Pietro Fiorentini

# Wastewater air valves

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# Wastewater combination air valve
# Mod. SWV 3S

SWV 3S air valve guarantees the proper operation of sewage lines allowing the entrance and the discharge of large volumes of air, during pipe draining and filling operations, and the release of air pockets during working conditions.

## Technical features and benefits

- Large lower body designed with strongly sloped funnel shaped walls to avoid deposit of grease or other material, and containing four ribs obtained by casting to guide the stainless steel float.
- Upper body containing a casing that protects the air release device against spurts during rapid filling.
- Mobile block including a large AISI 316 stainless steel float, placed on the lower body, and connected through a stainless steel rod to the air release system.
- Flat obturator in solid polypropylene to avoid deformations and to prevent it from remaining stuck to the gaskets, while other materials have the tendency to do it.
- Drainage valve for chamber control and draining.
- Nozzle and gasket holder wear resistant thanks to gasket compression control.
- Maintenance can be easily performed from the top without removing the air valve from the pipe.
- Evacuation bend in polypropylene standard for DN 50/65 and on request for other DN (trough SUB kit).

## Applications

- Sewage main transmission lines.
- Treatment plants.
- Irrigation systems in presence of solids/debris in suspension.
- Whenever the technology of air valves for treated water can’t be used for the risk of clogging and damages to the internal components.

## Operating principle

### Discharge of large volumes of air

During the pipe filling it is necessary to discharge air as liquid flows in. The SWV 3S, thanks to an aerodynamic 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. Little by little it is compressed and its volume increases, pushing the liquid level downwards and 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 liquid. This is to avoid negative pressure and serious damages to the pipeline and the entire system.

## Optional

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

▪ **Version for submerged applications**, **SUB series**, standard for DN 50/65, available both for SWV 3S and SWV 2S 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.

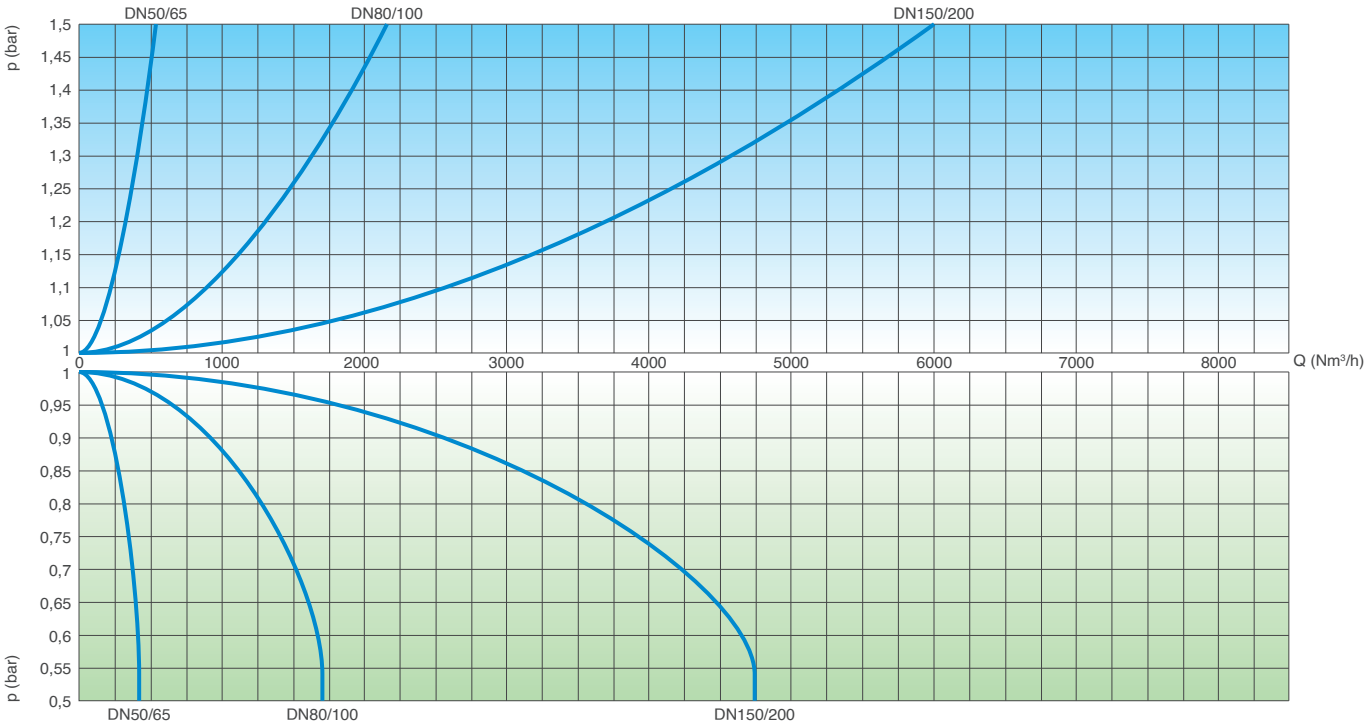
▪ **Version for air discharge only EO series** (on request), available both for SWV 3S and SWV 2S models. The most important application of EO is to allow the air valve installation in those locations of the system where HGL may drop below the pipe profile, and to any other node where for project requirements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

▪ **Version for air entrance only IO series**, available for vacuum breaker model. 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



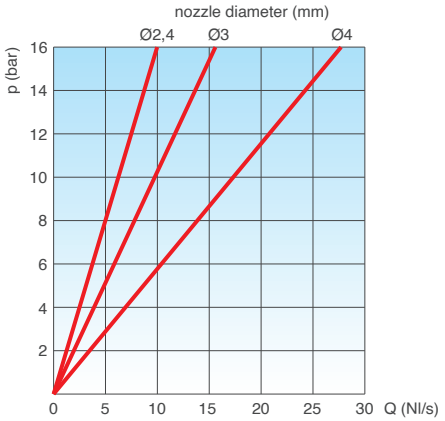

AIR ENTRANCE DURING PIPE DRAINING

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

Water and waste water max. 60°C.
Maximum pressure 16 bar.
Minimum pressure 0,2 bar. Lower on request.
Higher temperatures on request.

AIR RELEASE DURING WORKING CONDITIONS




## Standard

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

## Nozzle choice

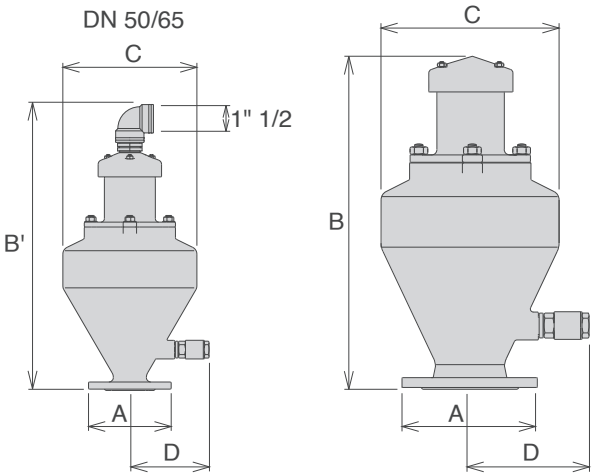
Nozzle diameter in mm according to the size of the air valve and the PN.

| | PN 10 | PN 16 |
|---|---|---|
| DN 50/65 | 2,4 | 2,4 |
| DN 80/100 | 3 | 3 |
| DN 150/200 | 4 | 4 |

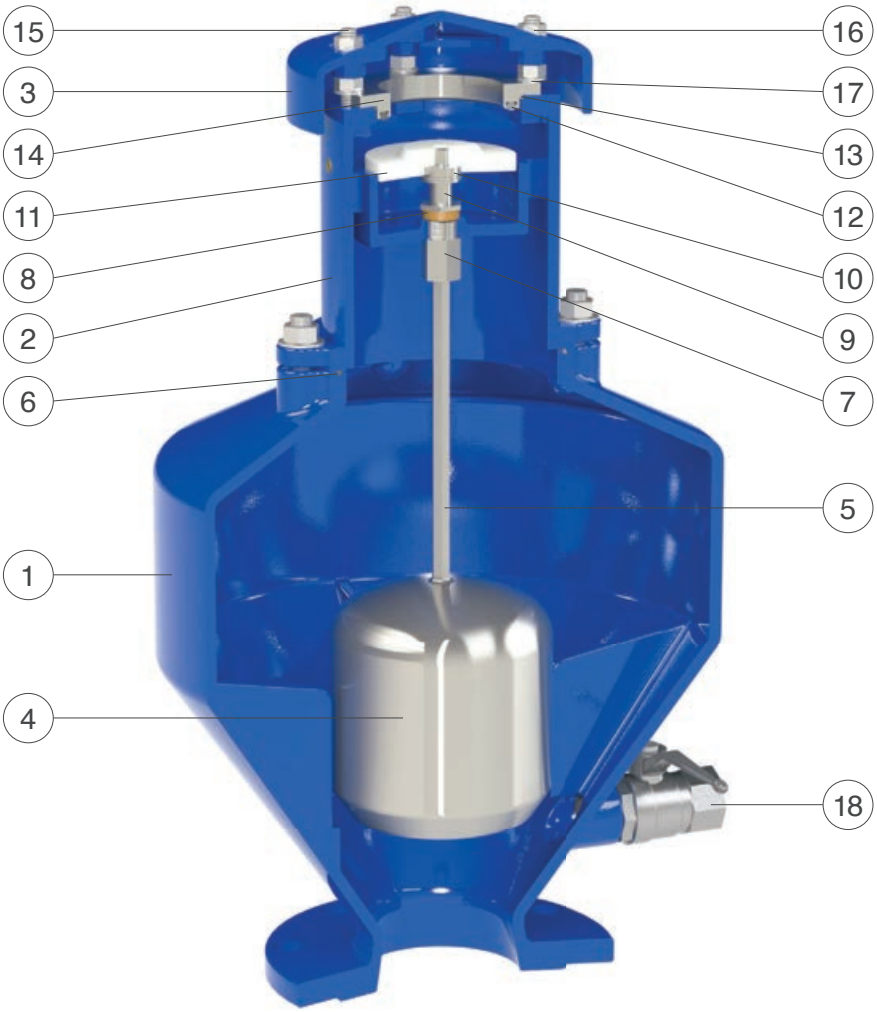
## Weights and dimensions

| DN mm | A mm | B mm | B' mm | C mm | D mm | Weight Kg |
|---|---|---|---|---|---|---|
| 50/65 | 185 | - | 650 | 300 | 190 | 29 |
| 80/100 | 220 | 600 | - | 350 | 202 | 40 |
| 150 | 285 | 850 | - | 488 | 243 | 78 |
| 200 | 340 | 850 | - | 488 | 243 | 82 |

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



## Technical details




Threaded PP evacuation bend 1" 1/2 supplied as a standard for DN 50/65.

| N. | Component | Standard material | Optional |
|---|---|---|---|
| 1 | Lower body | ductile cast iron GJS 450-10 | |
| 2 | Upper body | ductile cast iron GJS 450-10 | |
| 3 | Cap | ductile cast iron GJS 450-10 | |
| 4 | Float | stainless steel AISI 316 | |
| 5 | Float shaft | stainless steel AISI 316 | |
| 6 | O-ring | NBR | EPDM/Viton/silicone |
| 7 | Driving sleeve | stainless steel AISI 303 | stainless steel AISI 316 |
| 8 | Plane gasket | NBR | |
| 9 | Gasket holder | stainless steel AISI 316 | |
| 10 | Nozzle subset | stainless steel AISI 316 | |
| 11 | Obturator flat | polypropylene | |
| 12 | Seat gasket | NBR | EPDM/Viton/silicone |
| 13 | O-ring | NBR | EPDM/Viton/silicone |
| 14 | Seat | stainless steel AISI 304 (AISI 303 for DN 50/65) | stainless steel AISI 316 |
| 15 | Studs | stainless steel AISI 304 | stainless steel AISI 316 |
| 16 | Nuts | stainless steel AISI 304 | stainless steel AISI 316 |
| 17 | Washers | stainless steel AISI 304 | stainless steel AISI 316 |
| 18 | Ball valve 1" | stainless steel AISI 316 | |

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

# Wastewater anti-shock combination air valve - Mod. SWV 3S-AWH

The SWV 3S-AWH guarantees the proper operation of pressurized sewage systems allowing the release of air pockets in working conditions, the entrance of large quantities of air in case of pipe bursting or draining operations and a controlled air outflow speed to minimize the risk of water hammer events.

## Technical features and benefits

- Large lower body designed with strongly sloped funnel shaped walls to avoid deposit of grease or other material, and containing four ribs obtained by casting to guide the stainless steel float.
- Upper body containing a casing that protects the air release device against spurts during rapid filling.
- Mobile block including a large AISI 316 stainless steel float, placed on the lower body, and connected through a stainless steel rod to the air release system.
- Anti-Water Hammer automatism (AWH) composed of a metallic disk with 2 or more adjustable orifices, a guide bar and acounteracting spring in stainless steel.
- Drainage valve for chamber control and draining.
- Nozzle and gasket holder wear resistant thanks to gasket compression control.
- Maintenance can be easily performed from the top without removing the air valve from the pipe.

## Applications

- To protect pumping stations and nodes of sewage main transmission lines exposed to water hammer and column separation in case of pump failure.
- Treatment plants subject to rapid changes of the flow rate.
- Whenever the technology of air valves for treated water can’t be used and a protection against water hammer is needed.

## Operating principle

### Controlled air discharge

During the air discharge it is necessary to avoid rapid closures of the mobile block, responsible of water hammer effects. The SWV 3S-AWH will control the air outflow reducing the water approach velocity and thus minimizing the risk of overpressure.

### Air release during working conditions

During operation the air produced by the pipeline is accumulated in the upper part. Little by little it is compressed and its volume increases, pushing the liquid level downwards and 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 liquid. This is to avoid negative pressure and serious damages to the pipeline and the entire system.

## Optional

▪ **Vacuum breaker version Mod. SWV 2S**, to allow the entrance and the discharge of large volumes of air only with the anti-water hammer feature. This model is normally recommended at the pumps, on changes in slope ascending, long ascending segments exposed to transients events and, more in general, wherever air release won't be required still providing some protection against water hammer.

▪ **Version for submerged applications SUB series**, standard for DN 50/65, available both for SWV 3S-AWH and SWV 2S 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.

