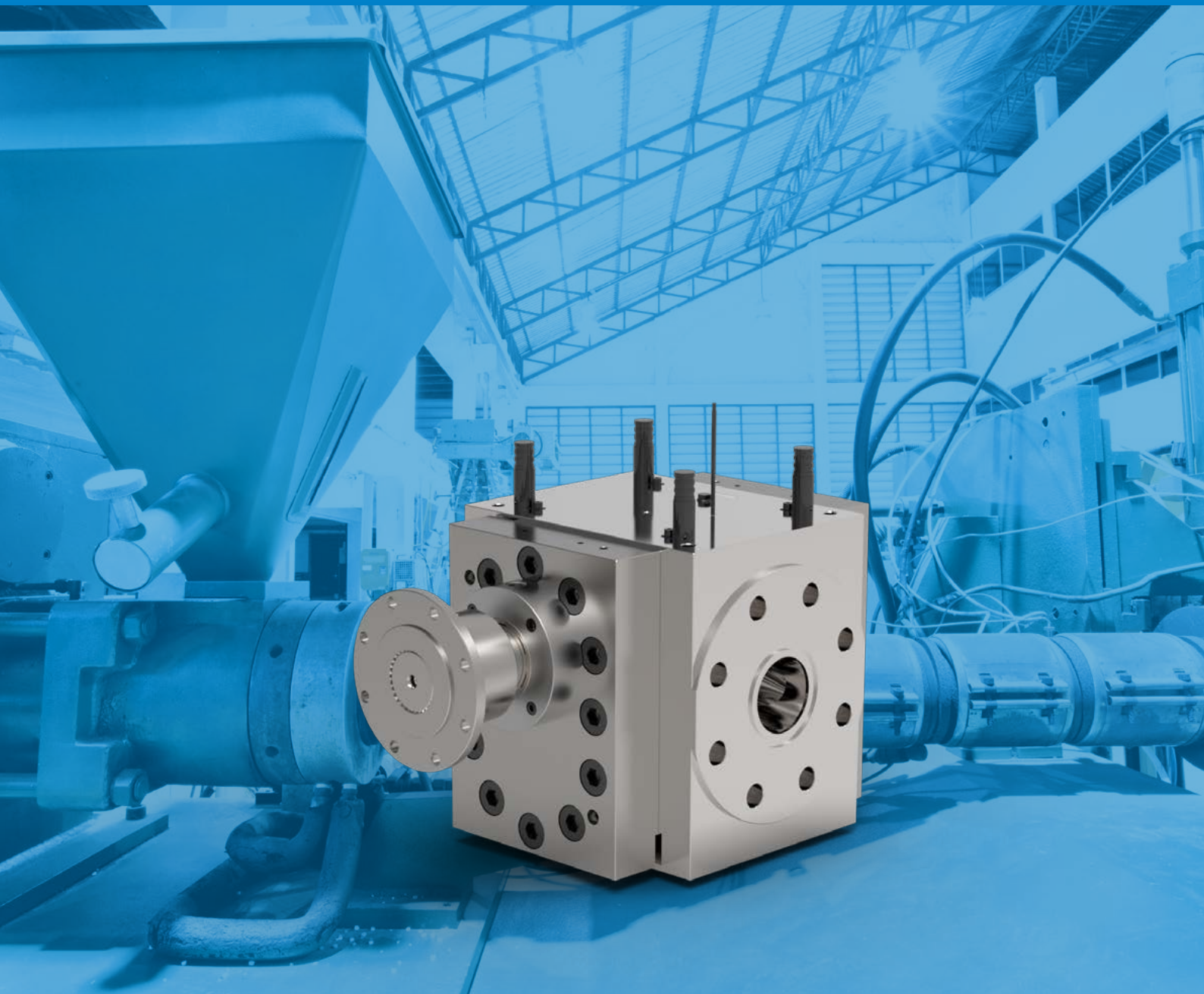


MADE IN GERMANY  
Gear pumps  
for extrusion



# WITTE Gear pumps for extrusion



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The extrusion process is very diverse. In the extrusion of plastics a wide variety of profiles and tubes can be produced. It is also possible to produce monolayer or multi-layer films by means of extruders. In coextrusion, various materials are made into a film using multiple extruders. Besides the classical polymers, e.g. Polypropylene or Polycarbonate are also used in extruding filled polymers.

In Wood Plastics Composites (WPC) wood parts are bound in a polymer matrix.

In the food industry extrusion technology is also used. For extrusion of foodstuffs very high demands on the purity. The production of licorice should be mentioned here as an example.

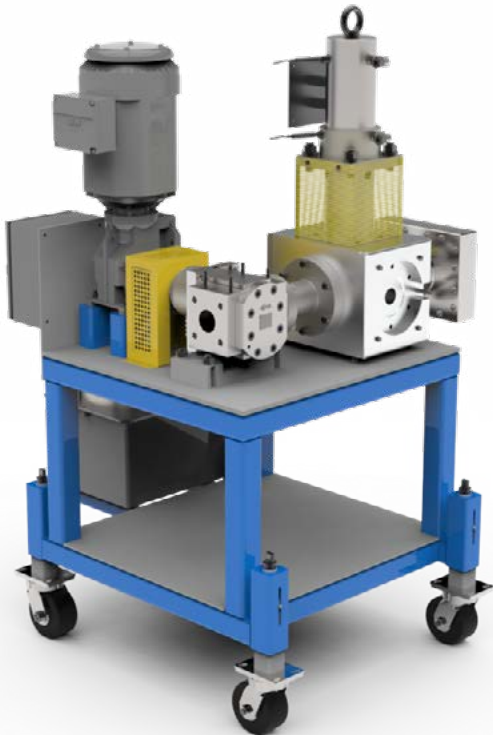
- Advantages at a glance:
- Precise volumetric conveying characteristics
  - Low pulsation
  - Capacity increase
  - Gentle conveying
  - Low temperature input

## The best pump for your process

is not just a slogan for us – it's what drives and inspires us on a daily basis. WITTE PUMPS & TECHNOLOGY GmbH is an international medium-sized machine designer and manufacturer based in Tornesch near Hamburg.

For almost 40 years, WITTE has specialized in developing and manufacturing precision gear pumps. Each pump is precisely tailored to the customer's process and needs. The WITTE engineers and designers develop custom gear pumps for use in standard or limit ranges.

WITTE has its own subsidiaries in the USA, China and Malaysia, as well as a number of agents representing it worldwide.





# ExtruCore® success story

Stable pressure conditions are important for the consistently high quality of the end product.

Gear pumps are preferably used after the extruder in order to compensate for the natural pulsation, especially of the single-screw extruder. Due to the design, extruders do not ensure a very constant conveying and pressure at the outlet.

The efficiency of pressure increase is also lower in an extruder than in a gear pump, so the pump takes over

the pressure build-up and thus relieves the extruder. It ensures an even pressure and reduces pulsations. The downstream equipment is optimally supplied with melt as a result.

Another advantage results from the more efficient pressure build-up, which significantly reduces the temperature input into the melt. The polymer can be processed more gently.

