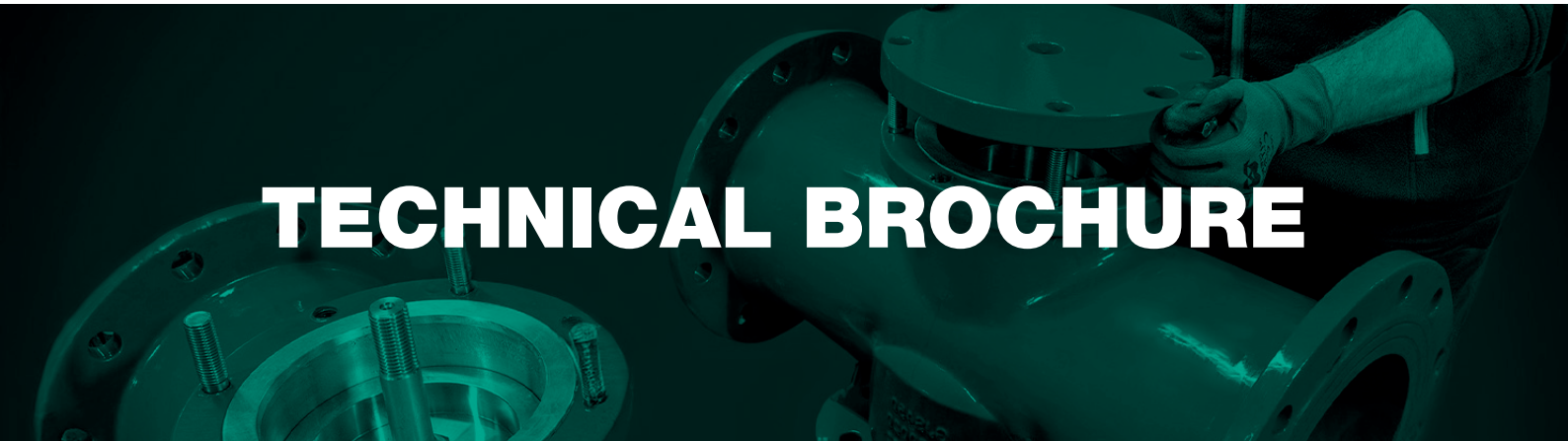
Pietro Fiorentini

SWV TH

Sewer air valve



TECHNICAL BROCHURE

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SWV TH_technicalbrochure_ENG_revB

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Three functions automatic air valve for sewerage **SWV TH 3S**

The air vents of the SWV TH series are devices that ensure that the water network functions properly by managing the air volumes inside the pipelines and allowing the pressurised air to be degassed. The SWV TH 3S model allows the entrance and discharge of large volumes of air when draining and filling pipelines, and the degassing of air pockets during operation.

Constructive features and advantages

- Lower body with steeply inclined walls to prevent the accumulation of residues or impurities that could generate malfunctions, and four cast ribs to guide the float.
- Upper body housing the degassing system and the plug. A stainless steel deflector protects them from possible splashes, drops or impurities during the rapid filling phase.
- Mobile block made entirely of AISI 316 stainless steel, consisting of a large float housed inside the lower body and a connecting rod to the air valve mechanism.
- Drain valve for control and maintenance operations.
- Cap with 1" threaded connection for conveyance, ideal for environments at risk of flooding and for controlled evacuation of gaseous emissions during operation.
- Easy maintenance from above, without removing the air valve from the pipeline.
- Compact and lightweight, the SWV TH 3S air valve utilises innovative technology that makes it suitable for a wide range of applications.

Main applications

- Sewer pipelines
- Purification plants
- Irrigation systems, in the presence of suspended solids or debris
- Cases where the air valves for treated water cannot be installed due to the risk of jamming

Operating principle

Discharge of large volumes of air

During the pipe filling, it is necessary to let out as much air as liquid enters. The SWV TH 3S air valve prevents premature closure of the mobile block during this phase.

Pressurised air degassing

During operation, the air inside the pipeline accumulates at the top of the air valve, compresses, and arrives at the same pressure as the liquid. As the volume increases, it pushes the float downwards, allowing the degassing nozzle to open.

Entrance of large volumes of air

During the pipe draining or in the event of pipe burst, it is necessary to draw in as much air as there is liquid coming out to avoid depressions and serious damage to the network.

Optional functions

Dual-function SWV TH 2S version, also called vacuum breaker. Suitable for locations where no air release is needed. It is used at upward slope changes and long ascending sections of the profile.

