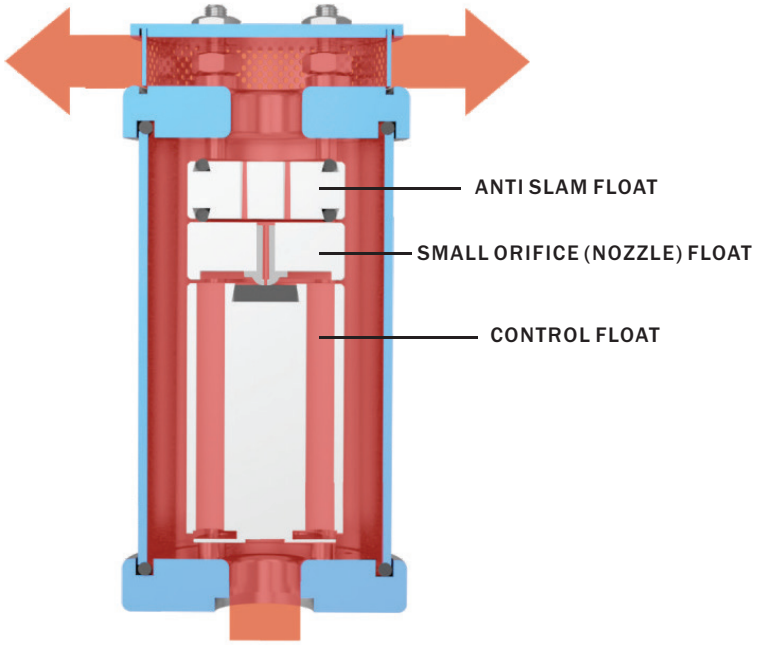
CLA-VAL 39 Series Air Valves

Cla-Val Automatic Control Valves

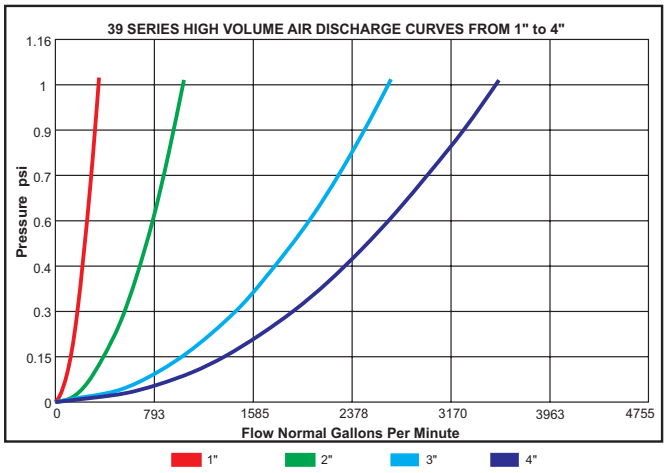
Table of Contents

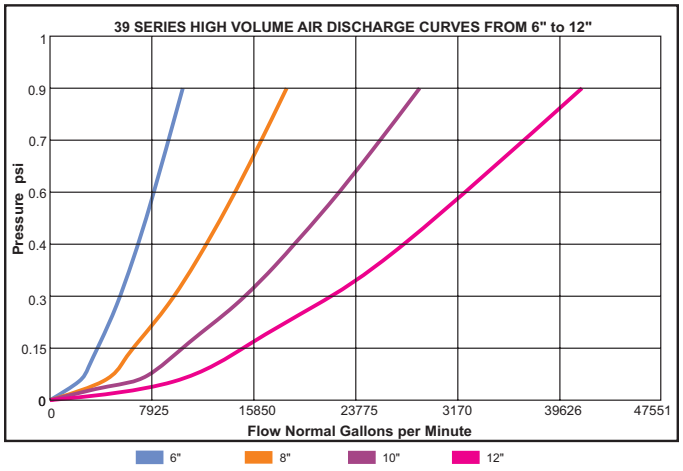
High Volume Air Discharge

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



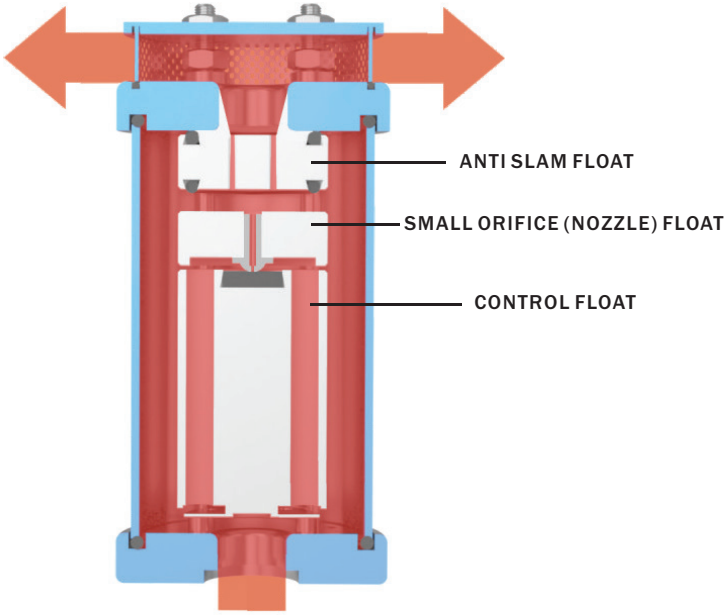


Anti Slam Air Discharge

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.

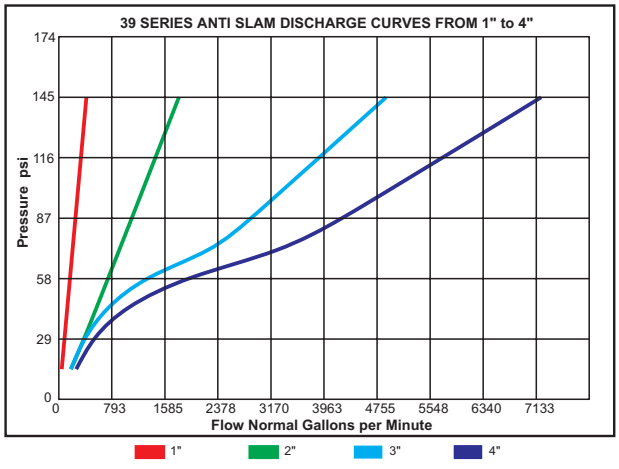
The smaller orifice will restrict the rate at which air can escape the pipeline and as a result show the flowrate of water through the pipeline.