**Seal technology:**  
Threaded shaft seal, optional stuffing box. Also possible with heat sink to increase viscosity.

**Housing:**  
Housings in different designs. Special materials such as stainless steel are possible.

**Heating:**  
Electric heating for the most simple integration into the plant.

**Flange:**  
Upon request, the flanges can also be adapted to the customer's needs.


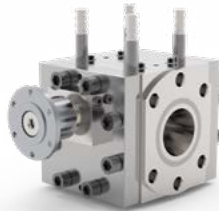


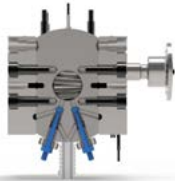
**Gears:**  
Helical gearing as a standard. Herringbone gearing for particularly demanding applications and media.





# The WITTE gear pump portfolio for extrusion

Extrusion is a versatile field of application for gear pumps. In many processes, it is a matter of creating constant pressure conditions and reducing the heat input into the medium.

					
<b>Chemical pump for finest dosing ChemCore®</b>	<b>Melt pump / Extrusion pump ExtruCore®</b>	<b>Optimized melt pump ExtruCore® AT</b>	<b>Customized Solutions ExtruCore®</b>	<b>Melt pump for 3D printing (BAAM) ExtruCore®</b>	<b>Quick-Color-Change- Version</b>
<p>Chemical pumps are used in extrusion for metering additives into the melt stream of the extruder.</p>	<p>The ExtruCore® melt pump brings significant advantages to the extrusion process.</p>	<p>Optimized melt pumps for better product qualities in the extrusion process.</p>	<p>Depending on the needs, we also develop designs directly tailored to the customer needs.</p>	<p>Melt pump for use in 3D printing applications.</p>	<p>Melt pump for fast color change.</p>
<b>Pages 8-9</b>	<b>Pages 10-11</b>	<b>Pages 12-13</b>	<b>Pages 14-15</b>	<b>Pages 16-17</b>	<b>Pages 18-19</b>

# Dosing pump for additives

ChemCore®

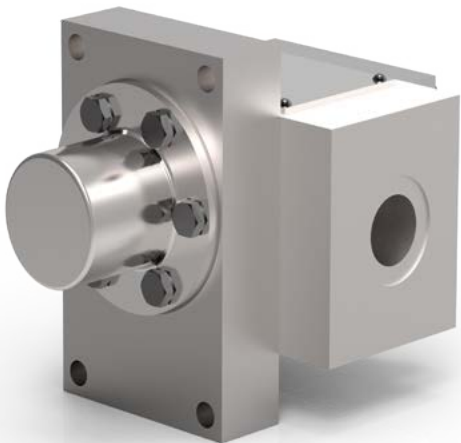


The ChemCore® gear pump series for use in the extrusion process was developed specifically for the requirements of additive metering. The series is used for conveying, metering and transferring low to medium viscosity media.

The diverse spectrum of applications ranges from additives, fillers and plasticizers to stabilizers and blowing agents.

The precisely matched components of the ChemCore® series guarantee maximum precision in repeatability, especially for metering tasks.

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



EXTRUSION

## Technical designs

HOUSING
Stainless steel · tantalum · titanium · Hastelloy®
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
FRICTION BEARINGS
Carbon · NiAg (nickel silver) · silicon carbide · zirconia · tool steel · alum. bronze · special materials · optionally available with coating
SEALS
Stuffing box · magnetic coupling · radial shaft seal ring
HEATING
Steam · water · heat transfer oil · electric

## Operating parameters

VISCOSITY
0.5 bis 1,000,000 mPas
TEMPERATURE
Up to 350 °C · higher temperatures upon request
SUCTION PRESSURE
Up to max. 15 bar, with magnetic drive max. 25 bar
DIFFERENTIAL PRESSURE
Up to 120 bar <i>The values listed are maximum values and must not coincide under certain circumstances.</i>
PUMP SIZES
From 0.2 ccm/rev to 46.3 ccm/rev

## Application examples

ORGANIC AND INORGANIC CHEMICALS
Antiblocking agents · Antioxidants · Dyestuffs · Lubricants · Adhesion promoters · Inhibitors · Light stabilizers · Radical generators · Flame retardants · UV stabilizers · Heat stabilizers · Plasticizers · Oils

## Optional equipment:



WITTE Core Command®  
the pump control for  
your gear pump

INPUTS
Flow meter: <ul style="list-style-type: none"><li>4-20 mA (scalable e.g. kg/min, l/min)</li><li>counter (scalable e.g. l/count)</li></ul>
Pressure sensor: <ul style="list-style-type: none"><li>analog 4 ... 20 mA</li></ul>
Ethernet: <ul style="list-style-type: none"><li>network communication</li><li>updates</li><li>configuration</li></ul>
Power supply: <ul style="list-style-type: none"><li>400 V, 16 A</li></ul>

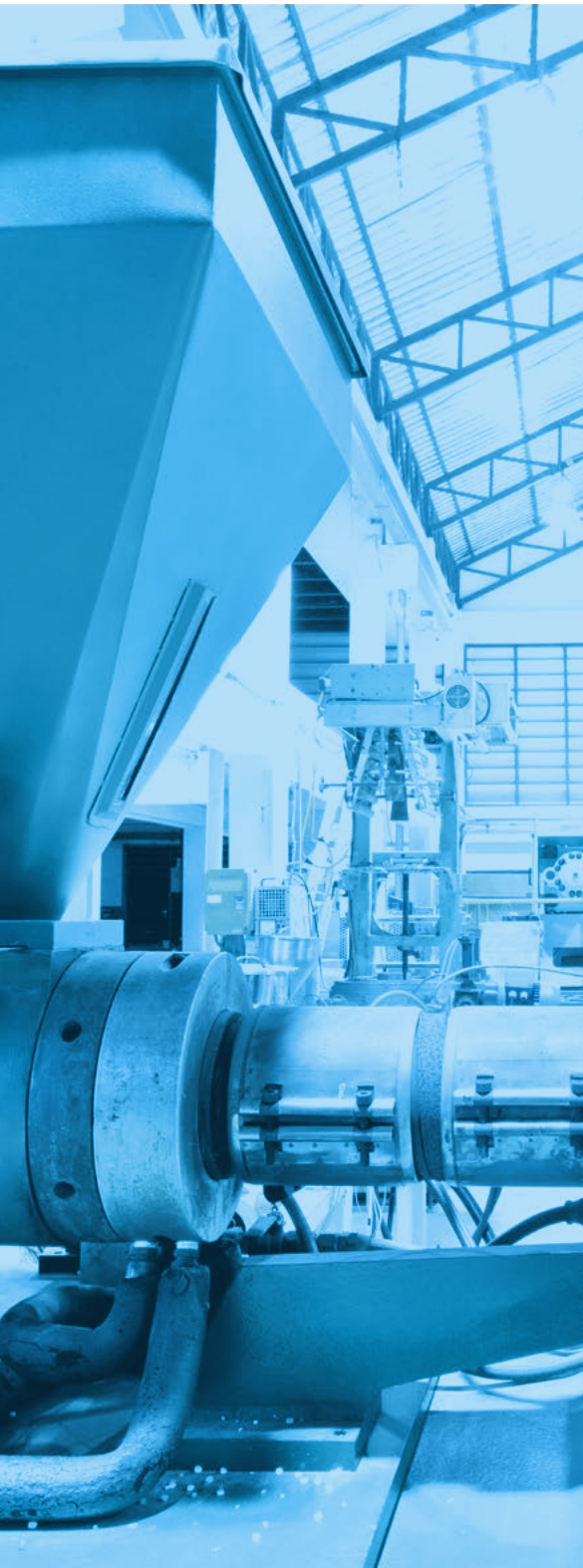
OUTPUTS
Profinet: <ul style="list-style-type: none"><li>external frequency converter</li><li>optional: analog 0...10 V; 4...20 mA</li></ul>
USB: <ul style="list-style-type: none"><li>datalogging</li></ul>

