



**Global Wind Power**

# **GWP82 - 2000kW**



Meeting the deadlines is not good enough,  
beating the deadlines is our expectation

We bet on people



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# GWP82-2000kW

*Designed by Lagerwey, the next generation of direct drive*



## Durability

Durability begins with a quality product. Lagerwey's newest generation of direct drive turbines is ready for the future and is challenging the old concepts in many aspects.

Lagerwey's long experience and innovative mind regarding direct drive technology has resulted in an optimal next generation turbine called the GWP82-2000kW. Reducing the amount of components and design simplicity are essential drivers in making durable quality.

## Technology

The turbine has a permanent magnet generator with excellent efficiency in partial and full load. Together with a full power converter we are able to deliver a clean, grid friendly power even during worst case circumstances.

Due to the variable speed principle, the turbine is the best choice when conditions get rough. An advanced electrical pitch system reduces the loads and guarantees maximum energy capture. The only moving part with a high load cycle is the main bearing into which Lagerwey has deliberately engineered a comfortable safety margin regarding wear and loads. The automatic lubrication system is closely monitored and is very accessible for maintenance.

The GWP82-2000kW has a hollow main shaft for direct internal access to the hub. This makes the design light together with high stiffness to withstand the loads. All service can be done comfortably from the inside of the turbine. The generator is closed from outside influences and has an efficient passive cooling system that makes it withstand the most severe environments (dust, coastal operation etc.).

## Profitability

Transportation and installation costs have become major costs in the multi megawatt turbine class. Our concept with ready to fit assembly modules ensures low installation costs and requires minimal crane capacity. The turbine can be erected with a 500 tonne mobile crane.

The GWP82-2000kW energy capture is very high, especially where it matters, in partial load. In partial load the turbine outperforms the existing drive train concepts by far.

Design margins and low installation and maintenance costs make the turbine a low risk investment and combined with the excellent energy capture allows for an attractive return on investment. This is the turbine of choice for your projects.

## Full Service

Full Service means that we GWP retains all internal technical risks for the product, such as spare parts, labour and consumables. Also included is an availability warranty and costs are based on a price per kWh produced. GWP offers a first class quality product in combination with a Full Service Agreement that reduces your risks to a minimum. GWP's solid financial position as a part of the Reliance ADA Group means you can have confidence in the service offer.

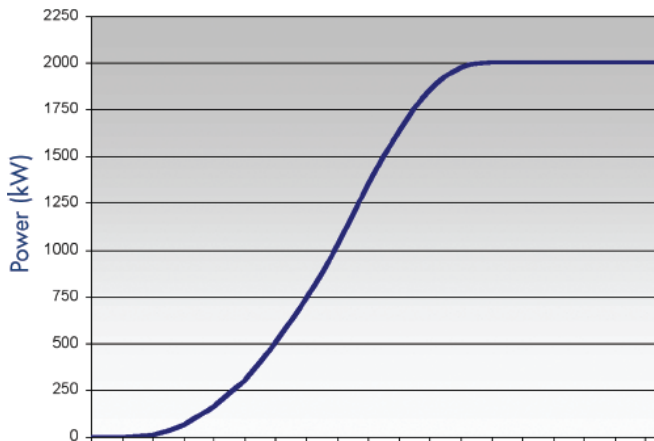


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# GWP82-2000kW, technical data

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Power curve GWP82-2000kW



## General

Rated power: 2000 kW  
Rotor diameter: 82,5 m  
Hub height: 80m, 105m, 120m+ hybrid tower  
Turbine concept: Direct drive gearless, variable speed, variable pitch, full power converter

## Rotor

Type: 3 bladed upwind rotor  
Diameter: 82,5 m  
Swept area: 5350 m<sup>2</sup>  
Rotor speed: Variable 7,5 - 18,5 rpm  
Power regulation: Electric pitch control  
Blade length: 40 m  
Blade material: Fibreglass / epoxy  
Lightning protection: Blade integrated, direct contact to structure.

## Generator

Type: Lagerwey multi pole synchronous  
Field excitation: Permanent Magnet  
Main bearing: Dual row tapered rollers

## Grid inverter

Type: Full power AC-DC-AC  
Control: IGBT-control  
Cooling: Water cooled

## Steel tower

Type: Tubular steel tower  
Hub height: 80m / 105m

## Hybrid tower

Type: Steel - concrete combination  
Hub height: >120m (in development)

## Safety system

Type: 3 Independent pitch system with allocated emergency supply

## Devices

Brakes: Rotor and yaw brake  
Locks: Rotor blade, yaw and drive train  
Lubrication: Automatic controlled bearings and teeth lubrication.

## Operational data

Cut in wind speed: 2,7 m/s  
Cut out wind speed: 25 - 28 m/s  
Nominal power: 12,5 m/s  
Power factor: Controllable





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# GWP82-2000kW, Power Curve

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## Certification and power curve measurement

The GWP82-2000kW wind turbine will be installed at the wind turbine test field in Lelystad mid 2009, components are secured, design is ready and permits plus other preparations are in place.

During the second half of 2009 the turbine will be certified by Germanischer Lloyds, the power curve will be measured, as well as the power quality and the noise curve.

GWP will give a warranty based on the calculated power curve for now and as soon as the measured power curve is available this warranty will be based on that curve, unless the calculated power curve is better than the measured one.

Below you find the calculated power curve of the GWP82-2000kW based on:  
1.225 kg/m<sup>3</sup> air density, clean blades and undisturbed horizontal inflow.

Wind speed [m/s]	Electrical power [kW]
1	0
2	1
3	16
4	67
5	167
6	313
7	507
8	750
9	1.040
10	1.355
11	1.646
12	1.860
13	1.983
14	2.000
15	2.000
16	2.000
17	2.000
18	2.000
19	2.000
20	2.000
21	2.000
22	2.000
23	2.000
24	2.000
25	2.000



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