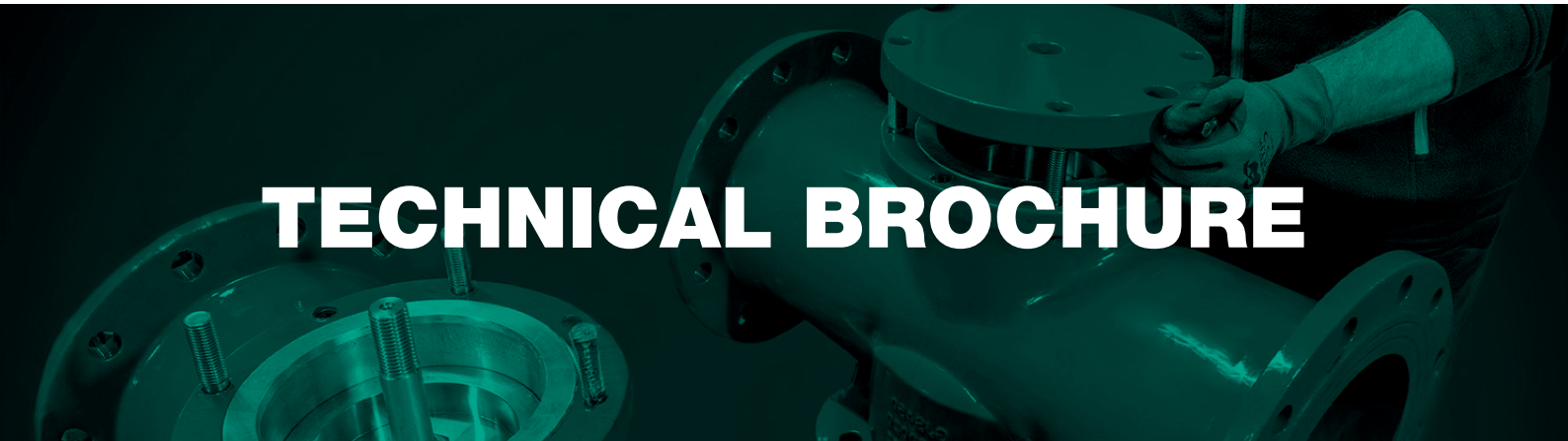
Pietro Fiorentini

WAVE HP

Air valve for aqueduct



TECHNICAL BROCHURE

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WAVE HP_technicalbrochure_ENG_revA

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Combined automatic air valve for high pressures **WAVE HP 3S**

The WAVE HP series air valves are high-performance single-chamber combined automatic devices. Equipped with a stainless steel seal seat, electro welded steel body and degassing system, they stand out for their reliability and durability.

The WAVE HP 3S model ensures the smooth operation of the waterworks by performing three functions: degassing of pressurised air during normal operation, and management of the entrance and discharge of large volumes of air during the draining and filling of pipelines.

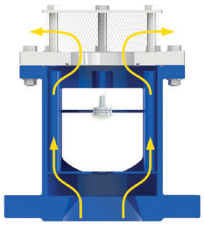
Constructive features and advantages

- Electrowelded steel body class PN 64, equipped with internal guides for sliding the central mobile block.
- Fixed flanges with drilling according to EN 1092/2, or different on request.
- Central mobile block consisting of a float and an upper plate, both cylindrical and made of solid polypropylene, joined by the nozzle and gasket holder. The solid floats avoid deformation phenomena at high pressures and, machined on the lathe, guarantee more precise sliding within the body ribs and a perfectly vertical thrust.
- Nozzle and gasket holder in AISI 316, designed to prevent gasket wear caused by excessive crushing.
- Very easy to intervene from above without removing the air valve from the pipeline.

Main applications

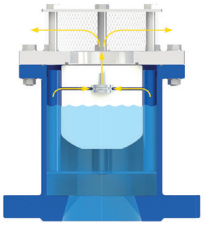
- Intake pipelines
- Mines
- Dams and high-pressure systems
- It is installed at downward slope changes and high points of pipelines, and generally at points exposed to high pressure conditions where ductile cast iron cannot be used

Operating principle



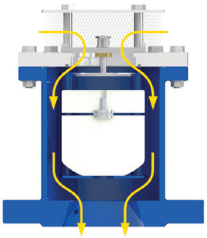
Discharge of large volumes of air

Durign the pipe filling, it is necessary to let out as much air as water enters. Thanks to the aerodynamic shape of the body and the deflector, the WAVE HP 3S air valve prevents the mobile block from closing prematurely during this phase.



