COPES-VULCAN

SPX VALVES & CONTROLS™

GUIDANCE NOTES FOR THE INSTALLATION OF MECHANICAL ATOMIZING DESUPERHEATERS (MA-II & MA-IIU)

(FORM GN-05)

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Printed in the USA

INSTALLATION OF MA-II AND MA-IIU DESUPERHEATERS
- GUIDANCE NOTES -

1. INTRODUCTION

The Mechanical Atomizing (MA) Desuperheater is a device used to inject cooling liquids into hot steam or gas to reduce the temperature of the fluid. The liquid passes through the main tube of the desuperheater to the spray nozzle, which disperses the coolant into the flow stream as small, high-surface-area water particles. The single nozzle is selected on an individual basis to guarantee an optimum spray pattern and coolant absorption rate.

Normally, the MA-II desuperheater is welded to an extension of the process header with the nozzle discharging in the downstream direction, as illustrated in Figure 1. A similar model, the MA-IIU (universal mount), is flanged and may be bolted to the customer's header connection. The MA-IIU is shown in Figure 2.

The MA-IIU flanged header mounting will also accept these desuperheater models: MA-IU, MNSD-U, and SAMND-U.

The MA-II and MA-IIU desuperheaters require virtually no maintenance and, when properly installed, will provide many years of reliable, trouble-free service.

2. PRIOR TO DELIVERY

Shortly after your order is entered, Copes-Vulcan will issue a certified copy of the Data Specification Sheet, detailing the operating conditions for which the equipment is being designed, along with drawings illustrating the critical installation dimensions of the equipment we propose to supply. This information should be reviewed carefully to confirm that our interpretation of the service requirements is correct. Any discrepancies should be pointed out immediately to Copes-Vulcan.

These guidance notes and the drawings illustrating the equipment should be forwarded to the person(s) responsible for locating the desuperheater and designing the associated piping. These recommendations must be followed to achieve a satisfactory installation.

3. PIPING CONSIDERATIONS

Of particular importance in locating the desuperheater in the piping system are the placement of the temperature-sensing element and the capacity, pressure, and temperature of the cooling water supply, which are critical to proper desuperheating performance.

In those cases where an upstream steam-pressure-reducing valve is used, the desuperheater steam inlet temperature should be checked to determine if the temperature change (decrease) caused by the pressure drop has been used for sizing the desuperheater.

Cooling Water Supply

The cooling water used for the desuperheater should be deaerated, as any dissolved oxygen in the water will be released when the cooling water evaporates. Oxygen corrosion on carbon steel can be very severe and has, in some cases, led to failure of the pressure boundary.

Of additional concern is the level of dissolved or suspended solids in the cooling water. As the cooling water vaporizes, these solids are deposited in the pipeline and desuperheater. There-fore, only deaerated and demineralized water containing no more than 9 to 10 parts per million of dissolved solids is recommended for use in Copes-Vulcan desuperheaters.

The MA-II and MA-IIU desuperheaters operate best with a water pressure 60 psi (4.1 bar) above the steam pressure at minimum flow conditions and 240 psi (16.6 bar) above the steam pressure at full load conditions. This range yields a coolant flow turndown of 2.0:1.

Pipe Size/Configuration

The MA-II and MA-IIU desuperheaters are designed for installation in a branch connection attached to a straight run of pipe. The pipe should be sized so that the steam velocity at minimum flow is no less than 5,000 ft/min (1,524 m/min) and no more than 50,000 ft/min (15,240 m/min) at the maximum flow condition. If the minimum steam velocity is less than 5,000 ft/min (1,524 m/min), reduce the pipe size or install a Venturi liner.

It is recommended, but not mandatory that the MA-II and MA-IIU desuperheaters be installed in a horizontal run of pipe. The desuperheaters may be located at any point along the perimeter of the system piping as long as the nozzle is centered in the pipe and discharges in the down-stream direction.

The MA-II and MA-IIU desuperheaters should not be installed with an upstream control valve, block valve, or elbow closer than three pipe diameters or 3 feet (0.9 m), whichever is greater.

No bends or elbows should be installed within 21 feet (6.4 m) of the desuperheater on the downstream side. The presence of a bend or elbow may adversely affect the absorption of the cooling water, which may lead to poor temperature control or excessive coolant drop-out. A bend too close to the desuperheater may also result in erosion of the pipe wall.

Location of Temperature-Sensing Element

The temperature-sensing element may be mounted upstream of an elbow, but should be a minimum of one pipe diameter before the inlet end of the elbow. The element should not be installed in an elbow, but may be installed downstream of the elbow a minimum of three pipe diameters.

A bend in the upstream piping will require an increase in the distance to the temperature-sensing element if the equivalent diameter of the bend is less than ten pipe diameters. Increase the distance to the temperature-sensing element by 1 foot (0.3 m) for every increment the equivalent of the bend is less than ten pipe diameters. For example, for a bend having an equivalent of six pipe diameters, the sensing element distance from the desuperheater would be increased by 4 feet (1.2 m), or 10 - 6 = 4.

The Data Specification Sheet will indicate Copes-Vulcan's recommendation for the distance that the temperature-sensing element should be installed downstream of the desuperheater. Locating the element farther downstream than this recommended distance may affect system response time.

Condensate Removal

Provision must always be made to remove excess water from the steam line.

Access to Desuperheater

The MA-II and MA-IIU desuperheaters require little or no maintenance, but access for installation and removal should be provided.

