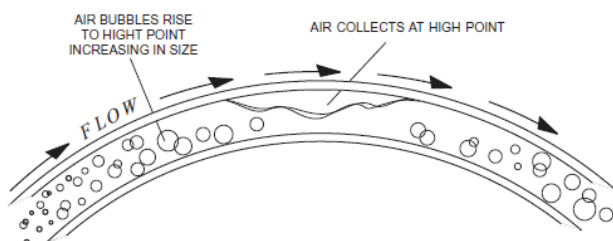


## ITS IMPACT ON A AIR & WATER AND WASTEWATER SYSTEM

One of the most misunderstood aspects of the Water & Wastewater industry is the presence of air in a pipeline and its impact on operations. Many operational problems, especially at the time of initial start-up, including broken pumps, valves and pipe, as well as faulty instrumentation readings, are blamed on inadequate thrust blocking, improper pipeline bedding, etc. In reality, many of these problems are not caused by improper installation of the line, but by failure to de-aerate the line. Properly de-aerating your pipeline will safeguard it from air-related problems, however if no steps are taken to accomplish this, you should be ready for trouble.

## SOURCES OF AIR

Air in a pressurized, operating pipeline comes from three primary sources. First, prior to start-up, the line is not empty - it is full of air. To entirely fill a pipeline with fluid, it is necessary to eliminate this air. As the line fills, much of this air will be pushed downstream to be released through hydrants, faucets, etc. but a large amount will become trapped at system high points (Figure 1). This phenomenon will occur because air is lighter than water

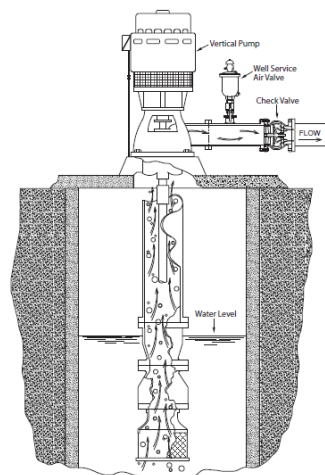


**Figure 1**  
Air in pipeline collects at high points

and therefore, will collect at the high points. This air will continuously be added to by the second and third sources as the system continues operation.

Source number two is the water itself. Water contains approximately 2% air by volume. During system operation, the entrained air will continuously separate out of the water and once again accumulate at system high points. To illustrate the potential massive amount of air this 2% represents, consider the following: A 1000 ft. length of pipe could contain a pocket of air 20 ft. long if all the air accumulated in one location.

Or a one mile length of pipe could contain a 100 ft. pocket of air. This would be true regardless of the diameter of the pipe.

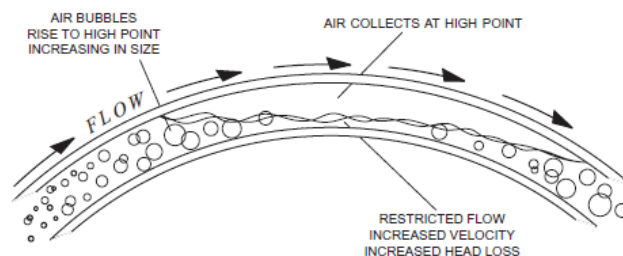


**Figure 2**  
Air entering through mechanical equipment

The third source of air is that which enters through mechanical equipment (Figure 2). This includes air being forced into the system by pumps as well as air being drawn in through packing, valves, etc. under vacuum conditions. As one can see, a pressurized pipeline is never without air and typically the volume is substantial.

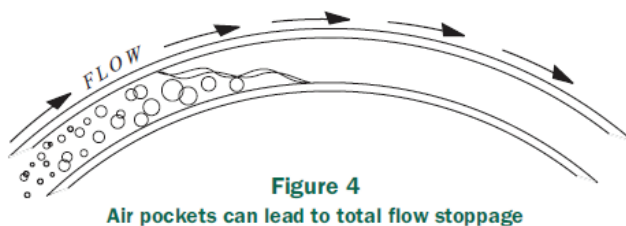
## IMPACT OF AIR ON SYSTEM

Now that we have identified the air sources, let us consider their impact on the system. Two problems are apparent. The pocket(s) of air accumulating at a high point(s) can result in a line restriction (Figure 3).



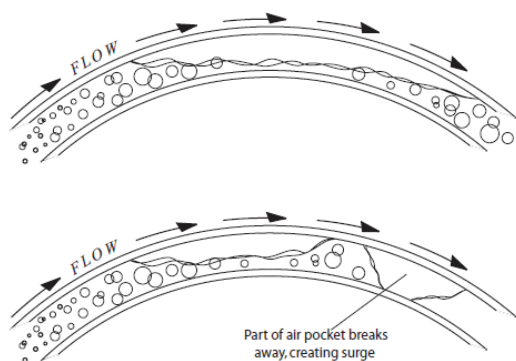
**Figure 3**  
Air pockets can lead to line restriction

Like any restriction, the pocket(s) of air increases headloss, extends pumping cycles and increases energy consumption. The presence of air can also promote corrosion of pipe and fittings. As air continues to accumulate at system high points, the fluid velocity increases as the fluid is forced through a smaller and smaller opening.



As the pocket(s) grows, one of two phenomena will occur. The first possibility is a total flow stoppage (Figure 4). If system dynamics are such that the air cannot be continuously removed by the increased fluid velocity and pushed downstream, then this could happen. As the pocket(s) continues to accumulate air, a pressure drop higher than pump capacity can develop and stop all flow.

The second, and more likely occurrence, is that the increased velocity will cause all, or part of, the pocket to suddenly dislodge and be pushed downstream (Figure 5). The sudden and rapid change in fluid velocity when the pocket dislodges and is then stopped by another high point,

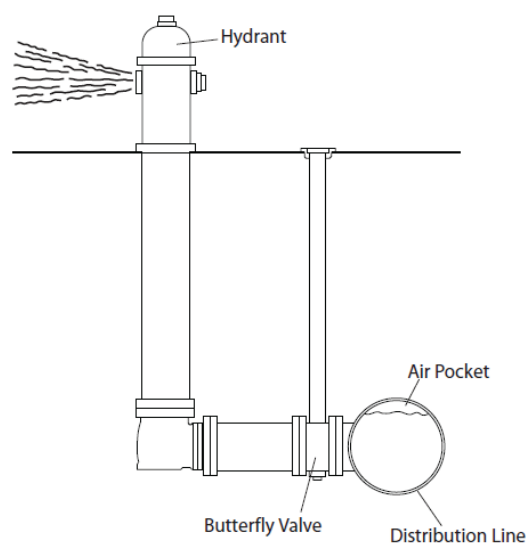


**Figure 5**  
Air pockets can lead to surges in the line

can and often will, lead to a high pressure surge (water hammer). Serious damage to valves, fittings, gaskets, or even breakage of the line can occur. This is the most serious of the possible consequences of air being allowed to accumulate in system high points.

## HISTORICAL SOLUTIONS

As we can see, air in a pressurized pipeline is a serious concern. Obviously, its removal will result in a more efficient, cost effective operation and potentially avoid more serious problems. In the early 1900's, engineers and water works personnel started developing an understanding of the problems associated with air and the search for a solution began. Some depended on standpipes, believing that a large portion of the air would be expelled through them.



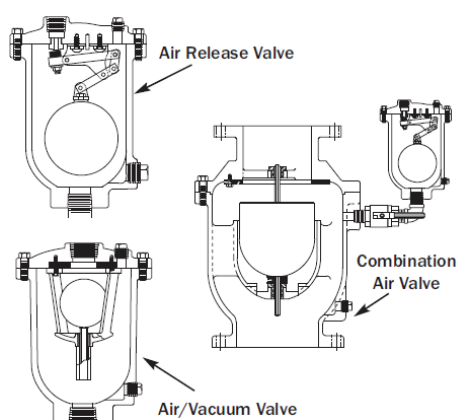
**Figure 6**  
Opening a hydrant may not eliminate air pockets

Many began placing gate or ball valves at system high points to manually bleed off accumulated air. Unfortunately, it has proved impossible to predict when it is time to bleed the air. This proved impractical, especially on larger systems. Open fire hydrants (Figure 6) are frequently used under the assumption that all air in the pipeline will be released. Unfortunately, hydrants are generally connected to the side of the pipe, leaving air trapped at the top and at system high points. It should be noted that there are still municipalities using these methods.

## THE AIR VALVE SOLUTION

Today, most municipalities utilize Automatic Air Valves. They are available in many different designs and configurations for a wide range of applications. Their function is to automatically release and admit air without operator assistance. Today, countless Air Valves are performing this task around the globe on a daily basis.

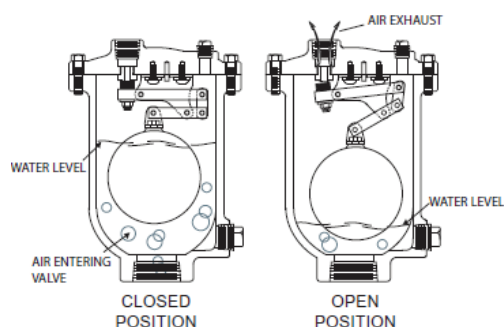
Air Valves are available in three basic configurations (Figure 7): Air Release Valves, Air/Vacuum Valves and Combination Air Valves. Correct sizing and location of all three types are critical. Every high point greater than one pipe diameter where the pipeline converts from a positive grade to a negative grade requires an air valve. Even minimal high points with small air pockets can cause serious surge problems and reduce line efficiency. In addition, it is recommended that air valves be installed every half mile or 2500 feet on straight horizontal runs (AWWA M51). Air Valve Sizing Software is available, see page 25.



**Figure 7**  
Basic Air Valve configurations

## AIR RELEASE VALVES

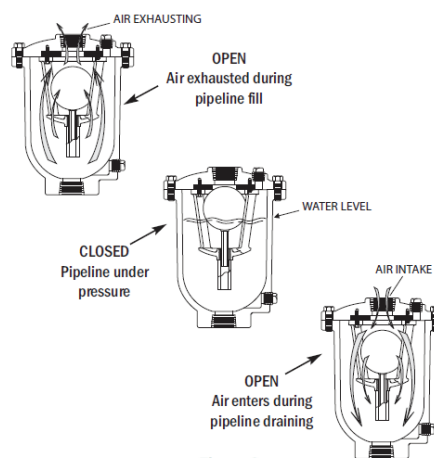
An Air Release Valve (Figure 8), sometimes referred to as a "small orifice" valve, will continuously release accumulated air during system operation. As air from the pipeline enters the valve, it displaces the water, allowing the float to drop. The air is then released into the atmosphere through a small orifice. As the air is vented it is replaced by water, raising the float and closing the valve orifice. As air accumulates, the valve will continue to cycle in this manner to remove collected air.



**Figure 8**  
Air Release Valve in Operation

## AIR/VACUUM VALVES

Air/Vacuum Valves (Figure 9), sometimes referred to as "large orifice" valves, are used to exhaust large quantities of air upon system start-up, as well as allowing air to reenter the line upon system shut down or system failure. As water enters the valve, the float will rise, closing the discharge port. The valve will remain closed until system pressure drops to near zero psi. It will not open to release any accumulation of air while the system is under pressure.

