

# RELIABLE REPAIR INJECTION

## Introduction

The trend within the wind industry is towards higher capacity turbines. As blades get longer and more complex to manufacture, the number of minor defects such as voids or dis-bonds within the composite structure invariably increases. Over its typical lifetime, a blade may see over 60 million rotational cycles, and any defect left untreated during its manufacture may give rise to stress concentrations leading to cracking and premature failure.

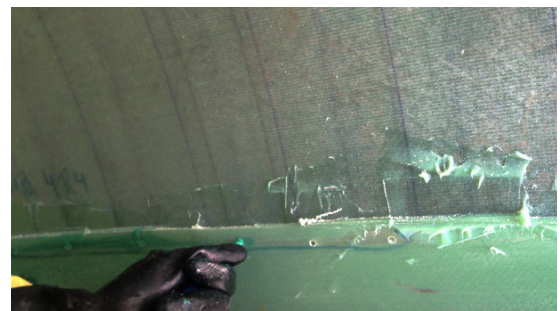
Having a robust and reliable solution to repair these is vital to ensure the longevity of the blades in operation and to reduce the number of field service repairs. developed SikaPower®-800, a low-shrinkage epoxy repair injection adhesive that is chemically identical to current blade bonding adhesives. It offers very similar mechanical properties, a higher toughness to resist cracking and can also fully cure without the need for external heating.

## Material selection

In an ideal world, the solution selected to repair voids or disbonds would have final properties that are the same as the original blade. However, the properties that make bonding pastes suitable for manufacturing large composite structures, such as long open time, high sag resistance and relatively long thermal curing profiles, are not suited for repair injection where low viscosity and full room temperature curing capability are beneficial or preferred.

The material used should have little or no shrinkage as this will require further remedial work to fully fill the voids. Shrinkage voids within an existing repair cause localized stress concentrations which can also initiate detrimental cracking. This is a well-known disadvantage of existing fast-curing solutions on the market.

It is therefore inevitable that an alternative to the blade bonding adhesive is required for injection bonding and ideally, it should have as similar properties as possible in the other areas. Sika has developed SikaPower®-800, a low-shrinkage epoxy repair injection adhesive that is chemically identical to current blade bonding adhesives. It offers very similar mechanical properties, a higher toughness to resist cracking and can also fully cure without the need for external heating.



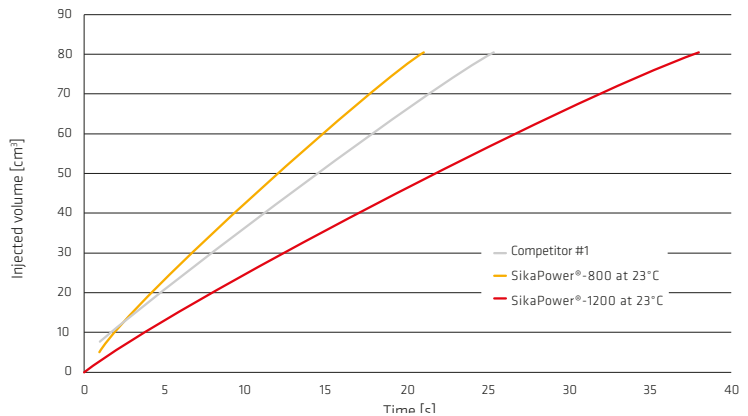
### KEY FEATURES AND BENEFITS

- Excellent injection properties
- Chemically identical to original blade materials
- Similar mechanical properties
- Low shrinkage
- Improved toughness
- Ambient temperature curing
- No post curing required

## Application and curing

### INJECTABILITY

SikaPower®-800 has been formulated to offer improved injectability properties compared to current commercially available solutions. This saves time during injection repairs and thus increases customers' production efficiency.

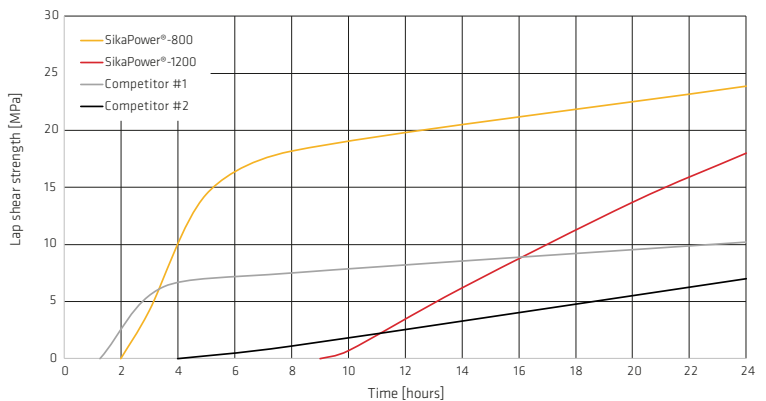


Injection volume vs. time

### CURING

It can be very time consuming and expensive to reach the required post-cure temperature during the repair process. The physical mass of the blade acts as a large heat sink drawing heat away from the repair area, increasing the time it takes to reach a minimum level. Field repairs also have the added issue of the prevailing ambient temperature adding to this effect, especially in the colder months.

The optimal solution is to therefore have a material that can fully cure without the need for subsequent post curing. SikaPower®-800 has been developed to reach a handling strength of 1-2 MPa after 3hrs and reaches 95% of final strength after 24hrs.



Strength vs. time

Subsequent post curing has a limited effect on increasing the mechanical properties and is therefore not necessary.

For more details contact us or visit our website:  
[www.sika.com/wind](http://www.sika.com/wind)

### LEGAL NOTE

The information, and, in particular, the recommendations relating to the application and end-use of Sika products, are given in good faith based on Sika's current knowledge and experience of the products when properly stored, handled and applied under normal conditions in accordance with Sika's recommendations. In practice, the differences in materials, substrates and actual site conditions are such that no warranty in respect of merchantability or of fitness for a particular purpose, nor any liability arising out of any legal relationship whatsoever, can be inferred either from this information, or from any written recommendations, or from any other advice offered. The user of the product must test the products suitability for the intended application and purpose. Sika reserves the right to change the properties of its products. The proprietary rights of third parties must be observed. All orders are accepted subject to our current terms of sale and delivery. Users must always refer to the most recent issue of the local Product Data Sheet for the product concerned, copies of which will be supplied on request.