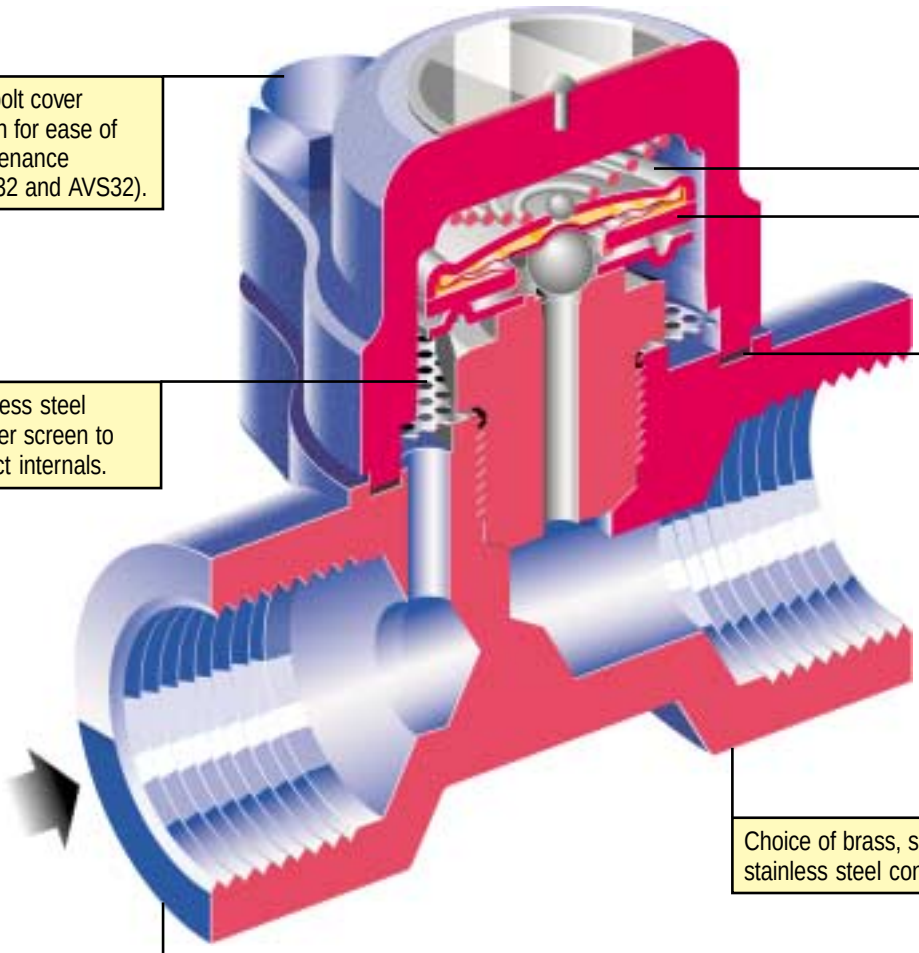
Thermostatic air vents

for steam systems up to 45 bar

spirax sarco

The thermostatic air vent

Spirax Sarco has been supplying steam control equipment for over 70 years. The combination of the best materials, high technology engineering and field research has made possible the development of the best known and most reliable automatic thermostatic air vents.



AVC32 shown

* AV45 has a corrosive resistant bimetal stainless steel thermostatic element.

