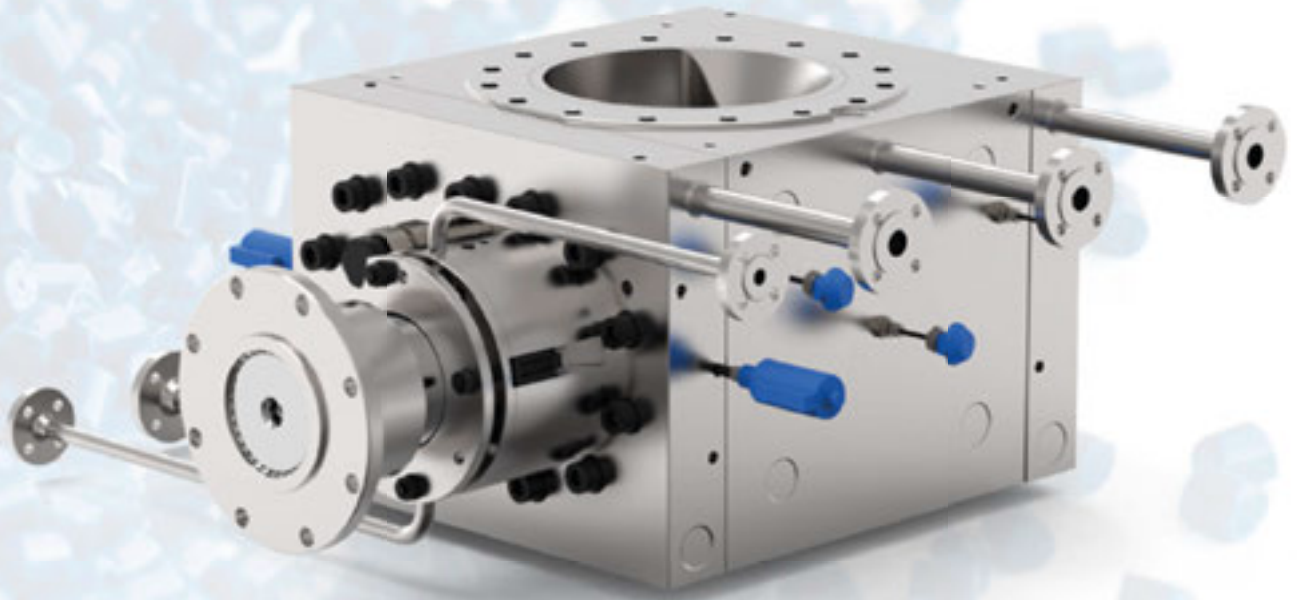


MADE IN GERMANY  
Gear pumps  
for the polymer industry



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WITTE PUMPS & TECHNOLOGY GmbH is an international medium-sized machine designer and manufacturer based in Tornesch near Hamburg.

WITTE specialises in developing and manufacturing precision gear pumps. It has its own subsidiaries in the USA, China, Russia and Malaysia, as well as a number of agents representing it worldwide.

# WITTE gear pumps for the polymer process



The petrochemical industry is one of the most important economic sectors. It is the foundation and engine for new and innovative products and materials. The manufacture of chemical base substances as raw materials for plastic products and chemical products calls for the highest standard of precision and care.

