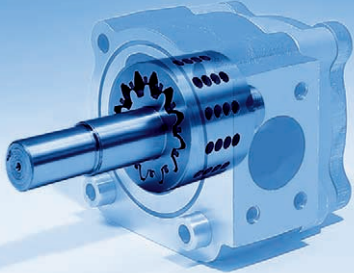


Voith Turbo

VOITH



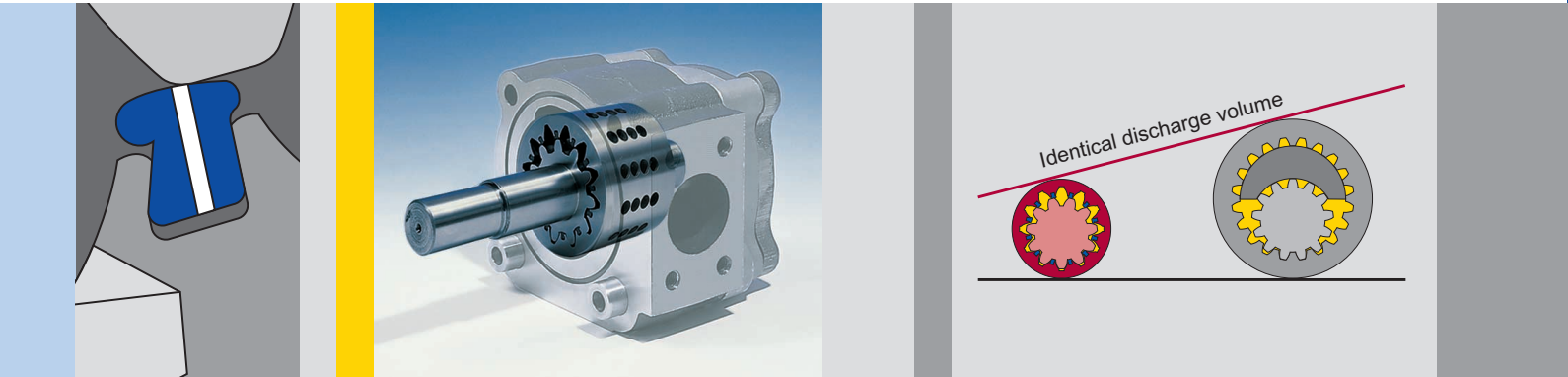
**Low pressure internal gear pumps
Superlip-System®**



What is new about these pumps?

As specialist for challenging tasks in the field of power transmission, Voith has always been the leader by providing innovative ideas.

The development of a new internal gear pump with the Voith Superlip-System[®] is yet another breakthrough for Voith.

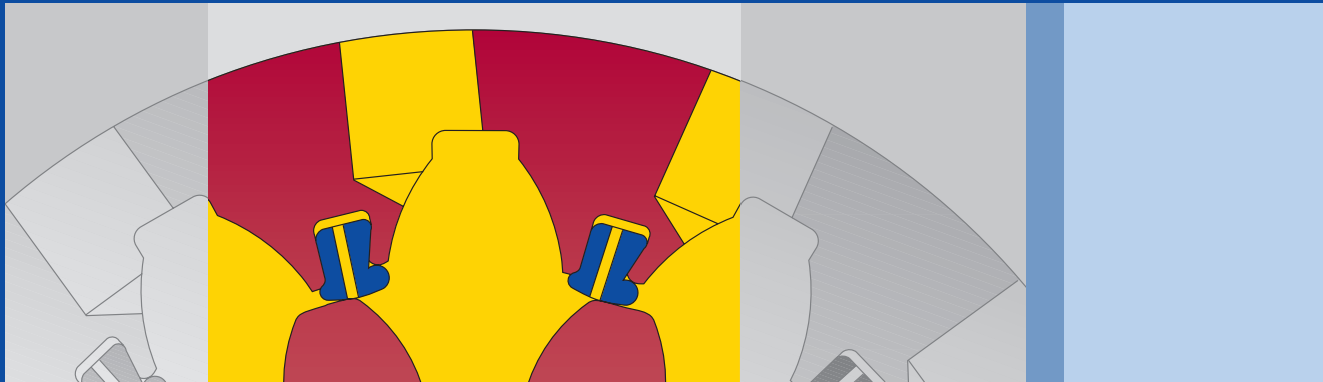


For the first time the filler, normally obligatory for internal gear pumps with involute teeth, has been omitted. The space thus gained allows a reduced outer diameter for the annular gear, resulting in a more efficient outer gear profile and a more compact pump assembly, without reducing the rated capacities.

