AVANCO
composites

Composite technology leadership

Facts & figures

Lightweight experts

350

With more than 350 lightweight experts, we develop, produce, process and refine fiber-reinforced plastics based on carbon, glass and other fiber materials.

Years of experience

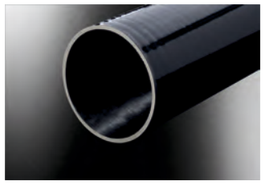
40

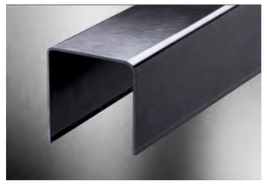
Our group unique knowledge and more than 40 years of experience in lightweight aluminum and carbon fiber composite plastic solutions.

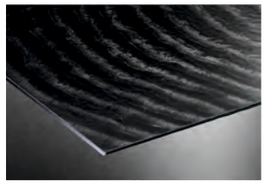
Production sites

3

Our production sites are located at our headquarters in Herford, Laudenbach and Bermatingen. Our main manufacturing technologies are Thermoplastic Tape Placement, Filament Winding and Continuous Compression Molding.







Our sites

INOMETA Thermoplastics

INOMETA Thermoplastics is your development partner and contract manufacturer for wound CFRP and GFRP composite profiles made of thermoplastic UD tapes. As experts for part design, material selection and process design, we take your application from the idea to series production.

DYNEXA

As a global technology leader and competent development partner, DYNEXA offers solutions using filament winding of CFRP and GFRP with thermoset matrix. High performance composites applications, where conventional material reached their limits are our focus from research and development, joining expertise, till final post-processing.

XELIS

XELIS is a leading global partner for the development and production of high-precision thermoplastics solutions. Here, we have focused our expertise on the production and development of thermoplastic products made of fiber-reinforced composite materials. A key area is the series production of thermoplastic composite laminates and profiles with the in-house developed Continuous Compression Molding (X-CCM®) process.

Technology in a nutshell

Thermoplastic Tape Placement

Laser-assisted tape winding is a robot-based process (Automated Fiber Placement) in which thermoplastic tapes are placed on a mandrel / table and are fully consolidate in a single process step (in-situ consolidation). The layered structure of the final part allows for customizing the mechanical part properties by adjusting the fiber orientation of each layer. The thermoplastic tape is fed from the spool through the tape laying head and is heated by a laser shortly before it is placed on the mandrel. At the same time, the upper layer of the already deployed tape is melted and the two layers are consolidated using a compaction roller. After this consolidation step, no downstream production steps such as curing in an autoclave or a separate pressing process are necessary.

Filament Winding

Filament winding is a process in which continuous fibers (usually glass or carbon fibers, but also aramid or kevlar fibers) are wound around a rotating core to create a structural part. The core can be as well rotationally symmetrical as rectangular or polygonal. The fibers are impregnated with resin to create a strong bonding between the fibers. As the core rotates, the filaments are deposited onto it. The combination of feed (feed eye) and rotation speed (core) describes the later winding angle and as well as the rigidity and strength of the structure created in this way in the three room axes. As soon as the filaments are completely applied to the core, the component produced is cured and then demolded.

Continuous Compression Molding

For more than 25 years, XELIS has been utilizing the Continuous Compression Molding (X-CCM®) on in-house developed and designed X-CCM® machines. During the application of this process, the customer- specified material (in form of fabric or tape) is routed through the tool with a pulling mechanism, which opens and closes cyclically. The inserted fiber composite materials are continuously transitioned into the desired form by means of high pressure and the proper temperature induction.

Lightweight is our passion – innovation is our propulsion.