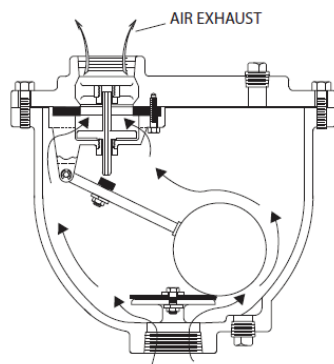


**Figure 9**  
Air/Vacuum Valve Operation

An added benefit of an Air/Vacuum Valve is its ability to provide pipeline vacuum protection. If a negative pressure develops, the valve will open, admitting air into the line, reducing the potential for surges related to column separation and possible pipeline collapse. While Air/Vacuum Valves will exhaust large quantities of air upon start-up, it should be remembered that they will not continuously release air during system operation. For this function, an Air Release Valve is also required.

## COMBINATION AIR VALVES

Combination Air Valves (Figure 10) are the most commonly used valves. They perform the functions of an Air/Vacuum Valve (exhaust large quantities of air on start-up, admit air on shut-down) and Air Release Valves (release air continuously during operation). Combination Air Valves are available in single body and dual body (an Air/Vacuum Valve and Air Release Valve piped together) configurations. The single body configuration is more compact and economical.



**Figure 10**  
Single Body Combination Air Valve

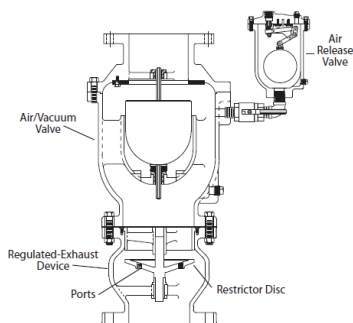
The dual body configuration provides two independent valves so that if maintenance is being performed on the Air Release Valve, the Air/Vacuum Valve is still protecting the pipeline. The dual body valve also provides a much wider range of sizing options.

## SURGE-SUPPRESSION AIR VALVES

Pipelines with high points, where pressure transients or column separation can occur should have air valves equipped with slow closing devices (regulated-exhaust device) to restrict the outflow of air (AWWA C512-07). During these conditions, typically caused by unexpected pump shut down, line break, power outage etc., the air valve must allow air to flow rapidly into the pipeline. The large volume of air entering the pipeline will prevent the formation of a

severe vacuum pocket and the damaging pressures that can occur when these pockets collapse. When the water columns rejoin and the pressure recovers, the air valve should exhaust the air in a regulated manner to suppress surges. While the pipeline is pressurized and in operation, the Air Valve must continue to automatically release entrained air to maintain the pipeline flow efficiency.

Surge-Suppression Air Valves are Combination Air Valves equipped



**Figure 11**  
Surge-Suppression Air Valve

with Regulated-Exhaust Devices (slow closing devices) as shown in Figure 11. The Regulated-Exhaust Device consists of a flanged or threaded body with a normally-open restrictor disc. The Surge-Suppression Air Valve provides full airflow into the pipeline during vacuum conditions to prevent a vapor pocket (vacuum) from forming. When the pressure recovers and the water column rejoins, air is expelled through the valve, which lifts the restrictor disc. This action regulates the discharge airflow creating an air pocket that cushions the surge effect of the returning water column. When the column reaches the restrictor disc, the water flows through the reduced ports and gently closes the air valve. Transient studies (Kroon 1984, Lingireddy 2004) have shown a dramatic reduction in pressure surges when the exhausting air is controlled under these conditions.

## WELL SERVICE AIR VALVES

Well Service Air Valves (Figure 12) are a member of the Air/Vacuum Valve family and are used with vertical pumps. Vertical pumps (Figure 2) lift water from a reservoir or deep well at high velocities because they start against little head and a pump column filled with air. Well Service Air Valves are specifically designed to vent the air from the pump column during pump start-up in a controlled manner before the check valve opens to reduce pressure surges that result from the accelerating water column.

Val-Matic provides Dual Port Throttling Devices (Figure 12) on the outlet of ½ to 3 in. Well Service Air Valves. The Dual Port Throttling Device regulates the exhaust rate through an adjustable exhaust port and provides full vacuum flow through a separate vacuum port during pump shutdown. This exclusive feature of the Dual Port reduces any potential for contaminated water being drawn into the system by vacuum during the pump shut down.

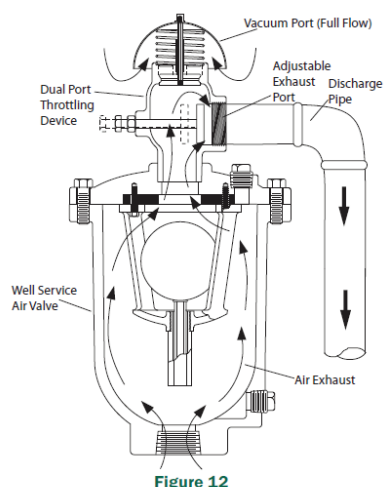
Val-Matic provides Regulated-Exhaust Devices on the inlet of 4 in. and larger (see Figure 11) Well Service Air Valves. The Regulated-Exhaust Device provides controlled air exhaust during start-up and full vacuum flow during shut down. The device controls the flow of air and water into the air valve and is effective in suppressing water hammer in the pump column and air valve during pump start-up.



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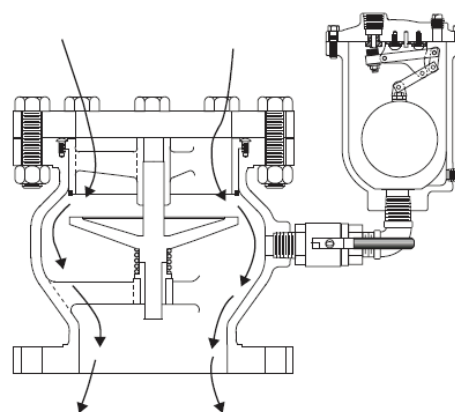


**Figure 12**  
Well Service Air Valve with Dual Port Throttling Device

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## VACUUM BREAKER VALVES

For critical applications where vacuum protection is a must or where column separation is predicted, a vacuum breaker (Figure 13) is used. The Vacuum Breaker is mounted at critical pipeline high points, penstocks, or tanks and allows for rapid inflow of atmospheric air to reduce vacuum conditions in piping systems.



**Figure 13**  
Vacuum Breaker with Air Release Valve  
(Open Position)

When positive pressure in the system is restored, the Vacuum Breaker provides a positive resilient seal to maintain system pressure. When equipped with an Air Release Valve, the Air Release Valve is used to slowly exhaust the air that was admitted to the pipeline. The slow release of air prevents the sudden rejoining of separated columns in a pipeline and the associated pressure surges or water hammer.

## SUMMARY

When air is allowed to accumulate in pressurized pipelines, efficiency is sacrificed and serious damage can occur. A properly de-aerated pipeline will not solve all surge problems; however, the elimination of air can solve one of the most common causes. Air Valves are a cost effective, reliable method of improving efficiency and solving air related surge problems.

REFERENCES Kroon, R. "Water Hammer: Causes and Effects," AWWA Journal. Nov., 1984. pp. 39-45.

Lingireddy, "Pressure Surges in Pipeline Systems Resulting From Air Releases," AWWA Journal. July, 2004. pp. 88-94.

## FEATURES & BENEFITS

From the float material to the shape of the body, Val-Matic Air Valves are designed for optimum performance. All valves meet AWWA C512 requirements.

## EXPERIENCE

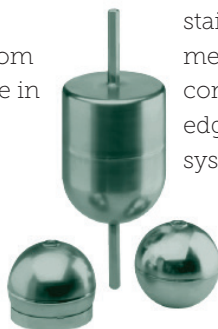
Val-Matic offers over 40 years of experience in providing a full line of air valves up to 20 inch and vacuum breakers up to 42 inch in size. The Val-Matic Air Release, Air/Vacuum and Combination Air Valves are manufactured in accordance to the rigorous industry requirements given in American Waterworks Association (AWWA) Standard C512. The standard was developed and based on decades of successful application of air valves in our industry. Val-Matic's AWWA Air Valves feature 316 stainless steel trim, full size ports, ANSI threaded or flanged connections and stringent testing. ValMatic manufactures air valves in a wide range of materials and pressure ratings with many accessories including Regulated-Exhaust Devices, Dual Port Throttling Devices, Isolation Valves, Screened Hoods and Backwash Accessories. Val-Matic also provides Windows-Based software to locate, select and size air valves for pipelines and force mains.

## NSF/ANSI 61 CERTIFICATION

Val-Matic Air Valves for water service are independently NSF/ANSI 61 certified and marked for use in drinking water applications.

## TYPE 316 STAINLESS STEEL TRIM

Type 316 stainless steel is the standard for all internal components in Val-Matic Air Valves. Type 316 stainless steel provides the greatest protection from aggressive waters and hydrogen sulfide exposure in wastewater application.



## UNCONDITIONALLY GUARANTEED FLOATS

Floats are unconditionally guaranteed for the life of the valve from corrosion, collapse or leakage. No other valve manufacturer has the confidence in their float construction to provide this guarantee.

## GUIDED FLOATS

Providing a quality float is not enough to assure a good seal every time. When entering the seat, a damaged or off-center float will prevent a valve from sealing tight. The high air and water velocities in air valves can cause unguided floats to violently strike the sides of the valve body. Val-Matic floats are guided; four inch and larger valves feature double guides (top and bottom). Guiding assures that the float approaches the center of the seat every time to provide a positive drop tight seal.



## SELF CLEANING FLOAT GUIDES

The Val-Matic floats are guided by hexagonal float stems. The float stems pass through round stainless steel bushings preventing the build up of debris or scale and provide self cleaning of the bushings.

## RESILIENT SEATS

All Val-Matic valves incorporate a resilient seat or orifice button which mates with a 316 stainless steel float or seat for positive drip tight seating. Val-Matic elastomers are specially formulated for water and wastewater service and have been NSF/ANSI 61 certified. Air Release Valves have a synthetic sealing button mounted to the float linkage mechanism. On Air/Vacuum and Combination Air Valves, the stainless steel float closes against the resilient seat mechanically retained in a body register. The seats contain raised sealing beads and/or a unique flex edge that provide positive shutoff from the lowest system pressure to the valve's rated working pressure.

## FULL SIZE FLOW AREA

Val-Matic Air/Vacuum and Combination Air Valves are equipped with full and equal size inlets and outlets in accordance with AWWA C512. Some air valve manufacturers use common covers for different size air valves resulting in undersized outlets and reduced flow. Standard industry calculations assume a full port size so the air valve should provide the same. You can be assured that the inlets and outlets of Val-Matic's Air Valves are equal to or larger than the area of the nominal valve size. Finally, all Combination Air Valves with float guides in the outlet have expanded flow areas around the guide spokes to provide full flow area through the valve.

