

# MA-I & MA-IU

MECHANICAL ATOMIZING DESUPERHEATER



Copes-Vulcan has been providing control valves and desuperheaters for the power, process and nuclear industries since 1903. SPX provides a wide range of valves for the control of pressure, temperature and flow-induced noise in all types of power plants. Products include severe service and general service control valves, variable orifice desuperheaters, Raven™, trim and steam-conditioning valves and nuclear control valves, as well as custom designed specialty valves. Copes-Vulcan is recognized worldwide as a leader in valves for severe and critical service applications. Our strength lies in our ability to provide innovative valve solutions for our customers' application needs.

Finding innovative ways to help the world meet its ever growing demand for power is a key focus for SPX. SPX provides creative solutions that serve global energy markets in a myriad of ways. Our ideas are helping build more efficient power plants and renovate older existing facilities. SPX supplies a wide range of components - from air preheaters to filter systems for nuclear, coal-fired, combined cycle, solar, thermal and geothermal power plants.

With operations in over 35 countries, SPX has the global experience and regional presence, products and powerful ideas it takes to help our customers compete more effectively, and more efficiently deliver power to almost any part of the world.

## MA-I & MA-IU Mechanical Atomizing Desuperheater

The MA-I / MA-IU is a mechanical atomizing desuperheater that is generally used for applications which feature steady loads. It is particularly designed for rugged service and can maintain final temperature to within 20°F (11°C) of saturation. In addition to steady load service, it is often used for attemperating applications, and performs equally well for both.

Maximum cooling liquid capacity is 25,860 lbs/hr (11,700 kg/hr) at a nozzle differential pressure of 160 psi (1100 kPa) when using 100°F (38°C) water. Multiple units or other models can be installed in a header for higher capacities.

### TWO MOUNTING OPTIONS

This model is available in two mounting options. The MA-I is designed for welding to the pipe line and the MA-IU is flange mounted. The MA-IU also offers mounting commonality with other 'U'-series desuperheaters (MA-IIU, MNSD-V and SAMN-U).

### FEATURES

The MA-I / MA-IU can be installed in pipe headers, elbows, tees and similar fittings. The main line suffers no appreciable pressure loss due to its restriction. No special supports are required for installation.

The higher the main fluid velocity the better the desuperheating, since, with higher velocity, a shorter distance is required to achieve mixing. The temperature sensing element should be located approximately 40' (12m) downstream from the desuperheater.



## Typical product applications

### PRINCIPLE OF OPERATION

The Copes-Vulcan MA Desuperheaters reduce steam or gas temperatures by introducing cooling liquids directly into the hot fluid. Temperature reduction is essentially a matter of heat transfer, where the cooling liquid is placed in direct contact with the hot fluid and receives the necessary heat for evaporation. After sufficient time, all of the liquid is vaporized, resulting in final fluid flow at the desired lower temperature. The operation is quite simple. A Copes-Vulcan control valve, SD-Severe Duty or GS-General Service valves, control the cooling liquid flow. This valve responds to changes received from the temperature controller or temperature control system. This liquid then passes through the main tube of the desuperheater to the spray nozzle and discharges into the header as a fine spray. By controlling the flow through the spray nozzle and maintaining proper header velocities, good reliable temperature control is obtained. Speed of response is optimized by:

- 1) The proper range selection of the temperature controller
- 2) Placement of the controller as close to the valve as possible
- 3) Use of a valve positioner
- 4) Precise throttling of the cooling liquid valve

The MA-I / MA-IU is a mechanical atomizing desuperheater that is generally used for applications which feature steady loads and attemperating applications.

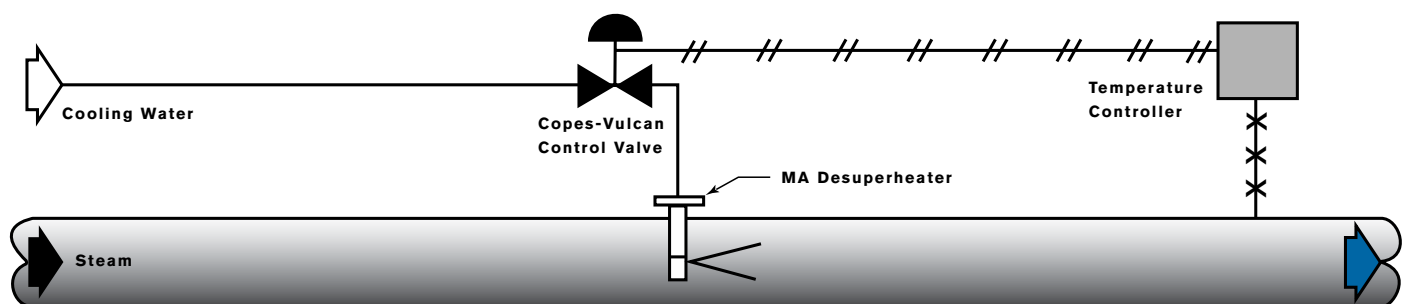
### Chemical



### Power



### Pulp & Paper



Temperature Controller sends signal to cooling water control valve, which in turn regulates flow of water to mechanical atomizing desuperheater.

