IFS

Infinite Flow Solutions

The Power of Control

NUVENT

ANTI SLAM
AIR RELEASE
AND
VACUUM BREAK
AIR VALVES

INFINITE FLOW SOLUTIONS

Combining over 60 years of air valve experience, Infinite Flow Solutions is made up of individuals who have worked with the core of South Africa's top valve brands. These individuals have been at the forefront of air valve and valve technology for the last 20 years. Supplying and servicing the needs of international clients in over 100 countries worldwide, including customers in Africa, the USA, UK, Australia, Middle East, Europe and Far East.

Infinite Flow Solutions brings together the best in valve design, valve sizing, valve placement, surge experience, valve sales and customer satisfaction.

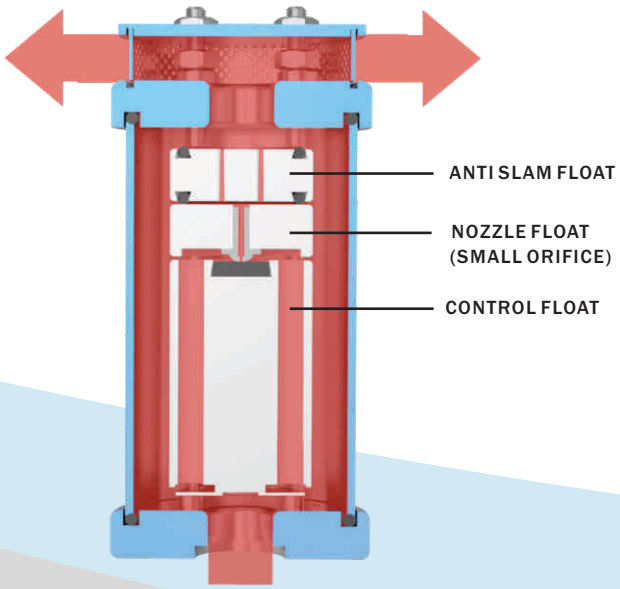
The individuals behind Infinite Flow Solutions have not only supplied valves, but have offered advice, analysis and problem solving to clients in thousands of applications worldwide.

Infinite Flow Solutions strives to carry forward and build on this history to offer reliable, affordable and dependable solutions to its clients.

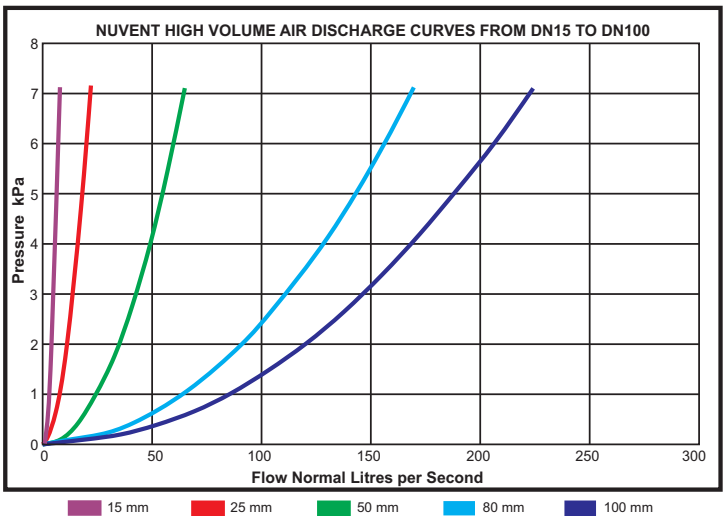
CONTENTS

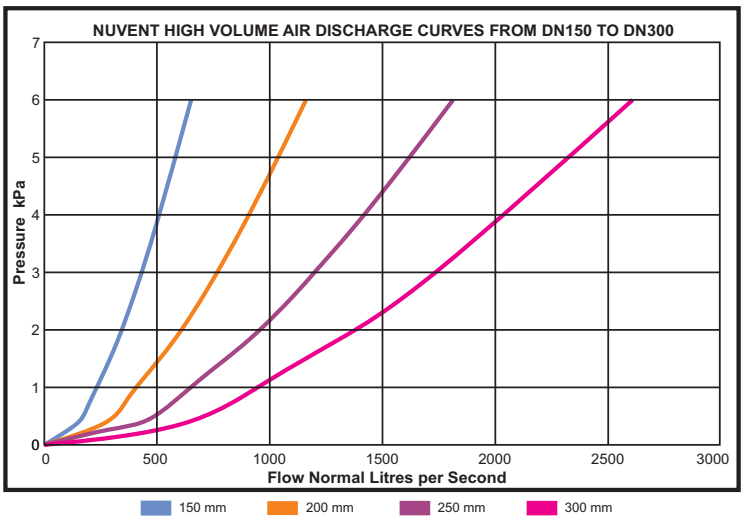
HIGH VOLUME AIR DISCHARGE

During filling of the pipeline, air passes through the air valve at the same flow rate as water in the pipeline, the floats remain in the open position allowing air to pass freely through the valve. When water enters the valve the floats are buoyed and the valve closes.



HIGH VOLUME AIR DISCHARGE CAPACITY



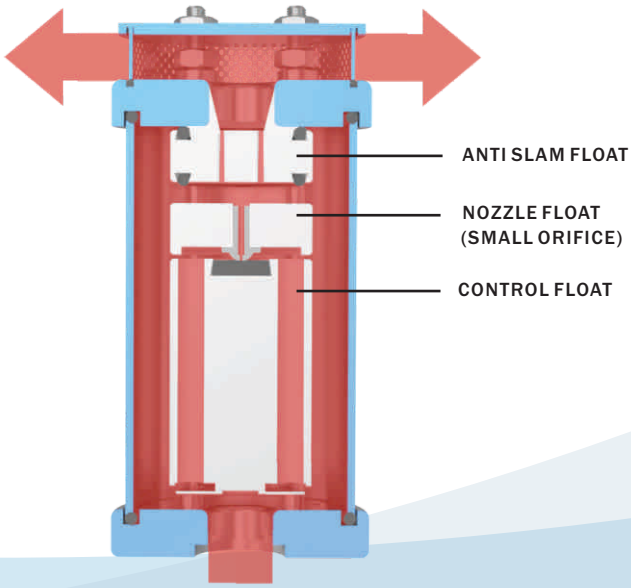


ANTI SLAM AIR DISCHARGE

During rapid filling, pump trip, rapid valve closure and other surge events. The valve will switch into anti slam mode. Switching from the larger orifice to a smaller anti slam orifice.

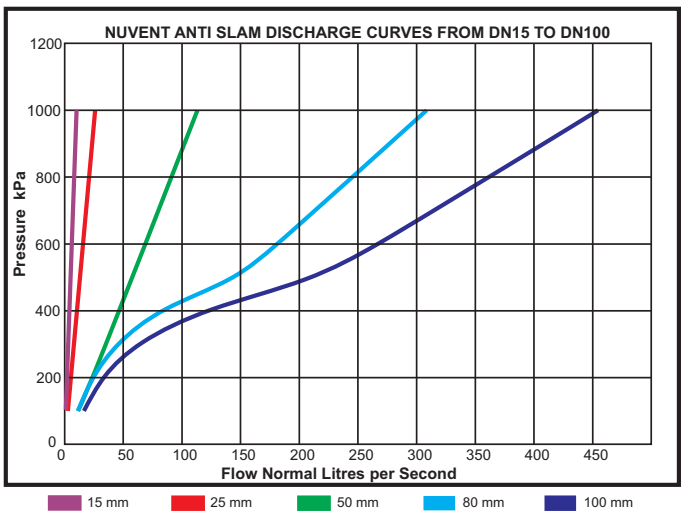
The smaller orifice will restrict the rate at which air can escape the pipeline and as a result, slow the flow rate of water through the pipeline.

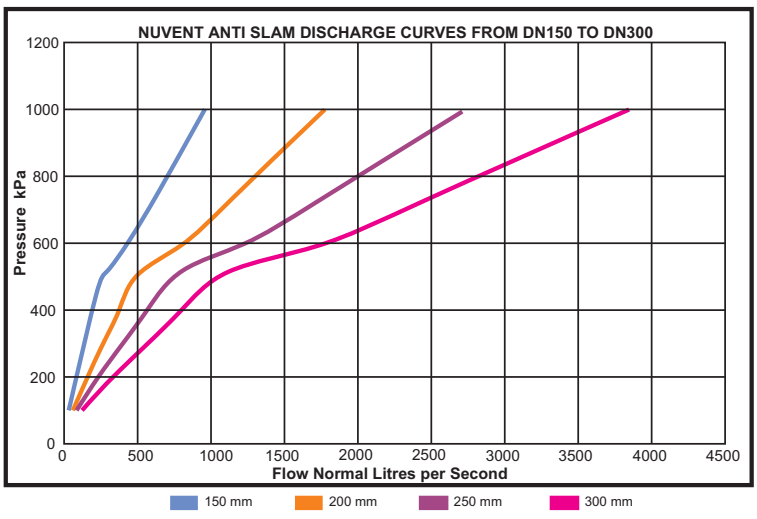
Air passes around the control float and nozzle float through the anti slam orifice to atmosphere.



ANTI SLAM AIR DISCHARGE CAPACITY

ANTI SLAM SWITCHING POINTS & INPUT DATA FOR SURGE PROGRAMS						
	15mm	**25mm**	**50mm**	**80mm**	**100mm**	**150mm**
Anti-Shock Orifice Size (mm)	2.5	4	9	14	17	25
Inlet Size (mm)	15	25	50	80	100	150
Outlet Size (mm)	15	25	50	80	100	150
Switching Pressure (kPa)	7.15	7.15	7.11	7.11	7.11	6
Switching Velocity (m/s)	44.81	44.81	33.1	33.7	33.7	36.95
Switching Flow (l/s)	7.92	22	65	169	265	653



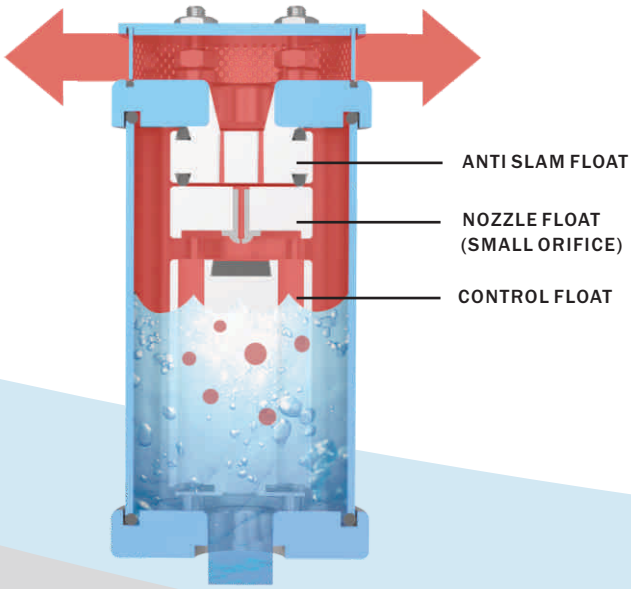


NUVENT

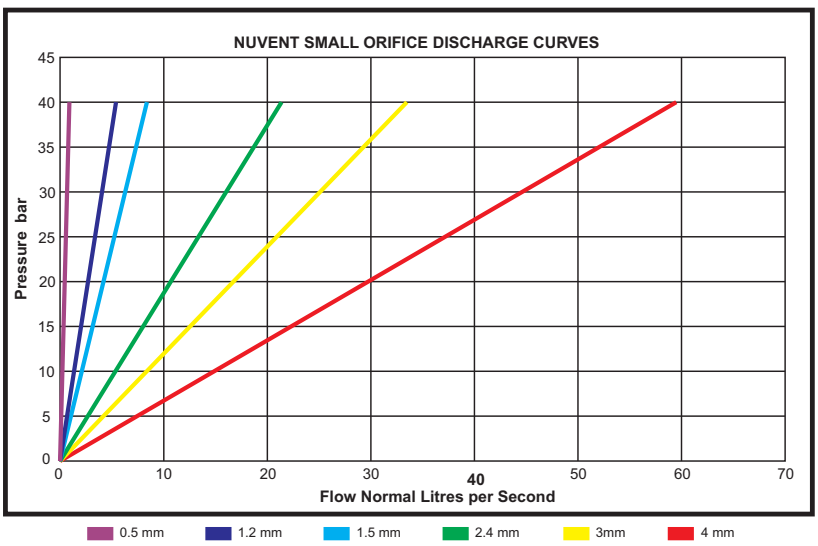
PRESSURISED AIR RELEASE

During normal operation, while the pipeline is fully charged, disentrained air will accumulate at many air valve locations.