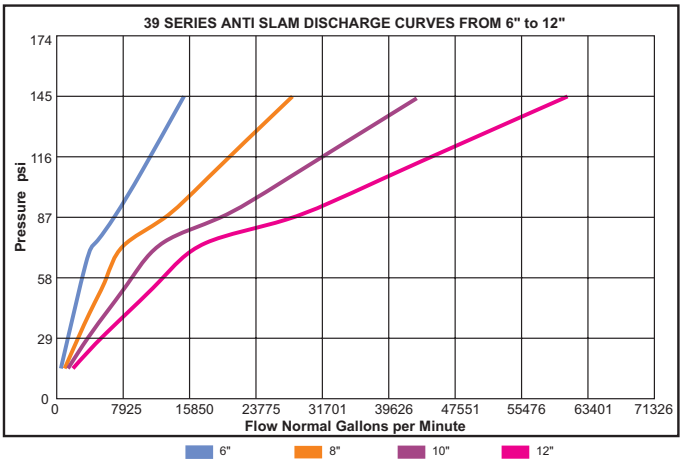
Air passes around the lower float and small orifice float through the anti slam orifice to atmosphere.



Anti Slam Air Discharge Capacity

ANTI SLAM SWITCHING POINTS & INPUT DATA FOR SURGE PROGRAMS								
	1"	2"	3"	4"	6"	8"	10"	12"
Anti-Shock Orifice Size (inches)	0.16	0.35	0.55	0.67	1	1.34	1.65	2
Inlet Size (inches)	1	2	3	4	6	8	10	12
Outlet Size (inches)	1	2	3	4	6	8	10	12
Switching Pressure (psi)	1.04	1.03	1.03	1.03	0.87	0.87	0.87	0.87
Switching Velocity (ft/s)	147	109	111	111	121	121	121	121
Switching Flow (gpm)	349	1030	2679	4200	10350	18386	28737	41401

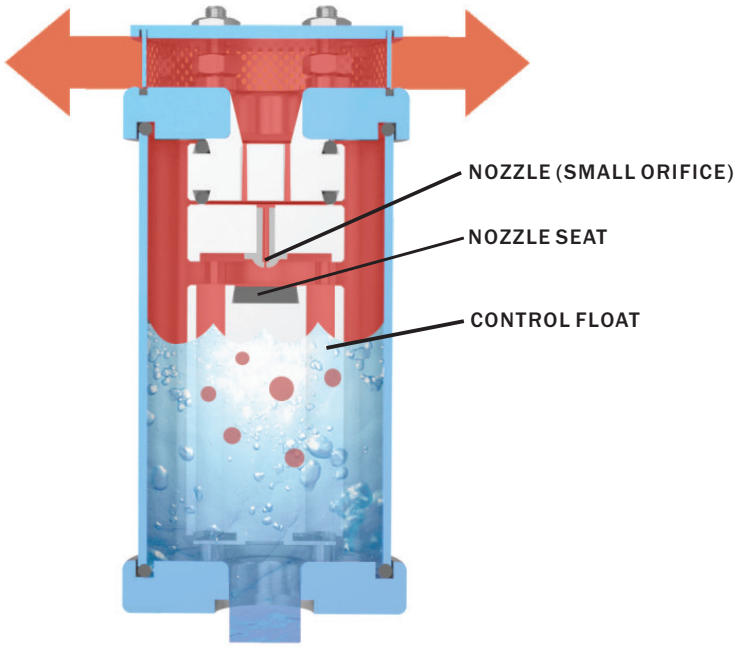




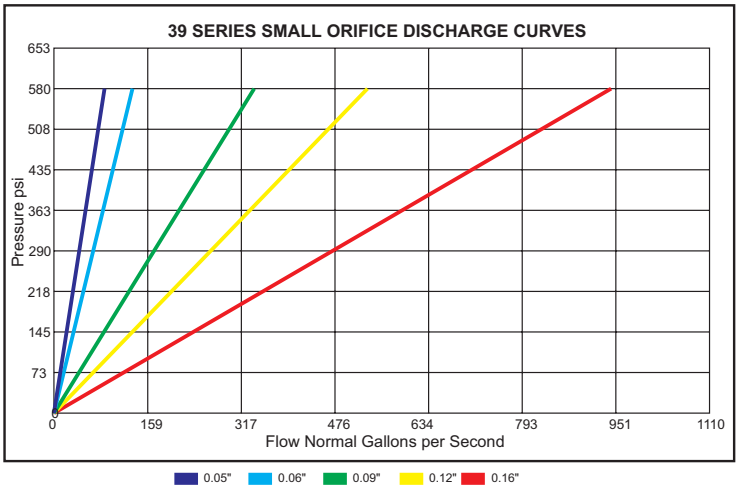
Pressurized Air Release

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 small orifice (nozzle) and release the accumulated air. The control float will then buoy back into place and seal off the small orifice.



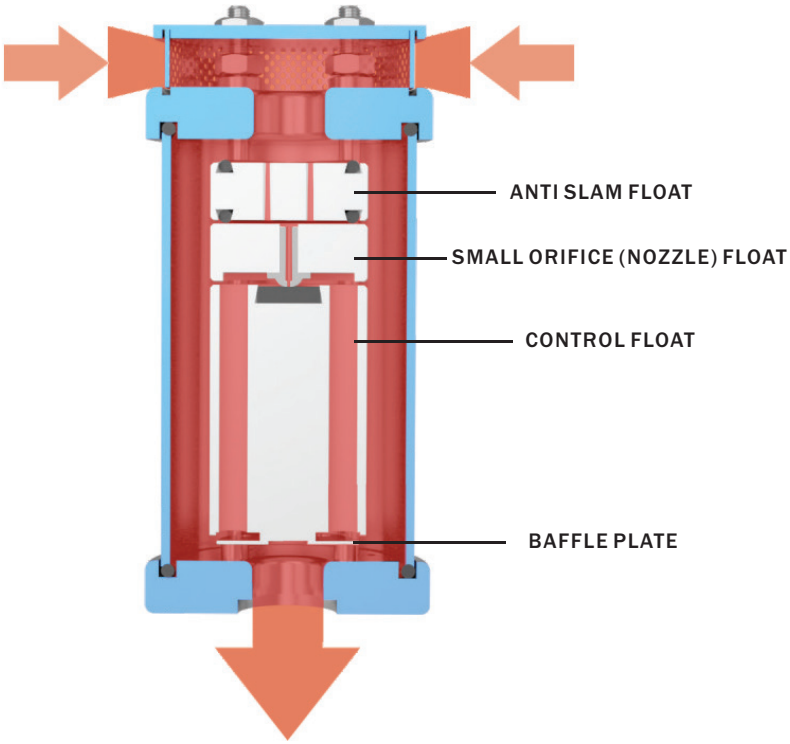
Small Orifice Air Discharge Capacity and Sizes



