

IES LM-79-19

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: INFTP4/8CCT3S/DIM010UNV

Report Type:	Electrical and Photometric tests including: Luminous Flux, Chromaticity, Luminous Intensity Distribution
Project Engineer:	Bay Wang <i>Bay Wang</i>
Report Number:	RKSB230301005-10-1
Test Date:	2023-03-02 to 2023-03-06
Report Date:	2023-03-10
Reviewed By:	Seven Xia / EE Engineer <i>Seven . Xia</i>
Prepared By:	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
Accreditation:	The IAS Accreditation Number TL-1044.



1. Product Description#

General Information:

One sample was received on 2023-03-01 and used for testing.

Model Tested:	INFTP4/8CCT3S/DIM010UNV
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:	3000K, 3500K, 4000K
Least Efficient Setting:	3000K
Most Consumptive Setting:	3000K
Default Setting:	3500K

Rated Values:

Rated Voltage/Frequency:	120-277VAC 50/60Hz
Rated Power:	6W/9W/12W
Nominal CCT:	3000K, 3500K, 4000K
Nominal Lumen Output:	1350lm/1400lm/1400lm @12W

2. Standards Used

- IES LM-79-19: Approved Method: Optical and Electrical Measurements 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	2022-06-21	2023-06-20
Power Meter	INVENTFINE	WT500	GSJWQ20009	2022-11-03	2023-11-02
Spectral photometer	INVENTFINE	CMS-3S	GSGSE100017	2022-06-21	2023-06-20
AC Power Supply	INVENTFINE	CHP500	JWJSD010071	2022-06-21	2023-06-20
Standard Light Source	Osram	24V/50W	JWWCR020104	2021-09-15	2023-09-14
Thermal Meter	ANYMETRE	TH-20E	N/A	2022-11-11	2023-11-10
DC Power Supply	INVENTFINE	WL3005	JWWCP020069	2022-06-21	2023-06-20
AC Power Supply	INVENTFINE	CHP-5KVA	900511765	2022-06-21	2023-06-20
DC Power Supply	INVENTFINE	WL3010	JWDMP030001	2022-06-21	2023-06-20
Power Meter	INVENTFINE	WT500	GSDSQ200007	2022-11-03	2023-11-02

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

Statement of Traceability: Bay Area Compliance Laboratories Corp. (Kunshan) attested that all calibration has been performed using suitable standards traceable to National Primary Standards and International System of Units (SI).

4. Test Method

Product was tested with no seasoning. All stabilization and measurements were made in compliance with ANSI/IES LM-79-19. The product was operated at rated voltage or at voltage required by manufacturer. The ambient temperature of the sample was maintained at $25^{\circ}\text{C} \pm 1.2^{\circ}\text{C}$ during measurement. And relative humidity is maintained between 10% than 65%.

Integrating Sphere System

The system includes AC power source, digital power meter, DC power supply, Spectroradiometer, and integrating sphere. The integrating sphere system is calibrated by standard spectrum light source before measurement.

4π geometry was used during measurement. The product was operated in its intended orientation in application and was recorded in this report.

The uncertainty of the light output (luminous flux) measurements is $U_{rel}=2.6\%$ ($k=2$), 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. For measurement of luminous intensity distribution, The horizontal angle (C plane) test intervals were set 22.5 degree, the vertical angle (γ) test intervals were set 1 degree while data for 5 degree intervals is reported.

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_t , 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: 3000K

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

Test orientation: **Downward**

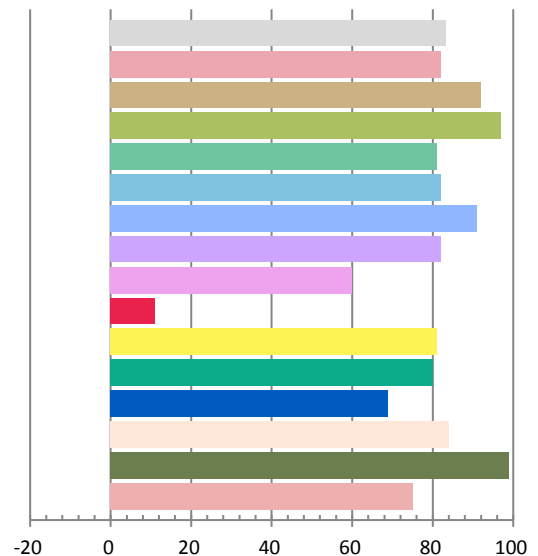
Photometric and Electrical Measurement Result

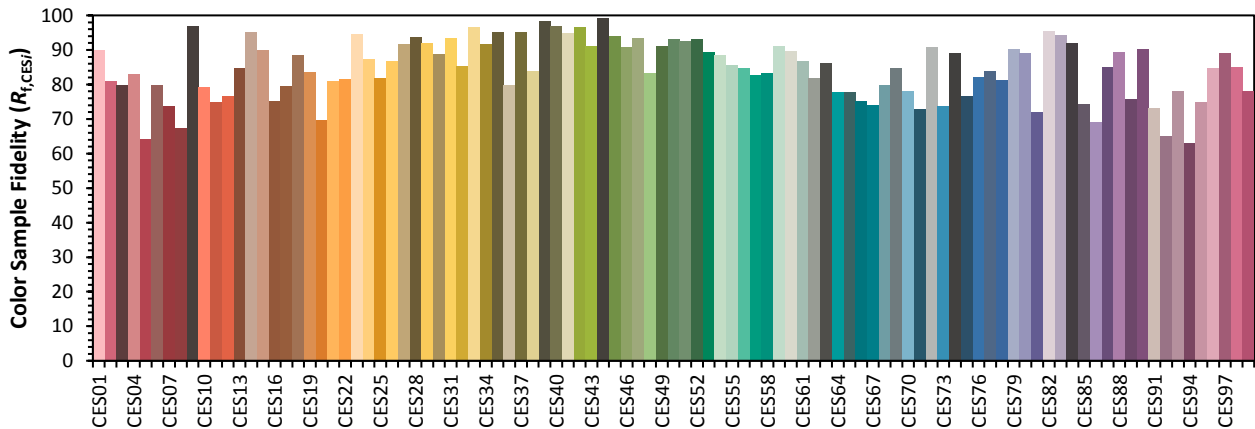
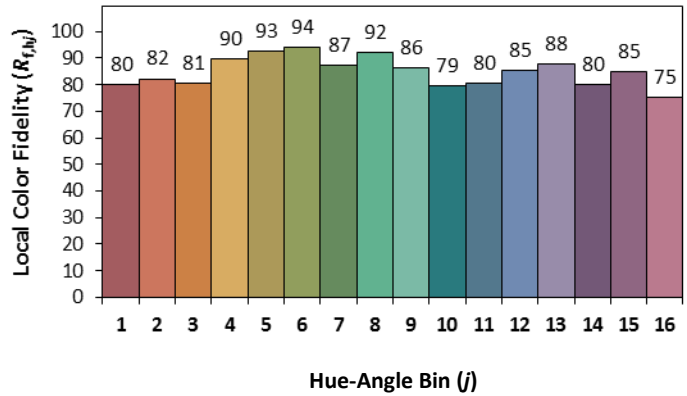
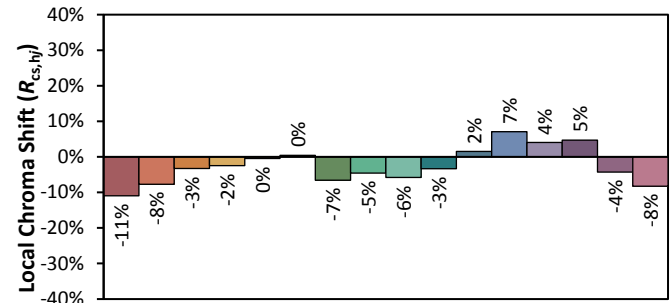
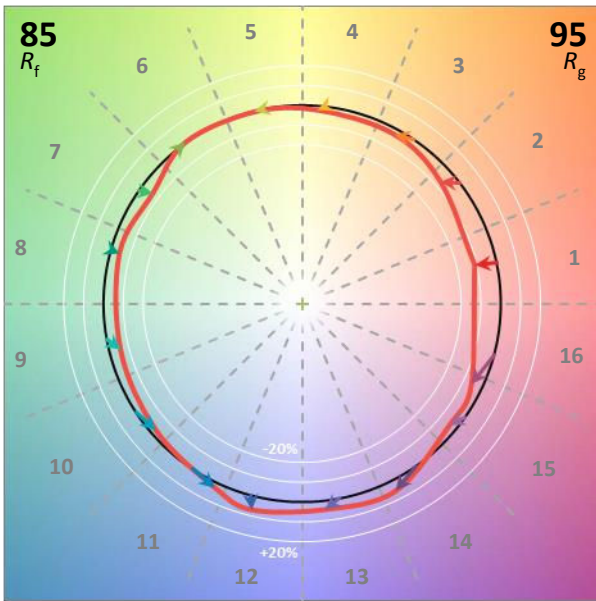
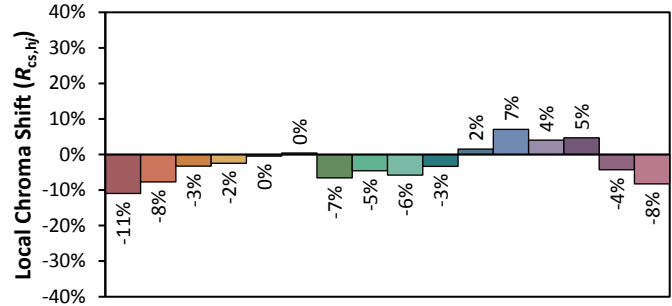
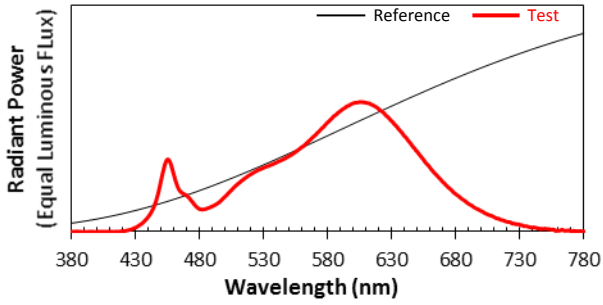
Voltage(V)	Frequency(Hz)	Current(A)	Power (W)	Power Factor	Luminous Flux(lm)	Efficacy(lm/W)
120	60	0.1021	12.16	0.9925	1421.0	116.86