Mobility

Aviation and Space

Defense

Oil and Gas

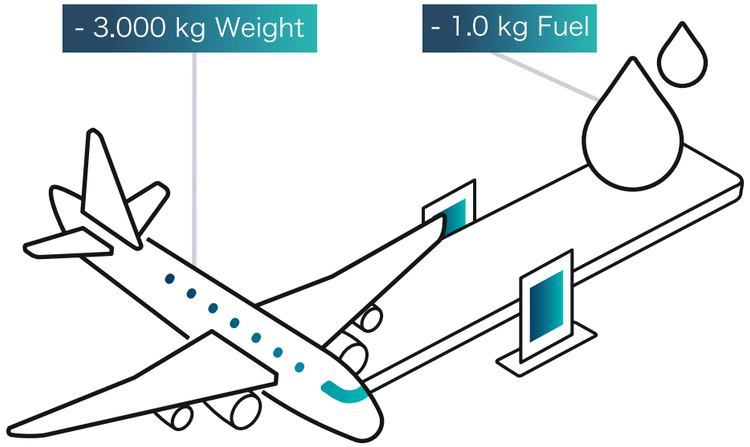
Energy

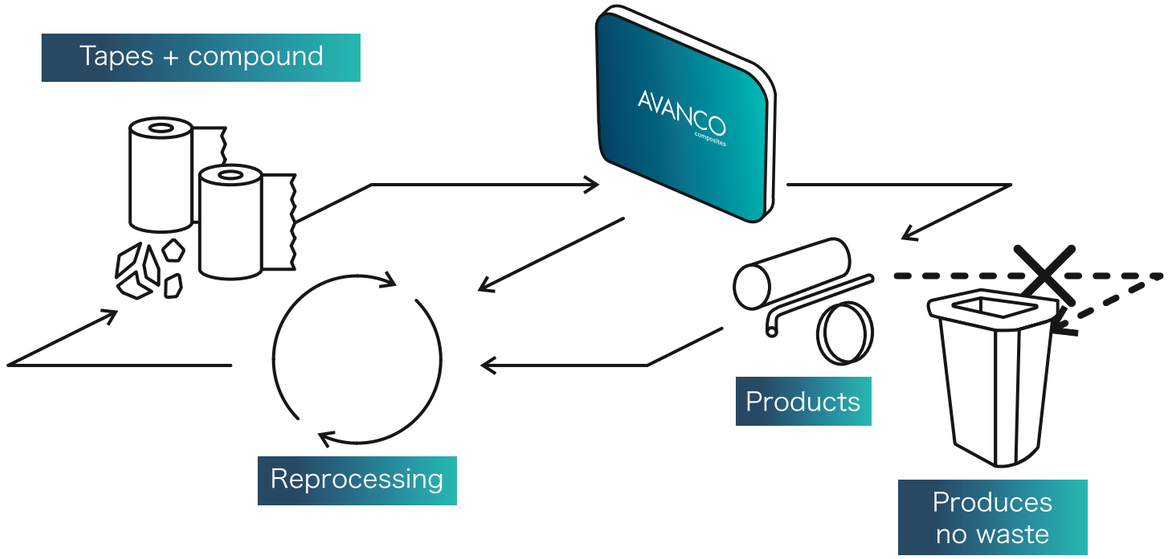
Marine

Sustainability

The environmental impact

Compared to traditional materials such as steel or aluminium, fiber-reinforced composites cause lower environmental emissions, consume less energy during over the entire product life cycle and emit fewer greenhouse gases. Low environmental impact and a good carbon footprint make CFRP a genuine material of the future: constructively intelligent and sustainable. Due to the properties of thermoplastic polymers, thermoplastic composites offer very good recycling options compared to thermoset composites.





"Decades of knowledge
in the calculation, simulation,
production and processing
of fiber-reinforced plastics
and lightweight metal
structures make the difference.
Lightweight is our passion
– innovation is our propulsion."

Cedric Tappe | Managing Director

Mobility

Mobility applications

If the mobility industry wants to achieve its climate targets, fuel consumption and weight must be reduced. As well as future powertrains for electrically powered vehicles must be designed more efficiently. This means that composites as CFRP and GFRP are indispensable. Examples include our rotor and stator sleeves for electric motors, which use the extraordinary properties of reinforced composites to make motors more efficient and powerful.

