

**BOOSTER**



**CHEM**



**EXTRU**



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**POLY**



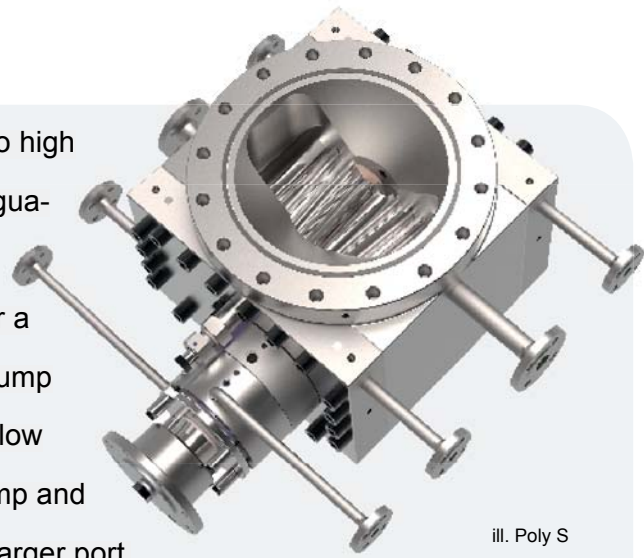
# POLY

Discharge Gear Pump



# POLY

POLY high-pressure gear pump for the discharge of medium to high viscose 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 shorter path and larger port.



ill. Poly S

## There are two types of Poly:

- Standard design: The suction flange is also the fastening flange to the reactor.
- 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.

## Technical Features

<b>Housing:</b>	Stainless steels, carbon steel, optional: surface coating
<b>Gears:</b>	Nitrided steel, tool steel, optional: special steel, surface coating, helical gearing, herringbone gearing
<b>Friction Bearings:</b>	Tool steel, Al-bronze, NiAg (nickel-silver), optional: special materials, surface coating
<b>Shaft Seals:</b>	Vacuum viscoseal, buffered stuffing box, buffered lip seal combination of vacuum viscoseal and buffered stuffing box, or vacuum viscoseal with buffered lip seal, double and buffered mechanical seal,
<b>Heating Systems:</b>	Heat transfer oil, steam

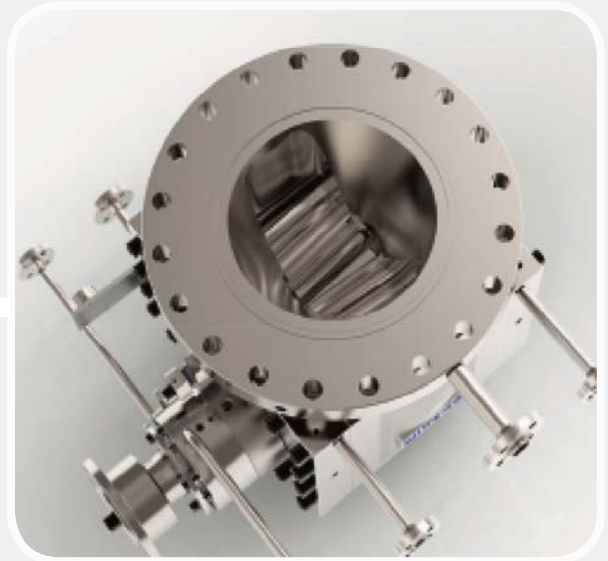
## Application Examples

<b>Polymers:</b>	PET, PBT, PA, PC, PS, SAN, ABS, HIPS, PP, PE, POM, Biopolymers
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## Pump Sizes

From 22/22 (4.7 cm<sup>3</sup>/rev) up to 360/360 (25.000 cm<sup>3</sup>/rev).

Intermediate sizes, with wider gear wheels for lower differential pressure, are available as standard, e.g. 152/254 (3.170 cm<sup>3</sup>/rev).



