

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: INFTP8/8CCT3S/DIM010UNV

Report Type:	Electrical and Photometric tests including: Luminous Flux, Chromaticity, Luminous Intensity Distribution
Project Engineer:	Bay Wang
Report Number:	RKSB230301007-10-1
Test Date:	2023-03-02 to 2023-03-06
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:	INFTP8/8CCT3S/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:	12W/16W/23W
Nominal CCT:	3000K, 3500K, 4000K
Nominal Lumen Output:	2900lm/3000lm/3000lm @23W

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**

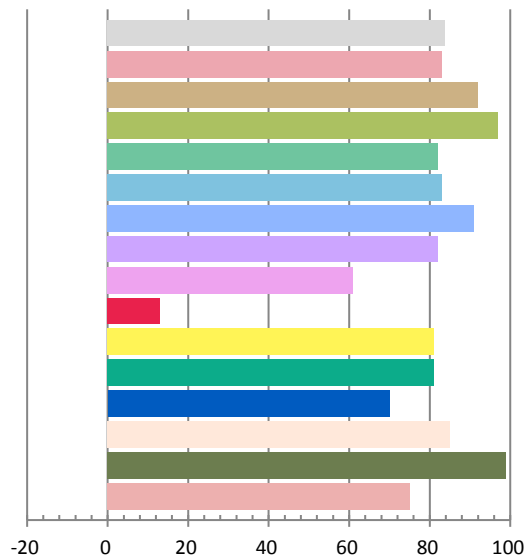
Photometric and Electrical Measurement Result

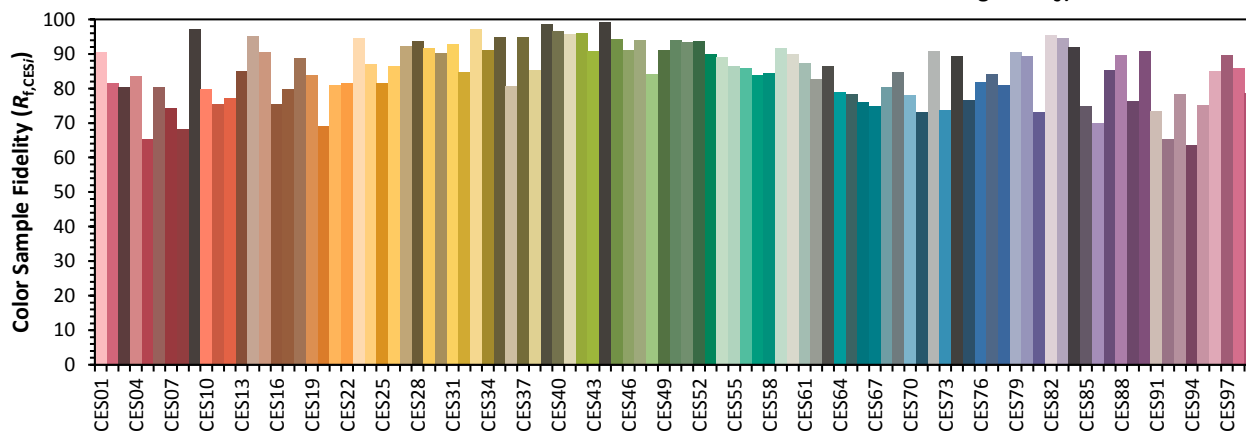
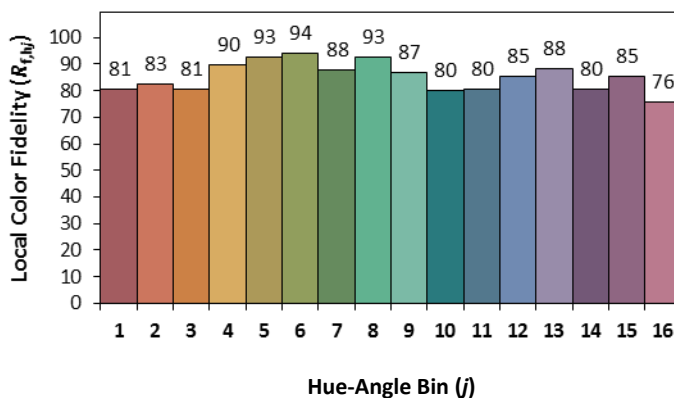
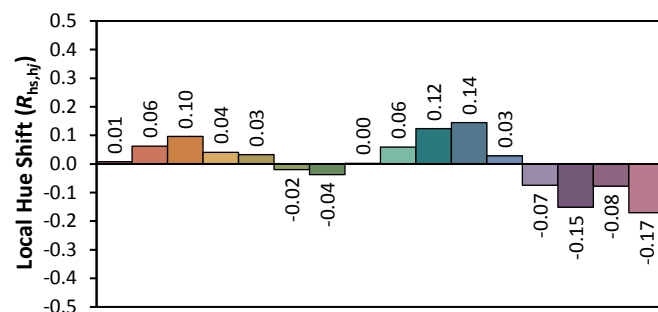
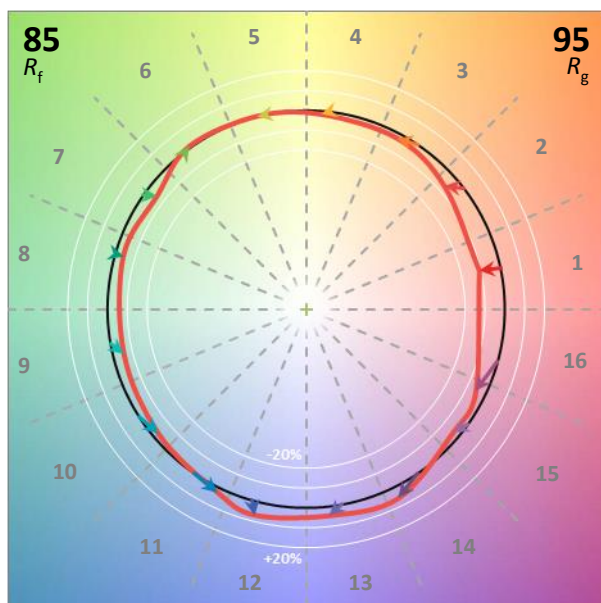
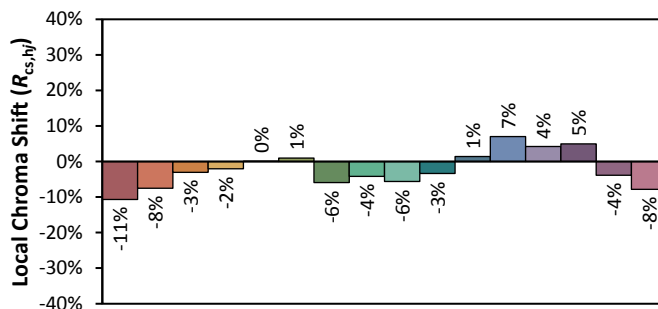
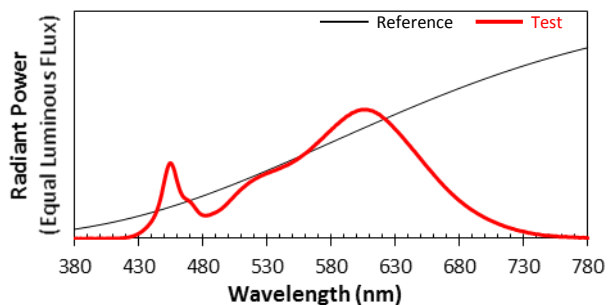
Voltage(V)	Frequency(Hz)	Current(A)	Power (W)	Power Factor	Luminous Flux(lm)	Efficacy(lm/W)
120	60	0.1924	22.86	0.9901	2938.9	128.56

Radiant Flux (W)	CCT (K)	Duv	x	y	u'	v'
8.973	2937	-0.00008	0.4414	0.4053	0.2529	0.5225

