

Boiler Feedwater Recirculation Valve with 5-Stage Cavitrol® IV Trim Stage a 7800 psig Pressure Drop



RESULTS

- Trim design withstands high temperature, cavitation, and flashing.
- FIELDVUE® digital valve controller improves valve monitoring and enables Performance Diagnostics.



APPLICATION

Boiler feedwater recirculation service

CUSTOMER

Coal-fired power plant in Colorado

CHALLENGE

In 2007, an EPC in Denver, Colorado faced some challenging process conditions at a new coal-fired power plant under construction. Valves in boiler feedwater recirculation service, for example, experienced extreme pressure drops (up to 7800 psi) and temperatures up to 400-degrees F.

To address the valves' control and cavitation issues, engineers at Applied Control Equipment, Emerson LBP in Denver, sought assistance from the Engineered Products' team in Marshalltown, Iowa. Together, they custom-designed a pair of block-body Fisher® valves for this process and added another stage to the field-proven Cavitrol® IV trim. The Cavitrol IV, five-stage design will handle an 8000 psi continuous pressure drop in normal conditions.

This is one of two identical, heavy-weight, block-body Fisher® valves featuring five-stage Cavitrol® IV trim. The 16,000-pound assembly was hydro-tested to withstand 13,000 pounds of pressure. Its trim was designed to stage the pressure drop, separate shutoff and throttling, and prevent clearance-flow erosion.



Severe Service

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POWER GENERATION

SOLUTION

A properly sized CAV4 valve directs flow through a series of successively larger flow areas, with each causing a reduction in pressure. This “staging” of the overall pressure drop results in more than 90% of the total drop being taken in the early stages, where there is little danger of bubbles forming. The later stages ensure low-inlet pressure and minimal fluid energy exiting the trim. The pressure staging, together with the separation of shutoff and throttling within the CAV4 trim, prevents clearance-flow erosion.

The pair of 10X10 valves have block-forged bodies and bonnets and an ANSI 3700 intermediate rating (8450 psig and 410-degrees F). F22 body material was selected to prevent damage if the valve experiences flashing.

The assemblies include FIELDVUE® DVC6020f digital valve controllers with Performance Diagnostic (PD tier) and FOUNDATION fieldbus capabilities. (Fieldbus communication is new to the power industry, and few new plants adopt this technology.) The EPC emphasized PD-tier diagnostics to ensure that the end-user received the best possible control and performance from these valves.

“As the power industry pushes for increased efficiency and capacity, this project illustrates how Emerson/Fisher is willing and able to customize product designs to meet critical application requirements.”

Sales Team Leader

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