

SLURRIES • SLUDGES • TAILINGS • REAGENT METERING



***Pumps Built Tough For
The Mining Industry***



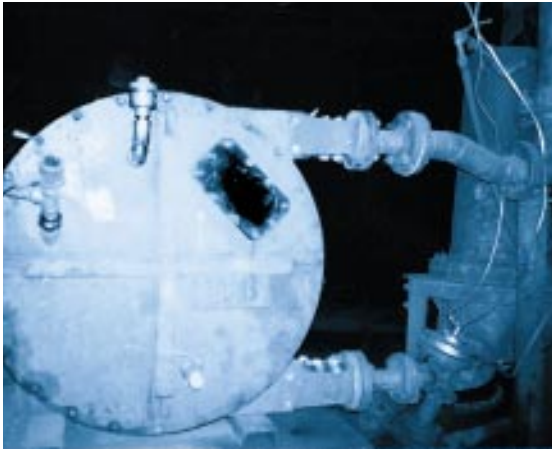
WATSON
MARLOW PUMPS
Bredel

Mining operations challenge most conventional pumps...

Handling abrasive and corrosive fluids typically used in mining operations presents a challenge to any pump manufacturer. High solids content and strong acidity create problems for diaphragm, centrifugal or other types of pumps where the product comes in contact with the working parts of the pump. And, in some cases, the mechanical action of the pump has caused problems with the structural integrity of the material being pumped due to shearing. To get around these problems, mine operators have had to purchase special pumps constructed from acid-resistant materials or put up with frequent, costly pump maintenance or replacement. In several applications, the rotors on progressive cavity pumps last only three weeks and diaphragm pumps fail after only few months.

but not Watson-Marlow/Bredel hose pumps...

Watson-Marlow/Bredel has been designing and manufacturing positive displacement pumps specifically for mining operations for over 40 years. Our hose pumps are used in many different types of mines for a wide range of materials as peristaltic pumps offer significant advantages for handling these difficult and abrasive fluids.



First and most important there are no moving parts in the product zone. Throughout the entire pumping operation, the interior surface of the hose is the only component in contact with the pumped material. Unlike other pumps, the abrasive nature of the product has no bearing on pump life. As a result, the need for routine maintenance and spare parts is greatly reduced. Hose replacement takes only minutes.



because of our unique design.

For high pressure applications, the hose used in the Watson-Marlow/Bredel design has a composite construction, formulated to withstand the effect of abrasive media. The inner core is manufactured from soft-grade material, allowing solids that have become trapped during the squeeze phase of peristaltic motion, to be cushioned in the inner surface of the hose and returned into the flow at the termination of the squeeze movement. The soft inner core has a second and equally important advantage: the cushioning effect not only minimizes erosion of the inner surface of the hose when pumping hard solids, but also enables shear-sensitive media, such as flocculants, to be passed through the pump without damage. The outer covering of the hose is a harder-grade natural rubber, reinforced with braided nylon. These materials provide the mechanical strength necessary to withstand the stress imposed by the peristaltic movement and to permit operation at higher pressures (up to 232 PSI) necessary for many processing applications.

For low pressure applications Watson-Marlow/Bredel offers tubing materials for a wide range of chemical compatibility. These compact metering pumps also offer an integral washdown design with built-in programming capability. The entire family of heavy duty pumps are self priming, can run dry safely, and can meter accurately to $\pm 1\%$.

Superior performance for:

- **Handling abrasive slurries** with extremely high solids content (70-80%) with high viscosity and densities as high as 4.
- **Keeping the drains clear** of the abrasive-laden sludge after back-filling.
- **Pumping highly abrasive**, fine-grained silica approximately 70% solid by weight which settles out in conventional pumps.
- **Transferring tailings**, used in the manufacture of lightweight aggregate, typically 60% solid content with particle sizes up to 5-mm diameter, reliably and precisely.

Proven for these applications:

Types of Mines	Typical Applications
Gold	Thickener Underflow
Platinum	Flocculants / Reagent Feed
Vanadium	Cyanide Metering
Nickel	Activated Carbon
Coal	Acid Slurry
Copper	Thick Sludges
Kaolin	
Diamond	
Trona	
Uranium	

Here are specific examples of how Watson-Marlow/Bredel hose pumps solve even the most challenging problems encountered in the mining industry:

Product: Copper tailings

Problem: Slurry is very abrasive. Centrifugal pumps were installed with soft packing shaft seals and flushed with water to avoid wear of the shaft sleeve. However, in winter, the water freezes.

Solution: Watson-Marlow/Bredel Model SP/100 has no seals to flush or to wear out. The tailings can be pumped at a much higher concentration, moving less water, doubling the plant efficiency.

Hose Life: 2000 hours

Duty Cycle: Continuous

Product: Natural kaolin

Problem: Pumping a very abrasive sludge which is dilatant and has a very high specific gravity.

Solution: Watson-Marlow/Bredel Model SP/40, 80 or 100. The gentle, low shear pumping action enables us to pump at higher volumes without hardening the slurry.

Pump Speed: Low, < 30 rpm

Counter Pressures: Various

Product: Acid slurry platinum waste

Problem: The acid slurry waste settles in a plastic lined tank, which has to be dredged from the tank and pumped with low pulsation to the cyclone for density separation.

Solution: Watson-Marlow/Bredel 700 Series with marprene tubing and four-roller pumphead with 90° roller separation for smooth low-pulsation pumping.

Speed: 7-360 rpm, flow rate to 8.8 gpm

Pressure: 14.5 PSI

Duty Cycle: Continuous

Product: Metallurgical acid slurry

Problem: Centrifugal pumps show a high wear rate, and pump repairs are expensive

Solution: Watson-Marlow/Bredel Model SP/25. The abrasive/corrosive acid slurry only touches the inside of the hose, preventing pump wear.

Speed: 25 rpm

Pressure: 56.5 PSI

Duty Cycle: Continuous

Product: Magnetite slurry

Problem: Centrifugal pumps show high wear and can only handle a specific gravity of 1.6, so that only a 25 mm cake is possible on the belt filter.

Solution: Watson-Marlow/Bredel Model SP/80 can pump much higher specific gravities, greatly improving the efficiency of the belt press.

Speed: 22 rpm

Pressure: 108.8 PSI

Duty Cycle: Continuous

Product: Ammonia metavanadate slurry

Problem: Delivery lines for both centrifugal and eccentric screw type pumps become blocked, resulting in water separation and loss of production.

Solution: Watson-Marlow/Bredel Model SP/40. The hose pump has no valves or obstructions in the product zone to block or plug.

Speed: 40 rpm

Pressure: 87 PSI

Duty Cycle: Continuous





Watson-Marlow/Bredel is the pump of choice in mines throughout the world to pump shear sensitive polymers for flocculation, abrasive lime slurries for pH control, or corrosive cyanide for gold recovery. With a wide variety of drive configurations available, including integral washdown, TEFC, explosionproof, and multiple pumphead, Watson-Marlow/Bredel offers the flexibility to meet the requirement of any mining application. By changing either the bore diameter of the tube or the rpm of the rotor, the rate of reagent feed will vary proportionally. And, each unit can be interfaced to any digital or analogue process control signals.

Pumped material never contacts any rotating part of the pump, and these pumps do not use ball valves, mechanical seals or stuffing boxes – keeping both maintenance costs and downtime to a minimum. Combining the advantage of safely running dry with the self-priming, positive displacement characteristics, Watson-Marlow/Bredel provides a 99% repeatable metering pump for either high or low pressure with flow ranges from microliters to thousands of gallons per hour.



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