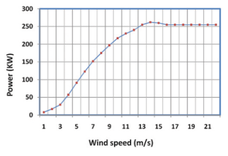
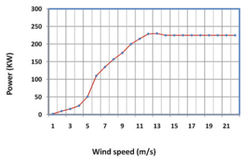
Technical Specification

	SIVA 250/50	SIVA 225/40	SIVA 200
Rotor			
Rotor Diameter	: 30 m	30 m	30m/29 m
Rotor Speed	: 40/24 rpm	40/24 rpm	40/24 rpm
Power Regulation	: Stall	Stall	Stall
Blades			
Type	: LM 13.4	LM 13.4	LM 13.4
Length	: 13.4 m	13.4 m	13.4 m
Aerodynamic brake			
Type	: Tip Brakes	Tip Brakes	Tip Brakes
Activation	: Hydraulic	Hydraulic	Hydraulic
Transmission System			
Gearbox Type	: Helical, 3 Stage	Helical, 3 Stage	Helical, 3 Stage
Ratio	: 37.77	37.77	37.77
Gearbox Cooling	: Oil Cooler	Oil Cooler	Oil Cooler
Mechanical Brake			
Type	: Disc Brake	Disc Brake	Disc Brake
Activation	: Hydraulic	Hydraulic	Hydraulic
Generator			
Type	: Asynchronous, 4/6 Pole	Asynchronous, 4/6 Pole	Asynchronous, 4/6 Pole
Nominal Power	: 250/50 kw	225/40 kw	200/50 kw
Voltage	: 400 V	400 V	400 V
Protection Class	: IP54	IP54	IP54
Yaw System			
Control	: Active	Active	Active
Brake Drives	: 2	2	2
Turbine Control			
Software & Hardware	: SIVA IC1000	SIVA IC1000	SIVA IC1000
SCADA	: Gateway	Gateway	Gateway
Tower			
Type	: Lattice/Tubular	Lattice/Tubular	Lattice/Tubular
Hub height	: 50/30, 40, 45, 50 m	50/30, 40, 45, 50 m	50/30, 40, 45, 50 m
Weight			
Nacelle	: 9200 Kgs	9200 Kgs	9200 Kgs
Rotor	: 4150 Kgs	4150 Kgs	4150 Kgs
Tower	: 23500 Kgs*	23500 Kgs*	23500 Kgs*

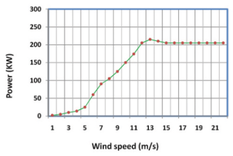
Power Curve SIVA 250/50kW
Rotor diameter: 30m
Air-density: 1.225kg/m2



Power Curve SIVA 225/40kW
Rotor diameter: 30m
Air-density: 1.225kg/m2



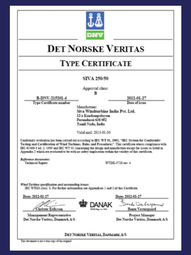
Power Curve SIVA 200/50kW
Rotor diameter: 29m,30m
Air-density: 1.225kg/m2



** Specification subject to change without notice*
** Specified tower weight for 50m lattice tower*


CERTIFICATE TÜV NORD

Design, Manufacture, Installation and Maintenance of Wind Electric Generators


DET NORSKE VERITAS

TYPE CERTIFICATE

SIVA 250/50

Siva Windturbine India Pvt. Ltd.

Siva Windturbine India Private Limited
12A Kandampalayam
Perundurai 638 052
Tamilnadu India
Tel : +91 4294 220017
Fax : +91 4294 220137
Mob : +91 99656 34345
email : vk@sivawind.com
mani@sivapolymers.com
www.sivawind.com

DNV Type Certified
CWET Type Tested
Installed Worldwide

SIVA 250/50
SIVA 225/40
SIVA 200
SIVA 100
SIVA 60

siva

Profile

Siva Windturbine India Private Limited was founded on a number of key elements which have been crucial to its continued success and development. Market knowledge, established technical and management expertise, combined with corporate financial strength provided the foundation on which Siva Windturbine India Private Limited was based.

The management's intimate knowledge of the wind industry identified an opportunity within the sector to develop and manufacture a new medium size of wind turbine generator (WTG). Market analysis also indicated a growing demand for medium size WTGs that established manufacturers could no longer support. These market forces led to the development of the Siva 250/50 WTG

The Siva development and management team have extensive experience in the wind energy sector as both technology providers and project developers. Utilising both these skill sets, Siva developed the Siva 250/50 wind turbine that incorporated technical innovation within a newly designed mainframe. The Siva 250/50 has been designed to reliably operate under a wide range of conditions and grid requirements.

SIVA 250/50 on 50 m lattice tower at Lithuania (EU)

The Siva group companies, based in India, are successfully engaged in a number of core business activities;

- Windfarm development
- Manufacture and sale of injection moulded plastic products
- Manufacture and export of Steel Castings

SIVA 250/50 on 45 m tubular tower at Portland, USA.

