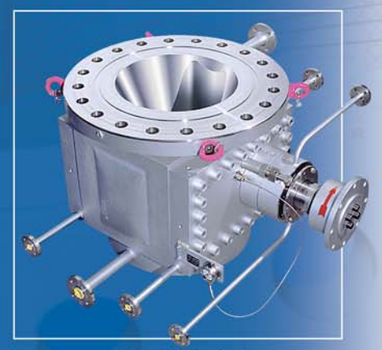
CHEM

EXTRU

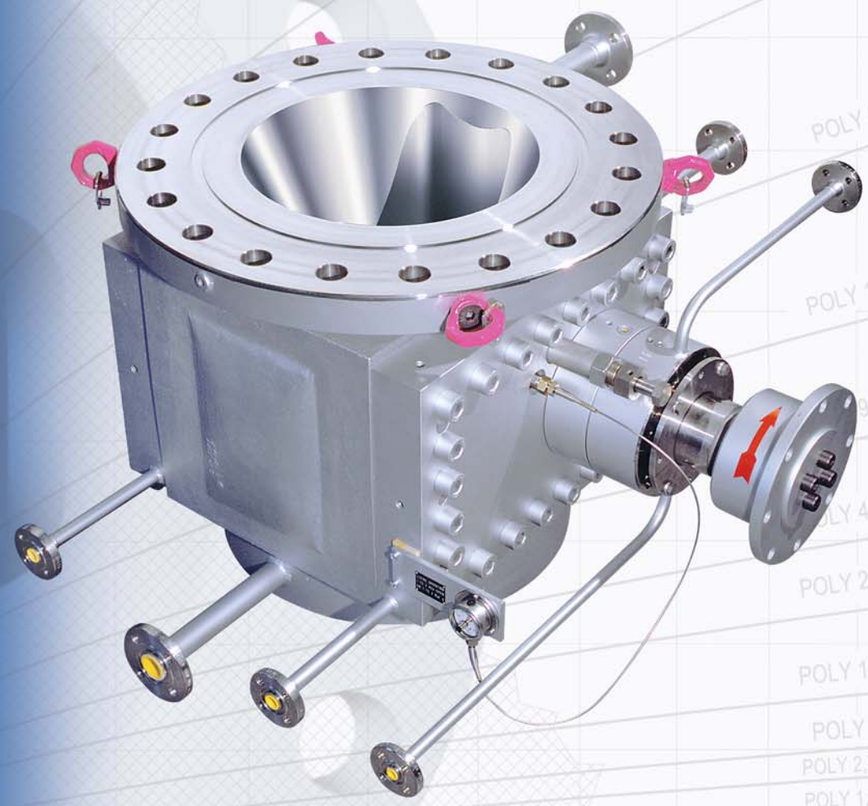
BOOSTER



POLY

POLY

Discharge Gear Pump



WITTE PUMPS & TECHNOLOGY

POLY Gear Pump

Discharge of medium to high viscosity media from a reactor

POLY high-pressure gear pump for the discharge of medium to high viscosity media from a reactor

POLY high-pressure gear pump for the discharge of medium to high viscosity media from the reactor. The extra large inlet opening guarantees an even flow of product to the gearwheels even under vacuum or extremely low NPSH conditions.

Offered with either a round inlet port, by means of which the suction flange of the pump is directly connected to the outlet flange of the reactor or as a low NPSH version, where the pump is connected between the pump and reactor flanges, in order to achieve an even larger and shorter inlet port.

Technical Features

Housing
Non-alloyed and alloyed steels · cast steel · with optional surface coating

Gears
Nitrated steel · tool steel · special steel · with optional surface coating · helical gearing · herringbone gearing

Friction Bearings
Tool steel · NiAg (nickel-silver) · Al-bronze · special materials * with optional surface coating

Shaft Seals
(Vacuum) viscoseal · stuffing box · combination of viscoseal and stuffing box · double-action, buffered mechanical seal

Heating Systems
Heat transfer oil · steam

Operating Parameters

Viscosity
up to 40000 Pas

Temperature
up to 350° (662°F)

Inlet pressure
Vacuum to max. 40 bar (580 psig)

Differential Pressure
Up to 250 bar (3225 psig)

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

Pump Sizes
From 22/22 (4.7 cm3/U – 10 kg/h) up to 280/280 (12000 cm3/U – 30000 kg/h). Intermediate sizes, with wider gear wheels for lower differential pressure, are available as standard, e.g. 152/254 (3,170 cm3/U).

