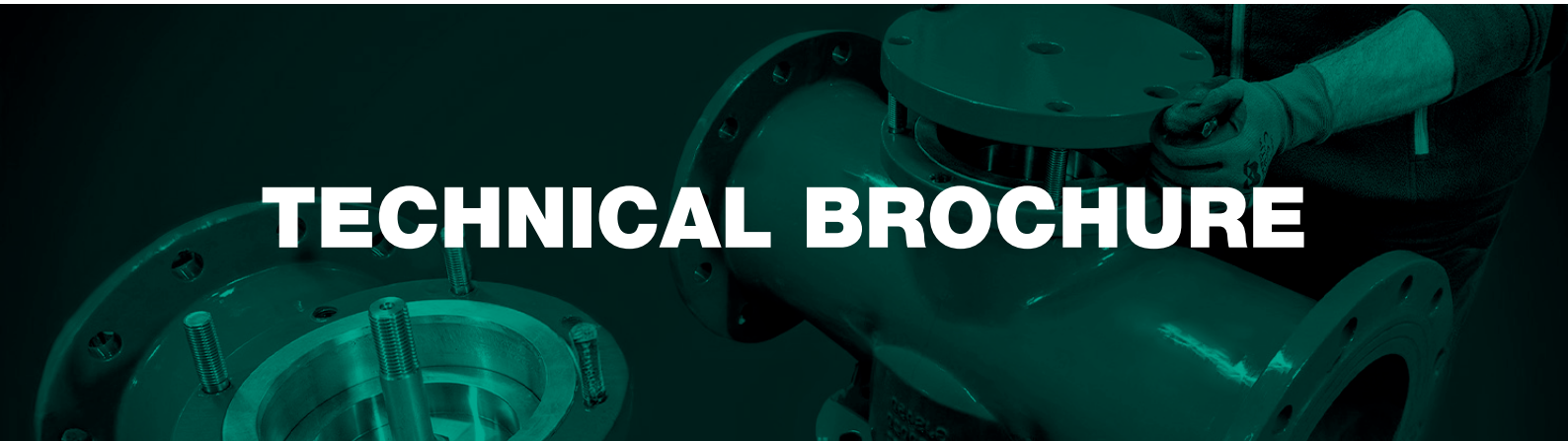
Pietro Fiorentini

WAVE LITE

Air valve for aqueduct



TECHNICAL BROCHURE

Pietro Fiorentini S.p.A.
Via E.Fermi, 8/10 | 36057 Arcugnano, Italy | +39 0444 968 511
sales@fiorentini.com

WAVE LITE_technicalbrochure_ENG_revA

www.fiorentini.com

Three functions combined air valve

WAVE LITE 3S

The WAVE LITE series air valves are single-chamber, reduced-bore combined automatic devices. They ensure that the water network functions properly by managing the air volumes inside the pipelines and allowing the pressurised air to be degassed.

The WAVE LITE 3S air valve performs three functions: degasses air during normal operation, and controls the entrance and discharge of large volumes of air during the draining and filling of pipelines.

Constructive features and advantages

- Single chamber housing, in ductile cast iron; class PN 40, fitted with cast ribs for optimum guidance of the central mobile block.
- Aerodynamic deflector to prevent premature closure of the mobile block.
- Drainage valve for draining the chamber.
- Central mobile block consisting of a float and an upper plate, both cylindrical and made of solid polypropylene, joined by the nozzle and gasket holder.The solid floats avoid deformation phenomena at high pressures and, machined on the lathe, guarantee more precise sliding within the body ribs and a perfectly vertical thrust.
- Nozzle and gasket holder in AISI 316, designed to prevent gasket wear caused by excessive crushing.
- Ductile cast iron cap and stainless steel filter, in the standard configuration.
- Very easy to intervene from above without removing the air valve from the pipeline.

Main applications

- Intake pipelines
- Distribution networks
- Irrigation systems
- It is generally used at slope changes and at the high points of the pipelines

Operating principle

Discharge of large volumes of air

During 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 WAVE LITE 3S air valve prevents the mobile block from closing prematurely 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 water. 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 water coming out to avoid depressions and serious damage to the network.

Optional functions

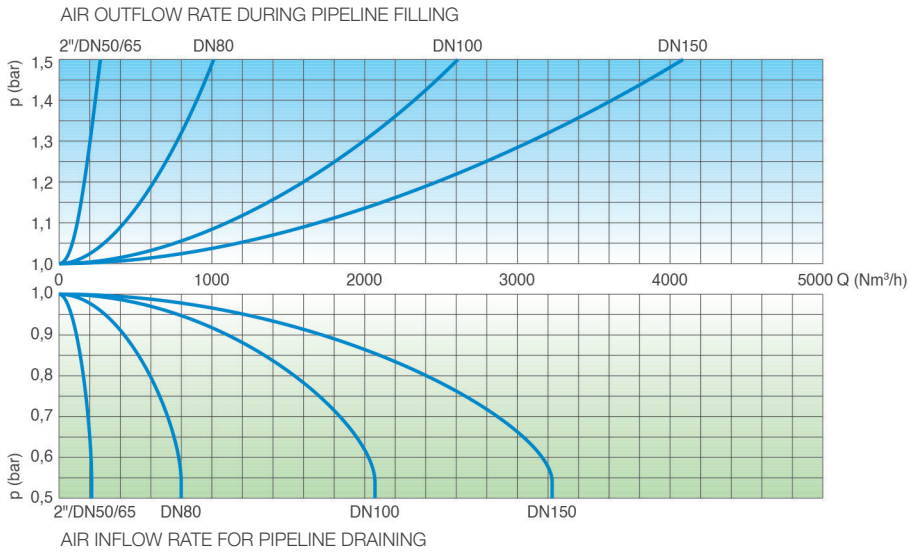
Dual-function WAVE LITE 2S version, also called vacuum breaker. Suitable for locations where no air pockets are required to be expelled during operation. It is used at upward slope changes and long ascending sections of the profile; in dry and fire-prevention installations.

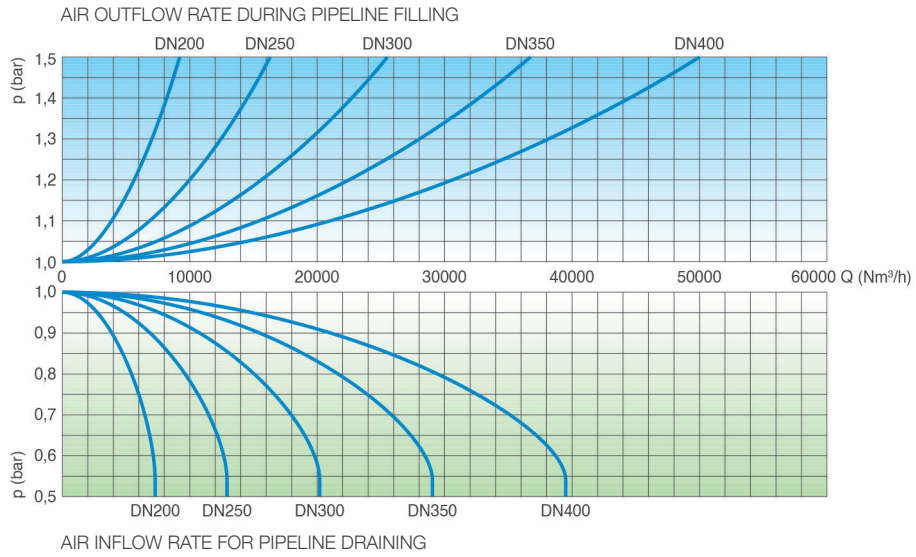
SUB version, with conveyance drain, available for WAVE LITE 2S and 3S models. The threaded bend, connected to a discharge pipe, allows the air valve to operate even in the event of flooding of the well or the installation site, without the risk of contaminated water entering the pipeline. Another advantage of the SUB model is the possibility of conveying spurts when the air valve is closing.

