

AFTER SALES SERVICE

Extruders and extrusion lines



LEISTRITZ **SUPPORT**

Individual support, consulting, machine optimization

The Leistritz twin screw extruders are among the top machines in the world in the plastics and pharmaceuticals market. They satisfy the highest production and quality requirements every day. In order to stand up to tough competition, they must operate in an efficient and economical manner. This requires a reliable technology, perfectly harmonized work processes and last but not least, qualified and trained personnel.

With Leistritz' all-round service, you can be sure that your machine always „keeps on running“. We accompany you during your plant's complete lifecycle: starting with commissioning, through the ordering of spare parts, right down to its modernization. Our team will be happy to answer your service inquiries at any time.

Our service offers:

➤ **Tutorials / trainings**

p.4



➤ **Commissioning / advice, spare parts service**

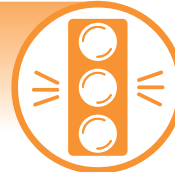
p.6



» *For us, service means always keeping the customer's needs in mind.*

➤ **Preventive maintenance**

p.8



➤ **Smart services**

p.10



➤ **Modernization / upgrades**

p.12



➤ **Repairing service / process laboratory**

p.14



KNOW-HOW AND EXPERIENCE

A competent, well-established team

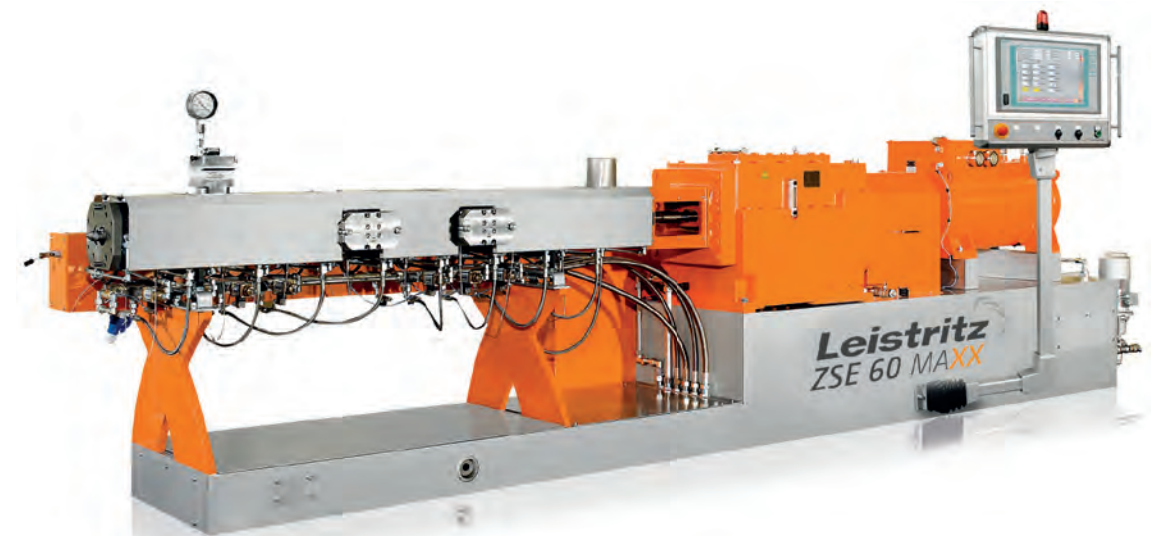
The technical support offered by Leistritz will convince you through its many years of experience in dealing with extruders and extrusion lines. Support is provided by the service centers in Nuremberg, Somerville (USA), Taicang (China) and Singapore. Our team is active around the world for you – competent and solution-oriented.

SERVICE HOTLINE

➤ +49 911 4306-444

➤ extrusion-service@leistritz.com

extrusion-spareparts@leistritz.com





CUSTOMER TRAININGS

Bring your employees up to speed

Training makes perfect! We have made it our task to pass on our extensive knowledge of all aspects of extrusion and process engineering to our customers. The various training modules, which build up on each other, offer profound know-how for operating extruders and lines at optimum throughputs and quality.

Of course, we also offer customized training sessions: Here, we specifically address the needs of our customers and offer tailored and solution-oriented trainings for beginners and professionals at your site or in our training center in Nuremberg.