Product range and options

Material		Brass	Carbon steel	Stainless steel	Alloy steel
Model		**AV13**	**AVC32**	**AVS32**	**AV45**
Body pressure rating		PN16	PN40	PN40	PN63
Sizes	DN10 - ⅜"	●			
	DN15 - ½"	●	●	●	●
	DN20 - ¾"	●	●	●	●
	DN25 - 1"		●	●	●
	DN40 - 1½"				●
Connections	Screwed	●	●	●	●
	Socket weld		●	●	●
	Flanged		●	●	●
	Butt weld		●	●	●
Strainer		●	●	●	●
Optional chrome plated finish		●			

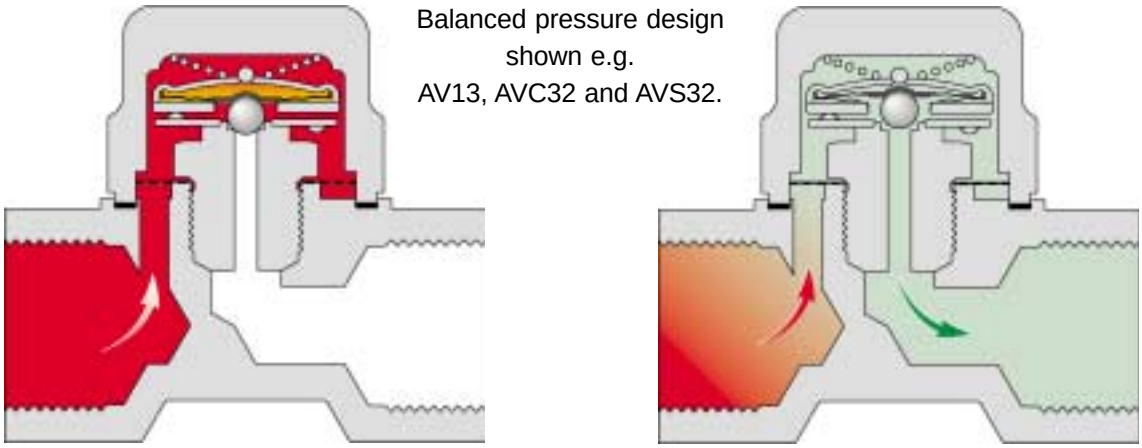
Why use thermostatic air vents?

Although properly attended manual air cocks can release air on start-up, it is not possible to tell when all the air has been let out. Manual operators may shut off the vent too soon, leaving air in the system; or too late, having blown steam to waste. Also, manual air cocks are useless when dealing with air and incondensable gases which are mixed in with the steam during operation.

Spirax Sarco automatic air vents open to air and gases but shut against steam. They discharge air at full bore on start-up and open during running whenever air collects, irrespective of the steam pressure.

How the air vent works

Spirax Sarco thermostatic air vents contain a liquid-filled stainless steel capsule. (The AV45 contains a bimetal element). The liquid boils at a temperature slightly below that of saturated steam, so when pure steam surrounds the capsule the resultant vapour pressure keeps the valve closed. When air is present in the steam the temperature at the capsule is lower than that of pure steam so the valve automatically opens to release the air. It will close again when the surrounding temperature corresponds to the steam pressure saturation temperature (the bimetal element responds to change in temperature in the same way). The AV45 bimetal design is offered for pressures exceeding 32 bar g up to approximately 45 bar g (depending upon connection) and is recommended for all superheated steam applications.



Balanced pressure design shown e.g. AV13, AVC32 and AVS32.

The effective way to remove air

The balanced pressure principle is now the most widely accepted where air vents are required, to ensure efficient operation of steam plant.

