



IES LM-79-08

MEASUREMENT AND TEST REPORT

For

MaxLite Inc

12 York Ave West Caldwell, NJ. 07006

Test Model: RRECO82427W/V2

Report Type:	Electrical and Photometric tests including: Luminous Flux, Chromaticity, Luminous Intensity Distribution
Test Engineer:	Carl Du <i>Carl Du</i>
Report Number:	RSZ170714505-10
Test Date:	2017-04-24 to 2017-08-30
Report Date:	2017-09-01
Reviewed By:	Blake Zhang / EE Engineer <i>Blake Zhang</i>
Prepared By:	Bay Area Compliance Laboratories Corp. (Dongguan). No.69,Pulongcun ,Puxihu Industrial Area, Tangxia , Dongguan, Guangdong, China. Tel: +86-0769-86858888 Fax:+86-0769-86858588
Accreditation:	The IAS Accreditation Number TL-460.

Note: The test data was only valid for the test sample(s). This test report is prepared for the customer shown above and for the device described herein. It may not be duplicated or used in part without prior written consent from Bay Area Compliance Laboratories Corp. (Dongguan). 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.

1. Product Description

General Information:

Three samples were received on 2017-04-20 and used for testing.

Model Tested: RRECO82427W/V2
 Product Designation: LED Recessed Downlight
 Burning Time Before Test: 0hour(For New Products)

Rated Values:

Rated Voltage/Frequency: 100-277 V AC 60Hz
 Rated Power: 24 W
 Nominal CCT: 2700K
 Nominal Lumen Output: 2000 lm

Family Declaration

MaxLite Inc declares that there are some differences between multiple models and tested model. Details as below:

Model Number	CCT	Test Item
RRECO82427W/V2	2700K	All
RRECO82430W/V2	3000K	Initial Photometric and Electrical Measurements
RRECO82440W/V2	4000K	

Note:

1. The applicant *MaxLite Inc* declare that their products with models RRECO82427W/V2, RRECO82430W/V2 and RRECO82440W/V2 are the same to the products in report #RSZ170420505-10A1, #RSZ170420505-10A2 and #RSZ170420505-10A3 and is authorized by original applicant to use their test data.

2. All the data in previous report (#RSZ170420505-10A1, #RSZ170420505-10A2 and #RSZ170420505-10A3) is shared in this report.

2. Standards Used

- IES LM-79-08: Approved Method: Electrical & Photometric Measurement of Solid-state Lighting Products
- ANSI C82.77-2002: Harmonic Emission Limits – Related Power Quality Requirements for Lighting
- IES TM-30-15: IES Method for Evaluating Light Source Color Rendition (This method is not in IAS accreditation scope)

3. Description of Test Equipment

Device	Manufacture	Model No	Serial No	Test Range	Calibration date	Calibration due date
2.0m integrating sphere	EVERFINE	R98	11010018	R98	2016-11-18	2017-11-18
spectroradiometer	EVERFINE	HAAS-2000	20140912	380-780nm	2016-11-18	2017-11-18
Digital Power Meter	EVERFINE	PF2010A	1011004	600V/20A	2017-07-11	2018-07-11
Digital CC&CV DC Power Supply	EVERFINE	WY305-V1	1101047	30V/5A	2017-07-07	2018-07-07
Rapid Recording Photometer	EVERFINE	PHOTO-2000F	1007010	0.1lm—200klm	2016-11-18	2017-11-18

Device	Manufacture	Model No	Serial No	Test Range	Calibration date	Calibration due date
Standard Light Source	SENSING	N/A	LSD090808	N/A	2016-12-05	2017-12-05
Special zero-voltage synchronous switching AC	EVERFINE	DPS1010-YF	1011001T	0-150V, 0-300V	2017-03-03	2018-03-03
1.5m temperature integrating sphere	SENSING	SPR-600	S09008	25~50°C	2017-03-09	2018-03-09
High-precision rapid spectral analysis system	EVERFINE	HAAS-2000	M112048CA1 361125	380-780nm	2017-07-07	2018-07-07
Digital power meter	YOKOGAWA	WT310	13398	N/A	2016-12-05	2017-12-05
Programmable Precision DC Power Supply	ITECH	IT6154	0061 0417 6471 0010 19	0~32V	2017-03-03	2018-03-03
thermometer	SENSING	NA	NA	25、50°C	2017-03-09	2018-03-09
Standard Light Source	SENSING	NA	LSD090808	N/A	2016-12-05	2017-12-05
Precision frequency power supply	ALL Power	APW-105N	970613	220V±10% 50Hz	2017-03-03	2018-03-03
AC Power Supply	EVERFINE	VPS1030 PWM	1012017	0-150V, 0-300V	2017-03-03	2018-03-02
DC Power Supply	EVERFINE	WY12010	1009009	30V/5A	2017-03-03	2018-03-02
Power Meter	YOKOGAWA	WT-210	91KB35700	15/30/60/150/ 300/600 V	2017-03-03	2018-03-02
Goniophotometer	EVERFINE	GO-R5000	YG108492N1 0120001	1600mm, 3000W/10A	2017-03-09	2018-03-08
Wireless Remote Sensor	N/A	433MHz	N/A	0°C~50°C; -20°C~60°C	2017-03-20	2018-03-19
Standard Light Source	EVERFINE	D908	1012003	N/A	2016-12-17	2017-12-17

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

4. Test Method

Product was tested with no seasoning. All stabilization and measurements were made in compliance with IES LM-79-08. The product was operated at rated voltage or at voltage required by manufacturer. The ambient temperature of the sample was maintained at 25°C±1°C during measurement. And relative humidity is less than 65%.

Integrating Sphere System

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

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=1.8% (K=2), at the 95% confidence level. The uncertainty of the correlated color temperature measurements is U=20K (K=2), at the 95% confidence level. The uncertainty of the CRI is U=1.8(K=2), at the 95% confidence level.

The uncertainty of power meter AC current U=0.19 % of rdg, AC Voltage U=0.15% of rdg, Power U=0.20%) (K=2), at the 95% confidence level.

Goniophotometer System

The goniophotometer system is calibrated by standard light source before measurement.

Type C goniophotometer was used for measuring total luminous flux, luminous intensity distribution, and color spatial uniformity. The product was operated in its intended orientation in application and was recorded in this report. The vertical angle (γ) test intervals were set no more than 1 degree while data for 5 degree intervals is reported. The horizontal angle (C plane) test intervals were set no more than 22.5 degree.

The uncertainty of the luminous intensity is $U=1.6\%$ ($K=2$) , at the 95% confidence level.

Fidelity Index and Gamut Index Calculation

The R_i , R_g was calculated according to IES TM-30-15 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.

FINAL

5. Test Result

[Integrating Sphere System]

The test data for RRECO82427W/V2

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

Test orientation: **Downward**

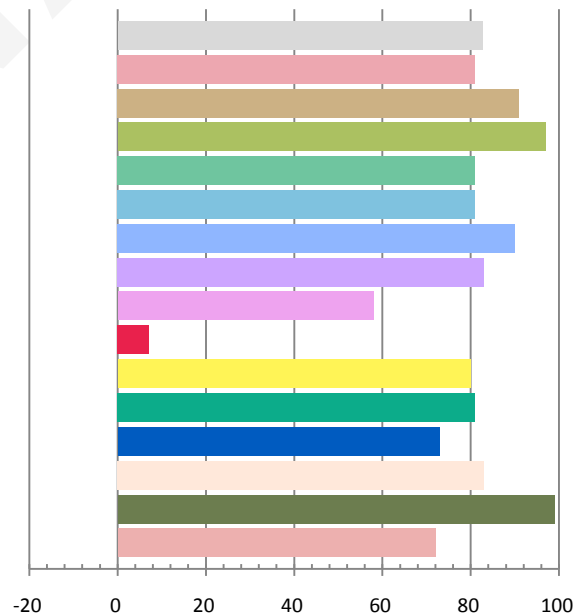
Photometric and Electrical Measurement Result

Voltage (V)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Luminous Flux(lm)	Efficacy (lm/W)
120.0	60	0.2016	23.93	0.9895	2096.9	87.62

Radiant Flux (W)	CCT (K)	Duv	x	y	u'	v'
6.3672	2748	0.00425	0.4633	0.4231	0.2592	0.5325

Color Rendering Index

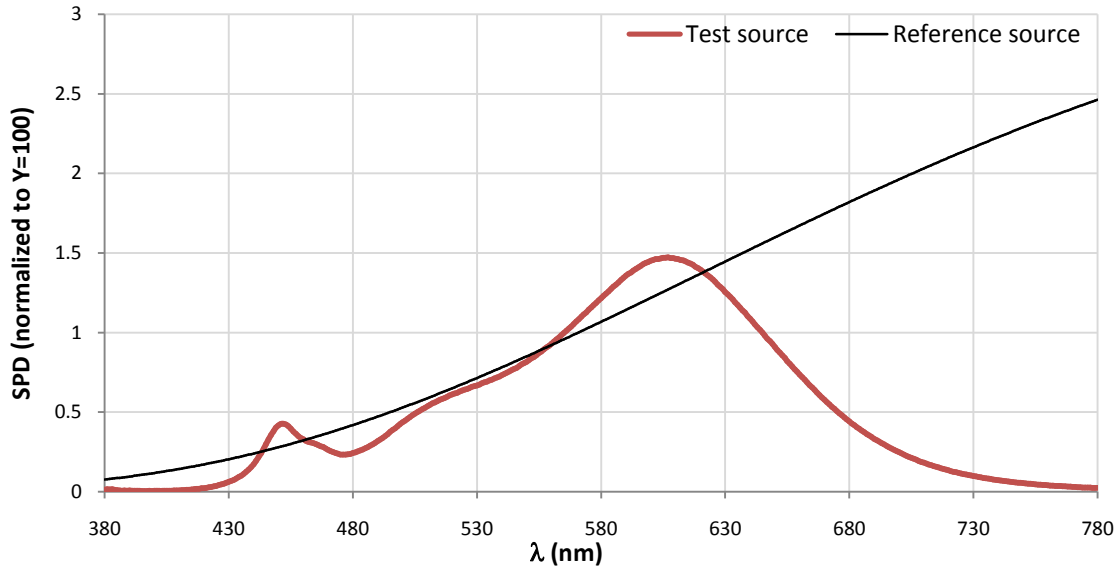
Ra			
82.7			
R1	R2	R3	R4
81	91	97	81
R5	R6	R7	R8
81	90	83	58
R9	R10	R11	R12
7	80	81	73
R13	R14	R15	
83	99	72	