Advantages

- Weight
- Durability
- Mass inertia
- Stiffness
- Oscilation
- Vibration
- Corrosion

1. Rotor & stator sleeves
2. Profiles
3. Drive shafts
4. Stabilizers
5. Pressure vessels

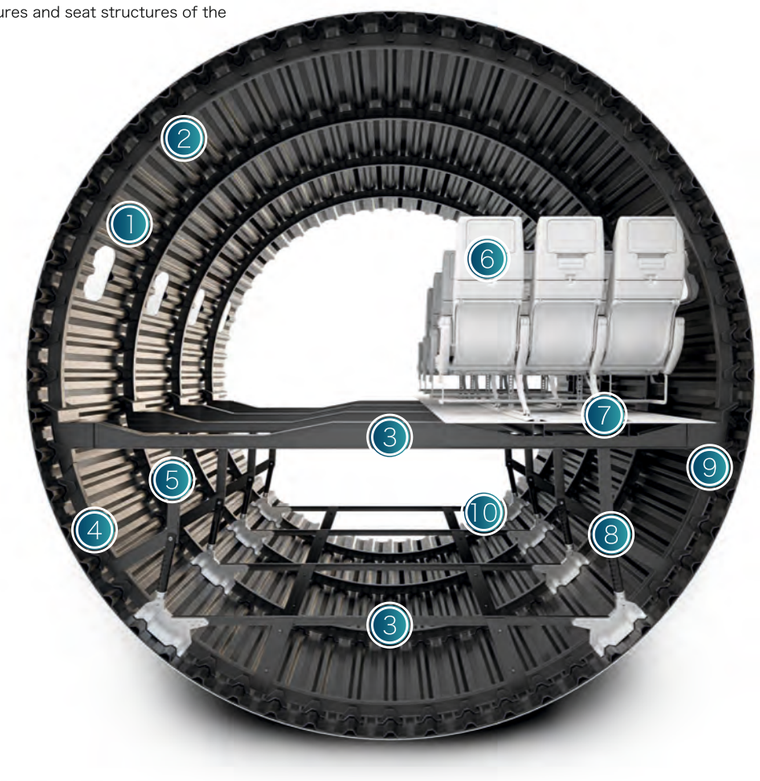
Aviation & Space

Aerospace applications

The demand for composites in the aviation industry is constantly increasing, and thermoplastic and thermoset components are proving to be the ideal solution for many applications. They are lightweight, reliable and can adapt flexibility to customer requirements. This leads to a reduction in fuel consumption and therefore emissions. A lower structural weight leads to a reduction in the overall weight and enables a more efficient use of the aircraft. We developing innovative GFRP and CFRP lightweight products, which are increasingly being used in the primary structure, secondary structures and seat structures of the aircraft.

Advantages

- Weight
- Stiffness
- Corrosion
- Constrution
- Fire protection



1. Stringers in Ω- or T-shape
2. Overhead structures and interior parts
3. Passenger & cargo crossbeams
4. Curved profiles & frames
5. C-shaped profiles
6. Seat structures
7. Seat rail profiles
8. Rods and struds
9. Clips and brackets
10. Various Z- and S-reinforcement profiles