Pressurised air degassing

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



Entrance of large volumes of air

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

Optional functions

Dual-function WAVE 3S version, also called vacuum breaker. Suitable for locations where no air release is needed. It is used at upward slope changes and long ascending sections of the profile, in dry and fire-fighting systems.

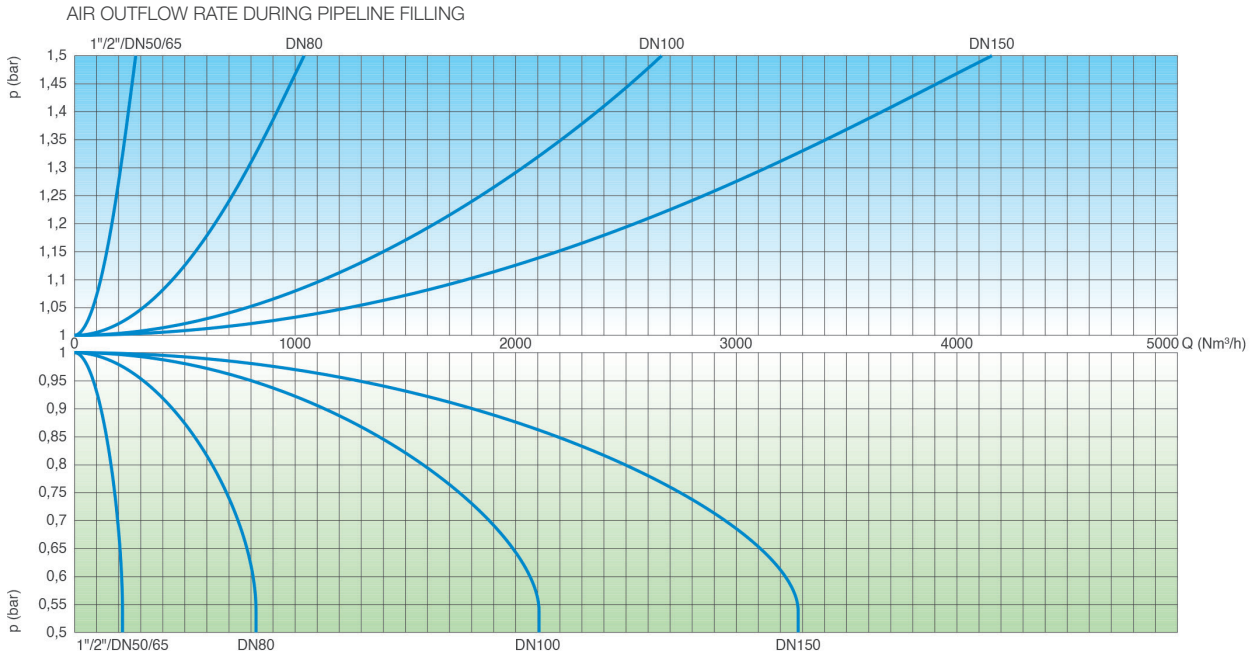
SUB version, with conveyance drain, available for WAVE HP 2S and HP 3S models. The threaded bend, connected to a discharge pipe, allows the air valve to operate even in the event of flooding of the well or the installation site, without the risk of contaminated water entering the pipeline. Another advantage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

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

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

Technical data

Air flow characteristic charts



Air flow charts are obtained in Kg/s from laboratory tests and numerical analysis, without filtering, and converted to Nm^3/h by applying a safety :za. factor.

