Leistritz

EXTRUSION TECHNOLOGY

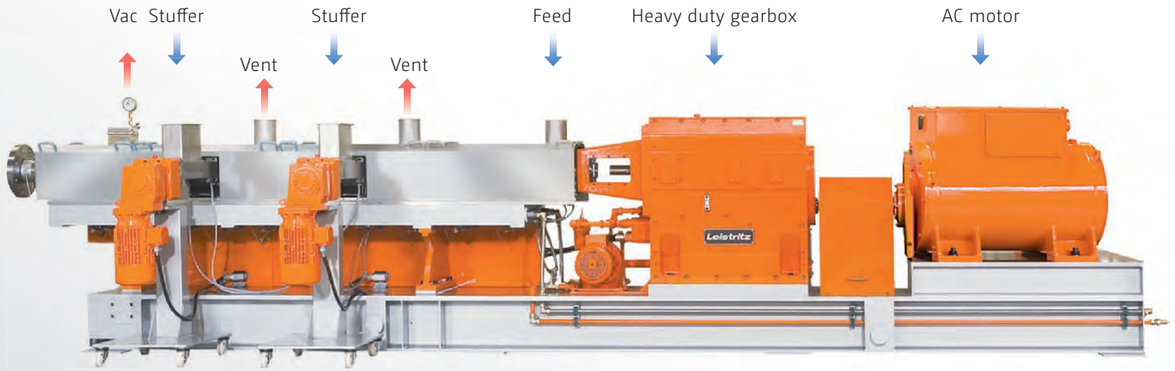
Twin screw extruders and systems

XXPERIENCE COUNTS!

Leistritz Extrusion Technology

Established in 1905, Leistritz is a multi-national company with business units in a number of high technology areas. Leistritz Extrusion designs, manufactures and supplies twin screw extruders and turnkey systems for the plastics and pharmaceutical industries all around the world. Whether your requirement is a laboratory sample or high-volume production, Leistritz can supply the twin screw extrusion system to meet your needs!

Co-rotating twin screw extruder screw set



ZSE MAXX twin screw extruder

Laboratory scale

High-volume production

Turnkey system

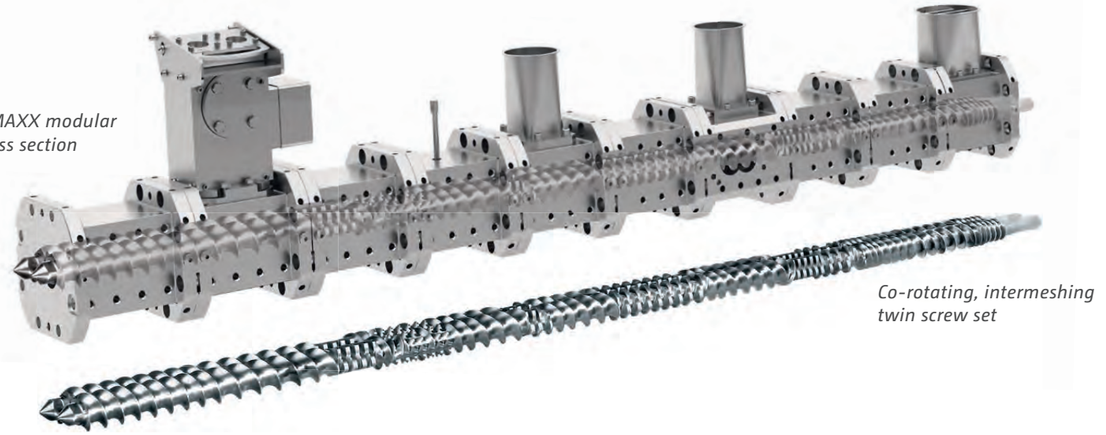
» *ZSE MAXX twin screw extruders are used for many processing tasks*

TWIN SCREW EXTRUDER DESIGN

Modular barrel and screw system

Co-rotating, intermeshing twin screw extruders (TSEs) continuously mix plastics formulations consisting of pellets, powders and fluids. Barrels are modular and utilize liquid cooling. Screws are segmented and assembled on high torque shafts. Screw designs are shear intensive or passive, based upon the application. Metallurgies are matched to the process and can be highly corrosive and abrasive resistant. Feeder(s) set the rate to the TSE and a controlled pressure gradient allows materials to be introduced into downstream zones via side stuffers and liquid injection systems.