New is also the wide tooth profile which is designed to the dimensions of the suction connection, with radially arranged bore holes, through which all suction and displacement is carried out.

However, the major innovation is the radial gear compensation between internal gear and pinion. State-of-the-art compensation inserts in the crown of the internal gear seal the pressure area securely. The sliding speed at the sealing points is very low, being only 1/12 of the circumferential speed.

The Voith Superlip-System®



Voith low-pressure internal gear pumps operate with an innovative radial compensation principle, the Voith Superlip-System.

The pinion shaft and the annular gear have involute teeth and form the core of the pump. The annular gear is equipped with just one tooth more than the pinion shaft.

The displacement process is carried out across an arc of 180° , and the displacement space is sealed in the pressure area after being contacted by two to three tooth heads.

The compensation inserts in the tooth head of the annular gear are balancing the manufacturing tolerances. The pressing power and the radial movement of the sealing elements are limited.

The shape of the sealing elements and the geometric design of the tooth root in the pinion shaft ensure that no oil escapes, thus avoiding pressure surges and high noise levels. The sealing process occurs at a sliding speed of almost 0 m/s.

Unlike with vane pumps, the sealing elements touch the pinion head only across a short angle, which is a pre-condition for wear-resistant operation and long service life.

Construction and operating principle



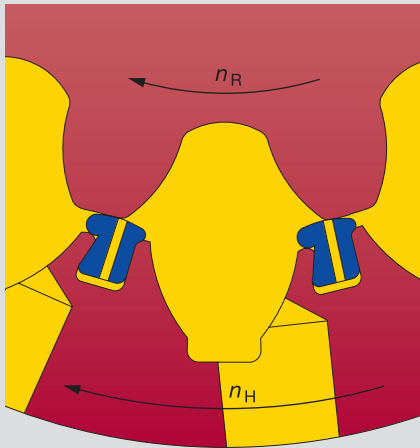
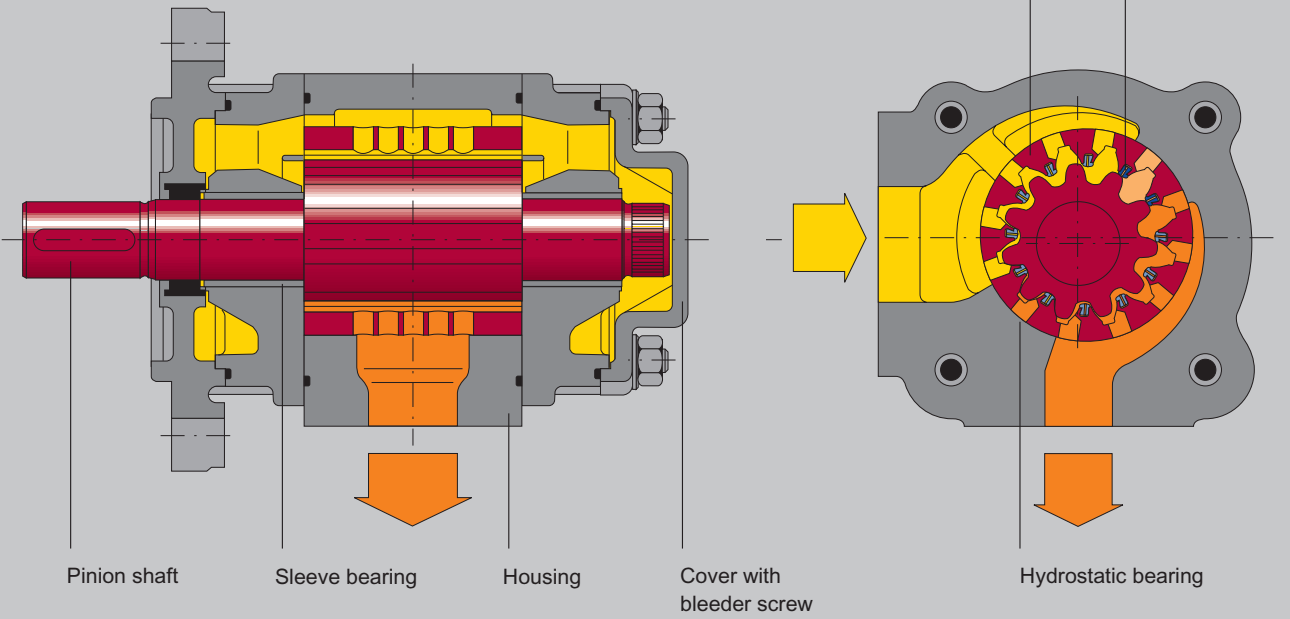
The pinion shaft is mechanically driven and drives the annular gear with its specially designed tooth profile. Torque is transmitted exclusively via the tooth flanks. The compensation inserts are activated on the reverse side with reduced operating pressure and seal the pressure area over two or three tooth heads. The pinion head is supported by two journal bearing bushes which are pressed into the bearing housing.

