

## **V52-850 kW**

**The turbine that goes anywhere**





## Versatile, efficient, dependable – and popular

The highly efficient operation and flexible configuration of the V52 make this turbine an excellent choice for all kinds of wind conditions. In addition, thanks to its modest dimensions, the V52 is simple and cost-effective to transport and install. If you add in robust construction, thoroughly tested components and an enviable track record, it is easy to see why Vestas has erected more V52s than any other turbine in its portfolio – approximately 1500 turbines, all over the world.

One of the factors that contribute to the success of the V52 is OptiTip®, its pitch regulation system. This system features microprocessors which control the pitching of the blades, thus ensuring continuous adjustment to maintain optimal blade angles in relation to the prevailing wind. At the same time, OptiTip® makes it possible to keep sound levels within the limits stipulated by local regulations.

## The optimal solution

Another innovative feature of the V52 is the OptiSpeed®\* generator. This is a significant advance in wind turbine technology and makes a major contribution to the efficiency of the V52. In practice, it allows the turbine rotor speed to vary between 14 and 31 rpm depending on the conditions at any given time.

While the technology involved may be advanced, its purpose is simple: to maximise output. It does this by tapping the higher efficiency of slow and variable rotation, storing excess energy in rotational form and exploiting the full force of transient gusts. All told, OptiSpeed® boosts annual energy production.

As an added benefit, OptiSpeed® also reduces wear and tear on the gearbox, blades and tower on account of lower peak loading. Moreover, as turbine sound is a function of wind speed, the lower rotation speeds made possible by OptiSpeed® naturally reduce sound levels.

Finally, OptiSpeed® helps the V52 deliver better quality power to the grid, with rapid synchronisation, reduced harmonic distortion and less flicker.

Quite simply, OptiSpeed® means more output, better quality power and less mechanical strain and sound.

## Proven Performance

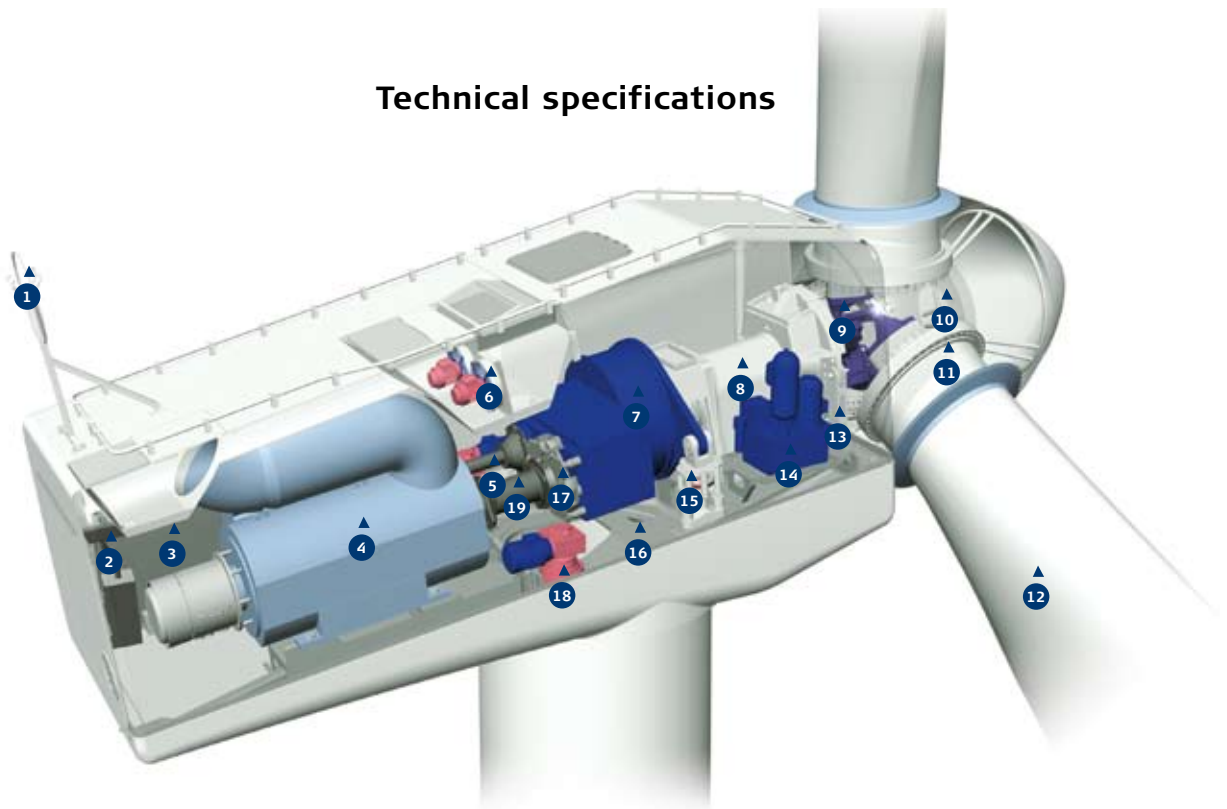
Wind power plants require substantial investments, and the process can be very complex. To assist in the evaluation and purchasing process, Vestas has identified four factors that are critical to wind turbine quality: energy production, operational availability, power quality and sound level.

