

Solids handling pumps HSP

For fine grain slurries with a high percentage of solids



Putzmeister

Industrial Technology

Mining · Energy · Environment · Oil & Gas

Solids pumps HSP

Oil-hydraulic piston pump with seat valves

The seat valve pump is used for arduous applications. The HSP series is used with pastelike and highly viscous material with a low content of foreign bodies and small particle sizes (< 5 mm).



Precise sealing of the valves means that extremely high pumping pressures can be achieved. The principle behind the design of the hydraulic and pumping pistons is the same as in the Putzmeister KOS and KOV series. This ensures maximum reliability and availability.

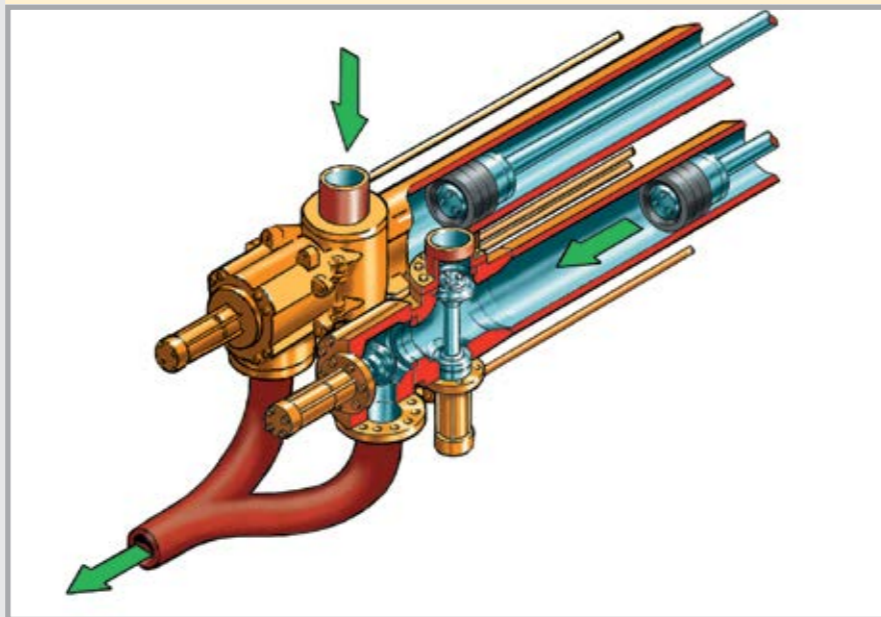
Two special features of the Putzmeister design are that not only is it a simple matter to replace the valves but the design also means a long service life for all wearing parts. Valves and valve seatings are made of highly wear-resistant steels and can be used at either end. This doubles their service life. Valves can be easily replaced without dismantling the delivery lines.

A pulsation-free conveyance can be achieved with the PCF system (Pressure Constant Flow, optional)

All of the familiar Putzmeister options and variations (ex-protection, materials) are available with the HSP series on request as well.

Features and advantages

- For conveying fine-grained sludges or slurries
- Switch-over without shorting
- No backflow at high pressures
- No booster pump required if there is a positive feed
- PCF system for an almost pulsation-free conveyance (optional)
- Output up to 400 m³/h
- Delivery pressure up to 150 bar



HSP pumps are mainly used where fine slurries laden with a high proportion of solids must be conveyed against high pressures:

- Mineral solids (tailings) with particle sizes smaller than 100 µm and with a dry solids content of up to 80 %
- Fluids containing slurry, e.g. pit water
- Thick pastes of electro filter ash with low water content
- Various chemical and organic solids
- Sewage sludge with a high proportion of solids (moist, compact)

Systems using HSP pumps can be found in many industries:

- Mining (de-watering of mines, backfilling, pumping of tailings)
- Sewage works (transport of sewage sludge)
- Power stations (transport of fly ash)
- Waste recycling (transport of oil sludge)