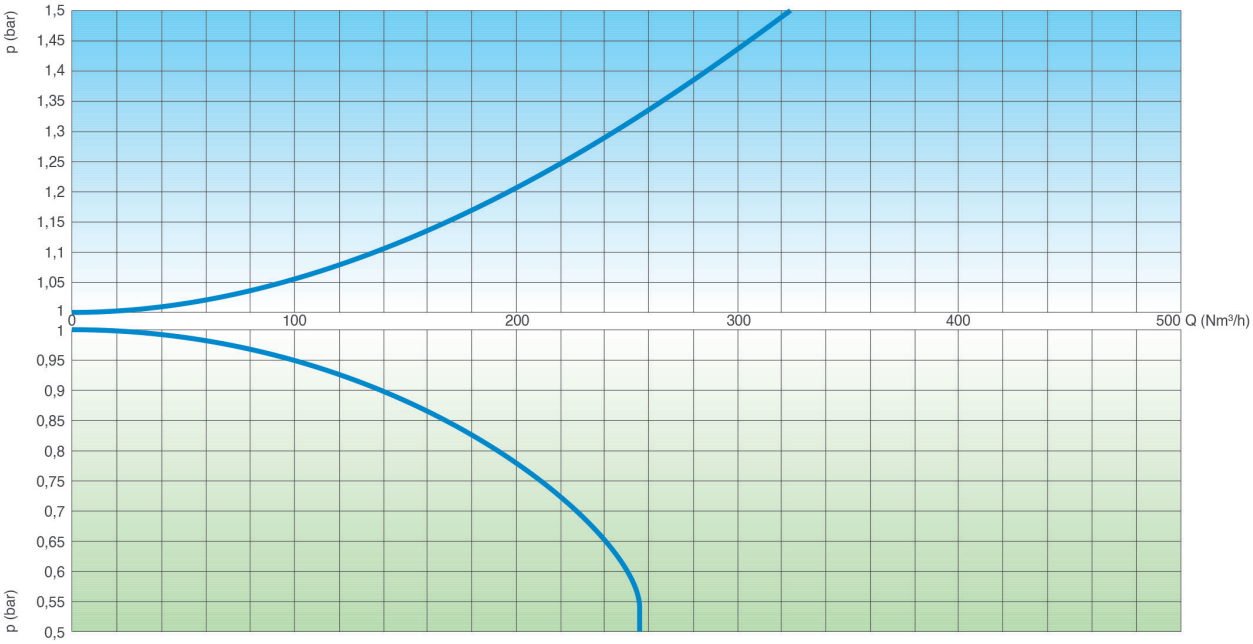
EO SERIES discharge only version, available for SWV TH 2S and SWV TH 3SS models. This variant is designed to allow the air valve to be installed at critical points of the layout where HGL may drop below the pipe profile, and at any other junction where, for design reasons, air entrance must be absolutely avoided.

IO entrance only version, only available for the SWV TH 2S dual function model. This variant allows for the installation of the air valve at critical points of the layout where, for design reasons, air discharge must be avoided. It should be noted that, when using the IO version, the air valve does not provide any protection against overpressure caused by filling the pipeline.

Technical data

Air flow characteristic charts

AIR OUTFLOW RATE DURING PIPELINE FILLING



AIR INFLOW RATE FOR DUCT DRAINING

The air flow rate charts were obtained in Kg/s, from laboratory tests and numerical analysis, and converted to Nm/h by applying a safety factor.

Operating conditions

Maximum treated water	60°C (Version for higher temperatures on request)
Maximum pressure	16 bar
Minimum pressure	0.2 bar (lower on request)

Standard

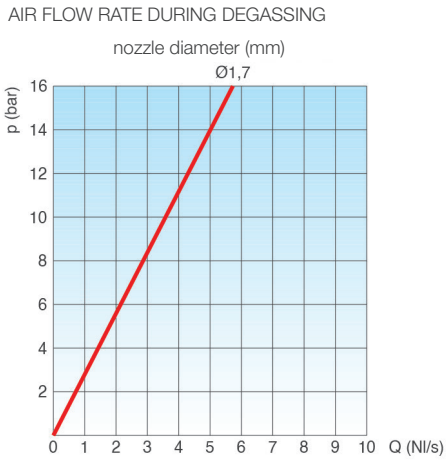
- Certification and testing according to EN 1074/4
- Provided with 2" threaded connection; supplied on request with EN 1092-2 or ANSI drilled flanges
- RAL 5005 blue epoxy paint applied on fluid bed

Modifications to painting and flanging standards on request.

Choice of nozzle

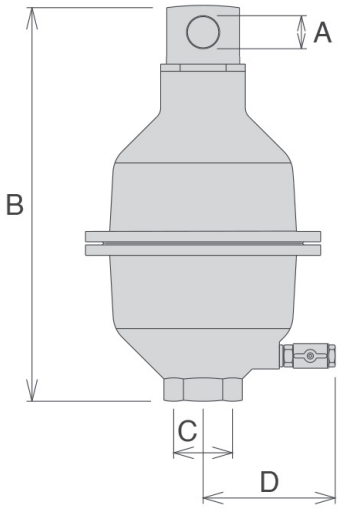
Nozzle diameter in mm depending on air valve size and PN.