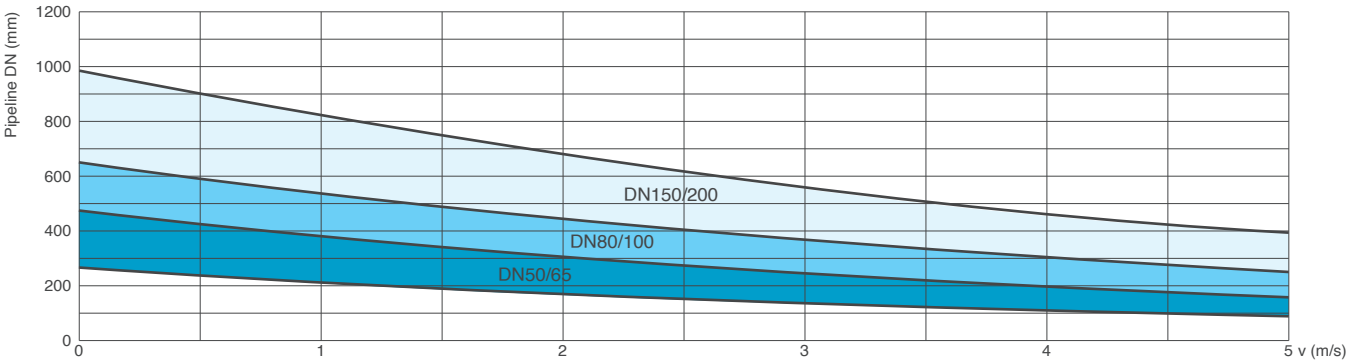
▪ **Version for air entrance only IO series**, available for vacuum breaker model SWV 2S. The most important application of IO is to allow the air valve installation in those locations of the system where, for project requirements, air discharge and release must be avoided.

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

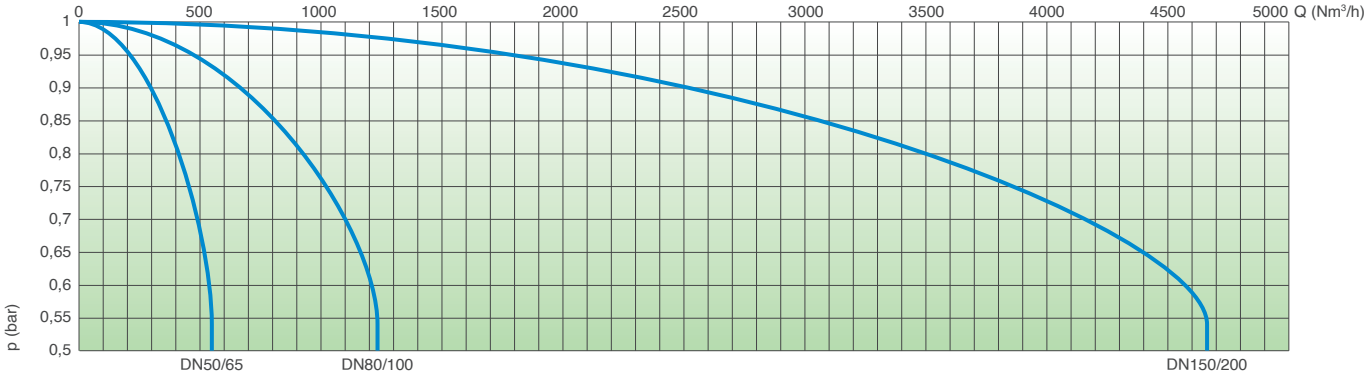
# Technical data

## Air valve selection chart

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




## Air flow performance chart



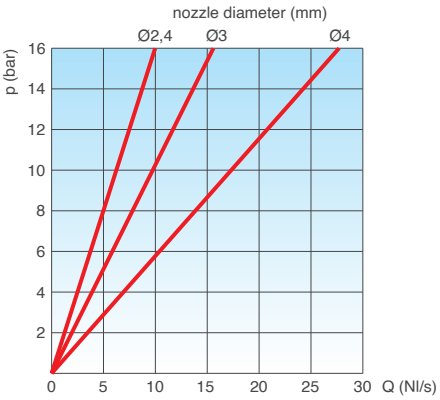

AIR ENTRANCE DURING PIPE DRAINING

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

## Working conditions

Water and waste water max. 60°C.
Maximum pressure 16 bar.
Minimum pressure 0,2 bar. Lower on request.
Higher temperatures on request.

AIR RELEASE DURING WORKING CONDITIONS




## Standard

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

## Nozzle choice

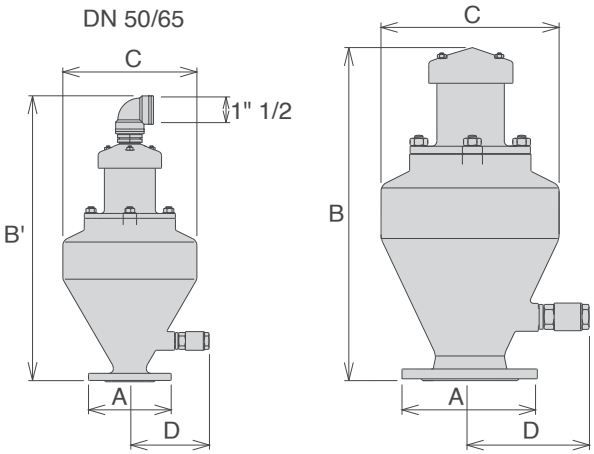
Nozzle diameter in mm according to the size of the air valve and the PN.

| | PN 10 | PN 16 |
|---|---|---|
| DN 50/65 | 2,4 | 2,4 |
| DN 80/100 | 3 | 3 |
| DN 150/200 | 4 | 4 |

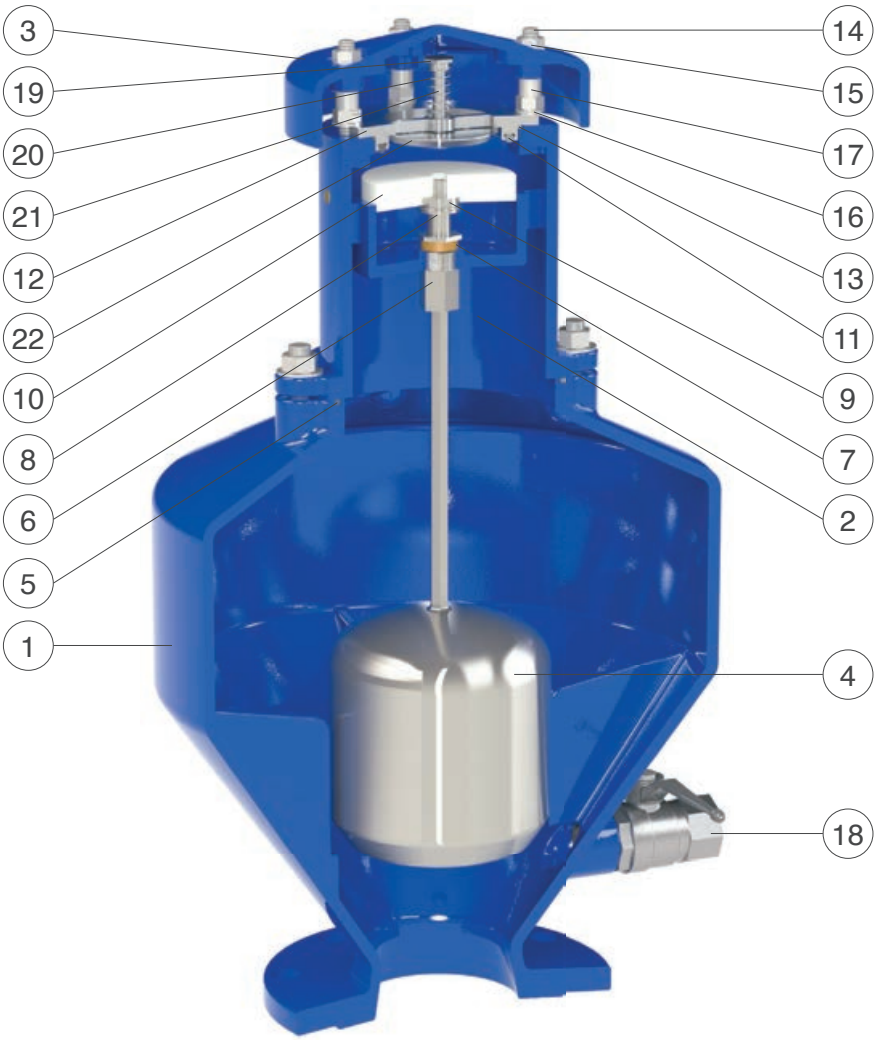
## Weights and dimensions

| DN mm | A mm | B mm | B' mm | C mm | D mm | Weight Kg |
|---|---|---|---|---|---|---|
| 50/65 | 185 | - | 650 | 300 | 190 | 29 |
| 80/100 | 220 | 615 | - | 350 | 202 | 40 |
| 150 | 285 | 870 | - | 488 | 243 | 78 |
| 200 | 340 | 870 | - | 488 | 243 | 82 |

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



## Technical details




Threaded PP evacuation bend 1" 1/2 supplied as a standard for DN 50/65.

| N. | Component | Standard material | Optional |
|---|---|---|---|
| 1 | Lower body | ductile cast iron GJS 450-10 | |
| 2 | Upper body | ductile cast iron GJS 450-10 | |
| 3 | Cap | ductile cast iron GJS 450-10 | |
| 4 | Float with shaft | stainless steel AISI 316 | |
| 5 | O-ring | NBR | EPDM/Viton/silicone |
| 6 | Driving sleeve | stainless steel AISI 303 | stainless steel AISI 316 |
| 7 | Plane gasket | NBR | |
| 8 | Gasket holder | stainless steel AISI 316 | |
| 9 | Nozzle subset | stainless steel AISI 316 | |
| 10 | Obturator flat | polypropylene | |
| 11 | Seat gasket | NBR | EPDM/Viton/silicone |
| 12 | AWH seat | stainless steel AISI 304 | stainless steel AISI 316 |
| 13 | O-ring | NBR | EPDM/Viton/silicone |
| 14 | Studs | stainless steel AISI 304 | stainless steel AISI 316 |
| 15 | Nuts | stainless steel AISI 304 | stainless steel AISI 316 |
| 16 | Washers | stainless steel AISI 304 | stainless steel AISI 316 |
| 17 | Spacers | stainless steel AISI 304 | |
| 18 | Ball valve 1" | stainless steel AISI 316 | |
| 19 | Spring guide nut (from DN 150) | stainless steel AISI 303 | stainless steel AISI 316 |
| 20 | Spring | stainless steel AISI 302 | stainless steel AISI 316 |
| 21 | AWH shaft | stainless steel AISI 303 | stainless steel AISI 316 |
| 22 | AWH flat | stainless steel AISI 304 | stainless steel AISI 316 |

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

# Wastewater combination air valve with anti-surge mechanism - Mod. SWV 3S-CSF-HR

The SWV 3S-CSF-HR guarantees the proper operation and safety of pressurized sewage systems allowing the release of air pockets in working conditions and the entrance of large quantities of air, in case of pipe bursting or draining phases. The air discharge velocity is maintained within a safety level by means of a anti-surge mechanism to prevent water hammer.

## Technical features and benefits

- Large lower body designed with strongly sloped funnel shaped walls to avoid deposit of grease or other material, and containing four ribs obtained by casting to guide the stainless steel float.
- Mobile block including a large AISI 316 stainless steel float, placed on the lower body and connected through a stainless steel rod to the air release system.
- Drainage valve for chamber control and draining.
- CSF anti-surge automatism composed of two floats in solid polypropylene, where the upper one will be automatically lifted in case of excessive air outflow, reducing the water approach velocity and avoiding potential water hammer events.
- Nozzle and gasket holder wear resistant thanks to gasket compression control.
- Maintenance can be easily performed from the top without removing the air valve from the pipe.
- Upper body in stainless steel AISI 316.

## Applications

- Sewage main transmission lines.
- Treatment plants.
- Irrigation systems in presence of solids/debris in suspension.
- Whenever the technology of air valves for treated water can’t be used, for the risk of clogging and damages to the internal components, and the proper protection of the system has to be provided.

## Operating principle

1

### 1. Discharge of large volumes of air

During the pipe filling it is necessary to discharge air as liquid flows in. The SWV 3S-CSF-HR, thanks to a large upper body and an aerodynamic deflector, will make sure to avoid premature closures of the mobile block during this phase.

### 2. Controlled outflow

If the differential pressure of air across the valve during pipe filling, and the consequent air outflow, rises above a certain value without control, there is the risk of potential water hammer and damages to the system caused by rapid closures of the mobile block. Should that happen the SWV 3S-CSF-HR anti-surge float will rise automatically reducing air outflow and slowing down the velocity of the approaching water column.

2

3

### 3. Air release during working conditions

During operation the air produced by the pipeline is accumulated in the upper part. Little by little it is compressed and its volume increases, pushing the liquid level downwards and allowing the air release through the nozzle.

### 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 liquid to avoid negative pressure and serious damages to the pipeline, and the entire system.

4

## Optional

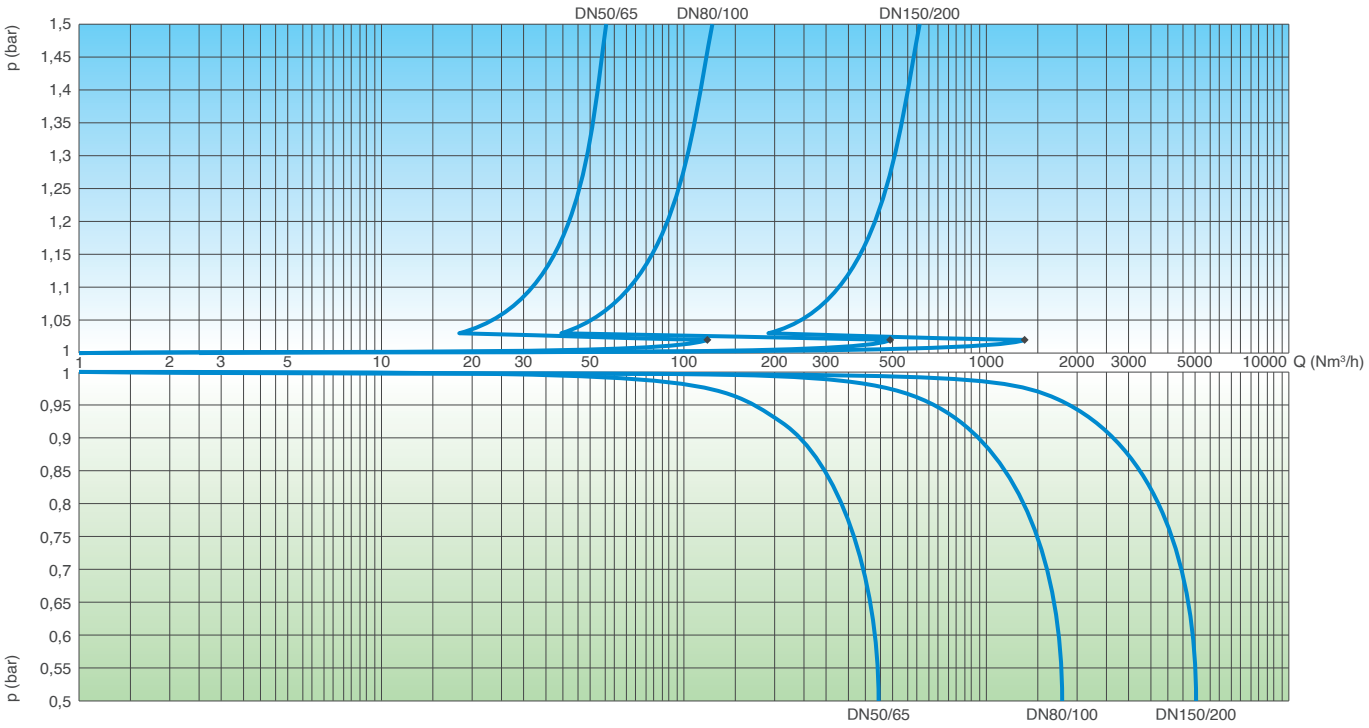
▪ **Vacuum breaker version Mod. SWV 2S-CSF-HR**, to allow the entrance of large volumes of air only with the controlled air outflow thanks to the CSF technology. This model is normally recommended in changes on slope ascending, long ascending segments, and wherever the air release won't be required.