Sewage sludge



Fly ash



Tailings

The piston pumps with hydraulically-operated seat valves

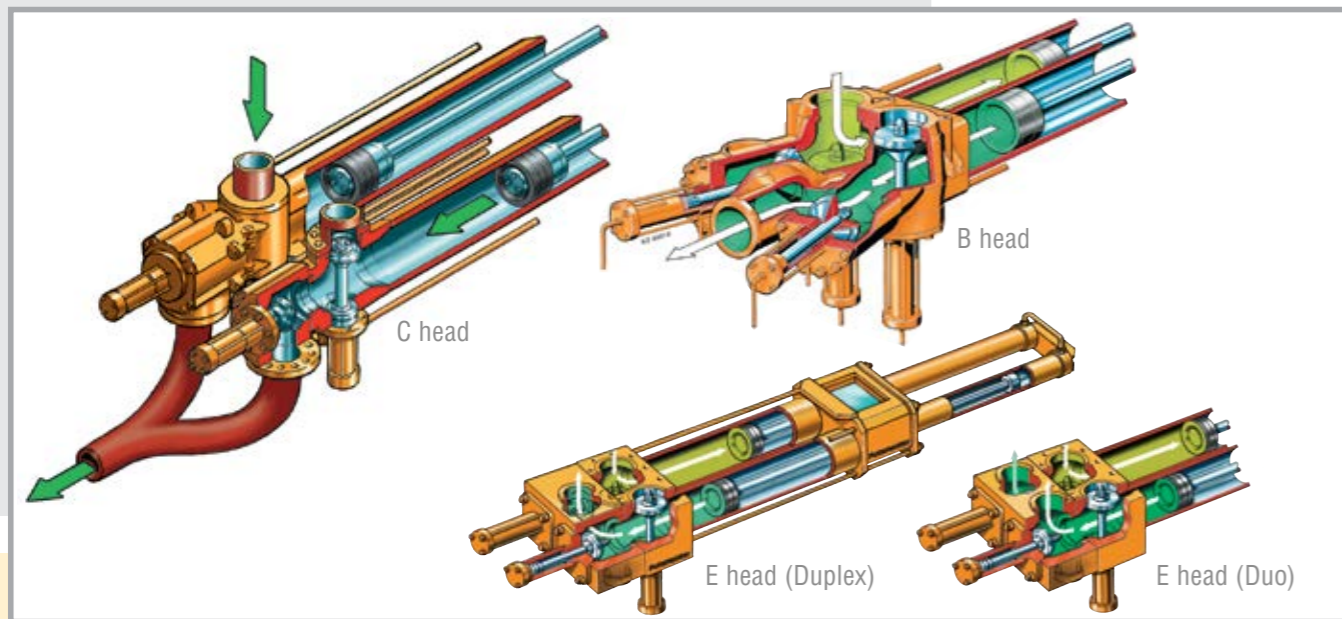
The pump head

The principal feature of the HSP pump series is the hydraulically-controlled disc valves. The pumps are either Duplex, Duo or Single pumps with different pump heads.

The „C pump heads“ are designed as individual heads and can be folded open, making them easily accessible for the inspection and replacement of wearing parts.

The „B pump head“ has a horizontal pressure line outlet and two vertical intake ports, providing compact design on all machine sizes.

On versions with the „E pump head“, two lines supply the pump with the product to be delivered. The delivery outlet is perpendicular to the pump direction. A pipeline bend at the outlet allows the delivery line to be routed in any direction. The delivery line is, therefore, kept free of tension and is easy to open in the event of repair work.



Duplex HSP

In this standard version, two delivery pistons running opposed to one another supply a common delivery line. Interruptions to delivery when the delivery pistons switch over are only minimal (0.2 – 0.3 seconds). A damping vessel renders such interruptions even less significant.