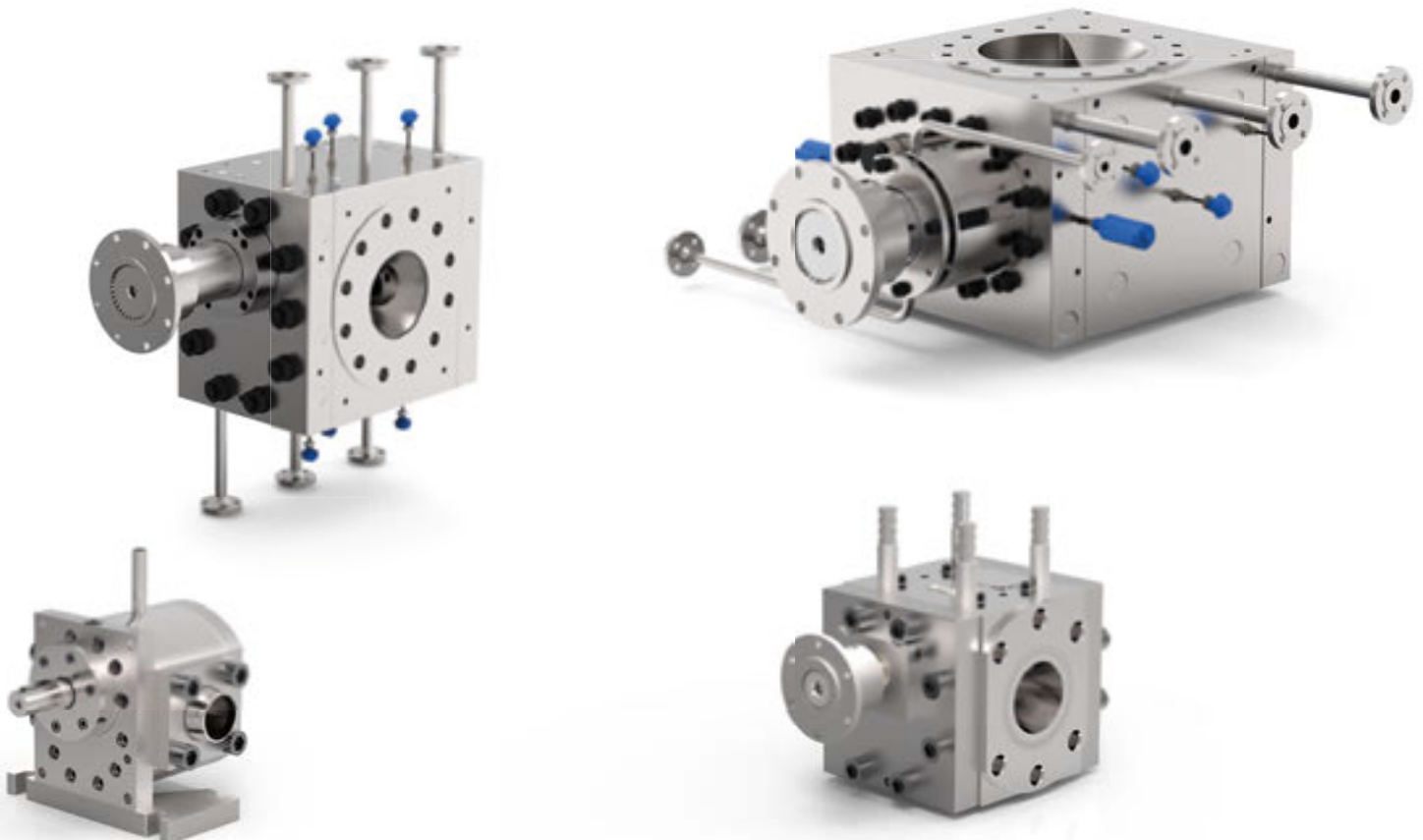
WITTE PUMPS & TECHNOLOGY GmbH has been a reliable technological partner to innovation drivers and giants in the chemical and plastics industries for years. We always aim to offer our customers the maximum degree of process reliability with our precision gear pumps

and, in doing so, comprehensive quality controls take top priority.

Usually a number of different pumps are needed in the manufacture of plastics and their raw materials. WITTE specialises in serving the entire process chain for the production of polymers with a wide range of pumps.

The advantage here is that customers can get all of their pumps from one place and these pumps are perfectly matched. The pumps in all series are individually adapted to the requirements and conditions of the plant and process

in question. It is important to us that the highest safety standards are met and any risk to humans and nature is eliminated. We use an extensive network of material experts and manufacturers in the production of the components, allowing us to be able to offer pumps for even the most extreme conditions.



# Product overview



**The WITTE polymer pump range: the right pump for every processing stage. Available in standard designs or modified in accordance with customer requirements.**

Plants and components are subject to extreme requirements in the production and processing of polymers. High temperatures and pressures are required for many processing stages. The quality of the product strongly depends on constant process parameters. Temperature fluctuations, shearing, pulsation or pressure changes negatively impact the quality of the melt.

That's why WITTE has developed a range of pumps that are precisely matched and can therefore be used in every required processing stage.

From the preparation and mixing of individual chemical components to the production of prepolymers and the final product, we offer the optimal pump solution.