Operating conditions

Maximum treated water	60°C (Higher temperatures on request)
Maximum pressure	64 bar
Minimum pressure	0.2 bar (lower on request)

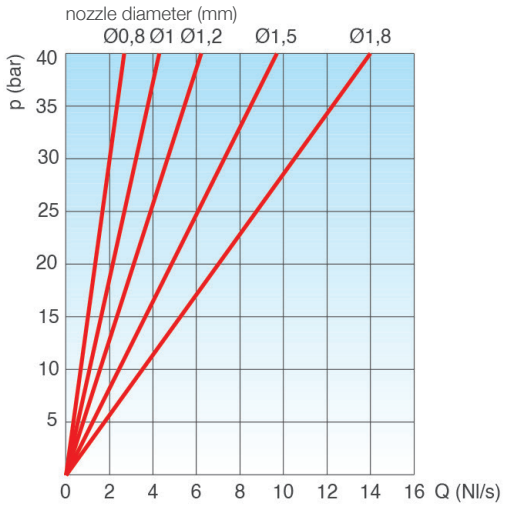
Standard

- Design according to EN 1074/4
- Drilling according to EN 1092/2 or ANSI
- Fluid bed coating RAL 5005 blue

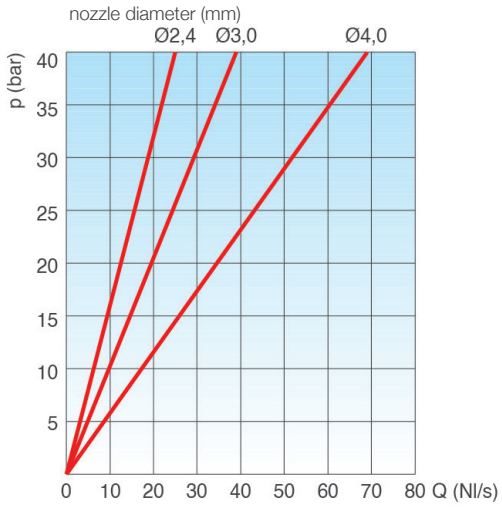
Modifications to painting and flanging standards on request.