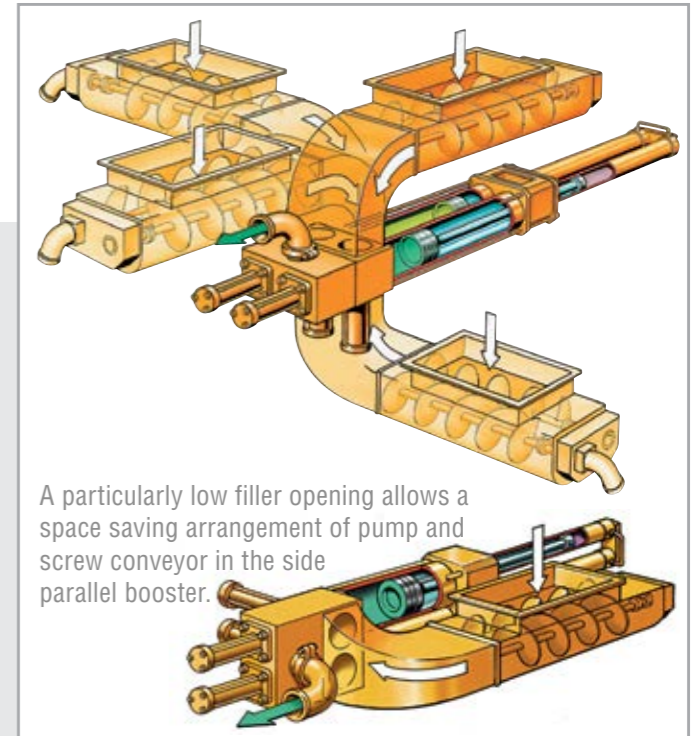
Duo HSP

Each cylinder pumps separately from its own intake line to its own delivery line. Without the need for complicated distribution systems, the conveyed product is pumped in equal quantities to two different areas.

The feeding device

Auger feed devices with self-cleaning screws for delivering high-viscosity, non self-flowing media are installed at the suction side. The double screws generate primary pressure for filling the piston pumps effectively. A key advantage is that the double screws are arranged in a comb formation which enables self-cleaning.

Putzmeister offers combined mixing and auger feed devices for mixing tasks involving slurry and specially adapted series-connected mixers for rigid media.



A particularly low filler opening allows a space saving arrangement of pump and screw conveyor in the side parallel booster.

The valves

HSP disc valves with various diameters can be obtained, with the largest being 280 mm.

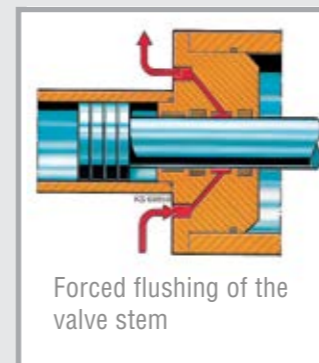
Two types of seal can be used, depending on the product being delivered:

- Hard-soft: steel disc with elastic seal ring for watery or fine grain slurries
- Hard-hard: hard metal seat for media with a high content of dry solids

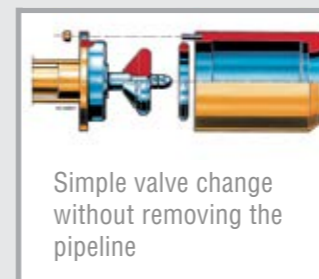
The machine is particularly service-friendly since wear parts can be replaced with ease. This minimises interruptions to operation and the system remains with maximum availability. The valve rods are force-flushed beneath a cover, thus separating the hydraulic circuit from the conveyed product. Grease or optionally a special medium is used for flushing.

As long a cylinder stroke as possible is used to reduce the switching frequency. This means less wear and higher lifetime. Lengths between 1000 and 2500 mm are standard for diameters of 150 to 560 mm.

An L version seat valve is available for special applications. This prevents the piston rod, which is immersed in the conveyed medium, from coming into contact with the hydraulic fluid in the valve cylinder.



Forced flushing of the valve stem



Simple valve change without removing the pipeline

The power pack

The output and pressure can be adjusted to suit various applications thanks to the hydraulic drive. Both are controlled via the control cabinet or from a higher level control room.

The electric and diesel power packs are between 5.5 and 1800 kilowatts, more can be achieved under certain circumstances with special requirements. The machine is delivered with an open (VHS-EU) or closed hydraulic circuit (FFHE) depending on the volume of fluid required. For problem-free operation, all essential information (hydraulic fluid temperature, pressure, level of filter contamination and motor speed) is displayed and recorded as required.

The power packs can be optionally equipped with acoustic enclosures.