Application Examples

Polymer processing
PET · PBT · PA · PC · PS · SAN · ABS · HIPS · PP · PE · POM · Bio-polymers

There are two types of Poly:
a) Standard design: The suction flange is also the fastening flange to the reactor.

b) The Low NPSH design: In this case, the fastening flange is designed as an aligning flange and is seated on the delivery side of the pump. The pump is clamped between the aligning flange and the reactor flange. This design provides an extremely large and short suction opening, promoting product flow. The opening can be circular, square or rectangular.

Low NPSH Version

The loss of pressure on the suction side of the pump is dependent upon a number of factors. Parameters like viscosity and flow rate are largely predetermined by the process. According to the Hagen-Poiseuille equation, the pressure loss is linearly proportional to the length of the inlet path and inversely proportional to the fourth power of the diameter.

The unique WITTE low NPSH version utilises this knowledge and offers an extremely large diameter, short suction inlet.

With the Low NPSH version, the connecting flange is foreseen as a loose flange and is located on the pressure side of the pump. The pump itself is connected between the loose flange and the reactor flange. This configuration allows an extremely large diameter, short suction inlet to be incorporated into the housing. The shape of the inlet is variable and can for example be round, quadratic or square.

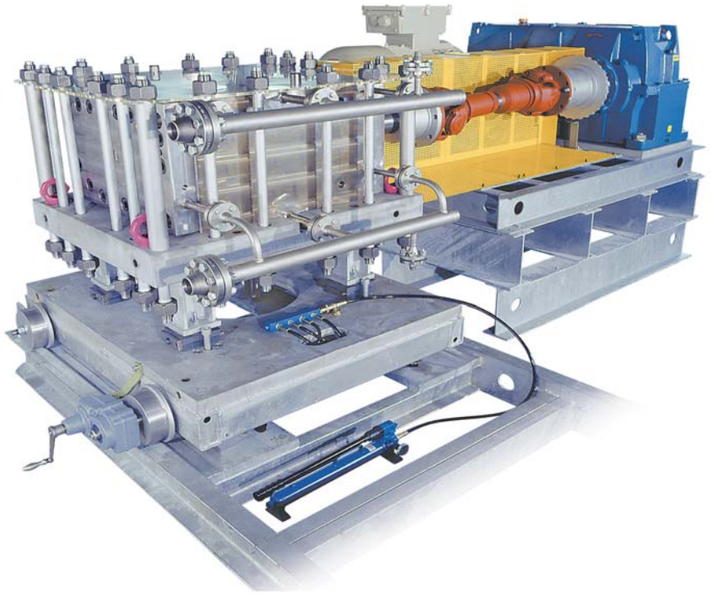
Due to the fact that the pressure losses at the suction side have been reduced to a minimum, even critical applications can be reliably realised, e.g. discharging high viscosity or foaming melts.

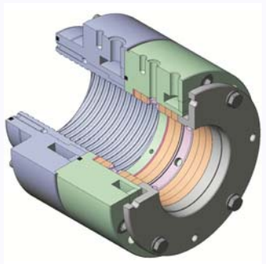
Typs of Seals

Vacuum Viscoseal with Stuffing Box
The vacuum viscoseal is a special version of the viscoseal and can also be provided with heating or cooling. The return flow to the suction side is adjusted by means of a needle valve, so that the choked product forms a barrier. This makes it possible to operate the pump with vacuum conditions on the suction side. Due to the fact that it is a dynamic seal, it is often combined with a buffered stuffing box. This combination prevents air from entering the reactor, even when the pump is at a standstill.

Stuffing Box
The stuffing box is a simple (static) seal for WITTE gear pumps. It can be provided with buffering if so desired. The range of application is similar to that of the viscoseal. The standard material used for the packing is made of expanded pure graphite with structural textile fibres. But it goes without saying, that other materials are also available.