The annular gear is hydrostatically supported within the pump housing. By turning the internal gearing, the tooth chambers are opened across an area of 180° , and the operating fluid flows from the suction connection through the radial holes in the annular gear into the chambers.

Over a further 180° the tooth chambers are decreased and the operating fluid is transported to the pressure connection. The teeth run freely across the larger part of the rotating angle and only engage when reaching a dead centre or going into reverse.

So slow is the sliding speed at the sealing elements, that extremely wear-resistant operation is guaranteed. The fact that the annular gear has only one tooth more than the pinion shaft which enables a large displacement angle is the result of the construction without filler piece. The consequence is a low pulsating pressure flow.

Sectional view



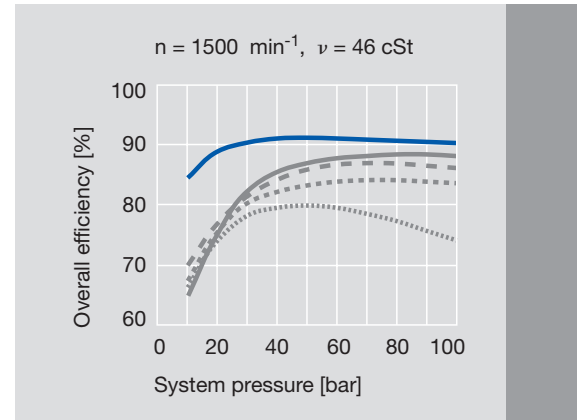
Speed difference between pinion shaft and annular gear.

$$n_R - n_H = n_R (1 - 11/12)$$

What are the benefits of the new internal gear pump?

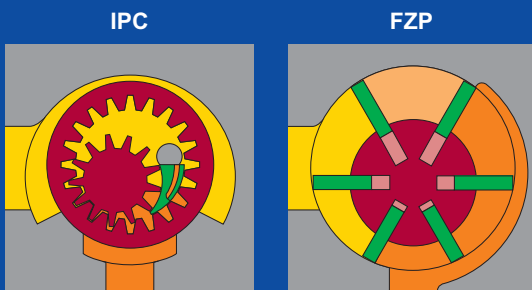
Here are the most important advantages in short:

- Twice the displacement capacity of comparable internal gear pumps
- Superior engineering at a low price
- Low noise level
- High overall efficiency
- Low flow and pressure pulsation
- Excellent suction performance, even at high speeds
- Long service life
- Low weight



Comparison of systems

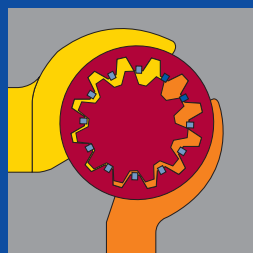
The new compensated internal gear pump combines the advantages of an internal gear pump and those of a vane pump.



High overall efficiency
Long service life
Quiet

Small
Economically priced
Quiet

Small, Economically priced
High overall efficiency
Long service life
Quiet



IPN

IPC = Voith Medium Pressure Internal Gear Pump
FZP = Vane Pump
IPN = Voith Low Pressure Internal Gear Pump

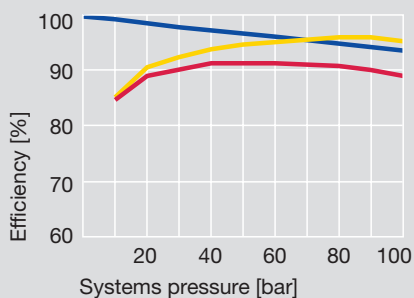
- Voith Superlip-System
- Internal gear pump (not compensated)
- - Vane pump
- - - Radial vane pump/rotating cam pump
- Screw pump