CI power pack with acoustic enclosure (optional)

Accessories for custom design and equipment of your system

HSP Technical data

Delivery lines

Delivery lines in industry must especially be safe over a long period of operation (24/7). The pressure resistance with pulsating load is one particular criteria when designing the delivery line. These can be designed in DIN, SK and ZX with different flange and coupling systems. The Putzmeister SK and ZX systems have proved themselves worthy for abrasive and non-abrasive materials. They have a clamp coupling for easy installation and removal.

ZX delivery lines are used in sewage treatment works, in waste recycling, in coal-fired power plants, waters desludging, in mining and other numerous special applications. Depending on the application, the design, material and the surface treatment can be modified in order to be ideally adapted to the pump and material to be conveyed.



Ball, gate or diversion valves

Delivery line components must be designed regarding the dynamic loads and characteristics of the media. Ball valves for example are therefore equipped with stronger shaft shanks and flush connections.

Gate and diversion valves are essential when multiple delivery lines have to be installed. Thus, the material located in the pipeline after the pump can be diverted through a gate valve to other routes such as a thermal dryer or intermediate storage.

Gate valves are hydraulically operated. For a faster switch, it is suggested to use a power pack of at least 7.5 kW. The valve housing is sealed with hardened sealing rings, that are pressed against the moving blade of the valve.

A wide range of application specific components and functions are available for extreme operation, e.g.

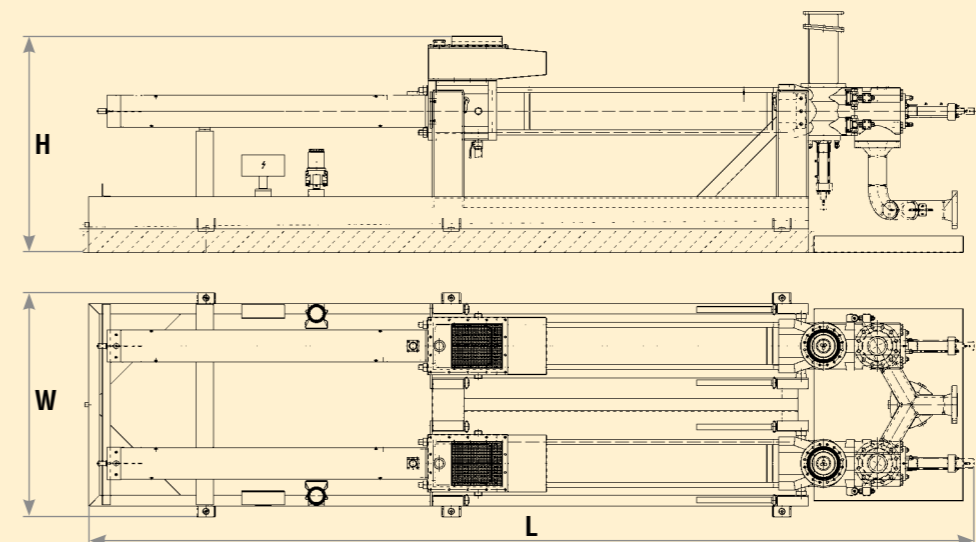
- Feed auger
- Receiver container with or without agitator
- Intake piping with gate valve
- Vibration damper for the delivery system
- Gate and distribution valves
- Boundary layer lubricant injection station
- Scraper pig gates for delivery line cleaning