▪ **Version for submerged applications SUB series**, standard for DN 50/65, available both for SWV 3S-CSF-HR and SWV 2S-CSF-HR 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 contaminat-ed 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.

# Technical data

## Air flow performance charts

AIR DISCHARGE DURING PIPE FILLING



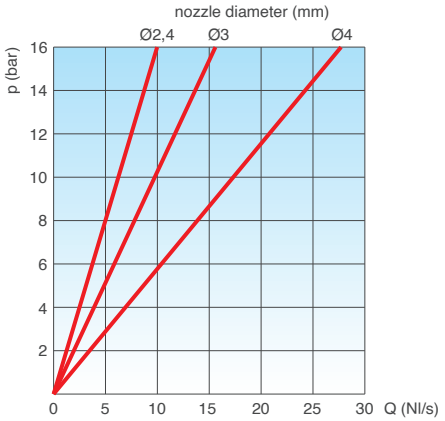

AIR ENTRANCE DURING PIPE DRAINING

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

Water and waste water max. 60°C.
Maximum pressure 16 bar.
Minimum pressure 0,2 bar. Lower on request.
Higher temperatures on request.

AIR RELEASE DURING WORKING CONDITIONS




## Standard

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

## Nozzle choice

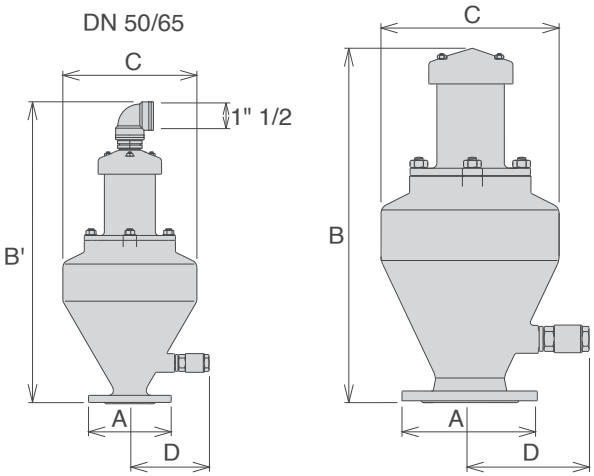
Nozzle diameter in mm according to the size of the air valve and the PN.

| | PN 10 | PN 16 |
|---|---|---|
| DN 50/65 | 2,4 | 2,4 |
| DN 80/100 | 3 | 3 |
| DN 150/200 | 4 | 4 |

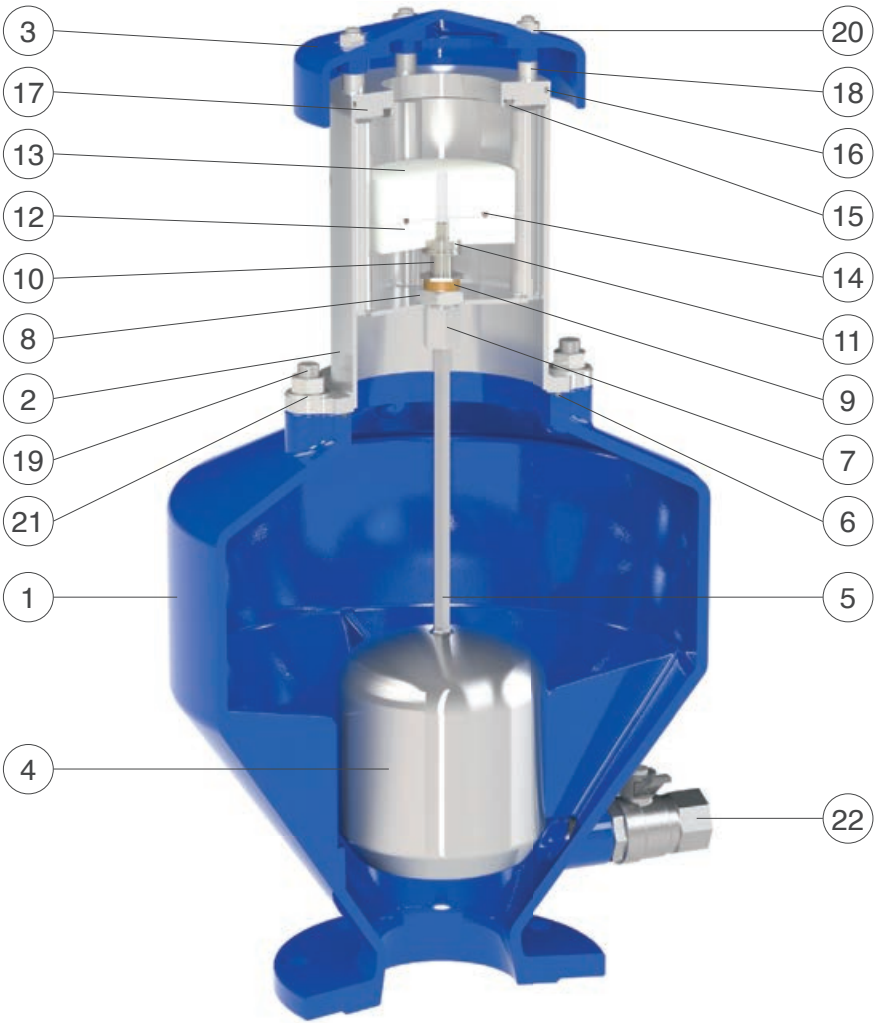
## Weights and dimensions

| DN mm | A mm | B mm | B' mm | C mm | D mm | Weight Kg |
|---|---|---|---|---|---|---|
| 50/65 | 185 | - | 680 | 300 | 190 | 29 |
| 80/100 | 220 | 645 | - | 350 | 202 | 40 |
| 150 | 285 | 870 | - | 488 | 243 | 78 |
| 200 | 340 | 870 | - | 488 | 243 | 82 |

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



## Technical details




Threaded PP evacuation bend 1" 1/2 supplied as a standard for DN 50/65.

| N. | Component | Standard material | Optional |
|---|---|---|---|
| 1 | Lower body | ductile cast iron GJS 450-10 | |
| 2 | CSF upper body | stainless steel AISI 316 | |
| 3 | Cap | ductile cast iron GJS 450-10 | |
| 4 | Float | stainless steel AISI 316 | |
| 5 | Float shaft | stainless steel AISI 316 | |
| 6 | O-ring | NBR | EPDM/Viton/silicone |
| 7 | Driving sleeve | stainless steel AISI 303 | stainless steel AISI 316 |
| 8 | Nut | stainless steel AISI 304 | stainless steel AISI 316 |
| 9 | Plane gasket | NBR | |
| 10 | Gasket holder | stainless steel AISI 316 | |
| 11 | Nozzle subset | stainless steel AISI 316 | |
| 12 | CSF obturator flat | polypropylene | |
| 13 | Anti-surge flat | polypropylene | |
| 14 | Anti-surge flat gasket | NBR | EPDM/Viton/silicone |
| 15 | Seat gasket | NBR | EPDM/Viton/silicone |
| 16 | O-ring | NBR | EPDM/Viton/silicone |
| 17 | Seat | stainless steel AISI 316 | |
| 18 | Spacers | stainless steel AISI 304 | |
| 19 | Studs | stainless steel AISI 304 | stainless steel AISI 316 |
| 20 | Nuts | stainless steel AISI 304 | stainless steel AISI 316 |
| 21 | Washers | stainless steel AISI 304 | stainless steel AISI 316 |
| 22 | Ball valve 1" | stainless steel AISI 316 | |

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

# Wastewater combination air valve with anti-surge mechanism - Mod. SWV 3S-CSF

The SWV 3S-CSF guarantees the proper operation and safety of pressurized sewage systems allowing the release of air pockets in working conditions and the entrance of large quantities of air, in case of pipe bursting or draining phases. The air discharge velocity is maintained within a safety level by means of a anti-surge mechanism to prevent water hammer.

## Technical features and benefits

- Large lower body designed with strongly sloped funnel shaped walls to avoid deposit of grease or other material, and containing four ribs obtained by casting to guide the stainless steel float.
- Mobile block including a large AISI 316 stainless steel float, placed on the lower body and connected through a stainless steel rod to the air release system.
- Drainage valve for chamber control and draining.
- CSF anti-surge automatism composed of two floats in solid polypropylene, where the upper one will be automatically lifted in case of excessive air outflow, reducing the water approach velocity and avoiding potential water hammer events.
- Nozzle and gasket holder wear resistant thanks to gasket compression control.
- Maintenance can be easily performed from the top without removing the air valve from the pipe.
- Upper body in ductile cast iron FBT painted.

## Applications

- Sewage main transmission lines.
- Treatment plants.
- Irrigation systems in presence of solids/debris in suspension.
- Whenever the technology of air valves for treated water can’t be used, for the risk of clogging and damages to the internal components, and the proper protection of the system has to be provided.

## Operating principle

1

### 1. Discharge of large volumes of air

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

### 2. Controlled outflow

If the differential pressure of air across the valve during pipe filling, and the consequent air outflow, rises above a certain value without control, there is the risk of potential water hammer and damages to the system caused by rapid closures of the mobile block. Should that happen the CSF anti-surge flat will rise automatically reducing air outflow and slowing down the velocity of the approaching water column.

2

3

### 3. Air release during working conditions

During operation the air produced by the pipeline is accumulated in the upper part. Little by little it is compressed and its volume increases, pushing the liquid level downwards and allowing the air release through the nozzle.

### 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 liquid to avoid negative pressure and serious damages to the pipeline, and the entire system.

4

## Optional

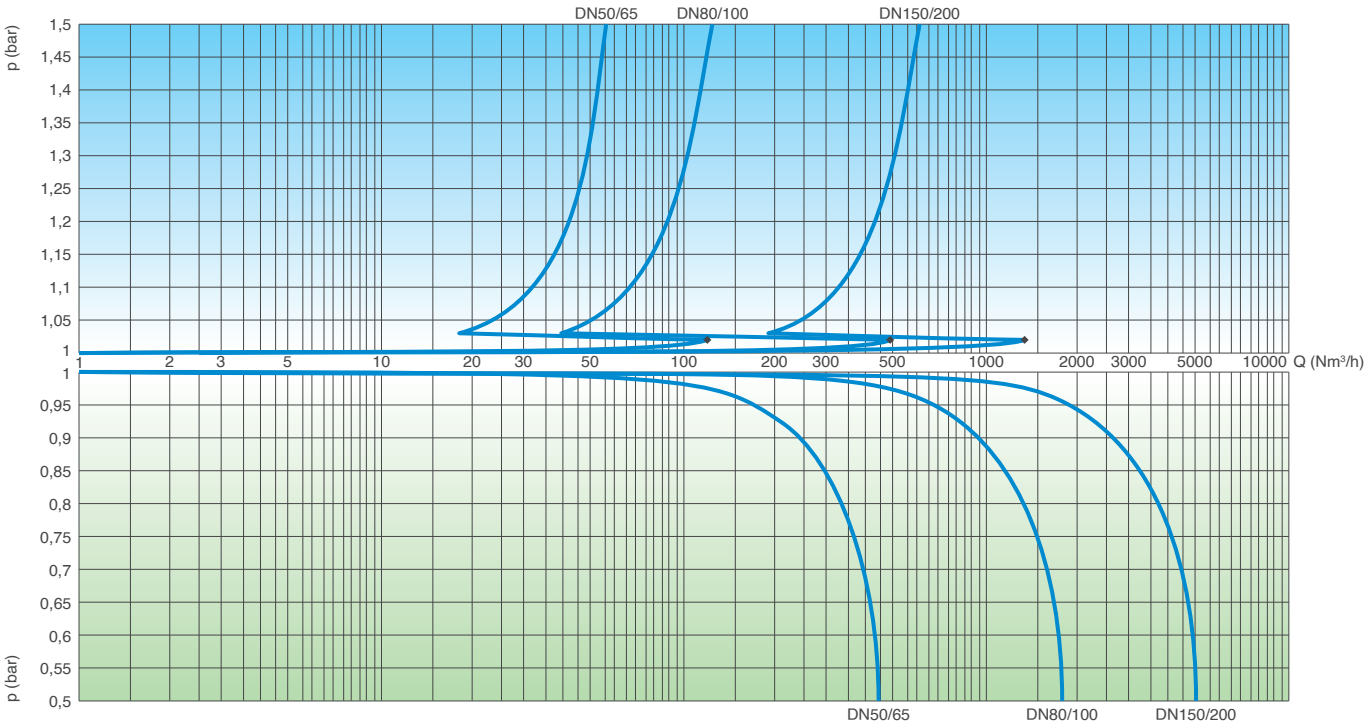
▪ **Vacuum breaker version Mod. SWV 2S-CSF**, to allow the entrance of large volumes of air only with the controlled air outflow thanks to the CSF technology. This model is normally recommended in changes on slope ascending, long ascending segments, and wherever the air release won't be required.

▪ **Version for submerged applications SUB series**, standard for DN 50/65, available both for SWV 3S-CSF and SWV 2S-CSF 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.

# Technical data

## Air flow performance charts

AIR DISCHARGE DURING PIPE FILLING



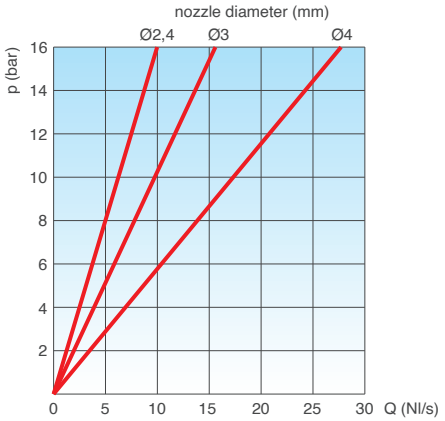

AIR ENTRANCE DURING PIPE DRAINING

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

Water and waste water max. 60°C.
Maximum pressure 16 bar.
Minimum pressure 0,2 bar. Lower on request.
Higher temperatures on request.