MODULE I - BASIC

content: function of modern extrusion lines

target group: operators with no basic knowledge

MODULE V - SIGMA

content: presentation of the functions of the SIGMA simulation program for screw and barrel configuration

target group: employees in R&D and quality assurance, process engineers

MODULE II - ADVANCED

content: in-depth training for a more efficient production

target group: operators with basic knowledge

MODULE III - MECHANICS

content: service and maintenance of extrusion lines

target group: service/maintenance personnel

MODULE IV - PROCESS ENGINEERING

content: development and optimization of the extrusion process

target group: experienced operators

» Today's knowledge determines tomorrow's success.

EXTRUSION ACADEMY

Knowledge – an indispensable success factor

How do you best utilize the potential of your extruder? How do you detect irregularities and how do you fix them? Get to know your plant and the process – with the support of professionals in the Extrusion Academies! After all, knowledge transfer is a very important component of the Leistritz service. Whether machine operators, technicians, beginners or professionals, the Extrusion Academies are the perfect place to take your knowledge to the next level. The participants put the theory they have learned into practice in our well-equipped technical centre. The Extrusion Academies take place several times a year in Nuremberg and China.

EXTRUSION ACADEMY BASIC



content: detailed information on the latest processing technology, improvement of product quality through extensive basic knowledge, optimization of production processes through adaptation of what has been learned, more efficient handling and operation of the extrusion line

target group: operating personnel, production managers

EXTRUSION ACADEMY PRO



content: focus on application-oriented solutions, optimization of extrusion lines, avoidance/removal of defects, deeper insight into material preparation, energy balance and factors influencing product quality in plastics extrusion

target group: operating personnel, production managers

PHARMA EXTRUSION ACADEMY



content: know-how on extruder functionality, development using Quality by Design (QbD) and Design of Experiments (DoE) as well as Process Analytical Technology (PAT) to achieve outstanding production results

target group: operating personnel, production and formulation development managers

Current dates can be found at extruders.leistritz.com

PLANT COMMISSIONING

Professional support

State-of-the-art, high-throughput extruders require a competent operation in order to realize best results. The twin screw extruders from Leistritz are commissioned on the customer's premises. Our service engineers assist the customers during the first production run to guarantee a smooth and safe start. The plant operator and operating personnel are given an extensive introduction in handling the extruder. This is an integral part of our commissioning service.



CUSTOMER BENEFITS:

- notification already in the run-up to delivery
- checklist to prepare for commissioning
- installation inspection
- setting of optimized system parameters
- trial run
- commissioning report
- practical instruction in the operation of the plant

COMPETENT ADVICE

Process and electrical engineering

As a pioneer in extrusion technology, Leistritz has accumulated a wealth of experience, which above all benefits our customers. It is no longer enough to simply be a supplier of modern mechanical engineering. This is why our process and electrical engineers are there to help and answer any questions you may have on handling your Leistritz extrusion lines.



CUSTOMER BENEFITS:

- team of experts including a top-notch network of partners will help with even difficult process tasks
- initial diagnosis and help in finding a solution
- optimization of the plant in terms of quality and throughput capacity

SPARE SPARTS DELIVERY

Quick and competent

"Made in Germany" is brought to life at Leistritz, because the heart of every extruder – the barrel and screws – are manufactured in Germany. The highest quality standards are guaranteed by top materials and sound production know-how. Our after-sales specialists provide competent help when choosing the relevant components and take care of their fastest possible delivery.



CUSTOMER BENEFITS:

- comprehensive advice from a competent team of experts
- fast availability and delivery of spare parts worldwide
- customized spare parts packages

ORIGINAL QUALITY

ZSE GL/HP screw elements – immediately available

In order to be able to supply older extrusion lines with the required screw elements at short notice, we have set up a warehouse especially for elements of the ZSE GL and HP series. A large number of the most common screw elements are stocked there all the time.



CUSTOMER BENEFITS:

- manufacturer's original quality *
- immediately available
- reasonable prices
- worldwide shipping

*Using parts other than the original spare parts can adversely affect the extruder's performance and the load capacity, precision and service life of individual components/modules.



