

Ball Mill Circulation Operation Achieves Stable Flow and 77% Energy Reduction

In applications where precision and consistency are critical, stable flow and reliable performance can have a significant impact on operating efficiency.

One of the leading new materials manufacturers in China faced persistent challenges with its ball mill circling operation, where traditional air operated double diaphragm (AODD) pumps consumed excessive energy, delivered unstable flow across varying viscosities, and required frequent diaphragm and valve replacements. These issues led to high maintenance costs, unexpected shutdowns, and rising operational expenses.

To overcome these hurdles, the customer implemented Cognito's electronically operated double diaphragm (EODD) pump technology. The result was improved ball mill circulation performance, stable flow, reduced energy consumption, lower maintenance costs, and enhanced operational reliability.

Discovering the Customer's Need

The customer's ball mill circulation process operated under the following conditions:

- **Fluid:** Slurry
- **Flow rate:** 250–285 LPM
- **Discharge pressure:** 1–2 barg
- **Viscosity:** 600 cP
- **Solid particle size:** Micron range
- **Temperature:** Ambient
- **Specific gravity:** 1.1



Challenges With Existing Pumps

Prior to the AODD replacement, the customer faced several operational challenges:

- Higher energy costs
- Unstable flow when transferring varying viscosities
- Limited safety features
- Frequent diaphragm and ball failures, leading to high maintenance costs and unexpected shutdowns

To improve performance, the customer required a slurry transfer pump solution that could:

- Lower maintenance costs
- Reduce energy consumption
- Improve safety through intelligent control
- Deliver a quicker return on investment

The Right Solution: Cognito's EODD Pump

Cognito introduced an EODD pump solution designed to improve efficiency, reliability, and process performance.

Key advantages included:

- Energy savings of more than 70% compared to the existing AODD pumps
- Stable flow across varying viscosities
- Robust diaphragm for long-term operation with minimal maintenance
- Reduced process downtime and improved safety



Customer Experience and Results

Following installation, the customer experienced immediate improvements in performance and reliability.

By replacing the existing AODD pumps with Cognito's EODD pump technology, the customer achieved:

- Stable flow despite abrasive slurry conditions
- Significant reductions in energy consumption
- Lower maintenance costs due to fewer diaphragm and check valve failures
- Improved reliability and reduced downtime

Additional benefits included:

- Stable flow across different viscosities
- Energy savings exceeding 70%
- Reduced spare part consumption and maintenance costs
- Enhanced safety and operational efficiency

ROI and Cost Analysis

The customer's results demonstrated measurable savings across both energy and maintenance costs:

- **AODD pump consumption:** 6.2 kW
- **Cognito EODD pump consumption:** 1.4 kW
- **Energy reduction:** Approximately 77%
- **Maintenance cost reduction:** Approximately 26%
- **Total annual savings (energy + maintenance):** Approximately 69%
- **Differential capital investment ROI in 1 year:** 137%
- **5-year operational cost reduction:** Approximately 69% sustained savings



Higher Reliability, Stable Flow, and Lower Energy Use in Ball Mill Circulation Operation

The customer reported complete satisfaction with the performance of Cognito's EODD pumps, emphasizing:

- Stable flow performance
- Significant energy savings
- Reduced spare part consumption
- Lower maintenance costs and operational downtime

By implementing Cognito's EODD pump technology as an AODD replacement, the manufacturer improved ball mill circulation performance while significantly reducing energy use and maintenance requirements. The result was a more reliable, efficient operation with a lower total cost of ownership.

