

# VST Series

INAIL approved and calibrated safety valves

## Technical Data Sheet



## Description

**VST Series**, INAIL qualified and calibrated safety valves are devices that automatically, without the assistance of energy other than pressurized fluid, discharge a sufficient amount of fluid to prevent the predetermined safety pressure from being exceeded to protect the heat generator and the system.

### VST

Diaphragm safety valve, fixed calibration. CW617N brass body and cap. PN10. Overpressure: 10%. Closing deviation < 20%. Temperature range: -10÷120°C. FF connections with increased outlet.



**INAIL qualified and calibrated.**

**Complies with PED Directive 2014/68/EU with identification number CE0425.**

Type	Part No.	DN	bar	Weight (g)
VST	0212122	1/2" x 3/4"	2,25	420
VST	0212125	1/2" x 3/4"	2,5	420
VST	0212127	1/2" x 3/4"	2,7	420
VST	0212130	1/2" x 3/4"	3	420
VST	0212135	1/2" x 3/4"	3,5	420
VST	0212140	1/2" x 3/4"	4	420
VST	0212145	1/2" x 3/4"	4,5	420
VST	0212150	1/2" x 3/4"	5	420
VST	0212154	1/2" x 3/4"	5,4	420
VST	0212160	1/2" x 3/4"	6	420
VST	0213122	3/4" x 1"	2,25	780
VST	0213125	3/4" x 1"	2,5	780
VST	0213127	3/4" x 1"	2,7	780
VST	0213130	3/4" x 1"	3	780
VST	0213135	3/4" x 1"	3,5	780
VST	0213140	3/4" x 1"	4	780
VST	0213145	3/4" x 1"	4,5	780
VST	0213150	3/4" x 1"	5	780
VST	0213154	3/4" x 1"	5,4	780
VST	0213160	3/4" x 1"	6	780
VST	0214122	1" x 1.1/4"	2,25	1000
VST	0214125	1" x 1.1/4"	2,5	1000
VST	0214127	1" x 1.1/4"	2,7	1000
VST	0214130	1" x 1.1/4"	3	1000
VST	0214135	1" x 1.1/4"	3,5	1000
VST	0214140	1" x 1.1/4"	4	1000
VST	0214145	1" x 1.1/4"	4,5	1000
VST	0214150	1" x 1.1/4"	5	1000
VST	0214154	1" x 1.1/4"	5,4	1000
VST	0214160	1" x 1.1/4"	6	1000

### IS

Exposed drain funnel for safety and thermal drain valves.



Type	Part No.	DN	Weight (g)
IS	0235115	1/2" FF	270
IS	0235120	3/4" FF	400
IS	0235125	1" FF	600
IS	0235132	1.1/4" FF	1000

Technical features	
Nominal pressure	PN10
Overpressure	10%
Blowdown	<20%
Maximum operating temperature	-10÷120°C
PED class	IV

Materials	
Body and cap	CW617N brass
Diaphragm and seals	EPDM
Manual discharge knob	Impact-resistant technopolymer
Setting spring	Galvanised C100 steel
Disc	CW617N brass

## Approvals

### CE mark

**VST Series** safety valves meet the requirements of the Pressure Equipment Directive 2014/68/EU (PED). The valves fall under category IV as safety accessories and bear the CE mark followed by the identification number of the approving body.

### INAIL

**VST Series** safety valves are manufactured in accordance with the specifications and requirements defined in the R Compendium Chapter R.2.A (Edition 2009) and are accompanied by the INAIL type approval certificate and calibration certificate. The **INAIL approval certificate** is issued to the manufacturer following verification that the valve fully complies with the operating characteristics required by the standard. The document is valid for a period of five years: each valve produced within this period is approved by INAIL for an indefinite period of time and can be used on installations without time limits. The valves are individually tested and supplied complete with a calibration report, in a single copy bearing the serial number of the valve stamped on the immovable metal disc fixed in the knob. The **calibration report** must accompany the valve throughout its service life.

## Application

**VST Series** safety valves are generally used in closed-loop heating systems with nominal heat output of more than 35kW that use hot water at temperatures below 110°C. The safety valve protects the boiler and system tank from sudden, unexpected pressure surges.

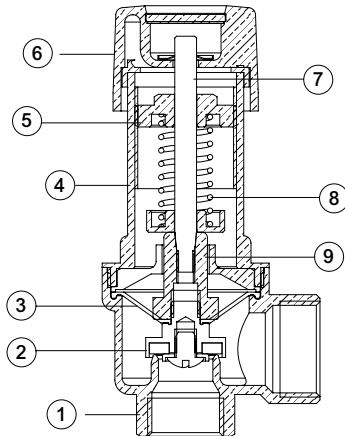
Valve opening can be triggered for various reasons:

- fluid temperature rises above the maximum set value, resulting in uncompensated expansion;
- expansion vessel undersized;
- circuit overfilled.

Therefore, the safety valve remains inoperative when the system is operating normally.