These group businesses, under the leadership of Mr V.Velumani, provided the financial strength for Siva to develop and manufacture the Siva 250/50 and obtain DNV Type certification.

Siva Windturbine India Private Limited was founded in Perundurai in 2005 and has continued to expand and develop successfully as part of the Siva group. The Siva Management is DIN EN ISO 9001:2008 certified by TUV NORD. From its headquarters in Perundurai, Siva now manufacture and sell the Siva 250/50 wind turbine worldwide, both directly and through a network of specialist suppliers established in countries around the world.

Service and maintenance is provided directly from Siva or through trained local service partners. All spare parts required for the 20 years lifetime of the turbine are readily available from Siva and its exclusive suppliers.

Technical Description

Design Concept

The Siva 250/50 wind turbine is designed to produce a nominal electrical power output of 250 kW. The rotor diameter is 30 m, and power control is based on the ''stall'' principle. For the sake of smooth connection to the grid, a set of thyristors is interposed between the Mains supply and the generator during the start phase. Even at inland sites with relatively low wind speed, the250/50 attains high production levels due to its large rotor and correspondingly high tower.

Rotor

The rotor consists of three blades rightly flange-mounted on a cast hub. The overall diameter is 30 m giving a swept area of 707 m^2. As a function of wind speed the rotational speed is 40 or 26 rpm. This matching of rotational speed makes the 250/50 particularly suitable for in land locations. The material of the blades is a glass-fibre reinforced plastic (GRP). Each blade tip is pivotable and can be turned 75 degrees to the main blade. The three blade tips are operated independently by a hydraulic-system. Hydraulic-pressure is required to keep the tips in their operational position.

Gearbox

The gearbox is a helical gear system designed to IEC standards. The components are designed and constructed by an established transmission manufacturer in accordance with Siva specification with a ratio of 37.777.Wind turbines designed by SIVA have low noise emissions.. Vibration dampers specially developed by Siva are used for the decoupling of structure borne noise. This provides maximum attenuation between gearbox and machine bed.

Brake System

The aerodynamic tip brake works independently in each individual blade. If one system fails, the aerodynamic brakes in the other two blades continue to be active. In addition, there is a mechanical disk brake on the high speed shaft between the gearbox and generator. The two braking systems, (aerodynamic and mechanical disk brake), work independently of each other. This guarantees a failsafe braking system, even in the event of a failure of an individual component In addition, an independent power supply is provided for the controller which guarantees the safe braking of the wind turbine in the event of a voltage or grid failure.

Generator

The generator is a two-speed, pole-changeable asynchronous machine. At low wind speeds, the first stage generates up to 50 kW and at higher wind speeds the second stage generates up to 250kW. The generator is of protection class IP54 and cooling is provided by forced-air ventilation. Temperature sensors are installed on both the windings to monitor the machine temperature. The housing of the generator is earthed in order to provide equipotential bonding. The generator is elastically supported on the machine bed by noise and vibration-decoupling elements, for improved noise insulation.

Rotor erection in Thailand

SIVA 250/50

Yaw System

The nacelle is connected to the tower by means of a slewing ring bearing. Yawing of the nacelle is achieved by means of two electrical brake drives. The yaw drives are bolted through the yaw pinion on the toothed inner ring of the slewing ring bearing. Two Holding brakes stabilize the nacelle. An electronic wind-direction sensor controls the yaw drive motors via turbine controller. The same system is used to automatically untwist the power cables.

Nacelle

The nacelle is housed in a weather proof enclosure which is constructed from a robust coated sheet steel material. Covering. There is ample space within the nacelle to allow service and maintenance to be carried out in poor weather conditions without the need to open the doors at the top of the nacelle, Access to the nacelle is gained from the top of the tower via a hatch in the base frame. A remote control panel located in the nacelle allows the service engineers to access the main control inactions of the turbine. There is also an emergency stop button incorporated into the panel.

Tower

The tubular tower is manufactured from high quality steel plate. The lattice tower is manufactured from high quality angle steel an internal ladder provides access to the nacelle. In accordance with health and safety regulations there are a number of platforms in the tower as well as additional landings incorporated into the access ladder. The power cabinets are located at the base of the tubular tower. A suitable weather proof enclosure is used to house the power cabinets in applications where a lattice tower is employed.

Corrosion protection

To safeguard all turbine components against the effects of corrosion, suitable protective coatings are employed.

SIVA 250/50 on 30 m tubular tower at South Korea.

The coating systems comply with the requirements of DIN EN ISO 12944.

Serviceability

There is ample space within the nacelle to allow service and maintenance to be carried in poor weather conditions without the need to open the doors at the top of the nacelle. All major power train components within the nacelle are easily accessible.