## WITTE gear pumps for the polymer process



### Metering CHEM series

Chemical pumps for metering additives.

Pages 10–11



### Pressure boost BOOSTER series

Pumps for building up the required process pressure for further processing.

Pages 12–13



### Extrusion EXTRU series

Extrusion pumps optimise the extrusion process and relieve the extruder. Product quality is kept consistently high.

Pages 14–15



### Discharge POLY series

For discharge from melt reactors. Powerful discharge pumps with enormous output even from high vacuum conditions.

Pages 16–17

# Applications

WITTE pumps can be used in a number of applications in the chemical and plastics industry. We've compiled a rough overview of the most common media that can be pumped with WITTE pumps here.

	Alcohols	Additives	Bases	Esters	Glycerine	Resins	Hardeners	Isocyanates	Monomers	Oils	Phenols	Acids	Biodiesel	Asphalt	Bitumen	Tar	Hot melt	Adhesives	Demineralsised water	Waxes	PET	PBT	PA/Nylon 66®	PC	PS/HIPS	SAN/ABS	PP/PE
Chemical pumps CHEM	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•			•				
Extrusion pumps EXTRU																					•			•	•		•
Booster pumps BOOSTER																					•	•	•	•	•	•	•
Discharge pumps POLY																					•	•	•	•	•	•	•



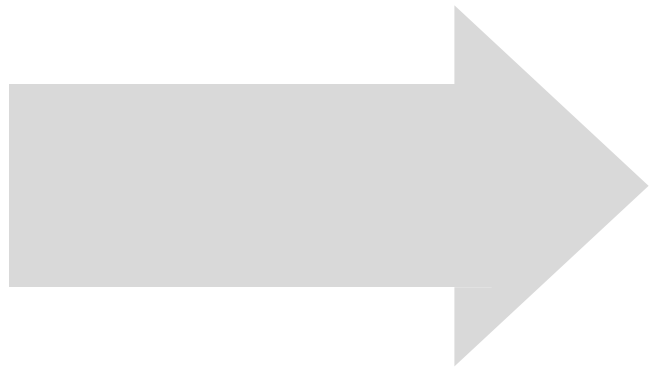
CHEMICALS



POLYMERS



•	•	POM	
•	•	Cellulose	•
	•	Prepolymers	•
	•	PVC	•
	•	PMMA	•
	•	HDPE/LDPE/LLDPE	•
	•	PEEK	•
	•	Polysulphone	•
•	•	Biopolymers	•
	•	EPDM	•
	•	CR	•
	•	NBR	•
	•	SBR	•
	•	NR	•
	•	FPM	•
	•	BR	•
	•	IIR	•



ELASTOMERS

# Processing stages

## Using gear pumps in the production of polymers



### The right pump at every point

WITTE offers the right pump solution for the entire process chain in the production of polymers. Different pump types are used depending on the requirement and the application. All pumps are tailored to the respective technical conditions of the processing stage in question. From small metering pumps for introducing additives in the production of raw melt and

pumps for the production of pre-polymers to discharge pumps for discharging the final polymer melt, WITTE is the one-stop shop for the entire process chain. WITTE also offers the required components for subsequent processing of granulates in the extrusion process.

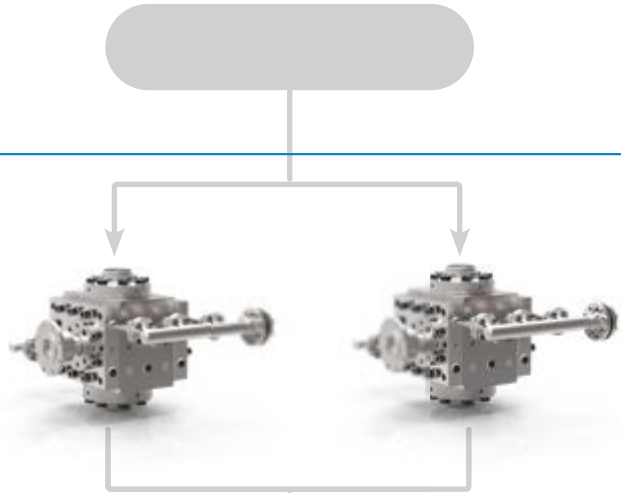


## Reactor with prepolymer melt

- Preliminary product for polymer production
- Discharge of prepolymer for further processing
- Prepolymers, monomers, oligomers

