Fisher® Feedpump Recirculation Solutions

FISHER®
Severe Service

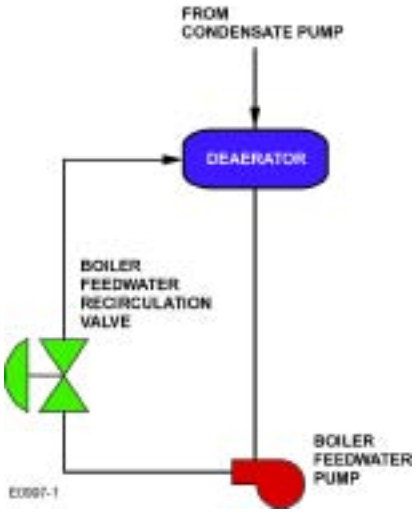
EMERSON™
Process Management

Application Discussion

A power plant's operating pressure and efficiency are highly dependent upon the performance of its feedwater pumps. Each feedwater pump must be protected from low flow operation and loss of net positive suction head (NPSH), which are conditions that always occur at plant startup and shutdown. At low flow the pump can overheat, and the water flowing through the pump can separate, causing vortices that cavitate and damage the pump. Protection against overheating and cavitation is gained by recirculating a minimum amount of flow to the pump inlet.

Maintaining this minimum flow is the task of the boiler feedpump recirculation valve. It recirculates a portion of the total pump flow back to a collection reservoir, such as a deaerator or condenser hot well. Because of the differential between the high pump outlet pressure and the low pressure at the collection vessel, the recirculation valve is exposed to some of the most difficult operating conditions in the plant. The main challenges with this application are:

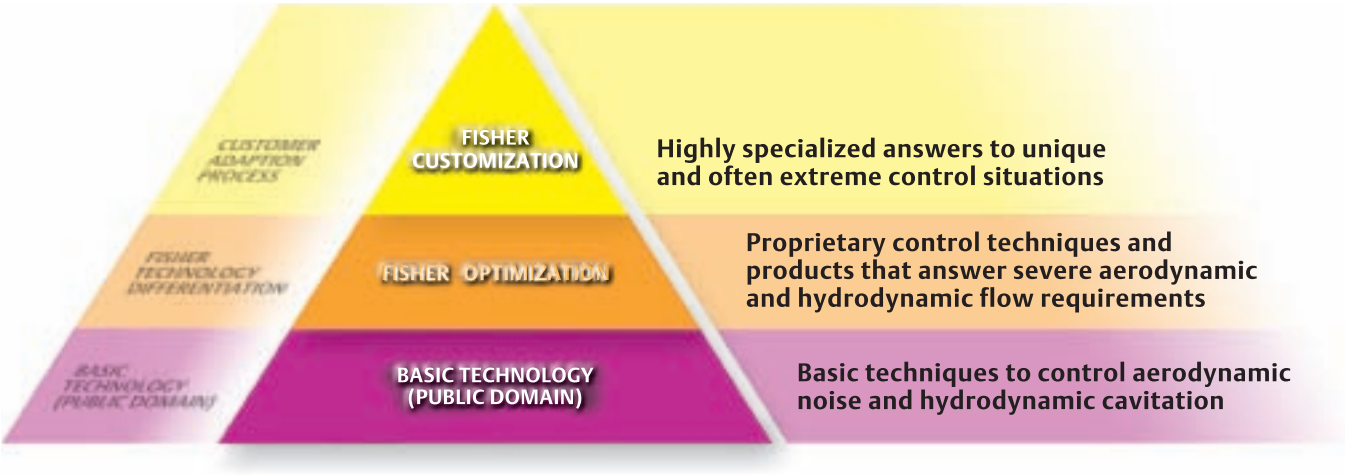
- Improper valve selection that can result in cavitation damage to the pump
- Cavitation damage at the valve and immediate downstream piping due to high differential pressures across the valve
- Valve leakage due to inadequate seat load, with the leakage causing increased heat rate and decreased plant efficiency
- Potential valve plugging during plant startup



The feedpump recirculation valve must reduce pressure as high as 6000 psig down to 50 psig while avoiding cavitation. The Fisher valve solution eliminates the cavitation potential by unique pressure control of flow through the valve. Also, the recirculation valve is shut during normal operation, at which time tight shutoff (ANSI Class V or greater) is critical. Any leakage results in damage to the valve as well as added power being consumed by the feedwater pump instead of being sold to the plant's customers.