4. THERMAL LINER

Thermal liners are recommended if the difference in cooling water temperature and inlet steam temperature is more than 450^{o}F (230^{o}C) and the pressure boundary piping has a wall thickness greater than 0.50 inches (13 mm). The thermal liner should extend a minimum of 15 feet (4.6m) downstream of the desuperheater, with provision made for approximately 10% of the

steam to pass between the outside diameter of the liner and the pressure boundary pipe.

5. EQUIPMENT RECEIPT

On receipt, the desuperheater should be inspected to ensure that no damage has been sustained in transit. A packing list containing a complete description of the equipment is included with the shipment. Check the list against the items that have been supplied. Check that the serial number on the desuperheater matches that on the Copes-Vulcan Data Specification Sheet. Report any problems to Copes-Vulcan.

6. PROVISIONS FOR PROPER STORAGE

If the desuperheater is not being installed immediately upon receipt, it should be stored indoors in a ventilated area. If indoor storage is not possible, the equipment should not be stored in contact with the ground.

Unpainted metal surfaces may be protected from rust by applying a rust preventive compound that is easily removed by the process fluid and is not harmful to the process. On flanged units, the gasket sealing surfaces of the flange are of primary importance, on other units, the weld prep surfaces are critical.

Where needed, rust preventive compound should be reapplied annually.

7. INSTALLATION/SET-UP

Verify that the header mounting size, configuration, and height are in accordance with the certified Copes-Vulcan outline drawing. The through bore of the header stand-off must be a minimum of 3.0 inches (76.2 mm) in diameter for the MA-II desuperheater and a minimum of 2.90 inches (73.7 mm) in diameter for installation of the MA-IIU desuperheater.

The MA-II desuperheater normally is welded into place. The MA-IIU desuperheater is bolted, with a gasket placed between, to the customer's connection.

In all cases, the nozzle must be oriented to discharge in the downstream direction.

Detailed installation instructions are provided in Form 60:37:60 in the Copes-Vulcan Installation, Operation and Maintenance Manual supplied with the equipment or may be obtained from Copes-Vulcan Service Department.

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FIGURE 1

MA-II DESUPERHEATER
ANSI CLASSES 150 - 2500

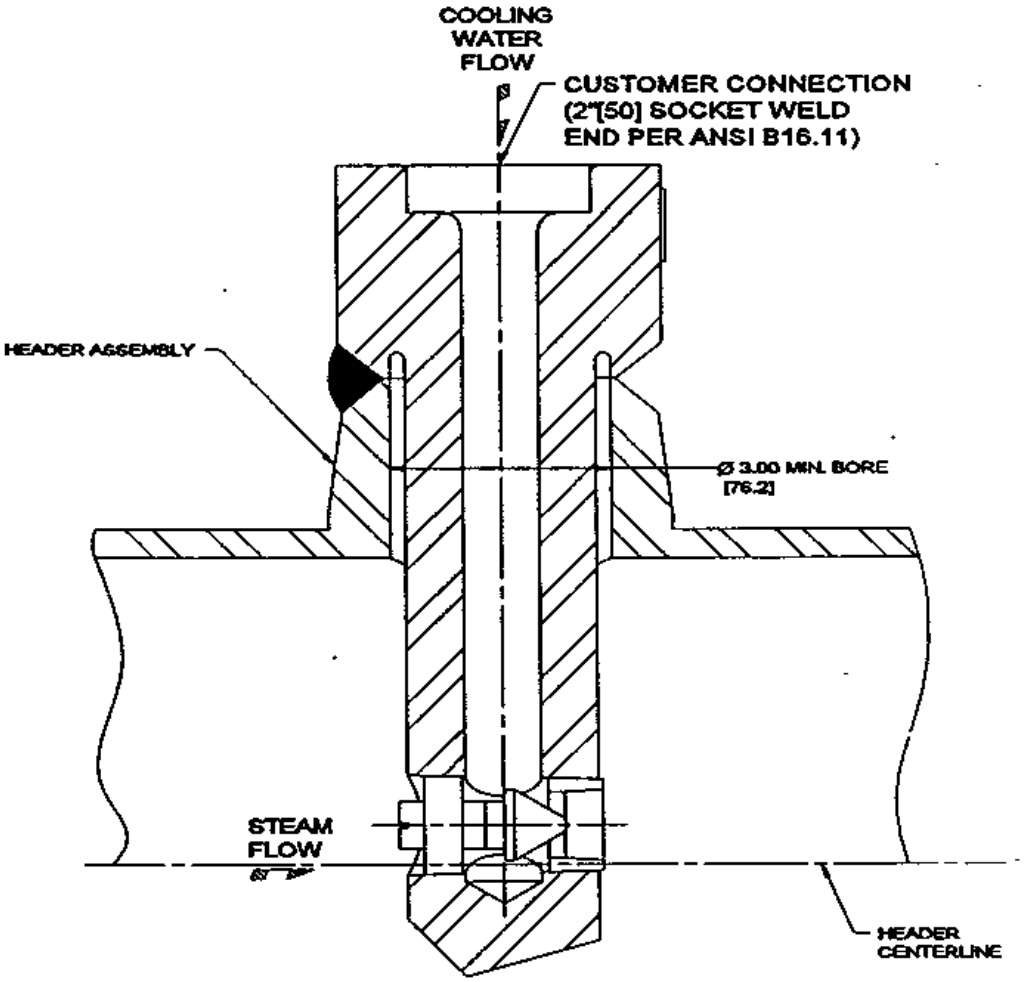

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FIGURE 2

MA-IIU DESUPERHEATER
ANSI CLASSES 150 - 2500