Pietro Fiorentini

Water air valves

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Water air valves

WAVE series

WAVE LITE series

WAVE HP series for high pressure

Air release valve Mod. VNT HP

Air release valve Mod. VNT

WAVE LP90 series

Underground WAVE SUBWAY series

Combination air valve
Mod. WAVE 3S

The Pietro Fiorentini combination, triple function, automatic air valve Mod. WAVE 3S will ensure the proper operation of the pipeline network allowing the release of air pockets during working conditions, the evacuation and entrance of large volumes of air during filling and draining operations.

Technical features and benefits

- Single chamber full bore body in ductile cast iron, PN 40 bar rated, provided with internal ribs for accurate guiding of the floats.
- Aerodynamic deflector in stainless steel to avoid premature closures of the mobile block.
- Drainage valve, produced by PF, for chamber control and pressure relief during maintenance.
- Mobile block composed of a cylindrical float and upper disk in solid polypropylene, joined together by the PF air release system in AISI 316. The solid cylindrical floats, obtained by CNC machining, avoid deformations and ensure a great sliding precision inside the body processed ribs and a perfectly vertical thrust.
- Nozzle and gasket holder, part of PF air release system, entirely made in stainless steel AISI 316 and designed with gasket compression control to prevent aging process and consequent leakage during working conditions.
- Maintenance can be easily performed from the top, without removing the air valve from the pipe.
- Cover in ductile and screen in stainless steel as a standard execution to prevent the entrance of insects, with three optional outlets (for submerged applications, air inlet only, air outlet only).

Applications

- Main transmission lines.
- Water distribution networks.
- Irrigation systems.
- In general this model is used on changes in slope and at the high points of the pipeline.

Operating principle

Discharge of large volumes of air

During the pipe filling it is necessary to discharge air as water flows in. The WAVE 3S, thanks to the aerodynamic full port body and deflector, will make sure to avoid premature closures of the mobile block during this phase.

Air release during working conditions

During operation the air produced by the pipeline is accumulated in the upper part of the air valve. Little by little it is compressed and the pressure arrives to water pressure, therefore its volume increases pushing the water level downwards allowing the air release through the nozzle.

Entrance of large volumes of air

During pipeline draining, or pipe bursts, it is necessary to bring in as much air as the quantity of outflowing water to avoid negative pressure and serious damages to the pipeline, and to the entire system.

Optional

▪ **Vacuum breaker version Mod. WAVE 3S**, to allow the entrance and discharge of large volumes of air only. This model is normally recommended in changes in slope ascending, long ascending segments, dry fire systems, and wherever the air release won't be required.

▪ **Version for submerged applications**, **SUB series,** available both for WAVE 3S and 2S Models, with threaded elbow for air conveyance. The design sprang from the necessity of having an air valve performing also in case of flood, without the risk of contaminated water entering the pipeline. Another benefit of SUB is the possibility of conveying spurts coming from the rapid closure of the air valve.

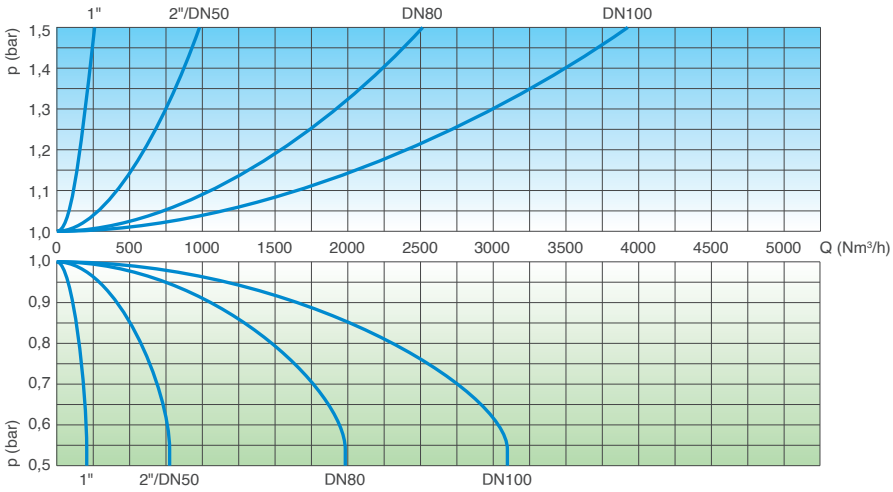
▪ **Version for air discharge only EO series**, available both for WAVE 3S and 2S models. The most important application of EO is to allow the air valve installation in those locations of the system where HGL may drop below the pipe profile, and to any other node where for project requirements air entrance must be avoided, such as in pump suction lines or siphons pipelines.

▪ **Version for air entrance only IO series**, available for WAVE 3S model only. The most important application of IO is to allow the air valve installation in those locations of the system where, for project requirements, air discharge and release must be avoided.

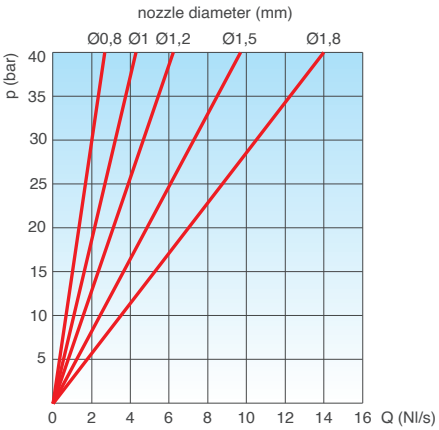
Technical data

Air flow performance charts

AIR DISCHARGE DURING PIPE FILLING

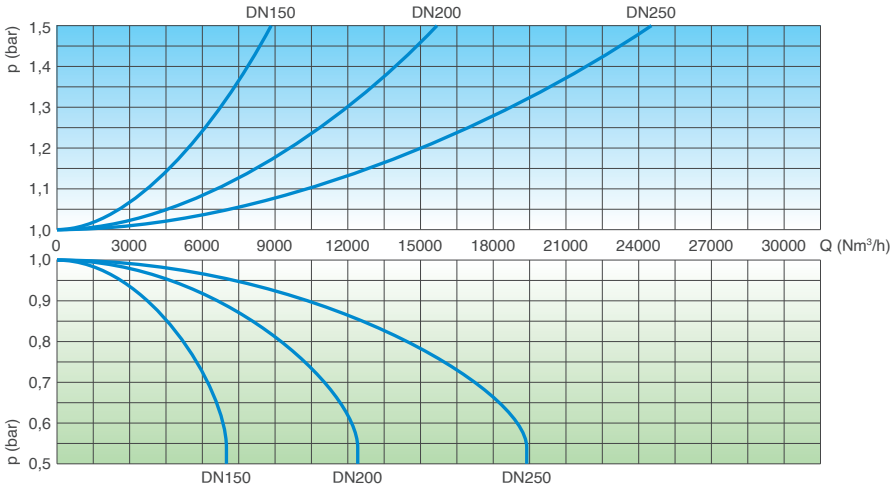


AIR ENTRANCE DURING PIPE DRAINING

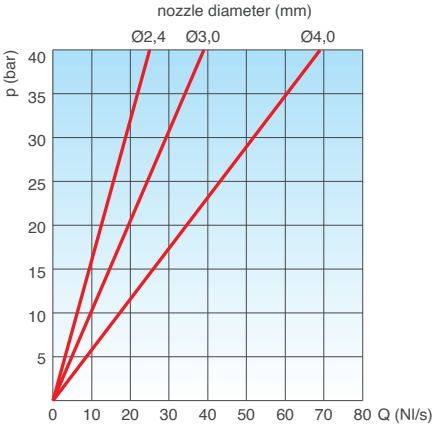


AIR RELEASE DURING WORKING CONDITIONS

AIR DISCHARGE DURING PIPE FILLING



AIR ENTRANCE DURING PIPE DRAINING



AIR RELEASE DURING WORKING CONDITIONS

The air flow charts were created in Kg/s from laboratory tests and numerical analysis, without the screen, then converted in Nm³/h using a safety factor.

Working conditions

Treated water max. 60°C.
Max. pressure 40 bar.
Min. pressure 0,2 bar. Lower on request.

Standard

Designed in compliance with EN-1074/4 and AWWA C-512. Flanges according to EN 1092/2 or ANSI 150. Epoxy painting applied through fluidized bed technology blue RAL 5005. Changes on the flanges and painting on request.

Weights and dimensions

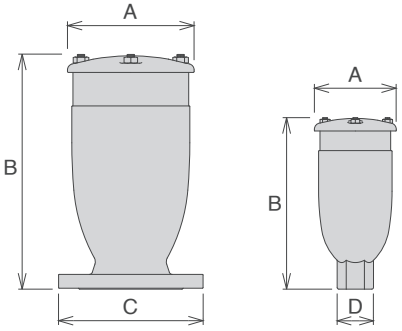
CONNECTION inch/mm	A mm	B mm	C mm		D mm	Weight Kg
Threaded 1"	117	240	-	-	CH 45	4,0
Threaded 2"	141	295	-	-	CH 70	7,5
Flanged 50	141	305	165	-	-	9,5
Flanged 80	172	322	210	205	-	13,8
Flanged 100	206	370	235	220	-	21,7
Flanged 150	285	555	305	285	-	44,5
Flanged 200	365	635	375	340	-	85,0
Flanged 250	450	785	450	405	-	134,0

All values are approximate, consult PF service for more details.

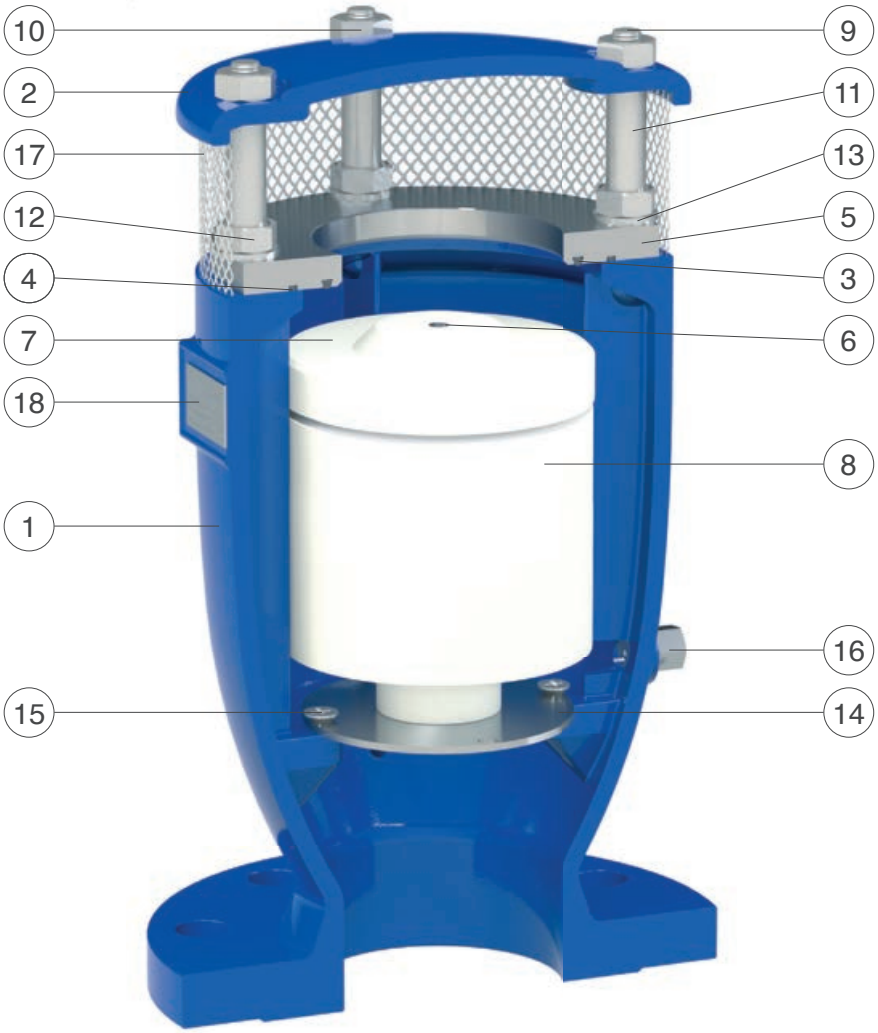
Nozzle choice

Nozzle diameter in mm according to the size of the air valve and the PN.

	PN 10	PN 16	PN 25	PN 40
1"	1,2	1,2	1	0,8
2"/DN 50	1,5	1,2	1	0,8
DN 80	1,8	1,5	1,2	1
DN 100	2,4	1,8	1,8	1,2
DN 150	4	3	2,4	1,8
DN 200	4	4	4	3
DN 250	4	4	4	4



Technical details



N.	Component	Standard material	Optional
1	Body	ductile cast iron GJS 450-10	
2	Cap	ductile cast iron GJS 450-10	
3	O-ring	NBR	EPDM/Viton/silicone
4	O-ring	NBR	EPDM/Viton/silicone
5	Seat	stainless steel AISI 304	stainless steel AISI 316
6	Nozzle Subset	stainless steel AISI 316	
7	Upper flat	polypropylene	
8	Float	polypropylene	
9	Studs	stainless steel AISI 304	stainless steel AISI 316
10	Nuts	stainless steel AISI 304	stainless steel AISI 316
11	Spacers	stainless steel AISI 304	stainless steel AISI 316
12	Nuts	stainless steel AISI 304	stainless steel AISI 316
13	Washers	stainless steel AISI 304	stainless steel AISI 316
14	Deflector (not in 1")	stainless steel AISI 304	stainless steel AISI 316
15	Screws	stainless steel AISI 304	stainless steel AISI 316
16	Drain valve	stainless steel AISI 303	stainless steel AISI 316
17	Screen	stainless steel AISI 304	
18	Tag	stainless steel AISI 304	

The list of materials and components is subject to changes without notice.

Anti-water hammer combination air valve Mod. WAVE 3S-AWH

The PF surge alleviation, non slam combination automatic air valve Mod. WAVE 3S-AWH will ensure the proper operation of the pipeline network allowing the release of air pockets during working conditions, the entrance of large volumes of air during draining operations and pipeline bursts and the controlled air outflow, to prevent water hammer.

Technical features and benefits

- Single chamber full bore body in ductile cast iron, PN 40 bar rated, provided with internal ribs for accurate guiding of the mobile block.
- Drainage valve produced by PF, for chamber control and pressure relief during maintenance.
- Mobile block composed of a cylindrical float and upper disk in solid polypropylene, joined together by the PF air release system in AISI 316. The solid cylindrical floats, obtained by CNC machining only, avoid deformations and ensure a great sliding precision inside the body processed ribs and a perfectly vertical thrust.
- Nozzle and gasket holder, part of PF air release system, entirely made in AISI 316.
- Maintenance can be easily performed from the top, without removing the air valve from the pipe.
- Anti water hammer system (also called AWH function), never in contact with water, obtained by a spring and shaft in stainless steel, disk with adjustable nozzles for air outflow control.
- Cover in ductile and screen in stainless steel as a standard execution, to prevent the entrance of insects, with optional outlet for submerged applications.

Applications

- Main transmission lines.
- Water distribution networks.
- Irrigation systems.
- In general this model is used at the pumps, on changes in slope ascending, and at the critical points of the pipeline subjected to water hammer and column separation.

Operating principle

Controlled air discharge

During the air discharge it is necessary to avoid rapid closures of the float, responsible of water hammer effects. The WAVE 3S-AWH, thanks to the anti-shock feature, will control the air outflow thus reducing the velocity of the approaching water column and minimizing the risk of overpressure.

Air release during working conditions

During operation the air produced by the pipeline is accumulated in the upper part of the air valve. Little by little it is compressed and the pressure arrives to water pressure, therefore its volume increases pushing the water level downwards allowing the air release through the nozzle.

Entrance of large volumes of air

During pipeline draining, or pipe bursts, it is necessary to bring in as much air as the quantity of outflowing water to avoid negative pressure and serious damages to the pipeline, and to the entire system.

Optional

▪ **Vacuum breaker version Mod. WAVE 2S AWH**, to allow the entrance of large volumes of air and the controlled outflow only. This model is normally recommended in changes in slope ascending, long ascending segments, dry fire systems.

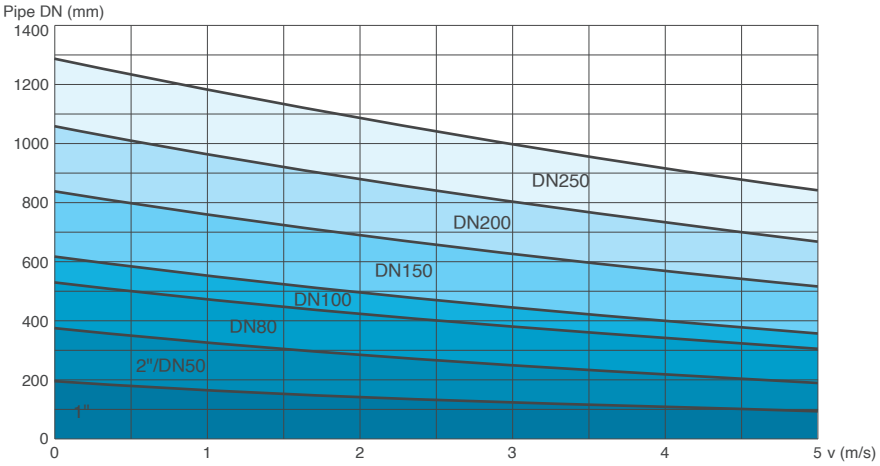
▪ **Version for submerged applications, SUB series,** available both for WAVE 3S AWH and 2S AWH Models, with threaded elbow for air conveyance. The design sprang from the necessity of having an air valve performing also in case of flood, without the risk of contaminated water entering the pipeline. Another benefit of SUB is the possibility of conveying spurts coming from the closure away from the air valve.

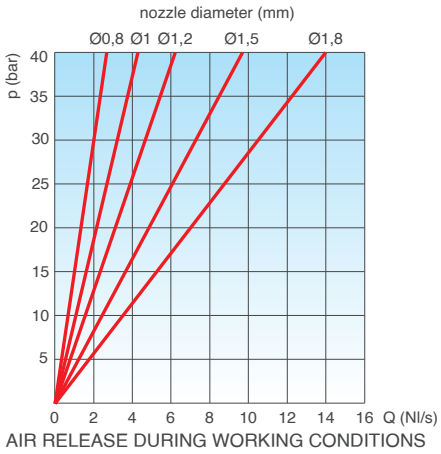
▪ The counteracting spring force as well as the sonic nozzles, both responsible of the proper operation of the AWH device, can be modified on request according to the project conditions and the results of the transient analysis.

Technical data

Air valve selection chart

Air valve preliminary sizing as a function of pipeline internal diameter and fluid flow velocity in m/s.

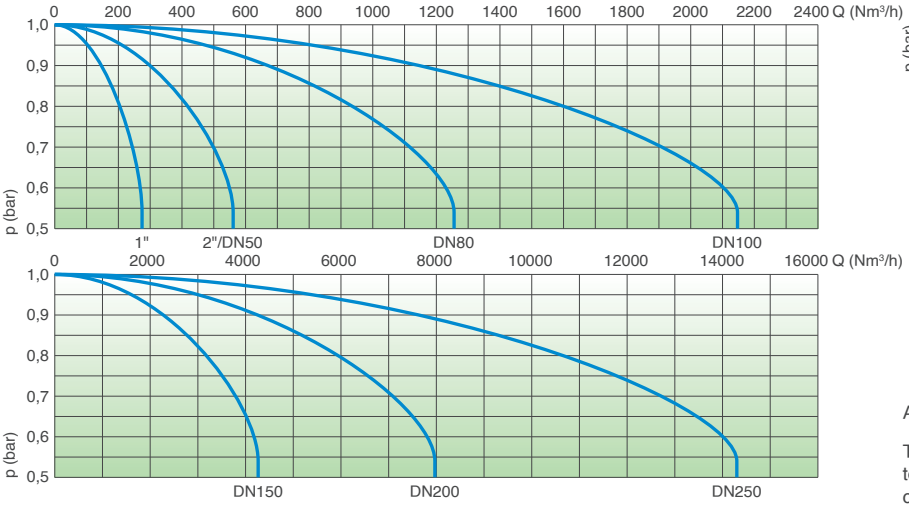




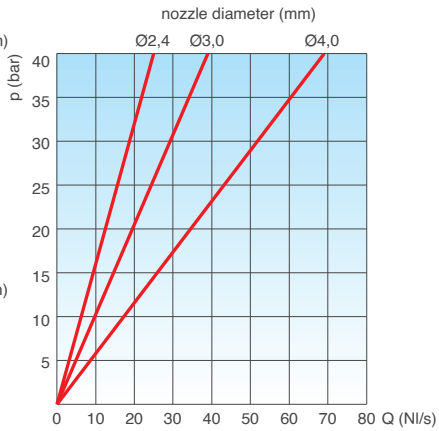
AIR RELEASE DURING WORKING CONDITIONS

Air flow performance charts

AIR ENTRANCE DURING PIPE DRAINING



AIR ENTRANCE DURING PIPE DRAINING



AIR RELEASE DURING WORKING CONDITIONS

The air flow charts were created in Kg/s from laboratory tests and numerical analysis, without the screen, then converted in Nm³/h using a safety factor.

Working conditions

Treated water max. 60°C.
Max. pressure 40 bar.
Min. pressure 0,2 bar. Lower on request.

Standard

Designed in compliance with EN-1074/4 and AWWA C-512. Flanges according to EN 1092/2 or ANSI 150. Epoxy painting applied through fluidized bed technology blue RAL 5005. Changes on the flanges and painting on request.

Weights and dimensions

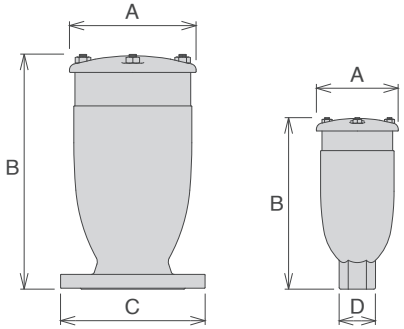
CONNECTION inch/mm	A mm	B mm	C mm		D mm	Weight Kg
Threaded 1"	117	240	-	-	CH 45	4,0
Threaded 2"	141	295	-	-	CH 70	7,5
Flanged 50	141	305	165	-	-	9,5
Flanged 80	172	322	210	205	-	13,8
Flanged 100	206	370	235	220	-	21,7
Flanged 150	285	555	305	285	-	44,5
Flanged 200	365	635	375	340	-	85,0
Flanged 250	450	785	450	405	-	134,0

All values are approximate, consult PF service for more details.

