

CSA

Water air valves





The company was founded in 1987 by transforming the former CSA, which was a trading company dealing with pipes and valves for water networks, into a manufacturing company, through the research and realization of pillar fire hydrants. These were compliant with the UNI 9485 regulation, which was at the approval stage. Since then many other products have been added.

The history of our company is characterised by years of technical and commercial research, which have enabled us to offer a complete range of valves designed for controlling, regulating and protecting the pipelines under pressure in both waterworks and sewage lines as well as fire hydrants.

Our many industrial patents and innovative technical solutions, together with modern and attractive style of design, have made it possible to differentiate our products from those offered by competitors and have allowed us to become a point of reference in our sector.

Flexibility and reliability have been the key points of CSA's rapid growth over the last few years. We are perfectly aware that we are managing the world's most precious resource and, motivated by this responsibility and the commitment towards our customers, we have dedicated ourselves to constantly improving our products, placing them at the highest levels of quality.

Quality

In the manufacturing business today, quality is the fundamental requirement for achieving and maintaining a growing market share.

For this reason we have always aimed at developing a synergy between the various sectors of the company and thus ensuring:

- Quick and precise answers;
- Evaluation of data received and immediate response;
- Rigorous control of incoming and outgoing products.

Since 1998 CSA is certified according to regulation ISO 9001 by RINA (Italian Naval Registry) recently converted into ISO 9001/2008.





During the research and realisation of new products, CSA has always focused his efforts on:

- Listening to the customer's needs and finding the best solution both at the design and operational phases.
- Guiding our R&D department to develop ranges of modern, reliable and complementary products.
- Adopting production techniques that, even while complying with the severest quality standards, would allow us to reduce delivery times.
- Guaranteeing complete technical support for our customers and prompt after-sales assistance.

This philosophy characterizes us not only as a valve manufacturer but also as a reliable partner whom you can

always depend on for consulting and solutions.

The production cycle, aimed at the constant improvement of our products and complete customer satisfaction, ensures predetermined margins of tolerance by establishing production standards, which guarantee that the semi finished products reach the next production stage with the required specifications.

All our valves are made of ductile cast iron GJS 400-15 / 500-7 in absolute compliance with European standards, and are suitable for PN 25-40 bar.

The manufacturing process is carried out exclusively by means of numerically controlled lathes, mills, and horizontal machining units. Subsequent step-by-step controls are based on strict quality procedures. Painting, pre-treated by sand blasting grade SA 2.5, is carried out inside a fluidized bed containing epoxy powder, which guarantees maximum surface protection. All our products are tested under water pressure and certified.



Combination air valve Mod. FOX 3F

The CSA air valve Mod. FOX 3F 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.



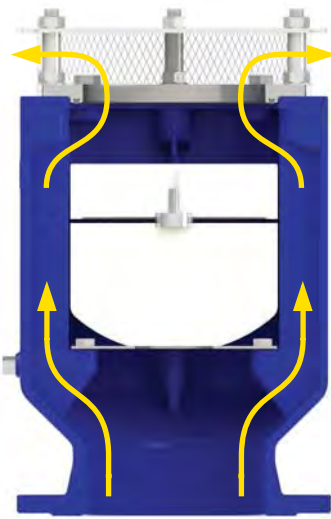
Technical features and benefits

- Body in ductile cast iron, PN 40 bar rated, provided with internal ribs for consistent and accurate guiding of the mobile block.
- In general supplied with fixed flanges and, for some DN only, mobile flanges (according to EN 1092/2) that can be changed to suit different pressure conditions.
- Drainage valve, produced by CSA, 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 CSA air release system in AISI 316 (pat. Pending). 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 CSA 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.
- Mesh and cap in stainless steel for the M version only.

Applications

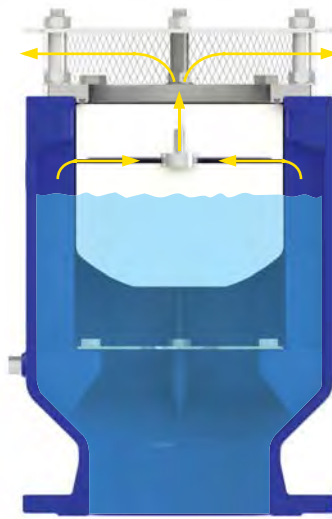
- Main transmission lines.
- Water distribution networks.
- Irrigation systems.
- In general this model is used on changes in slope descending and at the high points of the pipeline.

Operating principle



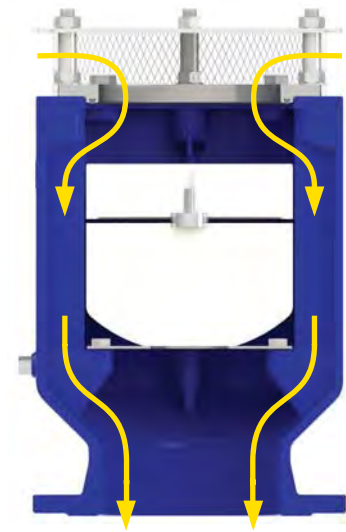
Discharge of large volumes of air

During the pipe filling it is necessary to discharge air as water flows in. The FOX 3F, thanks to an 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 of the pipeline, and to the entire system.

Optional



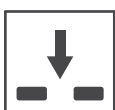
■ **Vacuum breaker version Mod. FOX 2F**, to allow the entrance and discharge of large volumes of air only. This model is normally recommended in changes in slope ascending, long ascending segments, dry fire systems, and wherever the air release won't be required.



■ **Version for submerged applications, SUB series**, available both for FOX 3F and 2F Models, with 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.

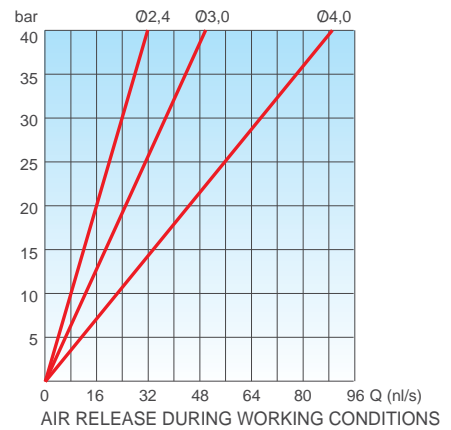
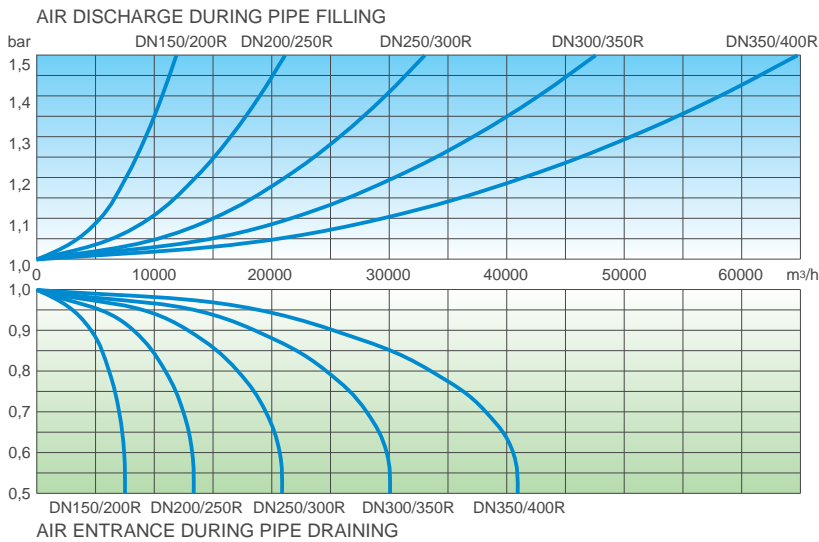
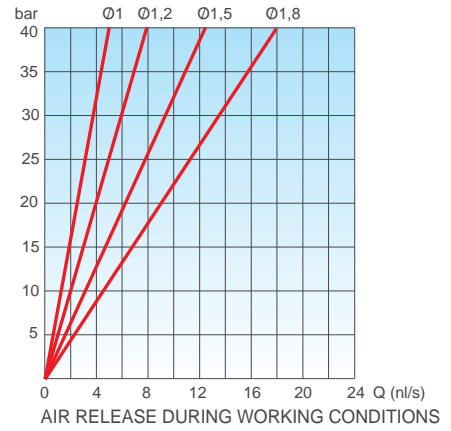
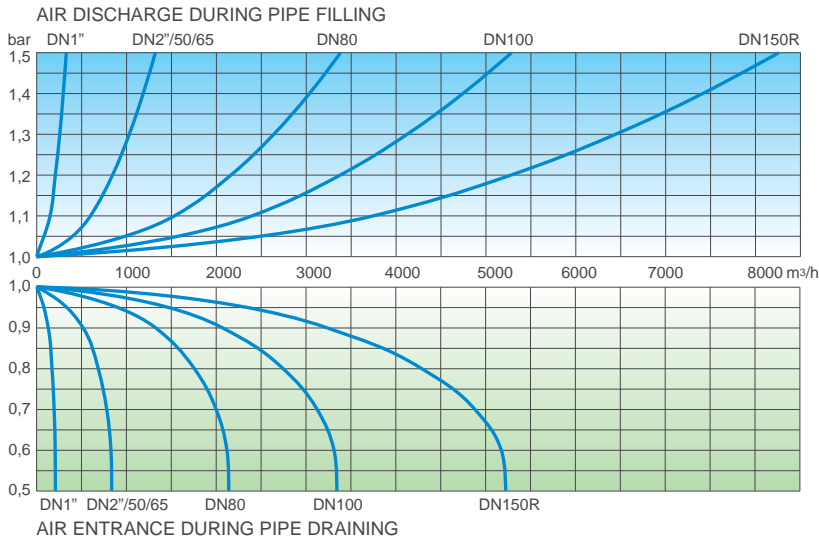


■ **Version for air discharge only EO series**, available both for FOX 3F and 2F models. The most important application of EO is to allow the air valve installation in those locations of the system where HGL may drop below the pipe profile, and to any other node where for project requirements air entrance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



■ **Version for air entrance only IO series**, available for FOX 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.

Air flow performance charts



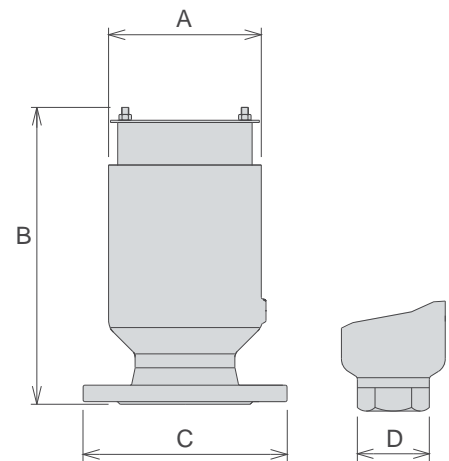
Working conditions

Treated water max. 60°C;
 Max. pressure 40 bar;
 Min. pressure 0,3 bar;
 Low pressure version to 0,19 bar on request.

Standard

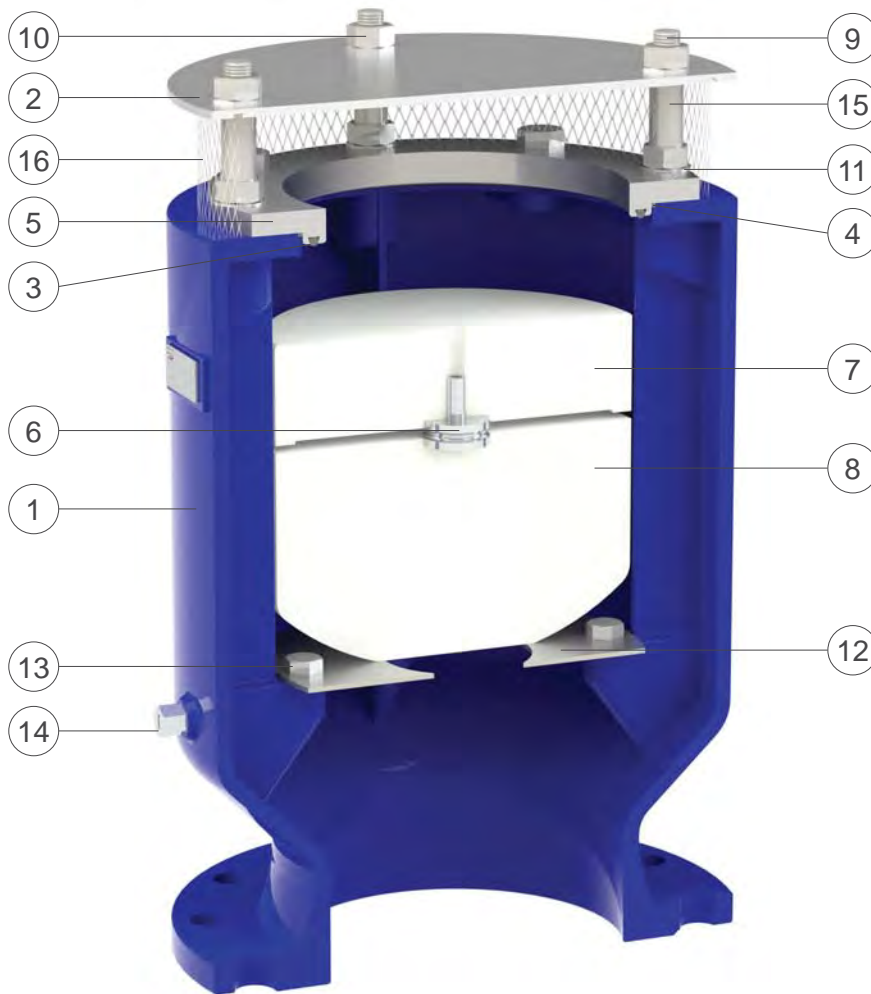
Designed in compliance with EN-1074/4 and AWWA C-512.
 Flanges according to EN 1092/2.
 Epoxy painting applied through fluidized bed technology blue RAL 5005.
 Changes and variations on the flanges and painting details available on request.

