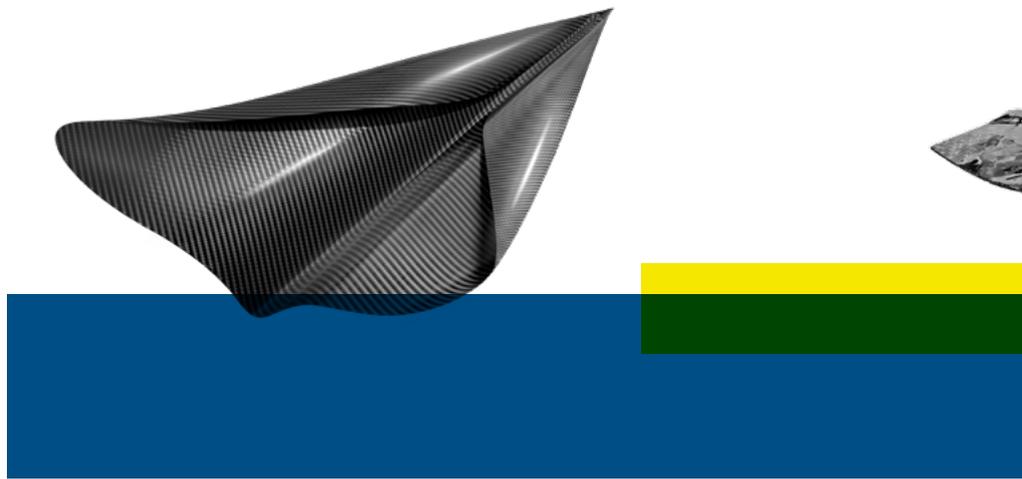




TECATEC
Thermoplastic Composite Materials



Your solution partner for thermoplastic composite materials

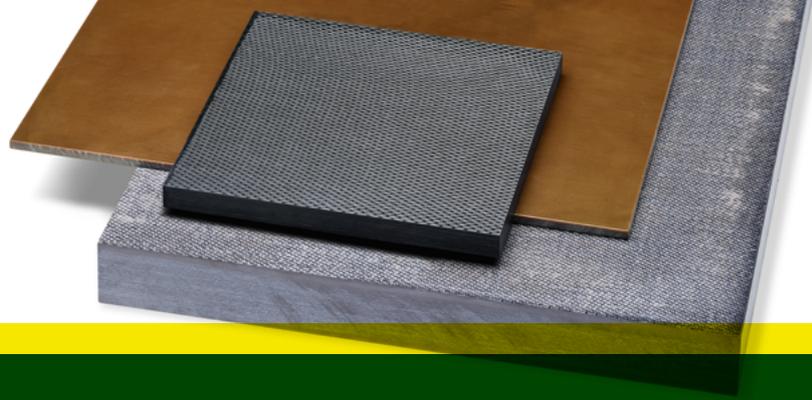
At Ensinger, we cover the entire process chain in-house – from raw material granulates, to fully consolidated thermoplastic composite materials. Our portfolio ranges from polymer powders, semipregs, prepregs, organosheets, compression moulded composite plates to customer development projects that are realised with a wide variety of material combinations. Years of experience in the processing of thermoplastic composites allow Ensinger to provide a tailored technical and economical solution for specific customer projects across many industries.

State of the art equipment and a wide selection of textile and polymer combination makes Ensinger's range of products unique. Through our in-house process development and fast technology transfer, we are able to bring innovative materials such as flame-retardant polycarbonate matrices, bio-based polymers, high-quality natural fibre fabrics and others to the market.

The Ensinger TECATEC range of thermoplastic composite materials offers many advantages:

- ✓ High impact strength and significantly higher damage tolerance than thermosets
- ✓ High chemical resistance
- ✓ High temperature resistance
- ✓ Tough, non-brittle fracture behaviour due to high elongation at break of the thermoplastics
- ✓ Intrinsic vibration damping of the matrix
- ✓ High stiffness with low weight
- ✓ Extremely low coefficients of thermal expansion (CTE) in a range of about $5 \cdot 10^{-6} \text{ K}^{-1}$
- ✓ Automatable production
- ✓ Short process times
- ✓ Thermoformability and weldability
- ✓ Transport and storage at room temperature
- ✓ Recyclability





Thermoplastic composites with continuous, oriented fibre reinforcement are characterised by their outstanding mechanical, thermal and chemical properties and outperform thermoset composites or short-fibre reinforced thermoplastics in many areas. Their beneficial properties make them perfectly suited for applications with high demands on resistance, wear and impact toughness. The inherent recyclability of thermoplastic composites also helps achieve a more sustainable use of resources.

The potential of composites can only be fully exploited through a deep understanding and the right combination of their basic components. With over 50 years of experience in the field of thermoplastics, Ensinger offers an unrivalled material portfolio through its TECATEC range.

TECATEC CP Semipregs are fabrics onto which the selected thermoplastic matrix material is applied as polymer powder and melted on.

TECATEC IP Prepregs are the next processing stage. The semipreg is fully impregnated and consolidated under temperature using a double-belt press.

TECATEC OS Organosheets are manufactured at Ensinger from semipreg or prepreg material or using a film stacking process. They are fully consolidated and impregnated multi-layer sheets.

Material combinations

The high-performance thermoplastic composite materials of Ensinger are available in a wide range of material combinations, allowing the composite to be tailor-made to suit the application:

Matrix materials:

- Polyetheretherketone (PEEK)
- Polyether sulfone (PES)
- Polyphenylene sulfide (PPS)
- Polyphthalamide (PPA)
- Polyetherimide (PEI)
- Styrene acrylonitrile (SAN)
- Polycarbonate (PC)
- Polyamide 66 (PA 66)
- Polyamide 6 (PA 6)
- Polyamide 12 (PA 12)
- Polybutylene terephthalate (PBT)
- Polyoxymethylene (POM)
- Polypropylene (PP)

Other special polymers and blends are available, such as:

- Bio-based, biodegradable polymers
- Flame-retardant polycarbonate
- Visual quality SAN
- Low-melt polyaryletherketone (LM-PAEK)
- Medical-grade PEEK

Reinforcing materials and fibres:

Various weave structures can be used for the reinforcing fabric. The type of fibre as well as the weave can be adapted to the specific application:

- Glass fibre fabric
- Carbon fibre fabric
- Synthetic fibres such as aramide
- Natural fibre fabrics such as basalt or flax
- Hybrid composites
- UD fabric
- Bimax® +/-45° braided fabric

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Ensinger's fully implemented value chain offers a complete in-house solution – from granulated polymer, right through to fully consolidated, multi-layer thermoplastic composite laminates. With Ensinger TECATEC composite materials:

- *Every process step, from polymer pulverising, to further processing of semipregs, prepregs and organosheets can be carried out by Ensinger*
- *Special mixtures and compounds for composite materials can be produced thanks to in-house compounding*
- *The use of customer-specific materials, matrix and fibre combinations or fibre architectures is possible in order to create a solution tailored precisely to your application*
- *Fast response and delivery times are standard*