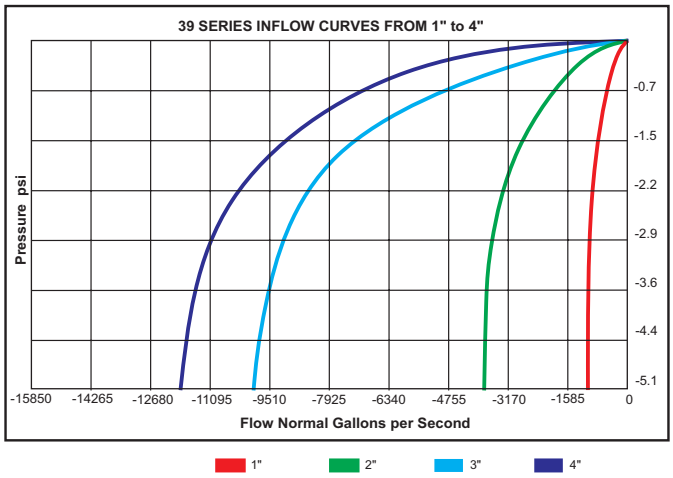
SMALL ORIFICE SIZES	
Valve Series	Small Orifice Size Inches
1 "	0.05
2"	0.05
3"	0.06
4"	0.06
6"	0.09
8"	0.09
10"	0.12
12"	0.16

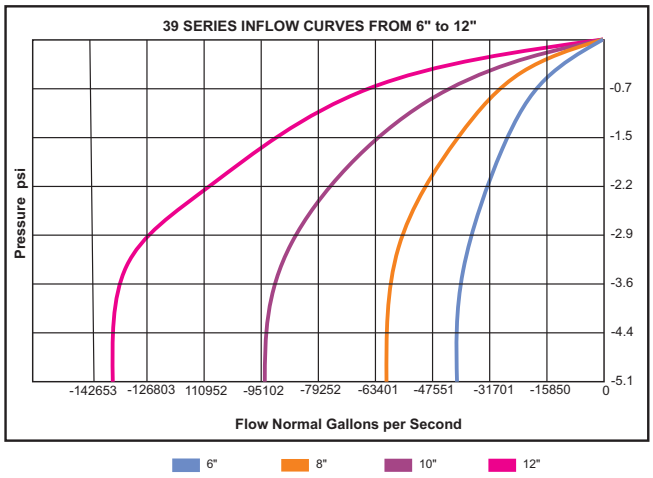
Vacuum Break

During the 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.

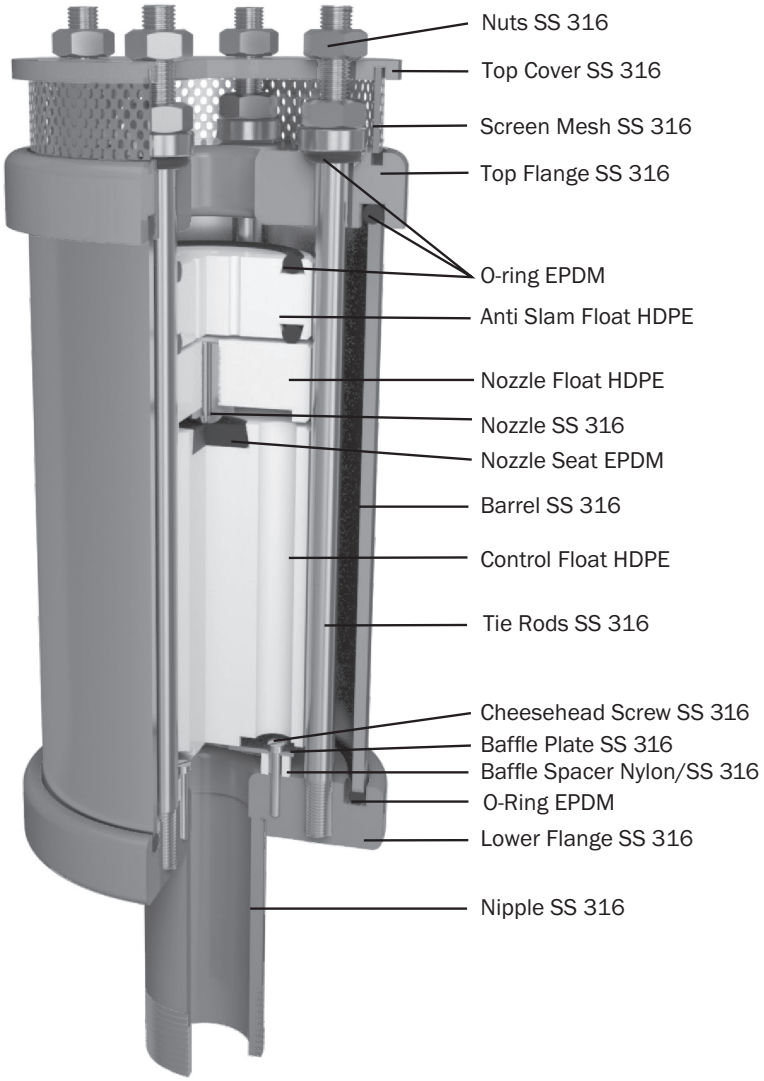


Vacuum Break Capacity





Model 39A 1" & 2" Threaded



Operating Pressures

2.9 - 363 psi
2.9 - 580 psi
2.9 - 928 psi
2.9 - 1450 psi

Operating Temperatures

32 - 176°F

End Connection

Screwed NPT

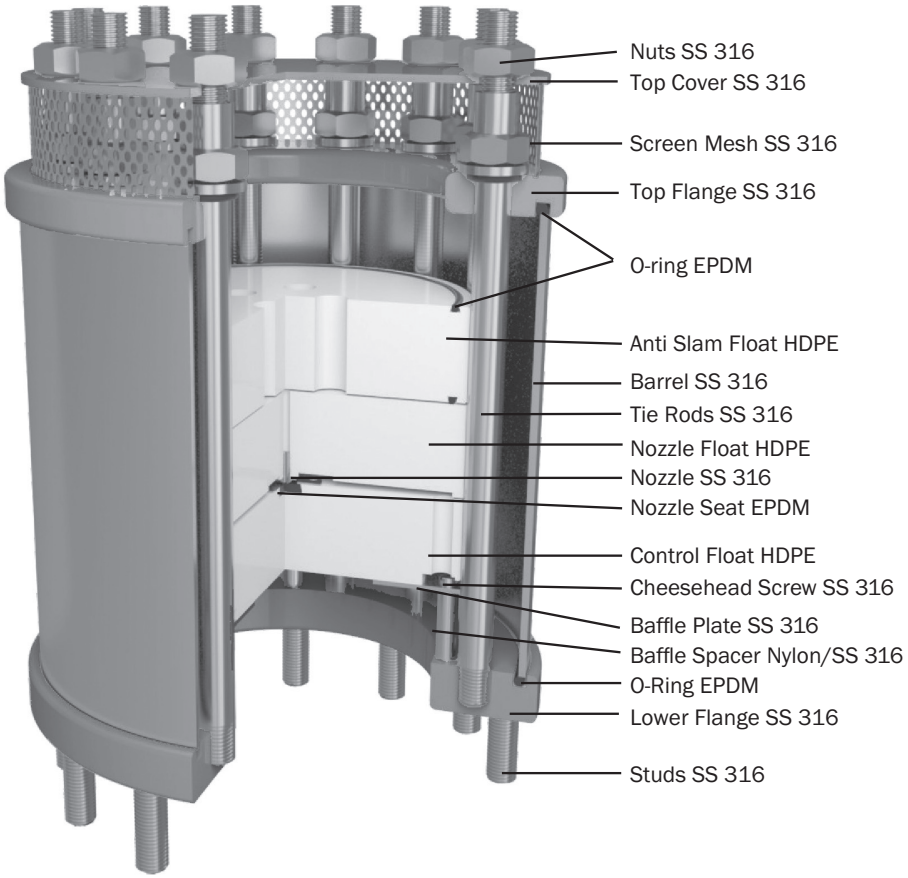
Double Acting with Anti Slam Orifice

(Triple acting / Three stage)

