



Composites

Thermoplastic composites



What are composites

Composites are a class of materials created by the systematic combination of two or more materials. Usually, fine particles or fibres of one material are embedded into another, referred to as the matrix. This means that the individual properties of the starting materials can be combined to a composite with a customised and unique set of material properties.

Composite materials have become a necessity

for high-end applications in many markets. Through the use of continuous, oriented fibres (e.g. unidirectional or woven fabric), composite parts have much higher specific strength and stiffness than short fibre reinforced or unreinforced plastics. In addition to their light weight, high strength and high stiffness, they allow for tailored mechanical properties.

Advantages of thermoplastic composites

Composites with a thermoplastic matrix have many advantages over thermoset composite materials. These include:

- Short cycle times
- No emissions (VOC) and less occupational health issues
- A wide variety of possible matrix materials with different properties tailored to the application: from standard to high-performance polymers

- Outstanding toughness
- Possibility of use of high-temperature matrices
- High chemical resistance
- Weldable
- Recyclable

Fields of application

- Medical
- Sports & Leisure
- Automotive

- Aerospace
- Industrial
- Oil & Gas



Ensinger's offer in the field of composites

Design and Engineering

Ensinger offers extensive design and engineering capabilities in the field of thermoplastic composites. Customers profit from Ensinger's expertise in developing composite parts using tailored design, materials and processes. Together with the customer, Ensinger's engineers optimise the part for composite manufacturing and adapt the materials and processes to the customer's specifications.

Materials

With more than 50 years of experience in high-performance engineering plastics, Ensinger helps you choose the right combination of polymer and reinforcement for your application. Our portfolio of matrix materials ranges from standard plastics to engineering and high-performance polymers, including both semi-crystalline and amorphous polymers. Reinforcement fibres can be chosen from most available fibre materials and grades.

Processes

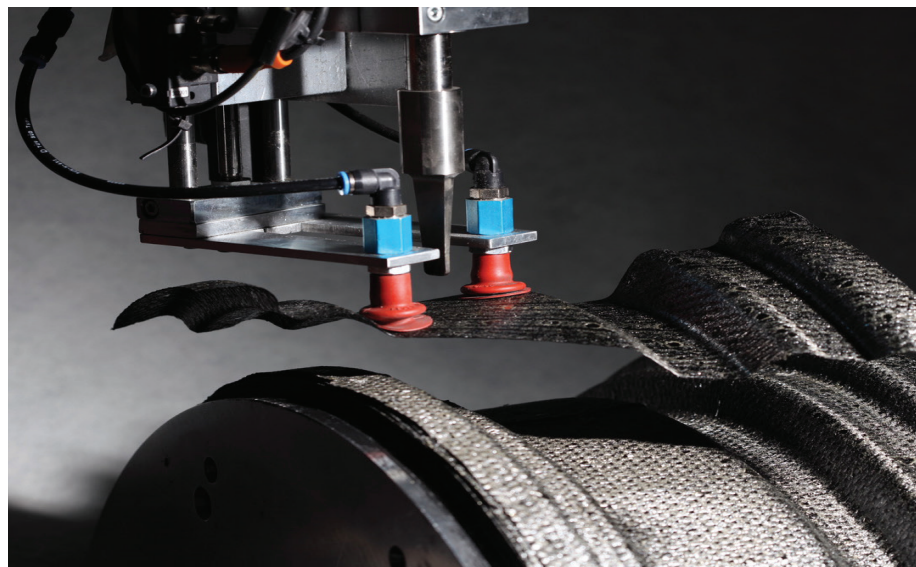
In close collaboration with the customer, Ensinger applies its processing technologies for thermoplastic composites to suit each specific part. In serial production, quality management makes use of automated in-line controls in order to meet the customer's quality expectations at low costs. Through the use of a thermoplastic matrix, fully automated production and quality control is possible.

Prototyping

Samples and prototypes for testing purposes are manufactured by Ensinger using near-series machines and processes. Whether it be a few parts demonstrating the feasibility or a small series made out of a production mould, Ensinger has the capabilities to satisfy the customer's requirements.

Production

After successful testing of prototypes, series production will take place at Ensinger's facilities, fulfilling all required industrial and quality standards. Ensinger provides you with the finished part, with post-processing and finishing of parts done in-house.



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Advantages of thermoplastic composites from Ensinger:

- *Glass or carbon fibre reinforcement possible*
- *Broad range of matrix materials available – with particular expertise in high-temperature and engineering plastics*
- *Increased geometrical complexity achievable using state-of-the-art processes*
- *Embedded metallic inserts possible*
- *Even small and medium series can be economically advantageous*

Ensinger provides the whole supply chain in-house: from material compounding, engineering and prototyping, to production and machining, Ensinger is your one-stop supplier for high-performance thermoplastic composite parts.

