

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: INFTP6/8CCT3S/DIM010UNV

Report Type:	Electrical and Photometric tests including: Luminous Flux, Chromaticity, Luminous Intensity Distribution
Project Engineer:	Bay Wang
Report Number:	RKSB230301006-10-1
Test Date:	2023-03-02 to 2023-03-04
Report Date:	2023-03-10
Reviewed By:	Seven Xia / EE Engineer
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:	INFTP6/8CCT3S/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:	9W/13W/16W
Nominal CCT:	3000K, 3500K, 4000K
Nominal Lumen Output:	1900lm/2000lm/2000lm @16W

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**

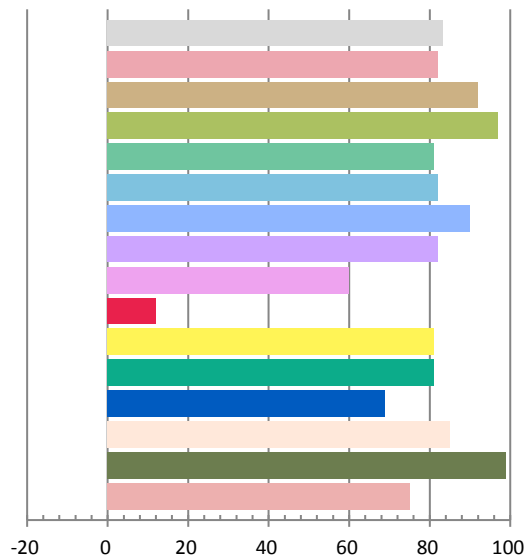
Photometric and Electrical Measurement Result

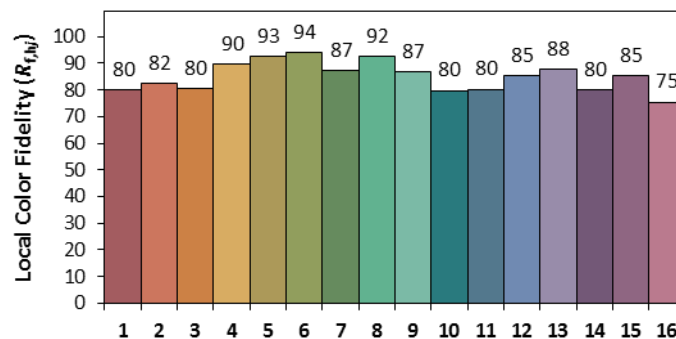
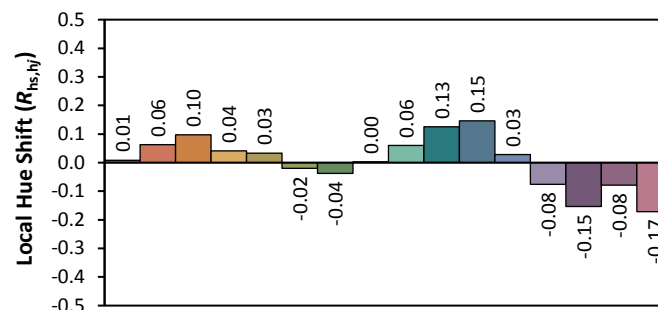
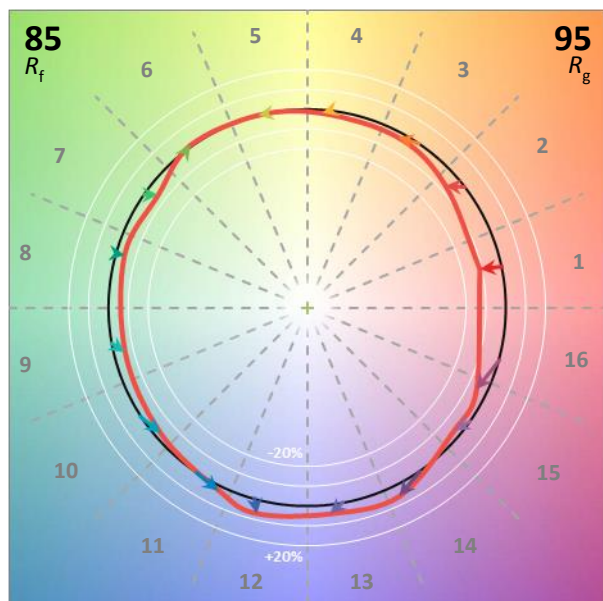
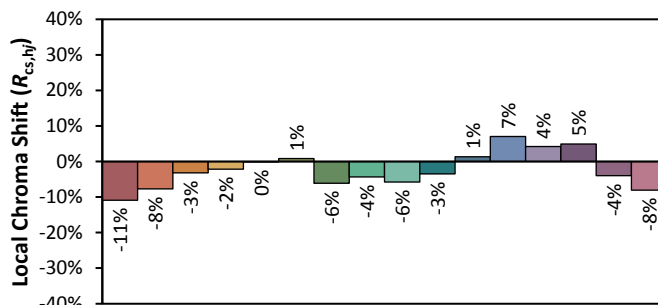
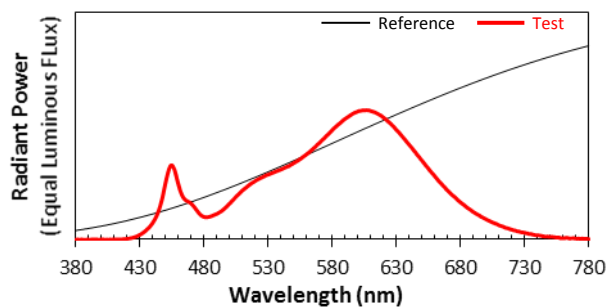
Voltage(V)	Frequency(Hz)	Current(A)	Power (W)	Power Factor	Luminous Flux(lm)	Efficacy(lm/W)
120	60	0.1355	16.16	0.9938	2162.8	133.84

Radiant Flux (W)	CCT (K)	Duv	x	y	u'	v'
6.569	2918	0.00023	0.4433	0.4067	0.2535	0.5234

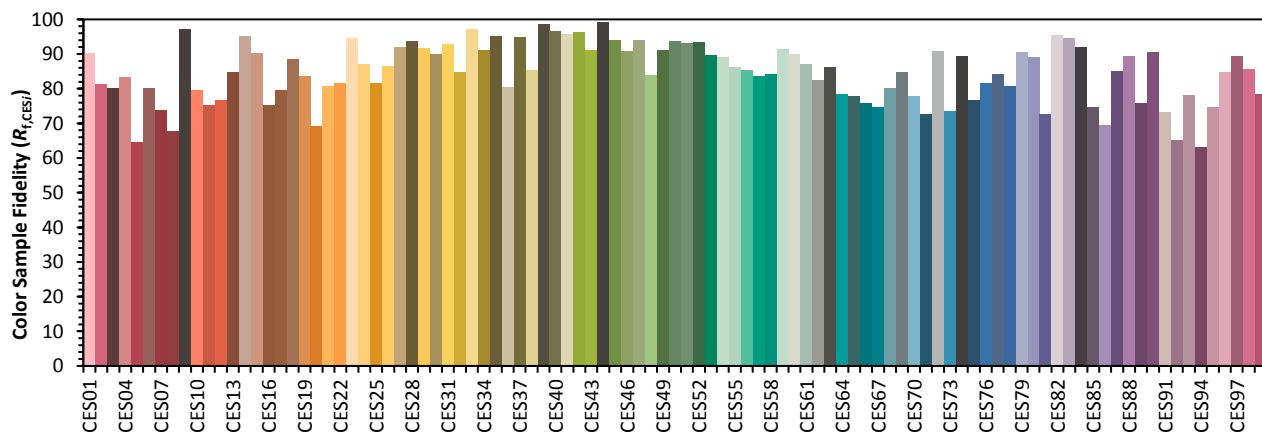
Color Rendering Index

Ra			
83.4			
R1	R2	R3	R4
82	92	97	81
R5	R6	R7	R8
82	90	82	60
R9	R10	R11	R12
12	81	81	69
R13	R14	R15	
85	99	75	

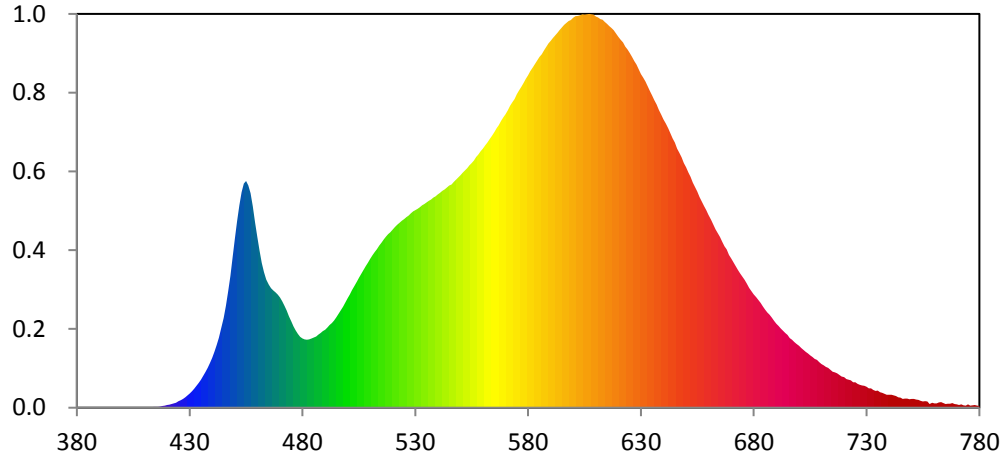




Hue-Angle Bin (j)