CONNECTION inch/mm	A mm	B mm	C* mm	C** mm	D mm	Weight Kg
Threaded 1"	93	217	=	=	CH 45	3,3
Threaded 2"	118	277	=	=	CH 75	6,1
Flanged 50	118	290	165	165	=	8,1
Flanged 65	118	290	185	185	=	8,6
Flanged 80	142	322	200	205	=	11,1
Flanged 100	180	364	220	235	=	18,5
Flanged 150R	218	435	285	300	=	34,5
Flanged 150	261	500	285	300	=	49,0
Flanged 200R	261	500	340	340	=	51,0
Flanged 200	333	574	340	375	=	94,0
Flanged 250R	333	574	=	400	=	102,0
Flanged 250	414	735	=	450	=	121,0
Flanged 300R	414	735	=	485	=	127,0
Flanged 300	492	850	=	515	=	240,0
Flanged 350R	492	850	=	580	=	250,5
Flanged 350	570	995	=	580	=	295,0
Flanged 400R	570	995	=	660	=	304,0



* M.F. = mobile flanges version
 ** F.F. = fixed flanges version

Technical details



Version with cap and mesh in stainless steel, M series, available from 1" up to DN 400.



Version with cap in ductile, C series, available from 1" up to DN 150.

N.	Component	Material	Standard
1	Body	ductile cast iron	GJS 500-7
2	Cap	stainless steel / ductile cast iron	AISI 304/316 / GJS 500-7
3	O-ring	NBR	
4	O-ring	NBR	
5	Seat	stainless steel	AISI 304/316
6	Nozzle Subset	stainless steel	AISI 316
7	Upper flat	polypropylene	
8	Float	polypropylene	
9	Studs	stainless steel	A2/A4/AISI 316
10	Bolts	stainless steel	A2/A4/AISI 316
11	Washer	stainless steel	A2/A4/AISI 316
12	Diffuser	stainless steel	AISI 304/316
13	Screws	stainless steel	A2/A4/AISI 316
14	Drain valve	stainless steel	AISI 304/316
15	Spacers	stainless steel	AISI 304/316
16	Filter	stainless steel	AISI 304



Anti water hammer combination air valve

Mod. FOX 3F - AS

The CSA air valve Mod. FOX 3F AS 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.



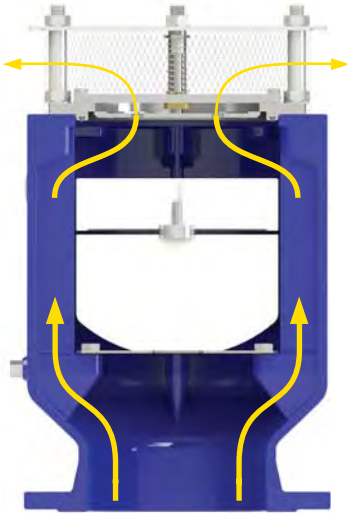
Technical features and benefits

- Body in ductile cast iron, PN 40 bar rated, provided with internal ribs for consistent and accurate guiding of the mobile block.
- Drainage valve produced by CSA, 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 CSA air release system in AISI 316 (pat. Pending). 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 CSA 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 AS 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

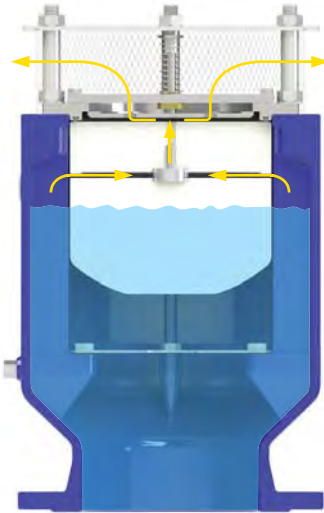
- Main transmission lines.
- Water distribution networks.
- Irrigation systems.
- In general this model is used near pumps, on changes in slope ascending, and at the high points of the pipeline subjected to water hammer.

Operating principle



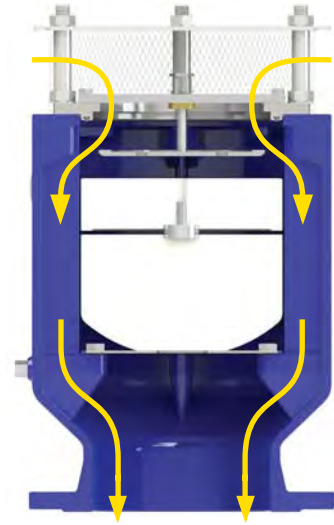
Controlled air discharge

During the pipe filling it is necessary to avoid rapid closures, responsible of water hammer effects. The FOX 3F AS, thanks to the anti-shock feature, will control the air outflow thus reducing the velocity of the approaching water column. The risk of overpressure 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 of the pipeline, and to the entire system.

Optional



■ **Vacuum breaker version Mod. FOX 2F AS**, 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.

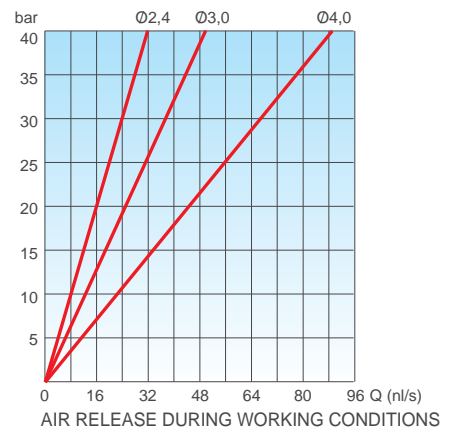
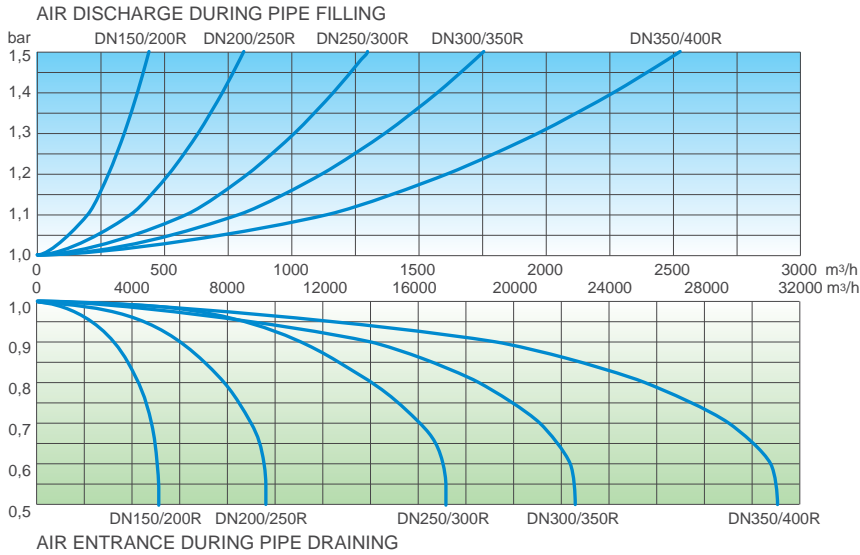
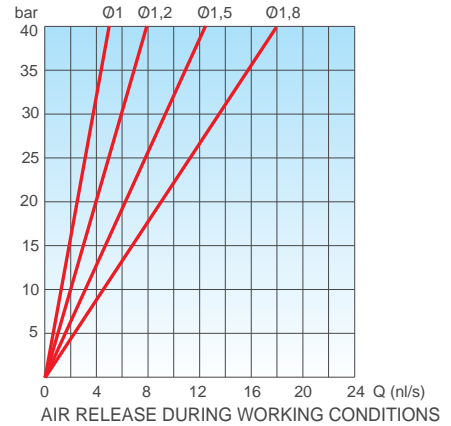
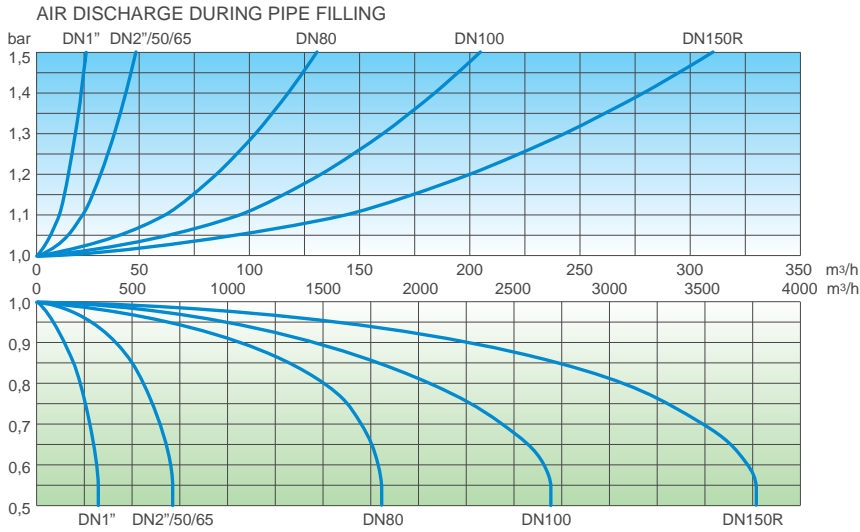


■ **Version for submerged applications, SUB series**, available both for FOX 3F AS and 2F AS Models, with elbow for air conveyance. The design sprang from the necessity of having an air valve performing also in case of flood, without the risk of contaminated water entering the pipeline. Another benefit 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 AS device, can be modified on request according to the project conditions and the transient analysis.

Air flow performance charts



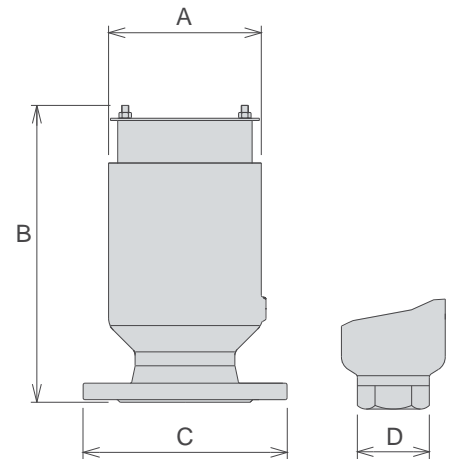
Working conditions

Treated water max. 60°C;
 Max. pressure 40 bar;
 Min. pressure 0,3 bar;
 Low pressure version to 0,19 bar on request.