## ADDITIONAL FEATURES & BENEFITS FOR WASTEWATER VALVES

### STAINLESS STEEL BODY

Cast stainless steel bodies are available for extreme service where hydrogen sulfide or industrial chemicals produce accelerated corrosion in iron. There are no weld-seams to worry about with the cast stainless body and it is in full compliance with AWWA C512.

### NON-STICK COATINGS

Special interior coatings are available to minimize the buildup of sewage on the inside of the valve. Val-Matic's Fusion Bonded Epoxy is a baked-on, glass-like coating that reduces maintenance and prevents corrosion of the valve. Non-stick coatings are important when force mains contain grease that tends to collect in valves and pipes.

## NON-CLOG DESIGN FOR REDUCED MAINTENANCE

Val-Matic Wastewater Air Valves are specially designed for grit and sewage service without the need for backwashing when combined with non-stick coatings. The bodies are extended in length to

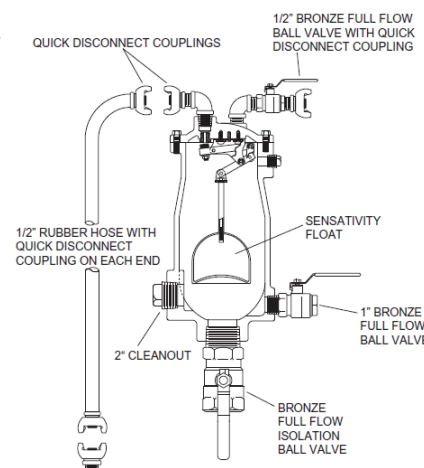
prevent solid material from reaching the operating mechanism. The bottom of the body is sloped toward the outlet to prevent clogging (See Figure 14). Val-Matic provides a minimum 2" inlet size and a 2" cleanout connection on all wastewater valves to facilitate the passage of solids.

## WASTEWATER FLOATS

As with all Val-Matic Air Valves, the float and operating mechanism are 316 stainless steel for long life in the harshest wastewater applications. Additionally, the floats are equipped with a specially shaped bottom to accelerate the closure of the float to reduce leakage and clogging of the valve.

## SEVERE SERVICE BACKWASHING

When systems are heavy in grease and solids, backwashing of Wastewater Air Valves may become a necessary maintenance process. The key is to reduce the frequency of backwashing by designing the valve to handle conditions such as wastewater containing solids and grease. As indicated in the above features, Val-Matic has done that with the extended body, the Bell Bottom, the sensitivity float and the availability of non-stick Fusion Bonded Epoxy. However, periodic maintenance may still be required on severe applications. Therefore, all Wastewater Air Valves can be furnished with an accessory kit which includes a shutoff valve to isolate the air valves from the line, flush and drain valves, and a hose for connecting to a clean water supply.



**Figure 14**  
Air Valve with Severe Service Backwash Accessories

Backwashing is as simple as: 1) isolating the air valve, 2) opening the drain valve, and 3) opening the flush valves to send clean water through the valve body for 5 minutes.

For those installations where backwashing on site is not practical or desirable, a valve rotation program can be established. The valve to be serviced is exchanged with a spare valve and taken back to the shop for cleaning. It is then ready to replace the next valve scheduled for maintenance. The valve rotation program also provides the benefit of a back up valve in the unlikely event one should ever fail.

## EFFICIENCY AND VACUUM PROTECTION

The primary purpose of air valves is to provide pipeline efficiency by continuous removal of air at pipeline highpoints and vacuum protection by admitting large quantities of air upon pump shut down or system failure.

## SURGE CONTROL

Air valves play an important role in pipelines to control or reduce surges. Surges result from sudden changes in velocity of the pipeline fluid. These velocity changes occur regularly due to pipeline filling, pump operation, line breaks and power failure. The effects of surges can be devastating. Surges are typically 50 psi for every 1 ft/sec of rapid change in flow velocity. This is added to the pipeline static pressure. Through computer modeling and transient analysis, it has been shown that air valves can play a critical role in suppressing pipeline surges during column separation conditions.

## PIPELINE SURGES

Power or system failures can often result in water column separation at high points in the line. If the water column is allowed to separate and form a vacuum pocket, a devastating surge can occur when the columns rejoin. To prevent a vacuum from forming, a Surge Suppression Air Valve or Vacuum Breaker is used to admit large quantities of air into the pipeline.

A Surge-Suppression Air Valve consists of a Combination Air Valve equipped with a Regulated-Exhaust Device that allows full airflow into the pipeline, but restricts the airflow out of the pipeline. Similarly, a Vacuum Breaker allows rapid entry of air into the pipeline, but prevents flow out of the pipeline. When equipped with an Air Release Valve, the Vacuum Breaker will provide controlled release of air through the small Air Release Valve orifice. Both methods dampen or suppress surges in the pipeline by temporarily trapping a pocket of air and cushioning the impact of the returning columns of water by regulating the exhaust of the air pocket.

## VERTICAL PUMP COLUMN SURGES

High velocity rapidly develops in a pump column when a vertical turbine or deep well pump starts against an air-filled column and closed check valve. A power-actuated check valve must absorb the full force of the impending impact. A mechanical check valve will open, relieving a portion of the force but still sees extreme surges. The best way to prevent surges in the pump column and connecting piping is to regulate the exhaust of the air in the pump column during pump start-up (AWWA M-51, p. 24). A Well Service Air Valve equipped with either a Dual Port Throttling Device or a Regulated-Exhaust Device vent air from the pump column at a controlled rate so that all or most of the air escapes just before the check valve opens. (See Val-Matic technical paper AEG-302.)





## APPLICATIONS, FUNCTIONS, PURPOSE & FEATURES



**Val-Matic Air Valves fully  
comply with ANSI/AWWA  
C512 and are NSF/ANSI 61  
Certified for Water Quality.**

	Air Release Valve	Air/Vacuum Valve	Combination Air Valve	Surge-Suppression Air Valve	Vacuum Breaker Valve	Well Service Air Valve	Wastewater Air Release Valve	Wastewater Air/Vacuum Valve	Wastewater Combination Valve	Vacuum Priming Valve
<b>PIPELINE APPLICATIONS</b>										
Water distribution and transmission	x	x	x	x	x					
Municipal wastewater collection						x	x	x		
Force Main				x	x		x	x	x	
<b>PUMP APPLICATIONS</b>										
Centrifugal pump volute	x					x		x	x	
Lift station						x	x	x	x	
Pump station high points	x		x	x						
Turbine well pump discharge					x					
Booster pump station	x		x	x						
Fire pumps (FM Approved, UL Listed)	x				x					
<b>WATER/WASTEWATER TREATMENT PLANT APPLICATIONS</b>										
High Points	x		x	x		x		x		
Filter backwash piping	x		x	x		x				
Pressure filters	x		x	x						
Venturi meters	x									
<b>TANK APPLICATIONS</b>										
Storage tank valves			x	x						
Hydropneumatic tanks	x									
<b>FUNCTION</b>										
Venting of accumulated air during system operation	x		x	x		x		x	x	
Admitting large volumes of air during shut down and draining operations (Power failure)		x	x	x	x	x		x	x	
Vacuum protection (pipe joints, gaskets, packing, etc.)		x	x	x	x	x		x	x	
Regulated-Exhaust of large volumes of air during start-up and filling operations				x		x				
<b>PURPOSE</b>										
Maintain pipeline efficiency	x		x	x		x		x		
Provide protection from pipeline collapse due to vacuum		x	x	x	x			x	x	
Air related surge protection		x	x	x	x	x		x	x	
Air related head loss protection (efficiency)	x		x	x		x		x		
Column separation vacuum protection				x	x	x		x	x	
Air bound pump protection	x									x
Extend air valve life				x						
Maintain pump prime										x
Reduce Air/Vacuum valve size requirement				x						
<b>FEATURES</b>										
Conforms to AWWA standard	x	x	x	x		x				x
Certified to NSF/ANSI 61	x	x	x	x	x	x				
Adjustable seating	x		x	x			x		x	x
Full flow area equal to nominal valve size		x	x	x	x	x		x	x	
Inlets and Outlets equal to or greater than the nominal valve size		x	x	x	x	x		x	x	
Single and dual body designs			x	x					x	
Bell bottom body (anti-clog)						x	x	x		
Regulated-Exhaust Device (Slow-Closing Device)				x		x				

## AIR RELEASE VALVES:

### OPERATIONAL HIGHLIGHT

- Maintains system flow efficiency
- Releases unwanted air pockets during system operation
- Protects system against air related surges

### PRODUCT FEATURES

- Unconditionally guaranteed stainless steel floats
- Stainless steel 316 internal trim
- Resilient seating for positive shutoff
- Performance proven for over 40 years
- Non-clog design eliminates backwashing

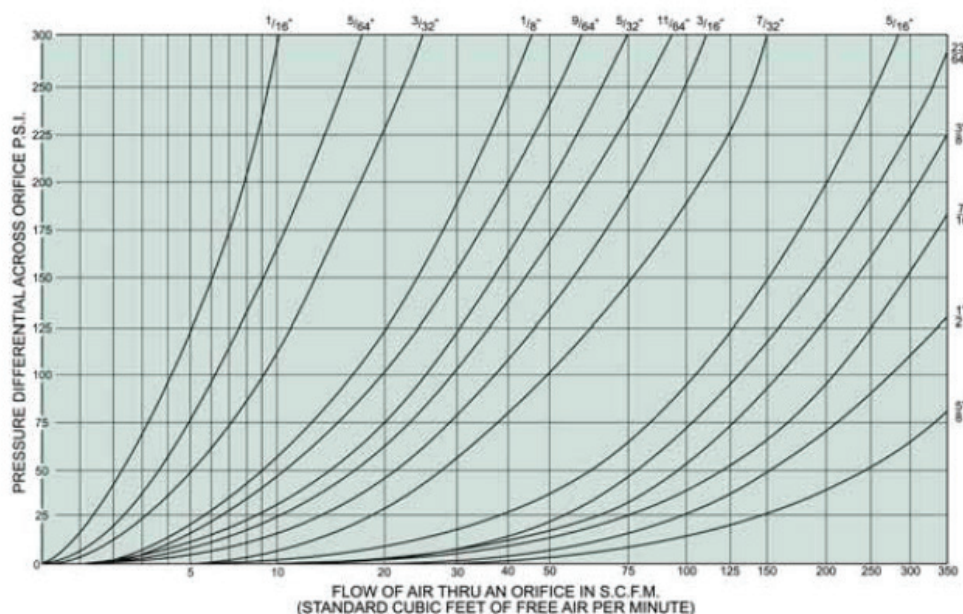
## OPTIONAL ACCESSORIES

- Vacuum check (prevents inflow of air)
- Outlet hood with screen (prevents debris from entering valves)
- Ball and plug isolation valves (allows valve maintenance)
- Inflow Preventer on outlet (stops flood water and resulting contamination from entering pipeline)
- Backwash kit (for severe wastewater applications)



MATERIALS OF CONSTRUCTION		
COMPONENT	STANDARD	OPTIONAL
Body and Cover	Cast Iron ASTM A126 Class B < 300 psig	Ductile Iron ASTM A536 Grade 65-45-12 Stainless Steel ASTM A351 Grade CF8M
Trim	Type 316 Stainless Steel	—
Coating	Universal Alkyd Primer (external)	Non-Stick Fusion Bonded Epoxy (internal & external)

