



## **S88 - 2.1 MW TECHNICAL OVERVIEW**

**SUZLON**  
POWERING A GREENER TOMORROW

[www.suzlon.com](http://www.suzlon.com)

# S88 - 2.1 MW

ROBUST, RELIABLE AND PROVEN TECHNOLOGY



S88 - 2.1 MW is designed for a medium wind speed regime. The wind turbine concept is based on robust design with pitch regulated blade operation, a three-stage gearbox with 2,310 kW rating and flexible coupling to the asynchronous induction generator. The Suzlon flexi-slip system provides efficient control of the load and power control and the turbine operation is effectively controlled by the Suzlon controller. These technologies are all well known in the wind power industry and have proven themselves. The S88 - 2.1 MW is designed to withstand extreme conditions and operate effectively with low maintenance costs.

## BLADES

As with all other Suzlon blades, the AE43 blade is a fully integrated design. The blade manufacturing system, from mould engineering to state-of-the-art Resin Infusion Moulding (RIM), is implemented in close co-operation between the Dutch design team and the manufacturing plant operators. Blades for the world market are manufactured at Suzlon's in-house facilities located in India and the USA. Specifically in the North American market, the S88 blades are manufactured in our Pipestone, Minnesota facility.

## PITCH SYSTEM

The full-span blade pitching system is based on electrical motors with individual power backup which allows fast and efficient pitching of the blades. With a resolution of 0.1° and a special fast-pitching mode, the S88 - 2.1 MW allows optimal power output as well as fast and safe braking of the rotor.

## GEARBOX

Suzlon has always placed significant focus on gearbox design. The design philosophy is based on years of experience with wind turbines in harsh environments and our internal design standards exceeding the industry standards. The power rating of the Winergy gearbox for the S88 - 2.1 MW is actually 2,310 kW. Suzlon will continue to secure development of superior gearbox technology for the customer's benefit.

## SERVICE AND MAINTENANCE

Suzlon has teams of trained wind farm technicians around the globe who focus on excellence in service, maintenance and monitoring. Our service technicians aim to maximise energy production from the wind, and ensure the turbines operate reliably and with minimal maintenance costs during their life span. The key emphasis is on maximizing availability and efficiency in operation thus providing ease of mind for our clients. Suzlon provides intensive and continuous training programs for its wind farm technicians, both in and out of field and complement our own training resources by using highly respected and reputable industry training consultants to tutor and train our technicians and technical support engineers.

## MANUFACTURING

Suzlon's manufacturing facilities for wind turbine generator components and rotor blades are currently located in India, Brazil and the USA. As part of Suzlon's strategic growth plans to significantly increase manufacturing capacity of all key turbine components, a number of new facilities are currently planned or under construction. This will meet the objective to vertically integrate the entire supply chain, ensuring that Suzlon brings to the market cost efficient and reliable technology. It will also help control the supply chain to secure quality, volume and growth, as well as deliver long term service support to customers.

## END-TO-END SOLUTIONS SINCE 1995

The end-to-end solution pattern is built on Suzlon's expertise in technology, processes and thorough understanding of the wind energy market. It is a unique combination of proven technology and a bundle of value added services. Under this successful and proven business model, Suzlon - undertakes the complete turn-key responsibility from arranging land; to equipment supply & EPC; to nodal agency clearances; to life-cycle operations & maintenance of projects. Customers therefore do not have to engage extra manpower for their wind projects. Suzlon brought about a paradigm shift in the wind energy market with the end-to-end solutions. It made setting up wind energy projects simple, hassle-free and enabled hundreds of customers including small / medium / big enterprises, Indian and multinational corporates, public sector companies and even individuals set-up their own wind energy projects with confidence and ease.

