

# Solids handling pumps EKO

Single piston pumps for particularly difficult materials



**Putzmeister**

Industrial Technology

Mining · Energy · Environment · Oil & Gas

# Solids handling pumps EKO

## The oil-hydraulic single-piston pump

The EKO series is designed for the most extreme pumping tasks. The open hoppers allow extremely dry material containing a high proportion of foreign bodies to be fed into the pump. Materials which were unpumpable until now, such as highly dewatered paper sludges, are thrust by the hydraulically driven piston into the delivery line.



The EKO Crown model is equipped with a delivery piston with a hardened toothed cutting crown. This pump is used when the material contains large-sized foreign bodies, which would swiftly result in blockages in other systems. The EKO pumps and cuts in one single operation. The most difficult materials, such as sewage treatment plant screenings or shredded barrel waste in special waste incineration plants, can be pumped without issue into the delivery line.

A near continuous operation is also possible with the double EKO version.

## Features and advantages

- For conveying large-sized and coarse foreign bodies
- For conveying extremely stiff material
- Crown version – pumping and cutting in one stroke
- Simple design
- Delivery pressures up to 100 bar (version PP)
- Cutting force up to 80 t
- Outputs up to 14 m<sup>3</sup>/h

EKO pumps are mainly used for materials that were considered unpumpable, for example:

- Highly dewatered sludge from filter presses
- Dried paper pulp
- Hazardous waste from barrel comminution, including shredded barrels
- Screenings from sewage treatment plants



Shredded barrel material



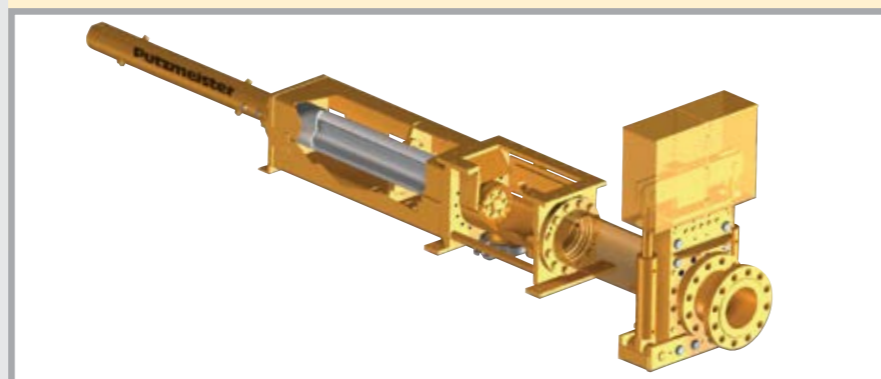
Leftovers and expired, packaged foods



Highly dewatered sludge



Screenings from sewage plants

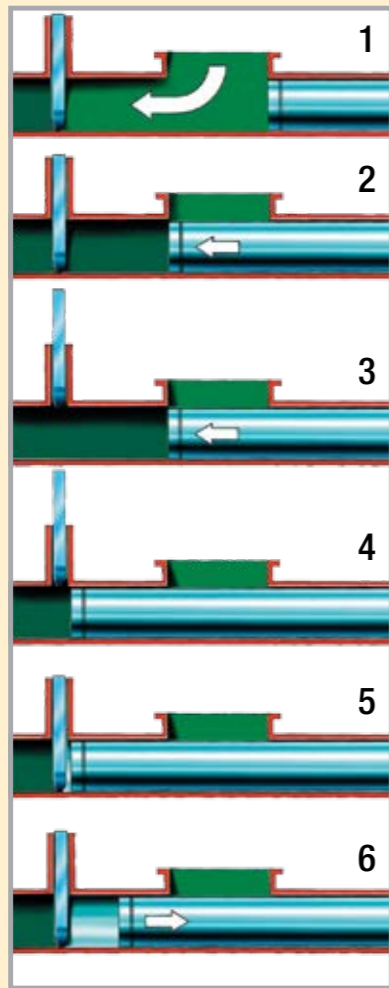


# The EKO series

## Principle of function and pump construction

The material to be conveyed is fed into the pump via a material feeding hopper.

1. A hydraulic drive cylinder moves the plunger forwards and backwards. As the piston is retracting, the feed chamber is filled.
2. The plunger pushes the compressed material out of the feed chamber into the supply cylinder.
3. The slide valve opens on entry of the plunger into the cylinder.
4. The hydraulically driven plunger delivers the material into the pipeline.
5. The gate valve closes the pipeline, preventing any reverse flow material. In addition, this prevents „burn back“ from the furnace.
6. The plunger returns to its starting position, thus opening the feed chamber allowing the material to enter.