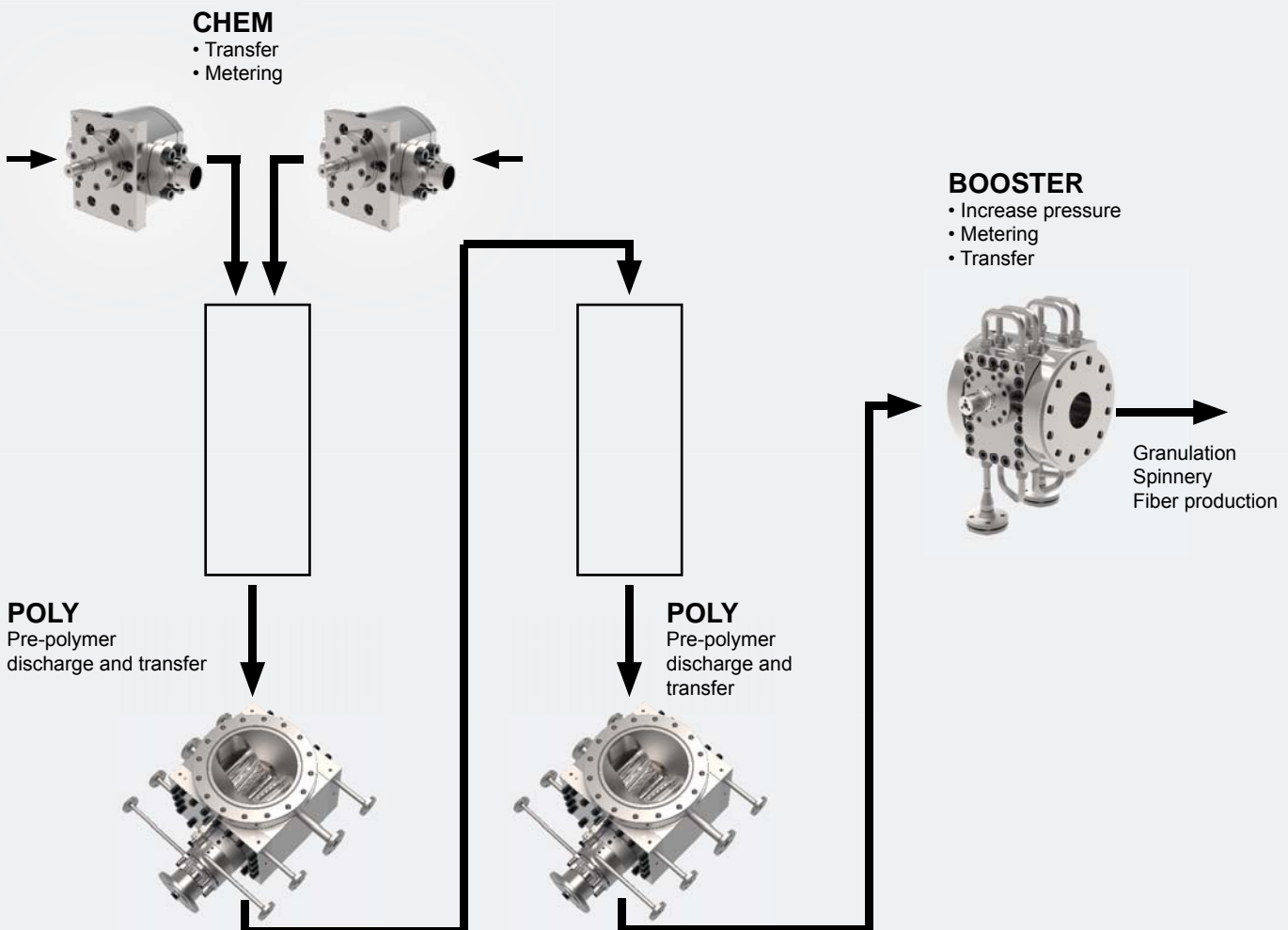
ill. Poly classic

## Operating Parameters

<b>Viscosity:</b>	Up to 40.000 Pas
<b>Temperature:</b>	Up to 350 °C (662 °F)
<b>Suction Pressure:</b>	Vacuum to max. 15 bar (218 psig)
<b>Differential Pressure:</b>	Up to 250 bar (3.625 psig)

