

SWCC Summary Report

Manufacturer: **Xzeres Wind Corporation**
 Wind Turbine: **442SR** (240 VAC, 1-phase, 60 Hz)
 Certification Number: **SWCC-10-10**



CERTIFIED
 SMALL WIND TURBINE
 Conforms to AWEA 9.1 - 2009
 SWCC-10-10

The above-identified Small Wind Turbine is certified by the Small Wind Certification Council to be in conformance with the AWEA *Small Wind Turbine Performance and Safety Standard* (AWEA Standard 9.1 – 2009).

For the SWCC Certificate visit: www.smallwindcertification.org

1. Introduction

This report summarizes the results of testing and certification of the Xzeres 442SR in accordance with AWEA Standard 9.1-2009. The 442SR is a 3-blade, upwind, horizontal axis wind turbine with a swept area of 40.7 m². The tested configuration utilized two (2) SMA SB6000US inverters and a 24.4 m (80 ft.) self-supporting monopole tower. Field tests were conducted at the UL/WTAMU Advanced Wind Turbine Test Facility in Canyon, Texas from December 4, 2013 to December 17, 2014.

2. Turbine Ratings

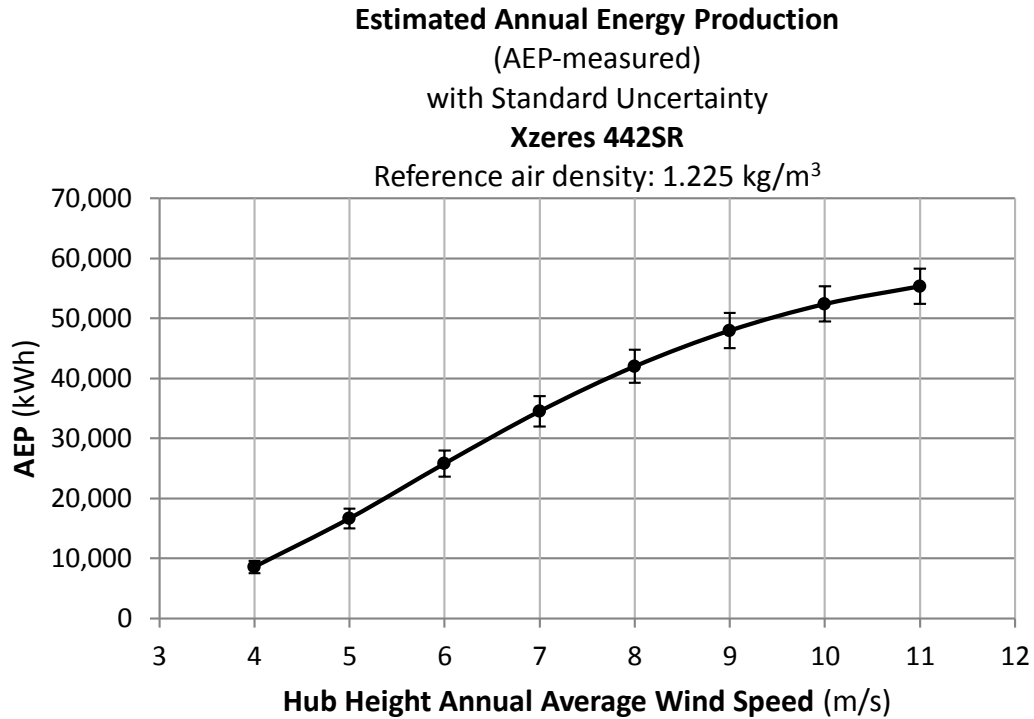
AWEA Rated Annual Energy @ 5 m/s	16,700 kWh
AWEA Rated Sound Level	48.5 dB(A)
AWEA Rated Power	10.4 kW @ 11 m/s
Peak Power	11.3 kW @ 12 m/s