Type	Output*	Permanent delivery pressure**	Delivery cylinder Ø	Delivery cylinder length	Cylinder volume per stroke	Type HSP head	Length (L)	Width (W)	Height (H)	Weight approx.
HSP 1040	25 m³/h	100 bar	150 mm	1000 mm	16.3 l	E	4100 mm	1120 mm	882 mm	2500 kg
	110 gpm	1450 psi	5.91 in	39.37 in	4.23 gal		161.42 in	44.09 in	34.72 in	5512 lb
HSP 1050	35 m³/h	80 bar	180 mm	1000 mm	21.4 l	E	4100 mm	1120 mm	882 mm	2800 kg
	154 gpm	1160 psi	7.09 in	39.37 in	5.55 gal		161.42 in	44.09 in	34.72 in	6173 lb
HSP 1070	55 m³/h	70 bar	230 mm	1000 mm	34.9 l	E	4100 mm	900 mm	1200 mm	3000 kg
	242 gpm	1015 psi	9.06 in	39.37 in	8.98 gal		161.42 in	35.4 in	47.24 in	6614 lb
HSP 2180 HP	95 m³/h	80 bar	280 mm	2100 mm	113.3 l	B	7030 mm	1000 mm	1310 mm	5200 kg
	418 gpm	1160 psi	11.02 in	82.68 in	29.85 gal		276.77 in	39.37 in	51.57 in	11464 lb
HSP 2180 HPS	95 m³/h	150 bar	280 mm	2100 mm	120.5 l	C	7155 mm	2100 mm	1697 mm	8900 kg
	418 gpm	2175 psi	11.02 in	82.68 in	31.7 gal		281.69 in	82.68 in	66.81 in	19621
HSP 25100 HP	160 m³/h	100 bar	360 mm	2500 mm	216.4 l	B	8036 mm	1200 mm	1411 mm	8500 kg
	704 gpm	1160 psi	14.17 in	98.43 in	57.06 gal		316.38 in	47.24 in	55.55 in	18739 lb
HSP 25100 HPS	160 m³/h	150 bar	360 mm	2500 mm	223.9 l	C	8307 mm	2100 mm	1801 mm	13500 kg
	704 gpm	2175 psi	14.17 in	98.43 in	58.91 gal		327.05 in	82.68 in	70.91 in	29762
HSP 25150 HP	250 m³/h	100 bar	450 mm	2500 mm	349.9 l	C	9045 mm	2340 mm	2040 mm	15800 kg
	1100 gpm	1450 psi	17.72 in	98.43 in	92.2 gal		356.1 in	92.13 in	80.31 in	34833 lb
HSP 25150 HPS	250 m³/h	150 bar	450 mm	2500 mm	349.9 l	C	9045 mm	2340 mm	2040 mm	16700 kg
	1100 gpm	2175 psi	17.72 in	98.43 in	92.2 gal		356.1 in	92.13 in	80.31 in	36817 lb
HSP 25200 HP	400 m³/h	100 bar	560 mm	2500 mm	523.6 l	C	9500 ¹ mm	2400 ¹ mm	2100 ¹ mm	32000 ¹ kg
	1760 gpm	1450 psi	22.05 in	98.43 in	138.16 gal		374.02 ¹ in	94.49 ¹ in	82.68 ¹ in	70547 ¹ lb

The values provided above are to be viewed as guideline values only and may alter depending on machine applications. Please request detailed quotation drawings.

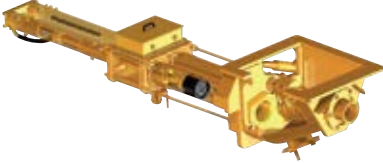




* geometric, rounded
 ** maximum theoretical
¹ planning variables

Conversions:
 1 bar = 14.5 psi
 1 inch = 25.4 mm
 1 US Gallon = 3.785 l
 1 kg = 2.2046 lb



HSP solids pump with C head, exemplary illustration

The right pump for every application

	Application	Output	Pressure
 <p>KOS series S-tube pump</p>	Coarse sludges or slurries with a high proportion of solids, up to 80 mm grain size	10 – 400 m ³ /h (440 – 1760 gpm)	up to 150 bar (2176 psi)
 <p>HSP series seat valve pump</p>	Fine grained sludges or slurries	10 – 400 m ³ /h (440 – 1760 gpm)	up to 150 bar (2176 psi)
 <p>KOV series ball valve pump</p>	Fine grained pastes	0 – 70 m ³ /h (0 – 308 gpm)	up to 80 bar (1160 psi)
 <p>EKO series single piston pump</p>	Large-sized and coarse particles, extremely stiff material	up to 14 m ³ /h (61.6 gpm)	up to 100 bar (1450 psi)
 <p>Hydraulic power pack and control cabinet</p>	All Putzmeister pumps are driven by a hydraulic power pack	Performance:	5.5 – 1800 kW

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