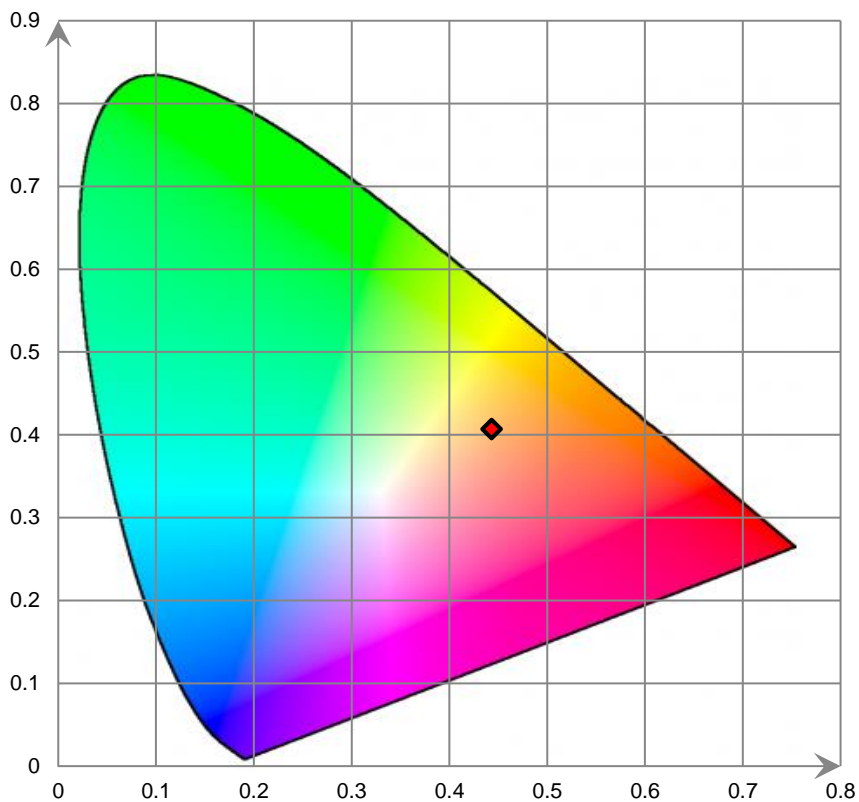
Relative Spectral Power Distribution



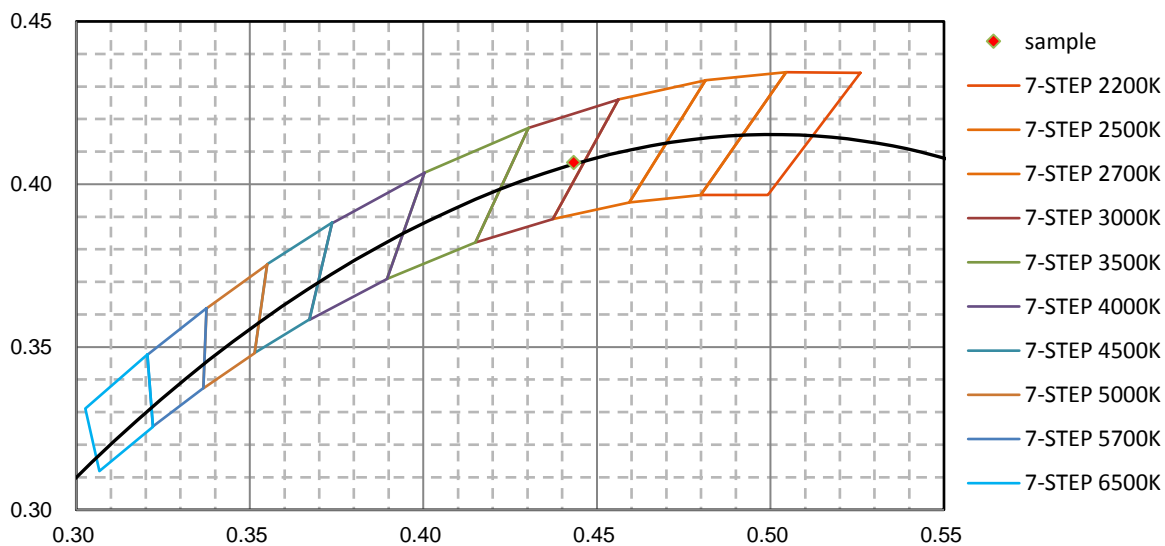
nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
380	2.000E-03	421	3.499E-01	462	1.657E+01	503	1.388E+01	544	2.518E+01
381	3.590E-02	422	4.042E-01	463	1.551E+01	504	1.440E+01	545	2.540E+01
382	3.950E-02	423	5.081E-01	464	1.465E+01	505	1.486E+01	546	2.551E+01
383	1.290E-02	424	5.868E-01	465	1.408E+01	506	1.530E+01	547	2.580E+01
384	4.140E-02	425	7.375E-01	466	1.368E+01	507	1.574E+01	548	2.609E+01
385	4.800E-02	426	8.516E-01	467	1.341E+01	508	1.619E+01	549	2.632E+01
386	4.000E-03	427	1.002E+00	468	1.320E+01	509	1.661E+01	550	2.660E+01
387	3.160E-02	428	1.188E+00	469	1.294E+01	510	1.705E+01	551	2.687E+01
388	9.500E-03	429	1.425E+00	470	1.261E+01	511	1.743E+01	552	2.713E+01
389	3.110E-02	430	1.630E+00	471	1.216E+01	512	1.781E+01	553	2.739E+01
390	2.440E-02	431	1.867E+00	472	1.164E+01	513	1.813E+01	554	2.771E+01
391	1.320E-02	432	2.164E+00	473	1.112E+01	514	1.854E+01	555	2.798E+01
392	9.400E-03	433	2.498E+00	474	1.046E+01	515	1.886E+01	556	2.827E+01
393	7.900E-03	434	2.826E+00	475	9.907E+00	516	1.922E+01	557	2.866E+01
394	1.900E-03	435	3.189E+00	476	9.321E+00	517	1.955E+01	558	2.897E+01
395	2.690E-02	436	3.644E+00	477	8.830E+00	518	1.984E+01	559	2.932E+01
396	2.680E-02	437	4.070E+00	478	8.426E+00	519	2.008E+01	560	2.964E+01
397	1.930E-02	438	4.549E+00	479	8.119E+00	520	2.037E+01	561	3.001E+01
398	8.500E-03	439	5.109E+00	480	7.912E+00	521	2.067E+01	562	3.033E+01
399	4.000E-04	440	5.686E+00	481	7.814E+00	522	2.093E+01	563	3.075E+01
400	0.000E+00	441	6.406E+00	482	7.772E+00	523	2.113E+01	564	3.114E+01
401	1.980E-02	442	7.151E+00	483	7.817E+00	524	2.138E+01	565	3.153E+01
402	2.940E-02	443	8.006E+00	484	7.910E+00	525	2.157E+01	566	3.195E+01
403	1.540E-02	444	9.064E+00	485	8.037E+00	526	2.180E+01	567	3.232E+01
404	7.000E-03	445	1.025E+01	486	8.161E+00	527	2.198E+01	568	3.280E+01
405	3.750E-02	446	1.166E+01	487	8.370E+00	528	2.225E+01	569	3.323E+01
406	1.050E-02	447	1.329E+01	488	8.553E+00	529	2.245E+01	570	3.358E+01
407	6.350E-02	448	1.507E+01	489	8.757E+00	530	2.259E+01	571	3.403E+01
408	1.470E-02	449	1.721E+01	490	8.916E+00	531	2.275E+01	572	3.453E+01
409	5.890E-02	450	1.933E+01	491	9.161E+00	532	2.293E+01	573	3.492E+01
410	7.040E-02	451	2.136E+01	492	9.442E+00	533	2.315E+01	574	3.531E+01
411	3.950E-02	452	2.313E+01	493	9.693E+00	534	2.329E+01	575	3.583E+01
412	5.330E-02	453	2.463E+01	494	9.979E+00	535	2.346E+01	576	3.627E+01
413	2.700E-02	454	2.562E+01	495	1.035E+01	536	2.368E+01	577	3.668E+01
414	8.180E-02	455	2.591E+01	496	1.074E+01	537	2.382E+01	578	3.714E+01
415	7.710E-02	456	2.542E+01	497	1.116E+01	538	2.402E+01	579	3.759E+01
416	9.350E-02	457	2.453E+01	498	1.156E+01	539	2.416E+01	580	3.801E+01
417	1.369E-01	458	2.303E+01	499	1.202E+01	540	2.439E+01	581	3.847E+01
418	1.948E-01	459	2.122E+01	500	1.250E+01	541	2.456E+01	582	3.892E+01
419	2.317E-01	460	1.958E+01	501	1.292E+01	542	2.478E+01	583	3.931E+01
420	3.117E-01	461	1.800E+01	502	1.347E+01	543	2.498E+01	584	3.973E+01

nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
585	4.014E+01	626	4.014E+01	667	1.848E+01	708	5.480E+00	749	9.755E-01
586	4.042E+01	627	3.964E+01	668	1.809E+01	709	5.225E+00	750	1.008E+00
587	4.085E+01	628	3.925E+01	669	1.748E+01	710	4.983E+00	751	9.970E-01
588	4.127E+01	629	3.871E+01	670	1.707E+01	711	4.857E+00	752	9.322E-01
589	4.165E+01	630	3.816E+01	671	1.663E+01	712	4.665E+00	753	9.074E-01
590	4.196E+01	631	3.773E+01	672	1.621E+01	713	4.560E+00	754	7.918E-01
591	4.229E+01	632	3.730E+01	673	1.575E+01	714	4.346E+00	755	6.989E-01
592	4.258E+01	633	3.675E+01	674	1.533E+01	715	4.125E+00	756	7.575E-01
593	4.286E+01	634	3.619E+01	675	1.500E+01	716	4.045E+00	757	7.311E-01
594	4.320E+01	635	3.568E+01	676	1.462E+01	717	3.924E+00	758	4.372E-01
595	4.348E+01	636	3.514E+01	677	1.417E+01	718	3.755E+00	759	5.819E-01
596	4.379E+01	637	3.467E+01	678	1.369E+01	719	3.555E+00	760	4.985E-01
597	4.401E+01	638	3.405E+01	679	1.335E+01	720	3.502E+00	761	4.754E-01
598	4.423E+01	639	3.353E+01	680	1.296E+01	721	3.268E+00	762	6.080E-01
599	4.434E+01	640	3.299E+01	681	1.263E+01	722	3.216E+00	763	6.557E-01
600	4.459E+01	641	3.248E+01	682	1.230E+01	723	3.136E+00	764	5.407E-01
601	4.477E+01	642	3.198E+01	683	1.197E+01	724	2.900E+00	765	4.037E-01
602	4.480E+01	643	3.138E+01	684	1.158E+01	725	2.900E+00	766	4.620E-01
603	4.488E+01	644	3.080E+01	685	1.121E+01	726	2.740E+00	767	4.477E-01
604	4.498E+01	645	3.032E+01	686	1.088E+01	727	2.606E+00	768	5.282E-01
605	4.497E+01	646	2.962E+01	687	1.062E+01	728	2.530E+00	769	4.280E-01
606	4.500E+01	647	2.916E+01	688	1.030E+01	729	2.498E+00	770	3.707E-01
607	4.504E+01	648	2.863E+01	689	9.935E+00	730	2.410E+00	771	3.223E-01
608	4.499E+01	649	2.799E+01	690	9.615E+00	731	2.201E+00	772	3.849E-01
609	4.494E+01	650	2.748E+01	691	9.368E+00	732	2.220E+00	773	2.769E-01
610	4.473E+01	651	2.692E+01	692	9.042E+00	733	2.017E+00	774	2.440E-01
611	4.462E+01	652	2.639E+01	693	8.815E+00	734	1.917E+00	775	3.964E-01
612	4.446E+01	653	2.575E+01	694	8.538E+00	735	1.958E+00	776	2.529E-01
613	4.435E+01	654	2.525E+01	695	8.334E+00	736	1.791E+00	777	2.830E-01
614	4.414E+01	655	2.472E+01	696	7.946E+00	737	1.719E+00	778	3.060E-01
615	4.389E+01	656	2.411E+01	697	7.782E+00	738	1.595E+00	779	2.576E-01
616	4.365E+01	657	2.359E+01	698	7.538E+00	739	1.469E+00	780	1.853E-01
617	4.341E+01	658	2.306E+01	699	7.306E+00	740	1.501E+00		
618	4.317E+01	659	2.261E+01	700	7.064E+00	741	1.485E+00		
619	4.280E+01	660	2.204E+01	701	6.817E+00	742	1.407E+00		
620	4.243E+01	661	2.152E+01	702	6.609E+00	743	1.349E+00		
621	4.210E+01	662	2.096E+01	703	6.399E+00	744	1.180E+00		
622	4.178E+01	663	2.040E+01	704	6.199E+00	745	1.161E+00		
623	4.130E+01	664	1.998E+01	705	5.968E+00	746	1.005E+00		
624	4.096E+01	665	1.952E+01	706	5.794E+00	747	1.026E+00		
625	4.055E+01	666	1.898E+01	707	5.590E+00	748	1.035E+00		

CIE 1931xy Chromaticity Diagram



7-Step Chromaticity Quadrangles



Control Setting: 3500K

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

Test orientation: **Downward**

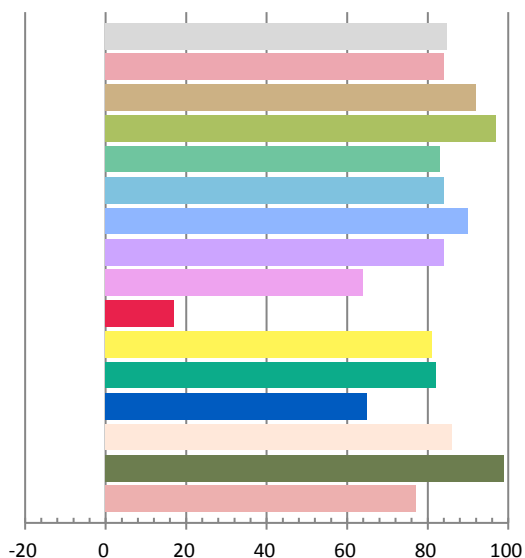
Photometric and Electrical Measurement Result

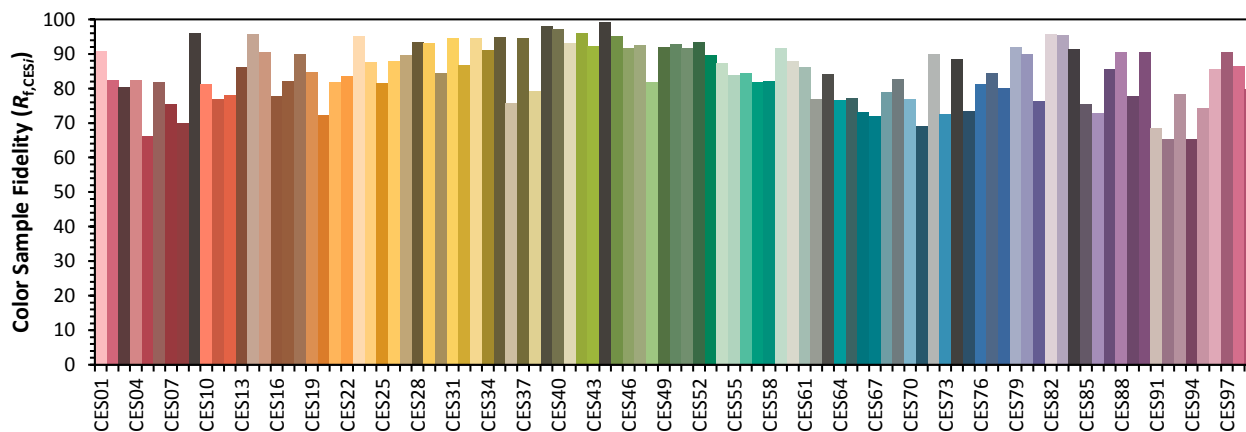
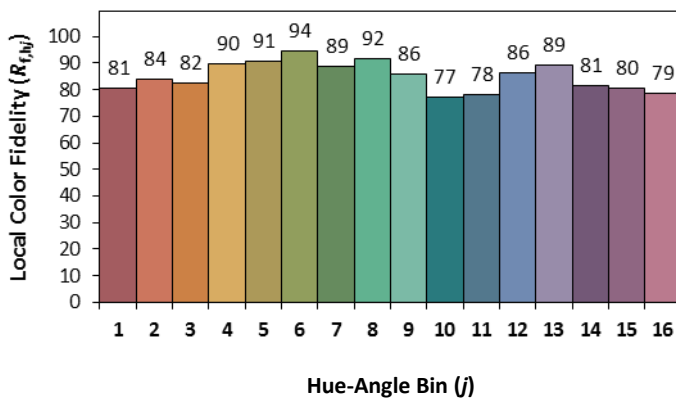
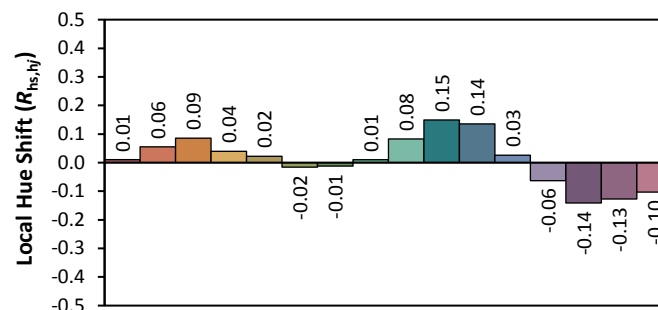
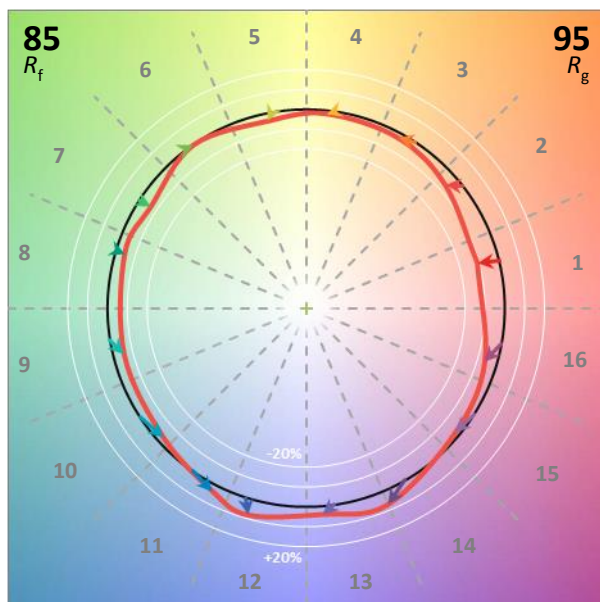
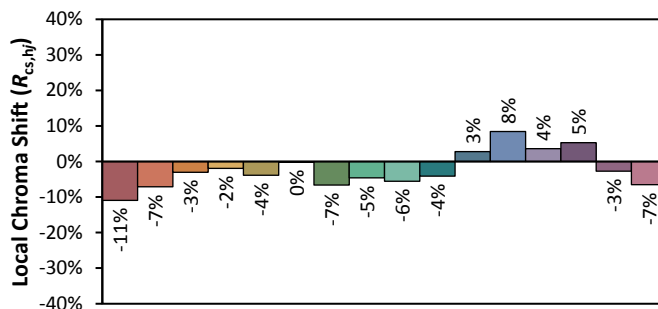
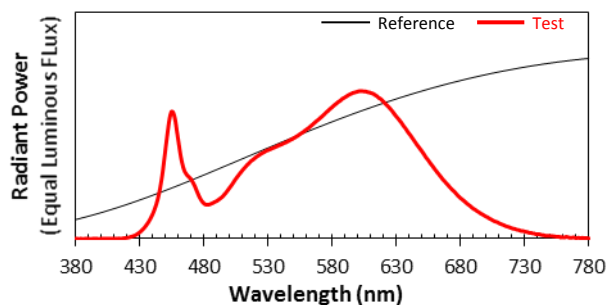
Voltage(V)	Frequency(Hz)	Current(A)	Power (W)	Power Factor	Luminous Flux(lm)	Efficacy(lm/W)
120	60	0.1306	15.56	0.9929	2253.8	144.84

