

# 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: MFR8HO/9CCT5S/DUALDIM/EXT**

<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>	RKSB220907011-10-2
<b>Test Date:</b>	2022-09-13 to 2022-09-16
<b>Report Date:</b>	2022-09-19
<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<sup>#</sup>

### General Information:

One sample was received on 2022-09-07 and used for testing.

Model Tested:	MFR8HO/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:	24W
Nominal CCT:	2700K/3000K/3500K/4000K/5000K
Nominal Lumen Output:	1780lm/1800lm/1860lm/1920lm/1980lm

## 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  $R_i$ ,  $R_g$  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**

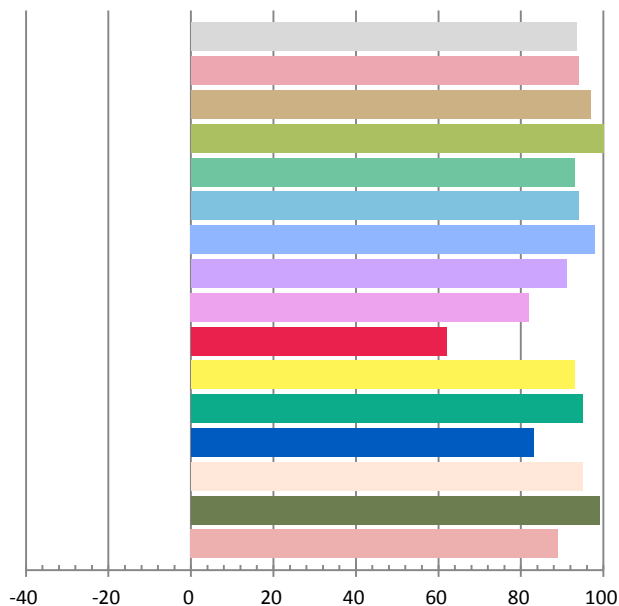
### Photometric and Electrical Measurement Result

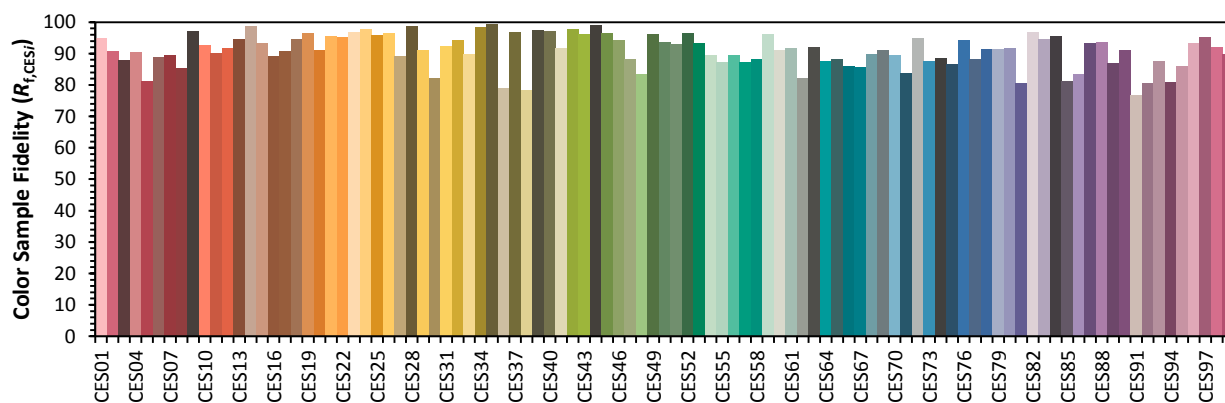
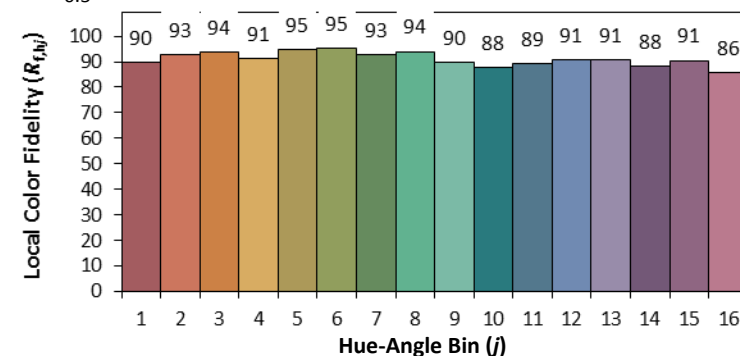
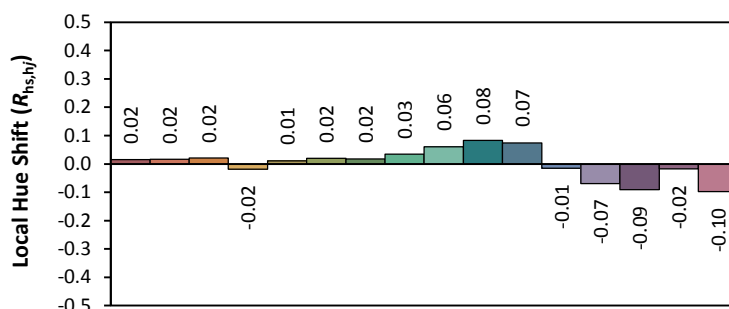
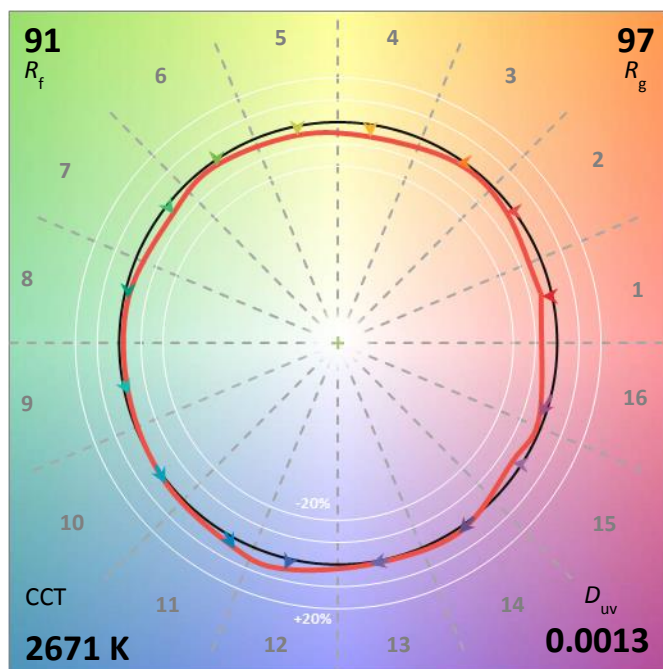
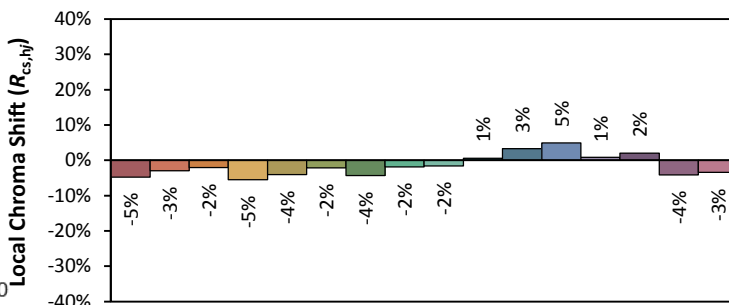
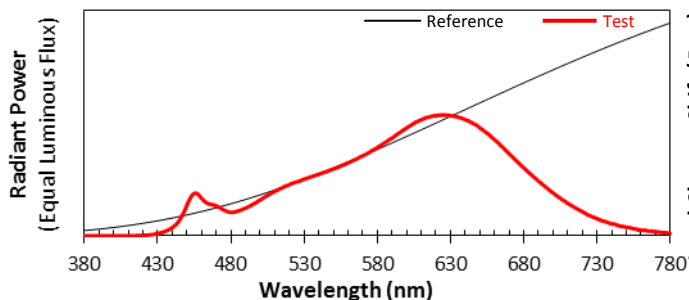
Voltage(V)	Frequency(Hz)	Current(A)	Power (W)	Power Factor	Luminous Flux(lm)	Efficacy(lm/W)
120.0	60	0.1911	22.8	0.9942	1966.46	86.25

Radiant Flux (W)	CCT (K)	Duv	x	y	u'	v'
6.993	2671	0.00128	0.4645	0.4151	0.2635	0.5298

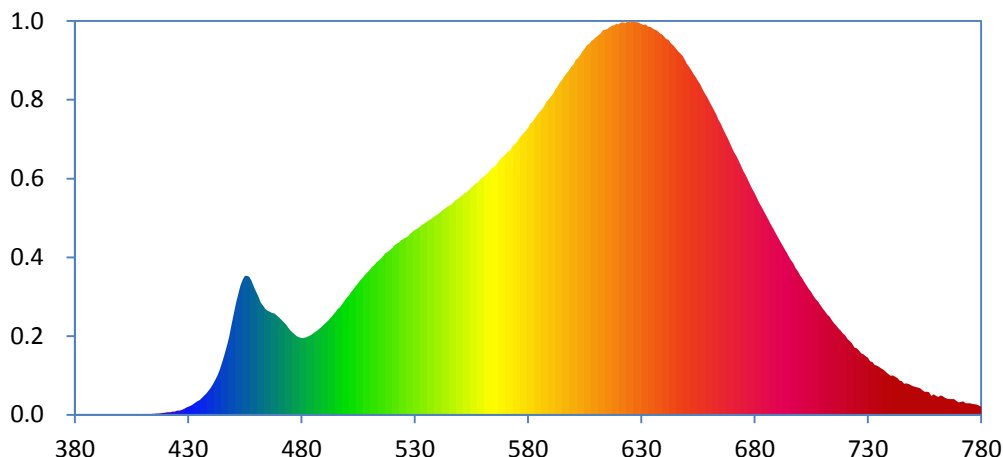
### Color Rendering Index

Ra			
93.5			
R1	R2	R3	R4
94	97	100	93
R5	R6	R7	R8
94	98	91	82
R9	R10	R11	R12
62	93	95	83
R13	R14	R15	
95	99	89	





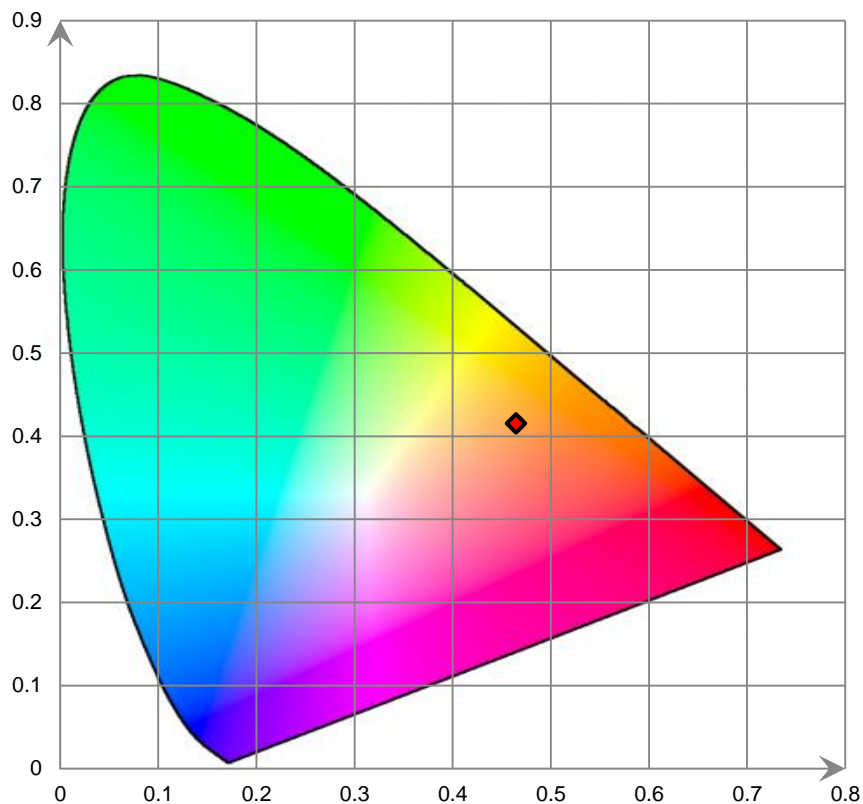
### Relative Spectral Power Distribution