ZSE MAXX modular process section



Co-rotating, intermeshing twin screw set

Modular barrels

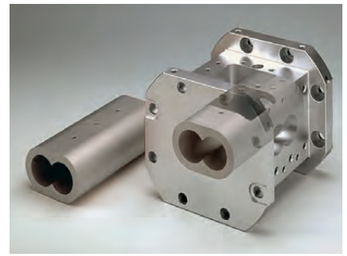
Segmented screws

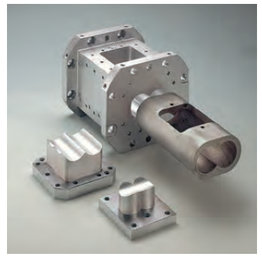
Dispersive mixing element

Flighted conveying element

Distributive mixing element

Heavy duty gearing





Modular barrel with insert liner and closures- metallurgies are matched to the process

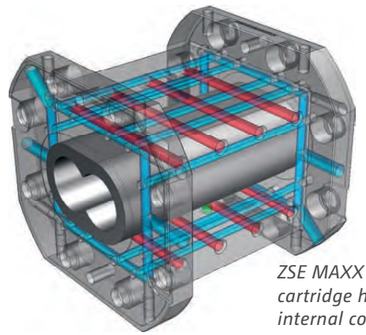
ZSE MAXX SERIES

High free volume and high specific torque

The Leistritz ZSE MAXX twin screw extruder series utilizes an OD/ID (outside diameter/inside diameter) screw ratio of 1.66/1 which facilitates a high free volume in the TSE process section in combination with high torque. The combination of high volume and torque is made possible by an asymmetrical splined shaft design. Barrels use electric cartridge heaters for increased heating capacities and improved maintenance. Another unique feature of the MAXX series is that each barrel section has two plumbing inlets and outlets for increased coolant flow and better heat transfer capabilities.

Features

Asymmetrical splined shaft

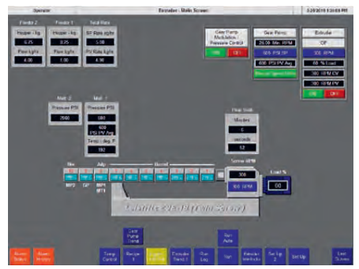


ZSE MAXX barrel with cartridge heaters and internal cooling bores

CONTROL ARCHITECTURES

Automation technology

Leistritz offers various control architectures and options. Programmable Logic Controllers (PLCs), Human Machine Interface (HMI) touchscreens, motors and drives are matched to in-house preferences. Systems can be accessed remotely via a VPN access for system diagnostics and upgrades!

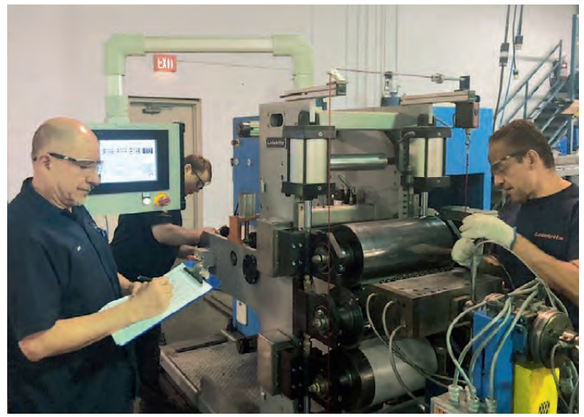


HMI touchscreen

TEST, DON'T GUESS!

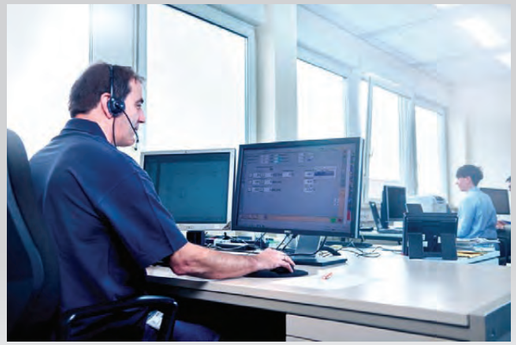
Fully equipped process development laboratory

The Leistritz USA process development laboratory includes various sizes of twin screw extruders, more than 40 feeders for pellets, powders and liquids, and a variety of downstream systems. A separate area is available for cleanroom testing. Pelletizing film, sheet and profile (including co-extrusion tooling) and supercritical liquid injection systems are available.



