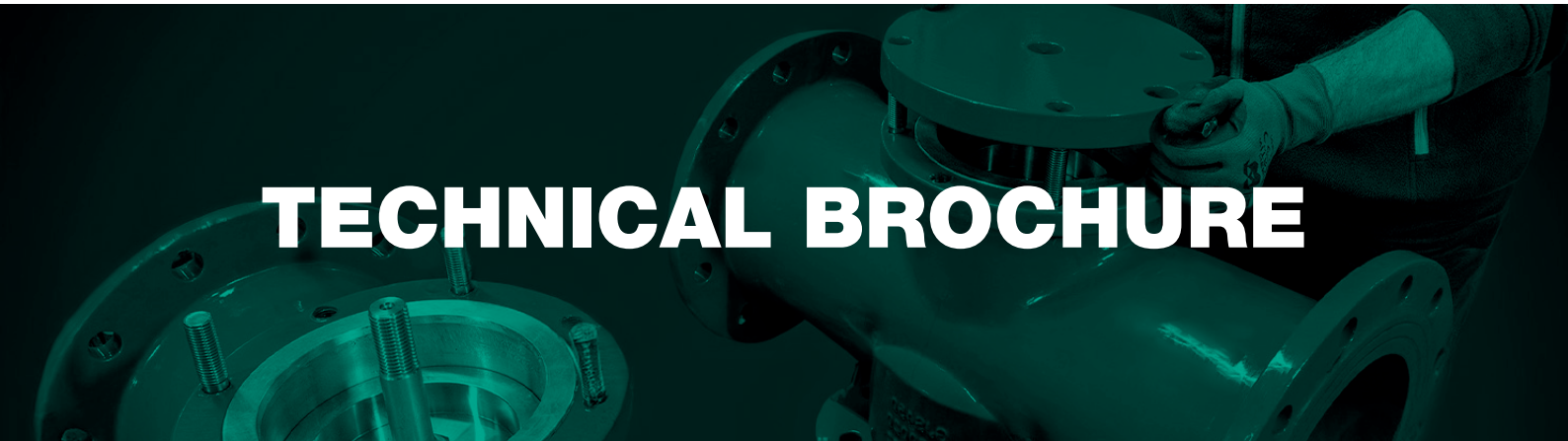
Pietro Fiorentini

WAVE SUBWAY

Underground aqueduct air valve



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Combined automatic underground air valve anti-water hammer **WAVE SUBWAY 3S-CSF**

The WAVE SUBWAY 3S-CSF is an automatic air valve designed to offer the best solution for underground installations, where building a well is impossible or too expensive.
It does not require any shut-off devices on the pipe. It ensures degassing under pressure during operation, the entrance of large volumes of air when draining the pipelines, and the speed-controlled discharge of air to avoid the risk of water hammer.

Constructive features and advantages

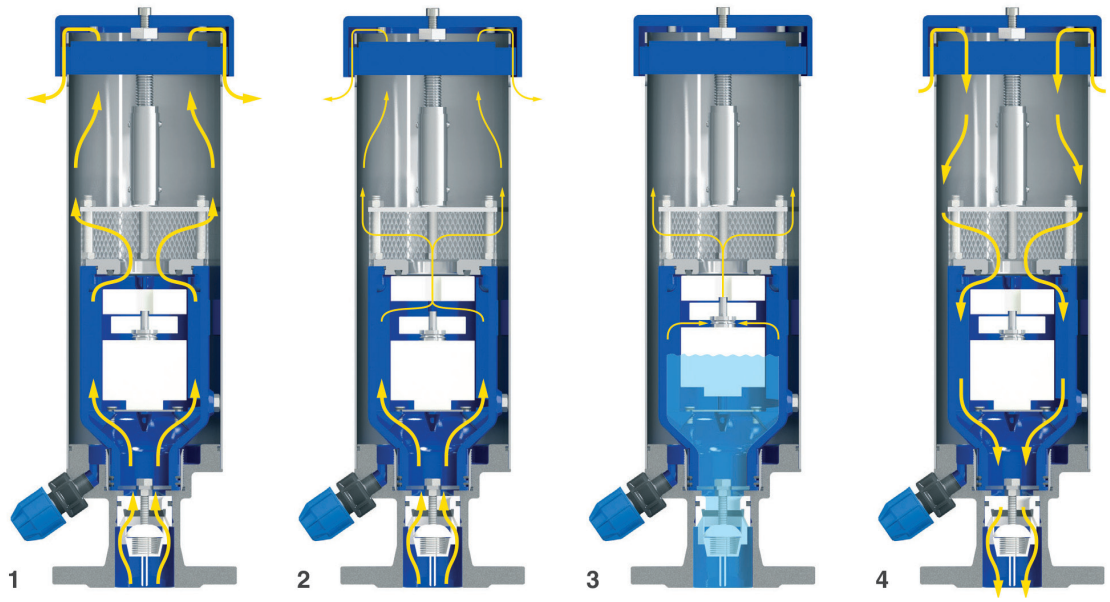
- The great advantage of the WAVE SUBWAY 3S-CSF over traditional air valves is that it is positioned directly on the pipeline, and therefore buried at the sides, without the need for excavations, manholes or other works. A simple manhole cover (square or round), at least 300 mm wide, is sufficient to complete the installation.
- The stainless steel extension pipe, firmly secured to the base, protects the internal air valve and supports the guide bar of the control rod.
- Flanged base made of ductile cast iron, on which the check valve and the drain that disposes of any water inside the extension pipe are mounted.
- Automatic anti-water hammer air valve WAVE 3S-CSF inserted in flanged base. It is sealed by two O-rings; removal is possible thanks to the control rod that can be operated from above.
- Painted aluminium cap.

