V80-2.0 MW

Versatile megawattage

Vestas®

No. 1 in Modern Energy

Top of its class

The V80-2.0 MW turbine has been engineered to make the very most of IEC I sites, as it provides unparallelled productivity in both high and moderate winds. More than 2,700 V80 turbines have already been installed around the world, and have proved themselves to be seasoned performers in both onshore and offshore environments. The high energy yield of the V80 turbine makes it an excellent choice for locations where space is limited. However, it also boasts an excellent track record in challenging offshore conditions, where its high operational availability, excellent grid compliance and proven technology make it a competitive choice with respect to both cost and performance.

One of the factors that contribute to the superior performance of the V80-2.0 MW turbine is OptiTip®, its pitch regulation system. This system features microprocessors that rotate the blades around their longitudinal axes, 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.

Optimal output

Another factor that helps to maximise the efficiency and optimise the sound level of the V80-2.0 MW turbine is OptiSpeed®*. The OptiSpeed® generator allows the turbine rotor speed to vary between 9 and 19 rpm, depending on conditions. While the technology involved may be advanced, its purpose is simple: to optimise 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 V80 turbine deliver better quality power to the grid, with rapid synchronisation, reduced harmonic distortion and less flicker. Quite simply, the V80-2.0 MW turbine is synonymous with more output, better quality power and less mechanical strain and sound.