Radiant Flux (W)	CCT (K)	Duv	x	y	u'	v'
4.323	2884	0.00029	0.4459	0.4077	0.2548	0.5241

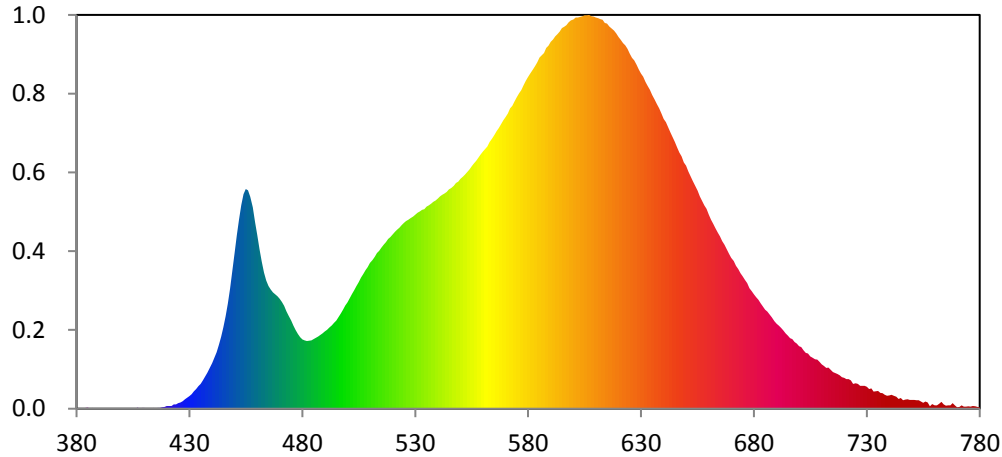
Color Rendering Index

Ra			
83.3			
R1	R2	R3	R4
82	92	97	81
R5	R6	R7	R8
82	91	82	60
R9	R10	R11	R12
11	81	80	69
R13	R14	R15	
84	99	75	





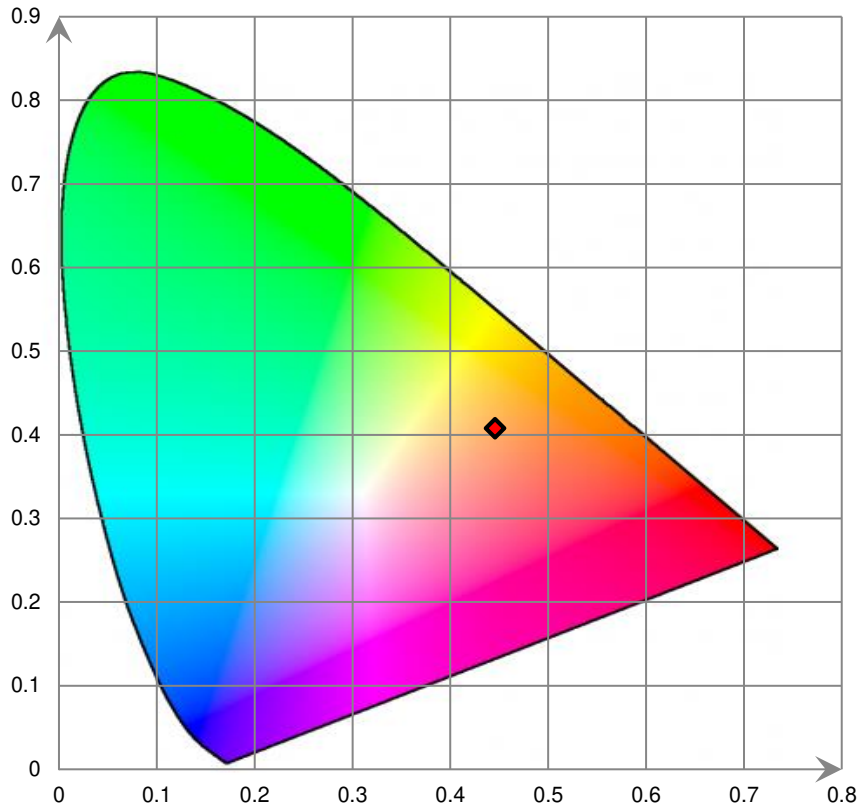
Relative Spectral Power Distribution



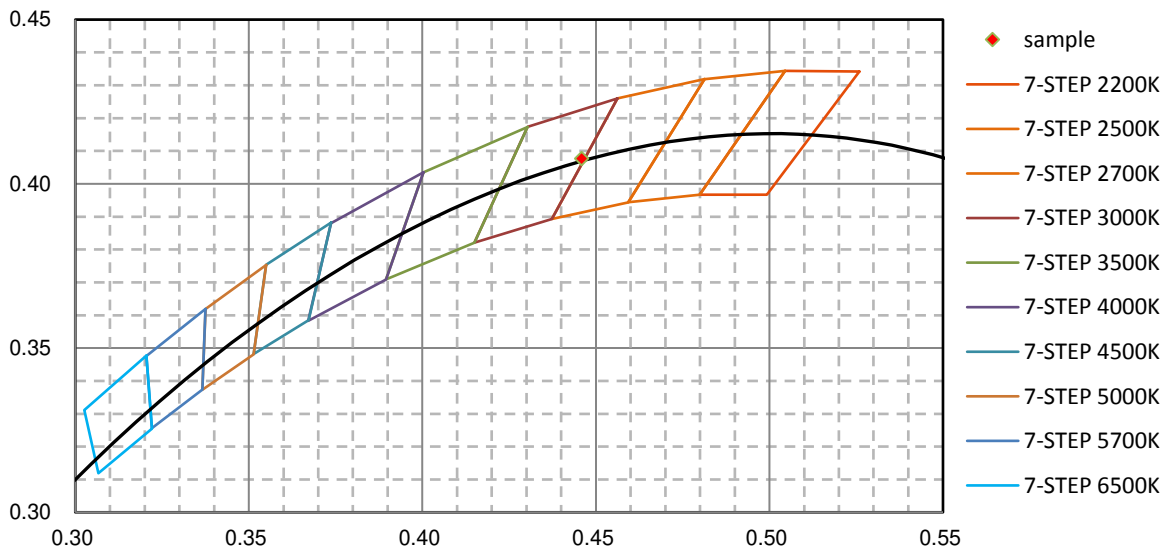
nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
380	1.580E-02	421	2.112E-01	462	1.112E+01	503	8.979E+00	544	1.641E+01
381	4.350E-02	422	2.020E-01	463	1.031E+01	504	9.278E+00	545	1.660E+01
382	2.360E-02	423	3.152E-01	464	9.702E+00	505	9.568E+00	546	1.670E+01
383	2.340E-02	424	3.378E-01	465	9.282E+00	506	9.904E+00	547	1.685E+01
384	7.160E-02	425	4.289E-01	466	9.015E+00	507	1.019E+01	548	1.708E+01
385	7.470E-02	426	4.727E-01	467	8.814E+00	508	1.048E+01	549	1.717E+01
386	7.400E-03	427	5.649E-01	468	8.658E+00	509	1.072E+01	550	1.739E+01
387	5.220E-02	428	7.110E-01	469	8.514E+00	510	1.102E+01	551	1.755E+01
388	1.210E-02	429	8.476E-01	470	8.328E+00	511	1.125E+01	552	1.772E+01
389	5.000E-04	430	9.529E-01	471	8.064E+00	512	1.149E+01	553	1.791E+01
390	4.420E-02	431	1.106E+00	472	7.788E+00	513	1.177E+01	554	1.809E+01
391	2.270E-02	432	1.313E+00	473	7.371E+00	514	1.195E+01	555	1.834E+01
392	3.400E-03	433	1.478E+00	474	7.037E+00	515	1.220E+01	556	1.856E+01
393	1.400E-03	434	1.707E+00	475	6.681E+00	516	1.240E+01	557	1.876E+01
394	9.000E-04	435	1.885E+00	476	6.273E+00	517	1.260E+01	558	1.899E+01
395	3.920E-02	436	2.154E+00	477	5.941E+00	518	1.285E+01	559	1.924E+01
396	1.750E-02	437	2.423E+00	478	5.650E+00	519	1.300E+01	560	1.945E+01
397	1.560E-02	438	2.728E+00	479	5.422E+00	520	1.319E+01	561	1.965E+01
398	6.800E-03	439	3.070E+00	480	5.235E+00	521	1.337E+01	562	1.985E+01
399	2.400E-03	440	3.445E+00	481	5.172E+00	522	1.355E+01	563	2.017E+01
400	1.000E-04	441	3.851E+00	482	5.117E+00	523	1.370E+01	564	2.044E+01
401	1.630E-02	442	4.283E+00	483	5.156E+00	524	1.388E+01	565	2.071E+01
402	2.580E-02	443	4.840E+00	484	5.165E+00	525	1.405E+01	566	2.099E+01
403	2.510E-02	444	5.436E+00	485	5.268E+00	526	1.419E+01	567	2.125E+01
404	1.400E-02	445	6.159E+00	486	5.366E+00	527	1.430E+01	568	2.155E+01
405	4.420E-02	446	6.984E+00	487	5.458E+00	528	1.443E+01	569	2.183E+01
406	6.200E-03	447	7.960E+00	488	5.573E+00	529	1.455E+01	570	2.208E+01
407	7.400E-02	448	9.084E+00	489	5.710E+00	530	1.468E+01	571	2.234E+01
408	1.230E-02	449	1.042E+01	490	5.840E+00	531	1.484E+01	572	2.271E+01
409	5.000E-02	450	1.176E+01	491	5.976E+00	532	1.492E+01	573	2.293E+01
410	5.900E-02	451	1.311E+01	492	6.149E+00	533	1.505E+01	574	2.325E+01
411	2.480E-02	452	1.431E+01	493	6.308E+00	534	1.511E+01	575	2.356E+01
412	4.530E-02	453	1.541E+01	494	6.495E+00	535	1.529E+01	576	2.386E+01
413	2.600E-03	454	1.623E+01	495	6.679E+00	536	1.538E+01	577	2.410E+01
414	5.600E-02	455	1.662E+01	496	6.936E+00	537	1.550E+01	578	2.446E+01
415	3.390E-02	456	1.652E+01	497	7.204E+00	538	1.565E+01	579	2.480E+01
416	5.540E-02	457	1.604E+01	498	7.502E+00	539	1.575E+01	580	2.509E+01
417	5.910E-02	458	1.524E+01	499	7.808E+00	540	1.590E+01	581	2.535E+01
418	9.800E-02	459	1.413E+01	500	8.051E+00	541	1.607E+01	582	2.564E+01
419	1.435E-01	460	1.315E+01	501	8.374E+00	542	1.619E+01	583	2.593E+01
420	1.986E-01	461	1.206E+01	502	8.681E+00	543	1.628E+01	584	2.621E+01

nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
585	2.657E+01	626	2.656E+01	667	1.242E+01	708	3.711E+00	749	6.685E-01
586	2.674E+01	627	2.634E+01	668	1.208E+01	709	3.543E+00	750	6.587E-01
587	2.692E+01	628	2.603E+01	669	1.173E+01	710	3.364E+00	751	6.697E-01
588	2.729E+01	629	2.568E+01	670	1.141E+01	711	3.241E+00	752	6.525E-01
589	2.747E+01	630	2.537E+01	671	1.118E+01	712	3.078E+00	753	6.538E-01
590	2.775E+01	631	2.513E+01	672	1.082E+01	713	3.115E+00	754	5.517E-01
591	2.793E+01	632	2.473E+01	673	1.057E+01	714	2.935E+00	755	4.374E-01
592	2.818E+01	633	2.441E+01	674	1.025E+01	715	2.776E+00	756	5.504E-01
593	2.835E+01	634	2.413E+01	675	1.000E+01	716	2.709E+00	757	4.761E-01
594	2.854E+01	635	2.373E+01	676	9.744E+00	717	2.632E+00	758	1.843E-01
595	2.879E+01	636	2.339E+01	677	9.505E+00	718	2.527E+00	759	3.423E-01
596	2.890E+01	637	2.304E+01	678	9.124E+00	719	2.383E+00	760	2.449E-01
597	2.903E+01	638	2.273E+01	679	8.899E+00	720	2.339E+00	761	2.527E-01
598	2.923E+01	639	2.234E+01	680	8.647E+00	721	2.239E+00	762	3.862E-01
599	2.937E+01	640	2.192E+01	681	8.436E+00	722	2.249E+00	763	5.130E-01
600	2.946E+01	641	2.169E+01	682	8.249E+00	723	2.146E+00	764	3.343E-01
601	2.960E+01	642	2.131E+01	683	7.988E+00	724	1.890E+00	765	2.348E-01
602	2.961E+01	643	2.090E+01	684	7.745E+00	725	1.934E+00	766	2.605E-01
603	2.965E+01	644	2.054E+01	685	7.503E+00	726	1.866E+00	767	2.513E-01
604	2.969E+01	645	2.018E+01	686	7.338E+00	727	1.740E+00	768	4.150E-01
605	2.978E+01	646	1.977E+01	687	7.143E+00	728	1.734E+00	769	2.525E-01
606	2.976E+01	647	1.937E+01	688	6.918E+00	729	1.744E+00	770	9.710E-02
607	2.979E+01	648	1.910E+01	689	6.616E+00	730	1.653E+00	771	1.348E-01
608	2.969E+01	649	1.863E+01	690	6.437E+00	731	1.496E+00	772	2.658E-01
609	2.968E+01	650	1.839E+01	691	6.282E+00	732	1.543E+00	773	1.467E-01
610	2.960E+01	651	1.796E+01	692	6.127E+00	733	1.307E+00	774	1.539E-01
611	2.954E+01	652	1.758E+01	693	5.929E+00	734	1.329E+00	775	1.716E-01
612	2.949E+01	653	1.723E+01	694	5.694E+00	735	1.353E+00	776	1.567E-01
613	2.943E+01	654	1.685E+01	695	5.523E+00	736	1.196E+00	777	2.178E-01
614	2.918E+01	655	1.649E+01	696	5.333E+00	737	1.165E+00	778	1.902E-01
615	2.914E+01	656	1.606E+01	697	5.263E+00	738	1.046E+00	779	1.212E-01
616	2.893E+01	657	1.571E+01	698	5.059E+00	739	9.927E-01	780	1.037E-01
617	2.877E+01	658	1.538E+01	699	4.916E+00	740	1.003E+00		
618	2.860E+01	659	1.512E+01	700	4.724E+00	741	1.048E+00		
619	2.838E+01	660	1.469E+01	701	4.653E+00	742	9.828E-01		
620	2.812E+01	661	1.430E+01	702	4.430E+00	743	9.084E-01		
621	2.789E+01	662	1.398E+01	703	4.228E+00	744	7.484E-01		
622	2.766E+01	663	1.364E+01	704	4.164E+00	745	8.170E-01		
623	2.750E+01	664	1.332E+01	705	3.962E+00	746	6.338E-01		
624	2.722E+01	665	1.305E+01	706	3.860E+00	747	6.989E-01		
625	2.687E+01	666	1.268E+01	707	3.745E+00	748	7.054E-01		

CIE 1931xy Chromaticity Diagram



7-StepChromaticity Quadrangles



Control Setting: 3500K

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

Test orientation: **Downward**

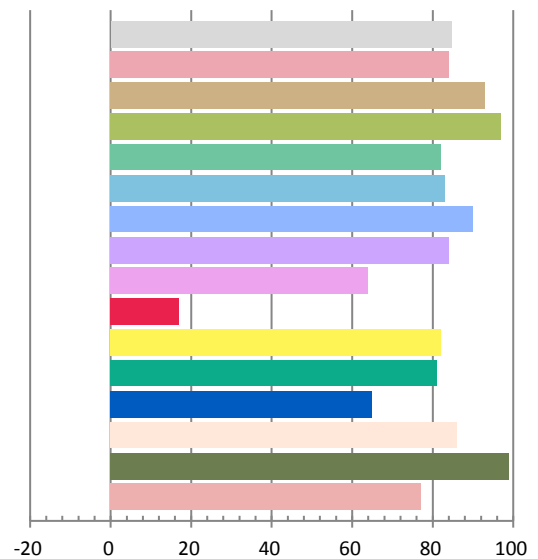
Photometric and Electrical Measurement Result

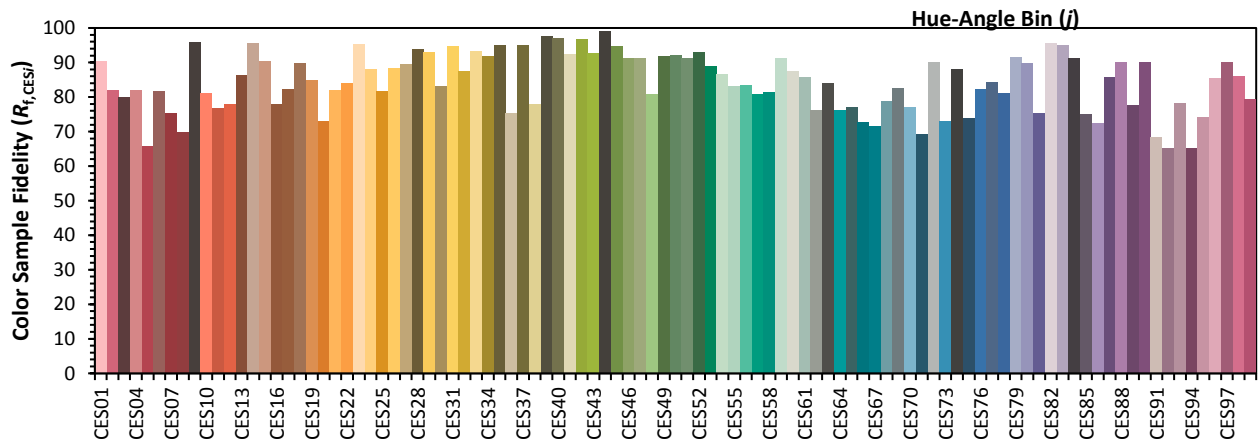
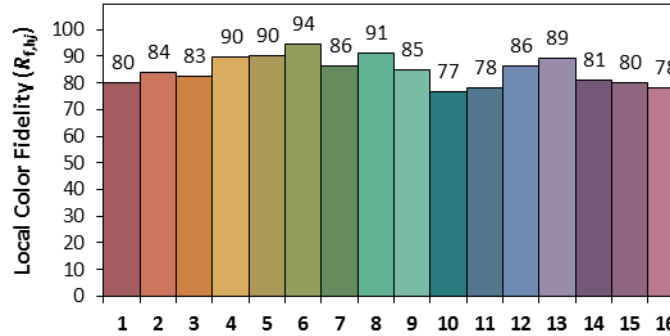
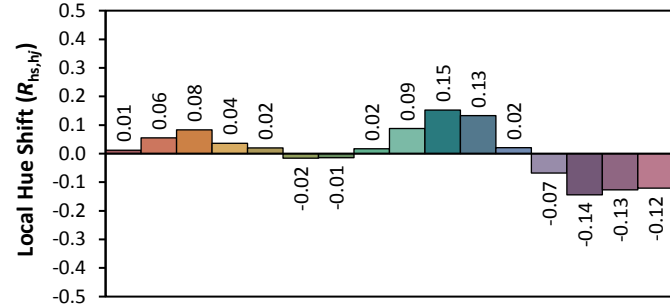
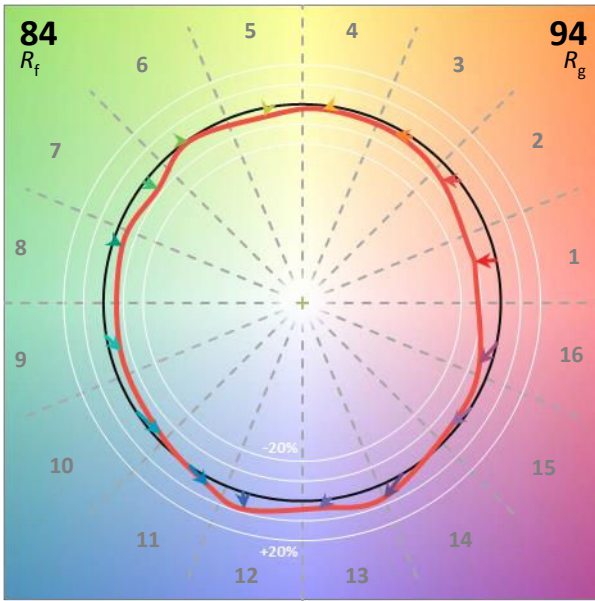
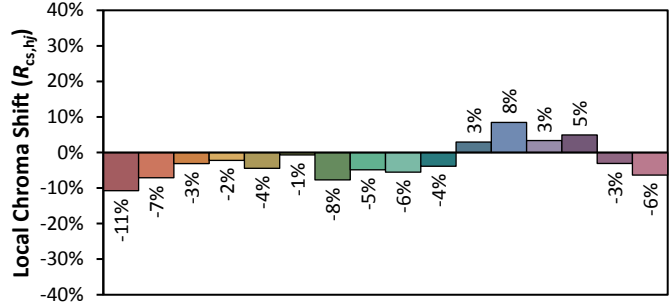
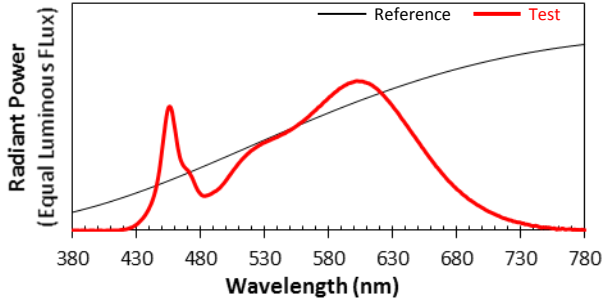
Voltage(V)	Frequency(Hz)	Current(A)	Power (W)	Power Factor	Luminous Flux(lm)	Efficacy(lm/W)
120	60	0.0983	11.7	0.9922	1468.5	125.46

