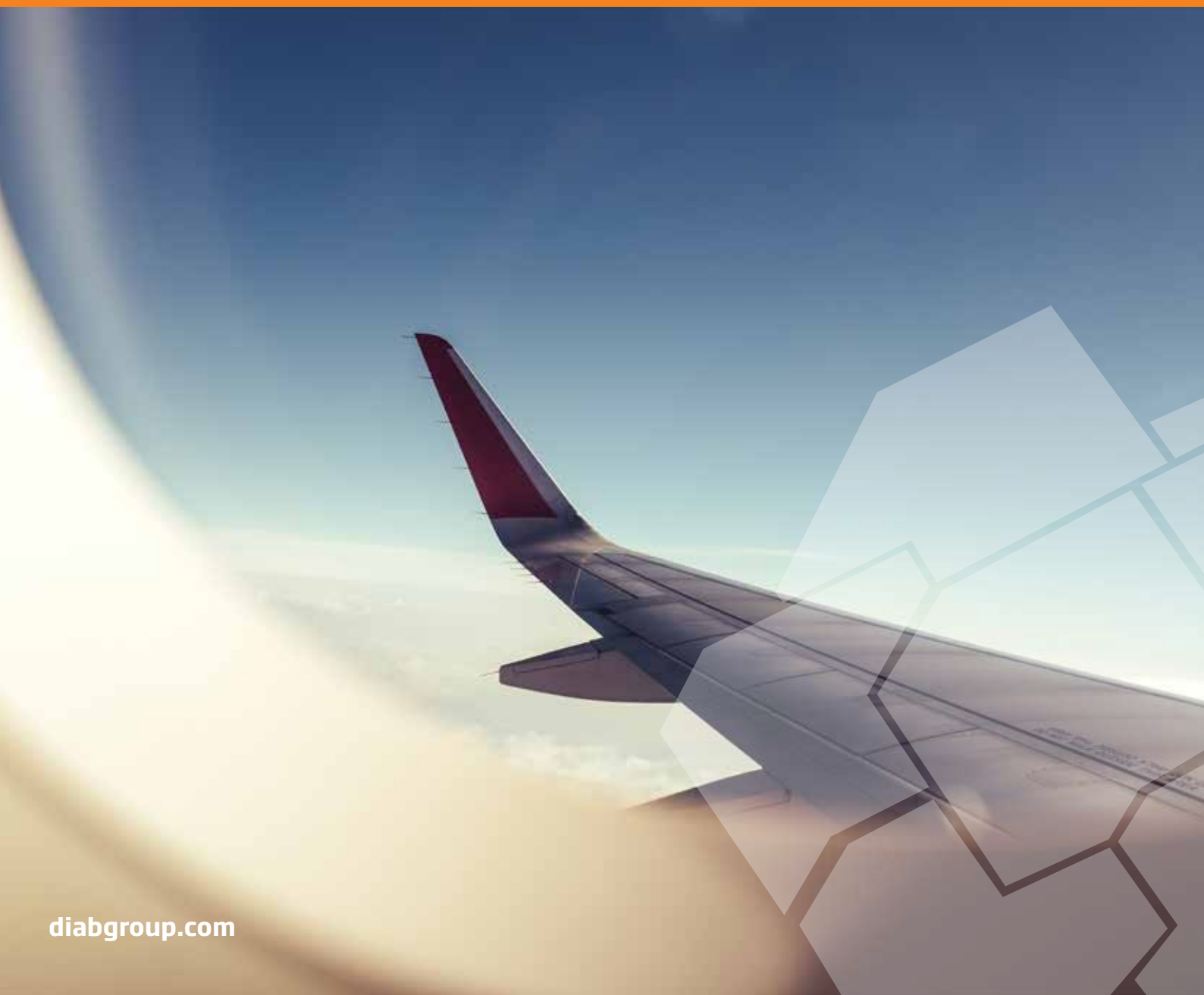
Diab

WE'RE ALWAYS AT THE CORE OF YOUR AEROSPACE SOLUTIONS



diabgroup.com

ALWAYS AT THE CORE OF YOUR SOLUTION

Diab was founded in Sweden in 1950. Ever since the beginning, and throughout our steady development into a global company, we have been dedicated to constant innovation and promoting a widespread adoption of structural core materials.