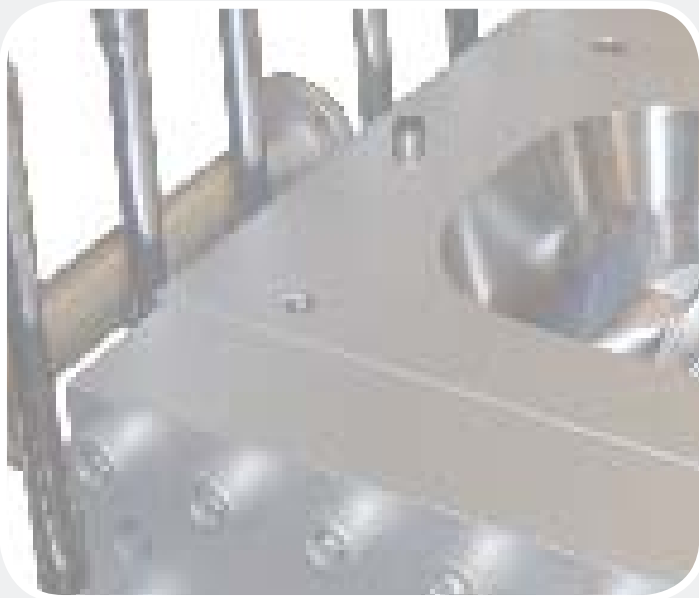
The values listed are maximum values and must not coincide under certain circumstances.

## Applications



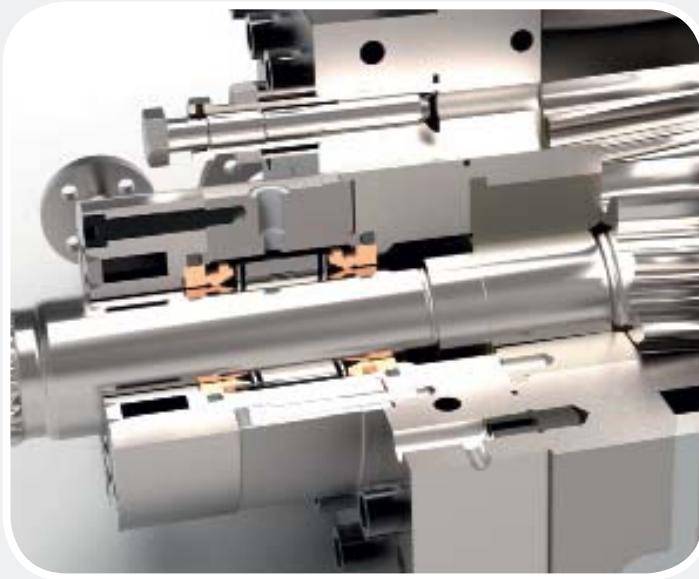
# Low-NPSH-Design

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 utilizes this knowledge and offers an extremely large diameter and 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 viscous or foaming melts.



# Type of Seals

## Double mechanical seal DD



The standard double mechanical seal can be used for pressures from vacuum up to 15 bar (210 psig). The seal can handle viscosities from 0,2 up to 1.000.000 cp (mPas). Maximum temperature of the liquid is about 300°C. For higher pressures and temperatures special designs exist.

**Viscosity:** 0,2 - 1.000.000 mPas

**Temperature:** max. 300 °C (580 °F)

**Suction Pressure:** Vacuum up to 15 bar (abs) (218 psig)

## Vacuum Viscoseal with buffered 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.

**Viscosity:** 10 - 40.000 Pas

**Temperature:** max. 350 °C (662 °F)

**Suction Pressure:** Vacuum up to 15 bar (abs) (218 psig)

## Vacuum viscoseal with buffered 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.

**Viscosity:** 10 - 20.000 Pas

**Temperature:** max. 250 °C (527 °F)

**Suction Pressure:** Vacuum up to 15 bar (abs) (218 psig)

# The herringbone gear design

## The Herringbone Gears

The herringbone gears reduces the pulsation of the medium being conveyed in comparison to straight and helical gears. 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 gears. The shafts and friction bearings could be easily replaced.

Sizes available are: 4 (45/45) to 11 (224/224).

### Advantages at a glance:

- Less pulsation
- Less stress on the polymers /shearing
- Decreased product heating effect
- Existing pumps can be converted