ADDITIONAL SENSOR
<ul style="list-style-type: none"><li>4-20 mA</li><li>0-10 Volt</li><li>+24 VDC power supply (1A max.)</li><li>0 VDC/GND</li></ul>



# Extrusion

ExtruCore®



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 in many cases.



## 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
SEALS
Viscoseal · stuffing box
HEATING
Electric · optionally available with cover heating

## Operating parameters

VISCOSITY
Up to 40,000 Pas
TEMPERATURE
Up to 400 °C
SUCTION PRESSURE
Up to 120 bar
DIFFERENZDRUCK
Up to 250 bar · custom designs for higher differential pressures also available <i>The values listed are maximum values and must not coincide under certain circumstances.</i>
PUMPENGRÖSSEN
From 1.28 ccm/rev bis 12,000 ccm/rev Intermediate sizes with more narrow gears for higher differential pressures are possible.

## Application examples

POLYMERS
PS · PET · PVC · PC · PMMA · HDPE · LDPE · LLDPE · PP · PEEK · Polysulfones · TPU · TPE · PA · ABS · PLA
FOOD
Licorice · Chewing gum

## Design versions



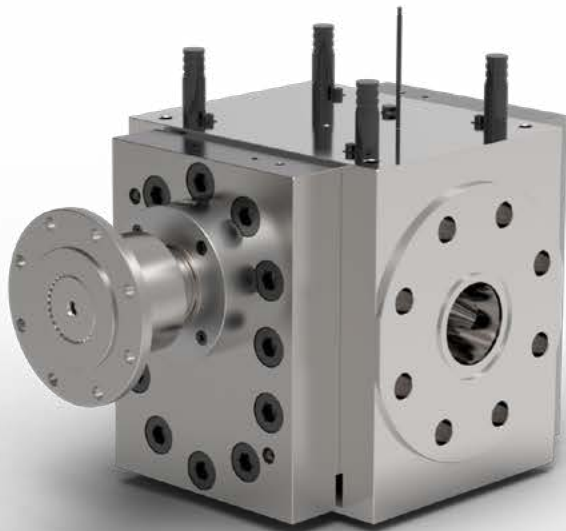
# ExtruCore® AT

Optimized melt pumps for better product qualities



The latest version of WITTE melt pumps closes the last gap in the product portfolio of polymer pumps in the latest design and most advanced, technological equipment. This provides the user with state-of-the-art pump technology Made in Germany for the entire process chain of polymer production and processing.

The further development of the pumps offers customers additional benefits such as lower heat input and reduced polymer shear. The adapted housing geometry and optimized gear shafts ensure that a throughput increase of up to 40 % can be achieved. These values refer to an EXTRU pump in the classic design compared to an ExtruCore® AT pump with identical center distance.

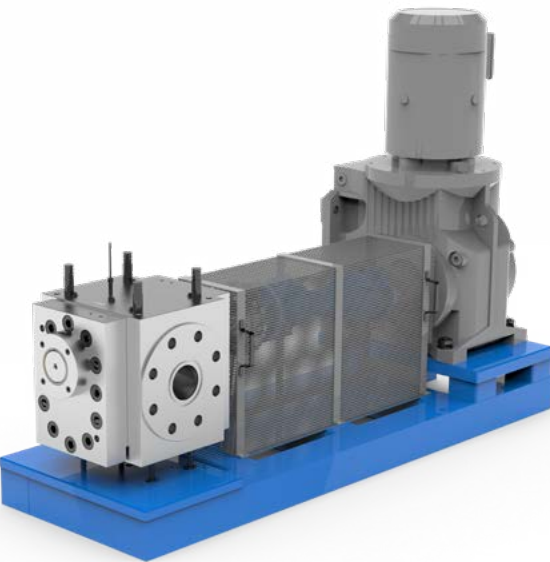
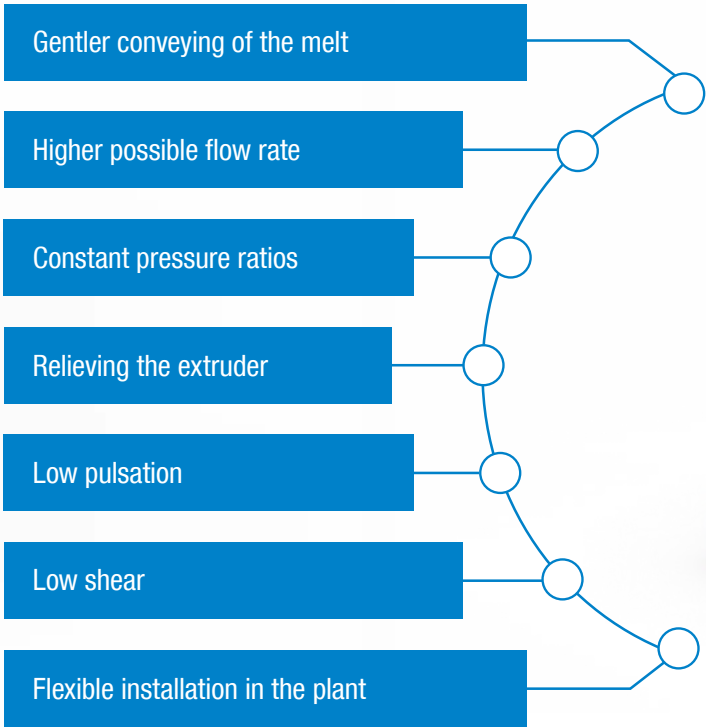


## Technical designs

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 · optionally available with coating
SEALS
Viscoseal optionally with cooling · stuffing box optionally with cooling
HEATING
Electric · optionally available with cover heating

## Operating parameters

VISKOSITÄT
Up to 40,000 Pas
TEMPERATURE
Up to 400 °C
SUCTION PRESSURE
Up to 120 bar
DIFFERENTIAL PRESSURE
Up to 250 bar · custom designs for higher differential pressures also available <i>The values listed are maximum values and must not coincide under certain circumstances.</i>
PUMP SIZES
From 98 ccm/rev to 3100 ccm/rev <i>more pump sizes coming soon</i>





# OEM solutions, customized



WITTE offers modified chemical pumps for OEM customers. These pumps are usually specially tailored to the customer's requirements.

