



# Excellence in Pumps

for the Mining and Metallurgical Industries

# FELUWA in the Mining and Metallurgy

Various methods are applied for the extraction of ore from minerals. Many ores require high pressure, high temperature, low pH value or a combination thereof. Acid leaching of the ore by means of pressure acid leaching (PAL) or high pressure acid leaching (HPAL) rank amongst the favoured treatment options. Dependent on the individual systems, slurries are fed at different temperatures into autoclaves or digesters. In the majority of cases diaphragm piston pumps are applied for such duties. Typical specifications for autoclave feeding are pressures in excess of 40 bar, high solid concentrations, low pH values and pumping temperatures of up to 230 °C, whereas digester feeding is subject to higher pressures in a range of 100 bar and pH values of 11 to 13.

Due to their unique design, FELUWA hose-diaphragm pumps are particularly conducive to autoclave and digester feed applications in metallurgical processes such as alumina, copper, gold, molybdenum, nickel, uranium or zinc. Since the slurry is in contact with the inside of the



*Autoclave feeding, using single-acting FELUWA MULTISAFE® double hose-diaphragm pump in triplex configuration.*

hose-diaphragm and the check valves only, diaphragm housings can be made from lesser materials, and are therefore more economical to manufacture and procure.

## Tailings Transfer



Metallurgical extraction processes are associated with enormous amounts of waste materials that require safe disposal. As an example in aluminium facilities 6 to 7 tonnes of red mud at high pH value accrue from a single tonne of bauxite. In gold processing, only a few grams of gold can be extracted from a tonne of ore. The resulting waste materials are usually pumped to tailings ponds at low concentrations.

FELUWA pumps (FP) provide for the environmentally friendly transportation of red mud and other tailings at solids concentrations of up to 70% with associated high efficiency as well as low power and wear.

*Each of the six FELUWA MULTISAFE® pumps transfers red mud at 95 m<sup>3</sup>/hr and 120 bar pressure at an alumina refinery in China.*

# urgical Industries

**U**nderground mines require effective dewatering in order to prevent flooding. Mine water contains all manner of contamination and solids. Traditional dewatering systems require large underground settling ponds to separate solids from fluid. The relatively clean water is pumped to the surface by means of centrifugal pumps in several stages. Traditional settling ponds require space and maintenance and centrifugal pumps are subject to low efficiencies and high wear. Nowadays solids are transported from below ground by alternative means.

FELUWA MULTISAFE® double hose-diaphragm pumps offer a most profitable alternative solution to multi-stage centrifugal pumps. They are not only capable of pumping unsettled mine effluent to the surface in a single stage, but likewise ensure maximum efficiency and minimum wear. Settling ponds can be avoided and solids are removed with the mine water.



Moreover, cylindrically shaped hose-diaphragm pump heads allow for a considerably smaller footprint and pump room than traditional diaphragm pumps and accordingly reduced excavation cost.

Mine Dewatering

## Concentrate Pipeline Transfer

**P**ipeline transfer of coal, ore or concentrate is increasingly replacing transportation by means of rail, road or long distance conveyor belt systems. Pipelines require less space and can be laid underground. Particularly in rugged mountainous areas that do not allow for transportation by road or rail, pipelines are the sole feasible method of conveyance. Pipelines are environmentally friendly and require little power, labour and maintenance. In the majority of cases the cost of ownership of pipeline slurry transfer systems therefore is an attractive alternative to traditional transportation methods.



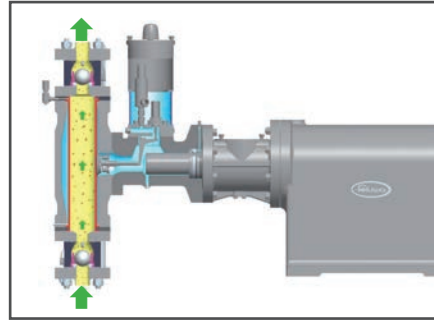
*The biggest FELUWA hose diaphragm piston pump.  
Flow rate 260 m<sup>3</sup>/hr at a discharge pressure of 100 bar.*

# About FELUWA Pumps

FELUWA pumps are available for flow rates of up to 1000 m<sup>3</sup>/h and discharge pressures of up to 400 bar. They are characterised by unique design features in favour of the overall performance, reliability, availability and cost of ownership. Some of these features are:

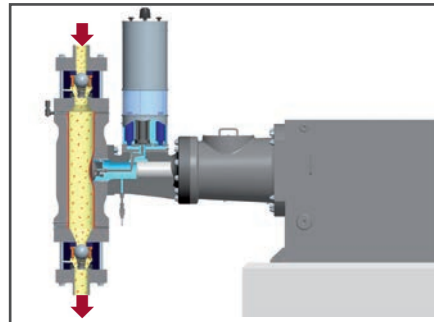
## FELUWA Double Hose-Diaphragms

At the heart of FELUWA MULTISAFE® pumps are two hose-diaphragms which are arranged one inside the other. They fully enclose the linear flow path of the product and provide for double hermetic sealing from the hydraulic drive end. The lifetime of hose-diaphragms is considerably extended beyond that of flat diaphragms. Standard materials are available for temperatures up to 200 °C.