- During maintenance operations, thanks to a built-in check valve, its design allows the air valve to be extracted from above, without interrupting the flow of the pipeline and resorting to excavation or other interventions.

Main applications

- At high points and slope changes of the distribution networks
- Pressurised systems with treated water; in frost-prone areas, roads and buildings

Operating principle



1. Discharge of large volumes of air

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

2. Controlled air discharge

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

3. Pressurised air degassing

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

4. 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 water coming out to avoid depressions and serious damage to the network.

Installation

The picture shows the correct installation of the WAVE SUBWAY 3S-CSF. A simple branch on the pipeline and a manhole cover are required to allow maintenance operations. The drain plays a key role, allowing water to exit from the extension pipe; usually supplied with a 3/8" fitting, it can be placed within a layer of pebbles to aid drainage.

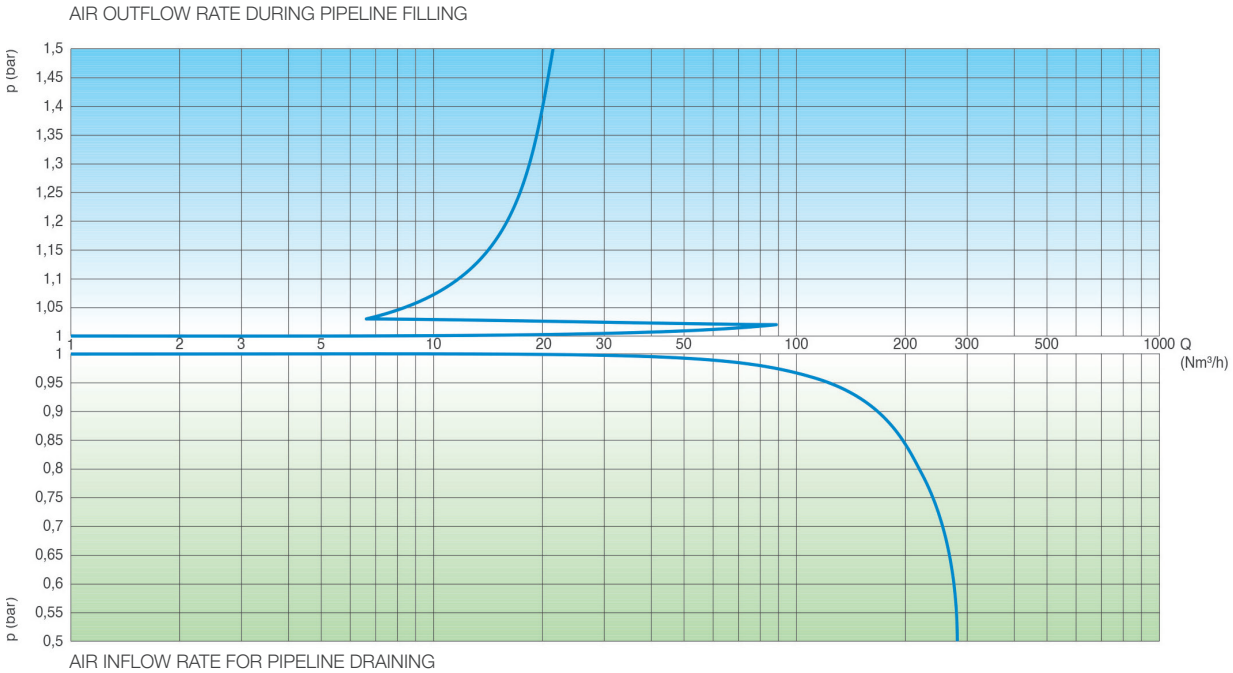
Removing the air valve

Thanks to the special design of the WAVE SUBWAY 3S-CSF, maintenance and replacement operations are possible without removing the air valve from the pipeline.

After removing the cap, screw and guide bar (as illustrated by the picture opposite), the internal WAVE air valve is pulled out from above by means of the control rod.