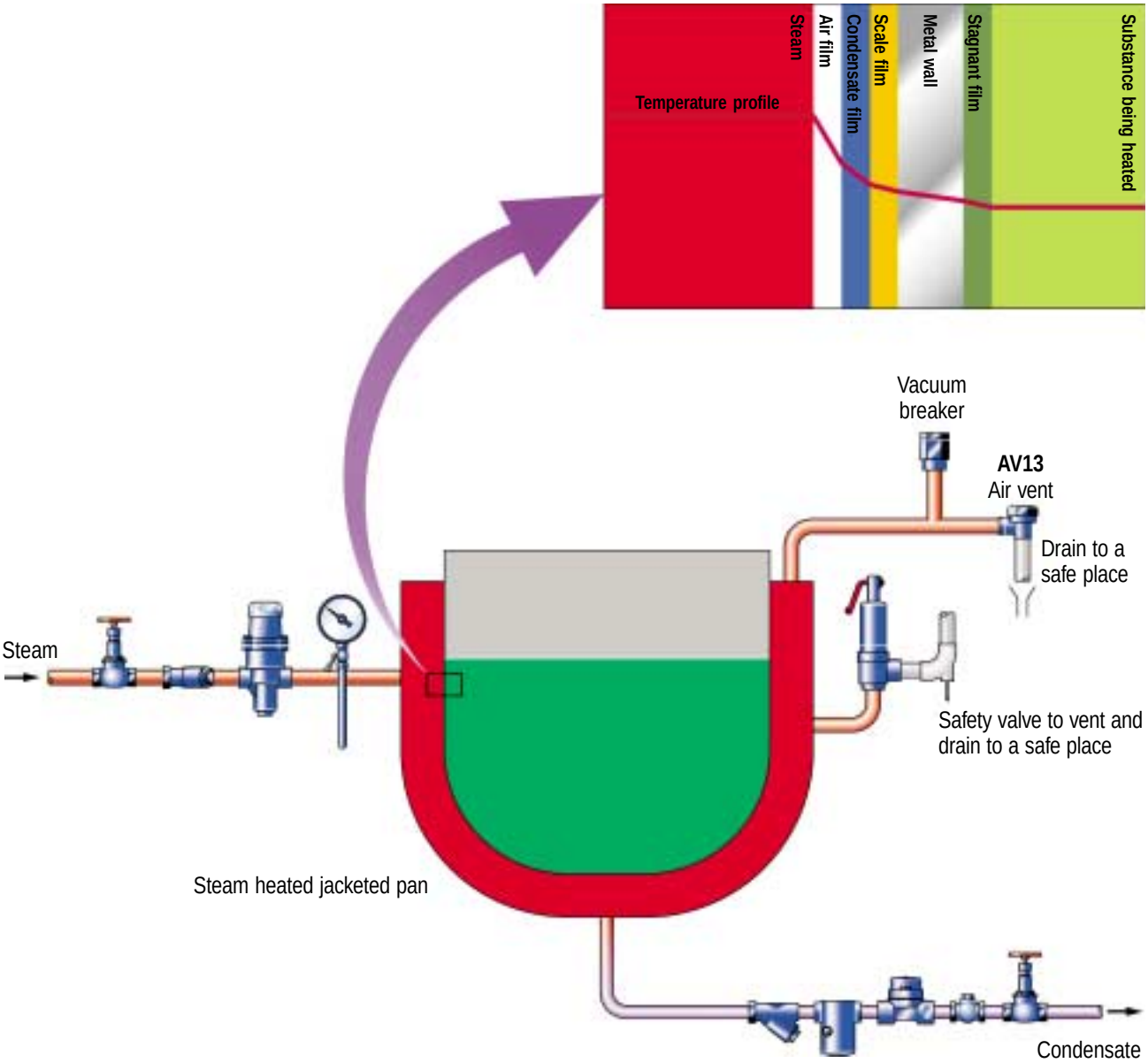
Because thermostatic air vents operate close to the steam saturation temperature they differentiate precisely between pure steam and air/steam mixtures.

The modular design of the internal components provides a quick and easy solution to air vent maintenance. With more than six million of the current stainless steel capsules installed and in use around the world the reliability of the balanced pressure air vent is well proven in a wide range of applications.

User benefits

- Improves heat transfer whilst saving energy and productivity.
- Maintains process performance where temperature is critical.
- Reduces corrosion and maintenance costs.
- Promotes even heating and improves product quality.
- Ease of maintenance with two bolt cover design.
- Fully complies with the requirements of the European Pressure Equipment Directive 97/23/EC.
- Spirax Sarco's guarantee of worldwide knowledge, service and technical support.

