ASK local. THINK global. SUCCEED together.

ENSINGER
ASK. THINK. SUCCEED.

Globally active with locally adapted solutions

Dear Reader,

Founded in the 1960s, ENSINGER has evolved from a small family business into a worldwide network of firms with over 1700 employees. Today, we produce and process engineering plastics and thermoplastics for a wide variety of industries and applications. From a global network of over 35 production and sales sites, we supply our products throughout the entire world.

We coordinate developments for specific applications worldwide, yet service our customers on a local basis. Continuous global exchanges enable us to learn and benefit from each other, even if regional and cultural differences continue to exist. As a customer, you too can benefit from this invaluable experience as much as the company itself.

Our versatility, however, lies not only in our global activities but also our broad product spectrum. Thanks to numerous process engineering technologies and materials, we are able to accompany our customers' projects from the raw material to the actual application stage.

When developing new products and in order to ensure their high quality, we are able to take advantage of our close contacts with leading research institutes and raw material manufacturers.

A combination of direct cooperation with our customers and our outstanding internal know-how provides the optimum basis for tailor-made products and applications.

In this way, our highly trained staff contribute to the progress of your project, so that together we achieve success.

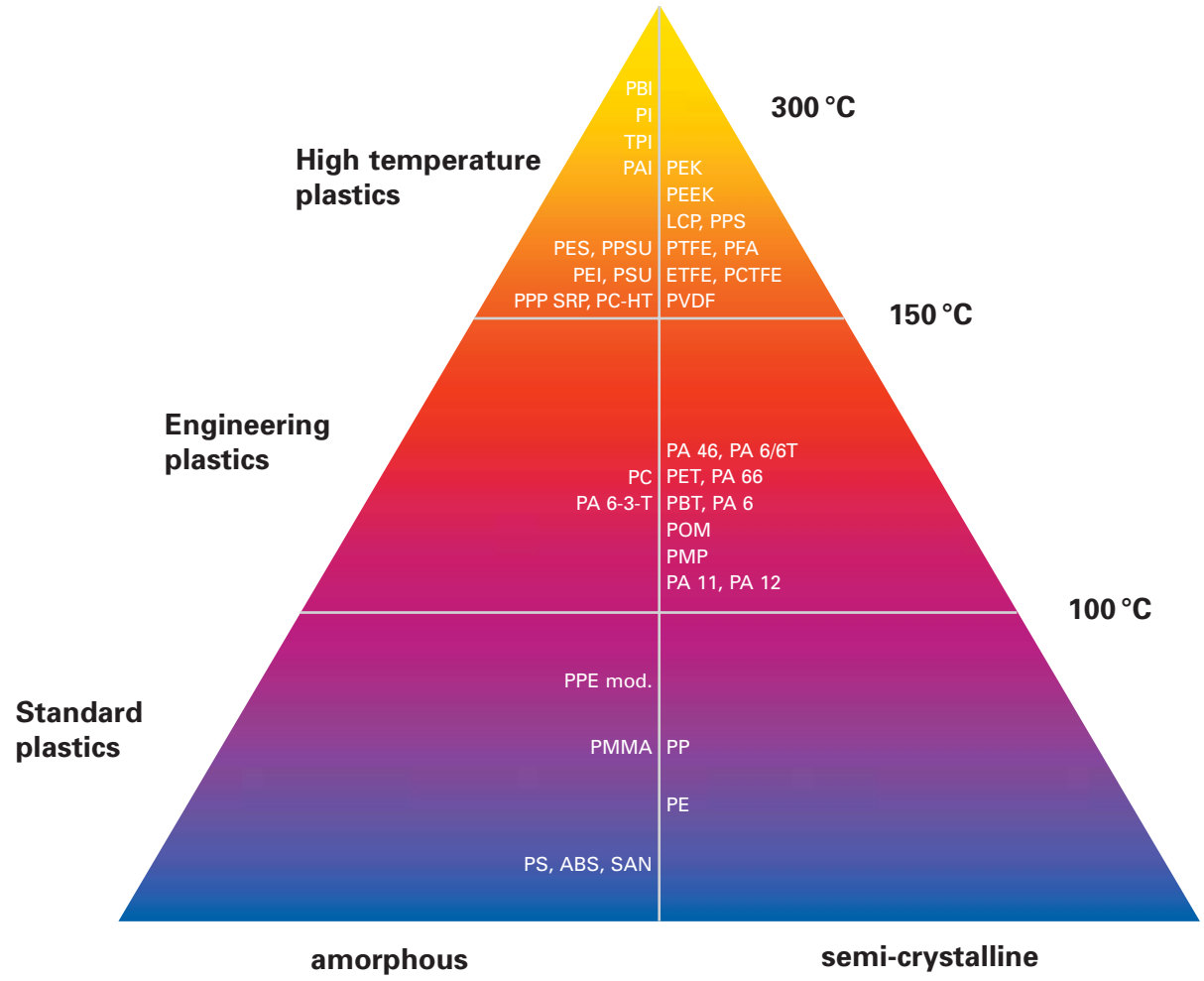
The company maxim, "Ask. Think. Succeed." is the recipe for our success. This means that we place our customers at the centre of our attention. Your requirements constitute the focal point of our entrepreneurial activity.