Standard

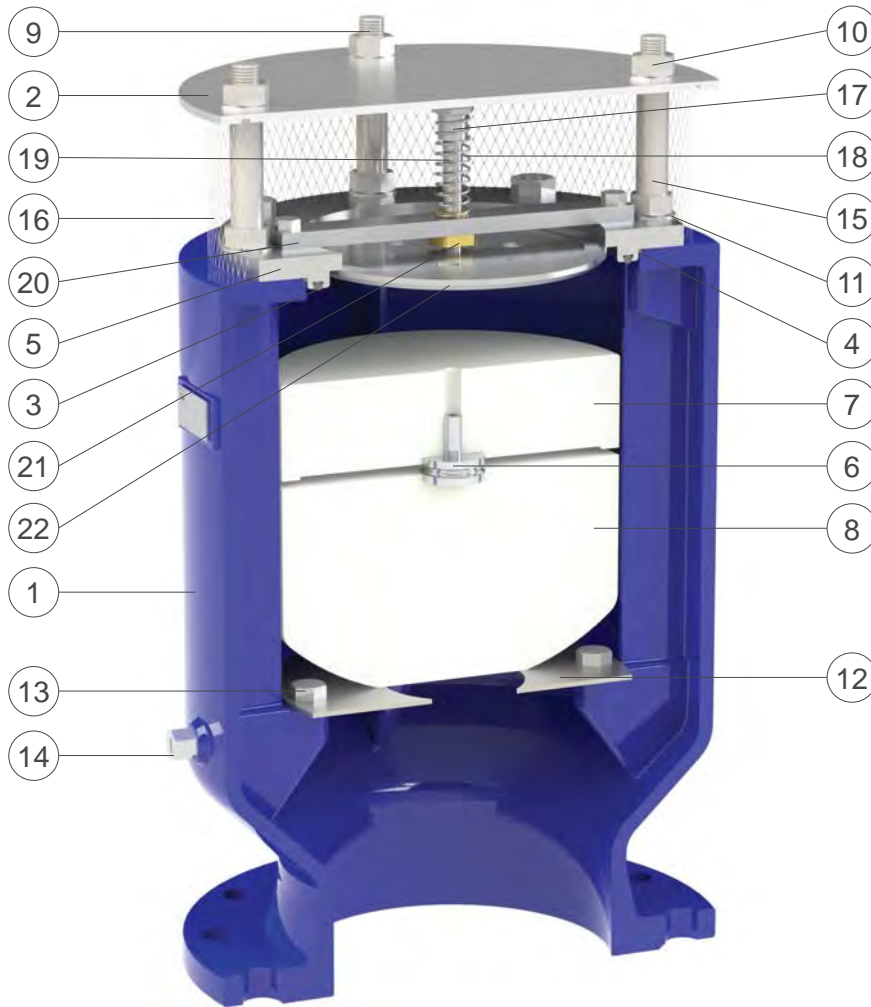
Designed in compliance with EN-1074/4 and AWWA C-512.
 Flanges according to EN 1092/2.
 Epoxy painting applies through fluidized bed technology blue RAL 5005.
 Changes and variations on the flanges and painting details available on request.

CONNECTION inch/mm	A mm	B mm	C* mm	C** mm	D mm	Weight Kg
Threaded 1"	93	217	=	=	CH 45	3,3
Threaded 2"	118	277	=	=	CH 75	6,1
Flanged 50	118	290	165	165	=	8,1
Flanged 65	118	290	185	185	=	8,6
Flanged 80	142	322	200	205	=	11,1
Flanged 100	180	364	220	235	=	18,5
Flanged 150R	218	435	285	300	=	34,5
Flanged 150	261	500	285	300	=	49,0
Flanged 200R	261	500	340	340	=	51,0
Flanged 200	333	596	340	375	=	94,0
Flanged 250R	333	596	=	400	=	102,0
Flanged 250	414	735	=	450	=	121,0
Flanged 300R	414	735	=	485	=	127,0
Flanged 300	492	850	=	515	=	240,0
Flanged 350R	492	850	=	580	=	250,5
Flanged 350	570	995	=	580	=	295,0
Flanged 400R	570	995	=	660	=	304,0



* M.F. = mobile flanges version
 ** F.F. = fixed flanges version

Technical details



Version with cap and mesh in stainless steel, M series, available from 1" up to DN 400.



Version with cap in ductile, C series, available from 1" up to DN 150.

N.	Component	Material	Standard
1	Body	ductile cast iron	GJS 500-7
2	Cap	stainless steel / ductile cast iron	AISI 304/316 / GJS 500-7
3	O-ring	NBR	
4	O-ring	NBR	
5	Seat	stainless steel	AISI 304/316
6	Nozzle subset	stainless steel	AISI 304/316
7	Upper flat	polypropylene	
8	Float	polypropylene	
9	Studs	stainless steel	A2/A4
10	Nuts	stainless steel	A2/A4
11	Washer	stainless steel	A2/A4
12	Diffuser	stainless steel	AISI 304/316
13	Screws	stainless steel	A2/A4
14	Drainage valve	stainless steel	AISI 304/316
15	Spacers	stainless steel	AISI 304/316
16	Filter	stainless steel	AISI 304
17	Nut	stainless steel	AISI 304/316
18	Spring	stainless steel	AISI 304/316
19	AS shaft	stainless steel	AISI 304/316
20	Guiding plate (from DN150R)	stainless steel	AISI 304/316
21	Guiding nut (from DN150R)	stainless steel	AISI 304/316
22	AS flat	stainless steel	AISI 304/316



Combination air valve with rapid filling preventer mechanism Mod. FOX 3F - RFP

The CSA air valve Mod. FOX 3F RFP will ensure the proper operation of the system allowing the release of air pockets during working conditions and the entrance of large volumes of air during draining. In addition to that this model will always maintain the air outflow within a safety limit, without the risk of water hammer.



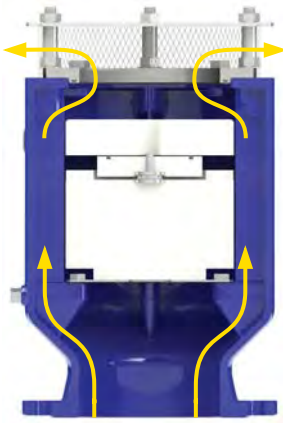
Technical features and benefits

- 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 CSA air valve FOX 3F RFP 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 closure and the risk of air valve drowning, due to low pressure and possible rapid filling, is avoided.
- Body in ductile cast iron, PN 40 bar rated, provided with internal ribs for consistent and accurate guiding of the mobile block.
- Mobile block composed of the main float and upper disk, joined together by the CSA air release system in AISI 316 (pat. pending), and an additional anti surge obturator.
- Nozzle and gasket holder, part of CSA air release system, entirely made in AISI 316 and designed with gasket compression control to prevent aging process and consequent leakage during working conditions.

Applications

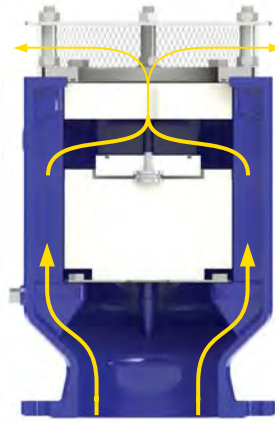
- Main transmission lines.
- Water distribution networks.
- Irrigation systems.
- In general this model is used, in combination with CSA AS technology, on changes in slope and high points of the profile to provide the best air control and safety of the pipeline.

Operating principle



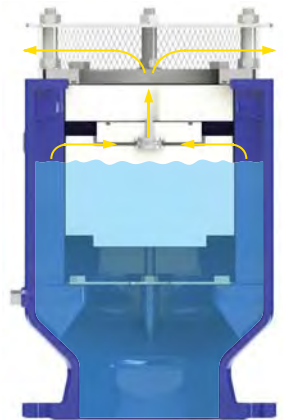
Discharge of large volumes of air

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



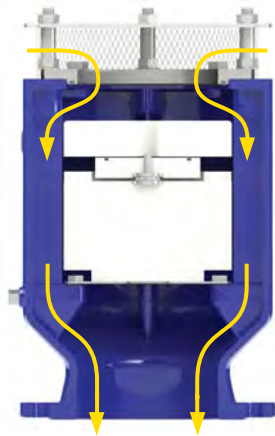
Controlled outflow

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 RFP 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 of the pipeline, and to the entire system.

Optional



■ **Vacuum breaker version Mod. FOX 2F RFP**, 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.

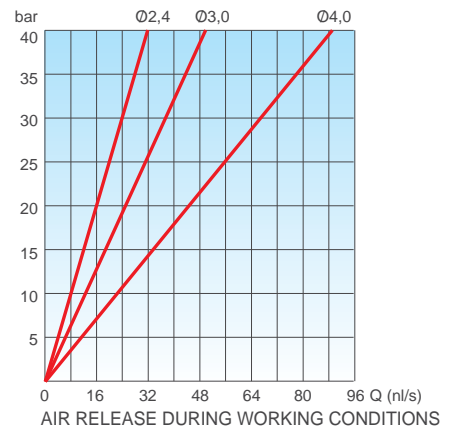
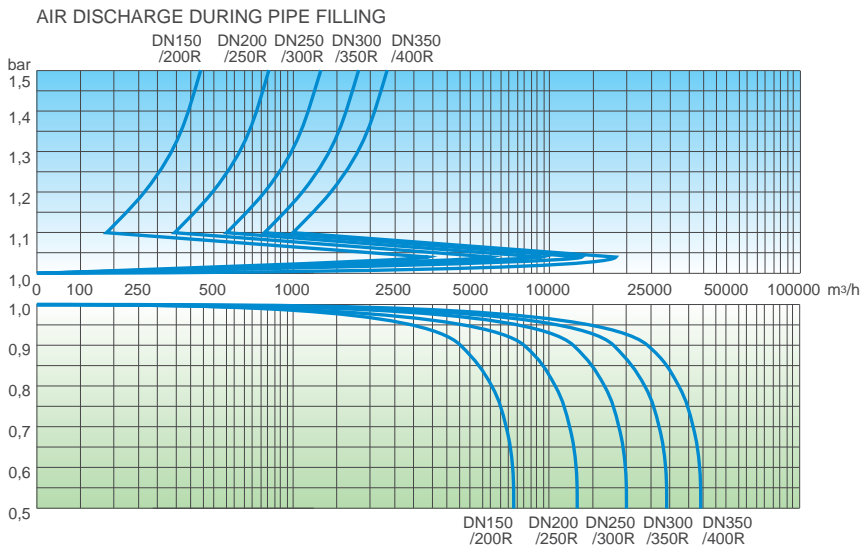
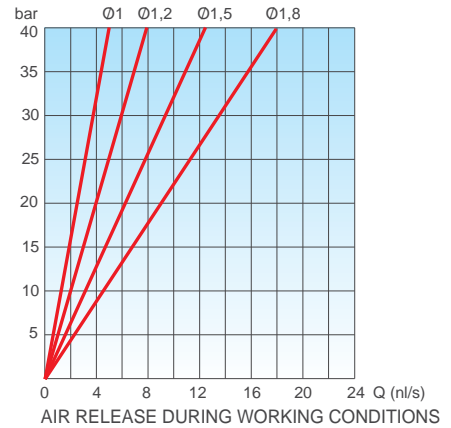
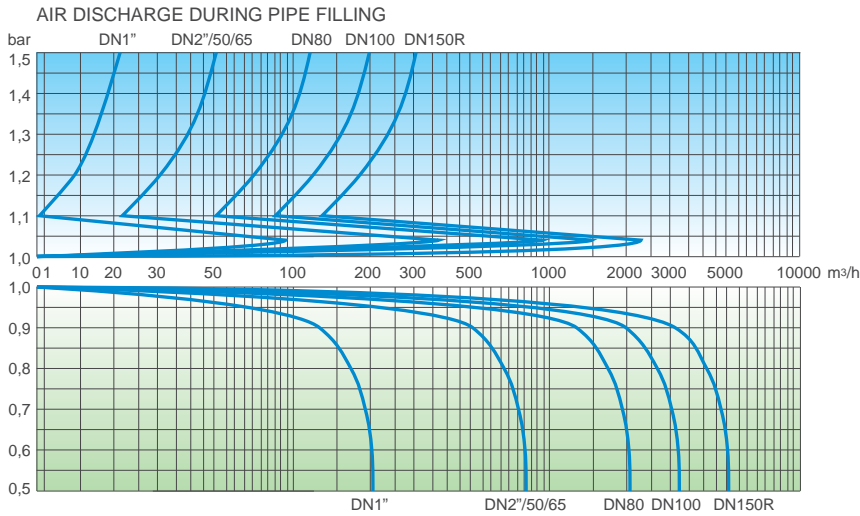


■ **Version for submerged applications, SUB series**, available both for FOX 3F RFP and 2F RFP Models, with elbow for air conveyance. The design sprang from the necessity of having an air valve performing also in case of flood, without the risk of contaminated water entering the pipeline. Another benefit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



■ **Version for air discharge only EO series**, available both for FOX 3F and 2F 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.

