



## Humidity control in the wind energy industry

The wind energy industry is faced with a range of challenges in which climatic conditions and environmental factors have a direct impact on the quality and performance of wind turbines.

Worthy of special mention are environments and conditions with excessive humidity levels, over and above the resistance levels of the materials employed.

The challenges resulting from excess humidity in the wind energy industry have an impact at every stage of the value chain:

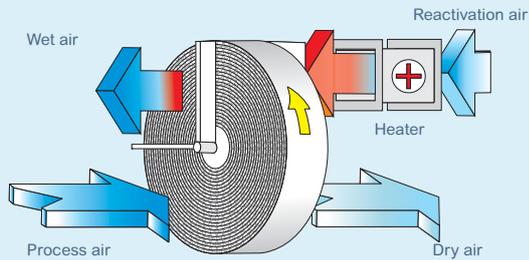
Quality at the manufacturing, and storage and transport stages, and following installation.





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### Drying rotor operating principles



The most important challenges faced at different stages of the value chain are as follows:

### Manufacture

**The resins used in the manufacture of the wind turbine blades are hygroscopic:** this means the ambient humidity level during transformation from a liquid to a solid end product is strongly correlated to the quality and the manufacturing time of the blades. As a result **it is necessary to control the humidity levels in order to guarantee the optimum quality of the product.**

### Storage and transport

When the process of manufacturing the towers finalizes, they are stored in areas exposed to adverse environmental conditions, where they can be kept for long periods of time until they are transported to their assembly point. **These large metal structures are subjected to corrosion processes from day one**, which have to be controlled to ensure quality standards.

### Installation and assembly

During installation and assembly, onshore and offshore, the metal structures continue to be subjected to excess humidity and associated corrosion during storage or transport, inside the tower and the nacelle. .

### Maintenance

The most significant problems associated with excess humidity for the correct working of wind turbines during their useful life are as follows:

- **Acceleration of corrosion processes** of the components inside the nacelle, generator, etc.
- **Deterioration and faults in electronic circuits** inside the nacelle, and consequently in the control systems.

Corrosion inherent to offshore assembly is especially critical, since reductions in useful lifetimes of structures caused by saline environments can be drastic. **Estimated average lifetimes of 20 years can fall by 5 years**, a quarter, if humidity levels are not regulated inside towers and nacelles.



A practical example is the manufacture of FISAIR equipment for air humidity control in the production processes of the LM Wind Power Plant located in Ponferrada, León (Spain).