Size	Pressure Rating	Overall Height	Overall Diameter	Weight
1"	363 psi	11.26"	3.94"	9 lbs
	580 psi	13.23"	3.94"	11 lbs
2"	363 psi	11.85"	5.12"	15 lbs
	580 psi	13.62"	5.12"	18 lbs

Dimensional data for higher pressure ratings available on request

Model 39A 1" to 8" Flanged



Operating Pressures

2.9 - 232 psi
2.9 - 363 psi
2.9 - 580 psi
2.9 - 928 psi
2.9 - 1450 psi

Operating Temperatures

32 - 176 °F

End Connection

Flanged studded

Double Acting with Anti Slam Orifice

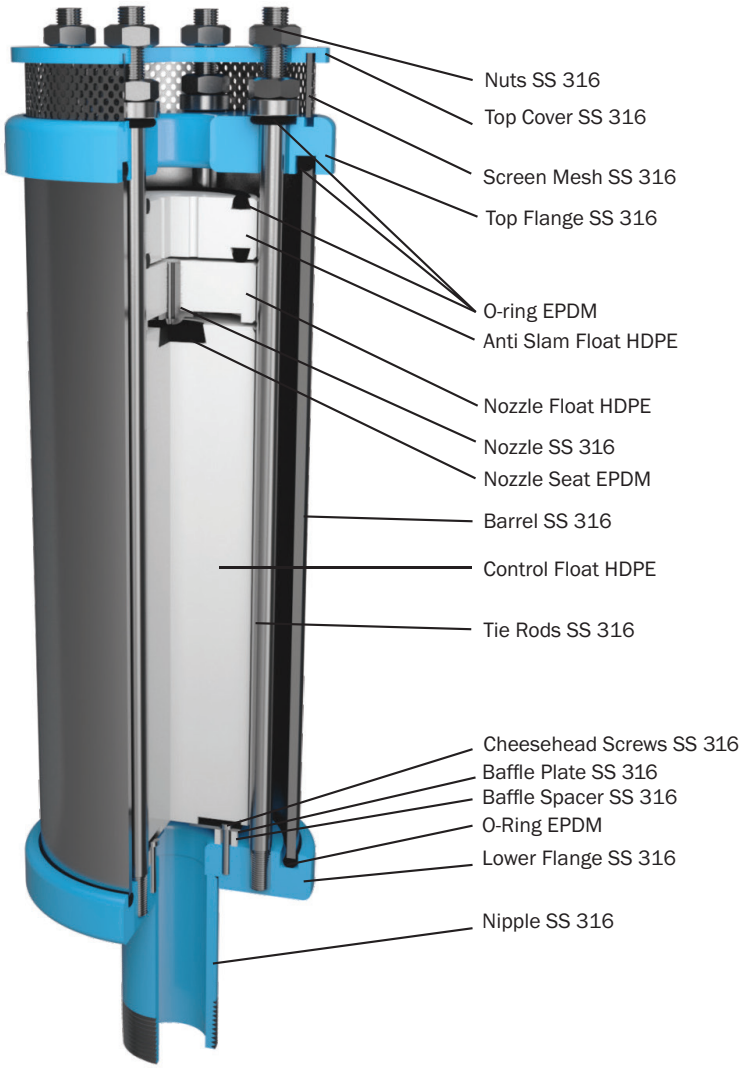
(Triple acting / Three stage)

Size	Pressure Rating	Overall Height	Overall Diameter	Weight
1"	232 psi	10.28"	4.26"	11 lbs
	363 psi	10.28"	4.88"	12 lbs
	580 psi	12.25"	4.88"	13 lbs
2"	232 psi	10.87"	5.98"	20 lbs
	363 psi	10.87"	6.50"	21 lbs
	580 psi	12.64"	6.50"	22 lbs
3"	232 psi	10.98"	7.87"	35 lbs
	363 psi	10.98"	7.87"	35 lbs
	580 psi	12.32"	7.87"	42 lbs
4"	232 psi	10.79"	8.66"	35 lbs
	363 psi	10.98"	9.25"	42 lbs
	580 psi	12.56"	9.25"	51 lbs
6"	232 psi	17.24"	11.22"	88 lbs
	363 psi	17.68"	11.81"	102 lbs
	580 psi	19.06"	11.81"	135 lbs
8"	232 psi	19.57"	13.39"	132 lbs
	363 psi	19.96"	14.17"	143 lbs
	580 psi	20.87"	14.76"	181 lbs

Larger sizes are available on request up to 18"

Dimensional data for higher pressure ratings available on request

Model 39B 1" & 2"



