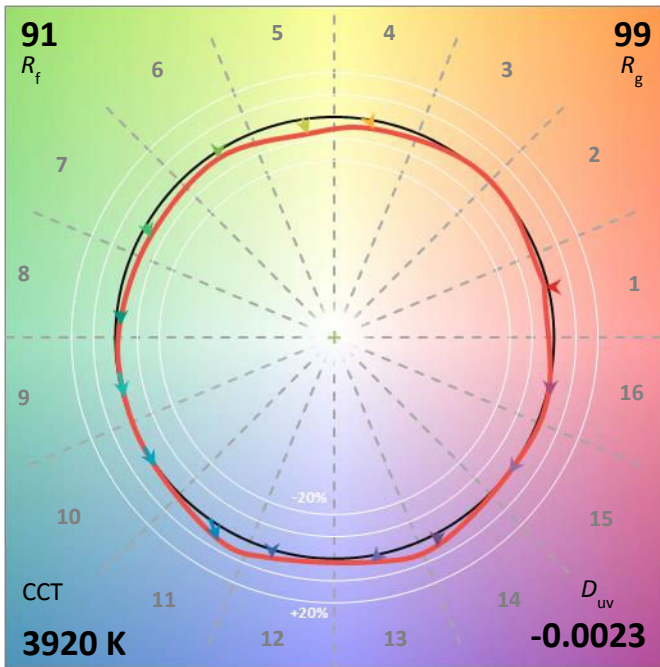
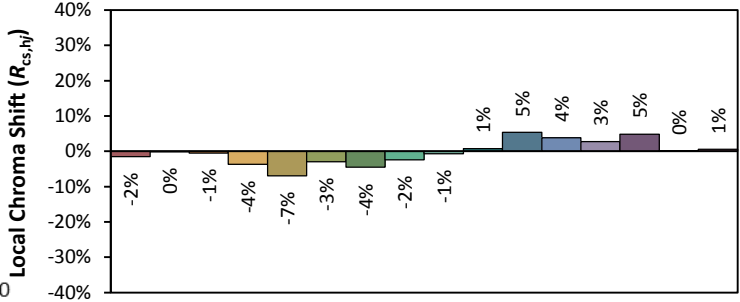
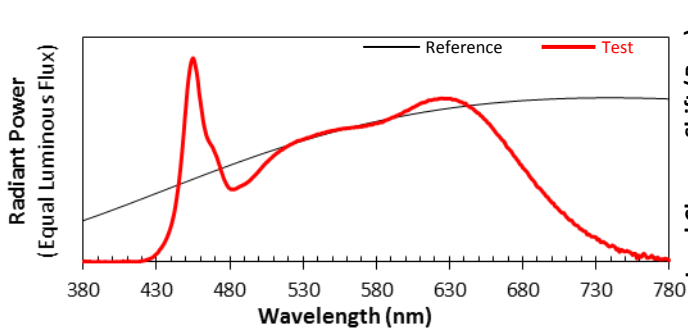
Voltage(V)	Frequency(Hz)	Current(A)	Power (W)	Power Factor	Luminous Flux(lm)	Efficacy(lm/W)
120.0	60	0.0658	7.7	0.9757	678.94	88.17

Radiant Flux (W)	CCT (K)	Duv	x	y	u'	v'
2.427	3921	-0.00229	0.3823	0.3730	0.2278	0.5002

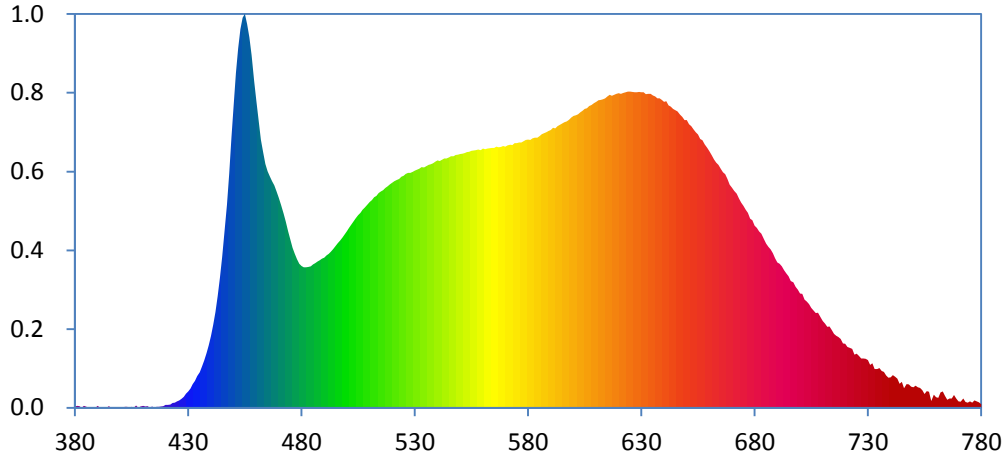
**Color Rendering Index**

<b>Ra</b>			
<b>96.6</b>			
<b>R1</b>	<b>R2</b>	<b>R3</b>	<b>R4</b>
98	99	98	96
<b>R5</b>	<b>R6</b>	<b>R7</b>	<b>R8</b>
96	96	95	95
<b>R9</b>	<b>R10</b>	<b>R11</b>	<b>R12</b>
93	99	98	73
<b>R13</b>	<b>R14</b>	<b>R15</b>	
99	99	97	





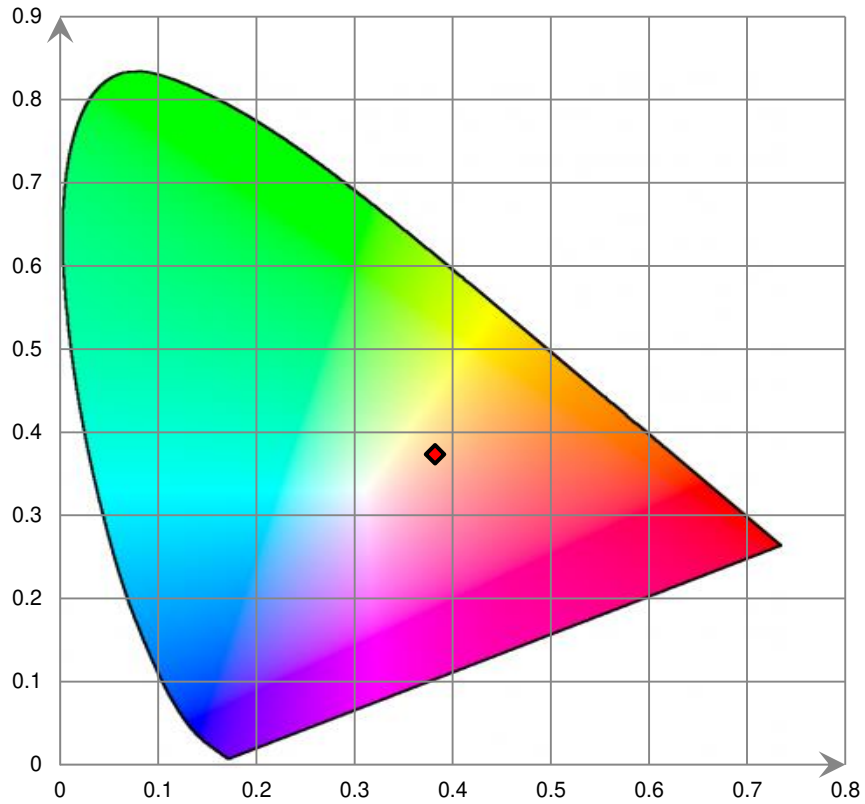
### Relative Spectral Power Distribution