## The gate valve

A special gate valve designed for extremely heavy loading prevents back-flow of material from the discharge pipe. This gate valve is directly attached to the outlet flange of the EKO and is operated via the pump's control system. An automatic lubrication system guarantees reliable operation, even with continuous use. The specially formed, robust valve blade is made from highly wear resistant steel, which easily shears foreign bodies on closing.

For bulky dry material that cannot flow back (e.g. screenings), a lamellar non-return valve is used. This is a simply-added economical and reliable system.



Absperrschieber

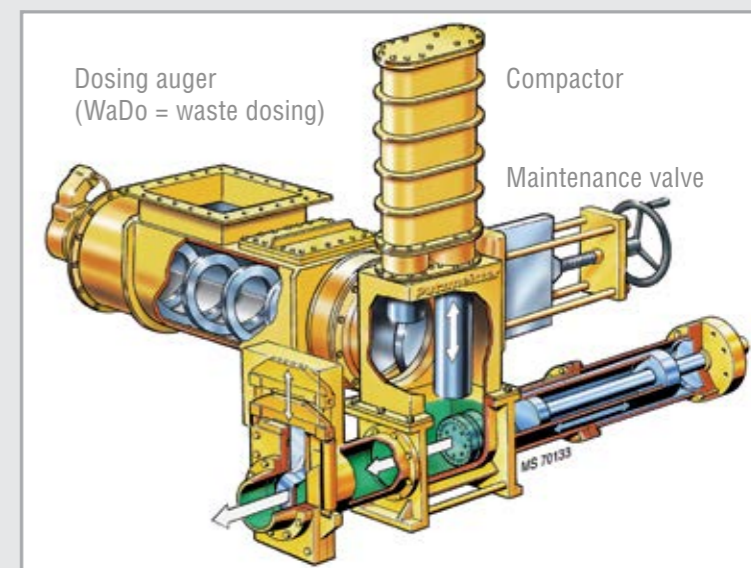
## The EKO crown cuts and transports in one operation

The EKO Crown is used where the material contains large foreign bodies. In other systems, these often lead to blocking of the pump. The EKO crown has a transport piston with a hardened and toothed cutting edge. Foreign bodies (metal, steel, glass, wood, etc.) that may come between the piston and the inlet to the feed chamber, are simply cut through. Thus a medium that may, for instance, contain long metal strips, can be transported into the discharge pipe without problems. A double chromium-plated and hardened plunger and various types of seals (e.g. Viton) are only two of the features that significantly increase the life-time of the EKO crown, making it capable of withstanding the most extreme demands.

Other performance features of the EKO crown illustrate its reliability:

- If a foreign body sticks between the piston and the material feed chamber, or if the material jams in the pipeline, the EKO crown switches over automatically to half stroke speed. At the same time, the piston drive power doubles. The foreign body is cut up with double the force. Blockages are cleared automatically.
- If the foreign body should still be stuck, the piston automatically retracts a short distance and is then pushed forward again. This process repeats up to three times. This „loosening“ procedure usually leads to continuation of the flow.
- If the foreign body cannot be removed in this way, a fault signal is automatically given to alert the operator and permit the pump to be driven clear in manual operating mode.

Awkward shapes or oversize materials may additionally have to be pressed into the material feed area using a compactor. In the case of sticky materials, there is a danger of bridging. This problem is solved by the compactor as well. A sticky consistency can also result in overfilling, with the consequence that blockages can form. This can be avoided by metered dosing of the material using a dosing auger.



## 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)



EKO 1060 mit Lamellen-Rückschlagventil



Plunger mit Schneidekranz

# Accessories for custom design and equipment of your system

# EKO 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.

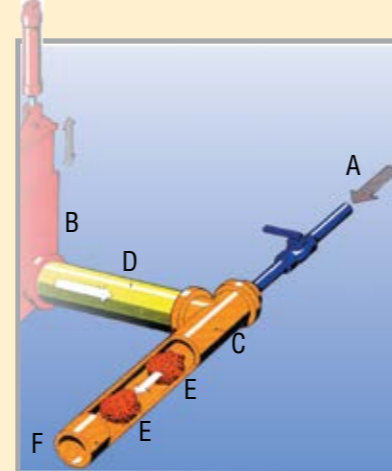
Gate valves are hydraulically operated. For a faster switch, it is suggested to use a power pack of at least 7.5 kW. The valve housing is sealed with hardened sealing rings, that are pressed against the moving blade of the valve.

## The hybrid feed system

Even with dry materials that are prone to bridging, long distances can be overcome. It is for just such cases that the "hybrid feed system" is designed. (The „hybrid“ designation denotes hydraulic + pneumatic).

It functions on the „pneumatic delivery“ principle. Compressed air is injected into the pipeline. This separates and fluidizes the material. Depending on the quantity of air, the material which is initially in the form of plugs can, with increasing distance, become a steady air-borne stream. In this way, extending feeding distances are possible. The feed air mixes readily with the combustion air in the furnace.