PN 10	PN 16
1.7	1.7

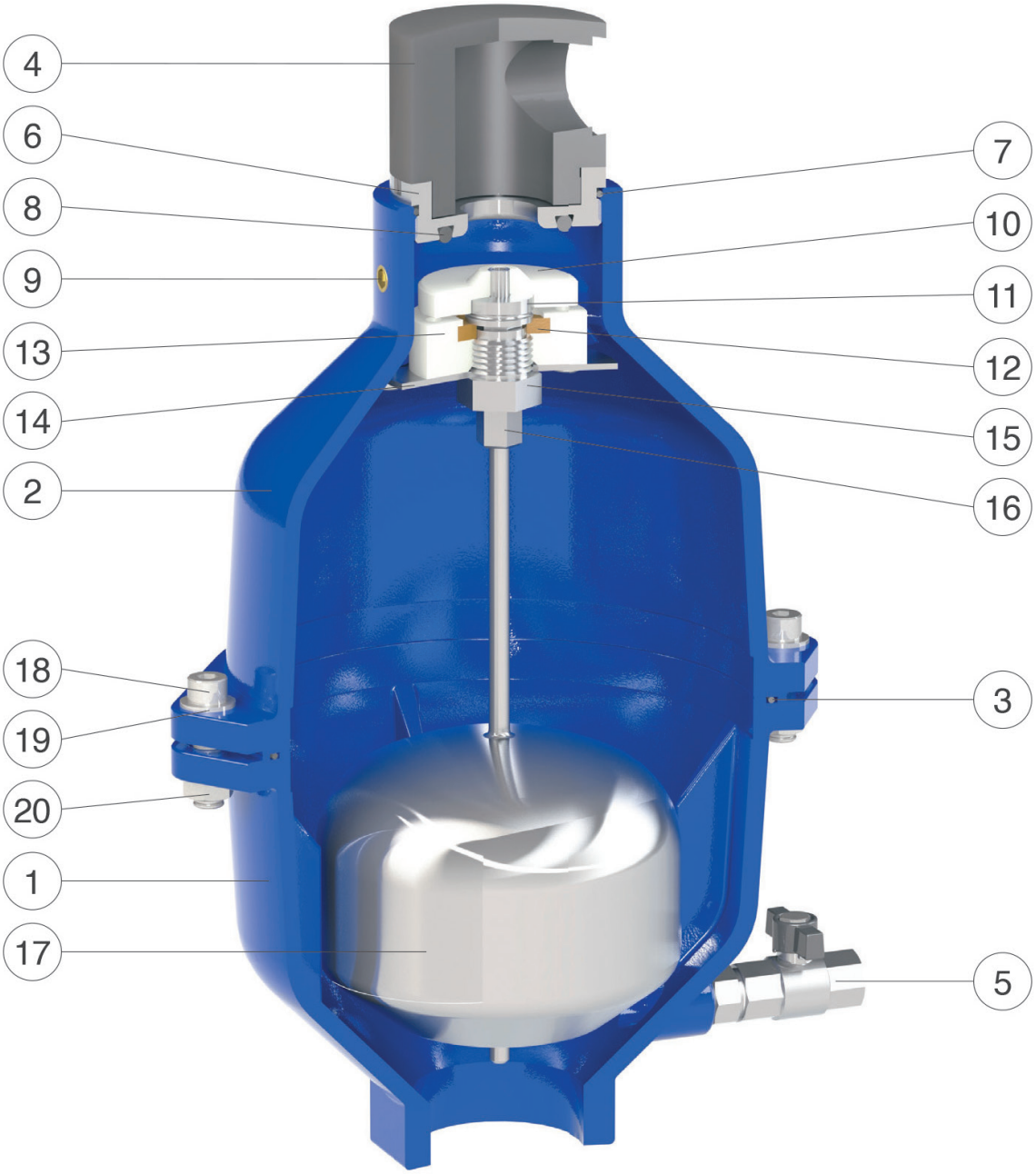


Dimensions and weights

C inches	A inches	B inches	D mm	Main orifice mm²	Nozzle orifice mm²	Weight Kg
2”	1”	380	137	490	2.3	10.5



Construction details



No.	Component	Standard material	Optional
1	Lower body	ductile cast iron GJS 450-10	
2	Upper body	ductile cast iron GJS 450-10	
3	Body O-ring	NBR	EPDM/Viton/silicone
4	Cap	PVC	
5	Ball valve 3/8" with nipple	AISI 316 stainless steel	
6	Seal seat	AISI 316 stainless steel	
7	Seal seat O-ring	NBR	EPDM/Viton/silicone
8	Seal seat gasket	NBR	EPDM/Viton/silicone
9	Conical screw	brass	AISI 316 stainless steel
10	Plug plate	polypropylene	
11	Nozzle unit	AISI 316 stainless steel	
12	Protective rubber	NBR	
13	Protective bushing	polypropylene	
14	Deflector	AISI 316 stainless steel	
15	Guide nut	AISI 316 stainless steel	
16	Gasket holder	AISI 316 stainless steel	
17	Float	AISI 316 stainless steel	
18	Screws	AISI 304 stainless steel	AISI 316 stainless steel
19	Washers	AISI 304 stainless steel	AISI 316 stainless steel
20	Nuts	AISI 304 stainless steel	AISI 316 stainless steel

The table of materials and components is subject to change without notice.

Combined automatic anti-water hammer air valve for sewerage **SWV TH 3S-AWH**

The air valves of the SWV TH series are devices that ensure that the water network functions properly by managing the air volumes inside the pipelines and allowing the pressurised air to be degassed.

The SWV TH 3S-AWH model, in addition to degassing, ensures the entrance of large volumes of air when draining the pipelines, and the discharge of air at a controlled speed during the filling phase to avoid the risk of water hammer.