Choice of nozzle

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



AIR FLOW RATE DURING DEGASSING

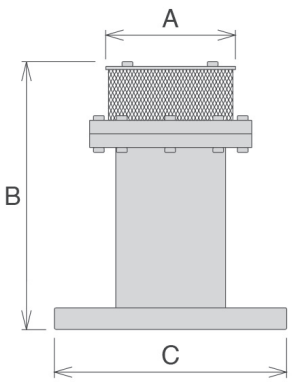


AIR FLOW RATE DURING DEGASSING

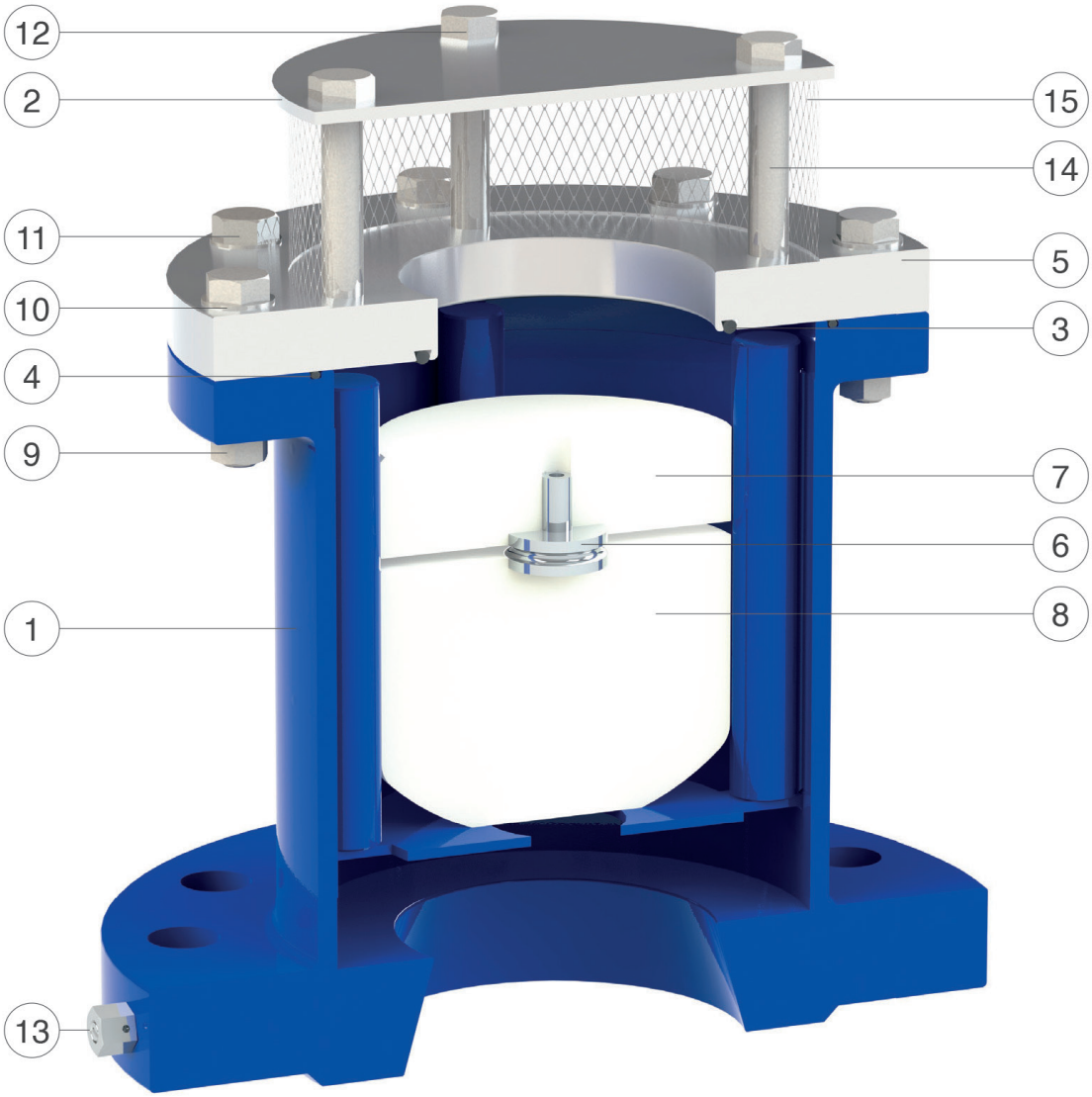
	PN 10	PN 16	PN 25	PN 40	PN 64
1”	1.2	1.2	1	0.8	0.8
2”/DN 50/65	1.5	1.2	1	0.8	0.8
DN 80	1.8	1.5	1.2	1	0.8
DN 100	2.4	1.8	1.8	1.2	1
DN 150	4	3	2.4	1.8	1.2

Dimensions and weights

CONNECTION inches/mm	A mm	B mm	C mm	Weight Kg
Threaded 1”	165	240	180	4.2
Flanged 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



Construction details



No.	Component	Standard material	Optional
1	Body	painted steel Fe 37	
2	Cap	AISI 304 stainless steel	AISI 316 stainless steel
3	Seal seat gasket	NBR	EPDM/Viton/silicone
4	Seal seat O-ring	NBR	EPDM/Viton/silicone
5	Seal seat	AISI 304 stainless steel	AISI 316 stainless steel
6	Nozzle unit	AISI 316 stainless steel	
7	Plug plate	polypropylene	
8	Float	polypropylene	
9	Nuts	AISI 304 stainless steel	AISI 316 stainless steel
10	Washers	AISI 304 stainless steel	AISI 316 stainless steel
11	HH screws	AISI 304 stainless steel	AISI 316 stainless steel
12	HH screws	AISI 304 stainless steel	AISI 316 stainless steel
13	Drain valve	AISI 303 stainless steel	AISI 316 stainless steel
14	Spacers	AISI 304 stainless steel	AISI 316 stainless steel
15	Filter	AISI 304 stainless steel	

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

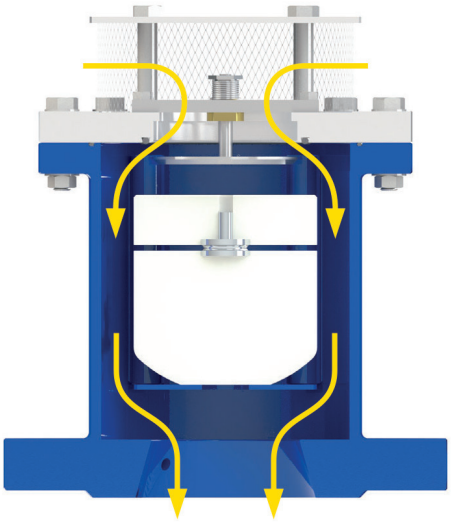
Combined anti-water hammer air valve for high pressures **WAVE HP 3S-AWH**

The WAVE HP series air valves are high-performance single-chamber combined automatic devices. Equipped with a stainless steel seal seat, electro welded steel body and degassing system, they stand out for their reliability and durability.