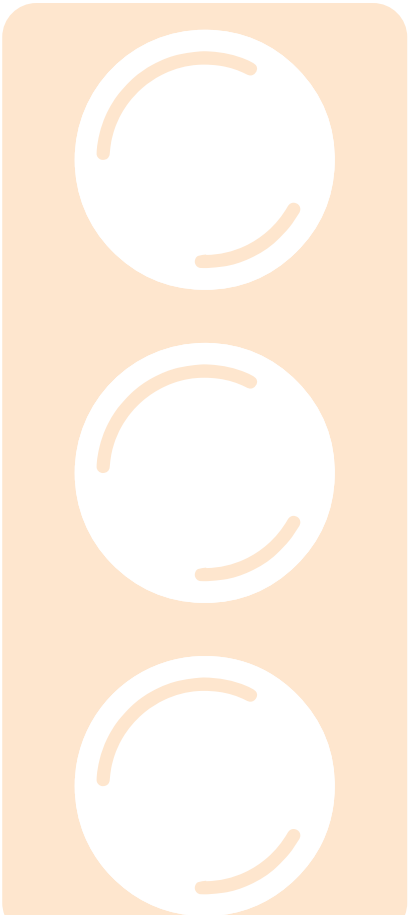
PREVENTIVE MAINTENANCE

Keep on the safe side

We all know that prevention is better than cure! This applies not just for many areas of daily life, but also for machines. Wear and tear are a natural phenomenon when they are in daily use. A lot of time and money can be saved through regular maintenance* and wear protection measures.

Leistritz offers various, individually configurable **maintenance concepts (CheckUp BASIC, CheckUp PROFESSIONAL)** to help guarantee a long machine life and reduce downtimes.

» Full utilization, improvement in quality and productivity, high availability, competitive edge – the basis for all these is an efficient and fully functional machinery.



Maintenance agreement: PREFERRED CUSTOMER

By regular maintenance not only do our customers benefit from a perfectly running extrusion line, they also gain valuable knowledge regarding machine optimization, which eventually helps them to save costs. With the **maintenance agreement PREFERRED CUSTOMER** they are on the safe side and enjoy considerable benefits. Basis of every maintenance agreement is the CheckUp PROFESSIONAL.

MAINTENANCE CONCEPT

PREFERRED
PROFESSIONAL
BASIC

PERFORMANCE	CHECKUP BASIC	CHECKUP PROFESSIONAL	PREFERRED CUSTOMER
➤ Wear measurement of screws	✓	✓	✓
➤ Wear measurement of barrels	✓	✓	✓
➤ Gear oil check	✓	✓	✓
➤ Inspection of melt pressure sensors		✓	✓
➤ Inspection of vacuum pump		✓	✓
➤ Water analysis		✓	✓
➤ Measurement of gear vibration		✓	✓
➤ Checking the dosing system incl. calibration function		✓	✓
➤ Evaluation of temperature curves		✓	✓
➤ smartGlasses			✓
➤ Defined response time			✓
➤ 5 hours technical consulting per extrusion line per year			✓
➤ 5% discount on all spare parts			✓
➤ Online vibration measurement			✓*

We recommend the first check up 10-12 months after commissioning, then annually.
*Option: permanent online vibration control of all gearbox and main motor bearings.

Additional maintenance features

Apart from those services offered within the scope of our various maintenance concepts, additional services are also available separately.

Barrel rinsing

The extruder's cooling circuit is very important for process reliability. Limescale and dirt that accumulate after some time on the walls of the pipes and barrels reduce the cross-section of a pipe. Consequently, an enormous drop in cooling capacity. The cooling circuit should be rinsed on a regular basis to prevent this. Leistritz offers eco-friendly and efficient cleaning of the barrel on site by means of a bio-chem process.

Leistritz online vibration measurement (LOVM)

A gearbox failure means production loss. Even a little bearing damage can bring an entire plant to a standstill. With the new diagnosis device LOVM, Leistritz provides the possibility of constantly monitoring the gear box. This way, possible gear damages can be recognized already at an early stage.

Gear oil check

Impurities or abrasion from gear box parts in the gear oil lead to wear on the inside of a gear box. This can be prevented: with a gear oil check. This inspection determines whether there is any water or other substances in the oil. Furthermore, impurities are examined in order to prevent possible damages.

Water analysis of the heating/cooling system

The water analysis measures the conductivity, hardness, PH value and above all the iron content of the water. These results allow us to draw important conclusions on the level of corrosion in the barrel's heating/cooling bores as well as the overall heating/cooling system. If the values are no longer within the tolerance range, we take care of optimizing the water.