Our products and solutions have been used in applications for marine, wind, aerospace, and industry for decades and are qualified according to relevant industry standards. With a complete range of high-performance core materials, numerous finishing options and kit operations in combination with engineering services and expertise, we present probably the widest and most valuable offering in the sandwich composite industry.

DECREASING LIFETIME COST AND ENVIRONMENTAL IMPACT

The aerospace industry has been driven by life cycle cost and weight reduction for decades, but now we also see increasing demands for sustainable applications and production methods to decrease global footprint. Air traffic habits are changing fundamentally, and new applications must serve new trends. We are ready to change with the changing market, replacing traditional materials with multifunctional and innovative core and sandwich materials.

Diab has decades of experience serving the aerospace industry. Our unique insights into products and processes, mixed with an innovative approach, have enabled us to create a wide and valuable offering. Aerospace quality requirements leave no room for error, further increasing the challenge. We combine market needs with high-performance materials, top-level engineering services and applications training to achieve new significant results and invaluable solutions.

MORE SUSTAINABLE IN EVERY WAY

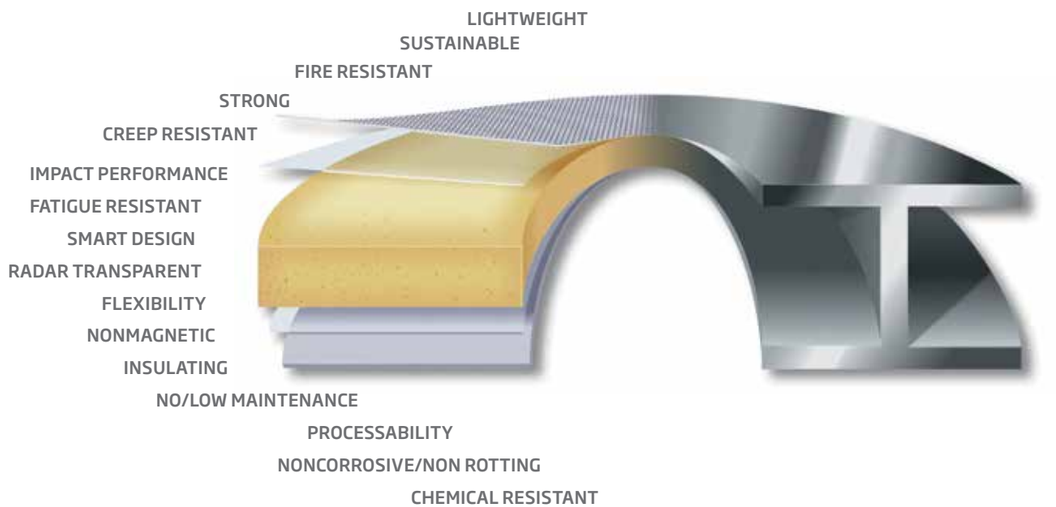
SUSTAINABILITY IS IN OUR CORE
Our products contribute to energy savings and a lower carbon footprint. They will help you boost energy efficiency, reduce emissions, conserve natural resources and create a longer life cycle for your product. Simultaneously, our customers in the aerospace market are setting increased demands for their suppliers in terms of quality, safety and environmental issues. At Diab we work hard to make a difference when it comes to sustainability. We are strongly committed to making your solution more sustainable in every way.