Operating Pressures

2.9 - 232 psi
2.9 - 363 psi
2.9 - 580 psi

Operating Temperatures

32 - 176°F

End Connection

Screwed NPT

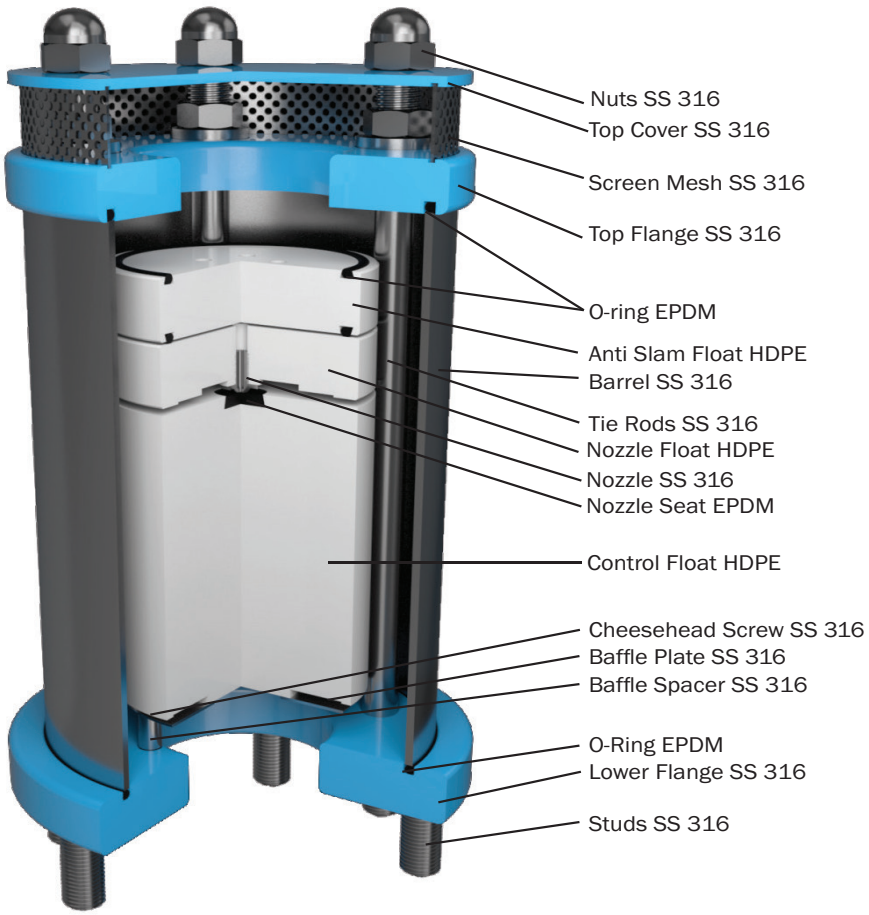
Double Acting with Anti Slam Orifice

(Triple acting / Three stage)

Size	Pressure Rating	Overall Height	Overall Diameter	Weight
1"	363 psi	15.20"	3.94"	12 lbs
	580 psi	17.17"	3.94"	14 lbs
2"	363 psi	15.83"	5.12"	21 lbs
	580 psi	17.76"	5.12"	24 lbs

For raw sewage applications please see page 12

Model 39B 3" to 12"



Operating Pressures

2.9 - 232 psi
2.9 - 363 psi
2.9 - 580 psi

Operating Temperatures

32 - 176°F

End Connection

Flanged studded

Double Acting with Anti Slam Orifice

(Triple acting / Three stage)

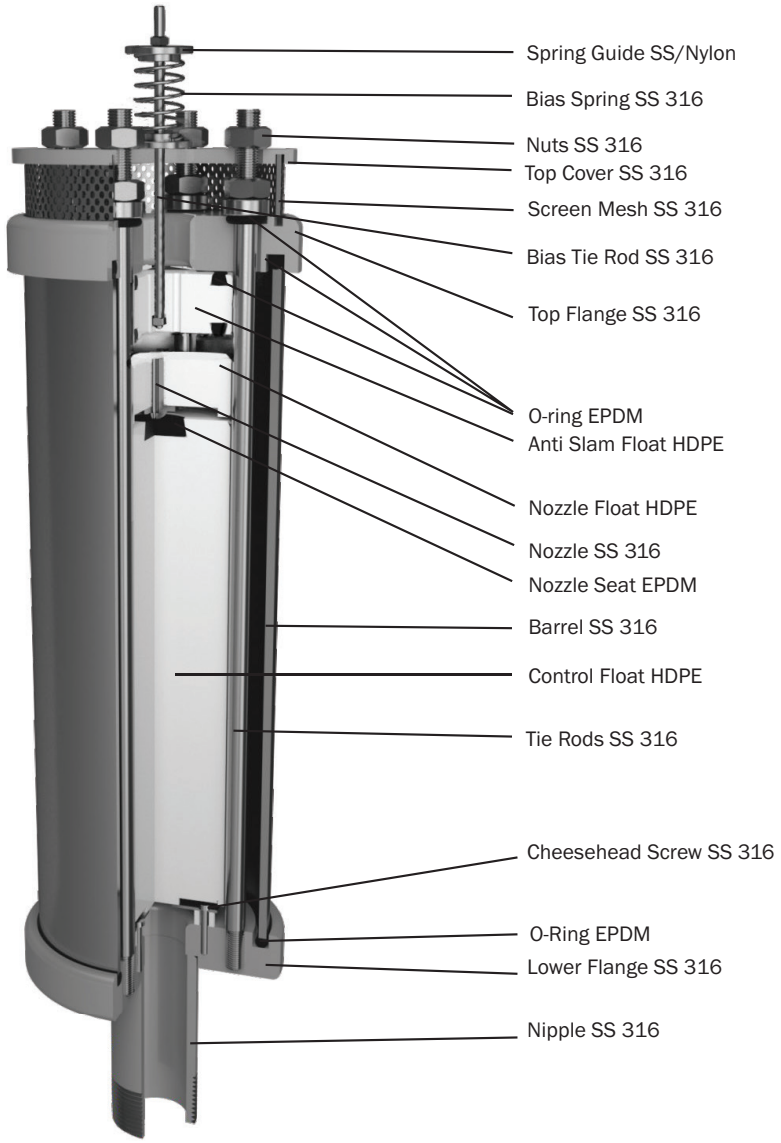
Size	Pressure Rating	Overall Height	Overall Diameter	Weight
3"	232 psi	15.12"	7.87"	40 lbs
	363 psi	15.12"	7.87"	40 lbs
	580 psi	16.42"	7.87"	49 lbs
4"	232 psi	15.12"	8.66"	44 lbs
	363 psi	15.12"	9.25"	51 lbs
	580 psi	16.46"	9.25"	62 lbs
6"	232 psi	25.12"	11.22"	110 lbs
	363 psi	25.12"	11.81"	123 lbs
	580 psi	26.57"	11.81"	170 lbs
8"	232 psi	27.95"	13.39"	172 lbs
	363 psi	27.95"	14.17"	183 lbs
	580 psi	28.94"	14.76"	235 lbs
10"	232 psi	30.71"	16.73"	287 lbs
12"	232 psi	32.87"	20.87"	410 lbs

Larger sizes are available on request up to 18"

For raw sewage applications please see page 13

Model 39BWW 2"