WITTE works with the customer to analyse the pumping task and draw up an initial solution. A pump is designed and prototype created depending on the required amount.

The customer has ample opportunity to test this prototype, and then the results are discussed and optimised together. The pumps can also be fitted with the customer's name plate if desired and delivered quickly by order contract.



## 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 · optionally available with coating
SEALS
Viscoseal · stuffing box · optionally with cooling
HEATING
Electric · optionally available with cover heating

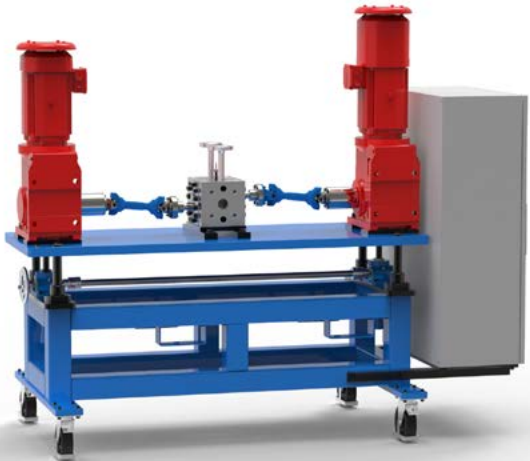
\* Customized design

## Operating parameters\*

VISCOSITY
Up to 40,000 Pas
TEMPERATURE
Up to 400 °C
SUCTION PRESSURE
Up to 120 bar
DIFFERENTIAL PRESSURE
Up to 400 bar(a)
PUMP SIZES
0.2-9-5.5 up to 6100-224-224 (customized)

## Application examples

EXTRUSION
Customized melt pump with two synchronized drive trains for conveying highly filled conductive polymer.

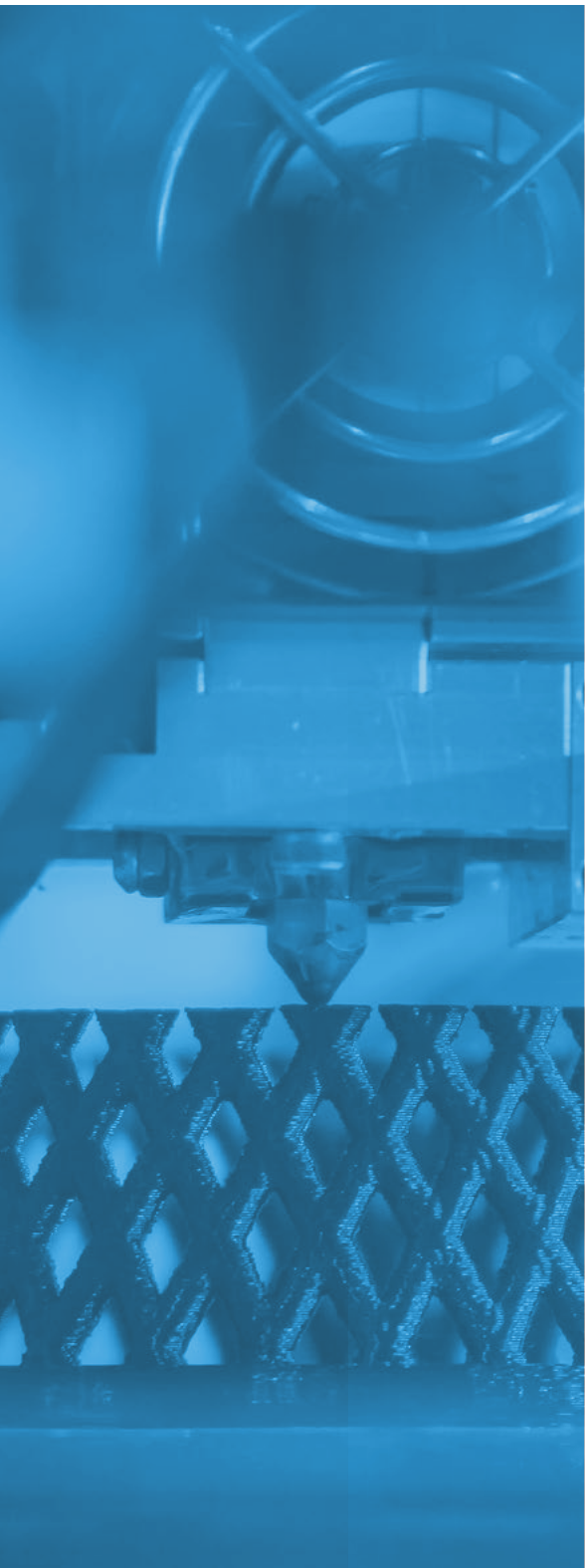


MEDIUM / EXTRUDATE
conductive polymer highly filled with graphite
VISCOSITY
Up to 30,000 Pas
FLOW RATE
10 to 60 kg/h
DIFFERENTIAL PRESSURE
up to 500 bar(a)



# Extrusion / 3D printing

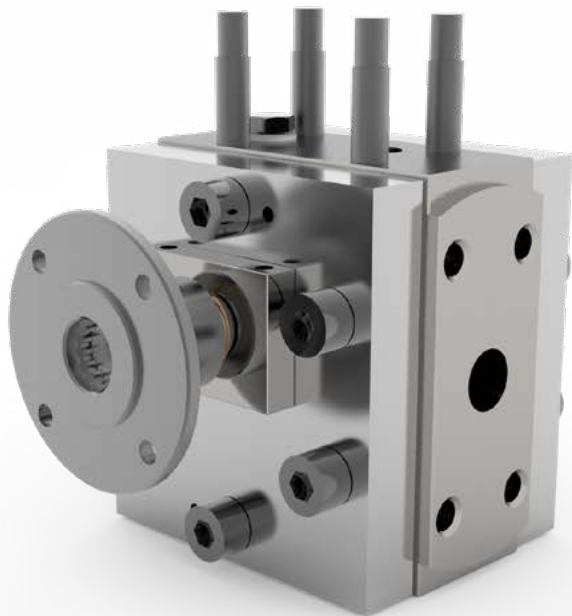
ExtruCore®



Gear pump-assisted 3D printing brings enormous advantages for the quality of the process and the end product.

A wide variety of materials can be used for 3D printing. Many applications take advantage of the good properties of different plastics. Filament or polymer melt from plastics such as ABS, PLA, etc. is used. The process of 3D printing is very similar to extrusion.

To meet the high requirements, we have designed our ExtruCore® series. It impresses with its compact design, light weight, high repeatability and absolute precision. With a dead weight of only 5 kg, it is also suitable for direct mounting on the print head.