The WAVE HP 3S-AWH model ensures degassing during normal operation, the entrance of large volumes of air during the draining of pipelines, and the speed-controlled discharge of air during the filling phase to avoid the risk of water hammer.

Constructive features and advantages

- Electrowelded steel body class PN 64, equipped with internal guides for sliding the central mobile block.
- Fixed flanges with drilling according to EN 1092/2, or different on request
- Central mobile block consisting of a float and an upper plate, both cylindrical and made of solid polypropylene, joined by the nozzle and gasket holder. The solid floats avoid deformation phenomena at high pressures and, machined on the lathe, guarantee more precise sliding within the body ribs and a perfectly vertical thrust.
- AISI 316 nozzle and gasket holder, designed to prevent gasket wear due to excessive crushing.
- Anti-shock system (AWH) consisting of a stainless steel spring and guide shaft, and a plate with sizable holes to control the air discharge.

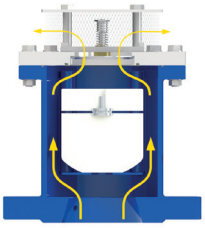


- Very easy to intervene from above without removing the air valve from the pipeline.

Main applications

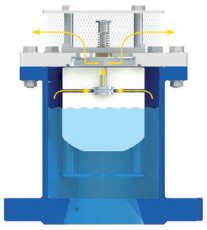
- Intake pipelines
- Mines
- Dams and high-pressure systems
- It is installed in lifting stations, at downward slope changes and high points subject to water hammer in pipelines. In general, at points exposed to high pressure conditions where ductile cast iron cannot be used

Operating principle



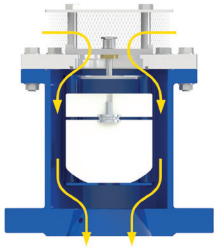
Controlled air discharge

The anti-shock system, by decreasing the air outflow as it escapes, reduces the speed of the incoming water column so as to avoid rapid air valve closing, the resulting overpressure, and the risk of water hammer.



Pressurised air degassing

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



Entrance of large volumes of air

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

Optional functions

Dual-function WAVE HP 2S-AWH version, also called vacuum breaker. Suitable for locations where no air release is needed. It is used at upward slope changes and long ascending sections of the profile; in dry and fire-prevention installations.

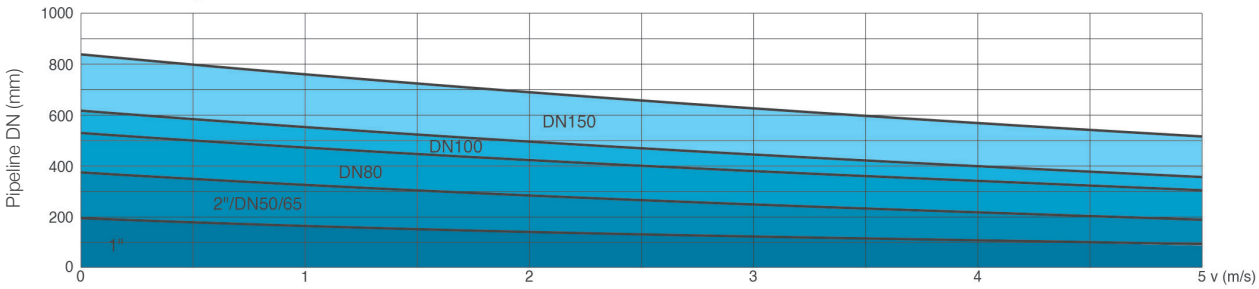
SUB version, with conveyance drain, available for WAVE 2S-AWH and 3S-AWH models. The threaded bend, connected to a discharge pipe, allows the air valve to operate even in the event of flooding of the well or the installation site, without the risk of contaminated water entering the pipeline. Another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