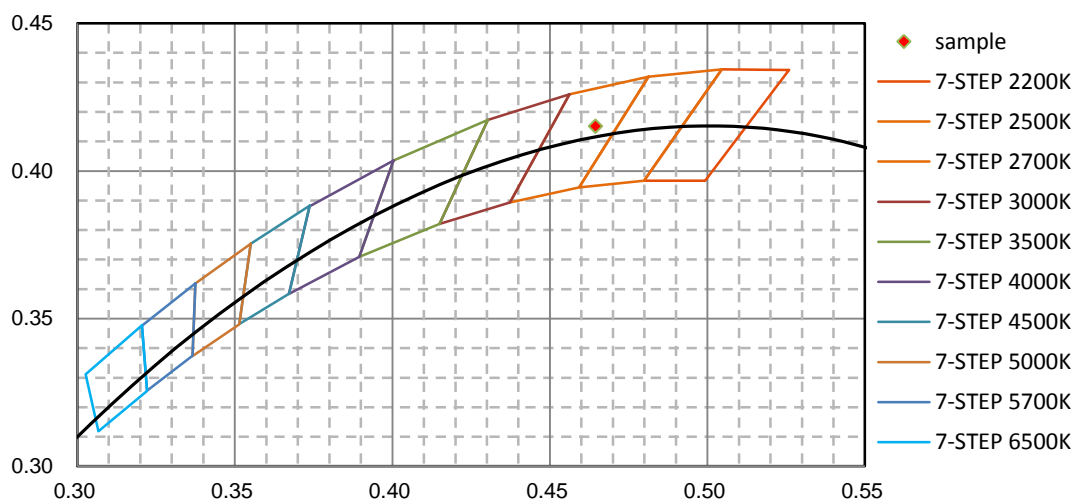
nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
380	3.710E-02	421	2.670E-01	462	1.231E+01	503	1.380E+01	544	2.274E+01
381	8.010E-02	422	2.855E-01	463	1.198E+01	504	1.415E+01	545	2.292E+01
382	4.540E-02	423	3.313E-01	464	1.161E+01	505	1.444E+01	546	2.302E+01
383	1.520E-02	424	3.534E-01	465	1.141E+01	506	1.479E+01	547	2.330E+01
384	7.270E-02	425	4.435E-01	466	1.131E+01	507	1.504E+01	548	2.356E+01
385	7.350E-02	426	4.628E-01	467	1.116E+01	508	1.536E+01	549	2.369E+01
386	4.600E-03	427	5.279E-01	468	1.113E+01	509	1.564E+01	550	2.392E+01
387	3.450E-02	428	6.396E-01	469	1.093E+01	510	1.588E+01	551	2.410E+01
388	2.460E-02	429	7.570E-01	470	1.070E+01	511	1.622E+01	552	2.432E+01
389	1.640E-02	430	8.599E-01	471	1.047E+01	512	1.641E+01	553	2.442E+01
390	6.780E-02	431	9.758E-01	472	1.018E+01	513	1.673E+01	554	2.468E+01
391	2.690E-02	432	1.139E+00	473	9.930E+00	514	1.693E+01	555	2.493E+01
392	3.000E-03	433	1.281E+00	474	9.597E+00	515	1.713E+01	556	2.517E+01
393	1.600E-02	434	1.457E+00	475	9.270E+00	516	1.743E+01	557	2.539E+01
394	1.380E-02	435	1.627E+00	476	9.028E+00	517	1.774E+01	558	2.551E+01
395	6.310E-02	436	1.846E+00	477	8.820E+00	518	1.789E+01	559	2.592E+01
396	1.960E-02	437	2.096E+00	478	8.589E+00	519	1.805E+01	560	2.606E+01
397	1.470E-02	438	2.346E+00	479	8.498E+00	520	1.831E+01	561	2.630E+01
398	1.120E-02	439	2.648E+00	480	8.429E+00	521	1.858E+01	562	2.648E+01
399	1.800E-03	440	2.979E+00	481	8.431E+00	522	1.880E+01	563	2.679E+01
400	1.000E-04	441	3.392E+00	482	8.506E+00	523	1.892E+01	564	2.703E+01
401	2.320E-02	442	3.864E+00	483	8.597E+00	524	1.915E+01	565	2.722E+01
402	3.770E-02	443	4.352E+00	484	8.755E+00	525	1.932E+01	566	2.746E+01
403	1.540E-02	444	4.972E+00	485	8.901E+00	526	1.944E+01	567	2.782E+01
404	2.480E-02	445	5.745E+00	486	9.104E+00	527	1.959E+01	568	2.811E+01
405	4.310E-02	446	6.566E+00	487	9.280E+00	528	1.986E+01	569	2.832E+01
406	1.130E-02	447	7.566E+00	488	9.488E+00	529	2.010E+01	570	2.855E+01
407	9.810E-02	448	8.556E+00	489	9.701E+00	530	2.025E+01	571	2.886E+01
408	2.800E-02	449	9.813E+00	490	9.946E+00	531	2.039E+01	572	2.902E+01
409	5.620E-02	450	1.102E+01	491	1.015E+01	532	2.056E+01	573	2.945E+01
410	7.400E-02	451	1.223E+01	492	1.040E+01	533	2.078E+01	574	2.966E+01
411	7.810E-02	452	1.321E+01	493	1.066E+01	534	2.097E+01	575	2.993E+01
412	6.730E-02	453	1.416E+01	494	1.096E+01	535	2.114E+01	576	3.035E+01
413	5.260E-02	454	1.482E+01	495	1.127E+01	536	2.130E+01	577	3.061E+01
414	9.610E-02	455	1.525E+01	496	1.159E+01	537	2.145E+01	578	3.091E+01
415	9.490E-02	456	1.522E+01	497	1.182E+01	538	2.168E+01	579	3.119E+01
416	1.201E-01	457	1.514E+01	498	1.219E+01	539	2.183E+01	580	3.145E+01
417	1.485E-01	458	1.467E+01	499	1.254E+01	540	2.198E+01	581	3.196E+01
418	1.671E-01	459	1.396E+01	500	1.286E+01	541	2.217E+01	582	3.216E+01
419	2.059E-01	460	1.344E+01	501	1.314E+01	542	2.239E+01	583	3.252E+01
420	2.465E-01	461	1.292E+01	502	1.353E+01	543	2.256E+01	584	3.293E+01

nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
585	3.322E+01	626	4.317E+01	667	3.089E+01	708	1.244E+01	749	3.225E+00
586	3.351E+01	627	4.308E+01	668	3.040E+01	709	1.200E+01	750	3.110E+00
587	3.387E+01	628	4.308E+01	669	2.988E+01	710	1.166E+01	751	3.054E+00
588	3.433E+01	629	4.301E+01	670	2.932E+01	711	1.134E+01	752	2.993E+00
589	3.460E+01	630	4.287E+01	671	2.878E+01	712	1.100E+01	753	2.899E+00
590	3.489E+01	631	4.275E+01	672	2.832E+01	713	1.076E+01	754	2.707E+00
591	3.523E+01	632	4.285E+01	673	2.782E+01	714	1.040E+01	755	2.526E+00
592	3.569E+01	633	4.258E+01	674	2.728E+01	715	1.004E+01	756	2.519E+00
593	3.601E+01	634	4.255E+01	675	2.674E+01	716	9.792E+00	757	2.495E+00
594	3.644E+01	635	4.238E+01	676	2.629E+01	717	9.488E+00	758	2.070E+00
595	3.672E+01	636	4.225E+01	677	2.579E+01	718	9.223E+00	759	2.258E+00
596	3.715E+01	637	4.213E+01	678	2.524E+01	719	8.902E+00	760	2.081E+00
597	3.752E+01	638	4.190E+01	679	2.474E+01	720	8.701E+00	761	1.954E+00
598	3.780E+01	639	4.174E+01	680	2.435E+01	721	8.328E+00	762	2.086E+00
599	3.821E+01	640	4.149E+01	681	2.381E+01	722	8.081E+00	763	2.027E+00
600	3.846E+01	641	4.122E+01	682	2.327E+01	723	7.780E+00	764	1.864E+00
601	3.893E+01	642	4.114E+01	683	2.284E+01	724	7.379E+00	765	1.741E+00
602	3.917E+01	643	4.078E+01	684	2.234E+01	725	7.295E+00	766	1.703E+00
603	3.947E+01	644	4.055E+01	685	2.187E+01	726	7.043E+00	767	1.705E+00
604	3.990E+01	645	4.029E+01	686	2.142E+01	727	6.753E+00	768	1.732E+00
605	4.016E+01	646	3.997E+01	687	2.092E+01	728	6.636E+00	769	1.533E+00
606	4.056E+01	647	3.967E+01	688	2.050E+01	729	6.434E+00	770	1.369E+00
607	4.069E+01	648	3.942E+01	689	2.005E+01	730	6.234E+00	771	1.408E+00
608	4.102E+01	649	3.902E+01	690	1.960E+01	731	5.863E+00	772	1.484E+00
609	4.121E+01	650	3.852E+01	691	1.916E+01	732	5.779E+00	773	1.273E+00
610	4.146E+01	651	3.819E+01	692	1.872E+01	733	5.472E+00	774	1.254E+00
611	4.166E+01	652	3.783E+01	693	1.829E+01	734	5.358E+00	775	1.254E+00
612	4.187E+01	653	3.741E+01	694	1.786E+01	735	5.228E+00	776	1.184E+00
613	4.221E+01	654	3.703E+01	695	1.740E+01	736	5.049E+00	777	1.169E+00
614	4.225E+01	655	3.663E+01	696	1.698E+01	737	4.915E+00	778	1.106E+00
615	4.236E+01	656	3.628E+01	697	1.662E+01	738	4.660E+00	779	1.008E+00
616	4.251E+01	657	3.575E+01	698	1.609E+01	739	4.463E+00	780	8.692E-01
617	4.271E+01	658	3.527E+01	699	1.575E+01	740	4.280E+00		
618	4.275E+01	659	3.482E+01	700	1.529E+01	741	4.311E+00		
619	4.292E+01	660	3.435E+01	701	1.494E+01	742	4.162E+00		
620	4.284E+01	661	3.388E+01	702	1.452E+01	743	4.044E+00		
621	4.304E+01	662	3.343E+01	703	1.415E+01	744	3.750E+00		
622	4.307E+01	663	3.298E+01	704	1.376E+01	745	3.693E+00		
623	4.297E+01	664	3.237E+01	705	1.343E+01	746	3.415E+00		
624	4.322E+01	665	3.194E+01	706	1.304E+01	747	3.436E+00		
625	4.306E+01	666	3.138E+01	707	1.266E+01	748	3.369E+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**

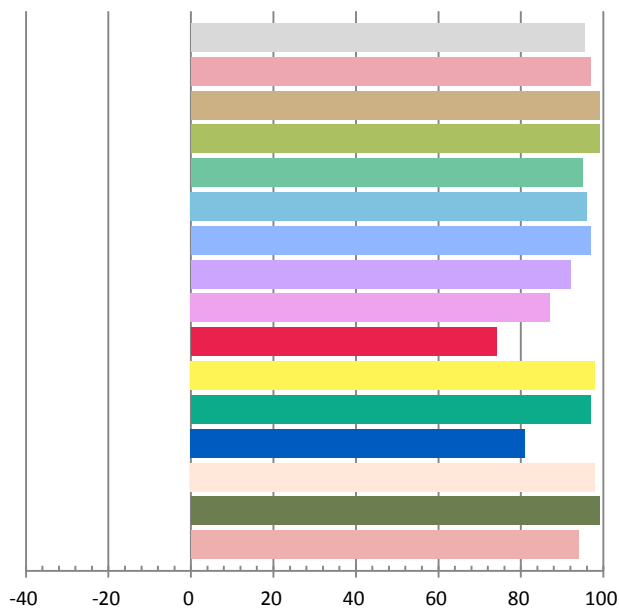
**Photometric and Electrical Measurement Result**

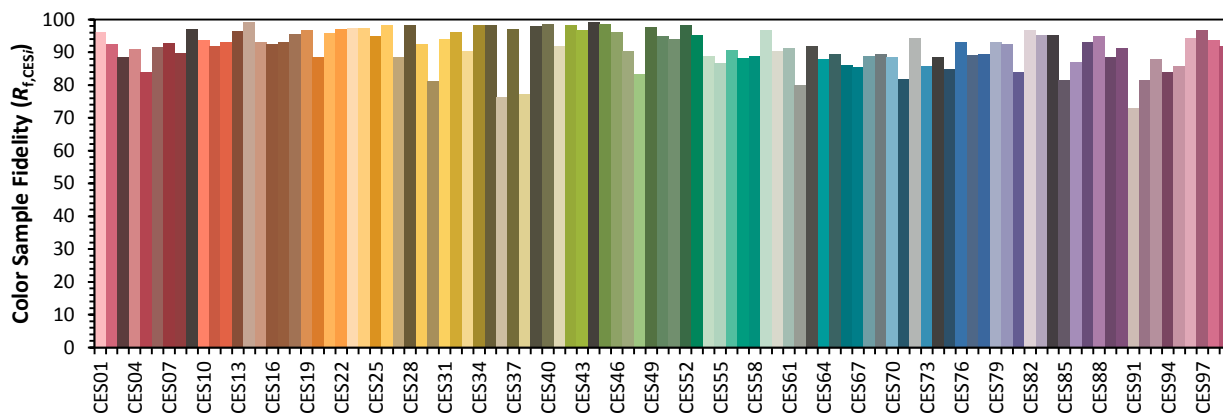
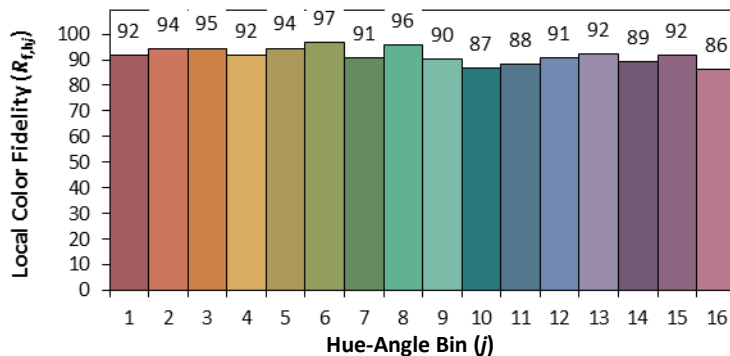
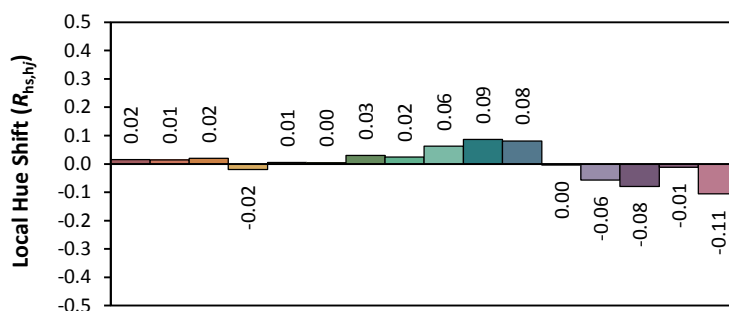
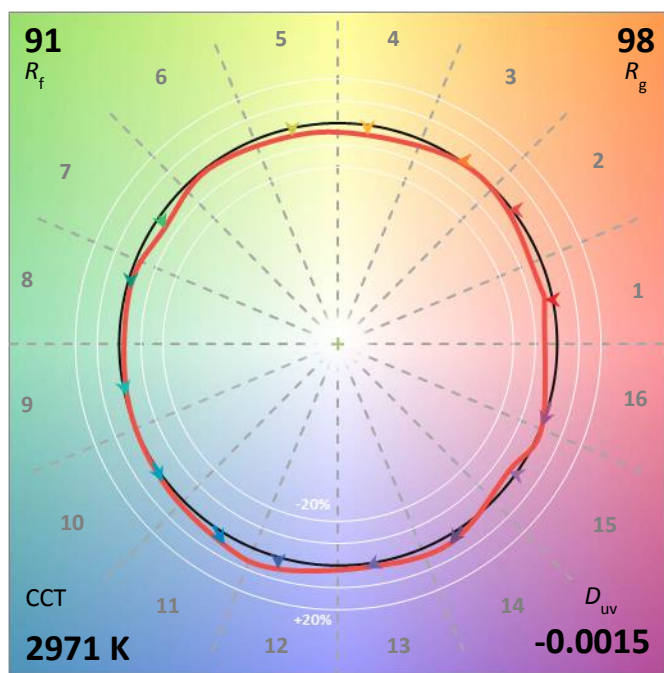
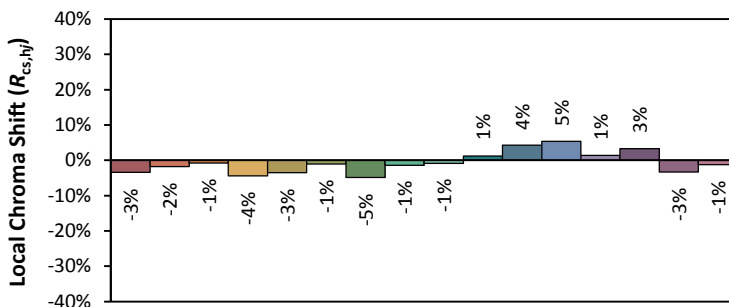
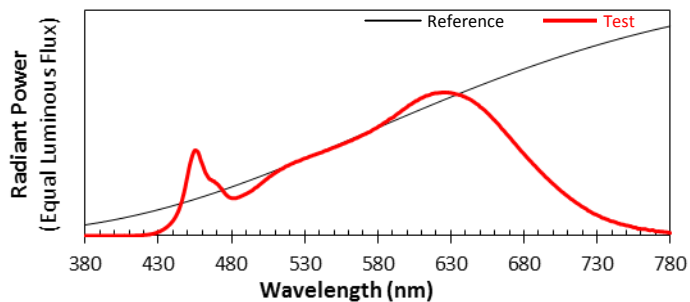
Voltage(V)	Frequency(Hz)	Current(A)	Power (W)	Power Factor	Luminous Flux(lm)	Efficacy(lm/W)
120.0	60	0.1895	22.61	0.9943	2065.07	91.32

