INSTALLATION OF VARIABLE ORIFICE DESUPERHEATERS
- GUIDANCE NOTES -

1.0 INTRODUCTION

The Copes-Vulcan Variable Orifice (VO) Desuperheater employs an orifice that is continually adjusted by the incoming vapor flow to create ideal conditions for atomization of the desuperheating medium and for intimate mixing of the medium with the incoming vapor. The VO desuperheater provides good rangeability and extremely accurate downstream temperature control. This allows the final temperature set point to be very close to the saturation point of the steam.

The VO desuperheater is a very reliable piece of equipment, requiring virtually no maintenance. When properly installed, the VO desuperheater will become part of the piping system and provide many years of trouble-free service.

2.0 PRIOR TO DELIVERY

Shortly after your order is entered, Copes-Vulcan will issue a certified copy of the Variable Orifice Desuperheater 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. The recommendations herein must be followed to achieve a satisfactory installation.

3.0 EQUIPMENT RECEIPT

On receipt, the desuperheater and, if applicable, its cooling water control valve 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 Variable Orifice Desuperheater Data Specification Sheet. Report any problems to Copes-Vulcan.

4.0 PROVISIONS FOR PROPER STORAGE

If the desuperheater is not being installed immediately upon receipt, the end covers should be removed and a film of rust preventive compound should be sprayed on the internals and on any external machined surfaces. The ends should then be securely re-sealed. NOTE: Before performing this procedure, make sure that any substance used for this purpose will not be detrimental to the fluid to be passed through the installed desuperheater.

If the equipment is stored for an extended period, the treatment should be applied annually.

5.0 LOCATION OF THE EQUIPMENT

A. VO Desuperheater Location

The Variable Orifice Desuperheater is designed to be installed vertically in the pipeline with steam flowing upward through the unit. This arrangement allows gravity to return the plug to the lowest position as the steam flow decreases. The operation of the desuperheater is such, however, that bends may be incorporated immediately before and after the unit, making a compact installation possible.

An elbow with a long radius equal to a minimum of 1.5 times the pipe diameter may be installed immediately on the inlet to the unit. If it is required to provide a bend immediately on the outlet, however, Copes-Vulcan recommends as large a radius as possible to guard against the possibility of water impingement on the pipe wall caused by water particles under the influence of centrifugal force being thrown against the pipe as the steam travels around the bend.

Figure 1 shows the recommended radii and straight pipe for close-coupled bends. Smaller radii may be used if the straight pipe length (Dimension B) is increased by an amount equal to the reduction in the recommended radius (Dimension A). In no case should the radius be less than one pipe diameter. A pipe bend radius equal to the sum of Dimension A and Dimension B may be used without a straight length of pipe on the outlet of the desuperheater.

Avoid locating the desuperheater at a point where large end loads may occur.

B. Locating the Coolant Control Valve

The coolant control valve should be positioned below the coolant entry point on the desuperheater so that, under light load conditions, the interconnecting pipework does not drain and a reservoir of cooling water is maintained between the valve and desuperheater. This will ensure immediate changes in coolant flow in response to changes in the process temperature.

C. Installation of Check Valve

It is recommended that a full-bore check valve be installed between the coolant control valve and the desuperheater so that, in the event of a loss of coolant supply, the steam will not pass back and affect the coolant valve or the associated pipework.

D. Locating the Temperature-Sensing Element

The location of the temperature-sensing probe downstream of the desuperheater is critical to the performance of the unit. If it is located too close to the desuperheater, stable temperature conditions will not be achieved. If located too far from the desuperheater, a delay in desuperheated steam reaching the sensing point may affect desuperheater performance. It is recommended that the temperature-sensing point be located between 15 and 20 feet (5 and 6 meters) from the desuperheater outlet.

Where a filled thermal system is being used, the length of capillary should be checked to confirm that the above criterion can be met.

It is recommended that the sensing element be installed in the top of the pipe (if horizontal) and have sufficient length to reach the center of the pipe.

It is recommended that a thermometer pocket be fitted adjacent to the temperature- sensing point so that check readings may be taken.

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6.0 INSTALLATION/SET-UP

The most common causes of problems with desuperheaters are the result of incorrect installation, transference of pipe stresses to the components, or the ingress of foreign matter into the units, resulting in trim damage and sticking. Care taken in the installation of desuperheaters will provide substantial benefits in terms of trouble-free operation.

A. Direction of Flow Through Body

Make sure the desuperheater is installed so the direction of flow through the unit is correct. A flow arrow on the desuperheater body indicates the direction of flow through the body. The desuperheater inlet connection is tagged “INLET”.

B. Pipe Connections

The desuperheater should be properly aligned and the connecting pipework should be adequately supported so that no pipe strain is imposed upon the desuperheater body.

If the unit is flanged, make sure the mating flanges are aligned and are square to each other.