Vacuum viscoseal with lip seal
As an alternative, the vacuum viscoseal can also be combined with a lip seal instead of a stuffing box. The buffer fluid of this static shaft seal acts as barrier. If the pump is stopped for a short time this design prevents air getting sucked in the pump through the shaft seal.



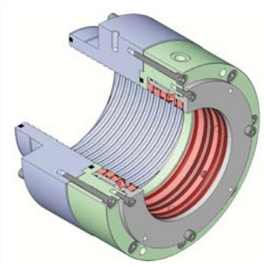


Vacuum-viscoseal with stuffing box

Suction pressure:
Vacuum up to 10 bar (abs) (145 psig)

Viscosity:
10 - 40000 Pas

Temperature:
max. 350° (662°F)

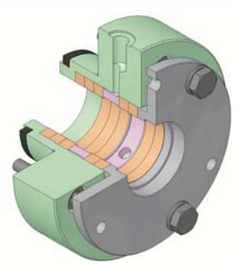


Vacuum-viscoseal with lip seal

Suction pressure:
Vacuum up to 10 bar (abs) (145 psig)

Viscosity:
10-20000 Pas

Temperature:
max. 275° (527°F)



Stuffing box, buffered

Suction pressure:
Vacuum up to 10 bar (abs) (145 psig)

Viscosity:
0.001-10000 Pas

Temperature:
max. 300° (580°F)

POLY

Discharge Gear Pump

The Herringbone Gearing

The herringbone gearing reduces the pulsation of the medium being conveyed in comparison to straight and helical gearing. This is a great advantage, particularly for polymers.

Products with a high solids content are conveyed better, as the product is more easily displaced from between spaces between the teeth. The polymer is also subjected to less stress. This is particularly advantageous for highly sensitive polymers, as both shearing and heating effects are reduced during the pumping process.

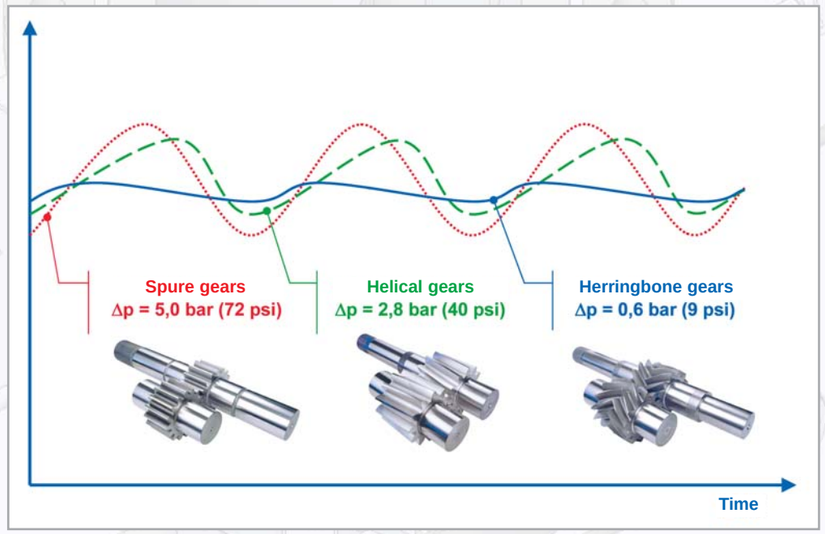
Existing gear pumps can be converted to herringbone gearing. This merely entails replacement of the friction bearings and shafts. Sizes available are: 4 (45/45) to 11 (224/224).