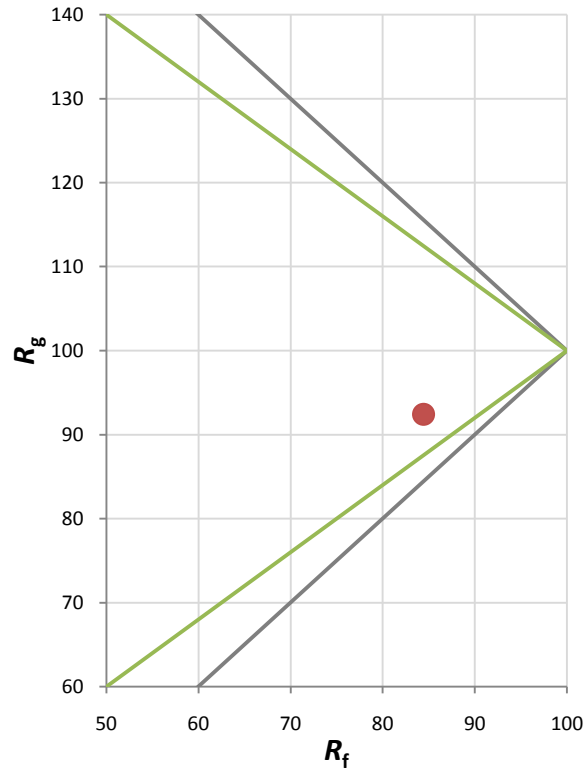
Fidelity Index and Gamut Index

Fidelity Index R_f	84
Gamut Index R_g	92

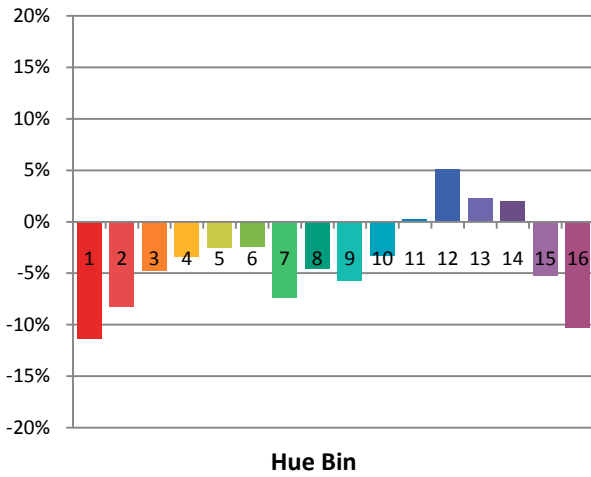
Spectral Power Distribution Comparison



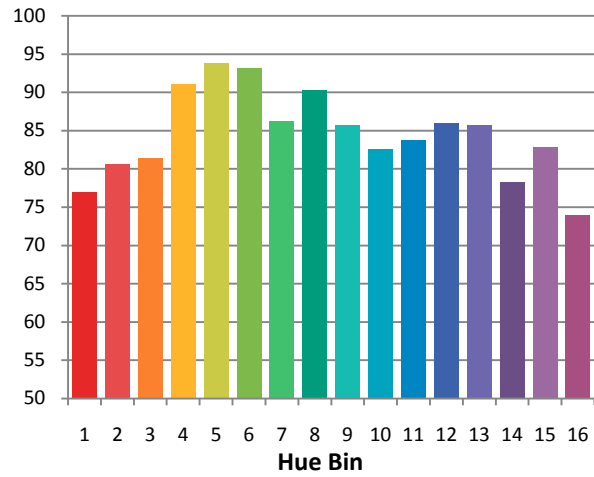
Plot of R_g versus R_f



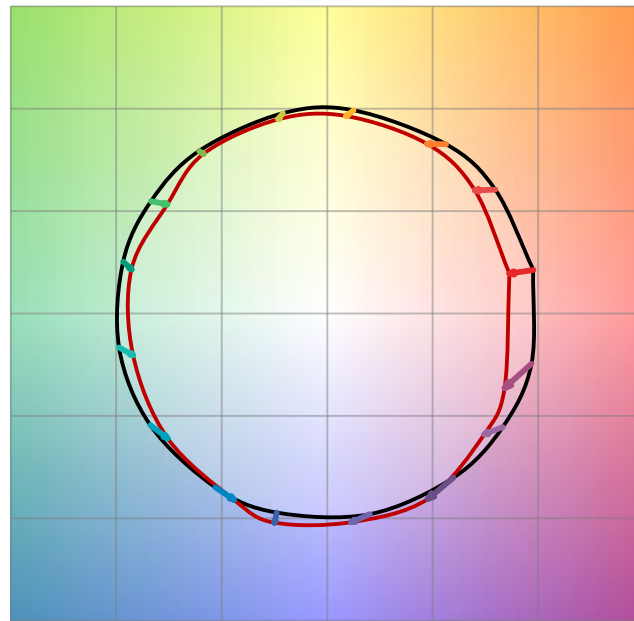
Chroma Shift by Hue



R_f by Hue

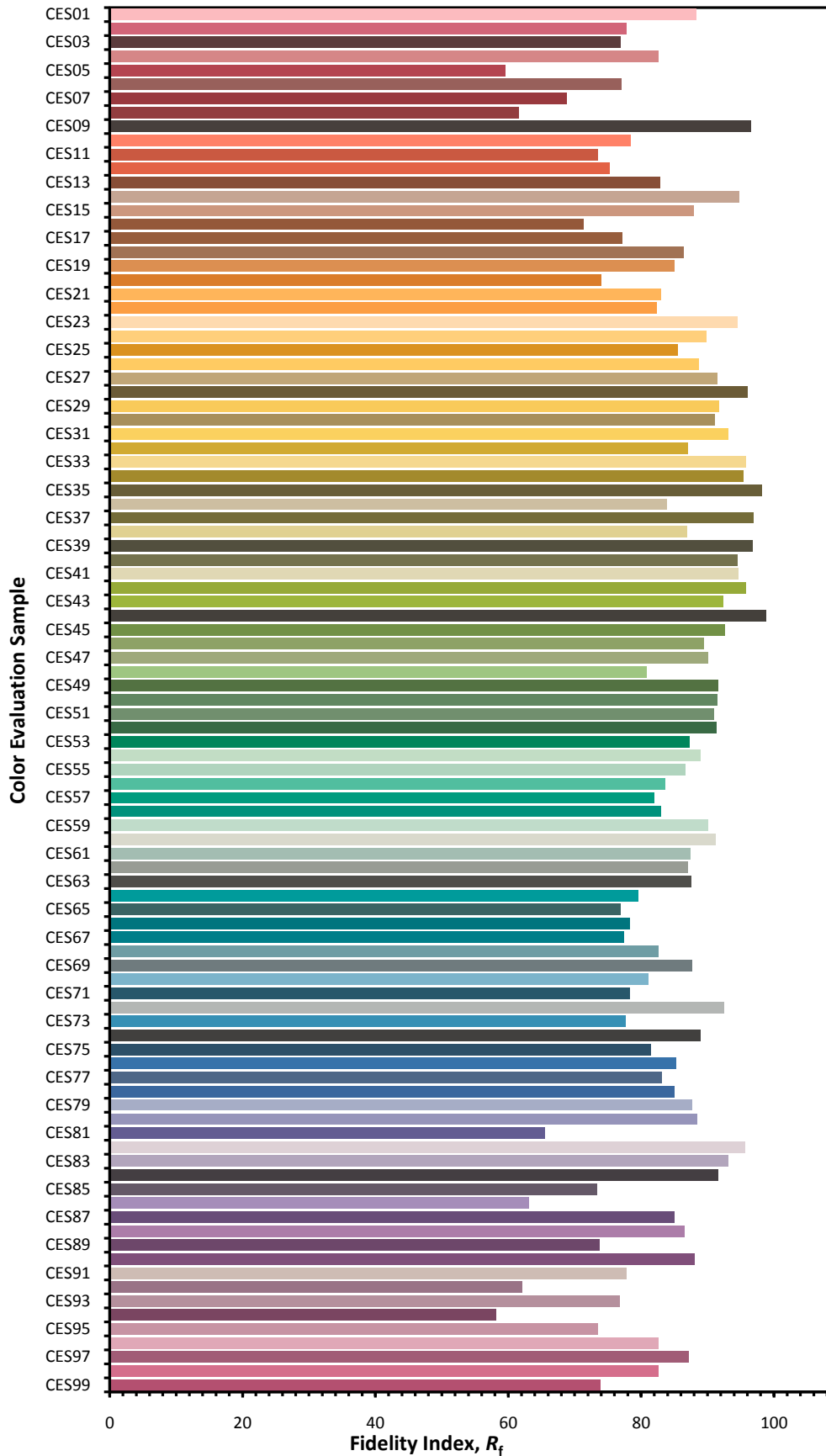


Color Vector Graphic

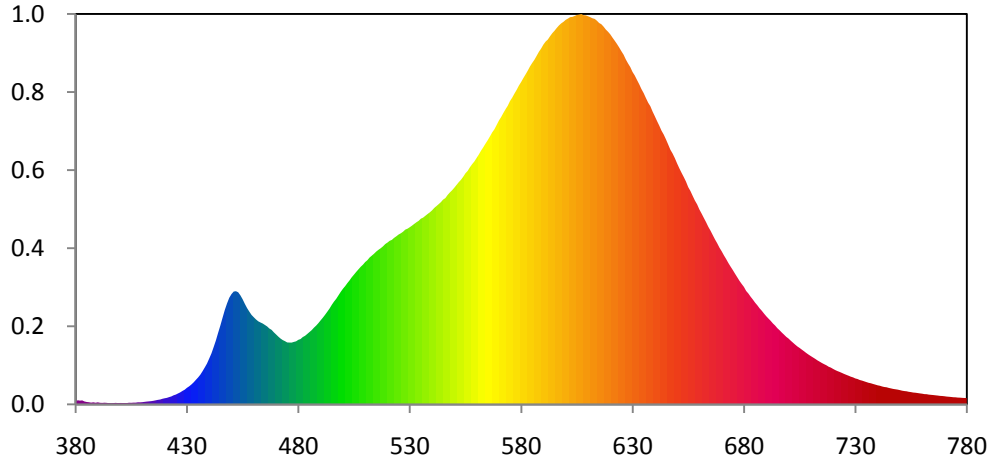


— Reference Illuminat — Test Source

Color Fidelity by CES Sample



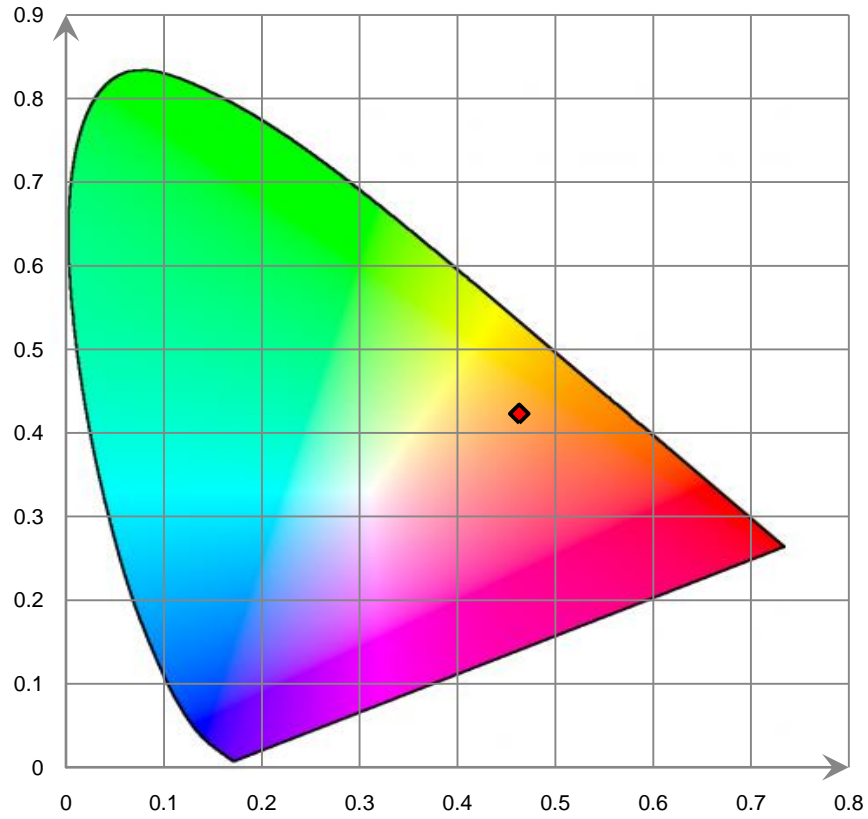
Relative Spectral Power Distribution



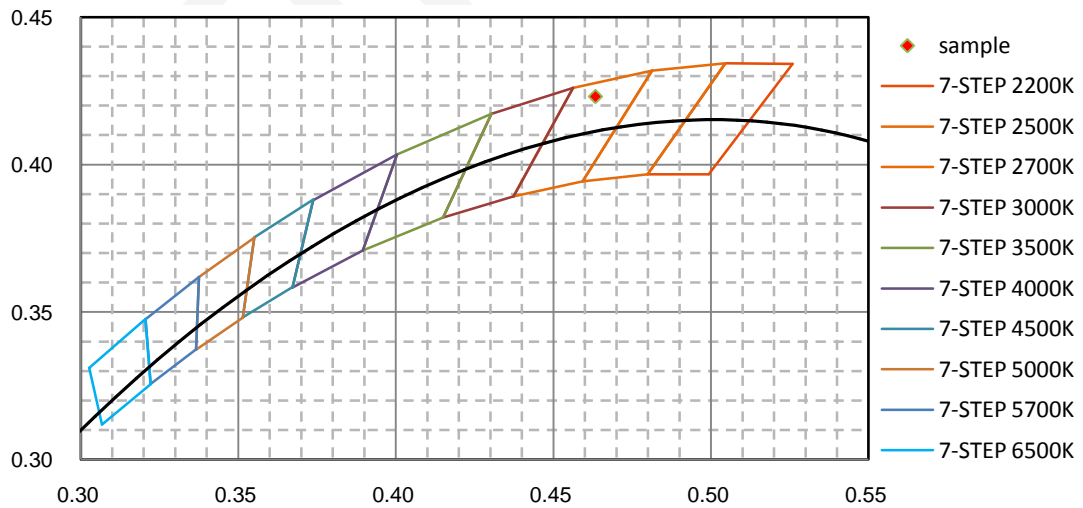
nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
380	3.624E-01	421	7.532E-01	462	9.622E+00	503	1.437E+01	544	2.342E+01
381	4.772E-01	422	8.419E-01	463	9.485E+00	504	1.472E+01	545	2.372E+01
382	4.344E-01	423	9.174E-01	464	9.365E+00	505	1.503E+01	546	2.389E+01
383	4.595E-01	424	1.048E+00	465	9.195E+00	506	1.535E+01	547	2.425E+01
384	3.395E-01	425	1.137E+00	466	9.025E+00	507	1.564E+01	548	2.454E+01
385	2.770E-01	426	1.267E+00	467	8.787E+00	508	1.593E+01	549	2.479E+01
386	2.495E-01	427	1.392E+00	468	8.631E+00	509	1.618E+01	550	2.508E+01
387	2.035E-01	428	1.558E+00	469	8.346E+00	510	1.647E+01	551	2.540E+01
388	2.420E-01	429	1.701E+00	470	8.103E+00	511	1.670E+01	552	2.573E+01
389	1.921E-01	430	1.916E+00	471	7.849E+00	512	1.701E+01	553	2.601E+01
390	2.412E-01	431	2.089E+00	472	7.625E+00	513	1.723E+01	554	2.635E+01
391	1.871E-01	432	2.301E+00	473	7.447E+00	514	1.745E+01	555	2.676E+01
392	1.734E-01	433	2.546E+00	474	7.318E+00	515	1.770E+01	556	2.703E+01
393	1.930E-01	434	2.834E+00	475	7.172E+00	516	1.790E+01	557	2.745E+01
394	1.767E-01	435	3.110E+00	476	7.155E+00	517	1.808E+01	558	2.781E+01
395	1.405E-01	436	3.433E+00	477	7.154E+00	518	1.830E+01	559	2.812E+01
396	1.161E-01	437	3.832E+00	478	7.236E+00	519	1.856E+01	560	2.853E+01
397	1.481E-01	438	4.271E+00	479	7.302E+00	520	1.874E+01	561	2.893E+01
398	1.758E-01	439	4.727E+00	480	7.473E+00	521	1.894E+01	562	2.938E+01
399	1.492E-01	440	5.309E+00	481	7.565E+00	522	1.905E+01	563	2.976E+01
400	1.636E-01	441	5.894E+00	482	7.797E+00	523	1.929E+01	564	3.019E+01
401	1.602E-01	442	6.637E+00	483	7.939E+00	524	1.947E+01	565	3.059E+01
402	1.564E-01	443	7.411E+00	484	8.151E+00	525	1.967E+01	566	3.103E+01
403	1.503E-01	444	8.283E+00	485	8.376E+00	526	1.981E+01	567	3.149E+01
404	1.881E-01	445	9.132E+00	486	8.595E+00	527	1.999E+01	568	3.185E+01
405	1.788E-01	446	1.004E+01	487	8.878E+00	528	2.023E+01	569	3.235E+01
406	2.054E-01	447	1.094E+01	488	9.120E+00	529	2.034E+01	570	3.285E+01
407	2.034E-01	448	1.168E+01	489	9.411E+00	530	2.051E+01	571	3.326E+01
408	2.434E-01	449	1.234E+01	490	9.726E+00	531	2.069E+01	572	3.373E+01
409	2.400E-01	450	1.277E+01	491	1.004E+01	532	2.089E+01	573	3.418E+01
410	2.583E-01	451	1.307E+01	492	1.037E+01	533	2.109E+01	574	3.458E+01
411	2.920E-01	452	1.310E+01	493	1.073E+01	534	2.125E+01	575	3.512E+01
412	3.233E-01	453	1.298E+01	494	1.110E+01	535	2.150E+01	576	3.552E+01
413	3.512E-01	454	1.262E+01	495	1.152E+01	536	2.162E+01	577	3.598E+01
414	3.775E-01	455	1.217E+01	496	1.190E+01	537	2.183E+01	578	3.643E+01
415	4.151E-01	456	1.163E+01	497	1.222E+01	538	2.204E+01	579	3.692E+01
416	4.710E-01	457	1.115E+01	498	1.262E+01	539	2.223E+01	580	3.733E+01
417	5.260E-01	458	1.074E+01	499	1.302E+01	540	2.246E+01	581	3.778E+01
418	5.634E-01	459	1.036E+01	500	1.338E+01	541	2.274E+01	582	3.821E+01