A PART OF THE RENEWABLE ENERGY SUPPLY CHAIN
Sustainability is one of our top business priorities. We are adopting to the responsible framework of UN Global Compact; our Sustainability report is publicly available, and we have approval of our CO_2-reduction targets from the Science Based Targets Initiative. We strive to be a part of the renewable energy supply chain, and we also believe that this approach drives long-term profitability and competitiveness.

MAKE THE MOST OF YOUR APPLICATION

THE SANDWICH TECHNOLOGY
Composite materials are made from two or more materials with significantly different physical or chemical properties, that when combined, form an overall structure with characteristics different from the individual components.
The basic idea is simple; the execution is a bit more advanced. Two thin, strong and stiff skins, of fiber reinforced plastics or solid material, are attached to a lightweight core by press-bonding or lamination. This allows each element forming the composite panel to be designed to minimize weight and maximize strength and stiffness, or other desired features. The result is a component with a very high stiffness-to-weight and high bending strength-to-weight ratio. A Diab sandwich has all the advantages of conventional materials, such as steel or wood, but none of the disadvantages, such as heavy weight, corrosion, or design limitations.

MASTERS OF SANDWICH CORE
In a typical sandwich panel the skins are taking tension and compression loads, and the core carries the shear forces. Our PVC and PET cores are engineered foams that absorb and distribute the loads exposed to the sandwich, static or dynamic . They have a stable closed cell structure resistant to water ingress, corrosion and decay, an important characteristic in harsh environments.
A variety of grades can be used to give the final product additional desired features, such as fatigue and impact resistance, fire resistance, insulation, radar transmittance and many more.
Diab offers the widest range of high-quality sandwich cores, but our true strength goes beyond the material. You can draw from our knowledge when it comes to anything from sandwich design to efficient production methods. With our experience and expertise you can make the most of your application, existing or new.



THE RIGHT CORE MATERIAL FOR YOUR NEEDS

Every application and manufacturing method has its special demand on the material used. To be able to get the most out of your product, Diab offers the widest range of core materials and grades with unique properties that will suit the needs of your aerospace applications today and tomorrow.

DIVINYCELL - PES

Recyclable PES foam core material for commercial aircrafts interiors.

Divinycell F

Divinycell F is the ideal core material for aerospace applications, especially well-suited for commercial aircraft interiors. Divinycell F foam is a recyclable, prepreg compatible sandwich core with excellent Fire, Smoke and Toxicity (FST) properties, good mechanical properties and good processing characteristics. It meets the global regulatory requirements for commercial aircraft interiors. Other key features include exceptional fatigue performance, good aircraft fluid resistance, excellent heat ageing at 180°C and great dielectric performance. Divinycell F also exhibits exceptional hot-wet performance with nearly identical isothermal values in the wet and dry condition.

Divinycell F is one of the few core materials that offer exceptional OSU heat release performance and nearly zero smoke – well below the regulatory and industry requirements. Acoustical and thermal insulation performance is superior to rigid honeycombs. Divinycell F is compatible with most common aerospace composite manufacturing processes and is particularly well suited in crush core press molding as it does not crack. It also performs well in traditional vacuum bag molding up to 205°C/400°F and resin infusion processing. Its smooth surface allows for elimination of film adhesive and reduced use of faring materials. Use Divinycell F130 for lightweight edge fill and hardpoints. Divinycell F is coldformable, thermo-formable or can be shaped with CNC machining. It is particularly suitable for free form parts.

Application areas:
Cabin interiors: Luggage bins, bin doors, ceiling panels, heads, lavatories, galleys, IFE components, crew rest modules, class partitions and seat shells.
Structural components: Radomes to aerodynamic fairings, antennas, rotor blades, cargo liners, freight containers and engine nacelles and cowlings.

DIVINYCELL - PEI

Recyclable PEI foam core material excellent for structures, radomes and interior components.

Divinycell U

This PEI foam is a polyetherimide based thermoplastic foam with excellent dielectric properties. The material combines high strength to weight ratio with low moisture absorption. It also possesses excellent Fire, Smoke and Toxicity (FST) properties. The material is compatible with most aerospace and defense composite manufacturing processes at high temperature.