Advantages at a glance:

- larger diameter shaft journals, thus increased differential pressure
- Less pulsation
- Less stress on the polymers /shearing
- Decreased product heating effect
- Existing pumps can be converted Produktes

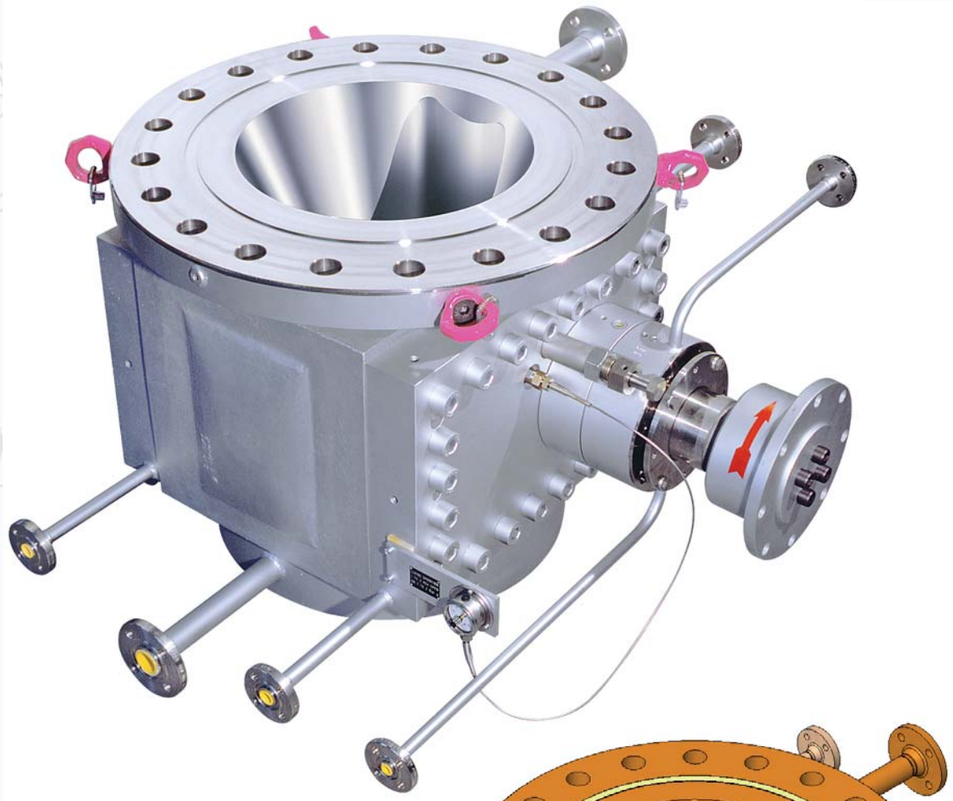
Differing designs:
The "O" design displaces the medium

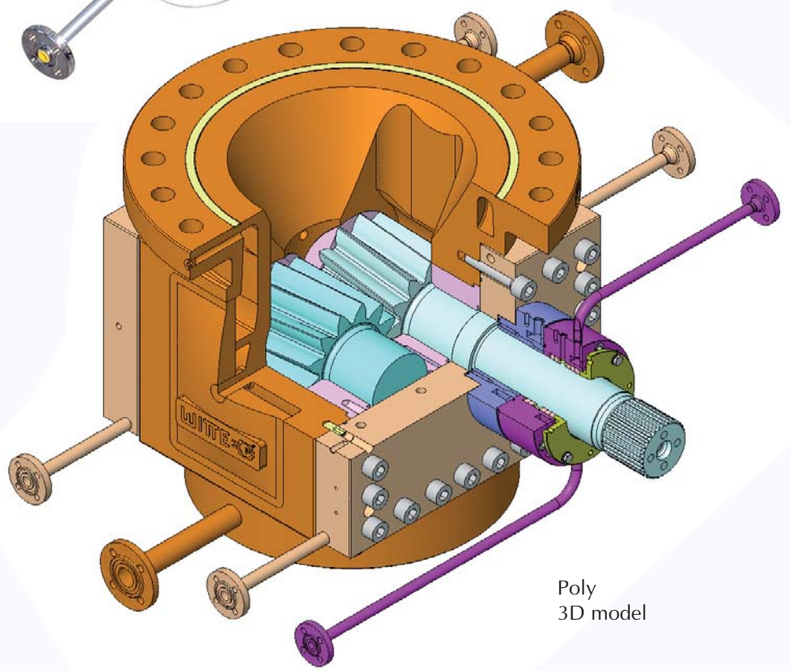
towards the centre.
The "X" design displaces the medium towards



