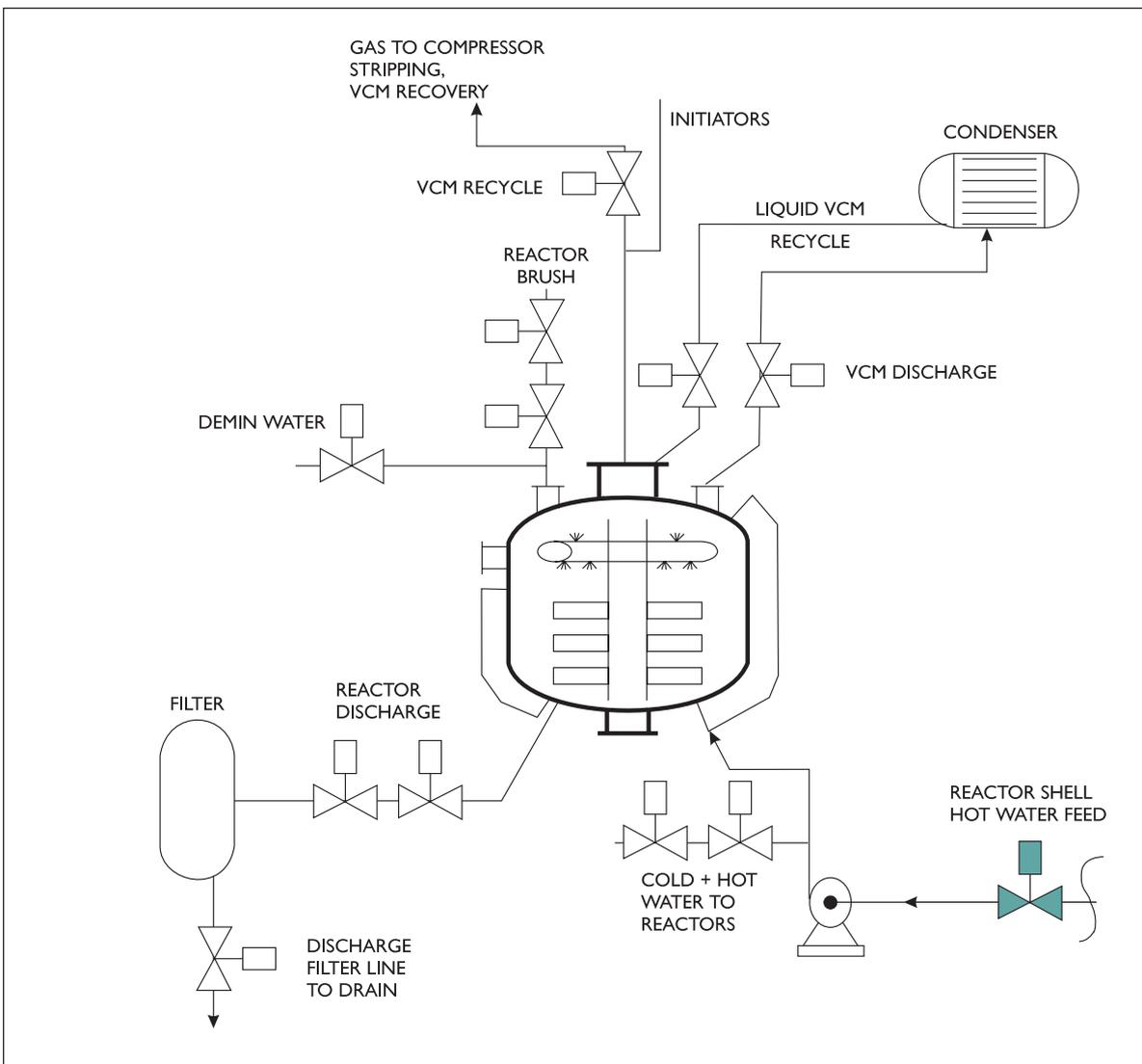


Reactor shell water circulation



Introduction

In the mass polymerization process of producing PVC, the enthalpy of the reaction is removed by two means, heat transfer through a reactor shell, and the discharge of VCM gas. This application bulletin addresses the water supply to the reactor shell by explaining the process, the application demands, and Metso Automation's solution.

The Process

The reaction temperature of the PVC depends on the quality of end product required and can be between 40-70 °C / 104-158 °F.

By building a shell around the PVC reactor, and filling it with water, the enthalpy (or heat of reaction) can be removed through heat transfer.

APPLICATION REPORT

The PVC process is usually a batch process, and the water feed to the shell is an on-off application. Some typical process conditions are:

- Fluid: Water at 95 °C / 203 °F,
Water at 18 °C / 64 °F
- Flow: 300-400m³ /h
- Pressure: 2 bar / 29 psi
- Pressure drop to atmosphere

Application demand

Pressure drop to atmosphere can cause:

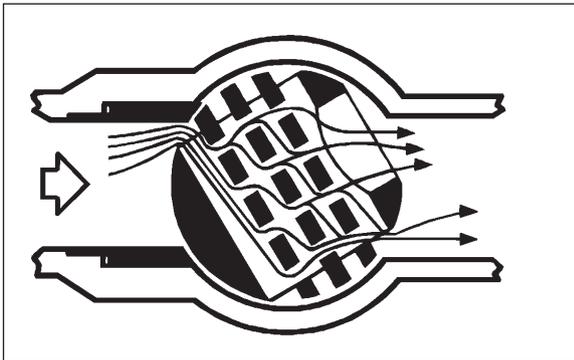
- Cavitation
- Noise
- Vibration
- This can result in premature valve failure, as well as environmental hazards (noise).

Valve selection

In order to avoid the cavitation, noise, and resultant vibration, a rotary ball valve with the unique Q-Trim™ was proposed.

Features and benefits

- Q-Trim breaks down pressure gradually to reduce noise and cavitation
- Rotary ball valve provides maximum flow capacity
- Capacity reduces time required to fill shell



The Q-Trim design is simple and effective. Parallel Perforated plates in the flow opening smooth the pressure drop as the flow passes through. This gradual pressure reduction over the valve reduces velocities, noise generation and cavitation.

Valve selected

- Type X-MBV series with Q-Trim
- Seat supported, full bore ball valve
- Unique pressure reducing trim (Q-Trim) which reduces cavitation and noise, while retaining the high capacity of a ball valve
- Metal seat
- Stainless steel valve body
- Flanged, ANSI 300
- Metso Automation piston actuator

Older type Q-C2D, installed in 1990, has provided excellent service. The type X-MBV full bore ball valve, introduced 1992, is a more economical solution providing the same benefits and characteristics as the C2D, ball valve.

Alternative solution

In the cases where cavitation is not present, a standard Neldisc® triple eccentric disc valve can be proposed providing long term tight shut-off, and an economical solution.



Metso Automation X-MBV ball valve

The information provided in this bulletin is advisory in nature, and is intended as a guideline only. For specific circumstances and more detailed information, please consult with your local automation expert at Metso.

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