REMOTE SERVICING

Quick support



Quick and economical service from afar! Safe and encrypted remote access is available via VPN connection for software updates, process and service related troubleshooting.

Spare parts programs: We maintain all the necessary parts at our USA facility to keep you up and running. Consignment arrangements are available upon request.

Training: We offer Twin Screw Workshops that combine classroom training with "hands-on" machine demonstrations. Since 1990 5000+ have attended Leistritz educational programs.

Technical library: Technical literature relating to twin screw extrusion technology is available for download via our website.

TWIN SCREW EXTRUDERS

Laboratory scale and pilot plant

There is a reason Leistritz has installed more TSEs at research institutions than anyone else. Integrating these systems is a Leistritz specialty. Whether it's early stage research, formulation testing or pilot scale development, we have a TSE designed for the task. Pelletizing and/or direct extrusion systems are commonly supplied.

ZSE 18 with LHLG pelletizer

Data acquisition

R&D

ZSE 27 HP with gear pump and underwater pelletizer

ZSE 40 MAXX with side stuffer, screen changer, gear pump, diverter and underwater pelletizer

TWIN SCREW EXTRUDERS

Small lot, mid-size and high-volume production applications

All Leistritz TSEs are rated for 24 hr/day industrial scale production and are ideal for small lot specialty compounds, mid-range or high-volume production applications making pellets or parts. Complete systems may be specified, including upstream material handling equipment, dies and downstream systems, all fully integrated. Each system is equipped with remote VPN access for troubleshooting and service.

Compounding

ZSE 50 with air-quench pelletizer

Flexibility of design

Specialty applications

ZSE MAXX compounding plant for highly filled compounds

Reactive extrusion

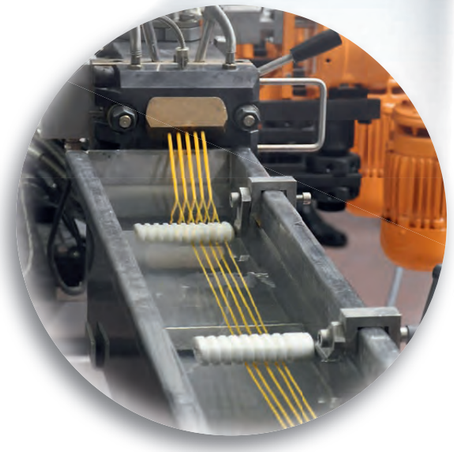
Devolatilization

MASTERBATCH AND COMPOUNDING

Very good quality of dispersion

Continuous mixing (compounding) of polymers with pigments, fillers, fibers and additives is the most common application for a TSE. Highly-filled formulations and masterbatch production are Leistritz specialties. Pre-mixes that don't segregate are often metered into the TSE. Multiple feed streams typically require loss-in-weight feeders. Downstream introduction of fillers and fibers often utilize a side stuffer, which is particularly beneficial for shear sensitive materials! Strand, hot face and underwater pelletizers are all commonly integrated into the TSE system.