Radiant Flux (W)	CCT (K)	Duv	x	y	u'	v'
7.383	2971	-0.00145	0.4369	0.4004	0.2521	0.5199

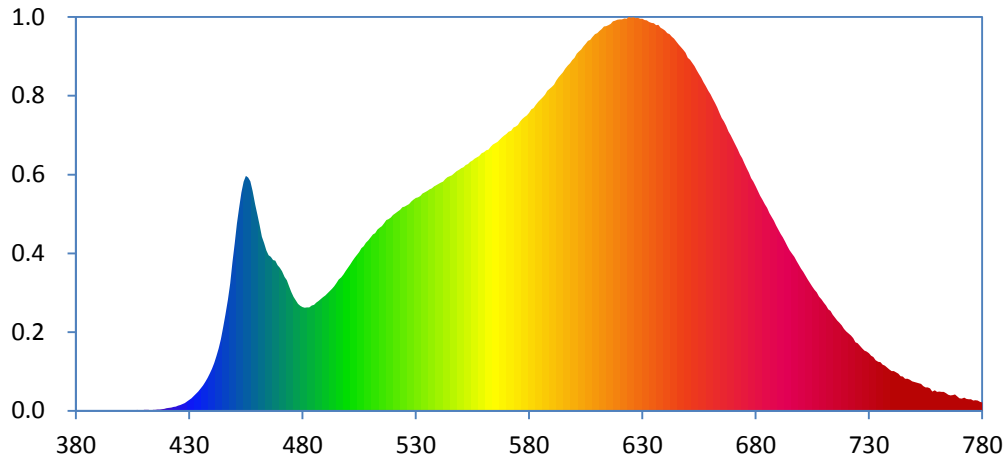
**Color Rendering Index**

<b>Ra</b>			
<b>95.4</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	97	92	87
<b>R9</b>	<b>R10</b>	<b>R11</b>	<b>R12</b>
74	98	97	81
<b>R13</b>	<b>R14</b>	<b>R15</b>	
98	99	94	





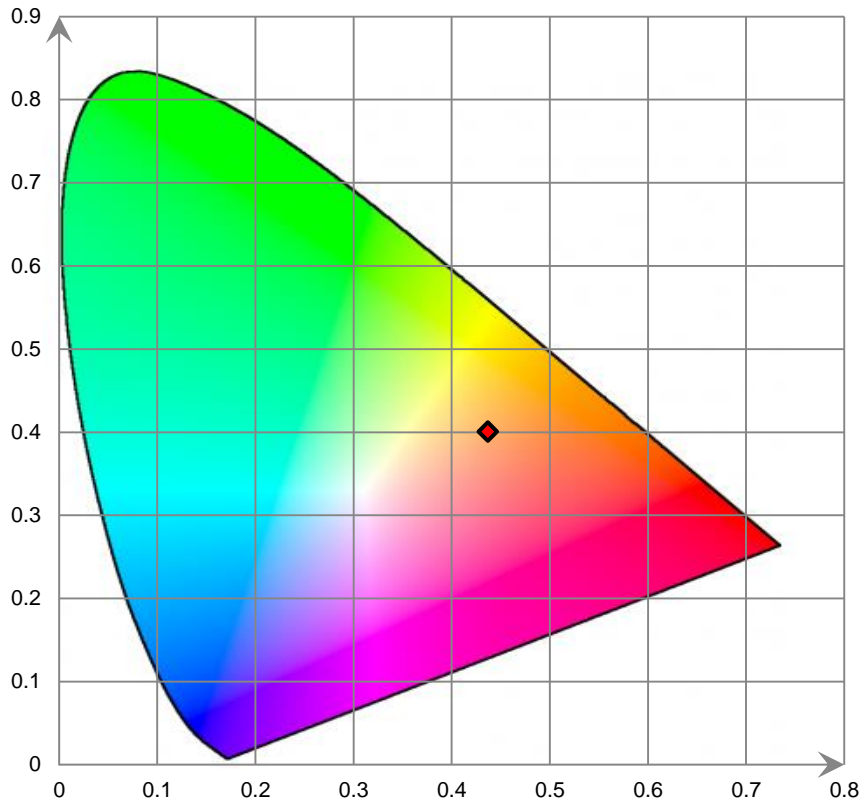
### Relative Spectral Power Distribution



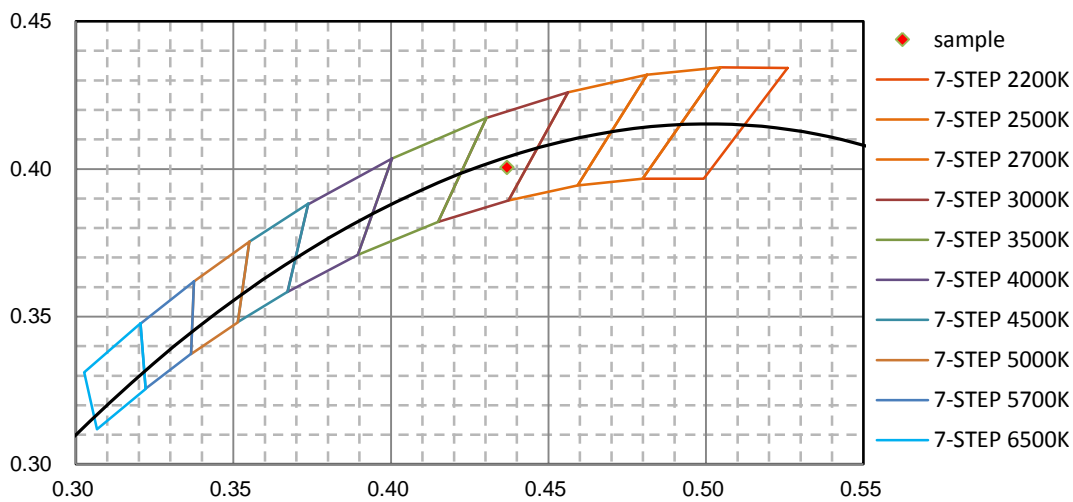
nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
380	5.400E-02	421	3.139E-01	462	1.871E+01	503	1.643E+01	544	2.508E+01
381	5.420E-02	422	3.393E-01	463	1.801E+01	504	1.676E+01	545	2.519E+01
382	5.680E-02	423	4.098E-01	464	1.723E+01	505	1.706E+01	546	2.529E+01
383	8.500E-03	424	4.470E-01	465	1.672E+01	506	1.748E+01	547	2.556E+01
384	7.520E-02	425	5.542E-01	466	1.653E+01	507	1.768E+01	548	2.574E+01
385	4.380E-02	426	6.048E-01	467	1.621E+01	508	1.805E+01	549	2.589E+01
386	1.890E-02	427	7.162E-01	468	1.611E+01	509	1.832E+01	550	2.607E+01
387	4.730E-02	428	8.383E-01	469	1.565E+01	510	1.862E+01	551	2.615E+01
388	1.860E-02	429	1.007E+00	470	1.538E+01	511	1.893E+01	552	2.640E+01
389	3.810E-02	430	1.169E+00	471	1.498E+01	512	1.909E+01	553	2.650E+01
390	5.030E-02	431	1.335E+00	472	1.437E+01	513	1.947E+01	554	2.674E+01
391	2.030E-02	432	1.589E+00	473	1.401E+01	514	1.966E+01	555	2.687E+01
392	9.900E-03	433	1.807E+00	474	1.336E+01	515	1.983E+01	556	2.710E+01
393	2.630E-02	434	2.060E+00	475	1.276E+01	516	2.014E+01	557	2.724E+01
394	1.810E-02	435	2.385E+00	476	1.222E+01	517	2.049E+01	558	2.737E+01
395	6.570E-02	436	2.710E+00	477	1.187E+01	518	2.059E+01	559	2.766E+01
396	8.600E-03	437	3.088E+00	478	1.147E+01	519	2.076E+01	560	2.779E+01
397	9.000E-03	438	3.511E+00	479	1.129E+01	520	2.105E+01	561	2.800E+01
398	1.300E-02	439	3.980E+00	480	1.112E+01	521	2.122E+01	562	2.806E+01
399	2.010E-02	440	4.495E+00	481	1.107E+01	522	2.140E+01	563	2.834E+01
400	6.000E-04	441	5.125E+00	482	1.108E+01	523	2.160E+01	564	2.859E+01
401	2.810E-02	442	5.871E+00	483	1.108E+01	524	2.186E+01	565	2.875E+01
402	3.550E-02	443	6.700E+00	484	1.130E+01	525	2.192E+01	566	2.886E+01
403	4.150E-02	444	7.694E+00	485	1.138E+01	526	2.207E+01	567	2.911E+01
404	4.010E-02	445	8.986E+00	486	1.161E+01	527	2.220E+01	568	2.937E+01
405	5.010E-02	446	1.030E+01	487	1.179E+01	528	2.248E+01	569	2.957E+01
406	7.500E-03	447	1.196E+01	488	1.198E+01	529	2.268E+01	570	2.974E+01
407	9.580E-02	448	1.369E+01	489	1.222E+01	530	2.286E+01	571	2.997E+01
408	2.250E-02	449	1.595E+01	490	1.238E+01	531	2.292E+01	572	3.007E+01
409	4.660E-02	450	1.795E+01	491	1.261E+01	532	2.307E+01	573	3.043E+01
410	1.005E-01	451	2.010E+01	492	1.286E+01	533	2.333E+01	574	3.053E+01
411	8.370E-02	452	2.183E+01	493	1.311E+01	534	2.348E+01	575	3.071E+01
412	8.350E-02	453	2.346E+01	494	1.336E+01	535	2.362E+01	576	3.106E+01
413	3.640E-02	454	2.461E+01	495	1.371E+01	536	2.380E+01	577	3.134E+01
414	9.610E-02	455	2.524E+01	496	1.411E+01	537	2.389E+01	578	3.155E+01
415	1.150E-01	456	2.506E+01	497	1.432E+01	538	2.411E+01	579	3.175E+01
416	1.247E-01	457	2.465E+01	498	1.463E+01	539	2.423E+01	580	3.201E+01
417	1.447E-01	458	2.362E+01	499	1.503E+01	540	2.436E+01	581	3.239E+01
418	1.779E-01	459	2.218E+01	500	1.536E+01	541	2.452E+01	582	3.254E+01
419	2.129E-01	460	2.107E+01	501	1.571E+01	542	2.463E+01	583	3.285E+01
420	2.773E-01	461	1.993E+01	502	1.608E+01	543	2.489E+01	584	3.322E+01

nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
585	3.346E+01	626	4.228E+01	667	3.059E+01	708	1.226E+01	749	3.168E+00
586	3.368E+01	627	4.218E+01	668	3.003E+01	709	1.198E+01	750	3.096E+00
587	3.396E+01	628	4.223E+01	669	2.960E+01	710	1.162E+01	751	3.036E+00
588	3.439E+01	629	4.212E+01	670	2.911E+01	711	1.130E+01	752	2.953E+00
589	3.460E+01	630	4.211E+01	671	2.863E+01	712	1.089E+01	753	2.867E+00
590	3.480E+01	631	4.198E+01	672	2.807E+01	713	1.073E+01	754	2.648E+00
591	3.503E+01	632	4.196E+01	673	2.754E+01	714	1.032E+01	755	2.496E+00
592	3.547E+01	633	4.179E+01	674	2.711E+01	715	1.001E+01	756	2.510E+00
593	3.582E+01	634	4.166E+01	675	2.657E+01	716	9.679E+00	757	2.406E+00
594	3.610E+01	635	4.163E+01	676	2.605E+01	717	9.441E+00	758	2.053E+00
595	3.637E+01	636	4.142E+01	677	2.556E+01	718	9.163E+00	759	2.196E+00
596	3.675E+01	637	4.144E+01	678	2.499E+01	719	8.790E+00	760	2.035E+00
597	3.709E+01	638	4.114E+01	679	2.461E+01	720	8.539E+00	761	2.043E+00
598	3.732E+01	639	4.103E+01	680	2.414E+01	721	8.312E+00	762	2.029E+00
599	3.767E+01	640	4.086E+01	681	2.362E+01	722	8.070E+00	763	2.014E+00
600	3.793E+01	641	4.055E+01	682	2.311E+01	723	7.804E+00	764	1.874E+00
601	3.837E+01	642	4.045E+01	683	2.267E+01	724	7.364E+00	765	1.728E+00
602	3.860E+01	643	4.021E+01	684	2.218E+01	725	7.245E+00	766	1.658E+00
603	3.881E+01	644	3.998E+01	685	2.178E+01	726	6.967E+00	767	1.691E+00
604	3.916E+01	645	3.966E+01	686	2.126E+01	727	6.699E+00	768	1.760E+00
605	3.942E+01	646	3.936E+01	687	2.084E+01	728	6.468E+00	769	1.551E+00
606	3.974E+01	647	3.905E+01	688	2.041E+01	729	6.354E+00	770	1.326E+00
607	3.985E+01	648	3.878E+01	689	1.991E+01	730	6.167E+00	771	1.315E+00
608	4.016E+01	649	3.848E+01	690	1.947E+01	731	5.919E+00	772	1.415E+00
609	4.047E+01	650	3.792E+01	691	1.900E+01	732	5.775E+00	773	1.263E+00
610	4.057E+01	651	3.770E+01	692	1.862E+01	733	5.432E+00	774	1.233E+00
611	4.080E+01	652	3.736E+01	693	1.819E+01	734	5.265E+00	775	1.237E+00
612	4.100E+01	653	3.703E+01	694	1.770E+01	735	5.219E+00	776	1.113E+00
613	4.128E+01	654	3.658E+01	695	1.725E+01	736	4.964E+00	777	1.145E+00
614	4.131E+01	655	3.615E+01	696	1.692E+01	737	4.849E+00	778	1.083E+00
615	4.144E+01	656	3.580E+01	697	1.653E+01	738	4.634E+00	779	9.597E-01
616	4.158E+01	657	3.530E+01	698	1.607E+01	739	4.423E+00	780	8.958E-01
617	4.185E+01	658	3.488E+01	699	1.567E+01	740	4.266E+00		
618	4.189E+01	659	3.436E+01	700	1.526E+01	741	4.269E+00		
619	4.202E+01	660	3.399E+01	701	1.492E+01	742	4.134E+00		
620	4.205E+01	661	3.350E+01	702	1.451E+01	743	3.988E+00		
621	4.206E+01	662	3.308E+01	703	1.408E+01	744	3.718E+00		
622	4.215E+01	663	3.259E+01	704	1.372E+01	745	3.670E+00		
623	4.211E+01	664	3.200E+01	705	1.335E+01	746	3.422E+00		
624	4.231E+01	665	3.146E+01	706	1.298E+01	747	3.422E+00		
625	4.221E+01	666	3.109E+01	707	1.271E+01	748	3.333E+00		