419	6.468E-01	460	1.009E+01	501	1.369E+01	542	2.297E+01	583	3.865E+01
420	7.039E-01	461	9.839E+00	502	1.404E+01	543	2.319E+01	584	3.914E+01

nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
585	3.955E+01	626	4.049E+01	667	1.911E+01	708	5.947E+00	749	1.709E+00
586	3.992E+01	627	3.993E+01	668	1.866E+01	709	5.766E+00	750	1.651E+00
587	4.038E+01	628	3.948E+01	669	1.815E+01	710	5.598E+00	751	1.587E+00
588	4.084E+01	629	3.906E+01	670	1.774E+01	711	5.434E+00	752	1.541E+00
589	4.121E+01	630	3.850E+01	671	1.726E+01	712	5.273E+00	753	1.516E+00
590	4.166E+01	631	3.808E+01	672	1.684E+01	713	5.096E+00	754	1.457E+00
591	4.201E+01	632	3.757E+01	673	1.638E+01	714	4.947E+00	755	1.420E+00
592	4.225E+01	633	3.707E+01	674	1.596E+01	715	4.793E+00	756	1.368E+00
593	4.264E+01	634	3.652E+01	675	1.556E+01	716	4.659E+00	757	1.347E+00
594	4.298E+01	635	3.605E+01	676	1.514E+01	717	4.532E+00	758	1.312E+00
595	4.327E+01	636	3.547E+01	677	1.472E+01	718	4.363E+00	759	1.272E+00
596	4.359E+01	637	3.494E+01	678	1.431E+01	719	4.259E+00	760	1.237E+00
597	4.389E+01	638	3.453E+01	679	1.394E+01	720	4.109E+00	761	1.188E+00
598	4.412E+01	639	3.391E+01	680	1.360E+01	721	3.969E+00	762	1.179E+00
599	4.430E+01	640	3.337E+01	681	1.314E+01	722	3.852E+00	763	1.130E+00
600	4.453E+01	641	3.281E+01	682	1.284E+01	723	3.752E+00	764	1.102E+00
601	4.467E+01	642	3.228E+01	683	1.247E+01	724	3.641E+00	765	1.080E+00
602	4.484E+01	643	3.170E+01	684	1.214E+01	725	3.524E+00	766	1.050E+00
603	4.487E+01	644	3.124E+01	685	1.179E+01	726	3.419E+00	767	1.023E+00
604	4.498E+01	645	3.070E+01	686	1.148E+01	727	3.314E+00	768	9.842E-01
605	4.509E+01	646	3.009E+01	687	1.113E+01	728	3.205E+00	769	9.657E-01
606	4.513E+01	647	2.948E+01	688	1.085E+01	729	3.123E+00	770	9.396E-01
607	4.520E+01	648	2.904E+01	689	1.052E+01	730	3.000E+00	771	9.064E-01
608	4.507E+01	649	2.851E+01	690	1.021E+01	731	2.934E+00	772	8.796E-01
609	4.504E+01	650	2.791E+01	691	9.937E+00	732	2.820E+00	773	8.583E-01
610	4.495E+01	651	2.734E+01	692	9.674E+00	733	2.753E+00	774	8.269E-01
611	4.484E+01	652	2.682E+01	693	9.374E+00	734	2.666E+00	775	8.180E-01
612	4.471E+01	653	2.632E+01	694	9.128E+00	735	2.582E+00	776	7.879E-01
613	4.464E+01	654	2.580E+01	695	8.824E+00	736	2.498E+00	777	7.784E-01
614	4.443E+01	655	2.515E+01	696	8.585E+00	737	2.440E+00	778	7.567E-01
615	4.417E+01	656	2.471E+01	697	8.317E+00	738	2.358E+00	779	7.419E-01
616	4.402E+01	657	2.415E+01	698	8.077E+00	739	2.287E+00	780	7.433E-01
617	4.374E+01	658	2.360E+01	699	7.821E+00	740	2.208E+00		
618	4.340E+01	659	2.316E+01	700	7.629E+00	741	2.158E+00		
619	4.315E+01	660	2.257E+01	701	7.378E+00	742	2.076E+00		
620	4.285E+01	661	2.210E+01	702	7.149E+00	743	2.012E+00		
621	4.247E+01	662	2.160E+01	703	6.924E+00	744	1.981E+00		
622	4.211E+01	663	2.111E+01	704	6.706E+00	745	1.906E+00		
623	4.174E+01	664	2.057E+01	705	6.533E+00	746	1.848E+00		
624	4.133E+01	665	2.012E+01	706	6.341E+00	747	1.790E+00		
625	4.090E+01	666	1.961E+01	707	6.149E+00	748	1.750E+00		

CIE 1931 x y Chromaticity Diagram



7-Step Chromaticity Quadrangles



The test data for RRECO82430W/V2

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

Test orientation: **Downward**

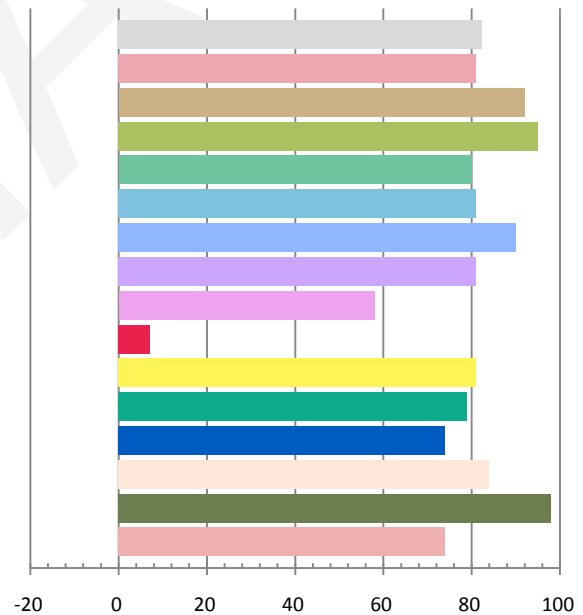
Photometric and Electrical Measurement Result

Voltage (V)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Luminous Flux(lm)	Efficacy (lm/W)
120.1	60	0.1966	23.38	0.9905	2056.4	87.97

Radiant Flux (W)	CCT (K)	Duv	x	y	u'	v'
6.3406	2925	-0.0018	0.4397	0.4006	0.2539	0.5204