Constructive features and advantages

- Lower body with steeply inclined walls to prevent the accumulation of residues or impurities that could generate malfunctions, and four cast ribs to guide the float.
- Upper body housing the anti-water hammer system and nozzle assembly. A stainless steel deflector protects the latter from possible splashes, drops or impurities during the rapid filling phase.
- Mobile block made entirely of AISI 316 stainless steel, consisting of a large float housed inside the lower body and a connecting rod to the air valve mechanism.
- Anti-shock system (AWH) consisting of a stainless steel spring and guide shaft, and a plate with sizable holes to control the air discharge.
- Drain valve for control and maintenance operations.
- Cap with 1" threaded connection for conveyance, ideal for environments at risk of flooding and for controlled evacuation of gaseous emissions during operation.
- Easy maintenance from above, without removing the air valve from the pipeline.

Main applications

- Lifting stations and points in sewer systems exposed to water hammer, or separation of the water column, in the event of pump shutdown
- Sewage treatment plants subject to rapid flow rate variations
- Cases where, although water hammer protection is required, the air valves for treated water cannot be installed due to the risk of jamming

Operating principle

Controlled air discharge

During air discharge, the anti-shock system (AWH) reduces the speed of the incoming water column by decreasing the outflow. This avoids rapid air valve closures and the risk of water hammer.

Pressurised air degassing

During operation, the air inside the pipeline accumulates at the top of the air valve and reaches the same pressure as the liquid. As the volume increases, it pushes the float downwards, allowing the degassing nozzle to open.

Entrance of large volumes of air

During the pipe draining or in the event of pipe burst, is necessary to draw in as much air as there is liquid coming out to avoid depressions and serious damage to the network.

Optional functions

Dual-function version, also called vacuum breaker. Suitable for locations where, although protection against water hammer is required, no air pockets are required to be expelled during operation. In particular, it is installed at pumps, upward slope changes and long upward sections of the profile subject to varied motion phenomena.

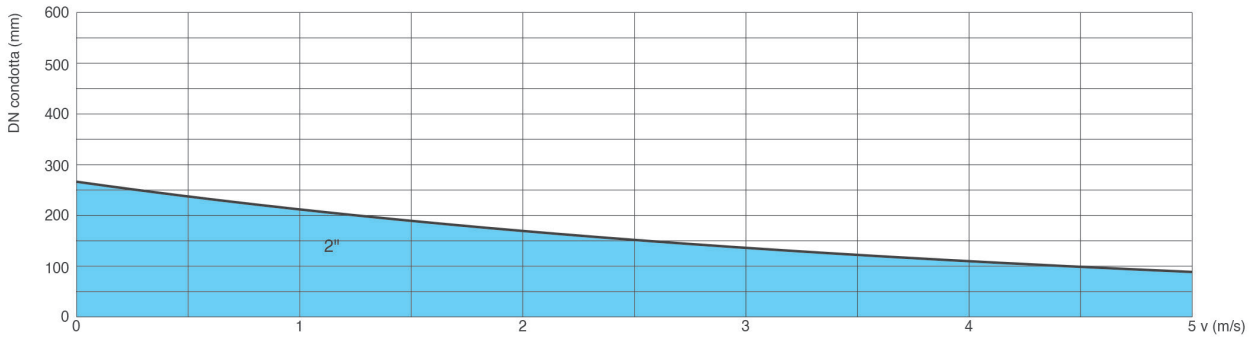
IO entrance only version, only available for the dual-function model. This variant is designed for installation critical points of the layout where, for design reasons, air discharge must be avoided. It should be noted that, when using the IO version, the air valve does not provide any protection against overpressure caused by filling the pipeline.

The force of the **counter spring** as well as the **sonic nozzles**, both responsible of the proper operation of the AWH, can be modified according to the to the project conditions and the results of the transient analysis.

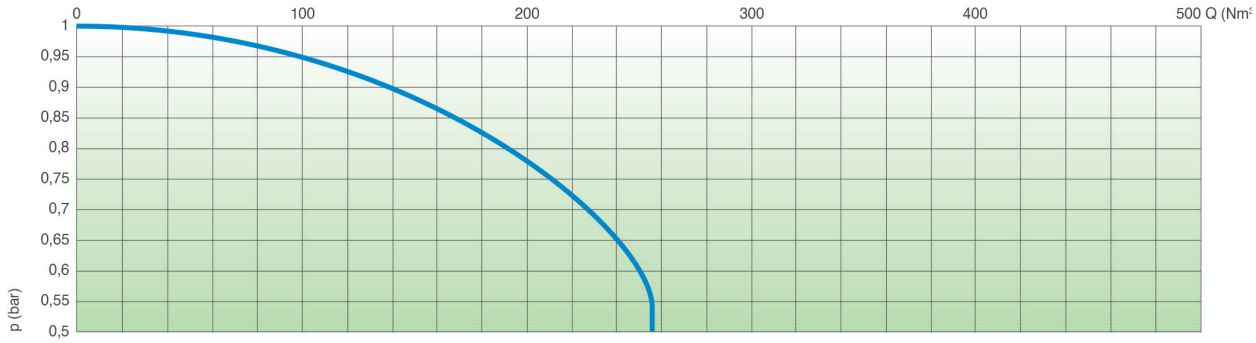
Technical data

Air valve selection chart

Preliminary dimensioning of the air valve according to pipeline diameter and required air discharge speed



Air flow characteristic charts



AIR INFLOW RATE FOR DUCT DRAINING

The air flow rate charts were obtained in Kg/s, from laboratory tests and numerical analysis, and converted to Nm/h by applying a safety factor.