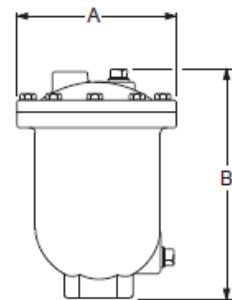
**Venting Capacity for Air Release Valve Orifice Sizes**



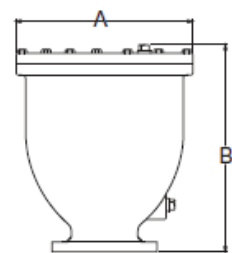
## AIR RELEASE VALVES INSTALLATION DIMENSIONS

WATER AIR RELEASE VALVES						
Inlet Size	Outlet Size	Model Number	CWP PSI	Orifice Size	Dimensions	
					A	B
1/2" NPT	1/2" NPT	15A*•	175	1/16"	4 3/4"	5 1/4"
3/4" NPT	1/2" NPT	15A.2*•	175	1/16"	4 3/4"	5 1/4"
1" NPT	1/2" NPT	15A.3*•	175	1/16"	4 3/4"	5 1/4"
1" NPT	1/2" NPT	22.3*•	175	3/32"	5 1/8"	6"
1/2" - 3/4" NPT	1/2" NPT	22.4*•	175	3/32"	5 1/8"	6"
1/2" NPT	1/2" NPT	22.7*•	300	1/16"	5 1/8"	6"
1/2" - 1" NPT	1/2" NPT	22.9*	300	1/16"	5 1/8"	6"
3/4" - 1" NPT	1/2" NPT	25.5*	150	1/8"	6 1/8"	7"
3/4" - 1" NPT	1/2" NPT	25.6*	300	3/32"	6 1/8"	7"
1" NPT	1/2" NPT	38*	150	3/16"	7"	10"
1" NPT	1/2" NPT	38HP*	500	1/8"	7"	10"
2" NPT	1/2" NPT	38.2*	150	3/16"	7"	10"
1" NPT	1/2" NPT	38.5*	300	5/32"	7"	10"
2" NPT	1/2" NPT	38.6*	300	5/32"	7"	10"
2" NPT	1" NPT	45*	150	23/64"	9 1/2"	12 1/4"
2" NPT	1" NPT	45HP*	400	3/16"	9 1/2"	12 1/4"
3" NPT	1" NPT	45.2*	150	23/64"	9 1/2"	12 1/4"
2" NPT	1" NPT	45.5*	300	7/32"	9 1/2"	12 1/4"
3" NPT	1" NPT	45.6*	300	7/32"	9 1/2"	12 1/4"
2" NPT	1" NPT	50*	500	7/32"	10 7/8"	13"
2" NPT	1" NPT	50HP*	1000	1/8"	10 7/8"	13"
6" 125lb Flg	1" NPT	61*	150	1"	18 3/4"	22"

\*NSF/ANSI 61 Certified • UL Listed/FM Approved

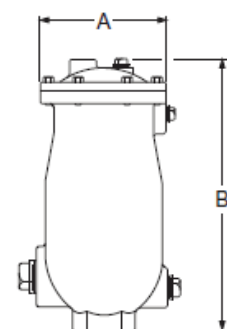


**15A - 50HP**  
Air Release Valve



**61**  
Air Release Valve

WASTEWATER AIR RELEASE VALVES						
Inlet Size	Outlet Size	Model Number	CWP PSI	Orifice Size	Dimensions	
					A	B
2" NPT	1/2" NPT	48A	150	3/16"	7"	15 5/16"
3" NPT	1/2" NPT	48A.2	150	3/16"	7"	15 5/16"
2" NPT	1/2" NPT	48A.4	75	5/16"	7"	15 5/16"
3" NPT	1/2" NPT	48A.5	75	5/16"	7"	15 5/16"
2" NPT	1" NPT	49A	150	7/16"	9 1/2"	17 9/16"
3" NPT	1" NPT	49A.2	150	7/16"	9 1/2"	17 9/16"
2" NPT	1" NPT	49A.4	75	1/2"	9 1/2"	17 9/16"
3" NPT	1" NPT	49A.5	75	1/2"	9 1/2"	17 9/16"
4" NPT	1" NPT	49A.6	75	1/2"	9 1/2"	17 9/16"



**48A - 49A.6**  
Wastewater Air Release Valves



## AIR/VACUUM VALVES:

### OPERATIONAL HIGHLIGHT

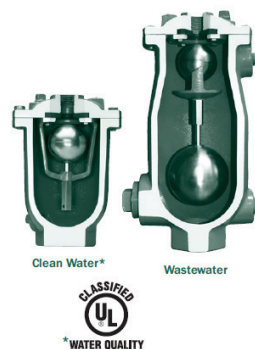
- Exhausts large quantities of air at system start-up
- Provides pipeline vacuum protection
- Responds to loss of pressure during power failures, line breaks and intentional drainage

### PRODUCT FEATURES

- Unconditionally guaranteed stainless steel floats
- Stainless steel 316 internal trim
- Exclusive high/low pressure resilient seating
- Full pipe size inlets and outlets provide maximum protection
- Non-clog design eliminates backwashing

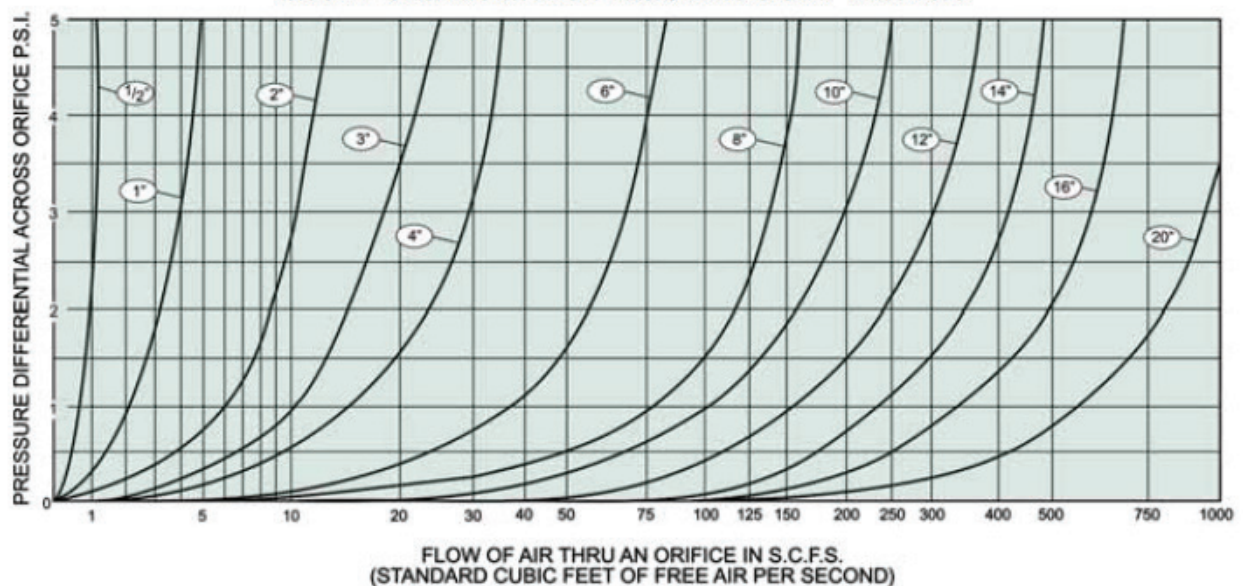
## OPTIONAL ACCESSORIES

- Outlet hood with screen (prevents debris from entering valves)
- Flanged outlets on sizes 8 inch & smaller
- Ball, plug, and butterfly isolation valves (allows valve maintenance)
- Inflow Preventer on outlet (stops flood water and resulting contamination from entering pipeline)
- Backwash kit (for severe wastewater applications)



MATERIALS OF CONSTRUCTION		
COMPONENT	STANDARD	OPTIONAL
Body and Cover	Cast Iron ASTM A126 Class B Class 125 and 250	Ductile Iron ASTM A536 Grade 65-45-12 Stainless Steel ASTM A351 Grade CF8M
Trim	Type 316 Stainless Steel	-
Coating	Universal Alkyd Primer (external)	Non-Stick Fusion Bonded Epoxy (internal & external)

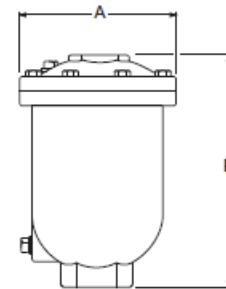
## FLOW CAPACITY OF AIR/VACUUM VALVES



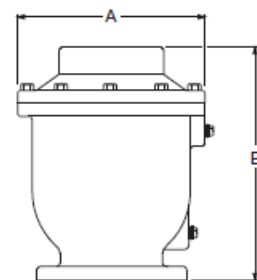


## AIR/VACUUM VALVES INSTALLATION DIMENSIONS

WATER AIR/VACUUM VALVES					
Inlet Size	Outlet Size	Model Number	CWP PSI	Dimensions	
				A	B
1/2" NPT	1/2" NPT	100S	300	6 1/8"	7"
1" NPT	1" NPT	101S	300	7"	9 1/2"
2" NPT	2" NPT	102S	300	9 1/2"	12"
3" NPT	3" NPT	103S	300	9 1/2"	12"
4" Flg	4" NPT	104S 154S	125lb - 150 250lb - 300	12"	20 3/4"
6" Flg	6" NPT	106S 156S	125lb - 150 250lb - 300	14"	18 5/8"
8" Flg	8" NPT	108S 158S	125lb - 150 250lb - 300	17 1/4"	21 5/8"
10" Flg	10" Flg	110F 160F	125lb - 150 250lb - 300	20"	26"
12" Flg	12" Flg	112F 162F	125lb - 150 250lb - 300	24"	31"
14" Flg	14" Flg	114F 164F	125lb - 150 250lb - 300	27"	34"
16" Flg	16" Flg	116F 166F	125lb - 150 250lb - 300	30 1/2"	34"
20" Flg	20" Flg	120F 170F	125lb - 150 250lb - 300	38 1/4"	36 1/4"

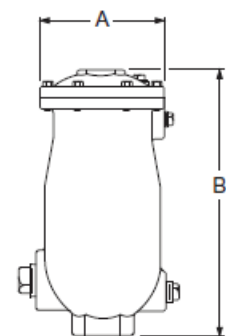


**100S - 103S**  
Air/Vacuum Valves



**104S - 170F**  
Air/Vacuum Valves

WASTEWATER AIR/VACUUM VALVES					
Inlet Size	Outlet Size	Model Number	CWP PSI	Dimensions	
				A	B
2" NPT	1" NPT	301A	150	7"	15 1/16"
2" NPT	2" NPT	302A	150	9 1/2"	17 7/16"
3" NPT	3" NPT	303A	150	9 1/2"	17 7/16"
4" Flg	4" NPT	304	150	11 1/2"	36 1/2"
6" Flg	6" NPT	306	150	14"	36 1/2"
8" Flg	8" NPT	308	150	17 1/4"	40 1/8"