AIR RELEASE DURING WORKING CONDITIONS




## Standard

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

## Nozzle choice

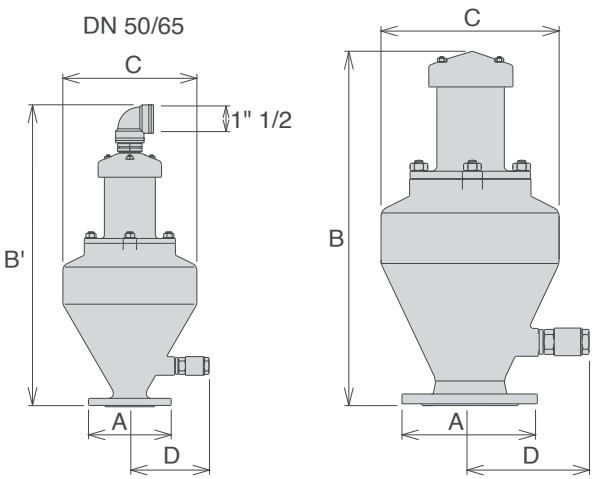
Nozzle diameter in mm according to the size of the air valve and the PN.

| | PN 10 | PN 16 |
|---|---|---|
| DN 50/65 | 2,4 | 2,4 |
| DN 80/100 | 3 | 3 |
| DN 150/200 | 4 | 4 |

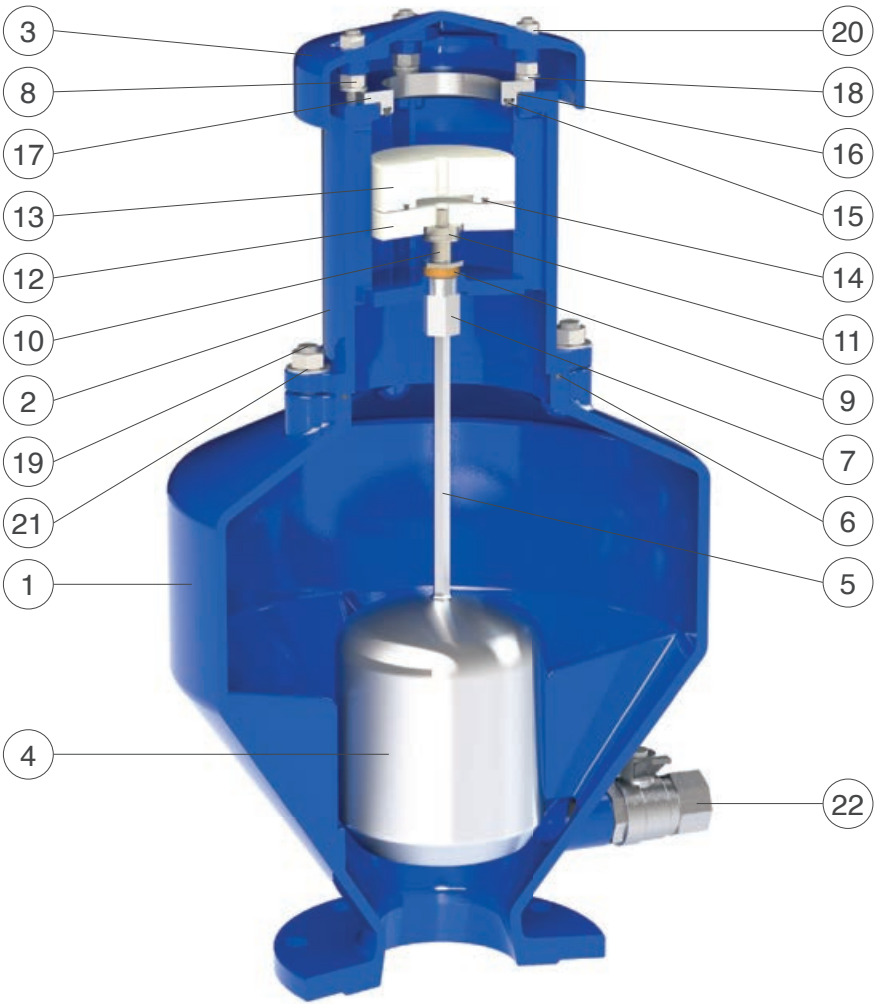
## Weights and dimensions

| DN mm | A mm | B mm | B' mm | C mm | D mm | Weight Kg |
|---|---|---|---|---|---|---|
| 50/65 | 185 | - | 675 | 300 | 190 | 29 |
| 80/100 | 220 | 635 | - | 350 | 202 | 40 |
| 150 | 285 | 865 | - | 488 | 243 | 78 |
| 200 | 340 | 865 | - | 488 | 243 | 82 |

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



## Technical details




Threaded PP evacuation bend 1" 1/2 supplied as a standard for DN 50/65.

| N. | Component | Standard material | Optional |
|---|---|---|---|
| 1 | Lower body | ductile cast iron GJS 450-10 | |
| 2 | CSF upper body | ductile cast iron GJS 450-10 | |
| 3 | Cap | ductile cast iron GJS 450-10 | |
| 4 | Float | stainless steel AISI 316 | |
| 5 | Float shaft | stainless steel AISI 316 | |
| 6 | O-ring | NBR | EPDM/Viton/silicone |
| 7 | Driving sleeve | stainless steel AISI 303 | stainless steel AISI 316 |
| 8 | Nuts | stainless steel AISI 304 | stainless steel AISI 316 |
| 9 | Plane gasket | NBR | |
| 10 | Gasket holder | stainless steel AISI 316 | |
| 11 | Nozzle subset | stainless steel AISI 316 | |
| 12 | CSF obturator flat | polypropylene | |
| 13 | Anti-surge flat | polypropylene | |
| 14 | Anti-surge flat gasket | NBR | EPDM/Viton/silicone |
| 15 | Seat gasket | NBR | EPDM/Viton/silicone |
| 16 | O-ring | NBR | EPDM/Viton/silicone |
| 17 | Seat | stainless steel AISI 316 | |
| 18 | Washers | stainless steel AISI 304 | stainless steel AISI 316 |
| 19 | Studs | stainless steel AISI 304 | stainless steel AISI 316 |
| 20 | Nuts | stainless steel AISI 304 | stainless steel AISI 316 |
| 21 | Nuts and washers | stainless steel AISI 304 | stainless steel AISI 316 |
| 22 | Ball valve 1" | stainless steel AISI 316 | |

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

# Wastewater combination air valve
# Mod. SWV TH 3S

The SWV TH 3S air valve guarantees the proper operation of sewage lines allowing the entrance of a large quantity of air in case of pipe burst or draining, the release of air pockets during working conditions and the discharge during pipe filling.

## Technical features and benefits

- Lower body designed with strongly sloped funnel shaped walls to avoid deposit of grease or other material, it contains four ribs to guide the stainless steel float.
- Upper body containing the air release device which is protected by a stainless steel deflector against spurts caused by rapid filling.
- Mobile block, including a large AISI 316 stainless steel float, placed on the lower body and connected through a stainless steel rod to the air release mechanism.
- Compact and light, the SWV TH 3S features an innovative technology making it suitable even to the most demanding environments.
- Drainage valve for chamber control and draining.
- Maintenance can be easily performed from the top without removing the air valve from the pipe.
- Evacuation bend suitable for flooded environments with 1" elbow outlet.

## Applications

- Sewage main transmission lines.
- Treatment plants.
- Irrigation systems in presence of solids/debris in suspension.
- Whenever the technology of air valves for treated water can’t be used for the risk of clogging and damages to the internal components.

## Operating principle

### Discharge of large volumes of air

During the pipe filling it is necessary to discharge air as liquid flows in. The SWV TH 3S, thanks to an aerodynamic 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. Little by little it is compressed and its volume increases, pushing the liquid level downwards and 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 liquid. This is to avoid negative pressure and serious damages to the pipeline and the entire system.

## Optional

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

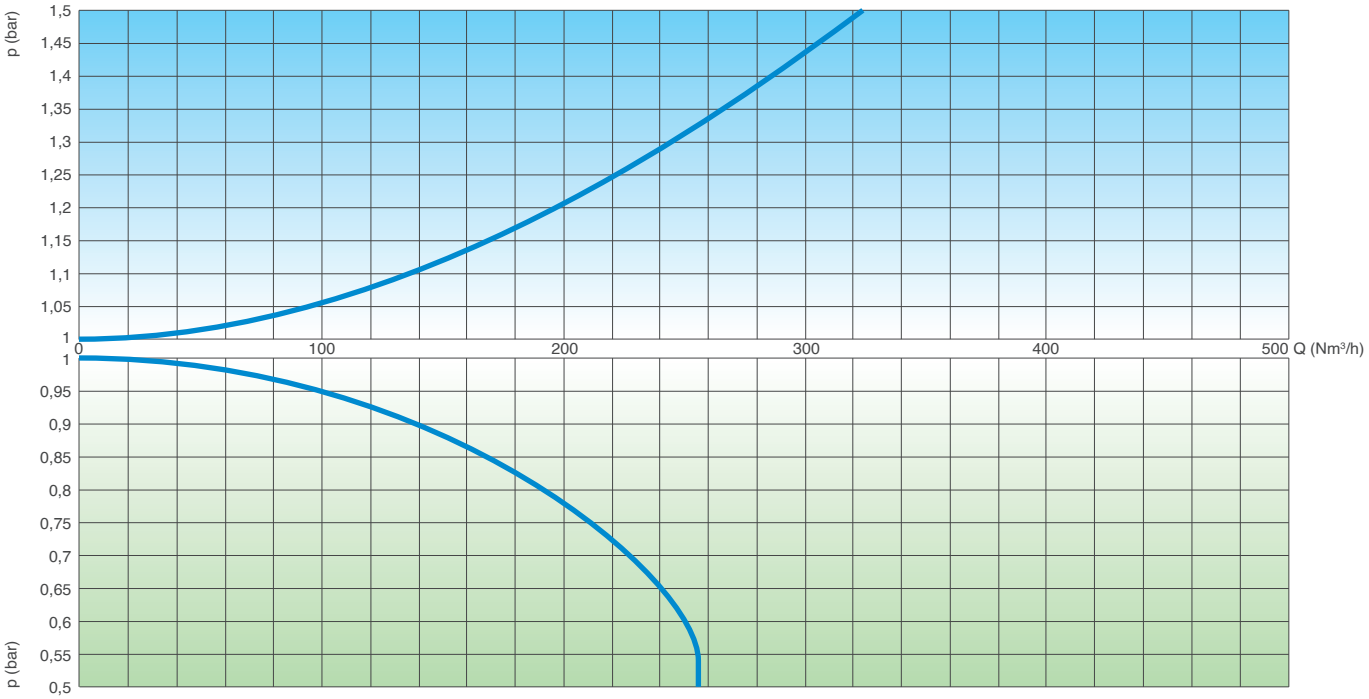
▪ **Version for air discharge only SWV TH EO series** (on request), available both for SWV TH 3S and SWV TH 2S models. The most important application of EO is to allow the air valve installation in those locations of the system where HGL may drop below the pipe profile, and to any other node where for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

▪ **Version for air entrance only SWV TH 3S IO series**, available for vacuum breaker 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







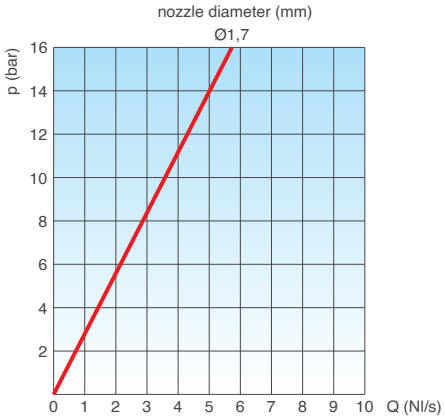
AIR ENTRANCE DURING PIPE DRAINING

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

Water and waste water max. 60°C.
Maximum pressure 16 bar.
Minimum pressure 0,2 bar. Lower on request.

AIR RELEASE DURING WORKING CONDITIONS



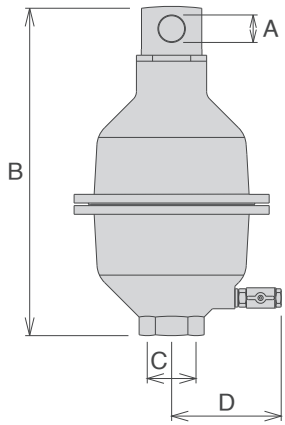

## Standard

Certified and tested in compliance with EN-1074/4.
Manufactured with 2" inlet; supplied on request with flanges according to EN 1092/2 / ANSI.
Epoxy painting applied through fluidized bed technology blue RAL 5005.
Changes on the flanges and painting details available on request.

## Nozzle choice

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

| PN 10 | PN 16 |
|---|---|
| 1,7 | 1,7 |

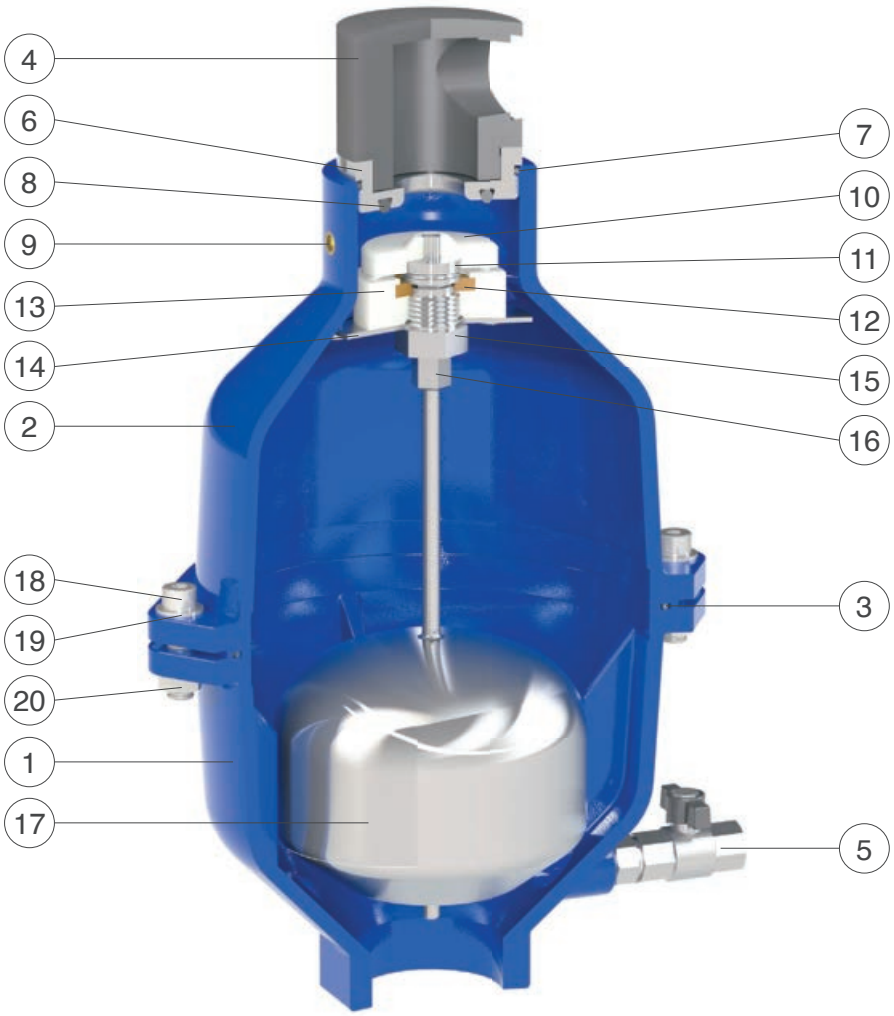



## Weights and dimensions

| C inch | A inch | B mm | D mm | Main orifice mm² | Nozzle orifice mm² | Weight Kg |
|---|---|---|---|---|---|---|
| 2" | 1" | 380 | 137 | 490 | 2,3 | 10,5 |

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

## 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 | Cap | PVC | |
| 5 | Drain valve | stainless steel AISI 316 | |
| 6 | Seat | stainless steel AISI 316 | |
| 7 | O-ring | NBR | EPDM/Viton/silicone |
| 8 | Seat gasket | NBR | EPDM/Viton/silicone |
| 9 | Plug | brass | stainless steel AISI 316 |
| 10 | Obturator | polypropylene | |
| 11 | Nozzle subset | stainless steel AISI 316 | |
| 12 | Plane gasket | NBR | |
| 13 | Lower gasket holder | polypropylene | |
| 14 | Deflector | stainless steel AISI 316 | |
| 15 | Guiding nut | stainless steel AISI 316 | |
| 16 | Upper gasket holder | stainless steel AISI 316 | |
| 17 | Float | stainless steel AISI 316 | |
| 18 | Screws | stainless steel AISI 304 | stainless steel AISI 316 |
| 19 | Washers | stainless steel AISI 304 | stainless steel AISI 316 |
| 20 | Nuts | stainless steel AISI 304 | stainless steel AISI 316 |

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

# Wastewater anti-shock combination air valve - Mod. SWV TH 3S-AWH

The SWV TH 3S-AWH air valve guarantees the proper operation of sewage lines allowing the entrance of large quantities of air in case of pipe burst or draining phases, the release of air pockets during working conditions and the controlled air outflow speed.