Operating conditions

Maximum treated water	60°C
Maximum pressure	16 bar
Minimum pressure	0.2 bar (lower on request)

Standard

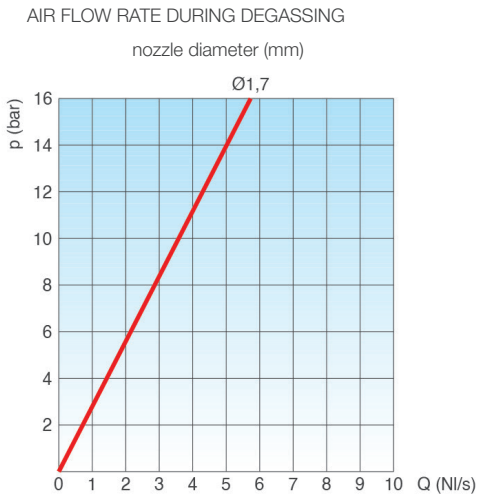
- Certification and testing according to EN 1074/4
- Provided with 2" threaded connection; supplied on request with EN 1092-2 or ANSI drilled flanges
- RAL 5005 blue epoxy paint applied on fluid bed

Modifications to painting and flanging standards on request.

Choice of nozzle

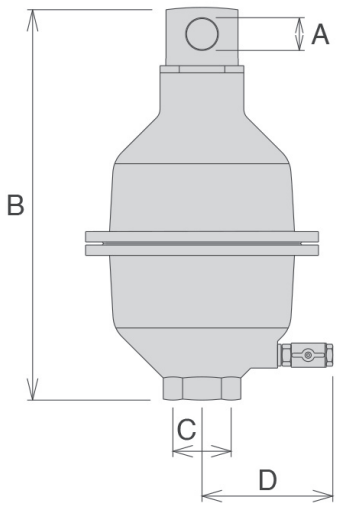
Nozzle diameter in mm depending on air valve size and PN.