Radiant Flux (W)	CCT (K)	Duv	x	y	u'	v'
4.457	3285	0.00016	0.4182	0.3971	0.2414	0.5158

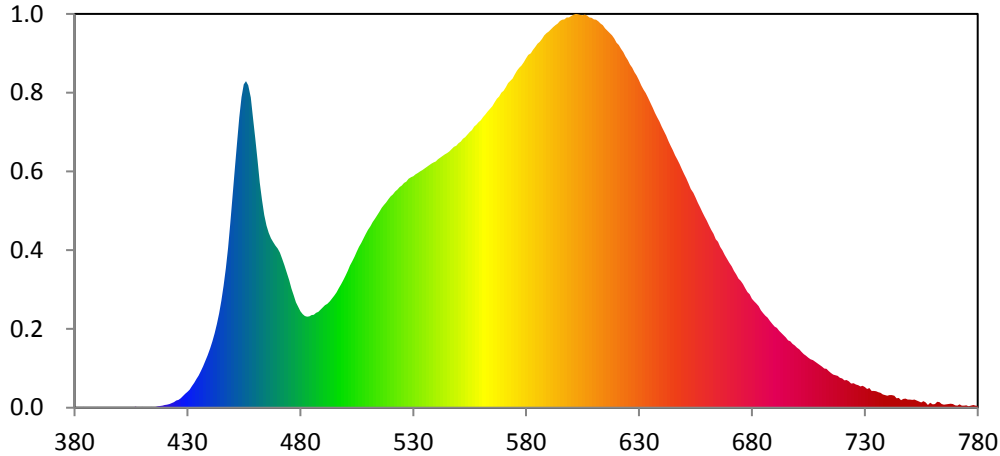
Color Rendering Index

Ra			
84.6			
R1	R2	R3	R4
84	93	97	82
R5	R6	R7	R8
83	90	84	64
R9	R10	R11	R12
17	82	81	65
R13	R14	R15	
86	99	77	





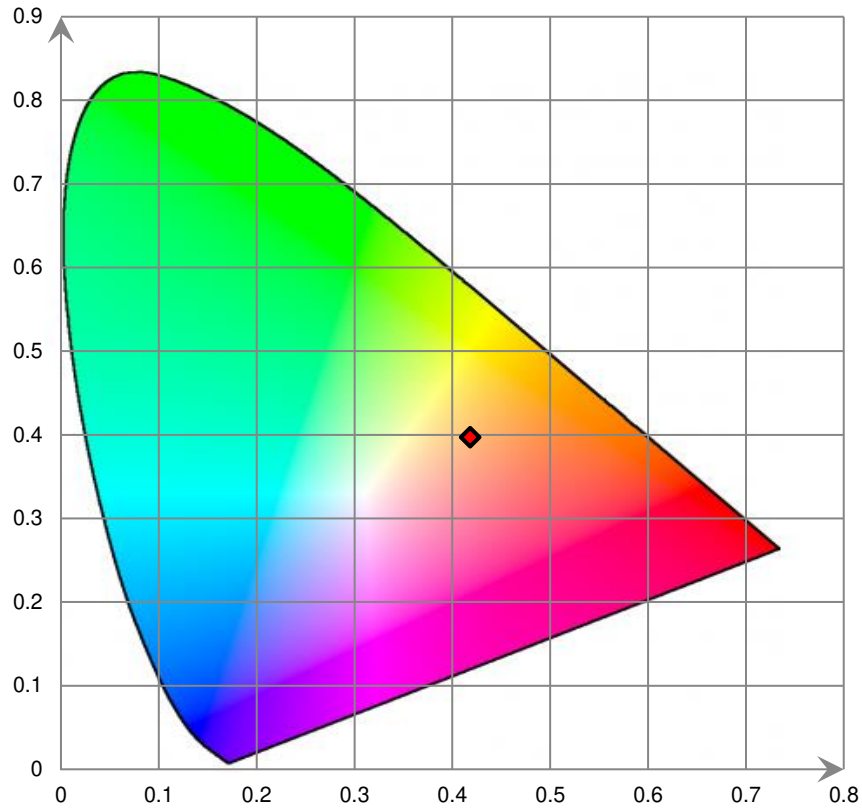
Relative Spectral Power Distribution



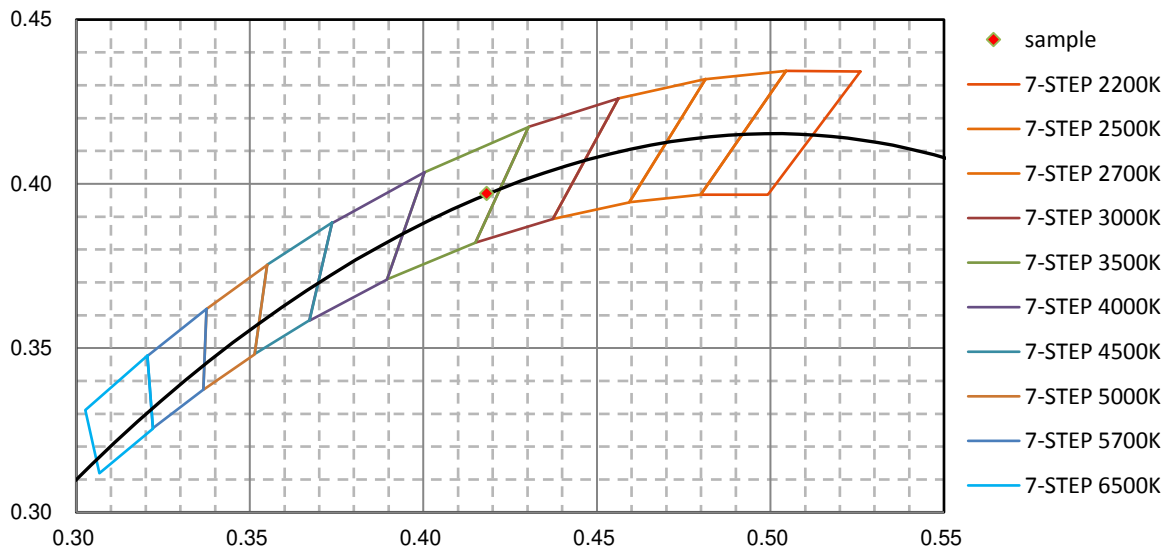
nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
380	1.180E-02	421	2.214E-01	462	1.616E+01	503	1.052E+01	544	1.818E+01
381	5.220E-02	422	2.669E-01	463	1.493E+01	504	1.084E+01	545	1.829E+01
382	1.770E-02	423	3.377E-01	464	1.384E+01	505	1.119E+01	546	1.839E+01
383	1.100E-02	424	4.015E-01	465	1.309E+01	506	1.155E+01	547	1.857E+01
384	5.310E-02	425	5.111E-01	466	1.255E+01	507	1.182E+01	548	1.875E+01
385	3.430E-02	426	5.597E-01	467	1.216E+01	508	1.214E+01	549	1.882E+01
386	1.900E-03	427	6.837E-01	468	1.190E+01	509	1.248E+01	550	1.899E+01
387	2.780E-02	428	8.286E-01	469	1.164E+01	510	1.277E+01	551	1.910E+01
388	9.100E-03	429	9.883E-01	470	1.143E+01	511	1.305E+01	552	1.930E+01
389	1.150E-02	430	1.147E+00	471	1.113E+01	512	1.335E+01	553	1.944E+01
390	4.720E-02	431	1.295E+00	472	1.069E+01	513	1.357E+01	554	1.961E+01
391	1.320E-02	432	1.545E+00	473	1.025E+01	514	1.382E+01	555	1.978E+01
392	1.100E-03	433	1.777E+00	474	9.735E+00	515	1.408E+01	556	1.994E+01
393	7.400E-03	434	2.049E+00	475	9.165E+00	516	1.435E+01	557	2.018E+01
394	1.190E-02	435	2.310E+00	476	8.567E+00	517	1.455E+01	558	2.032E+01
395	3.270E-02	436	2.631E+00	477	8.070E+00	518	1.473E+01	559	2.052E+01
396	1.210E-02	437	2.966E+00	478	7.577E+00	519	1.497E+01	560	2.065E+01
397	2.130E-02	438	3.368E+00	479	7.242E+00	520	1.518E+01	561	2.088E+01
398	1.100E-03	439	3.766E+00	480	6.928E+00	521	1.532E+01	562	2.107E+01
399	0.000E+00	440	4.268E+00	481	6.710E+00	522	1.551E+01	563	2.127E+01
400	0.000E+00	441	4.760E+00	482	6.581E+00	523	1.565E+01	564	2.146E+01
401	1.240E-02	442	5.345E+00	483	6.529E+00	524	1.585E+01	565	2.166E+01
402	1.240E-02	443	6.004E+00	484	6.560E+00	525	1.597E+01	566	2.193E+01
403	1.460E-02	444	6.777E+00	485	6.653E+00	526	1.615E+01	567	2.218E+01
404	8.000E-03	445	7.692E+00	486	6.677E+00	527	1.624E+01	568	2.234E+01
405	2.400E-02	446	8.765E+00	487	6.811E+00	528	1.644E+01	569	2.262E+01
406	4.200E-03	447	1.002E+01	488	6.879E+00	529	1.655E+01	570	2.277E+01
407	7.900E-02	448	1.149E+01	489	7.038E+00	530	1.661E+01	571	2.301E+01
408	9.800E-03	449	1.327E+01	490	7.203E+00	531	1.675E+01	572	2.332E+01
409	2.450E-02	450	1.520E+01	491	7.363E+00	532	1.685E+01	573	2.347E+01
410	4.860E-02	451	1.713E+01	492	7.467E+00	533	1.697E+01	574	2.364E+01
411	3.540E-02	452	1.902E+01	493	7.641E+00	534	1.706E+01	575	2.393E+01
412	4.060E-02	453	2.085E+01	494	7.842E+00	535	1.717E+01	576	2.420E+01
413	1.830E-02	454	2.230E+01	495	8.052E+00	536	1.730E+01	577	2.441E+01
414	4.740E-02	455	2.322E+01	496	8.289E+00	537	1.740E+01	578	2.457E+01
415	3.860E-02	456	2.344E+01	497	8.592E+00	538	1.751E+01	579	2.480E+01
416	4.780E-02	457	2.316E+01	498	8.847E+00	539	1.761E+01	580	2.507E+01
417	9.910E-02	458	2.227E+01	499	9.162E+00	540	1.768E+01	581	2.534E+01
418	1.329E-01	459	2.078E+01	500	9.490E+00	541	1.784E+01	582	2.544E+01
419	1.419E-01	460	1.934E+01	501	9.817E+00	542	1.795E+01	583	2.571E+01
420	2.003E-01	461	1.779E+01	502	1.021E+01	543	1.808E+01	584	2.592E+01

nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
585	2.614E+01	626	2.466E+01	667	1.129E+01	708	3.287E+00	749	5.841E-01
586	2.629E+01	627	2.442E+01	668	1.096E+01	709	3.178E+00	750	5.807E-01
587	2.649E+01	628	2.410E+01	669	1.070E+01	710	3.057E+00	751	5.648E-01
588	2.674E+01	629	2.383E+01	670	1.042E+01	711	2.945E+00	752	5.849E-01
589	2.690E+01	630	2.351E+01	671	1.015E+01	712	2.824E+00	753	5.219E-01
590	2.700E+01	631	2.316E+01	672	9.822E+00	713	2.789E+00	754	4.399E-01
591	2.717E+01	632	2.286E+01	673	9.560E+00	714	2.624E+00	755	3.799E-01
592	2.734E+01	633	2.259E+01	674	9.276E+00	715	2.494E+00	756	4.726E-01
593	2.747E+01	634	2.227E+01	675	9.105E+00	716	2.387E+00	757	3.782E-01
594	2.758E+01	635	2.192E+01	676	8.869E+00	717	2.343E+00	758	1.971E-01
595	2.777E+01	636	2.154E+01	677	8.572E+00	718	2.279E+00	759	3.603E-01
596	2.785E+01	637	2.118E+01	678	8.308E+00	719	2.161E+00	760	2.452E-01
597	2.790E+01	638	2.086E+01	679	8.148E+00	720	2.114E+00	761	2.545E-01
598	2.802E+01	639	2.056E+01	680	7.818E+00	721	1.955E+00	762	4.146E-01
599	2.803E+01	640	2.018E+01	681	7.650E+00	722	1.986E+00	763	4.133E-01
600	2.814E+01	641	1.987E+01	682	7.486E+00	723	1.900E+00	764	2.647E-01
601	2.823E+01	642	1.954E+01	683	7.286E+00	724	1.730E+00	765	2.097E-01
602	2.828E+01	643	1.915E+01	684	6.997E+00	725	1.756E+00	766	2.520E-01
603	2.826E+01	644	1.881E+01	685	6.802E+00	726	1.659E+00	767	2.537E-01
604	2.822E+01	645	1.849E+01	686	6.609E+00	727	1.611E+00	768	2.913E-01
605	2.818E+01	646	1.812E+01	687	6.462E+00	728	1.521E+00	769	2.643E-01
606	2.823E+01	647	1.782E+01	688	6.244E+00	729	1.575E+00	770	1.780E-01
607	2.816E+01	648	1.749E+01	689	6.012E+00	730	1.479E+00	771	1.445E-01
608	2.802E+01	649	1.713E+01	690	5.830E+00	731	1.354E+00	772	2.364E-01
609	2.801E+01	650	1.679E+01	691	5.731E+00	732	1.404E+00	773	1.519E-01
610	2.789E+01	651	1.646E+01	692	5.520E+00	733	1.205E+00	774	1.478E-01
611	2.785E+01	652	1.611E+01	693	5.375E+00	734	1.217E+00	775	1.764E-01
612	2.775E+01	653	1.570E+01	694	5.207E+00	735	1.184E+00	776	9.890E-02
613	2.758E+01	654	1.543E+01	695	5.033E+00	736	1.126E+00	777	1.531E-01
614	2.748E+01	655	1.508E+01	696	4.839E+00	737	1.060E+00	778	1.944E-01
615	2.725E+01	656	1.471E+01	697	4.759E+00	738	9.462E-01	779	1.376E-01
616	2.708E+01	657	1.440E+01	698	4.587E+00	739	9.022E-01	780	1.187E-01
617	2.691E+01	658	1.405E+01	699	4.462E+00	740	8.563E-01		
618	2.673E+01	659	1.374E+01	700	4.297E+00	741	9.147E-01		
619	2.650E+01	660	1.343E+01	701	4.202E+00	742	9.086E-01		
620	2.622E+01	661	1.309E+01	702	4.004E+00	743	8.524E-01		
621	2.605E+01	662	1.277E+01	703	3.853E+00	744	6.830E-01		
622	2.576E+01	663	1.248E+01	704	3.741E+00	745	7.119E-01		
623	2.553E+01	664	1.210E+01	705	3.598E+00	746	5.310E-01		
624	2.523E+01	665	1.191E+01	706	3.492E+00	747	6.319E-01		
625	2.497E+01	666	1.156E+01	707	3.405E+00	748	6.442E-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**

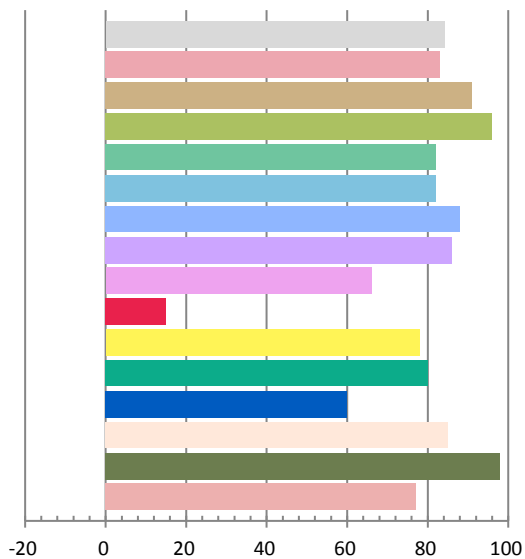
Photometric and Electrical Measurement Result

