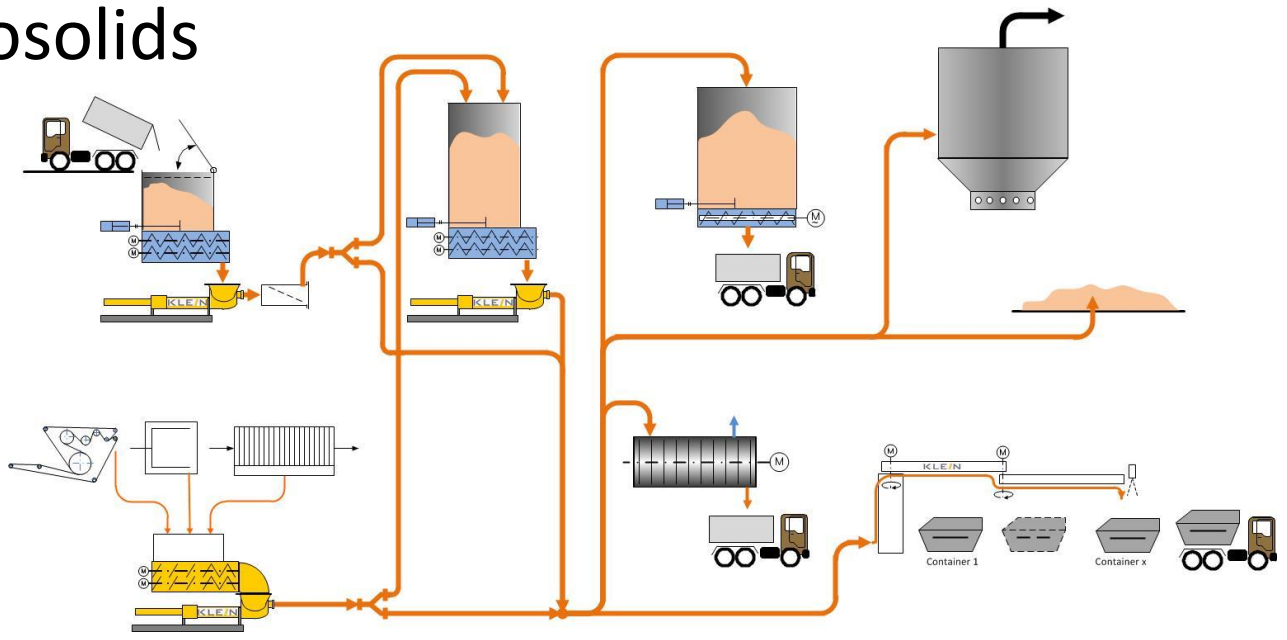


Biosolids

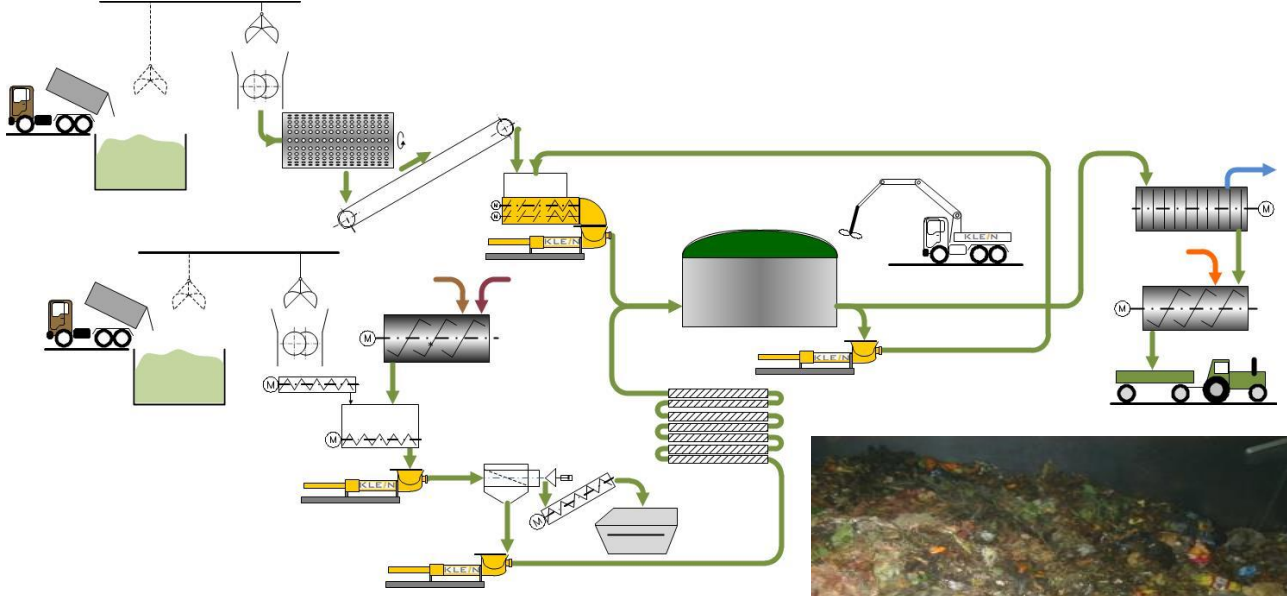


In sewage treatment plants, KLEIN GmbH will help dispose of the thickest types of sludge. Even solid contents as high as 45% are not a problem. Especially large-scale plants impose strict requirements when it comes to running a trouble-free continuous operation. This is precisely where KLEIN GmbH S-Tube Piston Pumps proving their economic efficiency in the conveyance of mechanically dewatered sewage sludges.



Mechanical dewatered sewage sludge (38 % DS), out of a Chamber Filter Press

Biomass

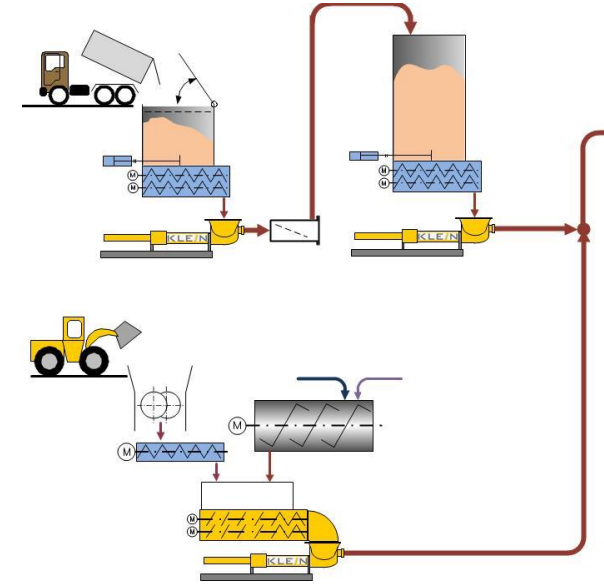


Nowadays the treatment of biomass to produce methane gas for energy production is becoming increasingly popular due to the rising costs of primary energy. There are now a number of