## Technical features and benefits

- Lower body designed with strongly sloped funnel shaped walls to avoid grease and/or other material deposit, and it contains four ribs to guide the stainless steel float.
- Upper body containing the AS and the air release mechanism which is protected by a stainless steel deflector against spurts caused by filling.
- Mobile block including a large AISI 316 stainless steel float, placed on the lower body and connected through a stainless steel rod to the air release mechanism.
- Anti-Water Hammer (AWH) automatism composed of a metallic disk with 2 or more adjustable orifices, a guide bar and a counteracting spring in stainless steel.
- Drainage valve for chamber control and draining.
- Maintenance can be easily performed from the top without removing the air valve from the pipe.
- Evacuation bend suitable for flooded environments with 1" elbow outlet.

## Applications

- To protect pumping stations and nodes of sewage main transmission lines exposed to water hammer and column separation in case of pump failure.
- Treatment plants subject to rapid changes of the flow rate.
- Whenever the technology of air valves for treated water can’t be used and a protection against water hammer is needed.

## Operating principle

### Controlled air discharge

During the pipe filling it is necessary to avoid rapid closures of the mobile block, responsible of water hammer effects. The SWV TH 3S-AWH will control the air outflow reducing the water approach velocity and thus minimizing the risk of overpressure.

### Air release during working conditions

During operation the air produced by the pipeline is accumulated in the upper part. Little by little it is compressed and its volume increases, pushing the liquid level downwards and 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 liquid. This is to avoid negative pressure and serious damages to the pipeline and the entire system.

## Optional

▪ **Vacuum breaker version**, to allow the entrance of large volumes of air only with the anti water hammer feature. This model is normally recommended at the pumps and on changes in slope ascending, long ascending segments exposed to transients events. More in general wherever air release won't be required still providing some protection against water hammer.

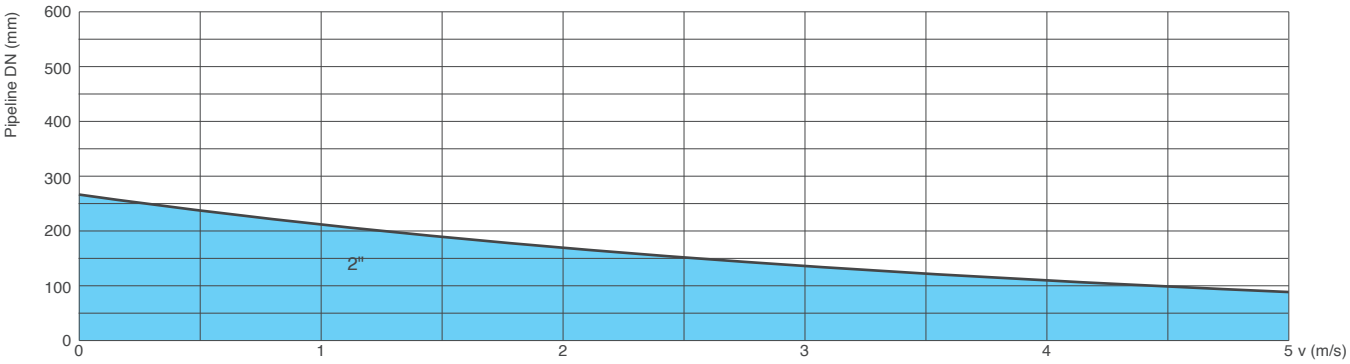
▪ **Version for air entrance only SWV TH 3S-AWH IO series**, available for vacuum breaker model only. The most important application of IO is to allow the air valve installation in those locations of the system where, for project requirements, air discharge and release must be avoided.

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

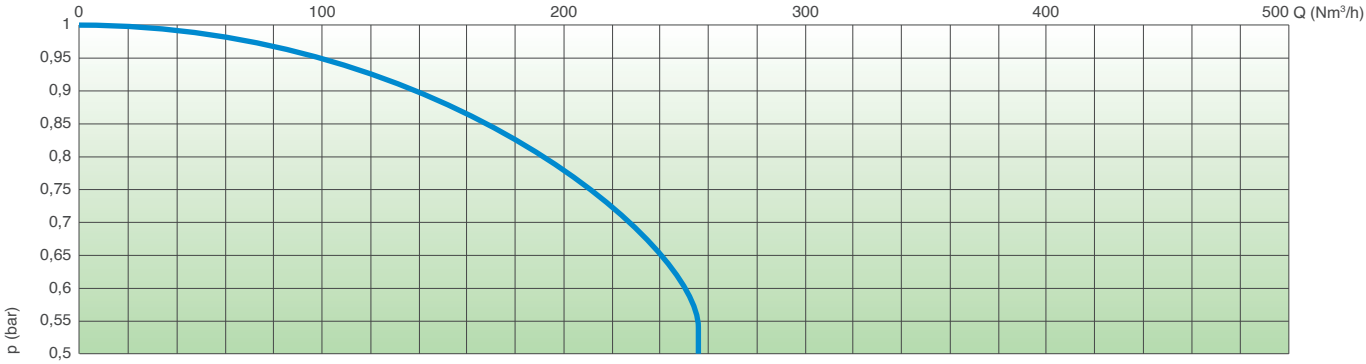
# Technical data

## Air valve selection chart

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



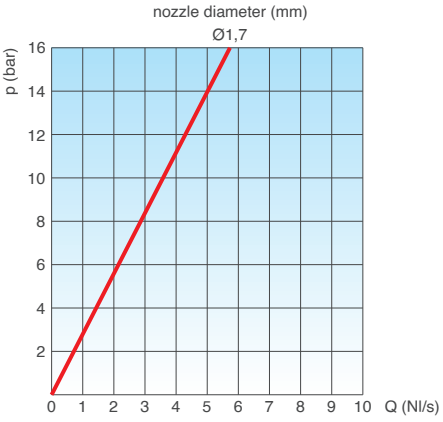

## Air flow performance chart




AIR ENTRANCE DURING PIPE DRAINING

The air flow charts were created in Kg/s from laboratory tests and numerical analysis, then converted in $Nm^3/h$ using a safety factor.

AIR RELEASE DURING WORKING CONDITIONS




## Working conditions

Water and waste water max. 60°C.
Maximum pressure 16 bar.
Minimum pressure 0,2 bar. Lower on request.

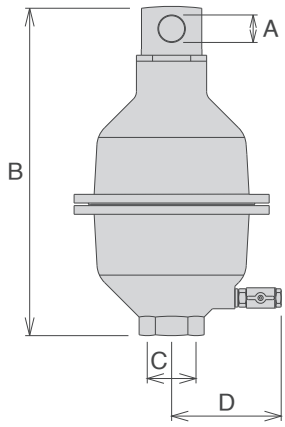
## Standard

Certified and tested in compliance with EN-1074/4.
Manufactured with 2" inlet; supplied on request with flanges according to EN 1092/2 / ANSI.
Epoxy painting applied through fluidized bed technology blue RAL 5005.
Changes on the flanges and painting details available on request.

## Nozzle choice

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

| PN 10 | PN 16 |
|---|---|
| 1,7 | 1,7 |

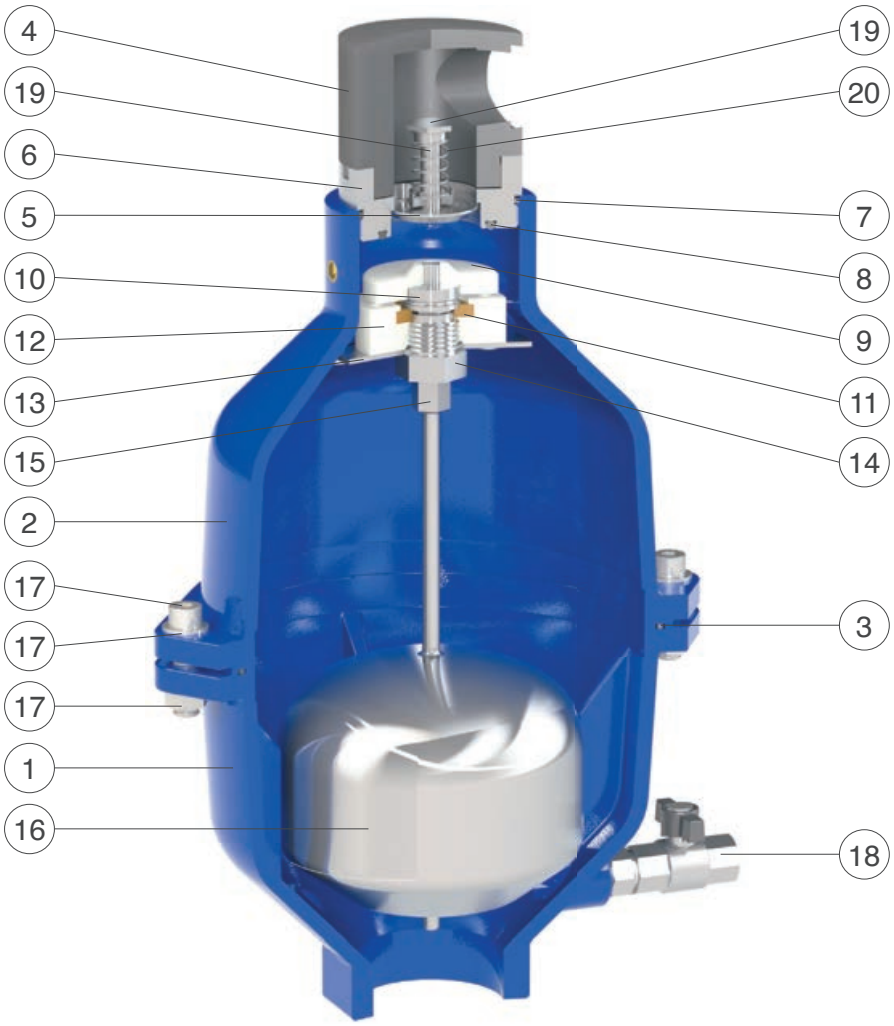



## Weights and dimensions

| C inch | A inch | B mm | D mm | Main orifice $mm^2$ | Nozzle orifice $mm^2$ | Weight Kg |
|---|---|---|---|---|---|---|
| 2" | 1" | 389 | 137 | 490 | 2,3 | 10,8 |

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

## 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 | Cap | PVC | |
| 5 | AWH flat | stainless steel AISI 316 | |
| 6 | Seat | stainless steel AISI 316 | |
| 7 | O-ring | NBR | EPDM/Viton/silicone |
| 8 | Seat gasket | NBR | EPDM/Viton/silicone |
| 9 | Obturator | polypropylene | |
| 10 | Nozzle subset | stainless steel AISI 316 | |
| 11 | Plane gasket | NBR | |
| 12 | Lower gasket holder | polypropylene | |
| 13 | Deflector | stainless steel AISI 316 | |
| 14 | Guiding nut | stainless steel AISI 316 | |
| 15 | Upper gasket holder | stainless steel AISI 316 | |
| 16 | Float | stainless steel AISI 316 | |
| 17 | Screws, washers and nuts | stainless steel AISI 304 | stainless steel AISI 316 |
| 18 | Drain valve | stainless steel AISI 316 | |
| 19 | AWH shaft | stainless steel AISI 316 | |
| 20 | Spring | stainless steel AISI 302 | stainless steel AISI 316 |

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

# Wastewater combination air valve with anti-surge mechanism - Mod. SWV TH 3S-CSF

The SWV TH 3S-CSF guarantees the proper operation and safety of pressurized sewage systems allowing the release of air pockets in working conditions and the entrance of large quantities of air, in case of pipe bursting or draining phases. The air discharge velocity is maintained within a safety level by means of a anti-surge mechanism to prevent water hammer.

## Technical features and benefits

- Lower body designed with strongly sloped funnel shaped walls to avoid deposit of grease or other material, it contains four ribs to guide the stainless steel float.
- Upper body containing the CSF and the air release mechanism which is protected by a stainless steel deflector against spurts caused by filling.
- Mobile block, including a large AISI 316 stainless steel float, placed on the lower body and connected through a stainless steel rod to the air release mechanism.
- CSF anti-surge automatism composed of two floats in solid polypropylene, where the upper one will be automatically lifted in case of excessive air outflow, reducing the water approach velocity and avoiding potential water hammer events.
- Drainage valve for chamber control and draining.
- Maintenance can be easily performed from the top without removing the air valve from the pipe.
- Evacuation bend suitable for flooded environments with 1" elbow outlet.

## Applications

- Sewage main transmission lines.
- Treatment plants.
- Irrigation systems in presence of solids/debris in suspension.
- Whenever the technology of air valves for treated water can’t be used, for the risk of clogging and damages to the internal components, and the proper protection of the system has to be provided.

## Operating principle

1

### 1. Discharge of large volumes of air

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

### 2. Controlled outflow

If the differential pressure of air across the valve during pipe filling, and the consequent air outflow, rises above a certain value without control, there is the risk of potential water hammer and damages to the system caused by rapid closures of the mobile block. Should that happen the SWV TH 3S-CSF anti-surge float will rise automatically reducing air outflow and slowing down the velocity of the approaching water column.

2

3

### 3. Air release during working conditions

During operation the air produced by the pipeline is accumulated in the upper part. Little by little it is compressed and its volume increases, pushing the liquid level downwards and allowing the air release through the nozzle.

### 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 liquid to avoid negative pressure and serious damages to the pipeline, and the entire system.