SMART SERVICES

Remote servicing and process optimization

Remote access to plant control systems is an indispensable benefit for both the plant operator and the plant manufacturer. Leistritz provides a hardware-based solution, which allows us to offer our customers even greater operational reliability: be it for error analysis, remedying configuration faults or technical defects, to carry out software updates or functional add-ons. This service has long been a standard feature at Leistritz (older plants can be upgraded).

Safety and the protection of customer data are of paramount importance here. This is why the data is encrypted via a **safe VPN tunnel**, and protection offered through a separate firewall. Only the customer can grant our service staff external access with a switch. We work with our own sub-network that is used exclusively by our service engineers. This means that the service can be rendered quickly and economically from far away.

Vibration measurement at the gear box

Gearbox failure = Production failure! Even a little gearbox failure can jam a production for weeks. Long waiting times for spare parts and expensive procurement as well as installation costs delay planned delivery times and make even experienced plant operator sweat. The Leistritz Online Vibration Measurement (LVOM) provides the possibility to monitor the condition of your gearbox. This way, you are able to detect bearing damages which might arise.

And this is how it works:

Four capacitive sensors can easily be mounted to monitor the gearbox of your Leistritz extruder. The diagnostic device analyzes the vibrations and sends a pre-alarm to the control unit. The best thing about it is that the current operation of the plant is not being interrupted. Our experts connect to the diagnostic device of your extruder via the Leistritz remote control software mGuard to perform the analysis.

SPECIAL

smartGlasses

Relevant information at the right time, place and in the right situation – this is made possible by the use of smartGlasses. Do you want to solve a problem on your extruder quickly and cost-effectively? Simply put on the smartGlasses, connect with our service team and you will get the support you need.

And this is how it works:

By means of these special data glasses and an intelligent software application you as a customer are given the opportunity to communicate very easily and bidirectionally with the Leistritz service team.

The glasses comprise a camera and microphone for video and sound recordings as well as a display. This way, instruction steps can be visualized directly at the workplace (e.g. when standing right in front of the machine in the production hall). Knowledge is shared cross-site in real time.



CUSTOMER BENEFITS:

➤ faster service

In case you have problems with the extruder, you will need quick support. By means of the smartGlasses our technician is capable of overseeing and evaluating the current situation within only a few seconds.