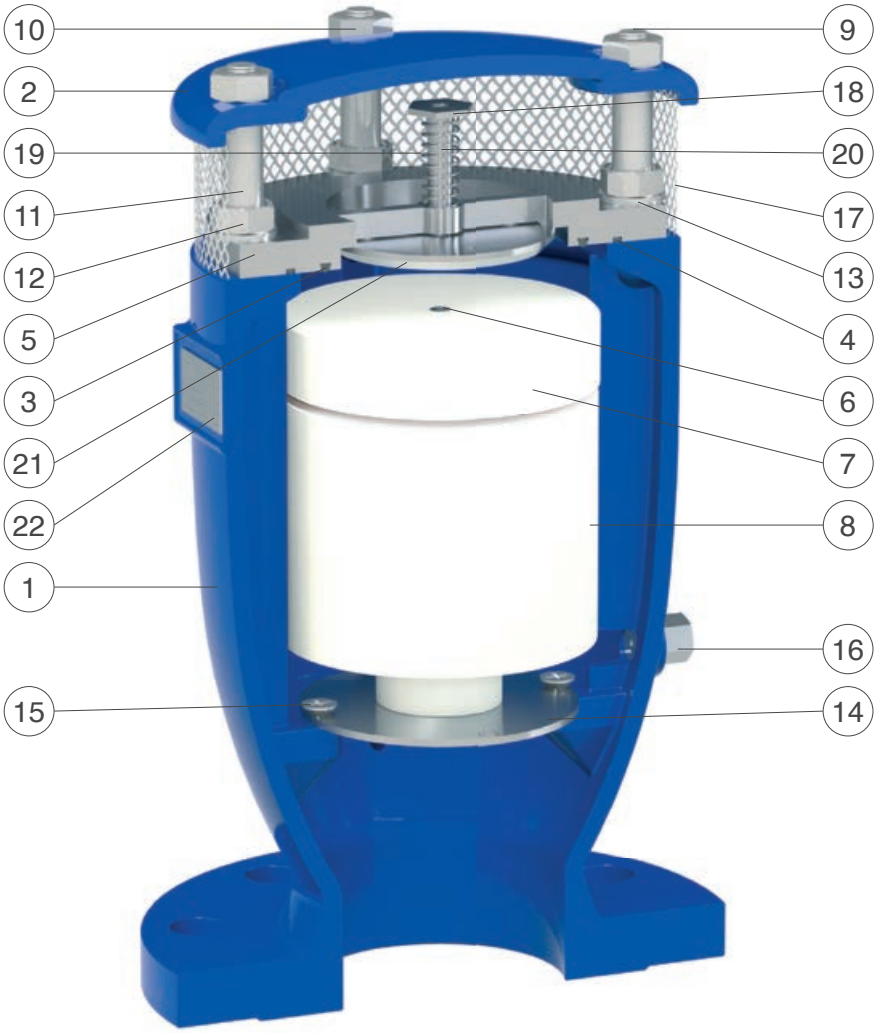
Nozzle choice

Nozzle diameter in mm according to the size of the air valve and the PN.

	PN 10	PN 16	PN 25	PN 40
1"	1,2	1,2	1	0,8
2"/DN 50	1,5	1,2	1	0,8
DN 80	1,8	1,5	1,2	1
DN 100	2,4	1,8	1,8	1,2
DN 150	4	3	2,4	1,8
DN 200	4	4	4	3
DN 250	4	4	4	4



Technical details



N.	Component	Standard material	Optional
1	Body	ductile cast iron GJS 450-10	
2	Cap	ductile cast iron GJS 450-10	
3	O-ring	NBR	EPDM/Viton/silicone
4	O-ring	NBR	EPDM/Viton/silicone
5	Seat	stainless steel AISI 304	stainless steel AISI 316
6	Nozzle subset	stainless steel AISI 316	
7	Upper flat	polypropylene	
8	Float	polypropylene	
9	Studs	stainless steel AISI 304	stainless steel AISI 316
10	Nuts	stainless steel AISI 304	stainless steel AISI 316
11	Spacers	stainless steel AISI 304	stainless steel AISI 316
12	Nuts	stainless steel AISI 304	stainless steel AISI 316
13	Washers	stainless steel AISI 304	stainless steel AISI 316
14	Deflector (not in 1")	stainless steel AISI 304	stainless steel AISI 316
15	Screws	stainless steel AISI 304	stainless steel AISI 316
16	Drain valve	stainless steel AISI 303	stainless steel AISI 316
17	Screen	stainless steel AISI 304	
18	Spring guide nut (from DN 100)	stainless steel AISI 303	stainless steel AISI 316
19	Spring	stainless steel AISI 302	stainless steel AISI 316
20	AWH shaft	stainless steel AISI 303	stainless steel AISI 316
21	AWH flat	stainless steel AISI 304	stainless steel AISI 316
22	Tag	stainless steel AISI 304	

The list of materials and components is subject to changes without notice.

Anti-surge combination air valve
Mod. WAVE 3S-CSF

The PF surge dampening, anti-slam automatic air valve Mod. WAVE 3S-CSF has been designed to allow the release of air pockets accumulated in working conditions, the entrance of large volumes of air in case of pipe draining or bursts and to prevent pipeline damages coming from pressure transients, associated with high air outflow velocities.

Technical features and benefits

- Uncontrolled pipeline filling operations and transient events will inevitably generate the rapid closure of the air valves installed along the system, with consequent damages. The PF air valve WAVE 3S-CSF will automatically adjust the outflow capacity, thus reducing the velocity of the incoming water column minimizing the risk of water hammer.
- The spray effect during closing and the risk of drowning, compared to standard combination air valves, are reduced.
- Single chamber full bore body in ductile cast iron, PN 40 bar rated, provided with internal ribs for accurate guiding of the mobile block.
- Mobile block composed of the main float and upper disk, joined together by the PF air release system in AISI 316, and an additional anti surge obturator.
- Nozzle and gasket holder, part of PF air release system, entirely made in AISI 316.
- Cover in ductile and screen in stainless steel as a standard execution, to prevent the entrance of insects, with optional outlet for submerged applications and air conveyance.

Applications

- Main transmission lines.
- Water distribution networks.
- Irrigation systems.
- In general this model is used, in combination with PF AWH technology, on changes in slope and high points of the profile to provide the best air management and control with effective surge protection.

Operating principle

Discharge of large volumes of air

During the pipe filling it is necessary to discharge air as water flows in. The WAVE 3S-CSF, thanks to an aerodynamic full port body and deflector, will make sure to avoid premature closures of the mobile block during this phase.

Controlled outflow

If the differential pressure of air, during pipe filling, increases above a certain value without control there is the risk of water hammer and damages to the system. Should that happen the CSF upper float will rise automatically, reducing the outflow and consequently the velocity of the approaching water column.

Air release during working conditions

During operation the air produced by the pipeline is accumulated in the upper part of the air valve. Little by little it is compressed and the pressure arrives to water pressure, therefore its volume increases pushing the water level downwards allowing the air release through the nozzle.

Entrance of large volumes of air

During pipeline draining, or pipe bursts, it is necessary to bring in as much air as the quantity of outflowing water to avoid negative pressure and serious damages to the pipeline, and to the entire system.

Optional

▪ **Vacuum breaker version Mod. WAVE 2S-CSF**, to allow the entrance of large volumes of air and the controlled outflow only. This model is normally recommended in changes in slope ascending, long ascending segments, dry fire systems, and wherever the water hammer effect has to be reduced without the necessity of air release.

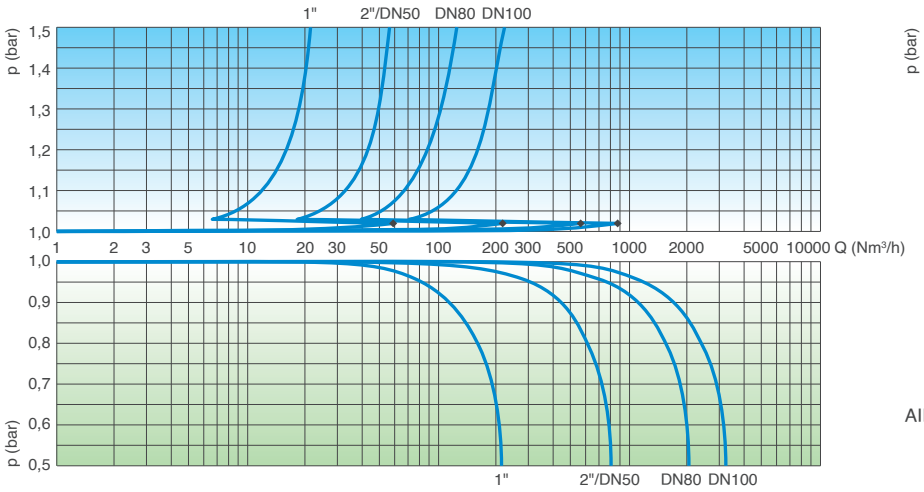
▪ **Version for submerged applications, SUB series,** available both for WAVE 3S-CSF and 2S-CSF Models, with threaded elbow for air conveyance. The design sprang from the necessity of having an air valve performing also in case of flood, without the risk of contaminated water entering the pipeline. Another benefit of SUB is the possibility of conveying spurts coming from the closure away from the air valve.

▪ **Version for air discharge only EO series**, available both for WAVE 3S-CSF and 2S-CSF models. The most important application of EO is to allow the air valve installation in those locations of the system where HGL may drop below the pipe profile, and to any other node where for project requirements air entrance must be avoided, such as in pump suction lines or siphons pipelines.

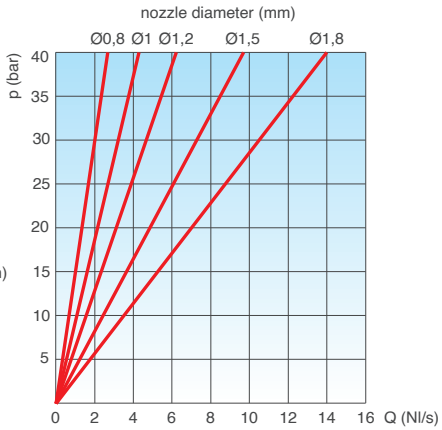
Technical data

Air flow performance charts

AIR DISCHARGE DURING PIPE FILLING

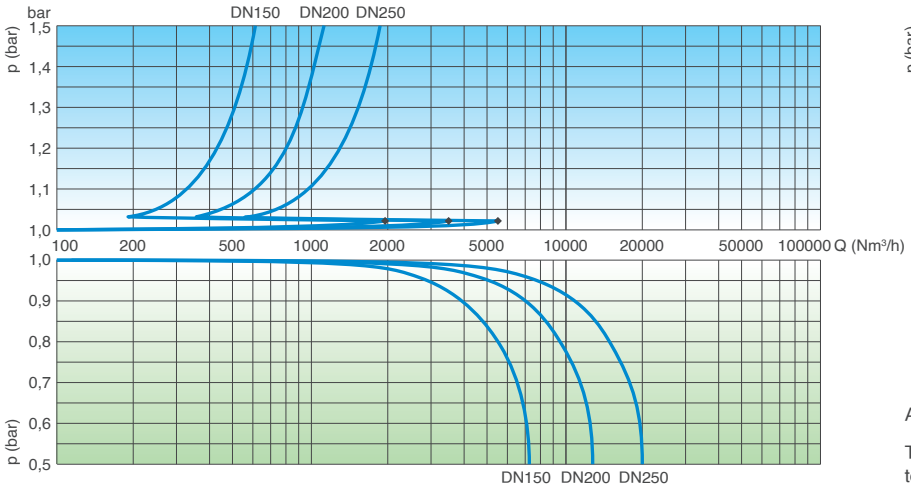


AIR ENTRANCE DURING PIPE DRAINING

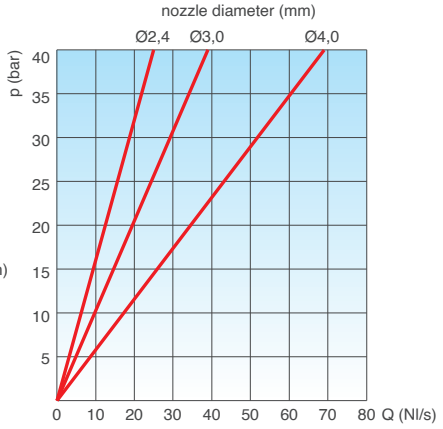


AIR RELEASE DURING WORKING CONDITIONS

AIR DISCHARGE DURING PIPE FILLING



AIR ENTRANCE DURING PIPE DRAINING



AIR RELEASE DURING WORKING CONDITIONS

The air flow charts were created in Kg/s from laboratory tests and numerical analysis, without the screen, then converted in Nm³/h using a safety factor.

Working conditions

Treated water max. 60°C.
Max. pressure 40 bar.
Min. pressure 0,2 bar. Lower on request.

Standard

Designed in compliance with EN-1074/4 and AWWA C-512. Flanges according to EN 1092/2 or ANSI 150. Epoxy painting applied through fluidized bed technology blue RAL 5005. Changes on the flanges and painting on request.

Weights and dimensions

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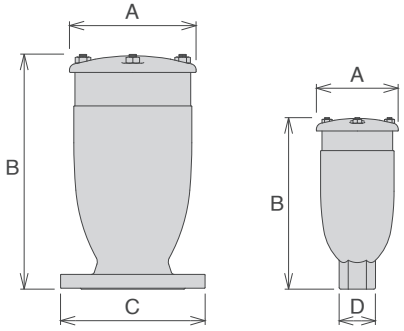
Threaded 1"	117	240	-	-	CH 45	4,0
Threaded 2"	141	295	-	-	CH 70	7,5
Flanged 50	141	305	165	-	-	9,5
Flanged 80	172	322	210	205	-	13,8
Flanged 100	206	370	235	220	-	21,7
Flanged 150	285	555	305	285	-	44,5
Flanged 200	365	635	375	340	-	85,0
Flanged 250	450	785	450	405	-	134,0

All values are approximate, consult PF service for more details.

Nozzle choice

Nozzle diameter in mm according to the size of the air valve and the PN.

	PN 10	PN 16	PN 25	PN 40
1"	1,5	1,2	1	0,8
2"/DN 50	1,8	1,5	1,2	1
DN 80	1,8	1,5	1,2	1
DN 100	3	2,4	1,8	1,2
DN 150	4	3	2,4	1,8
DN 200	4	4	4	3
DN 250	4	4	4	4



Technical details

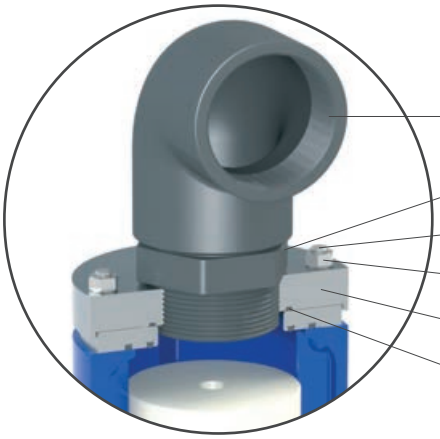
N.	Component	Standard material	Optional
1	Body	ductile cast iron GJS 450-10	
2	Cap	ductile cast iron GJS 450-10	
3	O-ring	NBR	EPDM/Viton/silicone
4	O-ring	NBR	EPDM/Viton/silicone
5	Seat	stainless steel AISI 304	stainless steel AISI 316
6	CSF flat with O-ring	polypropylene and NBR	EPDM/Viton/silicone
7	Upper flat with nozzle subset	polypropylene and stainless steel AISI 316	
8	Float	polypropylene	
9	Studs	stainless steel AISI 304	stainless steel AISI 316
10	Nuts	stainless steel AISI 304	stainless steel AISI 316
11	Spacers	stainless steel AISI 304	stainless steel AISI 316
12	Nuts	stainless steel AISI 304	stainless steel AISI 316
13	Washers	stainless steel AISI 304	stainless steel AISI 316
14	Deflector (not in 1")	stainless steel AISI 304	stainless steel AISI 316
15	Screws	stainless steel AISI 304	stainless steel AISI 316
16	Drain valve	stainless steel AISI 303	stainless steel AISI 316
17	Screen	stainless steel AISI 304	
18	Tag	stainless steel AISI 304	

The list of materials and components is subject to changes without notice.

Pietro Fiorentini

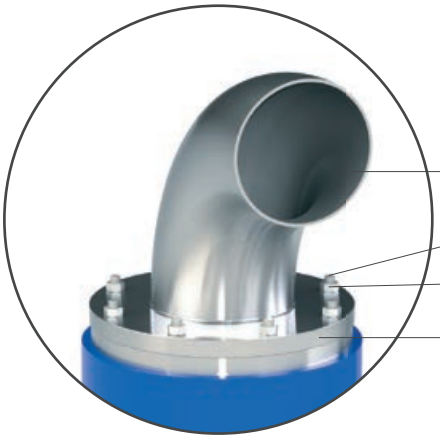
WAVE air valves range conveyance system bias kit - Mod. SUB

The air conveyance system SUB, provided with watertight threaded elbow for submerged applications, has been created to be retrofitted on existing PF WAVE air valves or as a standalone version. The design sprang from the necessity of having an air valve performing also in case of flood, without the risk of contaminated water entering the pipeline. Another benefit of SUB is the possibility of conveying spurts coming from the rapid closure of the air valve.



1"- 2", DN 50 - 150

- Threaded elbow in PVC (PP for DN 25-50)
- Fitting in PVC (PP for DN 25-50)
- Studs in stainless steel
- Bolts in stainless steel
- SUB flat in PP or stainless steel
- O-ring in EPDM, NBR, Viton or silicone



DN 200 - 250 *

- Elbow in stainless steel
- Studs in stainless steel
- Bolts in stainless steel
- SUB flat in stainless steel

Technical data

Working conditions

Treated water max. 60°C.
Max. pressure 40 bar.
Min. pressure 0,2 bar.
Lower on request.

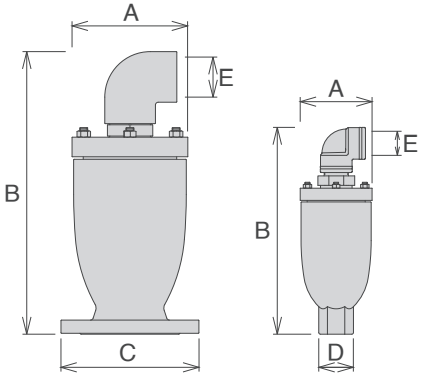
Standard

Designed in compliance with EN-1074/4 and AWWA C-512.
Flanges according to EN 1092/2 or ANSI 150.
Epoxy painting applied through fluidized bed technology blue RAL 5005.
Changes on flanges and painting on request.

Weights and dimensions

CONNECTION inch/mm	A mm	B mm	C mm		D mm	E inch	Weight Kg
Threaded 1"	105	302	-	-	CH 45	1"	4,0
Threaded 2"	128	385	-	-	CH 70	2"	7,5
Flanged 50	128	395	165	-	-	2"	9,5
Flanged 80	158	439	210	205	-	2" 1/2	13,8
Flanged 100	192	507	235	220	-	3"	21,7
Flanged 150	272	648	305	285	-	4"	44,5
Flanged 200	359	828	375	340	-	*	92,5
Flanged 250	430	1060	450	405	-	*	147,0

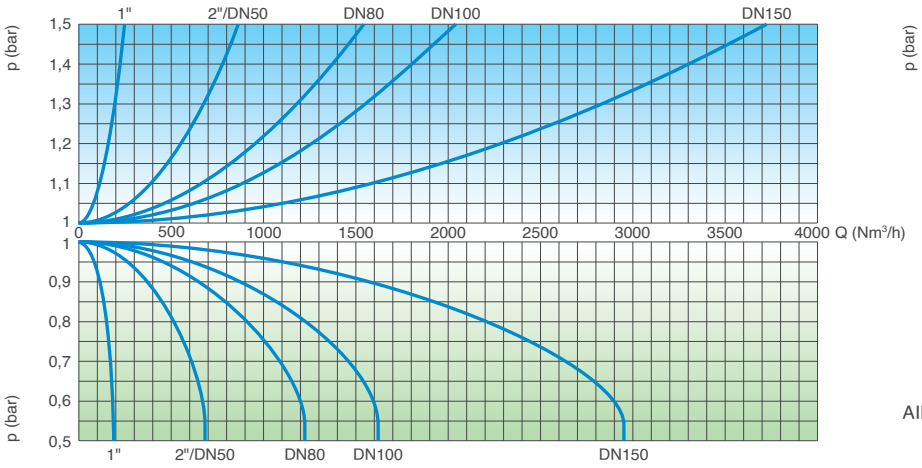
Approximate values. - *: Mod. SUB is stock available up to DN 150 mm, for larger sizes consult with PF.

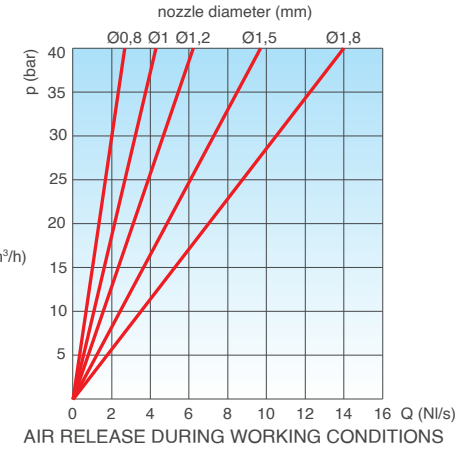


Technical data

WAVE SUB - Air flow performance charts

AIR DISCHARGE DURING PIPE FILLING



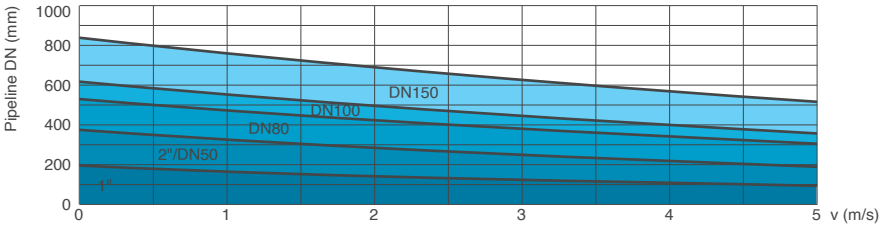


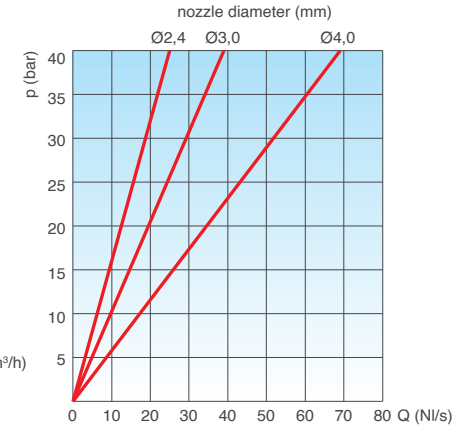
AIR RELEASE DURING WORKING CONDITIONS

AIR ENTRANCE DURING PIPE DRAINING

WAVE AWH SUB - Air valve selection chart

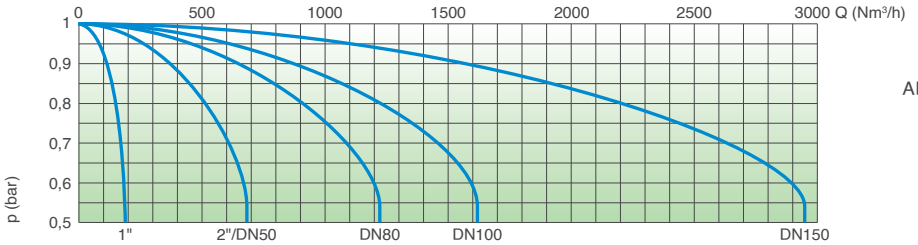
Air valve preliminary sizing as a function of pipeline internal diameter and fluid flow velocity in m/s.