4

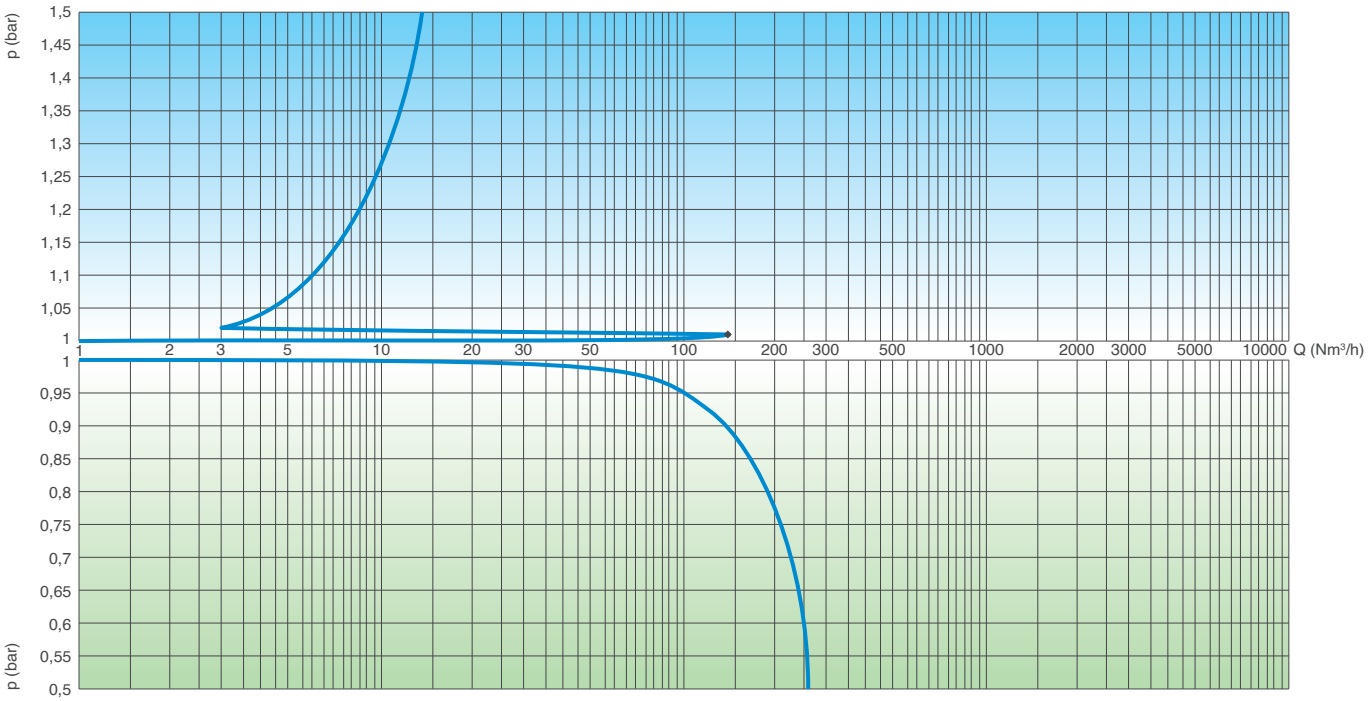
## Optional

▪ **Vacuum breaker version Mod. SWV TH 2S-CSF**, to allow the entrance of large volumes of air only with the controlled air outflow thanks to the CSF technology. This model is normally recommended in changes on slope ascending, long ascending segments, and wherever the air release won't be required.

# Technical data

## Air flow performance charts

AIR DISCHARGE DURING PIPE FILLING



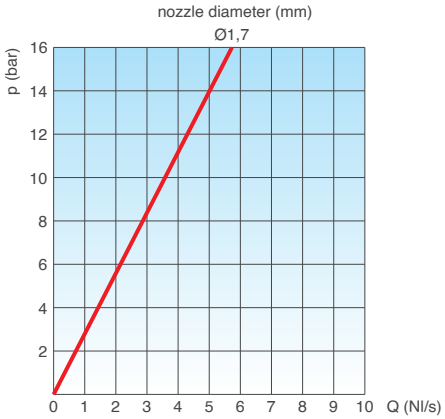

AIR ENTRANCE DURING PIPE DRAINING

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

Water and waste water max. 60°C.
Maximum pressure 16 bar.
Minimum pressure 0,2 bar. Lower on request.

AIR RELEASE DURING WORKING CONDITIONS



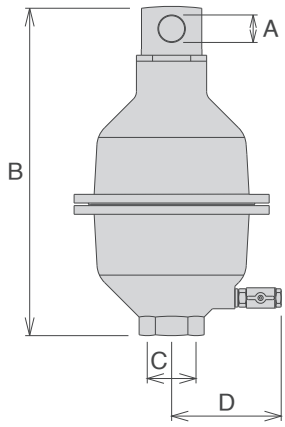

## Standard

Certified and tested in compliance with EN-1074/4.
Manufactured with 2" inlet; supplied on request with flanges according to EN 1092/2 / ANSI.
Epoxy painting applied through fluidized bed technology blue RAL 5005.
Changes on the flanges and painting details available on request.

## Nozzle choice

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

| PN 10 | PN 16 |
|---|---|
| 1,7 | 1,7 |

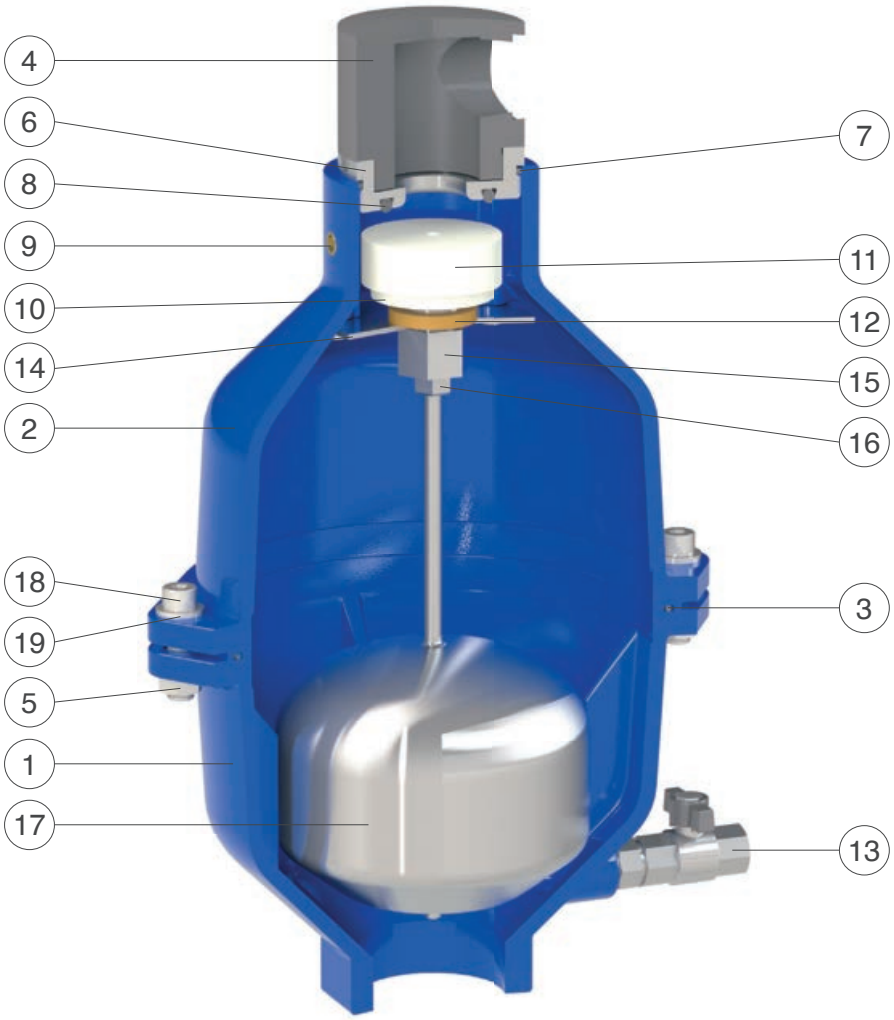



## Weights and dimensions

| C inch | A inch | B mm | D mm | Main orifice mm² | Nozzle orifice mm² | Weight Kg |
|---|---|---|---|---|---|---|
| 2" | 1" | 380 | 137 | 490 | 2,3 | 10,5 |

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

## 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 | Cap | PVC | |
| 5 | Nuts | stainless steel AISI 304 | stainless steel AISI 316 |
| 6 | Seat | stainless steel AISI 316 | |
| 7 | O-ring | NBR | EPDM/Viton/silicone |
| 8 | Seat gasket | NBR | EPDM/Viton/silicone |
| 9 | Plug | brass | stainless steel AISI 316 |
| 10 | Obturator with nozzle subset | polypropylene and stainless steel AISI 316 | |
| 11 | Anti-surge flat | polypropylene | |
| 12 | Plane gasket | NBR | |
| 13 | Drain valve | stainless steel AISI 316 | |
| 14 | Deflector | stainless steel AISI 316 | |
| 15 | Guiding nut | stainless steel AISI 316 | |
| 16 | Gasket holder | stainless steel AISI 316 | |
| 17 | Float | stainless steel AISI 316 | |
| 18 | Screws | stainless steel AISI 304 | stainless steel AISI 316 |
| 19 | Washers | stainless steel AISI 304 | stainless steel AISI 316 |

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

# Wastewater combination underground air valve Mod. SWV SUBWAY

The underground SWV SUBWAY 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 proper operation of sewage lines 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

- The model 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.
- Stand pipe in PVC with drain port in the lower part which avoids accumulation of water inside the pipe.
- Various sizes and drilling of the flange.
- PFwastewater combination air valve automatically operated by the flow medium, available in different versions, removable from the top by the handle connected to its upper part.
- Thanks to the drain pipe and the sectioning device included in the base, with manoeuvering rod operable from the top, maintenance can be carried out without interrupting the flow in the main pipe or digging.

## Applications

- At high points and changes in slope of sewage lines.
- Pressurized sewage systems.
- In areas exposed to frost, under the roads, buildings.

## Operating principle

### Discharge of large volumes of air

During the pipe filling it is necessary to discharge air as liquid flows in. The SWV SUBWAY, thanks to an aerodynamic 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. Little by little it is compressed and its volume increases, pushing the liquid level downwards and 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 liquid. This is to avoid negative pressure and serious damages to the pipeline and the entire system.

## Installation

The installation simply required a derivation from the main line with the same DN and PN of the air valve, and a manhole on top to allow for maintenance operation so the entire PF underground air valve system, equipped with a drain, can be buried below ground. Usually gravel stones are located at the bottom where drain is present and on the top around the manhole and the upper part of the air valve container A specifically designed gear box operated horizontal sliding disc valve - situated at the base of the assembly - allows for the air valve disconnection and maintenance from ground level even when the system is under pressure. The air valve can be removed by means of an intuitive and easy lever mechanism.

1

## Maintenance and extraction

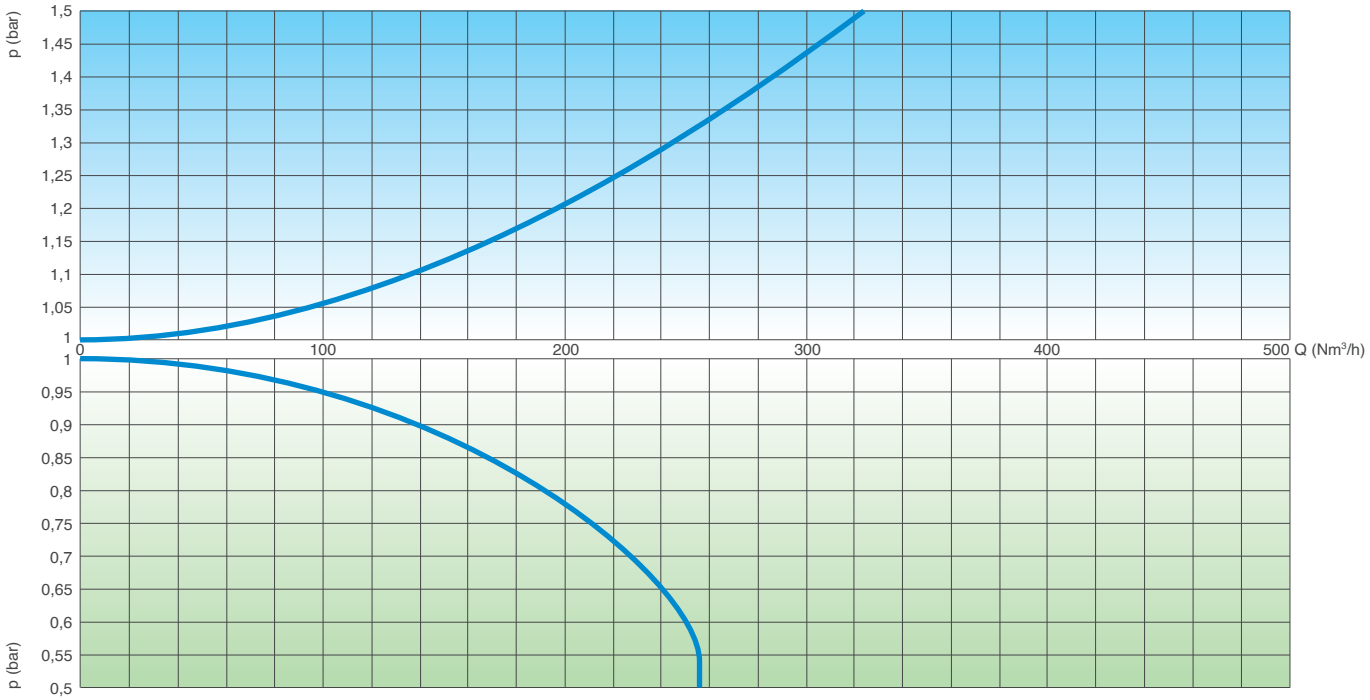
Before being maintained the SWV SUBWAY needs to be isolated from the main pipe, this is done by acting on the rod to close the passage through the PF sectioning device located at the bottom. Picture 1 shows the air valve without and subject to this maneuver. Once the air valve has been isolated simply act on the handle to rotate and pull it up from the connection as shown in the picture nr 2 The intuitive mechanism allows for a easy and friendly usage of the equipment. Simply follow the instruction backwards after having inspected the air valve

2

# Technical data

## Air flow performance charts

AIR DISCHARGE DURING PIPE FILLING







AIR ENTRANCE DURING PIPE DRAINING

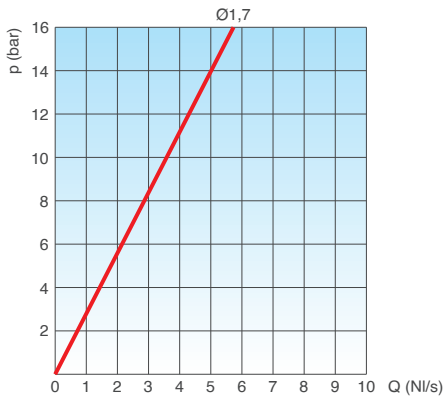
The air flow charts were created in Kg/s from laboratory tests and numerical analysis, then converted in Nm³/h using a safety factor.

