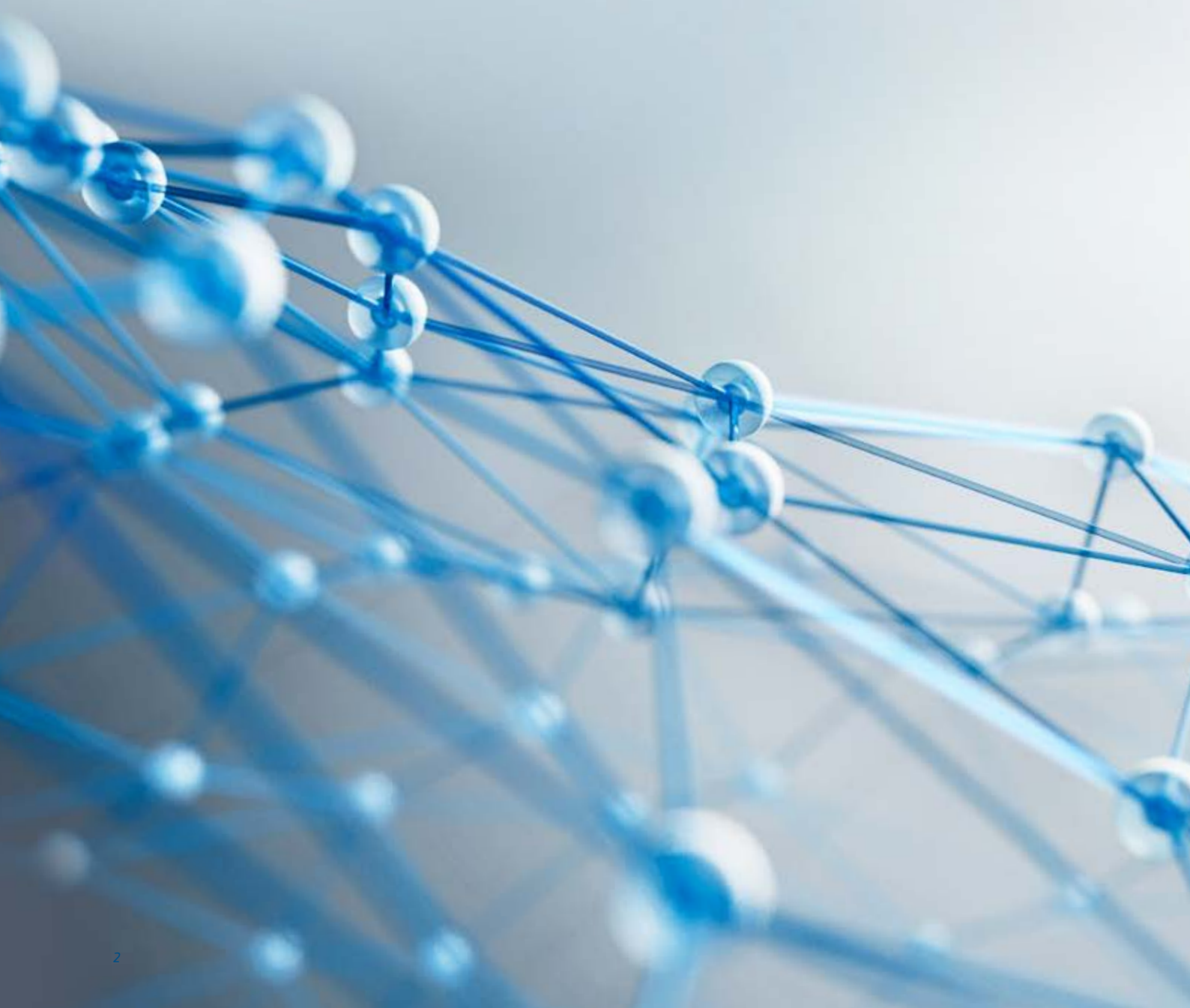
Ensinger

Compounds

Ensinger Compounds
Product range

High-performance compounds

The plastic granules of Ensinger compounds are the culmination of decades of experience in the production of high-performance plastics. Whether volume or specification, we cover the requirements of all important sectors of industry.
With proven standards and individual creations.