AIR RELEASE DURING WORKING CONDITIONS

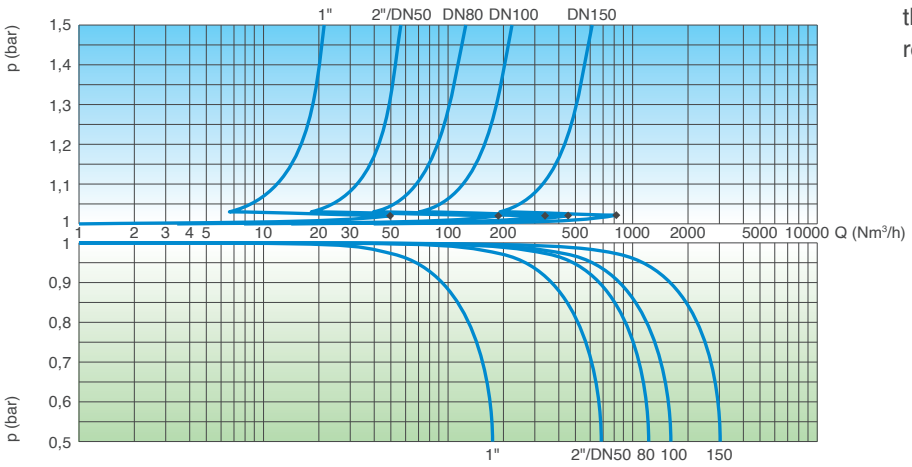
WAVE AWH SUB - Air flow performance chart



AIR ENTRANCE DURING PIPE DRAINING

WAVE CSF SUB - Air flow performance charts

AIR DISCHARGE DURING PIPE FILLING



AIR ENTRANCE DURING PIPE DRAINING

Nozzle choice

For the nozzle choice make reference to the available technical data sheets of the relative WAVE models.

The air flow charts were created in Kg/s from laboratory tests and numerical analysis, then converted in Nm³/h using a safety factor.

Combination air valve
Mod. WAVE LITE 3S

The PF combination, triple function, automatic air valve Mod. WAVE LITE 3S will ensure the proper operation of the pipeline network allowing the release of air pockets during working conditions, the evacuation and entrance of large volumes of air during filling and draining operations.

Technical features and benefits

- Single chamber body in ductile cast iron, PN 40 bar rated, provided with internal ribs for accurate guiding of the floats.
- Aerodynamic deflector in stainless steel to avoid premature closures of the mobile block.
- Drainage valve, produced by PF, for chamber control and pressure relief during maintenance.
- Mobile block composed of a cylindrical float and upper disk in solid polypropylene, joined together by the PF air release system in AISI 316. The solid cylindrical floats, obtained by CNC machining, avoid deformations and ensure a great sliding precision inside the body processed ribs and a perfectly vertical thrust.
- Nozzle and gasket holder, part of PF air release system, entirely made in AISI 316 and designed with gasket compression control to prevent aging process and consequent leakage during working conditions.
- Maintenance can be easily performed from the top, without removing the air valve from the pipe.
- Cover in ductile and screen in stainless steel as a standard execution to prevent the entrance of insects, with three optional outlets (for submerged applications, air inlet only, air outlet only).

Applications

- Main transmission lines.
- Water distribution networks.
- Irrigation systems.
- In general this model is used on changes in slope and at the high points of the pipeline.

Operating principle

Discharge of large volumes of air

During the pipe filling it is necessary to discharge air as water flows in. The WAVE LITE 3S, thanks to the aerodynamic body and the deflector, will make sure to avoid premature closures of the mobile block during this phase.

Air release during working conditions

During operation the air produced by the pipeline is accumulated in the upper part of the air valve. Little by little it is compressed and the pressure arrives to water pressure, therefore its volume increases pushing the water level downwards allowing the air release through the nozzle.

Entrance of large volumes of air

During pipeline draining, or pipe bursts, it is necessary to bring in as much air as the quantity of outflowing water to avoid negative pressure and serious damages to the pipeline, and to the entire system.

Optional

▪ **Vacuum breaker version Mod. WAVE LITE 2S**, to allow the entrance and discharge of large volumes of air only. This model is normally recommended in changes in slope ascending, long ascending segments, dry fire systems, and wherever the air release won't be required.

▪ **Version for submerged applications**, **SUB series,** available both for WAVE LITE 3S and 2S Models, with threaded elbow for air conveyance. The design sprang from the necessity of having an air valve performing also in case of flood, without the risk of contaminated water entering the pipeline. Another benefit of SUB is the possibility of conveying spurts coming from the rapid closure of the air valve.

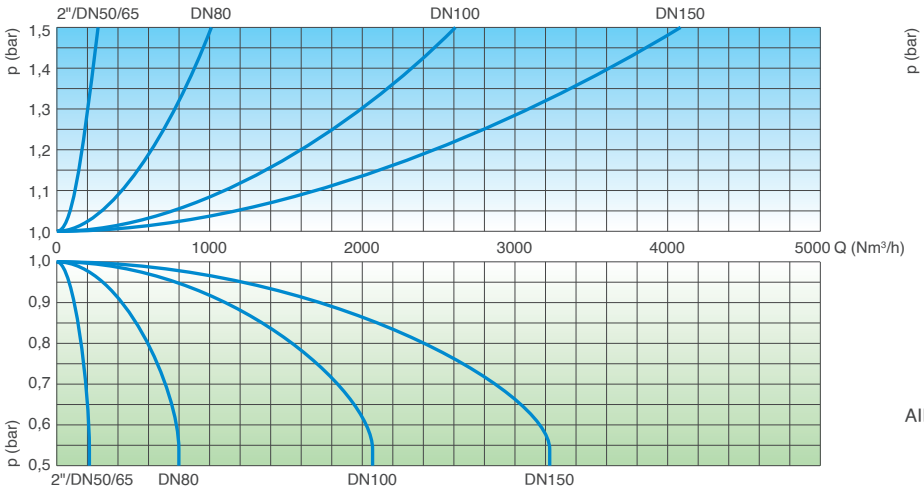
▪ **Version for air discharge only EO series**, available both for WAVE LITE 3S and 2S models. The most important application of EO is to allow the air valve installation in those locations of the system where HGL may drop below the pipe profile, and to any other node where for project requirements air entrance must be avoided, such as in pump suction lines or siphons pipelines.

▪ **Version for air entrance only IO series**, available for WAVE LITE 2F model only. The most important application of IO is to allow the air valve installation in those locations of the system where, for project requirements, air discharge and release must be avoided.

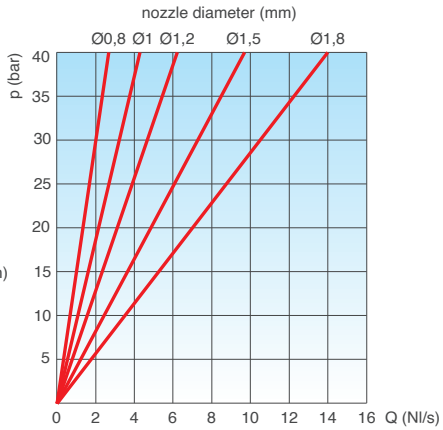
Technical data

Air flow performance charts

AIR DISCHARGE DURING PIPE FILLING

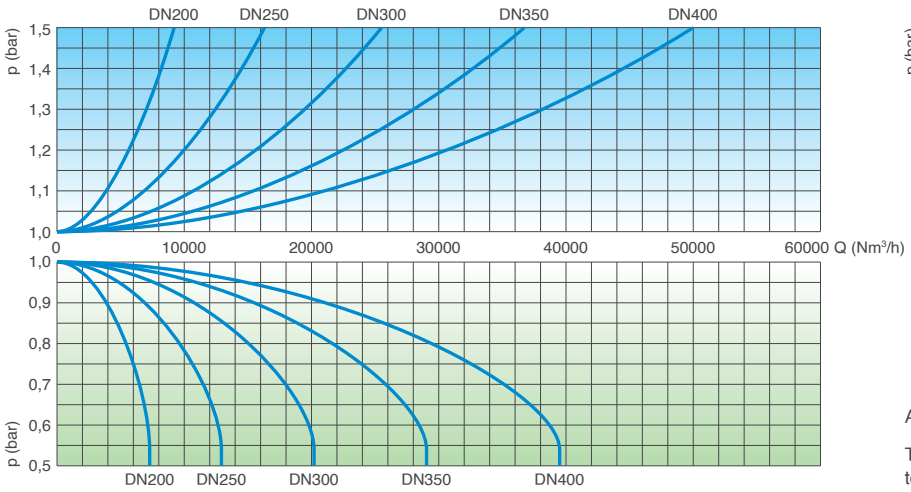


AIR ENTRANCE DURING PIPE DRAINING

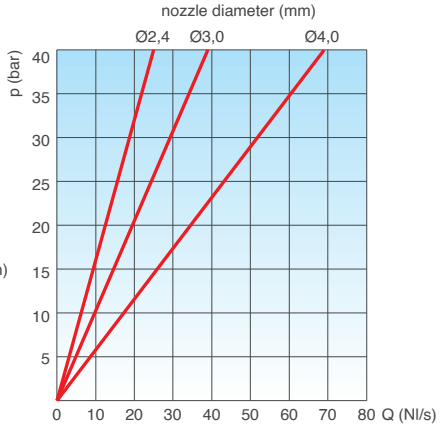


AIR RELEASE DURING WORKING CONDITIONS

AIR DISCHARGE DURING PIPE FILLING



AIR ENTRANCE DURING PIPE DRAINING



AIR RELEASE DURING WORKING CONDITIONS

The air flow charts were created in Kg/s from laboratory tests and numerical analysis, without the screen, then converted in Nm³/h using a safety factor.

Working conditions

Treated water max. 60°C.
Max. pressure 40 bar.
Min. pressure 0,2 bar. Lower on request.

Nozzle choice

Nozzle diameter in mm according to the air valve size and the PN.

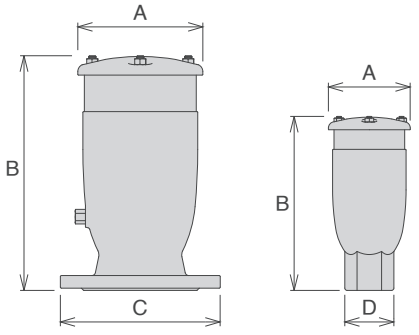
	PN 10	PN 16	PN 25	PN 40
2"-DN 65	1,2	1,2	1	0,8
DN 80	1,8	1,5	1,2	0,8
DN 100	1,8	1,5	1,2	1
DN 150	2,4	1,8	1,8	1,2
DN 200	4	3	2,4	1,8
DN 250	4	4	3	2,4
DN 300	4	4	4	4
DN 350	4	4	4	4
DN 400	4	4	4	4

Standard

Designed in compliance with EN-1074/4 and AWWA C-512. Flanges according to EN 1092/2 or ANSI 150. Epoxy painting applied through fluidized bed technology blue RAL 5005. Changes on the flanges and painting on request.

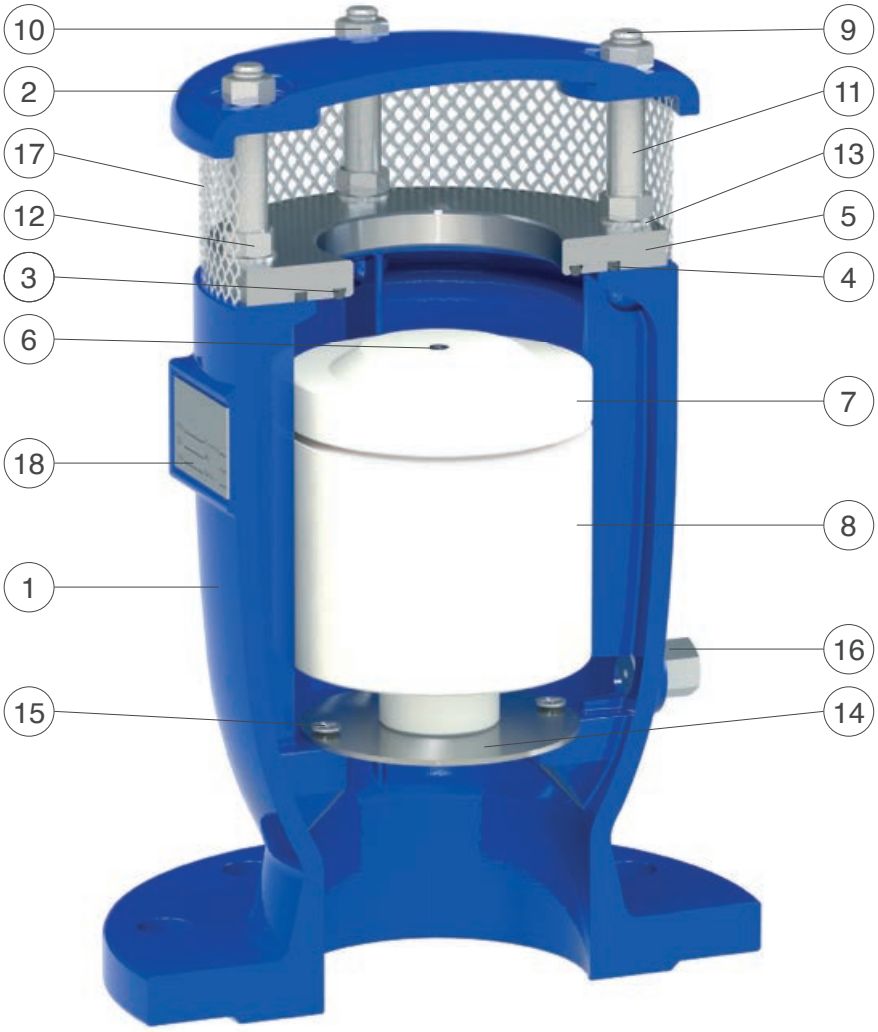
Weights and dimensions

CONNECTION inch/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



Values are approximate, consult PF service for more details.

Technical details



N.	Component	Standard material	Optional
1	Body	ductile cast iron GJS 450-10	
2	Cap	ductile cast iron GJS 450-10	
3	O-ring	NBR	EPDM/Viton/silicone
4	O-ring	NBR	EPDM/Viton/silicone
5	Seat	stainless steel AISI 304	stainless steel AISI 316
6	Nozzle Subset	stainless steel AISI 316	
7	Upper flat	polypropylene	
8	Float	polypropylene	
9	Studs	stainless steel AISI 304	stainless steel AISI 316
10	Nuts	stainless steel AISI 304	stainless steel AISI 316
11	Spacers	stainless steel AISI 304	stainless steel AISI 316
12	Nuts	stainless steel AISI 304	stainless steel AISI 316
13	Washers	stainless steel AISI 304	stainless steel AISI 316
14	Deflector (not in 1")	stainless steel AISI 304	stainless steel AISI 316
15	Screws	stainless steel AISI 304	stainless steel AISI 316
16	Drain valve	stainless steel AISI 303	stainless steel AISI 316
17	Screen	stainless steel AISI 304	
18	Tag	stainless steel AISI 304	

The list of materials and components is subject to changes without notice.

Anti-water hammer combination air valve Mod. WAVE LITE 3S-AWH

The PF surge alleviation, non slam combination automatic air valve Mod. WAVE LITE 3S-AWH will ensure the proper operation of the pipeline network allowing the release of air pockets during working conditions, the entrance of large volumes of air during draining operations and pipeline bursts and the air discharge with controlled speed, to prevent water hammer.

Technical features and benefits

- Single chamber body in ductile cast iron, PN 40 bar rated, provided with internal ribs for accurate guiding of the mobile block.
- Drainage valve produced by PF, for chamber control and pressure relief during maintenance.
- Mobile block composed of a cylindrical float and upper disk in solid polypropylene, joined together by the PF air release system in AISI 316. The solid cylindrical floats, obtained by CNC machining only, avoid deformations and ensure a great sliding precision inside the body processed ribs and a perfectly vertical thrust.
- Nozzle and gasket holder, part of PF air release system, entirely made in AISI 316.
- Maintenance can be easily performed from the top, without removing the air valve from the pipe.
- Anti water hammer system (also called AWH function), never in contact with water, obtained by a spring and shaft in stainless steel, and a disk with adjustable nozzles for air outflow control.
- Cover in ductile and screen in stainless steel as a standard execution, to prevent the entrance of insects, with optional outlet for submerged applications.

Applications

- Main transmission lines.
- Water distribution networks.
- Irrigation systems.
- In general this model is used at the pumps, on changes in slope ascending, and at the critical points of the pipeline subjected to water hammer and column separation.

Operating principle

Controlled air discharge

During the air discharge it is necessary to avoid rapid closures of the float, responsible of water hammer effects. The WAVE LITE 3S-AWH, thanks to the anti-shock feature, will control the air outflow thus reducing the velocity of the approaching water column and minimizing the risk of overpressure.

Air release during working conditions

During operation the air produced by the pipeline is accumulated in the upper part of the air valve. Little by little it is compressed and the pressure arrives to water pressure, therefore its volume increases pushing the water level downwards allowing the air release through the nozzle.

Entrance of large volumes of air

During pipeline draining, or pipe bursts, it is necessary to bring in as much air as the quantity of outflowing water to avoid negative pressure and serious damages to the pipeline, and to the entire system.

Optional

▪ **Vacuum breaker version Mod. WAVE LITE 2S-AWH**, to allow the entrance of large volumes of air and the controlled outflow only. This model is normally recommended in changes in slope ascending, long ascending segments, dry fire systems.

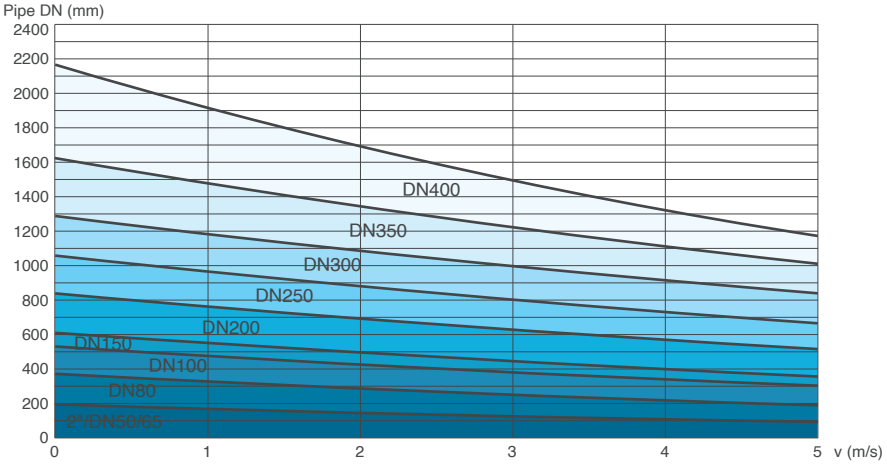
▪ **Version for submerged applications, SUB series,** available both for WAVE LITE 3S-AWH and 2S AWH Models, with threaded elbow for air conveyance. The design sprang from the necessity of having an air valve performing also in case of flood, without the risk of contaminated water entering the pipeline. Another benefit of SUB is the possibility of conveying spurts coming from the closure away from the air valve.

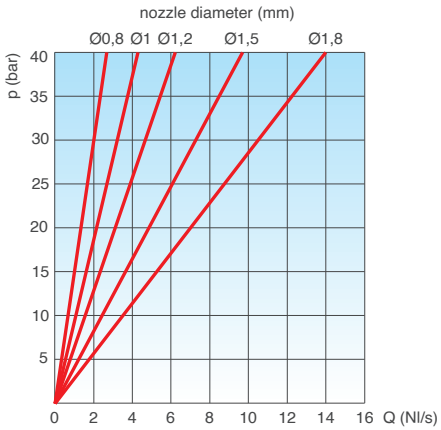
▪ The counteracting spring force as well as the sonic nozzles, both responsible of the proper operation of the AWH device, can be modified on request according to the project conditions and the results of the transient analysis.

Technical data

Air valve selection chart

Air valve preliminary sizing as a function of pipeline internal diameter and fluid flow velocity in m/s.

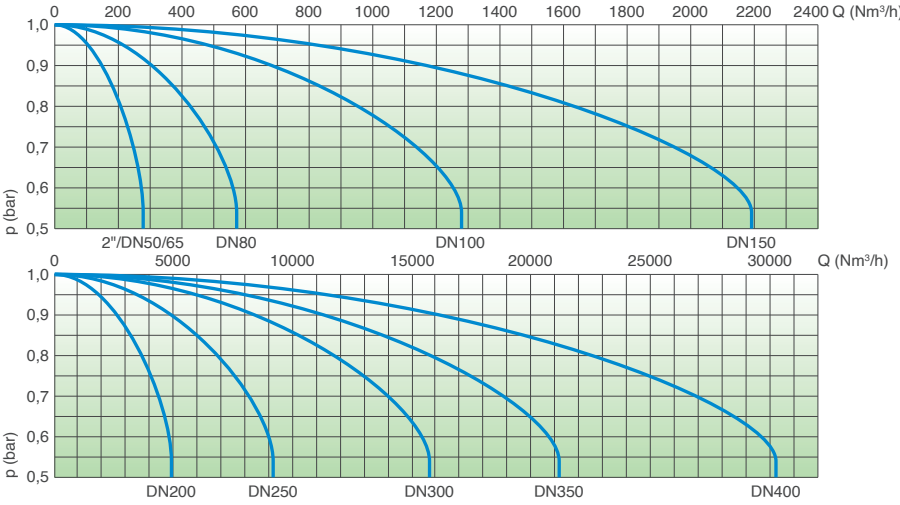




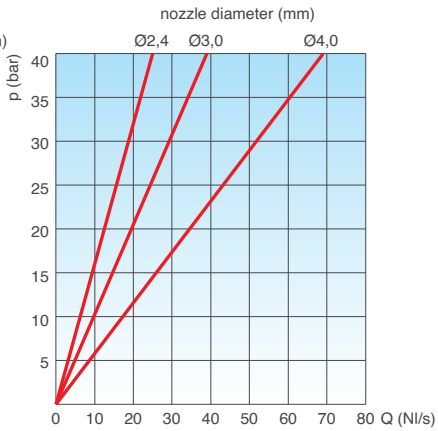
AIR RELEASE DURING WORKING CONDITIONS

Air flow performance charts

AIR ENTRANCE DURING PIPE DRAINING



AIR ENTRANCE DURING PIPE DRAINING



AIR RELEASE DURING WORKING CONDITIONS

The air flow charts were created in Kg/s from laboratory tests and numerical analysis, without the screen, then converted in Nm³/h using a safety factor.

Working conditions

Treated water max. 60°C.
Max. pressure 40 bar.
Min. pressure 0,2 bar. Lower on request.

Nozzle choice

Nozzle diameter in mm according to the air valve size and the PN.

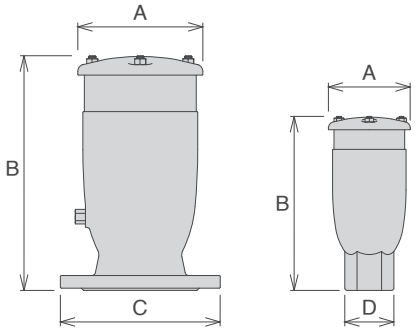
	PN 10	PN 16	PN 25	PN 40
2"-DN 65	1,2	1,2	1	0,8
DN 80	1,8	1,5	1,2	0,8
DN 100	1,8	1,5	1,2	1
DN 150	2,4	1,8	1,8	1,2
DN 200	4	3	2,4	1,8
DN 250	4	4	3	2,4
DN 300	4	4	4	4
DN 350	4	4	4	4
DN 400	4	4	4	4

Standard

Designed in compliance with EN-1074/4 and AWWA C-512. Flanges according to EN 1092/2 or ANSI 150. Epoxy painting applied through fluidized bed technology blue RAL 5005. Changes on the flanges and painting on request.