3. Tabulated Annual Energy Production (AEP)

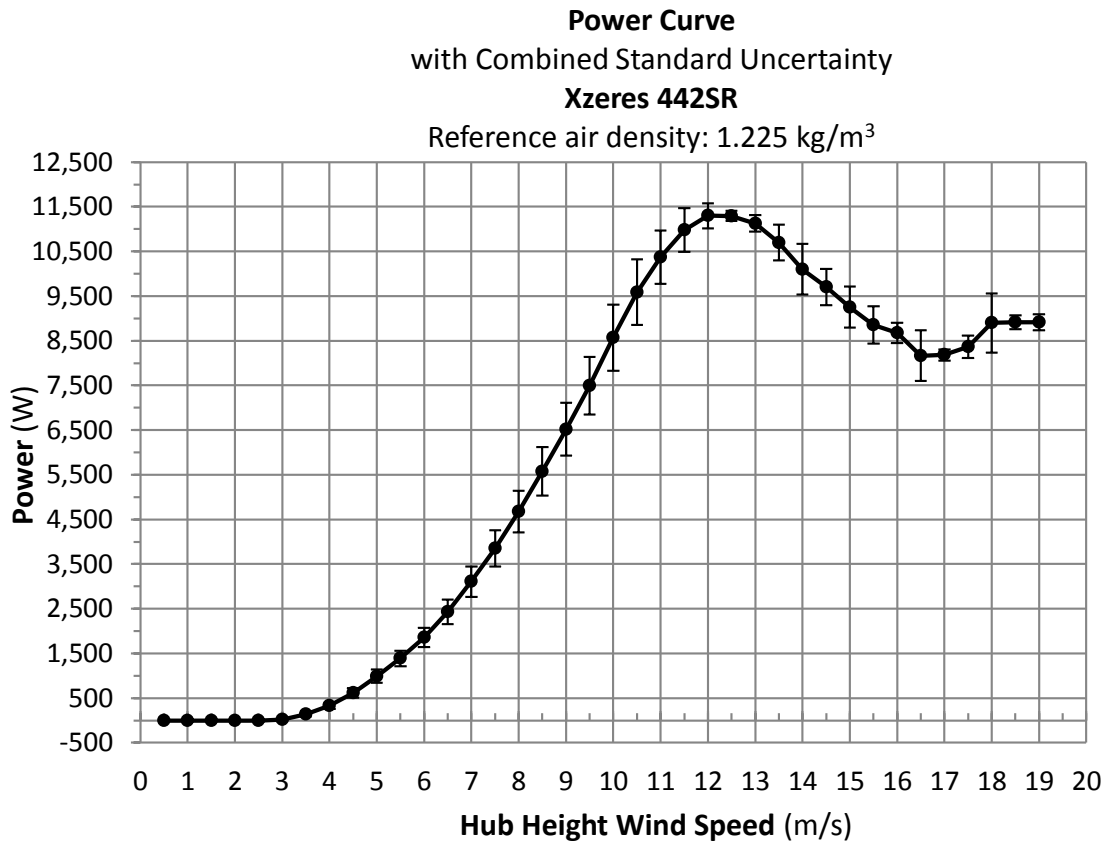
Corrected to a sea level air density of 1.225 kg/m³

Hub Height Annual Average Wind Speed (m/s)	AEP Measured (kWh)	Standard Uncertainty in AEP (kWh)	Standard Uncertainty in AEP (%)	AEP Extrapolated (kWh)
4	8,577	1,030	12%	8,577
5	16,664	1,644	10%	16,664
6	25,813	2,166	8%	25,814
7	34,541	2,539	7%	34,545
8	42,029	2,773	7%	42,059
9	47,997	2,897	6%	48,109
10	52,420	2,938	6%	52,693
11	55,385	2,920	5%	55,894

