

Fisher® Condensate Recirculation Solutions



Severe Service



EMERSON
Process Management

Application Discussion

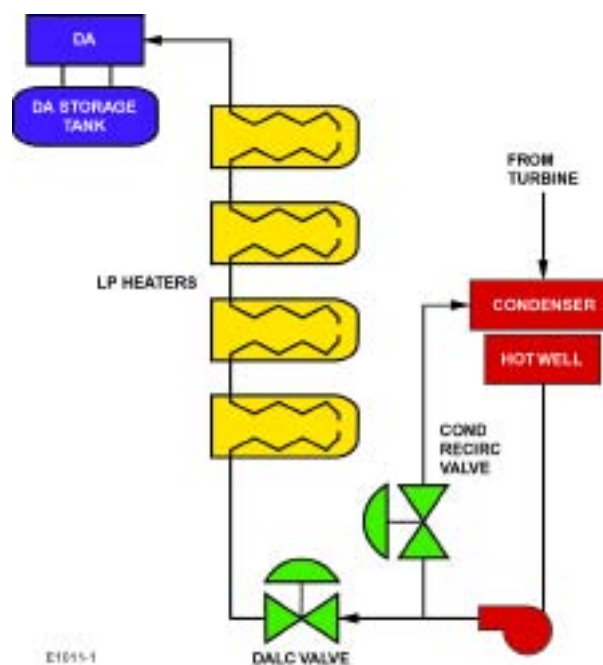
The condensate pumps are a critical asset to any power plant. Each condensate pump must be protected from low flow operation and loss of net positive suction head (NPSH), which are conditions that always occur at plant startup and shutdown. At low flow the pump can overheat, and the water flowing through the pump can separate causing vortices that can cavitate and damage the pump. Protection against overheating and cavitation is gained by recirculating a minimum amount of flow to the pump inlet.

A control valve is used to recirculate a portion of the total pump flow back to a collection reservoir such as the condenser hot well. Because of the high pump outlet pressures and low collection vessel pressures, this valve is exposed to challenging operating conditions. The main challenges with this application are:

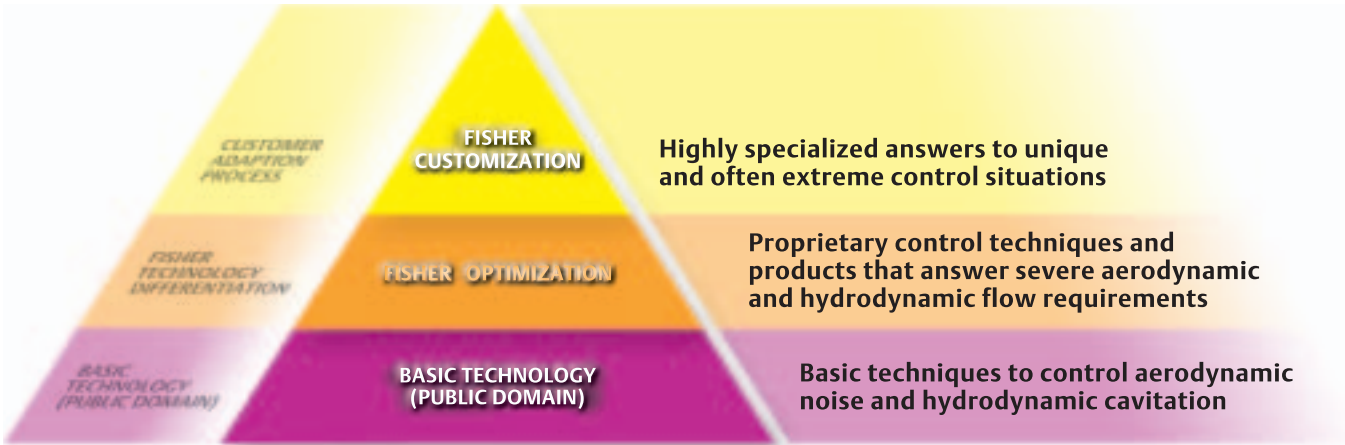
- Improper valve selection can cause cavitation damage to the pump
- Cavitation damage due to high differential pressures across the valve
- Leakage leading to valve damage
- Inadequate seat load to maintain tight shutoff
- Potential plugging during plant startup

The recirculation valve must reduce pressure as high as 600 psig down to vacuum while avoiding cavitation. Also, a 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 condensate pump instead of power sold to the plant's customers.

Emerson offers the broadest line of condensate pump control valves, which utilize a variety of solutions to protect against cavitation, erosion, plugging and leakage. The Fisher valve solution eliminates the cavitation potential by unique pressure control of flow through the valve, and the valve provides tight shutoff. Also, to ensure proper operation after installation, a Fisher FIELDVUE® digital valve controller can be used to monitor valve performance. Diagnostic reviews 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



Condensate Recirculation – Control Valve Solutions

FISHER CUSTOMIZATION

A U.S. nuclear plant in the process of increasing unit output experienced capacity constraints in their three condensate recirculation valves. Specially characterized Dirty Service Trim (DST) allowed the plant to utilize the existing valve bodies without compromising the required cavitation protection. See [D351298X012](#) 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 for long-term shutoff integrity

NotchFlo® Trim



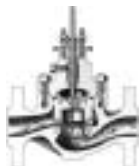
- Utilizes multi-stage, axial flow process to control pressure drop, prevent cavitation and pass entrained particles
- Features protected seat design that helps avoid clearance flow erosion for long-term shutoff integrity
- Offered in a wide range of materials to accommodate specific applications needs

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

BASIC TECHNOLOGY



- On-off, automated block valve or standard trim control valve with restriction orifice
- Restriction orifice downstream or sparger in the condenser to split the total pressure drop; optimum operation is restricted to one service condition.
- Hardened trim materials to extend service life

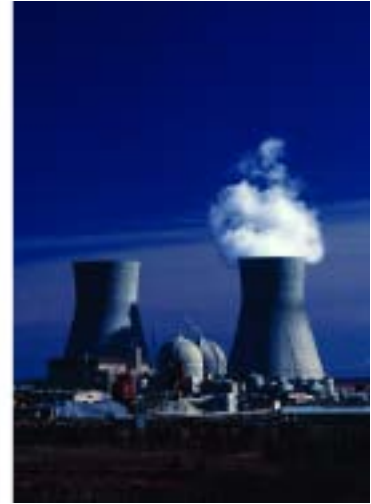
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The Next Step

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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