Air flow performance charts



AIR ENTRANCE DURING PIPE DRAINING

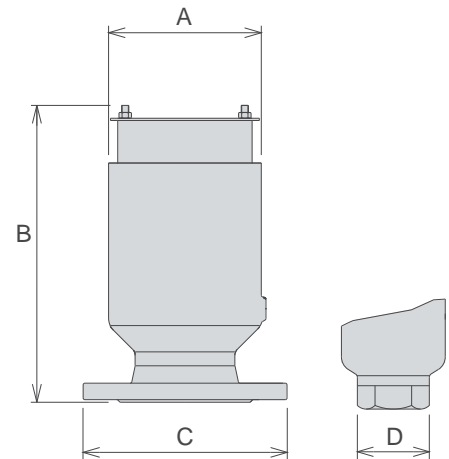
Working conditions

Treated water max. 60°C;
 Max. pressure 40 bar;
 Min. pressure 0,3 bar;
 Low pressure version to 0,19 bar on request.

Standard

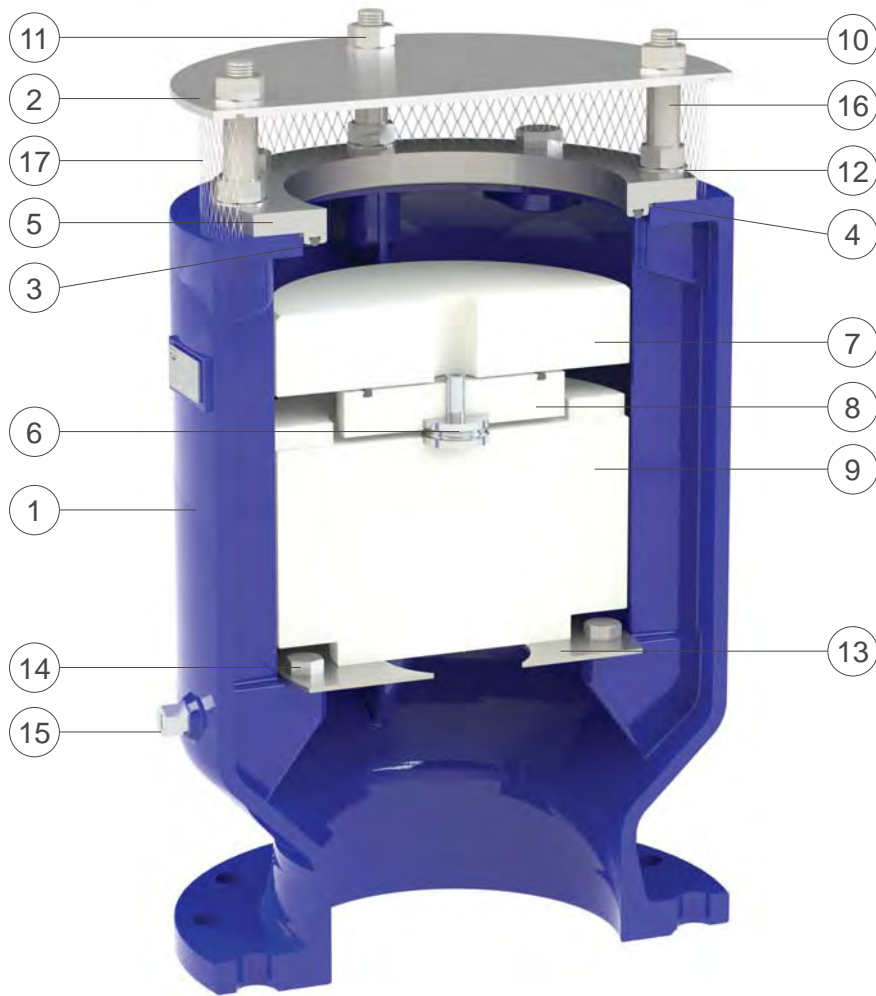
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Flanged 200	333	574	340	375	=	94,0
Flanged 250R	333	574	=	400	=	102,0
Flanged 250	414	735	=	450	=	121,0
Flanged 300R	414	735	=	485	=	127,0
Flanged 300	492	850	=	515	=	240,0
Flanged 350R	492	850	=	580	=	250,5
Flanged 350	570	995	=	580	=	295,0
Flanged 400R	570	995	=	660	=	304,0



* M.F. = mobile flanges version
 ** F.F. = fixed flanges version

Technical details



Version with cap and mesh in stainless steel, M series, available from 1" up to DN 400.



Version with cap in ductile, C series, available from 1" up to DN 150.

N.	Component	Material	Standard
1	Body	ductile cast iron	GJS 500-7
2	Cap	stainless steel / ductile cast iron	AISI 304/316 / GJS 500-7
3	O-ring	NBR	
4	O-ring	NBR	
5	Seat	stainless steel	AISI 304/316
6	Nozzle Subset	stainless steel	AISI 304/316
7	RFP flat	polypropylene	
8	Upper flat	polypropylene	
9	Float	polypropylene	
10	Studs	stainless steel	A2/A4
11	Bolts	stainless steel	A2/A4
12	Washers	stainless steel	A2/A4
13	Diffuser	stainless steel	AISI 304/316
14	Screws	stainless steel	A2/A4
15	Drain valve	stainless steel	AISI 304/316
16	Spacers	stainless steel	AISI 304/316
17	Filter	stainless steel	AISI 304



Combination air valve Mod. FOX 3F - HP

The CSA air valve Mod. FOX 3F HP 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.



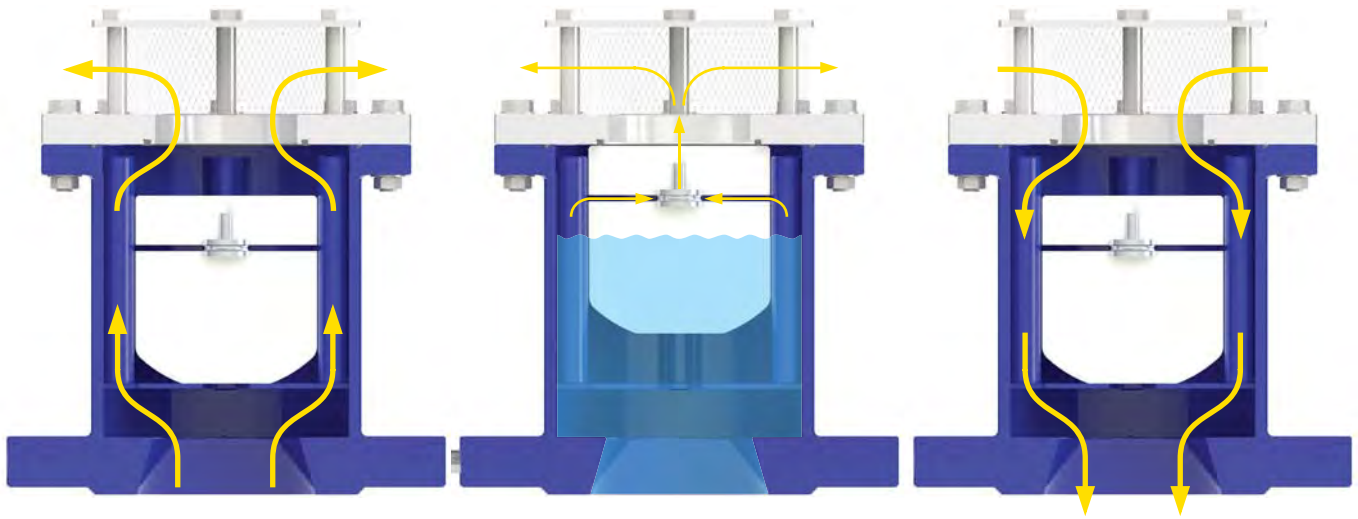
Technical features and benefits

- 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 on request.
- Mobile block composed of a cylindrical float and upper disk in solid polypropylene, joined together by the CSA air release system in AISI 316 (pat. Pending). 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 CSA 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.
- Mesh and cap in stainless steel.

Applications

- Main transmission lines.
- Mines.
- 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 when ductile cast iron is not acceptable.

Operating principle



Discharge of large volumes of air

During the pipe filling it is necessary to discharge air as water flows in. The FOX 3F HP, 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 of the pipeline, and to the entire system.

Optional



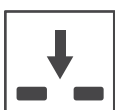
■ **Vacuum breaker version Mod. FOX 2F HP** to allow the entrance and discharge of large volumes of air only. This model is normally recommended in changes in slope ascending, long ascending segments, dry fire systems, and wherever the air release won't be required.



■ **Version for submerged applications, SUB series**, available both for FOX 3F HP and 2F HP Models, with 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.

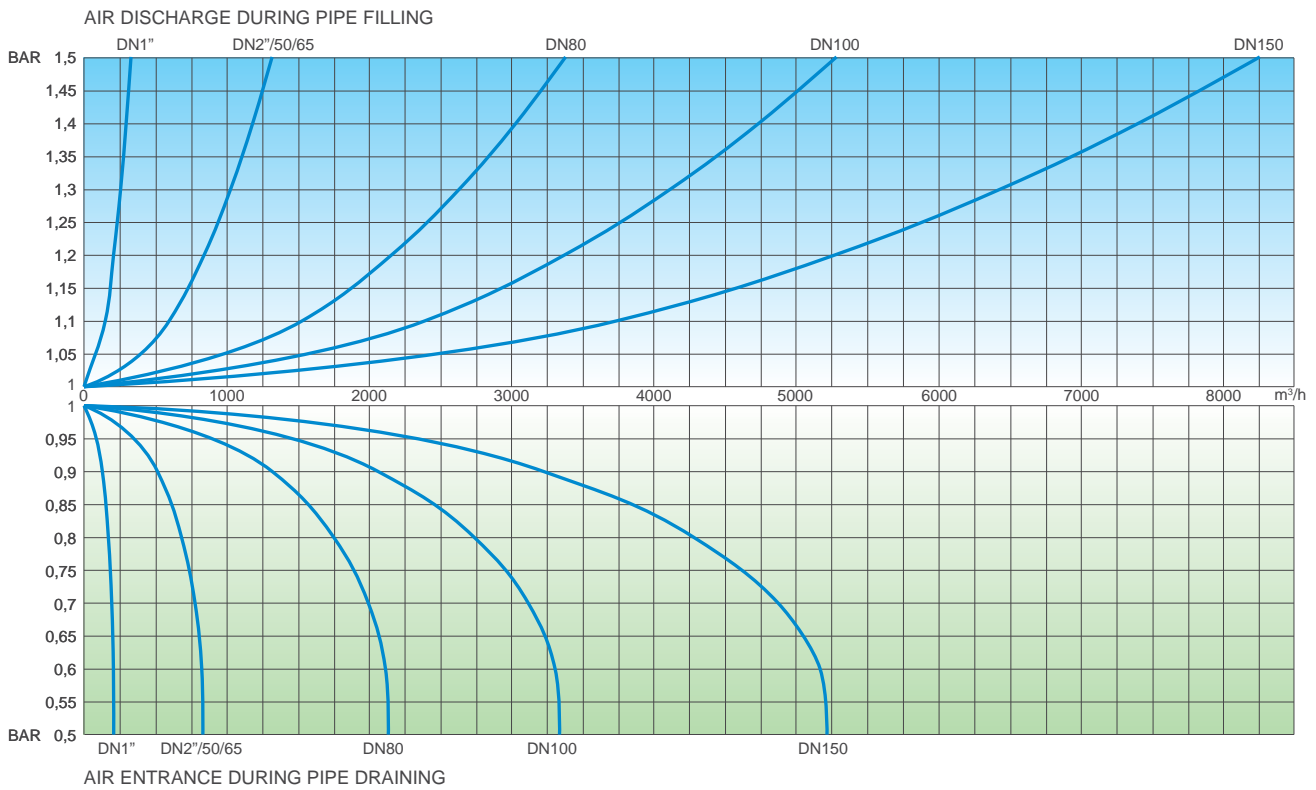


■ **Version for air discharge only EO series**, available both for FOX 3F HP and 2F HP models. The most important application of EO is to allow the air valve installation in those locations of the system where HGL may drop below the pipe profile, and to any other node where for project requirements air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



■ **Version for air entrance only IO series**, available for FOX 2F HP 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.