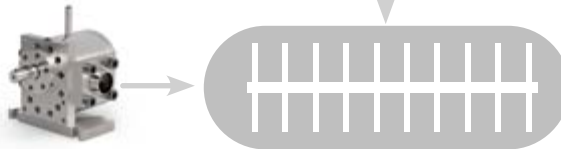
## Discharge of prepolymer

- Prepolymer is transferred from the reactor through prepolymer pumps
- Seal: viscoseal with stuffing box



## Metering of additives to mixer

- Metering of additives
- Mixing of melt



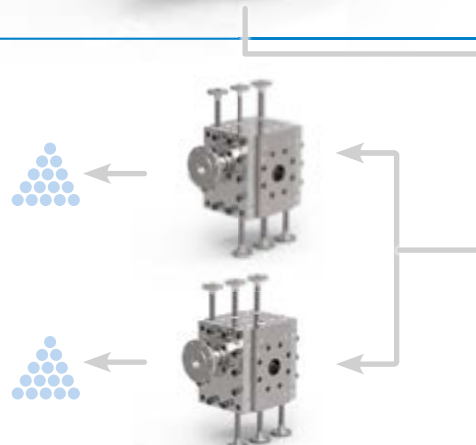
## Discharge of polymer melt with POLY pumps

- Polymer pumps used as discharge pumps
- Discharge from the melt reactor even under vacuum conditions



## Increase of process pressure to produce end product

- Increase of process pressure and transfer of melt to downstream equipment
- Seal: vacuum viscoseal



# Metering

## CHEM series



The CHEM gear pump series was specially developed for the requirements of the polymer industry. The pumps are used to pump and transfer low-to-medium viscous media and are designed as classic metering pumps.

The versatile spectrum of use for these pumps ranges from organic and inorganic chemicals and food-

grade lubricants to polymers and pharmaceutical products.

An extensive modular system provides optimal material pairings for corrosive or abrasive media.





CHEMICALS



POLYMERS

## Technical designs

### HOUSING

Stainless steel · tantalum · titanium · Hastelloy® · ceramic

### GEARS

1.4112, and also all other processable ceramic and metal materials, such as 1.4571, Ferralium®, Ferro-Titanit®, Hastelloy®, etc. · optionally available with coating · spur gearing

### FRICTION BEARINGS

Carbon · NiAg (nickel silver) · silicon carbide · zirconia · tool steel · alum. bronze · optionally available with coating

### SHAFT SEALS

Single internal, single external or double mechanical seal · stuffing box · magnetic coupling

### HEATING

Steam · water · heat transfer oil · electric

## Operating parameters

### VISCOSITY

0.5 to 1,000,000 mPa s

### TEMPERATURE

Up to 350°C · higher temperatures upon request

### SUCTION PRESSURE

Vacuum to max. 15 bar, higher with magnetic drive

### DISCHARGE/DIFFERENTIAL PRESSURE

Up to 120 bar

*The values listed are maximum values and must not coincide under certain circumstances.*

### PUMP SIZES

From 0.2 cm<sup>3</sup>/rev. to 24,000 cm<sup>3</sup>/rev.

## Application examples

### ORGANIC AND INORGANIC CHEMICALS

Alcohols · additives · bases · esters · glycerine · resins · hardeners · isocyanates · monomers · oils · phenols · acids · biodiesel · bitumen · tar · hot melt · adhesives · waxes · etc.

### POLYMERS

Cellulose · PA · prepolymers · etc.

# Pressure boost

## BOOSTER series

The BOOSTER pumps provide the necessary process pressure. Tools, filters or pipes cause the pressure from upstream processing stages to reduce, meaning that it is generally no longer sufficient to reliably transfer highly viscous melt to downstream processes.

The BOOSTER series guarantees the reliable flow of product and builds up the necessary pressure for further processing. Hydraulically heated, even temperature-sensitive fluids are reliably pumped.

