Ceramic Lined Control Valve Greatly Improves Performance in Copper Concentrator Process

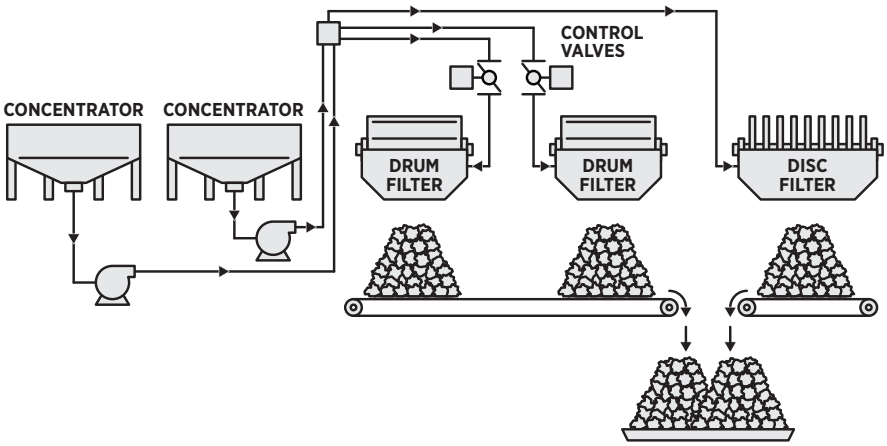
KEY RESULTS

- Significantly increased operational lifespan of valve.
- Electric actuator improved flow control accuracy and range.
- Improved process performance and continuous runtime.
- Reduced costs associated with maintenance, valve replacement, and operational shutdowns.

APPLICATION

In copper concentrator operations, the thickening process helps increase efficiency and production. Using gravity, excess water is separated from the feed mixture, resulting in a thickened slurry with a higher concentration of solids. This dense slurry is then transported through pipelines from the concentrators to drum and disc filters.

TYPICAL THICKENING PROCESS FLOW DIAGRAM



PROCESS CONDITIONS

Media	70% copper mineral slurry.
Operating Pressure	5.5 bar | 80 psi
Operating Temperature	22°C | 72°F
Performance Requirements	Electric proportional control valve 220 VAC.

CHALLENGE

In this application, the customer was using a manually operated pinch valve to control the flow of the thickened slurry. This type of valve was not only imprecise, but also required sleeve replacement every 2 months — resulting in line shutdowns, production losses, and costs associated with replacement and labor. A better solution was needed to provide greater durability and control precision.

SOLUTION

Bray performed field visits to better understand the operating conditions required. During these visits, Bray also learned that the copper mine was gradually automating its processes. This presented an opportunity to offer a valve and actuation solution optimized for the customer's existing setup.

Bray's engineering team proposed the Series 39L ceramic-lined butterfly valve with the Series 70 electric actuator. Both of these products were designed with features to handle the operating conditions observed.

SERIES 39L FEATURES

- Sintered silicon carbide liner with a partially stabilized zirconium disc. These advanced high-hardness materials provide robust resistance to abrasion and erosion.
- Upper and lower ceramic zirconium bushings prevent solids accumulation at critical points.
- Offset disc profile provides a larger opening at leading edge to prevent localized high-speed erosion.

SERIES 70 FEATURES

- Precision modulating control.
- Simplified field startup, adjustment, and maintenance.
- Specifications to match customer's existing field setup.

RESULTS

The customer agreed to install two Bray automated valve packages to evaluate operational improvements. Since installation, performance benefits have included:

- Continuous operation with zero incidents reported.
- Improved flow control precision for more efficient operation.
- Increased lifespan 3X compared to previous pinch valve.
- Cost savings associated with maintenance, spare parts, and labor of up to $10,000 USD per valve — not including losses from mineral production downtime.

Based on the outstanding performance of the Bray products, the customer intends to replace all remaining pinch valves with Bray automated control valve packages.

Series 39L features cutaway.

BRAY PRODUCT DETAILS

Valve	Series 39L lined butterfly valve.
Size	NPS 4 | DN100
Pressure Rating	232 psi | 16 bar
Materials, Modification, or Upgrades	Sintered silicon carbide liner; partially stabilzed zirconium disc; upper and lower ceramic zirconium bushings.
Actuator	Series 70 electric actuator. 220 VAC; servo card; 4-20 mA signal.

Bray Series 39L ceramic lined control valve with Series 70 electric actuator provided improved control precision with increased operational lifespan.