

# Optimize your kit Boost your performance

Improve efficiency, lower cost and increase quality

# Increase performance and quality

## Lower the cost

### Why a kit?

You can significantly improve the manufacturing process and quality of composite applications with pre-cut parts (kits). By eliminating the on-site cutting of flat sheets, you can reduce manufacturing time, save labor and material cost. In addition, with the easy assembly and exact fit, you can consistently achieve high quality in less time.

- Boost performance in terms of weight, cost and quality
- Shorten lay-up time of the core in the mold
- Improve surface quality and decrease weight
- Minimize the amount of waste handling
- Reduce material stock
- Recover factory space

### What is a kit?

A Diab kit is a tailor-shaped set of core elements. The kit can consist of simple pre-cut core panels or complex 3D shapes made with CNC routing. Each piece is pre-cut and then numbered to fit exactly into its designated place in the mold. Kits are designed based on your requirements for weight, cost and quality. Our kit engineers take geometry, manufacturing process and lay-up sequence into account when designing each kit. A kit drawing is supplied with each kit to define the assembly lay-up on the shop floor.

### Why a kit from Diab?

Diab is a world-leading supplier of sandwich composite solutions with long experience in developing kits. Our kits are designed and produced in house and we provide a direct connection between our engineering department and yours. Our experts are often on-site to discuss directly with you kit details, take measurements and note variations during the kit development phase. Together, we can find the optimal solution, for instance by combining different grades and materials to fit your needs.

We know that kits are far from off-the-shelf, one-size-fits-all solutions, which is why this knowledge guide, based on our expertise and experience from a variety of segments over the years, is just a springboard for more detailed discussions.





# What are the key success factors for your application?

Analyzing your key success factors will help you work with our experts to develop the kit best suited to your application.

## Surface finish

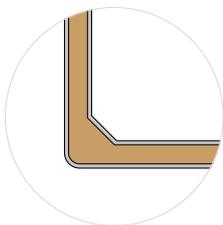
Whether the kit consists of flat sheets or 3D machined parts, surface requirements differ and affect the approach we take for each kit design. For example, the surface requirements are higher on the core when thin laminates are used on an application with high surface finishing demands.

## Tolerances

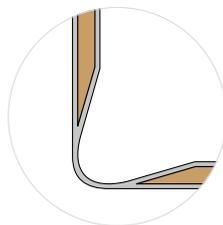
The tolerance level depends on the type of application, operational requirements and expected operational lifetime, for instance. We will adopt the tolerance of the kit to suit the requested needs and we are equipped to produce very advanced solutions.

## Cost

Cost is an essential part of the whole kit process. With correct understanding of your requirements you will receive a solution optimized to your needs.



Edge with bevels:  
full sandwich, lighter but  
more complex



Edge with single skin:  
Heavier but simpler



## Weight

In weight-sensitive applications, sandwich structures can be used also in small details. Where weight is not so critical, single skin could be used in complicated parts of the application to save cost and simplify fitting. Depending on the requirement, we can choose among multiple solutions to optimize weight or cost.

A modular approach allows for more complicated designs to be assembled on site.

The light weight makes transport and assembly substantially easier.

With core composite materials you can realize your wildest design dreams and create innovative and eye-catching structures.



# What are the technical drivers for your application?

Together with the key success factors, it is important to analyze the technology used for your application.

## Customer manufacturing operations

The type of manufacturing operations you run influences the way the kit is designed. It is also important for us to know your workflow as it provides invaluable information on how to pack and sequence the kit in the best way.

## Composite manufacturing process

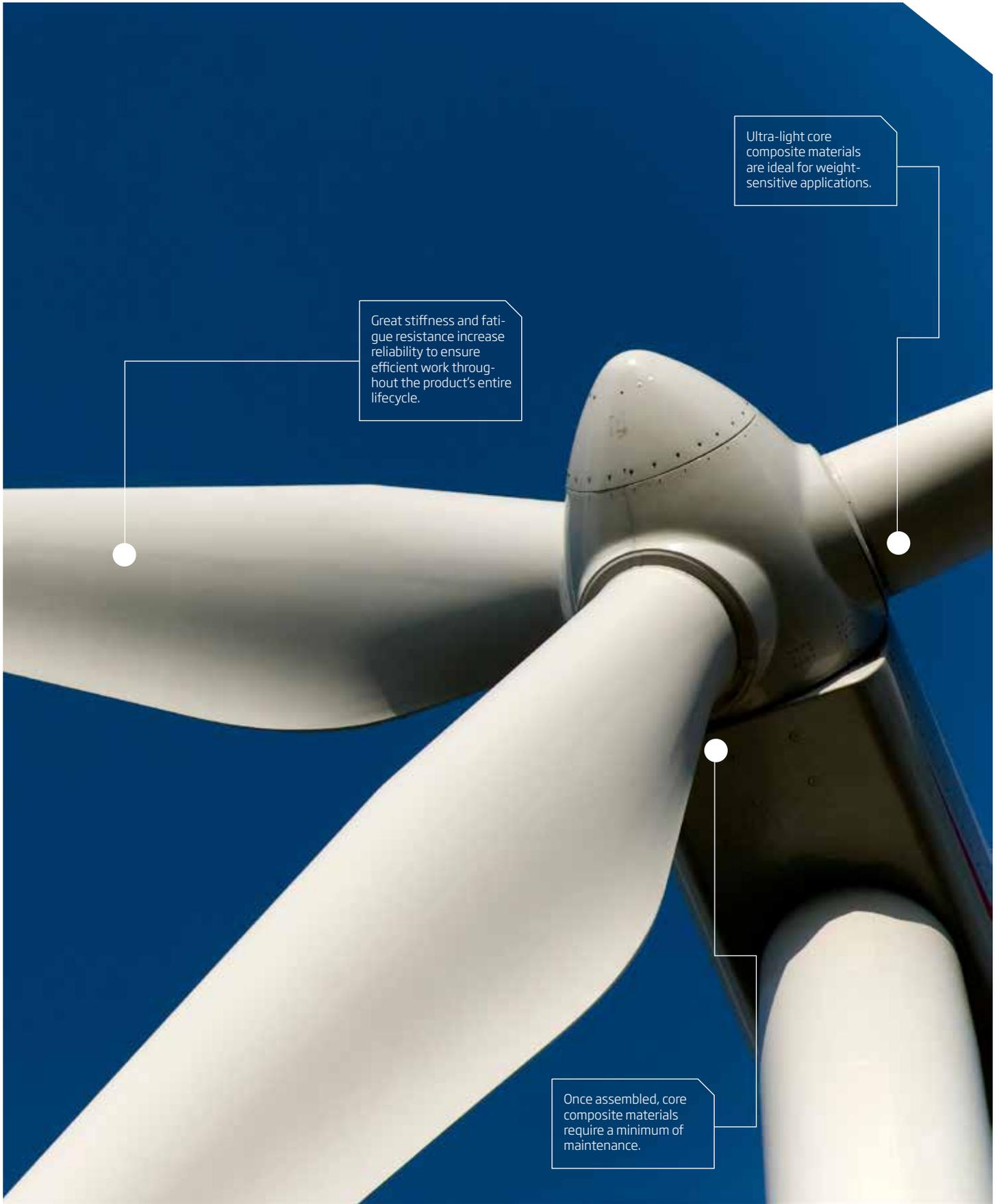
The manufacturing process you use defines what finishing is used in the kits and how important the tolerances are when joining the parts in the mold. The main groups are:

- Wet lamination. The tolerances on the kit parts are usually less critical compared to other processes.
- Infusion. The kit parts need to fit perfectly to reduce the risk of race tracks and print through.
- Resin Transfer Molding (RTM) includes two stiff counter molds, and it is essential to have a perfect match between core and mold to optimize resin consumption and ensure consistency over a production run.
- Prepreg. Pre-impregnated fibers are used where the evacuation of air and a perfect fit of the kit usually are critical points.

## Geometry

Geometry influences finishing selection and the time it takes to design and manufacture the kit. Thorough discussions at an early stage in the design phase will help ensure the kit meets the geometry requirements.





Ultra-light core composite materials are ideal for weight-sensitive applications.

Great stiffness and fatigue resistance increase reliability to ensure efficient work throughout the product's entire lifecycle.

Once assembled, core composite materials require a minimum of maintenance.

# Designing the optimal kit

**There are no off-the-shelf kits, which is why we provide solutions rather than products. Our expertise naturally blends with your own key competences.**

## Structural design and core selection

To optimize weight and cost, we help you select the most appropriate core for the application and produce the laminate design.

## Composite manufacturing process

We can provide training and help you set up the process that is best suited for your application.

## Core finishing

Diab helps you choose from a wide range of cuts, grooves, perforations and kerfs, each serving a specific purpose to optimize your kit and your preferred manufacturing method.

## Kit design

Kits are nested to maximize material yield and minimize waste. When doing so we take the handling of the kit in the installation process into consideration, providing the easiest and most economical solution.

## Kit manufacturing

Freeing you from tying up investments and capital, we have all the necessary tools to cut the kit according to your design, yielding high quality, speed and consistency.



## Packaging and fitting sequence

Knowledge of your lay-up flow enables us to package the kit parts to ensure that the kit is installed as fast as possible. In complicated kits we assist in the first fitting to instruct your staff.

## Refinement and changes

Kitting is a continuous process and the first prototype normally requires some changes. We provide onsite support to track changes. We then adjust and optimize the kit design prior to subsequent deliveries.



# The Diab kit process – teaming with you for success

## Customer kit request

- Spend some time thinking about the key success factors for your application.
- Specify the thicknesses and core properties. Ideally, you can provide a core drawing or mold offset for cores, bevel placement and angles. If this is not possible, we can assist you.
- A 3D model and detailed 2D drawings, along with notes, are usually enough to start the kit design process.

## Kit start-up meeting

Together with you, we will go through manufacturing options including:

- Finishing selection
- Tolerances
- Proposals for structural design, if needed
- Process selection and set up
- Lay-up scheme, incl. preferred starting point
- Packaging instructions
- Number of kits per delivery

Paying close attention to your requirements early in the project significantly decreases the amount of changes, which can save both time and money compared to build-to-print.

## Design proposal and cost estimation

After the start-up meeting, we will offer the kit design proposal and a quote for the kit. If the quote is accepted and the details (such as core to single skin transitions, bevels, finishing, grades and thickness) are approved, we will produce a prototype kit for delivery.

## Kit prototype

Depending on the complexity of the prototype kit, a representative from Diab will be present when it is fitted to identify potential changes and improvements. We will then make alterations to the design if necessary. Accurate geometries and detailed definitions of the kit at start-up help to minimize corrections for subsequent kits.

## Final kit design and series production

After making the corrections, we start series production of the kit. In most cases we will keep fine-tuning the kit to the changes in geometry which often occur within series production.



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Diab is a world leader in sandwich composite solutions that make customers' products stronger, lighter and smarter. Diab provides a range of core materials, cost-effective kits, finishings and in-depth knowledge on composites. Diab also provides engineering services for composite technology through Composites Consulting Group (CCG). Diab is a participant of UN Global Compact.