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

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 Nm3/h by applying an appropriate safety factor.

Operating conditions

Maximum treated water	60°C
Maximum pressure	40 bar
Minimum pressure	0.2 bar (lower on request)

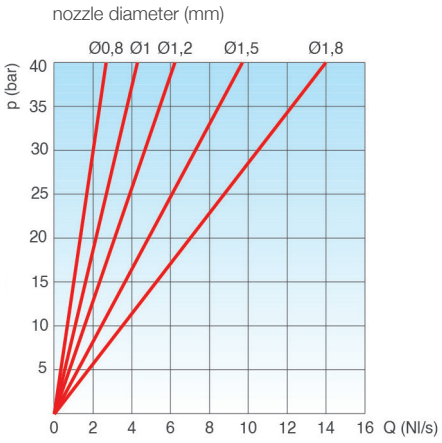
Standard

- 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

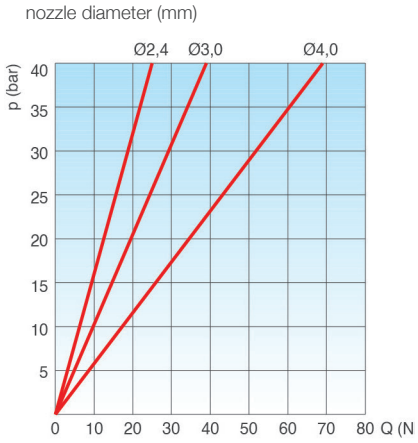
Modifications to painting and flanging standards on request.

Choice of nozzle

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



AIR FLOW RATE DURING DEGASSING



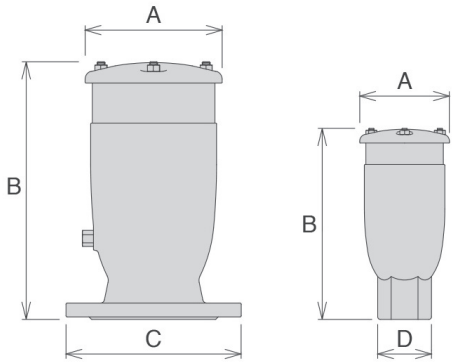
AIR FLOW RATE DURING DEGASSING

Air flow charts are obtained in Kg/s from laboratory tests and numerical analysis, without filtering, and converted to Nm3/h by applying an appropriate safety factor.

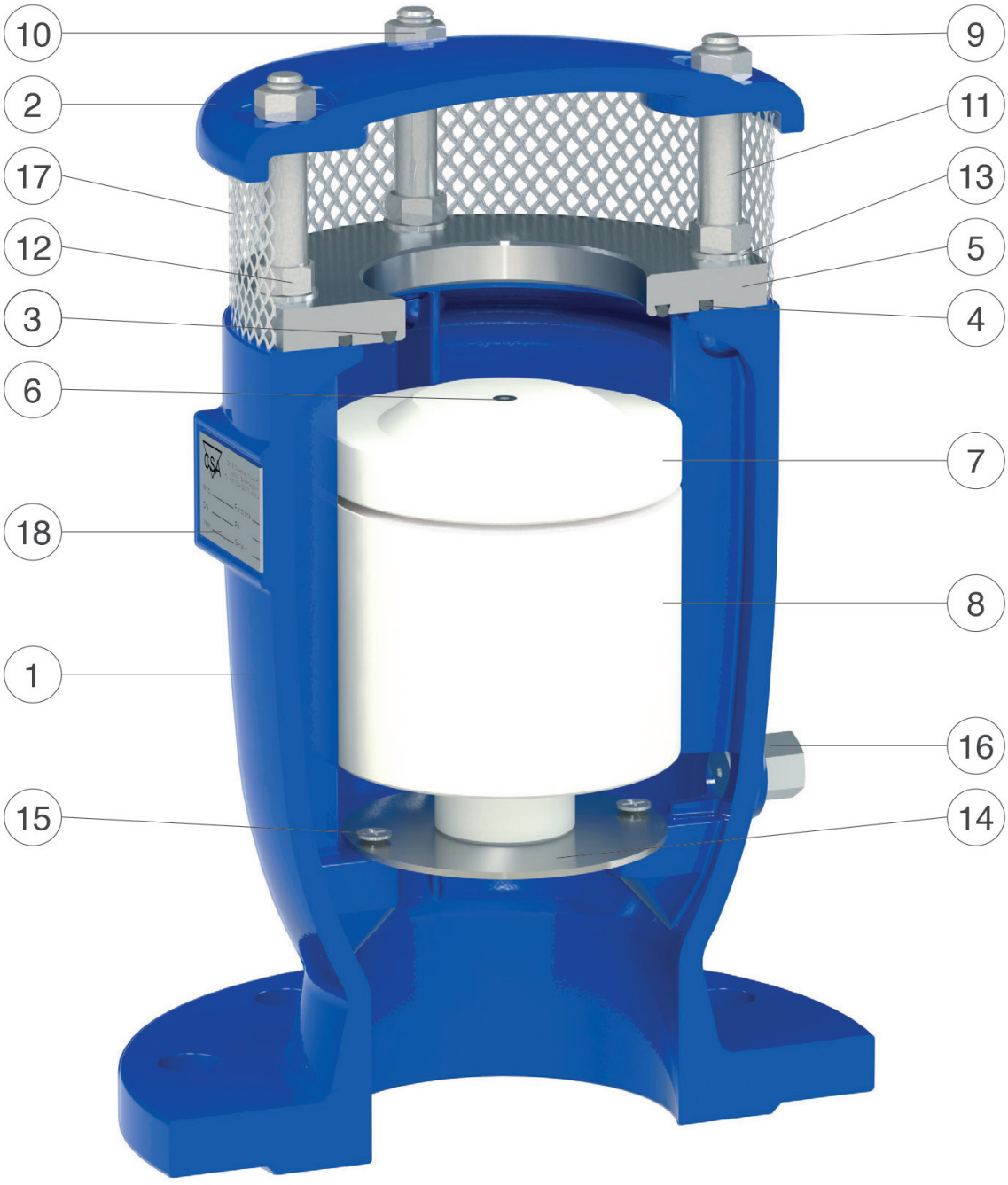
	PN 10	PN 16	PN 25	PN 40
2"/DN 65	1.2	1.2	1	0.8
DN 80	1.8	1.5	1.2	0.8
DN 100	1.8	1.5	1.2	1
DN 150	2.4	1.8	1.8	1.2
DN 200	4	3	2.4	1.8
DN 250	4	4	3	2.4
DN 300	4	4	4	4
DN 350	4	4	4	4
DN 400	4	4	4	4

