

V80-1.8 MW

Versatile megawattage





Top of its class

The Vestas V80 has been engineered to make the very most of aggressive sites, as it provides unparalleled productivity in both high and moderate winds. In terms of power output and swept area, it is the best turbine on the market in the 2 MW class. More than 1,000 of these 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 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 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 maximize the efficiency and optimize the sound level of the V80 is OptiSlip® technology. The OptiSlip® 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 optimize 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, OptiSlip® boosts annual energy production by around five per cent in relation to traditional fixed-speed turbines.

As an added benefit, OptiSlip® 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 OptiSlip® naturally reduce sound levels.

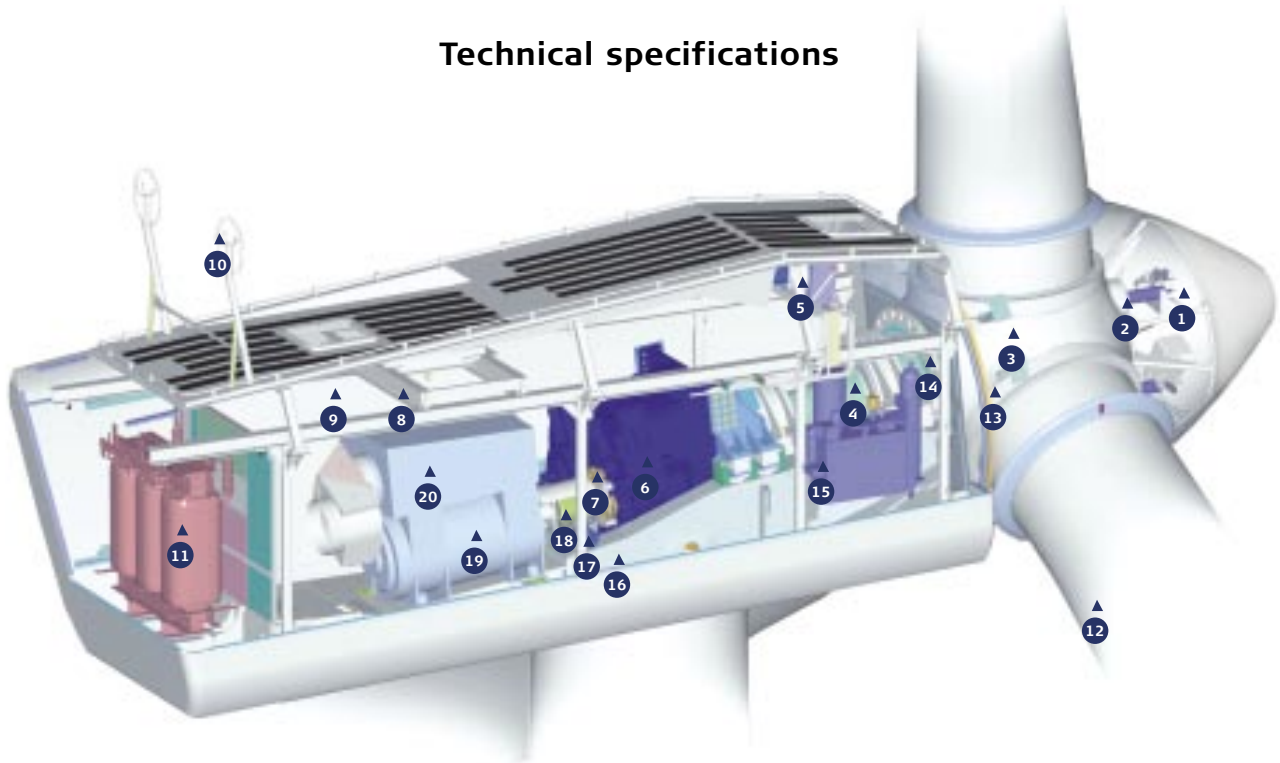
Finally, OptiSlip® helps the V80 deliver better quality power to the grid, with rapid synchronization, reduced harmonic distortion and less flicker. Quite simply, the V80-1.8 MW turbine is synonymous with more output, better quality power and less mechanical strain and sound.

Proven performance

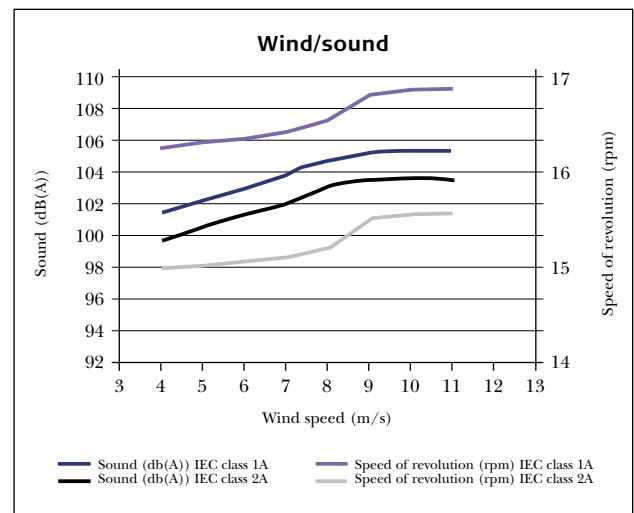
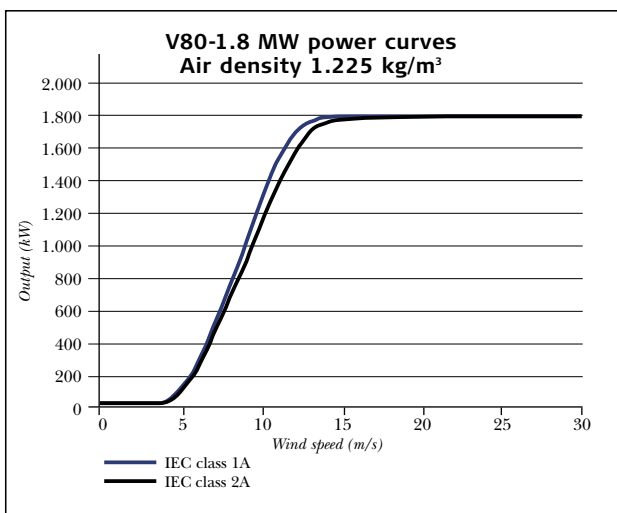
Wind power plants require substantial investments, and the process can be very complex. To assist in the evaluation and purchasing process, Vestas has identified four factors that are critical to wind turbine quality: energy production, operational availability, power quality and sound level.