When the quantity of air is sufficient to displace the control float, the float will drop away from the nozzle float and release the accumulated air. The control float will then buoy back into place and seal off the small orifice.



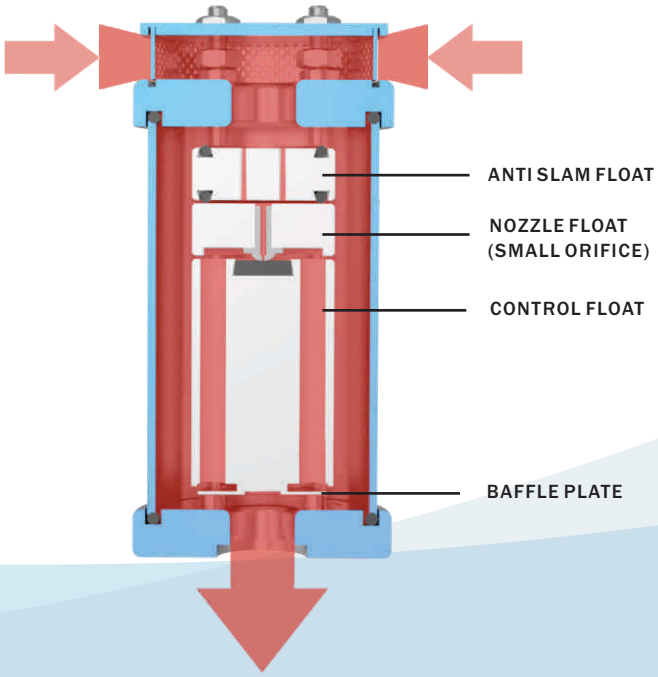
SMALL ORIFICE AIR DISCHARGE CAPACITY AND SIZES



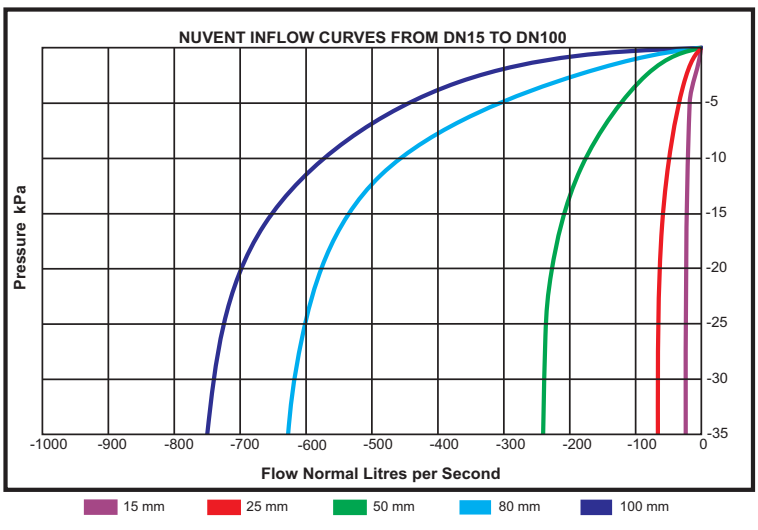
SMALL ORIFICE SIZES	
Valve Sizes	Small Orifice Size mm
15mm / ½"	0.5
25mm / 1"	1.2
50mm / 2"	1.2
80mm / 3"	1.5
100mm / 4"	1.5
150mm / 6"	2.4
200mm / 8"	2.4
250mm / 10"	3.0

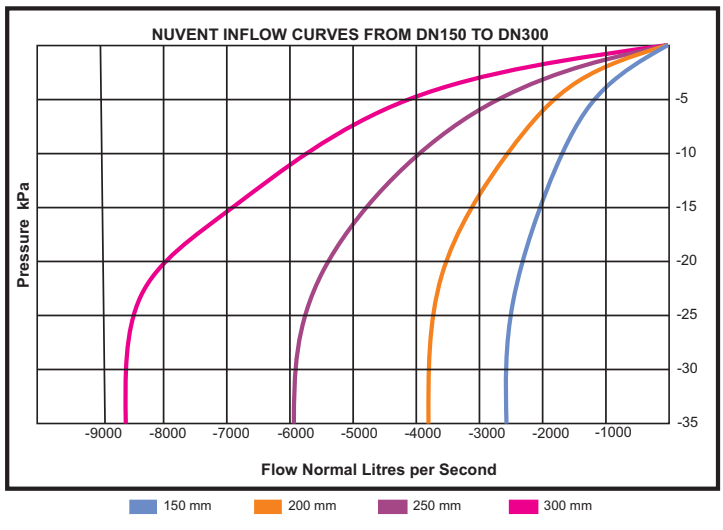
VACUUM BREAK

During draining, pump stoppage or pump trip, the floats will gravitate towards the baffle plate. Air will travel through the large orifice, past the floats and through the intake orifice into the pipeline.



VACUUM BREAK CAPACITY





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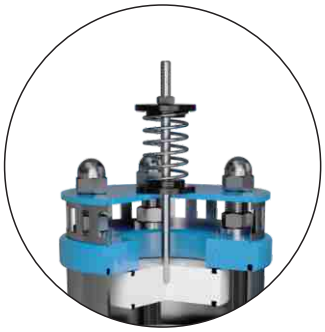
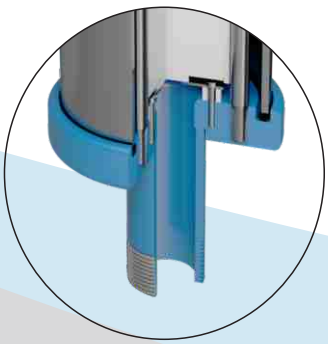
IWF SERIES
Potable water



Bias assembly
For pump station & high risk or previously identified surge areas



25mm / 1" & 50mm / 2"
Flanged option also available

Operating Pressures
0.5 - 16 bar / 7.2 - 232 psi
0.5 - 25 bar / 7.2 - 363 psi
0.5 - 40 bar / 7.2 - 580 psi
0.5 - 64 bar / 7.2 - 928 psi
0.5 - 100 bar / 7.2 - 1450 psi

Operating Temperatures
0 - 80°C / 32 - 176°F

End Connection
Screwed BSP / NPT
Flanged studded

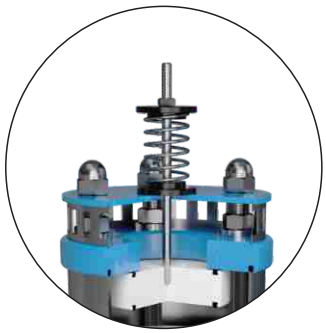
Double Acting with Anti Slam Orifice
(Triple acting / Three stage)

Size	Model no.	Pressure Rating	Overall Height	Overall Diameter	Weight
25mm / 1"	025 IWF 25	25 bar / 363 psi	286mm / 11.26"	100mm / 3.94"	4 kg / 9 lbs
	025 IWF 40	40 bar / 580 psi	336mm / 13.23"	100mm / 3.94"	5 kg / 10 lbs
50mm / 2"	050 IWF 25	25 bar / 363 psi	304mm / 11.97"	130mm / 5.12"	7 kg / 15 lbs
	050 IWF 40	40 bar / 580 psi	346mm / 13.62"	130mm / 5.12"	8 kg / 17 lbs
80mm / 3"	080 IWF 25	25 bar / 363 psi	288mm / 11.34"	200mm / 7.87"	15 kg / 33 lbs
	080 IWF 40	40 bar / 580 psi	322mm / 12.68"	200mm / 7.87"	18 kg / 39 lbs
100mm / 4"	100 IWF 16	16 bar / 232 psi	283mm / 11.14"	220mm / 8.60"	16 kg / 35 lbs
	100 IWF 25	25 bar / 363 psi	288mm / 11.36"	235mm / 9.25"	19 kg / 41 lbs
	100 IWF 40	40 bar / 580 psi	328mm / 12.93"	235mm / 9.25"	21 kg / 46 lbs
150mm / 6"	150 IWF 16	16 bar / 232 psi	438mm / 17.24"	285mm / 11.22"	40 kg / 89 lbs
	150 IWF 25	25 bar / 363 psi	449mm / 17.68"	300mm / 11.81"	46 kg / 102 lbs
	150 IWF 40	40 bar / 580 psi	484mm / 19.06"	300mm / 11.81"	61 kg / 135 lbs
200mm / 8"	200 IWF 16	16 bar / 232 psi	497mm / 19.57"	340mm / 13.39"	55 kg / 122 lbs
	200 IWF 25	25 bar / 363 psi	487mm / 19.17"	360mm / 14.17"	65 kg / 144 lbs
	200 IWF 40	40 bar / 580 psi	530mm / 20.87"	375mm / 14.76"	87 kg / 192 lbs

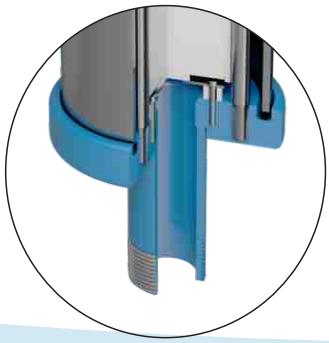
Larger sizes are available on request

ISF SERIES

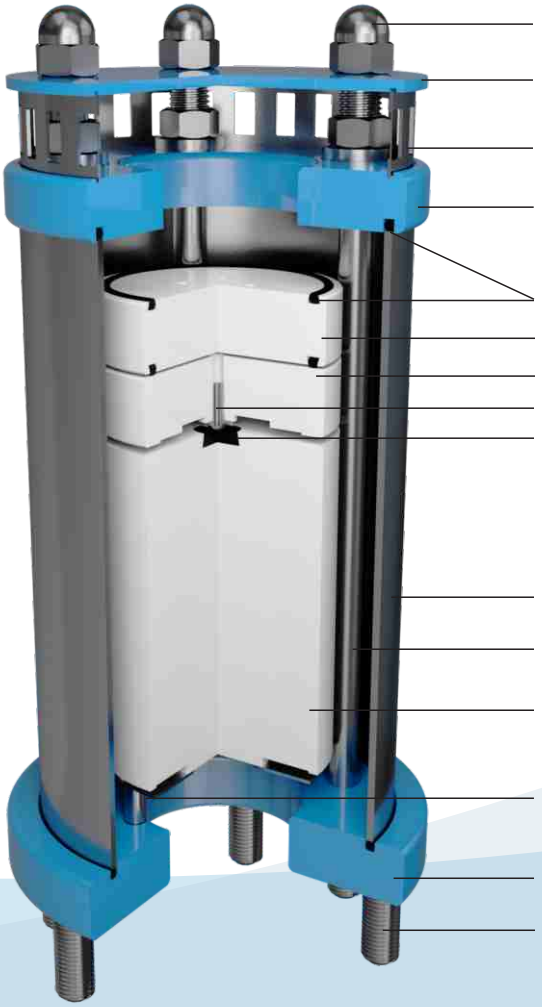
Grey water, treated sewage, stormwater, low pressure