Dimensions and weights

CONNECTION inches/mm	A mm	B mm	C mm		D mm	Weight Kg
Threaded 2”	117	240	-	-	CH 70	4.8
Flanged 50	117	250	165	-	-	6.8
Flanged 65	117	250	185	-	-	7.6
Flanged 80	141	305	210	205	-	10.8
Flanged 100	172	303	235	220	-	13.8
Flanged 150	206	337	305	285	-	23,0
Flanged 200	285	555	375	340	-	55,0
Flanged 250	365	635	450	405	-	101,0
Flanged 300	420	785	515	455	-	127,0
Flanged 350	515	940	580	520	-	250,5
Flanged 400	600	1075	620	580	-	304,0



Construction details



No.	Component	Standard material	Optional
1	Body	ductile cast iron GJS 450-10	
2	Cap	ductile cast iron GJS 450-10	
3	Seal seat gasket	NBR	EPDM/Viton/silicone
4	Seal seat O-ring	NBR	EPDM/Viton/silicone
5	Seal seat	AISI 304 stainless steel	AISI 316 stainless steel
6	Nozzle unit	AISI 316 stainless steel	
7	Plug plate	polypropylene	
8	Float	polypropylene	
9	Studs	AISI 304 stainless steel	AISI 316 stainless steel
10	Nuts	AISI 304 stainless steel	AISI 316 stainless steel
11	Spacers	AISI 304 stainless steel	AISI 316 stainless steel
12	Nuts	AISI 304 stainless steel	AISI 316 stainless steel
13	Washers	AISI 304 stainless steel	AISI 316 stainless steel
14	Deflector (not in 1")	AISI 304 stainless steel	AISI 316 stainless steel
15	Screws	AISI 304 stainless steel	AISI 316 stainless steel
16	Drain valve	AISI 303 stainless steel	AISI 316 stainless steel
17	Filter	AISI 304 stainless steel	
18	Label	AISI 304 stainless steel	

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

Combined automatic anti-water hammer air valve **WAVE LITE 3S-AWH**

The WAVE LITE series air valves are single-chamber, reduced-bore combined automatic devices. They ensure that the water network functions properly by managing the air volumes inside the pipelines and allowing the pressurised air to be degassed.

The WAVE LITE 3S-AWH air valve ensures degassing during operation, and the entrance of large volumes of air when draining pipelines. In addition, during the filling phase, it keeps the air discharge speed within a preset safety limit to avoid the risk of water hammer.

Constructive features and advantages

- Uncontrolled filling of the pipeline and varied motion phenomena cause the system air valves to close quickly, resulting in damage. In such cases, the WAVE LITE 3S-AWH air valve, by automatically decreasing the outflow capacity, reduces the speed of the incoming water column, thus minimising the risk of water hammer.
- Compared to normal combined air valves, it reduces spurts during closure, and the risk of flooding of the air valve during possible rapid filling of the pipeline at low pressure.
- Full-bore, single chamber housing, in ductile cast iron; class PN 40, fitted with cast ribs for optimum guidance of the central mobile block.
- Central mobile block consisting of a float and an upper plate, both cylindrical and made of solid polypropylene, joined by the nozzle, a gasket holder and an anti-water hammer AWH plate.
- AISI 316 stainless steel nozzle and gasket holder, designed to prevent gasket wear due to excessive crushing.
- Ductile cast iron cap and stainless steel filter, in the standard configuration.

Main applications

- Intake pipelines
- Distribution networks
- Irrigation systems
- It is generally used at pumps, slope changes on ascending sections and at high points of pipelines subject to water hammer.

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, the resulting overpressure and the risk of water hammer.

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

Optional functions

Dual-function WAVE LITE 2S-AWH version , also called vacuum breaker, suitable for locations where no air pockets are required to be expelled during operation. It is used at upward slope changes and long ascending sections of the profile; in dry and fire-prevention installations.

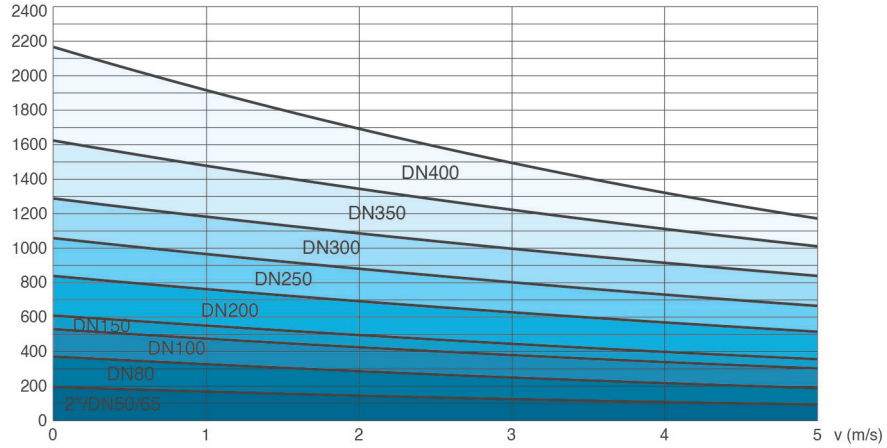
SUB version, with conveyance drain, available for WAVE LITE 2S-AWH and 3S-AWH models. The threaded bend, connected to a discharge pipe, allows the air valve to operate even in the event of flooding of the well or the installation site, without the risk of contaminated water entering the pipeline. Another advantage of the SUB model is the possibility of conveying spurts when the air valve is closing.

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.

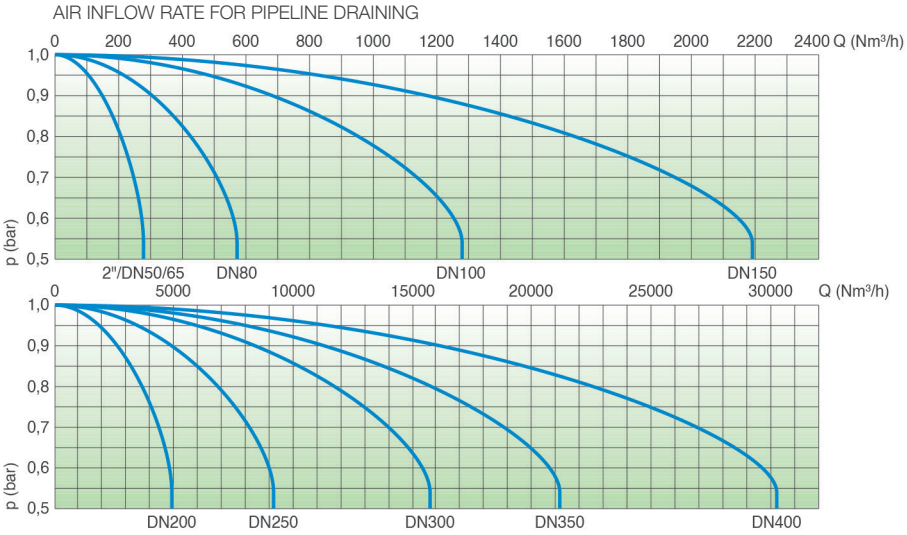
Technical data

Air valve selection chart

Preliminary dimensioning according to pipeline diameter and required air discharge speed.
Pipeline DN (mm)



Air flow characteristic charts



Operating conditions

Maximum treated water	60°C
Maximum pressure	40 bar
Minimum pressure	0.2 bar (lower on request)