**301A - 308**  
Wastewater Air/Vacuum Valves

## COMBINATION AIR VALVES:

### OPERATIONAL HIGHLIGHT

- Provides the functions of both Air Release and Air/Vacuum Valves
- Exhausts large quantities of air at system start-up
- Releases air pockets during system operation
- Provides pipeline vacuum protection

### PRODUCT FEATURES

- Single body incorporates both features within one valve – More compact and economical
- Dual body consists of two independent valves – Allows individual maintenance while still protecting the pipeline – Wider range of sizing options
- Inlets and outlets are equal to full nominal size
- Unconditionally guaranteed stainless steel floats
- Stainless steel 316 internal trim
- Non-clog design eliminates backwashing
- Exclusive high/low pressure resilient seating

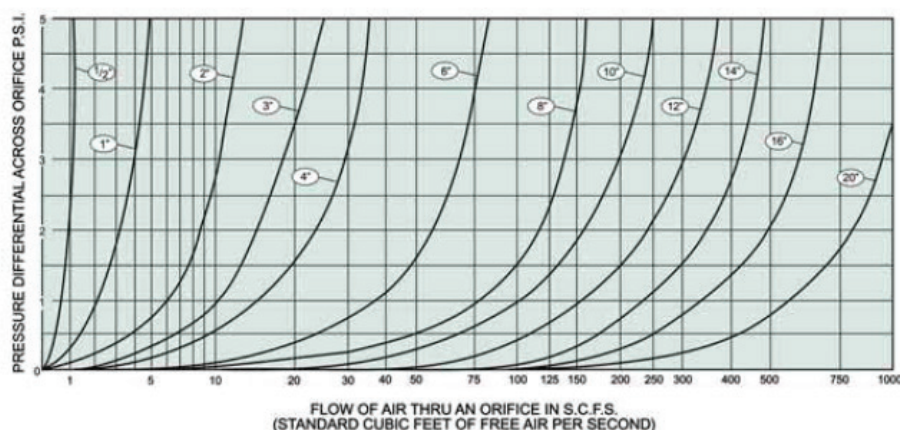
## OPTIONAL ACCESSORIES

- Outlet hood with screen (prevents debris from entering valves)
- Ball, plug and butterfly isolation valves (allows valve maintenance)
- Inflow Preventer on outlet (stops flood water and resulting contamination from entering pipeline)
- Backwash kit (for severe wastewater applications)



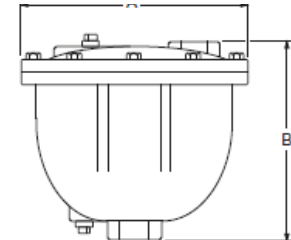
MATERIALS OF CONSTRUCTION		
COMPONENT	STANDARD	OPTIONAL
Body and Cover	Cast Iron ASTM A126 Class B Class 125 and 250	Ductile Iron ASTM A536 Grade 65-45-12 Stainless Steel ASTM A351 Grade CF8M
Trim	Type 316 Stainless Steel	-
Coating	Universal Alkyd Primer (external)	Non-Stick Fusion Bonded Epoxy (internal & external)

### FLOW CAPACITY OF COMBINATION AIR VALVES

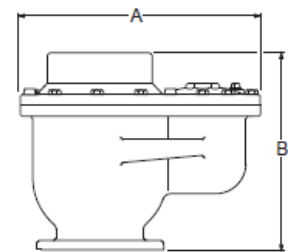


## COMBINATION AIR VALVES INSTALLATION DIMENSIONS

WATER COMBINATION AIR VALVES (SINGLE BODY)						
Inlet Size	Outlet Size	Model Number	CWP PSI	Orifice Size	Dimensions	
					A	B
1" NPT	1" NPT	201C.2	300	5/64"	11 3/8"	10 1/2"
2" NPT	2" NPT	202C.2	300	3/32"	14"	13"
3" NPT	3" NPT	203C.2	300	3/32"	16"	15"
3" 125lb Flg	3" NPT	203C.14	150	3/32"	16"	16 3/4"
3" 250lb Flg	3" NPT	203C.15	300	3/32"	16"	17 1/4"
4" NPT	4" NPT	204C.2	300	3/32"	18 1/2"	17"
4" 125lb Flg	4" NPT	204C.14	150	3/32"	18 1/2"	19 3/4"
4" 250lb Flg	4" NPT	204C.15	300	3/32"	18 1/2"	20 1/4"
6" 125lb Flg	6" NPT	206C	150	3/8"	21"	20 1/4"
6" 250lb Flg	6" NPT	256C	300	7/32"	21"	20 1/4"
8" 125lb Flg	8" NPT	208C	150	3/8"	25"	23 1/2"
8" 250lb Flg	8" NPT	258C	300	7/32"	25"	23 1/2"

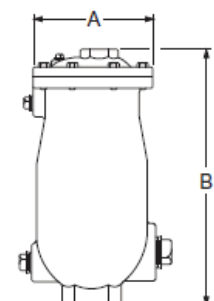


**201C.2 - 204C.15**  
Single Body Combination  
Air Valves



**206C - 258C**  
Single Body  
Combination Air Valves

WASTEWATER COMBINATION AIR VALVES (SINGLE BODY)						
Inlet Size	Outlet Size	Model Number	CWP PSI	Orifice Size	Dimensions	
					A	B
2" NPT	1" NPT	801A	150	1/8"	7"	14 15/16"
2" NPT	2" NPT	802A	150	9/64"	9 1/2"	18 1/16"
3" NPT	3" NPT	803A	150	11/64"	11"	23 1/2"
4" NPT	4" NPT	804	150	11/64"	11"	23 1/2"

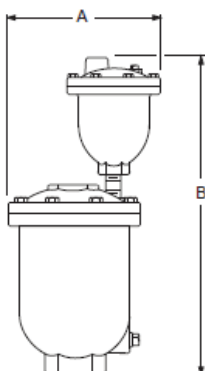


**801A - 804**  
Wastewater  
Single Body Combination  
Air Valves



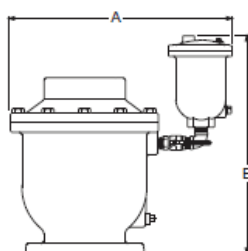
Surge-Suppression Air Valves and Isolation Valves in a pump discharge application.

## COMBINATION AIR VALVES INSTALLATION DIMENSIONS



**101S/22.9 - 103S/22.9**  
Dual Body Combination  
Air Valves

WATER COMBINATION AIR VALVES (DUAL BODY)						
Inlet Size	Outlet Size	Model Number	CWP PSI	Orifice Size	Dimensions	
					A	B
1" NPT	1" NPT	101S/22.9	300	1/16"	7 7/8"	15 5/8"
2" NPT	2" NPT	102S/22.9	300	1/16"	10 1/4"	17 7/8"
3" NPT	3" NPT	103S/22.9	300	1/16"	10 1/4"	18 1/4"



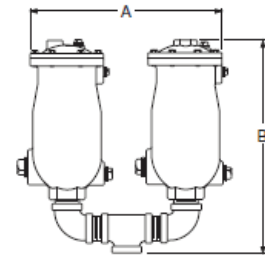
**104S/38 - 166F/45.5**  
Dual Body Combination  
Air Valves

WATER COMBINATION AIR VALVES (DUAL BODY)						
Inlet Size	Outlet Size Air/Vacuum	Model Number	CWP PSI	Orifice Size Air Release	Dimensions	
					A	B
4" Flg	4" NPT	104S/38 154S/38.5	125lb - 150 250lb - 300	3/16" 5/32"	21"	22"
6" Flg	6" NPT	106S/38 156S/38.5	125lb - 150 250lb - 300	3/16" 5/32"	24"	23"
8" Flg	8" NPT	108S/38 158S/38.5	125lb - 150 250lb - 300	3/16" 5/32"	27"	26"
8" Flg	8" NPT	108S/45 158S/45.5	125lb - 150 250lb - 300	23/64" 7/32"	30"	29"
10" Flg	10" Flg	110F/38 160F/38.5	125lb - 150 250lb - 300	3/16" 5/32"	30"	28"
10" Flg	10" Flg	110F/45 160F/45.5	125lb - 150 250lb - 300	23/64" 7/32"	33"	31"
12" Flg	12" Flg	112F/38 162F/38.5	125lb - 150 250lb - 300	3/16" 5/32"	33"	32"
12" Flg	12" Flg	112F/45 162F/45.5	125lb - 150 250lb - 300	23/64" 7/32"	37"	34"
14" Flg	14" Flg	114F/38 164F/38.5	125lb - 150 250lb - 300	3/16" 5/32"	36"	34"
14" Flg	14" Flg	114F/45 164F/45.5	125lb - 150 250lb - 300	23/64" 7/32"	40"	36"
16" Flg	16" Flg	116F/38 166F/38.5	125lb - 150 250lb - 300	3/16" 5/32"	39"	34"
16" Flg	16" Flg	116F/45 166F/45.5	125lb - 150 250lb - 300	23/64" 7/32"	44"	37"



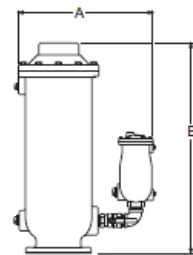
## COMBINATION AIR VALVES INSTALLATION DIMENSIONS

WASTEWATER COMBINATION AIR VALVES (DUAL BODY)						
Inlet Size	Outlet Size	Model Number	CWP PSI	Orifice Size	Dimensions	
					A	B
2" NPT	1" NPT	48A/301A	150	3/16"	20 5/16"	20 5/16"
2" NPT	1" NPT	49A/301A	150	7/16"	19 1/2"	22 3/4"
2" NPT	2" NPT	48A/302A	150	3/16"	20 3/4"	25 3/4"
2" NPT	2" NPT	49A/302A	150	7/16"	20 3/4"	22 3/4"
3" NPT	3" NPT	48A/303A	150	3/16"	21 1/2"	28 1/4"
3" NPT	3" NPT	49A/303A	150	7/16"	21 1/2"	24 3/4"



**48A/301A - 49A/303A**  
Dual Body Wastewater  
Combination Air Valves

WASTEWATER COMBINATION AIR VALVES (DUAL BODY)						
Inlet Size	Outlet Size	Model Number	CWP PSI	Orifice Size	Dimensions	
					A	B
4" Flg	4" NPT	48A/304	150	3/16"	20 3/4"	36 1/2"
4" Flg	4" NPT	49A/304	150	7/16"	20 3/4"	36 1/2"
6" Flg	6" NPT	48A/306	150	3/16"	23 1/4"	36 1/2"
6" Flg	6" NPT	49A/306	150	7/16"	23 1/4"	36 1/2"
8" Flg	8" NPT	48A/308	150	3/16"	25 3/4"	41 1/4"
8" Flg	8" NPT	49A/308	150	7/16"	27 1/2"	41 1/4"



**48A/304 - 49A/308**  
Dual Body Wastewater  
Combination Air Valves



Air Valves are commonly found in plant service as well as pipelines for efficiency and protection. The model shown above is a 48A/308 with flanged outlet and optional Cam-Centric® Plug Valve for isolation and maintenance.