Bias assembly
For pump station & high risk or previously identified surge areas



25mm / 1" & 50mm / 2"
Flanged option also available



Operating Pressures
0.2 - 16 bar / 2.9 - 232 psi
0.2 - 25 bar / 2.9 - 363 ps

Operating Temperatures
0 - 80 °C / 32 - 176 °F

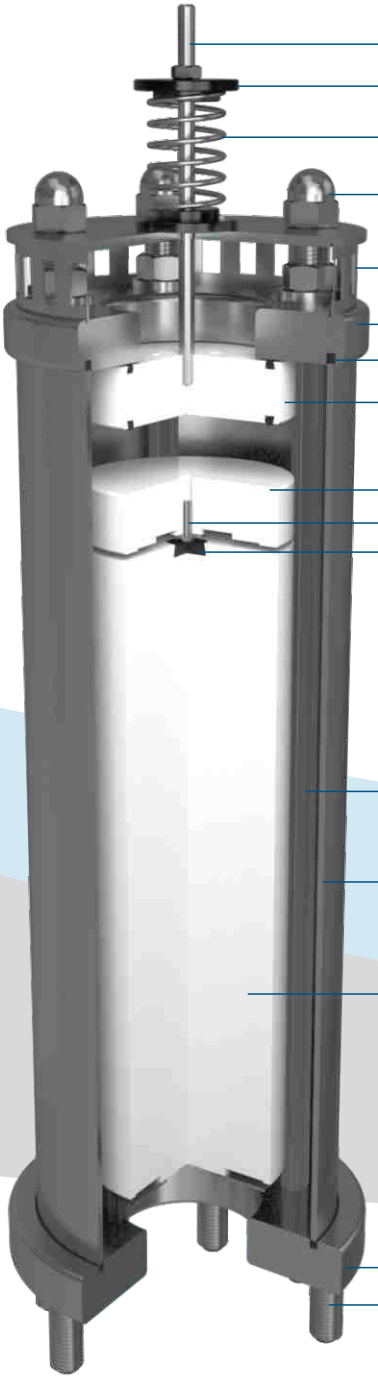
End Connection
Screwed NPT / BSP
Flanged studded

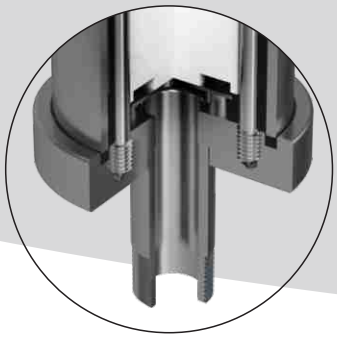
Double Acting with Anti Slam Orifice
(Triple acting / Three stage)

Size	Model no.	Pressure Rating	Overall Height	Overall Diameter	Weight
25mm / 1"	025 ISF 25	25 bar / 363 psi	386mm / 15.20"	100mm / 3.94"	5 kg / 11 lbs
50mm / 2"	050 ISF 25	25 bar / 363 psi	404mm / 15.91"	130mm / 5.12"	8 kg / 18 lbs
80mm / 3"	080 ISF 25	25 bar / 363 psi	388mm / 15.28"	200mm / 7.87"	18 kg / 39 lbs
100mm / 4"	100 ISF 16	16 bar / 232 psi	390mm / 15.35"	220mm / 8.66"	19 kg / 40 lbs
	100 ISF 25	25 bar / 363 psi	390mm / 15.35"	235mm / 9.25"	21 kg / 47 lbs
150mm / 6"	150 ISF 16	16 bar / 232 psi	638mm / 25.12"	285mm / 11.22"	50 kg / 110 lbs
	150 ISF 25	25 bar / 363 psi	638mm / 25.12"	300mm / 11.81"	56 kg / 123 lbs
200mm / 8"	200 ISF 16	16 bar / 232 psi	703mm / 27.68"	340mm / 13.39"	78 kg / 172 lbs
	200 ISF 25	25 bar / 363 psi	703mm / 27.68"	360mm / 14.17"	83 kg / 183 lbs

Larger sizes are available on request

ISFbl SERIES
Sewage, slurry





50mm / 2" threaded
Flanged option also available

Operating Pressures
0.2 - 16 bar / 2.9 - 232 psi

Operating Temperatures
0 - 80°C / 32 - 176°F

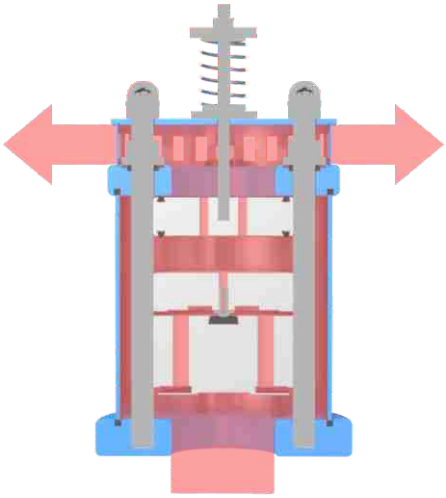
End Connection
Screwed BSP / NPT
Flanged studded

Double Acting with Anti Slam Orifice
(Triple acting / Three stage)

Size	Model no.	Pressure Rating	Overall Height	Overall Diameter	Weight
50mm / 2"	050 ISFbl 16	16 bar / 232 psi	631mm / 24.8"	130mm / 5.12"	11 kg / 24 lbs
80mm / 3"	080 ISFbl 16	16 bar / 232 psi	642mm / 25.3"	200mm / 7.87"	20 kg / 44 lbs
100mm / 4"	100 ISFbl 16	16 bar / 232 psi	637mm / 25.0"	220mm / 8.66"	22 kg / 49 lbs
150mm / 6"	150 ISFbl 16	16 bar / 232 psi	892mm / 35.1"	285mm / 11.22"	70 kg / 154 lbs
200mm / 8"	200 ISFbl 16	16 bar / 232 psi	941mm / 37.0"	340mm / 13.39"	85 kg / 187 lbs

Larger sizes are available on request

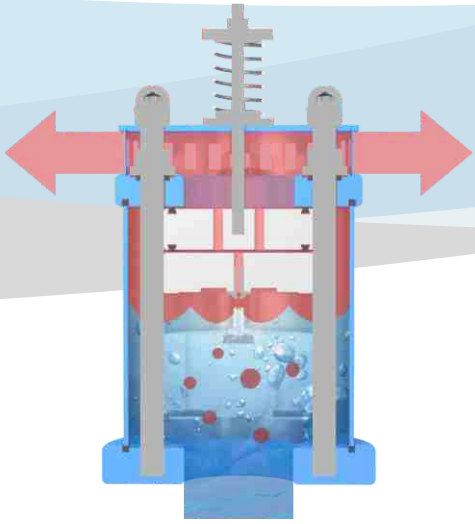
BIAS OPERATION



During normal filling, rapid filling, pump trip, rapid valve closure and other surge events. The valve is already in anti slam mode. All air is discharged in a controlled manner through the smaller anti slam orifice.

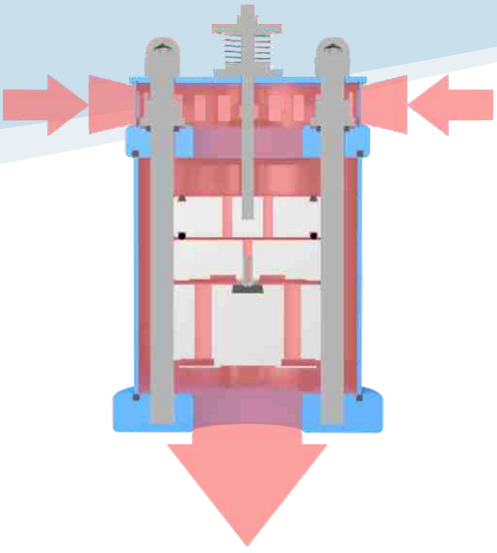
The smaller orifice will restrict the rate at which air can escape the pipeline controlling the flowrate of water through the pipeline. Eliminating the need to switch to anti slam in high risk areas.

Air passes around the control float and nozzle float through the anti slam orifice to atmosphere.



During normal operation, while the pipeline is fully charged, disentrained air will accumulate at many air valve locations.

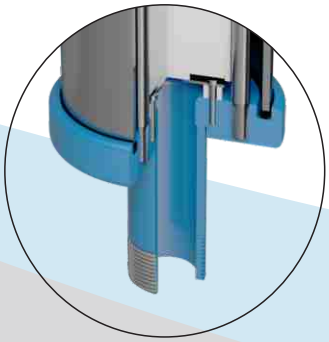
When the quantity of air is sufficient to displace the control float, the float will drop away from the nozzle float and release the accumulated air. The control float will then buoy back into place and seal off the small orifice.



During the draining, pump stoppage or pump trip, the spring will collapse as the control float and nozzle float will gravitate towards the baffle plate. Air will travel through the large orifice, past the floats and through the intake orifice into the pipeline. Once the negative differential in the pipe returns to atmosphere the spring will return to its original position.

IWFv SERIES

Potable water, grey water, treated sewage, stormwater, low pressure, sewage, slurry



25mm / 1" & 50mm / 2"
Flanged option also available

Operating Pressures
0.5 - 16 bar / 7.2 - 232 psi
0.5 - 25 bar / 7.2 - 363 psi
0.5 - 40 bar / 7.2 - 580 psi