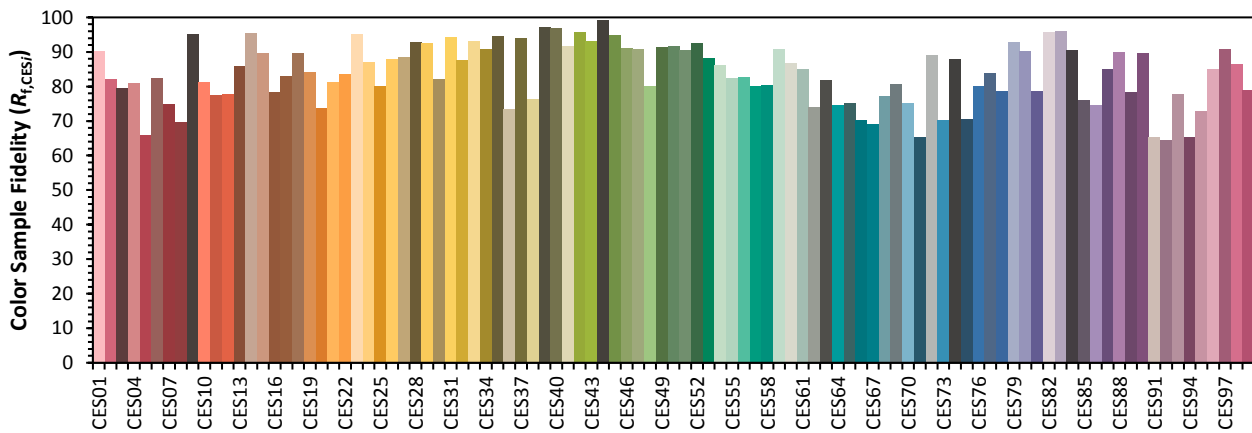
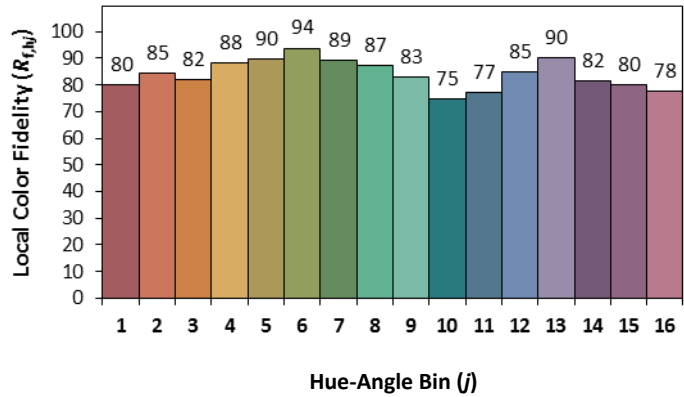
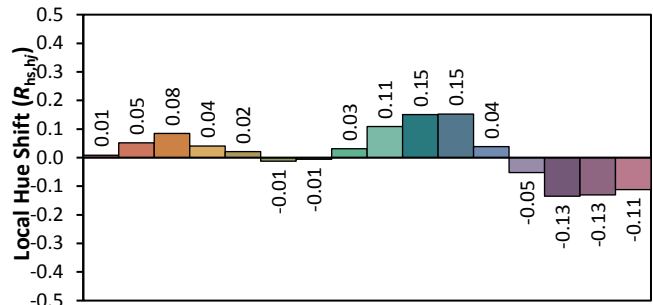
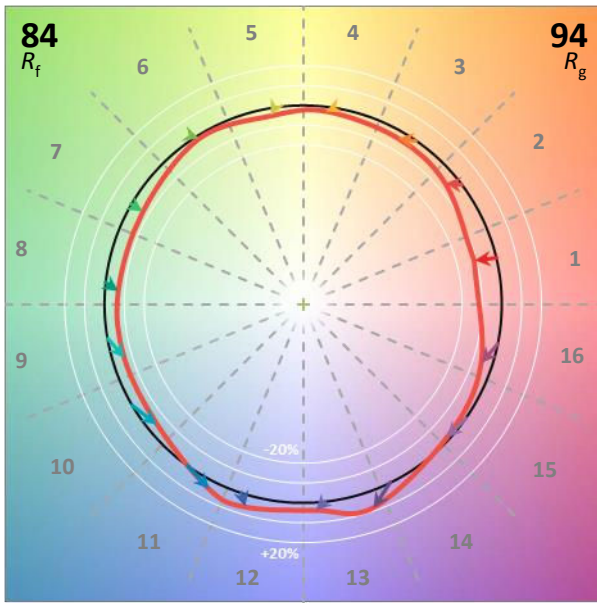
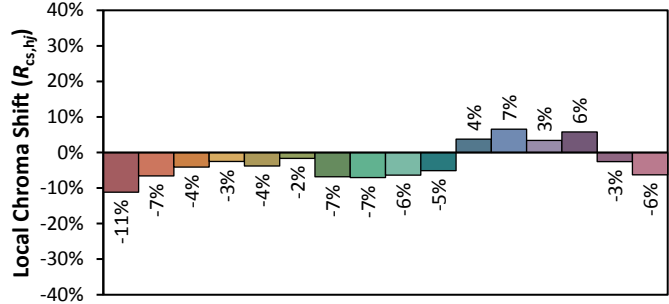
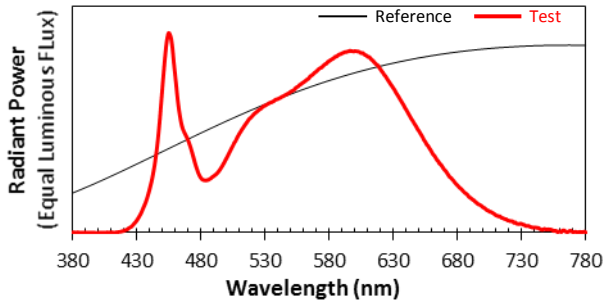
Voltage(V)	Frequency(Hz)	Current(A)	Power (W)	Power Factor	Luminous Flux(lm)	Efficacy(lm/W)
120	60	0.1016	12.1	0.9926	1483.6	122.62

Radiant Flux (W)	CCT (K)	Duv	x	y	u'	v'
4.477	3778	0.00145	0.3920	0.3868	0.2286	0.5076