## SURGE-SUPPRESSION AIR VALVES:

### OPERATIONAL HIGHLIGHT

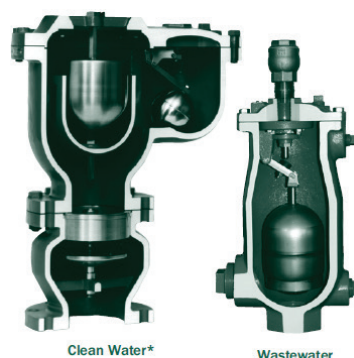
- Provides full vacuum protection for the pipeline
- Provides slow closure suppressing surge in the pipeline
- Minimizes water blow-by during Air Valve closure
- Allows the use of smaller valve size by utilizing a maximum sizing differential pressure of 5 psig
- Releases entrained air while pipeline is operating to maintain pumping efficiency
- Fully complies with AWWA C512 and NSF 61

### PRODUCT FEATURES

- Restrictor disc provides regulated exhaust to limit secondary surges during column separation
- Ability to adjust air exhaust for greater surge suppression
- Provides full vacuum flow port

### OPTIONAL ACCESSORIES

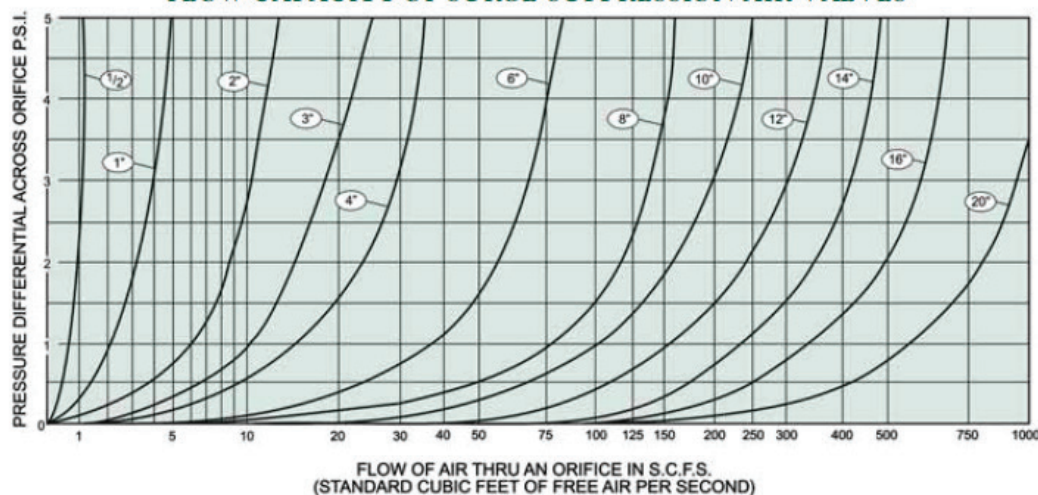
- Outlet hood with screen (prevents debris from entering valves)
- Ball and butterfly isolation valves (allows valve maintenance)
- Inflow Preventer on outlet (stops flood water and resulting contamination from entering pipeline)
- Backwash kit (for severe wastewater applications)



MATERIALS OF CONSTRUCTION		
COMPONENT	STANDARD	OPTIONAL
Body	Cast Iron ASTM A126 Class B	Ductile Iron ASTM A536 Grade 65-45-12
Trim	Type 316 Stainless Steel (Air Valve) Bronze ASTM B584 C83600 (Reg. Exh. Dev.)*	Stainless Steel ASTM A351 Grade CF8M (Reg. Exh. Dev.)*
Exterior Coating	Universal Primer (external)	Non-Stick Fusion Bonded Epoxy (internal & external)

\*(Reg. Exh. Dev.) = Regulated-Exhaust Device

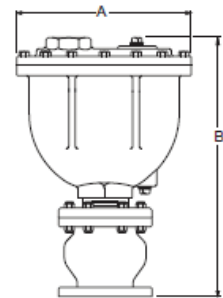
### FLOW CAPACITY OF SURGE-SUPPRESSION AIR VALVES



## COMBINATION AIR VALVES INSTALLATION DIMENSIONS

### WATER SURGE-SUPPRESSION AIR VALVES (SINGLE BODY)

Inlet Size	Outlet Size	Model Number	CWP PSI	Orifice Size	Dimensions	
					A	B
1" NPT	1" NPT	201CSS	250	5/64"	11 3/8"	13 5/8"
2" NPT	2" NPT	202CSS	250	3/32"	14"	17 1/4"
3" 125lb Flg	3" NPT	203CSS	300	3/32"	16"	22 3/4"
3" 250lb Flg	3" NPT	253CSS	300	3/32"	16"	22 3/4"
4" 125lb Flg	4" NPT	204CSS	300	3/32"	18 1/2"	27"
4" 250lb Flg	4" NPT	254CSS	300	3/32"	18 1/2"	27"
6" 125lb Flg	6" NPT	206CSS	150	3/8"	21"	30"
8" 250lb Flg	8" NPT	256CSS	300	7/32"	21"	30"
6" 125lb Flg	6" NPT	208CSS	150	3/8"	25"	36"
8" 250lb Flg	8" NPT	258CSS	300	7/32"	25"	36"



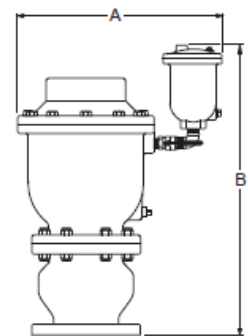
**203CSS - 258CSS**  
Surge-Suppression Single Body  
Air Valves

### WATER SURGE-SUPPRESSION AIR VALVES (DUAL BODY)

Inlet* Size	Outlet** Size	Model Number	CWP PSI	Orifice Size	Dimensions	
					A	B
4" 125lb Flg	4" NPT	104SS/38	150	3/16"	21"	29"
4" 250lb Flg	4" NPT	154SS/38.5	300	5/32"	21"	29"
6" 125lb Flg	6" NPT	106SS/38	150	3/16"	22 1/2"	33"
6" 250lb Flg	6" NPT	156SS/38.5	300	5/32"	22 1/2"	33"
8" 125lb Flg	8" NPT	108SS/38	150	3/16"	27"	38"
8" 250lb Flg	8" NPT	158SS/38.5	300	5/32"	27"	38"
10" 125lb Flg	10" Flg	110FSS/45	150	23/64"	33"	47"
10" 250lb Flg	10" Flg	160FSS/45.5	300	7/32"	33"	47"
12" 125lb Flg	12" Flg	112FSS/45	150	23/64"	37"	48 1/2"
12" 250lb Flg	12" Flg	162FSS/45.5	300	7/32"	37"	48 1/2"

\* For sizes 14" - 20" Consult Factory

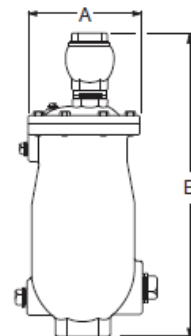
\*\*All outlet flanges are class 125 lb.



**104SS/38 - 162FSS/45.5**  
Surge-Suppression Dual Body  
Air Valves

### WASTEWATER SURGE-SUPPRESSION AIR VALVES (SINGLE BODY)

Inlet Size	Outlet Size	Model Number	CWP PSI	Orifice Size	Dimensions	
					A	B
2" NPT	1" NPT	801SS	150	1/8"	7"	18"
2" NPT	2" NPT	802SS	150	9/64"	9 1/2"	23"
3" NPT	3" NPT	803SS	150	11/64"	11"	33"
4" NPT	4" NPT	804SS	150	11/64"	11"	34"



**801SS - 804SS**  
Surge-Suppression Single Body  
Air Valves

## WELL SERVICE AIR VALVES:

### OPERATIONAL HIGHLIGHT

- Regulates the exhaust of air on pump start-up
- Admits air to protect pump and mechanical seals
- Protects against air-related surges on pump start-up
- Fully complies with AWWA C512 and NSF 61

### PRODUCT FEATURES

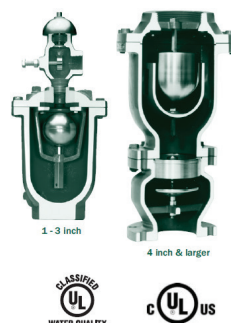
- Unconditionally guaranteed 316 stainless steel floats
- Inlets and outlets are equal to full nominal pipe area
- 1/2" - 3" equipped with Dual Port Throttling Device
- 4" and larger equipped with Regulated-Exhaust Device mounted on the inlet

## DUAL PORT THROTTLING DEVICE

- Adjustable discharge outlet provides regulated air exhaust
- Allows air to enter the system on pump shut down through an unrestricted independent vacuum port

## REGULATED-EXHAUST DEVICE

- Retrictor disc provides regulated exhaust to limit pump column surges
- Ability to adjust air exhaust for greater surge suppression
- Provides full vacuum flow port



MATERIALS OF CONSTRUCTION		
COMPONENT	STANDARD	OPTIONAL
Body and Cover	Cast Iron ASTM A126 Class B Class 125 and 250	Ductile Iron ASTM A536 Grade 65-45-12 Stainless Steel ASTM A351 Grade CF8M
Trim	Type 316 Stainless Steel (Air Valve) Bronze ASTM B584 C83600 (Reg. Exh. Dev.)*	-
Coating	Universal Alkyd Primer (external)	Non-Stick Fusion Bonded Epoxy (internal & external)

\*(Reg. Exh. Dev.) = Regulated-Exhaust Device

WELL SERVICE AIR VALVE SIZING			
VALVE SIZE	NO HEAD PUMP CAPACITY, GPM	MODEL NUMBER	
		150 PSI MODEL	300 PSI MODEL
1/2"	0 - 350	100ST	
1"	351 - 1,350	101ST	
2"	1,351 - 4,000	102ST	
3"	4,001 - 7,000	103ST	
4"	7,001 - 11,000	104SS	154SS
6"	11,001 - 24,000	106SS	156SS
8"	24,001 - 50,000	108SS	158SS
10"	50,001 - 70,000	110FSS	160FSS
12"	70,001 - 110,000	112FSS	162FSS

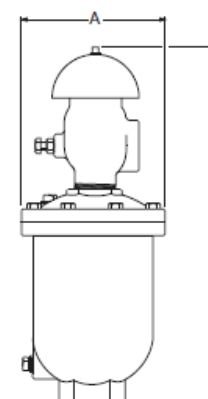


## WELL SERVICE AIR VALVES INSTALLATION DIMENSIONS

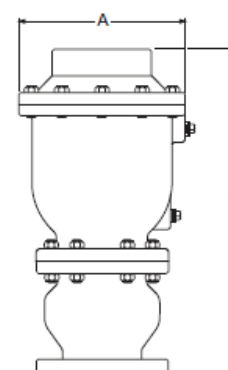
Well Service Air Valve with Dual Port Throttling Device					
Inlet Size	Outlet Size	Model Number	CWP PSI	Dimensions	
				A	B
1/2" NPT	1/2" NPT	100ST	300	6 1/8"	11 3/4"
1" NPT	1" NPT	101ST*	300	7"	14 3/4"
2" NPT	2" NPT	102ST*	300	9 1/2"	20 1/8"
3" NPT	3" NPT	103ST*	300	9 1/2"	22 1/8"