TECACOMP TRM

Optimized for tribology and mechanics

TECACOMP LDS

Compounds for laser direct structuring

TECACOMP HTE

Highly thermally and electrically conductive Compounds

TECACOMP ID

Safety through detectable plastics

TECACOMP TOL

Toll Compounding

Segments for Ensinger Compounds

Compose a New World

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E-mobility,
autonomous driving

Telecommunications

Industrial companies
with focus on
renewable energy

Focus on safety
e.g. food,
payment terminals

TECACOMP TRM
Optimized for tribology and mechanics

Options Base polymer + fillers

Class	Polymer	Remarks
TECACOMP PVX	PEEK XT, PEEK, PPS, PA66	CF, graphit, PTFE
	PEEK	CF, graphit, PTFE, SiC
TECACOMP XS	PEEK XT, PEEK, PPS, PPA, PA66	CF, graphit, mineral
TECACOMP f&w	PEEK	graphit & PTFE
	PPS	CF & PTFE
	POM	PTFE & silicon oil
TECACOMP fibre	PEEK	GF, CF
	PPS	CF, TF
	PA66	CF
		GF, CF
		GF, TF

The tribologically optimized and mechanically reinforced compounds of the TECACOMP TRM product series were developed for applications requiring optimum sliding properties, maximum strength and minimal wear. Ensinger focuses on semi-crystalline high-temperature and engineering plastics in the TECACOMP TRM product group. Building on many years of experience in the development and production of highly stressed materials, dealing with very special packages of fillers and additives, we have developed a very powerful portfolio. Customized material adaptation and material development complete our portfolio. *Components used particularly in the automotive as well as the mechanical and apparatus engineering industries have been produced over many decades using compounds from Ensinger adapted specifically to these special demands.*

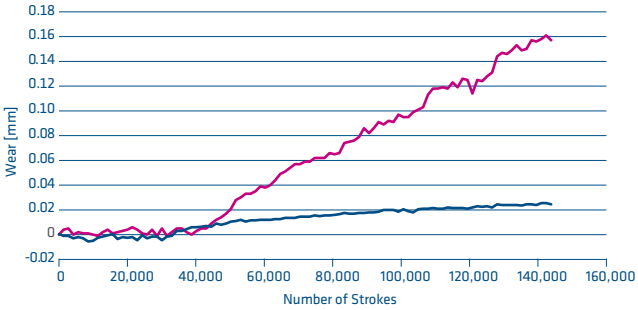
TECACOMP TRM XS: 70% lower wear

TECACOMP TRM XS compounds are designed for plastic components exposed to high levels of mechanical stress. Instead of PTFE, special minerals ensure optimum sliding and friction properties. The compounds developed by Ensinger demonstrate up to 70% less wear than plastics with added PTFE, and ensure an efficient end product manufacturing process with minimal downtimes.

The PTFE-free mineral-filled compounds are the right choice for applications involving higher speeds, high levels of mechanical stress and high temperature conditions. Typical applications involving extreme friction and sliding stress include components in engines, high-performance gears or vehicle drive trains.

TECACOMP TRM PVX

PTFE-modified materials are well known for their excellent friction and sliding properties. Ensinger compounds with PTFE are the right choice for applications involving moderate loads and high speeds.