Air flow performance charts

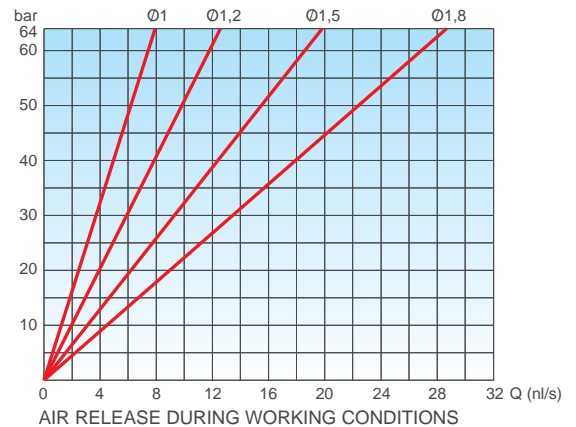


Working conditions

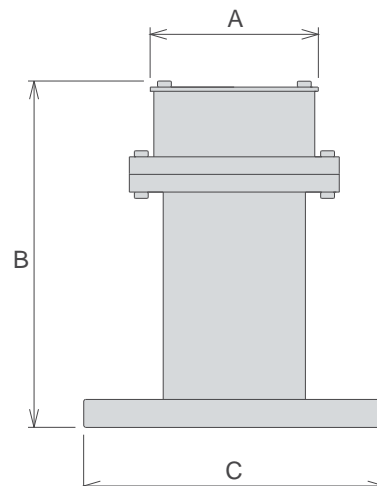
Treated water 70° C max.;
 Maximum pressure 64 bar;
 Minimum pressure 0,2 bar;

Standard

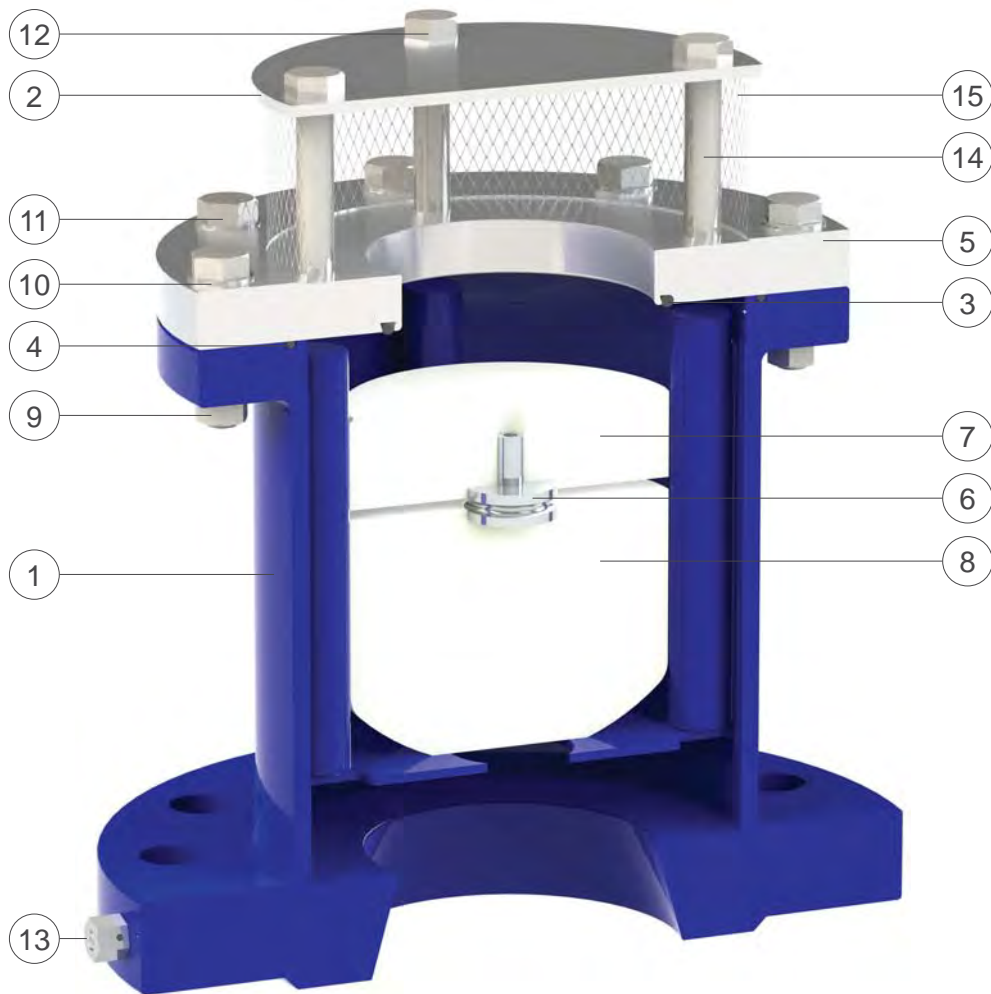
Designed in compliance with EN-1074/4.
 Flanges according to EN 1092/2, ANSI.
 Epoxy painting applied through fluidized bed technology blue RAL 5005.
 Changes and variations on the flanges and painting details available on request.



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



Technical details



N.	Component	Material	Standard
1	Body	steel	Fe 37
2	Cap	stainless steel	AISI 304/316
3	O-ring	NBR	
4	O-ring	NBR	
5	Seat	stainless steel	AISI 304/316
6	Nozzle Subset	stainless steel	AISI 316
7	Upper flat	polypropylene	
8	Float	polypropylene	
9	Nut	stainless steel	A2/A4/AISI 316
10	Washers	stainless steel	A2/A4/AISI 316
11	Screws	stainless steel	A2/A4/AISI 316
12	Screws	stainless steel	A2/A4/AISI 316
13	Drain valve	stainless steel	AISI 304/316
14	Spacers	stainless steel	AISI 304/316
15	Filter	stainless steel	AISI 304



Anti water hammer combination air valve

Mod. FOX 3F - AS - HP

The CSA air valve Mod. FOX 3F AS HP 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.



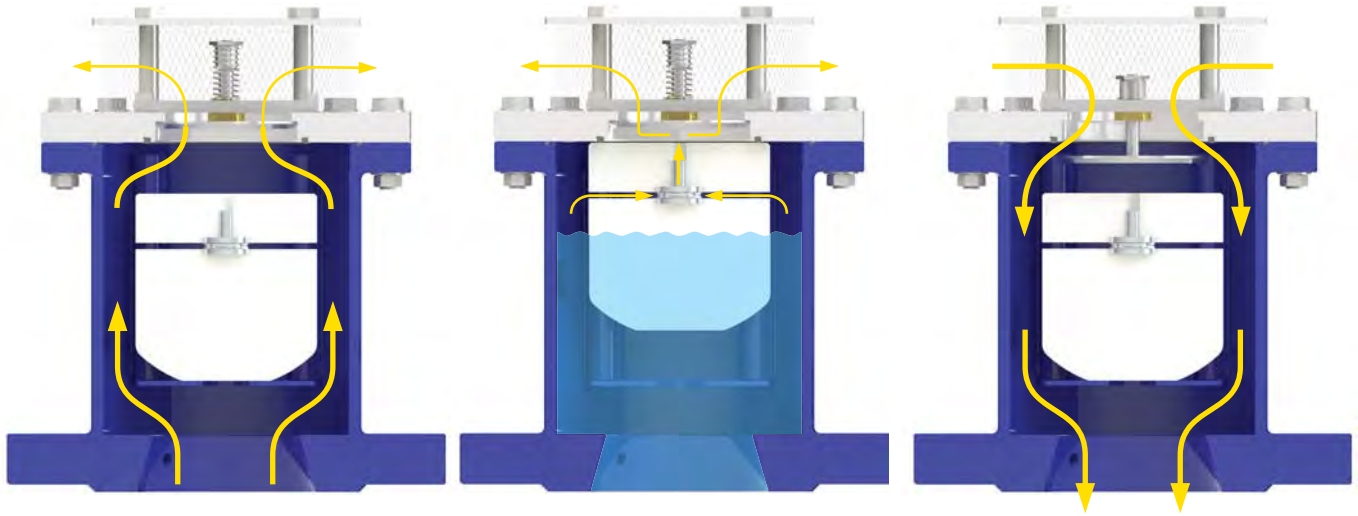
Technical features and benefits

- 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 on request.
- Mobile block composed of a cylindrical float and upper disk in solid polypropylene, joined together by the CSA air release system in AISI 316 (pat. Pending). 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 CSA 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 AS 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.
- Mines.
- Dams and high pressure systems.
- In general this model is used on changes in slope ascending, and at the high points of the pipeline subjected to water hammer.

Operating principle



Controlled air discharge

During the pipe filling it is necessary to avoid rapid closures, responsible of water hammer effects. The FOX 3F AS HP, thanks to the anti-shock feature, will control the air outflow thus reducing the velocity of the approaching water column. The risk of overpressure 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 of the pipeline, and to the entire system.

Optional



■ **Vacuum breaker version Mod. FOX 2F AS HP**, 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.

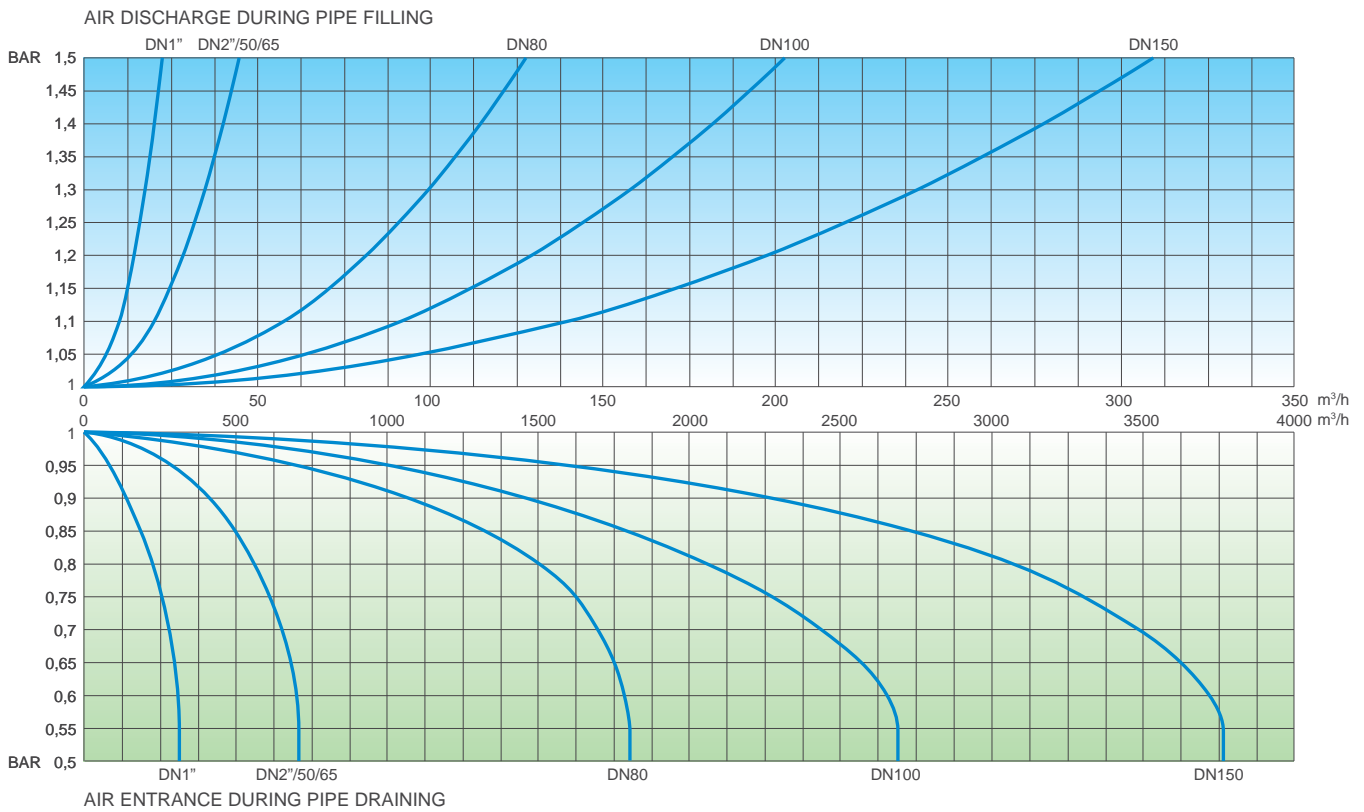


■ **Version for submerged applications, SUB series**, available both for FOX 3F AS HP and 2F AS HP Models, with elbow for air conveyance. The design sprang from the necessity of having an air valve performing also in case of flood, without the risk of contaminated water entering the pipeline. Another 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 AS device, can be modified on request according to the project conditions and the transient analysis.