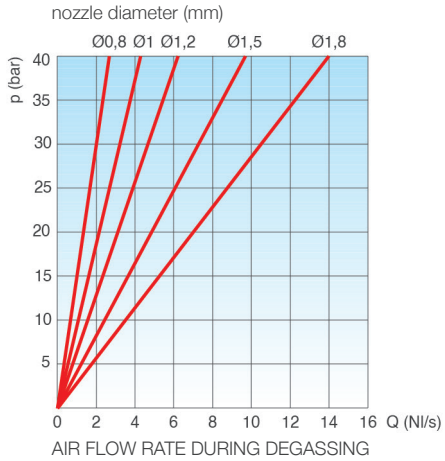
Standard

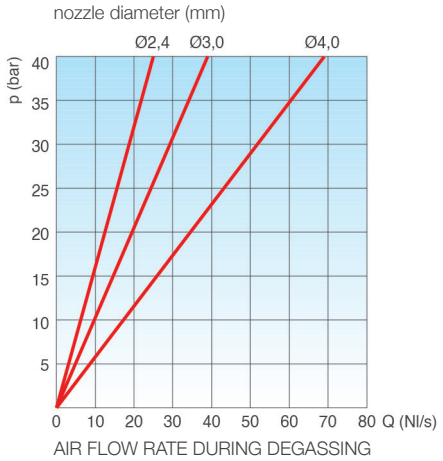
- Design according to EN 1074/4, in accordance with AWWA C-512
- Drilling according to EN 1092-2 or ANSI 150
- Fluid bed coating RAL 5005 blue

Modifications to painting and flanging standards on request.

Choice of nozzle

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



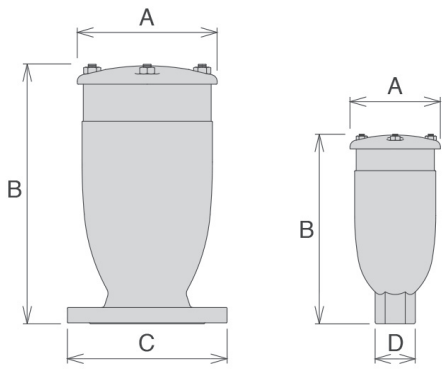


Air flow charts are obtained in Kg/s from laboratory tests and numerical analysis, without filtering, and converted to Nm3/h by applying an appropriate safety factor.

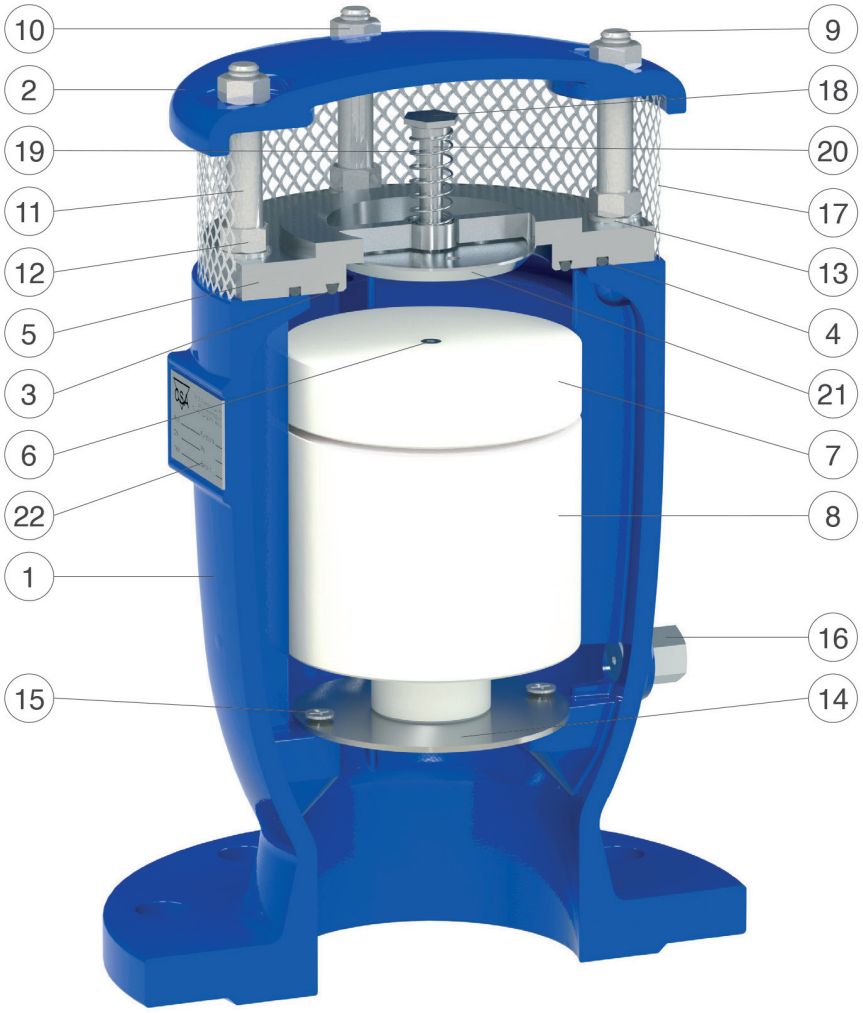
	PN 10	PN 16	PN 25	PN 40
2"-DN 65	1.2	1.2	1	0.8
DN 80	1.8	1.5	1.2	0.8
DN 100	1.8	1.5	1.2	1
DN 150	2.4	1.8	1.8	1.2
DN 200	4	3	2.4	1.8
DN 250	4	4	3	2.4
DN 300	4	4	4	4
DN 350	4	4	4	4
DN 400	4	4	4	4

Dimensions and weights

CONNECTION inches/mm	A mm	B mm	C mm		D mm	Weight Kg
Threaded 2”	117	240	-	-	-	4.8
Flanged 50	117	250	165	-	-	6.8
Flanged 65	117	250	185	-	-	7.6
Flanged 80	141	305	210	205	-	10.8
Flanged 100	172	303	235	220	-	13.8
Flanged 150	206	337	305	285	-	23,0
Flanged 200	285	555	375	340	-	55,0
Flanged 250	365	635	450	405	-	101,0
Flanged 300	420	785	515	455	-	127,0
Flanged 350	515	940	580	520	-	250,5
Flanged 400	600	1075	620	580	-	304,0



Construction details



No.	Component	Standard material	Optional
1	Body	ductile cast iron GJS 450-10	
2	Cap	ductile cast iron GJS 450-10	
3	Seal seat gasket	NBR	EPDM/Viton/silicone
4	Seal seat O-ring	NBR	EPDM/Viton/silicone
5	Seal seat	AISI 304 stainless steel	AISI 316 stainless steel
6	Nozzle unit	AISI 316 stainless steel	AISI 316 stainless steel
7	Plug plate	polypropylene	AISI 316 stainless steel
8	Float	polypropylene	AISI 316 stainless steel
9	Studs	AISI 304 stainless steel	AISI 316 stainless steel
10	Nuts	AISI 304 stainless steel	AISI 316 stainless steel
11	Spacers	AISI 304 stainless steel	AISI 316 stainless steel
12	Nuts	AISI 304 stainless steel	AISI 316 stainless steel
13	Washers	AISI 304 stainless steel	AISI 316 stainless steel
14	Deflector (not in 1")	AISI 304 stainless steel	AISI 316 stainless steel
15	Screws	AISI 304 stainless steel	AISI 316 stainless steel
16	Drain valve	AISI 303 stainless steel	AISI 316 stainless steel
17	Filter	AISI 304 stainless steel	
18	Clamping nut (from DN 150)	AISI 303 stainless steel	
19	Spring	AISI 302 stainless steel	AISI 316 stainless steel
20	Guide shaft	AISI 303 stainless steel	AISI 316 stainless steel
21	AS plate	AISI 304 stainless steel	AISI 316 stainless steel
22	Label	AISI 304 stainless steel	

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

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

The WAVE LITE series air valves are single-chamber, reduced-bore combined automatic devices. They ensure that the water network functions properly by managing the air volumes inside the pipelines and allowing the pressurised air to be degassed.