## Technical designs

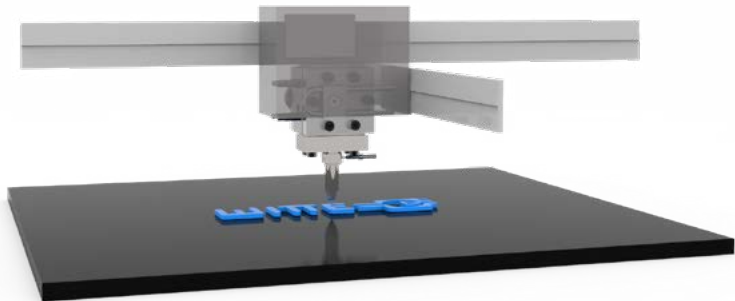
HOUSING
1.6582, alternative stainless steel 1.4313 / 1.4571
GEARS
1.2344, alternative 1.4112 · optionally available with coating
FRICTION BEARINGS
1.2379, alternatively NiAg / alum. bronze
SEALS
Viscoseal · stuffing box · optionally with cooling
HEATING
Electric · optionally available with cover heating

## Operating parameters

VISCOSITY
Up to 40,000 Pas
TEMPERATURE
Up to 400 °C
SUCTION PRESSURE
Up to 120 bar
DIFFERENTIAL PRESSURE
Up to 250 bar · custom designs for higher differential pressures also available <i>The values listed are maximum values and must not coincide under certain circumstances.</i>
PUMP SIZES
From 0.2 ccm/rev

## Application examples

POLYMERS
PS · PET · PVC · PC · PMMA · HDPE · LDPE · LLDPE · PP · PEEK · Polysulfones · TPU · TPE · PA · ABS · PLA



# Quick-Color-Change-version

ExtruCore® melt pump for quick color change



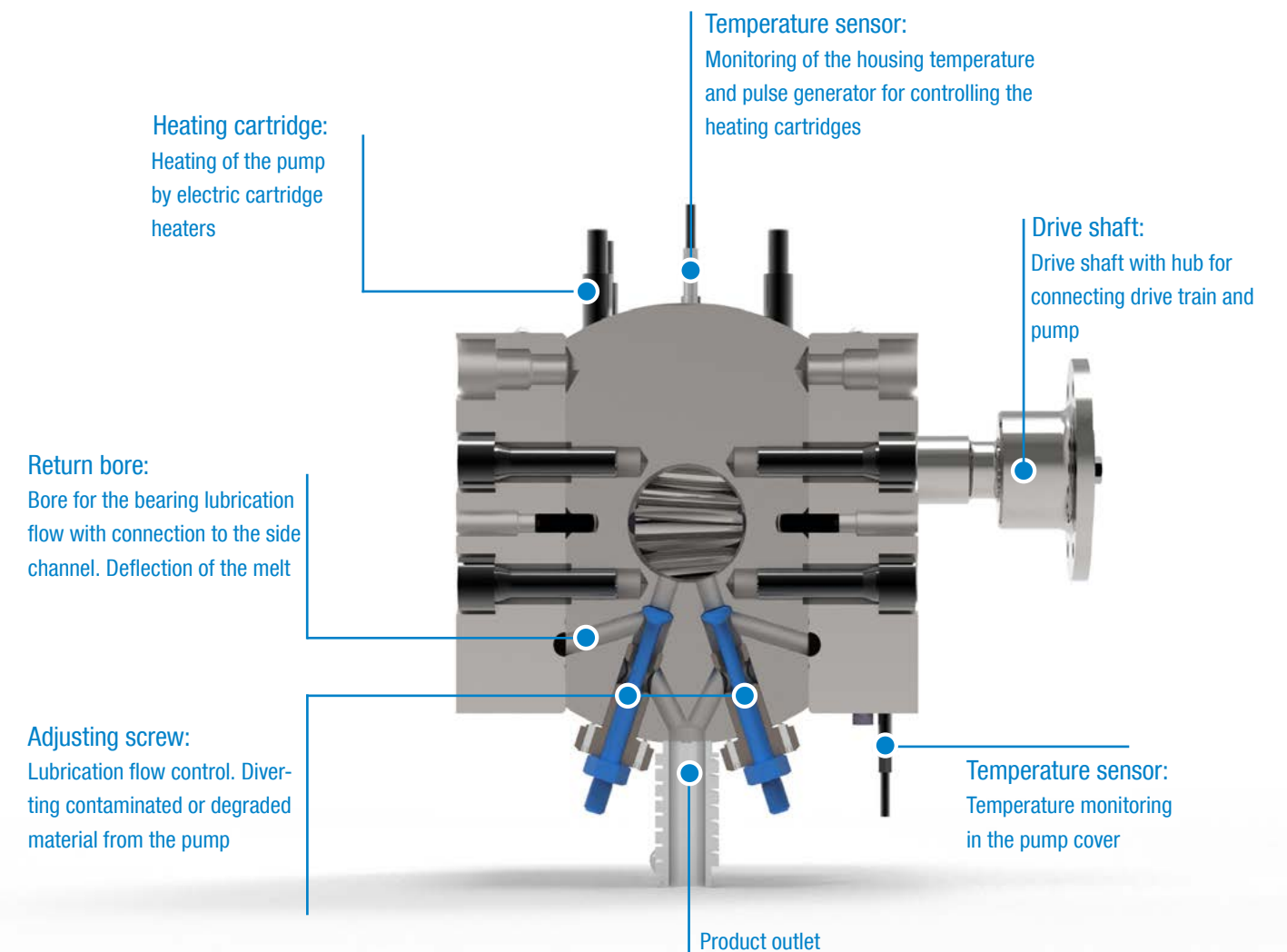
The Quick-Color-Change-version of the ExtruCore® series is perfect for master batch applications.

The pump is designed so that the pump does not have to be stopped when changing the product. The bearing lubrication flow can be diverted by means of adjusting screws and is therefore carried out of the pump.

Old and mixed material is not fed back into the main stream. The main advantage is that rejects are reduced to a minimum and the pump continues to run seamlessly without changeover time or cleaning. This means that quick and uncomplicated color changes are possible during the ongoing process.