If the desuperheater is to be welded into the line, make sure there is no offset between the pipe and the desuperheater end before welding.

C. Installation of Traps and Drains

To prevent build-up of condensate, adequate drainage must be provided at the lowest point of the system upstream of the desuperheater. Condensate in the incoming steam can cause the desuperheater plug to impact the plug stop with substantial force and may cause the plug stop to fail. The desuperheater plug is provided with relief ports to allow any condensate forming in the outlet piping above the plug to drain back into the inlet piping. This fact should be considered when sizing traps.

D. Cleaning the Piping

Before final connection of the desuperheater to the pipe, blow through the piping and check to confirm that it is free of foreign matter.

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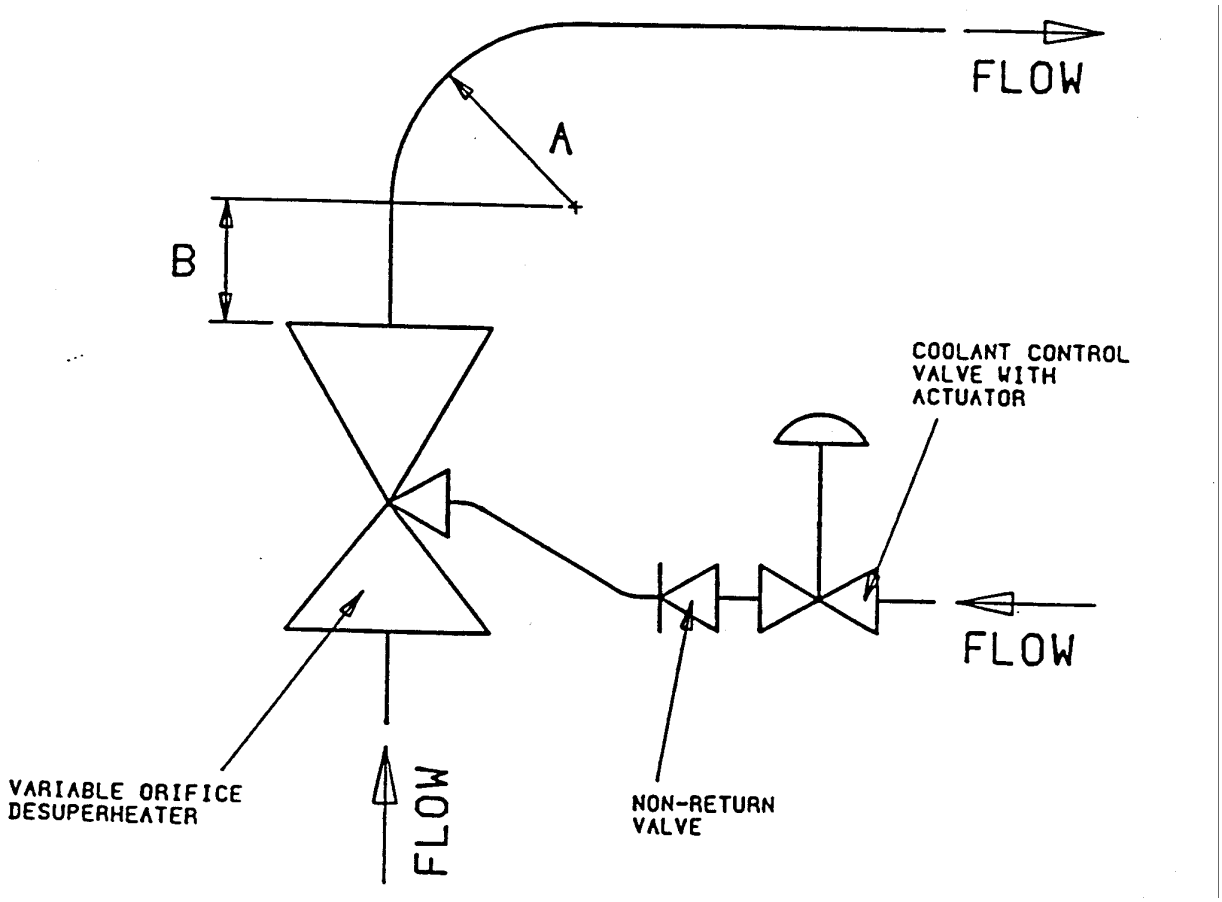
FIGURE 1
INSTALLATION OF COPES-VULCAN VARIABLE ORIFICE DESUPERHEATER(VO)



	UNIT SIZE	2	3	4	6	8	10	12	14	16	18	20	24
A	INCHES	3	4.5	6	9	12	15	18	21	24	27	30	36
	MM	76	114	152	229	305	381	457	533	610	686	762	914
B	INCHES	6	8.5	11	16	24	34	40	54	70	76	80	86
	MM	152	216	280	406	610	864	1016	1372	1778	1930	2032	2184