Application areas:
Radomes, antennas and structural components.

DIVINYCELL - PVC

The unique composition of our PVC foams yields impressive mechanical performance to a very low weight.

Divinycell HT

Divinycell HT has all the properties expected of a high-performance, lightweight construction material. It is a closed-cell, thermoformable foam core characterized by high ductility and resilience, giving excellent dynamic behavior under shock and dynamic load. Compatible with a wide range of matrix materials, it has low water absorption and is self-extinguishing. Divinycell HT suits various prepreg systems and is compatible with process temperatures up to 145°C/295°F. With superior impact performance, low susceptibi-lity to hydrocarbons and other aircraft fluids and excellent dielectric properties, Divinycell HT is suitable for a wide range of structural and non-structural applications. It is available in a range of densities, as standard sheets or fabricated to customer specifications. It can also be laminated "out of the box" unlike other aerospace grade core materials.

The impressive performance of Divinycell HT at cryogenic temperatures has also made it a natural choice for space launch applications.

Application areas:
Executive and VIP interiors, commercial radomes, leading edges, fairings and flaps, rotorcraft components,cargo liners, propeller and fan blades, tankage for fuel, water and waste, general aviation primary structures.

Divinycell H

This unique PVC formulation yields impressive mechanical performance to a low weight. Divinycell H provides excellent mechanical properties and low weight. It has a proven track record in virtually every application area where sandwich composites are employed.

Divinycell H is ideal for applications subject to fatigue, slamming or impact loads. Other key features include excellent adhesion/peel strength, excellent chemical resistance, low water absorption and good thermal/acoustic insulation. It is compatible with virtually all commonly used resin and manufacturing methods.

DIVINYCELL - PET

Thermoplastic recyclable PET foams suitable for many different applications.

Divinycell P

Divinycell P is a thermoplastic closed-cell PET structural core with good fire, smoke and toxicity (FST) behavior, offering good mechanical properties, high chemical resistance and does not absorb water.

This core is ideal but not limited to applications requiring demanding FST properties. Due to its good dimensional stability at elevated temperatures, Divinycell P can be processed with low-medium temperature pre-preg systems and it is compatible with the most commonly used resin and manufacturing systems. It is easy to thermoform, cut or mill.

RESOURCES TO ENHANCE YOUR PRODUCT

Alongside the broadest range of core materials, we also offer you a comprehensive array of added value products, such as kits with pre-cut parts and surface finishing options for form and flow.

WITH THE OPTIMAL FINISHING YOU CAN GET A COMPETITIVE EDGE

The right combination of core material, laminate and finishing affect performance and quality of the final product. Finishing refers to the machining of structural core materials. You can choose from a wide range of cuts, grooves and perforations in different variations each serving a specific purpose for the core to adapt to curvature, or for air evacuation & resin distribution in vacuum assisted manufacturing process. With our long experience in composite design and manufacturing methods, we can recommend the finishing suitable for each purpose.

OUR FINISHING OPTIONS:

Flow
To evacuate air and distribute resin in vacuum assisted processes requires perforations and/or grooves in the core surface.
Proper design of the flow finishing will ensure good wetout of laminate and proper core bonding. Grooved and perforated cores can also remove the need for an additional distribution medium.

Form
Formable finishing options enable the core to conform easily to the surface in complex mould shapes. A number of form finishes are available both with and without scrim backing, and with either one or two direction cuts in the core.

Flow & Form
A combination of both of the above, used where the core needs to adapt to the shape of the mould and also has to distribute the resin as part of the production process.