The WAVE LITE 3S-CSF air valve, in addition to degassing, allows the entrance of large volumes of air when draining pipelines. In addition, during the filling phase, it keeps the air discharge speed within a preset safety limit to avoid the risk of water hammer.

Constructive features and advantages

- Uncontrolled filling of the pipeline and varied motion phenomena cause the system air valves to close quickly, resulting in damage. In such cases, the WAVE LITE 3S-CSF air valve, by automatically decreasing the outflow capacity, reduces the speed of the incoming water column, thus minimising the risk of water hammer.
- Compared to normal combined air valves, it reduces spurts during closure, and the risk of flooding of the air valve during possible rapid filling of the pipeline at low pressure.
- Single chamber housing, in ductile cast iron; class PN 40, fitted with cast ribs for optimum guidance of the central mobile block.
- Central mobile block consisting of a float and an upper plate, both cylindrical and made of solid polypropylene, joined by the nozzle, a gasket holder and an anti-water hammer CSF plate.
- AISI 316 stainless steel nozzle and gasket holder, designed to prevent gasket wear due to excessive crushing.
- Ductile cast iron cap and stainless steel filter, in the standard configuration.

Main applications

- Intake pipelines
- Distribution networks
- Irrigation systems
- It is generally used as an alternative to AWH at slope changes and high points in pipelines.

Operating principle

Discharge of large volumes of air

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

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.

Optional functions

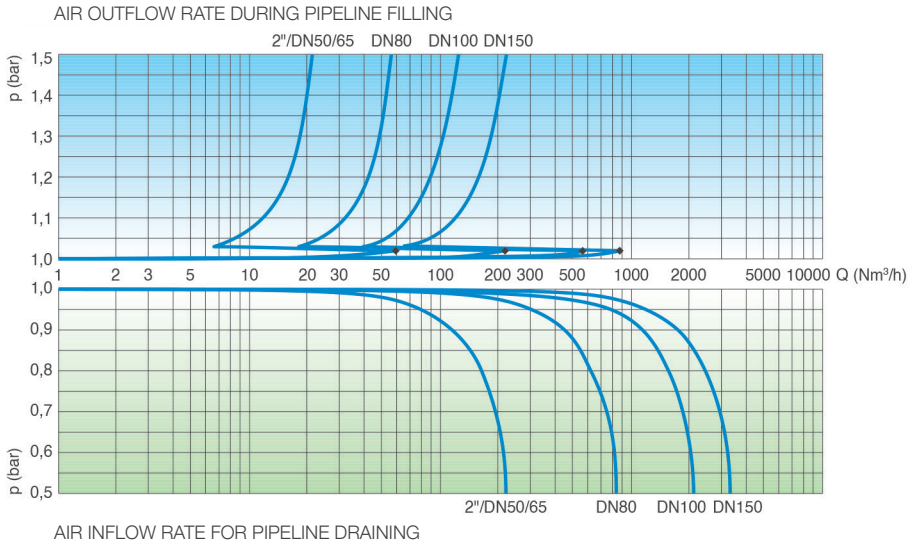
Dual-function version, WAVE LITE 2S-CSF, called vacuum breaker, for locations where no air pockets are required to be expelled during operation. It is used at upward slope changes and long ascending sections of the profile; in dry and fire-prevention installations.

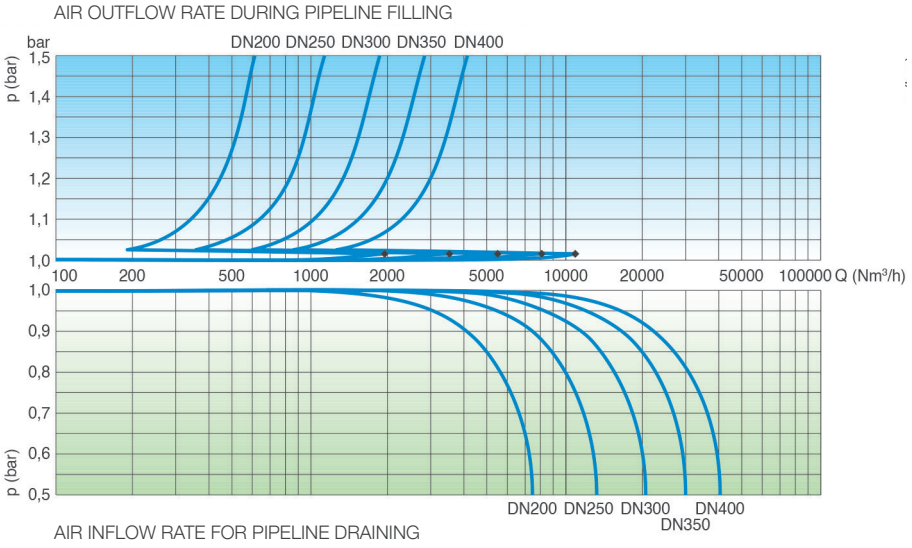
SUB version, with conveyance drain, available for WAVE LITE 2S-CSF and 3S-CSF models. The threaded bend, connected to a discharge pipe, allows the air valve to operate even in the event of flooding of the well or the installation site, without the risk of contaminated water entering the pipeline. Another advantage of the SUB model is the possibility of conveying spurts when the air valve is closing.

EO series discharge only version, available for WAVE LITE 2S-CSF and 3S-CSF models.This variant is designed to allow the air valve to be installed at 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.

Technical data

Air flow characteristic charts





Operating conditions

Maximum treated water	60°C
Maximum pressure	40 bar
Minimum pressure	0.2 bar (lower on request)

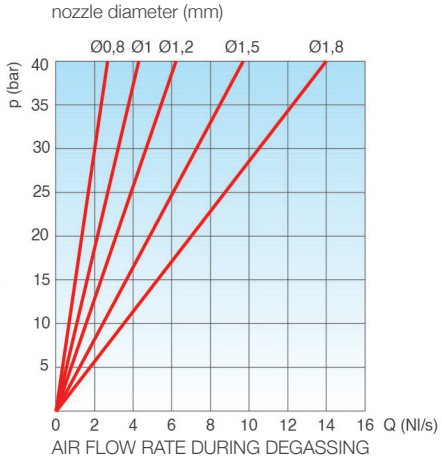
Standard

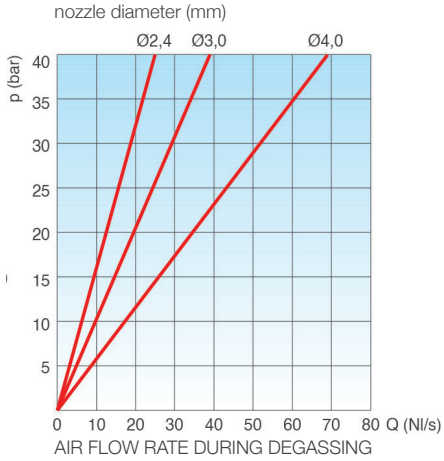
- Design according to EN 1074/4, in accordance with AWWA C-512
- Drilling according to EN 1092-2 or ANSI 150
- Fluid bed coating RAL 5005 blue

Modifications to painting and flanging standards on request.