## Operation

The fluid in the system exerts pressure on the disc, which pushes against the spring until the pressure exceeds the declared setting. The disc then slowly starts to open, allowing the water flow to inflate the diaphragm. The valve opens and discharges into the air, relieving the system from dangerous pressure for the boiler and system components. The disc opens fully before the fluid pressure exceeds the pressure setpoint by 10% (**overpressure**). The valve closes before the pressure drops to 20% less than the setpoint pressure (**blowdown**). The outlet port has a wider diameter than the inlet port, to increase the discharge capacity of the valve. The characteristics of the materials prevent the valves from seizing as a result of ageing.



### Key

- 1 - Valve body
- 2 - Disc
- 3 - Diaphragm
- 4 - Cap
- 5 - Setting nut
- 6 - Manual discharge knob
- 7 - Disc stem
- 8 - Setting spring
- 9 - Disc stem

## Sizing

The safety valve must be sized to ensure a discharge flow rate (Q), expressed in kg/h of vapour, of not less than:

$$Q = P/0.58$$

where

P = nominal heat output of boiler (kW)

The setpoint pressure of the valve, plus the permitted overpressure, must not exceed the maximum operating pressure of the boiler. For boilers with individual heat output exceeding 580 kW (500,000 kcal/h), the discharge flow rate must be divided between at least two safety valves.

### Technical data and discharge flow rates with overpressure of 10% and blowdown of 20%

Model	Pressure in bar			Ø of orifice mm	Section of orifice cm <sup>2</sup>	Flow coefficient K	Discharge flow rate Kg/h	Nominal heat output of boiler	
	setting	max discharge	min closure					Kcal/h	kW
1/2" x 3/4"	2,25	2,475	1,80				205,67	102.839	119,29
1/2" x 3/4"	2,50	2,75	2,00				221,40	110.703	128,41
1/2" x 3/4"	2,70	2,97	2,16				233,78	116.892	135,59
1/2" x 3/4"	3,00	3,30	2,40				253,74	126.873	147,17
1/2" x 3/4"	3,50	3,85	2,80				284,07	142.035	164,76
1/2" x 3/4"	4,00	4,40	3,20	15	1,7671	0,71	318,07	159.039	184,48
1/2" x 3/4"	4,50	4,95	3,60				344,78	172.393	199,97
1/2" x 3/4"	5,00	5,50	4,00				376,39	188.196	218,30
1/2" x 3/4"	5,40	5,94	4,32				399,70	199.850	232,42
1/2" x 3/4"	6,00	6,60	4,80				442,81	221.407	256,83
3/4" x 1"	2,25	2,475	1,80				412,01	206.006	238,96
3/4" x 1"	2,50	2,75	2,00				443,52	221.760	257,24
3/4" x 1"	2,70	2,97	2,16				468,31	234.156	271,62
3/4" x 1"	3,00	3,30	2,40				508,30	254.151	294,81
3/4" x 1"	3,50	3,85	2,80	20	3,1416	0,80	569,04	284.522	330,04
3/4" x 1"	4,00	4,40	3,20				637,17	318.585	369,55
3/4" x 1"	4,50	4,95	3,60				690,67	345.336	400,58
3/4" x 1"	5,00	5,50	4,00				753,98	376.992	437,31
3/4" x 1"	5,40	5,94	4,32				804,25	402.125	466,50
3/4" x 1"	6,00	6,60	4,80				887,04	443.520	514,48
1" x 1.1/4"	2,25	2,475	1,80				571,37	285.670	331,37
1" x 1.1/4"	2,50	2,75	2,00				615,03	307.515	356,71
1" x 1.1/4"	2,70	2,97	2,16				649,41	324.705	376,65
1" x 1.1/4"	3,00	3,30	2,40				704,86	352.433	408,82
1" x 1.1/4"	3,50	3,85	2,80	25	4,9087	0,71	789,09	394.548	457,67
1" x 1.1/4"	4,00	4,40	3,20				883,56	441.783	512,46
1" x 1.1/4"	4,50	4,95	3,60				957,75	478.879	555,49
1" x 1.1/4"	5,00	5,50	4,00				1.045,55	522.776	606,42
1" x 1.1/4"	5,40	5,94	4,32				1.120,24	560.117	649,79
1" x 1.1/4"	6,00	6,60	4,80				1.230,06	615.031	713,43

## Installation

The safety valve must be installed as prescribed in the technical specifications described in Collection R - Edition 2009. The safety valve must be installed in such a way that it cannot be intercepted or be subjected to external agents which could damage it. It is absolutely forbidden to install filters or similar devices on the pressure line.

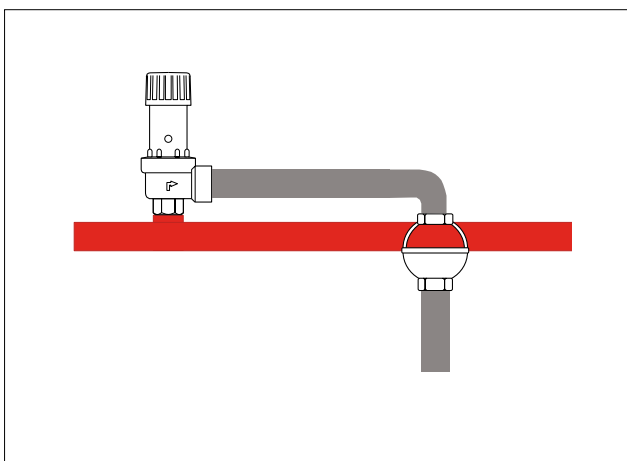
In order to avoid overheating, welding work must be completed prior to installation.