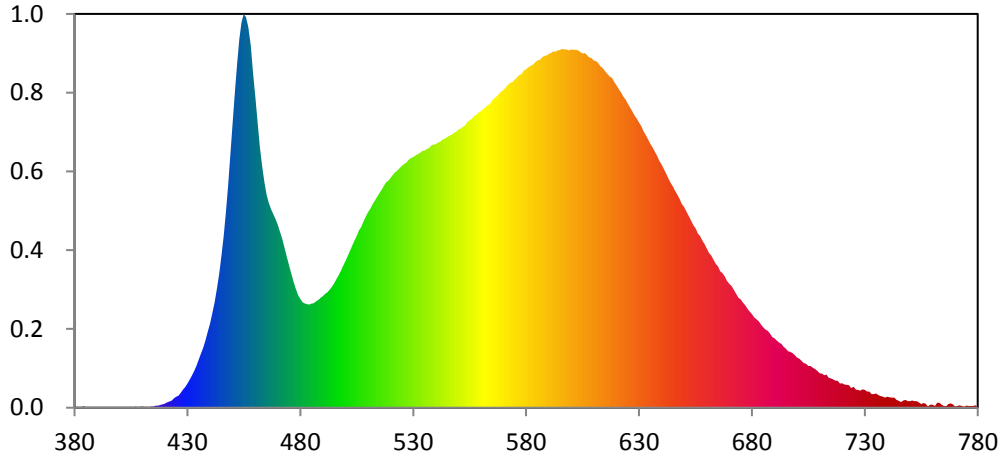
Color Rendering Index

Ra			
84.2			
R1	R2	R3	R4
83	91	96	82
R5	R6	R7	R8
82	88	86	66
R9	R10	R11	R12
15	78	80	60
R13	R14	R15	
85	98	77	





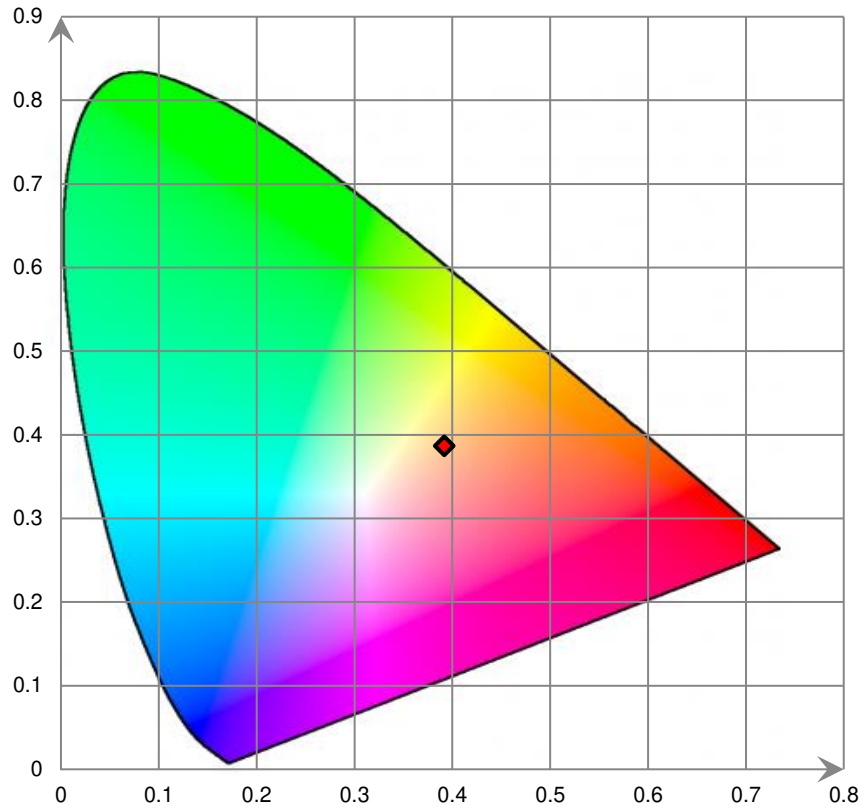
Relative Spectral Power Distribution



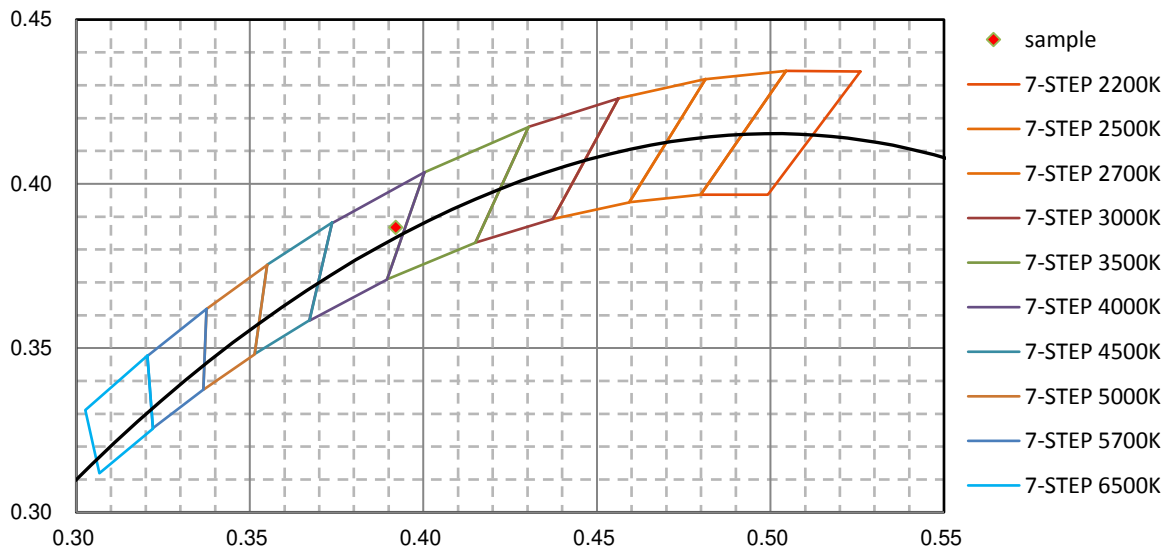
nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
380	4.770E-02	421	3.777E-01	462	1.910E+01	503	1.182E+01	544	1.960E+01
381	4.160E-02	422	4.452E-01	463	1.768E+01	504	1.219E+01	545	1.973E+01
382	4.530E-02	423	5.212E-01	464	1.653E+01	505	1.251E+01	546	1.982E+01
383	2.550E-02	424	6.880E-01	465	1.558E+01	506	1.293E+01	547	1.990E+01
384	9.900E-02	425	7.989E-01	466	1.495E+01	507	1.317E+01	548	2.003E+01
385	3.020E-02	426	8.876E-01	467	1.450E+01	508	1.358E+01	549	2.012E+01
386	2.100E-03	427	1.092E+00	468	1.412E+01	509	1.391E+01	550	2.029E+01
387	4.280E-02	428	1.317E+00	469	1.378E+01	510	1.424E+01	551	2.036E+01
388	5.400E-03	429	1.513E+00	470	1.335E+01	511	1.453E+01	552	2.046E+01
389	2.000E-03	430	1.754E+00	471	1.285E+01	512	1.484E+01	553	2.060E+01
390	6.790E-02	431	2.032E+00	472	1.232E+01	513	1.510E+01	554	2.083E+01
391	1.080E-02	432	2.338E+00	473	1.171E+01	514	1.540E+01	555	2.096E+01
392	9.800E-03	433	2.665E+00	474	1.104E+01	515	1.564E+01	556	2.105E+01
393	9.400E-03	434	3.050E+00	475	1.036E+01	516	1.590E+01	557	2.125E+01
394	1.030E-02	435	3.479E+00	476	9.735E+00	517	1.619E+01	558	2.136E+01
395	4.050E-02	436	3.924E+00	477	9.160E+00	518	1.643E+01	559	2.152E+01
396	6.300E-03	437	4.340E+00	478	8.635E+00	519	1.656E+01	560	2.161E+01
397	6.300E-03	438	4.887E+00	479	8.212E+00	520	1.676E+01	561	2.177E+01
398	8.800E-03	439	5.495E+00	480	7.914E+00	521	1.698E+01	562	2.191E+01
399	2.000E-04	440	6.161E+00	481	7.689E+00	522	1.716E+01	563	2.207E+01
400	0.000E+00	441	6.909E+00	482	7.592E+00	523	1.731E+01	564	2.215E+01
401	4.630E-02	442	7.695E+00	483	7.557E+00	524	1.746E+01	565	2.244E+01
402	2.300E-02	443	8.665E+00	484	7.515E+00	525	1.763E+01	566	2.258E+01
403	2.640E-02	444	9.723E+00	485	7.585E+00	526	1.776E+01	567	2.270E+01
404	3.220E-02	445	1.102E+01	486	7.619E+00	527	1.786E+01	568	2.290E+01
405	3.700E-02	446	1.244E+01	487	7.749E+00	528	1.807E+01	569	2.305E+01
406	9.700E-03	447	1.420E+01	488	7.850E+00	529	1.822E+01	570	2.317E+01
407	8.290E-02	448	1.615E+01	489	8.020E+00	530	1.827E+01	571	2.337E+01
408	1.870E-02	449	1.840E+01	490	8.132E+00	531	1.839E+01	572	2.355E+01
409	5.390E-02	450	2.067E+01	491	8.284E+00	532	1.849E+01	573	2.368E+01
410	8.340E-02	451	2.291E+01	492	8.421E+00	533	1.859E+01	574	2.373E+01
411	6.820E-02	452	2.499E+01	493	8.619E+00	534	1.872E+01	575	2.391E+01
412	2.100E-02	453	2.683E+01	494	8.838E+00	535	1.874E+01	576	2.409E+01
413	2.080E-02	454	2.809E+01	495	9.091E+00	536	1.886E+01	577	2.426E+01
414	8.200E-02	455	2.871E+01	496	9.390E+00	537	1.894E+01	578	2.433E+01
415	7.420E-02	456	2.847E+01	497	9.666E+00	538	1.912E+01	579	2.457E+01
416	1.409E-01	457	2.778E+01	498	1.001E+01	539	1.918E+01	580	2.467E+01
417	1.500E-01	458	2.640E+01	499	1.036E+01	540	1.922E+01	581	2.481E+01
418	1.959E-01	459	2.442E+01	500	1.070E+01	541	1.933E+01	582	2.494E+01
419	2.453E-01	460	2.271E+01	501	1.106E+01	542	1.940E+01	583	2.501E+01
420	2.940E-01	461	2.089E+01	502	1.145E+01	543	1.954E+01	584	2.518E+01

nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
585	2.533E+01	626	2.189E+01	667	9.821E+00	708	2.812E+00	749	4.776E-01
586	2.535E+01	627	2.162E+01	668	9.581E+00	709	2.675E+00	750	4.828E-01
587	2.552E+01	628	2.132E+01	669	9.255E+00	710	2.515E+00	751	5.229E-01
588	2.565E+01	629	2.107E+01	670	9.029E+00	711	2.474E+00	752	4.887E-01
589	2.567E+01	630	2.079E+01	671	8.854E+00	712	2.360E+00	753	4.781E-01
590	2.580E+01	631	2.053E+01	672	8.563E+00	713	2.406E+00	754	3.852E-01
591	2.586E+01	632	2.017E+01	673	8.283E+00	714	2.183E+00	755	2.663E-01
592	2.597E+01	633	1.989E+01	674	8.013E+00	715	2.144E+00	756	3.280E-01
593	2.595E+01	634	1.959E+01	675	7.898E+00	716	2.056E+00	757	2.813E-01
594	2.604E+01	635	1.927E+01	676	7.668E+00	717	1.975E+00	758	8.800E-02
595	2.606E+01	636	1.897E+01	677	7.477E+00	718	1.976E+00	759	2.119E-01
596	2.616E+01	637	1.865E+01	678	7.211E+00	719	1.766E+00	760	2.337E-01
597	2.613E+01	638	1.836E+01	679	7.011E+00	720	1.776E+00	761	1.191E-01
598	2.611E+01	639	1.798E+01	680	6.835E+00	721	1.688E+00	762	3.538E-01
599	2.605E+01	640	1.773E+01	681	6.601E+00	722	1.670E+00	763	3.660E-01
600	2.612E+01	641	1.739E+01	682	6.442E+00	723	1.640E+00	764	2.158E-01
601	2.610E+01	642	1.706E+01	683	6.308E+00	724	1.436E+00	765	1.185E-01
602	2.608E+01	643	1.673E+01	684	6.079E+00	725	1.523E+00	766	1.128E-01
603	2.604E+01	644	1.640E+01	685	5.875E+00	726	1.320E+00	767	2.578E-01
604	2.594E+01	645	1.614E+01	686	5.712E+00	727	1.290E+00	768	3.032E-01
605	2.582E+01	646	1.581E+01	687	5.603E+00	728	1.262E+00	769	2.366E-01
606	2.586E+01	647	1.552E+01	688	5.430E+00	729	1.346E+00	770	9.020E-02
607	2.571E+01	648	1.523E+01	689	5.157E+00	730	1.291E+00	771	1.234E-01
608	2.555E+01	649	1.486E+01	690	5.054E+00	731	1.174E+00	772	1.659E-01
609	2.548E+01	650	1.465E+01	691	4.898E+00	732	1.170E+00	773	1.221E-01
610	2.531E+01	651	1.431E+01	692	4.758E+00	733	1.003E+00	774	5.830E-02
611	2.528E+01	652	1.401E+01	693	4.644E+00	734	9.840E-01	775	1.586E-01
612	2.512E+01	653	1.369E+01	694	4.454E+00	735	1.030E+00	776	1.164E-01
613	2.488E+01	654	1.330E+01	695	4.315E+00	736	9.320E-01	777	1.350E-01
614	2.476E+01	655	1.307E+01	696	4.126E+00	737	8.416E-01	778	1.222E-01
615	2.453E+01	656	1.270E+01	697	4.071E+00	738	8.067E-01	779	1.828E-01
616	2.434E+01	657	1.251E+01	698	3.968E+00	739	7.277E-01	780	5.310E-02
617	2.415E+01	658	1.220E+01	699	3.826E+00	740	7.995E-01		
618	2.404E+01	659	1.193E+01	700	3.649E+00	741	7.614E-01		
619	2.373E+01	660	1.160E+01	701	3.586E+00	742	7.284E-01		
620	2.350E+01	661	1.127E+01	702	3.415E+00	743	7.321E-01		
621	2.322E+01	662	1.110E+01	703	3.250E+00	744	5.693E-01		
622	2.299E+01	663	1.079E+01	704	3.203E+00	745	5.110E-01		
623	2.268E+01	664	1.047E+01	705	3.039E+00	746	4.045E-01		
624	2.248E+01	665	1.030E+01	706	3.034E+00	747	5.137E-01		
625	2.217E+01	666	9.959E+00	707	2.901E+00	748	5.840E-01		

CIE 1931xy Chromaticity Diagram



7-StepChromaticity Quadrangles



[Goniophotometer System]