CIE 1931xy Chromaticity Diagram



7-StepChromaticity Quadrangles



**Control Setting: 3500K**

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

Test orientation: **Downward**

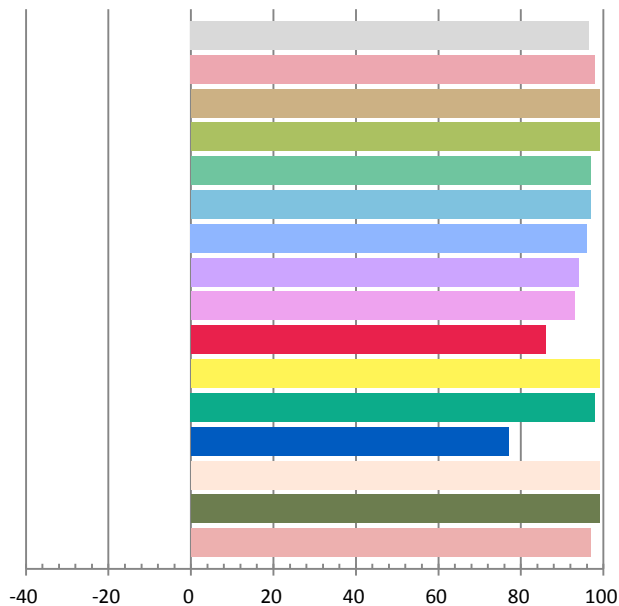
**Photometric and Electrical Measurement Result**

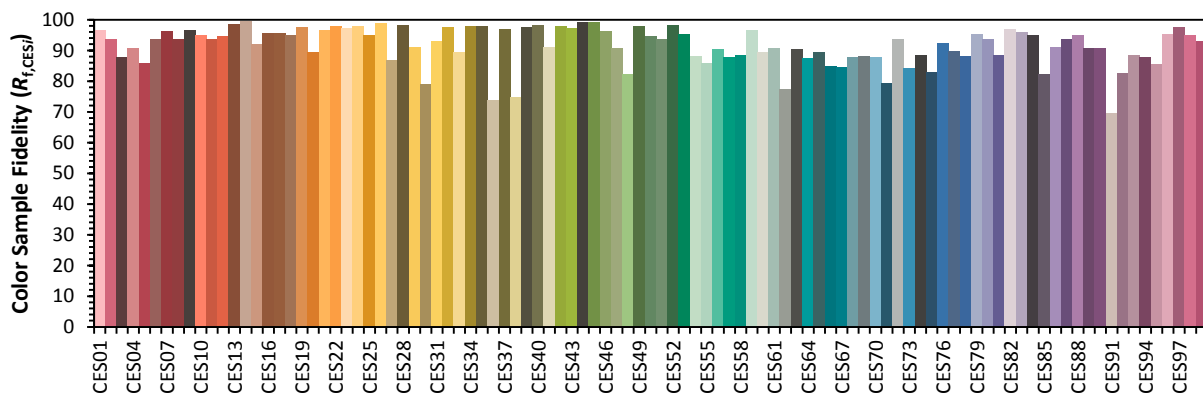
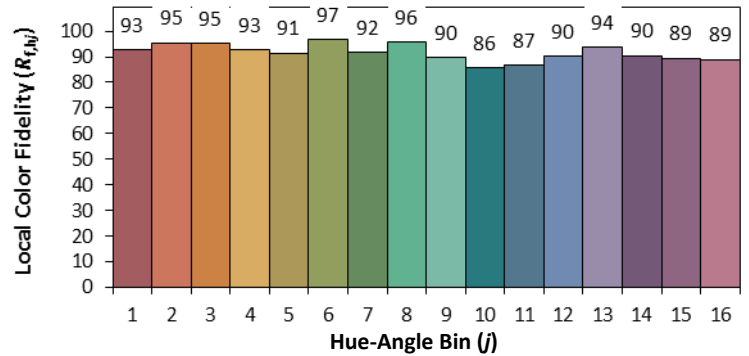
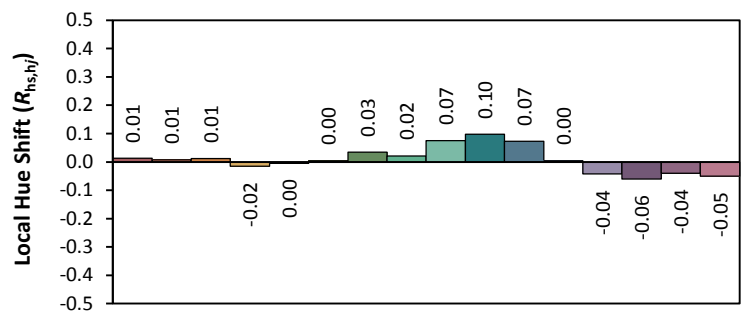
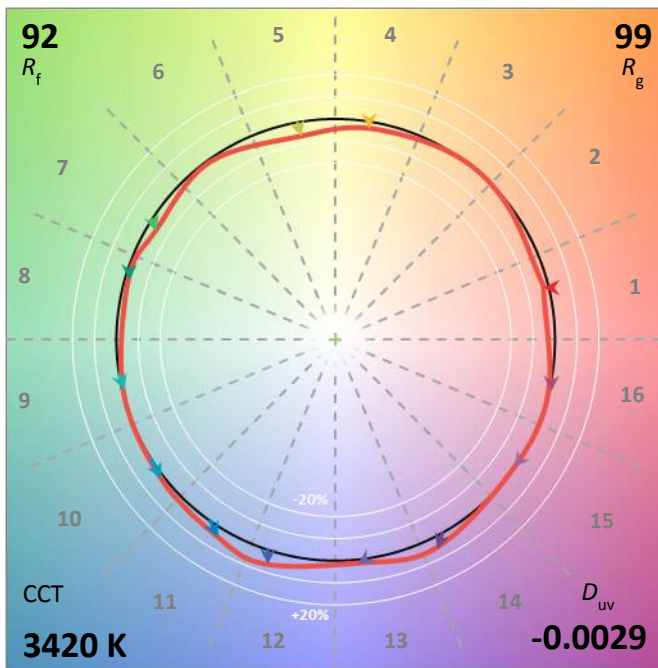
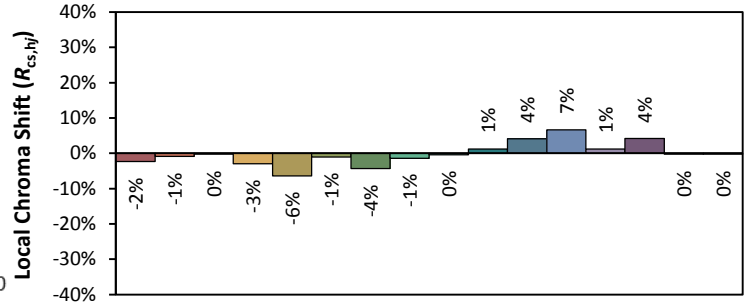
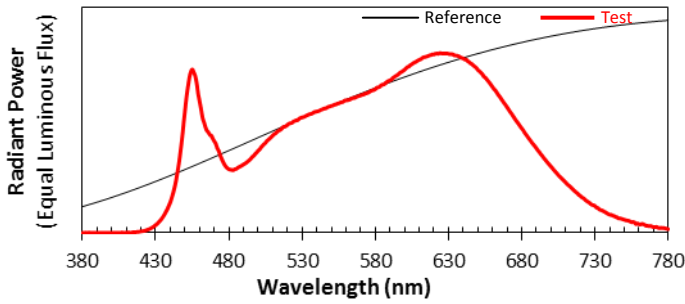
Voltage(V)	Frequency(Hz)	Current(A)	Power (W)	Power Factor	Luminous Flux(lm)	Efficacy(lm/W)
120.0	60	0.1883	22.46	0.994	2155.51	95.98

Radiant Flux (W)	CCT (K)	Duv	x	y	u'	v'
7.735	3420	-0.00287	0.4067	0.3849	0.2391	0.5090

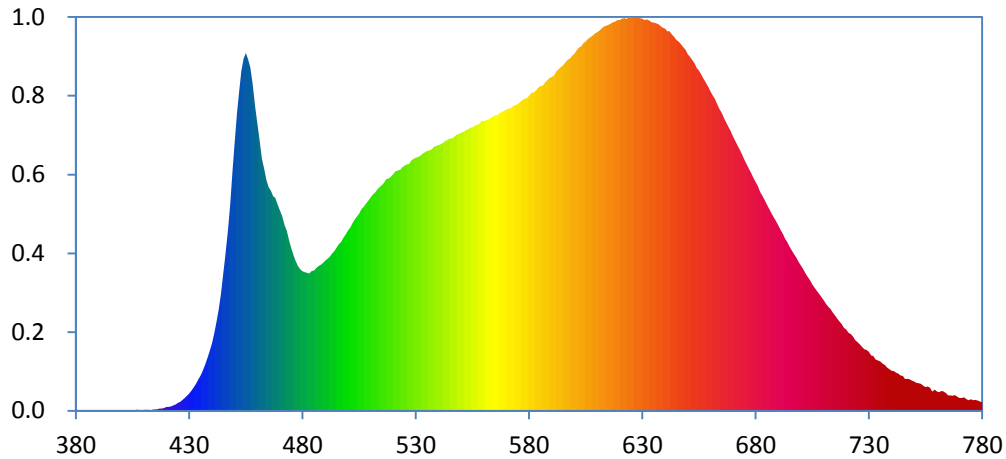
**Color Rendering Index**

<b>Ra</b>			
<b>96.5</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	96	94	93
<b>R9</b>	<b>R10</b>	<b>R11</b>	<b>R12</b>
86	99	98	77
<b>R13</b>	<b>R14</b>	<b>R15</b>	
99	99	97	





