

**GENERAL INFORMATION**

Type	Horizontal Axis Wind Turbine		
Nominal Power	kW	19,80	
Model	FX EVO 16-20		
Design and built to IEC Standard	CEI EN IEC61400-2		
Wind Class	IEC Class S 1		
Cut-in Wind Speed	m/s	3	
Rated Wind Speed	m/s	8	
Cut-out Wind Speed	m/s	25	
Working Temperature	From -10°C to +40°C		
Humidity	Up to 95%		
Environmental condition	Equivalent to continental non-polluted according to IEC 60721-2-1		
Solar irradiation	1000 W/m <sup>2</sup>		
Air density/Turbulence	1,225 kg/m <sup>3</sup> at 15°C / 18%		
Total weight @ different hub height	m	17,9	25,7
Total weight (@30m)	kg	9.100	12.000
Tower weight (@30m)	kg	4.700	7.600
Nacelle weight (including rotor)	kg	4.400	4.400

**ROTOR BLADES**

Nr of blades	nr	3	
Rotor diameter	m	15,94	
Swept area	m <sup>2</sup>	199,50	
Blades material	FRP (Fiberglass Reinforced Polymer)		
Rotation speed	rpm	50	
Rotation speed range	rpm	26,5-50	
Rotation speed (max)	rpm	70	
Rotation direction	Clockwise		
Yaw directionality	Active with anti torque cable device		
Colour	White RAL9010		

**STALL CONTROL**

Active Stall Control	Variable speed stall control		
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**GENERATOR**

Type	Direct Drive		
Generator type	Synchronous radial flux permanent magnet generator - external use		
Nominal power	kW	19,80	
Voltage	300-410V AC		
Cooling system	Conventional air cooling		

**INVERTER**

Type	AC/DC/AC dual feed		
Input voltage	Max 480V three-phase 100 Hz		
Output voltage	400V three-phase		
Certification	IEC-021 / JETGR0002-1-8.0 / JETGR0003-1-7.0		

**CONTROL AND SUPERVISION**

Control system	Industrial PLC		
Supervision system	Remotely controlled SCADA		
Connection	Modem/router UMTS/ADSL/3G-4G		

**TOWER**

Type	Flanged		
Hub height	m	17,9 / 25,7	
Colour	Hot dip galvanized / White RAL9010 (Option)		
Technical room	Internal		

**SAFETY**

Active and Negative Braking	Rotation braking with: * elastic energy accumulating brake calipers * hydraulic energy accumulating brake calipers		
Manual Safety Rotor Lock	Parking rotor block with mechanical interference pin system		
Active Yaw Control	Protecting the WTG in case of sharp atmospheric conditions, setting the safety stop position		
Access to the nacelle	Easy access to the nacelle without mobile elevating work platform (MEWP), thanks to certified ladder		

**NOISE**

Apparent noise level	dB	55	
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**LPS (LIGHTNING PROTECTION SYSTEM)**

Design and built according to IEC 61400-24	External LPS on blades and nacelle, internal LPS with surge suppressors		
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**NACELLE**

Type	Painted steel coupled to the tower, with yaw ring bearing		
Covering	Fiberglass, aerodynamic shape		
Colour	White RAL9010		

\* this datasheet is subject to changes at any time.

Power Curve and CP

WINDSPEED [m/s]	POWER** [m/s]	CP**
0,00	0,00	0,000
0,50	0,00	0,000
1,00	0,00	0,000
1,50	0,00	0,000
2,00	0,00	0,000
2,50	0,00	0,000
3,00	0,69	0,207
3,50	1,39	0,262
4,00	2,33	0,294
4,50	3,53	0,313
5,00	5,02	0,325
5,50	6,85	0,333
6,00	9,05	0,339
6,50	11,64	0,343
7,00	14,66	0,345
7,50	18,14	0,348
8,00	19,80	0,314
8,50	19,80	0,262
9,00	19,80	0,221
9,50	19,80	0,188
10,00	19,80	0,161
10,50	19,80	0,139
11,00	19,80	0,121
11,50	19,80	0,106
12,00	19,80	0,093
12,50	19,80	0,082
13,00	19,80	0,073
13,50	19,80	0,065
14,00	19,80	0,059
14,50	19,80	0,053
15,00	19,80	0,048
15,50	19,80	0,043
16,00	19,80	0,039
16,50	19,80	0,036
17,00	19,80	0,033
17,50	19,80	0,030
18,00	19,80	0,028
18,50	19,80	0,025
19,00	19,80	0,023
19,50	19,80	0,022
20,00	19,80	0,020
20,50	19,80	0,019
21,00	19,80	0,017
21,50	19,80	0,016
22,00	19,80	0,015
22,50	19,80	0,014
23,00	19,80	0,013
23,50	19,80	0,012
24,00	19,80	0,012
24,50	19,80	0,011
25,00	19,80	0,010

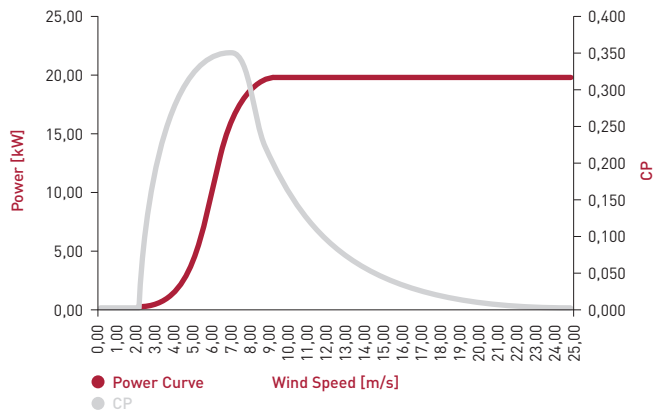
AEP - Annual Energy Production

Average Wind Speed [m/s]	GROSS Annual Energy Production[kWh]*	NET Annual Energy Production[kWh]*
4	44.833	37.850
4,5	58.986	49.863
5	72.803	61.588
5,5	85.797	72.590
6	97.614	82.614
6,5	108.226	91.614
7	117.699	99.631
7,5	126.034	106.700
8	133.359	112.911

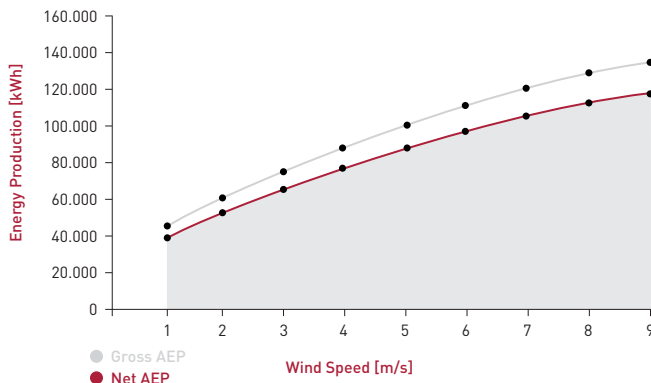
\* ESTIMATED PRODUCTION WITH AVAILABILITY OF 100%

This table does not guarantee Annual Energy Production, as AEP depend on environmental conditions.

Power Curve and CP



Estimated Annual Energy Production (AEP) FX 16-20



\*\* data relating to the power curve and the CP coefficient are actually taken from the validation being carried out by accredited laboratory ILAC-MRA, according the IEC61400-12