Herringbone gears: comparison of pulsation

POLY - Models





Poly
3D model

POLY

Discharge Gear Pump

POLY - operating conditions

CHEM
- Transfer
- Metering

POLY
- Polymer discharge and transfer

POLY/CHEM
- Pre-polymer discharge and transfer

BOOSTER
- Increase pressure
- Metering
- Transfer

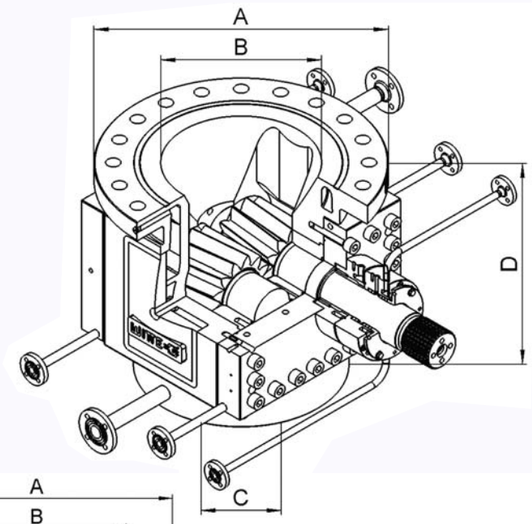
Granulation
Spinnery
Fibre pro-duction

Size (axial distance width)	Spec. displacement volume (ccm/U)	Capacity (l/h)*
1/1 (22/6)	1,28	1 - 14
1/2 (22/13)	2,78	2 - 33
1 (22/22)	4,7	3 - 56
2 (28/28)	10,2	6 - 92
3 (36/36)	25,6	15 - 230
4 (45/45)	46,3	28 - 417
5 (56/56)	92,6	55 - 722
6 (70/70)	176	105 - 1370
7 (90/90)	371	222 - 2890
8 (110/110)	716	430 - 4700
9 (140/140)	1.482	900 - 8850
10 (180/180)	3.200	1920 - 17000
11 (224/224)	6.100	3660 - 32000
12 (280/280)	12.000	6590 - 58000