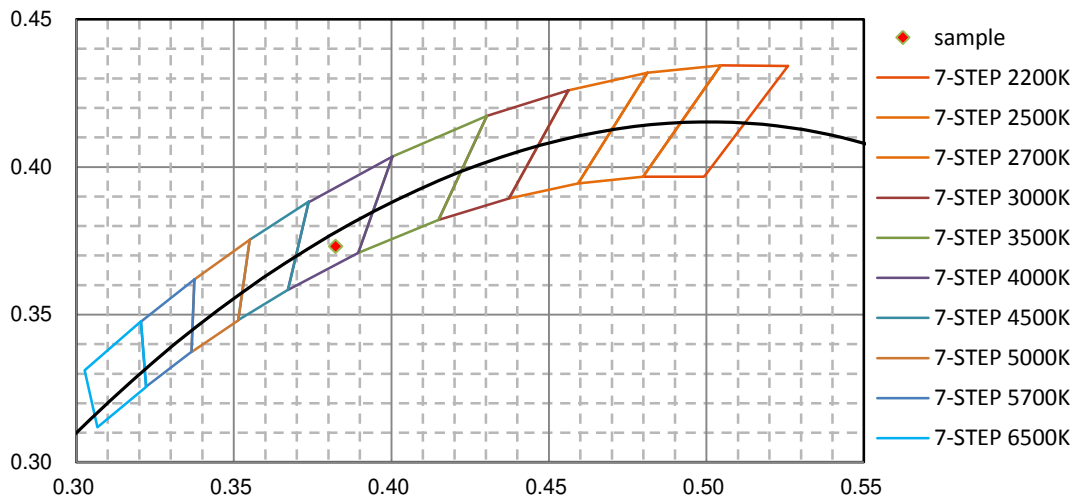
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380	4.520E-02	421	1.064E-01	462	9.812E+00	503	6.828E+00	544	9.116E+00
381	7.250E-02	422	1.216E-01	463	9.350E+00	504	6.942E+00	545	9.159E+00
382	6.040E-02	423	1.695E-01	464	8.922E+00	505	7.052E+00	546	9.205E+00
383	1.890E-02	424	1.871E-01	465	8.653E+00	506	7.126E+00	547	9.206E+00
384	6.270E-02	425	2.366E-01	466	8.467E+00	507	7.246E+00	548	9.244E+00
385	3.370E-02	426	2.631E-01	467	8.289E+00	508	7.332E+00	549	9.264E+00
386	2.400E-03	427	3.249E-01	468	8.142E+00	509	7.429E+00	550	9.290E+00
387	2.640E-02	428	3.970E-01	469	7.910E+00	510	7.524E+00	551	9.300E+00
388	1.830E-02	429	5.091E-01	470	7.677E+00	511	7.601E+00	552	9.319E+00
389	4.400E-03	430	5.903E-01	471	7.421E+00	512	7.701E+00	553	9.348E+00
390	7.130E-02	431	6.960E-01	472	7.108E+00	513	7.754E+00	554	9.370E+00
391	2.010E-02	432	8.654E-01	473	6.805E+00	514	7.851E+00	555	9.402E+00
392	8.200E-03	433	9.865E-01	474	6.461E+00	515	7.912E+00	556	9.409E+00
393	4.200E-03	434	1.155E+00	475	6.153E+00	516	7.956E+00	557	9.426E+00
394	1.570E-02	435	1.300E+00	476	5.856E+00	517	8.042E+00	558	9.452E+00
395	5.140E-02	436	1.514E+00	477	5.630E+00	518	8.104E+00	559	9.424E+00
396	9.300E-03	437	1.729E+00	478	5.431E+00	519	8.171E+00	560	9.478E+00
397	1.130E-02	438	1.994E+00	479	5.269E+00	520	8.225E+00	561	9.457E+00
398	9.000E-03	439	2.284E+00	480	5.188E+00	521	8.286E+00	562	9.487E+00
399	5.000E-04	440	2.618E+00	481	5.139E+00	522	8.340E+00	563	9.497E+00
400	0.000E+00	441	3.026E+00	482	5.139E+00	523	8.372E+00	564	9.511E+00
401	1.700E-02	442	3.495E+00	483	5.146E+00	524	8.449E+00	565	9.505E+00
402	3.020E-02	443	4.085E+00	484	5.174E+00	525	8.487E+00	566	9.553E+00
403	3.240E-02	444	4.756E+00	485	5.239E+00	526	8.564E+00	567	9.533E+00
404	1.220E-02	445	5.519E+00	486	5.296E+00	527	8.598E+00	568	9.545E+00
405	3.140E-02	446	6.409E+00	487	5.351E+00	528	8.594E+00	569	9.583E+00
406	5.200E-03	447	7.420E+00	488	5.391E+00	529	8.630E+00	570	9.558E+00
407	7.920E-02	448	8.563E+00	489	5.454E+00	530	8.671E+00	571	9.598E+00
408	6.800E-03	449	9.877E+00	490	5.493E+00	531	8.708E+00	572	9.621E+00
409	4.010E-02	450	1.107E+01	491	5.567E+00	532	8.749E+00	573	9.611E+00
410	6.780E-02	451	1.225E+01	492	5.634E+00	533	8.800E+00	574	9.681E+00
411	4.200E-02	452	1.315E+01	493	5.716E+00	534	8.795E+00	575	9.679E+00
412	5.130E-02	453	1.386E+01	494	5.811E+00	535	8.843E+00	576	9.700E+00
413	8.700E-03	454	1.427E+01	495	5.910E+00	536	8.882E+00	577	9.709E+00
414	4.120E-02	455	1.441E+01	496	6.017E+00	537	8.915E+00	578	9.750E+00
415	2.600E-02	456	1.404E+01	497	6.120E+00	538	8.941E+00	579	9.795E+00
416	3.340E-02	457	1.356E+01	498	6.233E+00	539	8.997E+00	580	9.814E+00
417	3.490E-02	458	1.290E+01	499	6.341E+00	540	9.045E+00	581	9.798E+00
418	4.950E-02	459	1.195E+01	500	6.466E+00	541	9.029E+00	582	9.859E+00
419	5.570E-02	460	1.121E+01	501	6.585E+00	542	9.075E+00	583	9.885E+00
420	1.069E-01	461	1.051E+01	502	6.711E+00	543	9.118E+00	584	9.876E+00

nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
585	9.938E+00	626	1.155E+01	667	8.541E+00	708	3.479E+00	749	7.685E-01
586	1.001E+01	627	1.155E+01	668	8.365E+00	709	3.317E+00	750	7.498E-01
587	1.005E+01	628	1.154E+01	669	8.160E+00	710	3.169E+00	751	8.086E-01
588	1.008E+01	629	1.155E+01	670	8.049E+00	711	3.076E+00	752	7.473E-01
589	1.012E+01	630	1.155E+01	671	7.943E+00	712	2.958E+00	753	7.285E-01
590	1.016E+01	631	1.154E+01	672	7.832E+00	713	2.972E+00	754	6.408E-01
591	1.024E+01	632	1.147E+01	673	7.659E+00	714	2.844E+00	755	5.075E-01
592	1.022E+01	633	1.148E+01	674	7.498E+00	715	2.698E+00	756	6.026E-01
593	1.031E+01	634	1.148E+01	675	7.388E+00	716	2.628E+00	757	5.873E-01
594	1.035E+01	635	1.143E+01	676	7.243E+00	717	2.591E+00	758	2.495E-01
595	1.039E+01	636	1.140E+01	677	7.124E+00	718	2.520E+00	759	4.783E-01
596	1.045E+01	637	1.132E+01	678	6.919E+00	719	2.347E+00	760	3.846E-01
597	1.047E+01	638	1.132E+01	679	6.858E+00	720	2.345E+00	761	3.577E-01
598	1.054E+01	639	1.126E+01	680	6.662E+00	721	2.227E+00	762	5.595E-01
599	1.062E+01	640	1.120E+01	681	6.575E+00	722	2.185E+00	763	5.954E-01
600	1.067E+01	641	1.122E+01	682	6.453E+00	723	2.153E+00	764	4.334E-01
601	1.070E+01	642	1.106E+01	683	6.364E+00	724	1.943E+00	765	2.906E-01
602	1.073E+01	643	1.102E+01	684	6.169E+00	725	1.973E+00	766	3.322E-01
603	1.081E+01	644	1.093E+01	685	6.008E+00	726	1.893E+00	767	3.401E-01
604	1.087E+01	645	1.089E+01	686	5.892E+00	727	1.796E+00	768	4.712E-01
605	1.094E+01	646	1.085E+01	687	5.790E+00	728	1.797E+00	769	3.358E-01
606	1.095E+01	647	1.072E+01	688	5.649E+00	729	1.794E+00	770	2.272E-01
607	1.104E+01	648	1.064E+01	689	5.465E+00	730	1.746E+00	771	2.236E-01
608	1.107E+01	649	1.053E+01	690	5.312E+00	731	1.568E+00	772	3.391E-01
609	1.115E+01	650	1.052E+01	691	5.266E+00	732	1.623E+00	773	2.082E-01
610	1.119E+01	651	1.037E+01	692	5.173E+00	733	1.414E+00	774	1.863E-01
611	1.126E+01	652	1.030E+01	693	5.039E+00	734	1.421E+00	775	2.355E-01
612	1.126E+01	653	1.018E+01	694	4.917E+00	735	1.449E+00	776	1.888E-01
613	1.129E+01	654	1.008E+01	695	4.810E+00	736	1.346E+00	777	2.621E-01
614	1.132E+01	655	9.993E+00	696	4.640E+00	737	1.311E+00	778	2.294E-01
615	1.139E+01	656	9.836E+00	697	4.590E+00	738	1.180E+00	779	1.994E-01
616	1.145E+01	657	9.788E+00	698	4.419E+00	739	1.097E+00	780	1.325E-01
617	1.142E+01	658	9.637E+00	699	4.324E+00	740	1.109E+00		
618	1.145E+01	659	9.508E+00	700	4.180E+00	741	1.190E+00		
619	1.148E+01	660	9.375E+00	701	4.169E+00	742	1.139E+00		
620	1.151E+01	661	9.238E+00	702	3.953E+00	743	1.067E+00		
621	1.149E+01	662	9.085E+00	703	3.882E+00	744	8.741E-01		
622	1.152E+01	663	8.970E+00	704	3.787E+00	745	9.525E-01		
623	1.155E+01	664	8.887E+00	705	3.653E+00	746	7.128E-01		
624	1.156E+01	665	8.741E+00	706	3.561E+00	747	8.599E-01		
625	1.157E+01	666	8.616E+00	707	3.463E+00	748	8.497E-01		

CIE 1931xy Chromaticity Diagram



7-Step Chromaticity Quadrangles



**Control Setting: 5000K**

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

Test orientation: **Downward**

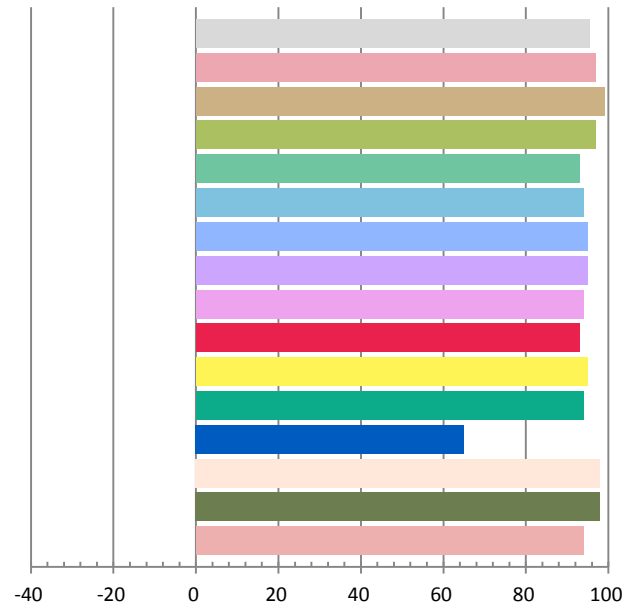
**Photometric and Electrical Measurement Result**