## FUNCTION

The cross section of the MA's tube is designed to minimize problems of mechanical vibration associated with compressible fluid flow. For example, as the main fluid flows past the desuperheater, vortices are formed and dissipated at a frequency dependent on the velocity, viscosity and diameter of pipe. The desuperheater has been designed to minimize problems associated with vibration so that tube failure will not occur.

Each nozzle is tailored to meet a specific set of operating conditions. In addition, the nozzle design optimizes the cooling liquid particle size so that quick evaporation can take place. If the liquid was merely pumped into the line without a spray, control problems and liquid fall-out might occur. If liquid falls out of the main fluid and settles on the pipe, thermal stress and cracking might occur. The MA Desuperheaters produce rapid absorption of the liquid by mechanically producing fine droplets. The surface area per unit volume of liquid exposed to the hot fluid is large, thereby producing quick evaporation.



**MA-I Nozzle**



**MA-IU Nozzle**

## SPECIFICATIONS

The MA-I desuperheaters are available in carbon and alloy steel, in accordance with ANSI codes. Materials are of the highest quality and selected to minimize the effects of erosion and corrosion.

## DESUPERHEATING STATION

A simple mechanical atomizing desuperheating station consists of a temperature controller, a cooling liquid control valve and the desuperheater. The desired temperature is obtained by the temperature controller fixing the amount of cooling liquid flow through the valve and desuperheater. The nozzle of the desuperheater provides the desired pressure drop to ensure that liquid particle size is sufficiently small for quick evaporation.

This simple type of desuperheating station is normally used for steady load applications and as a result, no atomizing fluid is required. However, this can be used when flow turndown requirements are not too high, in the order of 1.5 or 2 to one. The low limit of flow should be when the main fluid header velocity is 5000' per minute (1525m per minute) or higher.

# Dimensions

## ANSI CLASS 2500 MA-IU DESUPERHEATER

HEADER SIZE	A	C	D
8" 200MM	13.06 332	22.75 578	-
10" 250MM	14.12 359	23.81 605	1.06 27
12" 300MM	15.12 384	24.81 630	-
14" 350MM	15.75 400	25.44 646	.62 16
16" 400MM	16.75 425	26.44 672	1.62 41

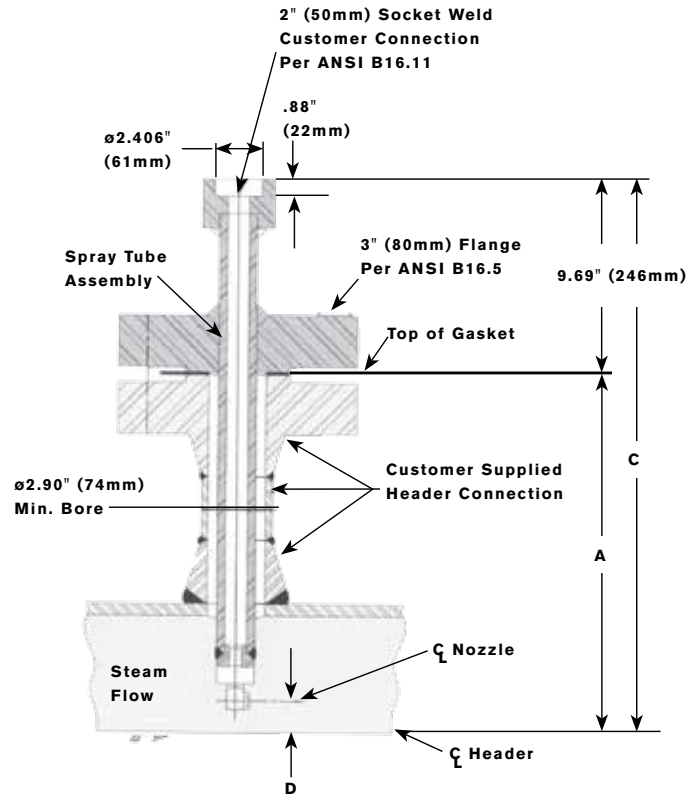
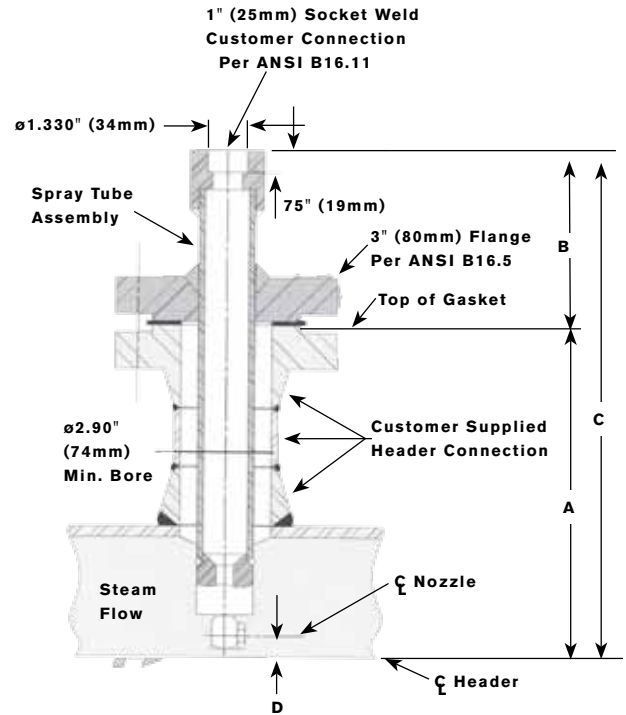
Inch  
Millimeter