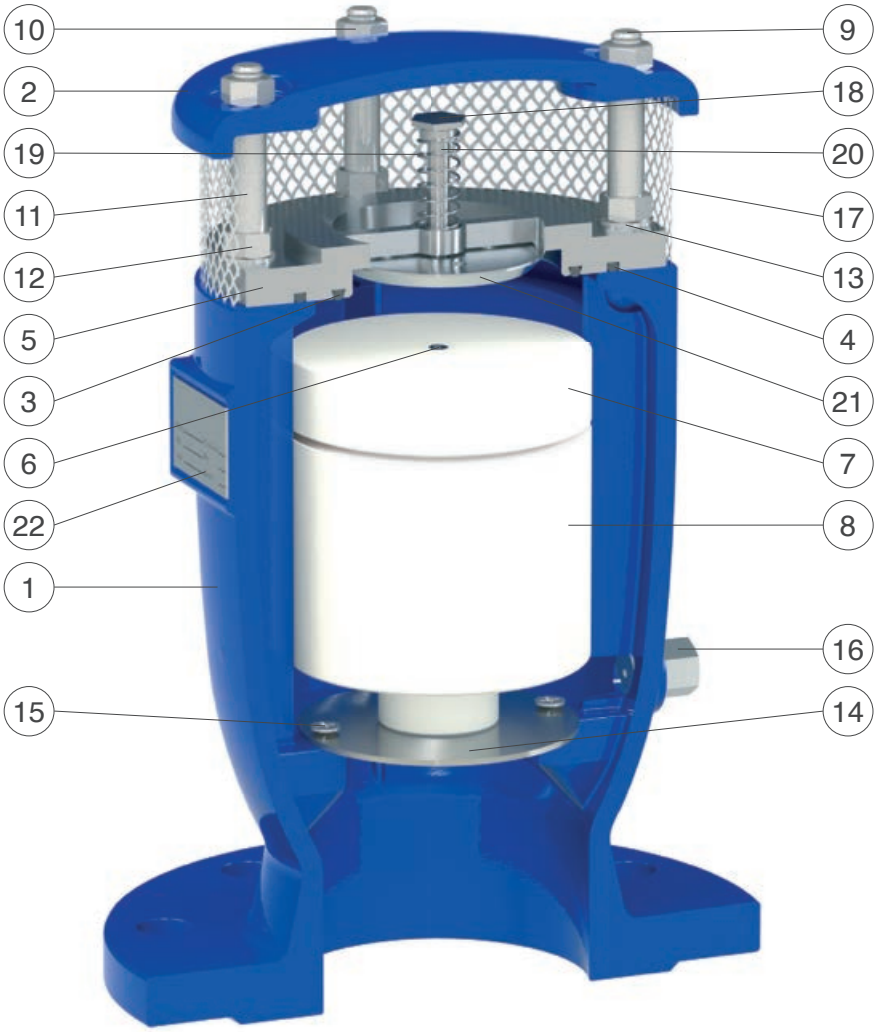
Weights and dimensions

CONNECTION inch/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



Values are approximate, consult PF service for more details.

Technical details



N.	Component	Standard material	Optional
1	Body	ductile cast iron GJS 450-10	
2	Cap	ductile cast iron GJS 450-10	
3	O-ring	NBR	EPDM/Viton/silicone
4	O-ring	NBR	EPDM/Viton/silicone
5	Seat	stainless steel AISI 304	stainless steel AISI 316
6	Nozzle subset	stainless steel AISI 316	
7	Upper flat	polypropylene	
8	Float	polypropylene	
9	Studs	stainless steel AISI 304	stainless steel AISI 316
10	Nuts	stainless steel AISI 304	stainless steel AISI 316
11	Spacers	stainless steel AISI 304	stainless steel AISI 316
12	Nuts	stainless steel AISI 304	stainless steel AISI 316
13	Washers	stainless steel AISI 304	stainless steel AISI 316
14	Deflector (not in 1")	stainless steel AISI 304	stainless steel AISI 316
15	Screws	stainless steel AISI 304	stainless steel AISI 316
16	Drain valve	stainless steel AISI 303	stainless steel AISI 316
17	Screen	stainless steel AISI 304	
18	Spring guide nut (from DN 150)	stainless steel AISI 303	stainless steel AISI 316
19	Spring	stainless steel AISI 302	stainless steel AISI 316
20	AWH shaft	stainless steel AISI 303	stainless steel AISI 316
21	AWH flat	stainless steel AISI 304	stainless steel AISI 316
22	Tag	stainless steel AISI 304	

The list of materials and components is subject to changes without notice.

Anti-surge combination air valve Mod. WAVE LITE 3S-CSF

The PF surge dampening, anti-slam automatic air valve Mod. WAVE LITE 3S-CSF has been designed to allow the release of air pockets accumulated in working conditions, the entrance of large volumes of air in case of pipe draining or bursts and to prevent pipeline damages coming from pressure transients, associated with high air outflow velocities.

Technical features and benefits

- Uncontrolled pipeline filling operations and transient events will inevitably generate the rapid closure of the air valves installed along the system, with consequent damages. The PF air valve WAVE LITE 3S-CSF will automatically adjust the outflow capacity, thus reducing the velocity of the incoming water column minimizing the risk of water hammer.
- The spray effect during closing and the risk of drowning, compared to standard combination air valves, are reduced.
- Single chamber body in ductile cast iron, PN 40 bar rated, provided with internal ribs accurate guiding of the mobile block.
- Mobile block composed of the main float and upper disk, joined together by the PF air release system in AISI 316, and an additional anti-surge obturator.
- Nozzle and gasket holder, part of PF air release system, entirely made in AISI 316.
- Cover in ductile and scree in stainless steel as a standard execution, to prevent the entrance of insects, with optional outlet for submerged applications and air conveyance.

Applications

- Main transmission lines.
- Water distribution networks.
- Irrigation systems.
- In general this model is used, in combination with PF AWH technology, on changes in slope and high points of the profile to provide the best air management and control with effective surge protection.

Operating principle

Discharge of large volumes of air

During the pipe filling it is necessary to discharge air as water flows in. The WAVE LITE 3S-CSF, thanks to the aerodynamic body and deflector, will make sure to avoid premature closures of the mobile block during this phase.

Controlled outflow

If the differential pressure of air, during pipe filling, increases above a certain value without control there is the risk of water hammer and damages to the system. Should that happen the CSF upper float will rise automatically, reducing the outflow and consequently the velocity of the approaching water column.

Air release during working conditions

During operation the air produced by the pipeline is accumulated in the upper part of the air valve. Little by little it is compressed and the pressure arrives to water pressure, therefore its volume increases pushing the water level downwards allowing the air release through the nozzle.

Entrance of large volumes of air

During pipeline draining, or pipe bursts, it is necessary to bring in as much air as the quantity of outflowing water to avoid negative pressure and serious damages to the pipeline, and to the entire system.

Optional

▪ **Vacuum breaker version Mod. WAVE LITE 2S-CSF**, to allow the entrance of large volumes of air and the controlled outflow only. This model is normally recommended in changes in slope ascending, long ascending segments, dry fire systems, and wherever the water hammer effect has to be reduced without the necessity of air release.

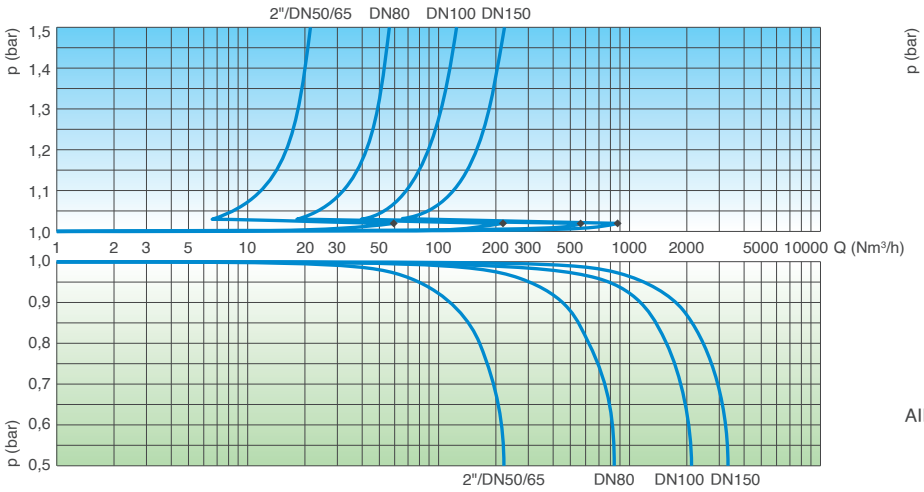
▪ **Version for submerged applications, SUB series,** available both for WAVE LITE 3S-CSF and 2S CSF Models, with threaded elbow for air conveyance. The design sprang from the necessity of having an air valve performing also in case of flood, without the risk of contaminated water entering the pipeline. Another benefit of SUB is the possibility of conveying spurts coming from the closure away from the air valve.

▪ **Version for air discharge only EO series**, available both for WAVE LITE 3S-CSF and 2S-CSF models. The most important application of EO is to allow the air valve installation in those locations of the system where HGL may drop below the pipe profile, and to any other node where for project requirements air entrance must be avoided, such as in pump suction lines or siphons pipelines.

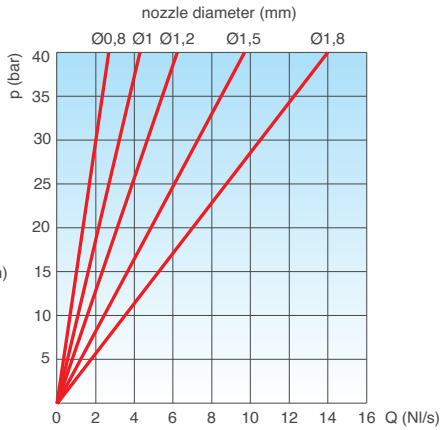
Technical data

Air flow performance charts

AIR DISCHARGE DURING PIPE FILLING

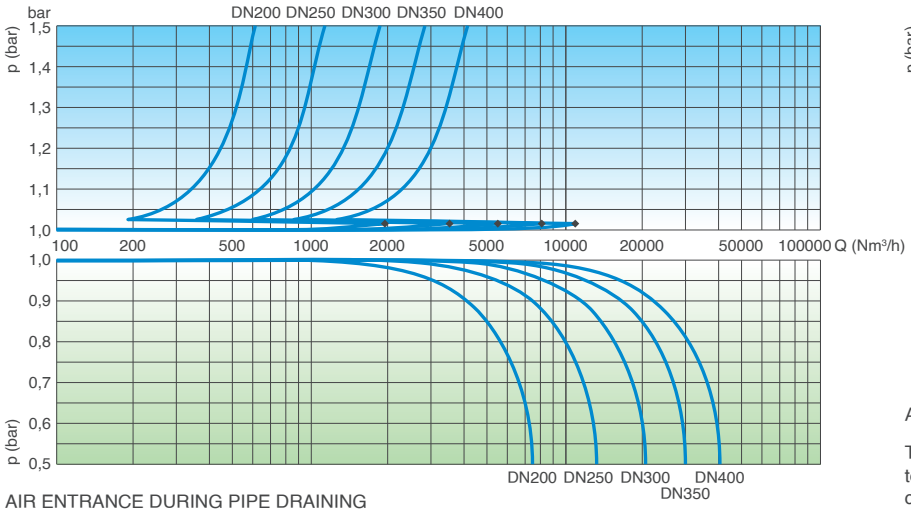


AIR ENTRANCE DURING PIPE DRAINING

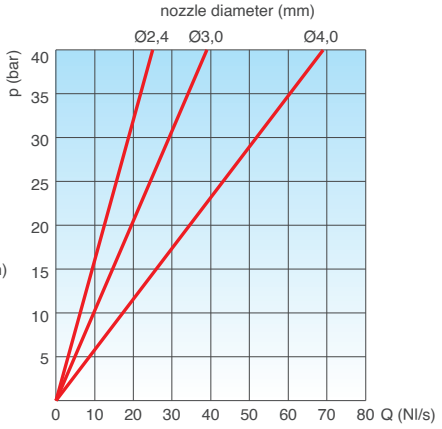


AIR RELEASE DURING WORKING CONDITIONS

AIR DISCHARGE DURING PIPE FILLING



AIR ENTRANCE DURING PIPE DRAINING



AIR RELEASE DURING WORKING CONDITIONS

The air flow charts were created in Kg/s from laboratory tests and numerical analysis, without the screen, then converted in Nm³/h using a safety factor.

Working conditions

Treated water max. 60°C.
Max. pressure 40 bar.
Min. pressure 0,2 bar. Lower on request.

Nozzle choice

Nozzle diameter in mm according to the air valve size and the PN.

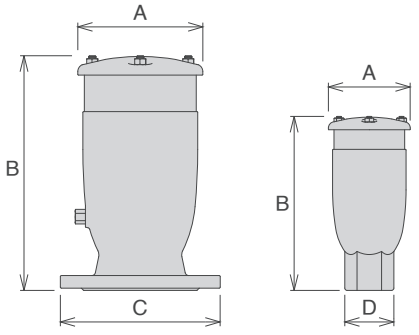
	PN 10	PN 16	PN 25	PN 40
2"-DN 65	1,5	1,2	1	0,8
DN 80	1,8	1,5	1,2	1
DN 100	1,8	1,5	1,2	1
DN 150	3	2,4	1,8	1,2
DN 200	4	3	2,4	1,8
DN 250	4	4	4	3
DN 300	4	4	4	4
DN 350	4	4	4	4
DN 400	4	4	4	4

Standard

Designed in compliance with EN-1074/4 and AWWA C-512. Flanges according to EN 1092/2 or ANSI 150. Epoxy painting applied through fluidized bed technology blue RAL 5005. Changes on the flanges and painting on request.

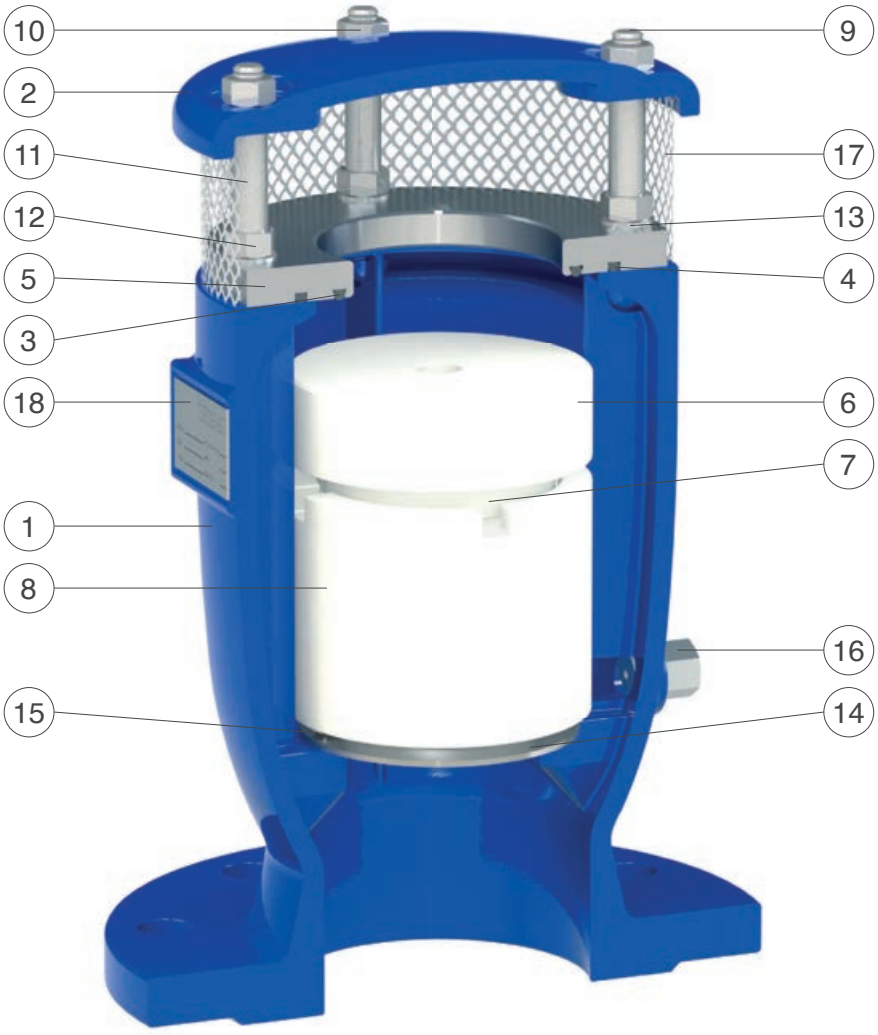
Weights and dimensions

CONNECTION inch/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



Values are approximate, consult PF service for more details.

Technical details



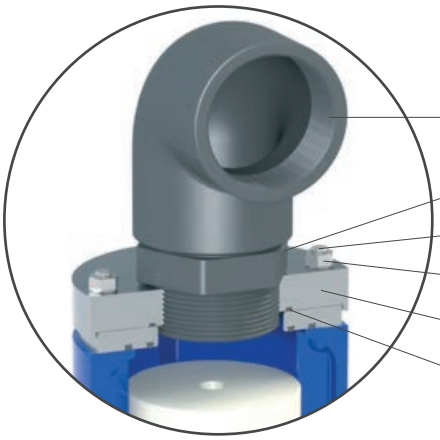
N.	Component	Standard material	Optional
1	Body	ductile cast iron GJS 450-10	
2	Cap	ductile cast iron GJS 450-10	
3	O-ring	NBR	EPDM/Viton/silicone
4	O-ring	NBR	EPDM/Viton/silicone
5	Seat	stainless steel AISI 304	stainless steel AISI 316
6	CSF flat with O-ring	polypropylene and NBR	EPDM/Viton/silicone
7	Upper flat with nozzle subset	polypropylene and stainless steel AISI 316	
8	Float	polypropylene	
9	Studs	stainless steel AISI 304	stainless steel AISI 316
10	Nuts	stainless steel AISI 304	stainless steel AISI 316
11	Spacers	stainless steel AISI 304	stainless steel AISI 316
12	Nuts	stainless steel AISI 304	stainless steel AISI 316
13	Washers	stainless steel AISI 304	stainless steel AISI 316
14	Deflector (not in 1")	stainless steel AISI 304	stainless steel AISI 316
15	Screws	stainless steel AISI 304	stainless steel AISI 316
16	Drain valve	stainless steel AISI 303	stainless steel AISI 316
17	Screen	stainless steel AISI 304	
18	Tag	stainless steel AISI 304	

The list of materials and components is subject to changes without notice.

Pietro Fiorentini

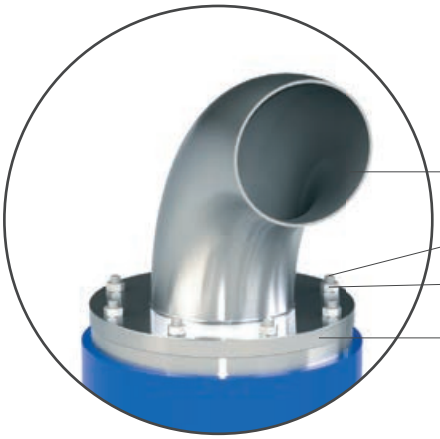
WAVE LITE air valves range conveyance system bias kit - Mod. SUB

The air conveyance system SUB, provided with watertight threaded elbow for submerged applications, has been created to be retrofitted on existing PF WAVE LITE air valves or as a standalone version. The design sprang from the necessity of having an air valve performing also in case of flood, without the risk of contaminated water entering the pipeline. Another benefit of SUB is the possibility of conveying spurts coming from the rapid closure of the air valve.



2", DN 50 - 200

- Threaded elbow in PVC (PP for DN 50-80)
- Fitting in PVC (PP for DN 50-80)
- Studs in stainless steel
- Bolts in stainless steel
- SUB flat in PP or stainless steel
- O-ring in EPDM, NBR, Viton or silicone



DN 250 - 400 *

- Elbow in stainless steel
- Studs in stainless steel
- Bolts in stainless steel
- SUB flat in stainless steel

Technical data

Working conditions

Treated water max. 60°C.
Max. pressure 40 bar.
Min. pressure 0,2 bar.
Lower on request.

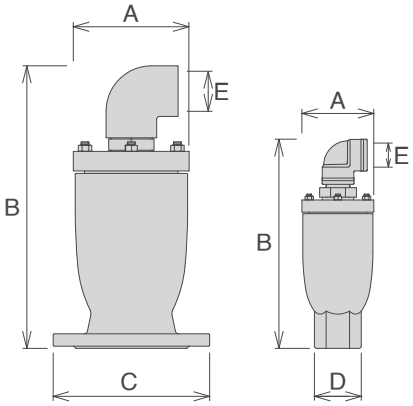
Standard

Designed in compliance with EN-1074/4 and AWWA C-512.
Flanges according to EN 1092/2 or ANSI 150.
Epoxy painting applied through fluidized bed technology blue RAL 5005.
Changes on flanges and painting on request.

Weights and dimensions

CONNECTION inch/mm	A mm	B mm	C mm		D mm	E inch	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

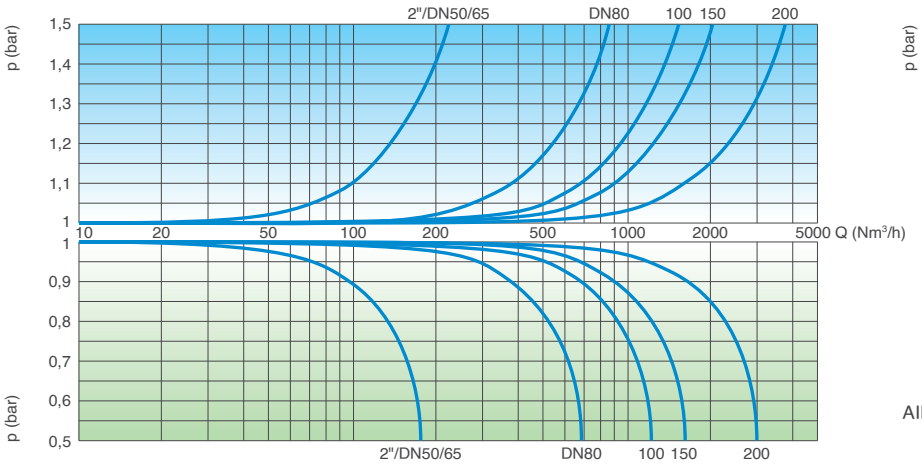
Approximate values. - *: Mod. SUB is stock available up to DN 200 mm, for larger sizes consult with PF.