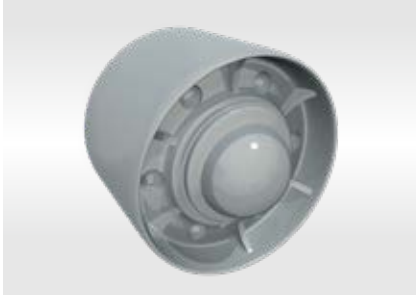
Oscillating test, system ball (steel 100Cr6) / plate (compound) –
wear at 60N force non lubricated
Ambient temperature: room temperature
Frequency: 10 H_Z
Stroke: 4 mm
→ v = 0.04 m/s

Benefits of TECACOMP TRM XS:

- → The selected fillers significantly increase the creep strength of components subject to loads and high temperatures. The additives used are stably embedded in the plastic matrix
- → A consistent property profile and stable surface structure
- → An absence of optical faults in applications subject to high loads
- → No deposits on the tool and minimal maintenance work required

Piston sleeve DSG gearbox

Sliding block for vehicle seat adjustment



Divert air valve

TECACOMP LDS
Compounds for laser direct structuring
3D MID Technology

Matrixpolymere

300° C

TECACOMP PEEK LDS

- → very good weld line strength and adhesive strength
- → chemical resistant
- → very good mechanical performance
- → structuring of vias possible
- → thermal conductive
- → low dielectrical loss
- → fine pitch performance

260° C

TECACOMP LCP LDS

- → very thin wall thickness possible
- → fine pitch performance
- → low moisture absorption
- → low dielectrical loss
- → thermal conductive

250° C

TECACOMP PPA LDS

- → very good adhesion strength
- → optimized for fine pitch
- → thermal conductive

Moulded Interconnect Devices (MID) integrate conductors and electrical circuits directly into three-dimensional plastic components which can be moulded practically at will. This makes the components both a housing and an electronic circuit in one. These injection moulded circuit carriers enable companies to develop components which are smaller, lighter and less expensive than is possible using classical circuit boards. Three dimensional MID systems are also simpler to mount and enable the integration of additional functions.

Extremely high requirement profile

There can be hardly any other application which poses such widely differing demands on a compound than MID technology. LDS requires the compound to have high thermal resistance, isotropic component behaviour and, most importantly, good capacity for metallization. Material developments are focused on the implementation of reduced conductor widths and improvement of thermal expansion and conduction. The choice of polymers is consequently restricted to highly thermally stable plastics. The matrix polymers used by Ensinger are polyphthalamides (PPA), polyetheretherketones (PEEK) and liquid crystal polymers (LCP).

Benefits of TECACOMP LDS

- → Suitable for all popularly used soldering techniques up to 260°C
  Optimized filler systems for fine pitch structures up to 70 µm
- → Reduced thermal expansion in the event of temperature changes
- → Enhanced thermal conductivity for improved cooling

TECACOMP PEEK LDS

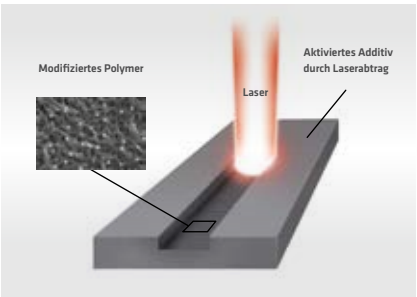
With PEEK, the chemical resistance, mechanical strength and very good dielectric performance are particularly noteworthy. PEEK LDS is also available for use in medical technology applications.

TECACOMP LCP LDS

LCP is characterized by very good dimensional stability and stiffness, even at very high temperatures. In addition, LCP has good chemical and flame retardant properties. It is the thermoplastic polymer with the lowest thermal expansion.

TECACOMP PPA LDS

The PPA used is 60% bio-based and has very high heat resistance, very low creep and low moisture absorption. The material is reflow solderable and is characterized by good metallizability. PPA is an alternative, especially for applications with corresponding requirements for the adhesion strength of the conductor track and the weld line strength.



Laser structuring


Smart phone antennae


Safety cab

TECACOMP HTE
Highly thermally and electrically conductive Compounds

Material	Form	Polymer	Processing
TECACOMP PP HTE black 1014973	Granules	PP	Injection moulding
TECACOMP PP HTE PW black 1014974	Powder	PP	Hot-pressing
TECACOMP PPS HTE PW black 1014976	Powder	PPS	Hot-pressing
TECACOMP PPS HTE PW black 1050231	Powder	PPS	Hot-pressing

If non-conductive plastics are modified in a targeted way, then they become ideally suited to applications in which electrical conductivity is crucial. With TECACOMP® HTE it is even possible to achieve electrical conductivity values of up to 104 S/m. Ensinger Compounds offers you a huge choice of high-performance plastics which not only have high electrical conductivity but also correspondingly high thermal conductivity.