**NEW DESIGN  
OUT NOW**





POLYMERS



RUBBER

## Technical designs

### HOUSING

Heat-resistant carbon steel · stainless steel 1.4313 · optionally available with coating

### GEARS

Tool steel · nitrided steel · optionally available with coating · helical gearing · herringbone gearing (for lowest possible pulsation)

### FRICION BEARINGS

Tool steel · NiAg (nickel silver) · alum. bronze · optionally available with coating

### SEALS

Viscoseal · stuffing box · (vacuum viscoseal)

### HEATING

Steam · water · heat transfer oil

## Operating parameters

### VISCOSITY

Up to 40,000 Pa s

### TEMPERATURE

Up to 400°C · higher temperatures upon request

### SUCTION PRESSURE

Up to max. 120 bar

### DIFFERENTIAL PRESSURE

Up to max. 250/320 bar

*The values listed are maximum values and must not coincide under certain circumstances.*

### PUMP SIZES – CLASSIC DESIGN

From 4.7 cm<sup>3</sup>/rev. to 21,500 cm<sup>3</sup>/rev.

## Application examples

### POLYMERS

PET · PBT · PA · PC · PS · SAN · ABS · HIPS · PP · PE · POM · biopolymers · elastomers

## AT design: advantages

- Greater efficiency, resulting in
  - Less temperature transfer to the polymer
  - Energy saving = cost saving
  - Broader viscosity range possible
  - Greater volumetric flow range possible
- Lower bearing temperature, leading to lower strain on the polymer
- Increased protection against shaft breakage due to overload thanks to innovative design
- Standardisation of components, meaning easier storage and improved availability

# Extrusion

## EXTRU series



Using gear pumps in extrusion brings enormous benefits in terms of the quality of the process and of the end product. By relieving the extruder, maintenance intervals can be extended and downtime minimised. Reduced backflow means increased output. The product is produced with consistent quality, minimising rejections. Pumping fluctuations and pulsation in the product flow are things of the past:

they're reliably absorbed by the extrusion pump. The pump also ensures constant pressure ratios and gentle transfer of the melt. The exact volumetric transfer of the pump even means that gravimetric metering can be eliminated.





POLYMERS

## Technical designs

### HOUSING

Heat-resistant carbon steel · stainless steel  
optionally available with coating

### GEARS

Tool steel · nitrided steel · special steel · optionally available with coating · helical gearing · herringbone gearing (for very low pulsation during pumping)

### FRICTION BEARINGS

Tool steel · NiAg (nickel silver) · alum. bronze · special materials · optionally available with coating

### SHAFT SEALS

Viscoseal · stuffing box

### HEATING

Electric · optionally available with cover heating

## Operating parameters

### VISCOSITY

Up to 40,000 Pa s

### TEMPERATURE

Up to 400°C

### SUCTION PRESSURE

Up to max. 120 bar

### DIFFERENTIAL PRESSURE

Up to 250 bar · custom designs for higher differential pressures also available

*The values listed are maximum values and must not coincide under certain circumstances.*

### PUMP SIZES

From 2.78 cm<sup>3</sup>/rev. to 12,000 cm<sup>3</sup>/rev.

Intermediate sizes with more narrow gears for higher differential pressures are possible, e.g. 140/90 (690 cm<sup>3</sup>/rev.)

