DY VARI*spray*

Fixed area vortex type desuperheater

Suitable for:


Steam


Process gas

Markets:


Power


General industry

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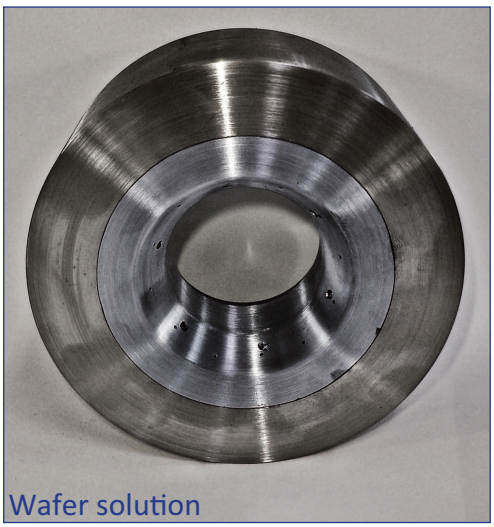

Wafer solution

Introduction

VARI*spray* nozzles are fixed area spraying devices which inject water in the outlet of a venturi-shaped section combined with a swirling pattern of nozzles for an excellent and rapid atomizing of sprayed water.
Low-velocity steam flows can be thoroughly handled as well with a minimum approach temperature of 6°C over saturation. They are primarily intended for very low capacity processes with moderate load changes and where an accurate temperature control is essential.

Main applications:
- turbine shaft sealing
- heat exchangers
- ejectors
- house facilities
- tires vulcanizing processes
- drum dryers
- general purpose cooking kettles

Functional features

approach temperature = min 6°C
max Δp water-to-steam = 30 bar between inlet pressures
min Δp water-to-steam = 1 bar between inlet pressures
max water/steam ratio = 15% - by weight at inlet conditions
min inlet steam velocity = 6 m/s

max water flow rate = 5 m3/h
min downstream straight run = 3 m
temperature sensor distance = 8 ÷ 10 m
rangeability: up to 10:1 depending on Δp water-to-steam

Fixed area nozzles have a ratio Cvmax/Cvmin = 1 and consequently the corresponding max value of Ry , with Δp_{max} = 30 bar and Δp_{min} = 1 bar should be:

$$Ry = 1.\sqrt{\frac{\Delta p_{max}}{\Delta p_{min}}}$$ = 5,4:1

However, the internal vortex-venturi geometry of VARI*spray* improves the performance of nozzles by increasing the steam velocity and by swirling the injected water.

Atomization of water is optimized and the corresponding actual Ry values are summarized in the following table:

Δp - bar	5	10	15	25	30
RANGEABILITY	4 : 1	6 : 1	7 : 1	9 : 1	10 : 1

Steam pressure drop can be estimated by the following relationship:

$$\Delta p = \frac{1}{625\,\rho_1} \cdot \frac{q_m^2}{Cv_s^2}$$

where: Δp bar - ρ1 kg/m3 - qm kg/h (steam inlet flow rate)

Main characteristcs

Steam pipe size: 1-½", 2", 3", 4"
Water connections: ½", ¾", 1"
Ratings: up to ANSI 600
Connection types: steam: SW-BW-wafer
water: RF - other on request
Nozzle sizes: 4 nozzle sizes are available DY1, DY2, DY3, DY4

Flow capacity: from one to eight nozzle assemblies can be provided for each nozzle size and more than 25 combined Cv's are available from 0,0145 through 0,928 (see Cv table)
Mounting: straight-in-line with top water connection
Materials: see part list table

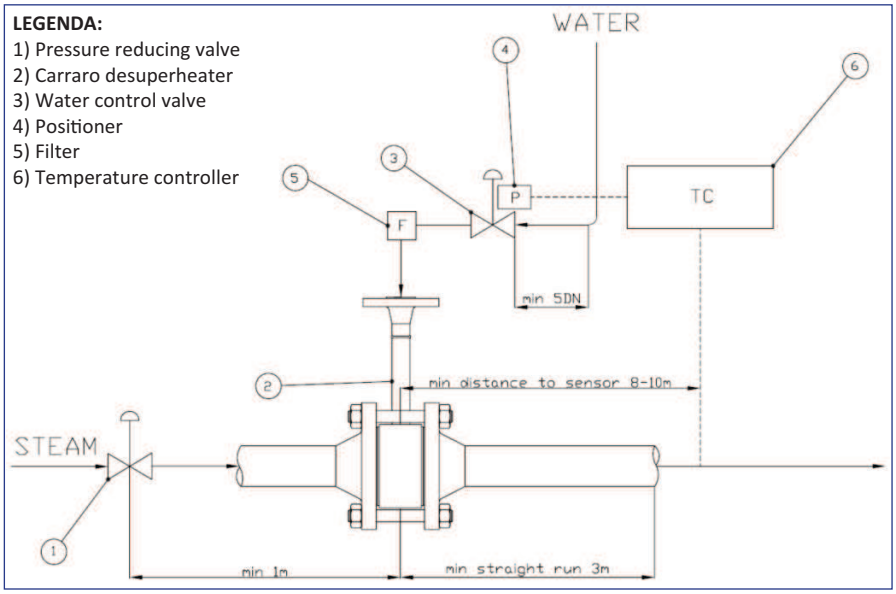
Body size	Nozzle size	CV of nozzle assembly							CVs of steam flow passage
		Number of nozzles							
		1	2	3	4	5	6	8	
1-½"	DY1	0,0145	0,029	0,0435	0,058	0,0725	0,087	-	35
2"	DY2	0,029	0,058	0,087	0,116	0,145	0,174	-	60
3"	DY3	0,058	0,116	0,174	0,232	0,29	0,348	0,464	130
4"	DY4	0,116	0,232	0,348	0,464	0,58	0,696	0,928	235