processes available for the methanisation of biomass, and there is also an increasing range of biomass sources such as corn, wooden chips or food waste that can be treated.



Kitchen waste, overage food waste and garden waste in a receiving hopper of a biomethanisation plant

Artificial Fuel



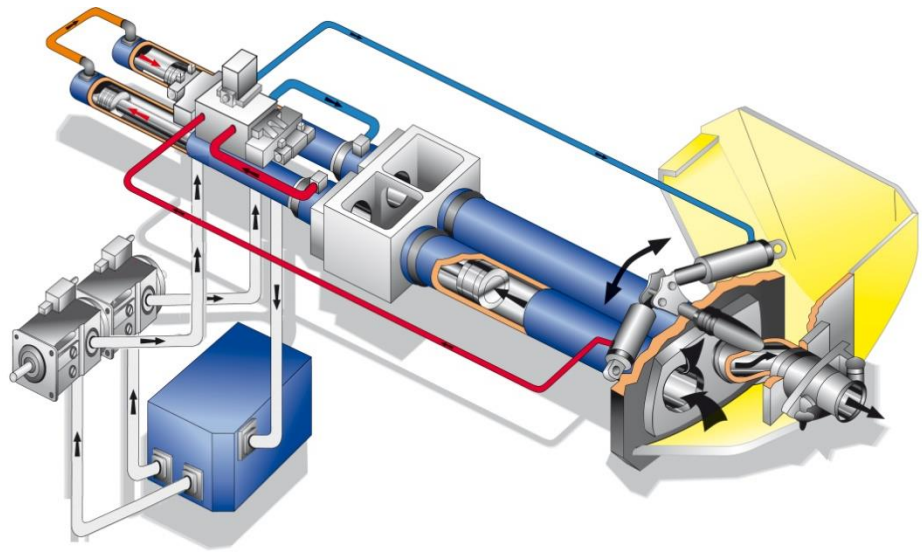
Primary energies such as coal and natural gas are currently so expensive that energy intensive industries are being forced to look into alternative fuels. KLEIN GmbH is supporting the cement industry, by providing silos and pumps to receive and supply alternative fuels, to produce reasonably priced cement for all kind of construction works. Transporting the materials Alternative fuels must have a proven high energy content to make a worldwide replacement for primary energies.



