

Thickened tailings transport using piston-diaphragm pump technology



BACKGROUND INFORMATION

Our Customer is headquartered in Latin America. Its core activities are copper extraction, processing and sales. The company generates an annual production volume of about 100,000 tons of fine copper.

The company concentrates on creating long-term value and focuses on work safety as well as on overall productivity, efficiency and cost controlling processes. Consequently, all production-related equipment and processes must match these general company goals.

THE WORK

To adhere with the company mandate, tailings transport with maximum efficiency and maximum availability is necessary. The production process requires a technology capable of pumping thickened tailings with the highest solid content possible without risking stoppages of the transport line.

Knowing that the company would incur unacceptably high costs if it had to interrupt metal production due to unexpected downtime of the pumping equipment, piston-diaphragm pump technology emerged as the best option for tackling this demanding task. Given the specific production requirements of the mining site, the pumps

were planned for continuously operation, 24 hours a day, 365 days per year.

THE APPLICATION

The requirements of the application, the characteristics of the tailings, the importance of the pumping equipment availability and the need for pumps with the highest overall efficiency resulted in the selection of the ABEL piston-diaphragm technology as it fully satisfied all requirements.

Pumping the thickened tailings is a top priority for the production process, given that all disposable inert materials must be extracted and evacuated at the last stage of the process. Failure of the evacuation system would result in a critical situation since the upstream continuous production process would continue generating tailings.

As a solution, ABEL proposed to install one single piston-diaphragm pump of the HMQ series, which is best suited for the specific operational requirements.

THE SOLUTION

The ABEL duplex, double-acting, piston-diaphragm pump model HMQ can reach a discharge pressure of 75 bar, a flow rate of 230 m³/h with solids content of 62%, which

means that the client can count on an hourly thickened tailings displacement of 375 metric tons in total. These pumping parameters are met with a power consumption of less than 558 kW, which complies with efficiency and availability parameters required by our customer.

Furthermore, the application also requires the equipment to adapt its pumping flow rate to varying production circumstances. This is rendered possible thanks to the use of a VFD which ensures an efficiency of 92% independent of the actual flow rate, material solid content or mixture viscosity.

The ABEL pumps have been installed and commissioned in 2016 and they have been operated since then. ABEL is proud to provide reliable equipment which allows a continuous operation in challenging conditions and represents a fully satisfactory solution for this difficult application.

Main characteristics of ABEL HMQ

Performance range: up to 800 m³/h (3,522 GPM) and up to 25.0 MPa (3,625 psi)

ADVANTAGES

- Transfer of media with solid content of up to 75%.
- Pre-formed diaphragm for efficient pumping, extending its useful life.
- Mechanical diaphragm stroke control extending its useful life.
- Constant operating flow, independent of the discharge pressure, which is mainly influenced by fluctuations of

viscosity or solid contents.

- Strokes per minute are low and ensure a low mechanic wear.

Due to these advantages, ABEL piston-diaphragm pumps offer a long and useful life that satisfy the tough requirements and demands of the mining industry. Furthermore, because of the wide pressure range which the HMQ pumps can handle, they are perfectly suitable for the transfer of tailings over a long distance. The distance can even be varied based on the development of the pumping process requirements.



Tailings thickened at 62% SC



ABEL HMQ pump