TECACOMP HTE

Highly filled graphite compounds for energy technology

The new TECACOMP HTE material from Ensinger Compounds is a compound which has been specifically developed and optimized for applications of this or a similar type. Their suitability is based on a significantly higher than normal ratio of fillers. This high filling ratio enables a degree of electrical and thermal conductivity which was previously unachievable with plastics. At the same time, chemical resistance is also maintained.

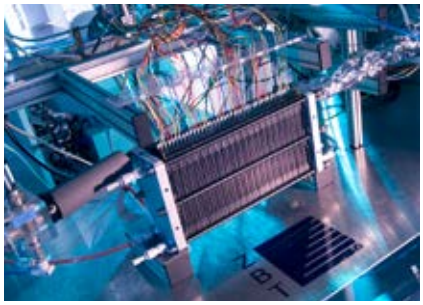
The polymers propylene (PP) or polyphenylene sulphide (PPS) is used as the basis for TECACOMP HTE. It is able to cover application temperatures ranging from 60° to 200°C. PPS has already proven its superiority over thermosetting plastic binders in HT PEM (high-temperature polymer electrolyte membrane) fuel cells. PP compounds are suitable for use in NT-PEM (low-temperature polymer electrolyte membrane) fuel cells as well as in direct methanol fuel cells (DMFC) or redox flow batteries.

To achieve the high electrical and thermal values required by these applications, carbon-based fillers such as graphite, carbon black or polymer fibres are mixed with the base polymers for TECACOMP HTE in a ratio of up to 90% by weight. Depending on the polymer used, the degree of filling and the targeted component size, the formulas are suitable either for processing by injection moulding or compression moulding. This is why the compounds are available in different versions either in powder or in granulate form.

Benefits of TECACOMP HTE

- → Optimized for bipolar plates in fuel cells, heat exchangers and redox flow batteries
- → Excellent thermal conduction capacity: (up to 85 W/(m · K))
- → Very good chemical resistance
- → No corrosion
- → Extrem long lifetime

Raw materials granules, powder



Fuel cell

Stack with bipolar plates

TECACOMP ID
Safety through detectable plastics
Elimination of risks

Description	Matrix	Colour	Detectability*
TECACOMP PEEK 450 ID blue - 1014884	PEEK	gray blue	Low - Mid
TECACOMP POM ID blue - 1055303	POM	pigeon blue (similar to RAL 5014)	Mid
TECACOMP PA66 ID blue - 1014958	PA66	dark blue (similar to RAL 5003)	Mid
TECACOMP PA66 ID blue - 1014961	PA66	dark blue (similar to RAL 5000)	High
TECACOMP PA6 ID blue - 1053686	PA6	dark blue (similar to RAL 5003)	Mid
TECACOMP PP ID blue - 1061097	PP-H	dark blue (similar to RAL 5003)	High
TECACOMP PP ID blue - 1014912	PP-H	dark blue (similar to RAL 5000)	High
TECACOMP PP ID blue - 1052958	PP-C	dark blue (similar to RAL 5000)	High
TECACOMP PE ID blue - 1049852	HD-PE	dark blue (similar to RAL 5010)	High
TECACOMP PE ID blue - 1014904	LD-PE	dark blue (similar to RAL 5003)	High
TECACOMP PE ID black (Batch) - 1054878	LD-PE	black	High +

* Detectability measured based on the Rondotest® GmbH - test method

There are many sectors in which minor errors in production are not a life-or-death issue. They can often result in nothing more than a blemish. When producing food or medicines, for instance, what may appear to be no more than a „detail“ can have wide-ranging repercussions.