4. Annual Energy Production Curve



5. Power Curve



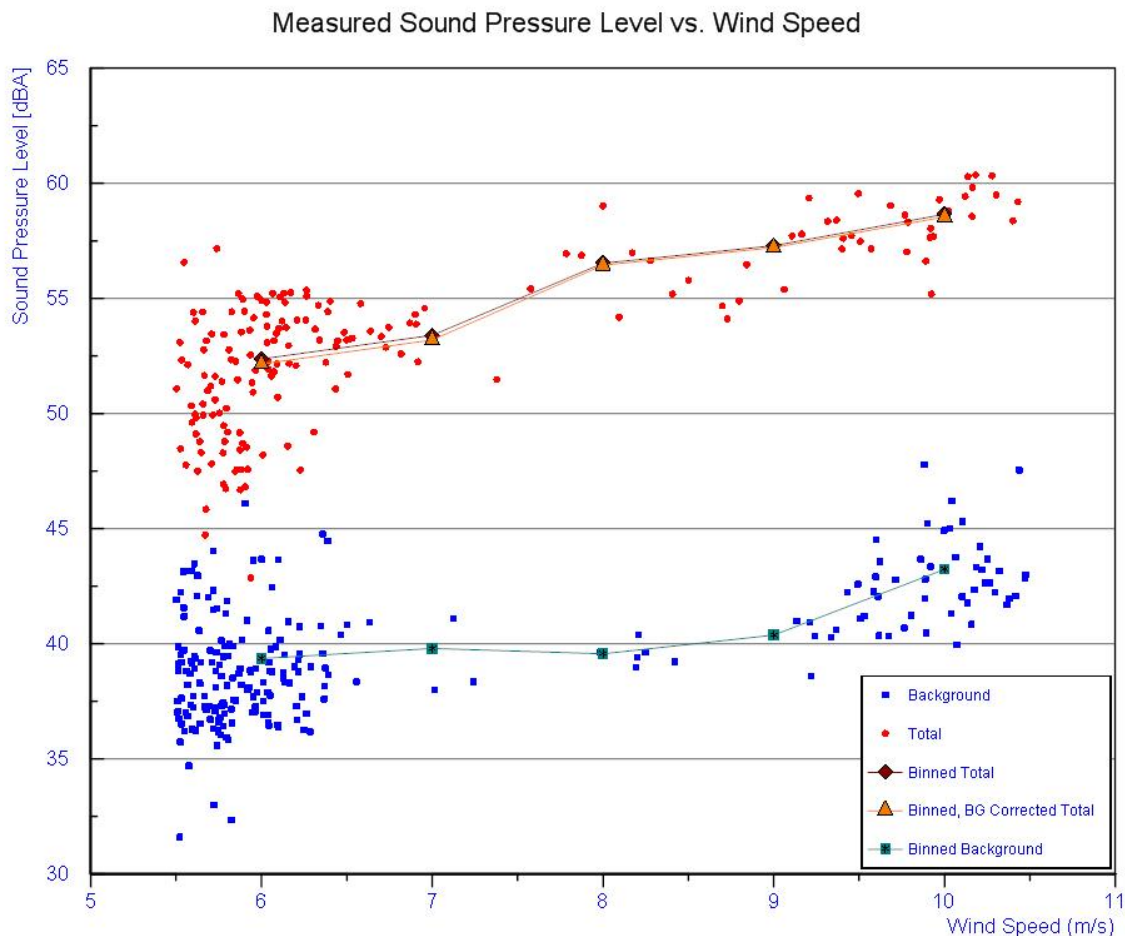
6. Tabulated Power Curve

Corrected to a sea level air density of 1.225 kg/m ³					Category A	Category B	Combined
Bin No.	Hub Height Wind Speed	Power Output	Cp	1-minute samples	Standard Uncertainty, Si	Standard Uncertainty, Ui	Standard Uncertainty, Ci
	<i>m/s</i>	<i>Watts</i>			<i>Watts</i>	<i>Watts</i>	<i>Watts</i>
1	0.5	-29	-9.17	79	0		
2	1.0	-30	-1.20	347	0	25	25
3	1.5	-47	-0.56	710	0	26	26
4	2.0	-66	-0.33	1,095	0	26	26
5	2.5	-56	-0.14	1,592	0	25	25
6	3.0	15	0.02	1,883	0	33	33
7	3.5	143	0.13	2,104	0	48	48
8	4.0	326	0.20	2,469	1	68	68
9	4.5	615	0.27	2,684	1	110	110
10	5.0	986	0.32	3,422	2	149	149
11	5.5	1,388	0.33	3,921	2	172	172
12	6.0	1,861	0.35	4,785	2	215	215
13	6.5	2,429	0.35	5,022	3	274	274
14	7.0	3,105	0.36	5,539	4	345	345
15	7.5	3,850	0.37	5,590	4	402	402
16	8.0	4,672	0.37	5,245	6	468	468
17	8.5	5,575	0.36	4,816	8	541	541
18	9.0	6,519	0.36	4,043	11	595	595
19	9.5	7,491	0.35	3,172	15	642	642
20	10.0	8,567	0.34	2,573	20	744	744
21	10.5	9,586	0.33	2,420	21	737	737
22	11.0	10,373	0.31	1,972	23	597	597
23	11.5	10,980	0.29	1,629	21	485	486
24	12.0	11,300	0.26	1,371	19	281	282
25	12.5	11,294	0.23	1,054	21	110	112
26	13.0	11,124	0.20	894	26	183	185
27	13.5	10,697	0.17	730	36	399	401
28	14.0	10,101	0.15	542	46	565	567
29	14.5	9,696	0.13	397	53	403	406
30	15.0	9,252	0.11	285	63	452	457
31	15.5	8,859	0.10	239	65	412	417
32	16.0	8,674	0.08	136	80	213	227
33	16.5	8,164	0.07	94	88	563	569
34	17.0	8,184	0.07	78	91	84	124
35	17.5	8,362	0.06	41	118	222	251
36	18.0	8,897	0.06	29	159	640	660
37	18.5	8,915	0.06	40	124	91	154
38	19.0	8,915	0.05	19	158	88	181