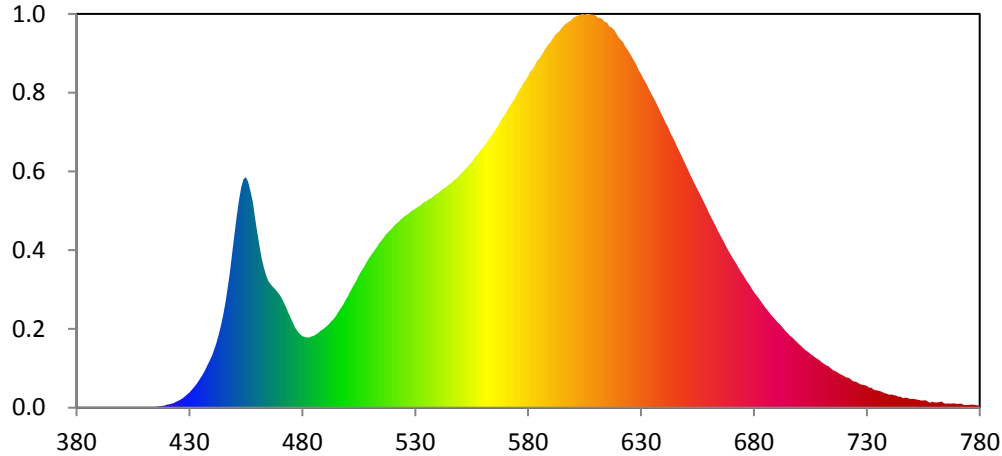
Color Rendering Index

Ra			
83.8			
R1	R2	R3	R4
83	92	97	82
R5	R6	R7	R8
83	91	82	61
R9	R10	R11	R12
13	81	81	70
R13	R14	R15	
85	99	75	





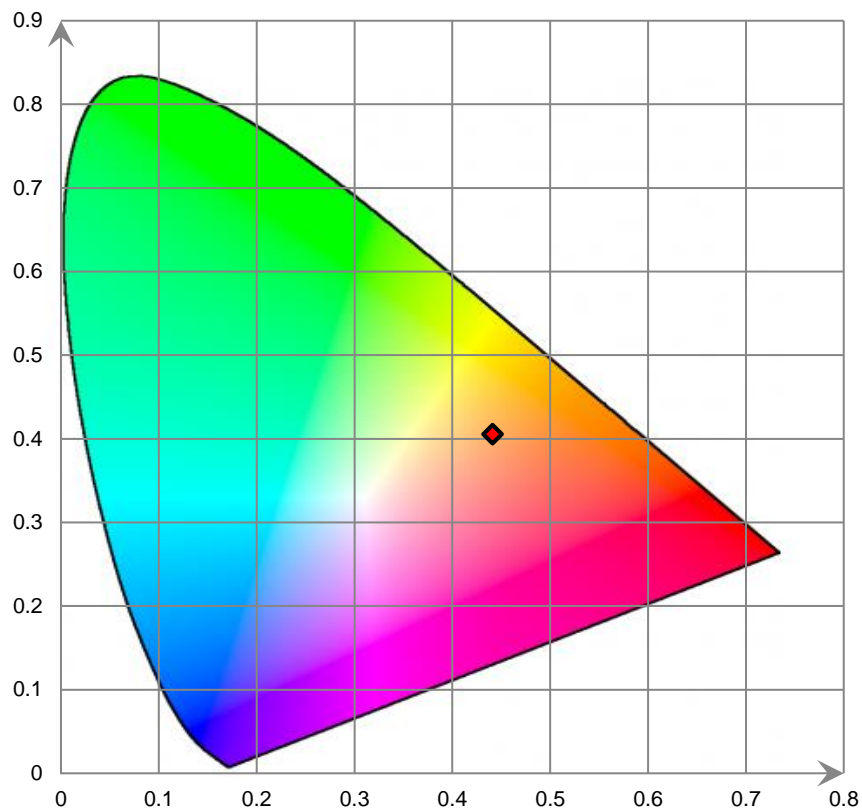
Relative Spectral Power Distribution



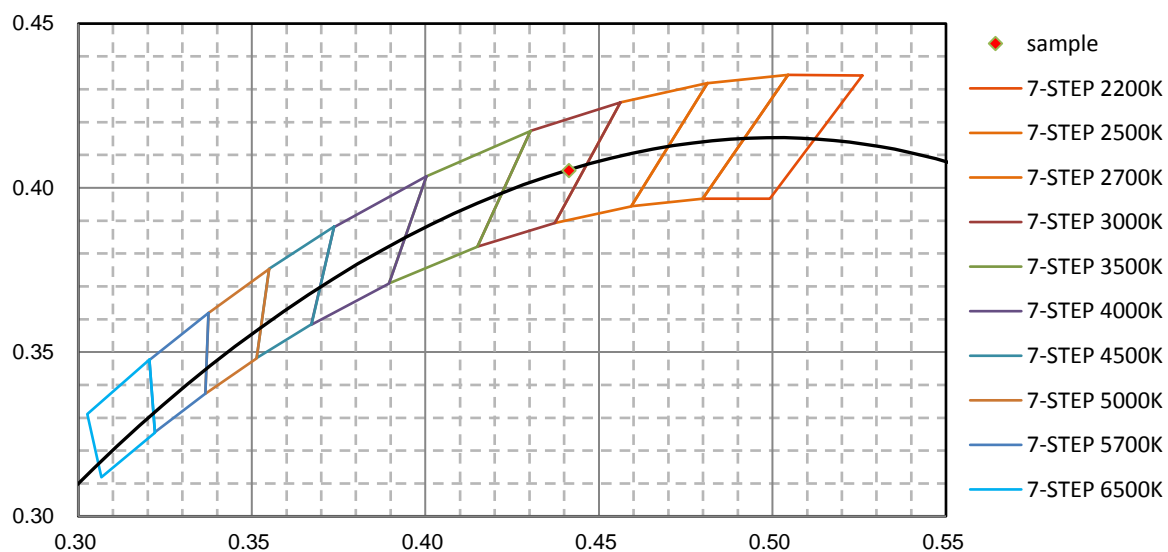
nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
380	7.400E-03	421	5.042E-01	462	2.309E+01	503	1.910E+01	544	3.429E+01
381	2.720E-02	422	6.081E-01	463	2.162E+01	504	1.976E+01	545	3.455E+01
382	3.510E-02	423	7.260E-01	464	2.046E+01	505	2.043E+01	546	3.478E+01
383	7.300E-03	424	9.060E-01	465	1.961E+01	506	2.111E+01	547	3.521E+01
384	3.380E-02	425	1.075E+00	466	1.912E+01	507	2.160E+01	548	3.547E+01
385	2.440E-02	426	1.245E+00	467	1.869E+01	508	2.222E+01	549	3.577E+01
386	1.700E-03	427	1.470E+00	468	1.838E+01	509	2.283E+01	550	3.618E+01
387	3.960E-02	428	1.768E+00	469	1.790E+01	510	2.336E+01	551	3.649E+01
388	1.090E-02	429	2.070E+00	470	1.748E+01	511	2.392E+01	552	3.692E+01
389	7.600E-03	430	2.363E+00	471	1.692E+01	512	2.439E+01	553	3.722E+01
390	1.200E-02	431	2.734E+00	472	1.618E+01	513	2.489E+01	554	3.770E+01
391	1.260E-02	432	3.146E+00	473	1.543E+01	514	2.547E+01	555	3.802E+01
392	1.150E-02	433	3.591E+00	474	1.458E+01	515	2.587E+01	556	3.852E+01
393	1.230E-02	434	4.112E+00	475	1.375E+01	516	2.635E+01	557	3.901E+01
394	1.660E-02	435	4.641E+00	476	1.298E+01	517	2.683E+01	558	3.940E+01
395	3.070E-02	436	5.192E+00	477	1.229E+01	518	2.718E+01	559	3.991E+01
396	1.100E-02	437	5.804E+00	478	1.175E+01	519	2.753E+01	560	4.028E+01
397	4.000E-04	438	6.557E+00	479	1.139E+01	520	2.789E+01	561	4.076E+01
398	1.510E-02	439	7.263E+00	480	1.107E+01	521	2.832E+01	562	4.119E+01
399	5.300E-03	440	8.123E+00	481	1.097E+01	522	2.859E+01	563	4.178E+01
400	2.000E-04	441	9.074E+00	482	1.086E+01	523	2.890E+01	564	4.230E+01
401	2.350E-02	442	1.016E+01	483	1.088E+01	524	2.927E+01	565	4.281E+01
402	4.370E-02	443	1.140E+01	484	1.104E+01	525	2.954E+01	566	4.340E+01
403	7.100E-03	444	1.280E+01	485	1.112E+01	526	2.982E+01	567	4.390E+01
404	1.410E-02	445	1.451E+01	486	1.132E+01	527	3.000E+01	568	4.459E+01
405	2.180E-02	446	1.644E+01	487	1.159E+01	528	3.038E+01	569	4.506E+01
406	7.300E-03	447	1.870E+01	488	1.186E+01	529	3.062E+01	570	4.554E+01
407	3.870E-02	448	2.119E+01	489	1.211E+01	530	3.084E+01	571	4.625E+01
408	2.470E-02	449	2.414E+01	490	1.236E+01	531	3.111E+01	572	4.676E+01
409	3.390E-02	450	2.698E+01	491	1.267E+01	532	3.126E+01	573	4.729E+01
410	6.980E-02	451	2.975E+01	492	1.303E+01	533	3.159E+01	574	4.781E+01
411	6.940E-02	452	3.217E+01	493	1.344E+01	534	3.182E+01	575	4.849E+01
412	6.850E-02	453	3.416E+01	494	1.379E+01	535	3.201E+01	576	4.912E+01
413	4.590E-02	454	3.543E+01	495	1.431E+01	536	3.228E+01	577	4.964E+01
414	8.570E-02	455	3.572E+01	496	1.489E+01	537	3.243E+01	578	5.033E+01
415	1.061E-01	456	3.505E+01	497	1.537E+01	538	3.273E+01	579	5.079E+01
416	1.835E-01	457	3.370E+01	498	1.595E+01	539	3.304E+01	580	5.133E+01
417	2.141E-01	458	3.188E+01	499	1.658E+01	540	3.318E+01	581	5.207E+01
418	2.782E-01	459	2.939E+01	500	1.717E+01	541	3.347E+01	582	5.244E+01
419	3.494E-01	460	2.715E+01	501	1.785E+01	542	3.378E+01	583	5.310E+01
420	4.539E-01	461	2.506E+01	502	1.853E+01	543	3.404E+01	584	5.373E+01

nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
585	5.416E+01	626	5.428E+01	667	2.551E+01	708	7.582E+00	749	1.371E+00
586	5.463E+01	627	5.369E+01	668	2.481E+01	709	7.347E+00	750	1.358E+00
587	5.526E+01	628	5.306E+01	669	2.416E+01	710	7.040E+00	751	1.351E+00
588	5.575E+01	629	5.226E+01	670	2.359E+01	711	6.826E+00	752	1.278E+00
589	5.627E+01	630	5.171E+01	671	2.292E+01	712	6.548E+00	753	1.232E+00
590	5.665E+01	631	5.103E+01	672	2.236E+01	713	6.409E+00	754	1.130E+00
591	5.723E+01	632	5.043E+01	673	2.180E+01	714	6.131E+00	755	1.109E+00
592	5.774E+01	633	4.974E+01	674	2.114E+01	715	5.821E+00	756	1.154E+00
593	5.807E+01	634	4.902E+01	675	2.065E+01	716	5.659E+00	757	9.565E-01
594	5.838E+01	635	4.838E+01	676	2.010E+01	717	5.498E+00	758	7.909E-01
595	5.883E+01	636	4.767E+01	677	1.949E+01	718	5.233E+00	759	9.051E-01
596	5.925E+01	637	4.698E+01	678	1.903E+01	719	5.103E+00	760	8.420E-01
597	5.957E+01	638	4.620E+01	679	1.847E+01	720	4.899E+00	761	7.982E-01
598	5.974E+01	639	4.548E+01	680	1.793E+01	721	4.666E+00	762	8.528E-01
599	5.998E+01	640	4.479E+01	681	1.746E+01	722	4.621E+00	763	9.756E-01
600	6.038E+01	641	4.406E+01	682	1.700E+01	723	4.375E+00	764	7.092E-01
601	6.057E+01	642	4.344E+01	683	1.653E+01	724	4.107E+00	765	6.336E-01
602	6.067E+01	643	4.255E+01	684	1.603E+01	725	4.042E+00	766	6.832E-01
603	6.087E+01	644	4.190E+01	685	1.554E+01	726	3.843E+00	767	6.206E-01
604	6.099E+01	645	4.123E+01	686	1.515E+01	727	3.664E+00	768	6.879E-01
605	6.089E+01	646	4.044E+01	687	1.466E+01	728	3.562E+00	769	6.906E-01
606	6.097E+01	647	3.969E+01	688	1.426E+01	729	3.497E+00	770	5.613E-01
607	6.097E+01	648	3.896E+01	689	1.380E+01	730	3.372E+00	771	6.034E-01
608	6.088E+01	649	3.824E+01	690	1.339E+01	731	3.111E+00	772	6.152E-01
609	6.088E+01	650	3.748E+01	691	1.307E+01	732	3.107E+00	773	4.376E-01
610	6.069E+01	651	3.673E+01	692	1.270E+01	733	2.796E+00	774	4.382E-01
611	6.040E+01	652	3.596E+01	693	1.229E+01	734	2.687E+00	775	4.475E-01
612	6.041E+01	653	3.524E+01	694	1.187E+01	735	2.679E+00	776	4.521E-01
613	6.015E+01	654	3.448E+01	695	1.151E+01	736	2.530E+00	777	4.697E-01
614	5.974E+01	655	3.377E+01	696	1.115E+01	737	2.428E+00	778	4.157E-01
615	5.966E+01	656	3.307E+01	697	1.087E+01	738	2.237E+00	779	3.656E-01
616	5.907E+01	657	3.242E+01	698	1.051E+01	739	2.177E+00	780	3.247E-01
617	5.889E+01	658	3.168E+01	699	1.017E+01	740	2.024E+00		
618	5.850E+01	659	3.099E+01	700	9.844E+00	741	2.080E+00		
619	5.795E+01	660	3.020E+01	701	9.556E+00	742	1.957E+00		
620	5.738E+01	661	2.952E+01	702	9.203E+00	743	1.867E+00		
621	5.695E+01	662	2.885E+01	703	8.887E+00	744	1.694E+00		
622	5.660E+01	663	2.815E+01	704	8.655E+00	745	1.703E+00		
623	5.592E+01	664	2.745E+01	705	8.376E+00	746	1.483E+00		
624	5.544E+01	665	2.678E+01	706	8.104E+00	747	1.540E+00		
625	5.486E+01	666	2.614E+01	707	7.828E+00	748	1.496E+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**

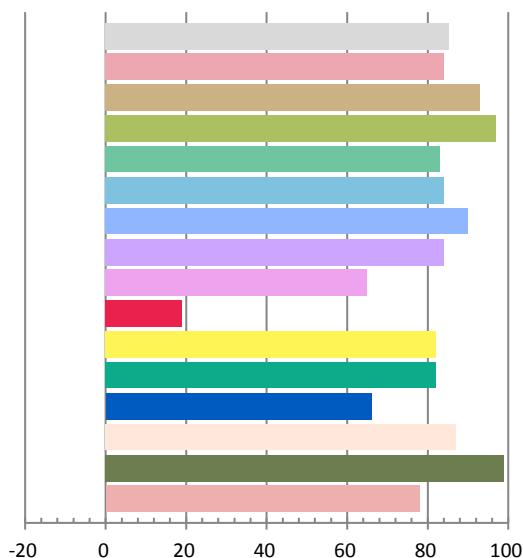
Photometric and Electrical Measurement Result

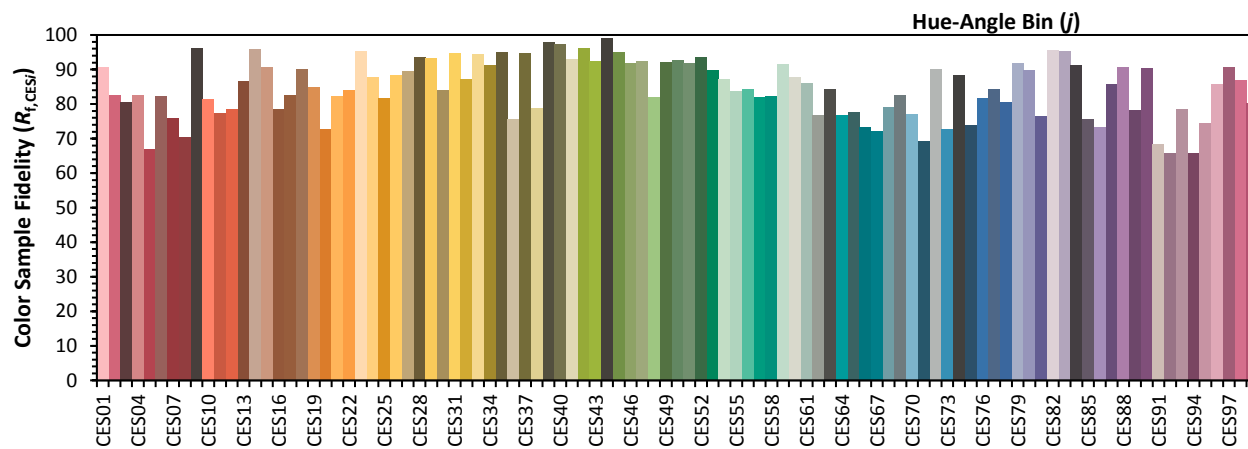
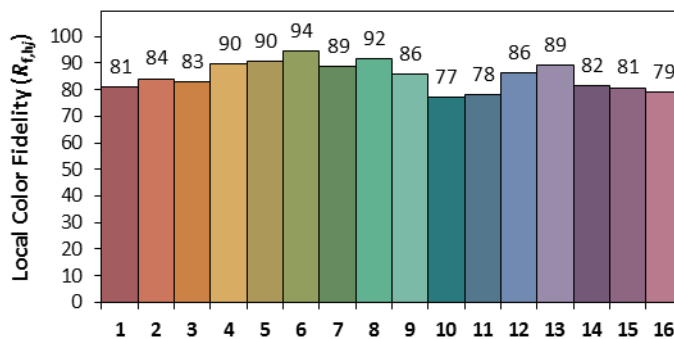
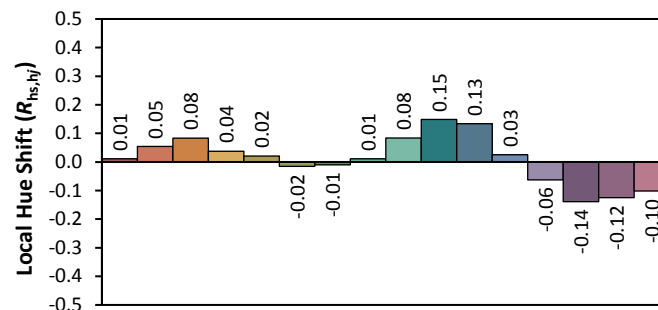
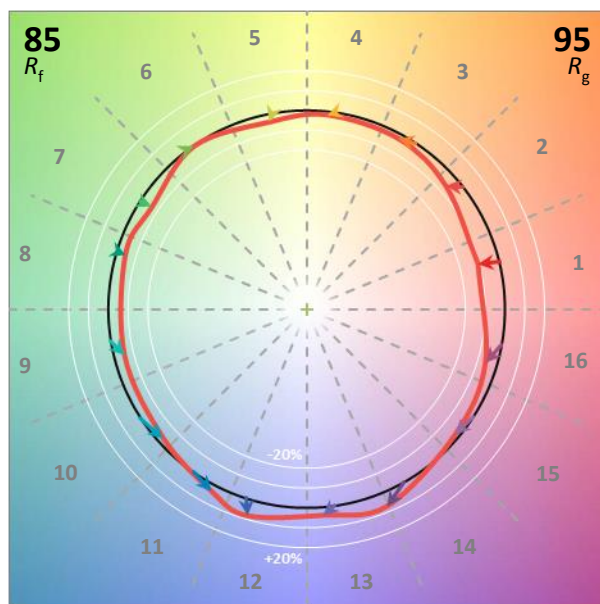
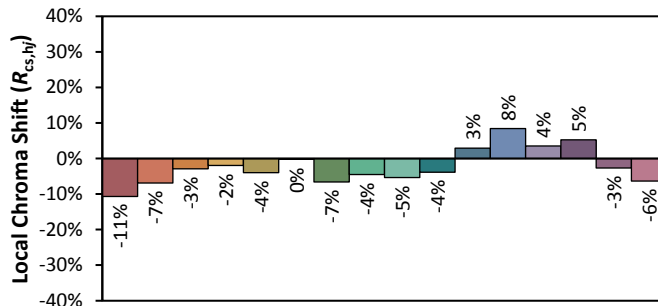
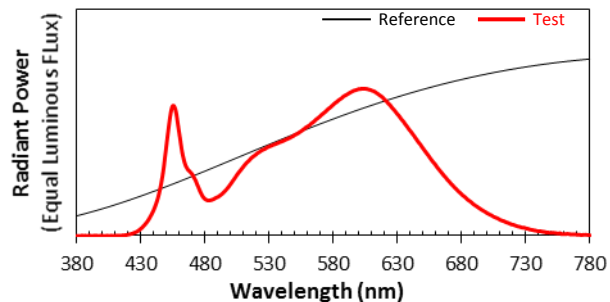
Voltage(V)	Frequency(Hz)	Current(A)	Power (W)	Power Factor	Luminous Flux(lm)	Efficacy(lm/W)
120	60	0.1847	21.93	0.9893	3084.4	140.65