PN 10	PN 16
1.7	1.7

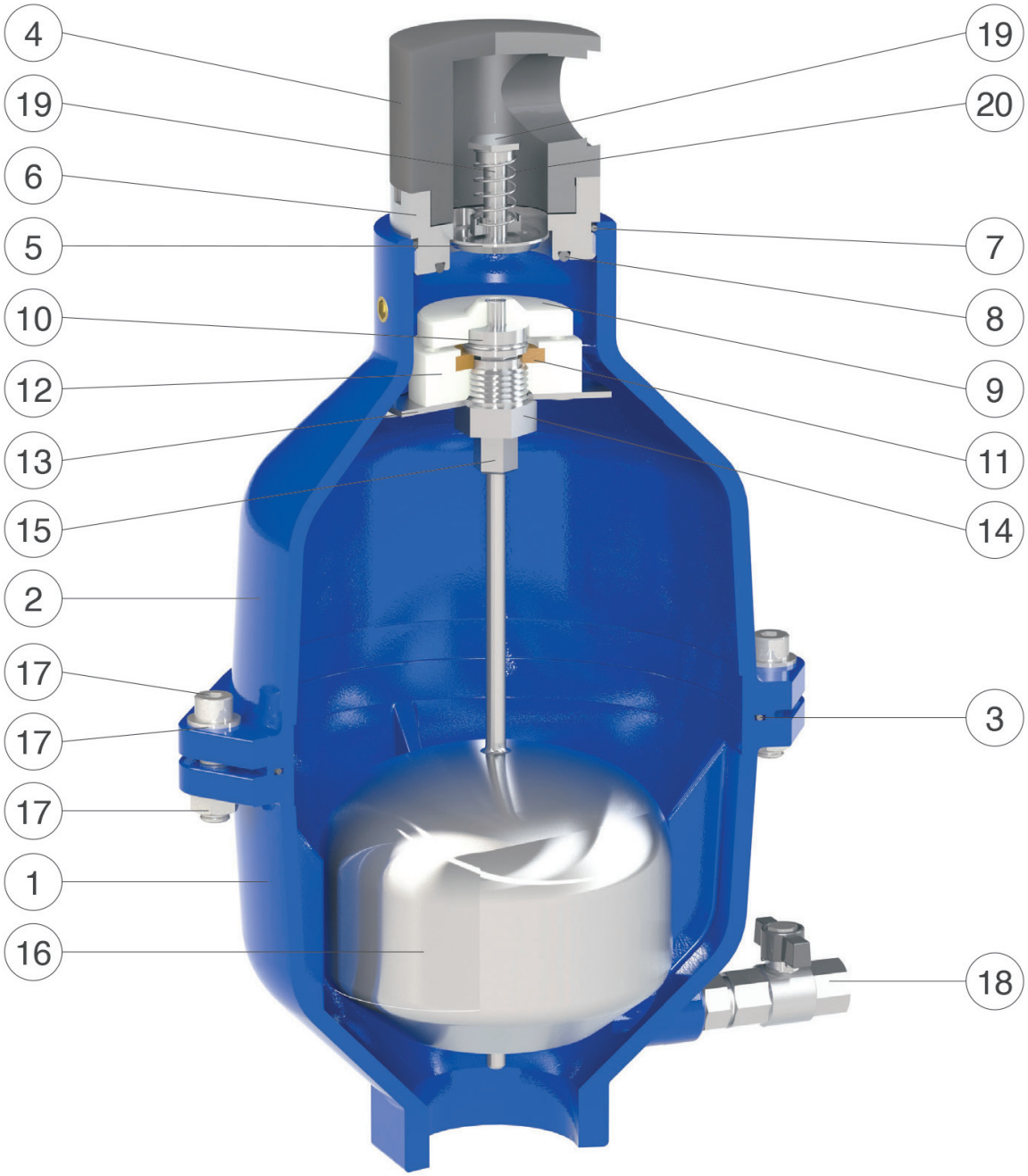


Dimensions and weights

C inches	A inches	B inches	D mm	Main orifice mm²	Nozzle orifice mm²	Weight Kg
2”	1”	389	137	490	2.3	10.8



Construction details



No.	Component	Standard material	Optional
1	Lower body	ductile cast iron GJS 450-10	
2	Upper body	ductile cast iron GJS 450-10	
3	Body O-ring	NBR	EPDM/Viton/silicone
4	Cap	PVC	
5	AWH plate	AISI 316 stainless steel	
6	Seal seat	AISI 316 stainless steel	
7	Seal seat O-ring	NBR	EPDM/Viton/silicone
8	Seal seat gasket	NBR	EPDM/Viton/silicone
9	Plug plate	polypropylene	
10	Nozzle unit	AISI 316 stainless steel	
11	Protective rubber	NBR	
12	Protective bushing	polypropylene	
13	Deflector	AISI 316 stainless steel	
14	Guide nut	AISI 316 stainless steel	
15	Gasket holder	AISI 316 stainless steel	
16	Float	AISI 316 stainless steel	
17	Screws, washers and nuts	AISI 304 stainless steel	AISI 316 stainless steel
18	Ball valve 3/8" with nipple	AISI 316 stainless steel	
19	Guide shaft	AISI 316 stainless steel	
20	Spring	AISI 302 stainless steel	AISI 316 stainless steel

The table of materials and components is subject to change without notice.

Combined automatic anti-water hammer air valve for sewerage **SWV TH 3S-CSF**

The air valves of the SWV TH series are devices that ensure that the water network functions properly by managing the air volumes inside the pipelines and allowing the pressurised air to be degassed.

The SWV TH 3S-CSF model, in addition to degassing, ensures the entrance of large volumes of air when the pipelines are drained, and keeps the air discharge speed within a set safety limit to avoid the risk of water hammer.

Constructive features and advantages

- Lower body with steeply inclined walls to prevent the accumulation of residues or impurities that could generate malfunctions, and four cast ribs to guide the float.
- Upper body housing the anti-water hammer system and nozzle assembly. A stainless steel deflector protects them from possible splashes, drops or impurities during the rapid filling phase.
- Mobile block made entirely of AISI 316 stainless steel, consisting of a large float housed inside the lower body and a connecting rod to the air valve mechanism.
- Plug plate and anti-shock top plate, both made of solid polypropylene. The second, in the event of excessive discharge speed, rises, reducing the outflow.
- Drain valve for control and maintenance operations.
- Cap with 1" threaded connection for conveyance, ideal for environments at risk of flooding and for controlled evacuation of gaseous emissions during operation.
- Easy maintenance from above, without removing the air valve from the pipeline.

Main applications

- Sewer pipelines
- Purification plants
- Irrigation systems, in the presence of suspended solids or debris
- Cases where, although water hammer protection is required, the air valves for treated water cannot be installed due to the risk of jamming

Operating principle

Discharge of large volumes of air

During the pipe filling, it is necessary to let out as much air as liquid enters. Thanks to the aerodynamic shape of the body and the deflector, the SWV TH 3S-CSF air valve prevents the mobile block from closing prematurely during this phase.

Controlled air discharge

During the filling of the pipeline, if the air pressure rises above a certain value, with the risk of water hammer and damage to the system, the CSF upper plate automatically rises, reducing the outflow and consequently the speed of the approaching water column.

Pressurised air degassing

During operation, the air inside the pipeline accumulates at the top of the air valve, compresses, and reaches the same pressure as the liquid. By increasing its volume, it pushes the float down and thus allows degassing through the nozzle.

Entrance of large volumes of air

During the pipe draining or in the event of pipe burst, it is necessary to draw in as much air as there is liquid coming out to avoid depressions and serious damage to the network.