* Dependent on the fluid characteristics and operating conditions

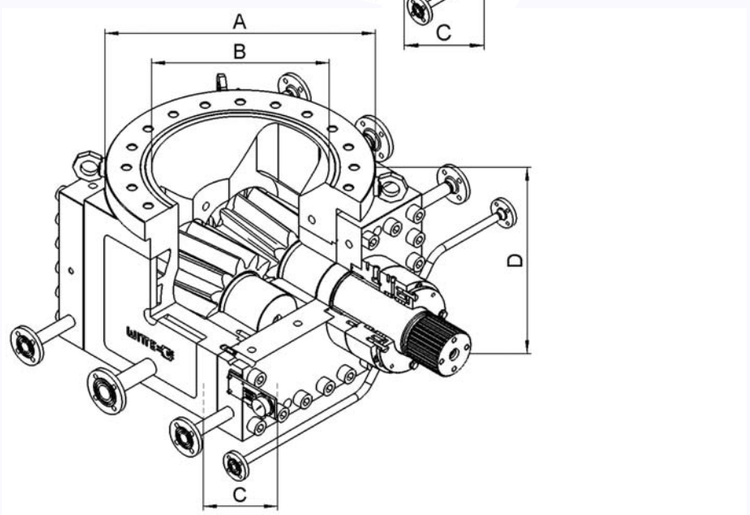
POLY-Dimensions „Classic“

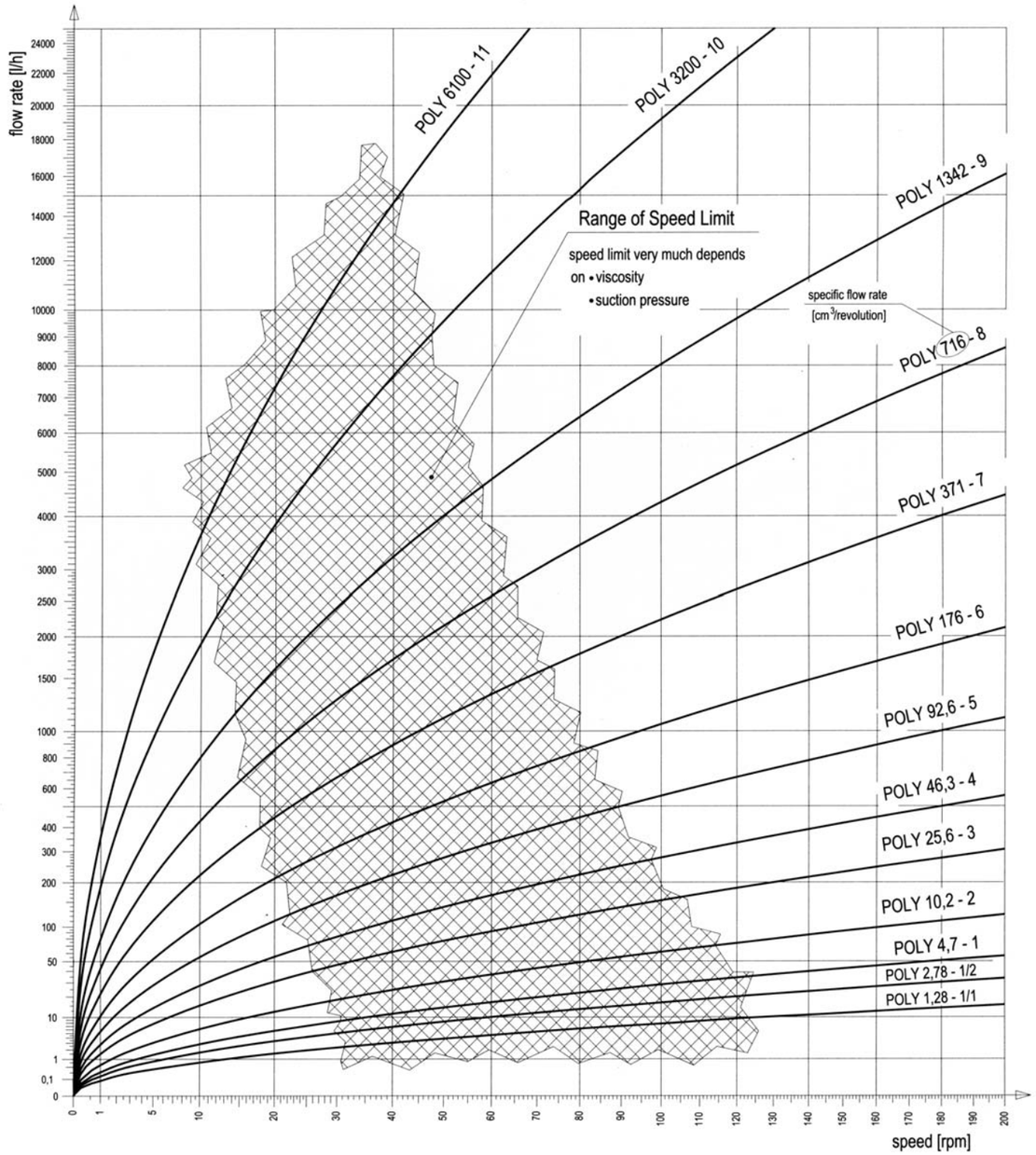
Pump size	suction side outside-Ø A	suction side inside-Ø B	suction side inside-Ø C	Size D
46,3-4	315	125	50	260
92,6-5	320	150	68	290
176-6	380	175	80	350
371-7	450	200	100	400
716-8	520	250	125	430
1482-9/1	584	300	150	530
3200-10	730	400	200	640
6100-11	915	500	250	770
12000-12	1150	600	300	960



POLY-Dimensions „POLY - S“

Pumpsize	A	B	C	D
371-7	380	200	80	377
716-8	450	250	100	430
1482-9/1	520	300	125	471
3200-10	580	400	150	540
6100-11	715	500	200	635
12000-12	915	600	250	775
18L-320/320	1035	700	250	850
25L-360/360	1150	800	300	950





WITTE Presence world wide

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