Radiant Flux (W)	CCT (K)	Duv	x	y	u'	v'
9.415	3362	-0.00032	0.4129	0.3937	0.2395	0.5136

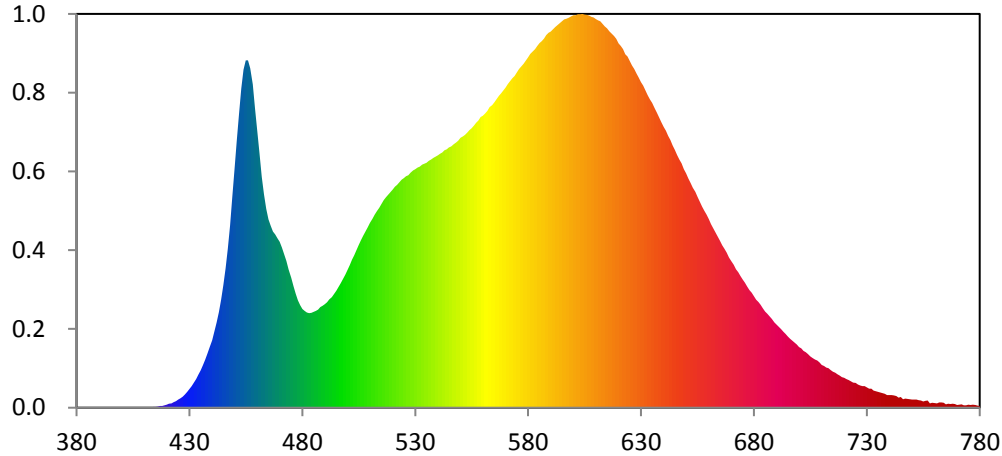
Color Rendering Index

Ra			
85.2			
R1	R2	R3	R4
84	93	97	83
R5	R6	R7	R8
84	90	84	65
R9	R10	R11	R12
19	82	82	66
R13	R14	R15	
87	99	78	





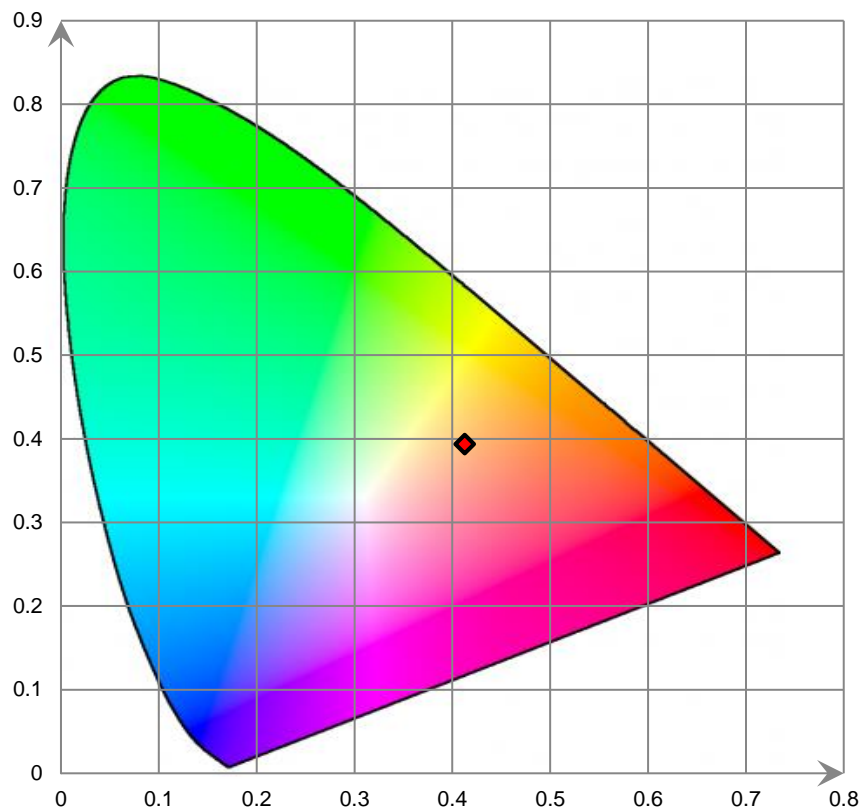
Relative Spectral Power Distribution



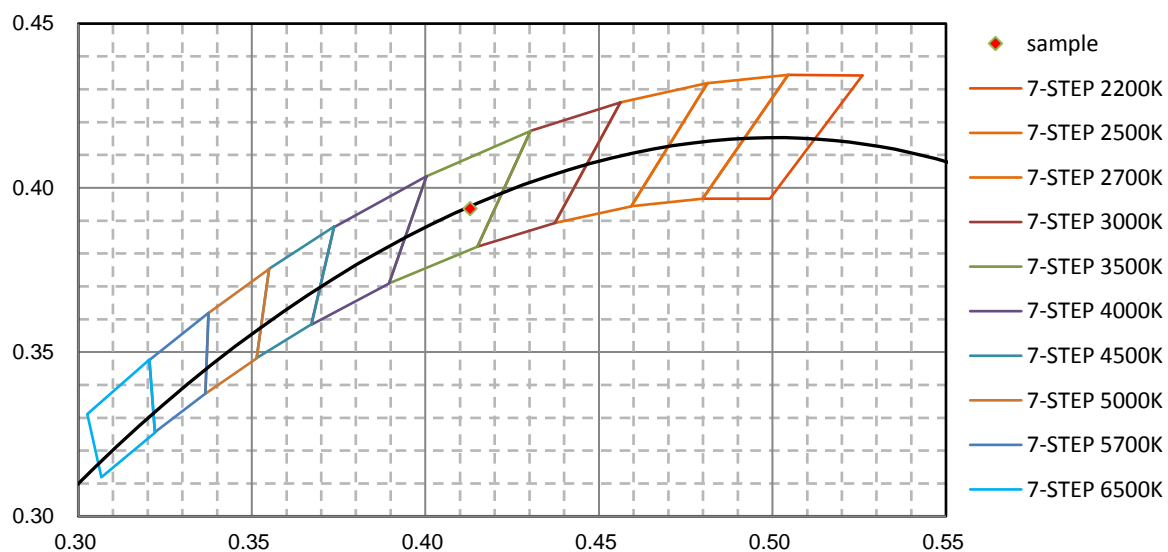
nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
380	3.710E-02	421	5.723E-01	462	3.440E+01	503	2.273E+01	544	3.847E+01
381	1.680E-02	422	6.586E-01	463	3.179E+01	504	2.348E+01	545	3.875E+01
382	3.540E-02	423	8.427E-01	464	2.964E+01	505	2.424E+01	546	3.894E+01
383	7.600E-03	424	9.939E-01	465	2.807E+01	506	2.493E+01	547	3.923E+01
384	7.420E-02	425	1.203E+00	466	2.708E+01	507	2.562E+01	548	3.950E+01
385	7.640E-02	426	1.407E+00	467	2.624E+01	508	2.623E+01	549	3.976E+01
386	9.000E-03	427	1.666E+00	468	2.581E+01	509	2.688E+01	550	4.020E+01
387	5.290E-02	428	1.997E+00	469	2.523E+01	510	2.753E+01	551	4.041E+01
388	9.500E-03	429	2.365E+00	470	2.470E+01	511	2.817E+01	552	4.065E+01
389	2.990E-02	430	2.780E+00	471	2.386E+01	512	2.876E+01	553	4.095E+01
390	4.540E-02	431	3.233E+00	472	2.285E+01	513	2.929E+01	554	4.137E+01
391	2.440E-02	432	3.741E+00	473	2.186E+01	514	2.978E+01	555	4.166E+01
392	9.300E-03	433	4.270E+00	474	2.055E+01	515	3.032E+01	556	4.204E+01
393	4.600E-03	434	4.913E+00	475	1.937E+01	516	3.091E+01	557	4.247E+01
394	1.500E-02	435	5.539E+00	476	1.815E+01	517	3.131E+01	558	4.277E+01
395	3.380E-02	436	6.318E+00	477	1.702E+01	518	3.172E+01	559	4.330E+01
396	2.040E-02	437	7.116E+00	478	1.598E+01	519	3.208E+01	560	4.348E+01
397	8.500E-03	438	8.037E+00	479	1.527E+01	520	3.248E+01	561	4.384E+01
398	7.000E-04	439	8.988E+00	480	1.473E+01	521	3.292E+01	562	4.422E+01
399	3.700E-03	440	1.005E+01	481	1.440E+01	522	3.321E+01	563	4.479E+01
400	5.000E-04	441	1.135E+01	482	1.416E+01	523	3.358E+01	564	4.506E+01
401	2.030E-02	442	1.271E+01	483	1.407E+01	524	3.397E+01	565	4.550E+01
402	1.650E-02	443	1.424E+01	484	1.412E+01	525	3.418E+01	566	4.595E+01
403	9.700E-03	444	1.608E+01	485	1.425E+01	526	3.448E+01	567	4.646E+01
404	8.200E-03	445	1.827E+01	486	1.444E+01	527	3.462E+01	568	4.683E+01
405	2.270E-02	446	2.078E+01	487	1.461E+01	528	3.503E+01	569	4.728E+01
406	4.700E-03	447	2.373E+01	488	1.498E+01	529	3.534E+01	570	4.769E+01
407	8.620E-02	448	2.716E+01	489	1.520E+01	530	3.552E+01	571	4.822E+01
408	1.620E-02	449	3.145E+01	490	1.544E+01	531	3.576E+01	572	4.862E+01
409	3.490E-02	450	3.556E+01	491	1.573E+01	532	3.590E+01	573	4.907E+01
410	5.900E-02	451	3.983E+01	492	1.612E+01	533	3.621E+01	574	4.941E+01
411	7.690E-02	452	4.380E+01	493	1.649E+01	534	3.636E+01	575	4.995E+01
412	7.390E-02	453	4.753E+01	494	1.693E+01	535	3.651E+01	576	5.047E+01
413	4.070E-02	454	5.035E+01	495	1.743E+01	536	3.677E+01	577	5.085E+01
414	9.680E-02	455	5.173E+01	496	1.799E+01	537	3.696E+01	578	5.121E+01
415	1.332E-01	456	5.171E+01	497	1.856E+01	538	3.721E+01	579	5.171E+01
416	1.816E-01	457	5.053E+01	498	1.916E+01	539	3.739E+01	580	5.219E+01
417	2.390E-01	458	4.814E+01	499	1.979E+01	540	3.759E+01	581	5.268E+01
418	2.766E-01	459	4.452E+01	500	2.054E+01	541	3.780E+01	582	5.310E+01
419	3.564E-01	460	4.120E+01	501	2.124E+01	542	3.801E+01	583	5.342E+01
420	4.669E-01	461	3.786E+01	502	2.203E+01	543	3.832E+01	584	5.389E+01

nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
585	5.430E+01	626	5.095E+01	667	2.365E+01	708	7.036E+00	749	1.260E+00
586	5.460E+01	627	5.044E+01	668	2.308E+01	709	6.743E+00	750	1.216E+00
587	5.496E+01	628	4.978E+01	669	2.237E+01	710	6.390E+00	751	1.236E+00
588	5.548E+01	629	4.915E+01	670	2.187E+01	711	6.207E+00	752	1.204E+00
589	5.581E+01	630	4.850E+01	671	2.128E+01	712	5.978E+00	753	1.134E+00
590	5.602E+01	631	4.798E+01	672	2.063E+01	713	5.866E+00	754	1.061E+00
591	5.637E+01	632	4.728E+01	673	2.021E+01	714	5.597E+00	755	9.071E-01
592	5.667E+01	633	4.653E+01	674	1.960E+01	715	5.383E+00	756	1.011E+00
593	5.697E+01	634	4.593E+01	675	1.908E+01	716	5.228E+00	757	1.047E+00
594	5.726E+01	635	4.538E+01	676	1.863E+01	717	4.990E+00	758	6.328E-01
595	5.754E+01	636	4.456E+01	677	1.806E+01	718	4.808E+00	759	7.629E-01
596	5.782E+01	637	4.394E+01	678	1.752E+01	719	4.546E+00	760	6.955E-01
597	5.793E+01	638	4.321E+01	679	1.712E+01	720	4.469E+00	761	6.600E-01
598	5.809E+01	639	4.249E+01	680	1.662E+01	721	4.287E+00	762	7.783E-01
599	5.825E+01	640	4.184E+01	681	1.609E+01	722	4.119E+00	763	7.823E-01
600	5.846E+01	641	4.124E+01	682	1.575E+01	723	3.913E+00	764	7.342E-01
601	5.844E+01	642	4.049E+01	683	1.533E+01	724	3.737E+00	765	5.229E-01
602	5.860E+01	643	3.986E+01	684	1.480E+01	725	3.680E+00	766	6.082E-01
603	5.859E+01	644	3.905E+01	685	1.434E+01	726	3.469E+00	767	5.626E-01
604	5.865E+01	645	3.839E+01	686	1.399E+01	727	3.320E+00	768	5.961E-01
605	5.853E+01	646	3.763E+01	687	1.363E+01	728	3.226E+00	769	5.717E-01
606	5.850E+01	647	3.695E+01	688	1.324E+01	729	3.217E+00	770	4.242E-01
607	5.843E+01	648	3.638E+01	689	1.272E+01	730	3.035E+00	771	4.344E-01
608	5.822E+01	649	3.555E+01	690	1.236E+01	731	2.828E+00	772	4.859E-01
609	5.815E+01	650	3.489E+01	691	1.202E+01	732	2.815E+00	773	3.661E-01
610	5.788E+01	651	3.414E+01	692	1.168E+01	733	2.546E+00	774	3.593E-01
611	5.772E+01	652	3.348E+01	693	1.130E+01	734	2.449E+00	775	4.432E-01
612	5.754E+01	653	3.276E+01	694	1.099E+01	735	2.383E+00	776	3.851E-01
613	5.719E+01	654	3.213E+01	695	1.063E+01	736	2.281E+00	777	4.546E-01
614	5.678E+01	655	3.139E+01	696	1.028E+01	737	2.156E+00	778	3.968E-01
615	5.650E+01	656	3.068E+01	697	9.992E+00	738	2.081E+00	779	3.121E-01
616	5.607E+01	657	2.998E+01	698	9.714E+00	739	1.905E+00	780	2.439E-01
617	5.575E+01	658	2.934E+01	699	9.405E+00	740	1.901E+00		
618	5.534E+01	659	2.877E+01	700	9.016E+00	741	1.897E+00		
619	5.492E+01	660	2.810E+01	701	8.822E+00	742	1.835E+00		
620	5.427E+01	661	2.733E+01	702	8.472E+00	743	1.726E+00		
621	5.386E+01	662	2.671E+01	703	8.270E+00	744	1.522E+00		
622	5.341E+01	663	2.608E+01	704	7.973E+00	745	1.592E+00		
623	5.267E+01	664	2.546E+01	705	7.645E+00	746	1.250E+00		
624	5.230E+01	665	2.486E+01	706	7.414E+00	747	1.377E+00		
625	5.162E+01	666	2.420E+01	707	7.178E+00	748	1.322E+00		

CIE 1931xy Chromaticity Diagram



7-StepChromaticity Quadrangles



Control Setting: 4000K

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

Test orientation: **Downward**

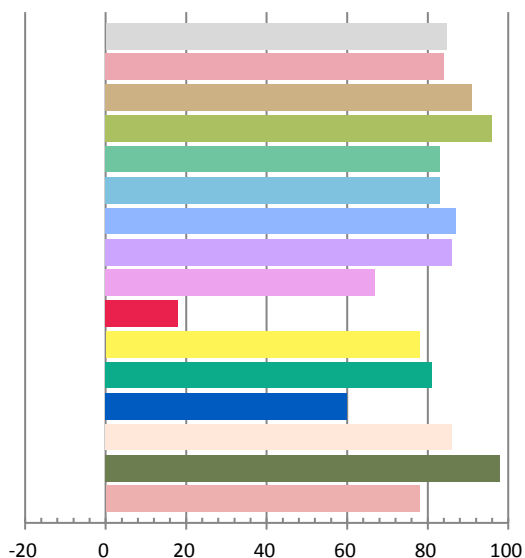
Photometric and Electrical Measurement Result