Operating Temperatures
0 - 80°C / 32 - 176°F

End Connection
Screwed BSP / NPT
Flanged studded

Single Acting Vacuum Break Only

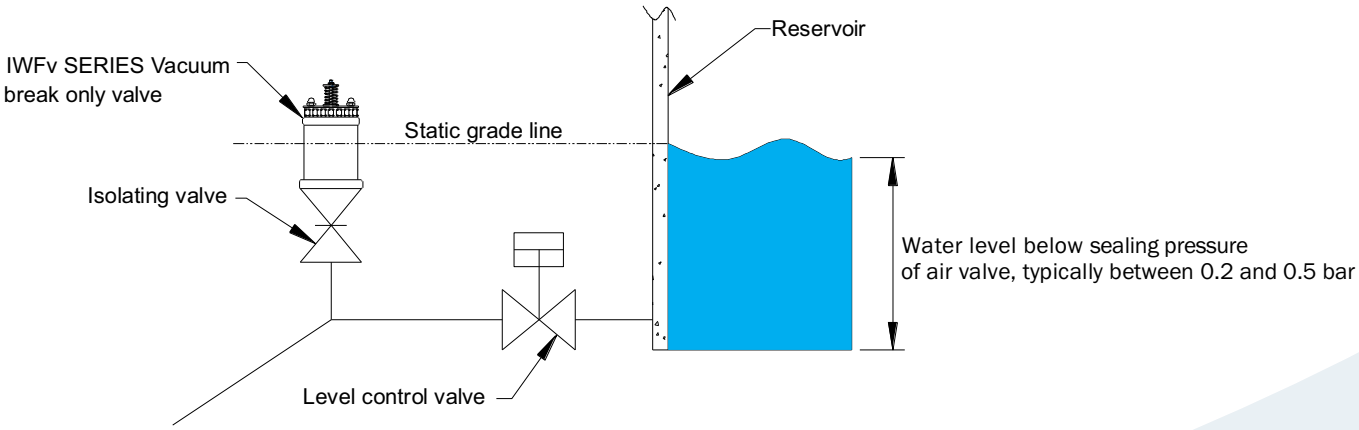
Size	Model no.	Pressure Rating	Overall Height	Overall Diameter	Weight
25mm / 1"	025 IWFv 25	25 bar / 363 psi	324mm / 12.74"	100mm / 3.94"	4 kg / 9 lbs
	025 IWFv 40	40 bar / 580 psi	324mm / 12.74"	100mm / 3.94"	5 kg / 10 lbs
50mm / 2"	050 IWFv 25	25 bar / 363 psi	331mm / 13.03"	130mm / 5.12"	7 kg / 15 lbs
	050 IWFv 40	40 bar / 580 psi	331mm / 13.03"	130mm / 5.12"	8 kg / 17 lbs
80mm / 3"	080 IWFv 25	25 bar / 363 psi	342mm / 13.46"	210mm / 8.27"	15 kg / 32 lbs
	080 IWFv 40	40 bar / 580 psi	342mm / 13.46"	210mm / 8.27"	18 kg / 39 lbs
100mm / 4"	100 IWFv 16	16 bar / 232 psi	342mm / 13.46"	229mm / 9.02"	16 kg / 35 lbs
	100 IWFv 25	25 bar / 363 psi	342mm / 13.46"	254mm / 10.00"	19 kg / 41 lbs
	100 IWFv 40	40 bar / 580 psi	342mm / 13.46"	254mm / 10.00"	23 kg / 51 lbs
150mm / 6"	150 IWFv 16	16 bar / 232 psi	504mm / 19.84"	285mm / 11.22"	40 kg/ 89 lbs
	150 IWFv 25	25 bar / 363 psi	504mm / 19.84"	318mm / 12.52"	46 kg / 102 lbs
	150 IWFv 40	40 bar / 580 psi	504mm / 19.84"	318mm / 12.52"	61 kg / 135 lbs
200mm / 8"	200 IWFv 16	16 bar / 232 psi	531mm / 20.91"	343mm / 13.50"	55 kg / 122 lbs
	200 IWFv 25	25 bar / 363 psi	531mm / 20.91"	381mm / 15.00"	65 kg / 144 lbs
	200 IWFv 40	40 bar / 580 psi	531mm / 20.91"	381mm / 15.00"	87 kg / 192 lbs

Larger sizes are available on request

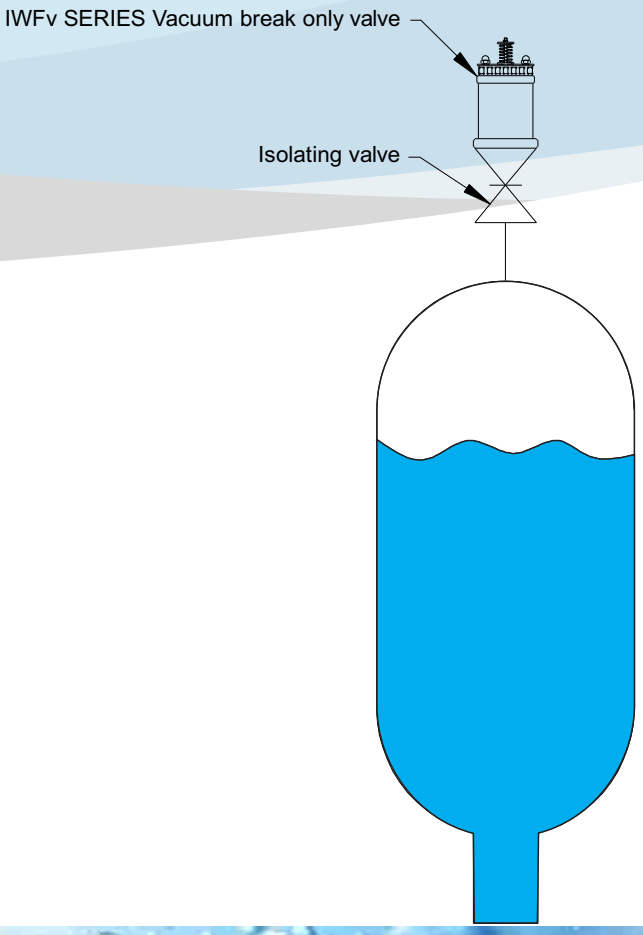
VACUUM BREAK ONLY OPERATION

Vacuum break only valves are used in specific applications and should only be considered when they meet the criteria for using them.

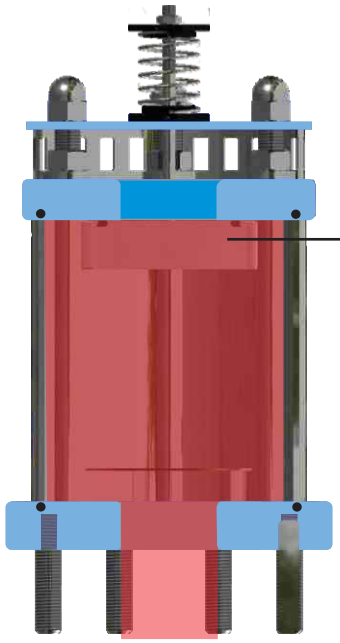
The first and most common place where these valves are used, is next to reservoirs. Here, the head from the reservoir is not sufficient to seal a standard air valve. Generally, there is a level control valve, check valve etc. that should prevent water from re-entering the pipeline from the reservoir, when the pipeline is being drained for maintenance, pump shut down or pipe burst. Any accumulated air at this point, will naturally be released through the reservoir as it will become the high point.



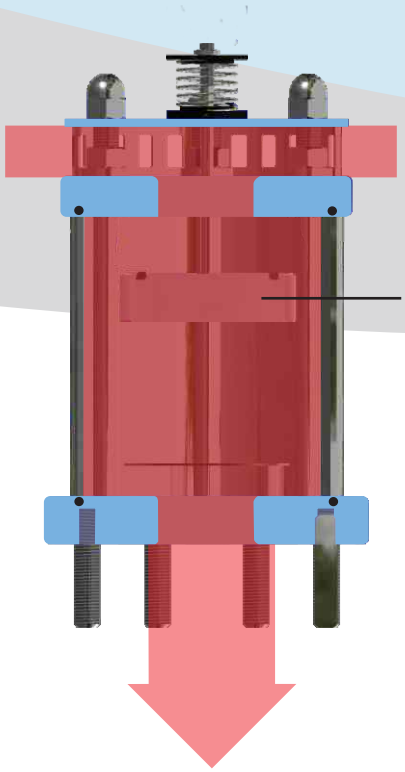
Another area where vacuum break only valves can be used, are in areas where vacuum break is required on tanks and accumulators, but where air release is not required. This is particularly useful where the medium contains either noxious smelling gases or the release of the medium vapour, may be harmful to people or the environment.



VACUUM BREAK ONLY OPERATION

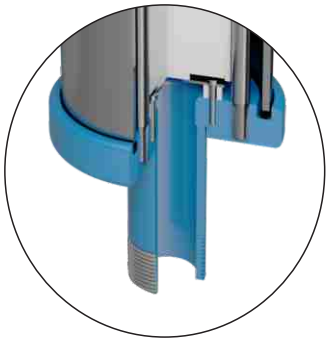


In normal operation, the IWFv SERIES is in the closed position. This prevents any air from being released from the pipeline. The valve will remain in the closed position, until such time as a negative differential pressure begins to form in the pipeline.

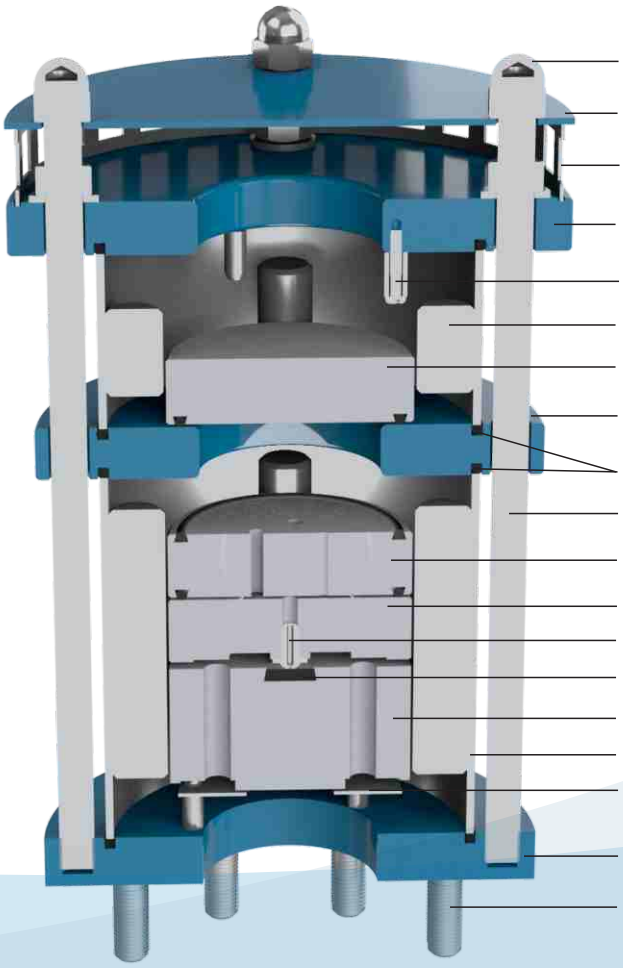


When a negative differential pressure forms in the pipeline, the greater atmospheric pressure causes the vacuum break float to open and air rushes into the pipeline, thereby preventing the formation of a negative cavity.

IWFa SERIES
Potable water



25mm / 1" & 50mm / 2"
Flanged option also available



Operating Pressures
0.5 - 16 bar / 7.2 - 232 psi
0.5 - 25 bar / 7.2 - 363 psi
0.5 - 40 bar / 7.2 - 580 psi

Operating Temperatures
0 - 80°C / 32 - 176°F

End Connection
Screwed BSP / NPT
Flanged studded

Air Out Only

Size	Model no.	Pressure Rating	Overall Height	Overall Diameter	Weight
25mm / 1"	025 IWFa 25	25 bar / 363 psi	275mm / 10.83"	140mm / 5.51"	14 kg / 31 lbs
50mm / 2"	050 IWFa 25	25 bar / 363 psi	305mm / 12.00"	177mm / 6.97"	16 kg / 36 lbs
80mm / 3"	080 IWFa 25	25 bar / 363 psi	380mm / 14.96"	245mm / 9.65"	22 kg / 49 lbs
100mm / 4"	100 IWFa 16	16 bar / 232 psi	395mm / 15.56"	245mm / 9.65"	32 kg / 70 lbs
	100 IWFa 25	25 bar / 363 psi	395mm / 15.56"	245mm / 9.65"	36 kg / 80 lbs
150mm / 6"	150 IWFa 16	16 bar / 232 psi	600mm / 23.62"	370mm / 14.57"	90 kg / 198 lbs
	150 IWFa 25	25 bar / 363 psi	600mm / 23.62"	370mm / 14.57"	100 kg / 220 lbs
200mm / 8"	200 IWFa 16	16 bar / 232 psi	695mm / 27.36"	420mm / 16.54"	113 kg / 249 lbs
	200 IWFa 25	25 bar / 363 psi	695mm / 27.36"	420mm / 16.54"	120 kg / 264 lbs