## ANSI CLASS 150-1500 MA-IU DESUPERHEATER

HEADER SIZE	A	B	C	D
3" 80MM	12.12 308	7.88 200	20 508	-
4" 100MM	12.12 308	7.88 200	20 508	-
5" 125MM	12.12 308	7.88 200	20 508	-
6" 150MM	12.06 306	7.94 202	20 508	-
8" 200MM	13.06 332	6.94 176	20 508	-
10" 250MM	14.12 359	5.88 149	20 508	-
12" 300MM	15.12 384	8.88 226	24 610	-
14" 350MM	15.75 400	8.25 210	24 610	-
16" 400MM	16.75 425	7.25 184	24 610	-
18" 450MM	17.75 451	6.25 159	24 610	-
20" 500MM	18.75 476	6.75 171	25.50 648	1.5 38
24" 600MM	20.75 527	6.25 159	27 686	3 76

Inch  
Millimeter

## MA-IU\*



\* Low temperature configuration.

# Dimensions

## ANSI CLASS 150-1500 MA-I DESUPERHEATER

LINE SIZE 150 LB PRESSURE	A	B	C
<b>3"</b> 80MM	<b>6.34</b> 161	<b>5.03</b> 128	<b>7.5</b> 191
<b>3.5-4"</b> 90-100MM	<b>6.09</b> 155	<b>4.78</b> 121	<b>7.5</b> 191
<b>5,6 &amp; 8"</b> 125,150 & 200MM	<b>6.09</b> 155	<b>4.78</b> 121	<b>7.5</b> 191
<b>10-12"</b> 250-300MM	<b>6.09</b> 155	<b>4.78</b> 121	<b>7.5</b> 191
<b>14-24"</b> 350-160MM	<b>6.09</b> 155	<b>4.78</b> 121	<b>7.5</b> 191

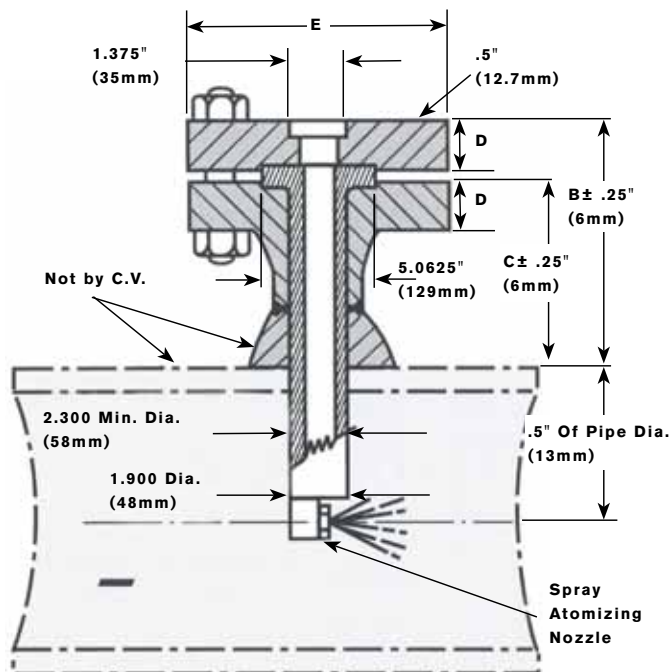
LINE SIZE 300 LB PRESSURE	A	B	C
<b>3"</b> 80MM	<b>6.91</b> 175	<b>5.41</b> 137	<b>8.12</b> 206
<b>3.5-4"</b> 90-100MM	<b>6.66</b> 169	<b>5.16</b> 131	<b>8.12</b> 206
<b>5,6 &amp; 8"</b> 125,150 & 200MM	<b>6.66</b> 169	<b>5.16</b> 131	<b>8.12</b> 206
<b>10-12"</b> 250-300MM	<b>6.66</b> 169	<b>5.16</b> 131	<b>8.12</b> 206
<b>14-24"</b> 350-160MM	<b>6.66</b> 169	<b>5.16</b> 131	<b>8.12</b> 206