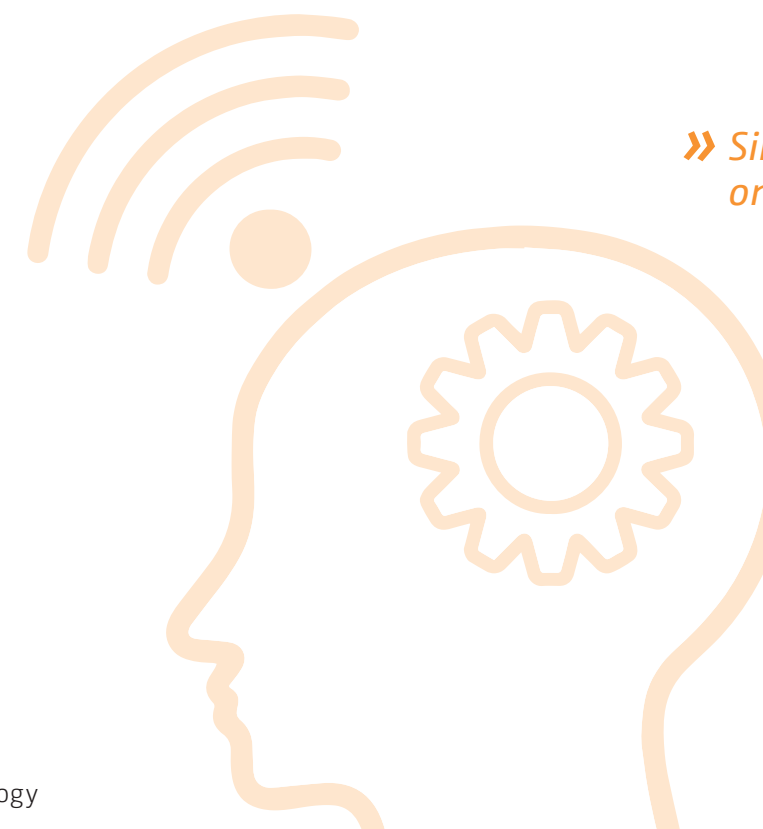
➤ less downtimes

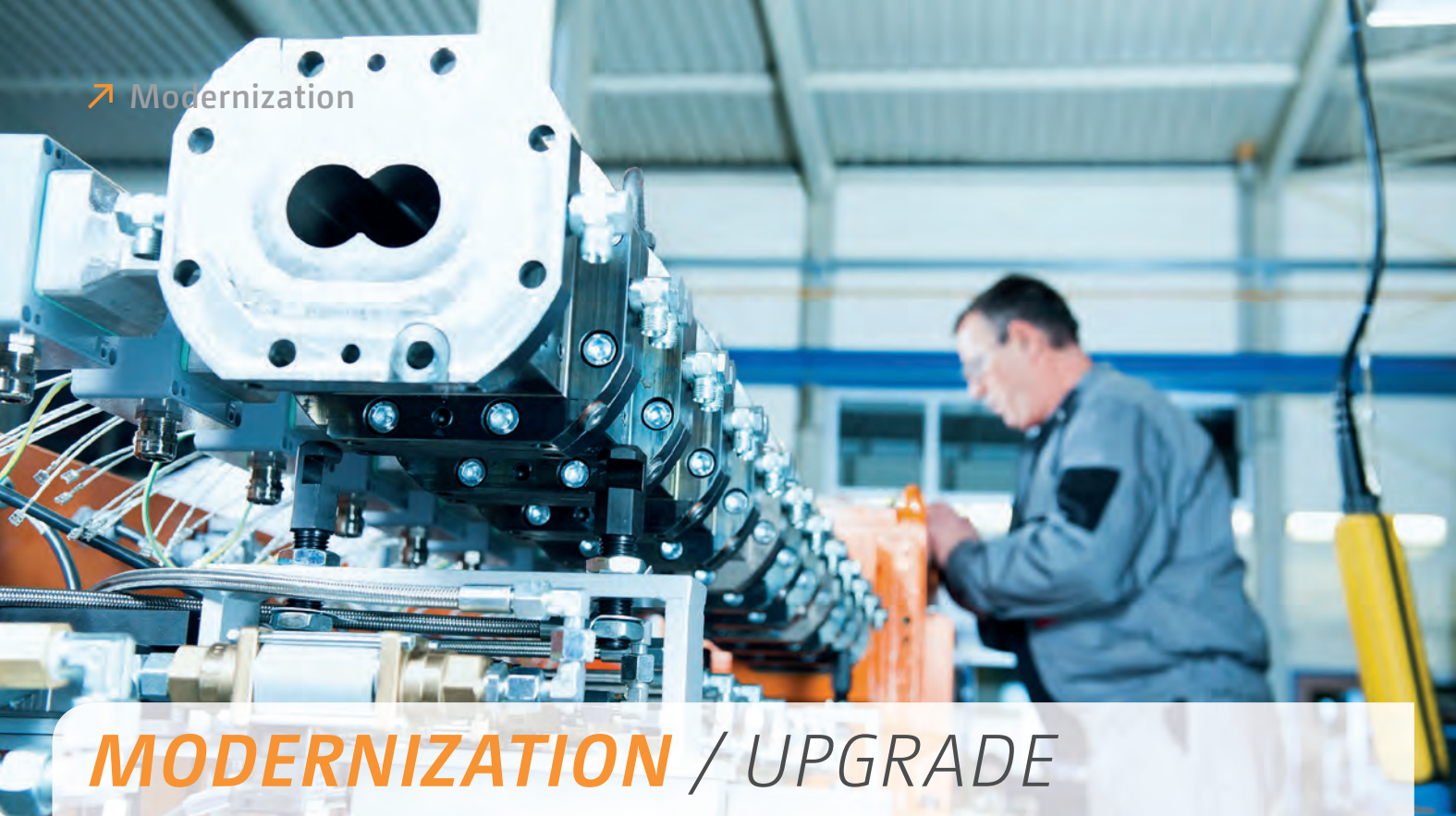
Every minute of downtime costs hard cash. With the use of smartGlasses and augmented support application downtimes can be enormously decreased.

