

BY-PASS CHOKE LINES

APPLICATION REFERENCE



TYPICAL PRACTICE FOR A CHOKE BY-PASS LINE

There are several applications where a process control logic requires the following two (2) distinct characteristics:

1. Flow control.
2. High pressure drop (or choked flow).

This requirement is common in numerous industrial and municipal applications with clean fluids, slurries and gas/liquid mixtures. A typical arrangement includes a primary line with a control valve, and a by-pass line with a ball valve and a restriction orifice immediately downstream. The ball valve is designed to engage or disengage a high pressure drop or choked flow using the restriction orifice (see example photo on right).

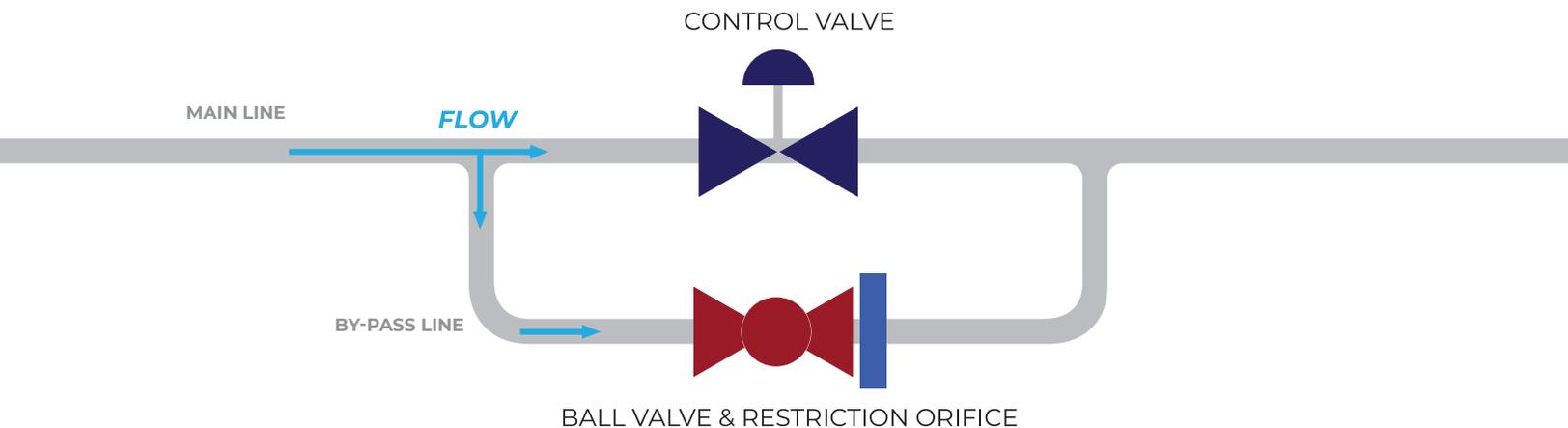
The choked flow mode of operation prevents slack flow, while the high-pressure drop can be used to induce liquid flashing within the pipe. When these secondary operations are not required, flow is diverted back to the primary line and the control valve is used to modulate flow.



Restriction orifice on the outlet flange of a ball valve.

TYPICAL BY-PASS SYSTEM (EXAMPLE)

The control valve installed on the primary line is sized to handle a variety of pressure and flow conditions. The restriction orifice on the by-pass line is sized for one (1) flow condition only, as it is a 'fixed' orifice. In some cases, end users may use the switching ball valve to throttle flow, affecting the pressure drop across the restriction orifice, however this is not common practice.



THE SLURRYFLO DIFFERENCE

Based on application requirements, SlurryFlo engineers will develop a customized valve trim to **eliminate the by-pass line**. This unique trim provides a 'dual flow' characteristic, which can operate in 'normal' or 'choked' flow mode at any time. Additionally, end users benefit from SlurryFlo's standard suite of features and benefits (i.e. centered flow, replaceable carbide wear components, long service life, etc). Learn more at www.slurryflo.com.



CUSTOM TRIM WITH 'DUAL FLOW' CHARACTERISTIC (EXAMPLE)

CHOKED FLOW POSITION

FLOW CONTROL POSITION

FULL OPEN POSITION



The SlurryFlo example above achieves a 'dual flow' characteristic via a multi-orifice trim design. The lower four (4) holes provide the required choked flow (and are fully exposed at the 20% open position), while the large centered orifice can be throttled at various gate positions for optimal flow control.



INSTALLATION EXAMPLE

This SlurryFlo control valve (see photo on left) incorporates a multi-orifice trim with 'dual flow' characteristic. It was specified and installed into a clean water mining application with limited space, which could not accommodate a by-pass line. The SlurryFlo solution provides **two valves in one**.

THE SLURRYFLO ADVANTAGE

- 1** Eliminating the ball valve, restriction orifice and by-pass line reduces the system footprint, as well as its operating costs.
- 2** SlurryFlo's custom 'choked flow' trim geometry dissipates energy across multiple holes, provides streamlined flow, reduces aerodynamic noise and lowers vibration.
- 3** In cases where severe cavitation is present, the centered flow minimizes the damage normally caused by fluid microjets imploding near pipe walls.
- 4** If flow conditions ever change, a new seat plate can be specified to provide an increase or decrease in flow. There is no need to replace the entire valve assembly (often the case with other valve designs).
- 5** All SlurryFlo valves can be provided with hardened trim components (e.g. tungsten carbide) for severe service, or stainless-steel trim for standard applications.
- 6** Due to SlurryFlo's patented design, only the trim components are exposed to erosive flow. If they do eventually wear out, the parts can be field replaced to reset the service life clock.