Color Rendering Index

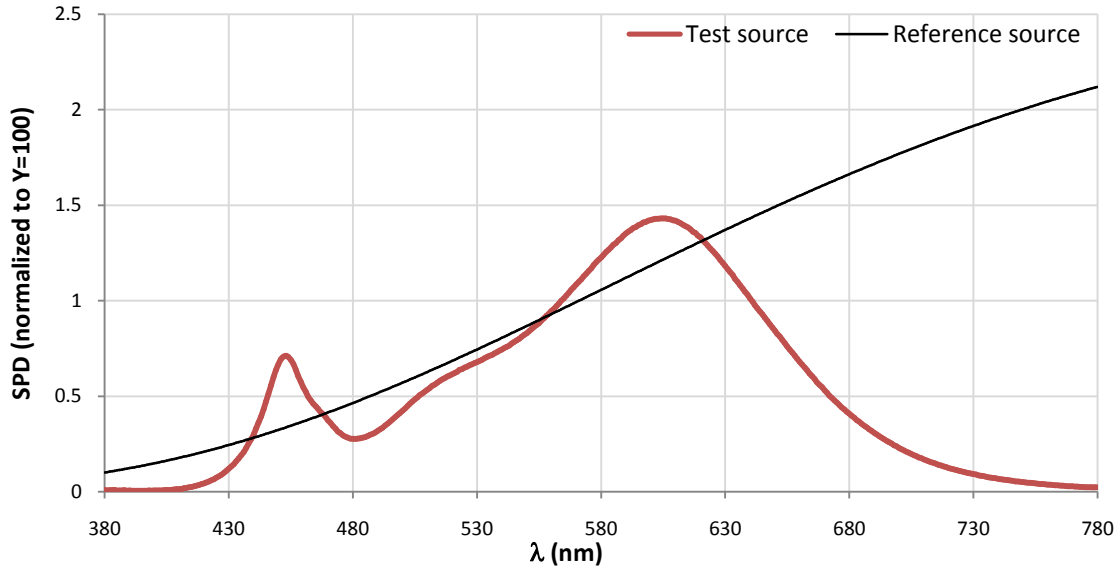
Ra			
82.3			
R1	R2	R3	R4
81	92	95	80
R5	R6	R7	R8
81	90	81	58
R9	R10	R11	R12
7	81	79	74
R13	R14	R15	
84	98	74	