Radiant Flux (W)	CCT (K)	Duv	x	y	u'	v'
6.836	3329	0.00008	0.4154	0.3957	0.2402	0.5148

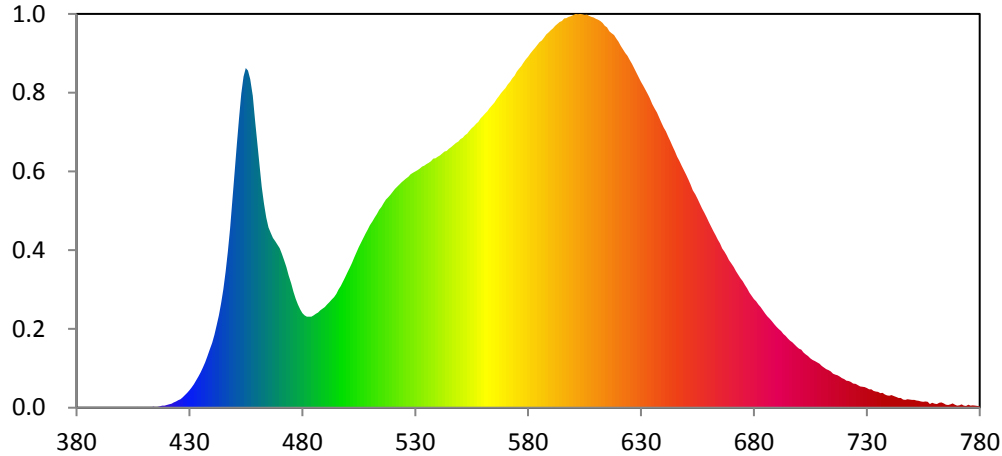
Color Rendering Index

Ra			
84.7			
R1	R2	R3	R4
84	92	97	83
R5	R6	R7	R8
84	90	84	64
R9	R10	R11	R12
17	81	82	65
R13	R14	R15	
86	99	77	





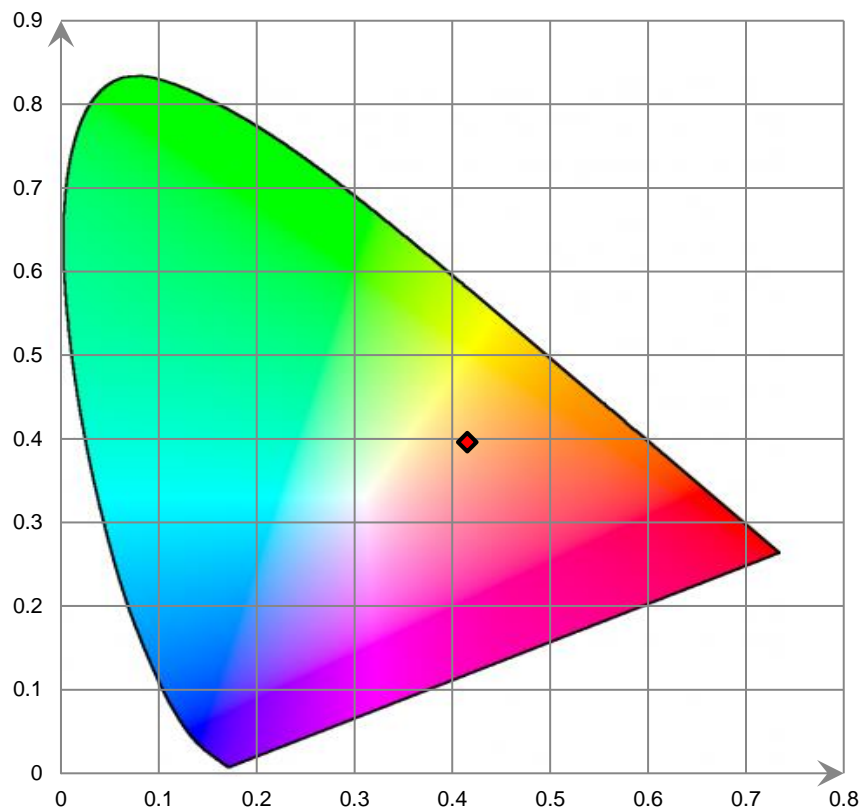
Relative Spectral Power Distribution



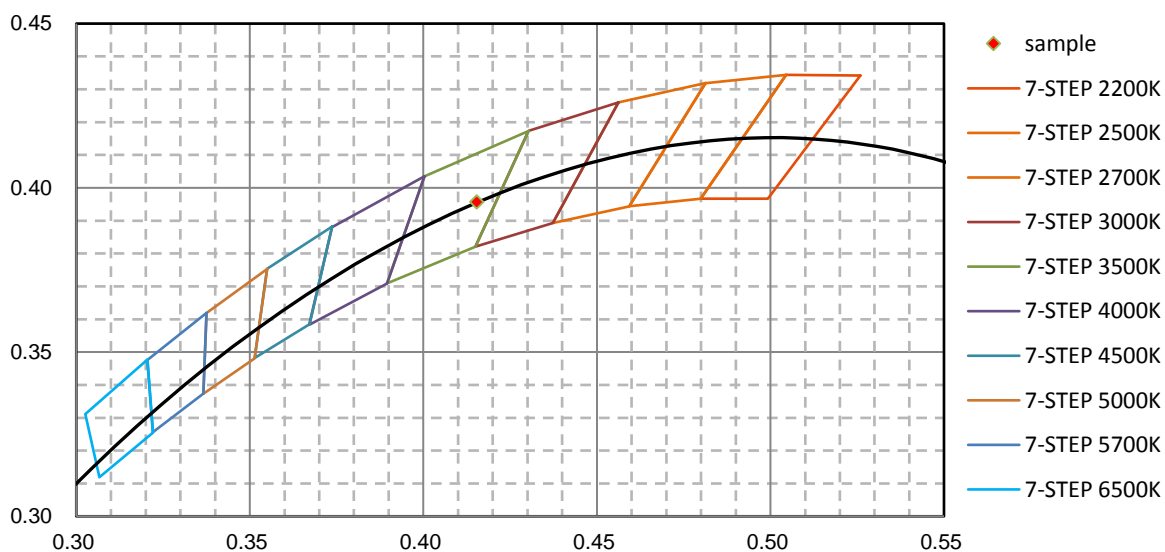
nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
380	5.330E-02	421	3.705E-01	462	2.410E+01	503	1.641E+01	544	2.804E+01
381	4.250E-02	422	4.466E-01	463	2.228E+01	504	1.698E+01	545	2.828E+01
382	3.120E-02	423	5.874E-01	464	2.078E+01	505	1.752E+01	546	2.845E+01
383	5.400E-03	424	6.678E-01	465	1.970E+01	506	1.802E+01	547	2.869E+01
384	5.110E-02	425	8.212E-01	466	1.910E+01	507	1.849E+01	548	2.890E+01
385	2.990E-02	426	9.336E-01	467	1.853E+01	508	1.899E+01	549	2.904E+01
386	1.700E-03	427	1.151E+00	468	1.819E+01	509	1.945E+01	550	2.934E+01
387	1.050E-02	428	1.387E+00	469	1.781E+01	510	1.991E+01	551	2.948E+01
388	3.500E-03	429	1.643E+00	470	1.743E+01	511	2.036E+01	552	2.976E+01
389	1.420E-02	430	1.894E+00	471	1.678E+01	512	2.078E+01	553	2.991E+01
390	4.420E-02	431	2.210E+00	472	1.609E+01	513	2.117E+01	554	3.023E+01
391	2.000E-02	432	2.577E+00	473	1.535E+01	514	2.162E+01	555	3.051E+01
392	2.000E-03	433	2.969E+00	474	1.443E+01	515	2.193E+01	556	3.074E+01
393	6.000E-04	434	3.394E+00	475	1.357E+01	516	2.233E+01	557	3.099E+01
394	1.620E-02	435	3.868E+00	476	1.267E+01	517	2.273E+01	558	3.120E+01
395	5.080E-02	436	4.404E+00	477	1.191E+01	518	2.296E+01	559	3.159E+01
396	2.500E-02	437	4.951E+00	478	1.126E+01	519	2.326E+01	560	3.184E+01
397	1.660E-02	438	5.609E+00	479	1.073E+01	520	2.358E+01	561	3.211E+01
398	1.400E-03	439	6.311E+00	480	1.034E+01	521	2.388E+01	562	3.235E+01
399	8.900E-03	440	7.088E+00	481	1.007E+01	522	2.411E+01	563	3.270E+01
400	1.200E-03	441	7.935E+00	482	9.924E+00	523	2.435E+01	564	3.302E+01
401	2.270E-02	442	8.984E+00	483	9.949E+00	524	2.463E+01	565	3.332E+01
402	1.830E-02	443	1.007E+01	484	9.958E+00	525	2.482E+01	566	3.369E+01
403	3.200E-02	444	1.140E+01	485	1.007E+01	526	2.504E+01	567	3.401E+01
404	2.350E-02	445	1.296E+01	486	1.027E+01	527	2.521E+01	568	3.435E+01
405	3.750E-02	446	1.482E+01	487	1.041E+01	528	2.547E+01	569	3.462E+01
406	1.690E-02	447	1.703E+01	488	1.064E+01	529	2.567E+01	570	3.492E+01
407	9.600E-02	448	1.956E+01	489	1.083E+01	530	2.579E+01	571	3.530E+01
408	1.390E-02	449	2.259E+01	490	1.098E+01	531	2.595E+01	572	3.558E+01
409	4.730E-02	450	2.563E+01	491	1.126E+01	532	2.611E+01	573	3.598E+01
410	6.150E-02	451	2.871E+01	492	1.151E+01	533	2.634E+01	574	3.626E+01
411	4.240E-02	452	3.159E+01	493	1.181E+01	534	2.644E+01	575	3.669E+01
412	5.200E-02	453	3.428E+01	494	1.207E+01	535	2.659E+01	576	3.702E+01
413	1.710E-02	454	3.613E+01	495	1.241E+01	536	2.676E+01	577	3.731E+01
414	1.078E-01	455	3.710E+01	496	1.290E+01	537	2.692E+01	578	3.766E+01
415	6.860E-02	456	3.680E+01	497	1.330E+01	538	2.718E+01	579	3.802E+01
416	9.620E-02	457	3.585E+01	498	1.377E+01	539	2.724E+01	580	3.832E+01
417	1.666E-01	458	3.403E+01	499	1.428E+01	540	2.739E+01	581	3.866E+01
418	2.124E-01	459	3.140E+01	500	1.480E+01	541	2.755E+01	582	3.900E+01
419	2.441E-01	460	2.895E+01	501	1.529E+01	542	2.776E+01	583	3.928E+01
420	2.976E-01	461	2.649E+01	502	1.582E+01	543	2.796E+01	584	3.958E+01

nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
585	3.992E+01	626	3.754E+01	667	1.701E+01	708	4.952E+00	749	9.025E-01
586	4.009E+01	627	3.706E+01	668	1.660E+01	709	4.814E+00	750	8.522E-01
587	4.042E+01	628	3.655E+01	669	1.613E+01	710	4.555E+00	751	8.717E-01
588	4.076E+01	629	3.607E+01	670	1.578E+01	711	4.392E+00	752	7.914E-01
589	4.096E+01	630	3.560E+01	671	1.534E+01	712	4.220E+00	753	7.474E-01
590	4.121E+01	631	3.517E+01	672	1.491E+01	713	4.113E+00	754	6.875E-01
591	4.141E+01	632	3.472E+01	673	1.452E+01	714	3.950E+00	755	6.398E-01
592	4.168E+01	633	3.424E+01	674	1.414E+01	715	3.737E+00	756	6.654E-01
593	4.189E+01	634	3.376E+01	675	1.381E+01	716	3.629E+00	757	6.370E-01
594	4.210E+01	635	3.318E+01	676	1.341E+01	717	3.530E+00	758	3.973E-01
595	4.223E+01	636	3.265E+01	677	1.301E+01	718	3.409E+00	759	5.302E-01
596	4.248E+01	637	3.224E+01	678	1.256E+01	719	3.226E+00	760	4.412E-01
597	4.255E+01	638	3.168E+01	679	1.223E+01	720	3.114E+00	761	3.887E-01
598	4.267E+01	639	3.111E+01	680	1.185E+01	721	2.968E+00	762	5.589E-01
599	4.273E+01	640	3.060E+01	681	1.161E+01	722	2.934E+00	763	5.629E-01
600	4.287E+01	641	3.015E+01	682	1.128E+01	723	2.813E+00	764	4.723E-01
601	4.297E+01	642	2.960E+01	683	1.097E+01	724	2.633E+00	765	3.293E-01
602	4.296E+01	643	2.907E+01	684	1.065E+01	725	2.616E+00	766	3.115E-01
603	4.299E+01	644	2.852E+01	685	1.029E+01	726	2.480E+00	767	3.531E-01
604	4.296E+01	645	2.799E+01	686	9.989E+00	727	2.331E+00	768	4.609E-01
605	4.289E+01	646	2.740E+01	687	9.741E+00	728	2.300E+00	769	3.219E-01
606	4.292E+01	647	2.695E+01	688	9.439E+00	729	2.272E+00	770	2.410E-01
607	4.279E+01	648	2.644E+01	689	9.082E+00	730	2.160E+00	771	2.693E-01
608	4.266E+01	649	2.595E+01	690	8.810E+00	731	2.025E+00	772	3.514E-01
609	4.261E+01	650	2.545E+01	691	8.562E+00	732	2.015E+00	773	2.358E-01
610	4.245E+01	651	2.492E+01	692	8.365E+00	733	1.820E+00	774	2.071E-01
611	4.237E+01	652	2.435E+01	693	8.062E+00	734	1.756E+00	775	3.281E-01
612	4.221E+01	653	2.374E+01	694	7.841E+00	735	1.746E+00	776	2.128E-01
613	4.199E+01	654	2.327E+01	695	7.580E+00	736	1.579E+00	777	2.729E-01
614	4.170E+01	655	2.281E+01	696	7.311E+00	737	1.612E+00	778	2.419E-01
615	4.152E+01	656	2.226E+01	697	7.153E+00	738	1.452E+00	779	2.023E-01
616	4.109E+01	657	2.176E+01	698	6.916E+00	739	1.337E+00	780	1.429E-01
617	4.091E+01	658	2.130E+01	699	6.671E+00	740	1.326E+00		
618	4.067E+01	659	2.080E+01	700	6.461E+00	741	1.376E+00		
619	4.029E+01	660	2.027E+01	701	6.330E+00	742	1.290E+00		
620	3.994E+01	661	1.979E+01	702	6.044E+00	743	1.169E+00		
621	3.950E+01	662	1.929E+01	703	5.821E+00	744	1.061E+00		
622	3.912E+01	663	1.885E+01	704	5.643E+00	745	1.052E+00		
623	3.871E+01	664	1.838E+01	705	5.411E+00	746	8.902E-01		
624	3.840E+01	665	1.792E+01	706	5.206E+00	747	8.724E-01		
625	3.795E+01	666	1.739E+01	707	5.076E+00	748	9.400E-01		

CIE 1931xy Chromaticity Diagram



7-StepChromaticity Quadrangles



Control Setting: 4000K

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

Test orientation: **Downward**

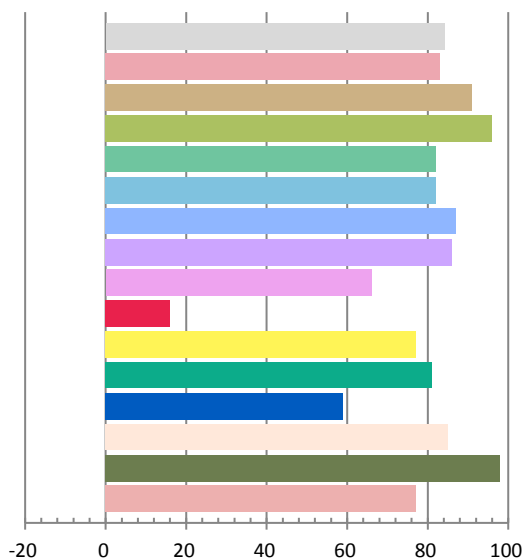
Photometric and Electrical Measurement Result