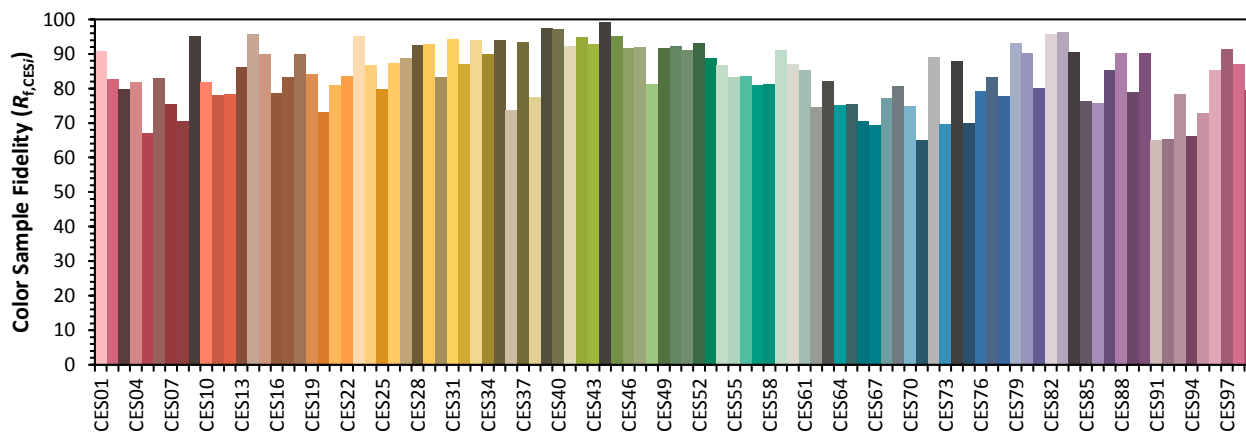
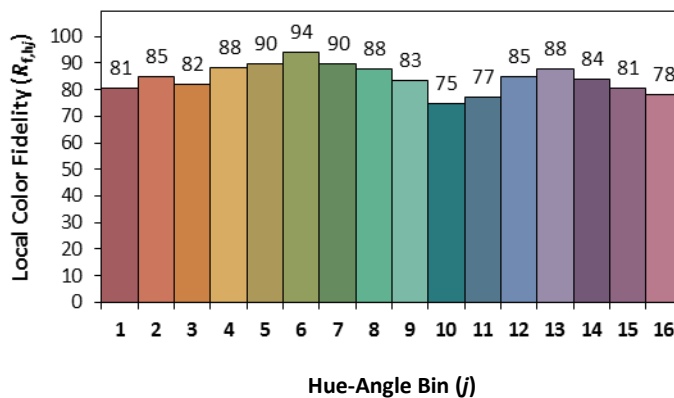
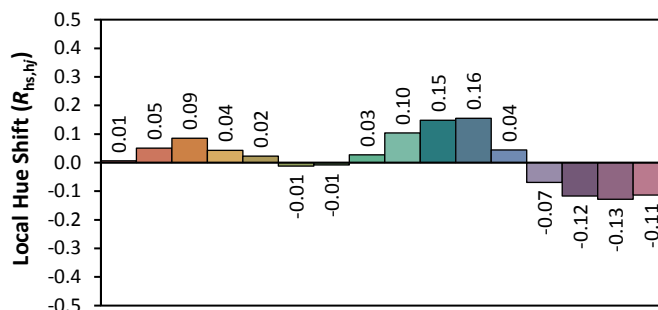
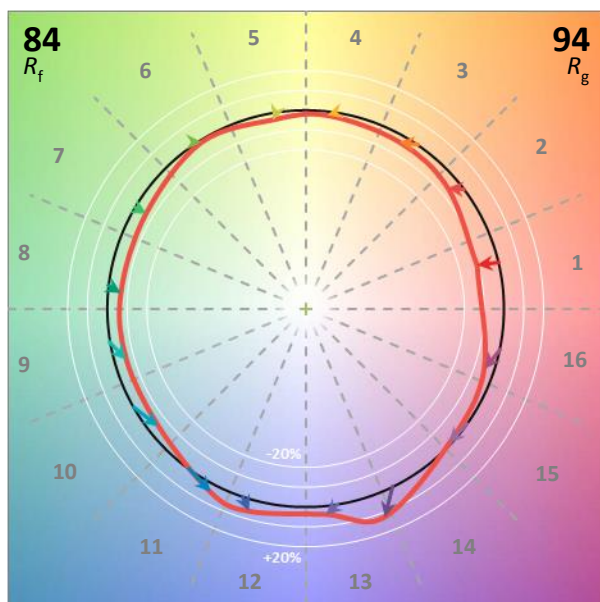
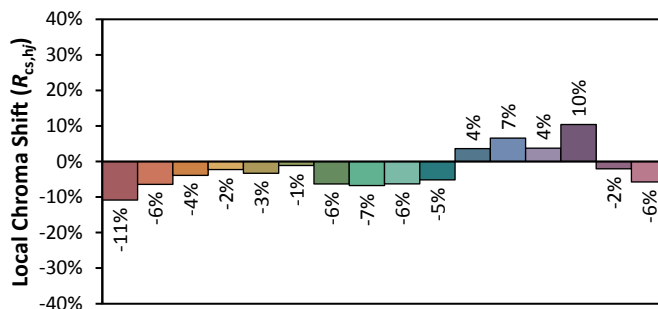
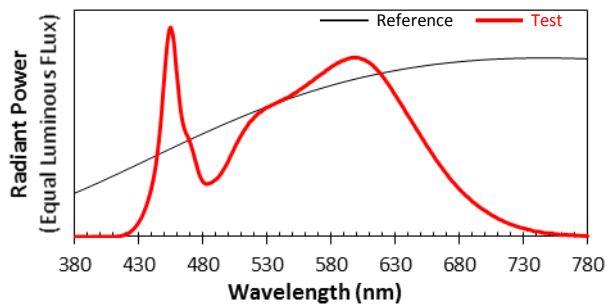
Voltage(V)	Frequency(Hz)	Current(A)	Power (W)	Power Factor	Luminous Flux(lm)	Efficacy(lm/W)
120	60	0.1908	22.67	0.9901	3079.7	135.87

Radiant Flux (W)	CCT (K)	Duv	x	y	u'	v'
9.362	3888	0.00107	0.3863	0.3827	0.2266	0.5050