Plastics with a safety package

With TECACOMP ID, Ensinger offers its customers a safety package:

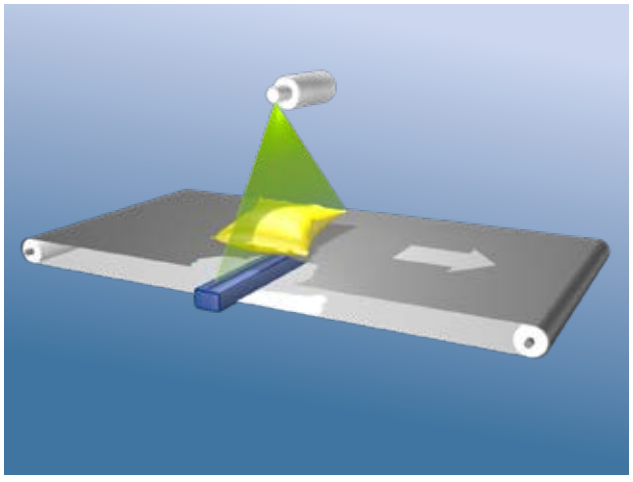
→ Safety against residues,
→ Safety against damaging loss of image,
→ Safety against incalculable follow-on costs.

These benefits add up to a major sales argument which can substantially strengthen your market position.

Instantly recognizable in metal detectors

TECACOMP ID is picked up by metal and X-ray detectors. Using standardized procedures, any material residues are reliably detected using standard commercially available systems. With the support of our partner RONDOTEST, which has specialized in the manufacturer-impartial testing of foreign body detection in the food and pharmaceutical industry, TECACOMP ID has been ideally adjusted in line with the functional characteristics of the most widely used metal detectors.

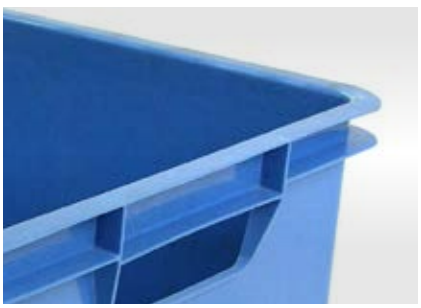
TECACOMP ID is produced by adding detectable fillers to the base polymer. These components ensure optimum presence recognition by detectors.



Benefits of TECACOMP ID

→ Additional security for you and your customers
→ Wide range of base polymers (PE, PP, PA66, POM or PEEK)
→ Reliable detectability
→ Individual colour settings possible
→ Toughness modification for lower susceptibility to breakage

