

Process Peristaltic Pumps Provide Robust, Effective Solutions For Demanding Mining Applications

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Mine operators and processors must stay highly active in improving the performance and efficiencies of key systems and processes. The success of many of these systems and processes relies heavily on the optimization of fluid handling and flow control.

Cole-Parmer possesses strong expertise and innovative peristaltic pump technologies that bring performance efficiencies to extraction processes in hydrometallurgical plants, tailings management, reagent dosing, and other mining operations involving the transfer of highly abrasive, high-solids sludges and slurries.

A Robust Solution

Pump failures in mining and mining related service can cause unnecessary and costly downtime and maintenance. However, the inherent design of Masterflex® and Enviroflex® peristaltic pumps eliminates the potential for many of the problems associated with other pump designs because the



From handling caustic reagents to high-solids slurries, robust peristaltic pumps help producers maintain production uptime.



With Cole-Parmer peristaltic pumps, a well-balanced range of capabilities and flexibility combines with optimal abrasive and chemical resistance. These pumping systems provide high reliability and long-term operation in Hydromet, tailings management, reagent dosing and other demanding mining operations.

material being pumped never actually touches the pump, but rather is occluded, or squeezed, through elastomer hose or tubing.

This squeezing action of the flexible tubing generates a powerful vacuum that moves high-solids sludges and slurries without clogging. Recurring failures associated with other pump designs, which can cause significant maintenance, downtime and cleanup costs, are a nonissue with Cole-Parmer® peristaltic pumps because there are no mechanical parts in the fluid stream.

Bringing efficiencies to Hydromet processes

Hydrometallurgical plants employing extraction processes such as the cyanide leach process in gold extraction and the sulphuric acid leach process in copper extraction, require pumping systems that consistently maintain production uptime. These operations continuously handle abrasive slurries and highly aggressive reagents, and this creates huge demands on pumping systems, leading to premature pump wear with many other pump types.

Cyanides, acids, and other process reagents are often highly

corrosive and can pose havoc to most pump designs, which typically have numerous points of failure. But with Masterflex and Enviroflex L Series pumps, the fluid remains inside the chemically resistive hose tubing. And, since no other parts of the pump contact the solution, only the tubing ever needs to be cleaned or changed, which is a very quick and simple procedure.

In Hydromet processes, the wetted materials of the pump must remain inert during the process for efficient recovery of the desired metal(s) without interference. The hose tubing is the only wetted part, and Cole-Parmer peristaltic pumps and hose and tubing formulations are compatible with a wide range of chemicals, solvents, flocculants and other media used in hydrometallurgy.

Handling high-solids, abrasive slurries

Mining slurries typically have very high undissolved solids content with high specific gravities. They also are often highly abrasive. Cole-Parmer peristaltic pump systems are virtually

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Key Words

- Masterflex®
- Enviroflex®
- Peristaltic Pumps
- Hose Pumps
- Tubing Pumps
- Hydrometallurgy
- Shear Rate
- Abrasion Resistance
- Viscous Fluids

impervious to highly abrasive and corrosive fluids. The pump's hosing or tubing is its only wear component, and the pump design provides a straight flow path with no dead flow areas for slurry to settle and agglomerate, harden, or negatively impact the process.

With the peristaltic pump design, the tubing hose essentially serves as the pump, so there are no abrasive wear on gears, lobes, or rotors due to process fluids. Plus, there are no seals, no need for flush plans, and no check valves to leak or hang open.

Effective Solutions

With Cole-Parmer peristaltic pumps, a well-balanced range of capacities and flexibility for handling high-solids flows is combined with optimal abrasive and chemical resistance to bring reliability and long-term operation in these and other demanding operations:

- In Hydromet processes, Cole-Parmer peristaltic tubing and hose pumps can be used to effectively move under flow slurries, supernatant, flocculants, acids, bases, and water in controlled ratios at a variety of temperatures.
- Shear rate is a critical parameter that can significantly influence process integrity of flocculants, coagulants and certain process reagents. Some pump designs impart high shear rates that reduce particle size, thereby reducing the effectiveness of the chemical. Cole-Parmer peristaltic pumps, on the other hand, impart very low shear and are especially well-suited to shear-sensitive materials due to their gentle pumping action.
- Thickener underflow is often highly viscous. Cole-Parmer peristaltic pumps are ideal

for pumping viscous products due, in part, to their ability to sustain volumetric accuracy regardless of viscosity to ensure consistent fluid handling.

- In addition to their ability to handle corrosive, viscous, high-solids, and abrasive media in demanding mining applications, Cole-Parmer peristaltic pumps maintain a precise, constant flow rate with excellent repeatability, providing volumetric accuracies of $\pm 0.5\%$ of liquid volume, or better. They are also self-priming for instant startup, and their high suction lift provides for operating flexibility. The pumps will also operate dry without damage.



Enviroflex hose pumps can effectively transfer abrasive slurries and semisolid products such as sludge, lime and carbon slurries.

Enviroflex Hose Pumps

- Flow rates up to 647 GPM (147,000 L/Hr.).
- Discharge pressures up to 145 PSIG.
- Dry running pump.
- Hose changes are faster and easy.
- Self-priming suction lift up to a maximum of 31 ft (9.5m) vertical.
- Fixed and variable speed options.

Masterflex I/P Process Pump System

- Pump meets 0.6 m³/Hr requirement at 60% of



Masterflex pumps are available in a wide range of performance ranges up to 540 gph, and operating pressures to 100 psig.

maximum speed resulting in longer tubing life and broad adjustment range adjustment range.

- Stainless washdown (IP65 - NEMA 4) housing is resistant to corrosive environment.
- Brushless, maintenance free motor.
- Fast tubing replacement.
- Remote controls provide full range of pump control to plant computer.
- Only UL and cUL approved pump in this class.
- Casing options include 304 and 316 stainless steel.
- Unique design brings twice the hose life and significant power savings compared to other peristaltics.
- Equipped with hose failure detection.

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