So ask us. We are at your disposal. In this sense, 'ASK local. THINK global. SUCCEED together.'

Yours,

Rick Phillips Dr. Roland Reber Klaus Ensinger

ENSINGER plastics for all applications.

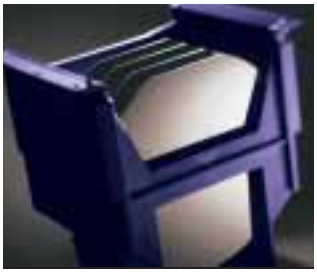


- Temperature ranges from - 270 °C to + 350 °C
- High strength or high flexibility
- Very good sliding properties
- Good dry and emergency running properties
- Excellent electrical insulating properties
- Good heat-insulating properties
- Standard types include plastics modified with numerous additives such as glass fibre, graphite or lubricating agents. Furthermore, ENSINGER develops plastic compounds according to specific customer requirements.

ENSINGER High Performance Plastics provide specialised solutions for any application.

TECAST. Rope pulley for DEMAG cranes.

TECAPEEK MT sw. Light cycler von ROCHE DIAGNOSTICS.



TECAPEEK. Wafer carrier for semiconductor industry.

Semi-finished products as a basis for individual solutions.

High quality semi-finished products from plastics fulfill the specific requirements that customers expect from quality products.

ENSINGER offers products from over 100 different plastics. Besides all standard thermoplasts, ENSINGER develops and extrudes a multitude of special materials according to customers´ demands.

Round rods, sheets and tubes are offered in a range of small dimensional increments and with special properties to meet your requirements.

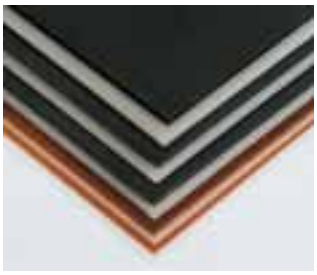
We offer:

- Rods
- Plates
- Tubes
- High precision profile extrusion
- Co-extrusion: plastic / metal, hard / soft
- Different colours
- Exclusive materials
- Clean room extrusion

Sheets, coils and punched parts.

Sheets and coils are produced in traditional thermoplastics, high temperature plastics and special composite materials.
Calendered sheets are used for thermoforming fabrication and for the production of punched parts.

- Sheets (< 5 mm) with uniformly calibrated thickness
- Standard stock sizes with thicknesses of 0.25 mm to 4 mm and widths up to 1200 mm
- Sizes specially produced to customer requirements
- Finished surface texture according to customers´ requirements e. g. polished, matt, grained
- Protective foils or lamination possible
- Punched parts are available in thicknesses of 0,25 mm to 3 mm



Calendered sheets made of ENSINGER thermoplastics.

Punched parts in all shapes.

Compression moulding and sintering.

Rollers made of **VESPEL® SP 21.** Used in semi-conductor industry.

For a long time, compression moulded and sintered parts have been used in many applications, where precision and high load capacity are required

- Small production volumes available
- Dimensional stability and low stress; therefore less distortion and easy machining
- Geometry of the semi-finished products largely approximates to the dimensions of the finished products – which saves costs in machining and material

Compression moulded parts.

Available:

- Semi-finished products (rods, plates, discs)
- Individual size rings in diameters up to 1500 mm

Custom cast.

Conveyor screw produced in **TECAST**

ENSINGER is the only system provider who offers cast parts and semi-finished products in PA 6G, PA 12G and Nyrim from a single source.

The non-pressurized casting process has proved successful for the production of large volume, virtually finished moulded parts. Additionally metals inserts can be moulded in. ENSINGER produces semi-finished products from TECAST and TECARIM. The casting process is especially suitable for low-stress thick-
walled parts and large dimensions, eg pulleys, slide bearings, gear wheel blanks and calender rolls.

