

PIPES, PUMPS, & VALVES

The importance of valve selection

Conventional bulk materials transport is giving way to long-distance slurry pipeline transport, which is now a proven technology.

In tailings transport and mine backfill, valve performance plays a critical role in the efficiency of the entire system. Improper valve selection can cause excessive downtime.

By Julien van Niekerk*

WITH THE TREND being the pumping of slurry over longer distances at higher solids concentrations, this statement has never been more relevant, and slurry valves are truly being put to the test in the resulting severe applications that are often high pressure and highly abrasive. In addition to these challenges, certain mines also have the added problem of the media being corrosive.

In general, engineers designing for process efficiency will often find that material and equipment capabilities pose the most serious limitations on allowable process conditions, curbing efficiency.

Abrasive materials

The most abrasive materials found in the mining industry are slurries from hard types

of ore and ferrosilicon. The media and process properties vary in different parts of the extraction process. In metal extraction mines and plants, one will typically find abrasive slurries in the milling, cyclone and DMS circuits and again at concentration feed and tailings, and to a lesser degree at flotation and thickener areas.

Particle size, shape, hardness and density play an important role, as well as the angle of impact on the wear surface. Pumping the media at a high solids concentration, pressure or velocity also leads to elevated levels of abrasion. When throttling abrasive media, the wear effects are also exacerbated.

If the transported media is abrasive, it is best not to install valves on the bend of a pipe, or on a Y-joint. It is also important to consider whether the application is





It is important to consider whether the application is bidirectional or unidirectional

bidirectional or unidirectional, and ensure that the valve is installed in accordance with the installation instructions provided.

Rubber lined gaskets may be convenient to use, but can pose problems for certain gasket-free or integrated-gasket valve designs. It is best to investigate the valve gasket requirements in the early project phase to ensure that rubber lining is not applied on their mating pipe flange faces.

When doing a valve selection, it is important to not only look at the process conditions, but also consider the general installation environment. For example, the media might not be corrosive, but the environment might well be.

It is always best to use full port valves in slurry applications. Valves with a tortuous flow path or an element directly in the flow path, such as butterfly, globe and weir-type diaphragm valves, will wear prematurely in slurry applications. This again refers back to valve selection.

Ideal valves

There are unique products on offer when the requirement is the throttling of an abrasive media. The DeZURIK RCV rotary control valve has been specially engineered for extremely precise throttling control in severe-service applications

where high-pressure media contains entrained water vapor or suspended abrasive particles. It combines the control accuracy of a globe valve with the strength of a severe-service ball valve. The valve is available with a tungsten carbide or heat treated nickel overlay plug.

There is also the Bray Series 39L ceramic butterfly control valve for highly erosive slurry control. It features a single offset disc that is available in hardened chromoly iron and partially stabilised zirconia ceramic. It is also available with ceramic liners and other hardened alloy liners. There are various other valves for the most abrasive isolation applications on offer as well.

New technology

Our company offers customers the option of using remote mount electro-pneumatic positioners, rather than having the positioner mounted directly on the valve. The positioner and its complementing air preparation equipment are supplied in a plug-and-play stainless steel pneumatic enclosure that can be custom made according to individual requirements. Mounting the positioners remotely in enclosures helps to protect the positioner from environmental damage, and is ideal when valves are in hazardous or hard

Factors impacting wear surface

- Particle size
- Shape
- Hardness and density play
- Angle of impact on the wear surface

to reach installations. This also prevents tampering and unauthorised entry to the equipment.

Materials technology directly influences the valve industry. Advanced materials and coatings are continuously being developed and made available. But even though innovation can be rapid, market readiness is important and resistance to change can be a large obstacle to advancement.

Specialists

Valve specialists can help to identify suitability issues early on, and it is best to involve them from the start. They will be able to offer the best solution for the most challenging applications. Working closely with a specialist valve supplier will certainly help to reduce cost of ownership and downtime.

Also, it is important to inspect valves regularly so that early signs of wear and failure can be detected and the valve can be maintained or repaired before it becomes irreparable. **35**

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