Air flow performance charts

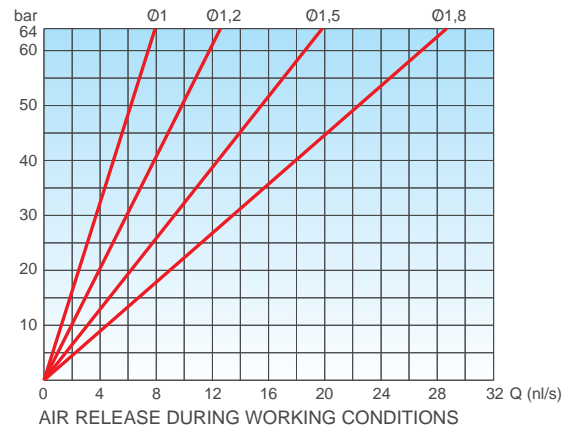


Working conditions

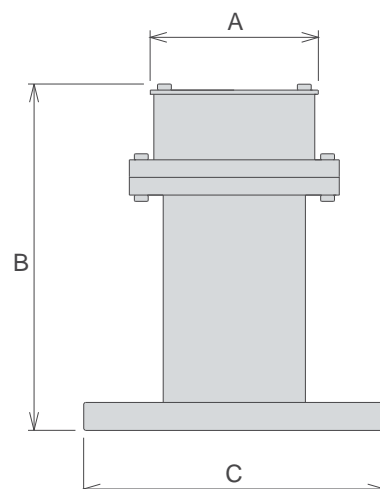
Treated water 70° C max.;
 Maximum pressure 64 bar;
 Minimum pressure 0,2 bar;

Standard

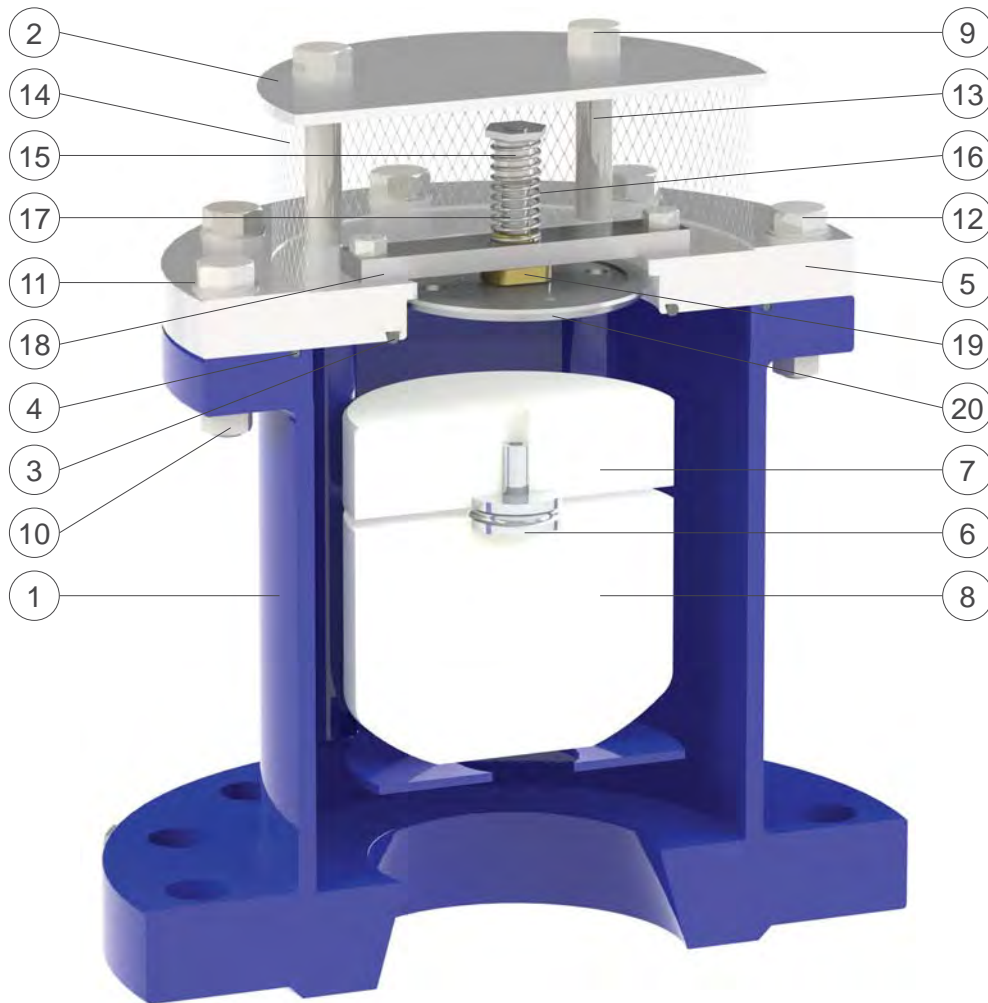
Designed in compliance with EN-1074/4.
 Flanges according to EN 1092/2, ANSI.
 Epoxy painting applied through fluidized bed technology blue RAL 5005.
 Changes and variations on the flanges and painting details available on request.



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



Technical details



N.	Component	Material	Standard
1	Body	steel	Fe 37
2	Cap	stainless steel	AISI 304/316
3	O-ring	NBR	
4	O-ring	NBR	
5	Seat	stainless steel	AISI 304/316
6	Nozzle subset	stainless steel	AISI 304/316
7	Upper flat	polypropylene	
8	Float	polypropylene	
9	Screws	stainless steel	A2/A4/AISI 316
10	Nuts	stainless steel	A2/A4/AISI 316
11	Washer	stainless steel	A2/A4/AISI 316
12	Screws	stainless steel	A2/A4/AISI 316
13	Spacers	stainless steel	AISI 304/316
14	Filter	stainless steel	AISI 304
15	Nut	stainless steel	AISI 304/316
16	Spring	stainless steel	AISI 304/316
17	AS shaft	stainless steel	AISI 304/316
18	Guiding plate (in DN150)	stainless steel	AISI 304/316
19	Guiding nut (in DN150)	stainless steel	AISI 304/316
20	AS flat	stainless steel	AISI 304/316



Air release valve Mod. VENTOLO

The CSA air release valve Ventolo will ensure the proper operation of the system allowing the release of air pockets accumulating during working conditions.



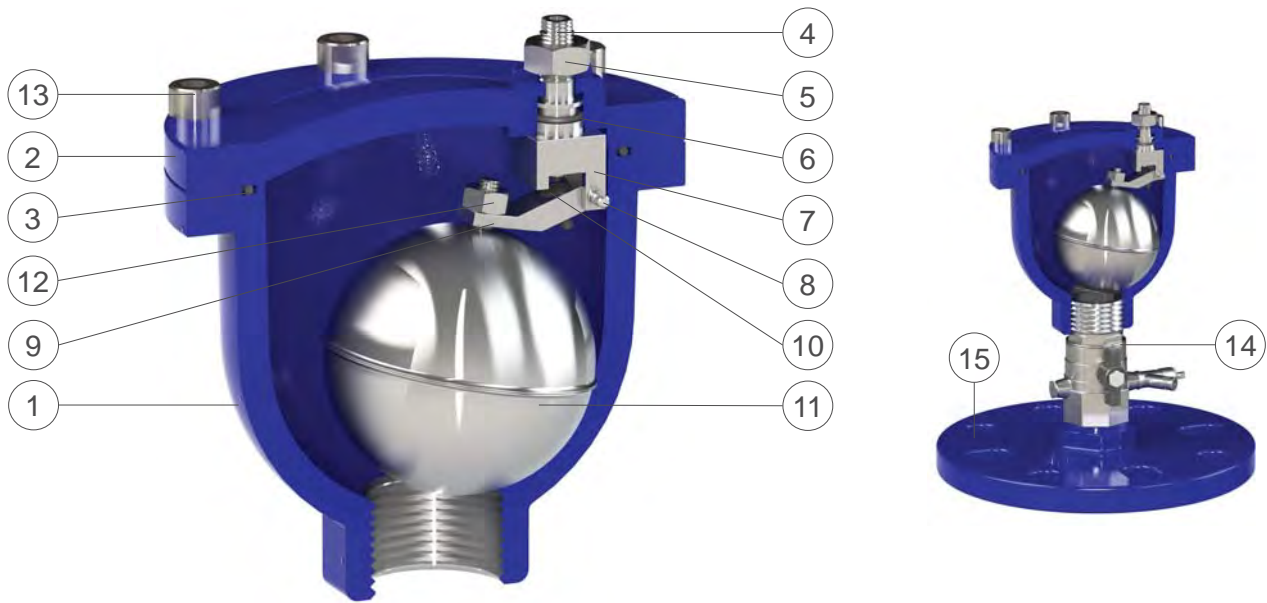
Technical features and benefits

- Body and cover in ductile cast iron, PN 40 bar rated.
- Float in stainless steel AISI 304/316.
- Lever and pivots in AISI 304/316.
- Nozzle in stainless steel AISI 304/316.
- 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 A2/ AISI 316.
- Minimum working pressure 0,1 bar.

Applications

- Water distribution systems, irrigation, buildings.
- Pumps case.
- Control valves and modulating devices.
- In general only when the air release function is required, it can be combined with CSA air valves FOX series for the kinetic functions of air outflow and inflow.

Technical details



N.	Component	Material	Standard
1	Body	ductile cast iron	GJS 500-7
2	Cap	ductile cast iron	GJS 500-7
3	O-ring	NBR	
4	Nozzle	stainless steel	AISI 304/316
5	Nut	stainless steel	AISI 304/316
6	O-ring	NBR	
7	Upper lever	stainless steel	AISI 304/316
8	Pivot	stainless steel	AISI 304/316
9	Lower lever	stainless steel	AISI 304/316
10	Nozzle gasket	NBR	
11	Float	stainless steel	AISI 316
12	Nut	stainless steel	AISI 304/316
13	Screw	stainless steel	AISI 304/316
14	Ball valve	stainless steel	AISI 316
15	Flange	ductile cast iron	GJS 500-7

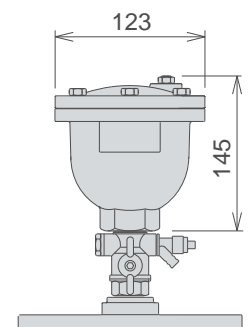
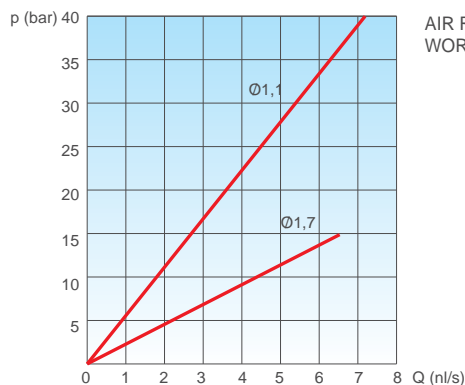
Working conditions

Treated water max. 70°C;
 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 applies through fluidized bed technology blue RAL 5005.
 Changes and variations on the flanges and painting details available on request.

Air flow performance charts





Combination air valve Mod. EOLO

The CSA combination air valve Eolo will ensure the proper operation of the system allowing the release of air pockets accumulating during working conditions, the entrance and discharge of large volumes of air during pipe draining and filling.



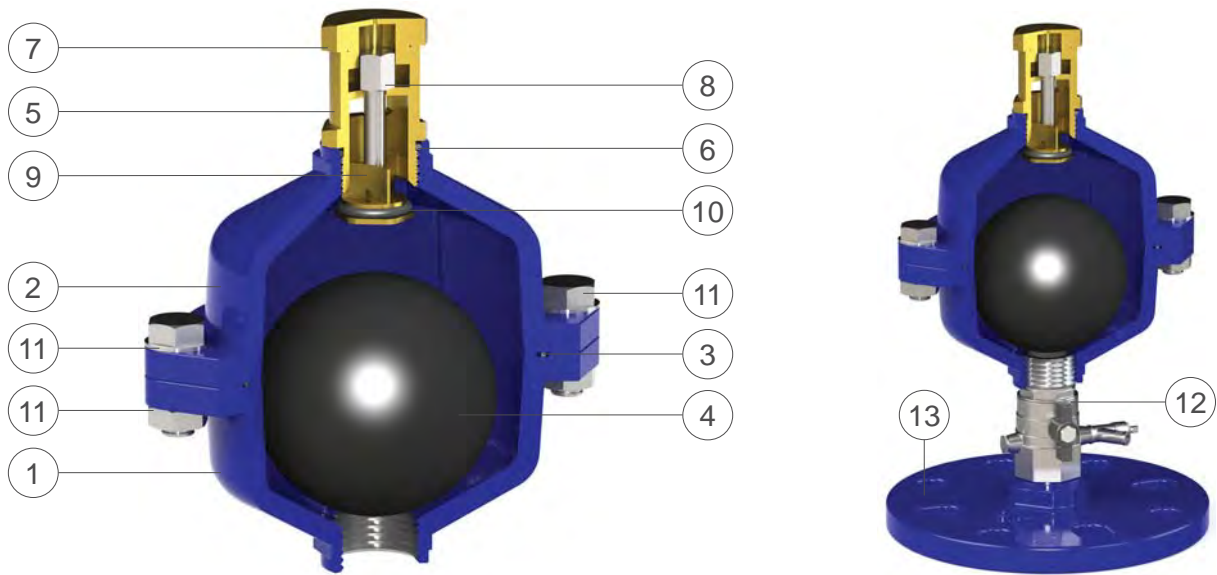
Technical features and benefits

- Upper and lower bodies in ductile cast iron GJS 500/7 PN 25 rated.
- Float in stainless steel AISI 304 covered with vulcanized NBR.
- Patented air release system with gasket compression control in brass/stainless steel AISI 304.
- Guiding shaft of the air release system in stainless steel AISI 304.
- Nuts and bolts in stainless steel A/2.
- Simple and compact.