## Application examples

### POLYMERS

PS · PET · PVC · PC · PMMA · HDPE · LDPE · LLDPE · PP · PEEK · polysulphone

### FOOD

Liquorice · chewing gum

## Design versions



# Discharge pumps

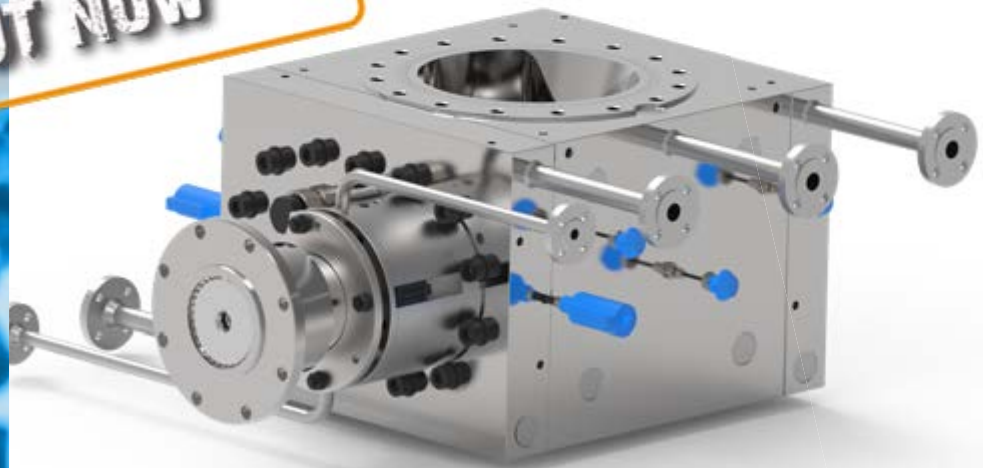
## POLY/POLY-AT series

Reliable and robust pumps are especially needed in the polymerisation process for emptying reactors and containers. The pumps transfer the melt to downstream process steps. The highly viscous material must be pumped from a reactor that is under vacuum conditions.

Discharge pumps in the POLY series are precisely adapted to this task. The customer can choose between a standard design or a custom solution that meets requirements exactly. These pumps achieve the best efficiency thanks to optimised shaft and bearing geometries. Energy consumption is kept low so that operating costs are optimised.

The POLY gear pump is available in different versions. Versions with conventional or shortened inlet wedges are just as possible as versions in the LowNPSH design. Pumps with shortened inlets guarantee fast transfer of the melt to the gears. All POLY discharge pumps have inlet openings that are as large as possible and have optimised flow geometries in order to minimise pressure loss and therefore facilitate a minimal fill level via the pump, which means the shortest possible dwell times for the polymer.

**NEW DESIGN  
OUT NOW**







POLYMERS

## Technical designs

### HOUSING

Stainless steel · alloyed steel  
optionally available with coating

### GEARS

Nitrided steel · tool steel · optionally available with coating · helical  
gearing · herringbone gearing

### FRICTION BEARINGS

Tool steel · NiAg (nickel silver) · alum. bronze · optionally available  
with coating

### SHAFT SEALS

(Vacuum) viscoseal with buffered stuffing box · stuffing box · double  
mechanical seal, locked

### HEATING

Heat transfer oil · steam

## Operating parameters

### VISCOSITY

Up to 40,000 Pa s

### TEMPERATURE

Up to 350°C

### SUCTION PRESSURE

Vacuum to max. 15 bar

### DISCHARGE/DIFFERENTIAL PRESSURE

Up to 250/320 bar

*The values listed are maximum values and must not coincide under  
certain circumstances.*

### PUMP SIZES

From 4.7 cm<sup>3</sup>/rev. to 44,400 cm<sup>3</sup>/rev.

## Anwendungen

### POLYMER PROCESSING

PET · PBT · PA · PC · PS · SAN · ABS · HIPS · PP · PE · POM

## AT design: advantages

- Greater efficiency, resulting in
  - Less temperature transfer to the polymer
  - Energy saving = cost saving
  - Broader viscosity range possible
  - Broader volumetric flow range possible
- Lower bearing temperature, leading to lower strain on the polymer
- Parts in the BOOSTER and POLY series are interchangeable (same size)
- Optimised intake geometry (POLY), leading to minimal pressure loss and therefore minimal dwell times of the polymer in the reactor
- Three different flange types each (EN 1092-1 and ANSI B16.5)
- Three different pressure levels (200 bar, 250 bar, 320 bar)



# Quality management

Quality plays a crucial role at WITTE and runs through every area of the company. It is reflected not only on our company's products but also in its processes and in the work itself. That's why WITTE PUMPS & TECHNOLOGY GmbH is certified under the current DIN ISO 9001 standard. Regular internal and external audits ensure continuous improvement. The principles of modern business operations are assured by a code of conduct.

#### Certificates:

- DIN EN ISO 9001
- AEO
- EAC
- TA Luft

Working with and pumping chemicals and critical media calls for maximum care. All of the core components of our pumps are therefore tested in modern 3D and optical measurement processes for dimensional stability, clearance classes and quality criteria. Compliance with our quality standards is the most important consideration when it comes to our gear pumps.