AIR - The enemy of good heat transfer



Why remove air from steam space?

The prime objective of steam plant is to transfer heat from the steam to the product being heated. The diagram above shows the three primary barriers to heat transfer - films of water, air and scale. The greatest barrier to heat transfer is air. Its presence on the heat transfer surface can cause cold spots and, at worst, prevent the required heat transfer taking place at all. At best the result is erratic and uneven heating.

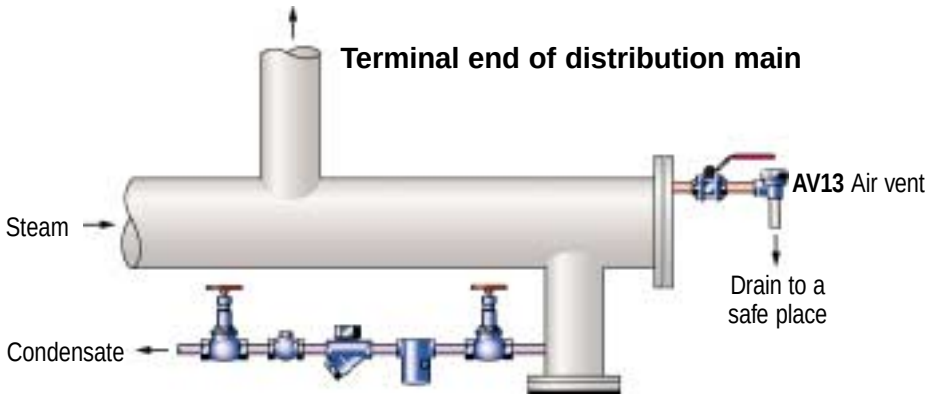
In fact air is more than 1 500 times more resistant to heat transfer than iron or steel and no less than 13 000 times more resistant than copper. This means that a 0.5 mm film of air will offer the same resistance to heat transfer as a 6.5 m copper wall!

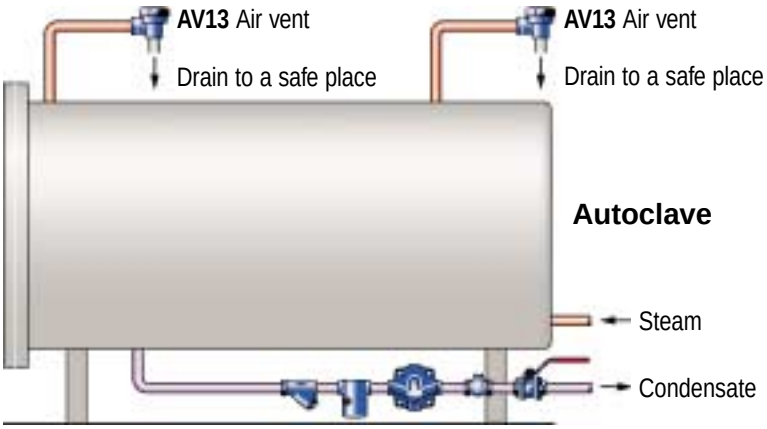
The air also reduces the temperature of the steam space, for example 20% air mixed with 80% steam can give a reduction in temperature of up to 10°C. Air also 'locks' steam traps and together with other non-condensable gases stimulates corrosion which in turn can create maintenance problems.

Rapid and complete removal of air from the steam system is essential to manufacturing efficiency.

Typical applications

The applications shown are diagramatic examples of only a small range of applications where air vents for steam are necessary.