Choice of nozzle

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



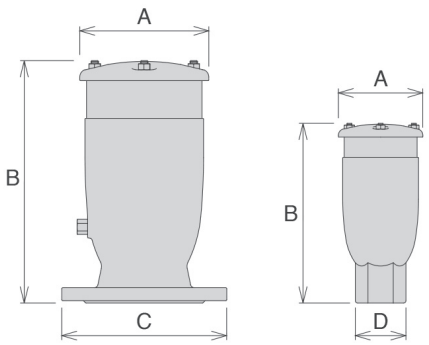


Air flow charts are obtained in Kg/s from laboratory tests and numerical analysis, without filtering, and converted to Nm3/h by applying an appropriate safety factor.

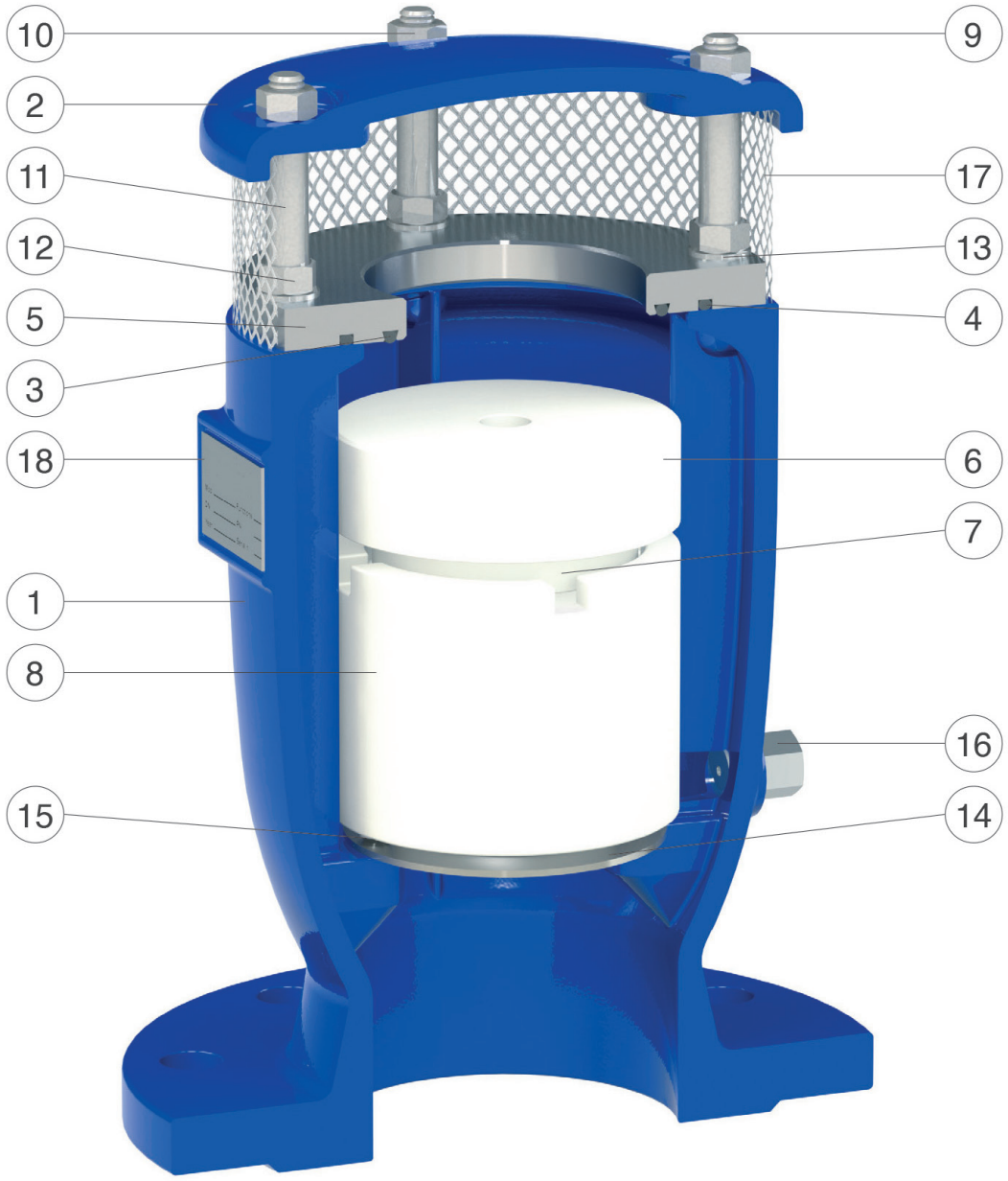
	PN 10	PN 16	PN 25	PN 40
2"/DN 65	1.5	1.2	1	0.8
DN 80	1.8	1.5	1.2	1
DN 100	1.8	1.5	1.2	1
DN 150	3	2.4	1.8	1.2
DN 200	4	3	2.4	1.8
DN 250	4	4	4	3
DN 300	4	4	4	4
DN 350	4	4	4	4
DN 400	4	4	4	4

Dimensions and weights

CONNECTION inches/mm	A mm	B mm	C mm		D mm	Weight Kg
Threaded 2”	117	240	-	-	CH 70	4.8
Flanged 50	117	250	165	-	-	6.8
Flanged 65	117	250	185	-	-	7.6
Flanged 80	141	305	210	205	-	10.8
Flanged 100	172	303	235	220	-	13.8
Flanged 150	206	337	305	285	-	23,0
Flanged 200	285	555	375	340	-	55,0
Flanged 250	365	635	450	405	-	101,0
Flanged 300	420	785	515	455	-	127,0
Flanged 350	515	940	580	520	-	250,5
Flanged 400	600	1075	620	580	-	304,0



Construction details

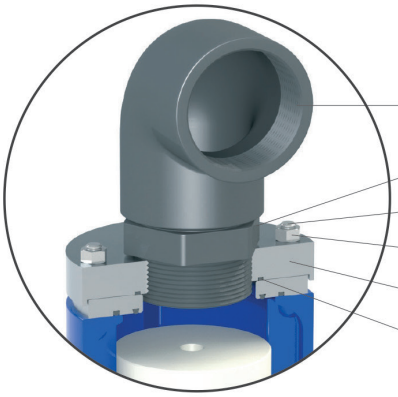


No.	Component	Standard material	Optional
1	Body	ductile cast iron GJS 450-10	
2	Cap	ductile cast iron GJS 450-10	
3	Seal seat gasket	NBR	EPDM/Viton/silicone
4	Seal seat O-ring	NBR	EPDM/Viton/silicone
5	Seal seat	AISI 304 stainless steel	AISI 316 stainless steel
6	RFP plate with O-ring	polypropylene and NBR	EPDM/Viton/silicone
7	Plug plate with nozzle	polypropylene and AISI 316 stainless steel	
8	Float	polypropylene	
9	Studs	AISI 304 stainless steel	AISI 316 stainless steel
10	Nuts	AISI 304 stainless steel	AISI 316 stainless steel
11	Spacers	AISI 304 stainless steel	AISI 316 stainless steel
12	Nuts	AISI 304 stainless steel	AISI 316 stainless steel
13	Washers	AISI 304 stainless steel	AISI 316 stainless steel
14	Deflector (not in 1")	AISI 304 stainless steel	AISI 316 stainless steel
15	Screws	AISI 304 stainless steel	AISI 316 stainless steel
16	Drain valve	AISI 303 stainless steel	AISI 316 stainless steel
17	Filter	AISI 304 stainless steel	
18	Label	AISI 304 stainless steel	