EXTRUSION





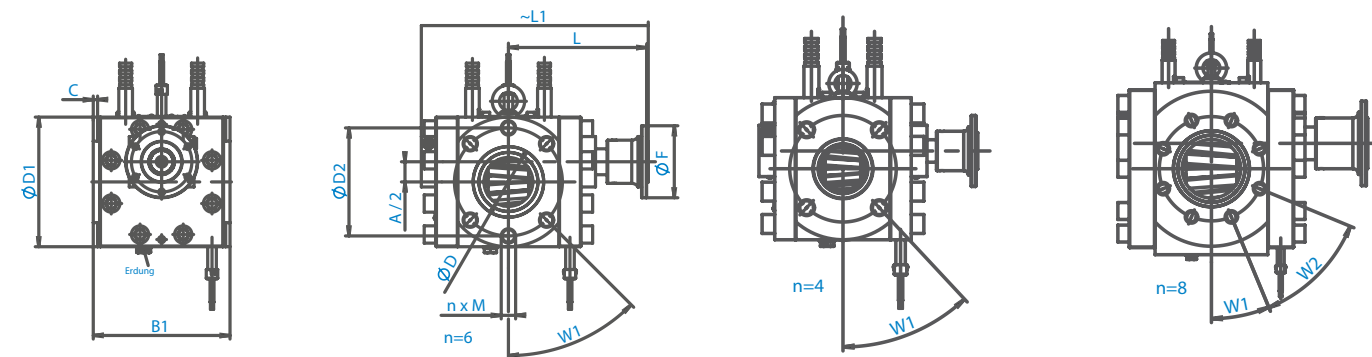
# Size/pumped amount/dimensions

für ExtruCore® gear pumps in standard design

## Pump sizes

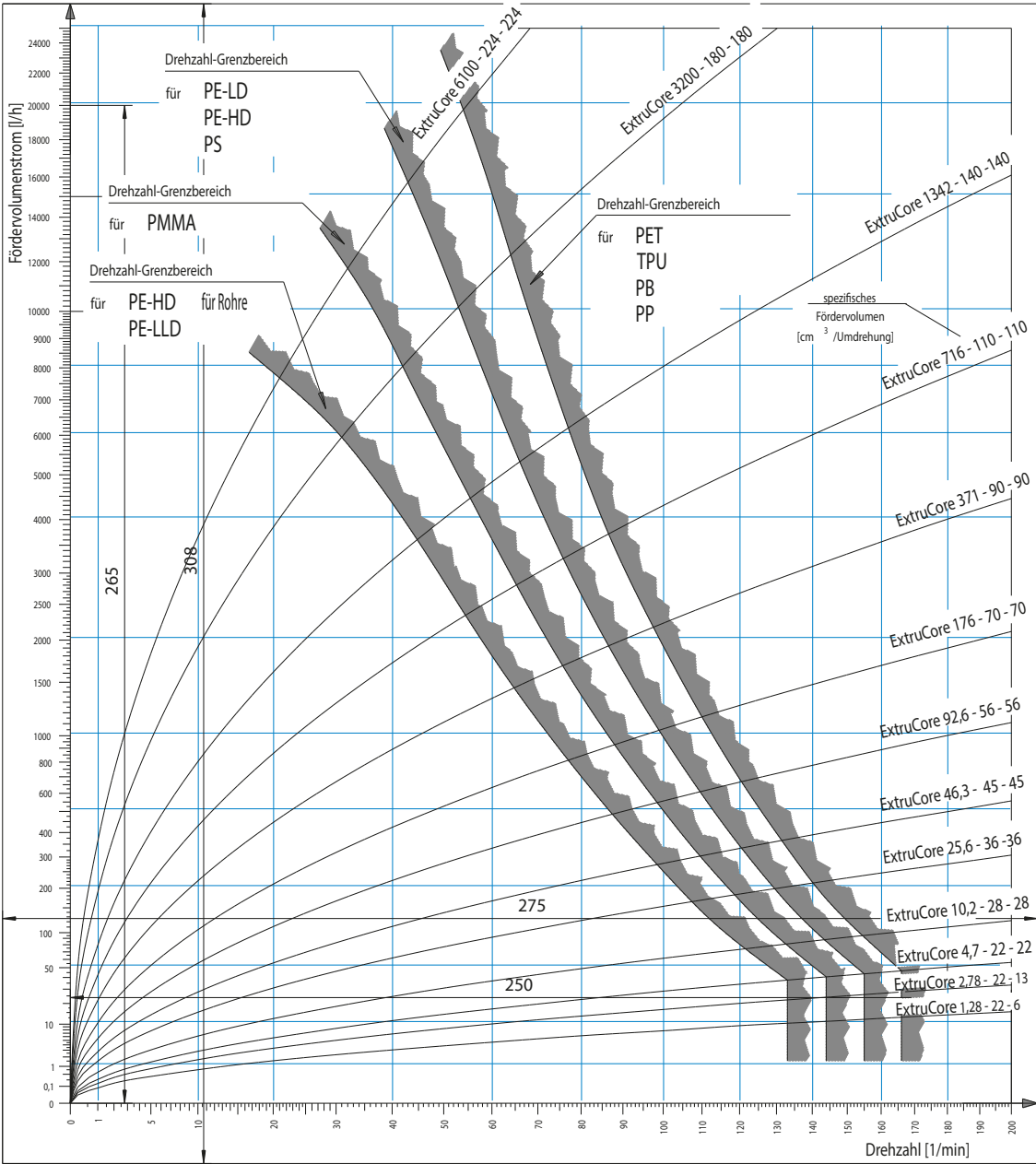
PUMP SIZE	SPECIFIC VOLUME (CCM/REV)	FLOW RATE (KG/H)*1	PUMP SIZE	SPECIFIC VOLUME (CCM/REV)	FLOW RATE (KG/H)*1
ExtruCore® 1.28-22-6	1.28	20 –200	ExtruCore® 176-70-70	176	990–9900
ExtruCore® 2.78-22-13	2.78	40–400	ExtruCore® 371-90-90	371	1,600–16,200
ExtruCore® 4.7-22-22	4.7	70–700	ExtruCore® 716-110-110	716	2,500–25,300
ExtruCore® 10.2-28-28	10.2	140–1,400	ExtruCore® 1,482-140 -140	1,482	3,800–37,800
ExtruCore® 25.6-36-36	25.6	280–2,800	ExtruCore® 3,200-180-180	3,200	6,900–69,100
ExtruCore® 46.3-45-45	46.3	410–4,100	ExtruCore® 6,100-224-224*2	6,100	11,000–106,000
ExtruCore® 92.6-56-56	92.6	650–6,500			

\*1 The pumped amount depends on the product being pumped and the operating conditions.  
\*2 Only available as custom solution.



## ExtruCore® dimensions

PUMP SIZE	A/B	A/2	B1	C	ØD	ØD1	ØD2	M	n	W1	W2	L	L1	ØF	WEIGHT
ExtruCore® 1.28-22-6	22/6	11	90	3	14	84	--	M8	4	--	--	103	153.2	58	5.1 kg
ExtruCore® 2.78-22-13	22/13	11	90	3	14	84	--	M8	4	--	--	107	160	58	5.4 kg
ExtruCore® 4.7-22-22	22/22	11	90	3	28	84	--	M12	4	--	--	111	169	58	5.8 kg
ExtruCore® 10.2-28-28	28/28	14	120	4	32	108	75	M10	6	40°	--	108	178	75	10 kg
ExtruCore® 25.6-36-36	36/36	18	136	4	42	136	95	M12	6	40°	--	126	208	90	17 kg
ExtruCore® 46.3-45-45	45/45	22,5	170	5	55	180	135	M20	4	43°	--	168.5	278	90	39 kg
ExtruCore® 92.6-56-56	56/56	28	190	6	68	180	150	M20	6	45°	--	192	315	120	49 kg
ExtruCore® 176-70-70	70/70	35	200	3.5	80	218	160	M20	6	60°	--	227	378	120	90 kg
ExtruCore® 371-90-90	90/90	45	230	3.5	104	275	185	M20	8	22.5°	45°	275	444	150	149 kg
ExtruCore® 716-110-110	110/110	55	310	5	125	300	215	M24	8	22.5°	45°	340	531	180	280 kg
ExtruCore® 1,482-140 -140	140/140	70	425	7.5	165	430	285	M30	8	22.5°	45°	415	670	250	645 kg
ExtruCore® 3,200-180-180	180/180	90	500	7.5	220	530	350	M36	8	22.5°	45°	547	893	315	1,250 kg

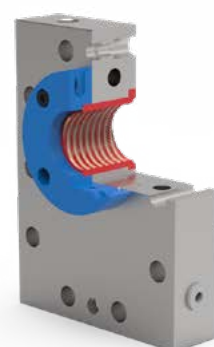


# Seal range

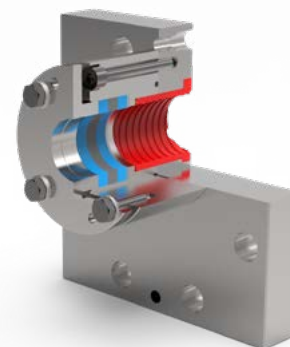


Each rotating pump has a drive shaft that has to be sealed in some way. Sealing can be done using a wide variety of systems.