Rope pulley produced in **TECAST 12**

- Parts up to 800 kg can be produced
- Know-how for metal insertion

TECARIM.
Pulleys for Leitner snow vehicle

Industrial profiles.

ENSINGER Industrial profiles are dimensionally stable and highly accurate.

ENSINGER produces industrial profiles in compliance with customers´ design specification – in varied cross-sections and with very tight tolerances. Profiles made of different thermoplastic polymers, eg unfilled, glass fibre, carbon fibre and aramide fibre reinforced or filled with a lubricant, are manufactured by extrusion as finished parts. Our industrial profiles are used in different branches of industry, eg automotive technology, aeronautic and space technology, medical technology and others.

Machined Parts.

Machining is the best method to achieve the highest precision and closest tolerances in parts; machining is often the quickest way to get an prototype, too.

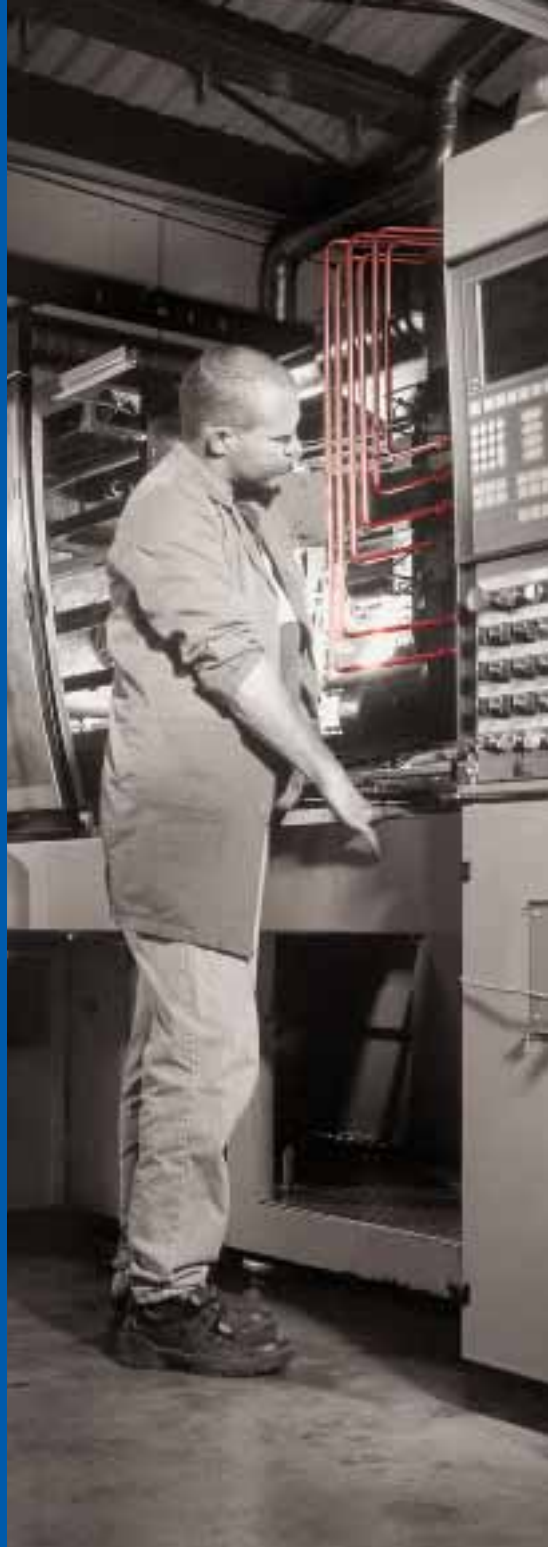
ENSINGER manufactures milled and turned components to a high standard of precision using state-of-the-art CNC controlled machining centres.

- Highest part precision with tolerances down to 0.02 mm
- Depending on a customer's terms of reference, 2, 3, 4 and 5-axis milling centres are used
- For small machined components, small machining centres with chip-to-chip times of less than a second are available. Large parts are processed on machines designed to allow machining lengths of up to 2000 mm

The ENSINGER production range is completed off by further processing like joining techniques, surface treatment or assemblies.

Fibre guide used in the textile processing industry – produced from **TECAFORM,** which is suitable for applications involving stringent purity requirements.

Nozzle block – machined to a high degree of precision. **TECAPEEK** is characterized by its high temperature resistance, its dimensional stability and chemical resistance.



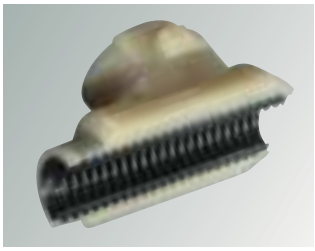
Injection Moulding.