Emerson offers the broadest line of boiler feedpump recirculation control valves, which utilize a variety of solutions to protect against cavitation, erosion, plugging and leakage. Also, to ensure proper operation after installation, a Fisher FIELDVUE® digital valve controller can be used to monitor valve performance. The FIELDVUE DVC provides diagnostic reviews that can be conducted without interrupting the process in order to identify potential performance issues. This helps to ensure proper operation and tight shutoff over the normal service life of the valve.

Severe Service Control Hierarchy



Boiler Feedpump Recirculation — Control Valve Solutions

FISHER CUSTOMIZATION

A combined cycle power plant experienced repeated leakage issues in boiler feedpump recirculation valves. The answer was to install specially characterized Cavitrol® IV trim with protected seats in the existing valve bodies. See D351136X012 at www.Fishersevereservice.com for additional details.

FISHER OPTIMIZATION

DST Trim

- Patented, multi-stage, anti-cavitation control trim
- Combines axial and radial flow patterns that can pass particulate without plugging
- Features protected seat design that helps avoid clearance flow erosion for long-term shutoff integrity

Cavitrol® Trim

- Employs special-shaped orifices and drilled-hole technology in keeping the flowing media above its vapor pressure
- Used in combination with Fisher high-pressure and high-capacity valve bodies to prevent cavitation, achieve tight shutoff and reduce vibration levels

CAV4 Valve with Cavitrol® IV Trim

- Employs special-shaped orifices and drilled-hole technology in keeping the flowing media above its vapor pressure
- Separation of throttling and shutoff locations avoids clearance flow erosion for long-term shutoff integrity
- Patented pressure-staging design avoids cavitation and its resultant damage and noise

NotchFlo® Trim

- Utilizes multi-stage, axial flow process to control pressure drop, prevent cavitation and pass entrained particles
- Features protected seat design that helps avoid clearance flow erosion for long-term shutoff integrity

BASIC TECHNOLOGY

- On-Off or automated block valve or standard control valve with restriction orifice
- Operate to supply only the required minimum flow for pump protection
- Single or multiple restriction orifices downstream to split the total pressure drop; optimum operation is restricted to one service condition
- Hardened trim materials to extend service life
- Tight shutoff construction
- Cr-Mo body material to resist cavitation erosion

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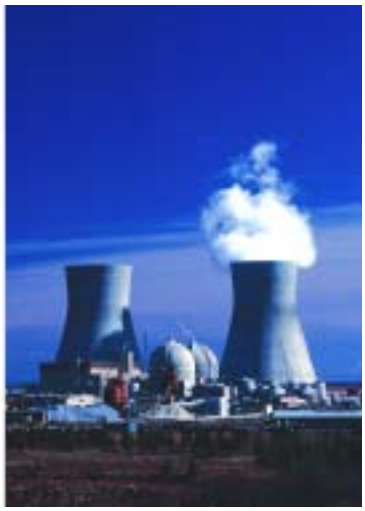
The way you manage your key production assets directly affects your plant's performance and profitability. Emerson's Asset Optimization capabilities deliver world-class services and innovative technologies to increase the availability and performance of mechanical equipment, electrical systems, process equipment, instruments and valves for improved bottom-line results. Asset Optimization helps you improve process availability and attain peak performance, which means wherever you are in your plant's life cycle—startup, maximizing operations or life extension—by relying on Emerson's Asset Optimization capabilities, you'll be on the path to realizing the true potential of your plant's instruments and valves.

The Next Step
Contact your local Emerson Process Management sales office or sales representative location for more information or to make a purchase.

For severe service solutions, see us at www.FisherSevereService.com



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