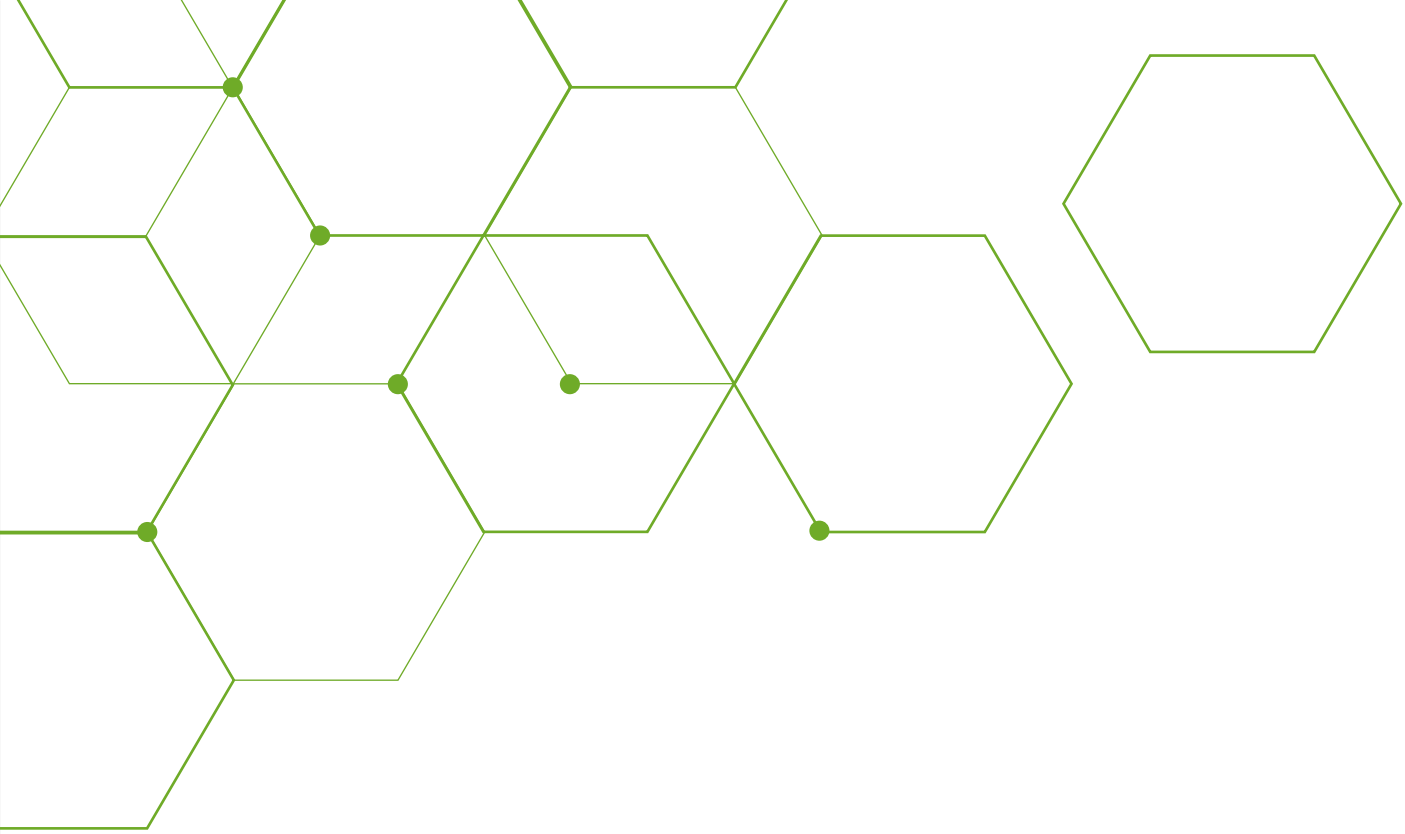
Cutting tool



Transport box

Production in the food industry

TECACOMP TOL
Toll Compounding



Do you need a partner for your special compound?
As an experienced manufacturer of high-performance compounds for technical applications, Ensinger processes almost all thermoplastics and doses solid and liquid fillers to the technical limits (filling grades up to 90 % by weight) in special settings. On request, Ensinger's experienced team of engineers will support you in process development or in adapting of your compound formulations. If you already have a formulation developed in-house, we can take care of scaling up and provide series production for you. We can take over complete series production processes for our customers or only provide support during production peaks or capacity bottlenecks in compounding.

Services

Our services at a glance:

- Process development with pilot plant
- Raw material procurement
- Scaling up
- Industrial manufacturing

Series production of compound specialities

Our extruders are equipped with feed enhancement technology (FET) for processing voluminous solids. Different pelletizing systems are used (strand, hot die, underwater pelletizing systems UWG). Our compounds are available in various forms as pellets or micro-pellets.

Our technical equipment

- Clean room class 7 (according to ISO 14644-1)
- Labo extruder ZSE 27 MAXX
- Various twin screw extruders ZSK 40 to ZSK 58
- Several single screw extruders 60 mm
- Melt filtration, depth filtration of High-temperature polymers (e.g. PEEK with 20 µm)
- Premixing of components (Mixaco)

We offer

- Individual process development with the support of our own Ensinger test facility
- Production set-up for medical technology and pharmaceuticals that meet the high requirements for purity and quality

Sales worldwide

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Your advantages from Ensinger Compounds at a glance:

- → *Decades of experience in the production and development of speciality compounds*
- → *High-performance compounds and individual formulations*
  Proven standard products and development of customer-specific formulations
- → *Tried-and-tested, state of the art production facilities for demanding compounding tasks*

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