Depending on the chemical pump type and place of use, different systems may be used. The limitation of the selected width of the seal types is defined by the process parameters. Pressure, temperature and viscosity are decisive factors that influence or limit the selection of the seal.



Threaded shaft seal, possibly with heat sink



Threaded shaft seal with stuffing box

PRESSURE SUCTION SIDE	1 – 120 bar(a)	1 – 120 bar(a)
VISCOSITY	50 – 40,000 Pas	1 – 40,000 Pas
TEMPERATURE	up to 450°C	max. 450°C

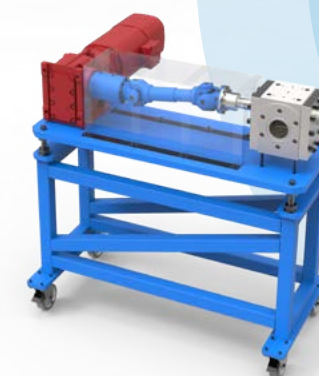


EXTRUSION

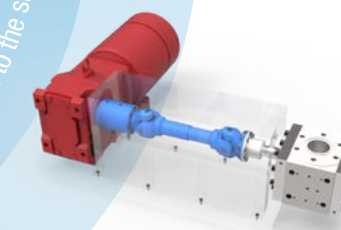
Melt pump with cardan shaft, gearbox and motor in vertical line installation

Melt pump on mobile cart with angular gear and 90° angled motor (vertically upwards)

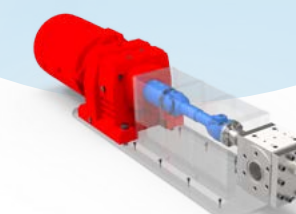
Melt pump on mobile cart with angular gear and 90° angled motor (vertically down)



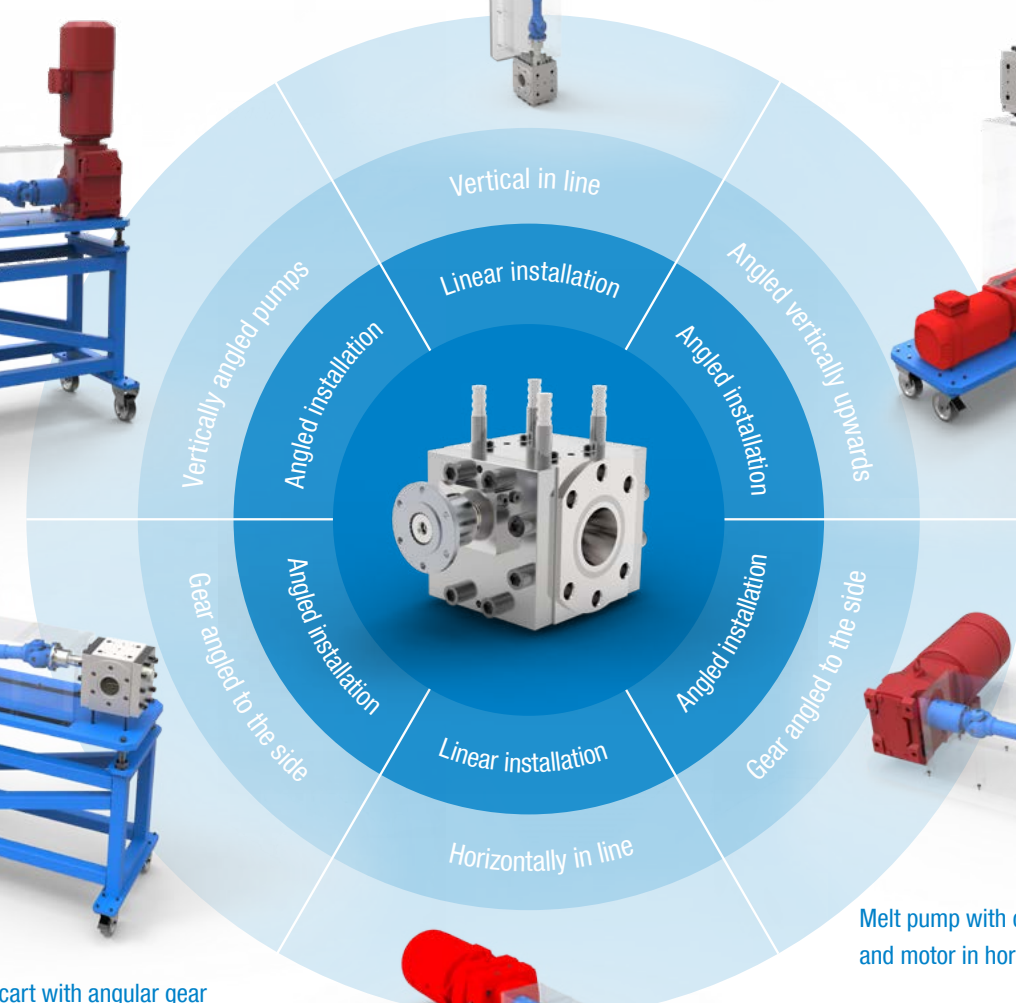
Melt pump on mobile cart with angular gear and 90° angled motor (horizontally to the side)



Melt pump with cardan shaft, gearbox and motor in horizontal line installation



Melt pump with cardan shaft, gearbox and motor in horizontal line installation





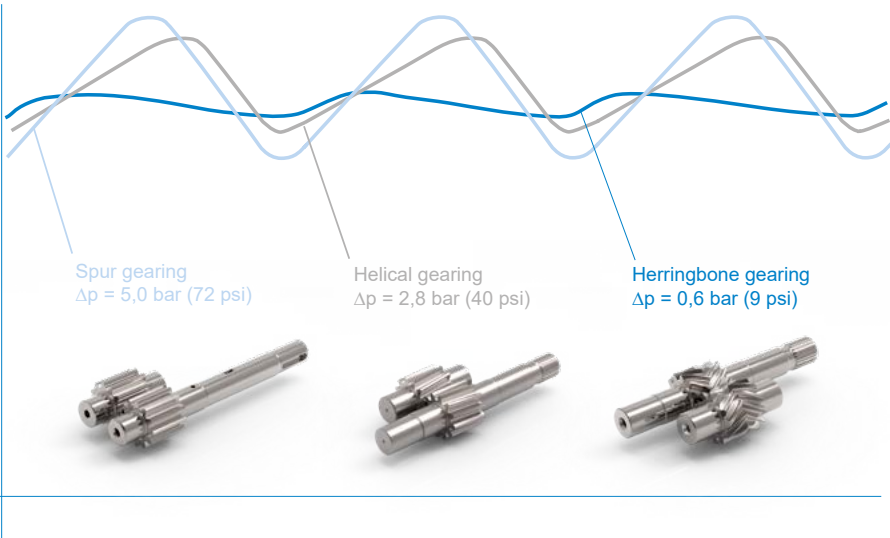
# Reduced pulsation



The herringbone gearing significantly reduces the pulsation of the pumped medium compared to the helical and spur gearing. This is an advantage, especially for the quality of the end product.