For Sewage Applications



Operating Pressures
2.9 - 232 psi

Operating Temperatures
32 - 176°F

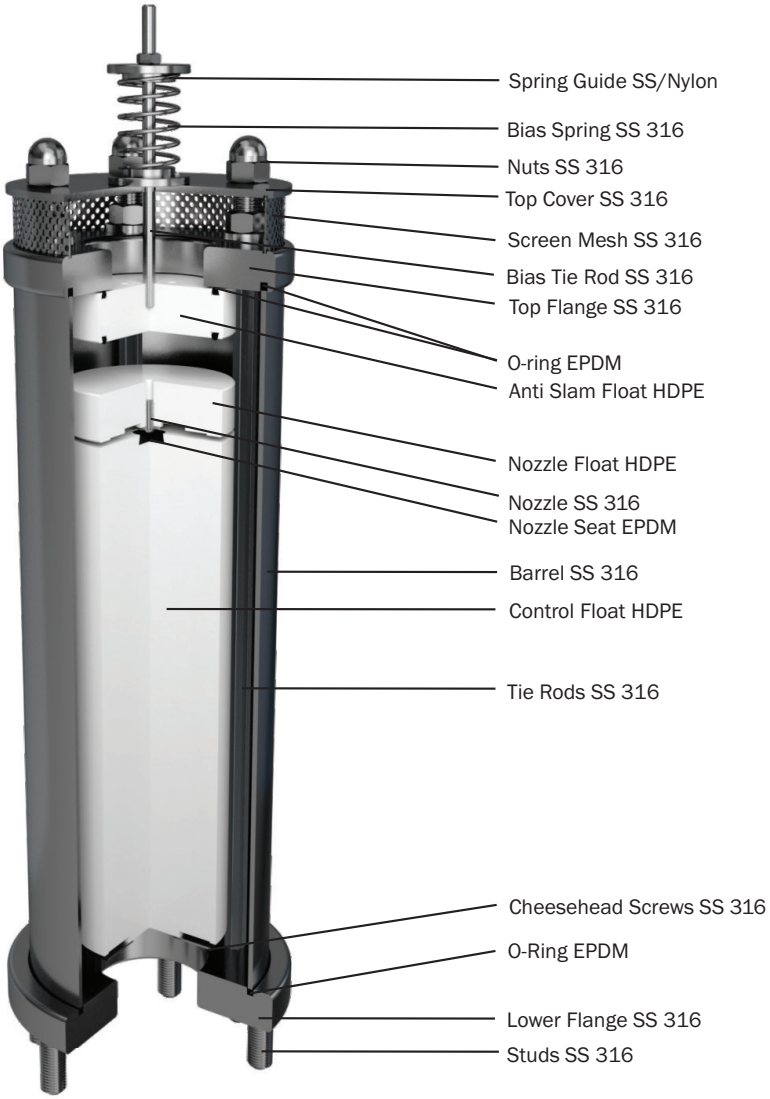
End Connection
Screwed NPT

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

Size	Pressure Rating	Overall Height	Overall Diameter	Weight
2"	232 psi	24.84"	5.12"	27 lbs

Model 39BWW 3" to 12"

For Sewage Applications



Operating Pressures
2.9 - 232 psi

Operating Temperatures
32 - 176°F

End Connection
Flanged studded

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

Size	Pressure Rating	Overall Height	Overall Diameter	Weight
2"	232 psi	24.84"	5.12"	27 lbs
3"	232 psi	25.08"	7.87"	44 lbs
4"	232 psi	25.08"	8.66"	49 lbs
6"	232 psi	35.11"	11.22"	154 lbs
8"	232 psi	37.05"	13.39"	187 lbs
10"	232 psi	40.20"	16.73"	342 lbs
12"	232 psi	42.30"	20.87"	441 lbs

Model 39-SA

"Surge Arrestor" and Air Release Valve

- Dampens Effect of Water-Hammer At Pump Startup
- Vacuum Protection During Pump Trip
- Low Sealing Pressure (0.3 bar)
- Stainless Steel Construction
- 3 Year Warranty

Automatic Surge Protection

The "always on" controlled air release function prevents hammer and surges in the line when filling or refilling pipes.

Vacuum Protection

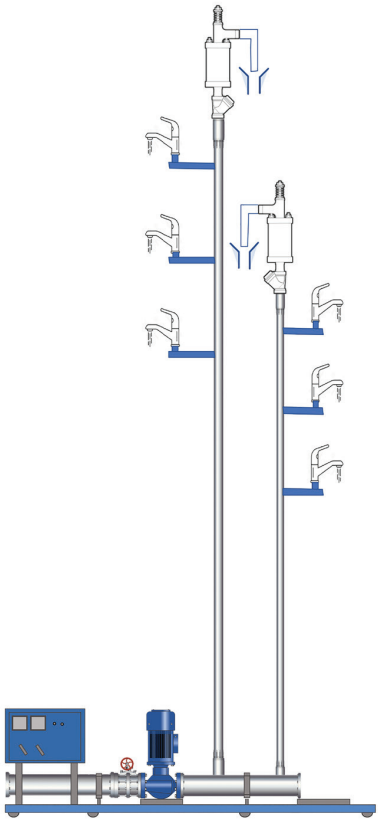
The large orifice admits air in the riser to prevent vacuum and damage to pipes and fittings from occurring when the booster set is down (powered off).

Effective Air Release

The small orifice functionality allows air to be removed from the system while the system is pressurised, preventing the formation of air locks in the system and keeping the system running efficiently.

Guaranteed performance

Every valve is pressure tested to ensure trouble free operation.



TYPICAL ARRANGEMENT

The valve must be installed at the top of each riser to ensure adequate Water-Hammer protection. A suitable isolating valve should also be installed to facilitate maintenance.

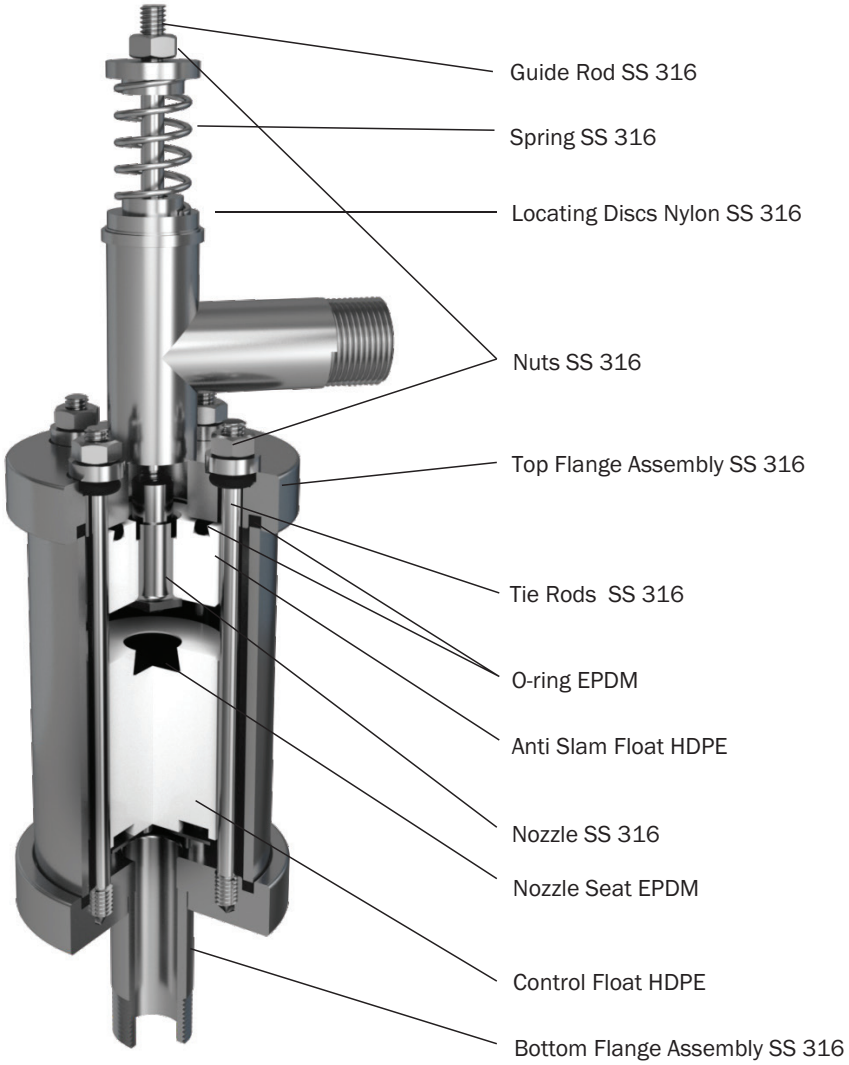
To ensure proper operation the pipeline must be adequately flushed prior to installation.