Applications

- Water distribution systems.
- Irrigation, cooling systems.
- Buildings.
- In general where the air release function is necessary along with a certain air flow capacity, limited to the kinetic passage of this model for which please see the air charts on the next page.

Technical details



N.	Component	Material	Standard
1	Lower body	ductile cast iron	GJS 500-7
2	Upper body	ductile cast iron	GJS 500-7
3	O-ring	NBR	
4	Float	stainless steel/NBR	AISI 316
5	Nozzle body	brass/stainless steel	OT 58/AISI 304/316
6	O-ring	NBR	
7	Tap	brass/stainless steel	OT 58/AISI 304/316
8	Shaft	stainless steel	AISI 304/316
9	Studs	brass	OT 58
10	O-ring	NBR	
11	Screws, washers and bots	stainless steel	AISI 304/316
12	Ball valve	stainless steel	AISI 316
13	Flange	ductile cast iron	GJS 500-7

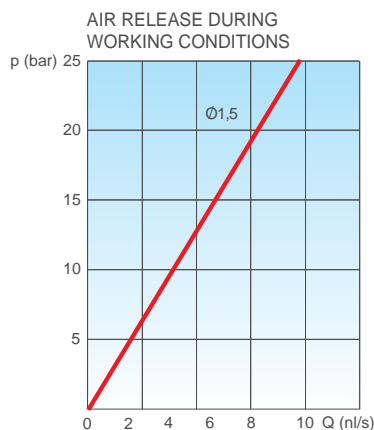
Working conditions

Treated water max. 70°C,
higher temperature on request;
Max. pressure 25 bar;
Min. pressure 0,3 bar.

Standard

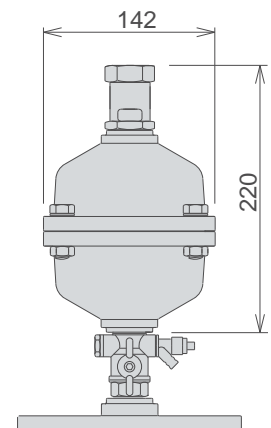
Designed in compliance with EN-1074/4.
Standard connection 1", flanged on request. Flanges according to EN 1092/2.
Epoxy painting applies through fluidized bed technology blue RAL 5005.
Changes and variations on the flanges and painting details available on request.

Air flow performance charts



AIR DISCHARGE AND ENTRANCE DURING PIPE FILLING AND DRAINING

Δp (bar)	0,1	0,2	0,3	0,4	0,5
Air discharge (m ³ /h)	82	106	120	128	133
Air entrance (m ³ /h)	78	90	118	125	127





Water combination air valve underground version Mod. Saturno

The Saturno air valve has been designed to provide the proper solution for underground installations, without the need of any sectioning devices to be installed on the pipe, when for cost savings or simply for practical reasons digging and chambers are not possible. The air valve will ensure the proper operation of the pipeline networks allowing the release of air pockets during working conditions, the evacuation and the entrance of large volumes of air during filling and draining operations.



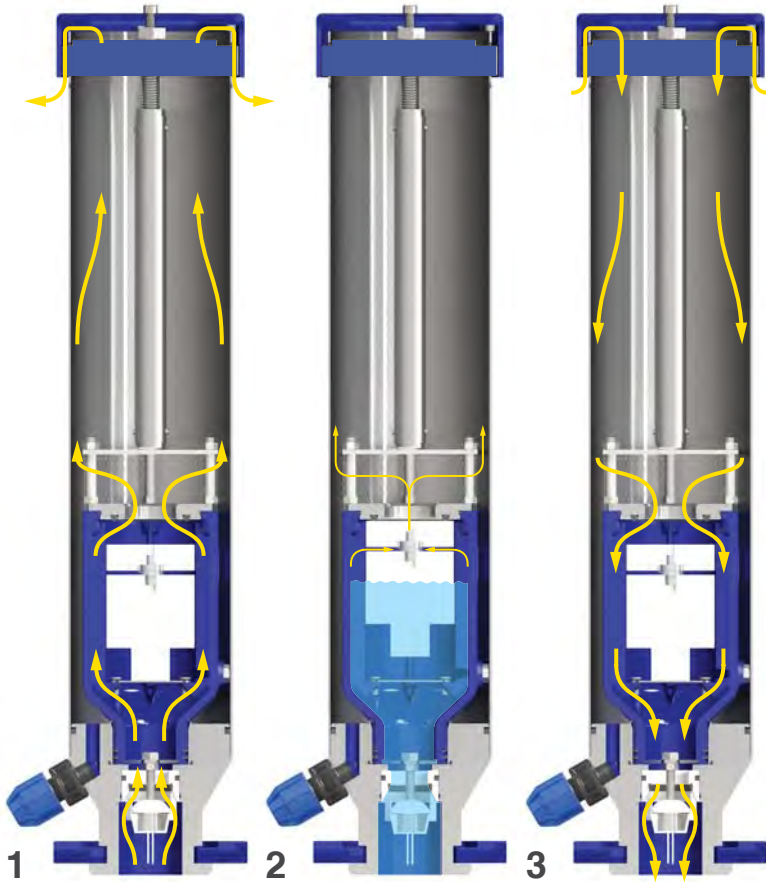
Technical features and benefits

- A new and reliable solution compared to the conventional way of installing air valves, requiring deep excavation to house concrete structures and whatever necessary to create the proper pit like TE piece, sectioning devices, the air valves itself and more. Saturno's innovative concept is based on the possibility of installing it directly on the TE piece before filling up the trench without any sectioning device, therefore dramatically reducing the overall cost. A simple manhole on the ground (DN 300 mm is recommended) is sufficient to carry out proper maintenance.
- Standpipe in stainless steel firmly secured to the basement to protect the air valves inside of it, and to hold the upper guide connected to the maneuvering system.
- Flanged basement to hold the check valve and the exhaust pipe 3/8" to avoid the accumulation of water into the standpipe.
- The combination air valve FOX housed into the flanged basement where its movement is controlled by a shaft, connected to its cover and whose water tightness is ensured by two o-rings.
- The system allows for proper maintenance simply by sectioning the flow rotating the maneuvering screw from the top, and extracting it from above.

Applications

- Water distribution networks.
- Pressurized system with treated water.

Operating principle



1. Discharge of large volumes of air

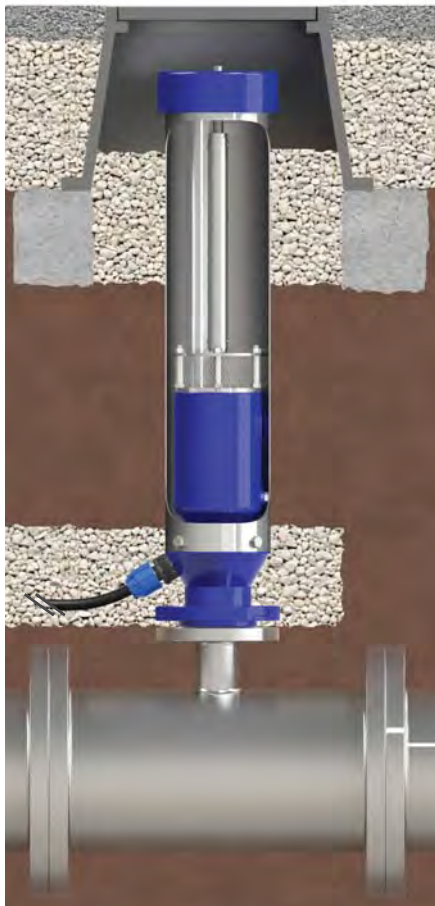
During the pipe filling it is necessary to discharge air as water flows in. The FOX 3F, thanks to an aerodynamic full port body and deflector, will make sure to avoid premature closures of the mobile block during this phase.

2. 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.

3. 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 of the pipeline, and to the entire system.

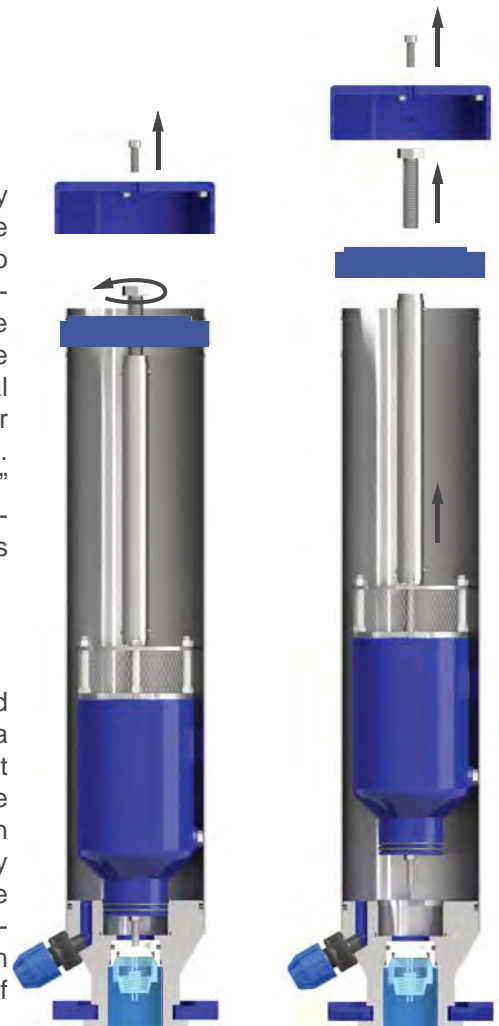


Installation

The installation of Saturno 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 the water discharge from the main pipe. Normally supplied with 3/8" connection it should be positioned within a layer of small stones to facilitate the draining.