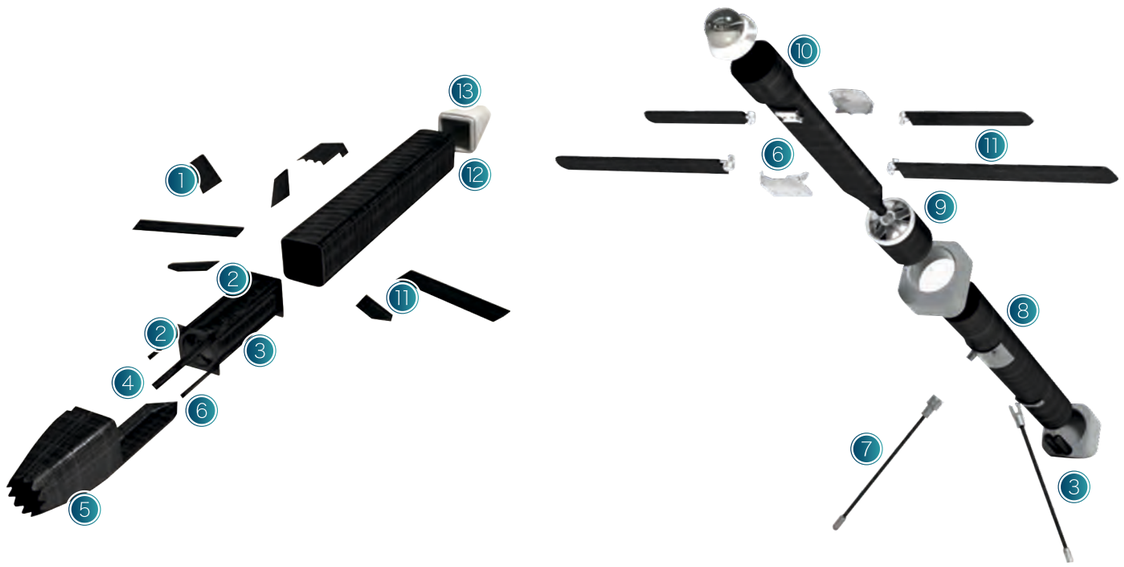
Defense

Defense applications

AVANCO Composites offers a broad variety of different systems to provide value adding solutions for the development of state of the art defense applications. Lightweight structures are in this context beneficial to increase the operation time, the covered distance or the duration of an operation as well as ensuring the survivability. Fiber reinforced components support existing applications by their superior material properties related to low density, high modulus and strength as well as low fatigue levels and high thermal stability. Several applications are only possible by using special properties of fiber reinforced products like radar or radio translucency, adjustable thermal expansions in different directions or adjustable deflection properties.

Advantages

- Weight
- Durability
- Mass inertia
- Stiffness
- Impact
- Oscilation
- Vibration
- Corrosion
- Noise



1. Discontinuous airfoil
2. Laminates
3. Pressure vessels
4. Open profiles
5. Highest temperature resistance
6. Covers
7. Rods, struts and booms
8. Transport and launching containments
9. Retaining sleeves
10. Discontinuous fuselage
11. Continuous airfoil
12. Tubes and fuselage
13. Radar transparent structures / Radome

Oil & Gas

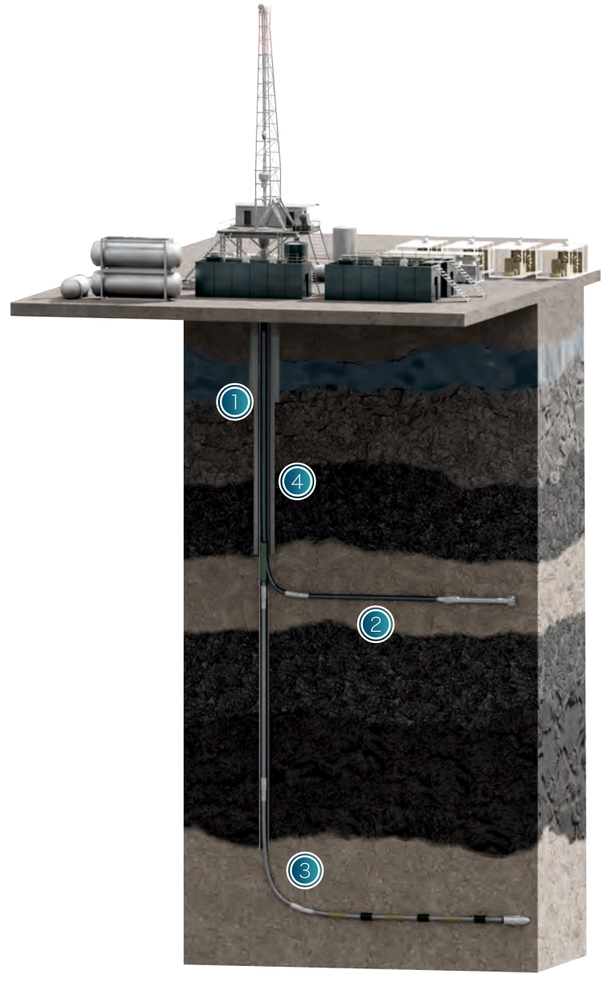
Oil and gas applications

In the oil and gas extraction sector the use of metal components is still the industrial standard. Many challenges, such as high pressures and temperatures, highly aggressive media, as well as highest levels of tensile stress and, for the deployment process, also compression loads are demanding for fiber reinforced products. Despite these continuously applied stresses, our products can prevail in the downhole application even in safety-relevant applications. Our durable composite solutions with metal joints solutions are therefore highly suitable for the offshore as well as the onshore oil and gas exploration.