Voltage(V)	Frequency(Hz)	Current(A)	Power (W)	Power Factor	Luminous Flux(lm)	Efficacy(lm/W)
120.0	60	0.0652	7.63	0.9757	682.46	89.44

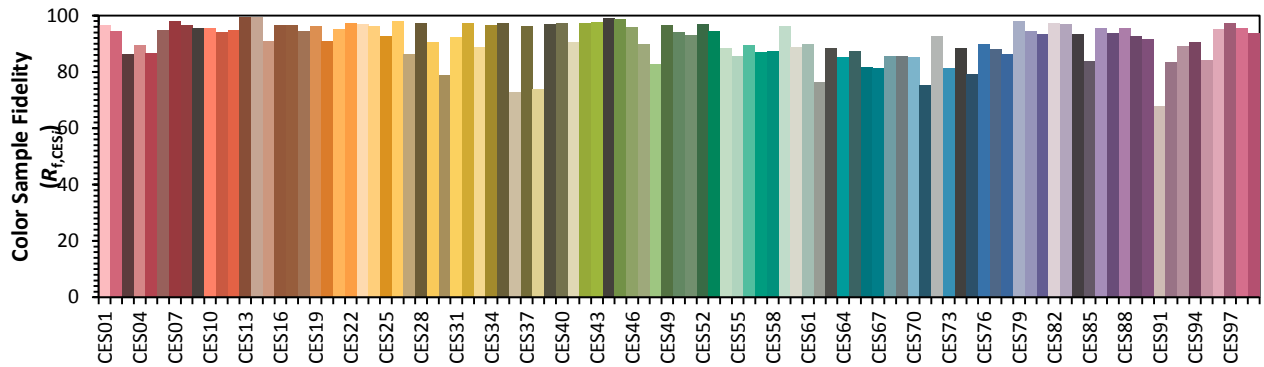
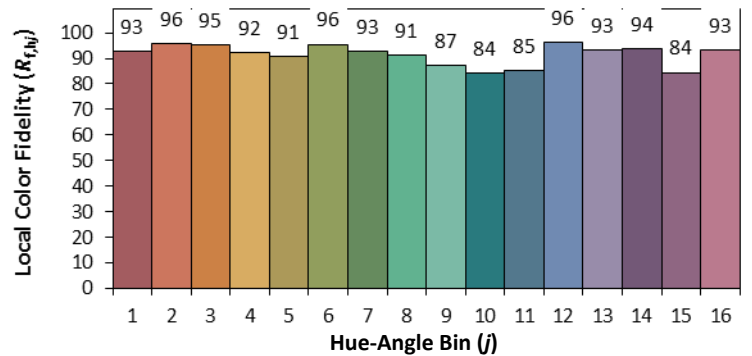
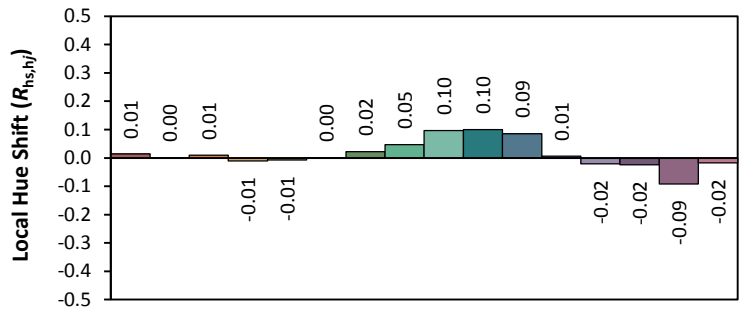
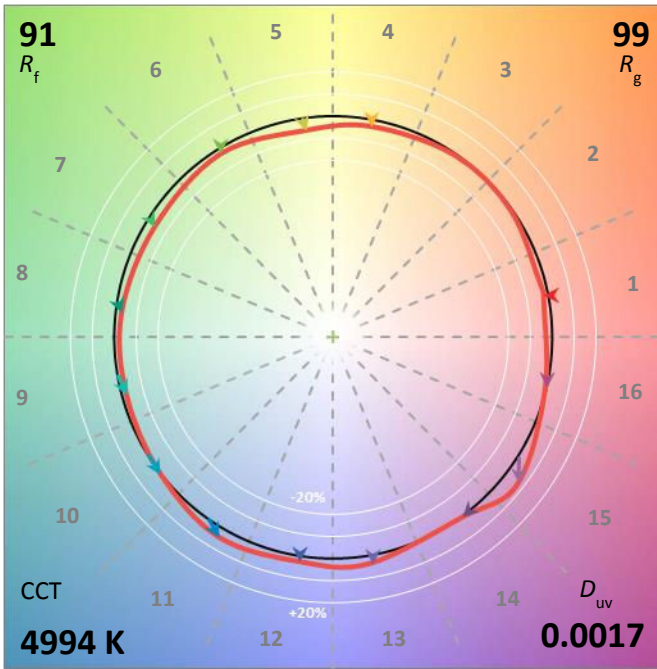
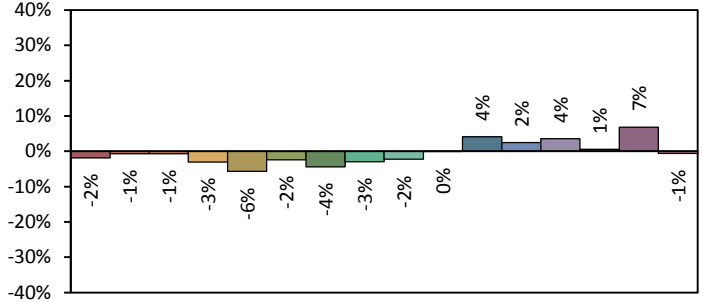
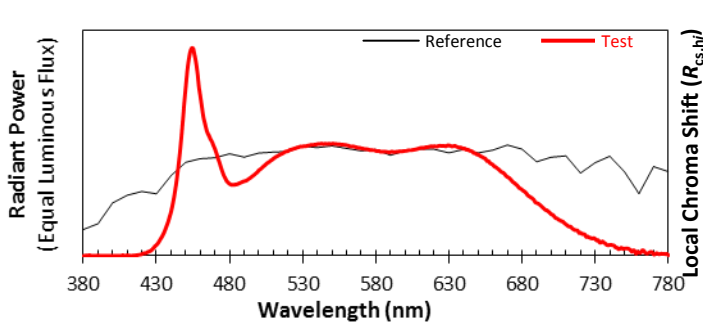
Radiant Flux (W)	CCT (K)	Duv	x	y	u'	v'
2.441	4995	0.00168	0.3456	0.3554	0.2103	0.4866