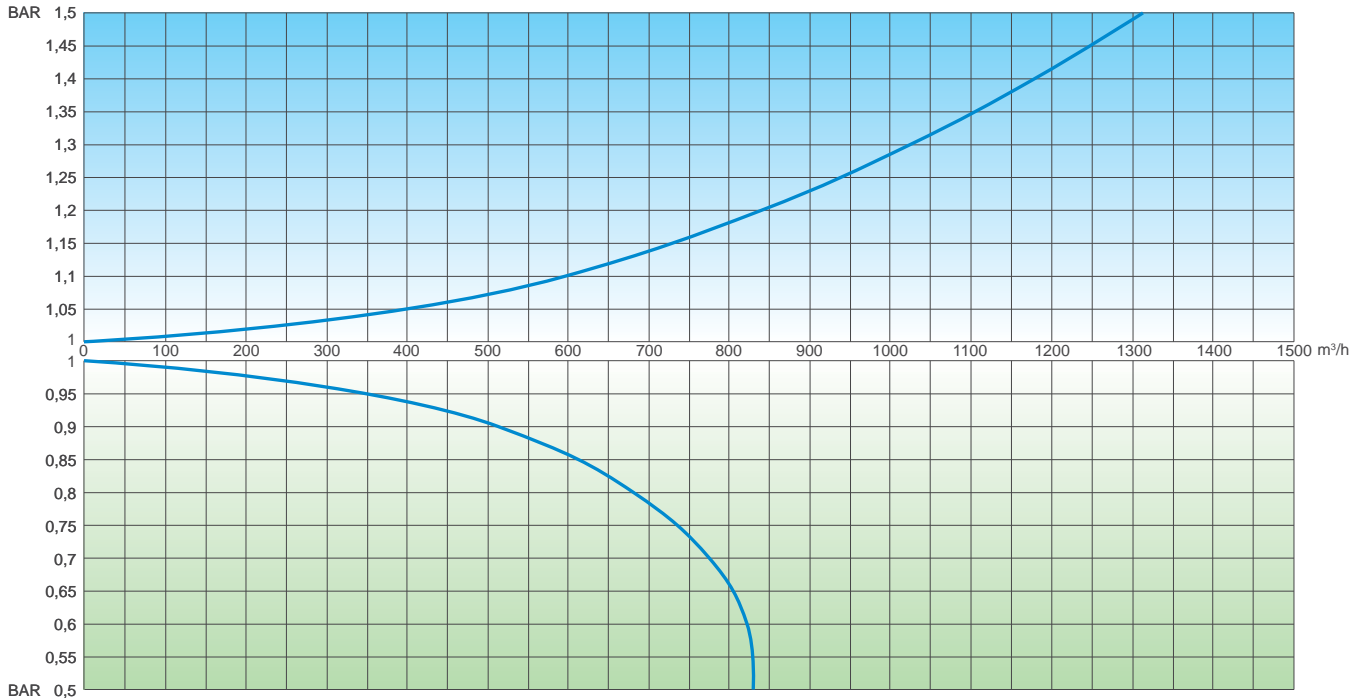
Air valve removal

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



Air flow performance charts

AIR DISCHARGE DURING PIPE FILLING



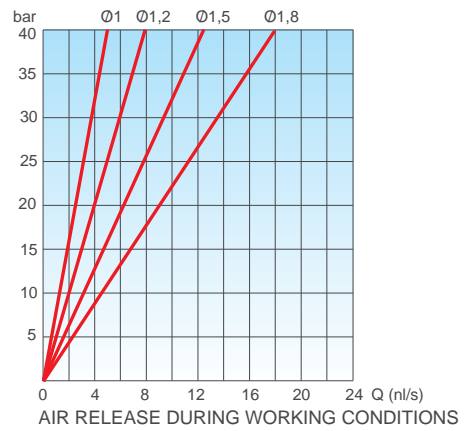
AIR ENTRANCE DURING PIPE DRAINING

Working conditions

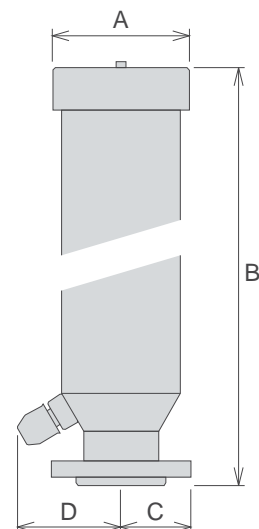
Treated water 60° C max..
 Maximum pressure 16 bar.
 Minimum pressure 0,3 bar.

Standard

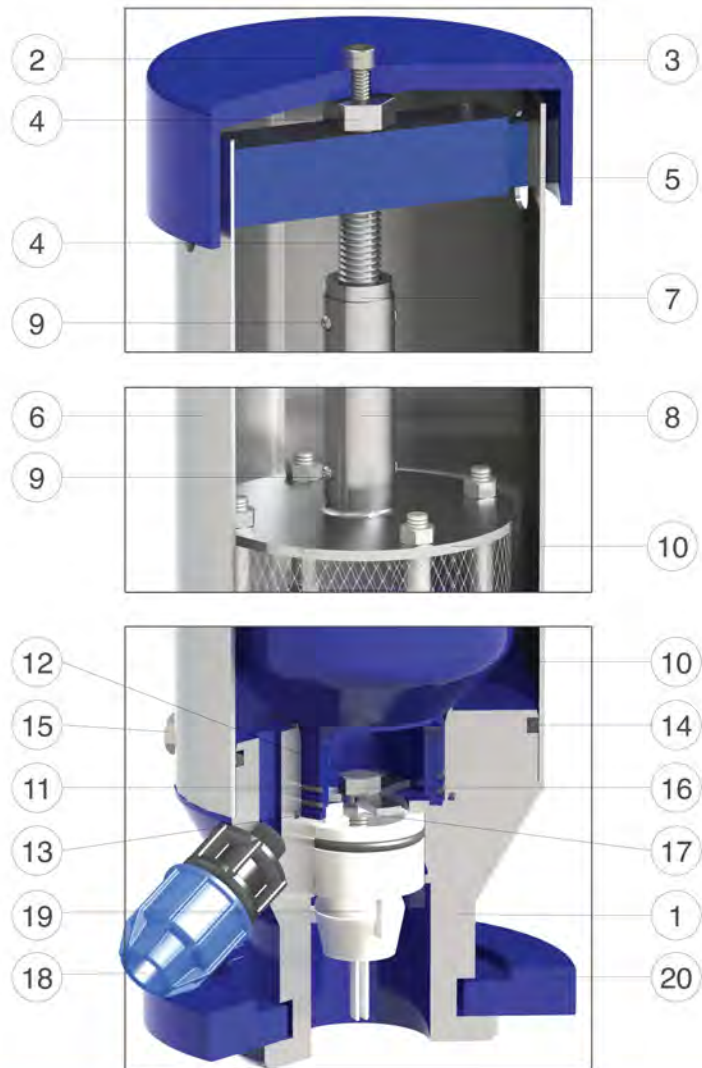
Designed in compliance with EN-1074/4 and AWWA C-512.
 Flanges according to EN 1092/2, ANSI.
 Epoxy painting applied through fluidized bed technology blue RAL 5005.
 Changes and variations on the flanges and painting details available on request.



DN mm	A mm	B mm	C mm	D mm	Weight Kg
50	160	750	82,5	122,5	20,5
	160	1000	82,5	122,5	23,2
	160	1250	82,5	122,5	25,3
	160	1500	82,5	122,5	28,6
80	160	750	100	122,5	22,0
	160	1000	100	122,5	24,7
	160	1250	100	122,5	26,8
	160	1500	100	122,5	30,1



Technical details



N.	Component	Material	Standard
1	Body	painted iron	Fe 37
2	Screw	stainless steel	A2
3	Cap	aluminium	
4	Driving screw	stainless steel	A2
5	Guiding plate	painted iron	Fe 37
6	Stand pipe	stainless steel	A4
7	Screw housing	stainless steel	A2
8	Maneuvering pipe	stainless steel	A2
9	Plug	stainless steel	A2
10	FOX DN2" for Saturno	ductile cast iron, s.s., PP, etc.	
11	O-ring	NBR	
12	Threaded sleeve	stainless steel	AISI 304/316
13	O-ring	NBR	
14	O-ring	NBR	
15	Screws	stainless steel	A2
16	Opening screw	stainless steel	A4
17	Blocking nut	stainless steel	A4
18	Drainage	polyethylene	
19	Control valve	delrin (polyoxymethylene)	
20	Adjustable flange	ductile cast iron	GJS 500-7



Advanced testing facilities

Designed to reproduce real conditions of modern water distribution systems the CSA testing facility is able to assess the dynamic performances of automatic control valves, direct acting pressure control valves, air valves and anti water hammer valves.

Provided with a high capacity booster pumps station, and linked to an advanced high frequency pressure transducers and flow meters, the testing rig allows for a real time visualization of pressure and flow evolutions. Water hammer events can also be simulated and recorded to prove the efficacy of CSA fast acting relief valve, in addition to level control for which, using an auxiliary stilling tank, a part of the pipeline system is entirely dedicated. The PLC and control station allows for the operation of step by step and solenoid operated valves to determine the sensitivity of such kind of application and pressure management solutions. Thanks to this important and powerful tool valves can be customized, simulated and set according to the project requirements assuring the perfect performance and accuracy.

The testing process

All our valves undergo severe tests according to EN standards to ensure they are mechanically resistant, watertight, and high performing. After testing every valve is identified by means of a metallic tag or sticker, and duly registered and certified.



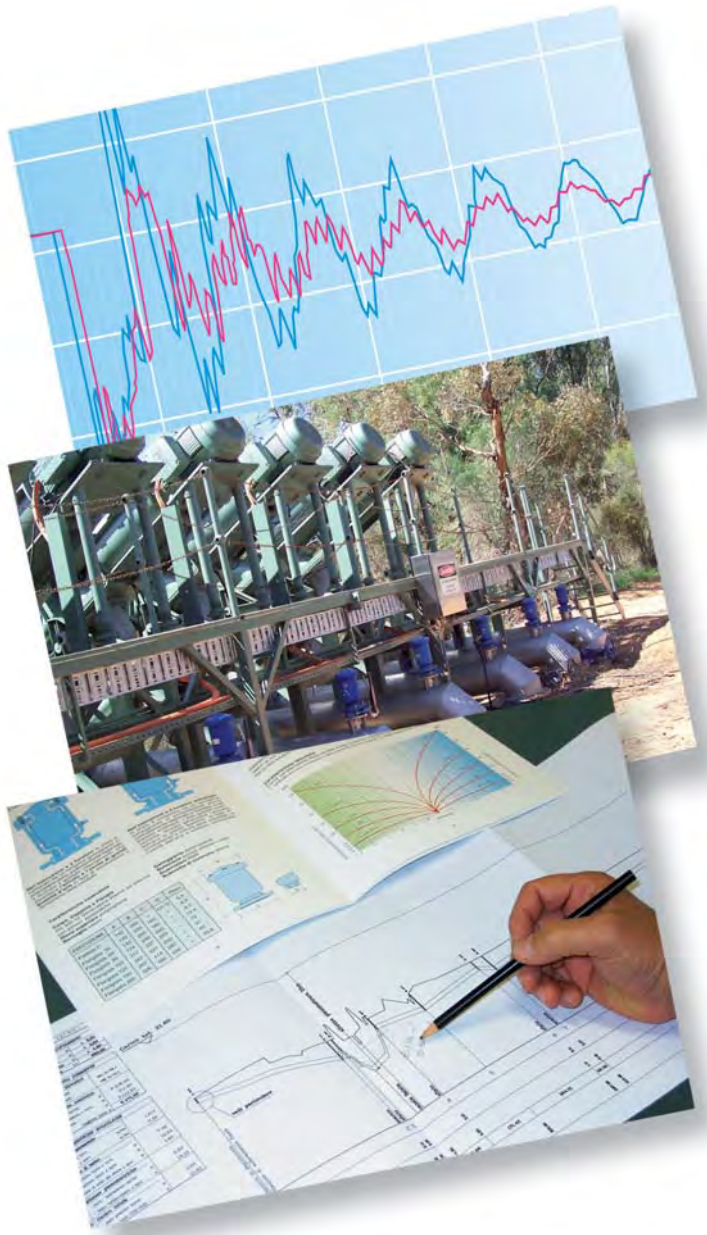
CSA HYCONSULT

Water hammer analysis CSA Hyconsult

CSA Hyconsult was founded to provide designers and consultants, involved in the design of water distribution and sewage systems, with accurate and unique technical support.

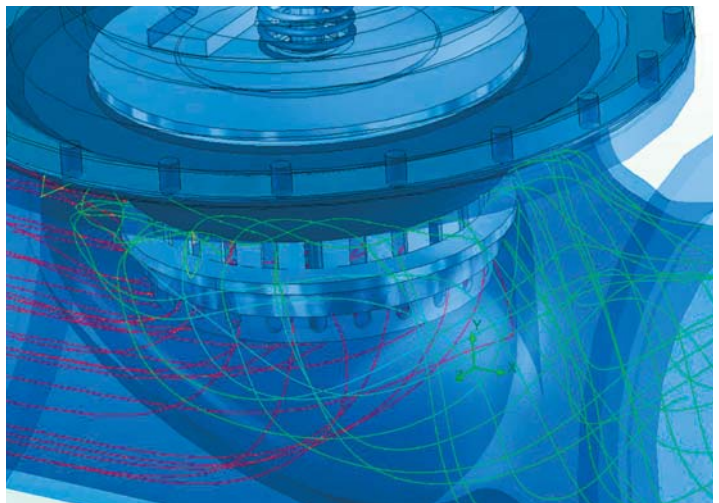
CSA Hyconsult has specialized in hydraulic modelling and transients analysis, entirely through the use of modern computational tools and advanced algorithms. Simulations are essential to predict system responses to events under a wide range of conditions without disrupting the actual system.

Using simulations, problems can be anticipated in possible or existing situations, and solutions can be evaluated in order to invest time, money and material in the most productive manner.



Research and innovation

CSA has always regarded knowledge as being indispensable for the kind of research that consistently feeds innovation at all levels. The R&D department at CSA constantly strives to improve product performance and continually searches for new solutions to meet our customer's needs. Twenty years of experience in valve design and sizing, supported by advanced computational tools, cooperation with external entities at the highest level, and test facilities for the verification of theoretical results which are available for our customers, guarantee our professionalism and reliability.





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