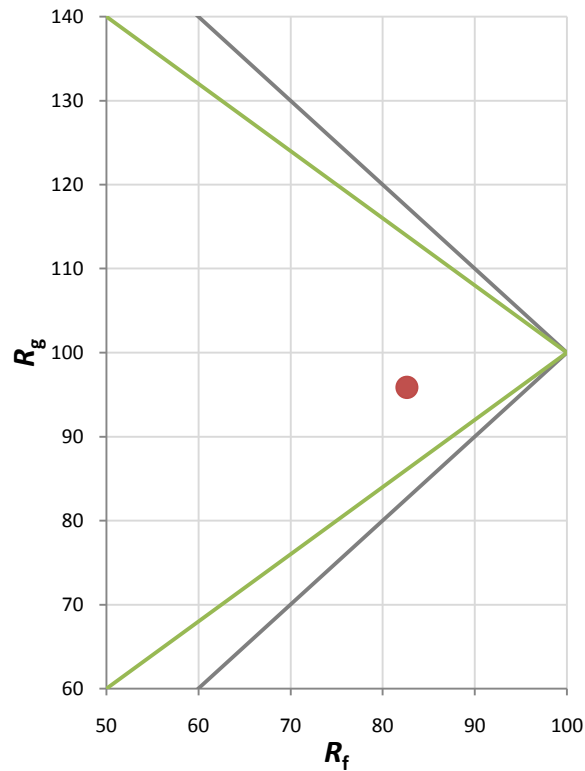
Fidelity Index and Gamut Index

Fidelity Index R_f	83
Gamut Index R_g	96

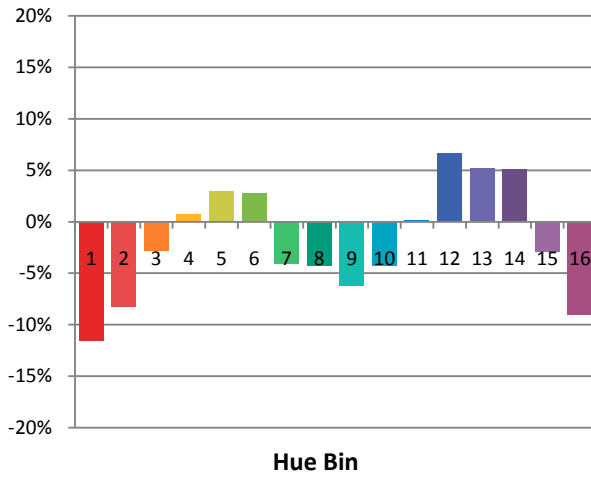
Spectral Power Distribution Comparison



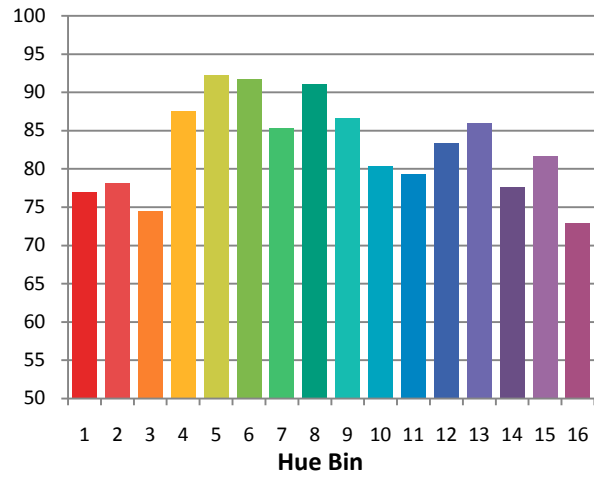
Plot of R_g versus R_f



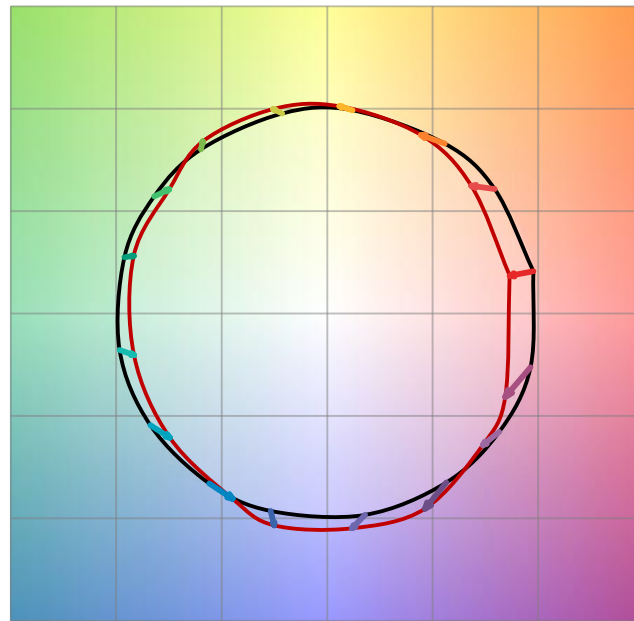
Chroma Shift by Hue



R_f by Hue

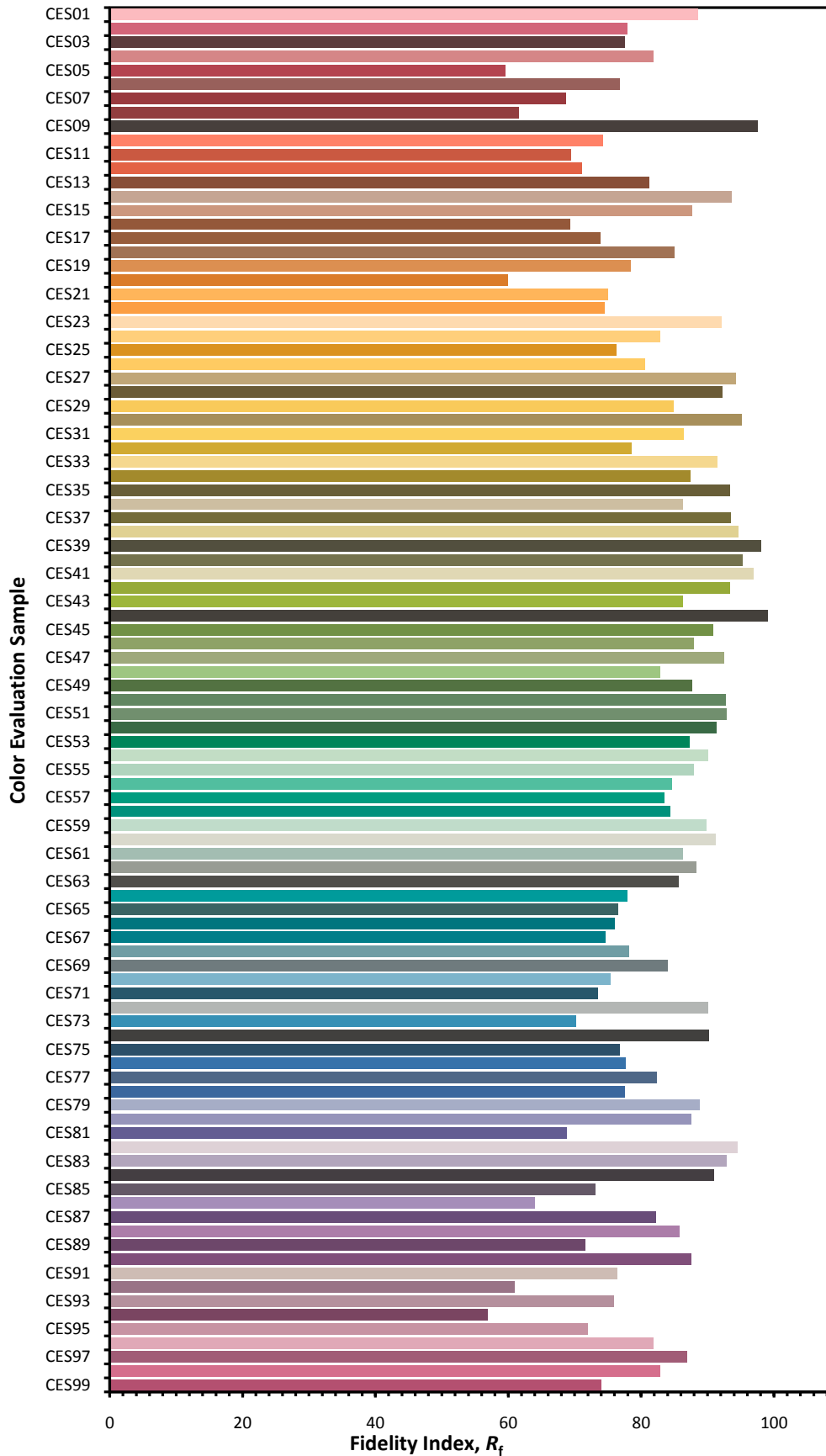


Color Vector Graphic

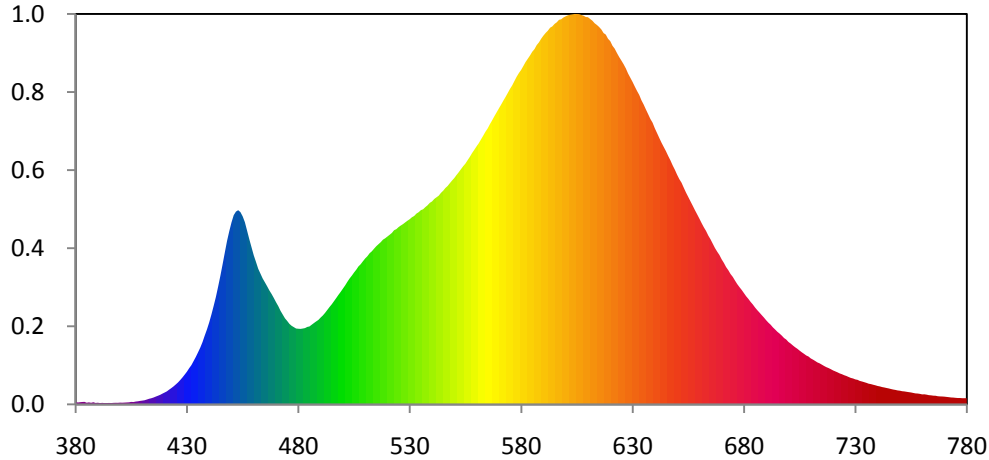


— Reference Illuminat — Test Source

Color Fidelity by CES Sample



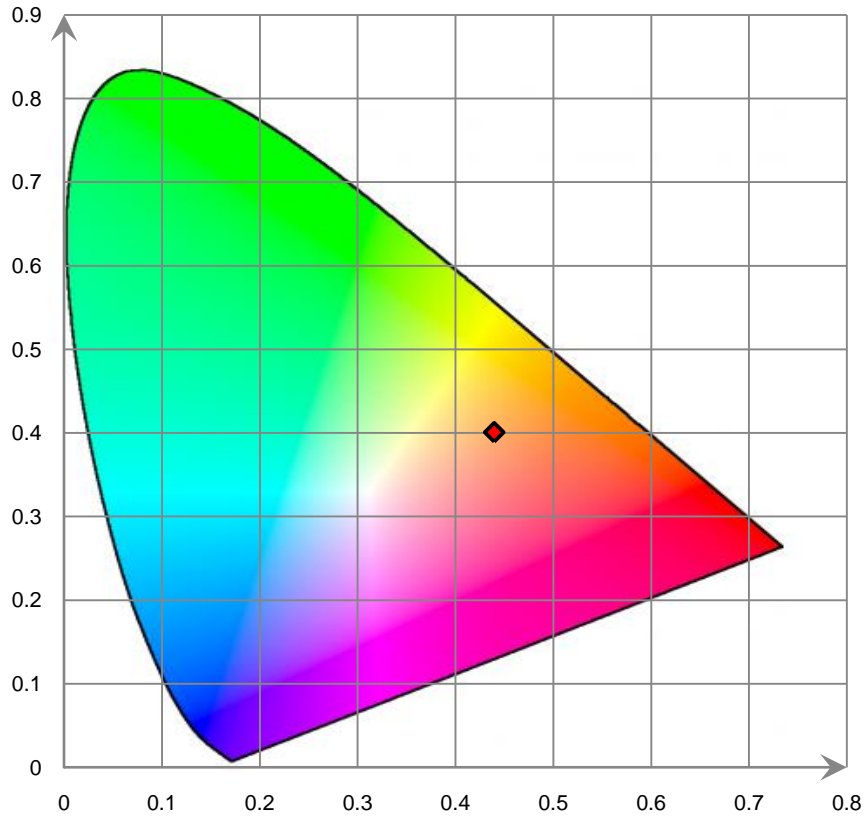
Relative Spectral Power Distribution



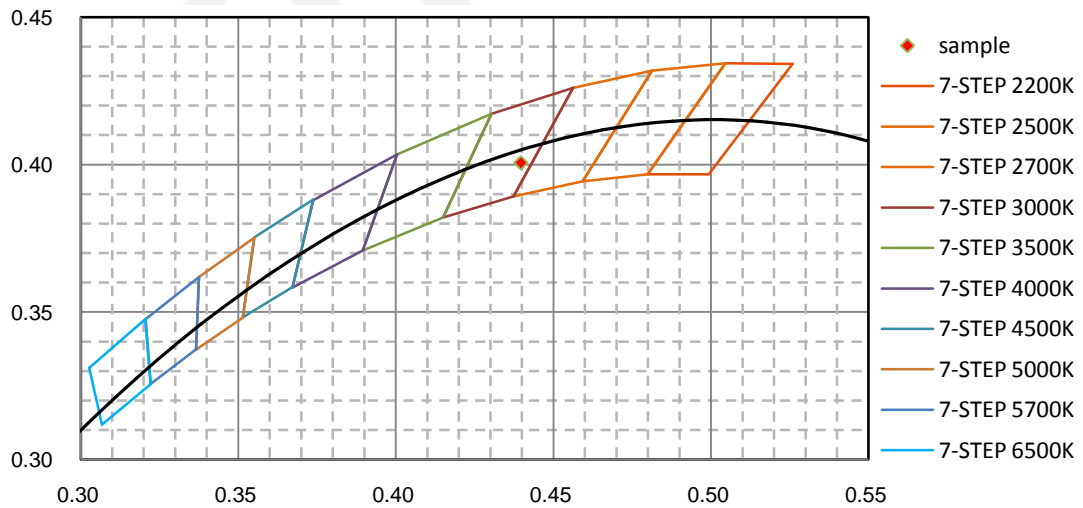
nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
380	3.010E-01	421	1.438E+00	462	1.496E+01	503	1.389E+01	544	2.334E+01
381	2.070E-01	422	1.623E+00	463	1.443E+01	504	1.420E+01	545	2.358E+01
382	2.415E-01	423	1.795E+00	464	1.389E+01	505	1.455E+01	546	2.388E+01
383	2.640E-01	424	1.988E+00	465	1.347E+01	506	1.486E+01	547	2.410E+01
384	2.780E-01	425	2.204E+00	466	1.304E+01	507	1.523E+01	548	2.441E+01
385	1.791E-01	426	2.420E+00	467	1.257E+01	508	1.547E+01	549	2.470E+01
386	2.225E-01	427	2.687E+00	468	1.218E+01	509	1.580E+01	550	2.498E+01
387	1.773E-01	428	2.971E+00	469	1.174E+01	510	1.610E+01	551	2.531E+01
388	2.396E-01	429	3.287E+00	470	1.127E+01	511	1.635E+01	552	2.562E+01
389	1.614E-01	430	3.607E+00	471	1.084E+01	512	1.668E+01	553	2.596E+01
390	1.821E-01	431	3.991E+00	472	1.032E+01	513	1.689E+01	554	2.629E+01
391	1.405E-01	432	4.331E+00	473	9.916E+00	514	1.718E+01	555	2.658E+01
392	1.670E-01	433	4.783E+00	474	9.497E+00	515	1.746E+01	556	2.696E+01
393	1.416E-01	434	5.243E+00	475	9.209E+00	516	1.768E+01	557	2.733E+01
394	1.460E-01	435	5.746E+00	476	8.887E+00	517	1.790E+01	558	2.774E+01
395	1.578E-01	436	6.275E+00	477	8.668E+00	518	1.818E+01	559	2.810E+01
396	1.465E-01	437	6.876E+00	478	8.518E+00	519	1.833E+01	560	2.848E+01
397	1.678E-01	438	7.603E+00	479	8.371E+00	520	1.853E+01	561	2.882E+01
398	1.747E-01	439	8.278E+00	480	8.345E+00	521	1.872E+01	562	2.925E+01
399	1.713E-01	440	9.050E+00	481	8.331E+00	522	1.892E+01	563	2.966E+01
400	1.957E-01	441	9.919E+00	482	8.367E+00	523	1.922E+01	564	3.009E+01
401	1.847E-01	442	1.087E+01	483	8.419E+00	524	1.934E+01	565	3.046E+01
402	1.996E-01	443	1.186E+01	484	8.545E+00	525	1.957E+01	566	3.093E+01
403	2.158E-01	444	1.299E+01	485	8.599E+00	526	1.974E+01	567	3.135E+01
404	2.292E-01	445	1.419E+01	486	8.791E+00	527	1.990E+01	568	3.180E+01
405	2.728E-01	446	1.544E+01	487	8.974E+00	528	2.009E+01	569	3.223E+01
406	2.604E-01	447	1.675E+01	488	9.151E+00	529	2.027E+01	570	3.266E+01
407	3.097E-01	448	1.803E+01	489	9.322E+00	530	2.044E+01	571	3.307E+01
408	3.417E-01	449	1.911E+01	490	9.580E+00	531	2.065E+01	572	3.351E+01
409	3.816E-01	450	2.007E+01	491	9.812E+00	532	2.079E+01	573	3.392E+01
410	4.192E-01	451	2.088E+01	492	1.010E+01	533	2.105E+01	574	3.436E+01
411	4.567E-01	452	2.128E+01	493	1.042E+01	534	2.121E+01	575	3.481E+01
412	5.339E-01	453	2.143E+01	494	1.075E+01	535	2.143E+01	576	3.521E+01
413	6.159E-01	454	2.122E+01	495	1.104E+01	536	2.153E+01	577	3.569E+01
414	6.778E-01	455	2.076E+01	496	1.139E+01	537	2.177E+01	578	3.616E+01
415	7.548E-01	456	2.011E+01	497	1.173E+01	538	2.197E+01	579	3.657E+01
416	8.576E-01	457	1.917E+01	498	1.209E+01	539	2.224E+01	580	3.691E+01
417	9.509E-01	458	1.822E+01	499	1.241E+01	540	2.239E+01	581	3.734E+01
418	1.055E+00	459	1.733E+01	500	1.277E+01	541	2.266E+01	582	3.779E+01
419	1.184E+00	460	1.644E+01	501	1.312E+01	542	2.285E+01	583	3.814E+01
420	1.310E+00	461	1.572E+01	502	1.352E+01	543	2.303E+01	584	3.851E+01

nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
585	3.892E+01	626	3.754E+01	667	1.725E+01	708	5.393E+00	749	1.540E+00
586	3.921E+01	627	3.707E+01	668	1.685E+01	709	5.277E+00	750	1.507E+00
587	3.966E+01	628	3.652E+01	669	1.649E+01	710	5.073E+00	751	1.452E+00
588	3.996E+01	629	3.605E+01	670	1.601E+01	711	4.937E+00	752	1.431E+00
589	4.035E+01	630	3.559E+01	671	1.561E+01	712	4.786E+00	753	1.388E+00
590	4.070E+01	631	3.508E+01	672	1.515E+01	713	4.628E+00	754	1.349E+00
591	4.099E+01	632	3.460E+01	673	1.480E+01	714	4.525E+00	755	1.313E+00
592	4.124E+01	633	3.415E+01	674	1.439E+01	715	4.382E+00	756	1.263E+00
593	4.157E+01	634	3.356E+01	675	1.407E+01	716	4.238E+00	757	1.212E+00
594	4.171E+01	635	3.309E+01	676	1.366E+01	717	4.108E+00	758	1.199E+00
595	4.199E+01	636	3.255E+01	677	1.327E+01	718	4.004E+00	759	1.157E+00
596	4.217E+01	637	3.203E+01	678	1.294E+01	719	3.882E+00	760	1.104E+00
597	4.244E+01	638	3.150E+01	679	1.263E+01	720	3.750E+00	761	1.113E+00
598	4.250E+01	639	3.109E+01	680	1.228E+01	721	3.642E+00	762	1.073E+00
599	4.270E+01	640	3.047E+01	681	1.193E+01	722	3.537E+00	763	1.016E+00
600	4.283E+01	641	2.995E+01	682	1.164E+01	723	3.419E+00	764	9.945E-01
601	4.294E+01	642	2.940E+01	683	1.131E+01	724	3.327E+00	765	9.588E-01
602	4.300E+01	643	2.889E+01	684	1.102E+01	725	3.217E+00	766	9.524E-01
603	4.304E+01	644	2.841E+01	685	1.069E+01	726	3.131E+00	767	9.012E-01
604	4.309E+01	645	2.795E+01	686	1.040E+01	727	3.021E+00	768	8.774E-01
605	4.308E+01	646	2.742E+01	687	1.013E+01	728	2.916E+00	769	8.684E-01
606	4.307E+01	647	2.693E+01	688	9.851E+00	729	2.855E+00	770	8.513E-01
607	4.298E+01	648	2.639E+01	689	9.574E+00	730	2.759E+00	771	8.218E-01
608	4.290E+01	649	2.589E+01	690	9.281E+00	731	2.706E+00	772	7.913E-01
609	4.275E+01	650	2.535E+01	691	9.015E+00	732	2.591E+00	773	7.617E-01
610	4.273E+01	651	2.486E+01	692	8.792E+00	733	2.526E+00	774	7.491E-01
611	4.253E+01	652	2.446E+01	693	8.496E+00	734	2.453E+00	775	7.254E-01
612	4.234E+01	653	2.391E+01	694	8.267E+00	735	2.375E+00	776	7.040E-01
613	4.206E+01	654	2.338E+01	695	8.017E+00	736	2.286E+00	777	7.011E-01
614	4.188E+01	655	2.290E+01	696	7.818E+00	737	2.236E+00	778	6.792E-01
615	4.165E+01	656	2.241E+01	697	7.590E+00	738	2.169E+00	779	6.805E-01
616	4.138E+01	657	2.193E+01	698	7.326E+00	739	2.106E+00	780	6.818E-01
617	4.098E+01	658	2.144E+01	699	7.153E+00	740	2.031E+00		
618	4.081E+01	659	2.097E+01	700	6.887E+00	741	1.984E+00		
619	4.035E+01	660	2.050E+01	701	6.709E+00	742	1.914E+00		
620	4.009E+01	661	2.001E+01	702	6.495E+00	743	1.867E+00		
621	3.958E+01	662	1.955E+01	703	6.304E+00	744	1.812E+00		
622	3.926E+01	663	1.914E+01	704	6.132E+00	745	1.759E+00		
623	3.878E+01	664	1.863E+01	705	5.934E+00	746	1.692E+00		
624	3.834E+01	665	1.822E+01	706	5.744E+00	747	1.636E+00		
625	3.795E+01	666	1.774E+01	707	5.576E+00	748	1.593E+00		