### Relative Spectral Power Distribution

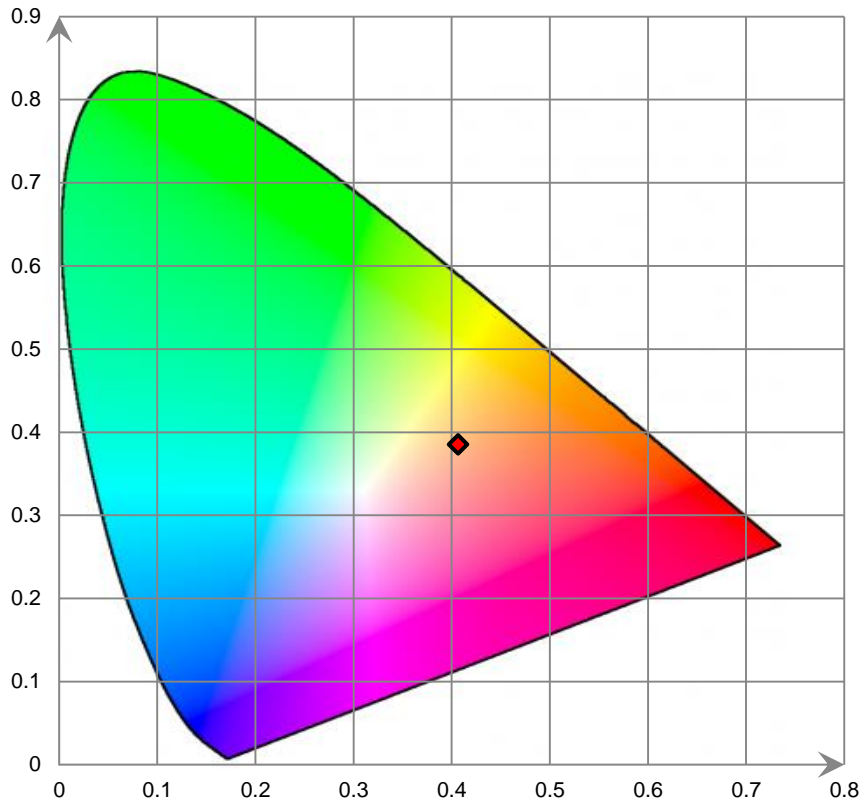


nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
380	3.560E-02	421	4.028E-01	462	2.574E+01	503	1.950E+01	544	2.765E+01
381	3.350E-02	422	4.515E-01	463	2.474E+01	504	1.985E+01	545	2.781E+01
382	7.530E-02	423	5.508E-01	464	2.361E+01	505	2.013E+01	546	2.781E+01
383	1.090E-02	424	6.645E-01	465	2.285E+01	506	2.058E+01	547	2.802E+01
384	6.810E-02	425	8.006E-01	466	2.249E+01	507	2.083E+01	548	2.821E+01
385	6.100E-02	426	9.072E-01	467	2.192E+01	508	2.116E+01	549	2.827E+01
386	6.300E-03	427	1.094E+00	468	2.172E+01	509	2.146E+01	550	2.840E+01
387	5.120E-02	428	1.291E+00	469	2.108E+01	510	2.179E+01	551	2.847E+01
388	3.940E-02	429	1.526E+00	470	2.049E+01	511	2.208E+01	552	2.867E+01
389	2.110E-02	430	1.774E+00	471	1.993E+01	512	2.230E+01	553	2.871E+01
390	5.780E-02	431	2.055E+00	472	1.895E+01	513	2.261E+01	554	2.888E+01
391	2.540E-02	432	2.389E+00	473	1.837E+01	514	2.286E+01	555	2.897E+01
392	6.600E-03	433	2.740E+00	474	1.741E+01	515	2.302E+01	556	2.913E+01
393	1.580E-02	434	3.154E+00	475	1.658E+01	516	2.329E+01	557	2.922E+01
394	1.960E-02	435	3.617E+00	476	1.587E+01	517	2.367E+01	558	2.929E+01
395	4.910E-02	436	4.133E+00	477	1.525E+01	518	2.371E+01	559	2.960E+01
396	9.700E-03	437	4.721E+00	478	1.476E+01	519	2.390E+01	560	2.958E+01
397	1.320E-02	438	5.375E+00	479	1.444E+01	520	2.414E+01	561	2.971E+01
398	2.340E-02	439	6.113E+00	480	1.423E+01	521	2.443E+01	562	2.973E+01
399	4.700E-03	440	6.871E+00	481	1.416E+01	522	2.454E+01	563	2.990E+01
400	1.000E-04	441	7.876E+00	482	1.409E+01	523	2.459E+01	564	3.008E+01
401	2.360E-02	442	9.040E+00	483	1.402E+01	524	2.489E+01	565	3.017E+01
402	2.940E-02	443	1.032E+01	484	1.427E+01	525	2.504E+01	566	3.020E+01
403	4.220E-02	444	1.189E+01	485	1.431E+01	526	2.517E+01	567	3.041E+01
404	3.100E-02	445	1.391E+01	486	1.457E+01	527	2.520E+01	568	3.052E+01
405	3.790E-02	446	1.591E+01	487	1.476E+01	528	2.556E+01	569	3.062E+01
406	1.140E-02	447	1.843E+01	488	1.490E+01	529	2.572E+01	570	3.075E+01
407	1.254E-01	448	2.108E+01	489	1.511E+01	530	2.584E+01	571	3.087E+01
408	3.590E-02	449	2.439E+01	490	1.532E+01	531	2.590E+01	572	3.093E+01
409	6.950E-02	450	2.738E+01	491	1.552E+01	532	2.604E+01	573	3.116E+01
410	1.028E-01	451	3.034E+01	492	1.572E+01	533	2.625E+01	574	3.121E+01
411	8.800E-02	452	3.262E+01	493	1.603E+01	534	2.640E+01	575	3.133E+01
412	8.100E-02	453	3.475E+01	494	1.627E+01	535	2.652E+01	576	3.154E+01
413	5.190E-02	454	3.599E+01	495	1.662E+01	536	2.659E+01	577	3.174E+01
414	1.339E-01	455	3.654E+01	496	1.701E+01	537	2.672E+01	578	3.186E+01
415	1.317E-01	456	3.587E+01	497	1.726E+01	538	2.697E+01	579	3.194E+01
416	1.622E-01	457	3.505E+01	498	1.768E+01	539	2.707E+01	580	3.215E+01
417	2.197E-01	458	3.342E+01	499	1.799E+01	540	2.714E+01	581	3.247E+01
418	2.342E-01	459	3.104E+01	500	1.839E+01	541	2.722E+01	582	3.253E+01
419	2.991E-01	460	2.930E+01	501	1.868E+01	542	2.734E+01	583	3.267E+01
420	3.742E-01	461	2.760E+01	502	1.916E+01	543	2.754E+01	584	3.301E+01

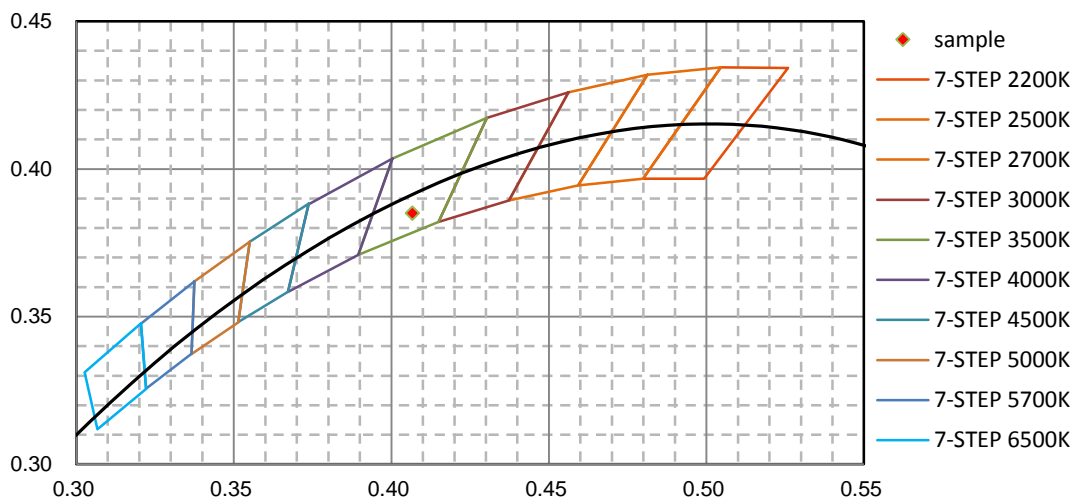


nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
585	3.316E+01	626	4.012E+01	667	2.945E+01	708	1.196E+01	749	3.065E+00
586	3.321E+01	627	4.010E+01	668	2.898E+01	709	1.160E+01	750	2.963E+00
587	3.353E+01	628	4.013E+01	669	2.857E+01	710	1.126E+01	751	2.850E+00
588	3.376E+01	629	4.011E+01	670	2.805E+01	711	1.090E+01	752	2.796E+00
589	3.400E+01	630	4.005E+01	671	2.759E+01	712	1.061E+01	753	2.741E+00
590	3.409E+01	631	3.992E+01	672	2.706E+01	713	1.039E+01	754	2.556E+00
591	3.426E+01	632	3.998E+01	673	2.664E+01	714	1.003E+01	755	2.399E+00
592	3.463E+01	633	3.988E+01	674	2.613E+01	715	9.729E+00	756	2.471E+00
593	3.486E+01	634	3.967E+01	675	2.562E+01	716	9.399E+00	757	2.364E+00
594	3.511E+01	635	3.966E+01	676	2.517E+01	717	9.119E+00	758	1.960E+00
595	3.526E+01	636	3.959E+01	677	2.471E+01	718	8.852E+00	759	2.147E+00
596	3.557E+01	637	3.948E+01	678	2.427E+01	719	8.476E+00	760	1.947E+00
597	3.586E+01	638	3.927E+01	679	2.380E+01	720	8.298E+00	761	1.897E+00
598	3.599E+01	639	3.912E+01	680	2.337E+01	721	7.957E+00	762	2.027E+00
599	3.627E+01	640	3.901E+01	681	2.293E+01	722	7.800E+00	763	1.959E+00
600	3.647E+01	641	3.875E+01	682	2.237E+01	723	7.535E+00	764	1.797E+00
601	3.682E+01	642	3.876E+01	683	2.195E+01	724	7.199E+00	765	1.575E+00
602	3.711E+01	643	3.842E+01	684	2.146E+01	725	6.987E+00	766	1.582E+00
603	3.721E+01	644	3.820E+01	685	2.102E+01	726	6.776E+00	767	1.519E+00
604	3.754E+01	645	3.790E+01	686	2.060E+01	727	6.504E+00	768	1.590E+00
605	3.771E+01	646	3.773E+01	687	2.014E+01	728	6.261E+00	769	1.433E+00
606	3.796E+01	647	3.741E+01	688	1.973E+01	729	6.210E+00	770	1.302E+00
607	3.813E+01	648	3.714E+01	689	1.935E+01	730	6.018E+00	771	1.301E+00
608	3.830E+01	649	3.688E+01	690	1.891E+01	731	5.655E+00	772	1.384E+00
609	3.852E+01	650	3.642E+01	691	1.845E+01	732	5.583E+00	773	1.168E+00
610	3.868E+01	651	3.614E+01	692	1.806E+01	733	5.229E+00	774	1.085E+00
611	3.883E+01	652	3.583E+01	693	1.758E+01	734	5.119E+00	775	1.166E+00
612	3.907E+01	653	3.550E+01	694	1.722E+01	735	5.024E+00	776	1.080E+00
613	3.927E+01	654	3.501E+01	695	1.675E+01	736	4.810E+00	777	1.107E+00
614	3.931E+01	655	3.474E+01	696	1.636E+01	737	4.664E+00	778	1.039E+00
615	3.941E+01	656	3.436E+01	697	1.595E+01	738	4.426E+00	779	9.485E-01
616	3.954E+01	657	3.393E+01	698	1.557E+01	739	4.247E+00	780	8.501E-01
617	3.968E+01	658	3.354E+01	699	1.518E+01	740	4.091E+00		
618	3.975E+01	659	3.308E+01	700	1.481E+01	741	4.056E+00		
619	3.991E+01	660	3.262E+01	701	1.444E+01	742	3.885E+00		
620	3.989E+01	661	3.219E+01	702	1.402E+01	743	3.791E+00		
621	4.005E+01	662	3.183E+01	703	1.366E+01	744	3.584E+00		
622	4.009E+01	663	3.132E+01	704	1.332E+01	745	3.545E+00		
623	4.002E+01	664	3.081E+01	705	1.290E+01	746	3.241E+00		
624	4.022E+01	665	3.044E+01	706	1.257E+01	747	3.266E+00		
625	4.014E+01	666	2.991E+01	707	1.224E+01	748	3.187E+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**

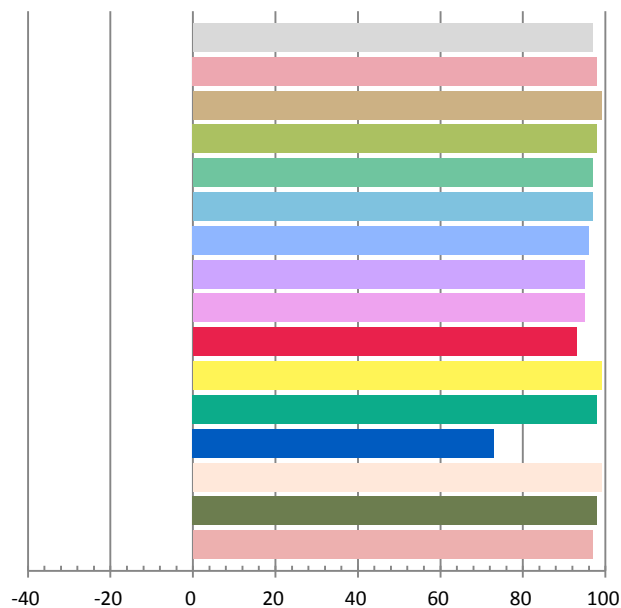
**Photometric and Electrical Measurement Result**

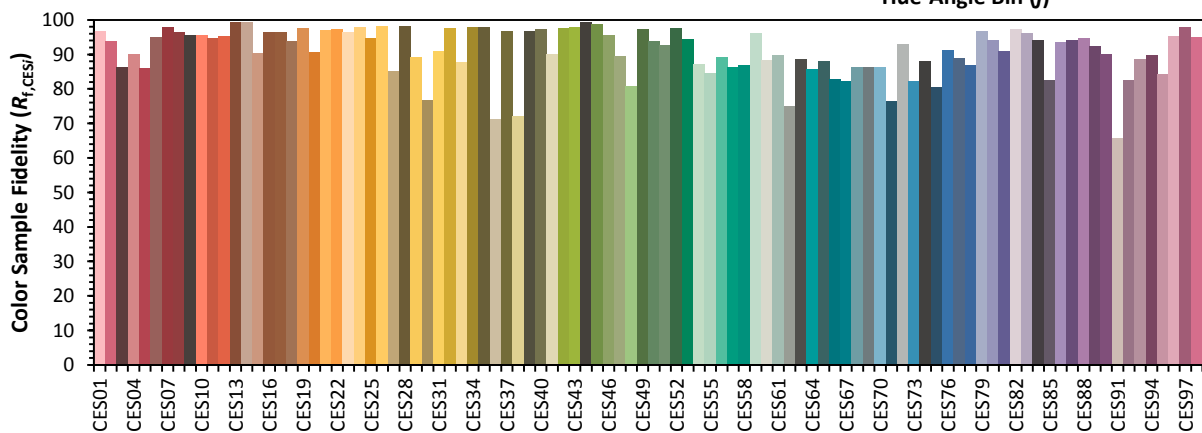
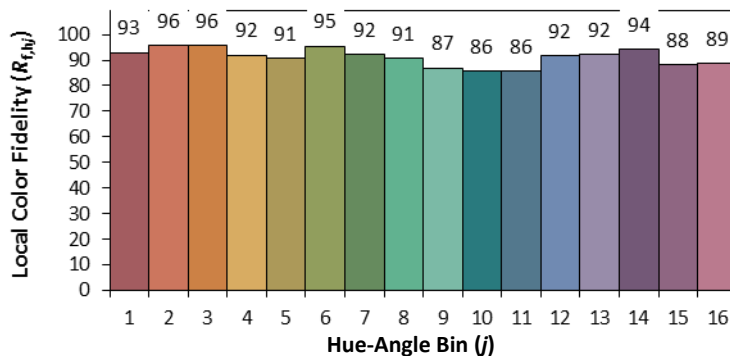
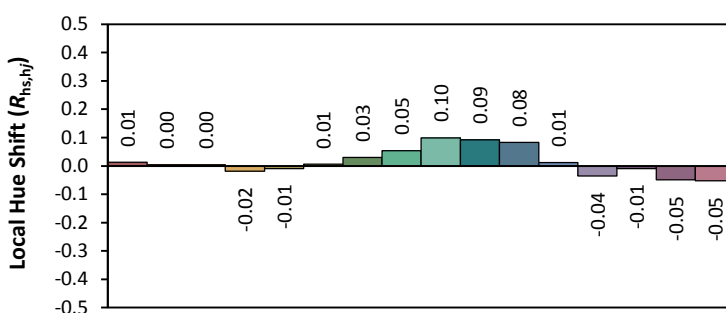
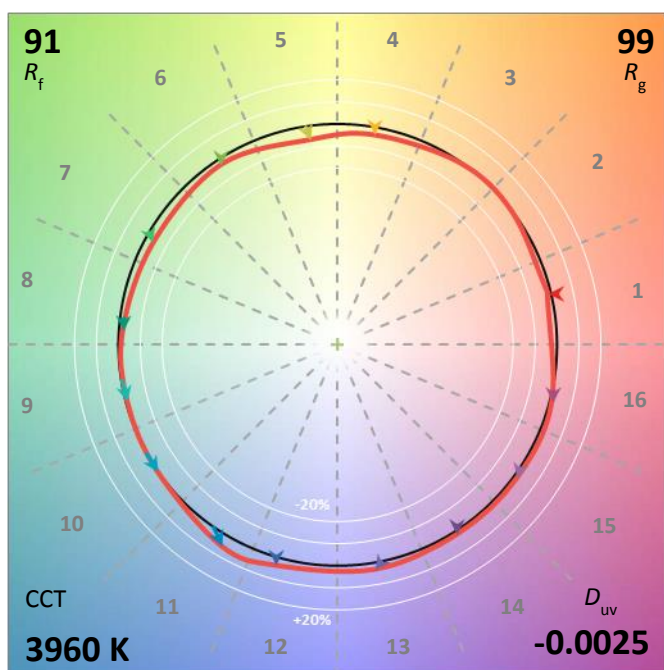
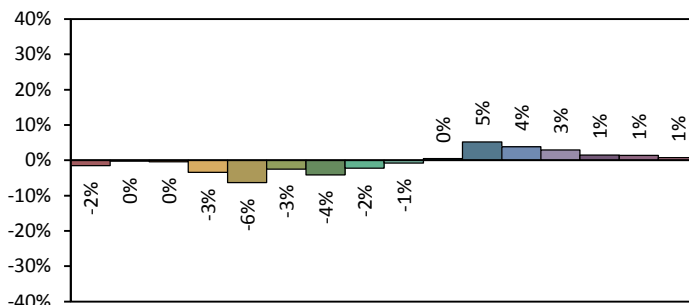
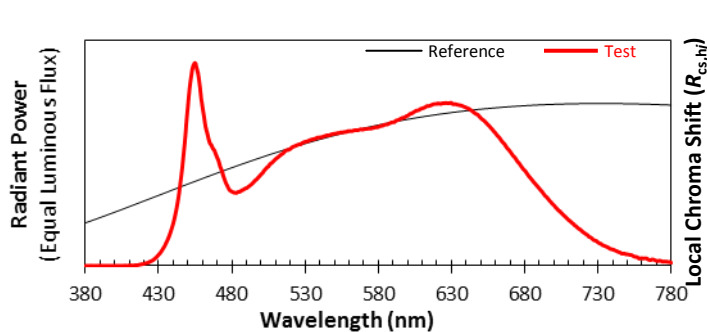
Voltage(V)	Frequency(Hz)	Current(A)	Power (W)	Power Factor	Luminous Flux(lm)	Efficacy(lm/W)
120.0	60	0.1884	22.48	0.994	2177.32	96.88