Technical data

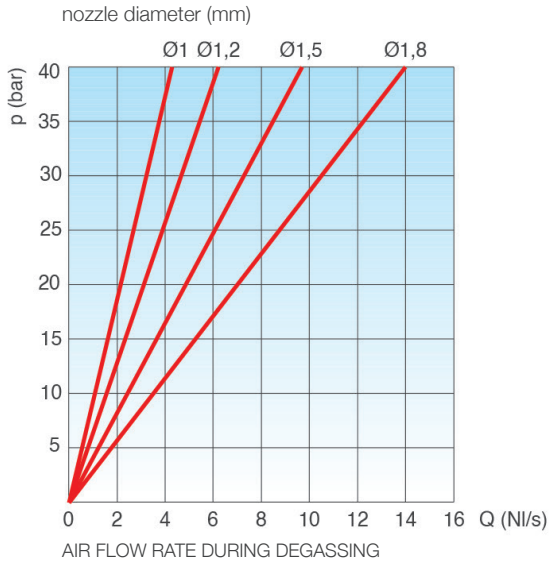
Air flow characteristic charts



Air flow charts are obtained in Kg/s from laboratory tests and numerical analysis, without filtering, and converted to Nm/h by applying a safety factor.

Choice of nozzle

Nozzle diameter in mm depending on DN and PN of the air valve.



PN 10	PN 16	PN 25	PN 40
1.5	1.2	1	0.8

Operating conditions

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

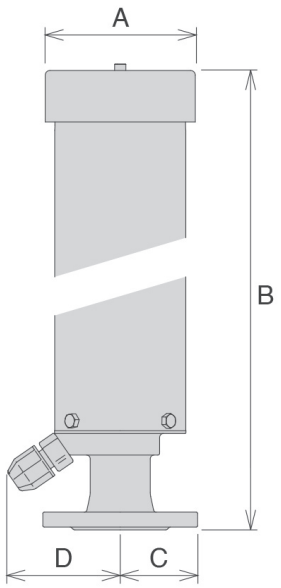
Standard

- Design according to EN 1074/4, in accordance with AWWA C-512
- Drilling according to EN 1092-2 or ANSI 150
- Fluid bed coating RAL 5005 blue

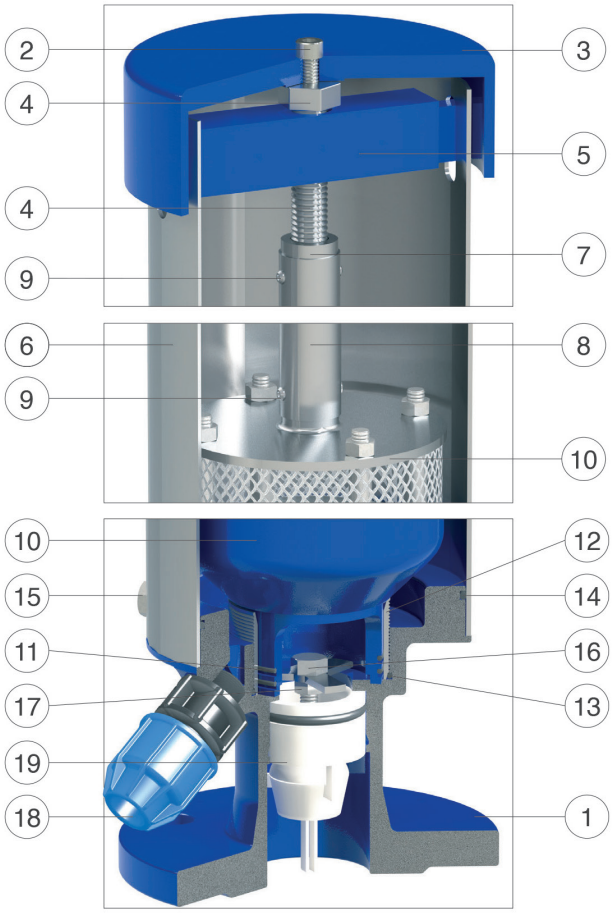
Modifications to painting and flanging standards on request.

Dimensions and weights

DN mm	A mm	B mm	C mm	D mm	Weight Kg
50	160	750	82,5	120	20.5
	160	1000	82,5	120	23.2
	160	1250	82,5	120	25.3
	160	1500	82,5	120	28.6
80	160	750	100	120	22,0
	160	1000	100	120	24,7
	160	1250	100	120	26.8
	160	1500	100	120	30,1



Construction details



No.	Component	Standard material	Optional
1	Body	ductile cast iron GJS 450-10	
2	Cap hex socket head screw	AISI 304 stainless steel	AISI 316 stainless steel
3	Cap	painted aluminium S11	
4	Control screw	AISI 304 stainless steel	
5	Guide bar	painted steel Fe 37	
6	Extension pipe	AISI 304 stainless steel	
7	Control screw seat	AISI 303 stainless steel	
8	Control rod	AISI 304 stainless steel	
9	Plugs	AISI 304 stainless steel	
10	WAVE 2”	various configurations (see mod. WAWE)	
11	FOX O-ring	NBR	EPDM/Viton/silicone
12	Threaded ring nut	AISI 304 stainless steel	
13	Ring nut O-ring	NBR	EPDM/Viton/silicone
14	Body O-ring	NBR	EPDM/Viton/silicone
15	HH screws	AISI 304 stainless steel	AISI 316 stainless steel
16	Opening screw	AISI 304 stainless steel	AISI 316 stainless steel
17	Locking nut	AISI 304 stainless steel	AISI 316 stainless steel
18	Drain connection	polypropylene	
19	Check valve	Delrin (polyoxymethylene)	

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.

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