\*UL Listed for fire pump service

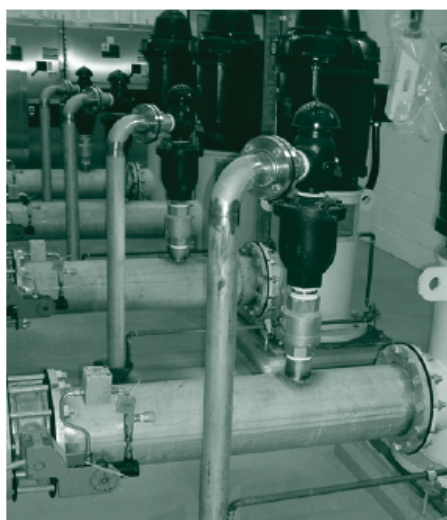
Well Service Air Valve with Regulated-Exhaust Device					
Inlet Size	Outlet Size	Model Number	CWP PSI	Dimensions	
				A	B
4" 125lb Flg	4" NPT	104SS	150	11 1/2"	22 3/4"
4" 250lb Flg	4" NPT	154SS	300	11 1/2"	22 3/4"
6" 125lb Flg	6" NPT	106SS	150	14"	28 1/2"
6" 250lb Flg	6" NPT	156SS	300	14"	28 1/2"
8" 125lb Flg	8" NPT	108SS	150	17 1/4"	35 5/16"
8" 250lb Flg	8" NPT	158SS	300	17 1/4"	35 5/16"
10" 125lb Flg	10" 125lb Flg	110FSS	150	20 1/4"	40 1/16"
10" 250lb Flg	10" 125lb Flg	160FSS	300	20 1/4"	40 1/16"
12" 125lb Flg	12" 125lb Flg	112FSS	150	24"	44 5/16"
12" 250lb Flg	12" 125lb Flg	162FSS	300	24"	44 5/16"



**100ST - 103ST**  
Well Service Air Valves with  
Dual Port Throttling Device



**104SS - 162FSS**  
Well Service Air Valves  
with Regulated-Exhaust Device



3" Well Service Air Valve on Vertical Pump discharge.

## WELL SERVICE AIR VALVES:

### OPERATIONAL HIGHLIGHT

- Provides vacuum protection for pipelines and tanks
- Cushions surges related to column separation
- Opens in response to a 0.25 psi vacuum

### PRODUCT FEATURES

- Resilient seals provide drop tight seating
- Full flow areas provide maximum vacuum protection

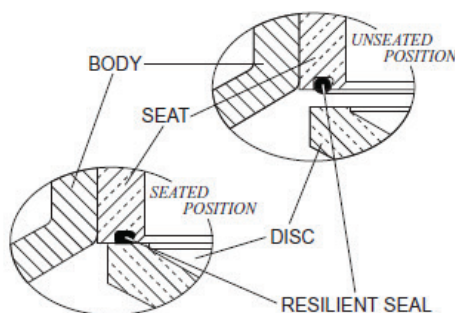
## OPTIONAL ACCESSORIES

- Hood with inlet screen (prevents debris from entering valves)
- Air Release Valve (slowly releases air to prevent violent rejoining of water columns)
- Inflow Preventer on outlet (stops flood water and resulting contamination from entering pipeline)



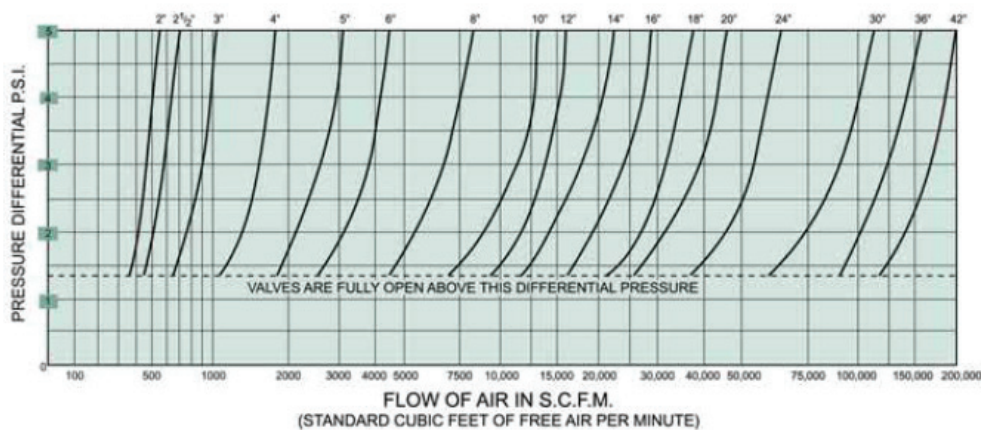
Vacuum Breaker with optional Air Release Valve

### SEAT DETAIL



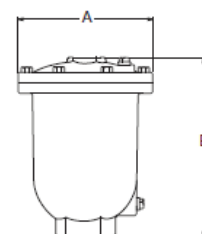
MATERIALS OF CONSTRUCTION		
COMPONENT	STANDARD	OPTIONAL
Body and Cover	Cast Iron ASTM A126 Class B Class 125 and 250	Ductile Iron ASTM A536 Grade 65-45-12
Trim	Bronze, ASTM B584, C83600	Stainless Steel ASTM A351 Grade CF8M
Coating	Universal Alkyd Primer	Non-Stick Fusion Bonded Epoxy (internal & external)

### VENTING CAPACITY FOR VACUUM BREAKERS



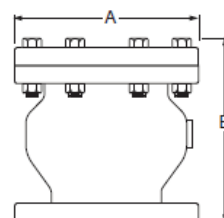
## WELL SERVICE AIR VALVES INSTALLATION DIMENSIONS

THREADED VACUUM BREAKER AIR VALVE					
INLET	OUTLET	MODEL NUMBER	CWP	Dimensions	
				A	B
1/2" NPT	1/2" NPT	100VB	300	6 1/8"	8"
1" NPT	1" NPT	101VB	300	7"	11"
2" NPT	2" NPT	102VB	300	9 1/2"	14"
3" NPT	3" NPT	103VB	300	9 1/2"	14 1/2"



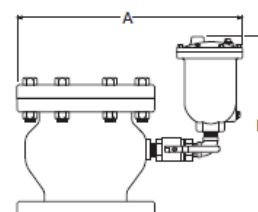
**100VB-103VB**  
Vacuum Breaker Valves

FLANGED VACUUM BREAKER AIR VALVE						
INLET SIZE *	MODEL NUMBER		MODEL NUMBER		Dimensions	
	125lb CLASS (CWP)		250lb CLASS (CWP)		A	B
2	1802VB	200	1852VB	400	7"	8 1/2"
2.5	1825VB	200	1875VB	400	7"	8 1/2"
3	1803VB	200	1853VB	400	7 1/2"	10"
4	1804VB	200	1854VB	400	9"	11 1/4"
5	1805VB	200	1855VB	400	10"	13"
6	1806VB	200	1856VB	400	11"	14 1/4"
8	1808VB	200	1858VB	400	13 1/2"	18"
10	1810VB	200	1860VB	400	16"	21 1/2"
12	1812VB	200	1862VB	400	19"	21 3/8"



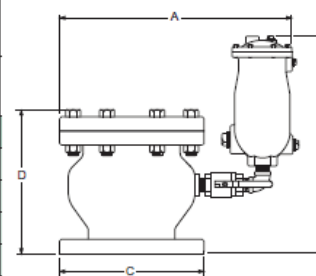
**1802VB-1862VB**  
Vacuum Breaker Valves

FLANGED VACUUM BREAKER WITH AIR RELEASE VALVE						
INLET SIZE*	MODEL NUMBER		MODEL NUMBER		Dimensions	
	125lb CLASS (CWP)		250lb CLASS (CWP)		A	B
3	1803VB/38	150	1853VB/38.5	300	16"	15"
4	1804VB/38	150	1854VB/38.5	300	17 3/8"	15 7/8"
5	1805VB/38	150	1855VB/38.5	300	18 3/4"	16 3/4"
6	1806VB/38	150	1856VB/38.5	300	20"	17 1/4"
8	1808VB/38	150	1858VB/38.5	300	22 3/4"	18 1/4"
10	1810VB/38	150	1860VB/38.5	300	25 5/8"	19 3/4"
12	1812VB/38	150	1862VB/38.5	300	28 3/4"	19 1/8"



**1803VB/38 - 1862VB/38.5**  
Vacuum Breaker Valves

FLANGED VACUUM BREAKER WITH AIR RELEASE VALVE FOR WASTEWATER SERVICE							
INLET SIZE*	MODEL NUMBER	MODEL NUMBER with Air Release Valve		Dimensions			
		125lb CLASS (CWP)		A	B	C	D
3	1803VBS	1803VBS/48A	200	16"	20 5/16"	7 1/2"	10"
4	1804VBS	1804VBS/48A	200	17 3/8"	21 5/16"	9"	11 1/4"
5	1805VBS	1805VBS/48A	200	18 3/4"	22 1/16"	10"	13"
6	1806VBS	1806VBS/48A	200	20"	22 9/16"	11"	14 1/4"
8	1808VBS	1808VBS/48A	200	22 3/4"	23 9/16"	13 1/2"	18"
10	1810VBS	1810VBS/48A	200	25 5/8"	25 1/16"	16"	21 1/2"
12	1812VBS	1812VBS/48A	200	28 3/4"	24 7/16"	19"	21 3/8"



**1803VBS - 1812VBS/48A**  
Vacuum Breaker Valves

\*For sizes 14" - 42" consult factory

## VACUUM PRIMING VALVES:

### OPERATIONAL HIGHLIGHT

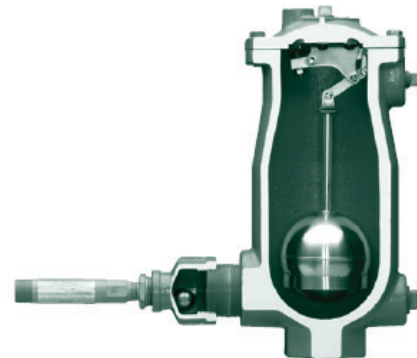
- Allows the extraction of air from the pump housing and suction piping
- Float rises and closes the priming valve to prevent fluid from flowing into the vacuum priming system
- Continues to release air while the pump is running

### PRODUCT FEATURES

- Specifically designed to prevent fluid leakage
- Flow sensitive float
- Stainless steel 316 internal trim and float

## OPTIONAL ACCESSORIES

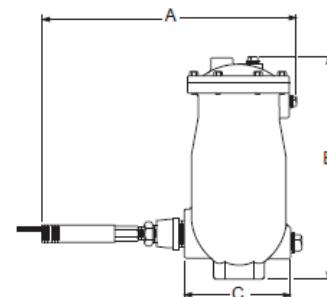
- Water Level Control Switch (Mercury-Free)