High energy content, highly viscose Sludge, in a Receiving Hopper at an Artificial Fuel Treatment Facility of a Cement Plant.

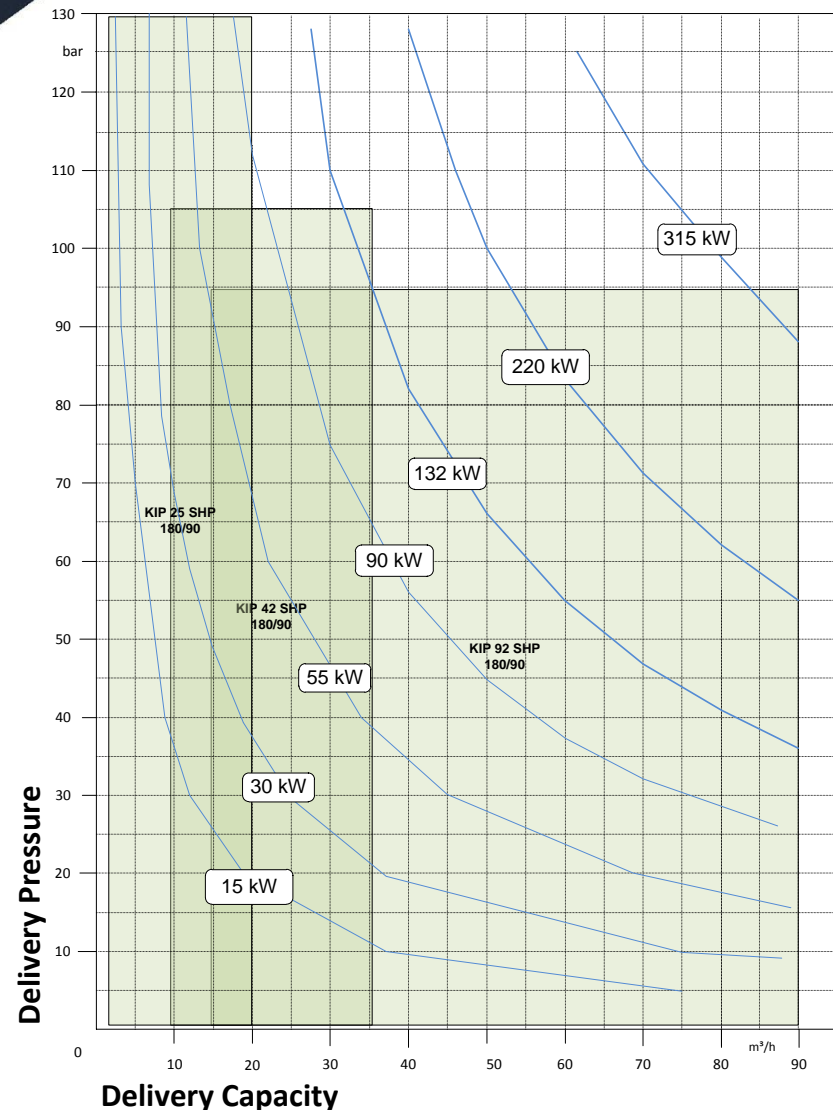
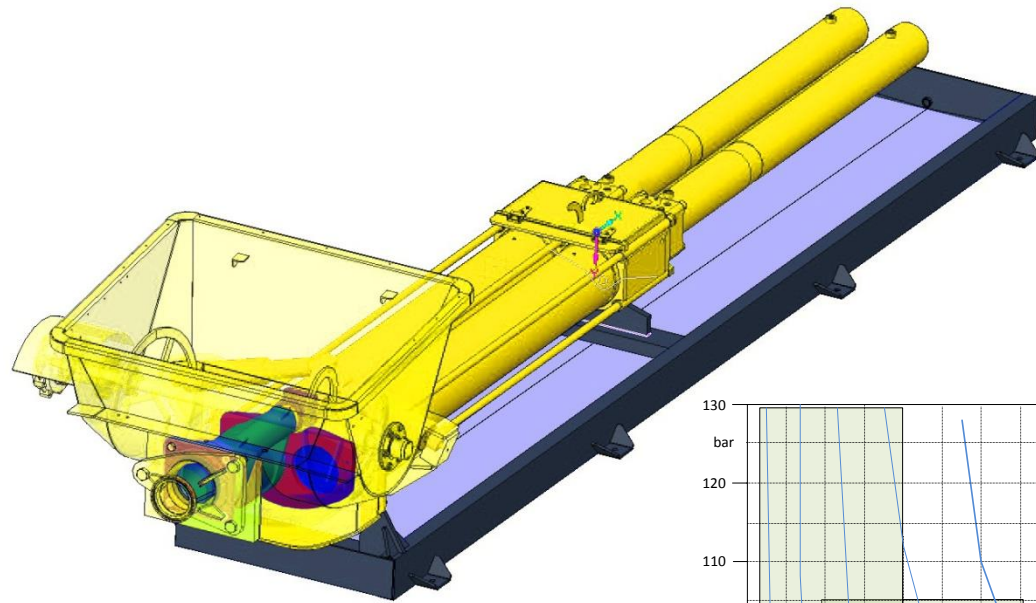
The „Blood Circuit“ of a Piston Pump – The Hydraulic System