**Color Rendering Index**

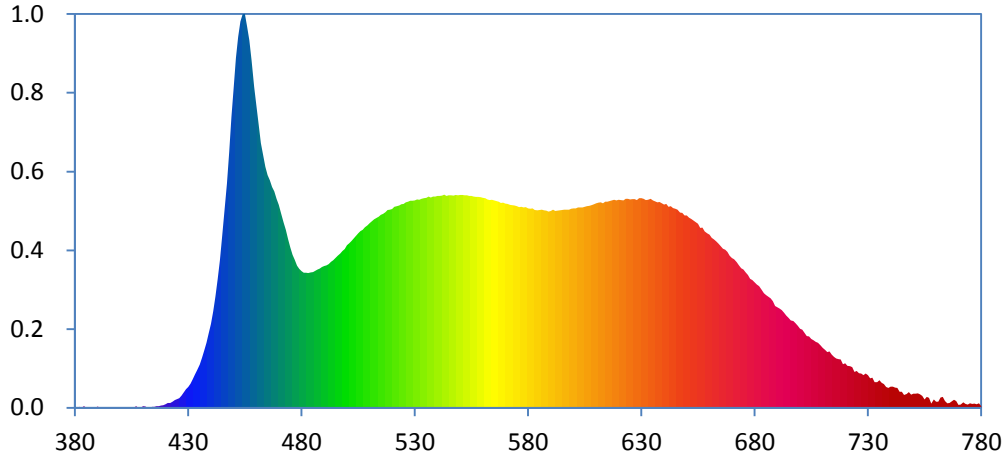
<b>Ra</b>			
<b>95.5</b>			
<b>R1</b>	<b>R2</b>	<b>R3</b>	<b>R4</b>
97	99	97	93
<b>R5</b>	<b>R6</b>	<b>R7</b>	<b>R8</b>
94	95	95	94
<b>R9</b>	<b>R10</b>	<b>R11</b>	<b>R12</b>
93	95	94	65
<b>R13</b>	<b>R14</b>	<b>R15</b>	
98	98	94	







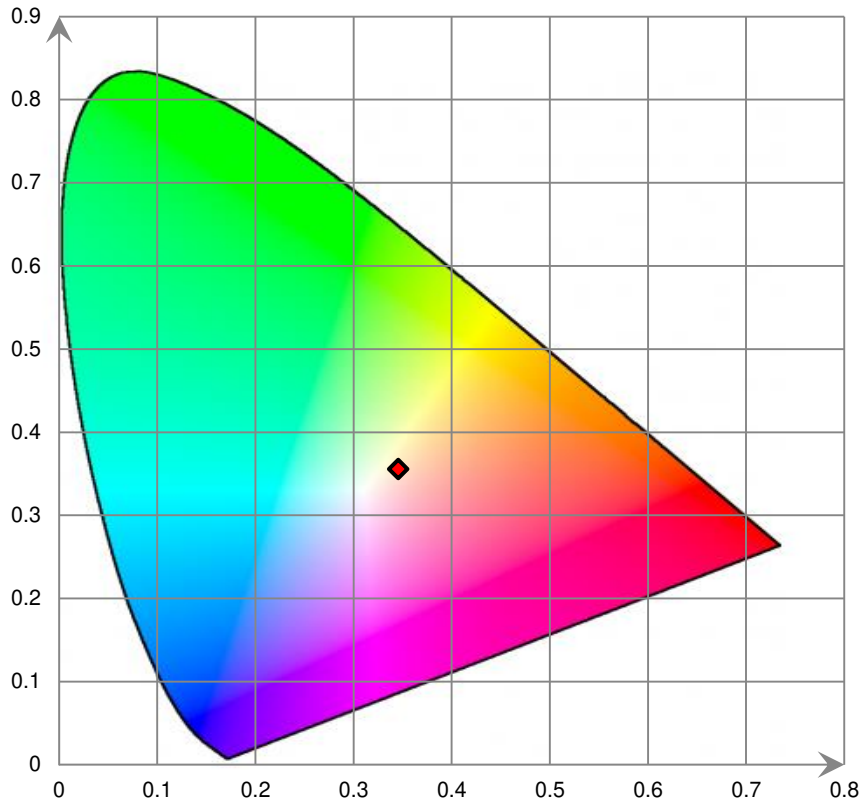
### Relative Spectral Power Distribution