## Working conditions

Water and waste water max. 60°C.
Maximum pressure 16 bar.
Minimum pressure 0,2 bar. Lower on request.

AIR RELEASE DURING WORKING CONDITIONS

nozzle diameter (mm)




## Standard

Certified and tested in compliance with EN-1074/4.
Manufactured with 2" inlet; supplied on request with flanges according to EN 1092/2 / ANSI.
Epoxy painting applied through fluidized bed technology blue RAL 5005.
Changes on the flanges and painting details available on request.

## Nozzle choice

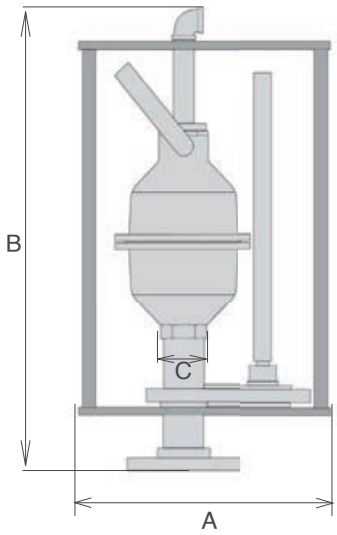
Nozzle diameter in mm according to the size of the air valve and the PN.

| PN 10 | PN 16 |
|---|---|
| 1,7 | 1,7 |

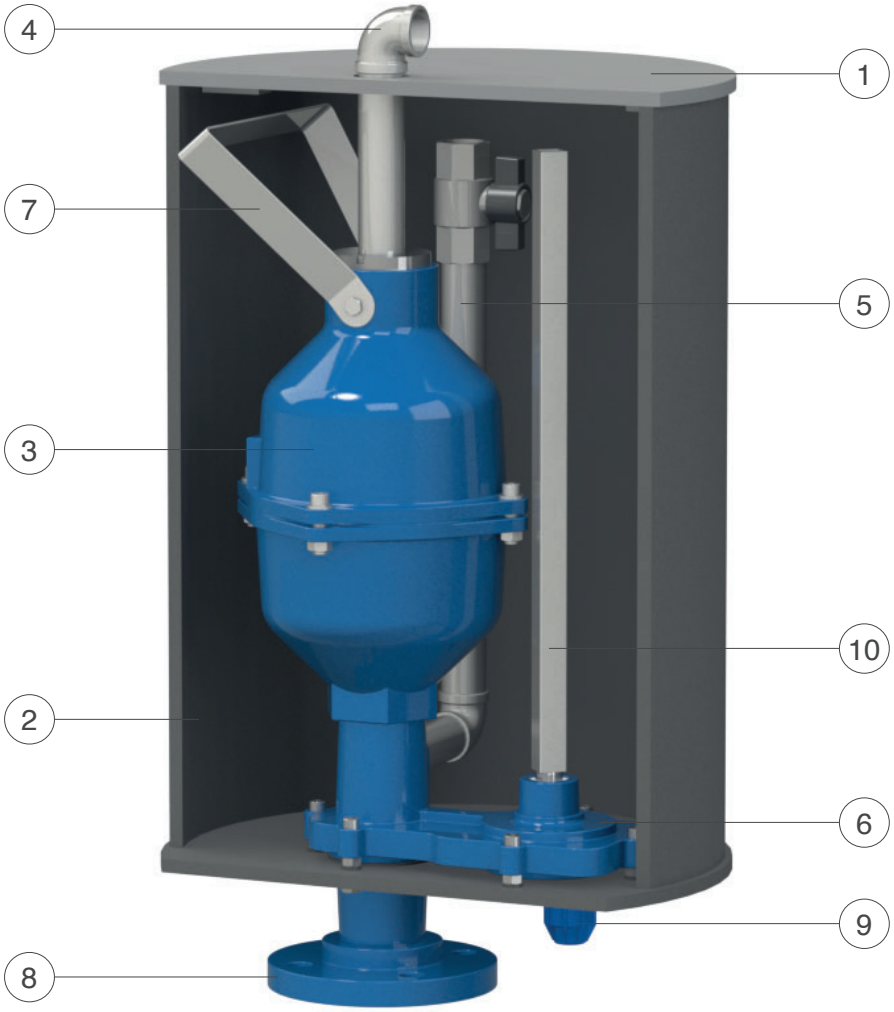
## Weights and dimensions

| C inch | A mm | B mm |
|---|---|---|
| 2" | 410 | 705 |

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



## Technical details




| N. | Component | Material |
|---|---|---|
| 1 | Cover | PVC |
| 2 | Stand pipe | PVC |
| 3 | Air valve SWV TH 3S | in different executions (see SWV TH 3S technical details) |
| 4 | Conveyance pipe | stainless steel or plastic |
| 5 | Drain pipe | stainless steel or plastic |
| 6 | Sectioning device | ductile cast iron GJS 450-10 epoxy coated, stainless steel, NBR |
| 7 | Handle | stainless steel |
| 8 | Flange | steel epoxy coated |
| 9 | Drain | polypropylene |
| 10 | Manoeuvering rod | zinc-plated steel |

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

# Wastewater high capacity air release valve Mod. SWV HC

SWV HC air valve guarantees the proper operation of sewage lines allowing the release of large quantity of air during working conditions.

## Technical data

### Working conditions

Water and waste water max. 60°C.
Maximum pressure 16 bar.
Minimum pressure 0,2 bar. Lower on request.
Higher temperatures on request.

### Standard

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

### Nozzle choice

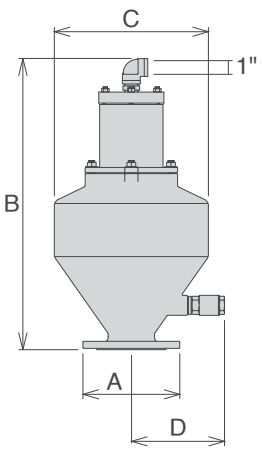
Nozzle diameter in mm, larger sizes available on request.

| | PN 10 | PN 16 |
|---|---|---|
| DN 50/65 | 3 | 3 |
| DN 80/100 | 3 | 3 |
| DN 150/200 | 4 | 4 |

### Weights and dimensions

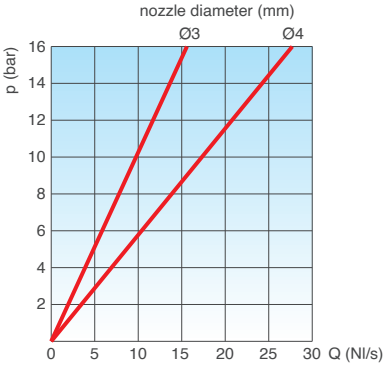
| DN mm | A mm | B mm | C mm | D mm | Wt Kg |
|---|---|---|---|---|---|
| 50/65 | 185 | 550 | 300 | 190 | 28 |
| 80/100 | 220 | 610 | 350 | 202 | 38 |
| 150 | 285 | 815 | 488 | 243 | 73 |
| 200 | 340 | 815 | 488 | 243 | 77 |

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

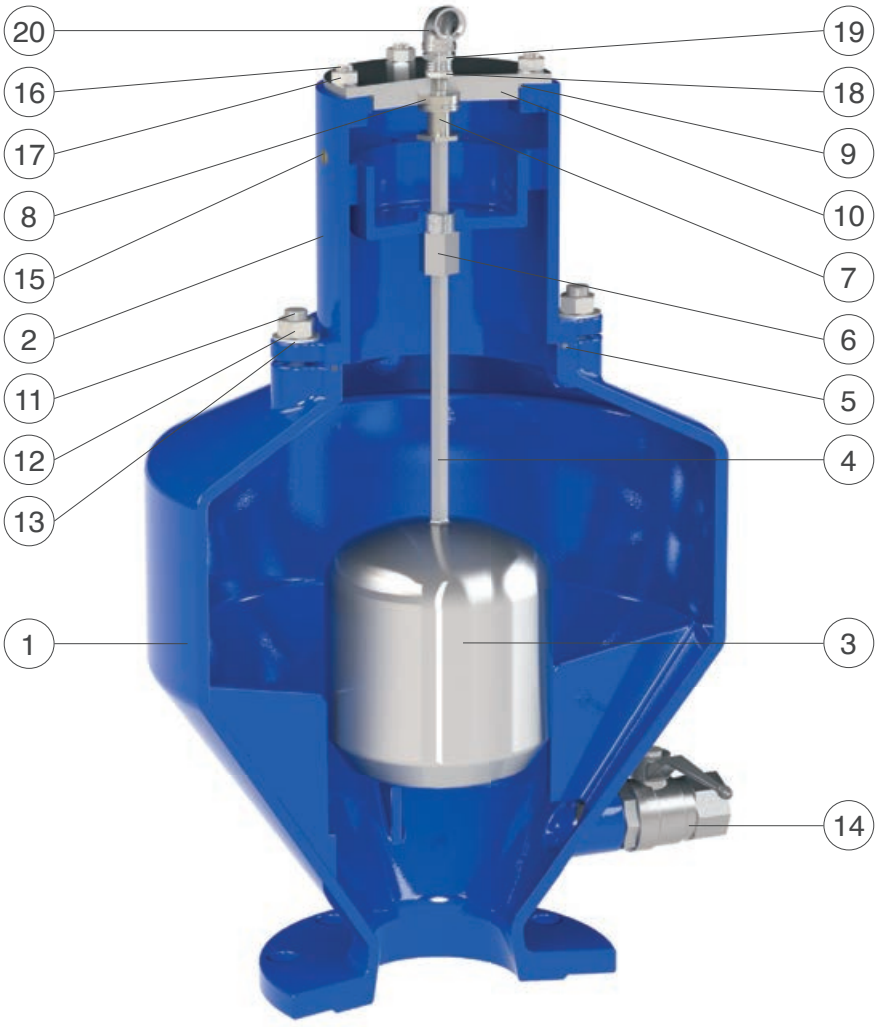



### Air flow performance chart in working conditions

AIR RELEASE DURING WORKING CONDITIONS



## Technical details

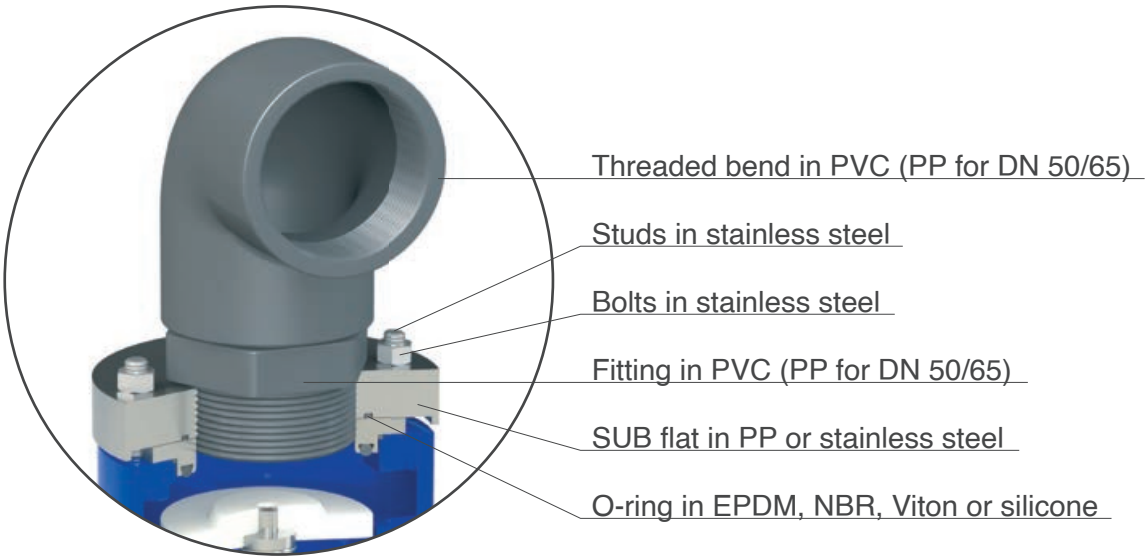



| N. | Component | Standard material | Optional |
|---|---|---|---|
| 1 | Lower body | ductile cast iron GJS 450-10 | |
| 2 | Upper body | ductile cast iron GJS 450-10 | |
| 3 | Float | stainless steel AISI 316 | |
| 4 | Float shaft | stainless steel AISI 316 | |
| 5 | O-ring | NBR | EPDM/Viton/silicone |
| 6 | Driving sleeve | stainless steel AISI 303 | stainless steel AISI 316 |
| 7 | Gasket holder | stainless steel AISI 316 | |
| 8 | Nozzle subset | stainless steel AISI 316 | |
| 9 | O-ring | NBR | EPDM/Viton/silicone |
| 10 | HC seat | stainless steel AISI 304 | stainless steel AISI 316 |
| 11 | Studs | 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 | Ball valve 1" | stainless steel AISI 316 | |
| 15 | Plug | brass | stainless steel |
| 16 | Studs | stainless steel AISI 304 | stainless steel AISI 316 |
| 17 | Nuts | stainless steel AISI 304 | stainless steel AISI 316 |
| 18 | Nut | stainless steel AISI 304 | stainless steel AISI 316 |
| 19 | Threaded fitting | stainless steel AISI 316 | |
| 20 | Threaded bend | stainless steel AISI 316 | |

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

# Wastewater combination air valve - Mod. SWV
# Version for submerged applications - SUB series

**Version for submerged applications**, **SUB series**, with threaded elbow for air conveyance, standard for DN 50/65, is available on request for other DN. 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, reducing noise and conveying spurts coming from possible rapid closure of the air valve.




## Technical data

### Working conditions

Water and waste water max. 60°C.
Maximum pressure 16 bar.
Min. press. 0,2 bar. Lower on request.
Version for higher temperatures available on request.

### Standard

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

### Evacuation bends

Evacuation bend sizes in relation to air valve DN.

| | Bend |
|---|---|
| DN 50/65 | 1" 1/2 |
| DN 80/100 | 2" 1/2 |
| DN 150/200 | 4" |

### Nozzle choice

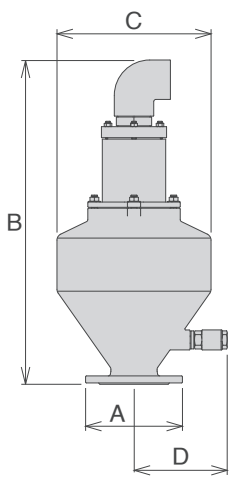
Nozzle diameter in mm according to the size of the air valve and the PN.

| | PN 10 | PN 16 |
|---|---|---|
| DN 50/65 | 2,4 | 2,4 |
| DN 80/100 | 3 | 3 |
| DN 150/200 | 4 | 4 |

### Weights and dimensions

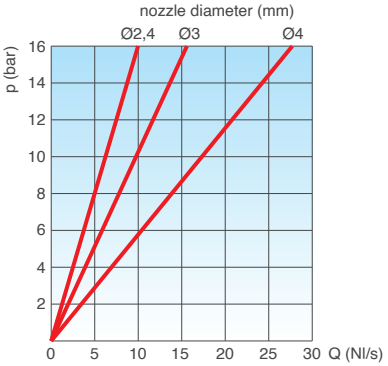
| DN mm | A mm | B* mm | C mm | D mm | Wt Kg |
|---|---|---|---|---|---|
| 50/65 | 185 | 665 | 300 | 190 | 28 |
| 80/100 | 220 | 770 | 350 | 202 | 38 |
| 150 | 285 | 1040 | 488 | 243 | 74 |
| 200 | 340 | 1040 | 488 | 243 | 78 |

*: maximum dimension (of the CSF model).
All values are approximate, consult PF service for more details.