Larger sizes are available on request

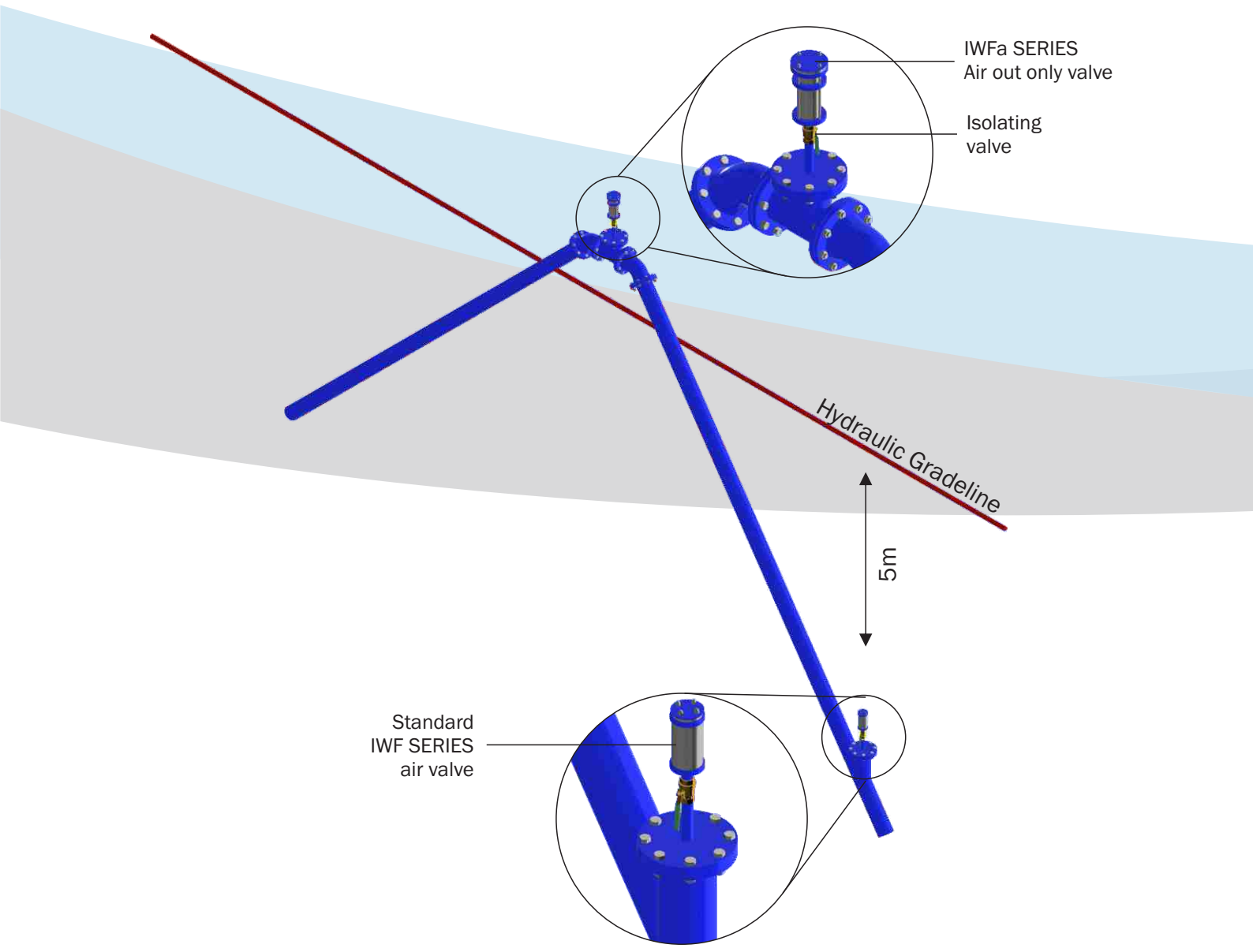
AIR OUT ONLY OPERATION

The IWFa SERIES air out only valve is a specialised valve that should only be used in specific applications or locations. By removing the vacuum break function from a standard air valve, problems will arise with the draining of pipelines and could cause your pipeline to collapse under vacuum conditions.

Air out only valves are used in siphon locations. These are locations where the medium is pumped to a point above the hydraulic grade line of the pipeline and thereafter gravity fed to the end of the pipeline, relying on a siphon to maintain flow.

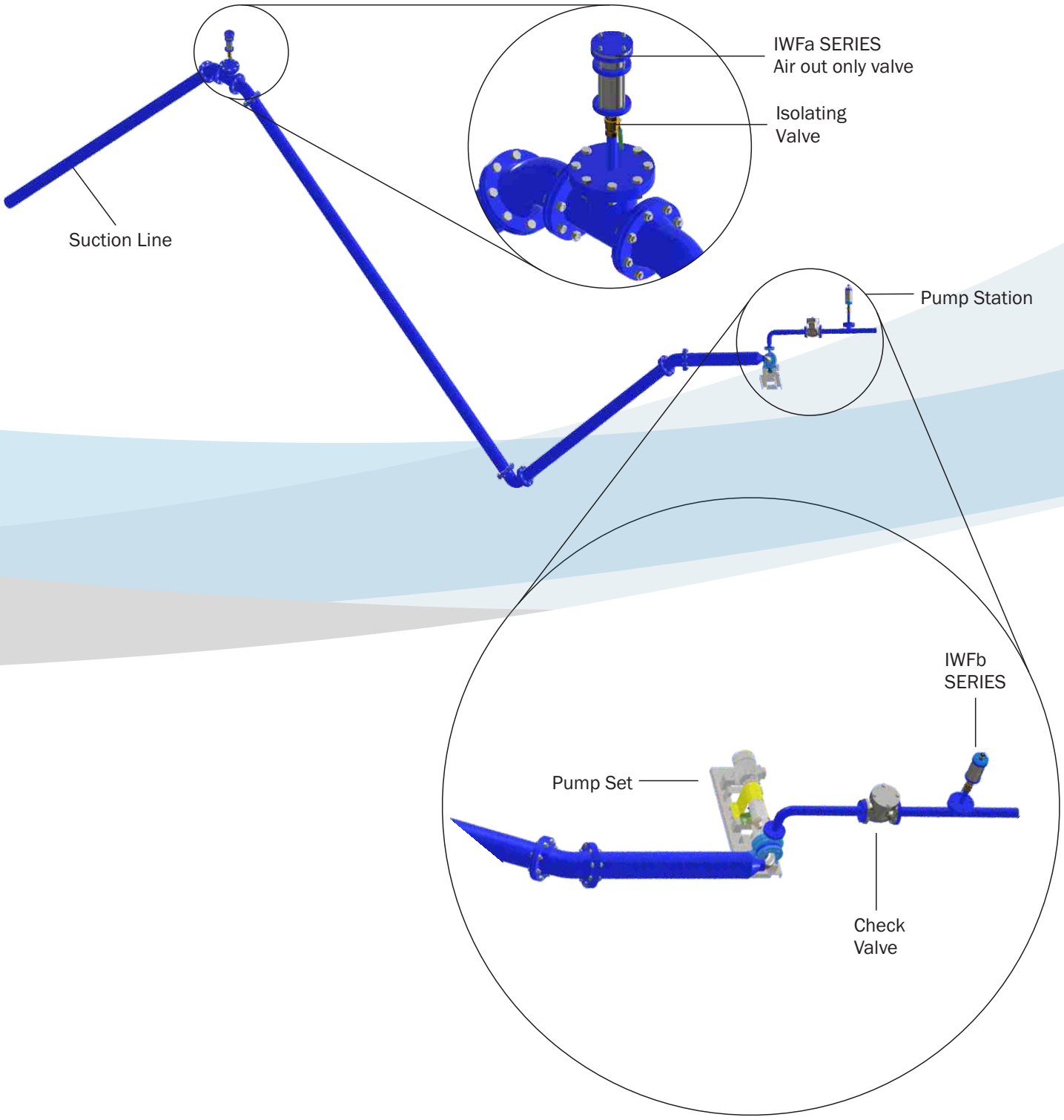
The IWFa SERIES air out only valve is placed at the point of the siphon, by preventing the inlet of air, the siphon is maintained. By allowing air to escape at this point is also beneficial to ensure that the siphon is maintained.

In many cases a normal triple acting valve such as the IWFa SERIES is placed 5m below the hydraulic intersection point. This allows for vacuum breaking to take place to assist with normal draining etc.

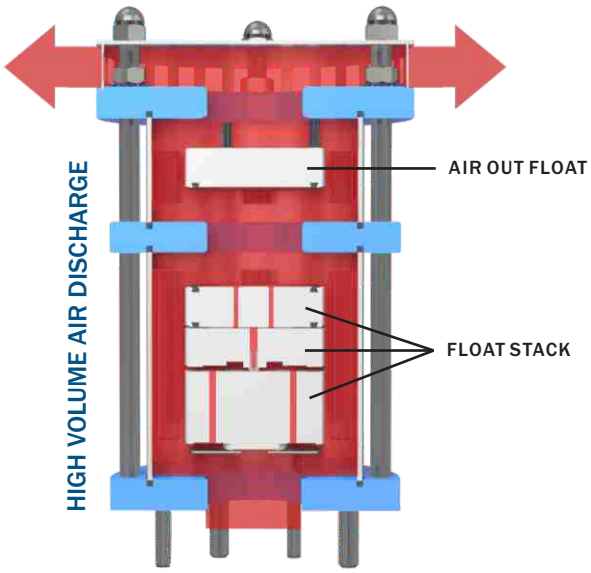


AIR OUT ONLY OPERATION

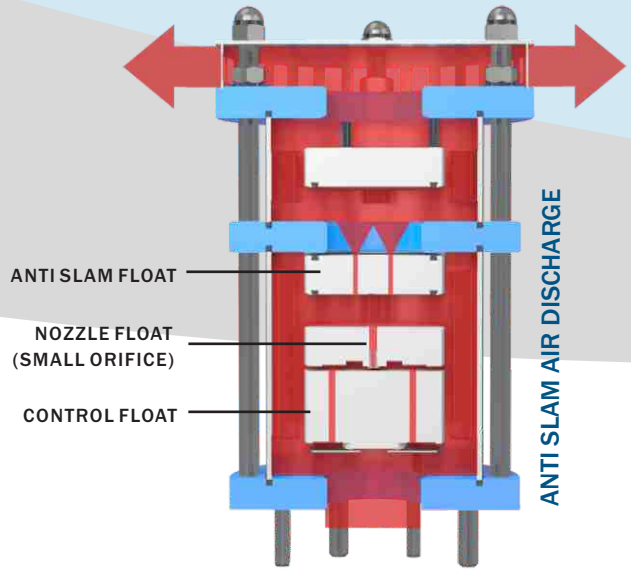
Another application where the IWFa SERIES air out only valve can be used, is on pump suction lines. This allows the valve to expel air and allow for efficient pump priming. The IWFa SERIES also minimises air been drawn through the pump and into the main line.



AIR OUT ONLY OPERATION



During filling of the pipeline, air passes through the air valve at the same flow rate as water in the pipeline. The air out float is lifted, while the float stack remains unaffected in the open position. This allows air to pass freely through the valve. When water enters the valve, the floats are buoyed and the valve closes.