KITS TO BOOST YOUR PERFORMANCE

A kit consists of pre-cut parts that are shaped as necessary and then numbered to fit exactly into their designated places in the mould. By eliminating the on-site shaping and cutting of sheets, you can reduce build times, save labour and material costs, and reduce waste. Easy assembly and exact fit in the mould mean you can consistently achieve a high quality in less time.
The kit can consist of everything from flat sheets to precise 3D shapes made with CNC routing. The design is based on your requirements for component weight, cost and quality level, as well as the geometry and manufacturing process selected.

OUR KITTING OPTIONS

Industrial kitting
High quality kitting that meets your needs for speed and efficiency. We use a well- defined kit process that enables us to provide the most competitive offering, top service, and quick turn-around times. Depending on the requirement, we can choose from multiple solutions to optimize weight or cost.

Advanced kitting
Diab's innovative advanced kits offer optimized fit in the mould, reduced resin consumption, and improved laminate surface finish. Combining Diab knowledge of kits and infusion and by creating custom software specifically for the task, we can optimize the cuts required in the core to allow it to perfectly fit the local curvature of your mould, while minimizing resin uptake.

KNOWLEDGE THAT OPTIMIZES YOUR SOLUTION

MAKE THE MOST OF YOUR APPLICATION WITH OUR EXPERTISE
Diab Application Center is our powerful team with engineers, product specialists, and process specialists ready to team up with you to realize the total value of composites.

PRODUCT SUPPORT
We are here to support you with selecting the suitable core material for your application, advice on finishing the best fit for purpose, and essential advice on different manufacturing processes. Product support always comes for free with the purchase of our products.

COMPOSITE CONSULTING GROUP (CCG)
Our experience in sandwich core materials and related manufacturing processes is well documented. CCG provides specialized composite technology and engineering services to improve your product further. With broad competence within everything from design and structural engineering to process optimization – including flow modeling for closed molding, tooling design, and infusion training – we ensure that you can realize the total value of composite designs.

KIT ENGINEERING AND PRODUCTION
Diab uses a well-defined kit process that enables us to provide the most competitive offering, top service, and quick turn-around times. Whether the kit consists of flat sheets or 3D machined parts, we look at surface requirements, tolerances, weight limitations, and it all affect the approach we take for each kit design.

COMPOSITE PART & PROTOTYPE PRODUCTION
Prototyping and short production runs have high investment costs and can limit other daily operational activities. Our experienced engineers and fabricators can quickly bring your concepts to reality, whether you are in a start-up or existing business with a lack of resources or equipment.

TESTING
Understanding the material and its behavior in a variety of environmental conditions is key to optimized design. Let us help you characterize your composite solution, core materials, and sandwich structures with our own calibrated testing equipment and network of authorized test labs for exotic test methods.

PROOF OF OUR EXPERIENCE

We are privileged to have participated in product innovation and development for some of the world's leading companies in the aerospace industry. The advances they've been able to make using sandwich composites and other solutions are truly exciting.

DIVINYCELL-CORED CIRRUS SF50 PIONEERS THE PERSONAL JET
Cirrus Aircraft, based in Duluth, Minnesota, USA, was the first company to utilize foam sandwich composites in series production of civil aircrafts. The company continues the successful implementation of composite solutions in its newest jet. Announced in June 2008, the Cirrus SF50 features an all-composites airframe and a sandwich construction based on polymer cores.

DIAB CORE KIT SOLUTION FOR PREMIER CLASS SEATING PODS
B/E Aerospace, Inc. is the world leader in the manufacture of aircraft passenger cabin interior products for the commercial and business jet aircraft markets. Its products are used by virtually all aircraft manufacturers and in service with almost all airlines.