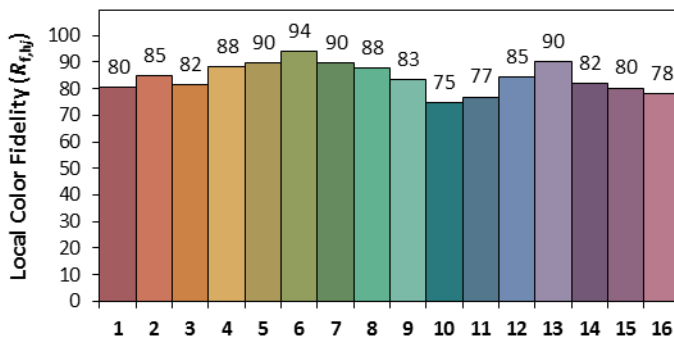
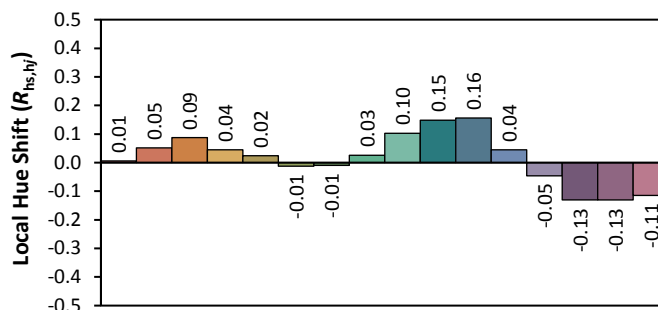
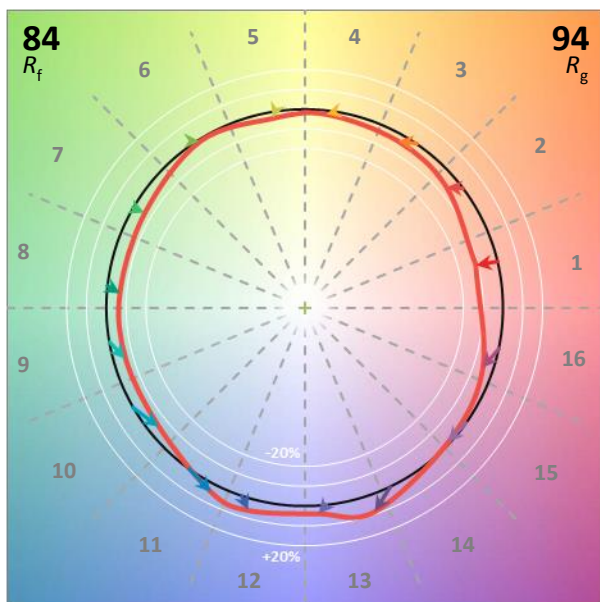
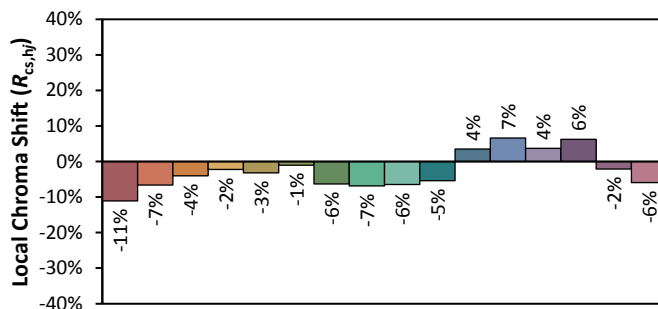
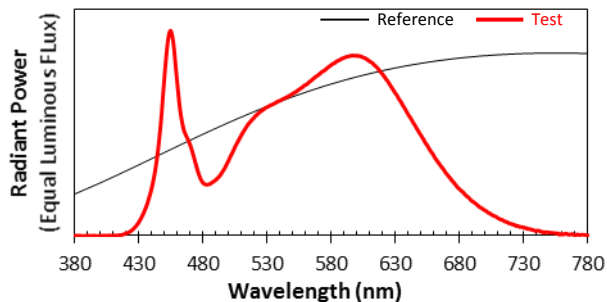
Voltage(V)	Frequency(Hz)	Current(A)	Power (W)	Power Factor	Luminous Flux(lm)	Efficacy(lm/W)
120	60	0.1342	16.01	0.9935	2248.3	140.45

Radiant Flux (W)	CCT (K)	Duv	x	y	u'	v'
6.789	3837	0.00141	0.3891	0.3850	0.2275	0.5065

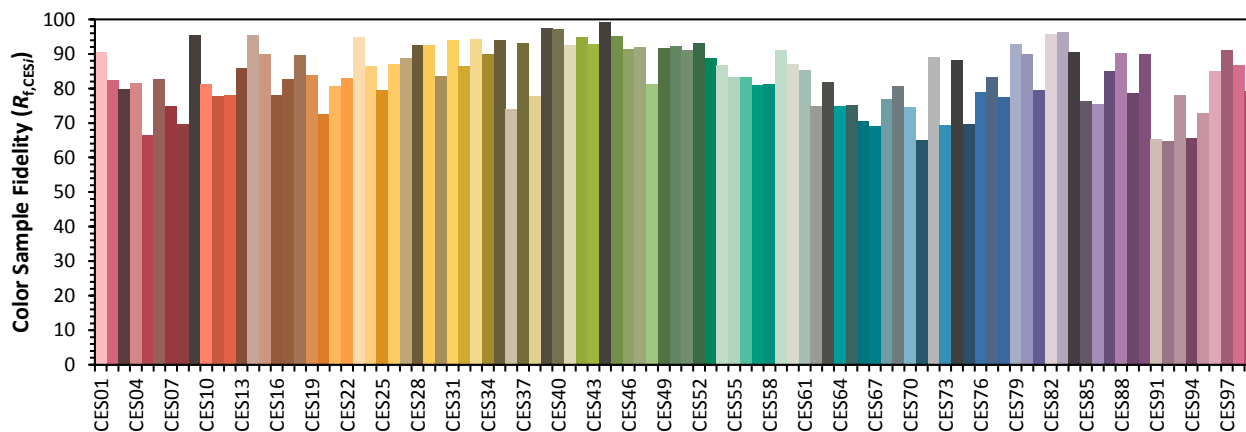
Color Rendering Index

Ra			
84.2			
R1	R2	R3	R4
83	91	96	82
R5	R6	R7	R8
82	87	86	66
R9	R10	R11	R12
16	77	81	59
R13	R14	R15	
85	98	77	

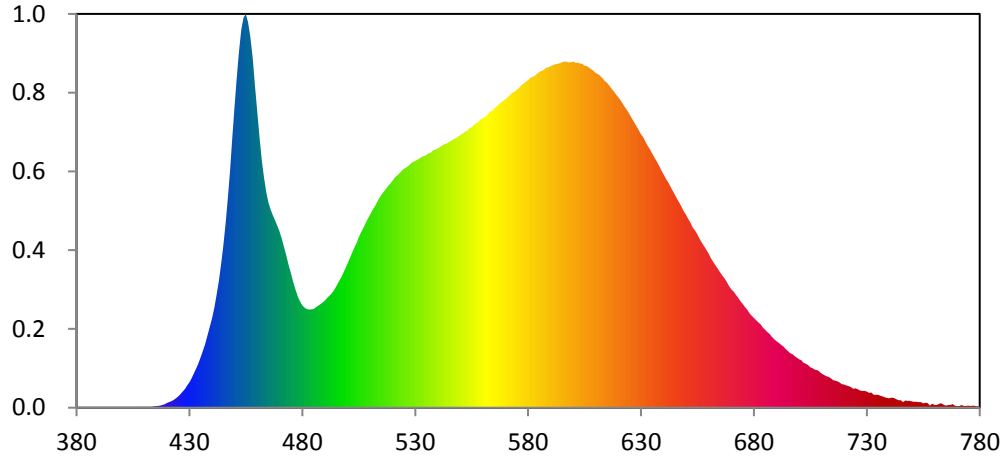




Hue-Angle Bin (j)