We spend months testing and documenting these performance areas for all Vestas turbines. When we are finally satisfied, we ask an independent testing organisation to verify the results – a practice we call Proven Performance. At Vestas we do not just talk about quality. We prove it.

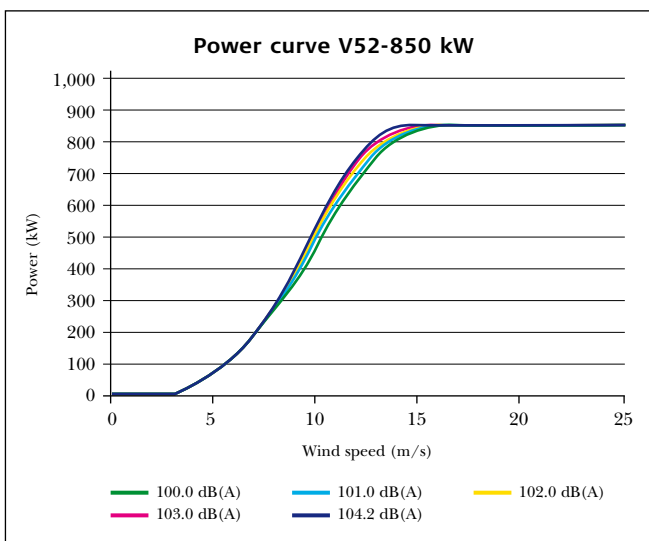


\* Vestas OptiSpeed® is not available in the USA and Canada.

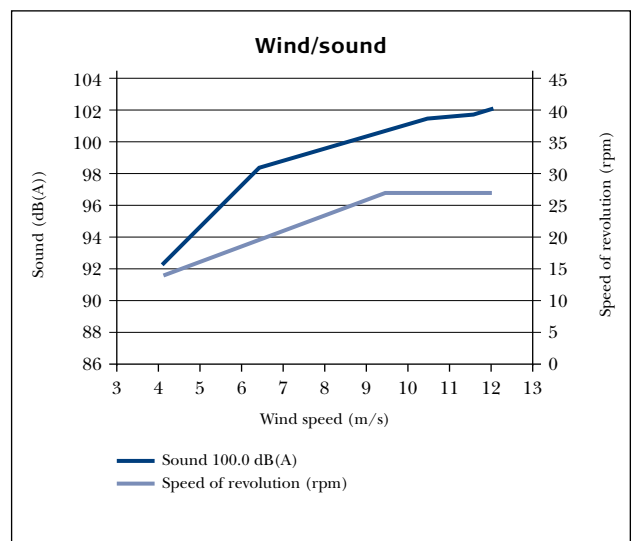
## Technical specifications



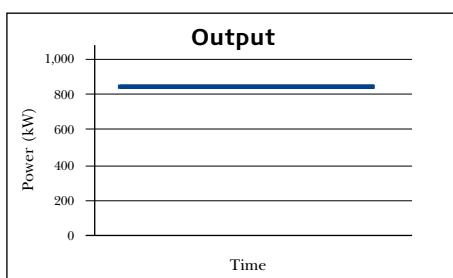
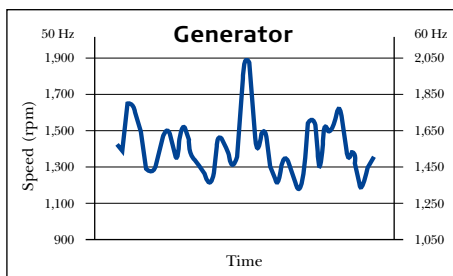
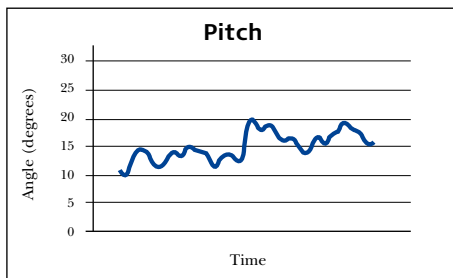
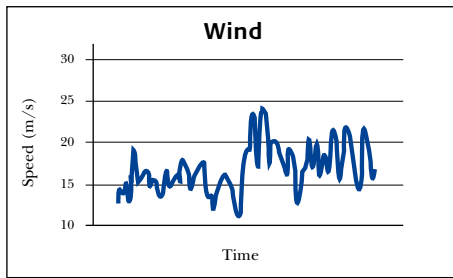
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|-------------------------------------|-------------------------|----------------------|----------------------------|
| 1 Ultrasonic wind sensor            | 6 Oil and water coolers | 11 Blade bearing     | 16 Machine foundation      |
| 2 Service crane                     | 7 Gearbox               | 12 Blade             | 17 Mechanical disc brake   |
| 3 VMP-Top controller with converter | 8 Main shaft            | 13 Rotor lock system | 18 Yaw gear                |
| 4 OptiSpeed® generator              | 9 Pitch system          | 14 Hydraulic unit    | 19 Composite disc coupling |
| 5 Pitch cylinder                    | 10 Blade hub            | 15 Torque arm        |                            |