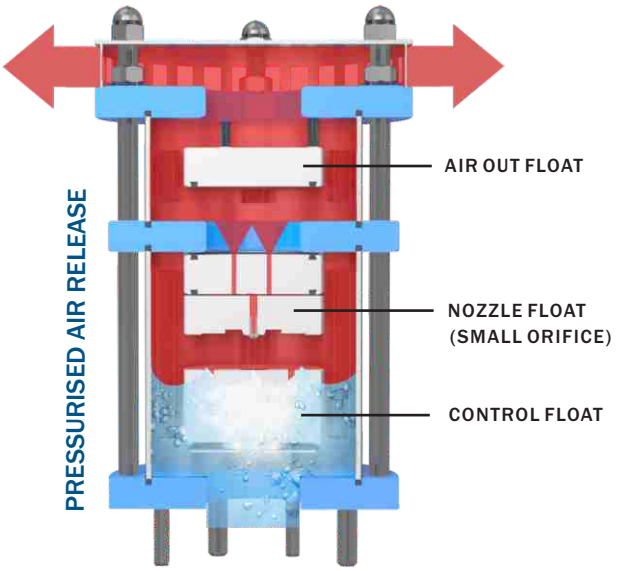


When rapid filling, pump trip, rapid valve closure or other surge events occur. The valve will switch into anti slam mode. Switching from the larger orifice to a smaller anti slam orifice.

The smaller orifice will restrict the rate at which air can escape the pipeline and as a result slow the flow rate of water through the pipeline.

Air passes around the control float and nozzle float through the anti slam orifices, lifting the air out float and releasing to atmosphere.

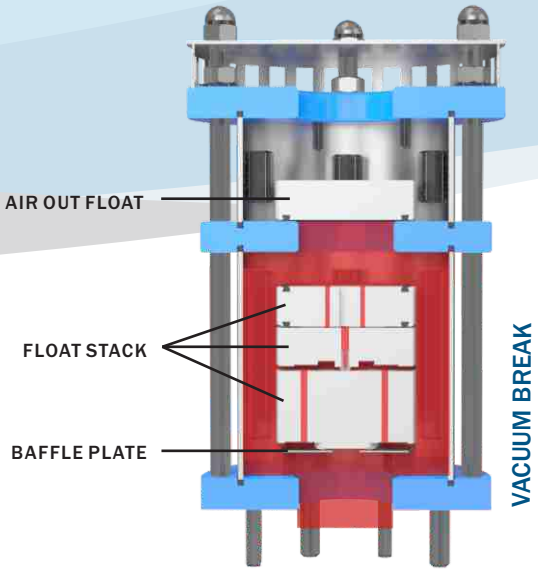
AIR OUT ONLY OPERATION



During normal operation, while the pipeline is fully charged, disentrained air will accumulate at many air valve locations.

When the quantity of air is sufficient to displace the control float, the float will drop away from the nozzle float and release the accumulated air. The control float will then buoy back into place and seal off the small orifice.

The air out float will flutter open to release the air without rising too much.



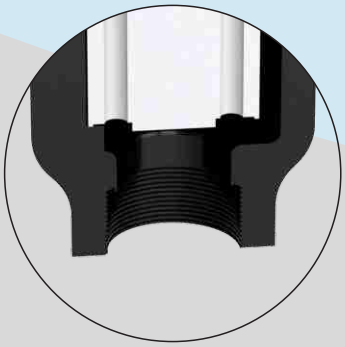
Should a negative differential pressure occur, the air out float will close preventing air from entering the pipeline.

The float stack will drop down and settle on the baffle plate and the valve will remain inactive until such time as air is needed to be released.

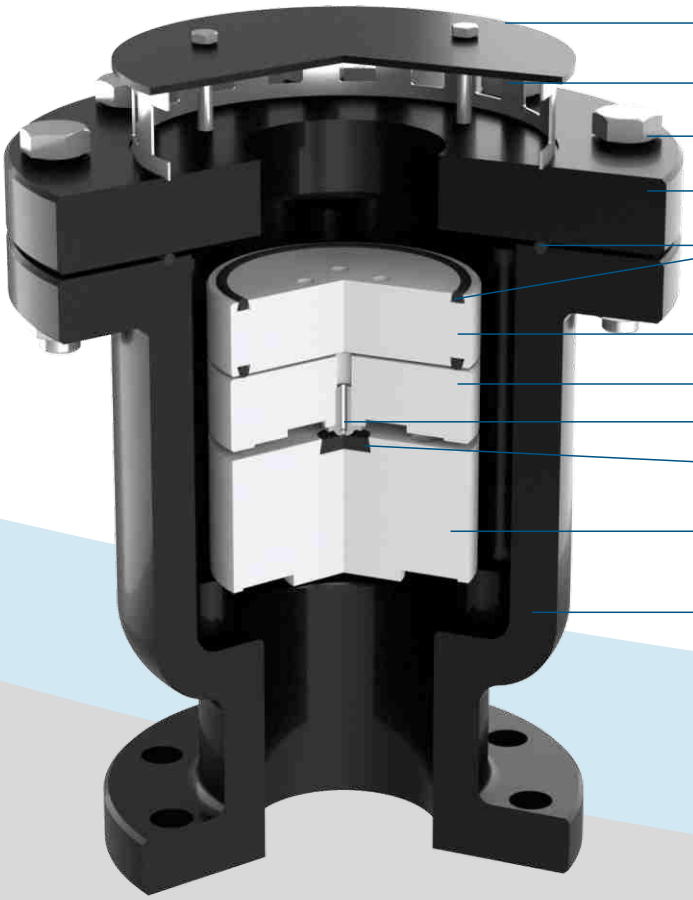
IWN SERIES

Anti-theft, potable water, brackish water

25mm / 1" & 50mm / 2"
90 Elbow discharge



25mm / 1" & 50mm / 2"
Female threaded



Operating Pressures
0.5 - 25 bar / 7.2 - 363 psi

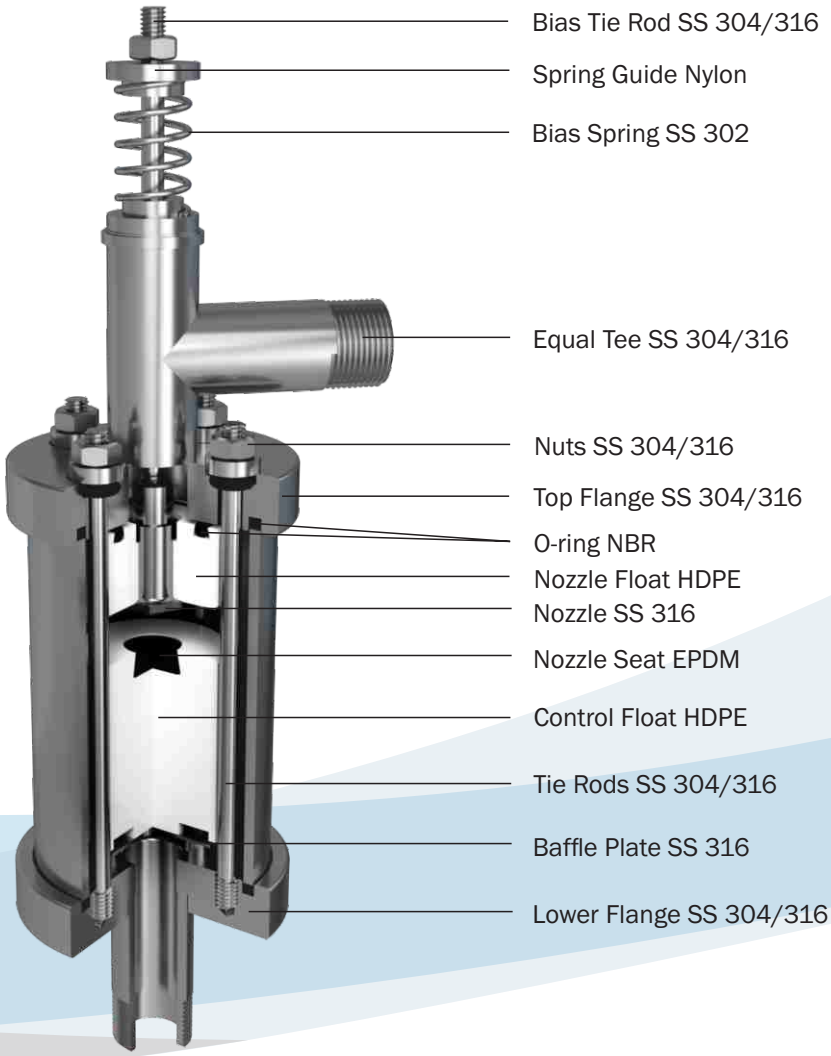
Operating Temperatures
0 - 80°C / 32 - 176°F

End Connection
Screwed BSP / NPT
Flanged

Double Acting with Anti Slam Orifice
(Triple acting / Three stage)

Size	Model no.	Pressure Rating	Overall Height	Overall Diameter	Weight
25mm / 1"	025 IWN 25	25 bar / 363 psi	241mm / 9.5"	140mm / 5.5"	2 kg / 5 lbs
50mm / 2"	050 IWN 25	25 bar / 363 psi	233mm / 9.2"	180mm / 7.1"	4 kg / 8 lbs
80mm / 3"	080 IWN 25	25 bar / 363 psi	330mm / 13"	265mm / 10"	8 kg / 18 lbs
100mm / 4"	100 IWN 25	25 bar / 363 psi	308mm / 12"	280mm / 11"	10 kg / 21 lbs

IBF SERIES
High Rise Buildings



Operating Pressures
0.5 - 10 bar / 7.2 - 145 psi

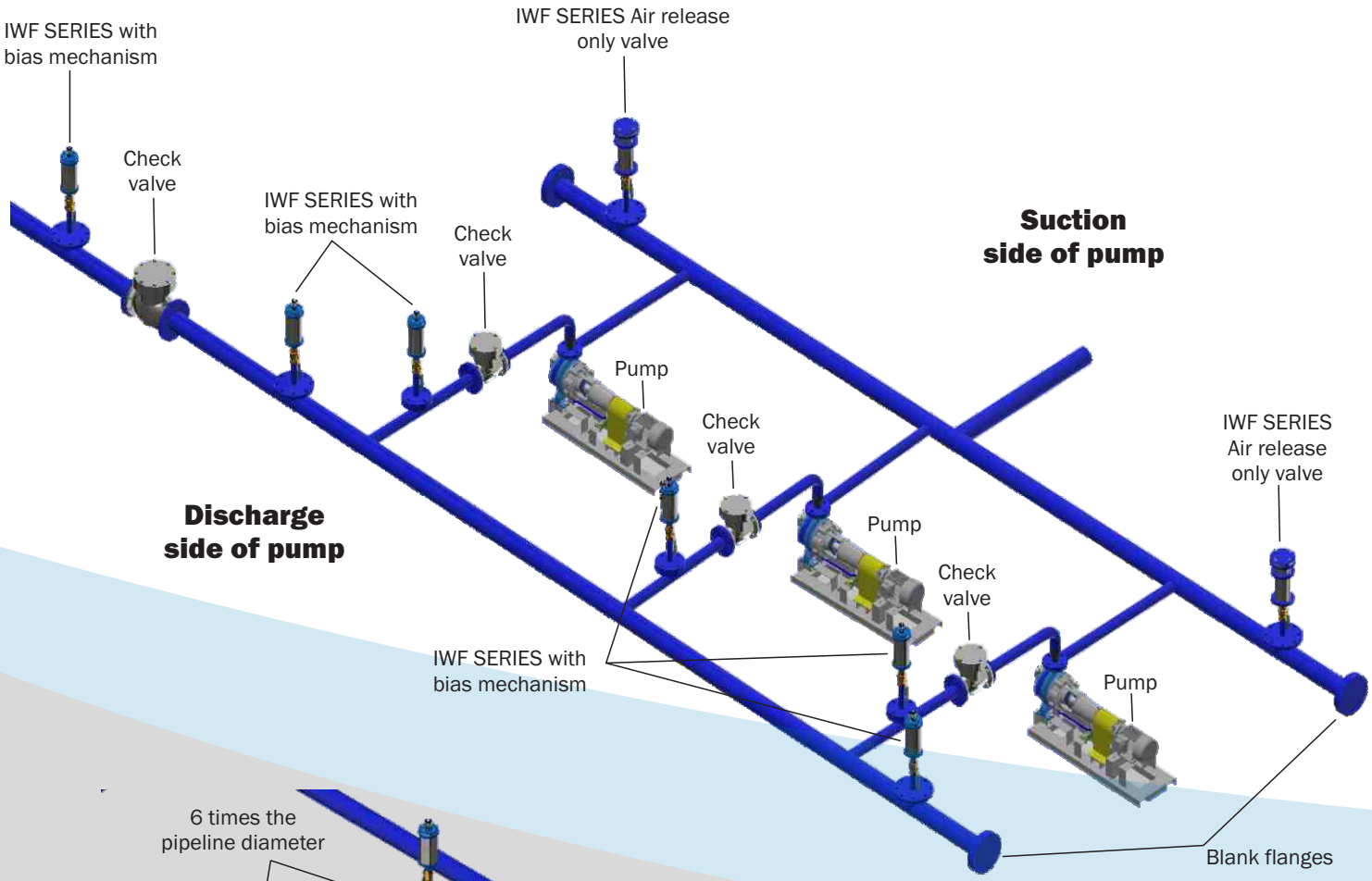
Operating Temperatures
0 - 80°C / 32 - 176°F