Control Setting: 3000K

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

Test orientation: **Downward**

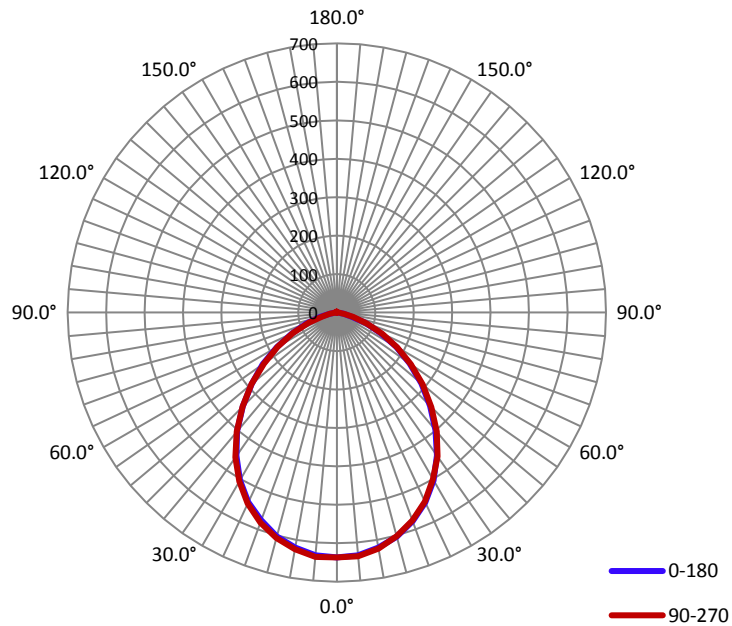
Electrical Measurement

Input Voltage(V)	Frequency(Hz)	Input Current(A)	Power (W)	Power Factor
120.0	60	0.1020	12.16	0.9950

Photometric Measurement

Luminous Flux(lm)	Efficacy(lm/W)	$I_{max}(cd)$	S/MH(C0/180)	S/MH(C90/270)
1421.3	116.93	641.4	1.18	1.18

Luminous Intensity Distribution



	C0/180	C45/225	C90/270	C135/315	AVG.
Beam Angle(50% I_{max}):	94.5	94.5	94.6	94.8	94.6
Field Angle(10% I_{max}):	144.4	144.3	144.1	144.2	144.3

Luminous Intensity (cd) Distribution Data

C \ y	0°	22.5°	45°	67.5°	90°	112.5°	135°	157.5°
0.0°	637	637	637	637	637	637	637	637
5.0°	634	630	632	635	636	633	633	632
10.0°	620	620	621	622	623	620	620	620
15.0°	603	601	600	601	602	600	602	600
20.0°	577	571	576	573	575	574	575	575
25.0°	545	540	540	540	542	541	542	543
30.0°	504	499	500	499	501	501	504	503
35.0°	454	452	450	453	457	453	456	457
40.0°	399	395	397	397	404	401	403	404
45.0°	343	342	341	343	348	347	349	349
50.0°	287	285	286	286	291	292	294	293
55.0°	231	232	232	233	235	237	239	239
60.0°	178	177	179	179	182	184	186	187
65.0°	127	126	128	129	131	132	135	137
70.0°	80	80	81	83	84	86	88	89
75.0°	39	41	42	43	44	47	48	49
80.0°	18	19	20	20	20	22	23	23
85.0°	5	6	6	6	7	8	10	9
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	1	0	0
145.0°	0	0	1	1	1	1	1	1
150.0°	0	1	1	1	1	1	1	1
155.0°	0	1	2	2	1	2	2	1
160.0°	0	1	2	2	2	2	1	1
165.0°	1	1	2	2	2	2	2	2
170.0°	0	2	2	2	2	3	2	2
175.0°	2	2	3	3	2	2	3	2
180.0°	0	0	0	0	0	0	0	0

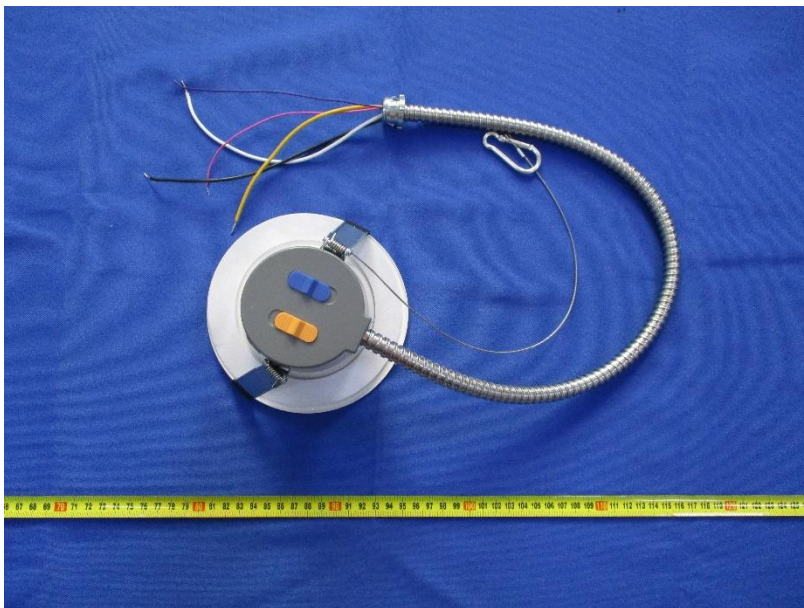
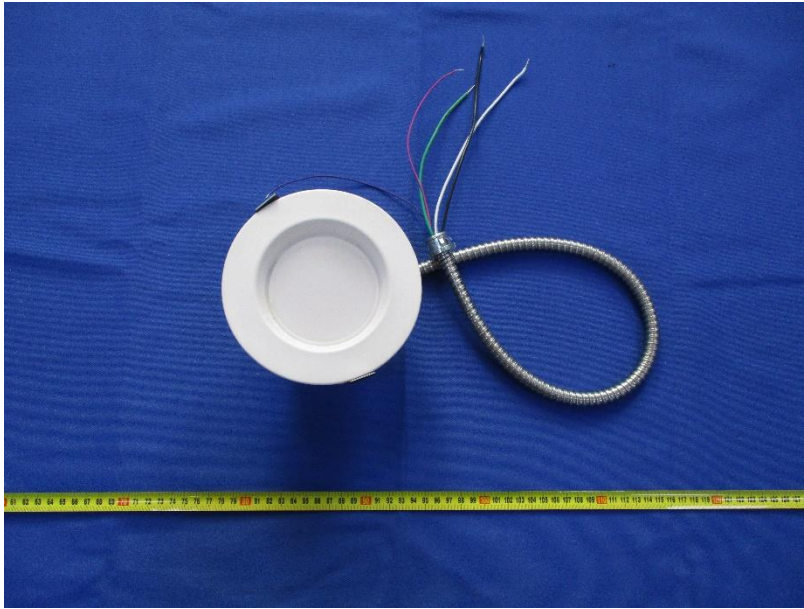
Luminous Intensity (cd) Distribution Data (cont.)

C \ Y	180°	202.5°	225°	247.5°	270°	292.5°	315°	337.5°
0.0°	637	637	637	637	637	637	637	637
5.0°	634	632	633	633	638	634	634	633
10.0°	621	621	621	622	625	622	623	623
15.0°	603	600	604	600	607	605	604	603
20.0°	575	574	580	580	581	579	579	578
25.0°	544	545	544	547	548	546	545	544
30.0°	503	504	507	502	507	504	503	501
35.0°	455	455	456	457	460	455	453	451
40.0°	403	402	404	403	404	401	399	397
45.0°	345	346	347	347	347	344	342	340
50.0°	289	289	291	289	289	287	284	282
55.0°	235	234	235	234	231	228	226	226
60.0°	181	180	179	178	177	173	172	172
65.0°	130	130	129	128	125	122	121	121
70.0°	85	84	83	80	78	76	75	74
75.0°	45	45	44	42	39	38	37	36
80.0°	21	21	20	19	19	18	17	17
85.0°	7	8	7	6	5	5	4	4
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	1	0	1	0
155.0°	0	0	1	1	1	2	1	1
160.0°	0	0	1	2	2	2	1	1
165.0°	0	1	2	2	2	2	2	2
170.0°	1	1	2	2	3	2	2	2
175.0°	1	2	2	2	2	2	2	2
180.0°	0	0	0	0	0	0	0	0

Zonal Lumen Density Measurement

Deg	Flux (lm)	%	Deg	Flux (lm)	%
0-5	15.2	1.06	0-5	15.2	1.07
5-10	44.8	3.15	0-10	60.1	4.23
10-15	72.6	5.11	0-15	132.7	9.33
15-20	97.1	6.83	0-20	229.8	16.17
20-25	117.4	8.27	0-25	347.3	24.43
25-30	132.4	9.32	0-30	479.7	33.75
30-35	140.8	9.92	0-35	620.6	43.67
35-40	142.6	10.02	0-40	763.2	53.70
40-45	138.0	9.71	0-45	901.2	63.41
45-50	127.8	9.01	0-50	1029.1	72.41
50-55	113.2	7.97	0-55	1142.3	80.37
55-60	95.0	6.68	0-60	1237.3	87.05
60-65	74.4	5.25	0-65	1311.6	92.28
65-70	52.8	3.71	0-70	1364.4	96.00
70-75	32.0	2.25	0-75	1396.4	98.25
75-80	15.6	1.09	0-80	1411.9	99.34
80-85	7.0	0.50	0-85	1419.0	99.84
85-90	1.0	0.07	0-90	1420.0	99.91
90-95	0.0	0.00	0-95	1420.0	99.91
95-100	0.0	0.00	0-100	1420.0	99.91
100-105	0.0	0.00	0-105	1420.0	99.91
105-110	0.0	0.00	0-110	1420.0	99.91
110-115	0.0	0.00	0-115	1420.0	99.91
115-120	0.0	0.00	0-120	1420.0	99.91
120-125	0.0	0.00	0-125	1420.0	99.91
125-130	0.0	0.00	0-130	1420.0	99.91
130-135	0.0	0.00	0-135	1420.0	99.91
135-140	0.0	0.00	0-140	1420.0	99.91
140-145	0.0	0.00	0-145	1420.0	99.91
145-150	0.0	0.00	0-150	1420.1	99.92
150-155	0.0	0.00	0-155	1420.3	99.93
155-160	0.5	0.00	0-160	1420.6	99.95
160-165	0.2	0.00	0-165	1420.9	99.97
165-170	0.0	0.00	0-170	1421.1	99.99
170-175	0.0	0.00	0-175	1421.2	100.00
175-180	0.0	0.00	0-180	1421.3	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.
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*****END OF REPORT*****