ZSE 27 MAXX split-feed strand pelletizing system



Color masterbatch is a Leistritz specialty

ZSE 75 MAXX high filler loading system with two side stuffers

ZSE 35 MAXX twin screw extruder

Engineering resins

PVCs

Masterbatch

Blends and alloys

CBAs

Highly filled formulations

FRs

Fiber filled

High liquid phase

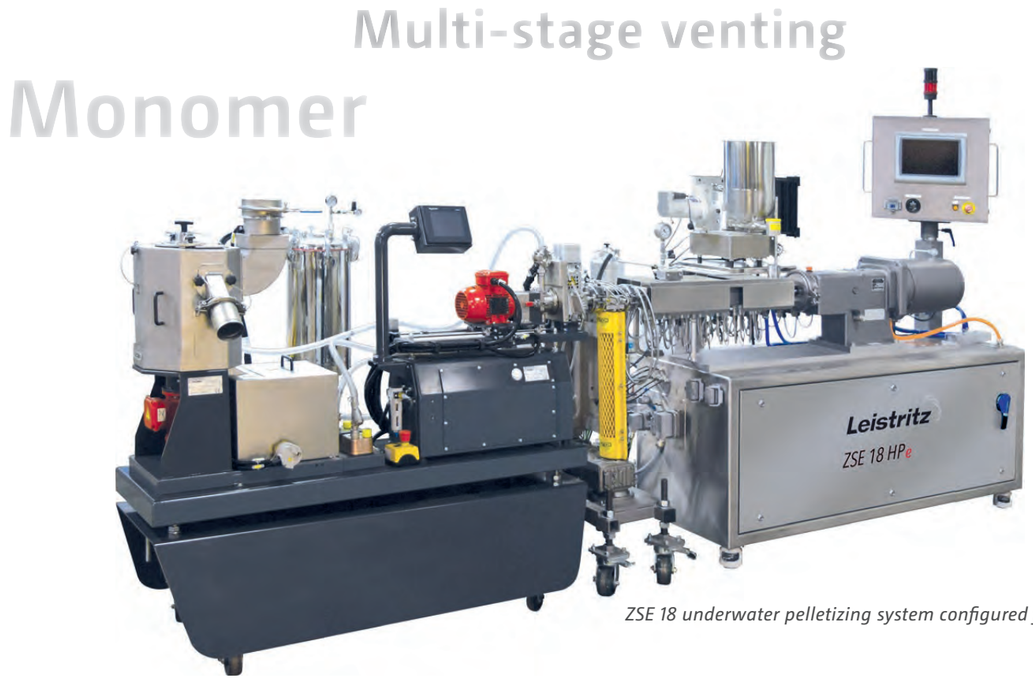
Specialty compounds

DEVOLATILIZATION *& REACTIVE EXTRUSION*

TSE systems

Devolatilization (DV) is a process where unreacted monomer, solvent, water or other undesirable volatile contaminants are removed from a polymer melt. Vacuum level, residence time, surface area of the melt pool and surface renewal are all managed to facilitate DV efficiencies. All/most TSEs include the provision for devolatilization – sometimes as a critical factor, and sometimes an after-thought.

Leistritz TSEs may be integrated into reactive extrusion (REX) systems, where a chemical modification and/or polymer synthesis occurs in the TSE. Screw design, temperatures, rate and screw rpms all play a key role in the final product properties.

