



DESUPERHEATERS  
& ATTEMPORATORS



## DESUPERHEATERS & ATTEMPORATORS

Conventional, Spillback and Steam Atomising



### ABOUT DESUPERHEATERS

The Desuperheaters have been designed with the aim of reducing plant maintenance by manufacturing a unit that is easy to install, lightweight, and has no moving parts. All units are designed and manufactured in accordance with ISO 9001 and PED quality approval systems.

Both desuperheating and attemporating are processes where water is added to superheated steam to control the temperature to a set value.

- Engineered for each application
- Conventional, Conventional Steam Flow and Steam Atomising designs

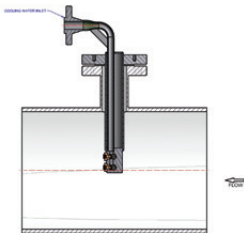
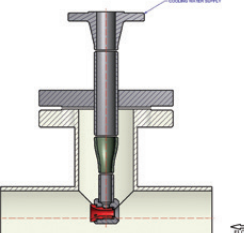
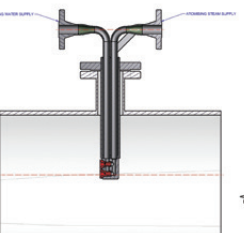
### INDUSTRIES AND APPLICATIONS

- Petrochemical
- Power generation
- Pulp and paper
- Food and beverage
- Sugar

## DEFINITIONS

Desuperheaters:	Used to reduce the temperature of superheated steam to a pre-determined set point within 10°C of the saturation point of the steam.
	Common Usage : Heat transfer in process plants
Attenuators:	Used to reduce the temperature of the superheated steam to a pre-determined set point - where the steam is still superheated.
	Common Usage : Protection of downstream devices, such as turbines, from being subjected to excessive temperatures
Desuperheater Turndown:	The ratio of the maximum to minimum amount of water required to be added to the system in order to achieve the required set point temperature over the entire range of operating conditions.

## SUMMARY OF KEY FEATURES AND BENEFITS

Model	Key features	Key benefits
<b>CONVENTIONAL DESUPERHEATERS</b>  	Simple and easy to install	Lightweight
	No moving parts in the steam flow	Reduced maintenance
	Turndown of up to 3:1	Best for low turndown applications
	Can be mounted in any position	One piece body mounted into T-piece
	Low pressure drop across the unit	
	Accurate temperature control to within $\pm 1^\circ \text{C}$ of set point	
	Robust design	Long lasting
<b>CONVENTIONAL STEAM FLOW DESUPERHEATERS</b>  	Simple and easy to install	Lightweight
	No moving parts in the steam flow	Reduced maintenance
	Turndown of 3:1	Best for low turndown applications
	Can be mounted in any position	
	Low pressure drop across the unit	
	Accurate temperature control to within $\pm 1^\circ \text{C}$ of set point	Good temperature control
	Ideal for very small pipeline applications	Minimum 2" (50 mm)
<b>STEAM ATOMISING DESUPERHEATERS</b>  	Simple and easy to install	Lightweight
	No moving parts in the steam flow	Reduced maintenance
	Turndown of 30:1	
	Can be mounted in any position	One-piece body mounted into T-piece
	Low pressure drop across the unit	
	Accurate temperature control to $\pm 1^\circ \text{C}$ of required set point	Good temperature control
	Good atomisation across a wide range of flows	No damage of steam piping
Only low pressure water required		

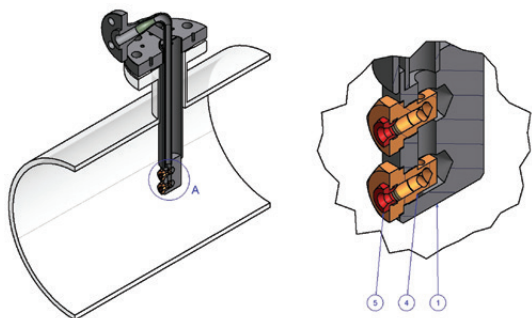
## ABOUT DESUPERHEATERS

### CONVENTIONAL DESUPERHEATERS

Where an application has small variations in steam flow, the ideal unit to use is a fixed nozzle desuperheater. This system works by feeding spraywater (normally feedwater) to a nozzle through a control valve.

The control valve will receive a signal from the temperature controller indicating the demand for spraywater required to achieve set point temperature. This water is injected through the nozzle into the main steam line, thus reducing the temperature of the steam. The use of high pressure water ensures that there is suitable atomisation of the water which will be absorbed by the steam.