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

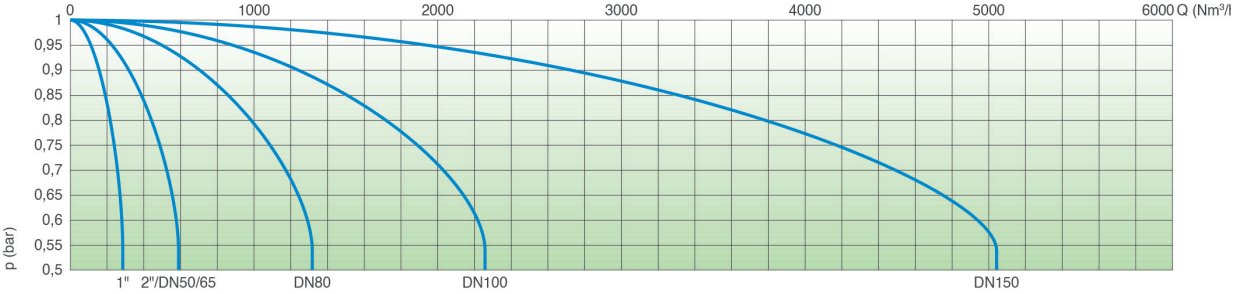
Technical data

Air valve selection chart

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



Air flow characteristic charts



AIR INFLOW RATE FOR PIPELINE DRAINING

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

Operating conditions

Maximum treated water	60°C Higher temperatures on request
Maximum pressure	64 bar
Minimum pressure	0.2 bar (lower on request)

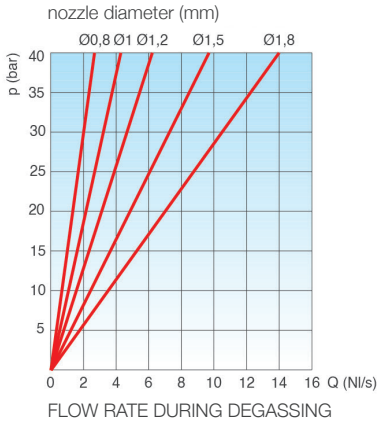
Standard

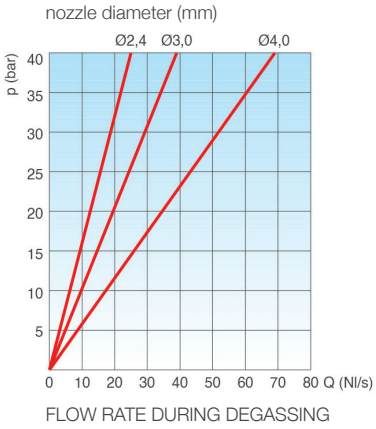
- Design according to EN 1074/4
- Drilling according to EN 1092/2 or ANSI
- Fluid bed coating RAL 5005 blue

Modifications to painting and flanging standards on request.