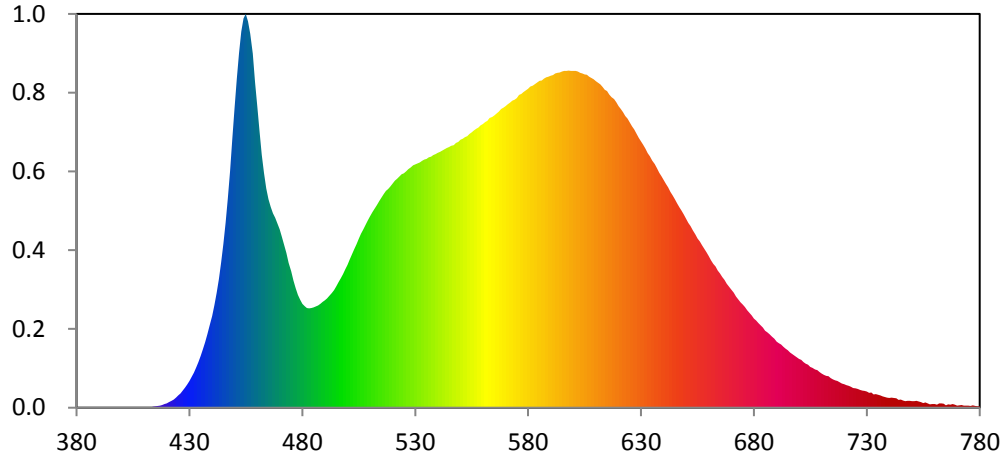
Color Rendering Index

Ra			
84.6			
R1	R2	R3	R4
84	91	96	83
R5	R6	R7	R8
83	87	86	67
R9	R10	R11	R12
18	78	81	60
R13	R14	R15	
86	98	78	





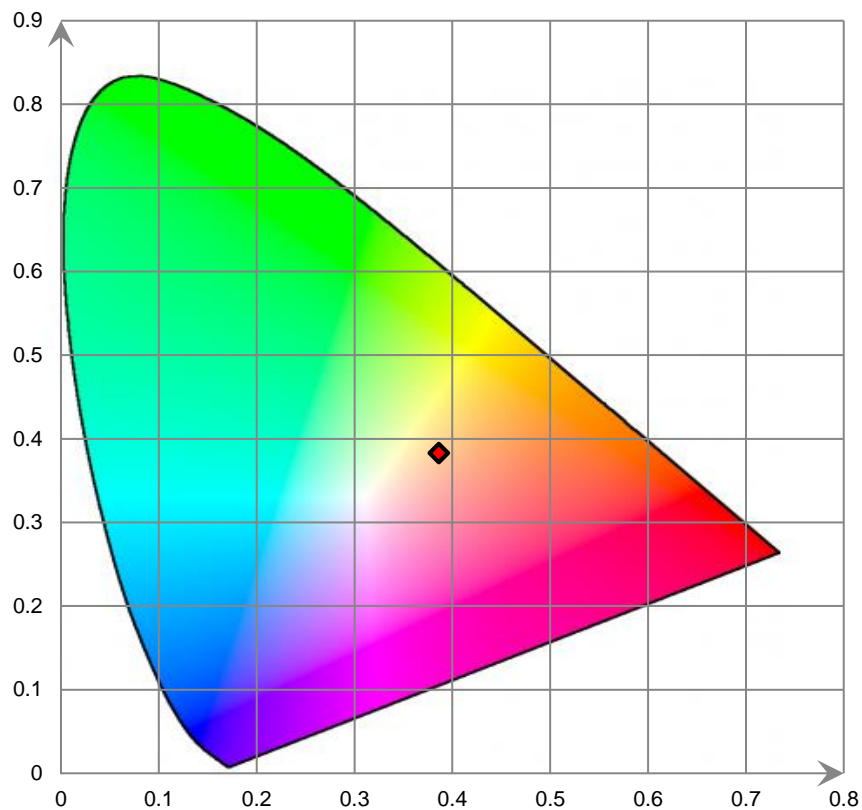
Relative Spectral Power Distribution



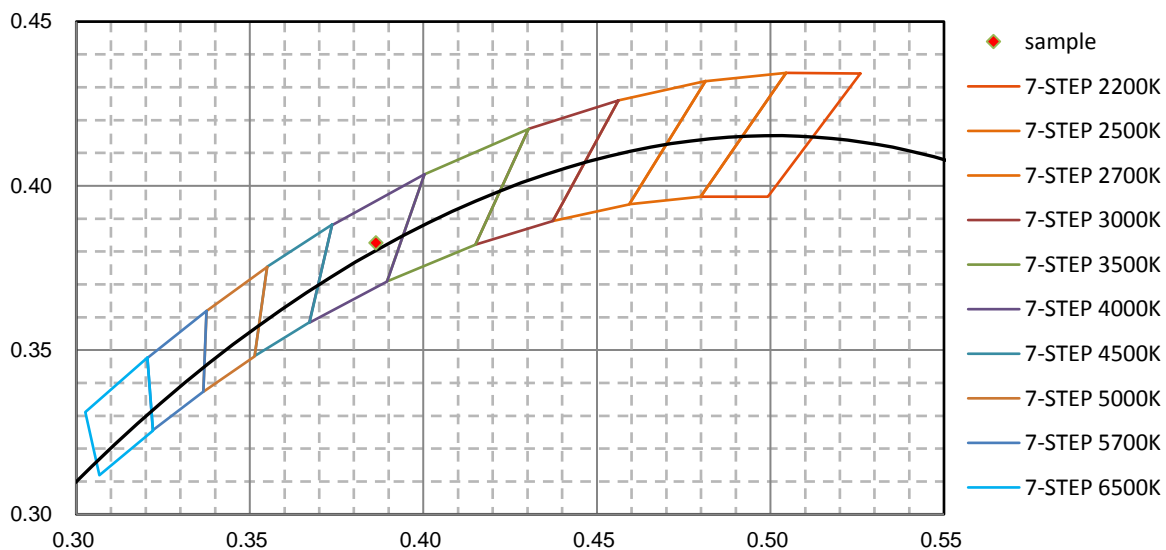
nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
380	2.520E-02	421	8.898E-01	462	4.015E+01	503	2.517E+01	544	4.121E+01
381	2.650E-02	422	1.068E+00	463	3.722E+01	504	2.591E+01	545	4.136E+01
382	2.910E-02	423	1.316E+00	464	3.480E+01	505	2.676E+01	546	4.154E+01
383	2.080E-02	424	1.594E+00	465	3.306E+01	506	2.758E+01	547	4.168E+01
384	6.160E-02	425	1.954E+00	466	3.187E+01	507	2.825E+01	548	4.199E+01
385	7.740E-02	426	2.264E+00	467	3.083E+01	508	2.897E+01	549	4.214E+01
386	8.000E-03	427	2.703E+00	468	3.014E+01	509	2.965E+01	550	4.253E+01
387	4.320E-02	428	3.182E+00	469	2.920E+01	510	3.036E+01	551	4.269E+01
388	3.200E-02	429	3.692E+00	470	2.832E+01	511	3.103E+01	552	4.294E+01
389	4.460E-02	430	4.261E+00	471	2.711E+01	512	3.160E+01	553	4.308E+01
390	4.780E-02	431	4.912E+00	472	2.582E+01	513	3.219E+01	554	4.343E+01
391	2.000E-02	432	5.575E+00	473	2.457E+01	514	3.279E+01	555	4.369E+01
392	7.200E-03	433	6.358E+00	474	2.300E+01	515	3.333E+01	556	4.398E+01
393	2.000E-02	434	7.237E+00	475	2.163E+01	516	3.391E+01	557	4.423E+01
394	1.510E-02	435	8.214E+00	476	2.019E+01	517	3.442E+01	558	4.445E+01
395	6.270E-02	436	9.260E+00	477	1.898E+01	518	3.471E+01	559	4.480E+01
396	1.210E-02	437	1.039E+01	478	1.789E+01	519	3.511E+01	560	4.500E+01
397	1.410E-02	438	1.165E+01	479	1.714E+01	520	3.557E+01	561	4.531E+01
398	1.330E-02	439	1.302E+01	480	1.647E+01	521	3.603E+01	562	4.551E+01
399	7.000E-04	440	1.454E+01	481	1.613E+01	522	3.635E+01	563	4.599E+01
400	0.000E+00	441	1.626E+01	482	1.581E+01	523	3.669E+01	564	4.612E+01
401	2.560E-02	442	1.820E+01	483	1.576E+01	524	3.704E+01	565	4.639E+01
402	3.370E-02	443	2.037E+01	484	1.584E+01	525	3.720E+01	566	4.667E+01
403	4.910E-02	444	2.301E+01	485	1.593E+01	526	3.752E+01	567	4.698E+01
404	2.230E-02	445	2.598E+01	486	1.606E+01	527	3.785E+01	568	4.738E+01
405	3.850E-02	446	2.931E+01	487	1.625E+01	528	3.810E+01	569	4.761E+01
406	1.250E-02	447	3.322E+01	488	1.650E+01	529	3.845E+01	570	4.784E+01
407	9.670E-02	448	3.756E+01	489	1.678E+01	530	3.859E+01	571	4.814E+01
408	3.140E-02	449	4.270E+01	490	1.703E+01	531	3.877E+01	572	4.841E+01
409	6.590E-02	450	4.754E+01	491	1.736E+01	532	3.890E+01	573	4.872E+01
410	7.420E-02	451	5.217E+01	492	1.774E+01	533	3.917E+01	574	4.887E+01
411	7.410E-02	452	5.627E+01	493	1.820E+01	534	3.937E+01	575	4.913E+01
412	9.550E-02	453	5.970E+01	494	1.868E+01	535	3.946E+01	576	4.962E+01
413	9.430E-02	454	6.177E+01	495	1.925E+01	536	3.971E+01	577	4.981E+01
414	1.805E-01	455	6.248E+01	496	1.994E+01	537	3.985E+01	578	5.009E+01
415	2.036E-01	456	6.130E+01	497	2.052E+01	538	4.008E+01	579	5.034E+01
416	2.738E-01	457	5.935E+01	498	2.121E+01	539	4.024E+01	580	5.062E+01
417	3.585E-01	458	5.618E+01	499	2.194E+01	540	4.046E+01	581	5.096E+01
418	4.392E-01	459	5.164E+01	500	2.269E+01	541	4.061E+01	582	5.109E+01
419	5.732E-01	460	4.785E+01	501	2.353E+01	542	4.081E+01	583	5.135E+01
420	7.070E-01	461	4.388E+01	502	2.437E+01	543	4.099E+01	584	5.160E+01

nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
585	5.188E+01	626	4.466E+01	667	2.030E+01	708	5.947E+00	749	1.103E+00
586	5.189E+01	627	4.414E+01	668	1.969E+01	709	5.687E+00	750	1.061E+00
587	5.220E+01	628	4.350E+01	669	1.920E+01	710	5.426E+00	751	1.029E+00
588	5.242E+01	629	4.283E+01	670	1.874E+01	711	5.232E+00	752	1.100E+00
589	5.253E+01	630	4.225E+01	671	1.825E+01	712	5.038E+00	753	9.730E-01
590	5.266E+01	631	4.172E+01	672	1.765E+01	713	4.979E+00	754	8.940E-01
591	5.279E+01	632	4.109E+01	673	1.721E+01	714	4.702E+00	755	7.205E-01
592	5.302E+01	633	4.040E+01	674	1.672E+01	715	4.490E+00	756	8.444E-01
593	5.311E+01	634	3.989E+01	675	1.638E+01	716	4.351E+00	757	6.996E-01
594	5.317E+01	635	3.924E+01	676	1.598E+01	717	4.242E+00	758	5.418E-01
595	5.332E+01	636	3.866E+01	677	1.545E+01	718	4.019E+00	759	5.808E-01
596	5.346E+01	637	3.801E+01	678	1.503E+01	719	3.820E+00	760	5.925E-01
597	5.342E+01	638	3.730E+01	679	1.465E+01	720	3.726E+00	761	4.857E-01
598	5.350E+01	639	3.671E+01	680	1.416E+01	721	3.559E+00	762	6.615E-01
599	5.344E+01	640	3.614E+01	681	1.383E+01	722	3.470E+00	763	6.732E-01
600	5.343E+01	641	3.550E+01	682	1.341E+01	723	3.325E+00	764	6.230E-01
601	5.342E+01	642	3.496E+01	683	1.305E+01	724	3.105E+00	765	4.019E-01
602	5.334E+01	643	3.427E+01	684	1.269E+01	725	3.094E+00	766	5.471E-01
603	5.313E+01	644	3.368E+01	685	1.223E+01	726	2.972E+00	767	4.792E-01
604	5.305E+01	645	3.309E+01	686	1.197E+01	727	2.808E+00	768	5.711E-01
605	5.286E+01	646	3.242E+01	687	1.164E+01	728	2.713E+00	769	4.654E-01
606	5.284E+01	647	3.183E+01	688	1.128E+01	729	2.677E+00	770	3.169E-01
607	5.252E+01	648	3.124E+01	689	1.095E+01	730	2.574E+00	771	3.613E-01
608	5.232E+01	649	3.064E+01	690	1.050E+01	731	2.387E+00	772	4.220E-01
609	5.212E+01	650	2.998E+01	691	1.024E+01	732	2.393E+00	773	3.525E-01
610	5.183E+01	651	2.933E+01	692	1.002E+01	733	2.133E+00	774	3.387E-01
611	5.156E+01	652	2.880E+01	693	9.683E+00	734	2.143E+00	775	3.345E-01
612	5.130E+01	653	2.814E+01	694	9.363E+00	735	2.079E+00	776	2.599E-01
613	5.092E+01	654	2.751E+01	695	9.090E+00	736	1.940E+00	777	3.805E-01
614	5.043E+01	655	2.683E+01	696	8.757E+00	737	1.789E+00	778	2.772E-01
615	5.023E+01	656	2.638E+01	697	8.525E+00	738	1.681E+00	779	2.461E-01
616	4.966E+01	657	2.579E+01	698	8.235E+00	739	1.585E+00	780	2.100E-01
617	4.927E+01	658	2.520E+01	699	8.019E+00	740	1.551E+00		
618	4.895E+01	659	2.465E+01	700	7.755E+00	741	1.589E+00		
619	4.847E+01	660	2.406E+01	701	7.597E+00	742	1.538E+00		
620	4.787E+01	661	2.339E+01	702	7.237E+00	743	1.505E+00		
621	4.740E+01	662	2.281E+01	703	6.985E+00	744	1.265E+00		
622	4.687E+01	663	2.240E+01	704	6.809E+00	745	1.318E+00		
623	4.627E+01	664	2.178E+01	705	6.489E+00	746	1.118E+00		
624	4.586E+01	665	2.129E+01	706	6.310E+00	747	1.053E+00		
625	4.527E+01	666	2.073E+01	707	6.058E+00	748	1.093E+00		