➤ reduced service costs

By using the smartGlasses you can reduce service costs of up to 70 % (elimination of travelling costs).

» Simply save time and money on maintenance!





MODERNIZATION / UPGRADE

New solutions for existing plants

Production requirements and formulations often change. Spare parts are sometimes no longer available for older machine components. If you need a fast, economical and technically optimized plant modernization, we will be happy to be of assistance. You will save both time and money with our upgrade service for twin screw extruders and extrusion lines. We will upgrade your machine to suit your specific needs – so that even older plants remain competitive.

CUSTOMER BENEFITS:

- comprehensive advice from a competent team of experts
- fast availability and spare parts delivery for upgrades worldwide
- customized spare parts packages

Leistritz vertical degassing

Besides venting, degassing is also state of the art in many extrusion processes. Conventional vacuum ports easily clog and consequently, the operational safety is no longer assured. Also, the product quality decreases. The production process has to be stopped and the port needs to be dismantled and laboriously cleaned. The new Leistritz vertical degassing (LVE) solves this problem!

Replace your old vacuum port by the new LVE. Thanks to this simple and cost-effective solution, you can reliably degass and continuously increase the profitability of your production plant.

SPECIAL

Control unit modernization

The availability of your Leistritz twin screw extruder is highly dependent on the reliability of the control unit. However, the older the control unit is, the more difficult and costly it becomes to procure the necessary spare parts. In the worst case, this can result in long downtimes. With our customized modernization concept, we will bring your old control unit back up to date and thus secure your production.



CUSTOMER BENEFITS:

- increased system availability
- quick support via remote maintenance
- lower maintenance costs
- fast availability of spare parts worldwide
- plug & play for electronic components
- simplified user interface
- online process data transfer
- connection to the customer's network

OPTION:

- remote maintenance of the system control via VPN tunnel
- melt pressure performance level „C“
- process data storage

Gear box replacement

Leistritz twin screw extruders have a high power density and require a very reliable mode of operation of the integrated machine parts. The gear box has to withstand high axial forces and long periods of use. A failure can have costly consequences. This is why we offer to replace your old gear box with one that has been overhauled.



CUSTOMER BENEFITS:

- saves time and money
- only short downtimes during replacement
- considerably more cost-effective than new gearboxes



REPAIR SERVICE

Economical and professional

The most common causes for increasingly poor product quality, reduced output or unstable processes are worn-out screw elements and barrels. Quick action is needed here. In such cases you can trust our experienced and competent staff in the Leistritz repair center. When it comes to worn-out screw elements and barrels, our team provides the solution. Send the parts in and you will receive the reconditioned parts back in the shortest possible time – like new! After all, we always have the most common elements in stock.

Not only do you as a customer save considerable costs with a repair, you also minimize the downtimes of your systems. Therefore, prevent!



Screw element disassembly service

Whether large or smaller twin-screw extruders, when the screws are stuck, oftentimes nothing more can be done. Before you reach for the hammer to remove screw elements from the shaft, it is better to choose the gentle method: Send us your screw set (whether from Leistritz or another supplier) and we will remove it in no time with the help of our screw element disassembly system!



LAB TESTS

Materials in practical tests

The Leistritz process laboratories in Nuremberg, Somerville (USA) and Taijiang (China) are a key factor in the company's success story. This is where materials and formulations can really be put through their paces. Nuremberg and Somerville also have process laboratories for tests in the pharmaceutical sector. Even if they are only involved in the development of processes or

the production of samples, customers profit not only from the long-standing know-how of our engineers and technicians, but also from the flexibility of our machines. The extrusion lines are of a modular design so that not only the machine layout itself but also the corresponding screw geometries and barrel arrangements can be quickly adjusted to different requirements.