Choice of nozzle

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





	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

Dimensions and weights

CONNECTION inches/mm	A mm	B mm	C mm	Weight Kg
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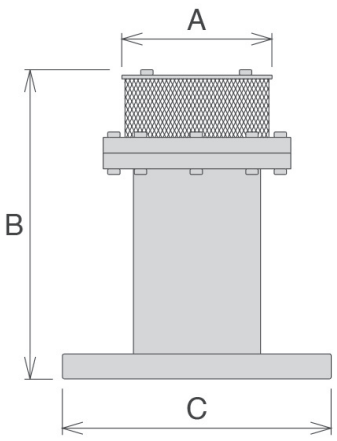
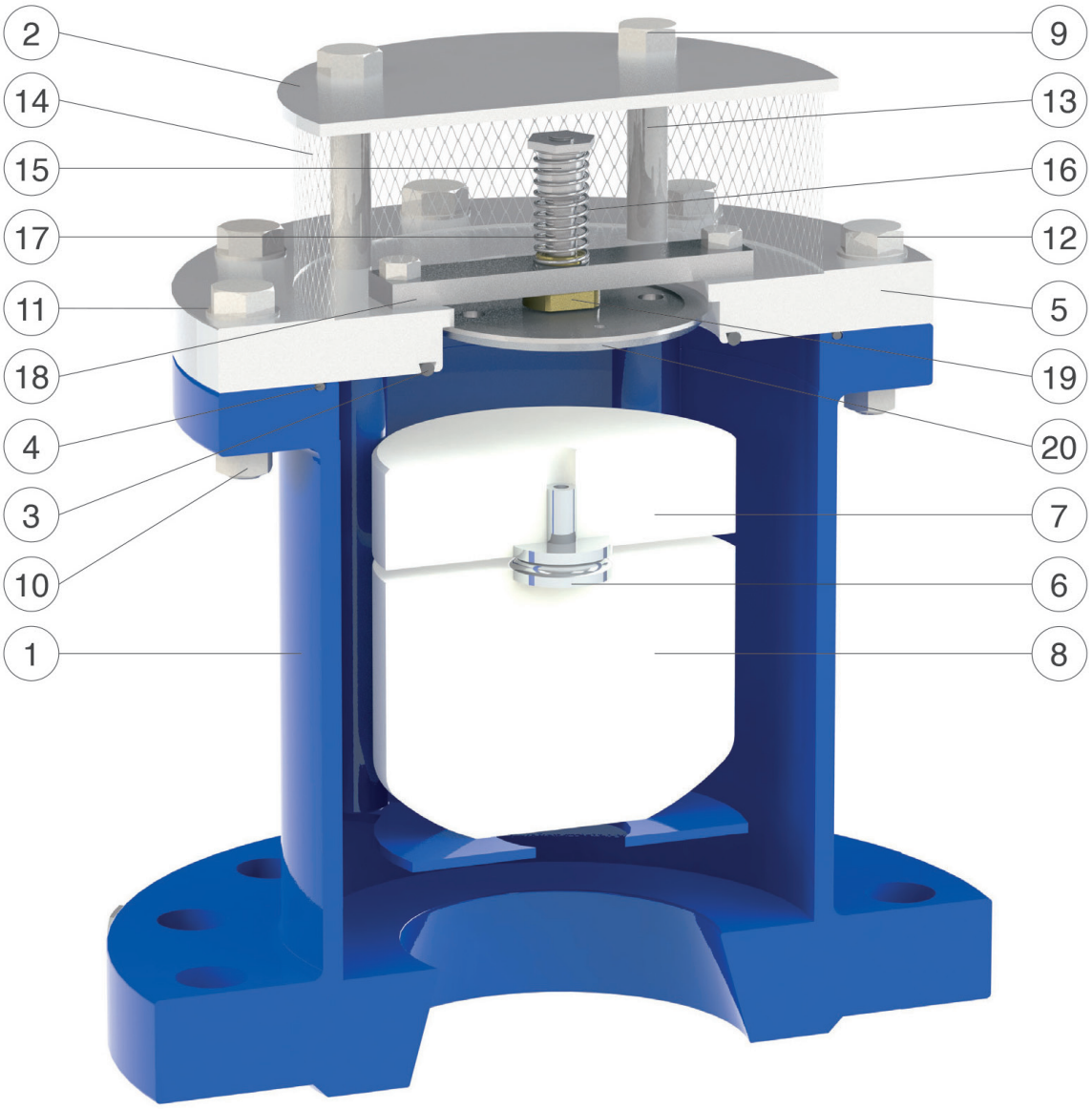


Construction details



No.	Component	Standard material	Optional
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2	Cap	AISI 304 stainless steel	AISI 316 stainless steel
3	Seal seat gasket	NBR	EPDM/Viton/silicone
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6	Nozzle unit	AISI 316 stainless steel	
7	Plug plate	polypropylene	
8	Float	polypropylene	
9	Screws	AISI 304 stainless steel	AISI 316 stainless steel
10	Nuts	AISI 304 stainless steel	AISI 316 stainless steel
11	Washers	AISI 304 stainless steel	AISI 316 stainless steel
12	Screws	AISI 304 stainless steel	AISI 316 stainless steel
13	Spacers	AISI 304 stainless steel	AISI 316 stainless steel
14	Filter	AISI 304 stainless steel	
15	Clamping nut	AISI 303 stainless steel	AISI 316 stainless steel
16	Spring	AISI 302 stainless steel	AISI 316 stainless steel
17	Guide shaft	AISI 303 stainless steel	AISI 316 stainless steel
18	Spring support and screws (in DN 150)	AISI 304 stainless steel	AISI 316 stainless steel
19	Guide nut (in DN 150)	Delrin (polyoxymethylene)	
20	AWH plate	AISI 304 stainless steel	AISI 316 stainless steel

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

Sustainability

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

Our commitment to the world of tomorrow

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

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

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