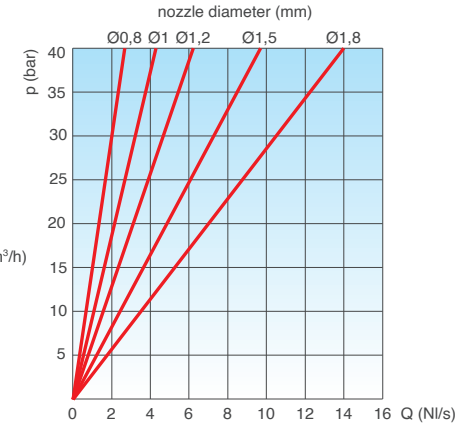


Technical data

WAVE LITE SUB - Air flow performance charts

AIR DISCHARGE DURING PIPE FILLING



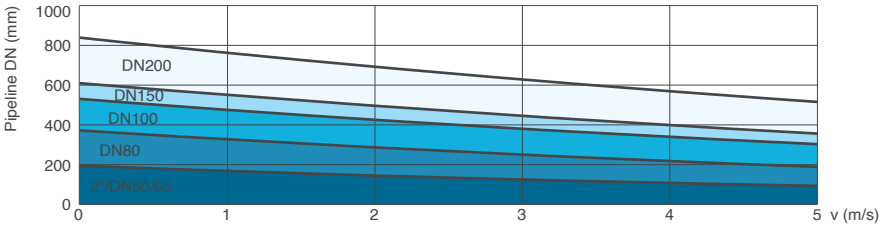


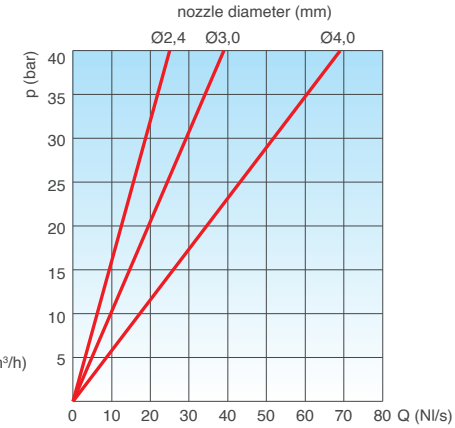
AIR RELEASE DURING WORKING CONDITIONS

AIR ENTRANCE DURING PIPE DRAINING

WAVE LITE AWH SUB - Air valve selection chart

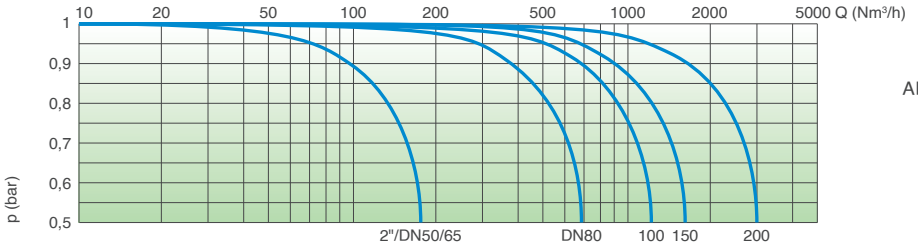
Air valve preliminary sizing as a function of pipeline internal diameter and fluid flow velocity in m/s.





AIR RELEASE DURING WORKING CONDITIONS

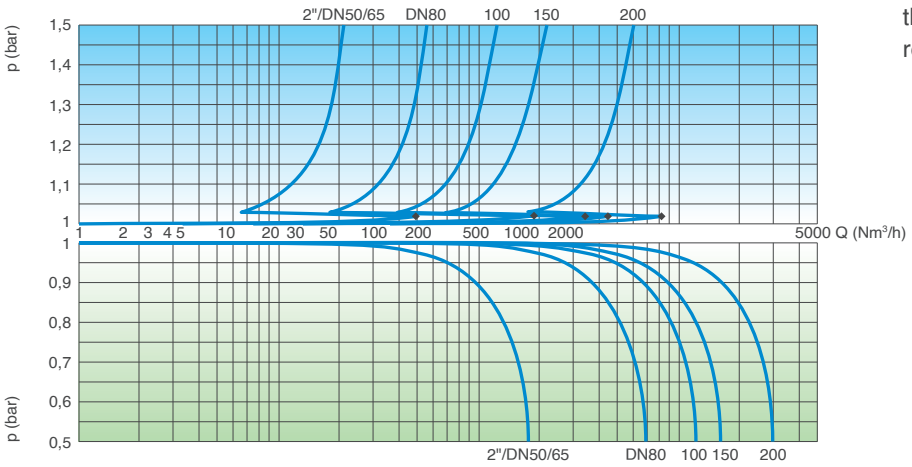
WAVE LITE AWH SUB - Air flow performance chart



AIR ENTRANCE DURING PIPE DRAINING

WAVE LITE CSF SUB - Air flow performance charts

AIR DISCHARGE DURING PIPE FILLING



AIR ENTRANCE DURING PIPE DRAINING

The air flow charts were created in Kg/s from laboratory tests and numerical analysis, then converted in Nm³/h using a safety factor.

Nozzle choice

For the nozzle choice make reference to the available technical data sheets of the relative WAVE LITE models.

Combination air valve for high pressure
Mod. WAVE HP 3S

The WAVE automatic air release valve Mod. WAVE HP 3S will ensure the proper operation of the pipeline network allowing the release of air pockets during working conditions, the evacuation and entrance of large volumes of air during filling and draining operations.

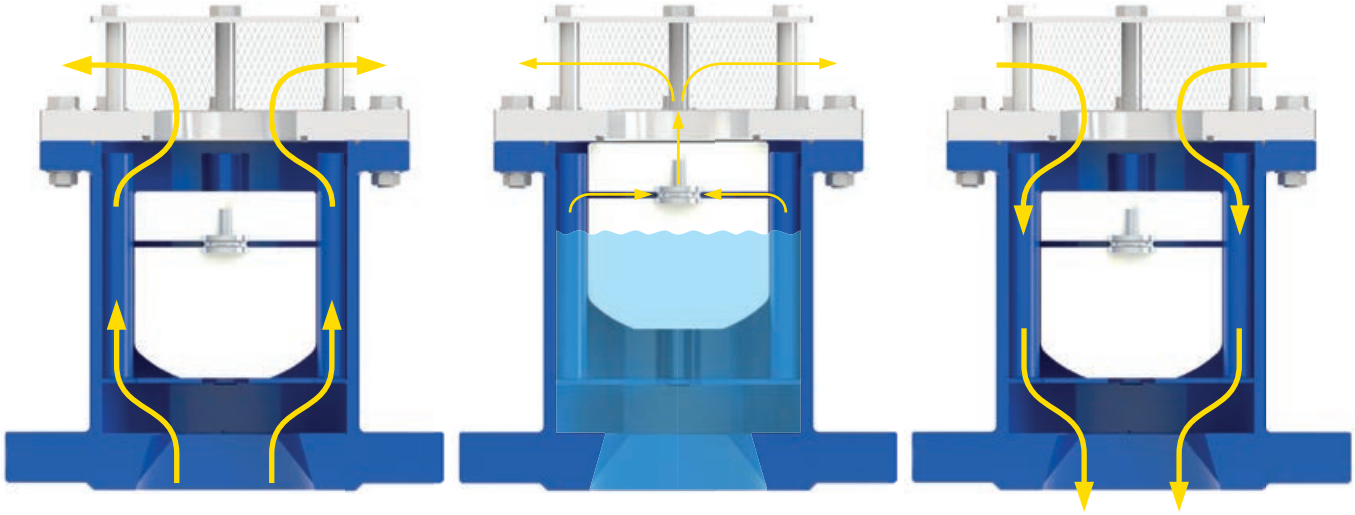
Technical features and benefits

- Body in carbon welded steel, PN 64 bar rated, provided with internal spacers for consistent and accurate guiding of the mobile block.
- In general supplied with fixed flanges according to EN 1092/2 or different standards on request.
- Mobile block composed of a cylindrical float and upper disk in solid polypropylene, joined together by the PF air release system in AISI 316. The solid cylindrical floats, obtained by CNC machining, avoid deformations and ensure a great sliding precision inside the body processed ribs and a perfectly vertical thrust.
- The nozzle and the gasket holder, part of PF air release system, are entirely made in AISI 316 and designed with gasket compression control to prevent aging process and consequent leakage during working conditions.
- Maintenance can be easily performed from the top, without removing the air valve from the pipe.
- Mesh and cap in stainless steel.

Applications

- Main transmission lines.
- Mining.
- Dams and high pressure systems.
- In general this model is used on changes in slope descending and at the high points of the pipeline for those locations exposed to high pressure conditions.

Operating principle



Discharge of large volumes of air

During the pipe filling it is necessary to discharge air as water flows in. The WAVE HP 3S, thanks to an aerodynamic deflector, will make sure to avoid premature closures of the mobile block during this phase.

Air release during working conditions

During operation the air produced by the pipeline is accumulated in the upper part of the air valve. Little by little it is compressed and the pressure arrives to water pressure, therefore its volume increases pushing the water level downwards allowing the air release through the nozzle.

Entrance of large volumes of air

During pipeline draining, or pipe bursts, it is necessary to bring in as much air as the quantity of outflowing water to avoid negative pressure and serious damages to the pipeline, and to the entire system.

Optional

▪ **Vacuum breaker version Mod. WAVE HP 2F** to allow the entrance and discharge of large volumes of air only. This model is normally recommended in changes in slope ascending, long ascending segments, dry fire systems, and wherever the air release won't be required.

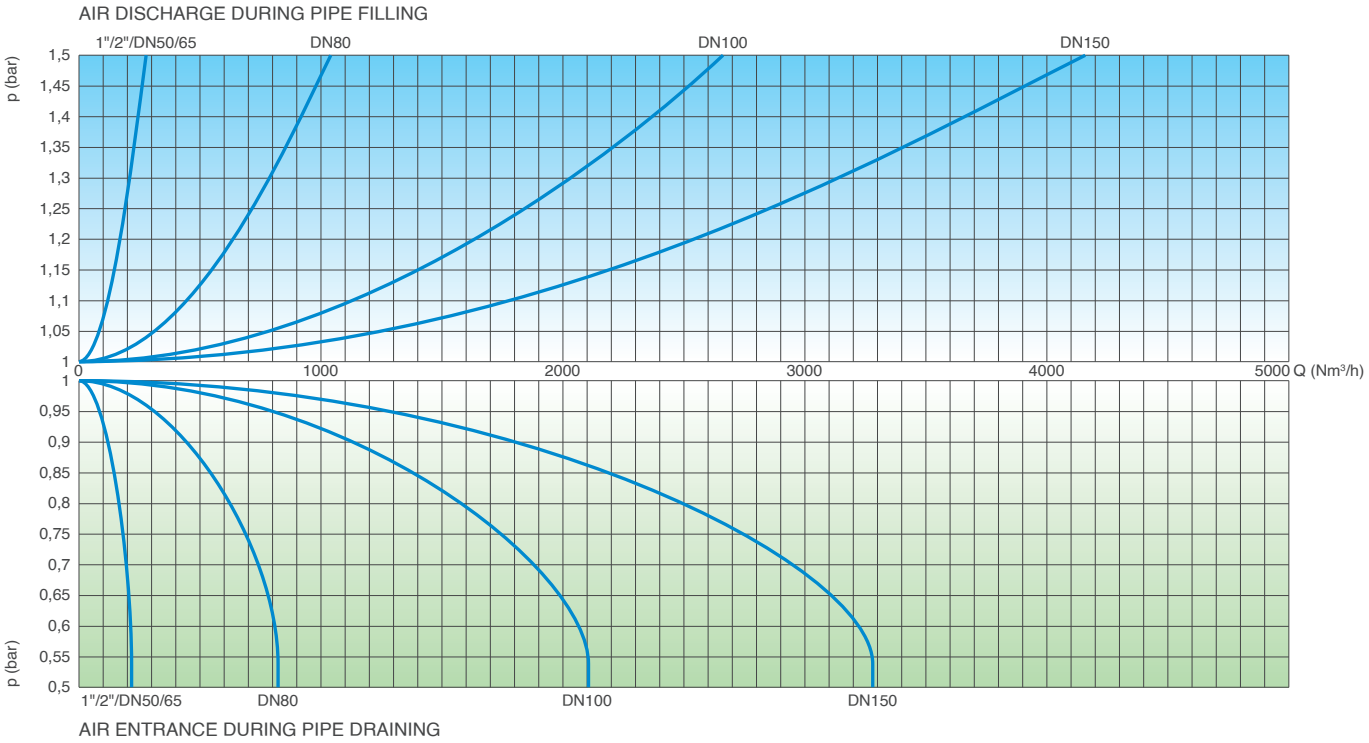
▪ **Version for submerged applications**, **SUB series,** available both for WAVE HP 3S and HP 2S Models, with threaded elbow for air conveyance. The design sprang from the necessity of having an air valve performing also in case of flood, without the risk of contaminated water entering the pipeline. Another benefit of SUB is to avoid the spray effect, conveying spurts coming from the rapid closure of the air valve.

▪ **Version for air discharge only EO series**, available both for WAVE HP 3S and HP 2S models. The most important application of EO is to allow the air valve installation in those locations of the system where HGL may drop below the pipe profile, and to any other node where for project requirements air entrance must be avoided.

▪ **Version for air entrance only IO series**, available for WAVE HP 2F model only. The most important application of IO is to allow the air valve installation in those locations of the system where, for project requirements, air discharge and release must be avoided.

Technical data

Air flow performance charts



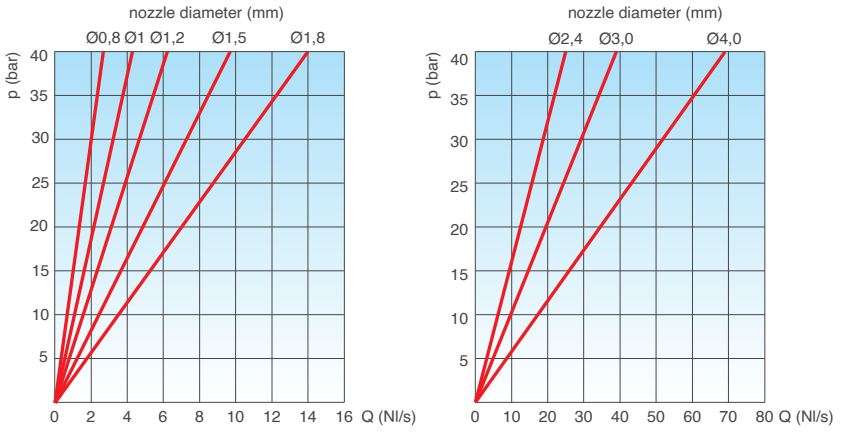
The air flow charts were created in Kg/s from laboratory tests and numerical analysis without the screen, then converted in Nm³/h using a safety factor.

Working conditions

Treated water max. 60° C. Version for high temperature available on request.
Maximum pressure 64 bar.
Minimum press. 0,2 bar. Lower on request.

Standard

Designed in compliance with EN-1074/4.
Flanges according to EN 1092/2, ANSI.
Epoxy painting applied through fluidized bed technology blue RAL 5005.
Other flanges or painting on request.

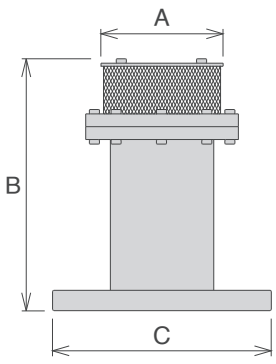


AIR RELEASE DURING WORKING CONDITIONS

Weights and dimensions

CONNECTION inch/mm	A mm	B mm	C mm	Weight Kg
Threaded 1"	165	240	180	4,2
Threaded 2"	165	240	180	5,0
Flanged 50	165	240	180	6,0
Flanged 65	185	240	180	6,0
Flanged 80	200	265	205	9,2
Flanged 100	235	334	205	13,0
Flanged 150	300	380	250	35,0

All values are approximate, consult PF service for more details.

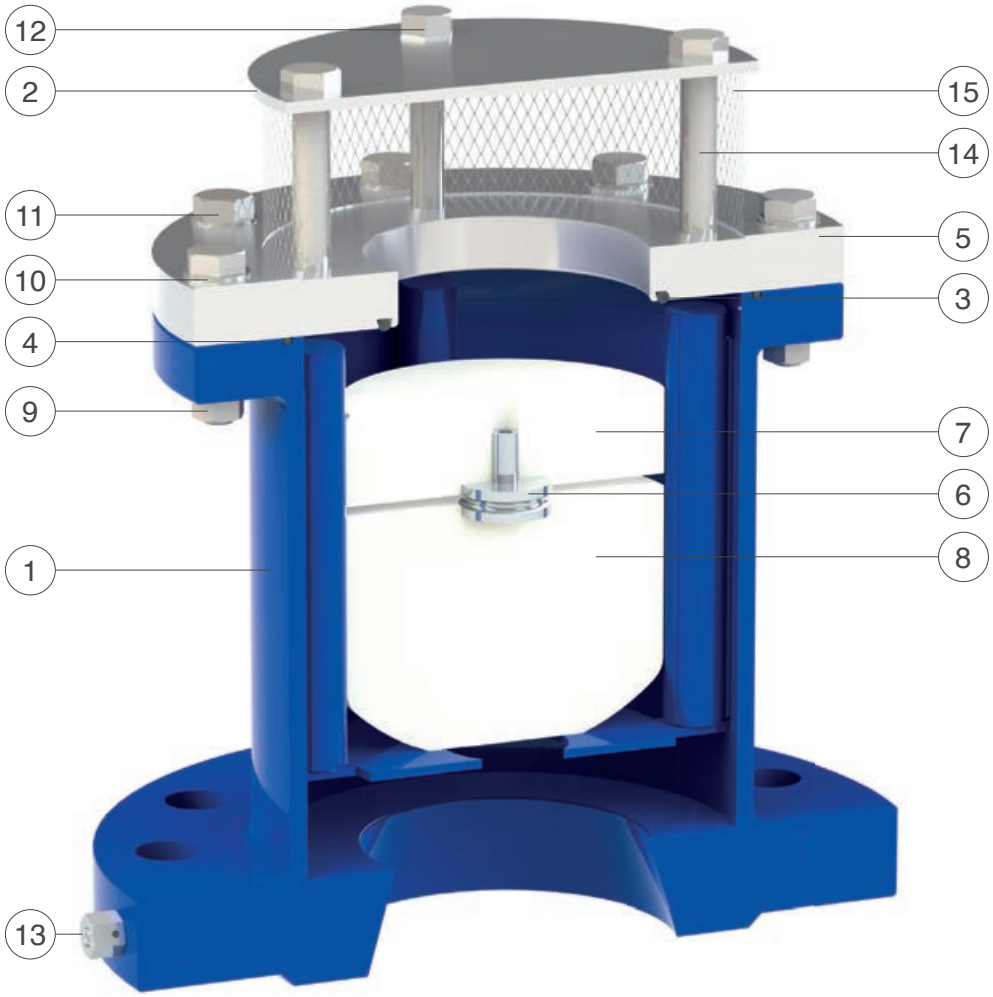


Nozzle choice

	PN 10	PN 16	PN 25	PN 40	PN 64
1"	1,2	1,2	1	0,8	0,8
2"/DN 50/65	1,5	1,2	1	0,8	0,8
DN 80	1,8	1,5	1,2	1	0,8
DN 100	2,4	1,8	1,8	1,2	1
DN 150	4	3	2,4	1,8	1,2

Nozzle diameter in mm according to the size of the air valve and the PN.

Technical details



N.	Component	Standard material	Optional
1	Body	painted steel	
2	Cap	stainless steel AISI 304	stainless steel AISI 316
3	O-ring	NBR	EPDM/Viton/silicone
4	O-ring	NBR	EPDM/Viton/silicone
5	Seat	stainless steel AISI 304	stainless steel AISI 316
6	Nozzle Subset	stainless steel AISI 316	
7	Upper flat	polypropylene	
8	Float	polypropylene	
9	Nut	stainless steel AISI 304	stainless steel AISI 316
10	Washers	stainless steel AISI 304	stainless steel AISI 316
11	Screws	stainless steel AISI 304	stainless steel AISI 316
12	Screws	stainless steel AISI 304	stainless steel AISI 316
13	Drain valve	stainless steel AISI 303	stainless steel AISI 316
14	Spacers	stainless steel AISI 304	stainless steel AISI 316
15	Screen	stainless steel AISI 304	

The list of materials and components is subject to changes without notice.

Anti-water hammer combination air valve for high pressure - Mod. WAVE HP 3S-AWH

The PF surge prevention automatic air release valve Mod. WAVE HP 3S-AWH will allow the release of air pockets during working conditions, the entrance of large volumes of air during draining operations and pipeline bursts and the air discharge with controlled speed, to prevent water hammer.

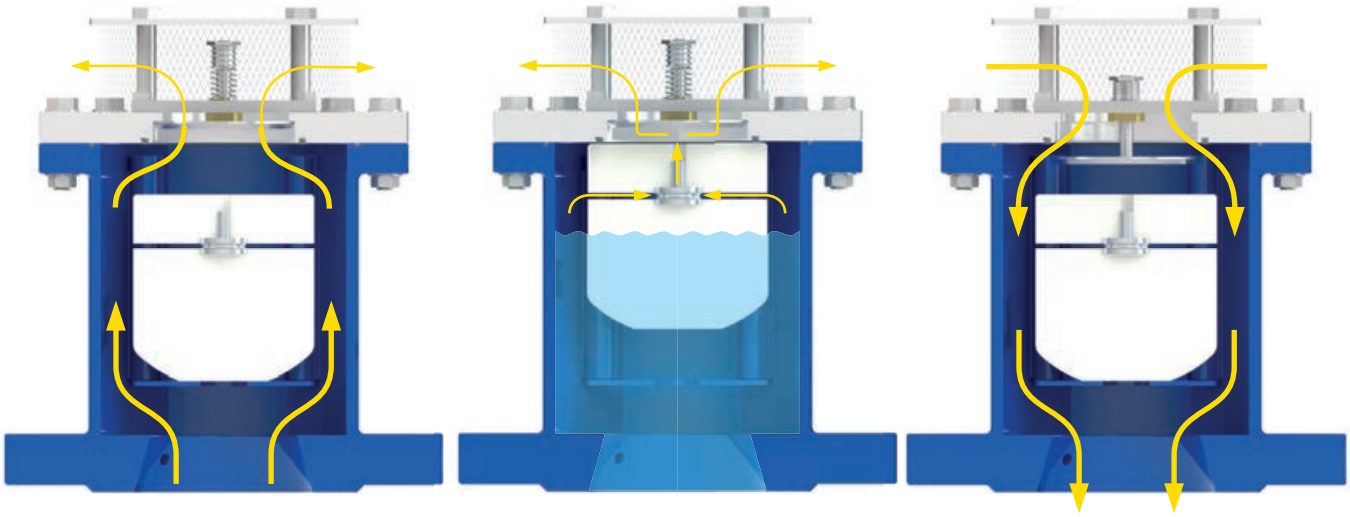
Technical features and benefits

- Body in carbon welded steel, PN 64 bar rated, provided with internal spacers for consistent and accurate guiding of the mobile block.
- In general supplied with fixed flanges according to EN 1092/2 or different standards on request.
- Mobile block composed of a cylindrical float and upper disk in solid polypropylene, joined together by the PF air release system in AISI 316. The solid cylindrical floats, obtained by CNC machining only, avoid deformations and ensure a great sliding precision inside the body processed ribs and a perfectly vertical thrust.
- Nozzle and gasket holder, part of PF air release system, entirely made in AISI 316 and designed with gasket compression control to prevent aging process and consequent leakage during working conditions.
- Maintenance can be easily performed from the top, without removing the air valve from the pipe.
- Anti water hammer system (also called AWH function), never in contact with water, obtained by a spring and shaft in stainless steel, disk with adjustable sonic nozzles for air flow control.