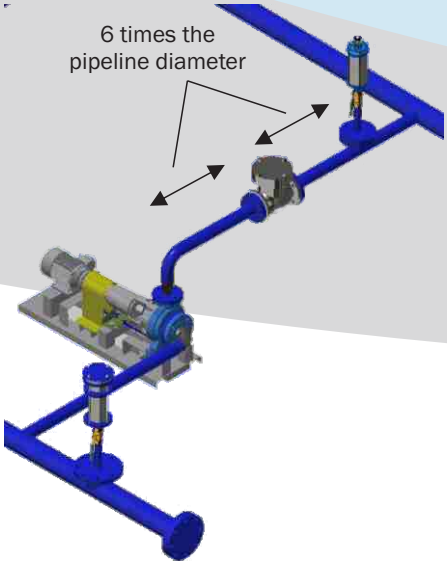
End Connection
Screwed BSP / NPT

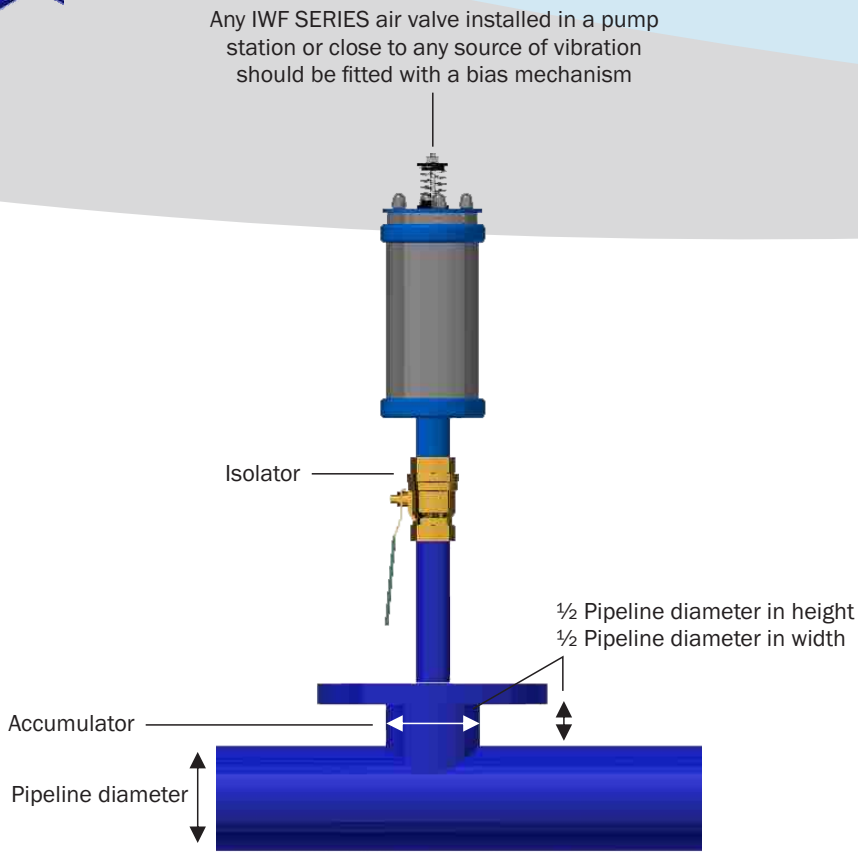
Double Acting

Size	Model no.	Pressure Rating	Overall Height	Overall Diameter	Weight
15mm / ½"	015 IBF 10	10 bar / 145 psi	253mm / 10"	65mm / 2.6"	1 kg / 2 lbs
25mm / 1"	025 IBF 10	10 bar / 145 psi	311mm / 12"	100mm / 3.9"	3 kg / 7 lbs

TYPICAL PUMP STATION LAYOUT







PUMP STATION AIR VALVES

Air valves in pump stations have two major functions, to release air and to break vacuum.

Due to the amount of turbulence that occurs in a pump station, air is released from solution. The purpose of the air valve is to release as much air as possible, thereby preventing the air from causing problems in the pipeline.

The same valves also provide vacuum break protection to the pipeline and components when the pumps are shut down, or under pump trip conditions.

The NUVENT anti slam valves offer an additional feature. By controlling the release of air through the anti slam floats, they reduce mass oscillation in short sections typically found in a pump station.

Pump Stations Call For Special Air Valves

On the suction side of the pumps, air valves are usually air out only valves. These valves allow the suction lines to run full by releasing the air out of the pipeline. However, they do not allow air back into the pipeline that can jeopardize the prime of the pump.

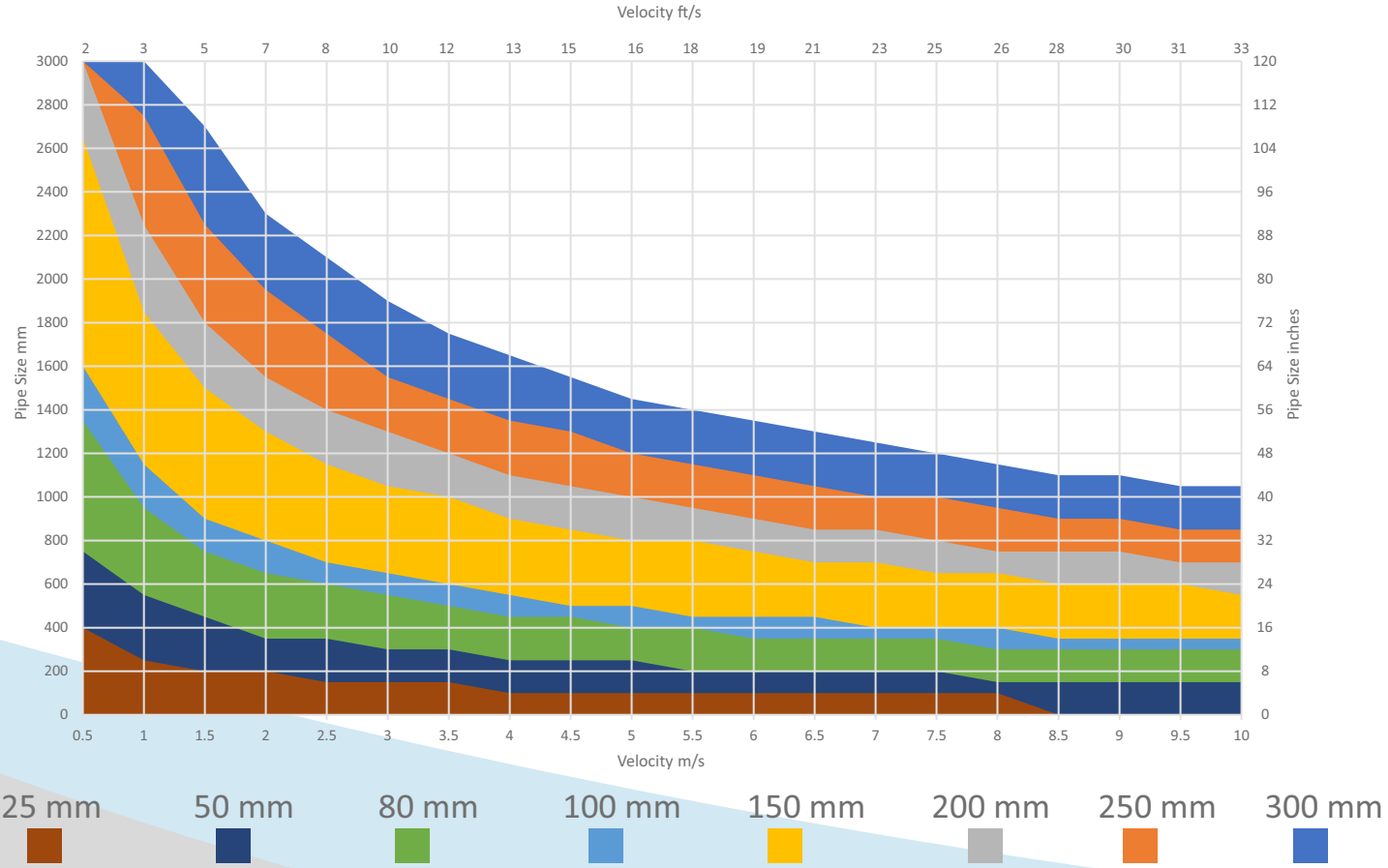
On the discharge side of the pump, we recommend the use of bias mechanisms added to our standard valve. The bias mechanism offers two distinct advantages.

- They offer instant control of air release though the anti slam orifice. This helps control surge as pumps are often the source of surge and water hammer.
- The bias mechanism helps the air valve cope with vibration, this limits the amount of leakage that is associated with air valves in pump stations.

Guidelines To Follow

- Air valves should be installed at least 6 times the pipeline diameter away from the pumps and check valves.
- In centrifugal pump stations, air valves are generally placed after check valves when installed.
- In Turbine and Submersible pump applications, air valves are placed before and after the check valve where possible. If only one option is possible, we recommend that this air valve be placed before the check valve.
- If there are blank flanges installed on the pipeline, an air valve should be installed close to these blank flanges.
- Where possible, air valves should be fitted with accumulators with dimensions of a minimum, half the pipeline diameter in height and half the pipeline diameter in width. In smaller systems, equal tees may be more cost effective.
- Often, air valves installed on risers and in areas with high vibration, may still exhibit leaking. In these cases, it is necessary to replace the existing small orifice nozzle with a blank nozzle. This removes the pressurized air release function from the air valve. Generally, if these cases are examined, we find that the velocity through the pipeline exceeds the scour velocity of air in the pipe. This means that the velocity in the pipeline, once full, is high enough to prevent air from being able to accumulate below the air valve.

VALVE SIZING



How To Use The Chart

Select pipe size and velocity, use either maximum flow velocity or calculate drainage velocity based on drainage or expected potential rupture. Where the pipe size and velocity intersect there will be a colour band, match the colour band to the valve size in the legend below. This will give you the valve size of a valve capable of drawing in sufficient air to match the drainage rate. All values are based on maintaining a minimum negative pressure of 0.35 bar in the pipeline pressure. It is not good practice to allow the negative pressure drop below 0.6 bar negative differential in the pipeline. Be aware when sizing that the upper part of the band is closer to the minimum negative differential of 0.35 bar and the lower part closer to 0.1 bar negative differential pressure. If you are quite close to the higher part of the band, one should then switch to the next size of valve to assure the safety of the pipeline.