The figure above illustrates the power curves at different sound levels for the V52-850 kW turbine, which is equipped with OptiSpeed®.



The sound output level can be adjusted by varying the revolution speed of the turbine as illustrated in the figure above. It clearly shows the sound level advantages of lower speeds of revolution because the sound level is approximately 7 dB(A) lower at 4 m/s than at 8 m/s. For other sound levels, the benefit can be as much as 10 dB(A). Please note that a decrease of 3 dB(A) represents a halving of the sound level.



*OptiSpeed® allows the rotor speed to vary within a range of approximately 60 per cent in relation to nominal rpm. Thus with OptiSpeed®, the rotor speed can vary by as much as 30 per cent above and below synchronous speed. This minimises both unwanted fluctuations in the output to the grid supply and the loads on the vital parts of the construction.*

## Rotor

Diameter: 52 m  
 Area swept: 2,124 m<sup>2</sup>  
 Nominal revolutions: 26 rpm  
 Operational interval: 14.0-31.4 rpm  
 Number of blades: 3  
 Power regulation: Pitch/OptiSpeed®  
 Air brake: Full blade pitch

## Tower

Hub height: 40 m, 44 m, 49 m, 55 m,  
 60 m, 65 m, 74 m, 86 m

## Operational data

Cut-in wind speed: 4 m/s  
 Nominal wind speed: 16 m/s  
 Cut-out wind speed: 25 m/s

## Generator

Type: Asynchronous with OptiSpeed®  
 Nominal output: 850 kW  
 Operational data: 50 Hz/60 Hz  
 690 V

## Gearbox

Type: 1 planet step/2-step  
 parallel axle gears

## Control

Type: Microprocessor-based monitoring of all turbine functions as well as OptiSpeed® output regulation and OptiTip® pitch regulation of the blades.

## Weight

Nacelle: 22 t  
 Rotor: 10 t

Towers:	IEC IA	IEC IIA	DIBt II	DIBt III
Hub height:				
40 m	40 t	–	–	–
44 m	45 t	–	–	–
49 m	50 t	–	–	–
55 m	55 t	50 t	–	–
60 m	70 t	70 t	–	70 t
65 m	75 t	75 t	–	75 t
74 m	–	–	95 t	–
86 m	–	–	110 t	–

*t = metric tonnes*

DIBt towers are only approved for Germany.

All specifications subject to change without notice.

# The turbine that goes anywhere



If you have a viable wind power site, chances are that the V52 will do well there. That is because at Vestas, we have devoted the last 25 years to expanding the range of conditions under which wind can be profitably harnessed – and because the V52 represents Vestas at its most versatile.

An all-round performer, this 850 kW wind turbine is our most adaptable turbine, well suited for a broad spectrum of medium and high winds. This is why we have installed approximately 1500 V52s all over the world.

Several factors contribute to the flexibility of this wind turbine. Not only is the V52 available with eight different tower heights, but its modest size and remarkable sound

profile also make it the perfect choice for both populated and remote locations. As a finishing touch, its compact dimensions make overland transport simple.

The V52 is also the only kW-class turbine to be fitted with OptiSpeed®, a technology that allows the rotor speed to vary within a range of approximately 60 per cent in relation to nominal rpm. This means that with OptiSpeed®, the rotor speed can vary by as much as 30 per cent above and below synchronous speed. OptiSpeed® thereby maximises the aerodynamic efficiency of the rotor in response to changing wind conditions – and provides yet another instance of how Vestas' versatility enhances the delivery of dependable power.

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