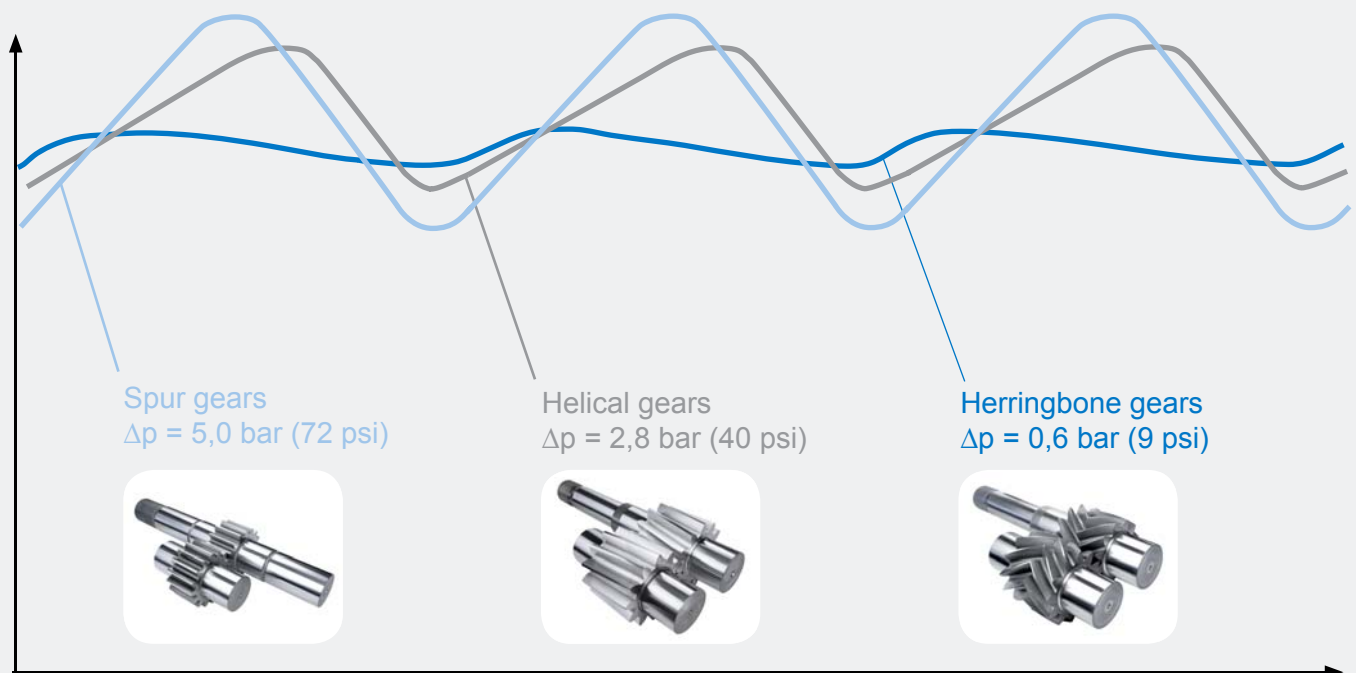


The „O“ design displaces the medium towards the centre.



The „X“ design displaces the medium towards.

### Example: comparison of pulsation

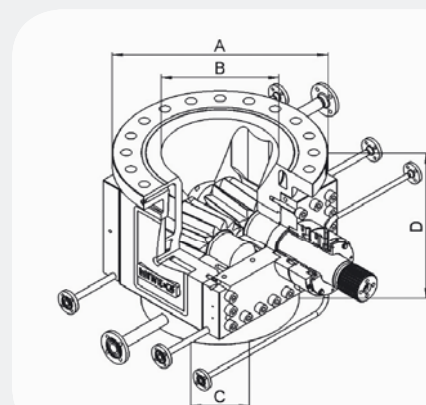


Herringbone gears: comparison of pulsation

# POLY-Dimensions

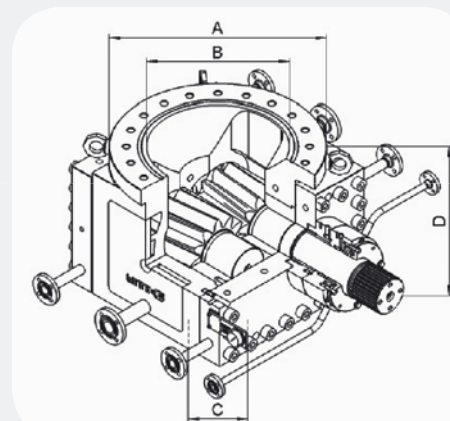
## POLY-Dimensions „Classic“

Pump size	suction side outside Ø A	suction side inside Ø B	pressure side inside Ø C	Height 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“

Pump size	suction side outside Ø A	suction side inside Ø B	pressure side inside Ø C	Height D
371-7	380	200	80	377
716-8	450	250	100	394
1482-9/1	520	300	125	471
3200-10	580	350	150	540
6100-11	715	400	200	635
12000-12	915	500	250	770
18L-320/320	1035	600	250	850
25L-360/360	1150	700	300	950