Depending on these applications, it can be the material's lightweight benefits, outstanding mechanical properties, superior thermal and chemical stability plus corrosion resistance and especially its drillability characteristics that gains high advantages compared to metal parts. Beside the easy drillability the composite debris is flushed out by the used liquids in the drilling process. With fiber reinforced products you prevent the downtime caused by a necessary cleanout. Nevertheless the highest wear resistances due to the Composite Coating process on the inside and outside make these products withstand even the rough conditions of downhole applications. Furthermore the adhesion in the interface of cement and fiber reinforced products can be increased to outstanding levels by our dedicated cement primer.

Advantages

- Weight
- Corrosion
- Durability
- Pierceability
- Strength & stiffness
- Stability
- Load distribution



1. Conductor and surface casing
2. Drill string components
3. Liner and lower completion
4. Production tubing / upper completion

Energy

Energy applications

Renewable energies are an important sources of electricity and are considered as a central pillar of the energy transition and the decarbonization of electricity generation. The energy transition can be supported by the use of fiber-reinforced lightweight structures. They offer great opportunities in direct electricity storage, as well as indirectly through energy storage using hydrogen as an energy carrier.

Advantages

- Weight
- Strenght
- Mass inertia
- Stiffness
- Process stability
- Robustness
- Sustainability

Marine

Marine applications

In the field of maritime shipping, whether for private shipbuilding, sports regattas or sea transport, sustainability and increased efficiency are playing an increasingly important role. In order to cross the seas in a resource-saving way, the requirements in terms of lightweight construction, durability and increased efficiency are constantly growing. More and more components, from drive shafts to frames, masts, hoists and many other components, are being replaced by composite solutions or supplemented by a hybrid design.

Advantages

- Weight
- Durability
- Mass inertia
- Stiffness
- Oscilation
- Vibration
- Corrosion

Promise of quality

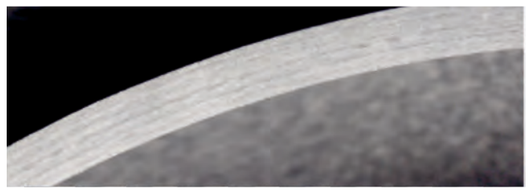
Quality assurance

For the highest standards, measurable and consistently high quality are our top priorities. We define and check all important characteristics on an ongoing basis: from material purchasing and internal production steps through to delivery of the end products.

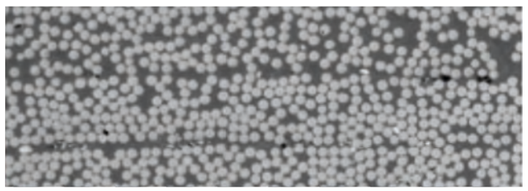
Quality management system

As a customer-oriented company that develops, produces and sells products for high-performance applications, we place the highest value on the quality of our products and services. Controlled and standardized processes are an important element in meeting the demand for maximum customer satisfaction. In order to achieve this high level of customer satisfaction, we rely on established quality management systems within AVANCO Composites. Our production units have therefore been certified for the relevant markets for many years and undergo regular audits. This includes DIN EN 9100 and DIN EN ISO 50001 certification. We check and record our products using state-of-the-art testing methods. Our routine tasks include carrying out internal audits and issuing certificates of conformity.

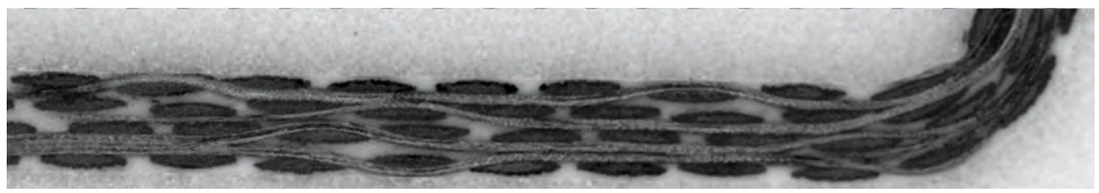
Micrographs



Individual layers within a laminate



Individual fibers within the matrix



0° and 90° fabric of a profile

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