Applications

- Main transmission lines.
- Mining.
- Dams and high pressure systems.
- In general this model is used on pumping stations, changes in slope ascending, and at the critical points of the pipeline subjected to water hammer and column separation.

Operating principle



Controlled air discharge

During the air discharge it is necessary to avoid rapid closures of the float, responsible of water hammer effects. The WAVE LITE 3S-AWH, thanks to the an-ti-shock feature, will control the air outflow thus reducing the velocity of the approaching water column. The risk of overpres-sure will therefore be minimized.

Air release during working conditions

During operation the air produced by the pipeline is accumulated in the upper part of the air valve. Little by little it is compressed and the pressure arrives to water pressure, therefore its volume increases pushing the water level downwards allowing the air release through the nozzle.

Entrance of large volumes of air

During pipeline draining, or pipe bursts, it is necessary to bring in as much air as the quantity of outflowing water to avoid negative pressure and serious damages to the pipeline, and to the entire system.

Optional

▪ **Vacuum breaker version Mod. WAVE HP 2S-AWH**, to allow the entrance of large volumes of air and the controlled outflow only. This model is normally recommended in changes in slope ascending, long ascending segments, dry fire systems.

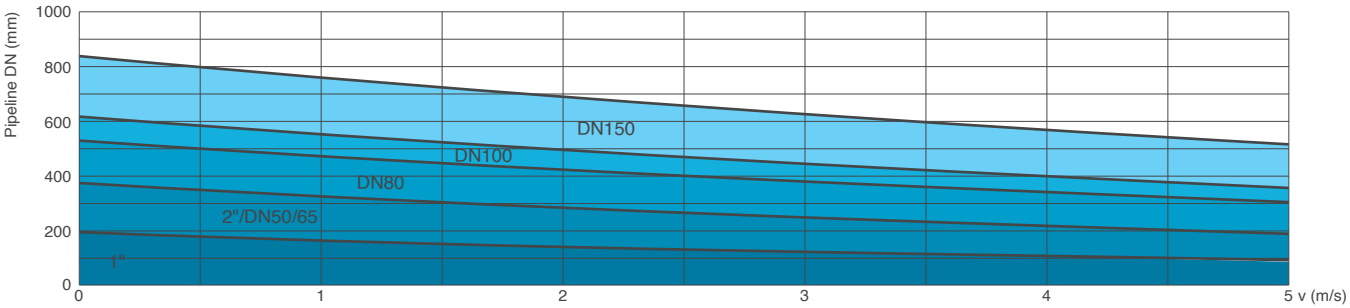
▪ **Version for submerged applications, SUB series,** available both for WAVE HP 3S AWH and HP 2S AWH Models, with threaded elbow for air conveyance. The design sprang from the necessity of having an air valve performing also in case of flood, without the risk of contaminated water entering the pipeline. Another benefit of SUB is to avoid the spray effect, conveying spurts coming from the closure away from the air valve.

▪ The counteracting spring force as well as the sonic nozzles, both responsible of the proper operation of the AWH device, can be modified on request according to the project conditions and the transient analysis.

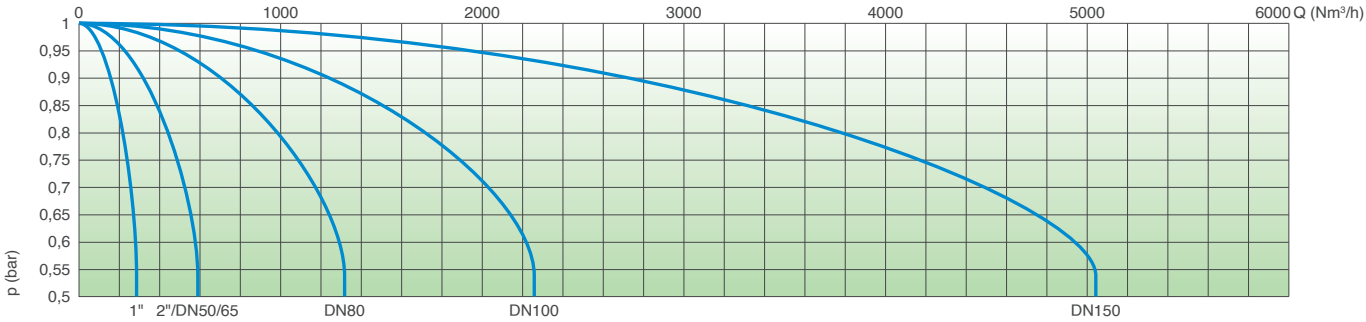
Technical data

Air valve selection chart

Air valve preliminary sizing as a function of pipeline internal diameter and fluid flow velocity expressed in m/s.



Air flow performance chart



AIR ENTRANCE DURING PIPE DRAINING

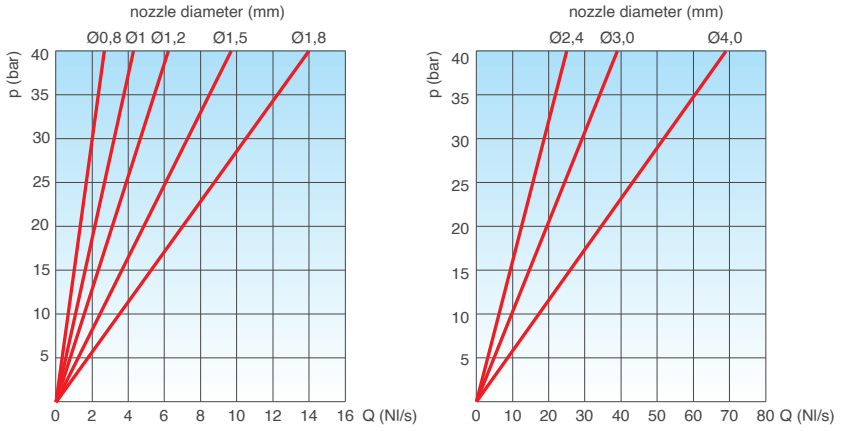
The air flow charts were created in Kg/s from laboratory tests and numerical analysis without the screen, then converted in Nm³/h using a safety factor.

Working conditions

Treated water max. 60° C. Version for high temperature available on request.
Maximum pressure 64 bar.
Minimum press. 0,2 bar. Lower on request.

Standard

Designed in compliance with EN-1074/4.
Flanges according to EN 1092/2, ANSI.
Epoxy painting applied through fluidized bed technology blue RAL 5005.
Other flanges or painting on request.

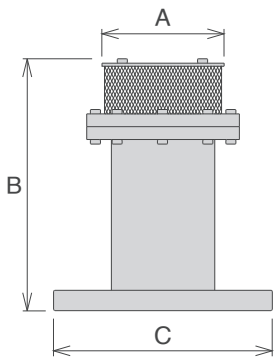


AIR RELEASE DURING WORKING CONDITIONS

Weights and dimensions

CONNECTION inch/mm	A mm	B mm	C mm	Weight Kg
Threaded 1"	165	240	180	4,2
Threaded 2"	165	240	180	5,0
Flanged 50	165	240	180	6,0
Flanged 65	185	240	180	6,0
Flanged 80	200	265	205	9,2
Flanged 100	235	334	205	13,0
Flanged 150	300	380	250	35,0

All values are approximate, consult PF service for more details.

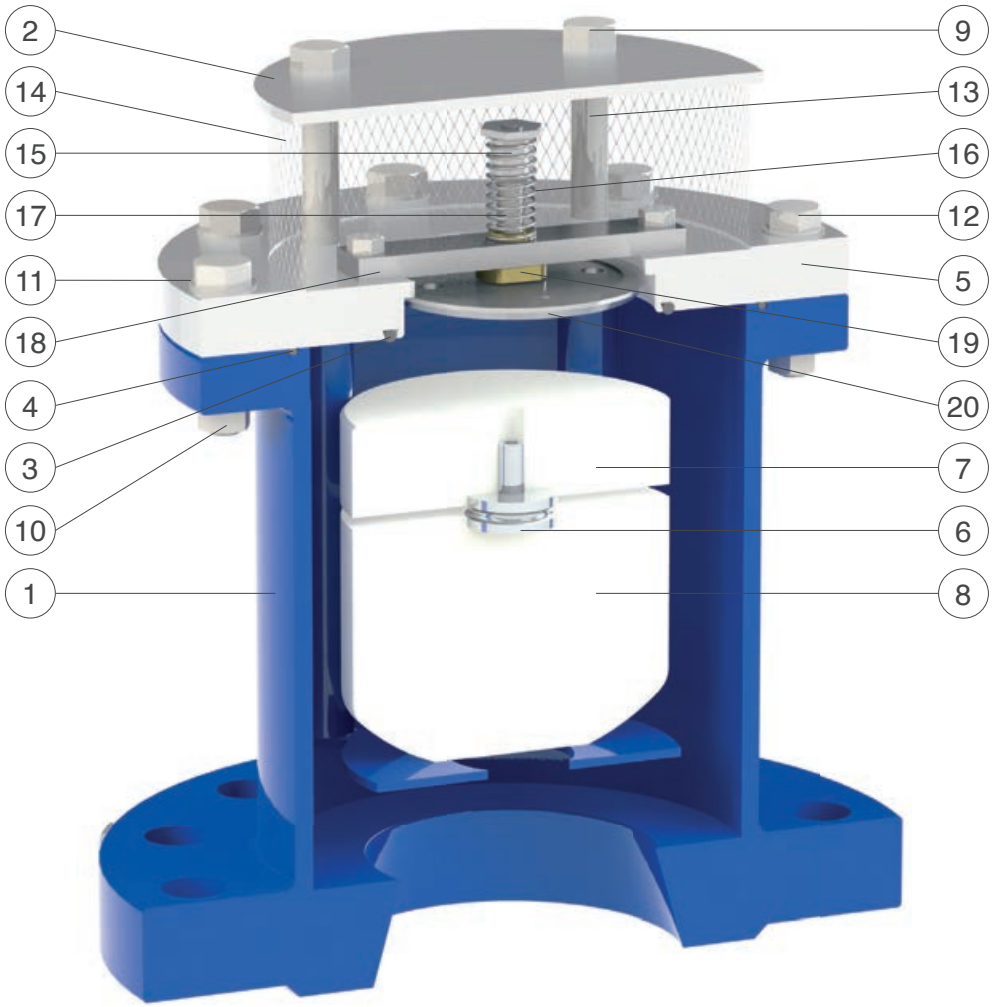


Nozzle choice

	PN 10	PN 16	PN 25	PN 40	PN 64
1"	1,2	1,2	1	0,8	0,8
2"/DN 50/65	1,5	1,2	1	0,8	0,8
DN 80	1,8	1,5	1,2	1	0,8
DN 100	2,4	1,8	1,8	1,2	1
DN 150	4	3	2,4	1,8	1,2

Nozzle diameter in mm according to the size of the air valve and the PN.

Technical details

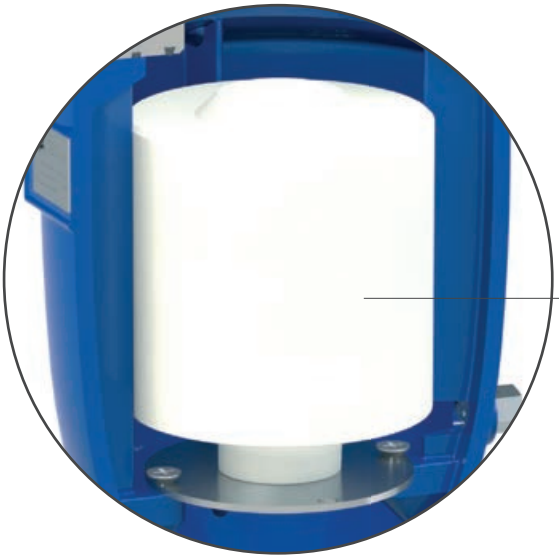


N.	Component	Standard material	Optional
1	Body	painted steel	
2	Cap	stainless steel AISI 304	stainless steel AISI 316
3	O-ring	NBR	EPDM/Viton/silicone
4	O-ring	NBR	EPDM/Viton/silicone
5	Seat	stainless steel AISI 304	stainless steel AISI 316
6	Nozzle subset	stainless steel AISI 316	
7	Upper flat	polypropylene	
8	Float	polypropylene	
9	Screws	stainless steel AISI 304	stainless steel AISI 316
10	Nuts	stainless steel AISI 304	stainless steel AISI 316
11	Washer	stainless steel AISI 304	stainless steel AISI 316
12	Screws	stainless steel AISI 304	stainless steel AISI 316
13	Spacers	stainless steel AISI 304	stainless steel AISI 316
14	Screen	stainless steel AISI 304	
15	Spring guide nut	stainless steel AISI 303	stainless steel AISI 316
16	Spring	stainless steel AISI 302	stainless steel AISI 316
17	AWH shaft	stainless steel AISI 303	stainless steel AISI 316
18	Support with screws (in DN 150)	stainless steel AISI 304	stainless steel AISI 316
19	Guiding nut (in DN 150)	Delrin (polyoxymethylene)	
20	AWH flat	stainless steel AISI 304	stainless steel AISI 316

The list of materials and components is subject to changes without notice.

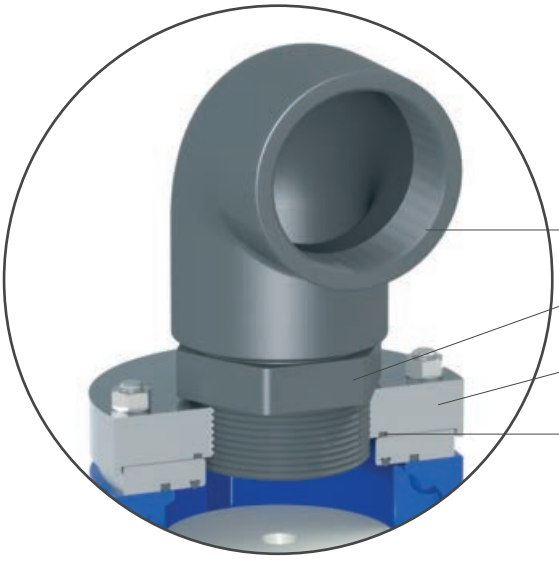
WAVE/WAVE LITE air valves range vacuum breaker version

Designed to allow the discharge and entrance of large volumes of air during pipe filling and draining /bursts, this version is usually recommended in changes in slope ascending, long ascending segments, dry fire systems, and wherever the air release won't be required.



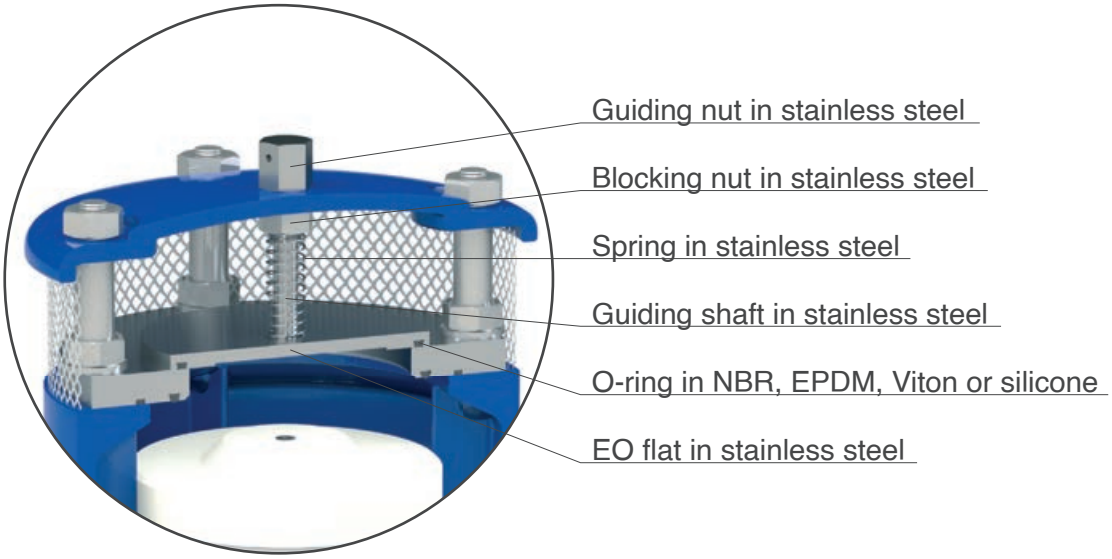
WAVE/WAVE LITE conveyance system bias kit - Mod. SUB

The air conveyance system SUB, provided with watertight threaded elbow for air conveyance and submerged applications, has been created to be retrofitted on existing PF WAVE air valves or as a standalone version. Another benefit of SUB is to convey spurts coming from the rapid closure of the air valve. The SUB kit is produced in plastic, different materials are available on request.



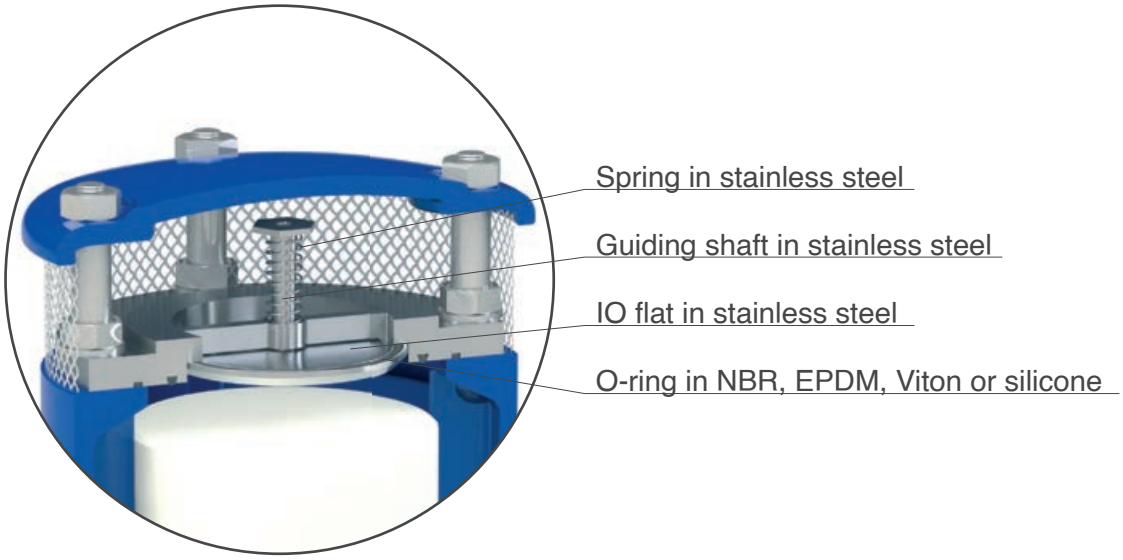
WAVE/WAVE LITE air valves range discharge only bias kit EO

The most important application of EO is to allow the air valve installation in those locations of the system where HGL may drop below the pipe profile, and whenever for project requirements air entrance must be avoided.



WAVE/WAVE LITE air valves range entrance only bias kit IO

The most important application of IO is to allow the air valve installation in those locations of the system where, for project requirements, air discharge and release must be avoided.



Air release valve
Mod. VNT HP

The PF single function, automatic air release valve VNT HP will ensure the proper operation of the system allowing the release of air pockets accumulated during working conditions.

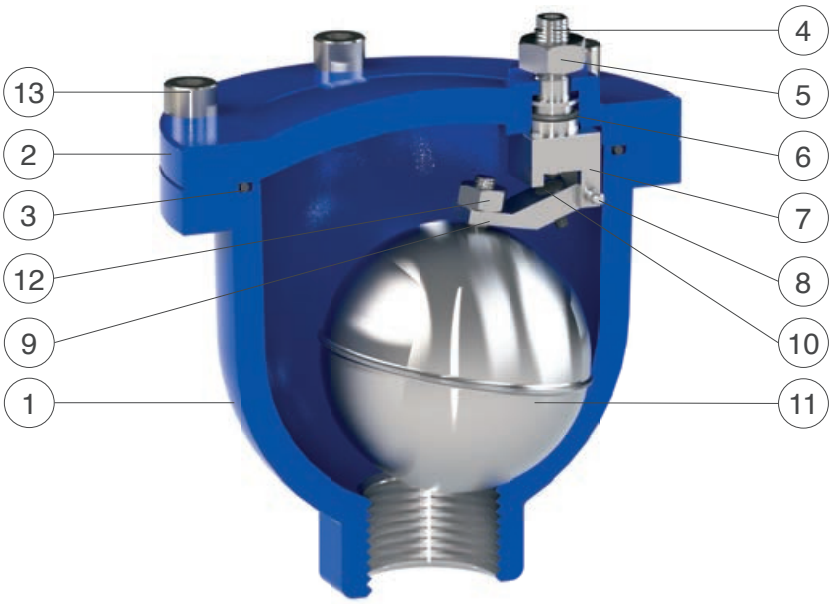
Technical features and benefits

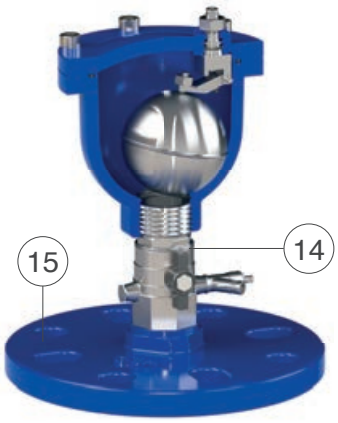
- Body and cover in ductile cast iron, PN 40 bar rated.
- Float in stainless steel AISI 304 or 316.
- Lever and pivots in AISI 303 or 316.
- Nozzle in stainless steel AISI 303 or 316.
- Compass lever technology to allow large air release capacity through the nozzle.
- Double O-ring to guarantee the perfect water tightness during working conditions.
- Gasket compression control thanks to the adjustable nozzle.
- Nuts and bolts in stainless steel AISI 304 or 316.
- Minimum working pressure 0,1 bar.

Applications

- Water distribution systems, irrigation, buildings.
- Pumps, control valves and modulating devices.
- In general when the simple air release function is required, it can be combined with PF kinetic air valves series for large air inflow and outflow requirements.

Technical details





N.	Component	Standard material	Optional
1	Body	ductile cast iron GJS 450-10	
2	Cap	ductile cast iron GJS 450-10	
3	O-ring	NBR	EPDM/Viton/silicone
4	Nozzle	stainless steel AISI 303	stainless steel AISI 316
5	Nut	stainless steel AISI 304	stainless steel AISI 316
6	O-ring	NBR	EPDM/Viton/silicone
7	Upper lever	stainless steel AISI 303	stainless steel AISI 316
8	Pivot	stainless steel AISI 303	stainless steel AISI 316
9	Lower lever	stainless steel AISI 303	stainless steel AISI 316
10	Nozzle gasket	silicone	
11	Float	stainless steel AISI 304	stainless steel AISI 316
12	Nut	stainless steel AISI 304	stainless steel AISI 316
13	Screw	stainless steel AISI 304	stainless steel AISI 316
14	Ball valve (on request)	nickel-plated brass	stainless steel AISI 316
15	Flange (on request)	ductile cast iron GJS 450-10	painted steel/AISI304/316

The list of materials and components is subject to changes without notice.