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.

Technical specifications

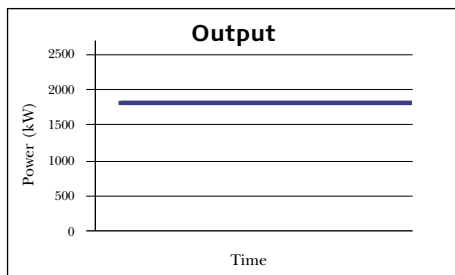
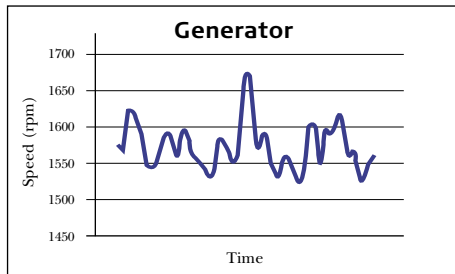
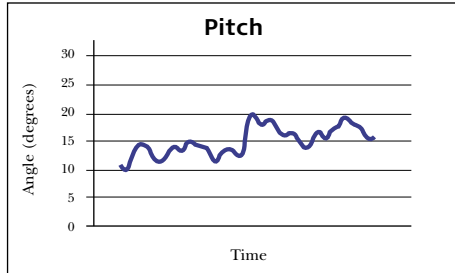
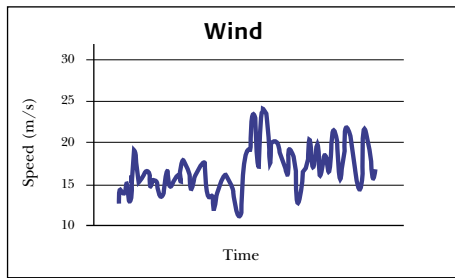


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|-------------------|-------------------------------------|---------------------------------------|-----------------------------|
| 1 Hub controller | 6 Gearbox | 11 High voltage transformer (6-33 kW) | 16 Machine foundation |
| 2 Pitch cylinders | 7 Mechanical disc brake | 12 Blade | 17 Yaw gears |
| 3 Blade hub | 8 Service crane | 13 Blade bearing | 18 Composite disc coupling |
| 4 Main shaft | 9 VMP-Top controller with converter | 14 Rotor lock system | 19 OptiSplip® generator |
| 5 Oil cooler | 10 Ultrasonic sensors | 15 Hydraulic unit | 20 Air cooler for generator |



The figure above illustrates the relationship between wind and sound levels, and that between wind and speeds of revolution for turbines equipped with OptiSpeed®. It clearly shows the sound level advantages of lower speeds of revolution because the beneficial effect on sound levels of lower speeds of revolution 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) is a halving of the sound level.

The sound output level can be adjusted by varying the revolution speed of the turbine as illustrated in the figure above. In practice, this means that, for example, the sound level recorded at a distance of 340 m (hub height 78 m) can be reduced from 44.5 to 40.4 dB(A) – i.e. by more than half the recorded level.



OptiSlip® allows the rotor speed to vary within a range of approximately 10 percent in relation to nominal rpm. This minimizes 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 m ²
Nominal revolutions:	15.5/16.8 rpm
Number of blades:	3
Power regulation:	Pitch/OptiSlip®
Air brake:	Full blade pitch by three separate pitch cylinders

Tower

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

Operational data

Cut-in wind speed:	4 m/s
Nominal wind speed (1,800 kW):	15 m/s
Cut-out wind speed:	25 m/s

Generator

Type:	Asynchronous with OptiSlip®
Nominal output:	1,800 kW
Operational data:	60 Hz 690 V

Gearbox

Type:	Planet/parallel axles
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Control

Type:	Microprocessor-based control of all the turbine functions with the option of remote monitoring. Output regulation and optimization via OptiSlip® and OptiTip® pitch regulation.
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Weight (IEC IA/IEC IIA)

Hub height:	60 m	67 m	78 m
Tower:	140 t/124 t	158 t/142 t	203 t/199 t
Nacelle:	67 t	67 t	67 t
Rotor:	37 t	37 t	37 t
Total:	244 t/234 t	262 t/252 t	307 t/309 t

t = metric tons

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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 specialize in finding ways to improve both at the same time. To see how we accomplish this, you need look no further than the V80, the cornerstone of our 2 MW class.

The V80 is a pitch-regulated turbine for medium and high winds that features OptiSlip® variable-speed technology. OptiSlip® allows the rotor speed to vary within a range of approximately 10 percent in relation to nominal rpm. OptiSlip® 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 particularly well suited to a wide range of sites.

Together with OptiTip®, our pitch-regulation system, OptiSlip® 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 your cost per kWh – to a minimum. It is just one more way in which the versatility of the V80 leads to increased efficiency.

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