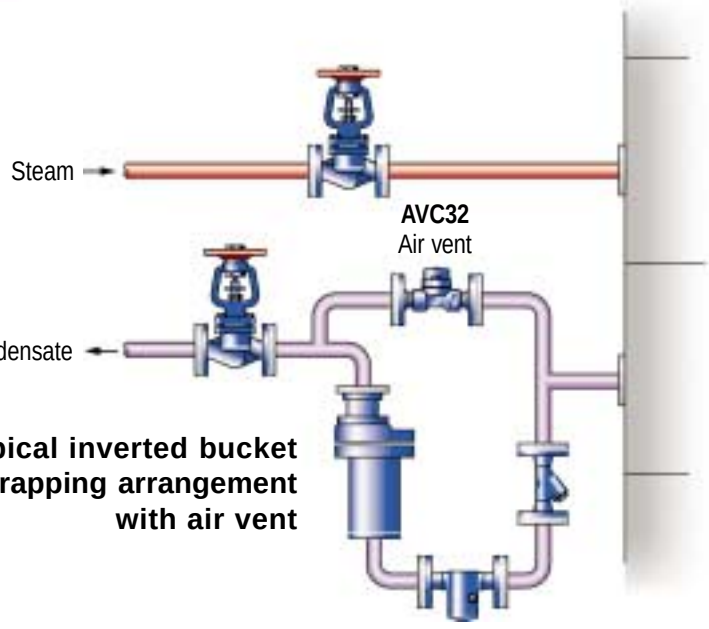


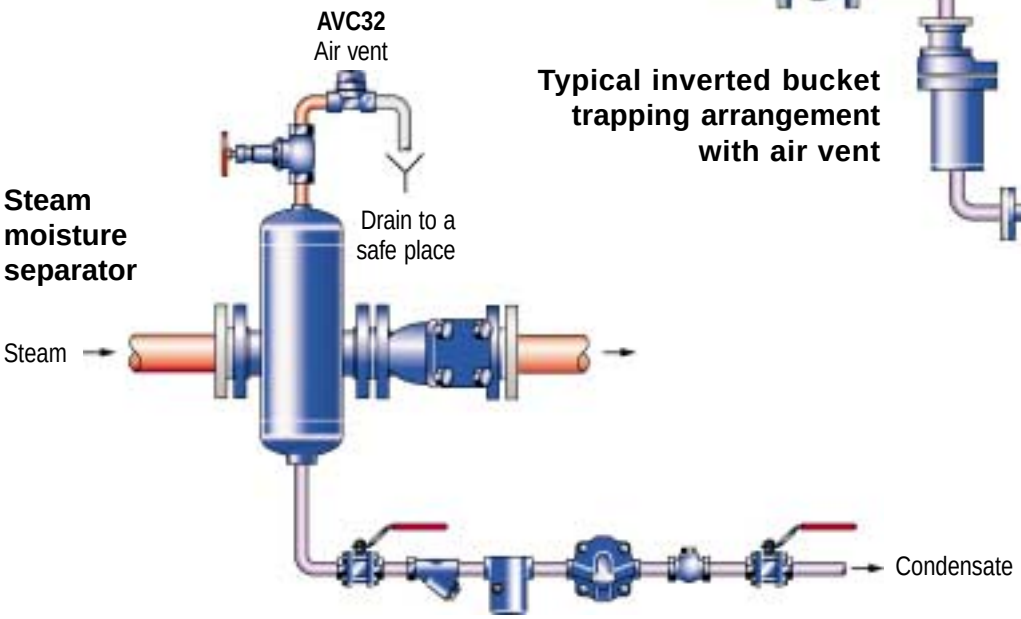


Installation

Air vents should be located at a point furthest away from the steam inlet because this is where air tends to collect. They should be fitted where possible at all high points in the system and to all 'critical' plant.

If you are in any doubt ask your local Spirax Sarco engineer.