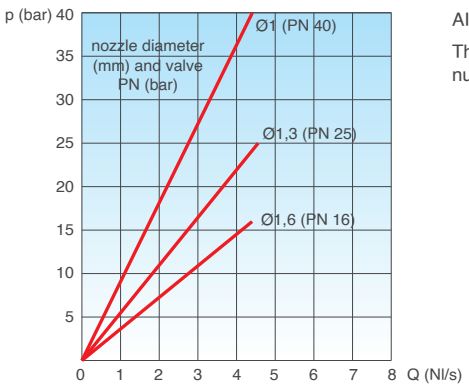
Working conditions

Treated water max. 60°C.
Higher temperature on request.
Max. pressure 40 bar;
Min. pressure 0,1 bar.

Standard

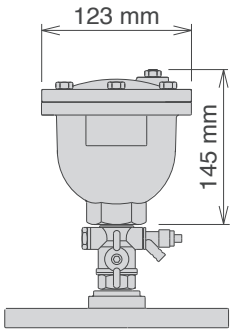
Designed in compliance with EN-1074/4.
Standard connection 1", flanged on request. Flanges according to EN 1092/2.
Epoxy painting applied through fluidized bed technology blue RAL 5005.
Changes and variations on the flanges and painting details available on request.

Air flow performance chart



AIR RELEASE DURING WORKING CONDITIONS

The air flow charts were created in Kg/s from laboratory tests and numerical analysis, then converted in Nl/s using a safety factor.



Air release valve
Mod. VNT LP

The PF automatic air valve VNT LP will ensure the proper operation of the system allowing the release of air pockets accumulating during working conditions.

Technical features and benefits

- Upper and lower bodies in ductile cast iron PN 25 rated.
- Float in stainless steel AISI 304 covered with vulcanized NBR or EPDM.
- Air release system in stainless steel AISI 303 or 316.
- Nuts and bolts in stainless steel AISI 304 or 316.
- Simple and compact.

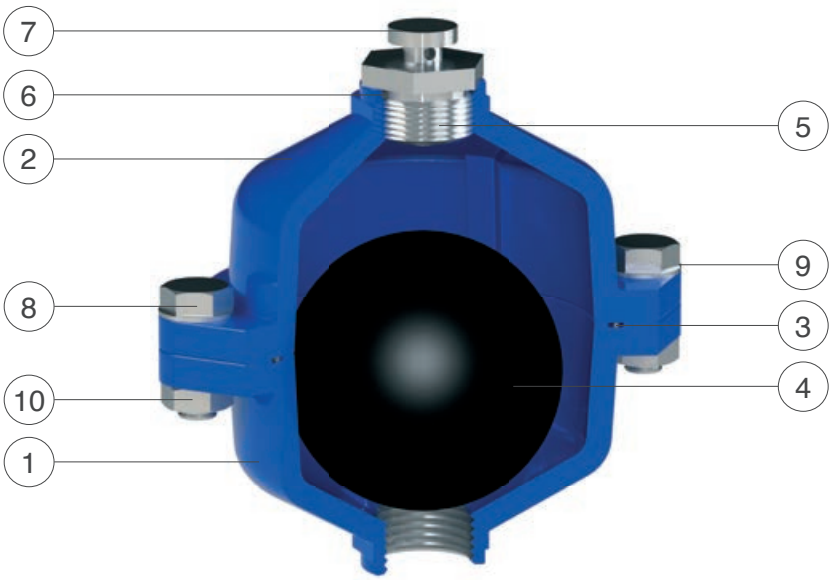
Applications

- Water distribution systems.
- Irrigation, cooling systems.
- Buildings.
- In general where the air release function is necessary.

Note to the engineer

- The air valve is supplied with 1" threaded female connection, on request provided with ball valve and flange.

Technical details



N.	Component	Standard material	Optional
1	Lower body	ductile cast iron GJS 450-10	
2	Upper body	ductile cast iron GJS 450-10	
3	O-ring	NBR	EPDM/Viton/silicone
4	Float	NBR/EPDM coated stainless steel AISI 304	
5	Nozzle	stainless steel AISI 303	stainless steel AISI 316
6	O-ring	NBR	EPDM/Viton/silicone
7	Nozzle tap	stainless steel AISI 303	stainless steel AISI 316
8	Screws	stainless steel AISI 304	stainless steel AISI 316
9	Washers	stainless steel AISI 304	stainless steel AISI 316
10	Nuts	stainless steel AISI 304	stainless steel AISI 316
11	Ball valve (on request)	nickel-plated brass	stainless steel AISI 316
12	Flange (on request)	ductile cast iron GJS 450-10	painted steel/AISI304/316

The list of materials and components is subject to changes without notice.

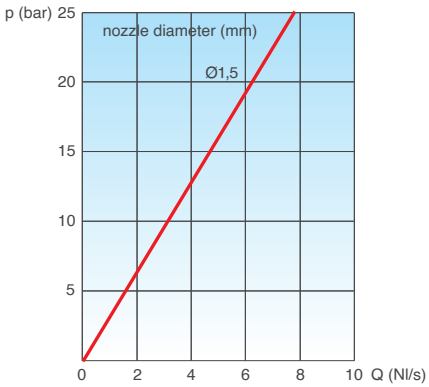
Working conditions

Treated water max. 60°C.
Higher temperatures on request.
Max. pressure 25 bar.
Min. pressure 0,1 bar.

Standard

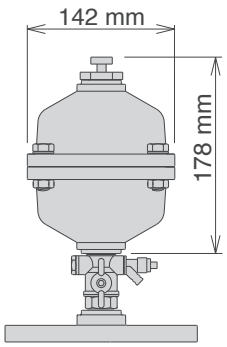
Designed in compliance with EN-1074/4.
Standard connection 1" BSP, flanged on request. Flanges according to EN 1092/2.
Epoxy painting applied through fluidized bed technology blue RAL 5005.
Changes and variations on the flanges and painting details available on request.

Air flow performance chart



AIR RELEASE DURING WORKING CONDITIONS

The air flow charts were created in Kg/s from laboratory tests and numerical analysis, then converted in Nl/s using a safety factor.



Combination air valve
Mod. WAVE LP90

The PF combination, triple function, automatic air valve Mod. WAVE LP90, for irrigation and treated water applications, will ensure the proper operation allowing the release of air pockets during working conditions and the evacuation and entrance of large volumes of air during filling and draining operations.

Technical features and benefits

- Single chamber body PN 16 bar rated, provided with internal ribs for accurate guiding of the float.
- The aerodynamic full bore body prevents premature closures of the mobile block also at high velocity air intake and discharge.
- Available with bias kits for air discharge only (EO), entrance only (IO) and anti-water hammer(AWH) feature.
- Available version with rapid filling prevention mechanism CSF.
- Drainage valve for chamber control and pressure relief during maintenance available on request.
- Maintenance can be easily performed from the top, without removing the air valve from the pipe.
- Compact and reliable structure whose parts are fully corrosion, chemical resistant. Lower maintenance.
- Designed in compliance with EN 1074/4 standard.
- Approved for potable water use.
- Factory approval and quality control following ISO 9001:2008.

Applications

- Main irrigation networks.
- Water distribution networks.
- Cooling systems, process and industrial plants.
- In general this model is used on changes in slope and at the high points of the pipeline.

Operating principle - WAVE LP90 3S

Discharge of large volumes of air

During the pipe filling it is necessary to discharge air as water flows in. The air valve WAVE LP90 3S, thanks to the aerodynamic full port body and float, will make sure to avoid premature closures of the mobile block during this phase.

Air release during working conditions

During operation the air produced by the pipeline is accumulated in the upper part of the air valve. Little by little it is compressed and the pressure arrives to water pressure, therefore its volume increases pushing the water level downwards allowing the air release through the automatic orifice.

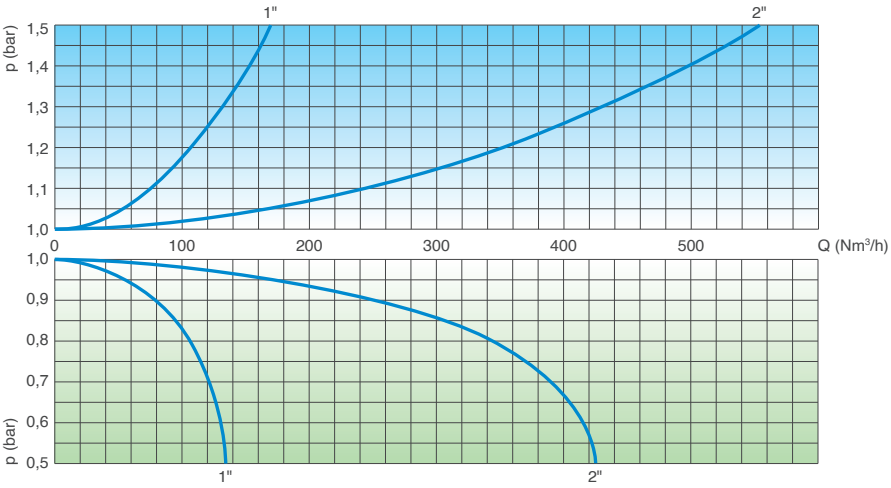
Entrance of large volumes of air

During pipeline draining, or pipe bursts, it is necessary to bring in as much air as the quantity of outflowing water to avoid negative pressure and serious damages to the pipeline, and to the entire system.

Technical data - WAVE LP90 3S

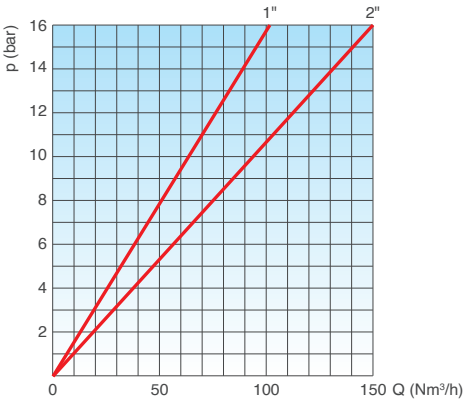
Air flow performance charts

AIR DISCHARGE DURING PIPE FILLING



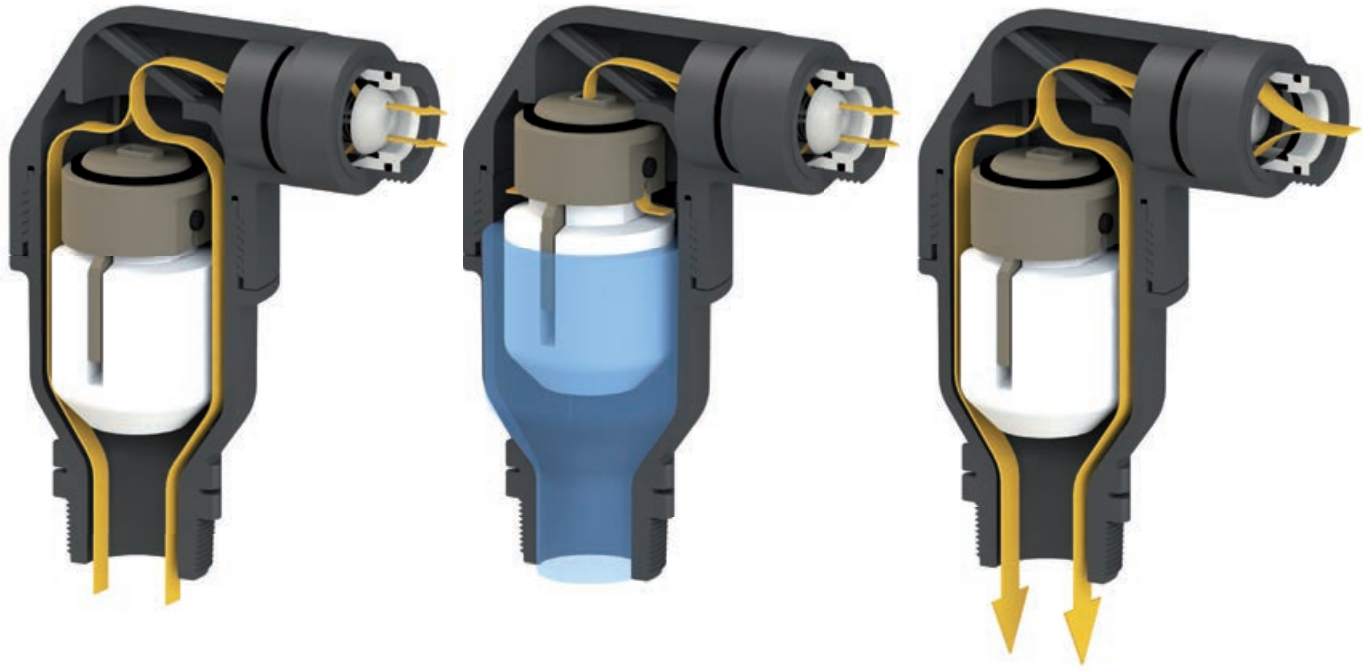
AIR ENTRANCE DURING PIPE DRAINING

AIR RELEASE DURING WORKING CONDITIONS



The air flow charts were created in Kg/s from laboratory tests and numerical analysis, then converted in Nm³/h using a safety factor.

Operating principle - WAVE LP90 3S-AWH



Controlled air discharge

During the air discharge it is necessary to avoid rapid closures of the float, responsible of water hammer effects. The anti-water hammer device will control the air outflow reducing the velocity of the approaching water column and minimizing the risk of overpressure.

Air release during working conditions

During operation the air produced by the pipeline is accumulated in the upper part of the air valve. Little by little it is compressed and the pressure arrives to water pressure, therefore its volume increases pushing the water level downwards allowing the air release through the automatic orifice.

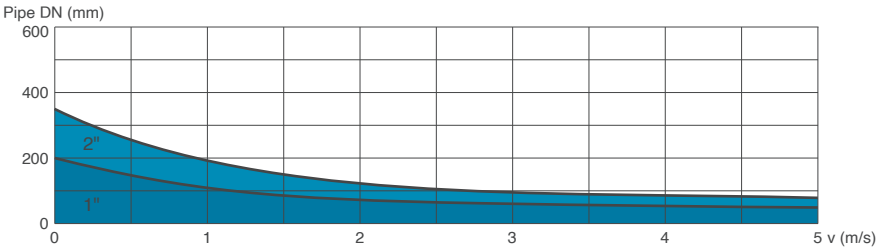
Entrance of large volumes of air

During pipeline draining, or pipe bursts, it is necessary to bring in as much air as the quantity of outflowing water to avoid negative pressure and serious damages to the pipeline, and to the entire system.

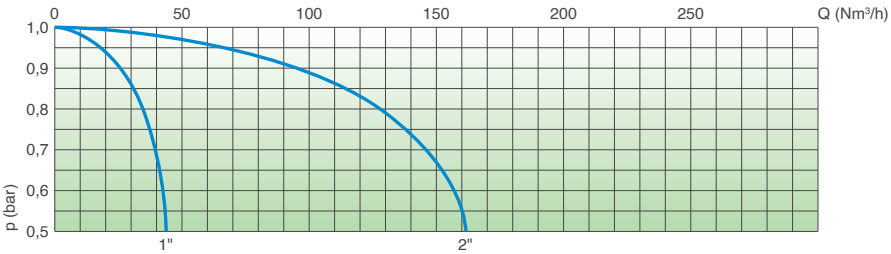
Technical data - WAVE LP90 3S AWH

Air valve selection chart

Air valve preliminary sizing as a function of pipeline internal diameter and fluid flow velocity in m/s.

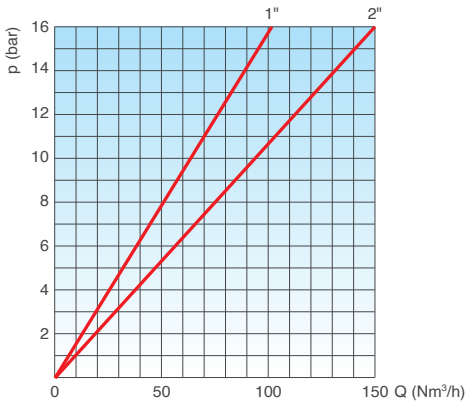


Air flow performance charts



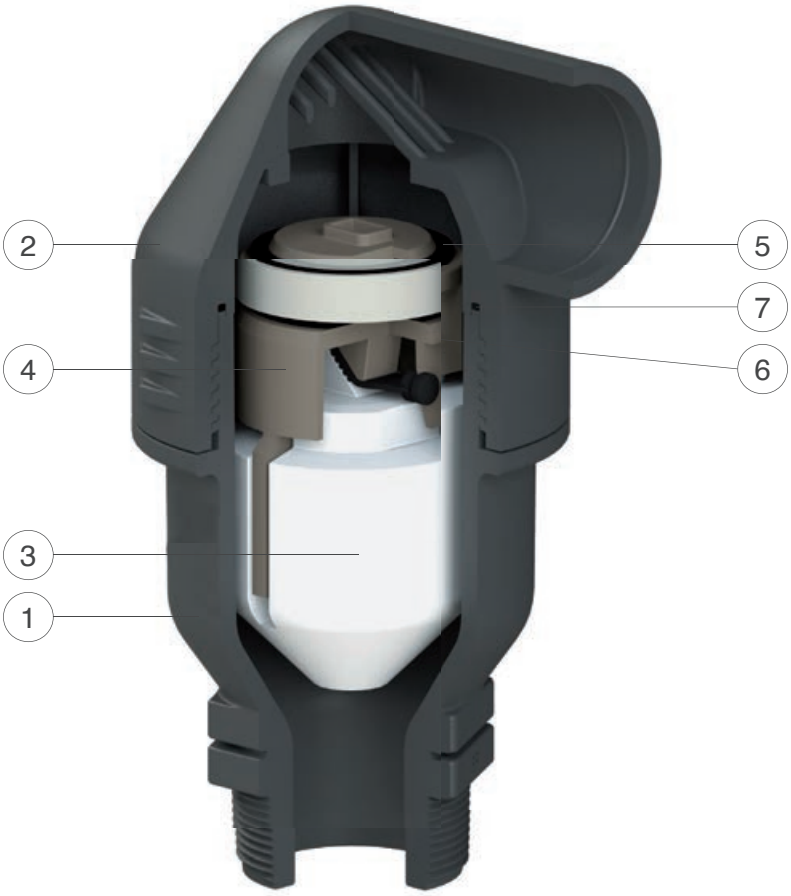
AIR ENTRANCE DURING PIPE DRAINING

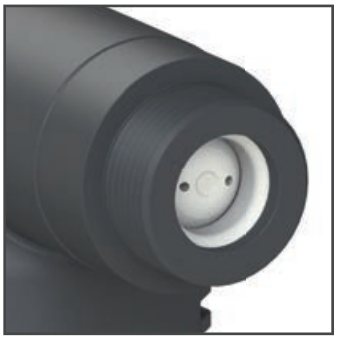
AIR RELEASE DURING WORKING CONDITIONS



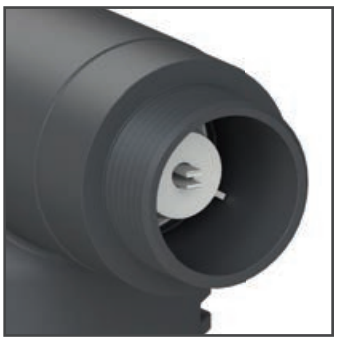
The air flow charts were created in Kg/s from laboratory tests and numerical analysis, then converted in Nm³/h using a safety factor.

Technical details





AWH/IO device in polypropylene with threaded connection 2".



EO device in polypropylene with threaded connection 2".

N.	Component	Material	Features
1	Body	glass reinforced polypropylene	provided with ribs for accurate guiding
2	Cap	glass reinforced polypropylene	provided with protection grid
3	Float	polypropylene	solid and resistant to high pressure
4	Kinetic plug	glass reinforced polyamide	with high air release capacity
5	Kinetic orifice seal	EPDM	
6	Automatic orifice seal	EPDM	
7	O-ring	EPDM	

The list of materials and components is subject to changes without notice.

Working conditions

Treated water max. 60°C.
Max. pressure 16 bar.
Min. pressure 0,2 bar; lower on request.

Valve selection

Body material: glass-reinforced PP.
Inlet size: DN 25, DN 50 (1", 2").
Connections: threaded male BSPT or NPT.
Certified in compliance with EN-1074/4.

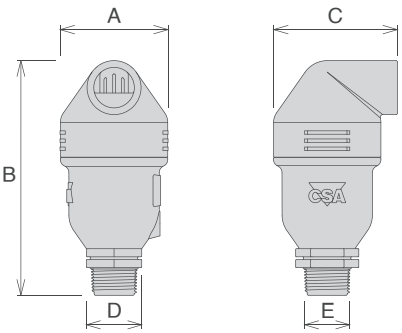
Nozzle specification

air valve size	kinetic orifice		autom. or.
	d (mm)	A (mm^2)	A (mm^2)
1"	21	346	5
2"	45	1590	12

Weights and dimensions

CONNECTION (E) inch	A mm	B mm	C mm	D mm	Weight Kg
Threaded 1"	80	167	92	CH 41	0,3
Threaded 2"	110	226	135	CH 65	0,75

All values are approximate, consult PF service for more details.



Anti-surge combination air valve Mod. WAVE LP90 3S-CSF

The PF surge dampening, anti-slam automatic air valve Mod. WAVE LP90 3S-CSF has been designed to allow the release of air pockets accumulated in working conditions, the entrance of large volumes of air in case of pipe draining or bursts and to prevent pipeline damages coming from pressure transients, associated with high air outflow velocities.

Technical features and benefits

- Uncontrolled pipeline filling operations and transient events will inevitably generate the rapid closure of the air valves installed along the system, with consequent damages. The PF air valve WAVE LP90 3S-CSF, thanks to the additional anti-surge obturator, will automatically adjust the outflow capacity, thus reducing the velocity of the incoming water column minimizing the risk of water hammer.
- The spray effect during closing and the risk of drowning minimized.
- Single chamber body PN 16 bar rated, provided with internal ribs for accurate guiding of the float.
- Available kits with threaded outlet connection and for air discharge only (EO).
- Drainage valve for chamber control and pressure relief during maintenance available on request.
- Maintenance can be easily performed from the top, without removing the air valve from the pipe.
- Compact and reliable structure whose parts are fully corrosion, chemical resistant. Lower maintenance.
- Designed in compliance with EN 1074/4 standard.
- Approved for potable water use.
- Factory approval and quality control following ISO 9001:2008.

Applications

- Water distribution networks.
- Cooling systems, process and industrial plants.
- In general this model is used, in combination with PF AWH technology, on changes in slope and high points of the profile to provide the best air management and control with effective surge protection.

Operating principle

Discharge of large volumes of air

During the pipe filling it is necessary to discharge air as water flows in. The WAVE LP90 3S-CSF, thanks to the aerodynamic body and float, will make sure to avoid premature closures of the mobile block during this phase.

Controlled outflow

If the differential pressure of air, during pipe filling, increases above a certain value without control there is the risk of water hammer and damages to the system. Should that happen the CSF upper float will rise automatically, reducing the outflow and consequently the velocity of the approaching water column.

Air release during working conditions

During operation the air produced by the pipeline is accumulated in the upper part of the air valve. Little by little it is compressed and the pressure arrives to water pressure, therefore its volume increases pushing the water level downwards allowing the air release through the nozzle.