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

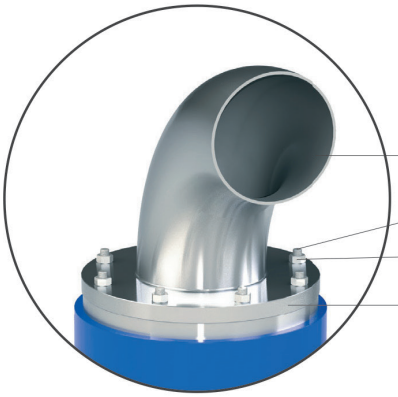
Conveyance system of **WAVE LITE SUB** air valves

The SUB system, with conveyance drain, is available on request for all WAVE LITE models, excluding the EO variants. A threaded bend, to be connected to a discharge pipe, allows the air valve to operate even in the event of flooding of the well or the installation site, without the risk of contaminated water entering the pipeline.
Another advantage of the SUB model is the possibility of conveying spurts when the air valve is closing.



2", DN 50 - 200

- PVC threaded bend (PP for DN 50-80)
- PVC fitting (PP for DN 50-80)
- Stainless steel studs
- Stainless steel nuts
- SUB plate in PP or stainless steel
- O-rings in EPDM, NBR, Viton or silicone



DN 250 - 400 *

- Stainless steel elbow
- Stainless steel studs
- Stainless steel nuts
- Stainless steel SUB plate

Technical data

Operating conditions

Maximum treated water	60°C
Maximum pressure	40 bar
Minimum pressure	0.2 bar (lower on request)

Standard

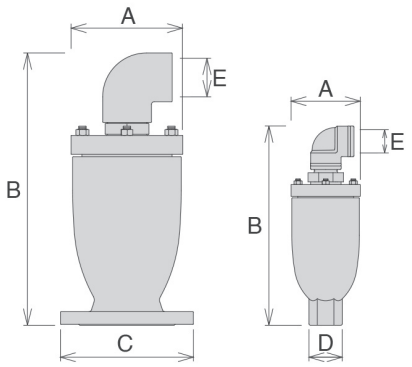
- Design according to EN 1074/4, in accordance with AWWA C-512
- Drilling according to EN 1092-2 or ANSI 150
- Fluid bed coating RAL 5005 blue

Modifications to painting and flanging standards on request.

Dimensions and weights

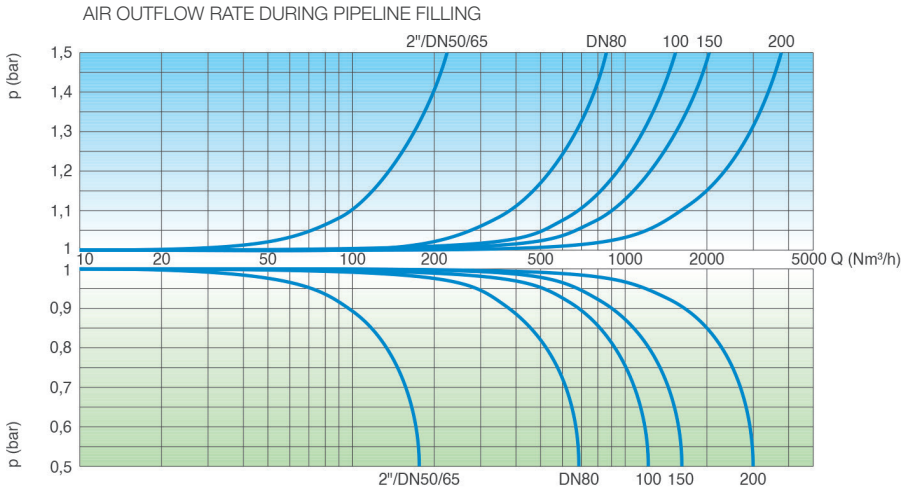
CONNECTION inches/mm	A mm	B mm	C mm		D mm	E inches	Weight Kg
Threaded 2”	105	293	-	-	CH 70	1"	4.8
Flanged 50	105	298	165	-	-	1"	6.8
Flanged 65	105	298	185	-	-	1"	7.6
Flanged 80	128	395	210	205	-	2"	10.8
Flanged 100	158	420	235	220	-	2" 1/2	13.8
Flanged 150	192	474	305	285	-	3"	23,0
Flanged 200	272	648	375	340	-	4"	55,0
Flanged 250	359	828	450	405	-	*	108,5
Flanged 300	414	1047	515	455	-	*	140,0
Flanged 350	492	1310	580	520	-	*	270,5
Flanged 400	578	1510	620	580	-	*	332,5

Approximate values. *: Mod. SUB is available up to DN 200

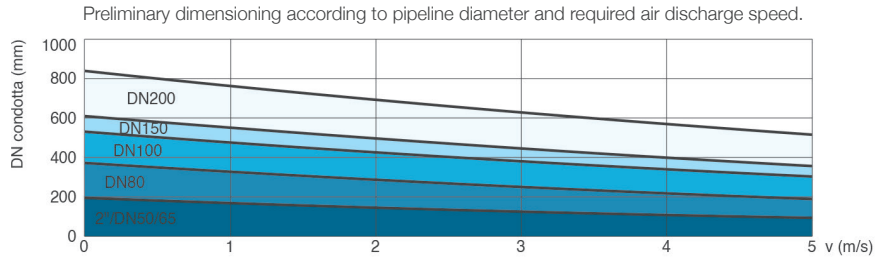


Technical data

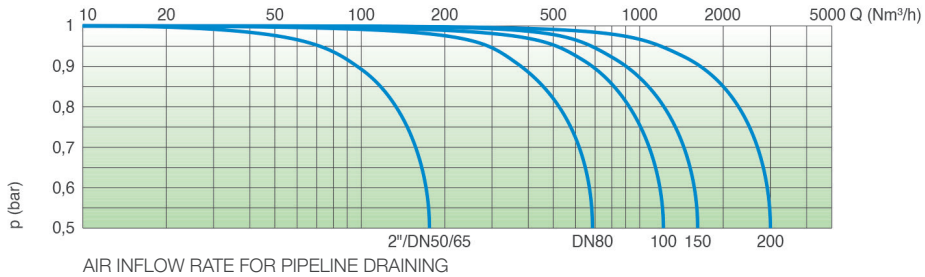
WAVE LITE 3S SUB Air flow characteristic charts