The safety valve must always be installed in a vertical position, with the inlet on the underside. Observe the flow direction indicated by the arrow on the valve body

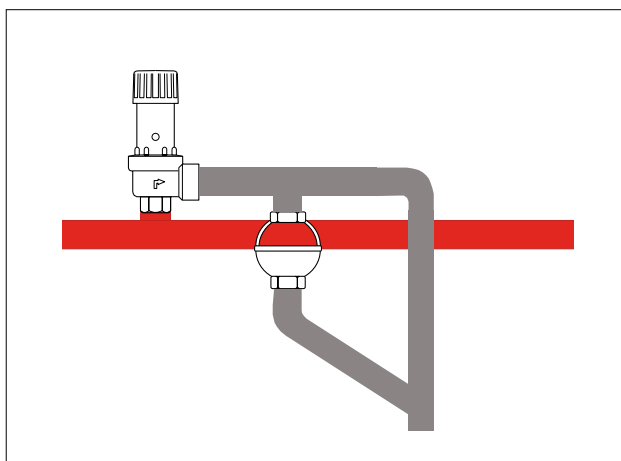
The tightness of the valve can be impaired by the presence of impurities. It is recommended to flush the pipes before installation.

The outlet of the valve must be visible and conveyed into a suitable siphon or receptacle (**IS series**) in such a way that it does not cause damage to people or property and allows the valve to be checked for openness. In order not to compromise the regular operation of the valve, it is advisable not to mount an elbow on the discharge pipe but a bend with a radius equal to at least 3 times the diameter of the pipe itself.

To ensure full efficiency, safety valves must be checked periodically. Over time, impurities may be deposited in the vicinity of the plug; therefore, periodic flushing of the seat is necessary (e.g. at the beginning of the season). Such flushing is achieved by manually draining the valve by turning the knob in the direction indicated by the arrows.



**Fig.1** Installazione diretta dell'imbuto sulla tubazione di scarico



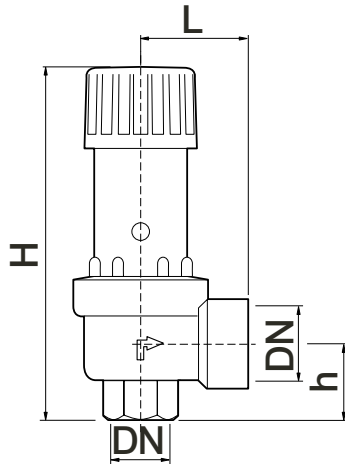
**Fig.2** Installazione tipica dell'imbuto in presenza di alta portata di scarico

## Maintenance

No further routine maintenance is required other than periodic washing of the seat (e.g. at the beginning of the season) to remove any impurities.

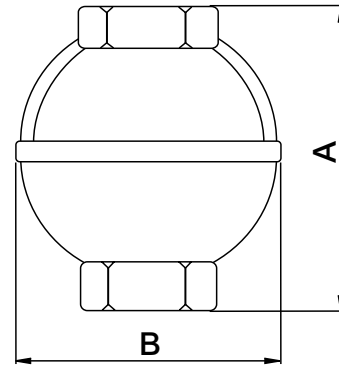
## Overall dimensions (mm)

### VST



DN	L	H	h
1/2" x 3/4"	37	119	24
3/4" x 1"	48	165	29
1" x 1.1/4"	54	190	34.5

### IS



DN	A	B
1/2"	61	45
3/4"	65	57
1"	78	68
1.1/4"	113	97

## Disclaimer

The products are intended for professional use.

The installation of the valves must be carried out by qualified technical personnel in accordance with the applicable technical standards and the contents of this manual. For direct or indirect damage caused by non-compliance with legal, technical and installation instructions or improper use, the manufacturer is not liable.

## Specification text

### VST Series

Diaphragm safety valve with fixed setting **VST Series** – WATTS brand. CW617N brass body and cap. PN10. Overpressure: 10% Blowdown <20% Temperature range: -10÷120°C. 1/2"-1" F/F connections with oversized outlet. Suitable for water with glycol: up to 50%. INAIL approved and calibrated. Compliant with PED 1014/68/EU with identification number CE0425.

### IS Series

Exposed brass drain funnel IS Series – WATTS brand – for safety and thermal drain valves. Diameters from 1/2" to 1 1/4" with FF connections.



**Watts Industries Italia S.r.l.**  
Via Brenno, 21 • 20853 Biassono (MB) • Italia  
Tel. +39 039 4986.1  
infowattsitalia@wattswater.com • www.watts.com