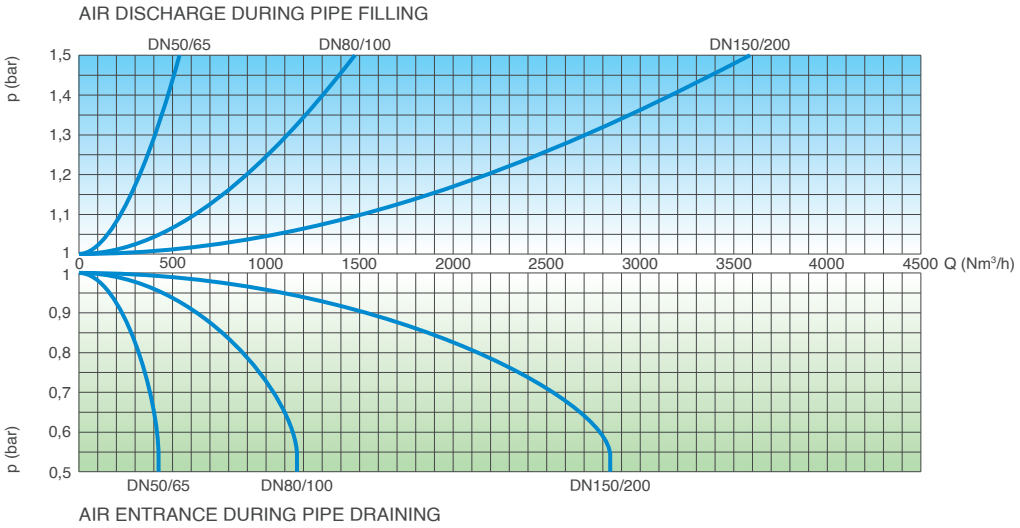

### Air flow performance chart in working conditions

AIR RELEASE DURING WORKING CONDITIONS



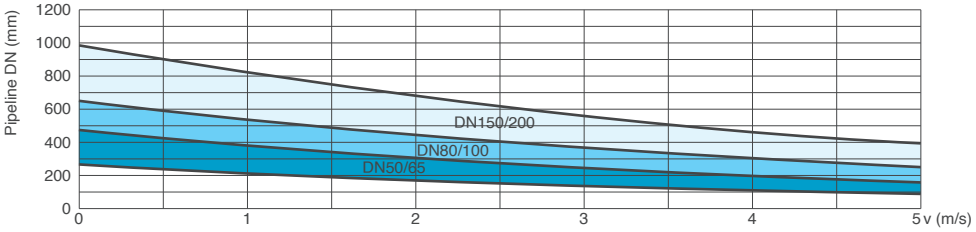
# Technical data

## SWV SUB - Air flow performance charts

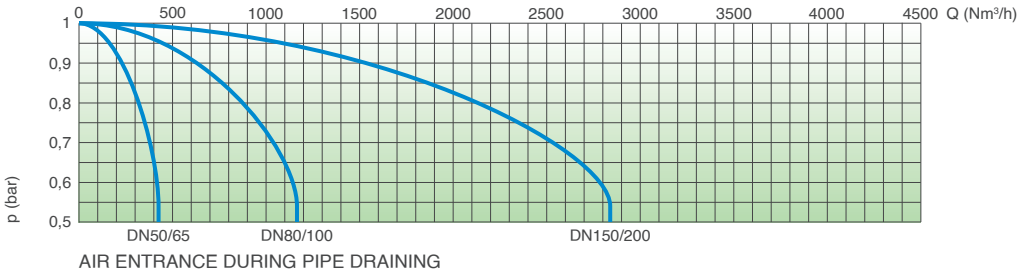



## SWV 3S-AWH SUB - Air valve selection chart

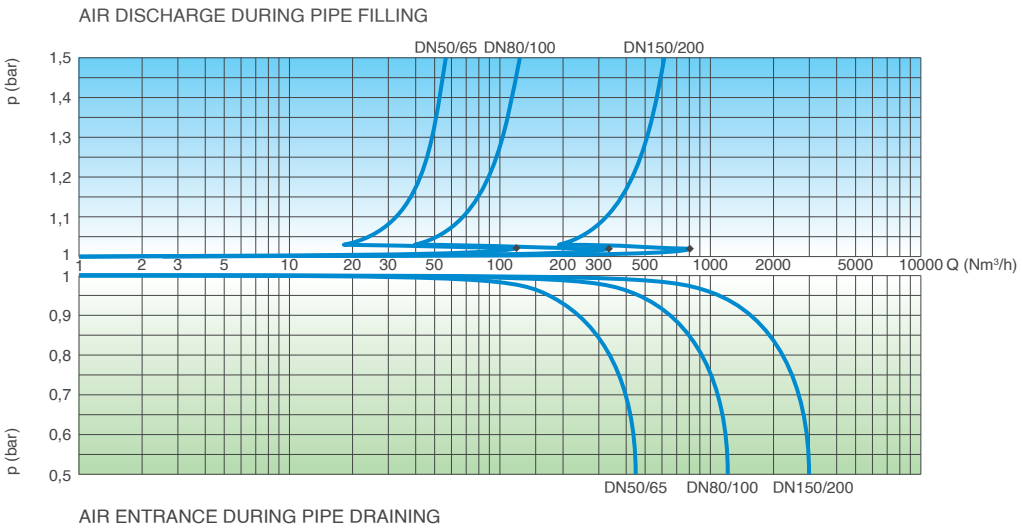
Air valve preliminary sizing as a function of pipeline internal diameter and fluid flow velocity expressed in m/s.




## SWV 3S-AWH SUB - Air flow performance charts



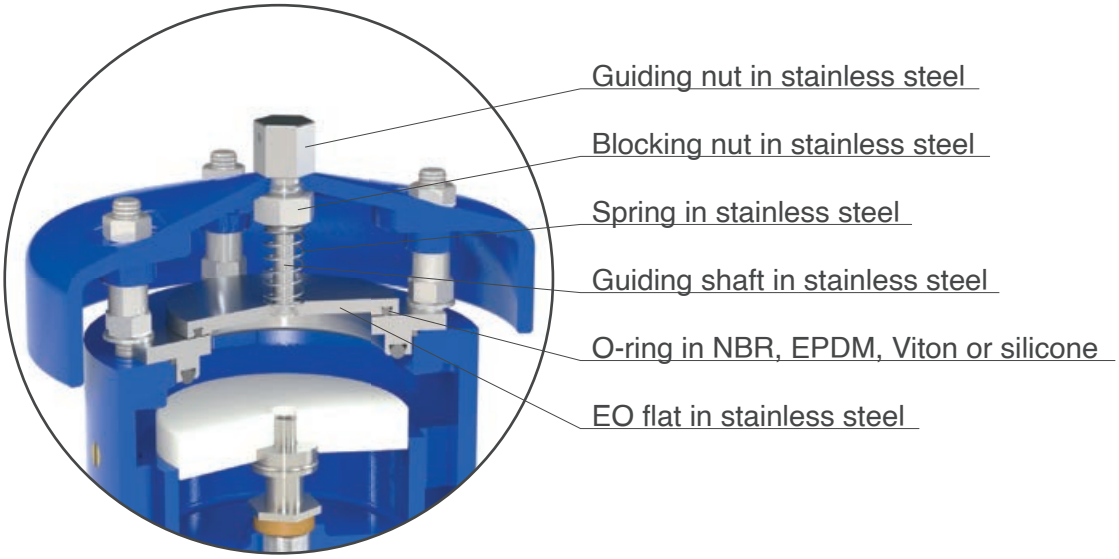

## SWV 3S-CSF SUB - Air flow performance charts




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

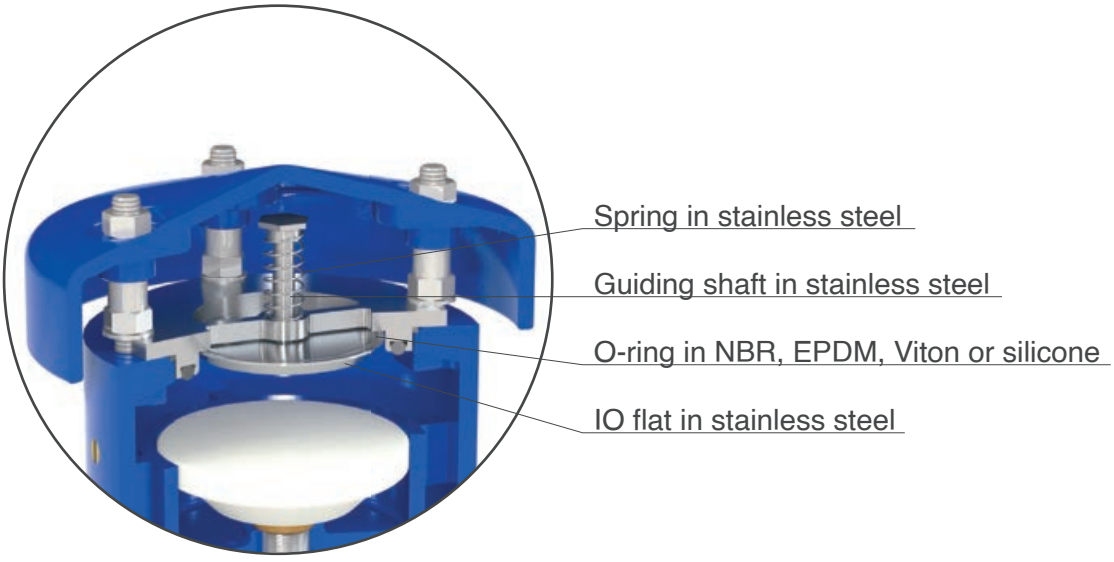
## Version for air discharge only SWV - EO series

**Version for air discharge only EO series**, available both for SWV 3S and SWV 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 whenever for project requirements air entrance must be avoided. For the compact line of SWV TH the EO bias kit will be composed of a check valve and threaded elbow.



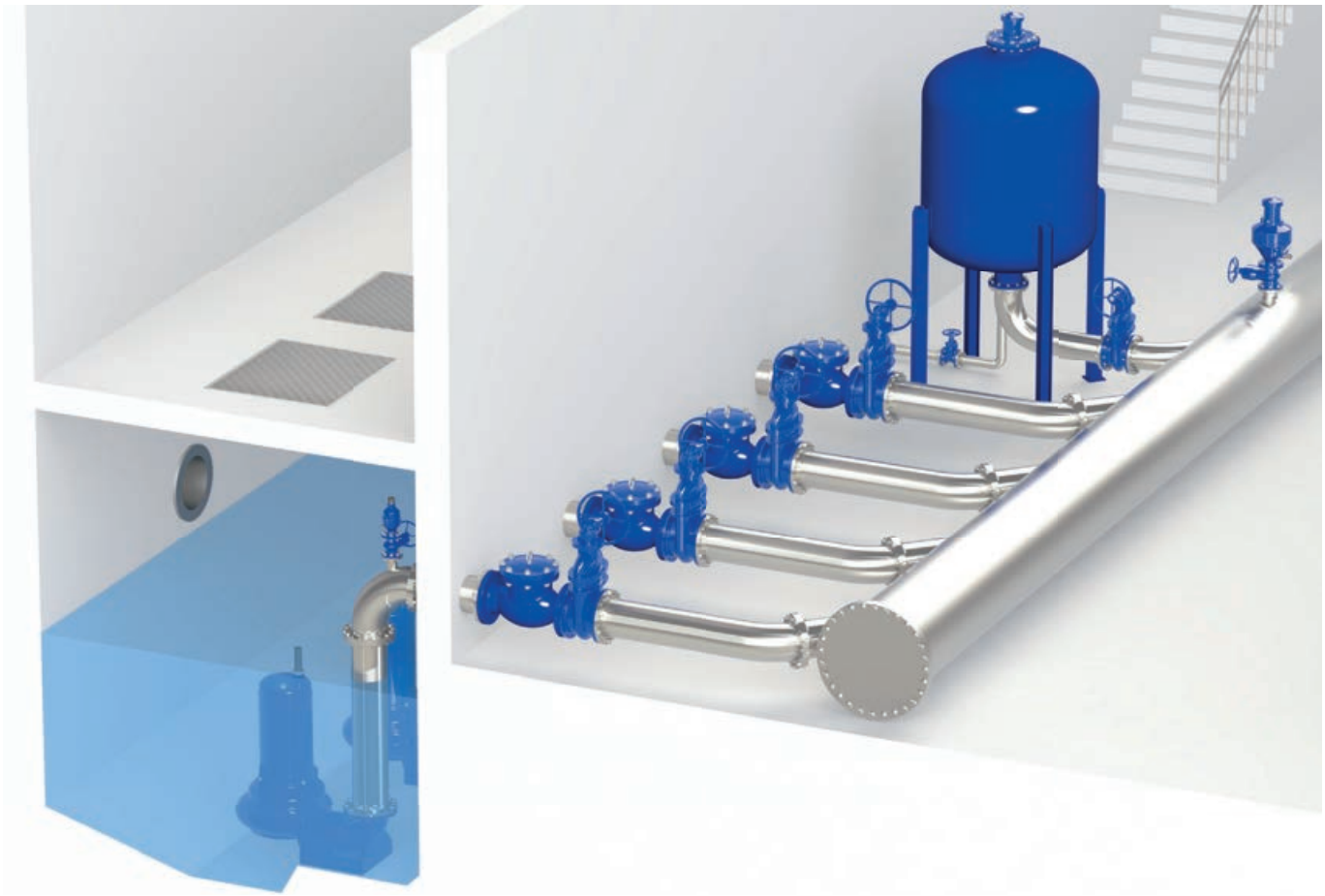

## Version for air entrance only SWV - IO series

**Version for air entrance only IO series**, available for vacuum breaker SWV 2S 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.



## Wastewater pumping station installation layout

The illustration below shows the use of PF wastewater anti-slam air valves in combination with PF air vented anti-surge tank A.V.A.S.T., in a common wastewater pumping station. The anti-slam air valve will allow the entrance of large volumes of air in case of negative pressure, the release of air pockets during working conditions and the controlled air disc PF expertise in the field of water hammer modeling and prevention can provide the right solution, through an accurate sizing and assessment of the devices needed to ensure the protection of the system.



The picture on the left shows the particular of PF anti-slam wastewater air valves installed on the pump riser, just upstream of the check valve. When the pump is idle, the riser will be filled with air, down to the water level in the sump. The air valve is needed to avoid at any time the onset of negative pressure, yet assuring a controlled air venting when pump is operated. This is achieved by means of PF anti-slam device and is extremely important to avoid pump overload and water hammer events, otherwise generated during abrupt closures caused by rapid water approach velocity and uncontrolled filling of the pump's raiser.