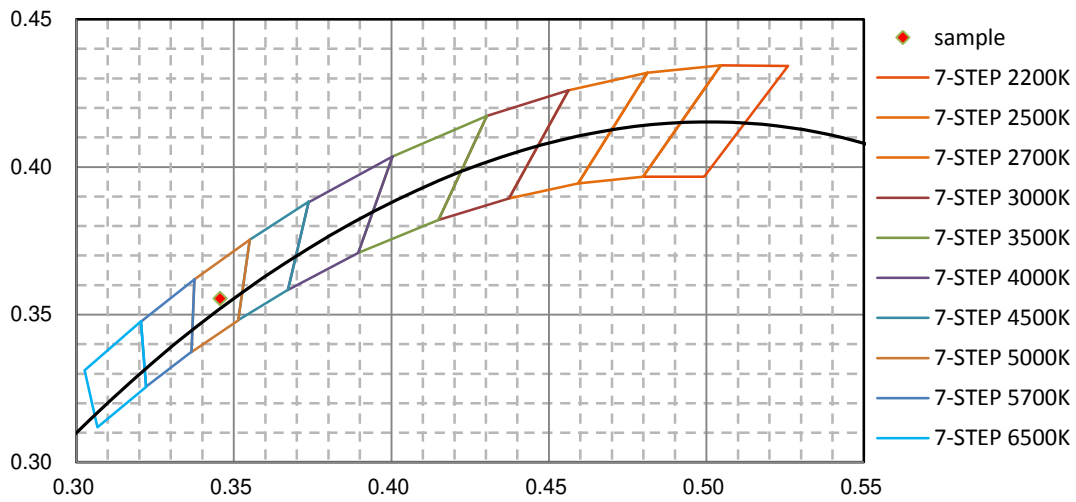
nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
380	1.050E-02	421	2.259E-01	462	1.235E+01	503	7.901E+00	544	9.877E+00
381	2.000E-02	422	2.248E-01	463	1.179E+01	504	8.011E+00	545	9.914E+00
382	4.740E-02	423	2.753E-01	464	1.123E+01	505	8.133E+00	546	9.913E+00
383	2.350E-02	424	3.531E-01	465	1.085E+01	506	8.236E+00	547	9.899E+00
384	7.780E-02	425	4.019E-01	466	1.061E+01	507	8.299E+00	548	9.932E+00
385	3.560E-02	426	4.485E-01	467	1.031E+01	508	8.423E+00	549	9.910E+00
386	2.300E-03	427	5.610E-01	468	1.009E+01	509	8.504E+00	550	9.921E+00
387	2.630E-02	428	7.090E-01	469	9.749E+00	510	8.607E+00	551	9.920E+00
388	1.800E-03	429	8.645E-01	470	9.461E+00	511	8.696E+00	552	9.912E+00
389	1.000E-04	430	9.665E-01	471	9.079E+00	512	8.794E+00	553	9.904E+00
390	6.300E-02	431	1.124E+00	472	8.634E+00	513	8.849E+00	554	9.883E+00
391	7.400E-03	432	1.332E+00	473	8.299E+00	514	8.919E+00	555	9.878E+00
392	3.000E-04	433	1.553E+00	474	7.871E+00	515	8.997E+00	556	9.857E+00
393	0.000E+00	434	1.758E+00	475	7.481E+00	516	9.047E+00	557	9.843E+00
394	1.760E-02	435	2.012E+00	476	7.132E+00	517	9.123E+00	558	9.836E+00
395	2.530E-02	436	2.334E+00	477	6.892E+00	518	9.220E+00	559	9.821E+00
396	7.700E-03	437	2.665E+00	478	6.627E+00	519	9.232E+00	560	9.789E+00
397	5.000E-04	438	3.030E+00	479	6.484E+00	520	9.273E+00	561	9.772E+00
398	0.000E+00	439	3.481E+00	480	6.374E+00	521	9.368E+00	562	9.712E+00
399	0.000E+00	440	3.911E+00	481	6.302E+00	522	9.406E+00	563	9.681E+00
400	0.000E+00	441	4.493E+00	482	6.293E+00	523	9.437E+00	564	9.698E+00
401	1.690E-02	442	5.198E+00	483	6.287E+00	524	9.494E+00	565	9.673E+00
402	1.540E-02	443	5.992E+00	484	6.318E+00	525	9.510E+00	566	9.638E+00
403	1.320E-02	444	6.874E+00	485	6.334E+00	526	9.587E+00	567	9.606E+00
404	1.600E-03	445	7.994E+00	486	6.391E+00	527	9.607E+00	568	9.560E+00
405	1.680E-02	446	9.148E+00	487	6.452E+00	528	9.661E+00	569	9.566E+00
406	2.100E-03	447	1.047E+01	488	6.495E+00	529	9.657E+00	570	9.518E+00
407	7.500E-02	448	1.192E+01	489	6.562E+00	530	9.679E+00	571	9.510E+00
408	4.500E-03	449	1.357E+01	490	6.617E+00	531	9.723E+00	572	9.471E+00
409	2.670E-02	450	1.493E+01	491	6.635E+00	532	9.697E+00	573	9.453E+00
410	6.970E-02	451	1.631E+01	492	6.703E+00	533	9.748E+00	574	9.440E+00
411	5.170E-02	452	1.730E+01	493	6.812E+00	534	9.775E+00	575	9.410E+00
412	1.640E-02	453	1.802E+01	494	6.885E+00	535	9.785E+00	576	9.363E+00
413	2.500E-03	454	1.836E+01	495	6.986E+00	536	9.847E+00	577	9.378E+00
414	3.930E-02	455	1.837E+01	496	7.086E+00	537	9.801E+00	578	9.345E+00
415	3.810E-02	456	1.778E+01	497	7.195E+00	538	9.847E+00	579	9.355E+00
416	6.650E-02	457	1.713E+01	498	7.308E+00	539	9.851E+00	580	9.293E+00
417	6.980E-02	458	1.620E+01	499	7.404E+00	540	9.887E+00	581	9.283E+00
418	1.093E-01	459	1.497E+01	500	7.577E+00	541	9.889E+00	582	9.297E+00
419	1.189E-01	460	1.408E+01	501	7.672E+00	542	9.900E+00	583	9.218E+00
420	1.647E-01	461	1.322E+01	502	7.771E+00	543	9.948E+00	584	9.209E+00

nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
585	9.222E+00	626	9.736E+00	667	7.373E+00	708	3.035E+00	749	6.147E-01
586	9.236E+00	627	9.729E+00	668	7.263E+00	709	2.906E+00	750	6.476E-01
587	9.209E+00	628	9.692E+00	669	7.087E+00	710	2.797E+00	751	6.495E-01
588	9.200E+00	629	9.773E+00	670	6.978E+00	711	2.702E+00	752	6.740E-01
589	9.153E+00	630	9.772E+00	671	6.932E+00	712	2.594E+00	753	6.317E-01
590	9.181E+00	631	9.743E+00	672	6.798E+00	713	2.621E+00	754	5.458E-01
591	9.238E+00	632	9.681E+00	673	6.648E+00	714	2.476E+00	755	3.808E-01
592	9.181E+00	633	9.704E+00	674	6.504E+00	715	2.372E+00	756	5.030E-01
593	9.199E+00	634	9.755E+00	675	6.444E+00	716	2.302E+00	757	4.591E-01
594	9.209E+00	635	9.674E+00	676	6.316E+00	717	2.273E+00	758	1.851E-01
595	9.217E+00	636	9.634E+00	677	6.189E+00	718	2.256E+00	759	3.846E-01
596	9.244E+00	637	9.590E+00	678	6.014E+00	719	2.031E+00	760	2.852E-01
597	9.244E+00	638	9.603E+00	679	5.958E+00	720	2.067E+00	761	2.825E-01
598	9.241E+00	639	9.539E+00	680	5.855E+00	721	1.952E+00	762	4.700E-01
599	9.282E+00	640	9.482E+00	681	5.741E+00	722	1.933E+00	763	5.002E-01
600	9.294E+00	641	9.502E+00	682	5.676E+00	723	1.900E+00	764	3.161E-01
601	9.300E+00	642	9.380E+00	683	5.529E+00	724	1.673E+00	765	2.122E-01
602	9.342E+00	643	9.403E+00	684	5.346E+00	725	1.721E+00	766	2.247E-01
603	9.352E+00	644	9.316E+00	685	5.260E+00	726	1.615E+00	767	2.916E-01
604	9.346E+00	645	9.291E+00	686	5.182E+00	727	1.600E+00	768	3.755E-01
605	9.371E+00	646	9.232E+00	687	5.098E+00	728	1.521E+00	769	3.138E-01
606	9.397E+00	647	9.098E+00	688	4.977E+00	729	1.590E+00	770	1.352E-01
607	9.421E+00	648	9.090E+00	689	4.753E+00	730	1.519E+00	771	1.530E-01
608	9.450E+00	649	8.971E+00	690	4.691E+00	731	1.372E+00	772	2.536E-01
609	9.488E+00	650	8.969E+00	691	4.633E+00	732	1.406E+00	773	1.813E-01
610	9.531E+00	651	8.871E+00	692	4.546E+00	733	1.192E+00	774	1.524E-01
611	9.562E+00	652	8.803E+00	693	4.430E+00	734	1.190E+00	775	2.116E-01
612	9.577E+00	653	8.735E+00	694	4.299E+00	735	1.288E+00	776	1.774E-01
613	9.535E+00	654	8.661E+00	695	4.191E+00	736	1.167E+00	777	1.886E-01
614	9.614E+00	655	8.588E+00	696	4.071E+00	737	1.097E+00	778	1.559E-01
615	9.610E+00	656	8.395E+00	697	4.038E+00	738	9.721E-01	779	2.035E-01
616	9.647E+00	657	8.408E+00	698	3.934E+00	739	9.284E-01	780	6.900E-02
617	9.674E+00	658	8.227E+00	699	3.816E+00	740	9.807E-01		
618	9.702E+00	659	8.138E+00	700	3.680E+00	741	9.832E-01		
619	9.672E+00	660	8.078E+00	701	3.645E+00	742	9.358E-01		
620	9.709E+00	661	7.928E+00	702	3.499E+00	743	9.180E-01		
621	9.682E+00	662	7.857E+00	703	3.346E+00	744	7.436E-01		
622	9.669E+00	663	7.758E+00	704	3.323E+00	745	7.416E-01		
623	9.744E+00	664	7.662E+00	705	3.206E+00	746	5.937E-01		
624	9.753E+00	665	7.540E+00	706	3.155E+00	747	6.475E-01		
625	9.719E+00	666	7.411E+00	707	3.074E+00	748	7.347E-01		

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**

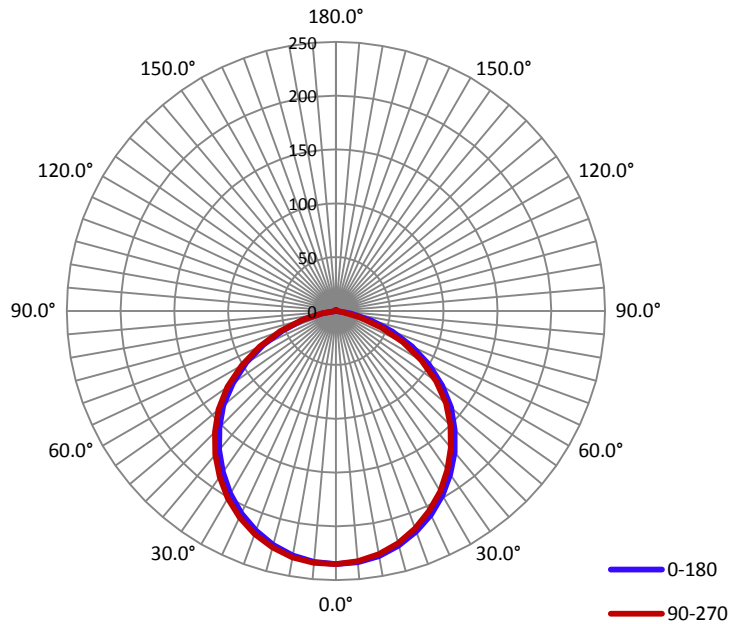
**Electrical Measurement**

Input Voltage(V)	Frequency(Hz)	Input Current(A)	Power (W)	Power Factor
120.0	60	0.0660	7.74	0.9810

**Photometric Measurement**

Luminous Flux(lm)	Efficacy(lm/W)	$I_{max}(cd)$	S/MH(C0/180)	S/MH(C90/270)
634.3	82.00	235.4	1.24	1.25

**Luminous Intensity Distribution**



	C0/180	C45/225	C90/270	C135/315	AVG.
Beam Angle(50% $I_{max}$ ):	110.5	110.6	110.2	110.7	110.5
Field Angle(10% $I_{max}$ ):	154.6	153.7	151.9	154.7	153.7

Luminous Intensity (cd) Distribution Data

C \ y	0°	22.5°	45°	67.5°	90°	112.5°	135°	157.5°
0.0°	235	235	235	235	235	235	235	235
5.0°	234	234	234	234	233	233	233	234
10.0°	231	231	230	230	229	229	230	230
15.0°	226	225	224	224	223	223	224	224
20.0°	218	217	216	216	215	215	215	216
25.0°	209	208	207	206	205	205	206	207
30.0°	198	196	195	194	194	194	194	195
35.0°	185	184	182	181	180	181	181	182
40.0°	171	169	168	167	166	166	167	169
45.0°	156	154	152	151	150	151	152	153
50.0°	140	137	135	134	133	134	135	137
55.0°	121	118	116	114	114	114	116	118
60.0°	100	97	95	92	92	93	94	97
65.0°	78	76	72	69	68	71	73	75
70.0°	56	53	49	45	45	48	51	53
75.0°	34	31	28	23	23	27	30	32
80.0°	14	12	10	7	7	10	11	12
85.0°	2	2	2	1	1	2	2	2
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	0	0	0	0	0	0	0
145.0°	1	1	1	1	1	1	1	1
150.0°	1	1	1	1	1	1	1	1
155.0°	1	1	1	1	1	1	1	1
160.0°	1	1	1	1	1	1	1	1
165.0°	1	1	1	1	1	1	1	1
170.0°	1	1	1	1	1	1	1	1
175.0°	1	1	1	1	1	1	1	1
180.0°	0	0	0	0	0	0	0	0

Luminous Intensity (cd) Distribution Data (cont.)

