Desuper-Heater
Mechanically Atomized

Application
Desuperheaters of the mechanical atomizing type are generally used for applications with near constant loads. Flow-Age DMA has been designed for this application as well as those requiring moderate turndown ratio i.e. less than 8:1. It is a ruggedly constructed device capable of maintaining final temperatures to within ±5°C of saturation.

The DMA comes with three different types of spray nozzles and has a maximum spray water capacity of 35 GPM at 500psig nozzle differential. Multiple units can be installed in a steam header for additional spray water quantities.

Features
The DMA can be installed in pipe headers, elbows, tees, and other similar pipe fittings. It can be installed directly into the header through an opening as small as a standard ANSI 4” RF flange connection. Installation causes no appreciable pressure loss due to obstruction of flow. The uses of variety of nozzles allows for optimum turndown ratio, spray water quantity, and serviceability.

Principle of Operation
Flow-Age DMA reduces steam or gas temperatures by introducing cooling liquids directly in contact with the hot fluid. Temperature reduction is basically a matter of heat transfer. As the cooling fluid is placed in contact with the hot fluid, the cooling fluid absorbs heat by conduction and forced convection. In the case of steam and water, the water absorbs sufficient heat for vaporization.

By regulating the water quantity, the degree of heat absorption can be controlled and final temperatures maintained. The water quantity is controlled very finely with the help of equal % trim in water spray control valve. The speed of vaporization, and/or cooling, is also a function of droplet size, distribution, and of particular importance in the case of mechanical atomized desuperheater, the velocity. The higher the main fluid velocity, shorter the distance is required to achieve complete and homogeneous mixing.

The operation of the DMA is quite simple. Spray water quantity is controlled by an external control valve which is responding to signals received from the temperature control system, the liquid passes through the main tube of the desuperheater to the spray head and discharges into the header as a fine spray. Each nozzle in the spray head is tailored to meet a specific set of operating condition. The nozzle design optimizes the spray water particle size so that when combined with reasonably high header steam velocity results in excellent temperature control.

Specifications
The DMA is available in carbon, alloy, and stainless steel and is designed according to ASME and ANSI codes. Materials are of highest quality and selected to minimize the effects of erosion and corrosion.
De-super heater
Mechanically Atomized

Process steam pipe, riser and mounting flange to be furnished by customer. For applications on line sizes greater than 16" contact your local representative. The DMA is available up to ANSI-600# class.

Total Desuperheating System Along With Control Loop

DMA individual Nozzle Capacities

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Spray water Flow (GPM)

Differential Pressure Water/steam (PSI)
**Desuperheater**

**VARIABLE SPRAY NOZZLE - VSD-110**

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**General Description**

*Flow-Age* Desuperheaters are designed to reduce superheated steam temperature by direct contact method of cooling by water injection. Cooling water, intimately mixed with extremely hot steam, attracts energy from the steam and vaporized. The result is an increased volume of steam at a lower temperature. By regulating the flow of water, the degree of heat absorption can be controlled and final temperature is maintained.

**Highlights**

- Design as per ANSI B 16.34
- Grafoil Packing provided for Optional Sealing with Stem
- Suitable to fit a variety of Yokes. (Flow-Age Make Pneumatic Suitable Diaphragm Actuator)
- Body - Available in Carbon Steel/Alloy steel/Stainless Steel (Other Mat’ls Available On Request)
- High Performance Spray Nozzle Assy- Gives Fine Atomization Of Spray Water
- Entire assembly shall be provided With IBR Approval
Desuperheater
VARIABLE SPRAY NOZZLE - VSD-110

Customer Scope - Header

<table>
<thead>
<tr>
<th>Pipe Dia</th>
<th>4”</th>
<th>6”</th>
<th>8”</th>
<th>10”</th>
<th>12”</th>
<th>14”</th>
<th>16”</th>
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<tbody>
<tr>
<td>Height - ‘P’</td>
<td>400mm</td>
<td>375mm</td>
<td>350mm</td>
<td>325mm</td>
<td>300mm</td>
<td>285mm</td>
<td>255mm</td>
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<tr>
<td>Distance - ‘Y’</td>
<td>2.0mt.</td>
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<td>4.0mt.</td>
<td>5.0mt.</td>
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<td>7.0mt.</td>
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Small Pipe line Desuperheater

SMALL PIPE LINE DESUPERHEATER
(WAFER TYPE BODY)
SPD-105

20 x Pipe Dia
Small Pipe line Desuperheater

Application
Desuperheating steam in small process lines has always been a difficult operation to perform effectively. Size limitation, velocity restrictions, and installation problems have always prevented the utilization of conventional desuperheaters.

Flow-Age SPD Offers efficient desuperheating in steam pipe lines of 4” nominal diameter and less, it is particularly designed for rugged service, conditions and can maintain final temperatures to within 20°F of saturation.

Features
By utilizing a compact design and unique flow path conditioning, the SPD affords even distribution of spray water with good turndown for a fixed orifice Desuperheater; it can be easily installed between any two ANSI flanges up to 600# and 4" in size. The simple design of the SPD affords virtually maintenance free operation.

Principle of Operation
Flow-Age SPD reduces steam temperature by introducing a calculated amount of spray water directly into the superheated flow. The temperature reduction is the result of the heat transfer between the cooling media, water, and the superheated steam. As two make direct contact, the water absorbs the necessary heat for vaporization. When all the water is vaporized, the result is an increased steam flow at the desired reduced temperature.

The operation of the SPD is quite simple, spray water flow is throttled by a Control Valve which responds to the signal received by the temperature control loop. The spray water then enters the desuperheater water tube. This tube has been aligned tangentially to the interior flow chamber and introduces a rotational action to the incoming fluid. As the chamber fills, the spray water is forced in to the injection cone. As the flow area is reduced, the spray water is accelerated into the injection port. The combination of rotational and accelerated flow results in a fine spray for efficient and rapid vaporization.

At the same time, the steam flow is entering the desuperheater venturi, the reductions in flow area continue until the point of water injection. This results in a higher velocity and turbulent steam flow thus improving the mixing of the water and steam and increasing overall system turn down.

Specifications
The SPD desuperheater is available in carbon and alloy steel by ANSI pressure classes. Materials are of the highest quality and selected to minimize the effects of erosion and corrosion.

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<th>Required Sizing Parameters</th>
<th>Steam Data</th>
<th>Water Data</th>
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<tr>
<td>» Inlet Pressure</td>
<td>Bar (g)</td>
<td>» Inlet Pressure</td>
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<tr>
<td>» Inlet Temperature</td>
<td>°C</td>
<td>» Inlet Temperature</td>
</tr>
<tr>
<td>» Outlet Temperature</td>
<td>°C</td>
<td>» Steam Flow (Inlet)</td>
</tr>
</tbody>
</table>

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