Technical data and dimensions

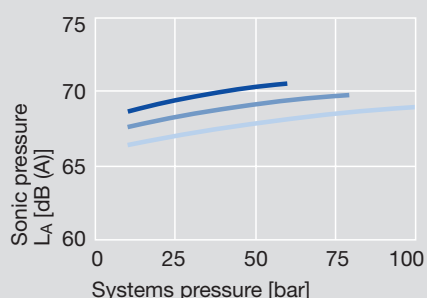
— volumetric
— mechanical
— total

Displacement
— IPN 6, 200 cm³/tr
— IPN 5, 160 cm³/tr
— IPN 4, 125 cm³/tr

Efficiency of a low-pressure internal gear pump IPN 6-125.



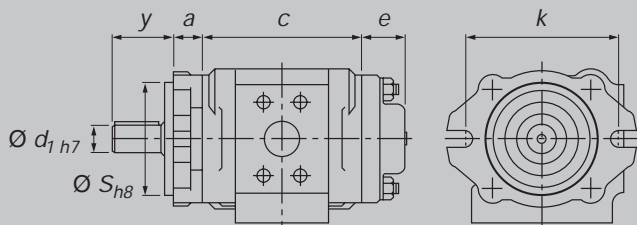
Noise level of a low-pressure internal gear pump IPN.



Measuring conditions:
 $n = 1500 \text{ min}^{-1}$, $\nu = 46 \text{ cSt}$.
 Place: 1 m axial.
 Measured in low-echo room;
 values are 5dB (A) lower if measured
 in an anechoic chamber.

Basic type Displace- ment size	Displace- ment cm ³ /U (*)	Speed min ⁻¹ (P_{\max})		Flow volume l/min at 1500 min ⁻¹	Pressures bar		Major dimensions mm						
		min	max		Continuous- pressure	Peak- pressure	$\varnothing d_1$ h7	$\varnothing S$ h8	k	a	c	e	y
IPN 4-32	32.1	400	3600	48.1	100	125	20	80	109	20	100.5	31	44.5
IPN 4-40	40.1	400	3600	60.1	80	100	20	80	109	20	113.5	31	44.5
IPN 4-50	50.2	400	3600	75.3	63	80	20	80	109	20	130.0	31	44.5
IPN 5-64	64.2	400	2500	96.3	100	125	25	100	140	26	119.5	34	52.5
IPN 5-80	79.9	400	2500	119.8	80	100	25	100	140	26	135.0	34	52.5
IPN 5-100	100.2	400	2500	150.3	63	80	25	100	140	26	155.0	34	52.5
IPN 6-125	125.0	400	2000	187.5	100	125	32	125	180	24	151.0	40	68.5
IPN 6-160	159.9	400	2000	239.8	80	100	32	125	180	24	172.5	40	68.5
IPN 6-200	199.7	400	2000	299.5	63	80	32	125	180	24	197.0	40	68.5

*Due to manufacturing tolerances, displacement can be up to 1,5% less.



Voith – The Company

World-wide, Voith is setting standards in paper technology, power transmission, power generation and industrial services.

Quality, reliability, solidity – these are the key words of our corporate philosophy. This is reflected in:

Voith – Engineered reliability.

Voith – Figures, Dates, Facts

Voith is one of Europe's large family-owned companies. The driving forces of our growth are innovative power and reliability.

Holding: Voith AG

Head office: Heidenheim/Brenz, Germany

Turnover: EUR 3.3 billion

Employees: 23,500

Locations: over 180 world-wide

Voith Turbo – Competent Partner for Power Transmission

Voith Turbo is a Group Division of Voith AG.

We develop and produce state-of-the-art drive and breaking systems for industry, rail and road applications.

Our products operate economically, efficiently and fast. They save energy, reduce emissions and, at the same time, offer ultimate comfort.

Voith Turbo GmbH & Co. KG
Product Group Hydrostatics
P.O. Box 2030
D-89510 Heidenheim/Germany
Tel. +49-73 21-37-45 73
Fax +49-73 21-37 78 09
hydrostatik@voith.com
www.voithturbo.com

VOITH
Engineered reliability.