For human being and as well for a hydraulically driven piston pump “blood circuit” / hydraulic system is essential for a good and long life. KLEIN is using first class German components to build the hydraulic system. Further more this hydraulic system is easy and simple to maintain to have the complete system of sludge handling running. At the end it is more expensive to stop a whole process of sludge handling because of a low price equipment.



Dual circuit hydraulic system with an extra cooling circuit for a long life time of the machine

	Cylinder-Diameter	Length of Delivery Cylinder	Max. theo. Delivery Capacity	Max. theo. Delivery Pressure
KIP 25 (SHP)	180 mm	1.000 mm	20 m ³ /h	130 bar
KIP 42 (SHP)	230 mm	1.000 mm	35 m ³ /h	105 bar
KIP 98 (SHP)	250 mm	2.000 mm	90 m ³ /h	95 bar



The S-tube Pumps from KLEIN GmbH covers a large range in regards of Delivery Pressure and Delivery Capacity.

Because of the modular design of the KLEIN industrial pump and the concrete pumps, wear and spare part are available in a short time.



Hydraulically driven S-Tube Piston Pump



Hydraulically driven piston pumps, with S-Tube technology, are well proven in the heavy construction world. More than 100.000 pumps are on duty with the 100% satisfaction of the operator. To use this kind of pump now in industrial applications is the logic consequence.

KLEIN S-Tube Piston Pumps **KIP** have a large and free discharge opening, without any kind of valves which can disturb the free flow of the sludge.

Sludges with particles sizes up to 2/3 of the pressure discharge diameter can be pumped.

In combination with a twin screw feeding device, mounted on top of the S-Tube Piston Pump, also high viscose and highly dewatered sludge can be pumped without any problems.

The well proven and simple design, compares well to other pump systems with many more mechanical parts in the sludge stream, and it reduces the costs of the wear parts to the minimum.

Out of this circumstance the KLEIN S-Tube Piston Pump is best in use for a 24/7 operation and is given to the operators a long running time with lower Life Cycle Costs.

Even sludges containing a lot of foreign particles will not damage the Pump.

Possible particle in between of the S-Tube and the delivery cylinder is not a problem. With the “Self Cleaning” function of the pump, this foreign particle will be washed out of the pump system without damaging the pump system.

This gives the operator the good confidence into a reliable equipment.