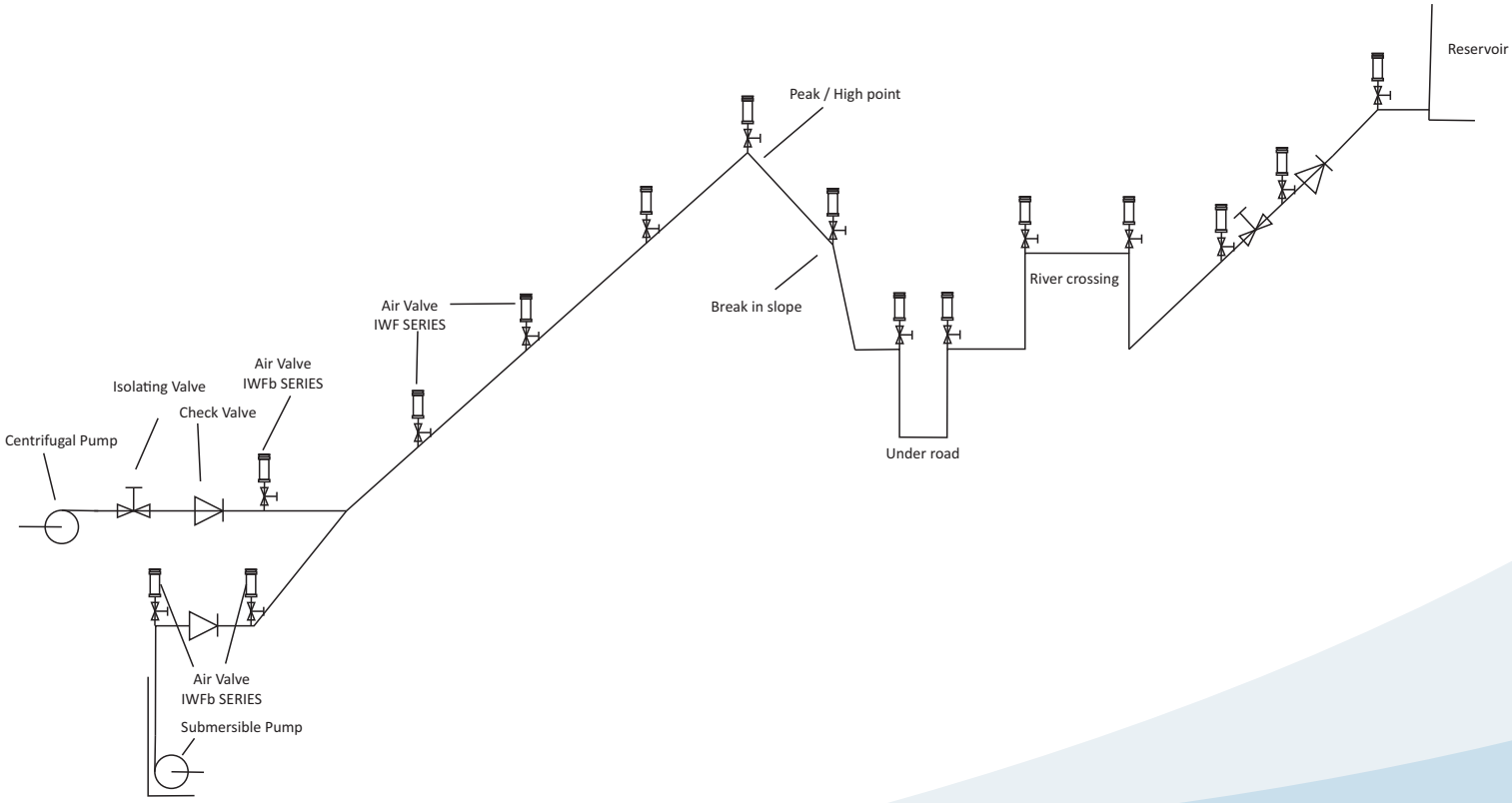
	Convert flow in litres per second into velocity in m/s						
Pipeline size in mm	3000	7069	14137	21206	28274	35343	42412
	2800	6158	12315	18473	24630	30788	36945
	2600	5309	10619	15928	21237	26546	31856
	2400	4524	9048	13572	18096	22619	27143
	2200	3801	7603	11404	15205	19007	22808
	2000	3142	6283	9425	12566	15708	18850
	1800	2545	5089	7634	10179	12723	15268
	1600	2011	4021	6032	8042	10053	12064
	1400	1539	3079	4618	6158	7697	9236
	1200	1131	2262	3393	4524	5655	6786
	1000	785	1571	2356	3142	3927	4712
	800	503	1005	1508	2011	2513	3016
	600	283	565	848	1131	1414	1696
	400	126	251	377	503	628	754
	200	31	63	94	126	157	188
	100	8	16	24	31	39	47
		1	2	3	4	5	6
		Pipeline velocity in m/s					

This table is to help you calculate your velocity, based on flow and pipe size. Select your pipe size in the left hand blue column. Run your finger to the right until you find the flow rate closest to your pipelines maximum demand rate. Drop your finger to the bottom blue column and it will give you your flow velocity in meters per second(m/s). Should your pipe size not be available you can calculate your velocity using this calculation:

$$V = \frac{Q}{A}$$

Where
V= Velocity m/s
Q=flow in m^3/s
A= Area in m^2

SIZING AND POSITIONING



Peaks/High Points

The most important areas to place air valves are high points or peaks along the pipeline. Air will always rise to these points when filling and when the pipeline is operating. Water will also always drain from the peaks first when draining or in the event of a burst.

Breaks in Slope

A break in slope is defined as any point where, under gravity, water will drain away from a point faster than it reaches that point causing column separation. These points can also be a point of turbulence where air can be released from solution.

Long Ascending and Descending Sections

Air valves on long ascending and descending sections should be placed every 600m.

Other Places Where Air Valves Should Be Considered

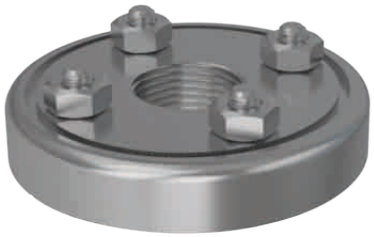
In Pump Stations

Centrifugal pumps after check valves, preferably six times the pipeline diameter away from the check valve. Turbine and submersible pumps, before and after the check valve. If only one is possible, then before the check valve in these instances. All air valves in pump stations should be of the bias type of air valves.

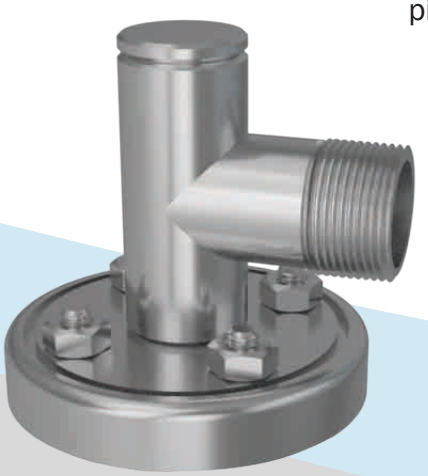
Isolation and Check Valves

Air valves should be placed with any isolation or inline check valve that will as a result of closure have water running away from the valve. The air valve should be placed on the side of the valve that water will drain from. In the case of isolation valves or check valves placed on peaks an air valve should be placed either side of the valve.

OUTLET CONNECTIONS

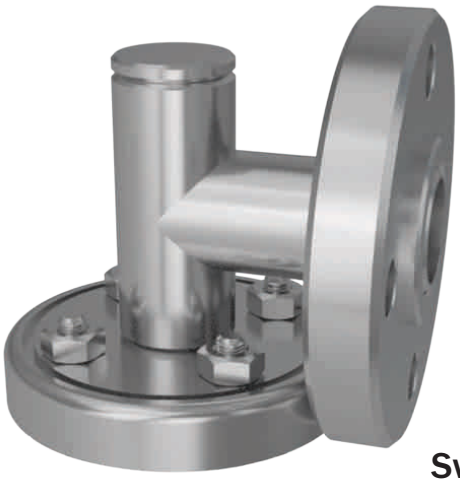


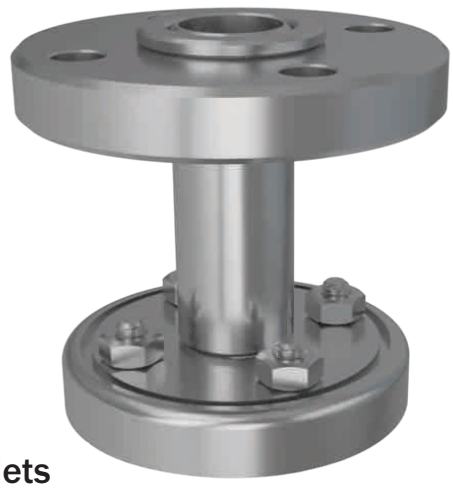
Screwed Outlet
The valve outlet is tapped to either BSP or NPT to allow connection to piping off systems.



Screwed T Outlet
The valve outlet is tapped to either BSP or NPT to allow connection to piping off systems. This type of connection can be used with controlled air release configuration.

Gooseneck Outlet
The valve outlet is fitted with a gooseneck. This is often requested in desert applications.





Swivel Outlets
Can be supplied in two formats, T outlet and straight outlet to connect to desired flanged piping.

TEST PROCEDURES

Every air valve is subjected to testing before departing the factory. Testing procedures are in accordance with, or exceed the procedures laid out in AWWA C-512-15.

Low Head Leak Test

The valve is attached to the test rig, water from an elevated tank flows under gravity into the valve buoying the floats, the floats seal once a pressure of 0.5 bar is achieved. Any excess water that has gathered during the priming of the valve is then cleared off the valve and the valve is inspected for leakages. Any sign of leakage at this point is a failure of the low head leak test.

Hydrostatic Testing

Once the valve is determined to have passed the low head leak test, it remains connected to the test rig and the pump is activated, the valve is then subjected to a pressure of 1.5 times the rated operating pressure (i.e. if the valve is rated at 25 bar it will be tested to 37.5 bar). Once this pressure is achieved, the valve will then be held at this pressure and be inspected for any leaking or weeping. Any evidence of leakage or weeping at the said test pressure will be cause for failure.

Additional Testing

Drop Testing

Drop testing is the test conducted to ensure that the valve will open and release disentrained air, when the valve is operating at the full rated pressure of the valve, (see pressurised air release page 3 for more information). Drop testing is governed by specific physical laws and is extensively tested during the development of the valve, to make sure the valve conforms to these necessary laws. Thereafter it is not necessary to test every valve or even every 10th valve in a run. Once the specific masses and orifice sizes are correct, the normal QC process of checking the components to the correct dimensions, ensures that the valve will breathe up to the rated pressure of the valve. As a result, this test is only performed on request or as part of a third-party test that specifically states a requirement for a drop test.

The valve is placed on the test rig and pressurised to slightly above the rated pressure of the valve. Nitrogen is then introduced into the valve at a pressure higher than the rated pressure. The valve is then slowly drained of liquid, if the valve releases air before or at the rated pressure of the valve, the valve is deemed to have passed the drop test. If air is released below the rated pressure of the valve, or does not release air at all it is deemed to have failed the test.

Failure of Testing

Any valve that fails any of the above tests, is marked and later inspected for the cause of failure. The issue is rectified and the valve is retested. No valve will be allowed to leave the factory until such time as it has successfully passed all the required testing procedures.

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