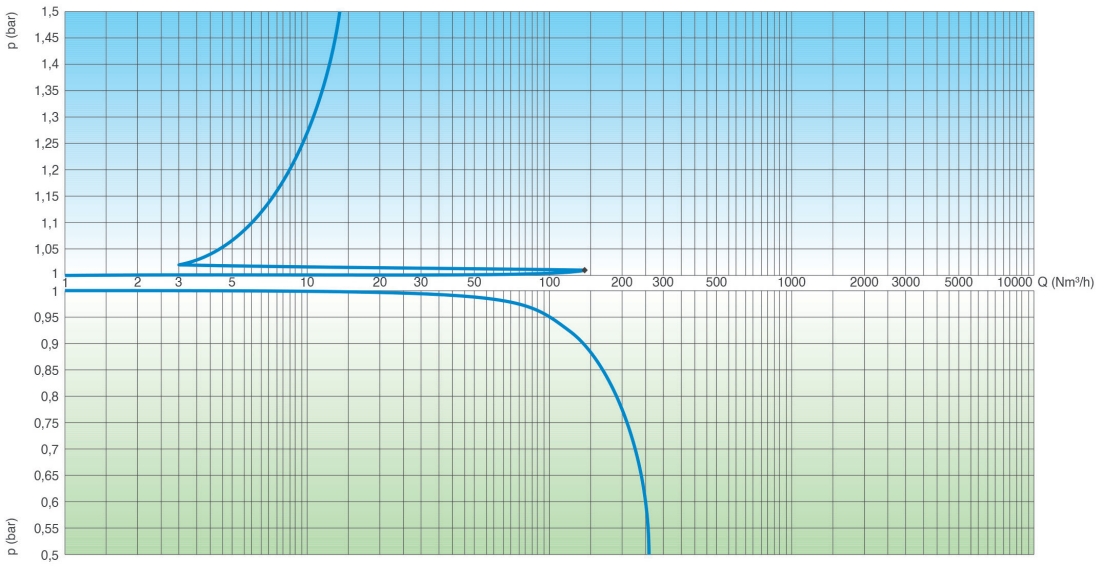
Optional functions

Dual-function version, also called vacuum breaker. Suitable for locations where no air release is needed. Thanks to CSF technology, it allows large volumes of air to enter and controlled air to be discharged. It is used at upward slope changes and long ascending sections of the profile.

Technical data

Air flow characteristic charts

AIR INFLOW RATE FOR PIPELINE FILLING



AIR INFLOW RATE FOR DUCT DRAINING

The air flow rate charts were obtained in Kg/s, from laboratory tests and numerical analysis, and converted to Nm/h by applying a safety factor.

Operating conditions

Maximum treated water	60°C
Maximum pressure	16 bar
Minimum pressure	0.2 bar (lower on request)

Standard

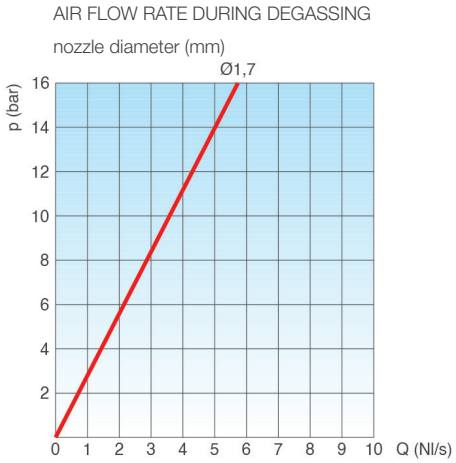
- Certification and testing according to EN 1074/4
- Provided with 2" threaded connection; supplied on request with EN 1092-2 or ANSI drilled flanges
- RAL 5005 blue epoxy paint applied on fluid bed

Modifications to painting and flanging standards on request.

Choice of nozzle

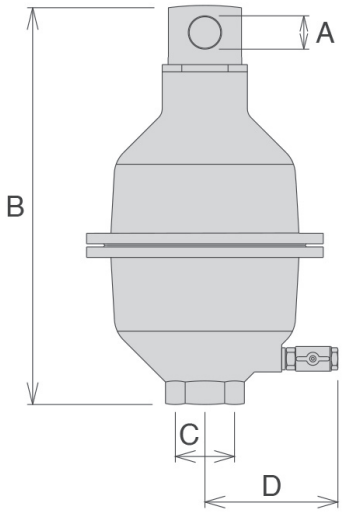
Nozzle diameter in mm depending on air valve size and PN.