Methods and processes are under constant audit and improvement, which is also reflected in our

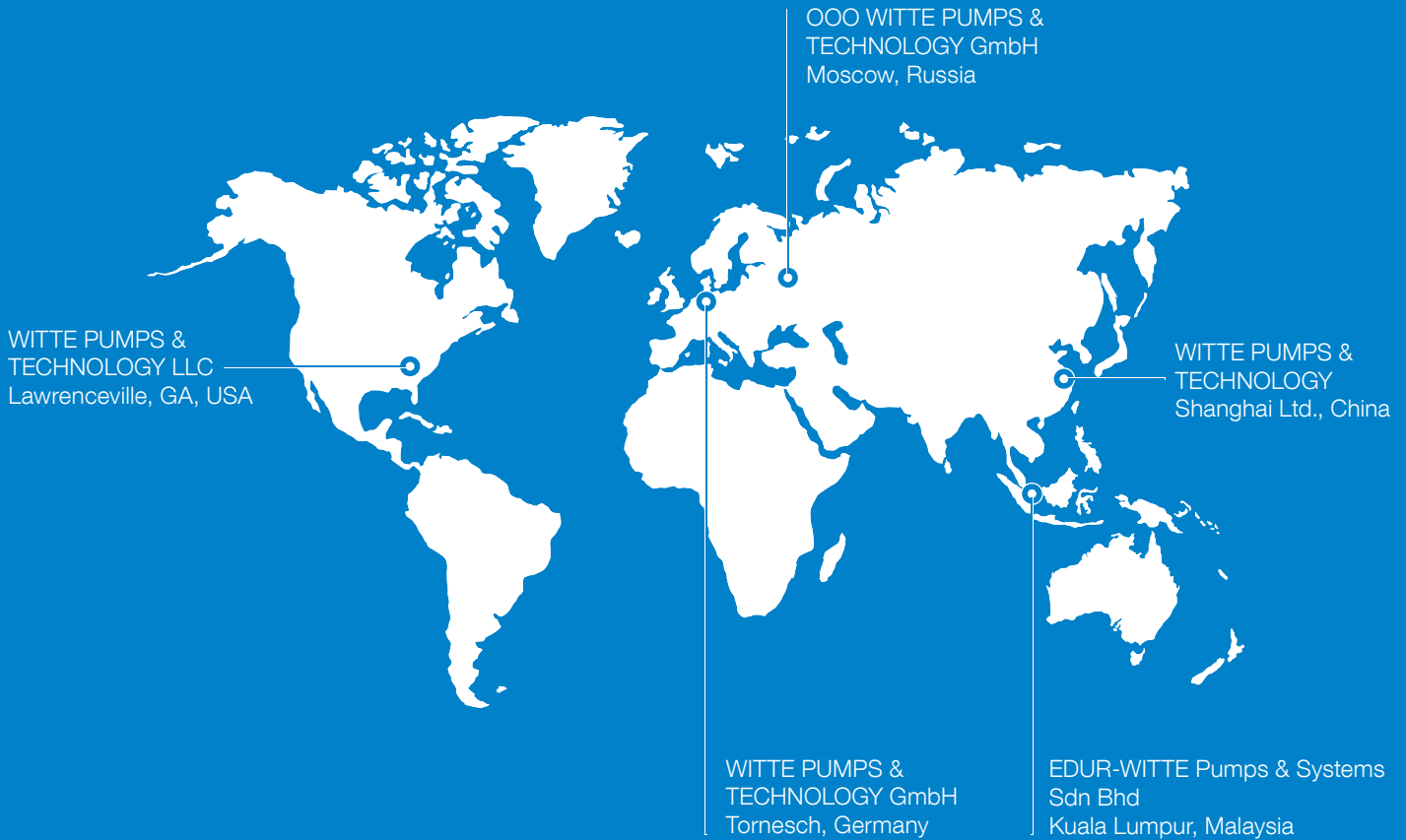
DIN ISO 9001 certification. We inspect not only ourselves but also all of our partners and suppliers to ensure that quality standards are met.

In addition to technical solutions for process requirements, WITTE also sees maximum safety for humans and the environment as a top priority.

It is for this reason that we are so strict about observing and implementing directives and standards for risk avoidance.





# WITTE WORLDWIDE



All of our sales partners can be found at [www.witte-pumps.com](http://www.witte-pumps.com)

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