Radiant Flux (W)	CCT (K)	Duv	x	y	u'	v'
7.808	3960	-0.00251	0.3804	0.3714	0.2272	0.4992

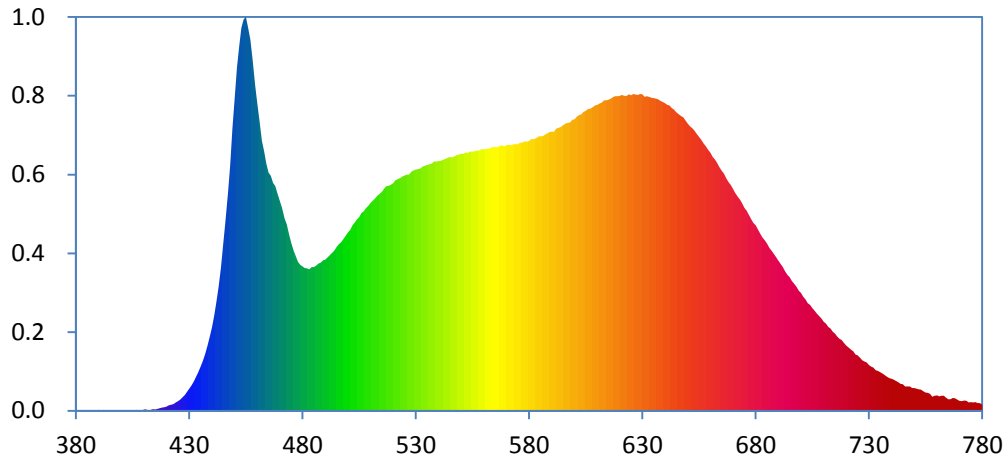
**Color Rendering Index**

<b>Ra</b>			
<b>96.8</b>			
<b>R1</b>	<b>R2</b>	<b>R3</b>	<b>R4</b>
98	99	98	97
<b>R5</b>	<b>R6</b>	<b>R7</b>	<b>R8</b>
97	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	98	97	





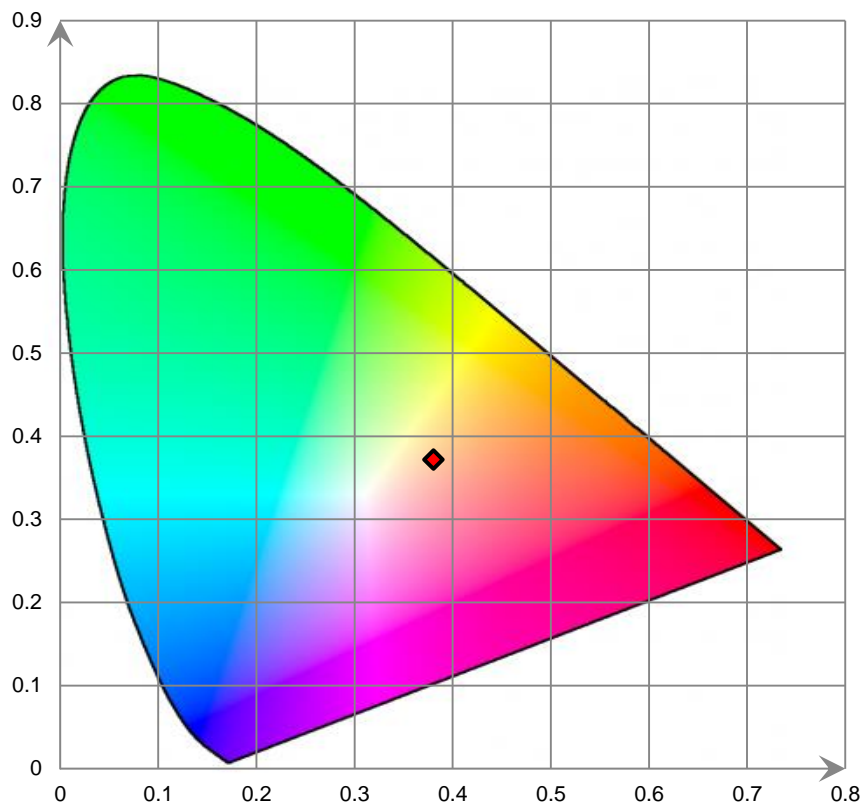
### Relative Spectral Power Distribution



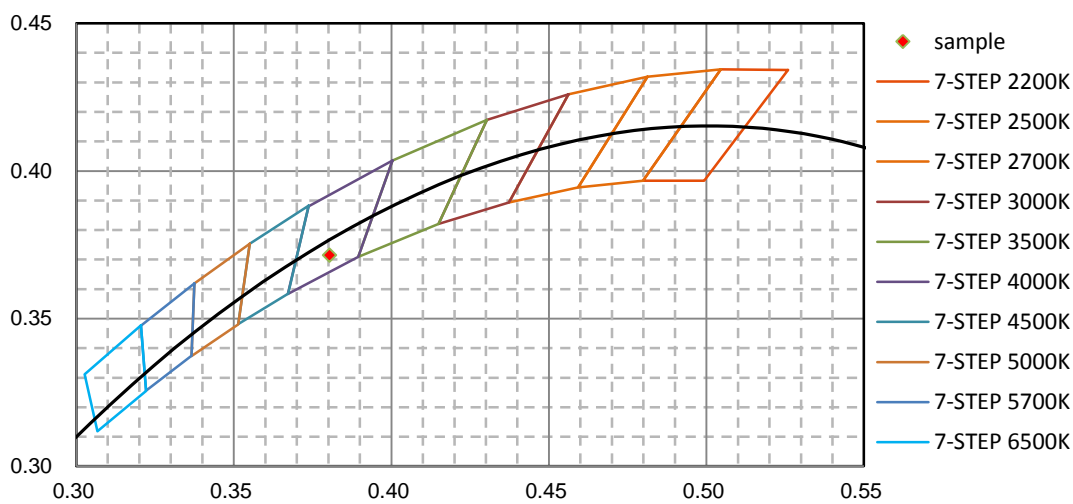
nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
380	6.110E-02	421	6.267E-01	462	3.140E+01	503	2.188E+01	544	2.938E+01
381	4.090E-02	422	6.848E-01	463	3.017E+01	504	2.225E+01	545	2.949E+01
382	4.590E-02	423	7.720E-01	464	2.873E+01	505	2.249E+01	546	2.945E+01
383	9.400E-03	424	9.787E-01	465	2.768E+01	506	2.299E+01	547	2.957E+01
384	7.370E-02	425	1.113E+00	466	2.728E+01	507	2.318E+01	548	2.973E+01
385	3.440E-02	426	1.284E+00	467	2.649E+01	508	2.354E+01	549	2.977E+01
386	1.900E-03	427	1.574E+00	468	2.609E+01	509	2.385E+01	550	2.987E+01
387	5.480E-02	428	1.828E+00	469	2.521E+01	510	2.416E+01	551	2.986E+01
388	1.120E-02	429	2.188E+00	470	2.441E+01	511	2.444E+01	552	3.000E+01
389	1.880E-02	430	2.545E+00	471	2.358E+01	512	2.468E+01	553	2.996E+01
390	1.072E-01	431	2.920E+00	472	2.236E+01	513	2.499E+01	554	3.013E+01
391	2.030E-02	432	3.395E+00	473	2.165E+01	514	2.522E+01	555	3.011E+01
392	7.000E-04	433	3.931E+00	474	2.049E+01	515	2.544E+01	556	3.016E+01
393	1.110E-02	434	4.470E+00	475	1.948E+01	516	2.581E+01	557	3.025E+01
394	1.470E-02	435	5.157E+00	476	1.862E+01	517	2.610E+01	558	3.023E+01
395	3.730E-02	436	5.840E+00	477	1.797E+01	518	2.614E+01	559	3.043E+01
396	2.970E-02	437	6.617E+00	478	1.731E+01	519	2.627E+01	560	3.040E+01
397	9.500E-03	438	7.557E+00	479	1.694E+01	520	2.645E+01	561	3.047E+01
398	1.690E-02	439	8.582E+00	480	1.677E+01	521	2.677E+01	562	3.044E+01
399	4.800E-03	440	9.660E+00	481	1.659E+01	522	2.694E+01	563	3.057E+01
400	9.000E-04	441	1.103E+01	482	1.656E+01	523	2.704E+01	564	3.064E+01
401	5.450E-02	442	1.267E+01	483	1.645E+01	524	2.722E+01	565	3.066E+01
402	3.090E-02	443	1.448E+01	484	1.669E+01	525	2.735E+01	566	3.064E+01
403	3.650E-02	444	1.659E+01	485	1.671E+01	526	2.746E+01	567	3.075E+01
404	4.440E-02	445	1.930E+01	486	1.690E+01	527	2.745E+01	568	3.087E+01
405	4.280E-02	446	2.197E+01	487	1.711E+01	528	2.777E+01	569	3.074E+01
406	1.360E-02	447	2.526E+01	488	1.723E+01	529	2.792E+01	570	3.087E+01
407	9.600E-02	448	2.857E+01	489	1.748E+01	530	2.802E+01	571	3.090E+01
408	3.550E-02	449	3.285E+01	490	1.757E+01	531	2.810E+01	572	3.089E+01
409	8.070E-02	450	3.631E+01	491	1.781E+01	532	2.816E+01	573	3.100E+01
410	1.344E-01	451	3.983E+01	492	1.807E+01	533	2.837E+01	574	3.097E+01
411	1.353E-01	452	4.234E+01	493	1.834E+01	534	2.850E+01	575	3.098E+01
412	7.600E-02	453	4.452E+01	494	1.861E+01	535	2.857E+01	576	3.115E+01
413	1.018E-01	454	4.550E+01	495	1.900E+01	536	2.866E+01	577	3.118E+01
414	1.669E-01	455	4.577E+01	496	1.935E+01	537	2.871E+01	578	3.131E+01
415	1.567E-01	456	4.451E+01	497	1.959E+01	538	2.896E+01	579	3.129E+01
416	2.238E-01	457	4.315E+01	498	1.997E+01	539	2.897E+01	580	3.135E+01
417	2.885E-01	458	4.084E+01	499	2.033E+01	540	2.902E+01	581	3.157E+01
418	3.711E-01	459	3.783E+01	500	2.072E+01	541	2.903E+01	582	3.159E+01
419	4.179E-01	460	3.561E+01	501	2.100E+01	542	2.915E+01	583	3.165E+01
420	4.850E-01	461	3.358E+01	502	2.153E+01	543	2.926E+01	584	3.186E+01

nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
585	3.192E+01	626	3.681E+01	667	2.705E+01	708	1.100E+01	749	2.643E+00
586	3.191E+01	627	3.673E+01	668	2.658E+01	709	1.070E+01	750	2.643E+00
587	3.209E+01	628	3.672E+01	669	2.625E+01	710	1.034E+01	751	2.566E+00
588	3.223E+01	629	3.680E+01	670	2.581E+01	711	1.011E+01	752	2.493E+00
589	3.241E+01	630	3.679E+01	671	2.534E+01	712	9.759E+00	753	2.452E+00
590	3.243E+01	631	3.648E+01	672	2.488E+01	713	9.562E+00	754	2.258E+00
591	3.245E+01	632	3.655E+01	673	2.456E+01	714	9.175E+00	755	2.102E+00
592	3.280E+01	633	3.649E+01	674	2.408E+01	715	8.963E+00	756	2.078E+00
593	3.288E+01	634	3.639E+01	675	2.358E+01	716	8.632E+00	757	1.969E+00
594	3.299E+01	635	3.634E+01	676	2.326E+01	717	8.372E+00	758	1.644E+00
595	3.318E+01	636	3.625E+01	677	2.274E+01	718	8.202E+00	759	1.730E+00
596	3.336E+01	637	3.618E+01	678	2.229E+01	719	7.862E+00	760	1.767E+00
597	3.348E+01	638	3.601E+01	679	2.183E+01	720	7.582E+00	761	1.672E+00
598	3.353E+01	639	3.589E+01	680	2.156E+01	721	7.371E+00	762	1.743E+00
599	3.382E+01	640	3.574E+01	681	2.108E+01	722	7.116E+00	763	1.736E+00
600	3.390E+01	641	3.556E+01	682	2.061E+01	723	6.920E+00	764	1.504E+00
601	3.417E+01	642	3.547E+01	683	2.017E+01	724	6.533E+00	765	1.349E+00
602	3.437E+01	643	3.519E+01	684	1.978E+01	725	6.445E+00	766	1.347E+00
603	3.445E+01	644	3.498E+01	685	1.940E+01	726	6.158E+00	767	1.472E+00
604	3.472E+01	645	3.470E+01	686	1.894E+01	727	5.870E+00	768	1.439E+00
605	3.486E+01	646	3.447E+01	687	1.861E+01	728	5.741E+00	769	1.282E+00
606	3.509E+01	647	3.427E+01	688	1.820E+01	729	5.624E+00	770	1.142E+00
607	3.511E+01	648	3.411E+01	689	1.784E+01	730	5.300E+00	771	1.121E+00
608	3.524E+01	649	3.373E+01	690	1.743E+01	731	5.128E+00	772	1.203E+00
609	3.546E+01	650	3.336E+01	691	1.706E+01	732	5.001E+00	773	1.138E+00
610	3.557E+01	651	3.305E+01	692	1.668E+01	733	4.709E+00	774	9.636E-01
611	3.569E+01	652	3.285E+01	693	1.620E+01	734	4.591E+00	775	1.015E+00
612	3.583E+01	653	3.254E+01	694	1.579E+01	735	4.456E+00	776	9.667E-01
613	3.609E+01	654	3.217E+01	695	1.554E+01	736	4.327E+00	777	9.854E-01
614	3.608E+01	655	3.182E+01	696	1.511E+01	737	4.140E+00	778	8.845E-01
615	3.615E+01	656	3.149E+01	697	1.471E+01	738	3.922E+00	779	9.063E-01
616	3.626E+01	657	3.109E+01	698	1.437E+01	739	3.800E+00	780	7.093E-01
617	3.644E+01	658	3.077E+01	699	1.395E+01	740	3.731E+00		
618	3.655E+01	659	3.029E+01	700	1.367E+01	741	3.606E+00		
619	3.656E+01	660	2.998E+01	701	1.325E+01	742	3.445E+00		
620	3.658E+01	661	2.951E+01	702	1.294E+01	743	3.323E+00		
621	3.672E+01	662	2.919E+01	703	1.251E+01	744	3.133E+00		
622	3.660E+01	663	2.879E+01	704	1.232E+01	745	3.076E+00		
623	3.659E+01	664	2.829E+01	705	1.195E+01	746	2.812E+00		
624	3.677E+01	665	2.791E+01	706	1.164E+01	747	2.806E+00		
625	3.669E+01	666	2.755E+01	707	1.131E+01	748	2.814E+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**