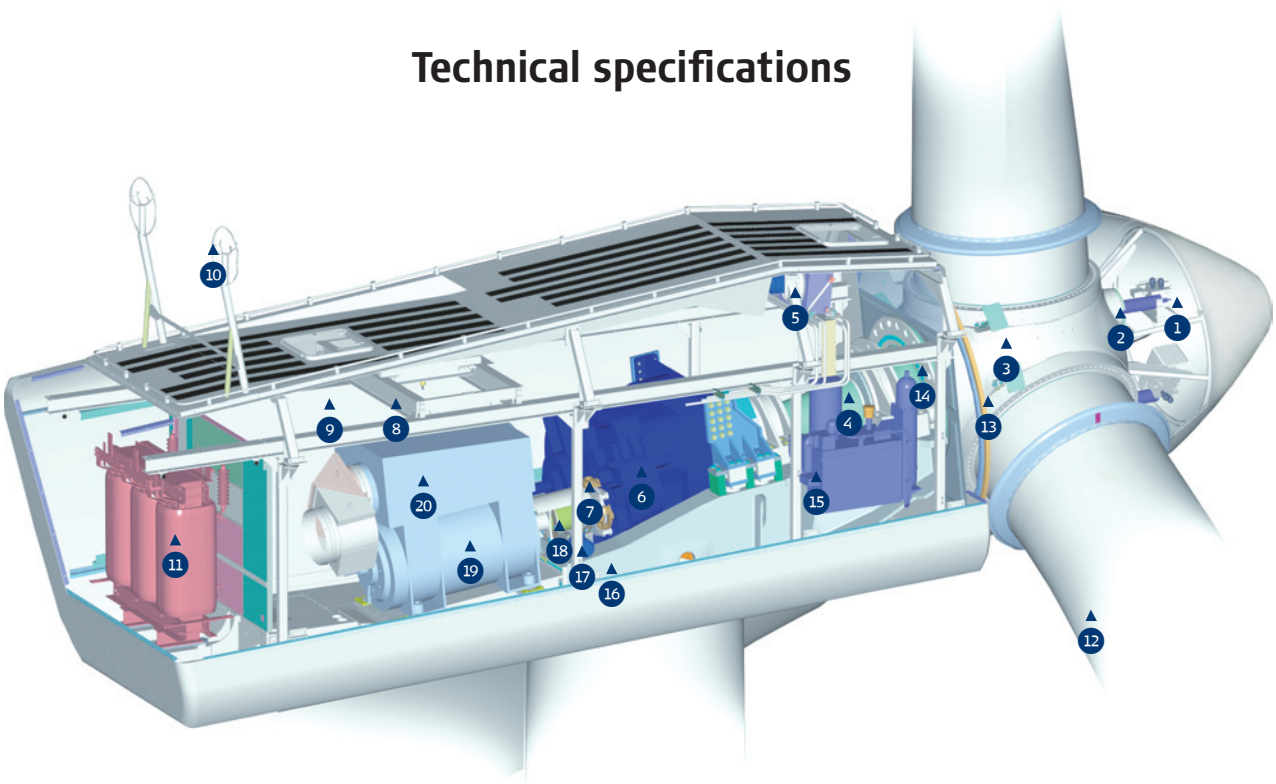
Proven Performance

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

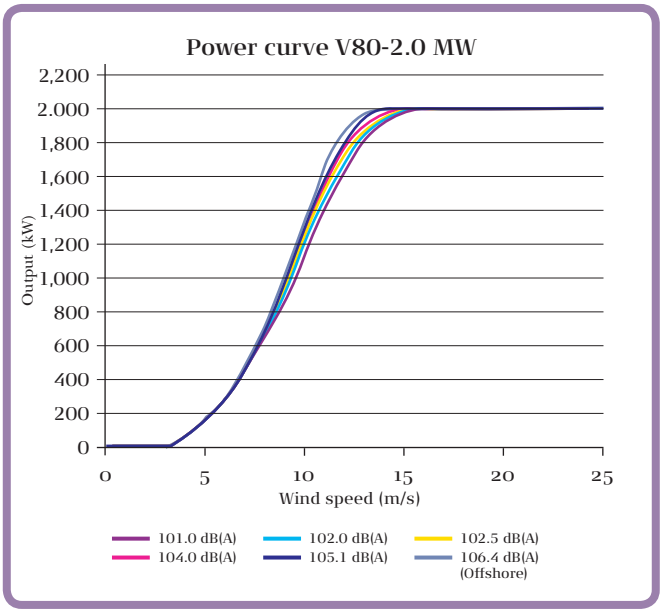
We spend months testing and documenting these performance areas for all Vestas turbines. When we are finally satisfied, we ask an independent testing organisation to verify the results – a practice we call Proven Performance. At Vestas we do not just talk about quality. We prove it.

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

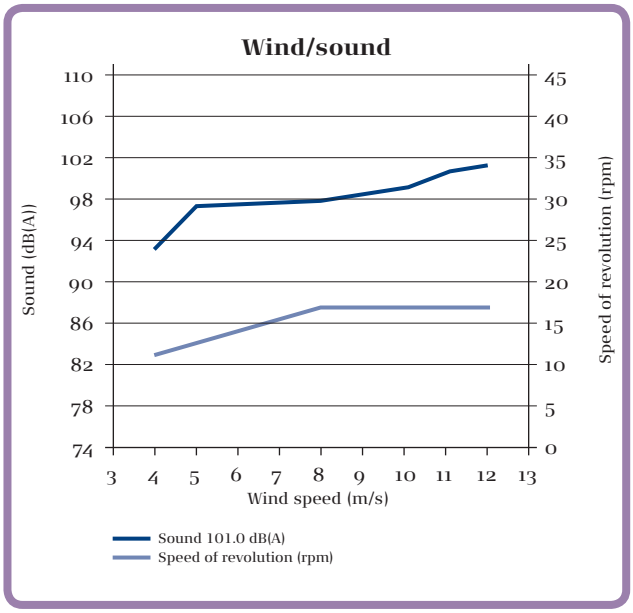
Technical specifications



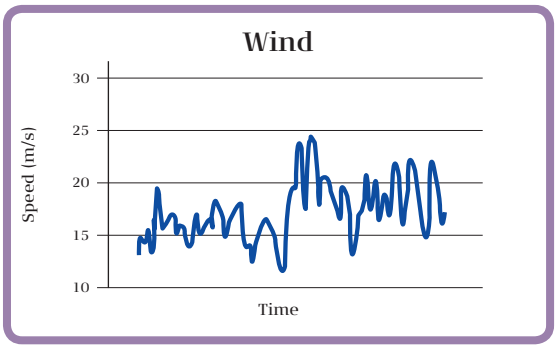
1. Hub controller
2. Pitch cylinders
3. Blade hub
4. Main shaft
5. Oil cooler
6. Gearbox
7. Mechanical disc brake
8. Service crane
9. VMP-Top controller with converter
10. Ultrasonic sensors
11. High voltage transformer
12. Blade
13. Blade bearing
14. Rotor lock system
15. Hydraulic unit
16. Machine foundation
17. Yaw gears
18. Composite disc coupling
19. OptiSpeed® generator
20. Air cooler for generator