CIE 1931 x y Chromaticity Diagram



7-Step Chromaticity Quadrangles



The test data for RRECO82440W/V2

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

Test orientation: **Downward**

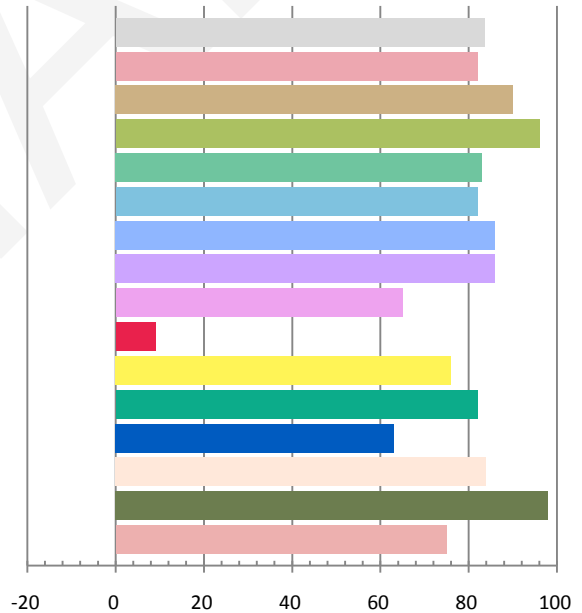
Photometric and Electrical Measurement Result

Voltage (V)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Luminous Flux(lm)	Efficacy (lm/W)
120.0	60	0.1976	23.55	0.9927	2147.7	91.19

Radiant Flux (W)	CCT (K)	Duv	x	y	u'	v'
6.4937	3926	0.00134	0.3848	0.3823	0.2257	0.5046

Color Rendering Index

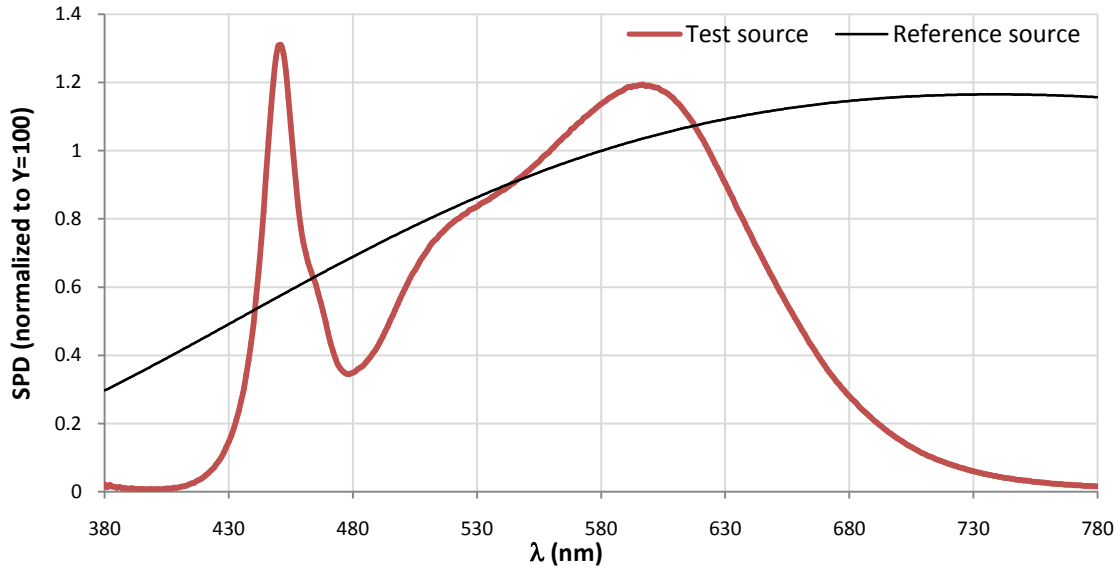
Ra			
83.6			
R1	R2	R3	R4
82	90	96	83
R5	R6	R7	R8
82	86	86	65
R9	R10	R11	R12
9	76	82	63
R13	R14	R15	
84	98	75	