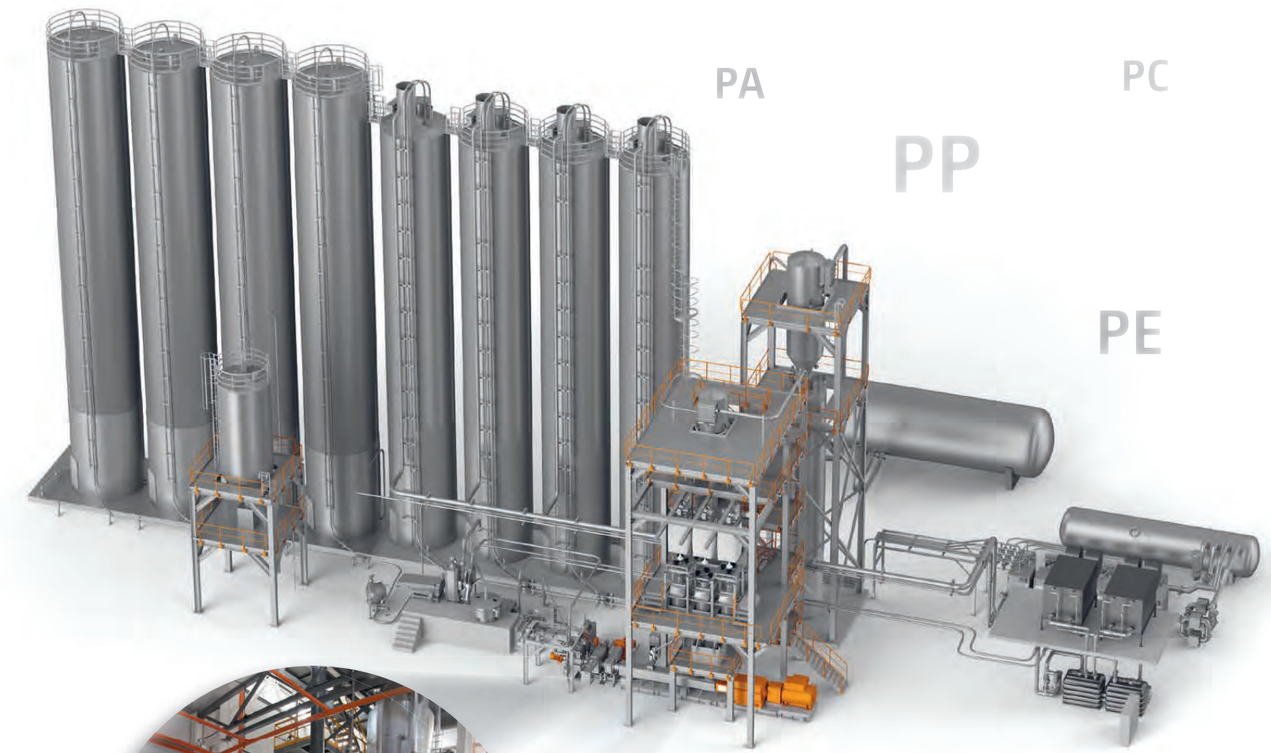


ZSE 18 underwater pelletizing system configured for REX

POST-REACTOR *TSE SYSTEM*

Large scale compounding

Leistritz twin screw extruders are utilized in the post-reactor process to compound additives into the polymer. On-line rheological equipment can be integrated to monitor and control the molecular weight of the polymer.



ZSE 180 MAXX post reactor plant

DIRECT EXTRUSION

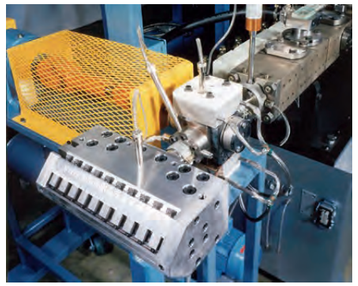
Films, sheets, fibers

Direct extrusion refers to when raw materials are compounded in a TSE and extrudated directly into the final part, bypassing the pelletization step. Why do it? The materials experience one less heat and shear history, which often translates into improved product properties.

And eliminating the second stage single screw operation saves cost. Direct extrusion systems can integrate gear pumps to achieve tight tolerances. Downstream systems are then matched to the specific application.

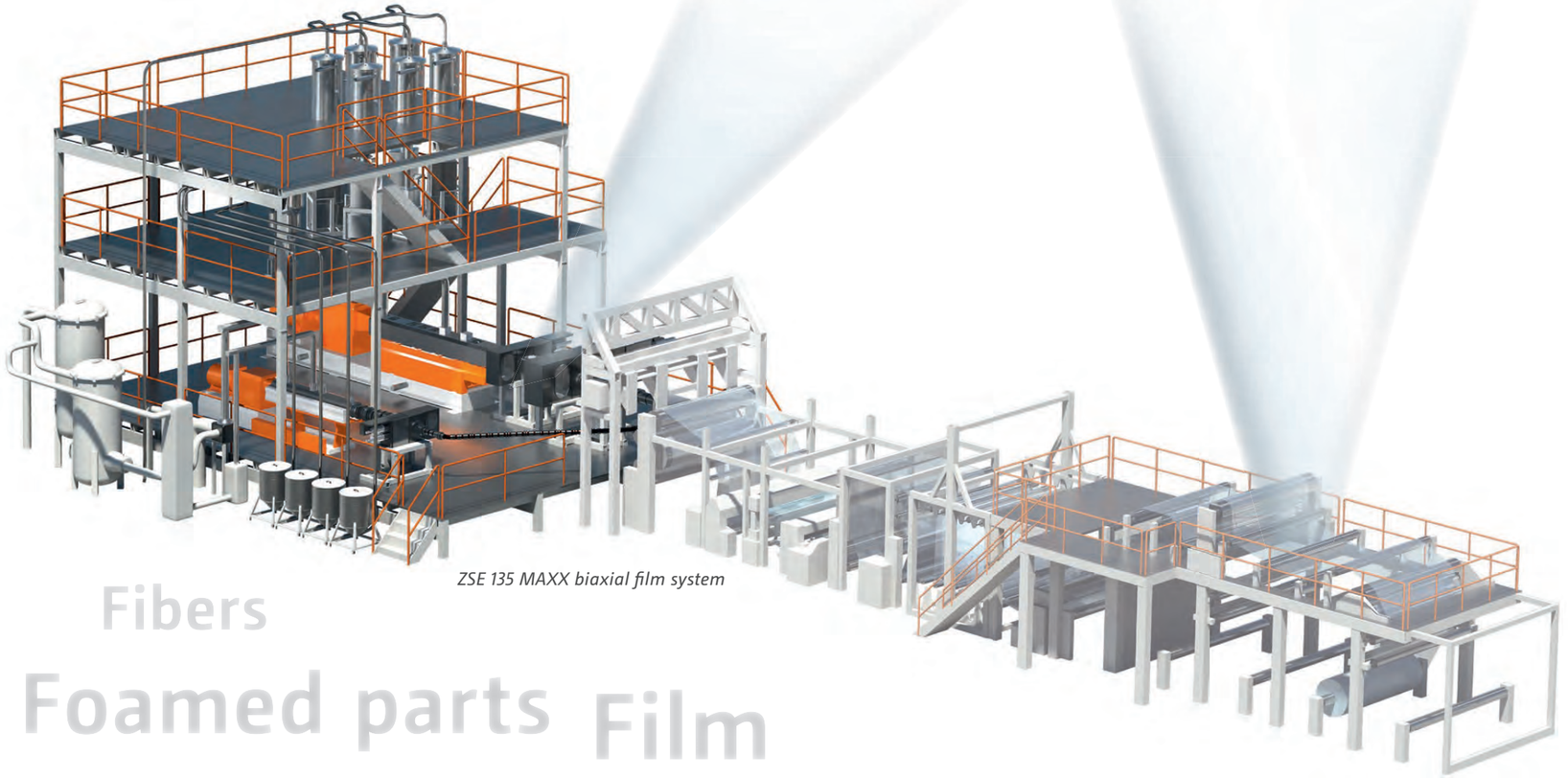
Micro-27 @ 60/1 L/D configured for compounding and foam profile extrusion

