

# Fisher® Superheater and Reheater Attemperator Solutions

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## Application Discussion

As with any superheated steam cycle, the temperature of the superheat needs to be controlled to ensure that it does not exceed the material limits of the steam turbine and boiler. Temperature control is accomplished by use of an attemperator or desuperheater that injects a controlled amount of cooling water into the superheated steam flow.

There are two types of attemperation systems in power plants: superheat attemperation and reheat attemperation. Superheat attemperation occurs in the superheater section prior to steam introduction into the high-pressure steam turbine. Reheat is applied to steam that is exhausted from the high-pressure turbine. The steam is sent through the boiler again to gain more heat before being admitted into the IP/LP turbine.

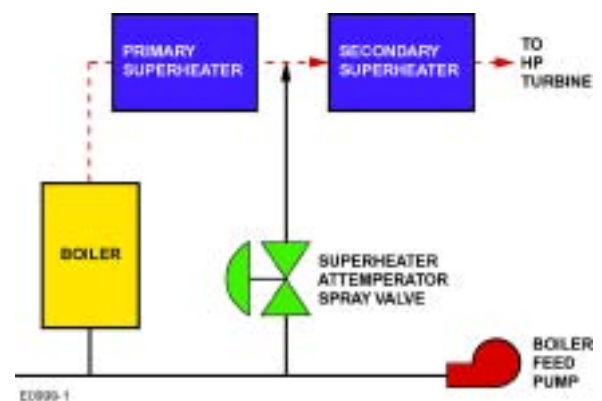
Attemperator spray water flow is regulated by an external control valve. For proper temperature control, the spray water valve must react quickly to downstream temperature variations, and at low flows, provide the rangeability needed to handle multiple operating loads. Critical performance criteria are:

- Accurate control at low flow and wide rangeability to maintain superheater outlet temperature
- Adequate seat load to prevent leakage during plant startup
- Fast-acting response to steam temperature changes

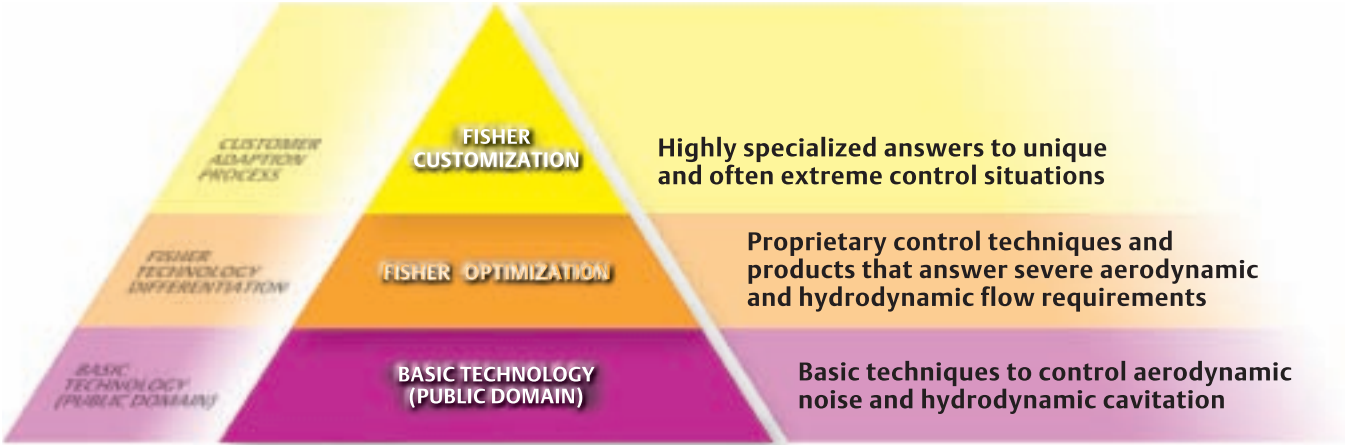
The reheat attemperator uses water from the main boiler feedwater line to control reheat steam temperature. Because the spray water is taken from the main feedwater line and the cold reheat is at a much lower pressure than high pressure steam, cavitation concerns arise, in addition to those above.

Emerson offers specific Fisher-engineered solutions for variations in plant design for both superheat and reheat attemperators. These solutions offer protection from cavitation, erosion, plugging and leakage while providing high rangeability. The reheat attemperator spray valve in particular can be exposed to the potential for cavitation. Cavitation formation is eliminated by unique pressure control of flow through the valve. Also, since these valves can be exposed to full pump pressure during plant startup, tight shutoff (ANSI Class V or greater) is critical. Any leakage can have an effect on steam temperature, which in turn affects heat rate and efficiency along with potentially causing valve trim damage.

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 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



## Superheater & Reheater Attenuator Spray – Control Valve Solutions

### FISHER CUSTOMIZATION

Original valves in a supercritical power plant experienced repeated packing failures and trim erosion. Replacements using Fisher customized valve plugs and drilled-hole cages provide the required high turndown and also prevent the valves from continually operating near the seat, thereby eliminating trim erosion. Packing failure was solved by using Fisher High-Seal™ live-loaded packing. See [D351191X012](#) at [www.Fishersevereservice.com](http://www.Fishersevereservice.com) for additional details.

### FISHER OPTIMIZATION

Reheater Attenuator Spray  
Cavitrol® III,  
Micro-Flat™ Trim



- Eliminates cavitation at higher flow rates
- Prevents cavitation damage to the valve seat at low flow conditions
- Maintains Class V shutoff capability
- Standard hardened trim materials provide excellent wear resistance

### BASIC TECHNOLOGY



- Standard trim control valve
- Trims designed for low-flow control
- Hardened trim materials to extend service life
- Angle valves to extend body life
- Tight shutoff construction

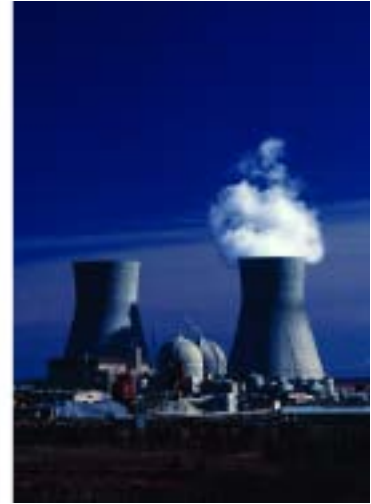
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**The Next Step**

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](http://www.FisherSevereService.com)



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