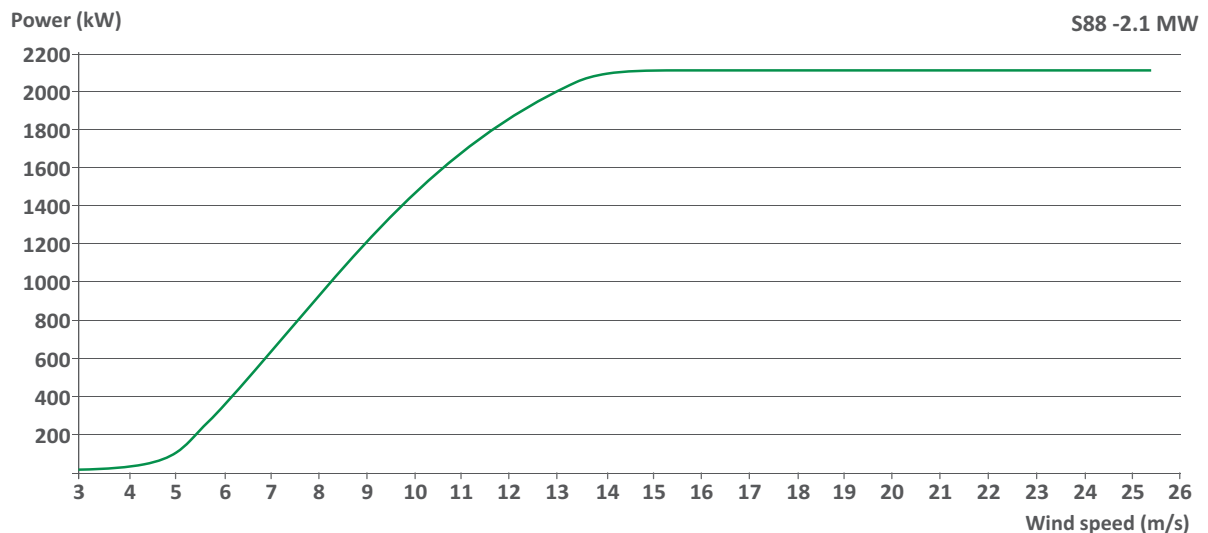
World's fifth largest\* wind turbine manufacturer with an installed capacity over 21 GW | Presence in 33 countries across six continents | Manufacturing units in four continents | R&D facilities in Denmark, Germany, India and The Netherlands

Source: \*BTM Consult ApS - A part of Navigant Consulting - World Market Update 2012



## S88 - 2.1 MW - POWER CURVE AND TECHNICAL SPECIFICATIONS

<b>OPERATING DATA</b>	Rated power	2.1 MW
	Cut-in wind speed	4m/s
	Rated wind speed	14m/s
	Cut-out wind speed	25m/s
	50 years gust wind speed	59.5m/s
	Hub height	80m & 100 m
	Wind Class	IIA
	Rotational Speed	15.1 - 17.7 rpm
<b>ROTOR</b>	Pitch system	Electric drive with electric brake, gearbox, frequency converter & batteries.
	Diameter	88m
	Swept area	6,082m <sup>2</sup>
	Blade material type	Fiberglass / Epoxy
<b>GENERATOR</b>	Type	Induction generator with slip rings, variable rotor resistance with Suzlon Flexi slip control system
	Rated power	2,100 kW
	Rated voltage	690 / 600V
	Frequency	50 / 60Hz
	Protection	IP54 & IP23 (for slip rings)
	Cooling system	Air cooled (IC6A1A6)
	Insulation	Class H
	Slip control	Flexi-Slip providing slip up to 16.7%
<b>BRAKING SYSTEM</b>	Aerodynamic brake	3 independent systems with blade pitching
	Mechanical brake	Hydraulic disc brake, activated by hydraulic pressure
<b>GEARBOX</b>	Type	3 stages (1 planetary & 2 helical)
	Ratio	1:98.8 (±0.5%)
	Nominal load	2,310 kW
<b>YAW SYSTEM</b>	Type	Electric motors with brake, gearbox & pinion
	Bearings	Friction bearing with gear rim
<b>CERTIFICATIONS</b>	Design standards	GL 2003 with supplement 2004
	Quality	ISO 9001:2008
<b>TOWER</b>	Type	Tubular in 4 sections



Under given set of parameter and conditions.

Subject to change without notice due to difference in parameters, conditions and / or change in equipment or technological requirements.

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