ZSE 27 MAXX with gear pump and downstream sheet system



Gear pump and sheet die

Coex PVB film system



ZSE 135 MAXX biaxial film system

Fibers
Foamed parts
Film
Molded parts
Filaments
Co-extrusion
Sheet
Profile

PHARMACEUTICAL AND NUTRACEUTICAL

TSEs for various processes

Leistritz manufactures twin screw extruders (TSE) that produce state-of-the-art pharmaceutical dosage forms. Melt extrusion increases the bioavailability of poorly soluble active pharmaceutical ingredients (APIs), and granulation extrusion processes facilitate continuous mixing and drying. For nutraceuticals the TSE is used to mix, cook, dry, condition and increase the nutrient bioavailability.

Entrapped air, moisture and volatiles are efficiently removed via venting in a TSE. A more consistent, repeatable and uniform product is the typical result as compared to batch processes.

Containment systems and validation documentation are commonly integrated into the cGMP system design, and a wide variety of downstream systems are available.

NANO 16 twin screw extruder – can process 50 grams or less

ZSE 18 HP-PH with micro-pelletizing system

Nano-scale

PAT

Excipients

Melt extrusion

Solubility

APIs

Gel mass

ZSE 27 HP-PH pharmaceutical class twin screw extruder

ZSE 27 in granulation format

ZSE 27 micro-pelletizing system with in-line gauge, pelletizer and classifier

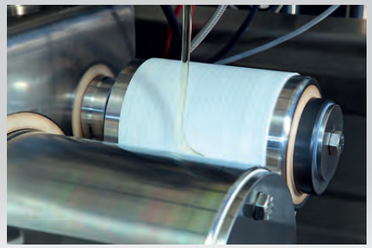
Dissolvable films

Drying

Micro-pellets

Specialty lamination system for transdermal, wound care and films

CHILL ROLL



ZSE 18 HP-PH extruding to the chill roll

ZSE 60 in granulation format

Conditioning

Multi-functional devices

Transdermal

Fibers

Twin screw extruder with glove box/containment features

Leistritz

EXTRUSION TECHNOLOGY

Available for you all over the world

USA

Leistritz Extrusion,
Somerville, NJ

GERMANY

Headquaters
Leistritz Extrusionstechnik GmbH,
Nürnberg

CHINA

Leistritz Machinery (Taicang) Co., Ltd.,
Taicang

ITALY

Leistritz Italia Estrusione,
Castellanza

FRANCE

Leistritz France Extrusion,
Ceyzeriat

SINGAPORE

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