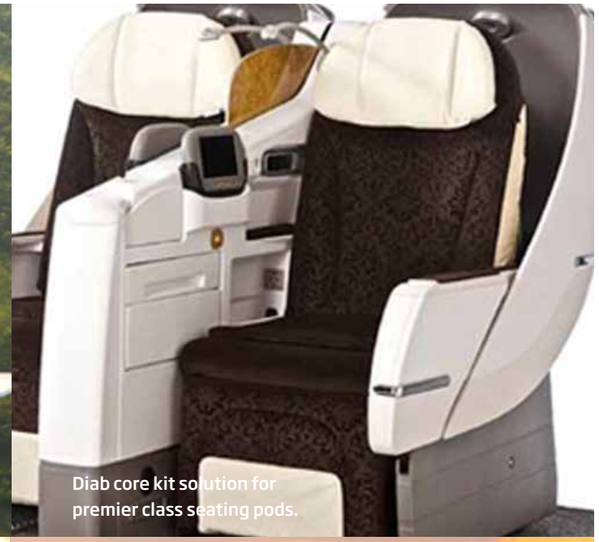
ENATA AND DIAB HELP THE UAV LARUS TAKE FLIGHT
When constructing a robotic bird for surveillance purposes for the RoBird® company, aviation expert ENATA turned to Diab for a lightweight material.

ADVANCED COMPOSITES CREATES AWARD-WINNING AEROSPACE DESIGN
Do you get seasick on a boat and have a fear of flying? Worry no more. In the future, we may all be travelling in so called WIGs (Wing In Ground), or flying boats. By harnessing the lift generated by flying close to the water surface, WIGs are able to travel at 200 210 km/h and up to 150 m above the sea level with only a third of the fuel consumption associated with modern planes.

DIVINYCELL-CORED FLYING BOATS TO REVOLUTIONIZE MARITIME TRANSPORTATION
Do you get seasick on a boat and have a fear of flying? Worry no more. In the future, we may all be travelling in so called WIGs (Wing In Ground), or flying boats. By harnessing the lift generated by flying close to the water surface, WIGs are able to travel at 200 210 km/h and up to 150 m above the sea level with only a third of the fuel consumption associated with modern planes. After two decades of product development by different nations, these oddities are starting to be considered for commercial flights (or should we say cruises?). One of the pioneers is CSIC (Hainan) Wig Craft Development in China that builds state-of-the-art WIGs using DIAB core material.

DIVINYCELL F – FOR NEW INNOVATIVE INTERIOR AIRCRAFT APPLICATIONS
An ideal solution for Canadian manufacturer FDC Composites, Divinycell F fulfills all regulations for interior applications of commercial airlines.


Divinycell-cored Cirrus SF50 pioneers the personal jet.


Diab core kit solution for premier class seating pods.


Enata and Diab help the UAV Larus take flight.


Advanced composites creates award-winning aerospace design.


Divinycell-cored flying boats to revolutionize maritime transportation.


Divinycell F - for new innovative interior aircraft applications.

DIAB AT A GLANCE

WORLDWIDE SUPPLY AND SUPPORT
Ensuring security of supply, cost efficiency, flexibility, and local support, Diab combines a global manufacturing, sales, and engineering presence with local know-how. We follow our customers and anticipate their needs, positioning ourselves in locations to best support them. Our seven manufacturing sites and fourteen sales companies in strategic locations around the world offer our full range of materials and services.

- SALES UNITS
- DIAB'S MANUFACTURING PLANTS
- MANUFACTURING PARTNER
- HEAD OFFICE

1 000
COWORKERS

FOUNDED 1950
IN SWEDEN

8
MANUFACTURING SITES

14
SALES COMPANIES

40
DISTRIBUTORS

OUR FOCUS AREAS:

WIND

MARINE

INDUSTRY

AEROSPACE

Take advantage of our knowledge!
At www.diabgroup.com you can get exclusive access to our expertise via MyDiab. And with our interactive Core Selection Guide it's easy to find the best core for your application.

Member of UN Global Compact
Approved CO_2-reduction targets from the Science Based Targets Initiative

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Diab Segment brochure Aerospace Oct 2022

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 and finishings, along with in-depth knowledge on composites. Diab also provides engineering services for composite technology through Composites Consulting Group (CCG). Diab is a participant in the UN Global Compact.