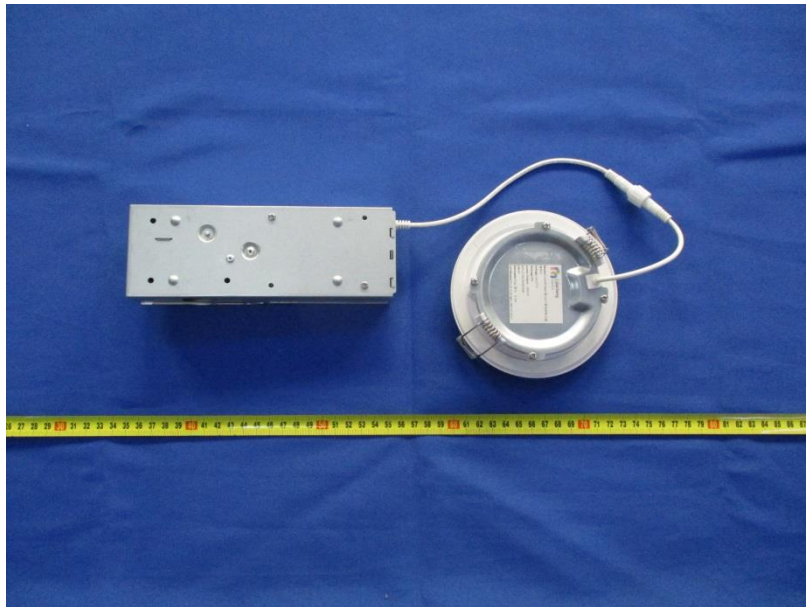
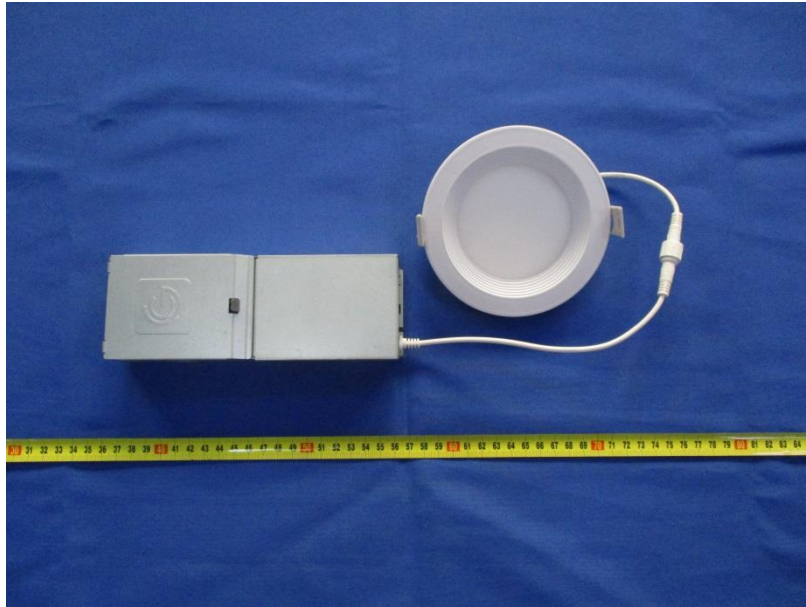
C Y	180°	202.5°	225°	247.5°	270°	292.5°	315°	337.5°
0.0°	235	235	235	235	235	235	235	235
5.0°	234	234	235	235	235	235	235	235
10.0°	230	231	232	232	232	232	232	232
15.0°	225	226	227	227	228	227	227	227
20.0°	217	218	219	220	220	220	220	219
25.0°	207	209	210	211	211	212	211	210
30.0°	196	198	199	200	201	201	200	199
35.0°	183	185	186	187	188	188	187	186
40.0°	169	171	172	173	174	174	173	172
45.0°	153	155	157	158	159	159	158	156
50.0°	136	138	140	142	142	142	141	140
55.0°	117	120	122	123	123	124	122	120
60.0°	96	99	101	100	101	103	101	99
65.0°	74	77	78	77	78	80	80	77
70.0°	53	55	55	54	55	57	58	56
75.0°	32	33	33	32	32	35	36	34
80.0°	12	14	15	12	13	17	16	14
85.0°	2	2	2	2	2	2	2	2
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	0	0	0	0	0	0	0
145.0°	0	0	0	1	1	1	1	1
150.0°	1	1	1	1	1	1	1	1
155.0°	1	1	1	1	1	1	1	1
160.0°	1	1	1	1	1	1	1	1
165.0°	1	1	1	1	1	1	1	1
170.0°	1	1	1	1	1	1	1	1
175.0°	1	1	1	1	1	1	1	1
180.0°	0	0	0	0	0	0	0	0

Zonal Lumen Density Measurement

Deg	Flux (lm)	%	Deg	Flux (lm)	%
0-5	5.6	0.90	0-5	5.6	0.88
5-10	16.7	2.63	0-10	22.2	3.51
10-15	27.0	4.27	0-15	49.3	7.77
15-20	36.6	5.76	0-20	85.8	13.53
20-25	44.5	7.04	0-25	130.5	20.57
25-30	51.3	8.08	0-30	181.7	28.65
30-35	56.1	8.86	0-35	237.9	37.50
35-40	59.0	9.33	0-40	297.0	46.82
40-45	60.0	9.48	0-45	357.0	56.29
45-50	59.0	9.33	0-50	416.1	65.61
50-55	55.9	8.81	0-55	472.0	74.42
55-60	49.9	7.88	0-60	522.0	82.30
60-65	42.0	6.61	0-65	563.9	88.91
65-70	32.3	5.09	0-70	596.2	94.00
70-75	21.7	3.43	0-75	618.0	97.43
75-80	11.5	1.80	0-80	629.4	99.23
80-85	3.2	0.50	0-85	632.5	99.73
85-90	0.4	0.07	0-90	633.0	99.80
90-95	0.0	0.00	0-95	633.0	99.80
95-100	0.0	0.00	0-100	633.0	99.80
100-105	0.0	0.00	0-105	633.0	99.80
105-110	0.0	0.00	0-110	633.0	99.80
110-115	0.0	0.00	0-115	633.0	99.80
115-120	0.0	0.00	0-120	633.0	99.80
120-125	0.0	0.00	0-125	633.0	99.80
125-130	0.0	0.00	0-130	633.1	99.81
130-135	0.0	0.00	0-135	633.2	99.83
135-140	0.0	0.00	0-140	633.3	99.85
140-145	0.0	0.00	0-145	633.4	99.87
145-150	0.0	0.04	0-150	633.6	99.89
150-155	0.0	0.05	0-155	633.7	99.92
155-160	0.0	0.04	0-160	633.9	99.95
160-165	0.0	0.00	0-165	634.0	99.97
165-170	0.0	0.00	0-170	634.2	99.98
170-175	0.0	0.00	0-175	634.2	100.00
175-180	0.0	0.00	0-180	634.3	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\*\*\*\*\*