Valve must be mounted directly to 'T' connection supplying the final branch of the riser.

A 1" male outlet connection allows any released water to be discharged externally to the building or to drain with a suitable air gap via a tundish.

Model 39-SA

"Surge Arrestor" and Air Release Valve



Operating Pressures
2.9 - 145 psi

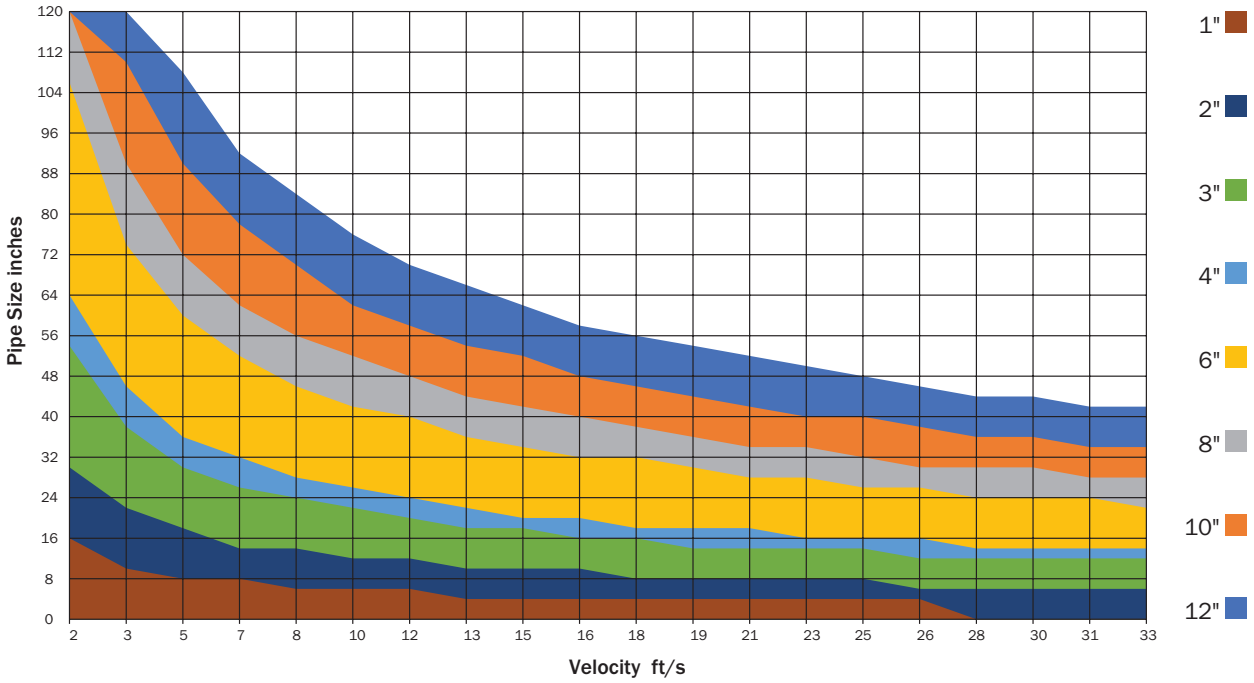
Operating Temperatures
32 - 176°F

End Connection
Screwed NPT

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

Size	Pressure Rating	Overall Height	Overall Diameter	Weight
1/2"	145 psi	9.4"	2.5"	3.0 lbs
1"	145 psi	12"	4"	8.8 lbs

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 color band, match the color 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 5 psi in the pipeline pressure. It is not good practice to allow the negative pressure drop below 8.5 psi negative differential in the pipeline. Be aware when sizing that the upper part of the band is closer to the minimum negative differential of 5 psi and the lower part closer to 1.5 psi 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.

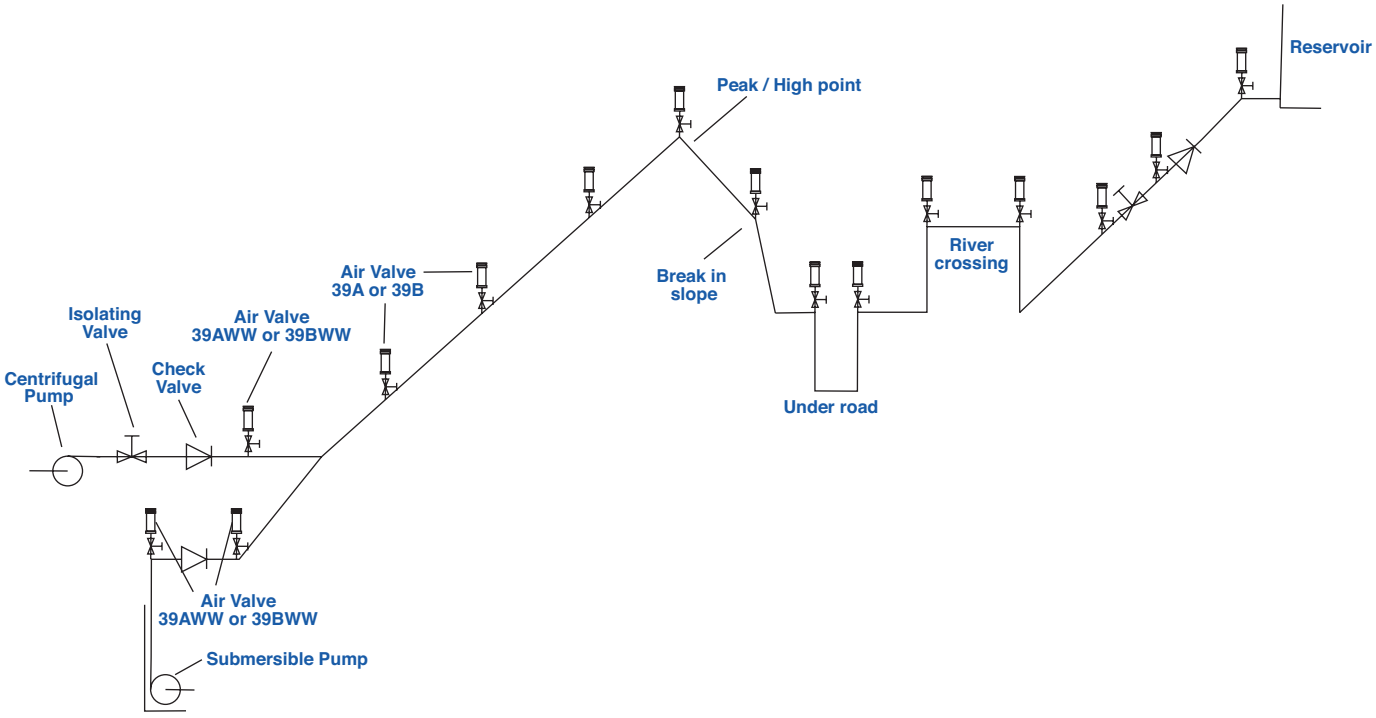
Convert flow in gpm/s into velocity in ft/s						
Pipeline Size (inches)	**Pipeline velocity in ft/s**					
	3	**6**	**10**	**12**	**15**	**20**
4	117	235	391	470	587	783
8	470	940	1566	1879	2349	3132
16	1879	3758	6264	7516	9395	12527
24	4228	8456	14093	16912	21140	28186
32	7516	15033	25054	30065	37582	50109
40	11744	23489	39148	46977	58721	78295
48	16912	33824	56373	67647	84559	112745
56	23019	46038	76729	92075	115094	153458
64	30065	60131	100218	120261	150327	200436
72	38051	76103	126838	152206	190257	253676
80	46977	93954	156590	187908	234885	313181
88	56842	113685	189474	227369	284211	378948
96	67647	135294	225490	270588	338235	450980
104	79391	158783	264638	317565	396956	529275
112	92075	184150	306917	368300	460375	613834
120	105698	211397	352328	422794	528492	704656