LINE SIZE 400/600 LB PRESSURE	A	B	C
<b>3"</b> 80MM	<b>7.16</b> 182	<b>5.53</b> 141	<b>8.25</b> 210
<b>3.5-4"</b> 90-100MM	<b>6.91</b> 175	<b>5.28</b> 134	<b>8.25</b> 210
<b>5,6 &amp; 8"</b> 125,150 & 200MM	<b>6.91</b> 175	<b>5.28</b> 134	<b>8.25</b> 210
<b>10-12"</b> 250-300MM	<b>6.91</b> 175	<b>5.28</b> 134	<b>8.25</b> 210
<b>14-24"</b> 350-160MM	<b>6.91</b> 175	<b>5.28</b> 134	<b>8.25</b> 210

LINE SIZE 900 LB PRESSURE	A	B	C
<b>3"</b> 80MM	<b>8.16</b> 207	<b>6.289.5</b> 160	<b>9.5</b> 241
<b>3.5-4"</b> 90-100MM	<b>7.91</b> 201	<b>6.03</b> 153	<b>9.5</b> 241
<b>5, 6 &amp; 8"</b> 125, 150 & 200MM	<b>8.03</b> 204	<b>6.16</b> 156	<b>9.5</b> 241
<b>10-12"</b> 250-300MM	<b>8.03</b> 204	<b>6.16</b> 156	<b>9.5</b> 241
<b>14-24"</b> 350-160MM	<b>8.03</b> 204	<b>6.16</b> 156	<b>9.5</b> 241

LINE SIZE 1500 LB PRESSURE	A	B	C
<b>3"</b> 80MM	<b>10.03</b> 255	<b>7.78</b> 198	<b>10.5</b> 267
<b>3.5-4"</b> 90-100MM	<b>10.03</b> 255	<b>7.78</b> 198	<b>10.5</b> 267
<b>5, 6 &amp; 8"</b> 125, 150 & 200MM	<b>10.03</b> 255	<b>7.78</b> 198	<b>10.5</b> 267
<b>10-12"</b> 250-300MM	<b>10.03</b> 255	<b>7.78</b> 198	<b>10.5</b> 267
<b>14-24"</b> 350-160MM	<b>9.72</b> 247	<b>7.47</b> 190	<b>10.5</b> 267

**MA-IU\***



MA-I & MA-IU

Mechanical  
Atomizing  
Desuperheater



## Global locations

### SPX FLOW TECHNOLOGY

5620 West Road  
McKean, PA 16426  
United States of America  
+1 814 476 5800

### SPX FLOW TECHNOLOGY

Road Two, Industrial Estate  
Winsford, Cheshire CW7 3QL  
England  
+44 1606 552041

### SPX FLOW TECHNOLOGY

25 International Business Park  
#03-03/12 German Centre  
Singapore 609916  
+65 6264 4366

### SPX FLOW TECHNOLOGY

6F Treasury Building  
1568 Hua Shan Road  
Shanghai 200052  
PR China  
+86 21 2208 5888

Based in Charlotte, North Carolina, SPX Corporation (NYSE: SPW) is a global Fortune 500 multi-industry manufacturing leader. For more information, please visit [www.spx.com](http://www.spx.com)

### SPX FLOW TECHNOLOGY

5620 West Rd.  
McKean, PA 16426  
P: (814)476-5800  
F: (814)476-5854  
E: [cv@spx.com](mailto:cv@spx.com)

SPX reserves the right to incorporate our latest design and material changes without notice or obligation.

Design features, materials of construction and dimensional data, as described in this bulletin, are provided for your information only and should not be relied upon unless confirmed in writing. Please contact your local sales representative for product availability in your region. For more information visit [www.spx.com](http://www.spx.com).

The green ">" is a trademark of SPX Corporation, Inc.

ISSUED 10/2012 CV-113-US

COPYRIGHT © 2012 SPX Corporation