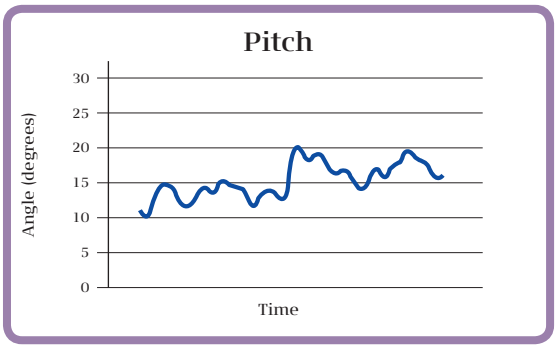


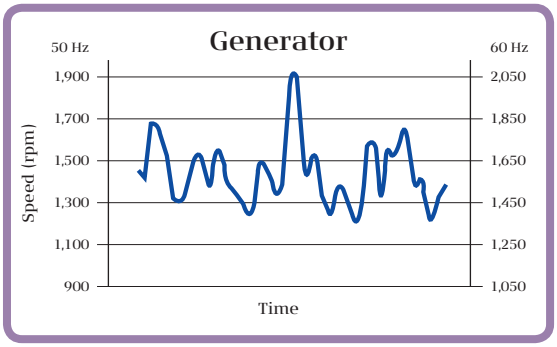
The figure above illustrates the power curves at different sound levels for the V80-2.0 MW turbine, which is equipped with OptiSpeed®.

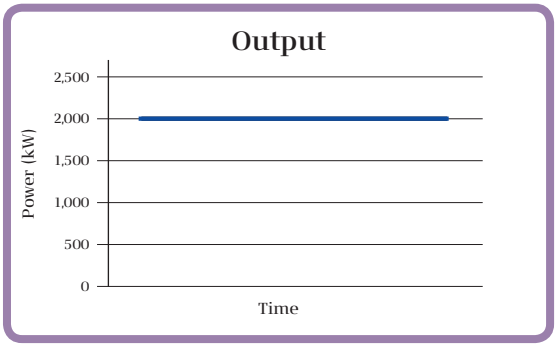


The sound output level can be adjusted by varying the revolution speed of the turbine as illustrated in the figure above. It clearly shows the sound level advantages of lower speeds of revolution because the sound level is approximately 7 dB(A) lower at 4 m/s than at 8 m/s. For other sound levels, the 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:	80 m
Area swept:	5,027 m²
Nominal revolutions:	16.7 rpm
Operational interval:	9-19 rpm
Number of blades:	3
Power regulation:	Pitch/OptiSpeed®
Air brake:	Full blade pitch by three separate hydraulic pitch cylinders.

Tower

Hub height (approx):	60 m, 67 m, 78 m, 100 m

Operational data

Cut-in wind speed:	4 m/s
Nominal wind speed (2,000 kW):	15 m/s
Cut-out wind speed:	25 m/s

Generator

Type:	Asynchronous with OptiSpeed®
Nominal output:	2,000 kW
Operational data:	50 Hz/60 Hz 690 V

Gearbox

Type:	Planet/parallel axles

Control

Type:	Microprocessor-based monitoring of all the turbine functions with the option of remote monitoring. Output regulation and optimisation via OptiSpeed® and OptiTip® pitch regulation.

Weight

Nacelle:	67 t
Rotor:	37 t

Towers:

Hub height:	IEC IA	IEC IIA	DIBt II	DIBt III
60 m	130 t	120 t	-	125 t
67 m	160 t	135 t	-	-
78 m	205 t	190 t	165 t	199 t
100 m	-	225 t	200 t	-

t = metric tonnes.

DIBt towers are only approved for Germany.

All specifications subject to change without notice.

Versatile megawattage

In many fields of engineering, flexibility and efficiency are considered almost diametric opposites – i.e. one can only be improved at the expense of the other. At Vestas, we specialise in finding ways to improve both at the same time. To see how we accomplish this, you need look no further than the V80 turbine, the cornerstone of our 2 MW class.

The V80 is a pitch-regulated turbine for medium and high winds that features OptiSpeed® – a variable-speed 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 significantly increases productivity and makes it possible to keep sound levels within the limits stipulated by local regulations.

This flexibility, enhanced by a variety of tower heights, makes the V80 turbine particularly well suited to a very wide range of sites, both onshore and offshore.

Together with OptiTip®, our pitch-regulation system, OptiSpeed® gives the V80 a competitive edge in its megawatt class. This edge, backed by Vestas' reputation for dependability, superior project management and service, has made the V80 one of the best-selling turbines in the world. The popularity of the turbine means that we are able to keep production costs – and hence the customer's cost per kWh – to a minimum.

Vestas Wind Systems A/S
Alsvej 21
8900 Randers
Denmark
Tel. +45 97 30 00 00
Fax +45 97 30 00 01
vestas@vestas.com
www.vestas.com

To see a complete list of our sales and service units, visit www.vestas.com

01/08 UK