AV13

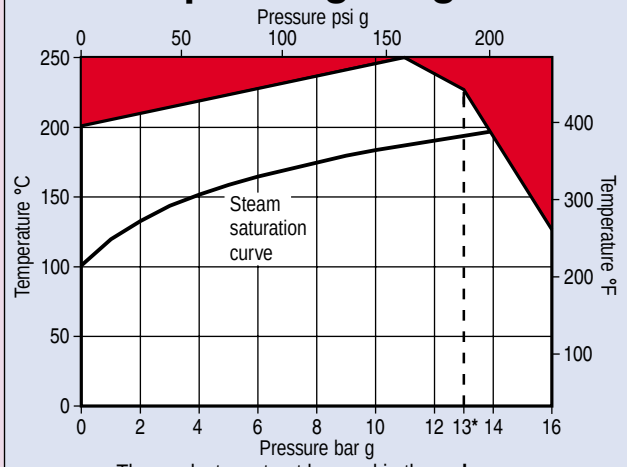
Sizes and pipe connections

3/8", ½" and ¾" screwed BSP or NPT.

Materials

Body	Brass	BS EN 12165 CW 617N
Cap	Brass	BS EN 12165 CW 617N
'O' ring	Synthetic rubber high fluorine fluorocarbon	
Internals	Stainless steel	

Operating range



The product must not be used in the **red** area.
***PMO** - Maximum operating pressure recommended for saturated steam service.

Limiting conditions (ISO 6552)

Body design conditions PN16
PMA - Maximum allowable pressure 16 bar g
TMA - Maximum allowable temperature 250°C
Designed for a maximum cold hydraulic test pressure of:
24 bar g

AVC32

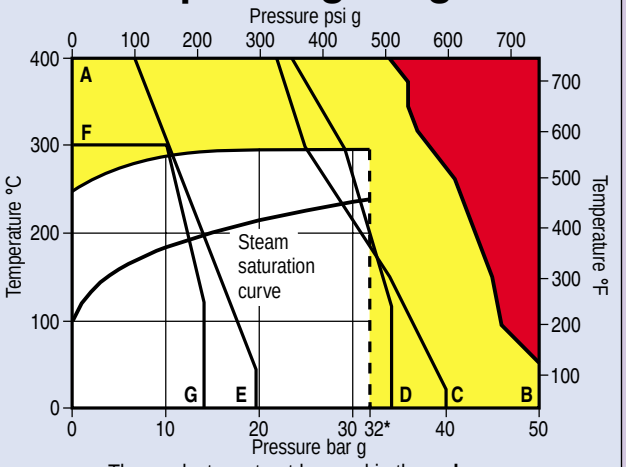
Sizes and pipe connections

½", ¾" and 1" screwed BSP or NPT,
socket weld ends to BS 3799 Class 3000,
butt weld ends to EN 12627.
DN15, 20 and 25 standard flange to EN 1092-1 PN40,
ANSI B 16.5 Class 150 and 300, JIS/KS 10K and JIS/KS 20K.

Materials

Body	Carbon steel	DIN 17243 C 22.8 (W/S 1.0460)/ ASTM A105N
Cover	Carbon steel	DIN 17243 C 22.8 (W/S 1.0460)/ ASTM A105N
Cover gasket	Stainless steel reinforced exfoliated graphite	
Internals	Stainless steel	
Cover bolts	Stainless steel (M10 x 30)	A2-70

Operating range



The product must not be used in the **red** area.
The product should not be used in the **yellow** area as damage to the internals may occur.
***PMO** - Maximum operating pressure recommended for saturated steam service.
A - B Screwed, socket weld, butt weld and flanged ANSI 300
A - C Flanged EN 1092-1 PN40 **A - D** Flanged JIS / KS 20K
A - E Flanged ANSI 150 **F - G** Flanged JIS / KS 10K

Limiting conditions (ISO 6552)

Body design conditions PN40
PMA - Maximum allowable pressure 50 bar g
TMA - Maximum allowable temperature 400°C
Designed for a maximum cold hydraulic test pressure of:
75 bar g

Capacity graphs for air vents are difficult to publish because of the complex way they have to be derived. Capacities vary not only with pressure