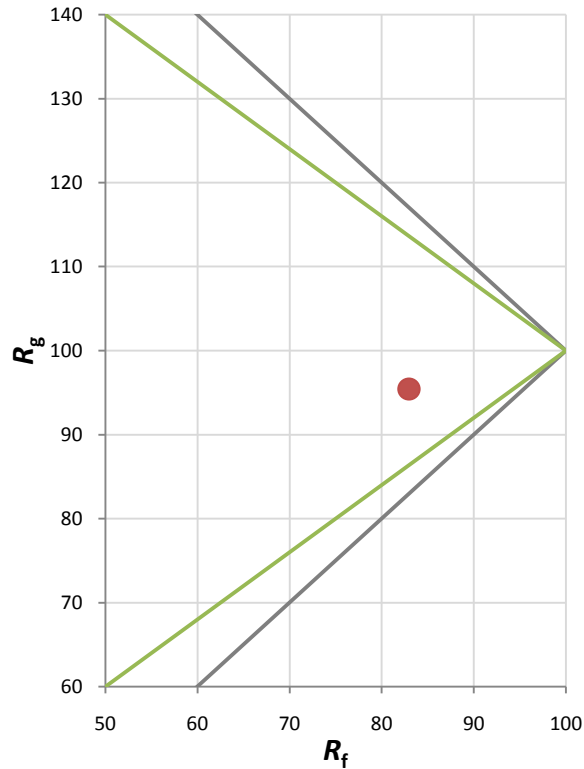
Fidelity Index and Gamut Index

Fidelity Index R_f	83
Gamut Index R_g	95

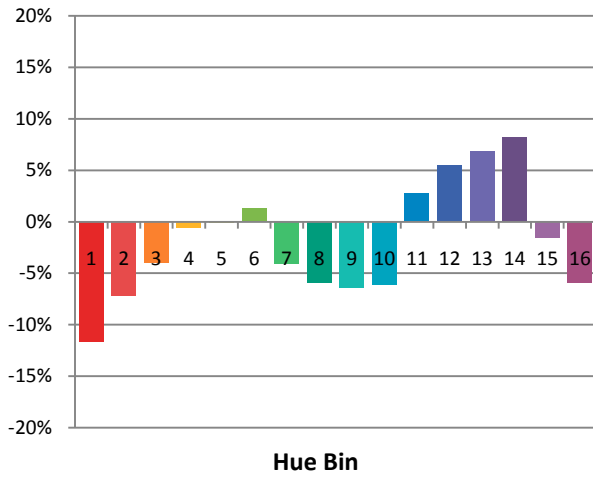
Spectral Power Distribution Comparison



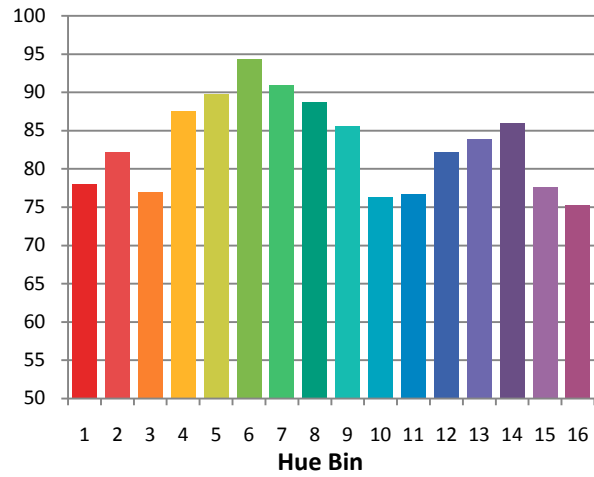
Plot of R_g versus R_f



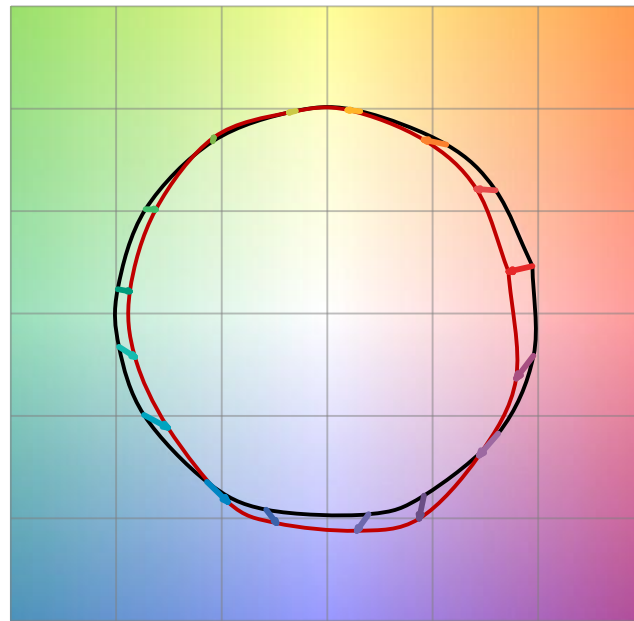
Chroma Shift by Hue



R_f by Hue

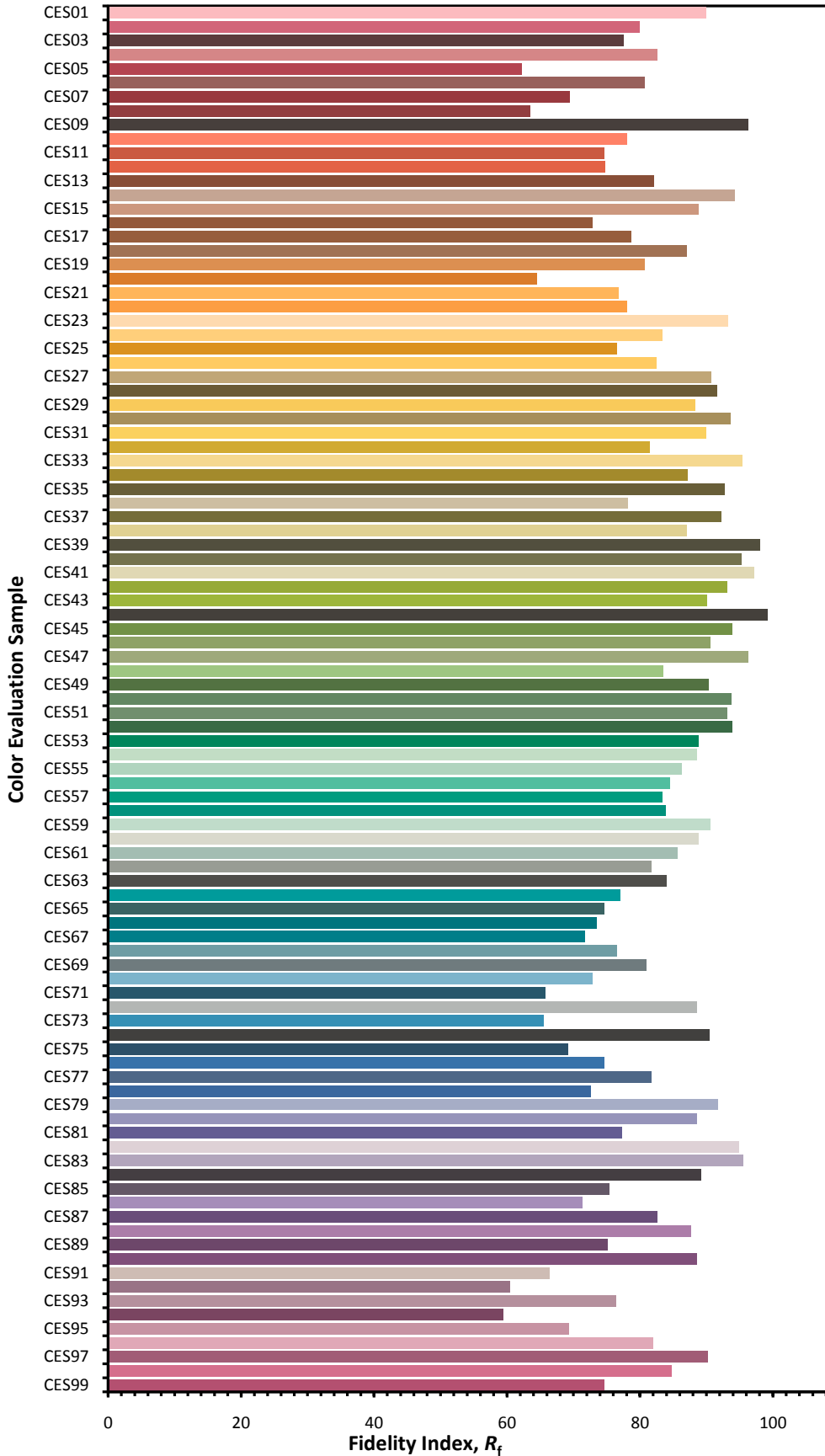


Color Vector Graphic

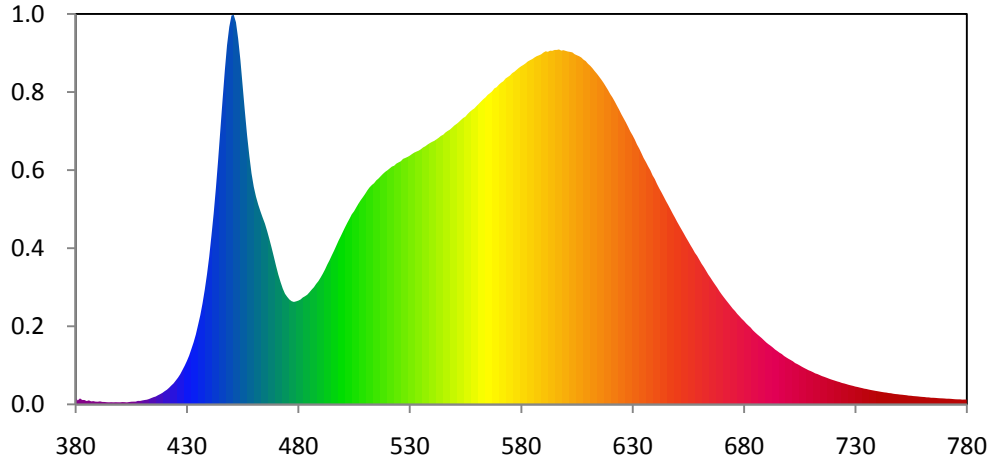


— Reference Illuminat — Test Source

Color Fidelity by CES Sample



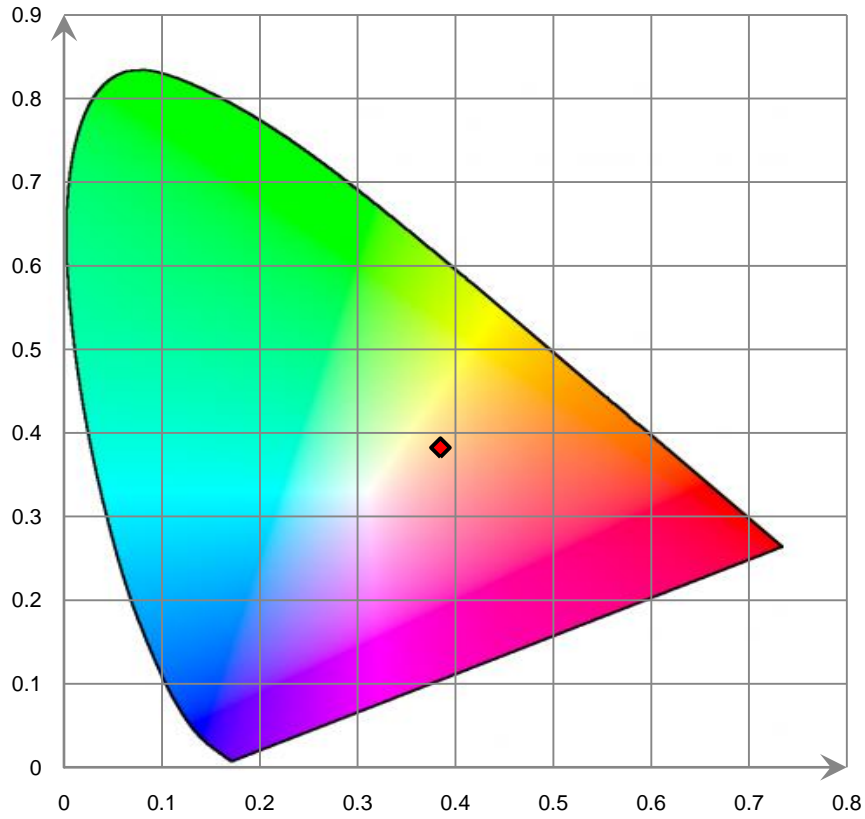
Relative Spectral Power Distribution



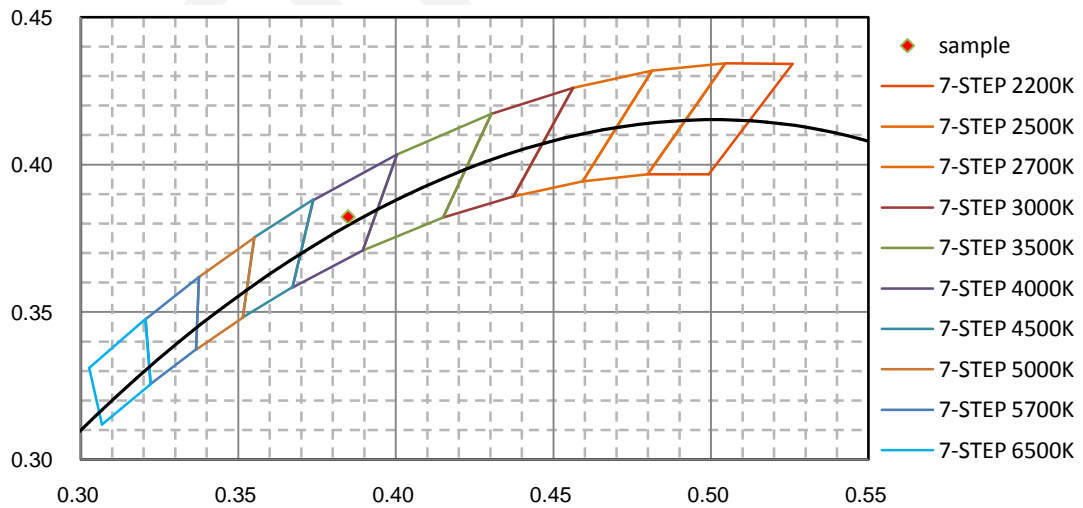
nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
380	7.079E-01	421	1.547E+00	462	2.112E+01	503	1.964E+01	544	2.839E+01
381	4.174E-01	422	1.760E+00	463	2.040E+01	504	2.010E+01	545	2.851E+01
382	6.316E-01	423	1.997E+00	464	1.974E+01	505	2.042E+01	546	2.874E+01
383	4.680E-01	424	2.218E+00	465	1.911E+01	506	2.082E+01	547	2.891E+01
384	4.621E-01	425	2.521E+00	466	1.833E+01	507	2.123E+01	548	2.905E+01
385	3.495E-01	426	2.828E+00	467	1.748E+01	508	2.159E+01	549	2.926E+01
386	4.261E-01	427	3.190E+00	468	1.658E+01	509	2.192E+01	550	2.948E+01
387	3.167E-01	428	3.637E+00	469	1.562E+01	510	2.226E+01	551	2.965E+01
388	3.413E-01	429	4.090E+00	470	1.465E+01	511	2.264E+01	552	2.985E+01
389	2.883E-01	430	4.594E+00	471	1.373E+01	512	2.295E+01	553	3.007E+01
390	2.793E-01	431	5.162E+00	472	1.294E+01	513	2.319E+01	554	3.028E+01
391	3.227E-01	432	5.858E+00	473	1.225E+01	514	2.339E+01	555	3.043E+01
392	2.588E-01	433	6.560E+00	474	1.170E+01	515	2.369E+01	556	3.071E+01
393	2.574E-01	434	7.391E+00	475	1.137E+01	516	2.389E+01	557	3.094E+01
394	2.324E-01	435	8.397E+00	476	1.108E+01	517	2.414E+01	558	3.113E+01
395	2.204E-01	436	9.434E+00	477	1.091E+01	518	2.438E+01	559	3.130E+01
396	2.325E-01	437	1.067E+01	478	1.083E+01	519	2.458E+01	560	3.155E+01
397	2.186E-01	438	1.212E+01	479	1.089E+01	520	2.475E+01	561	3.178E+01
398	2.317E-01	439	1.374E+01	480	1.097E+01	521	2.495E+01	562	3.203E+01
399	2.227E-01	440	1.561E+01	481	1.109E+01	522	2.514E+01	563	3.226E+01
400	2.171E-01	441	1.782E+01	482	1.130E+01	523	2.523E+01	564	3.246E+01
401	2.432E-01	442	2.018E+01	483	1.144E+01	524	2.545E+01	565	3.273E+01
402	2.341E-01	443	2.288E+01	484	1.159E+01	525	2.559E+01	566	3.290E+01
403	2.132E-01	444	2.583E+01	485	1.186E+01	526	2.571E+01	567	3.311E+01
404	2.497E-01	445	2.904E+01	486	1.213E+01	527	2.596E+01	568	3.341E+01
405	2.814E-01	446	3.220E+01	487	1.239E+01	528	2.605E+01	569	3.354E+01
406	2.898E-01	447	3.529E+01	488	1.274E+01	529	2.616E+01	570	3.380E+01
407	2.933E-01	448	3.797E+01	489	1.303E+01	530	2.629E+01	571	3.401E+01
408	3.672E-01	449	3.991E+01	490	1.340E+01	531	2.647E+01	572	3.416E+01
409	3.614E-01	450	4.111E+01	491	1.382E+01	532	2.662E+01	573	3.445E+01
410	4.189E-01	451	4.119E+01	492	1.427E+01	533	2.673E+01	574	3.461E+01
411	4.641E-01	452	4.040E+01	493	1.478E+01	534	2.683E+01	575	3.477E+01
412	4.971E-01	453	3.866E+01	494	1.524E+01	535	2.697E+01	576	3.503E+01
413	5.686E-01	454	3.639E+01	495	1.574E+01	536	2.717E+01	577	3.517E+01
414	6.683E-01	455	3.370E+01	496	1.623E+01	537	2.729E+01	578	3.538E+01
415	7.595E-01	456	3.100E+01	497	1.675E+01	538	2.747E+01	579	3.558E+01
416	8.321E-01	457	2.847E+01	498	1.729E+01	539	2.762E+01	580	3.575E+01
417	9.649E-01	458	2.630E+01	499	1.775E+01	540	2.775E+01	581	3.589E+01
418	1.084E+00	459	2.442E+01	500	1.825E+01	541	2.786E+01	582	3.606E+01
419	1.217E+00	460	2.300E+01	501	1.874E+01	542	2.802E+01	583	3.626E+01
420	1.391E+00	461	2.197E+01	502	1.920E+01	543	2.819E+01	584	3.639E+01

nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
585	3.651E+01	626	3.025E+01	667	1.268E+01	708	3.736E+00	749	1.075E+00
586	3.668E+01	627	2.982E+01	668	1.234E+01	709	3.611E+00	750	1.041E+00
587	3.682E+01	628	2.935E+01	669	1.197E+01	710	3.516E+00	751	1.018E+00
588	3.691E+01	629	2.886E+01	670	1.164E+01	711	3.404E+00	752	9.914E-01
589	3.701E+01	630	2.846E+01	671	1.132E+01	712	3.280E+00	753	9.651E-01
590	3.720E+01	631	2.800E+01	672	1.101E+01	713	3.203E+00	754	9.248E-01
591	3.733E+01	632	2.748E+01	673	1.072E+01	714	3.102E+00	755	9.138E-01
592	3.728E+01	633	2.705E+01	674	1.042E+01	715	2.992E+00	756	8.794E-01
593	3.740E+01	634	2.656E+01	675	1.012E+01	716	2.916E+00	757	8.642E-01
594	3.738E+01	635	2.604E+01	676	9.870E+00	717	2.828E+00	758	8.405E-01
595	3.747E+01	636	2.562E+01	677	9.569E+00	718	2.733E+00	759	8.147E-01
596	3.748E+01	637	2.516E+01	678	9.317E+00	719	2.646E+00	760	7.943E-01
597	3.753E+01	638	2.474E+01	679	9.058E+00	720	2.570E+00	761	7.761E-01
598	3.740E+01	639	2.422E+01	680	8.829E+00	721	2.493E+00	762	7.420E-01
599	3.745E+01	640	2.382E+01	681	8.567E+00	722	2.417E+00	763	7.400E-01
600	3.738E+01	641	2.330E+01	682	8.333E+00	723	2.355E+00	764	7.018E-01
601	3.731E+01	642	2.284E+01	683	8.128E+00	724	2.263E+00	765	6.973E-01
602	3.726E+01	643	2.242E+01	684	7.844E+00	725	2.209E+00	766	6.846E-01
603	3.722E+01	644	2.197E+01	685	7.617E+00	726	2.142E+00	767	6.607E-01
604	3.703E+01	645	2.151E+01	686	7.402E+00	727	2.068E+00	768	6.447E-01
605	3.692E+01	646	2.108E+01	687	7.205E+00	728	2.010E+00	769	6.377E-01
606	3.682E+01	647	2.064E+01	688	7.003E+00	729	1.952E+00	770	6.247E-01
607	3.668E+01	648	2.019E+01	689	6.773E+00	730	1.884E+00	771	5.992E-01
608	3.645E+01	649	1.976E+01	690	6.553E+00	731	1.836E+00	772	5.980E-01
609	3.629E+01	650	1.932E+01	691	6.360E+00	732	1.781E+00	773	5.835E-01
610	3.602E+01	651	1.890E+01	692	6.198E+00	733	1.724E+00	774	5.633E-01
611	3.581E+01	652	1.848E+01	693	6.007E+00	734	1.663E+00	775	5.409E-01
612	3.555E+01	653	1.807E+01	694	5.799E+00	735	1.625E+00	776	5.321E-01
613	3.524E+01	654	1.765E+01	695	5.637E+00	736	1.569E+00	777	5.335E-01
614	3.497E+01	655	1.725E+01	696	5.463E+00	737	1.520E+00	778	5.052E-01
615	3.466E+01	656	1.684E+01	697	5.321E+00	738	1.477E+00	779	5.123E-01
616	3.434E+01	657	1.645E+01	698	5.117E+00	739	1.431E+00	780	5.133E-01
617	3.400E+01	658	1.602E+01	699	4.965E+00	740	1.391E+00		
618	3.361E+01	659	1.569E+01	700	4.822E+00	741	1.352E+00		
619	3.323E+01	660	1.528E+01	701	4.688E+00	742	1.308E+00		
620	3.281E+01	661	1.487E+01	702	4.550E+00	743	1.273E+00		
621	3.245E+01	662	1.452E+01	703	4.366E+00	744	1.246E+00		
622	3.204E+01	663	1.413E+01	704	4.258E+00	745	1.198E+00		
623	3.159E+01	664	1.372E+01	705	4.123E+00	746	1.176E+00		
624	3.115E+01	665	1.339E+01	706	3.985E+00	747	1.127E+00		
625	3.068E+01	666	1.303E+01	707	3.855E+00	748	1.093E+00		

CIE 1931 x y Chromaticity Diagram



7-Step Chromaticity Quadrangles



[Goniophotometer System]

The test data for RRECO82427W/V2

Total operating time for luminous intensity distribution: **1.5 hours**

Test orientation: **Downward**

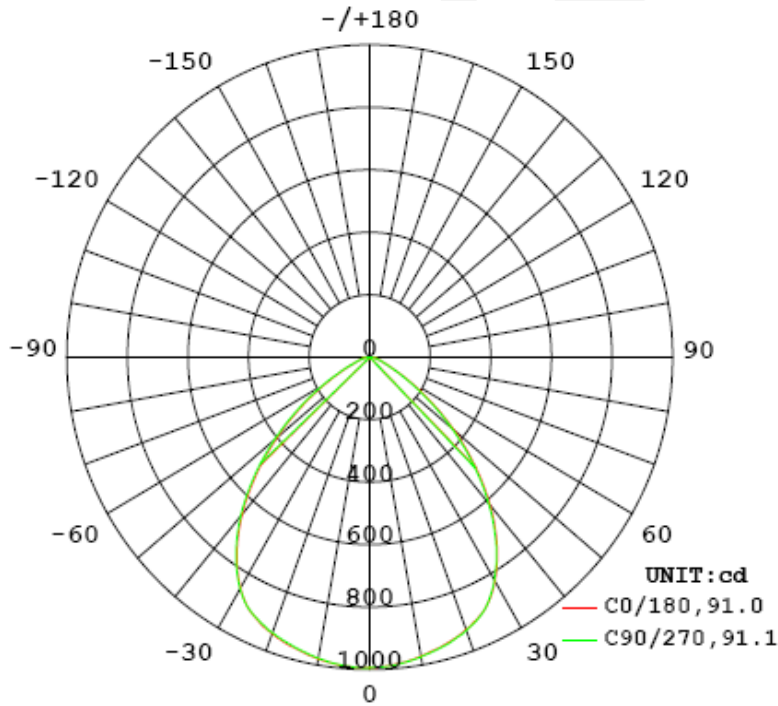
Electrical Measurement

Input Voltage (V)	Frequency (Hz)	Input Current (A)	Power (W)	Power Factor
120.0	60	0.1954	23.22	0.9904

Photometric Measurement

Luminous Flux (lm)	Efficacy (lm/W)	I _{max} (cd)	S/MH (C0/180)	S/MH (C90/270)
2005.35	86.36	994.6	1.23	1.22

Luminous Intensity Distribution



	C0/180	C45/225	C90/270	C135/315	AVG.
Beam Angle (50% I _{max}):	91.0	91.2	91.1	91.0	91.1
Field Angle (10% I _{max}):	127.6	127.8	127.7	127.5	127.7

Luminous Intensity (cd) Distribution Data

C γ	0°	22.5°	45°	67.5°	90°	112.5°	135°	157.5°
0.0°	994	994	994	994	994	994	994	994
5.0°	991	992	992	991	991	989	988	986
10.0°	980	981	981	980	978	975	974	972
15.0°	963	963	964	963	960	957	955	953
20.0°	941	943	943	942	939	936	932	929
25.0°	910	913	914	913	909	904	900	894
30.0°	854	860	863	862	856	848	839	829
35.0°	765	774	778	777	771	760	748	735
40.0°	656	666	672	671	663	651	637	622
45.0°	530	543	549	549	541	528	512	496
50.0°	400	413	420	419	411	398	383	367
55.0°	275	287	293	293	287	275	261	247
60.0°	168	178	184	184	179	169	158	148
65.0°	93	99	103	103	100	94	87	81
70.0°	53	55	57	58	56	53	50	47
75.0°	34	35	36	36	35	33	31	30
80.0°	20	21	21	21	20	19	17	16
85.0°	8	9	10	10	9	8	7	6
90.0°	0	0	1	1	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°	1	1	1	1	1	1	1	1
145.0°	1	1	1	1	1	1	1	1
150.0°	1	1	1	1	1	1	1	1
155.0°	1	1	1	1	1	1	1	1
160.0°	1	1	1	1	1	1	1	1
165.0°	1	1	1	1	1	1	1	1
170.0°	1	1	1	1	1	1	1	1
175.0°	1	1	1	1	1	1	1	1
180.0°	1	1	1	1	1	1	1	1

Luminous Intensity (cd) Distribution Data (cont.)

C Y	180°	202.5°	225°	247.5°	270°	292.5°	315°	337.5°
0.0°	994	994	994	994	994	994	994	994
5.0°	986	986	987	987	988	989	990	991
10.0°	971	971	971	972	974	976	978	979
15.0°	953	952	953	954	956	957	961	962
20.0°	928	928	927	928	931	934	938	941
25.0°	894	891	890	891	894	899	904	909
30.0°	826	821	818	819	823	832	841	850
35.0°	732	724	721	721	727	736	748	760
40.0°	617	609	604	605	611	621	634	649
45.0°	491	482	477	477	483	493	508	524
50.0°	362	353	348	348	353	363	377	393
55.0°	243	234	230	230	234	242	254	269
60.0°	146	139	136	136	138	145	153	164
65.0°	79	75	73	73	75	78	84	90
70.0°	46	45	44	45	46	47	49	51
75.0°	29	28	27	28	29	30	32	34
80.0°	15	14	14	14	15	16	18	19
85.0°	5	4	4	4	4	5	6	8
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	0
150.0°	1	1	1	1	1	1	1	1
155.0°	1	1	1	1	1	1	1	1
160.0°	1	1	1	1	1	1	1	1
165.0°	1	1	1	1	1	1	1	1
170.0°	1	1	1	1	1	1	1	1
175.0°	1	1	1	1	1	1	1	1
180.0°	1	1	1	1	1	1	1	1

Zonal Lumen Density Measurement

Deg	Flux (lm)	%
0-5	23.7	1.18
5-10	70.3	3.51
10-15	114.7	5.71
15-20	156.0	7.78
20-25	192.7	9.62
25-30	221.0	11.01
30-35	234.2	11.68
35-40	231.3	11.54
40-45	212.5	10.59
45-50	180.1	8.98
50-55	138.7	6.92
55-60	95.2	4.75
60-65	57.9	2.88
65-70	33.2	1.66
70-75	21.1	1.05
75-80	13.0	0.65
80-85	6.5	0.32
85-90	1.5	0.07
90-95	0.0	0.00
95-100	0.0	0.01
100-105	0.0	0.00
105-110	0.0	0.00
110-115	0.1	0.00
115-120	0.1	0.01
120-125	0.1	0.00
125-130	0.1	0.01
130-135	0.1	0.00
135-140	0.2	0.01
140-145	0.2	0.01
145-150	0.2	0.01
150-155	0.2	0.01
155-160	0.2	0.01
160-165	0.2	0.01
165-170	0.1	0.01
170-175	0.1	0.00
175-180	0.0	0.00

Deg	Flux (lm)	%
0-5	23.7	1.18
0-10	94.0	4.69
0-15	208.6	10.40
0-20	364.7	18.18
0-25	557.4	27.80
0-30	778.4	38.81
0-35	1012.6	50.49
0-40	1243.8	62.03
0-45	1456.3	72.62
0-50	1636.4	81.60
0-55	1775.1	88.52
0-60	1870.3	93.27
0-65	1928.2	96.15
0-70	1961.4	97.81
0-75	1982.4	98.86
0-80	1995.4	99.51
0-85	2001.9	99.83
0-90	2003.4	99.90
0-95	2003.4	99.90
0-100	2003.4	99.91
0-105	2003.5	99.91
0-110	2003.5	99.91
0-115	2003.6	99.91
0-120	2003.7	99.92
0-125	2003.8	99.92
0-130	2003.9	99.93
0-135	2004.0	99.93
0-140	2004.2	99.94
0-145	2004.4	99.95
0-150	2004.6	99.96
0-155	2004.8	99.97
0-160	2005.0	99.98
0-165	2005.1	99.99
0-170	2005.3	100.00
0-175	2005.3	100.00
0-180	2005.4	100.00

6. Product Photo

The Produce Photo for Model RRECO82427W/V2



The Produce Photo for Model RRECO82430W/V2



The Produce Photo for Model RRECO82440W/V2



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