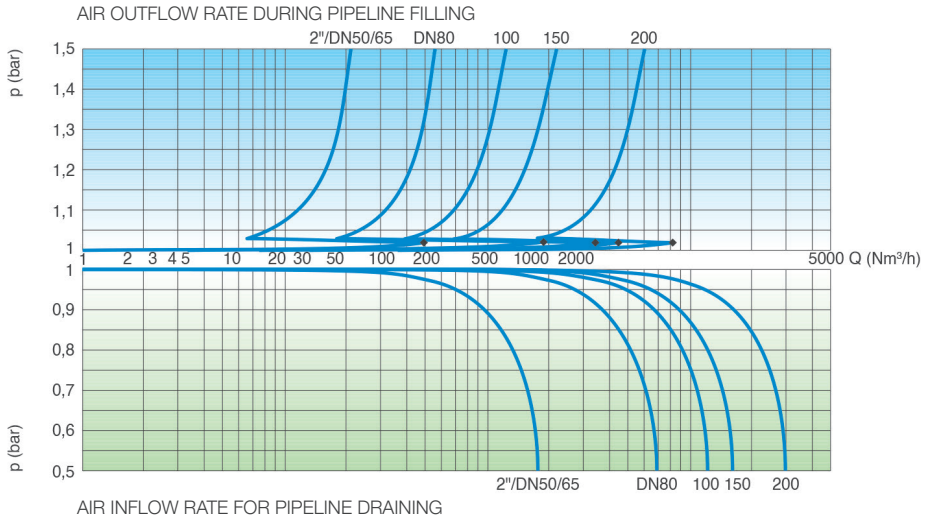
WAVE LITE 3S-AWH SUB - Air valve selection chart



WAVE LITE 3S-AWH SUB - Air flow characteristic charts

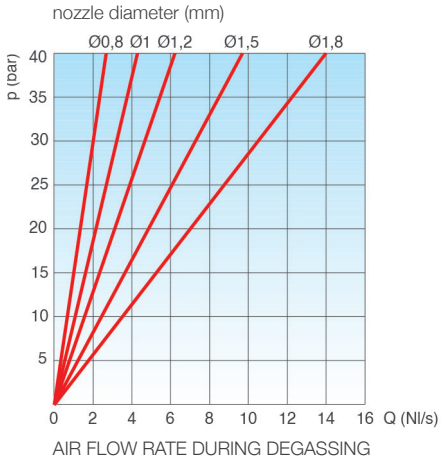


WAVE LITE 3S-CSF SUB - Air flow characteristic charts

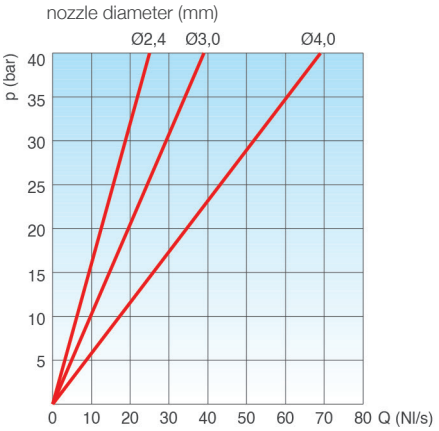


Choice of nozzle

Please refer to the data sheets of the WAVE LITE 3S, WAVE LITE 3S-AWH and WAVE LITE 3S-CSF models for nozzle selection.



AIR FLOW RATE DURING DEGASSING

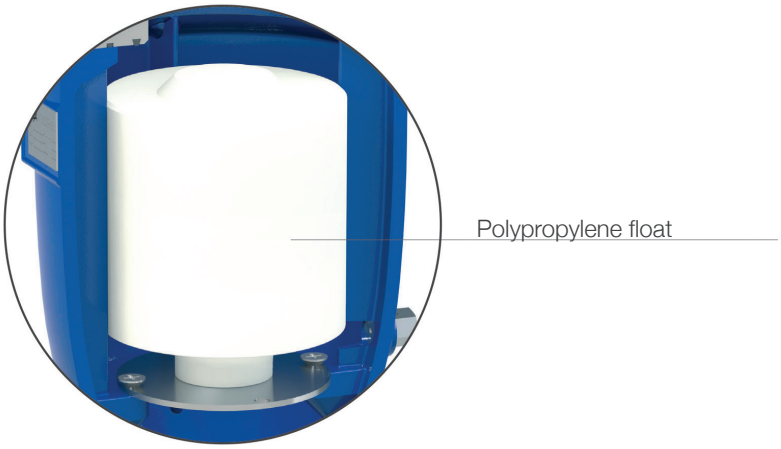


AIR FLOW RATE DURING DEGASSING

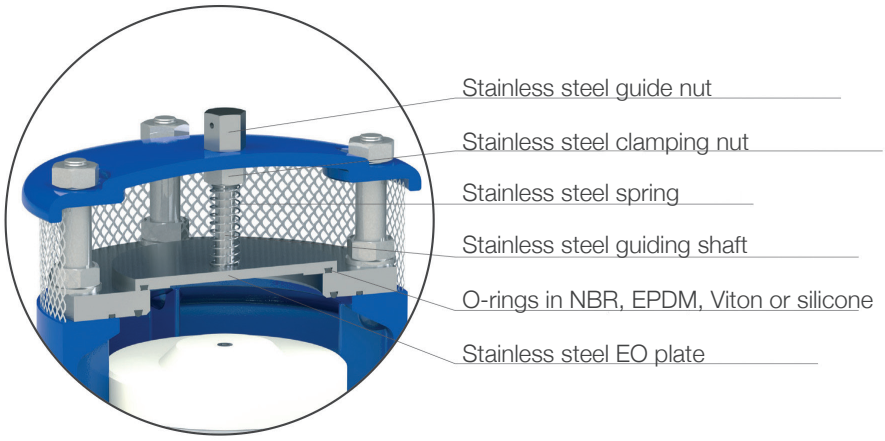
Air flow charts are obtained in Kg/s from laboratory tests and numerical analysis, without filtering, and converted to Nm3/h by applying an appropriate safety factor.

Optional functions

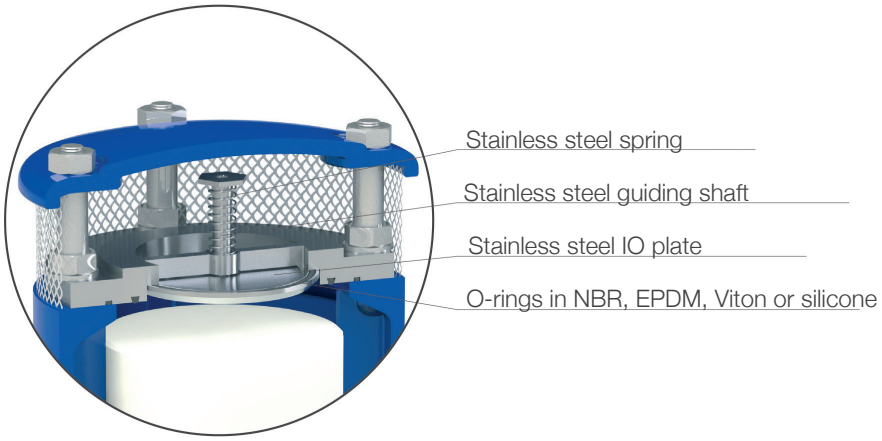
Dual-function 2S version, also called vacuum breaker. Suitable for locations where no accumulated air pockets are required to be expelled during operation. It is used at upward slope changes and long ascending sections of the profile; in dry and fire-prevention installations.



EO SERIES discharge only version, available for 2S and 3S 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, available for 2S and 3S dual-function models. This variant is designed to allow 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.



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

TB0187ENG

WAVE LITE_technicalbrochure_ENG_revA

www.fiorentini.com