The limitation of these units is, that as the requirement for water is reduced, the spraywater control valve closes, reducing the pressure at the nozzle. Since the nozzle is only effective in atomising the water with a high water pressure, the result is poor temperature control and excessive water in the lines which can cause cracking.

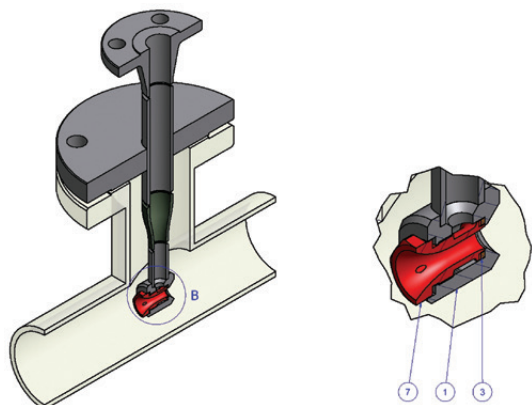


### CONVENTIONAL STEAM FLOW DESUPERHEATERS

A Conventional Steam Flow Desuperheater has all the same characteristics as the standard Conventional Desuperheater as described above.

This Desuperheater is able to fit into much smaller pipelines, as small as 2" (50mm). This allows the unit to handle very small steam flow through a single fixed nozzle.

The water is injected into the nozzle from above as per the Conventional Desuperheater. This nozzle however is open on both ends and allows the steam flow in the pipeline to flow through the nozzle, thereby creating a Venturi effect assisting in the atomisation of the water into the steam flow.



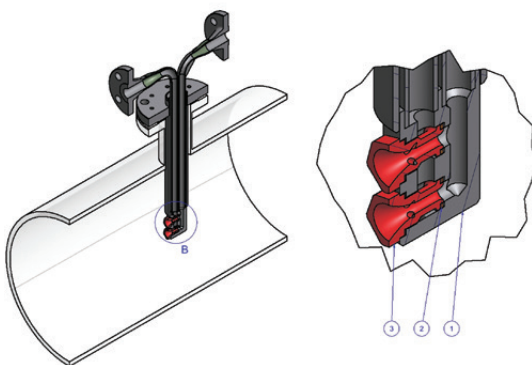
### STEAM ATOMISING DESUPERHEATERS

The Steam Atomising Desuperheater is used where the turndown requirements are higher, and where only low pressure water and high pressure steam are available to assist with atomising the water.

With these units, a small amount of HP steam is bled off from the main steam line. This steam is fed through venturi nozzles in the desuperheater unit. The spray water is injected into the low pressure region created by the high velocity steam.

Each unit consists of two valves, an On/Off valve for steam control and a Spraywater Control valve to control the amount of water required to obtain optimum set point temperature.

These units are best used in conjunction with a pressure reducing station, thus ensuring that high pressure steam is available at all times.