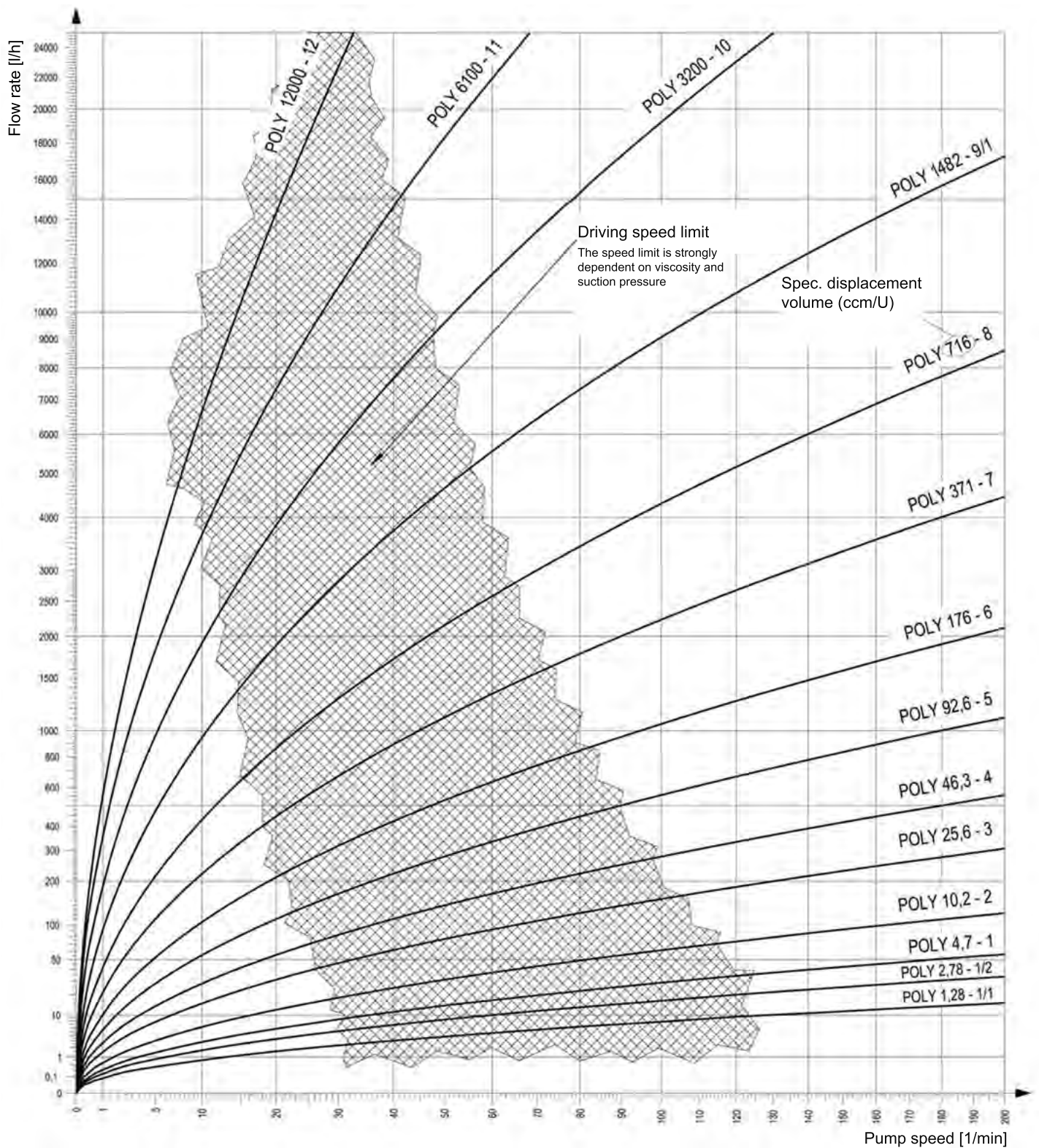


## Size/Spec. displacement volume/Capacity

Pump size	Spec. displacement volume (cm <sup>3</sup> /rev)	Capacity (l/h)*
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
18L (320/320)	18.000	13000 - 40000
25L (360/360)	25.000	17000 - 52000



\* (Depending on the fluid characteristics and operating conditions)



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