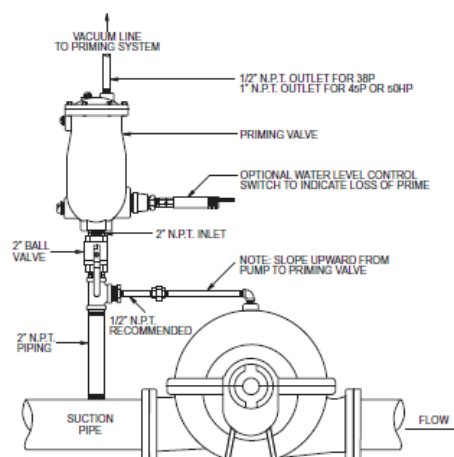
Vacuum Priming Valve

MATERIALS OF CONSTRUCTION		
COMPONENT	STANDARD	OPTIONAL
Body and Cover	Cast Iron ASTM A126, Class B	Ductile Iron ASTM A536 Grade 65-45-12 Stainless Steel ASTM A351 Grade CF8M
Trim	Stainless Steel, Type 316	-
Coating	Universal Alkyd Primer (external)	Non-Stick Fusion Bonded Epoxy (internal & external)

VACUUM PRIMING VALVES							
INLET SIZE	OUTLET SIZE	MODEL NO.	CWP PSI	ORIFICE SIZE	Dimensions		
					A	B	C
2" NPT	1/2" NPT	38P	150	3/16"	16 1/4"	15 5/16"	7"
2" NPT	1/2" NPT	38P.2	75	5/16"	16 1/4"	15 5/16"	7"
2" NPT	1" NPT	45P	150	23/64"	17 1/2"	17 9/16"	9 1/2"
2" NPT	1" NPT	45P.3	75	1/2"	17 1/2"	17 9/16"	9 1/2"



**38P - 45P.3**  
Vacuum Priming Valve  
with Optional Water Level  
Control Switch





## AIR VALVE SIZING SOFTWARE

The Val-Matic airValve Sizing program is an easy to use Windows-based computer program for locating and sizing Air Valves in Water and Wastewater applications.

The pipeline profile data is entered into the program (Figure 1) which evaluates system data and develops sizing criteria such as slope for each pipeline segment and flow rate due to slope. Then it will recommend valve locations, sizes and models and print a valve schedule (Figure 2) and prepare a pipeline profile (Figure 3) for the user. Finally, the program will save your data for future reference.

The Val-Matic airValve Sizing Software is an indispensable, free resource that allows engineers to more effectively and efficiently design their water and wastewater piping systems. It is available for download at [www.valmatic.com](http://www.valmatic.com).

### PROJECT INFORMATION

<b>PROJECT:</b>	<b>SAMPLE</b>
<b>OWNER:</b>	Valmatic
<b>ENGINEER:</b>	Valmatic
<b>MEDIA:</b>	Water-NSF/ANSI 61 Certified
<b>PIPE MATERIAL:</b>	Steel or Stainless
<b>PIPE INSIDE DIAMETER:</b>	47.00
<b>STEEL PIPE THICKNESS:</b>	0.25 In
<b>MAX FLOW RATE:</b>	30,000 GPM
<b>FILL RATE:</b>	12,000 GPM
<b>SELECTED SAFETY FACTOR:</b>	4:1
<b>DIFF.PRES. FOR VAC. SIZING:</b>	2.45 Psi
<b>VALVE RATING:</b>	150 Psig (Class 125 Iron)
<b>REVERSE FLOW:</b>	No
<b>VALVE SELECTION CRITERIA:</b>	Surge-Suppression Air Valves

FIGURE 1

### PIPELINE AIR VALVE SAMPLE SCHEDULE

Station No	ELEV ft	Excav ft	Description	Recommended Valve Size/Model	Max Slope	Flow Rate CFS
0	0	0.00	Beginning	No valve necessary	0.00	0.00
1,600	5	0.00	Long Ascent	8 IN #108SS Surge-Suppression AV	0.00	84.41
3,200	10	0.00	High Point	8 IN #108SS/38 Surge-Suppression AV	0.00	84.41
4,933	10	0.00	Long Horiz	2 IN #38.2 Air Release	0.00	0.00
6,667	10	0.00	Long Horiz	4 IN #104SS/38 Surge-Suppression AV	0.00	0.00
8,400	10	0.00	Low Point	No valve necessary	0.01	0.00
9,200	20	0.00	High Point	10 IN #110FSS/45 Surge-Suppression AV	0.01	134.66
11,200	16	0.00	Incr in Down-Slope	8 IN #108SS/38 Surge-Suppression AV	-0.02	95.37
12,000	2	0.00	Low Point	No valve necessary	0.02	0.00
12,800	16	0.00	Decr in Up-Slope	8 IN #108SS Surge-Suppression AV	0.02	74.17
13,600	20	0.00	High Point	8 IN #108SS/38 Surge-Suppression AV	0.01	85.17
14,400	20	0.00	End	No valve necessary	0.00	0.00

FIGURE 2

### SAMPLE PIPELINE PROFILE

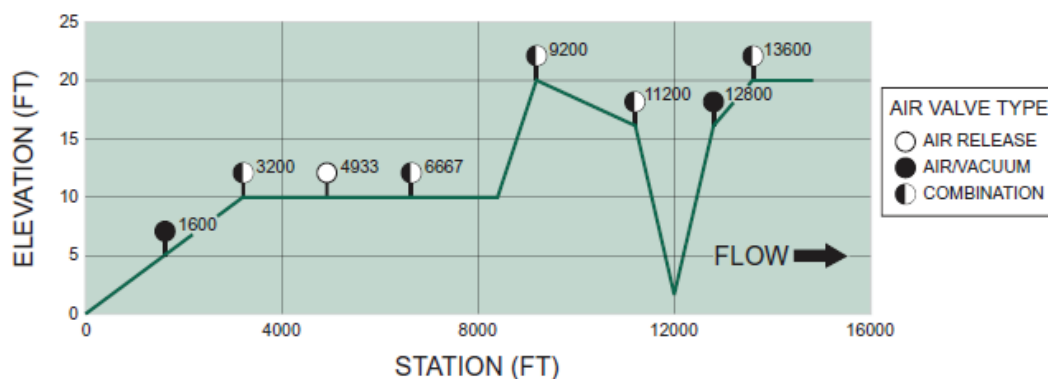
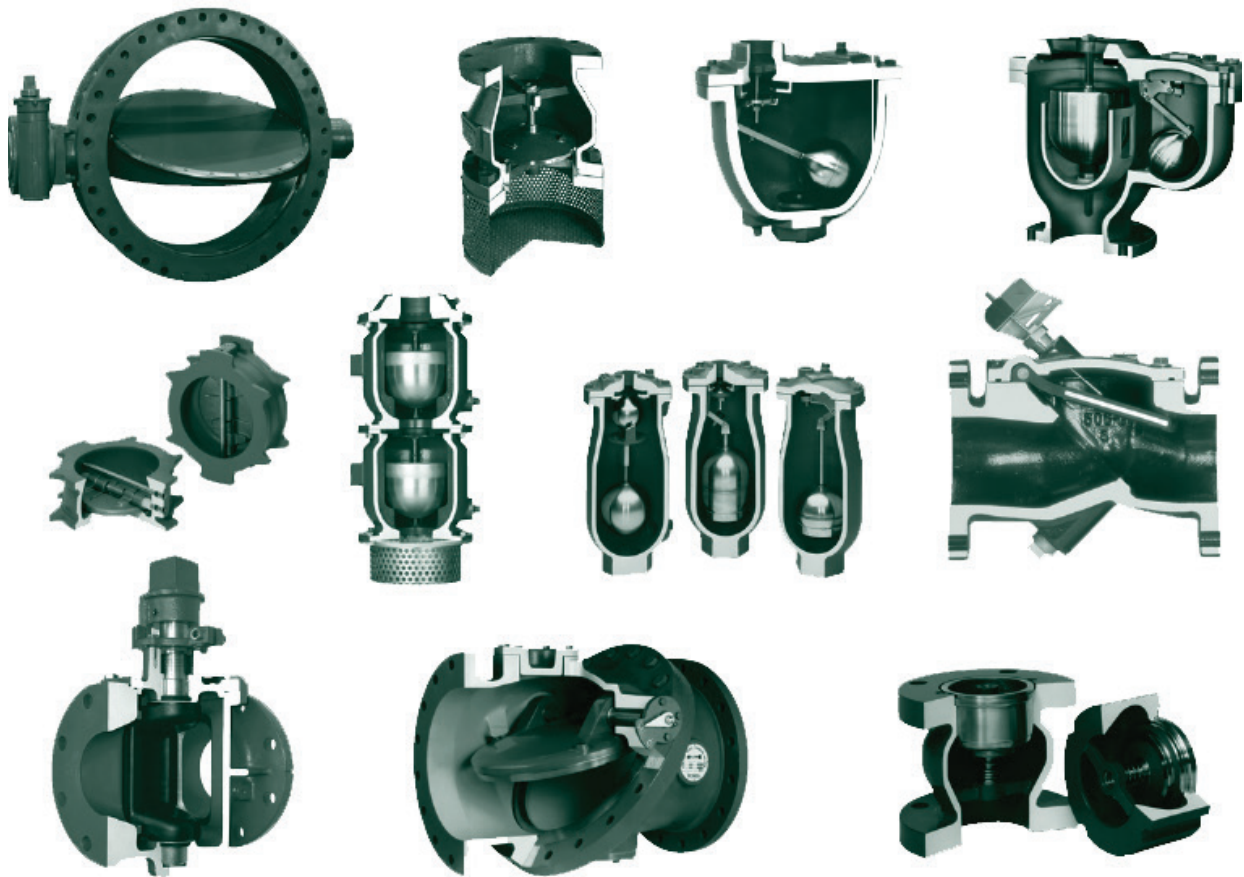


FIGURE 3



## MAKE THE CHANGE TO QUALITY!

Val-Matic's quality of design and meticulous workmanship has set the standards by which all others are measured. Quality design features such as Type 316 stainless steel trim as standard on Air Release, Air/Vacuum and Combination Air Valves... combined resilient/metal to metal seating for Silent Check® Valves...stabilized components that provide extended life of the Dual Disc® Check Valves...high strength and wear resistant aluminum bronze trim as standard for Tilted Disc® Check valves...unrestricted full flow area through Swing-Flex® Check Valves... heavy duty stainless steel screened inlet on Sure Seal® Foot Valves...a Cam-Centric® Plug Valve with more requested features than any other eccentric plug valve, and the American-BFV® Butterfly Valve that provides a field replaceable seat without the need for special tools.

These features coupled with our attention to detail put Val-Matic valves in a class by themselves. The VaultSafe® family of products included the FloodSafe™ Inflow Preventer, FrostSafe® two-way damper and the VentSafe® vent pipe security cage.

Val-Matic is totally committed to providing the highest quality valves and outstanding service to our customers. Complete customer satisfaction is our goal.

FLO-DS-0091 - SEP. 2020