ENSINGER has a whole range of benefits to offer in the field of injection moulding: development, tool manufacture, production, assembly, finishing and packaging.
Benefiting from an in-house toolroom, our specialists are able to produce highly accurate and complex geometries using the ENSINGER injection moulding technique. Together with a broad range of specialist expertise, ENSINGER also offers special machines designed for the processing of high performance plastics.

- Two-component injection moulding (soft / hard, different colours and functions)
- Insert moulding (metal inserts)
- Fluid silicone injection moulding
- Clean room processing
- Determination of the tool design

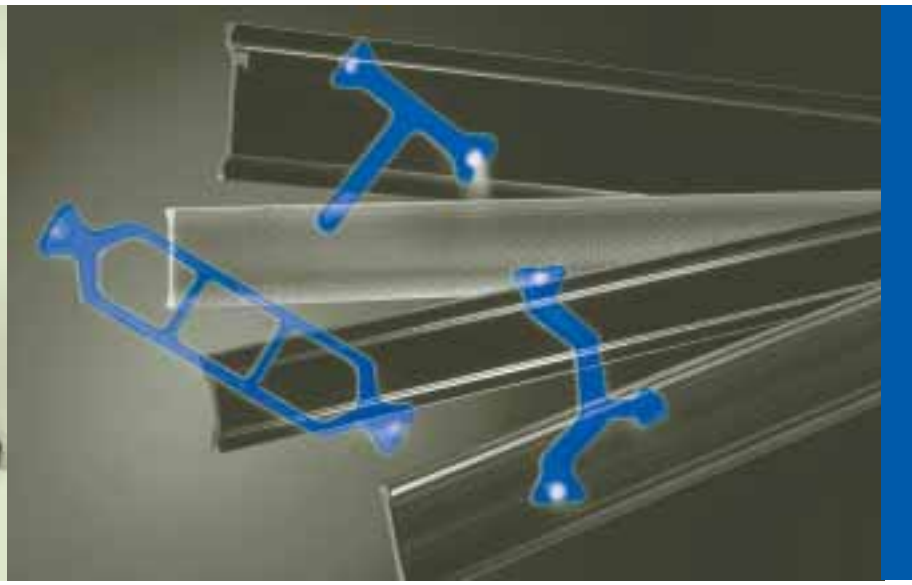
Depending on customer requirements, additional finishing methodes such as insert moulding or coating, hot embedding or ultra-sonic welding as well as machining are all possible. Complex assemblies are created using a combination of different process technologies and individual components.

Actuating mechanism for seat belt tensioner from TAKATA. **TECAFORM AD** offers impressive sliding properties and high strength.



Spindle nut as a load carrying device in a car jack. For cost-saving the thread is insert-moulded with glassfibre-reinforced **TECAMID 66** by a 2-component process.

Building Products.
insulbar® insulation profiles and Thermix® warm-edge spacers.



insulbar® - perfect insulation for metal windows

For more than 25 years, **insulbar®** thermal insulation profiles have been successfully used in windows and doors around the world. Thermal breaks can lead to huge energy savings. This means perfect insulation, cutting of costs by reduced energy consumption and therefore improved environmental protection. In addition to a considerable standard programme of profiles, individually designed **insulbar®** hollow profiles enable super-insulating constructions to meet the requirements of various national standards for energy-saving.

The more intelligent way to insulate. Plastic warm-edge spacers and bars for insulating glass

Thermix® warm edge spacers thermally break the edge bond of an insulating glass unit. **Thermix®** profiles reduce the thermal bridge at the transition between the glass and the frame. Besides considerable heat savings, the risk of condensation and mould formation is minimized. This results in improved hygiene in dwellings and a healthy indoor climate.

Hotel Atlantic, Hamburg. EDUARD HUECK GmbH & Co. KG from **insulbar®**-profiles fit flexibly and perfectly in the various winged, tilted and casement windows.

ENERGON Ulm: The administration building of the Software AG foundation is the largest office building in the world built to the passive house standard. **Thermix®** warm-edge spacers are built into the windows and the facade.

insulbar.
www.insulbar.de

Thermix.
www.thermix.de

Worldwide on the spot

ENSINGER has 40 production sites and sales branches. Customers work successfully with us in all important markets of the world. Expertise, commitement and the ability to supply is always available locally.

Flexibility, responsiveness and close customer relationships ensure that ENSINGER performance products of the highest quality will reach you anywhere and on time.

ASK local. THINK global. SUCCEED together.

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