AVS32

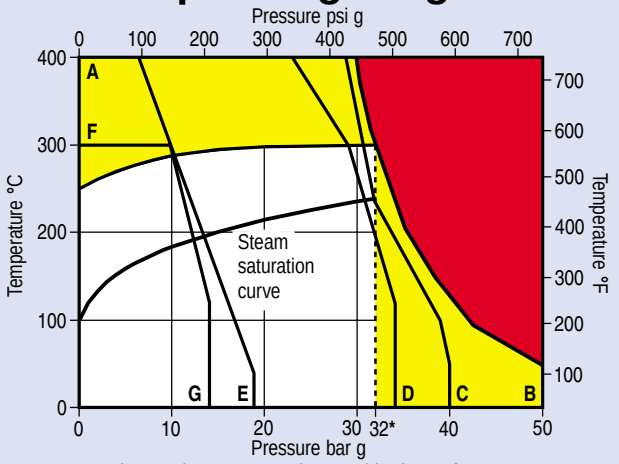
Sizes and pipe connections

½", ¾" and 1" screwed BSP or NPT,
socket weld ends to BS 3799 Class 3000,
butt weld ends to EN 12627.
DN15, 20 and 25 standard flange to EN 1092-1 PN40,
ANSI B 16.5 Class 150 and 300, JIS/KS 10K and JIS/KS 20K.

Materials

Body	Austenitic stainless steel	DIN 17440 (W/S 1.4571) 316Ti
Cover	Austenitic stainless steel	DIN 17440 (W/S 1.4571) 316Ti
Cover gasket	Stainless steel reinforced exfoliated graphite	
Internals	Stainless steel	
Cover bolts	Stainless steel (M10 x 30)	A2-70

Operating range



The product must not be used in the **red** area.
The product should not be used in the **yellow** area as damage to the internals may occur.
***PMO** - Maximum operating pressure recommended for saturated steam service.
A - B Screwed, socket weld, butt weld and flanged ANSI 300
A - C Flanged EN 1092-1 PN40 **A - D** Flanged JIS / KS 20K
A - E Flanged ANSI 150 **F - G** Flanged JIS / KS 10K

Limiting conditions (ISO 6552)

Body design conditions PN40
PMA - Maximum allowable pressure 50 bar g
TMA - Maximum allowable temperature 400°C
Designed for a maximum cold hydraulic test pressure of:
75 bar g

AV45

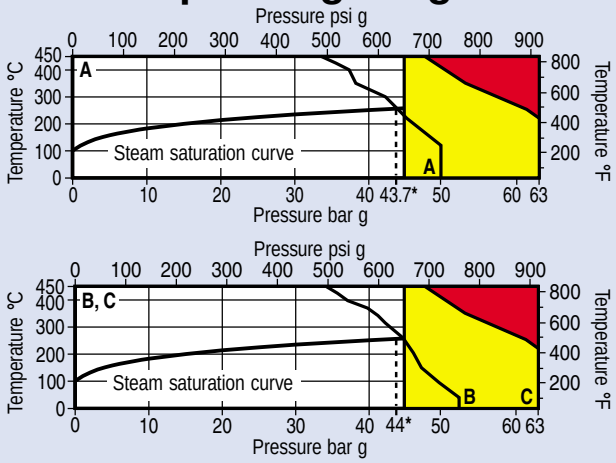
Sizes and pipe connections

½", ¾" and 1" screwed BSP or NPT,
½", ¾", 1" and 1½" socket weld ends to BS 3799 Class 3000,
butt weld ends to suit schedule 80 pipe.
DN15, 20, 25 and 40 standard flange to DIN 2546 PN64,
ANSI B 16.5 Class 300 and 600, JIS/KS 30K.