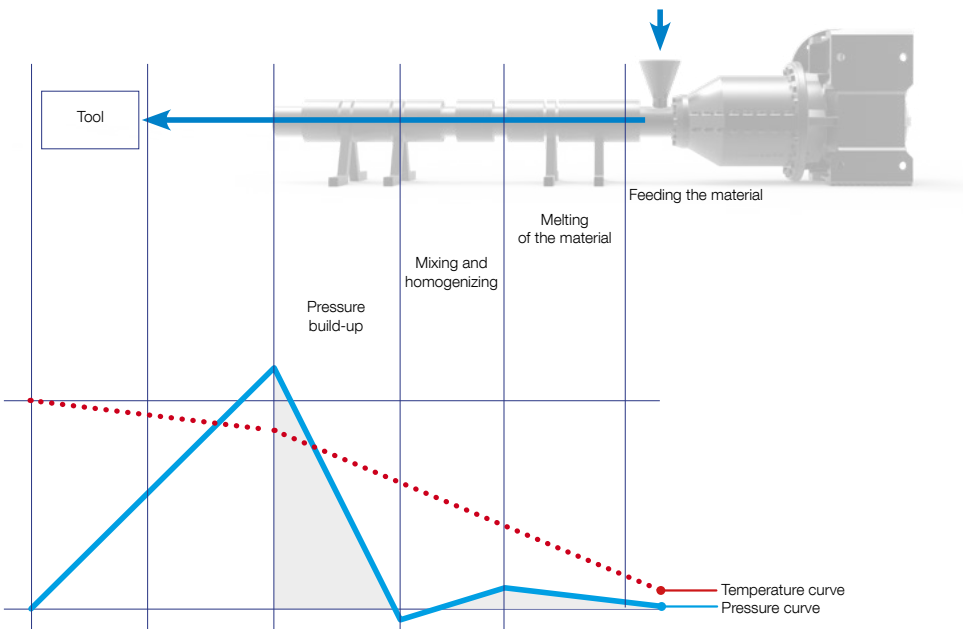
- Advantages:**
- Less pulsation
  - Conversion of existing pumps possible
  - Relief of the extruder

## Example reduced pulsation



Pressure fluctuations

When extruding without a gear pump at the extruder outlet the flow rate fluctuates strongly, as do the pressure ratios. The result is natural pulsation of the product flow.

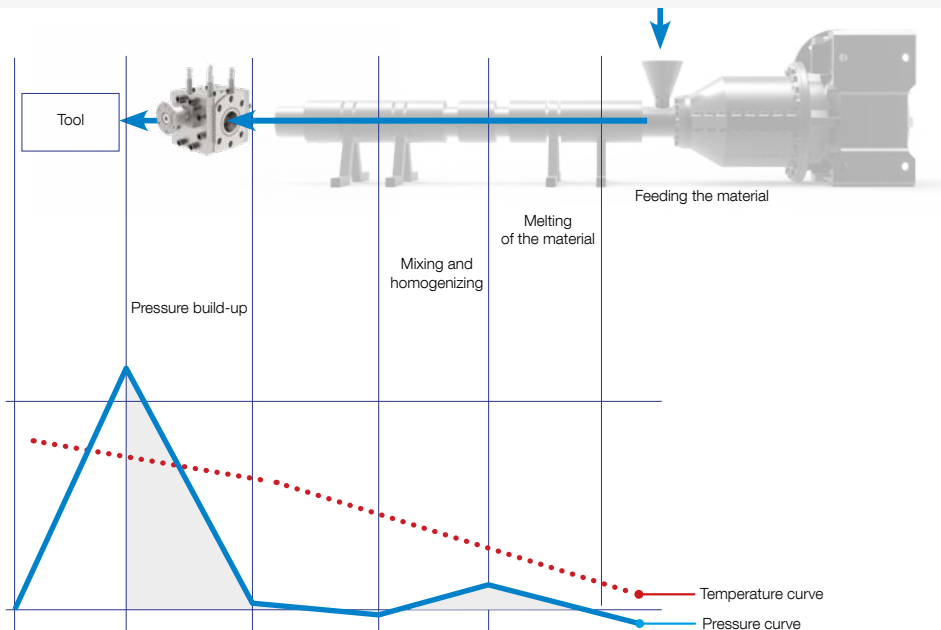


The efficiency of the extruder in terms of pressure buildup is comparatively low - even with optimally selected screw geometry. A large part of the energy expended is therefore introduced into the product as heat.



Pressure fluctuations

By using the melt pump, the pulsation curve is smoothed considerably. Pressure ratios and flow rate are constant due to the volumetric delivery characteristics of the pump.



The efficiency of a melt pump is high compared to an extruder. The mechanical power expended is converted to a large extent into hydraulic power and only to a small extent into heat.

# Accessories



## Metering system

The properties of the polymer melt are achieved in extrusion by adding additives. Additives are metered into the melt via a metering system consisting of a control system, gear pump and flow meter.



## Base frame

Pump aggregates consisting of pumps, drives and frequency converters are often installed on base frames. The modular construction makes it possible to quickly and easily remove the complete base frame - therefore the entire aggregate - from the process environment.



## Cardan shafts

In particular drive shafts are used if a large radial offsetting must be compensated for, for example, because the position of the pump is changed through the plant heating up.



## Drive technology

We have a worldwide network of suppliers as an internationally active company. This allows us to easily handle local requirements in the design of motors and to implement these according to the customer's requests.



## Pressure sensors

Pressure sensors deliver information about the pressure conditions in the pump and the process. The pressure can be regulated correspondingly should there be fluctuations.



## Coupling

The coupling ensures the safe transfer of power to the pump. We only use couplings from renowned manufacturers. We offer different variations dependent on the process.



## Gearbox

Matched to the engines and the process, we offer various gearbox variants from well-known manufacturers. All gearboxes are designed and coordinated by our engineers together with the manufacturers.



## Frequency converter

As further optional accessories, WITTE offers frequency converters precisely matched to the motor.



# WITTE WORLDWIDE

WITTE PUMPS &  
TECHNOLOGY LLC  
Lawrenceville, GA, USA

WITTE PUMPS &  
TECHNOLOGY  
Shanghai Ltd., China

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

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TECHNOLOGY GmbH  
Tornesch, Germany

EDUR-WITTE Pumps & Systems  
Sdn Bhd  
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