7. Tabulated Acoustic Data

Wind Speed @ 10 m Height m/s	Total Sound Pressure Level dB(A)	Background Sound Pressure Level dB(A)	Background Corrected Sound Pressure Level dB(A)	Sound Power Level dB(A)	Combined Uncertainty dB(A)
6	52.4	39.4	52.2	88.9	0.71
7	53.4	39.8	53.2	90.6	0.73
8	56.5	39.6	56.4	92.2	0.82
9	57.3	40.4	57.2	93.8	0.74
10	58.7	43.2	58.5	95.4	0.75

8. Graphical Acoustic Data



9. Duration Testing

The 442SR successfully completed a Duration Test for an IEC Class II Small Wind Turbine. The testing was performed from December 4, 2013 to June 4, 2014 with an Operational Time Fraction of 100%. The highest instantaneous wind speed recorded during the test was 28.8 m/s (64.4 mph). The average turbulence intensity at 15 m/s was 12.1%.

10. Mechanical Strength Analysis

The mechanical strength analysis was found to be in conformance with IEC 61400-2 as modified by AWEA Standard 9.1 – 2009 for an IEC Class II Small Wind Turbine.

11. Safety and Function testing

Safety and Function testing was found to be in conformance with sections 4.3 and 4.4 of AWEA Standard 9.1 – 2009.

12. Manufacturer Tower Design Requirements

Mechanical and electrical connections

Please refer to 442SR Installation Manual (Document #3112) which is available from XZERES.

For Electrical Wiring to Tower, refer to Manual, (#3112, Section 5.3).

Minimum blade/tower clearance

Tower Design Specifications for 442SR Wind Turbine (#1457 Process Specification, Technical, Tower, Monopole and #1458 Process Specification, Technical, Tower, Self-Supporting) specifies Maximum allowable tower-top envelope (for blade clearance & deflection): $\varnothing 32$ inches (812 mm) at 6 inches (152 mm) below the tower top, sloping to $\varnothing 45$ inches (1143 mm) at 124 inches (3150 mm) below the tower top.

Maximum allowable tower top diameter (for turbine bolt attachment): $\varnothing 8\frac{1}{2}$ inches (216 mm) within top 6 inches (152 mm) of tower.

Maximum tower top loads

Please refer to Tower Design Specifications for 442SR (Documents # 1457 and #1458) which are available from XZERES.

Max lateral thrust: 1600 lb (7118 N)

Maximum Tower Top Deflection

Please refer to Tower Design Specifications for 442SR (Documents # 1457 and #1458) which are available from XZERES.

Maximum calculated static deflection shall meet TIA-222-G standards set forth in section 2.8.2 for 120 MPH (53.6 m/s) basic wind speed. However, deflection shall not exceed 28 inches (711 mm) in wind speeds up to 90 MPH (40.2 m/s).

PLEASE NOTE: The above tower specification information is provided for reference only. Please obtain the 1457 and 1458 Specifications documents from XZERES. XZERES has a policy of allowing the 442SR turbine to be installed only on towers approved by XZERES.