In our plastics and pharmaceutical process laboratories in Nuremberg you will find, amongst other things:

- ZSE MAXX twin screw extruders (18, 27, 40, 50 mm)
- cast film extrusion plant (up to 800 mm film width)
- all common feeder and pelletizing systems
- Nano 16, ZSE HP-PH (12, 18, 27 mm)
- Leistritz Micro Pelletizer and other pharma-compatible downstream equipment

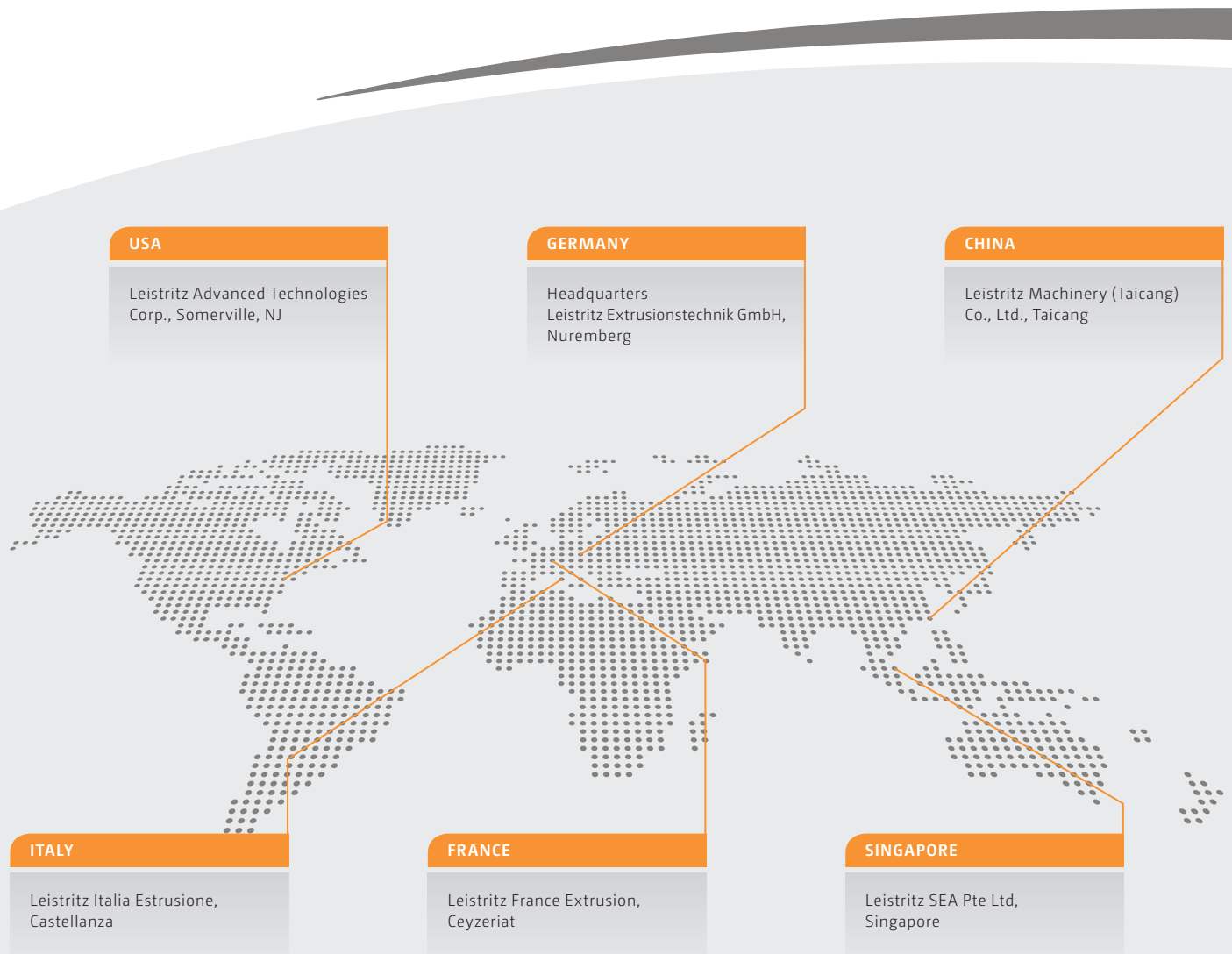
CUSTOMER BENEFITS:

- project-specific tests with customer material are possible
- validation, improvement and initial development of formulations
- comprehensive support and advice from qualified process laboratory teams



EXTRUSION TECHNOLOGY

Available for you all over the world



➤ Leistritz Extrusionstechnik GmbH | Markgrafenstrasse 36-39 | 90459 Nuremberg | Germany
T +49 911 4306-0 | F +49 911 4306-400 | extruder@leistritz.com