Nozzle

Engineering practice for efficient desuperheating

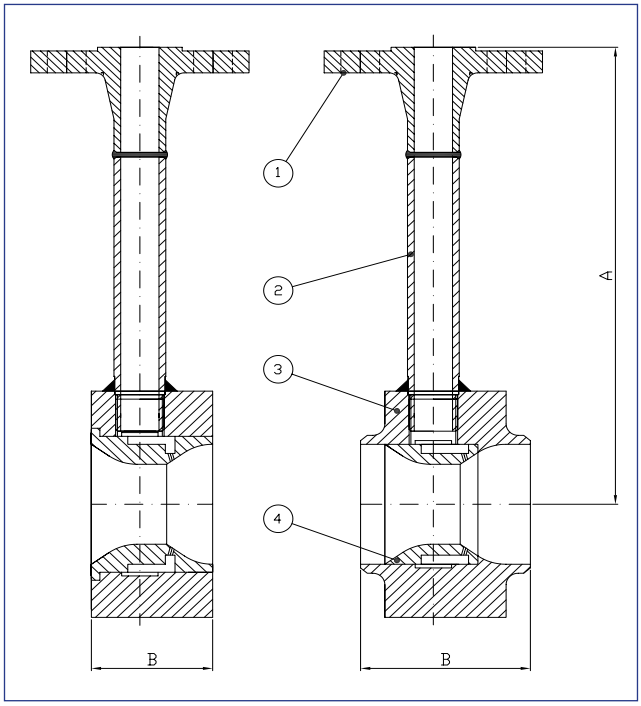
For efficient desuperheating the arrangement of installation is shown in figure.

LEGENDA:
1) Pressure reducing valve
2) Carraro desuperheater
3) Water control valve
4) Positioner
5) Filter
6) Temperature controller



Filter is highly recommended. The mesh of the sieve must be not less than 30 for DY1, 20 for DY2, 25 for DY3 and 16 for DY4.

VARI*spray* dimensions



Number	Item	Material
1	Flange	Carbon-, Cr-Mo steels
2	Pipe	Carbon-, Cr-Mo steels
3	Body	Carbon-, Cr-Mo steels
4	Nozzle	AISI 422

Nozzle	Water Connection		Steam Connection		A	B
	SIZE	RATING	SIZE	RATING		
DY 1	½”	150 RF	1-½”	RF	195	40
		300 RF		BW sch40		70
		600 RF		BW sch80		70
DY 2	½”	150 RF	2”	RF	205	50
		300 RF		BW sch40		75
		600 RF		BW sch80		75
DY 3	¾”	150 RF	3”	RF	225	60
		300 RF		BW sch40		95
		600 RF		BW sch80		95
DY 4	1”	150 RF	4”	RF	255	60
		300 RF		BW sch40		100
		600 RF		BW sch80		100

About Carraro

Carraro Srl is a private independent company, operative since 1924 in the field of industrial valves. The firm produces and commercializes worldwide a broad range of industrial pressure regulators, desuperheaters and safety valves for fluids such as steam, process gases and liquids.
The flexible organization of Carraro allows a great customization of the products and the production of "taylor made" constructions. Most of the Carraro's product range can be realized also in "exotic" materials such as e.g. duplex, superduplex, monel, hastelloy, aluminum bronze and others. Supported by a global network of sales offices, representatives and distributors, Carraro offers a wide range of solutions for the Oil&Gas, the Power industry and all other diversified industrial applications.

Carraro: product range

UB Regulators: direct-operated pressure regulators with compact design
Maxomatic Series: multifunction pilot-operated regulators for liquids
MM-BPM series: direct-operated, spring pressure regulators
AT series: direct-operated temperature regulators
M51 series: direct-operated, weight and lever pressure regulators
CS series: safety valves for vapours, gas, liquids
CSV series: safety valves for steam and gases
VRE series: electrically operated control valves
MCP - ACP series: pneumatically operated control valves
AIRMATIC series: electropneumatic safety valves
DSH series: desuperheaters

Approvals and certifications

UNI EN ISO 9001: 2008	✔
UNI EN ISO 14001: 2004	✔
97 / 23 / CE (PED)	✔
94 / 09 / CE (ATEX)	✔
RINA	✔
GOST R+RTN	✔
CRN Canada	✔

Cooperations with notified bodies

LLOYD's REGISTER	✔
ABS	✔
BV	✔
DNV	✔

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