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**

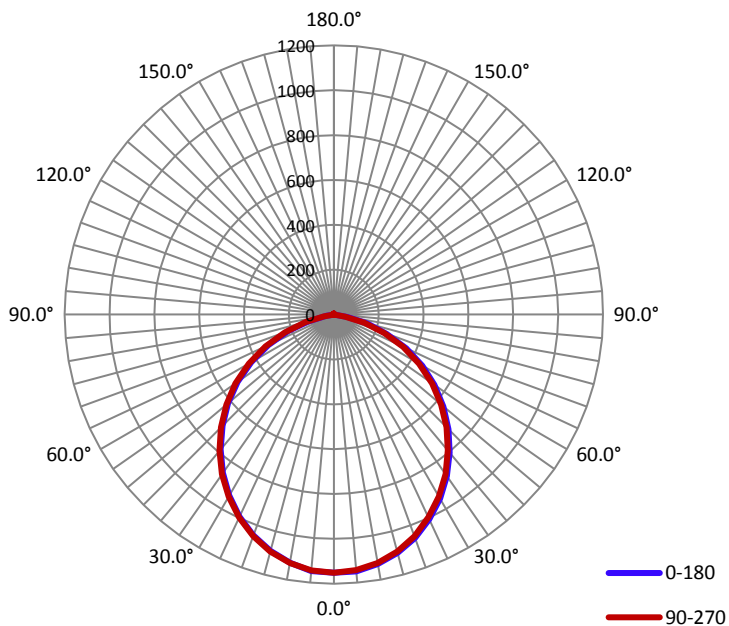
Electrical Measurement

Input Voltage(V)	Frequency(Hz)	Input Current(A)	Power (W)	Power Factor
120.0	60	0.1920	22.86	0.9930

Photometric Measurement

Luminous Flux(lm)	Efficacy(lm/W)	I _{max} (cd)	S/MH(C0/180)	S/MH(C90/270)
2939.8	128.65	1153.6	1.22	1.21

Luminous Intensity Distribution



	C0/180	C45/225	C90/270	C135/315	AVG.
Beam Angle(50%I _{max}):	105.6	105.6	105.7	105.8	105.7
Field Angle(10%I _{max}):	152.2	152.2	152.3	152.1	152.2

Luminous Intensity (cd) Distribution Data

C y	0°	22.5°	45°	67.5°	90°	112.5°	135°	157.5°
0.0°	1151	1151	1151	1151	1151	1151	1151	1151
5.0°	1149	1148	1146	1144	1144	1144	1145	1144
10.0°	1129	1126	1127	1126	1125	1124	1124	1123
15.0°	1100	1095	1096	1094	1093	1093	1093	1092
20.0°	1059	1055	1054	1052	1051	1050	1049	1049
25.0°	1006	1003	1001	998	997	997	996	995
30.0°	947	943	941	937	937	936	935	935
35.0°	879	873	871	869	868	867	864	865
40.0°	804	800	795	793	791	790	788	789
45.0°	723	719	716	711	711	710	707	707
50.0°	637	635	631	627	625	623	622	622
55.0°	547	547	543	538	536	533	531	531
60.0°	455	452	450	445	440	437	434	434
65.0°	356	354	349	346	341	336	332	332
70.0°	252	253	249	244	238	235	231	229
75.0°	155	154	151	146	141	135	132	131
80.0°	62	61	60	56	51	47	45	43
85.0°	6	7	7	6	6	5	5	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	1	1	1	1	1	1	1
145.0°	1	2	2	2	2	2	1	2
150.0°	1	2	2	2	3	2	3	2
155.0°	2	3	3	3	3	3	3	3
160.0°	3	3	4	3	4	4	4	4
165.0°	3	4	4	4	4	4	4	4
170.0°	3	4	4	4	4	5	4	4
175.0°	4	5	4	4	4	5	4	4
180.0°	0	0	0	0	0	0	0	0

Luminous Intensity (cd) Distribution Data (cont.)

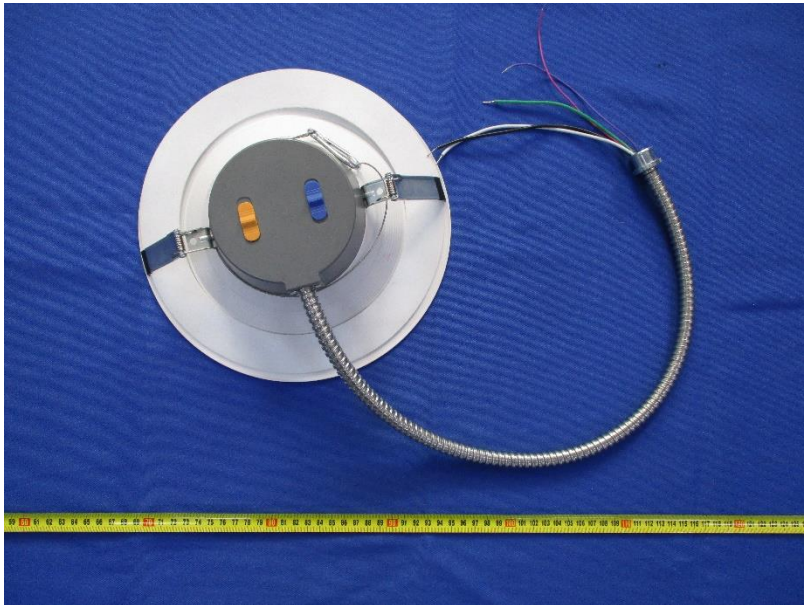
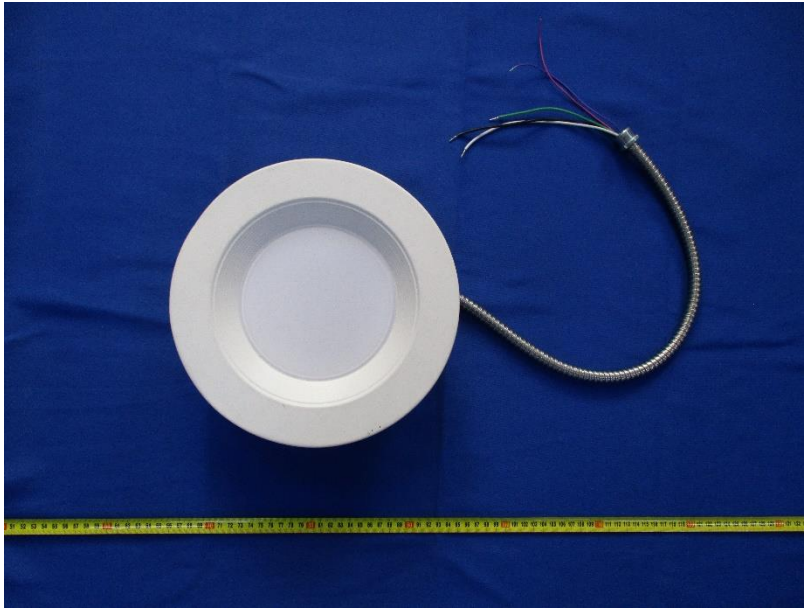
C y	180°	202.5°	225°	247.5°	270°	292.5°	315°	337.5°
0.0°	1151	1151	1151	1151	1151	1151	1151	1151
5.0°	1147	1144	1145	1144	1144	1146	1146	1145
10.0°	1123	1124	1125	1124	1124	1127	1127	1128
15.0°	1091	1090	1092	1093	1093	1097	1096	1097
20.0°	1048	1049	1049	1050	1051	1054	1056	1055
25.0°	994	992	994	996	998	1002	1004	1003
30.0°	932	931	934	935	937	941	943	942
35.0°	861	860	861	865	868	871	872	873
40.0°	785	784	787	790	793	795	798	799
45.0°	701	701	706	708	711	715	717	716
50.0°	616	616	620	621	625	630	632	631
55.0°	523	524	527	531	535	540	542	542
60.0°	424	424	428	434	438	441	444	446
65.0°	322	321	326	331	335	339	342	345
70.0°	216	218	222	225	231	236	240	241
75.0°	117	119	123	125	131	136	140	141
80.0°	32	33	37	41	44	47	50	52
85.0°	2	3	3	4	4	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	0	0	0	0	0	0	0
145.0°	0	0	1	1	1	1	1	1
150.0°	1	1	2	2	2	2	2	2
155.0°	2	2	2	2	2	2	2	2
160.0°	2	3	4	3	3	3	3	3
165.0°	3	3	4	3	3	3	4	4
170.0°	3	3	4	4	4	4	5	4
175.0°	4	4	5	4	4	4	5	4
180.0°	0	0	0	0	0	0	0	0

Zonal Lumen Density Measurement

Deg	Flux (lm)	%
0-5	27.5	0.94
5-10	81.3	2.75
10-15	131.6	4.48
15-20	176.9	6.03
20-25	215.1	7.32
25-30	245.1	8.32
30-35	265.8	9.04
35-40	277.0	9.42
40-45	278.5	9.47
45-50	270.1	9.19
50-55	252.6	8.59
55-60	225.3	7.67
60-65	188.6	6.42
65-70	144.9	4.93
70-75	96.6	3.29
75-80	48.3	1.64
80-85	10.5	0.36
85-90	0.8	0.02
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	0.4	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	0.4	0.00
175-180	0.0	0.00

Deg	Flux (lm)	%
0-5	27.4	0.93
0-10	108.7	3.70
0-15	240.3	8.18
0-20	417.2	14.19
0-25	632.3	21.51
0-30	877.3	29.84
0-35	1143.1	38.88
0-40	1420.0	48.30
0-45	1698.5	57.77
0-50	1968.5	66.96
0-55	2221.1	75.55
0-60	2446.5	83.22
0-65	2635.3	89.64
0-70	2780.1	94.57
0-75	2876.8	97.86
0-80	2925.0	99.50
0-85	2935.6	99.86
0-90	2936.4	99.88
0-95	2936.4	99.88
0-100	2936.4	99.88
0-105	2936.4	99.88
0-110	2936.4	99.88
0-115	2936.4	99.88
0-120	2936.4	99.88
0-125	2936.4	99.88
0-130	2936.4	99.88
0-135	2936.4	99.88
0-140	2936.5	99.89
0-145	2936.8	99.90
0-150	2937.2	99.91
0-155	2937.8	99.93
0-160	2938.4	99.95
0-165	2938.9	99.97
0-170	2939.4	99.99
0-175	2939.7	100.00
0-180	2939.8	100.00

6. Product Photo



Directions

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