PN 10	PN 16
1.7	1.7

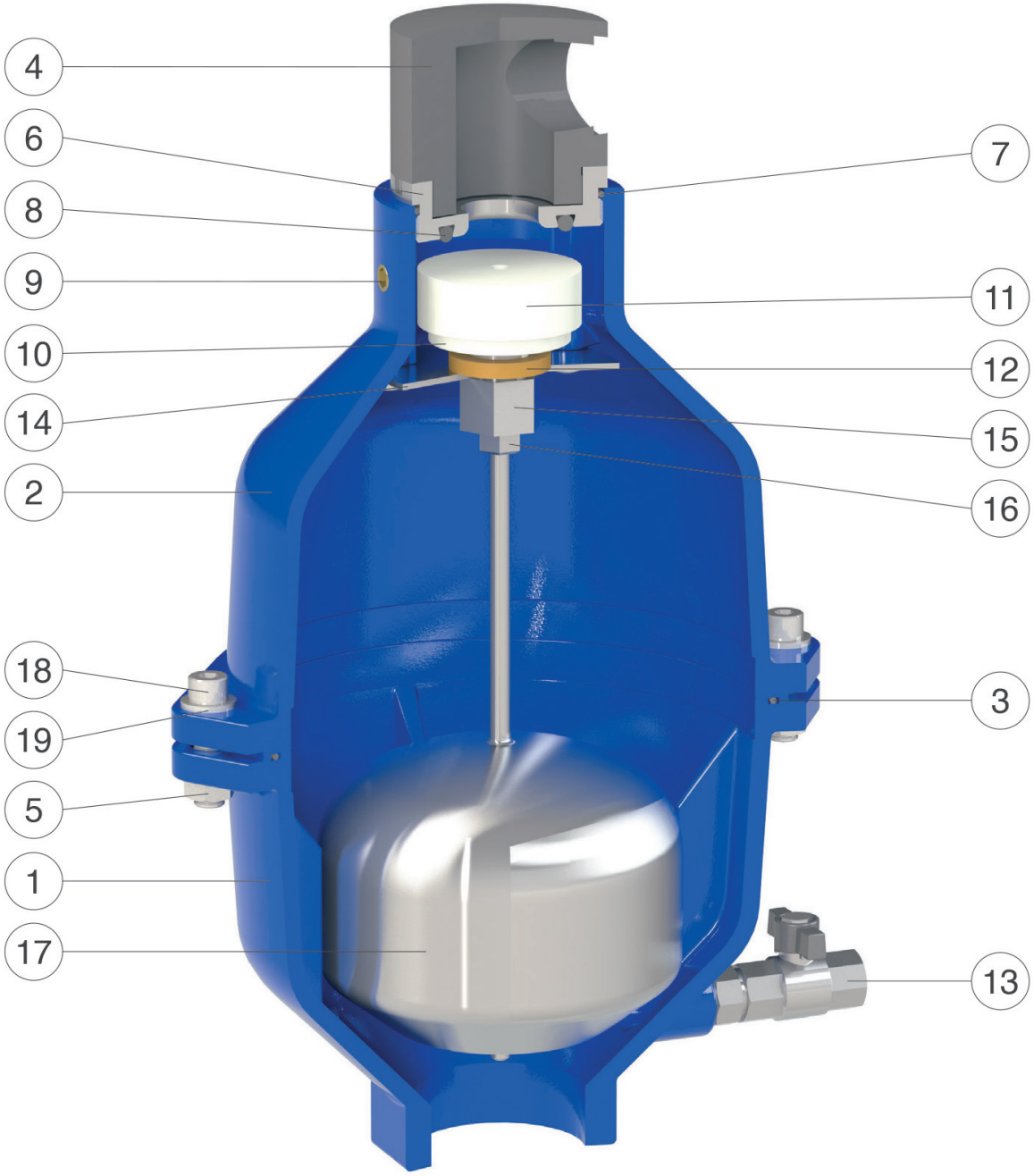


Dimensions and weights

C inches	A inches	B inches	D mm	Main orifice mm²	Nozzle orifice mm²	Weight Kg
2”	1”	380	137	490	2.3	10.5



Construction details



No.	Component	Standard material	Optional
1	Lower body	ductile cast iron GJS 450-10	
2	Upper body	ductile cast iron GJS 450-10	
3	Body O-ring	NBR	EPDM/Viton/silicone
4	Cap	PVC	
5	Nuts	AISI 304 stainless steel	AISI 316 stainless steel
6	Seal seat	AISI 316 stainless steel	
7	Seal seat O-ring	NBR	EPDM/Viton/silicone
8	Seal seat gasket	NBR	EPDM/Viton/silicone
9	Conical screw	brass	AISI 316 stainless steel
10	Plug plate with nozzle	polypropylene and AISI 316 stainless steel	
11	Anti-shock plate	polypropylene	
12	Protective rubber	NBR	
13	Ball valve 3/8" with nipple	AISI 316 stainless steel	
14	Deflector	AISI 316 stainless steel	
15	Guide nut	AISI 316 stainless steel	
16	Gasket holder	AISI 316 stainless steel	
17	Float	AISI 316 stainless steel	
18	Screws	AISI 304 stainless steel	AISI 316 stainless steel
19	Washers	AISI 304 stainless steel	AISI 316 stainless steel

The table of materials and components is subject to change without notice.

Customer Centricity

Pietro Fiorentini is one of the main Italian international company with high focus on product and service quality.

The main strategy is to create a stable long-term oriented relationship, putting the customer's needs first. Lean management and thinking and customer centricity are used to improve and maintain the highest level of customer experience.

Support

One of Pietro Fiorentini's top priorities is to provide support to the client in all phases of project development, during installation, commissioning and operation. Pietro Fiorentini has developed a highly standardized intervention management system, which helps to facilitate the entire process and effectively archive all the interventions carried out, drawing on valuable information to improve the product and service. Many services are available remotely, avoiding long waiting times or expensive interventions.

Training

Pietro Fiorentini offers training services available for both experienced operators and new users. The training is composed of the theoretical and the practical parts, and is designed, selected and prepared according to the level of use and the customer's need.

Customer Relation Management (CRM)

The centrality of customer is one of the main missions and vision of Pietro Fiorentini. For this reason, Pietro Fiorentini has enhanced the customer relation management system. This enables us to track every opportunity and request from our customers into one single information point.

Sustainability

Here at Pietro Fiorentini, we believe in a world capable of improvement through technologies and solutions that can shape a more sustainable future. That is why respect for people, society and the environment form the cornerstones of our strategy.

Our commitment to the world of tomorrow

While in the past we limited ourselves to providing products, systems and services for the oil & gas sector, today we want to broaden our horizons and create technologies and solutions for a digital and sustainable world, with a particular focus on renewable energy projects to help make the most of our planet's resources and create a future in which the younger generations can grow and prosper.

The time has come to put the why we operate before the what and how we do it.

Pietro Fiorentini

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