Materials

Body	Alloy steel	DIN 17245 GS 22 Mo4
Cover	Alloy steel	DIN 17243 13Cr Mo44 (W/S1.7335)
Cover gasket	Spirally wound stainless steel graphite filled gasket	
Internals	Stainless steel	
Cover studs	Alloy steel	ASTM A193 Gr. B7
Cover nuts	Carbon steel	BS 4882 Gr. 2H

Operating range



The product must not be used in the **red** area.
The product should not be used in the **yellow** area as damage to the internals may occur.
***PMO** - Maximum operating pressure recommended for saturated steam.
A - A Screwed, socket weld, butt weld and flanged JIS/KS 30K
B - B Flanged ANSI 300
C - C Flanged ANSI 600 and PN64

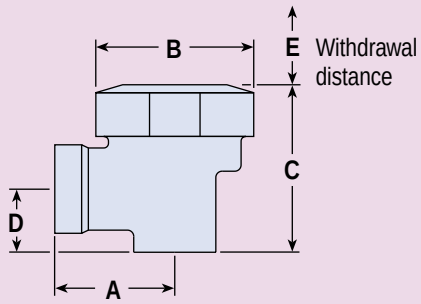
Limiting conditions (ISO 6552)

Body design conditions PN63
PMA - Maximum allowable pressure 63 bar g
TMA - Maximum allowable temperature 450°C
Designed for a maximum cold hydraulic test pressure of:
109 bar g

differential but with the temperature and composition of the air/steam mixture. If capacity is critical then Spirax Sarco should be consulted.

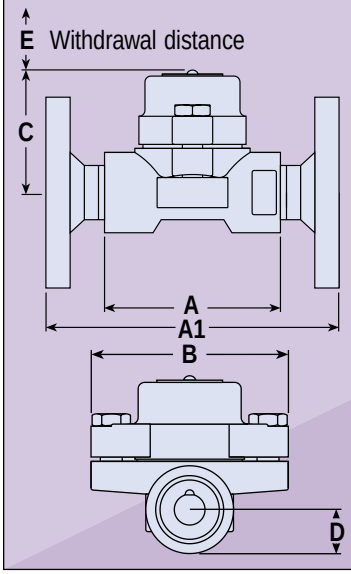
Dimensions/weights (approximate) in mm and kg

AV13



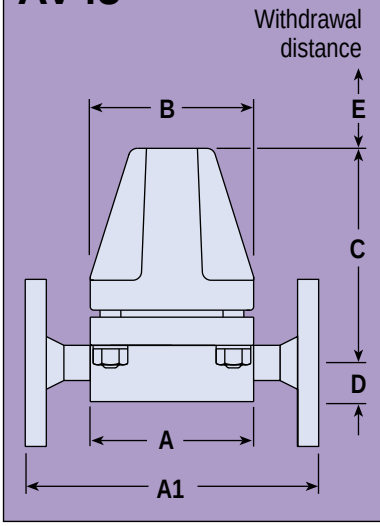
Product	Size	A	A1	B	C	D	E	Weight
AV13 Screwed	⅜"	32	-	50	49	18	55	0.40
	½"	38	-	50	53	20	55	0.40
	¾"	40	-	50	62	27	55	0.45

AVC32 and AVS32



Product	Size	A	A1	B	C	D	E	Weight Screwed SW/BW	Weight Flanged
AVC32 AVS32	DN15 ½"	95	150	94	64	17	37	1.40	2.90
	DN20 ¾"	95	150	94	64	19	37	1.40	3.50
	DN25 1"	95	160	94	64	23	37	1.50	4.10

AV45



Product	Size	A	A1	B	C	D	E	Weight Screwed SW/BW	Weight Flanged
AV45	DN15 ½"	130	210	102	138	24	108	5.40	7.20
	DN20 ¾"	130	230	102	138	24	108	5.40	8.60
	DN25 1"	130	230	102	138	24	108	5.40	9.50
	DN40 1½"	149	260	102	146	30	114	6.00	13.60

How to order

Example: 1 off Spirax Sarco DN15 AVC32 air vent having flanged EN 1092-1 PN40 connections.

Some of the products may not be available in certain markets.

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