

# Unique repair control

**To ensure correct overhaul and maintenance of wind turbines and their blades and to reduce maintenance downtime, NIBE ELEMENT WIND SOLUTIONS has developed and designed a solution that permits the blades to remain warm during the repair period.**

The concept is based on a portable intelligent controller that is combined with heating jackets.

The unit named PHBC-6 (Portable Heating Blanket Controller), controls the temperature via built-in sensors in the heating jacket.

At the same time, the PHBC-6 also measures and logs the ambient temperature and humidity.

All management and control of temperature, data, alarms, trend curves, and programmed planning time is handled via a handheld tablet.

The screen layout involves a step-by-step solution, with each step requiring confirmation before proceeding to the next level. This is to ensure that the operators are aware of what needs to be done in each step and what needs to be logged before proceeding to the next level.

PHBC-6 is developed in close cooperation with some of the most skilled composite engineers in the turbine blade maintenance business and the manufacturer of heating blankets.



Perfect curing  
Full curing support  
The right TG value instantly  
Best repair quality  
Automatic curing control





**The idea behind the PHBC-6 is:**

- To secure a proper repair each time, without any failures like too hot or too cold curing.
- To higher the quality of repairs and curing by reaching the correct Tg value each time in the first go.
- To avoid mistakes of monitoring curing temperatures over time.
- To decrease down time for the turbine, due to the fact, that repairs are perfect every time.
- To be able to start up, more than one repair job per turbine per day.
- To be able to supply an automatically generated and full documented report to the customer.
- To let the PHBC-6 work, as long as the maintenance people do something else.
- To monitor and control the curing process from another place.
- To communicate wireless between operator and PHBC-6.
- To reduce and save time in most aspects of the repair / curing.
- To be more reliable in the repair process



Antenna for serial communication between several PHBC units.



# Perfectly controlled curing - everytime

**The use of heating blankets are often related to the knowledge of how the material of the blade reacts in different environments as well as the construction and design of the blade.**

NIBE ELEMENT WIND SOLUTIONS has during many years worked closely together with some of the most professional and skilled composite engineers in this field. It has given us a lot of experience of where the heating blankets are used during the curing process.

Each application is different, and therefore NIBE ELEMENT WIND SOLUTIONS can offer a customized heating blanket which exactly fits the customer application. In cooperation with our customers, we are able to calculate the power density of the heating blankets. As a result, the curing process ends up with a perfect Tg value (glass temperature), each time.



All our heating blankets can be delivered with or without built-in limiters to protect the heating blankets against overheat, as well as an adjustable thermostat to control the temperature of the blankets.

If you want to use our heating blankets with the new intelligent control system, PHBC-6 mentioned on page 5 and 6, you do not need a thermostat, because the heating blankets have built-in Pt100 sensors beneath the silicone path, to scan the temperature and use it in the control system.

**After finished curing, a full report can be generated.**





# We cover it all...

## NIBE ELEMENT WIND SOLUTIONS heating blankets for heating the edges of wind turbine blades.

Due to low weight and flexibility, heating blankets are the obvious choice for on-site repair use. All our heating blankets can be customized. Once the leading and trailing edge have been cured, ground, and polished, any procedures required can be carried out without any risk of grinding non-cured material and thus releasing hazardous substances into the atmosphere.



## Can be customized to fit your request!

May also be manufactured for use elsewhere on the blade.

The blankets may also be designed for use on **various parts** of the blade. For repair use **on-site**, they are just great due to low weight and flexibility.