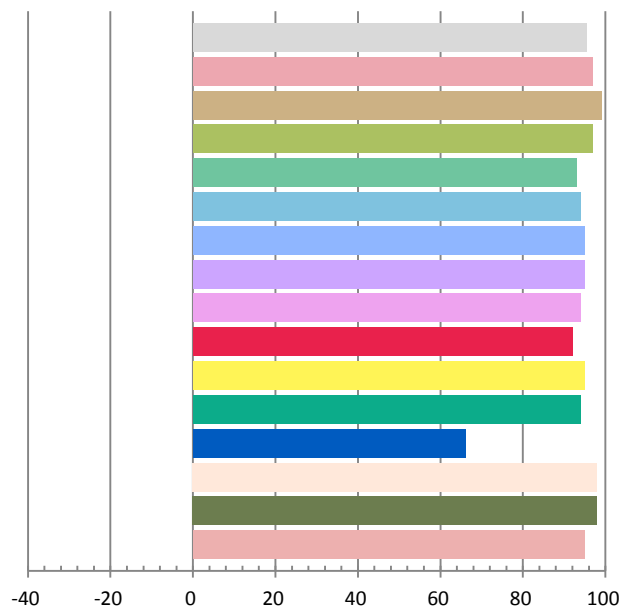
**Photometric and Electrical Measurement Result**

Voltage(V)	Frequency(Hz)	Current(A)	Power (W)	Power Factor	Luminous Flux(lm)	Efficacy(lm/W)
120.0	60	0.189	22.54	0.994	2186.92	97.01

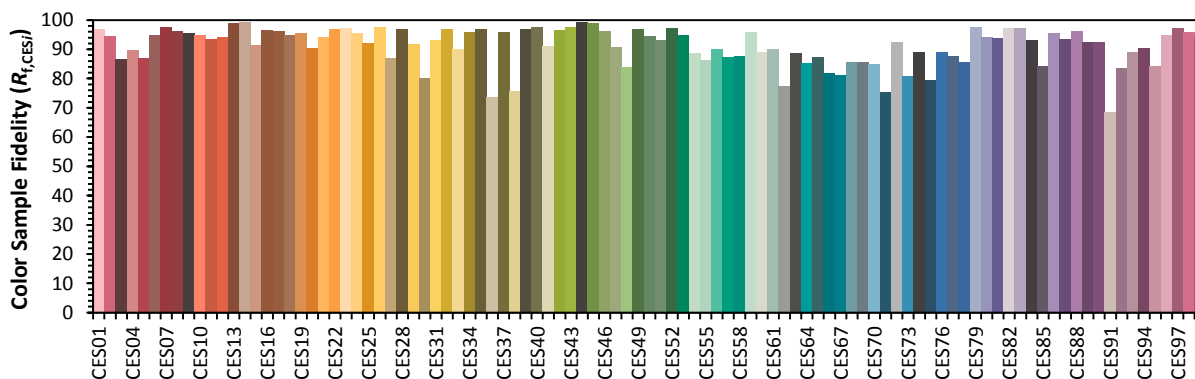
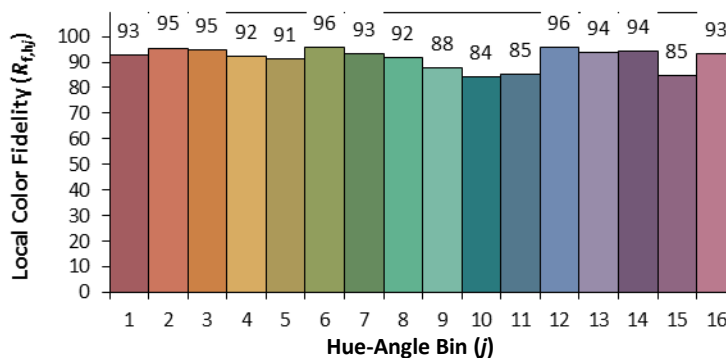
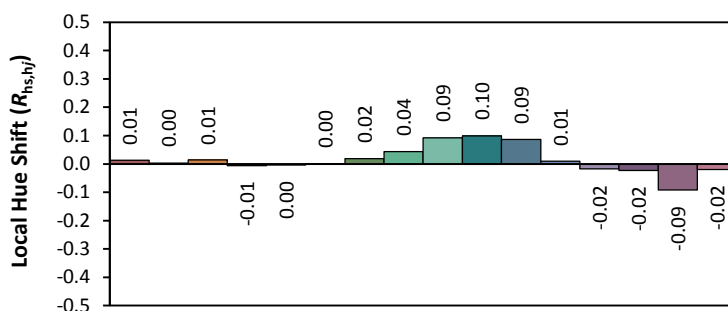
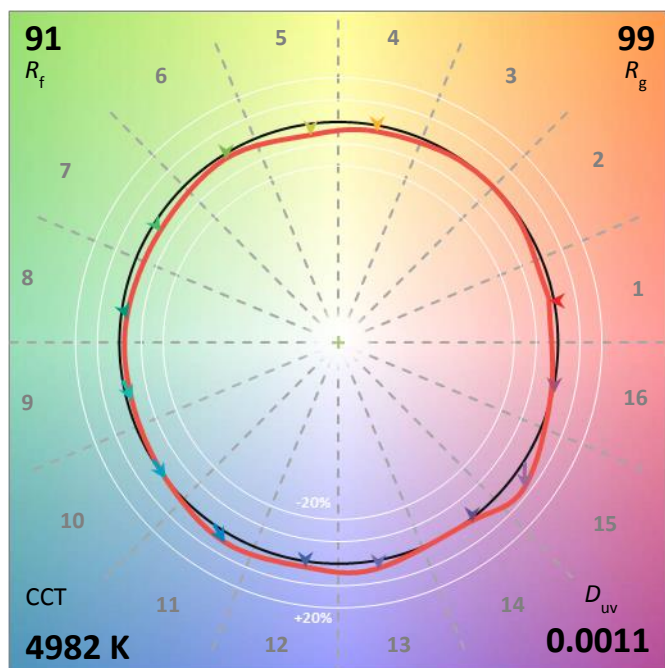
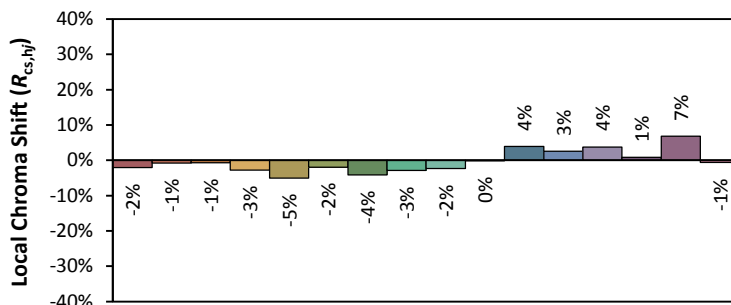
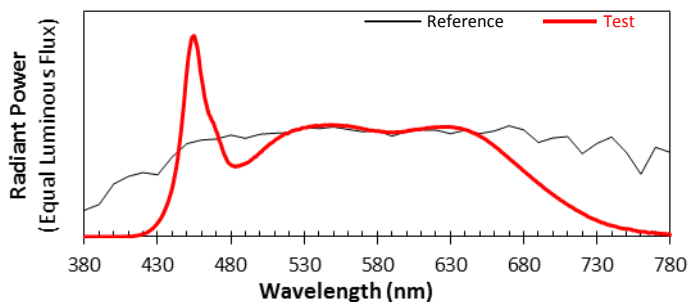
Radiant Flux (W)	CCT (K)	Duv	x	y	u'	v'
7.841	4982	0.00114	0.3458	0.3545	0.2108	0.4862

**Color Rendering Index**

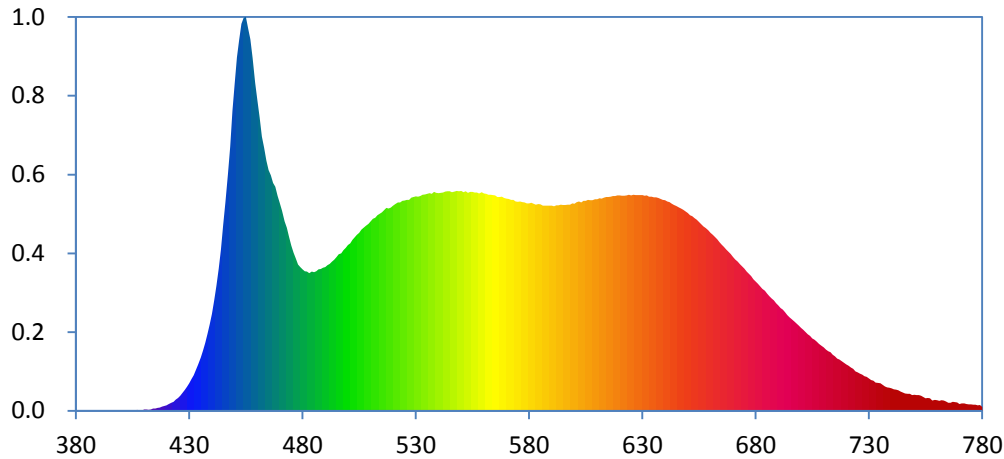
<b>Ra</b>			
<b>95.5</b>			
<b>R1</b>	<b>R2</b>	<b>R3</b>	<b>R4</b>
97	99	97	93
<b>R5</b>	<b>R6</b>	<b>R7</b>	<b>R8</b>
94	95	95	94
<b>R9</b>	<b>R10</b>	<b>R11</b>	<b>R12</b>
92	95	94	66
<b>R13</b>	<b>R14</b>	<b>R15</b>	
98	98	95	







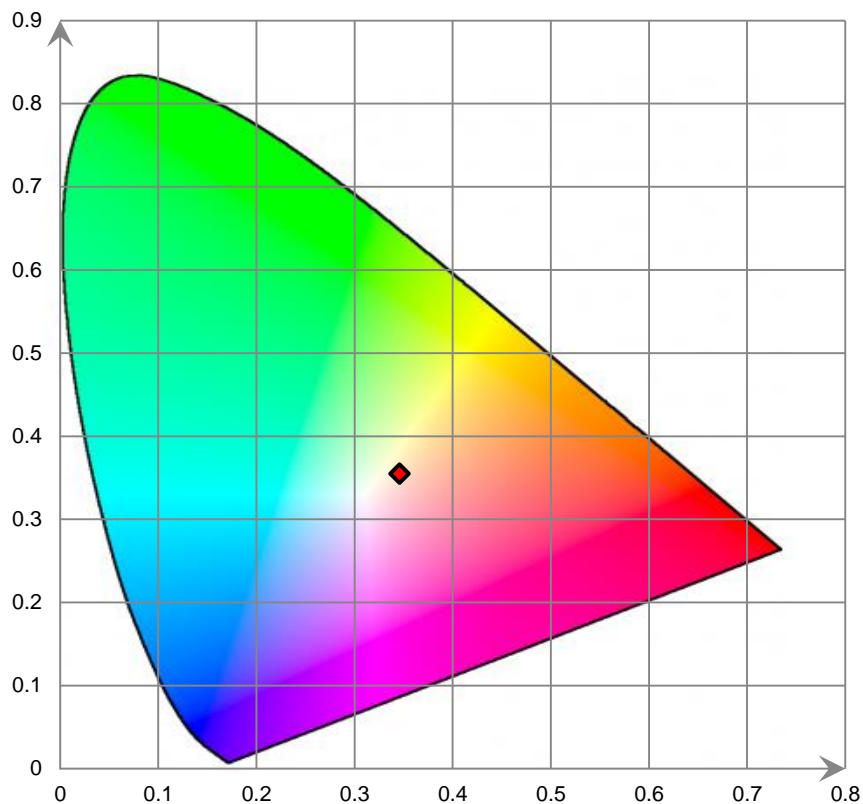
### Relative Spectral Power Distribution