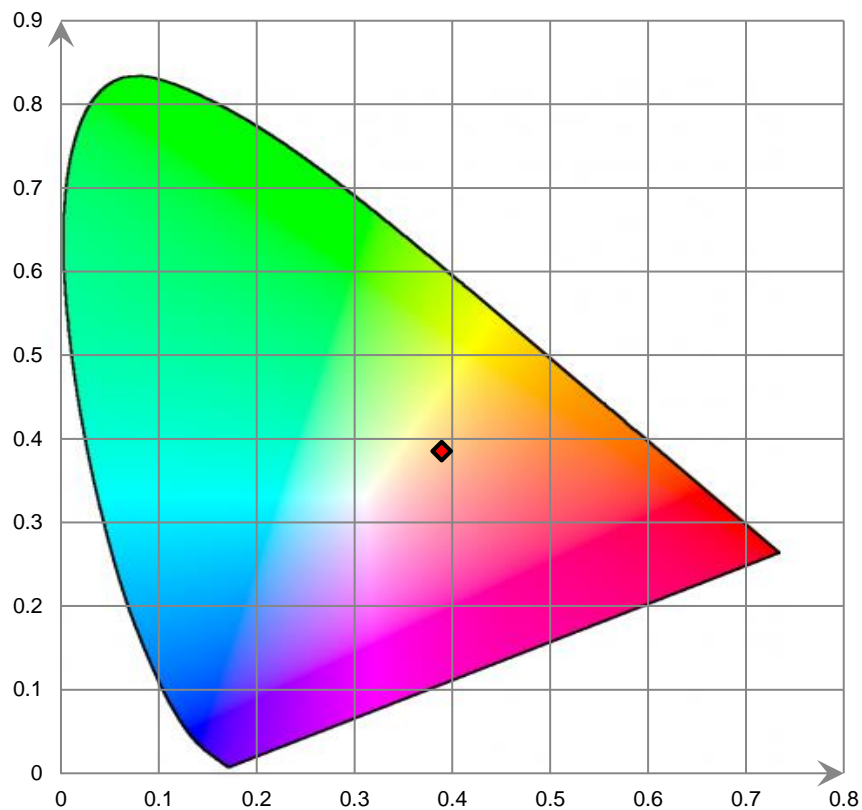
Relative Spectral Power Distribution



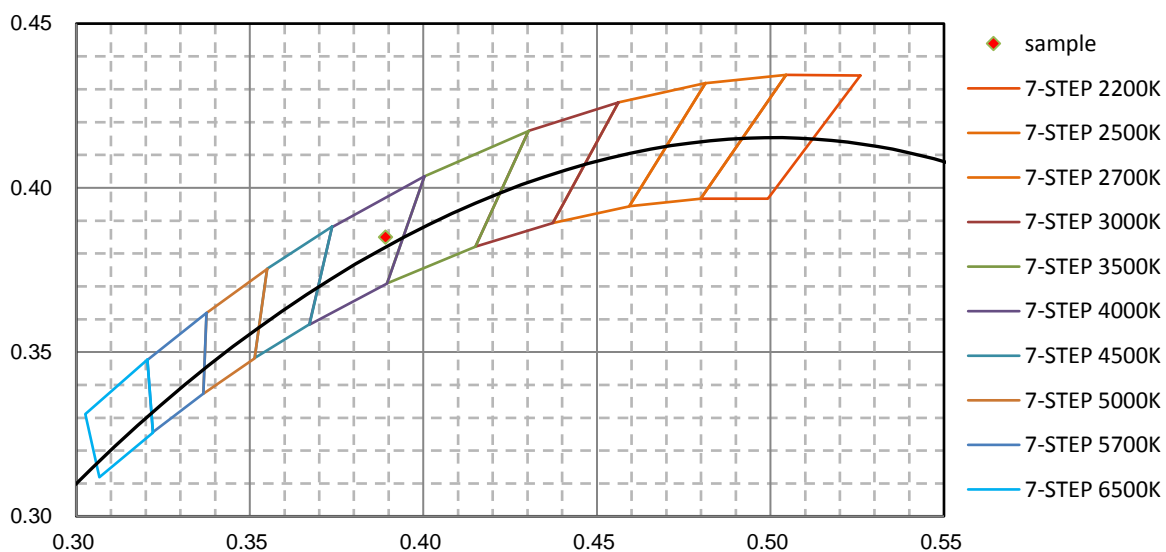
nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
380	3.710E-02	421	6.219E-01	462	2.812E+01	503	1.814E+01	544	2.999E+01
381	2.700E-02	422	7.324E-01	463	2.613E+01	504	1.866E+01	545	3.015E+01
382	4.660E-02	423	8.947E-01	464	2.451E+01	505	1.932E+01	546	3.025E+01
383	2.100E-03	424	1.057E+00	465	2.326E+01	506	1.987E+01	547	3.046E+01
384	5.740E-02	425	1.307E+00	466	2.245E+01	507	2.035E+01	548	3.061E+01
385	3.490E-02	426	1.526E+00	467	2.180E+01	508	2.088E+01	549	3.077E+01
386	3.500E-03	427	1.833E+00	468	2.124E+01	509	2.140E+01	550	3.096E+01
387	1.600E-02	428	2.119E+00	469	2.060E+01	510	2.189E+01	551	3.108E+01
388	4.600E-03	429	2.539E+00	470	1.994E+01	511	2.241E+01	552	3.131E+01
389	1.830E-02	430	2.873E+00	471	1.910E+01	512	2.283E+01	553	3.140E+01
390	4.940E-02	431	3.364E+00	472	1.816E+01	513	2.328E+01	554	3.171E+01
391	1.640E-02	432	3.886E+00	473	1.723E+01	514	2.377E+01	555	3.181E+01
392	1.280E-02	433	4.436E+00	474	1.617E+01	515	2.415E+01	556	3.207E+01
393	8.000E-03	434	5.026E+00	475	1.516E+01	516	2.449E+01	557	3.226E+01
394	8.700E-03	435	5.704E+00	476	1.418E+01	517	2.483E+01	558	3.241E+01
395	3.190E-02	436	6.453E+00	477	1.334E+01	518	2.518E+01	559	3.275E+01
396	1.940E-02	437	7.196E+00	478	1.257E+01	519	2.545E+01	560	3.284E+01
397	5.200E-03	438	8.157E+00	479	1.204E+01	520	2.578E+01	561	3.301E+01
398	1.450E-02	439	9.102E+00	480	1.160E+01	521	2.611E+01	562	3.321E+01
399	7.000E-04	440	1.018E+01	481	1.134E+01	522	2.634E+01	563	3.355E+01
400	0.000E+00	441	1.140E+01	482	1.119E+01	523	2.661E+01	564	3.368E+01
401	1.960E-02	442	1.283E+01	483	1.114E+01	524	2.684E+01	565	3.395E+01
402	2.420E-02	443	1.439E+01	484	1.118E+01	525	2.710E+01	566	3.419E+01
403	3.900E-02	444	1.627E+01	485	1.121E+01	526	2.726E+01	567	3.441E+01
404	1.920E-02	445	1.844E+01	486	1.138E+01	527	2.743E+01	568	3.466E+01
405	2.850E-02	446	2.090E+01	487	1.155E+01	528	2.770E+01	569	3.482E+01
406	8.200E-03	447	2.375E+01	488	1.176E+01	529	2.790E+01	570	3.503E+01
407	9.860E-02	448	2.691E+01	489	1.194E+01	530	2.800E+01	571	3.525E+01
408	2.040E-02	449	3.065E+01	490	1.213E+01	531	2.815E+01	572	3.550E+01
409	4.660E-02	450	3.420E+01	491	1.243E+01	532	2.832E+01	573	3.576E+01
410	7.800E-02	451	3.753E+01	492	1.269E+01	533	2.847E+01	574	3.587E+01
411	6.400E-02	452	4.045E+01	493	1.299E+01	534	2.857E+01	575	3.606E+01
412	7.500E-02	453	4.288E+01	494	1.336E+01	535	2.871E+01	576	3.631E+01
413	4.260E-02	454	4.426E+01	495	1.380E+01	536	2.888E+01	577	3.657E+01
414	1.310E-01	455	4.468E+01	496	1.425E+01	537	2.897E+01	578	3.677E+01
415	1.548E-01	456	4.376E+01	497	1.468E+01	538	2.923E+01	579	3.697E+01
416	1.841E-01	457	4.217E+01	498	1.522E+01	539	2.930E+01	580	3.718E+01
417	2.309E-01	458	3.958E+01	499	1.577E+01	540	2.943E+01	581	3.740E+01
418	3.027E-01	459	3.644E+01	500	1.635E+01	541	2.956E+01	582	3.757E+01
419	3.941E-01	460	3.358E+01	501	1.694E+01	542	2.975E+01	583	3.766E+01
420	5.171E-01	461	3.071E+01	502	1.754E+01	543	2.990E+01	584	3.792E+01

nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
585	3.811E+01	626	3.280E+01	667	1.469E+01	708	4.253E+00	749	7.909E-01
586	3.821E+01	627	3.237E+01	668	1.430E+01	709	4.079E+00	750	7.242E-01
587	3.835E+01	628	3.195E+01	669	1.381E+01	710	3.858E+00	751	6.896E-01
588	3.856E+01	629	3.150E+01	670	1.346E+01	711	3.729E+00	752	6.716E-01
589	3.863E+01	630	3.104E+01	671	1.317E+01	712	3.565E+00	753	6.331E-01
590	3.877E+01	631	3.069E+01	672	1.279E+01	713	3.519E+00	754	6.245E-01
591	3.887E+01	632	3.021E+01	673	1.249E+01	714	3.361E+00	755	4.759E-01
592	3.899E+01	633	2.971E+01	674	1.207E+01	715	3.160E+00	756	5.775E-01
593	3.903E+01	634	2.932E+01	675	1.180E+01	716	3.084E+00	757	5.286E-01
594	3.908E+01	635	2.885E+01	676	1.144E+01	717	2.998E+00	758	2.390E-01
595	3.920E+01	636	2.835E+01	677	1.112E+01	718	2.838E+00	759	4.430E-01
596	3.926E+01	637	2.792E+01	678	1.073E+01	719	2.684E+00	760	3.091E-01
597	3.925E+01	638	2.743E+01	679	1.043E+01	720	2.640E+00	761	3.015E-01
598	3.920E+01	639	2.693E+01	680	1.017E+01	721	2.510E+00	762	4.452E-01
599	3.921E+01	640	2.645E+01	681	9.936E+00	722	2.459E+00	763	4.981E-01
600	3.928E+01	641	2.599E+01	682	9.659E+00	723	2.347E+00	764	3.588E-01
601	3.912E+01	642	2.559E+01	683	9.478E+00	724	2.144E+00	765	2.427E-01
602	3.917E+01	643	2.511E+01	684	9.086E+00	725	2.201E+00	766	3.150E-01
603	3.905E+01	644	2.462E+01	685	8.827E+00	726	2.099E+00	767	2.992E-01
604	3.901E+01	645	2.418E+01	686	8.576E+00	727	1.949E+00	768	4.092E-01
605	3.881E+01	646	2.369E+01	687	8.378E+00	728	1.911E+00	769	2.275E-01
606	3.877E+01	647	2.325E+01	688	8.060E+00	729	1.904E+00	770	1.457E-01
607	3.859E+01	648	2.278E+01	689	7.760E+00	730	1.845E+00	771	2.104E-01
608	3.840E+01	649	2.228E+01	690	7.527E+00	731	1.677E+00	772	3.077E-01
609	3.820E+01	650	2.190E+01	691	7.354E+00	732	1.726E+00	773	1.914E-01
610	3.796E+01	651	2.141E+01	692	7.140E+00	733	1.471E+00	774	2.027E-01
611	3.784E+01	652	2.098E+01	693	6.950E+00	734	1.463E+00	775	2.471E-01
612	3.764E+01	653	2.044E+01	694	6.659E+00	735	1.467E+00	776	2.061E-01
613	3.736E+01	654	2.006E+01	695	6.452E+00	736	1.367E+00	777	2.390E-01
614	3.705E+01	655	1.963E+01	696	6.200E+00	737	1.289E+00	778	2.009E-01
615	3.686E+01	656	1.913E+01	697	6.101E+00	738	1.197E+00	779	1.322E-01
616	3.655E+01	657	1.866E+01	698	5.880E+00	739	1.118E+00	780	1.299E-01
617	3.621E+01	658	1.827E+01	699	5.680E+00	740	1.057E+00		
618	3.585E+01	659	1.789E+01	700	5.516E+00	741	1.147E+00		
619	3.550E+01	660	1.745E+01	701	5.378E+00	742	1.119E+00		
620	3.520E+01	661	1.694E+01	702	5.096E+00	743	9.776E-01		
621	3.483E+01	662	1.654E+01	703	5.000E+00	744	8.720E-01		
622	3.446E+01	663	1.616E+01	704	4.838E+00	745	8.531E-01		
623	3.403E+01	664	1.579E+01	705	4.593E+00	746	6.459E-01		
624	3.369E+01	665	1.538E+01	706	4.495E+00	747	8.201E-01		
625	3.326E+01	666	1.500E+01	707	4.310E+00	748	7.758E-01		