Entrance of large volumes of air

During pipeline draining, or pipe bursts, it is necessary to bring in as much air as the quantity of outflowing water to avoid negative pressure and serious damages to the pipeline, and to the entire system.

Optional

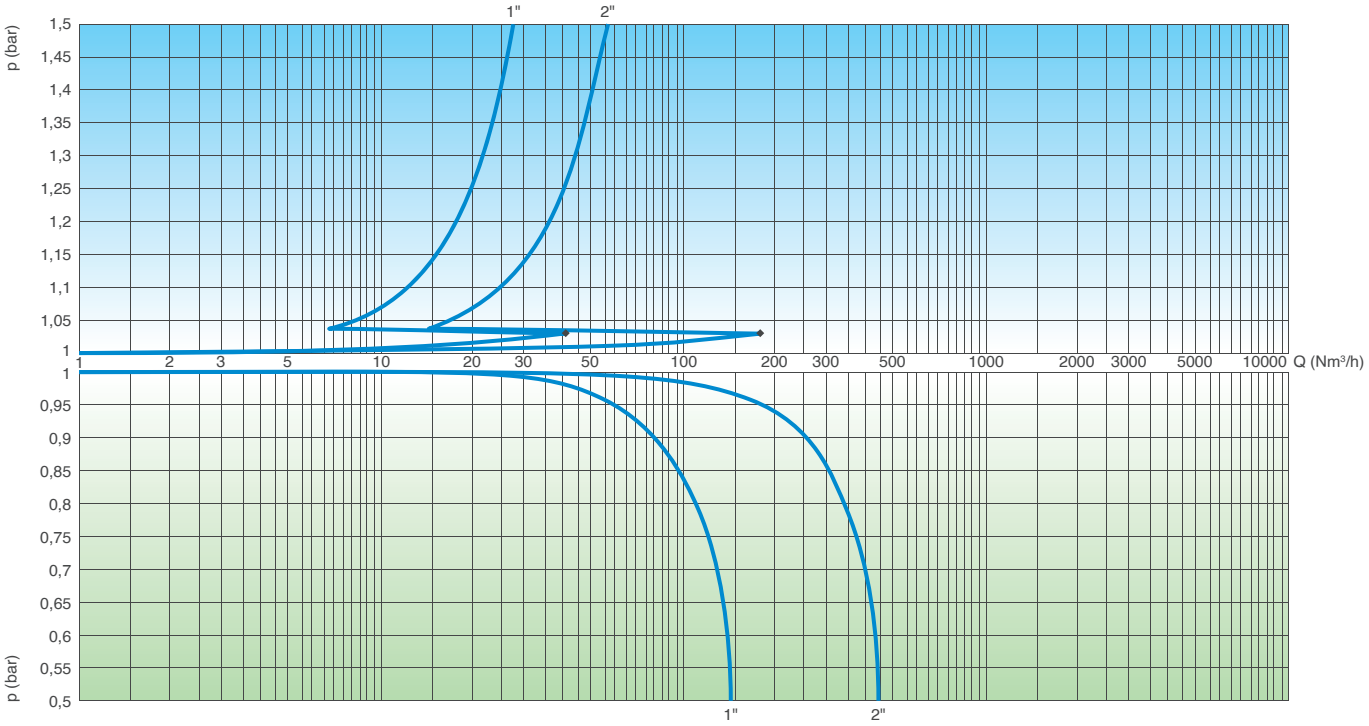
▪ **Version for air discharge only EO series**. The most important application of EO is to allow the air valve installation in those locations of the system where HGL may drop below the pipe profile, and to any other node where for project requirements air entrance must be avoided, such as in pump suction lines or siphons pipelines.

▪ **Optional fitting with threaded outlet** to allow the connection to external pipes to convey possible spurts generated during operation cycles.

Technical data

Air flow performance charts

AIR DISCHARGE DURING PIPE FILLING



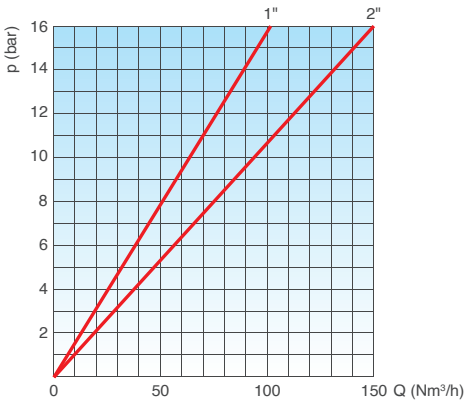
AIR ENTRANCE DURING PIPE DRAINING

The air flow charts were created in Kg/s from laboratory tests and numerical analysis, then converted in Nm³/h using a safety factor.

Working conditions

Treated water max. 60°C.
Max. pressure 16 bar.
Min. pressure 0,2 bar; lower on request.

AIR RELEASE DURING WORKING CONDITIONS



Valve selection

Body material: glass-reinforced PP.
Inlet size: DN 25, DN 50 (1", 2").
Connections: threaded male BSPT or NPT.
Certified in compliance with EN-1074/4.

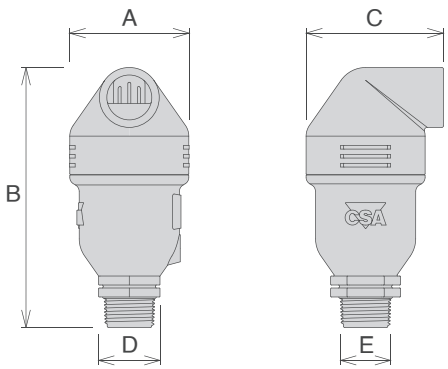
Nozzle specification

air valve size	kinetic orifice		autom. or.
	d (mm)	A (mm²)	A (mm²)
1"	21	346	5
2"	45	1590	12

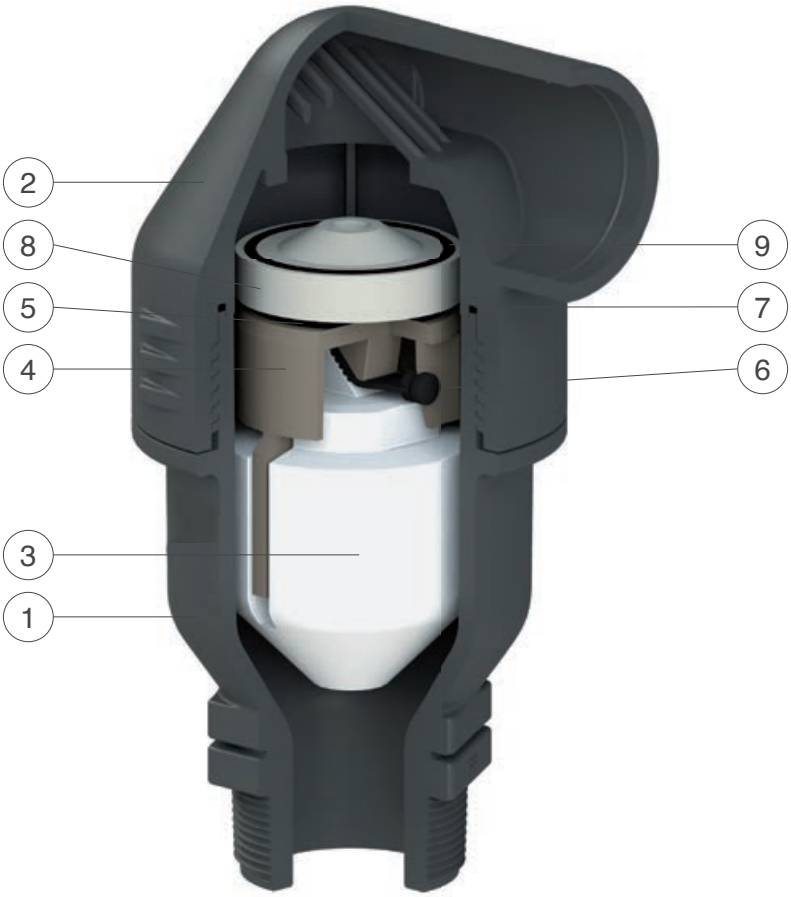
Weights and dimensions

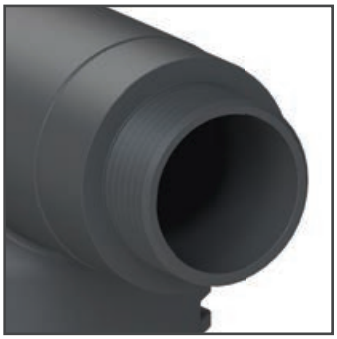
CONNECTION (E) inch	A mm	B mm	C mm	D mm	Weight Kg
Threaded 1"	80	167	92	CH 41	0,3
Threaded 2"	110	226	135	CH 65	0,75

All values are approximate, consult PF service for more details.

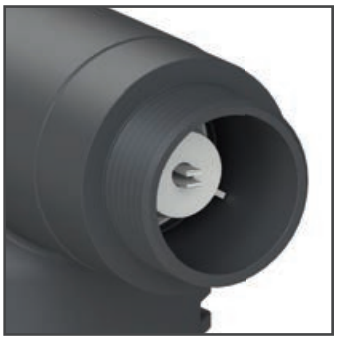


Technical details





Fitting with threaded outlet connection in polypropylene.



EO device in polypropylene with threaded connection.

N.	Component	Material	Features
1	Body	glass reinforced polypropylene	provided with ribs for accurate guiding
2	Cap	glass reinforced polypropylene	provided with protection grid
3	Float	polypropylene	solid and resistant to high pressure
4	Kinetic plug	glass reinforced polyamide	with high air release capacity
5	Kinetic orifice seal	EPDM	
6	Automatic orifice seal	EPDM	
7	O-ring	EPDM	
8	CSF flat	polypropylene	
9	O-ring	EPDM	

The list of materials and components is subject to changes without notice.

Anti-surge water combination underground air valve - Mod. WAVE SUBWAY 3S-CSF

The WAVE SUBWAY underground air valve has been designed to provide the proper solution for those locations requiring cost saving, frost protection, installation under roads, pavements, buildings. The air valve will ensure the operation of the pipeline networks allowing the release of air pockets during working conditions, the entrance of large volumes of air during draining operations and the controlled air discharge to avoid water hammer events.

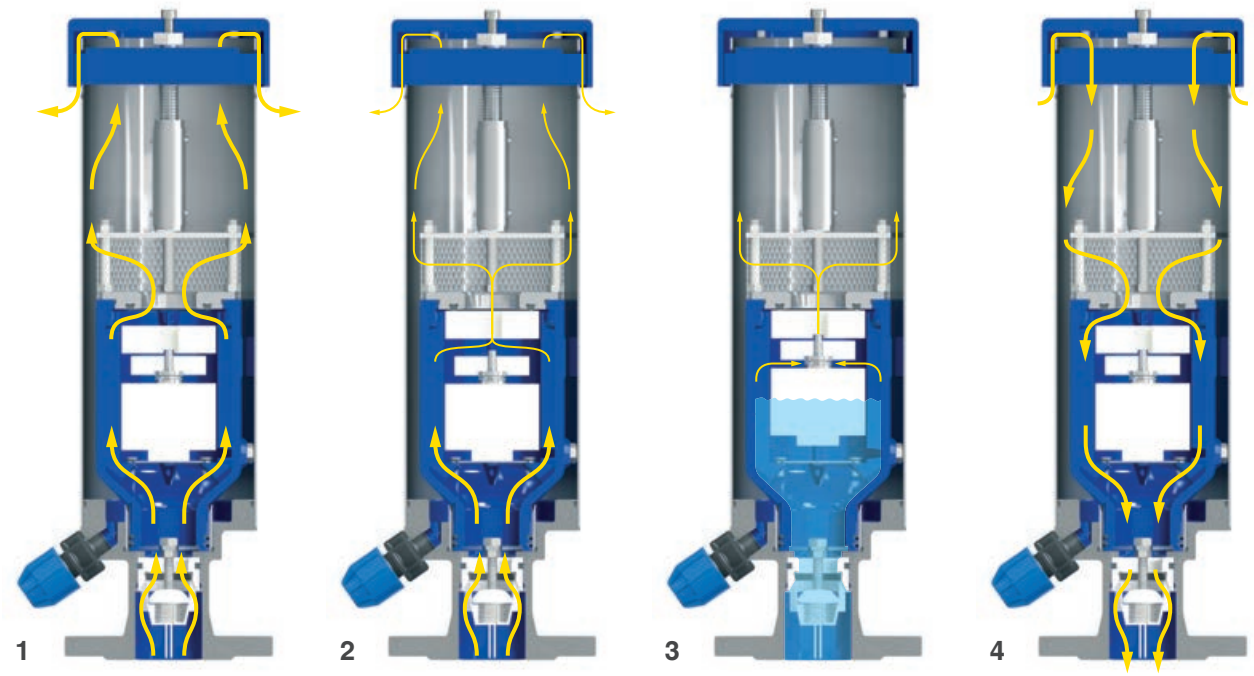
Technical features and benefits

- WAVE SUBWAY is designed to provide an alternative solution to conventional air valves installations avoiding chambers, structures, pits and sectioning devices between the air valve and the pipeline.
- Built in check valve for integral shut-off system when removing the air valve for maintenance purposes.
- Stand pipe in stainless steel for the maximum resistance against corrosion and to support the upper maneuvering system.
- Flanged basement to house the check valve and the drain port needed to avoid the accumulation of water inside the standpipe.
- Surge prevention combination air valve WAVE 3S-CSF automatically operated by the flow medium, and moving through the upper maneuvering system into a guidance bush with two O-rings for water tightness.
- Maintenance can be carried out from the top extracting the air valve from the standpipe.

Applications

- At high points and changes in slope of water distribution networks.
- Pressurized system with treated water.
- In areas exposed to frost, under the roads, buildings.

Operating principle



1. Discharge of large volumes of air

During the pipe filling it is necessary to discharge air as water flows in. The air valve, thanks to the aerodynamic body and deflector, will make sure to avoid premature closures of the mobile block during this phase.

2. Controlled outflow

If the differential pressure of air, during pipe filling, increases above a certain value without control there is the risk of water hammer and damages to the system. Should that happen the CSF upper float will rise automatically, reducing the outflow and consequently the velocity of the approaching water column.

3. Air release during working conditions

During operation the air produced by the pipeline is accumulated in the upper part of the air valve. Little by little it is compressed and the pressure arrives to water pressure, therefore its volume increases pushing the water level downwards allowing the air release.

4. Entrance of large volumes of air

During pipeline draining, or pipe bursts, it is necessary to bring in as much air as the quantity of outflowing water to avoid negative pressure and serious damages to the pipeline, and to the entire system.

Installation

The installation of WAVE SUBWAY simply requires a derivation from the main pipe, a manhole on top to allow for maintenance operations. The picture depicts the proper installation where the drain port plays a fundamental role, allowing for water discharge from the stand pipe. The drain should be located on a layer of gravel or crushed rock.

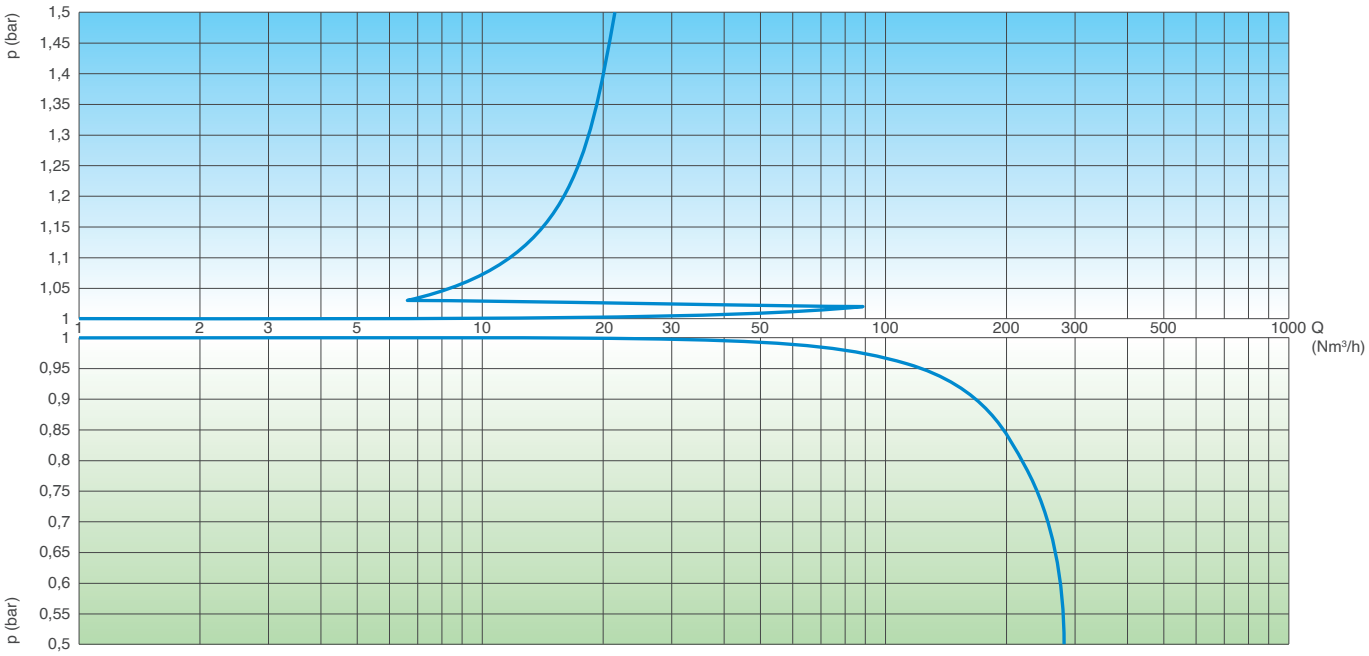
Air valve removal

The design of the underground air valve WAVE SUBWAY allows for a maintenance and replacement, without removing the air valve from the pipe, simply by acting on the cap and maneuvering key from above as shown on the picture on the right. All components will be pulled out from the top without the need of digging, and additional costs.

Technical data

Air flow performance charts

AIR DISCHARGE DURING PIPE FILLING



AIR ENTRANCE DURING PIPE DRAINING

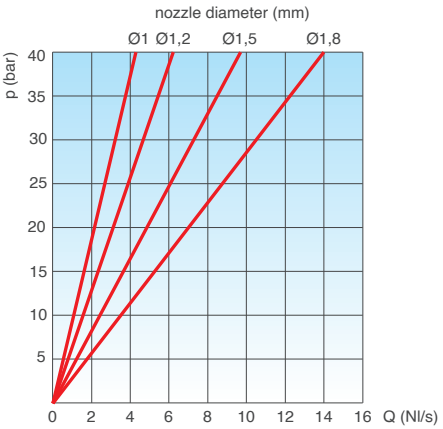
The air flow charts were created in Kg/s from laboratory tests and numerical analysis without the screen, then converted in Nm³/h using a safety factor.

Working conditions

Treated water max. 60° C.
Higher temperatures on request.
Maximum pressure 16 bar;
Minimum pressure 0,2 bar. Lower on request.

Standard

Designed in compliance with EN-1074/4.
Flanges according to EN 1092/2.
Epoxy painting applied through fluidized bed technology blue RAL 5005.
Changes and variations on the flanges and painting details on request.

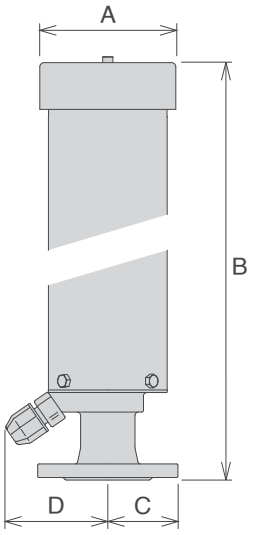


AIR RELEASE DURING WORKING CONDITIONS

Weights and dimensions

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

All values are approximate, consult PF service for more details.

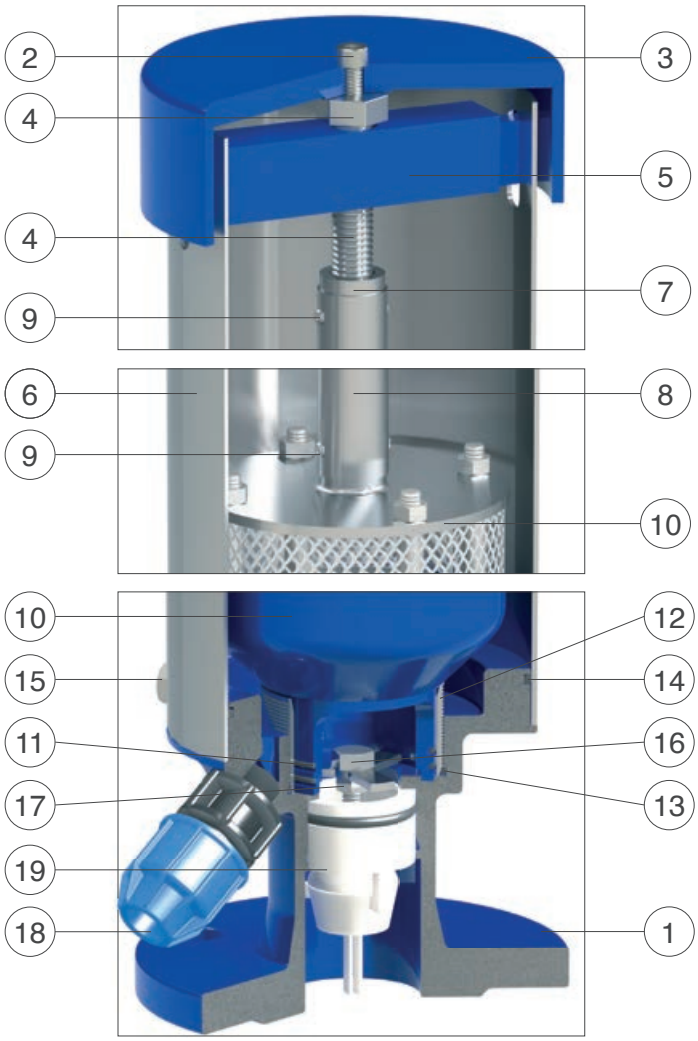


Nozzle choice

Nozzle diameter in mm according to the PN of the air valve.

PN 10	PN 16	PN 25	PN 40
1,5	1,2	1	0,8

Technical details



N.	Component	Standard material	Optional
1	Body	ductile cast iron GJS 450-10	
2	Screw	stainless steel AISI 304	stainless steel AISI 316
3	Cap	painted aluminium S11	
4	Driving screw	stainless steel AISI 304	
5	Guiding plate	painted steel	
6	Stand pipe	stainless steel AISI 304	
7	Screw housing	stainless steel AISI 303	
8	Maneuvering pipe	stainless steel AISI 304	
9	Plug	stainless steel AISI 304	
10	WAVE 3S 2"	in different executions (see WAVE technical details)	
11	O-ring	NBR	EPDM/Viton/silicone
12	Threaded sleeve	stainless steel AISI 304	
13	O-ring	NBR	EPDM/Viton/silicone
14	O-ring	NBR	EPDM/Viton/silicone
15	Screws	stainless steel AISI 304	stainless steel AISI 316
16	Opening screw	stainless steel AISI 304	stainless steel AISI 316
17	Locking nut	stainless steel AISI 304	stainless steel AISI 316
18	Drainage	polypropylene	
19	Check valve	Delrin (polyoxymethylene)	

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