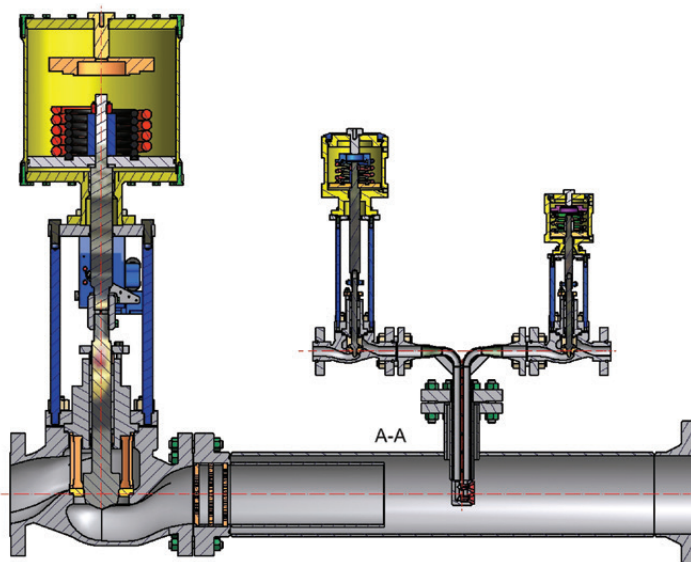
## COMPARISON OF DESUPERHEATER TYPES

	Conventional & Steam Atomising *	Venturi	Steam Conditioning +	Conventional Steam Flow *	Multi-Nozzle +	Variable Orifice
Advantages	Compact Ease of installation No moving parts Long lasting	Simple Long lasting No moving parts	Compact installation Shortest evaporation length	Compact Ease of installation No moving parts Good turndown	Suitable for large sizes Compact Good turndown	Desuperheating occurs in body - no thermal liners required
Disadvantages	Needs high pressure water (at least 1.5 times steam pressure) Only used for extremely low turndown	Will cause high pressure drop in steam line Heavy, difficult to install Poor turndown	Needs high pressure steam for flow turbulence Larger valve is required	Additional valve required for HP steam injection	Needs high pressure water (at least 1.5 times steam pressure) Moving parts within the unit	Can only be installed in vertical line Moving parts in the steam flow
Possible problems	At low flow requirement, bad atomisation of water	Poor temperature control at low flow conditions Thermal cracking of pipeline	Thermal cracking of the valve body	May be noisy	Maintenance of moving parts	Valve subject to thermal shock Body cracking
Best applications	Low turndown applications	Small units where long life is essential	Small units where the PRV and Desuperheater are required to be in one unit	Large units with high turndown requirements	Large units with high turndown requirements where high pressure water is available	Where low spray water pressure is available
Turndown	3:1	7:1	50:1	30:1	100:1	100:1

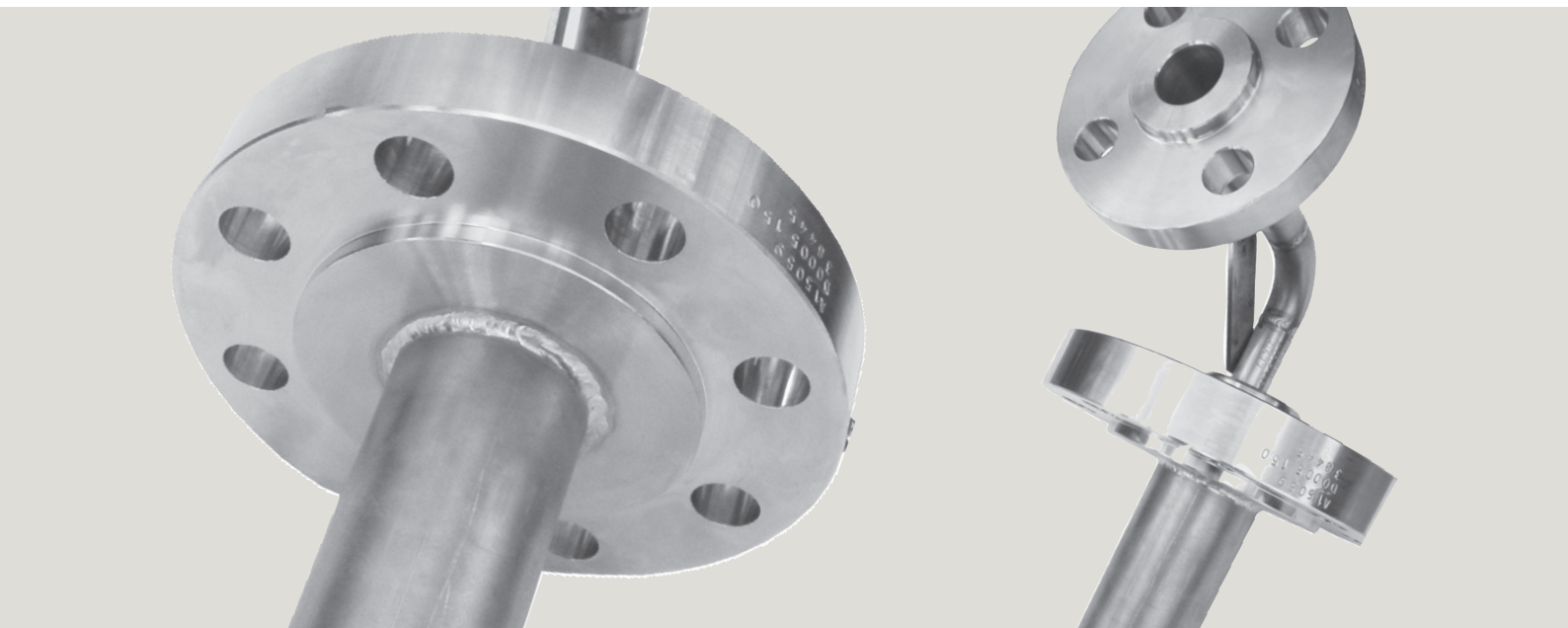
\* = Offered by Mitech

+ = Can be offered by Mitech upon request

## TYPICAL PRESSURE REDUCING DESUPERHEATER STATION



Pressure Reducing Station showing typical Steam Atomising Desuperheater Station



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