CIE 1931xy Chromaticity Diagram



7-Step Chromaticity Quadrangles



[Goniophotometer System]

Control Setting: 3000K

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

Test orientation: **Downward**

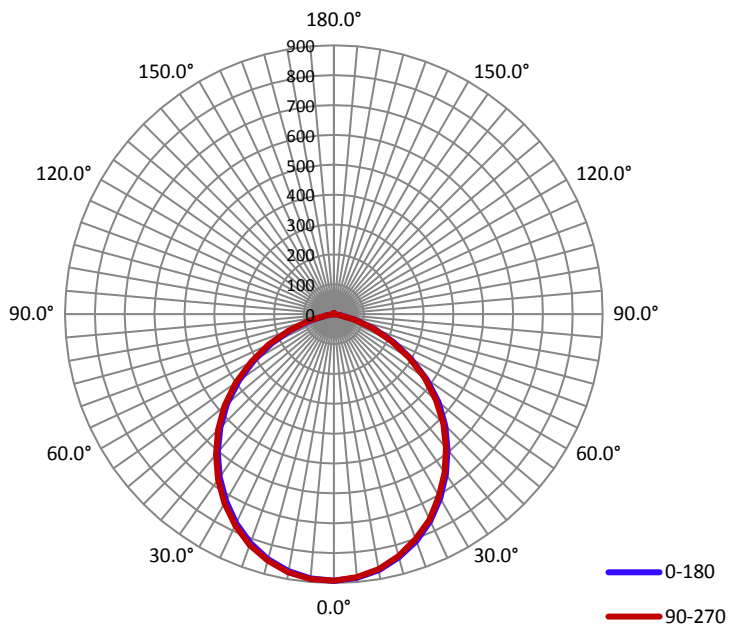
Electrical Measurement

Input Voltage(V)	Frequency(Hz)	Input Current(A)	Power (W)	Power Factor
120.0	60	0.1350	16.16	0.9960

Photometric Measurement

Luminous Flux(lm)	Efficacy(lm/W)	I _{max} (cd)	S/MH(C0/180)	S/MH(C90/270)
2162.8	133.89	893.8	1.20	1.20

Luminous Intensity Distribution



	C0/180	C45/225	C90/270	C135/315	AVG.
Beam Angle(50%I _{max}):	101.9	102.0	102.1	102.1	102.0
Field Angle(10%I _{max}):	148.4	148.4	148.5	148.5	148.5

Luminous Intensity (cd) Distribution Data

C y	0°	22.5°	45°	67.5°	90°	112.5°	135°	157.5°
0.0°	892	892	892	892	892	892	892	892
5.0°	886	885	885	884	884	884	886	887
10.0°	870	868	866	865	866	867	869	871
15.0°	842	841	839	838	838	840	844	846
20.0°	808	804	802	801	801	804	808	810
25.0°	765	761	759	757	758	759	763	768
30.0°	712	708	705	705	704	708	713	717
35.0°	655	651	648	646	647	650	653	661
40.0°	593	589	585	584	584	586	593	598
45.0°	528	524	518	518	519	522	528	533
50.0°	457	451	447	445	447	450	455	463
55.0°	380	373	369	368	370	373	379	384
60.0°	299	294	290	289	290	294	299	305
65.0°	221	216	214	212	212	215	220	227
70.0°	147	142	139	137	138	139	144	150
75.0°	78	74	72	69	70	71	75	80
80.0°	24	23	21	19	18	20	22	24
85.0°	6	6	5	4	5	5	6	6
90.0°	0	0	0	0	0	0	0	0
95.0°	0	0	0	0	0	0	0	0
100.0°	0	0	0	0	0	0	0	0
105.0°	0	0	0	0	0	0	0	0
110.0°	0	0	0	0	0	0	0	0
115.0°	0	0	0	0	0	0	0	0
120.0°	0	0	0	0	0	0	0	0
125.0°	0	0	0	0	0	0	0	0
130.0°	0	0	0	0	0	0	0	0
135.0°	0	0	0	0	0	0	0	0
140.0°	0	1	0	0	0	0	1	0
145.0°	1	1	1	1	1	1	2	1
150.0°	1	1	2	2	2	1	2	2
155.0°	2	2	2	2	2	2	2	3
160.0°	3	2	3	2	3	2	3	2
165.0°	2	2	3	3	3	3	3	3
170.0°	3	3	3	3	3	2	3	4
175.0°	3	3	3	4	3	3	4	4
180.0°	0	0	0	0	0	0	0	0

Luminous Intensity (cd) Distribution Data (cont.)

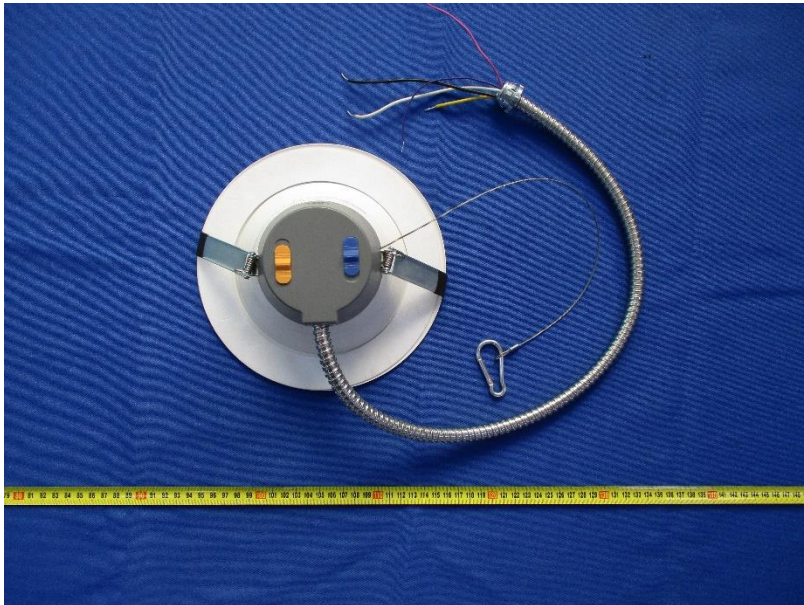
C y	180°	202.5°	225°	247.5°	270°	292.5°	315°	337.5°
0.0°	892	892	892	892	892	892	892	892
5.0°	888	889	890	890	890	889	889	889
10.0°	873	875	877	878	877	876	877	872
15.0°	849	852	854	855	854	852	850	849
20.0°	815	819	822	823	823	819	819	814
25.0°	773	777	779	781	781	776	774	770
30.0°	722	727	730	732	731	728	723	719
35.0°	665	670	673	676	675	672	667	661
40.0°	604	608	613	614	613	610	606	600
45.0°	537	543	547	548	548	546	541	533
50.0°	466	473	476	478	478	476	469	464
55.0°	388	394	398	401	401	398	391	383
60.0°	308	313	317	320	319	316	311	305
65.0°	229	233	237	240	241	237	231	226
70.0°	151	157	159	161	161	160	154	148
75.0°	81	85	87	89	89	88	84	79
80.0°	24	27	29	31	30	29	27	25
85.0°	5	6	7	7	6	7	6	6
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	1	1	1	1
150.0°	0	1	1	2	2	1	1	2
155.0°	1	2	2	2	2	1	1	2
160.0°	2	2	2	2	3	2	2	2
165.0°	2	3	3	3	3	2	2	3
170.0°	3	3	3	3	3	3	3	3
175.0°	2	3	3	3	4	3	3	3
180.0°	0	0	0	0	0	0	0	0

Zonal Lumen Density Measurement

Deg	Flux (lm)	%
0-5	21.4	0.99
5-10	62.9	2.91
10-15	101.9	4.70
15-20	136.7	6.32
20-25	165.7	7.67
25-30	188.2	8.71
30-35	202.9	9.38
35-40	210.1	9.72
40-45	209.6	9.69
45-50	201.3	9.30
50-55	184.0	8.50
55-60	158.9	7.35
60-65	128.6	5.95
65-70	94.5	4.36
70-75	59.3	2.74
75-80	26.8	1.23
80-85	6.7	0.30
85-90	0.9	0.04
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	0.5	0.00
150-155	0.5	0.00
155-160	0.5	0.00
160-165	0.5	0.00
165-170	0.5	0.00
170-175	0.1	0.00
175-180	0.0	0.00

Deg	Flux (lm)	%
0-5	21.3	0.98
0-10	84.2	3.89
0-15	186.1	8.60
0-20	322.8	14.92
0-25	488.5	22.59
0-30	676.6	31.29
0-35	879.5	40.67
0-40	1089.6	50.38
0-45	1299.2	60.07
0-50	1500.4	69.38
0-55	1684.4	77.88
0-60	1843.4	85.23
0-65	1972.0	91.18
0-70	2066.6	95.55
0-75	2125.9	98.30
0-80	2152.7	99.53
0-85	2159.5	99.85
0-90	2160.4	99.89
0-95	2160.4	99.89
0-100	2160.4	99.89
0-105	2160.4	99.89
0-110	2160.4	99.89
0-115	2160.4	99.89
0-120	2160.4	99.89
0-125	2160.4	99.89
0-130	2160.4	99.89
0-135	2160.4	99.89
0-140	2160.4	99.89
0-145	2160.6	99.90
0-150	2160.9	99.91
0-155	2161.3	99.93
0-160	2161.7	99.95
0-165	2162.1	99.97
0-170	2162.5	99.99
0-175	2162.7	100.00
0-180	2162.8	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.
6. This report cannot be reproduced except in full, without prior written approval of the Company.
7. This report is valid only with a valid digital signature. The digital signature may be available only under the Adobe software above version 7.0.

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