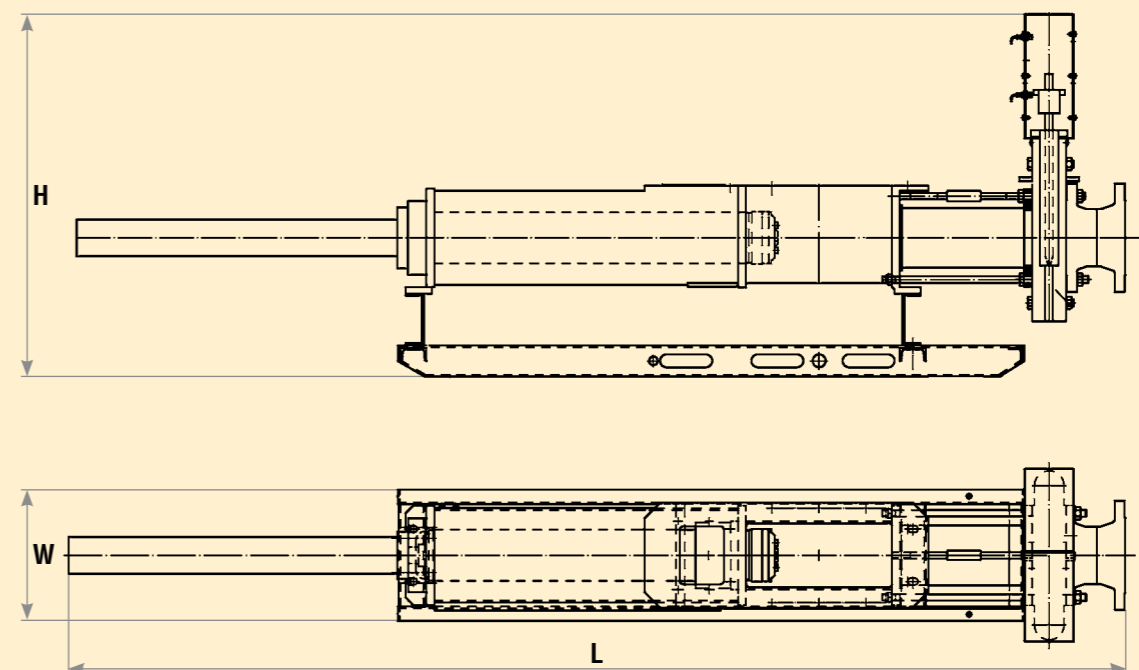
- A Compressed air
- B Shut-off valve
- C T-piece for air injection
- D Pressure line for compression stream
- E Plug of material
- F Delivery line



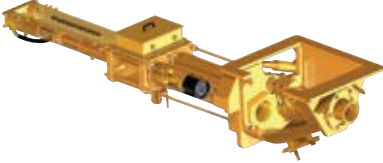



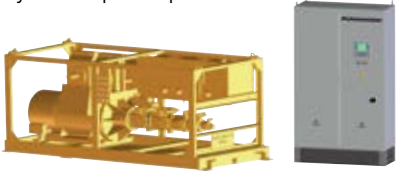
Type	Output*	Permanent delivery pressure**	Delivery cylinder Ø	Delivery cylinder Length	Cutting force	Length (L)	Width (W)	Höhe (H)
<b>EKO 1060</b>	6 m³/h 26 gpm	60 bar 870 psi	200 mm 7,87 in	500 mm 19,69 in	–	3950 mm 155,51 in	700 mm 27,56 in	600 mm 23,62 in
<b>EKO 1060 Crown</b>	6 m³/h 26 gpm	60 bar 870 psi	200 mm 7,87 in	500 mm 19,69 in	25/80 t	3950 mm 155,51 in	700 mm 27,56 in	600 mm 23,62 in
<b>EKO 14100</b>	14 m³/h 62 gpm	40 bar 580 psi	350 mm 13,78 in	700 mm 27,56 in	–	3900 mm 153,54 in	900 mm 35,43 in	800 mm 31,50 in
<b>EKO 14100 Crown</b>	14 m³/h 62 gpm	40 bar 580 psi	350 mm 13,78 in	700 mm 27,56 in	80 t	3900 mm 153,54 in	900 mm 35,43 in	800 mm 31,50 in

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

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



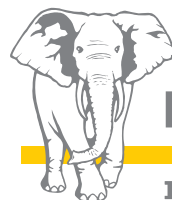
# The right pump for every application

	<b>Application</b>	<b>Output</b>	<b>Pressure</b>
 <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 <sup>3</sup> /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 <sup>3</sup> /h (440 – 1760 gpm)	up to 150 bar (2176 psi)
 <p>KOV series ball valve pump</p>	Fine grained pastes	0 – 70 m <sup>3</sup> /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 <sup>3</sup> /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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