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 feet per second(ft/s). Should your pipe size not be available you can calculate your velocity using this calculation:

$$V = \frac{Q*0.321}{A}$$

Where
V= Velocity ft/s
Q=flow in gpm
A= Area inches^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 2000ft.

Other places where air valves should be considered

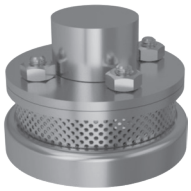
In Pump Stations

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 Model 39AWW or 39BWW type of air valves.

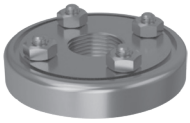
Isolation and Check Valves.

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.

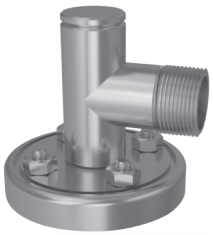
Outlet Connections



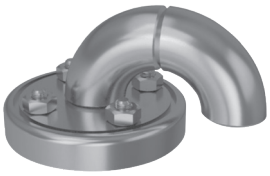
Smart Valve Telemetry Housing
Contains a compact integral data logging and communication feature.



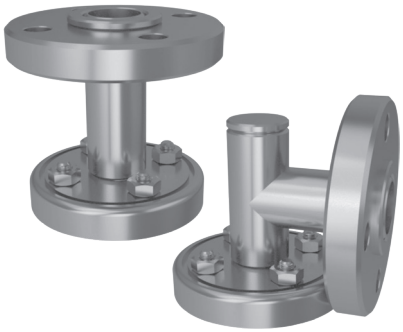
Screwed Outlet
The valve outlet is tapped to NPT to allow connection to piping off systems.



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 7.2 psi 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 363 psi it will be tested to 544 psi). 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

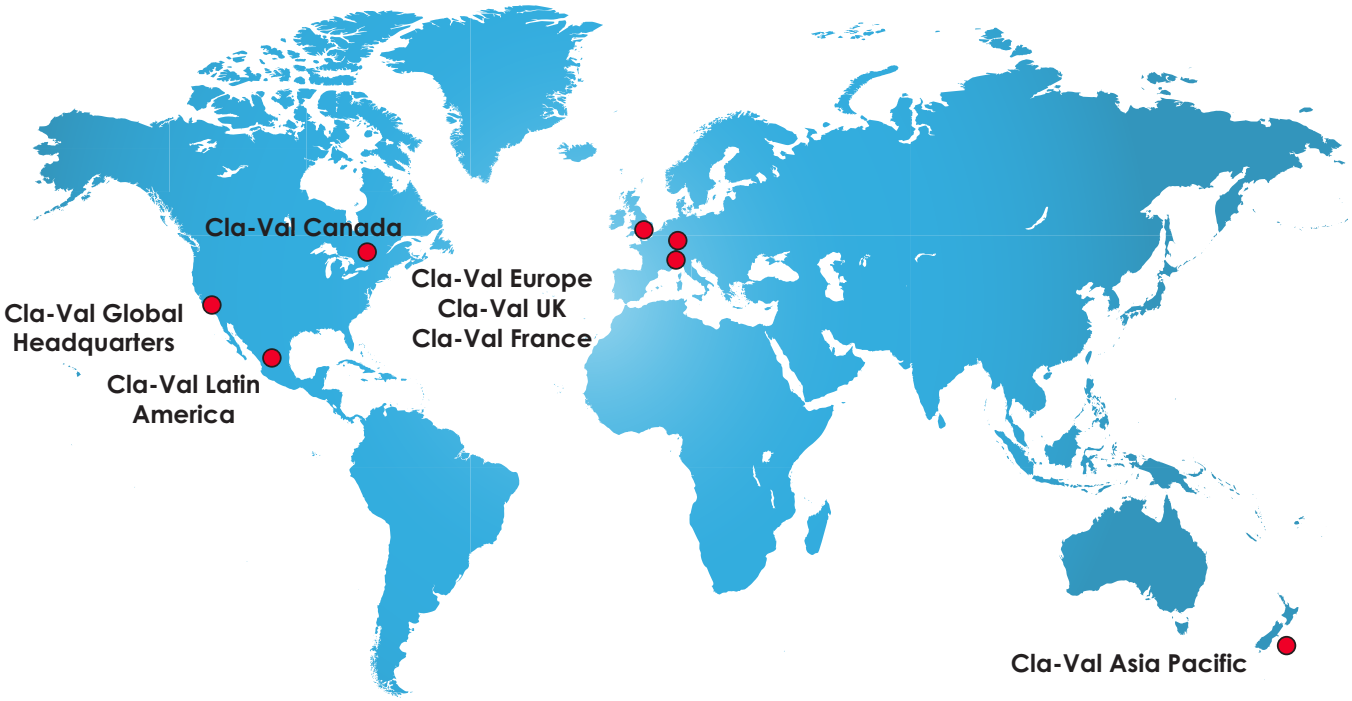
Drop testing is the test conducted to ensure that the valve will open and release disentrained air, when the valve is operating at the full rated pressure of the valve, (see pressurized air release page 3 for more information). Drop testing is governed by specific physical laws and is extensively tested 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 pressurized 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.

CLA-VAL 39 Series Air Valves



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