Process Automation

IMI CCI

DAM-H
High-temp multi-nozzle desuperheater with floating liner

Breakthrough engineering for a better world

DAM-H

High-temp multi-nozzle desuperheater with floating liner

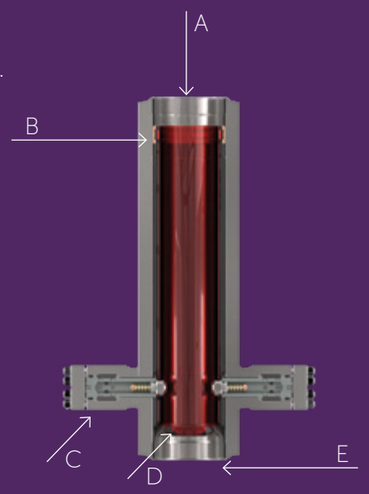
Attemperation is the primary technique used for controlling the degree of superheat in a boiler or a Heat Recovery Steam Generator (HRSG). This is achieved through a controlled injection of water into the superheated steam. Attemperators are typically installed between superheaters and regulate the output temperature of the boiler / HRSG, as well as protect any secondary superheater pipes from damage due to excessive heat. The temperature controller for this attemperator (known as inter-stage) bases its temperature regulation on input from a temperature transmitter placed on the boiler / HRSG output. A secondary attemperator (called final stage) is often placed after the inter-stage temperature transmitter in order to prevent thermal damages to the steam turbine during start-up. The final stage attemperator ensures that the steam temperature upstream from the turbine does not rise too fast.

The DAM-H is a high performing ring style attemperator with a floating flow profiling liner for superior evaporation and performance.

Key features

The DAM-H is fitted with a floating liner (patent pending) which creates an optimal flow profile for desuperheating. Upstream from the water injection point the liner is fitted with holes that allow steam to flow between liner and outlet pipe. This reduces any temperature differential on both sides of the liner which would otherwise result in a high level of stress. The liner is fastened downstream from the water injection point using a clamp. The lack of welding on the liner allows it to move with the expansion of the material, making the design more resistant to cycling.

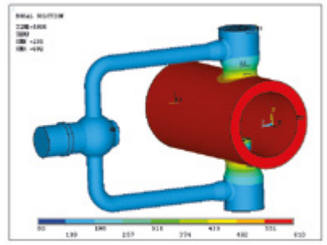
Water is routed through the water pipe and introduced into the steam flow through a series of spring-loaded spray nozzles.



A. Steam outlet
B. Clamp
C. Spray nozzle
D. Holes in the liner
E. Steam inlet

Benefits

- Excellent steam temperature control for severe applications.
- Very high ability to handle thermal cycling for reliable operation.
- Floating flow profiling liner (patent pending)
- Designed to handle large spray water quantities.
- Even distribution of spray water in the steam pipe.
- Negligible pressure drop in the steam line.
- Nozzles are designed to prevent flashing.



Temperature contour of DAM-H outlet, welds and water piping three hours after HP cold start

Spray water nozzles improve water atomisation

Product specification

Nozzle
- Material Inconel 718
- Rangeability Determined by water valve.

Regulatory requirements
ASME, PED, S-Stamp Water connection.

Steam connection
- Design Pressure 200 bar(g)
- Design Temperature 630 °C.

Water connection
- Design Pressure 320 bar(g)
- Design Temperature 250 °C.

Cycling
Up to 6300 cycles / 25 years

Steam pipe sizes
DN200 - DN700 (step size 50).

Installation
Horizontal or vertical up is recommended. Vertical down must be approved by IMI CCI. See II500.12 - System design considerations for more information.

Requirements for spray water valve

To ensure reliable attemperating of steam at the outlet of the HRSG, all components need to be synchronised perfectly. The spray water valve and the water injection nozzles work in conjunction to ensure that this is the case. The attemperating application puts the following demands on the spray water valve:

- It must be capable of handling the full feed water pressure
- It must ensure a tight shut off.
- High rangeability in order to cover both plant start-up and full load conditions
- High resolution and precision
- Stiff actuation system.

IMI CCI will select the best alternative water valve based on.

- Design and operation pressures and temperatures
- Feed water pump.

curve
Plant operating strategy.

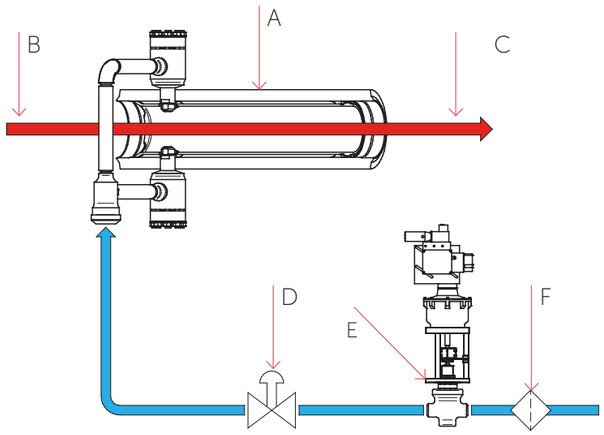
The 100DLC DRAG® valve

The **100DLC DRAG® valve** meets both the high and low Cv requirements as an alternative to the two valve system. This configuration is only possible due to DRAG® high rangeability trim providing excellent controllability at all flows, from start-up through to normal operation.

The VDA high pressure control valve

The **VDA high pressure control valve for water** are designed for flow control applications where the pressure differential across the valve is continuously high.

Installation example



A. DAM-H attemperator
B. Superheated steam from HRSG / boiler
C. Attemperated steam
D. Stop valve*
E. Spray water control valve
F. Strainer

* Only required for applications with S-stamp

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