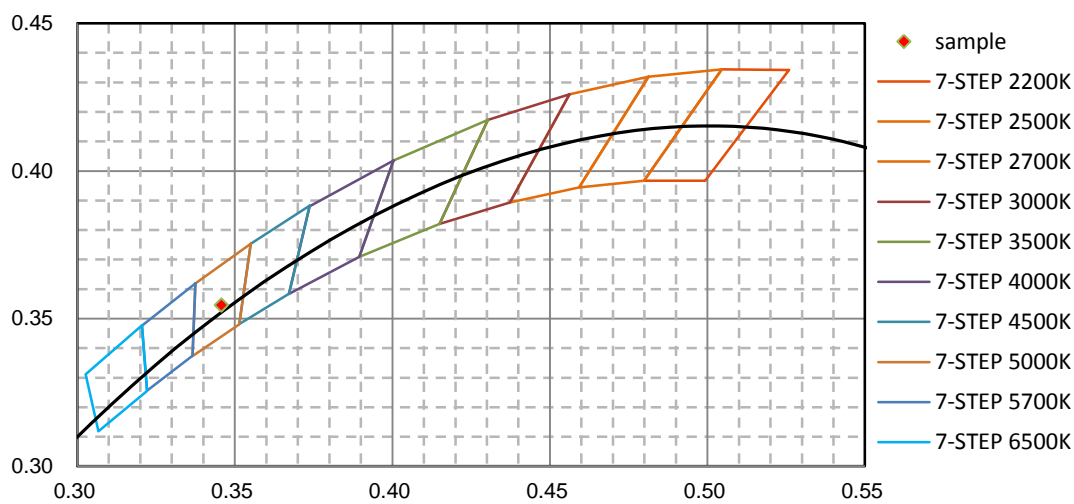
nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
380	1.580E-02	421	9.730E-01	462	3.911E+01	503	2.471E+01	544	3.127E+01
381	2.670E-02	422	1.115E+00	463	3.749E+01	504	2.509E+01	545	3.128E+01
382	3.850E-02	423	1.283E+00	464	3.566E+01	505	2.537E+01	546	3.117E+01
383	1.650E-02	424	1.612E+00	465	3.430E+01	506	2.583E+01	547	3.126E+01
384	7.850E-02	425	1.834E+00	466	3.356E+01	507	2.609E+01	548	3.135E+01
385	3.410E-02	426	2.146E+00	467	3.246E+01	508	2.638E+01	549	3.127E+01
386	2.600E-03	427	2.543E+00	468	3.191E+01	509	2.663E+01	550	3.134E+01
387	3.220E-02	428	2.948E+00	469	3.066E+01	510	2.699E+01	551	3.117E+01
388	1.610E-02	429	3.397E+00	470	2.961E+01	511	2.737E+01	552	3.131E+01
389	2.270E-02	430	3.919E+00	471	2.851E+01	512	2.751E+01	553	3.107E+01
390	7.880E-02	431	4.508E+00	472	2.700E+01	513	2.784E+01	554	3.120E+01
391	1.440E-02	432	5.080E+00	473	2.611E+01	514	2.807E+01	555	3.118E+01
392	8.100E-03	433	5.826E+00	474	2.476E+01	515	2.830E+01	556	3.113E+01
393	1.090E-02	434	6.609E+00	475	2.353E+01	516	2.858E+01	557	3.110E+01
394	3.950E-02	435	7.592E+00	476	2.254E+01	517	2.890E+01	558	3.096E+01
395	4.970E-02	436	8.579E+00	477	2.172E+01	518	2.881E+01	559	3.114E+01
396	9.300E-03	437	9.642E+00	478	2.086E+01	519	2.897E+01	560	3.096E+01
397	6.500E-03	438	1.096E+01	479	2.048E+01	520	2.922E+01	561	3.094E+01
398	6.400E-03	439	1.231E+01	480	2.016E+01	521	2.948E+01	562	3.081E+01
399	2.200E-03	440	1.381E+01	481	1.990E+01	522	2.967E+01	563	3.080E+01
400	1.000E-04	441	1.572E+01	482	1.982E+01	523	2.969E+01	564	3.074E+01
401	4.940E-02	442	1.785E+01	483	1.959E+01	524	2.993E+01	565	3.072E+01
402	3.430E-02	443	2.020E+01	484	1.982E+01	525	2.997E+01	566	3.046E+01
403	3.770E-02	444	2.295E+01	485	1.974E+01	526	3.004E+01	567	3.047E+01
404	4.050E-02	445	2.645E+01	486	1.991E+01	527	3.004E+01	568	3.050E+01
405	6.240E-02	446	2.970E+01	487	2.014E+01	528	3.036E+01	569	3.032E+01
406	2.830E-02	447	3.376E+01	488	2.019E+01	529	3.047E+01	570	3.024E+01
407	1.244E-01	448	3.764E+01	489	2.040E+01	530	3.054E+01	571	3.020E+01
408	4.610E-02	449	4.274E+01	490	2.050E+01	531	3.054E+01	572	3.004E+01
409	9.650E-02	450	4.660E+01	491	2.074E+01	532	3.059E+01	573	3.006E+01
410	1.730E-01	451	5.036E+01	492	2.092E+01	533	3.080E+01	574	2.985E+01
411	1.925E-01	452	5.289E+01	493	2.125E+01	534	3.086E+01	575	2.980E+01
412	1.271E-01	453	5.515E+01	494	2.152E+01	535	3.090E+01	576	2.982E+01
413	1.701E-01	454	5.602E+01	495	2.188E+01	536	3.100E+01	577	2.974E+01
414	2.935E-01	455	5.614E+01	496	2.228E+01	537	3.092E+01	578	2.968E+01
415	3.147E-01	456	5.452E+01	497	2.242E+01	538	3.119E+01	579	2.957E+01
416	4.052E-01	457	5.298E+01	498	2.288E+01	539	3.107E+01	580	2.954E+01
417	4.525E-01	458	5.030E+01	499	2.320E+01	540	3.101E+01	581	2.963E+01
418	5.700E-01	459	4.674E+01	500	2.361E+01	541	3.106E+01	582	2.949E+01
419	6.882E-01	460	4.423E+01	501	2.387E+01	542	3.112E+01	583	2.938E+01
420	7.932E-01	461	4.181E+01	502	2.437E+01	543	3.124E+01	584	2.948E+01

nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
585	2.940E+01	626	3.077E+01	667	2.299E+01	708	9.528E+00	749	2.230E+00
586	2.922E+01	627	3.075E+01	668	2.266E+01	709	9.269E+00	750	2.272E+00
587	2.923E+01	628	3.074E+01	669	2.233E+01	710	9.010E+00	751	2.240E+00
588	2.924E+01	629	3.074E+01	670	2.195E+01	711	8.729E+00	752	2.216E+00
589	2.924E+01	630	3.074E+01	671	2.156E+01	712	8.467E+00	753	2.131E+00
590	2.925E+01	631	3.066E+01	672	2.126E+01	713	8.347E+00	754	1.952E+00
591	2.913E+01	632	3.068E+01	673	2.090E+01	714	7.961E+00	755	1.788E+00
592	2.928E+01	633	3.052E+01	674	2.055E+01	715	7.734E+00	756	1.805E+00
593	2.931E+01	634	3.050E+01	675	2.027E+01	716	7.446E+00	757	1.764E+00
594	2.937E+01	635	3.042E+01	676	1.983E+01	717	7.275E+00	758	1.469E+00
595	2.932E+01	636	3.043E+01	677	1.953E+01	718	7.075E+00	759	1.565E+00
596	2.935E+01	637	3.034E+01	678	1.919E+01	719	6.821E+00	760	1.506E+00
597	2.940E+01	638	3.019E+01	679	1.875E+01	720	6.615E+00	761	1.429E+00
598	2.938E+01	639	3.004E+01	680	1.843E+01	721	6.404E+00	762	1.500E+00
599	2.955E+01	640	2.999E+01	681	1.810E+01	722	6.153E+00	763	1.449E+00
600	2.949E+01	641	2.982E+01	682	1.773E+01	723	5.966E+00	764	1.297E+00
601	2.975E+01	642	2.975E+01	683	1.738E+01	724	5.623E+00	765	1.155E+00
602	2.983E+01	643	2.952E+01	684	1.709E+01	725	5.480E+00	766	1.118E+00
603	2.970E+01	644	2.933E+01	685	1.669E+01	726	5.263E+00	767	1.250E+00
604	2.993E+01	645	2.917E+01	686	1.634E+01	727	5.150E+00	768	1.236E+00
605	2.991E+01	646	2.899E+01	687	1.599E+01	728	4.939E+00	769	1.173E+00
606	3.004E+01	647	2.882E+01	688	1.572E+01	729	4.832E+00	770	9.373E-01
607	3.001E+01	648	2.863E+01	689	1.532E+01	730	4.601E+00	771	1.039E+00
608	3.002E+01	649	2.840E+01	690	1.501E+01	731	4.378E+00	772	1.046E+00
609	3.014E+01	650	2.819E+01	691	1.466E+01	732	4.300E+00	773	9.491E-01
610	3.015E+01	651	2.789E+01	692	1.443E+01	733	3.992E+00	774	9.061E-01
611	3.029E+01	652	2.774E+01	693	1.404E+01	734	3.951E+00	775	9.120E-01
612	3.026E+01	653	2.748E+01	694	1.365E+01	735	3.909E+00	776	8.401E-01
613	3.039E+01	654	2.724E+01	695	1.333E+01	736	3.674E+00	777	8.444E-01
614	3.047E+01	655	2.692E+01	696	1.304E+01	737	3.477E+00	778	7.696E-01
615	3.049E+01	656	2.660E+01	697	1.273E+01	738	3.348E+00	779	8.359E-01
616	3.051E+01	657	2.629E+01	698	1.244E+01	739	3.262E+00	780	5.546E-01
617	3.060E+01	658	2.606E+01	699	1.214E+01	740	3.208E+00		
618	3.060E+01	659	2.572E+01	700	1.181E+01	741	3.041E+00		
619	3.070E+01	660	2.538E+01	701	1.153E+01	742	3.007E+00		
620	3.068E+01	661	2.507E+01	702	1.122E+01	743	2.922E+00		
621	3.064E+01	662	2.474E+01	703	1.089E+01	744	2.748E+00		
622	3.067E+01	663	2.444E+01	704	1.067E+01	745	2.617E+00		
623	3.072E+01	664	2.403E+01	705	1.029E+01	746	2.477E+00		
624	3.079E+01	665	2.365E+01	706	1.012E+01	747	2.392E+00		
625	3.068E+01	666	2.336E+01	707	9.850E+00	748	2.429E+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**

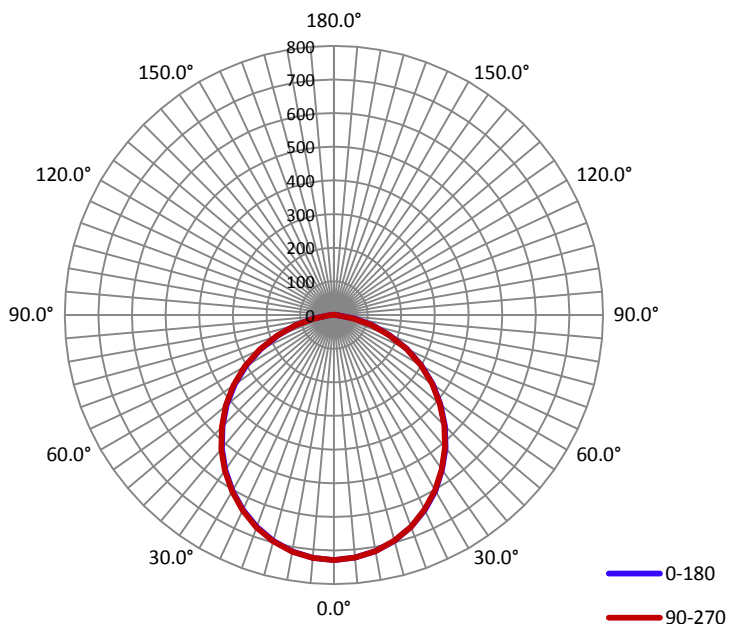
### Electrical Measurement

Input Voltage(V)	Frequency(Hz)	Input Current(A)	Power (W)	Power Factor
120.0	60	0.1920	22.91	0.9960

### Photometric Measurement

Luminous Flux(lm)	Efficacy(lm/W)	$I_{max}(cd)$	S/MH(C0/180)	S/MH(C90/270)
1976.9	86.34	728.5	1.23	1.23

### Luminous Intensity Distribution



	C0/180	C45/225	C90/270	C135/315	AVG.
Beam Angle(50% $I_{max}$ ):	109.2	109.4	109.4	109.3	109.3
Field Angle(10% $I_{max}$ ):	158.0	158.4	157.7	157.5	157.9

**Luminous Intensity (cd) Distribution Data**

C y	0°	22.5°	45°	67.5°	90°	112.5°	135°	157.5°
0.0°	728	728	728	728	728	728	728	728
5.0°	724	723	724	724	724	724	724	725
10.0°	713	712	712	712	712	713	714	714
15.0°	695	694	694	695	694	695	696	697
20.0°	670	669	669	669	670	671	672	673
25.0°	640	638	638	639	638	640	641	642
30.0°	603	601	601	601	601	603	604	606
35.0°	561	560	559	560	560	561	564	565
40.0°	516	514	514	514	514	515	518	520
45.0°	466	465	464	463	464	466	468	470
50.0°	414	412	411	411	411	414	415	418
55.0°	359	357	356	356	356	358	360	363
60.0°	300	298	298	297	297	298	302	304
65.0°	239	238	237	237	237	238	240	244
70.0°	177	177	176	176	175	176	178	181
75.0°	119	117	117	117	115	115	118	121
80.0°	63	62	62	61	59	59	62	65
85.0°	14	13	12	13	12	11	14	17
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	0	0	0	0	0
150.0°	0	0	0	0	0	0	0	0
155.0°	0	0	0	0	0	0	0	0
160.0°	0	0	0	0	0	0	0	0
165.0°	0	0	0	0	0	0	0	0
170.0°	0	0	0	0	0	0	1	0
175.0°	0	0	1	1	1	0	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°	728	728	728	728	728	728	728	728
5.0°	724	724	725	725	725	724	724	724
10.0°	714	714	714	715	714	714	713	713
15.0°	695	696	697	697	696	695	695	694
20.0°	670	671	673	673	672	671	670	668
25.0°	640	641	642	642	642	640	639	637
30.0°	603	605	606	606	606	604	603	601
35.0°	563	564	565	565	565	564	562	559
40.0°	517	519	521	521	520	519	517	514
45.0°	468	470	472	473	471	470	468	465
50.0°	416	418	420	420	419	418	416	412
55.0°	360	363	366	365	364	363	360	357
60.0°	301	304	305	306	305	303	300	297
65.0°	240	243	244	244	244	241	238	236
70.0°	177	181	183	183	180	177	174	173
75.0°	118	121	123	122	120	117	114	113
80.0°	62	65	66	67	63	60	58	56
85.0°	14	16	18	18	15	13	11	11
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	0	0	0	0	0
150.0°	0	0	0	0	0	0	0	0
155.0°	0	0	0	0	0	0	0	0
160.0°	0	0	0	0	0	0	0	0
165.0°	0	0	0	0	0	0	0	1
170.0°	0	0	0	0	0	1	1	1
175.0°	0	0	0	1	1	1	1	1
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\*\*\*\*\*