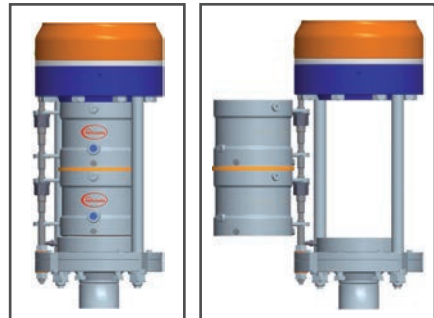
## FELUWA DownFlow Technology (DFT)

For applications carrying solids that tend to settle and may cause breakdown of the pump resulting from blockages within the check valves, pump chamber or piping, FELUWA literally turns the traditional pumping principle upside down. By means of downflow configuration the flow is led from the top to the bottom of the pump. Sedimentation within the pump is thus reliably prevented.



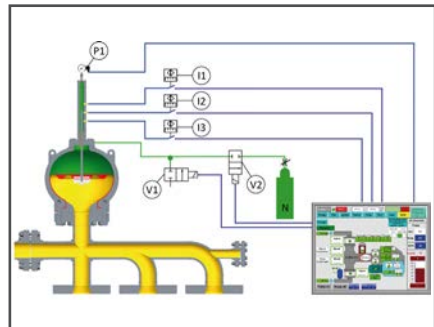
## FELUWA Double Valves and Quick Change System (QC)

Double valves with unique hydraulic clamping system are recommended for media with high solid content and applications which require a particularly high continuous flow. If, in the short term, a particle gets jammed between the ball or cone and the valve seat resulting in valve leakage, the second valve ensures effective sealing, thus preventing medium backflow and a resulting loss of volume.



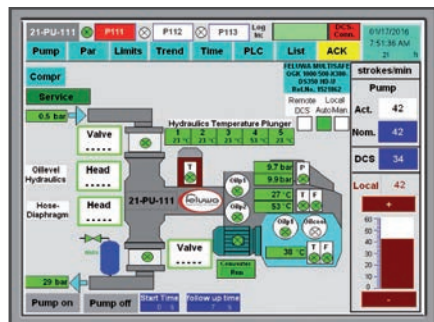
## FELUWA Pulsation Dampener PULSATROL

For applications with varying discharge pressures FELUWA provides systems with automatic adaptation of the gas volume within the PULSORBER. Integrated sensors detect the prevailing operating conditions and send signals to the control system for processing of the readings and adaptation of the gas volume. By this means optimum pulsation dampening is ensured throughout the entire pressure range.



## FELUWA WebGuard (FWG)

By means of diagnostic systems and touch panels, FELUWA offers a Human Machine Interface with full integration of pump diagnostics into industrial control systems and also a web-based service option. Permanent monitoring includes for example hose-diaphragms, check valves, inlet and discharge pressure, flow rate, speed, pulsation, hydraulic oil temperature, lube oil flow and pressure.



# About FELUWA



**F**ELUWA Pumpen GmbH has at its base in excess of 100 years company history. In 1901 the parent company was established in Neuwerk/Mönchengladbach as a foundry and expanded in 1931 by a machine factory, based in Cologne. After a short period of time, the company started concentrating on pump technology. In 1960, FELUWA moved to Mürtenbach in the Eifel area, because the considerably increased production line was calling for expanded manufacturing plants.

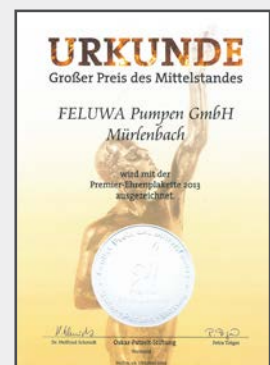
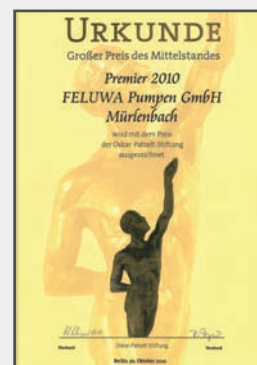
On 1st November 2000 FELUWA joined the ARCA Flow Group. For in excess of 80 years, ARCA Regler GmbH, whose headquarters are situated in Tönisvorst, has been one of the leading manufacturers of control valves, pneumatic actuators and positioners (including binary pneumatic output) and has been selected amongst the TOP 100 most innovative companies in Germany. With four production sites based in Germany, two in Switzerland as well as joint venture companies in India, Korea, Mexico and China the ARCA Flow Group operates worldwide.

Since 1931 FELUWA has been focusing on the design and development, production, sales and after-sales service of pumps for challenging duties, such as oscillating displacement pumps, waste-water pumps and sewage pumping stations.

The decisive lead in know-how is based on FELUWA's focus on pumps for solids-carrying, abrasive and aggressive fluids. Only those who specialise will be able to gain experience which is indispensable for actual state-of-the-art technology.

Today, FELUWA pumps can be found in operation throughout the world; in the heat of the Australian desert, in the icy cold of Antarctica, in endless Siberian tundra and on all the world's oceans. The growing demands for quality and safety are met in the same way as customers' wishes for an optimum solution to their specific materials handling problem.

The continuous process of innovation and development of FELUWA Pumps has been subject to multiple high-ranking recognition and awards.



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