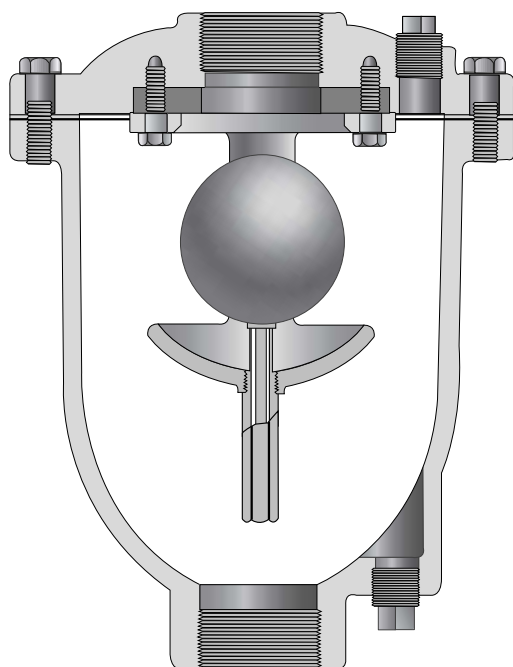




# Series 35

## Air and Vacuum Valves



- Provides High Capacity Venting for Pipeline Protection
- Stainless Steel Trim Standard
- Stainless Steel Floats Guaranteed
- Fully Ported Valves - No Restrictions
- Designed For Drip Tight Seal At Low Pressures

The Cla-Val Series 35 Air and Vacuum Valve is designed to perform two separate functions. First, it will allow large quantities of air to be exhausted from the pipeline as it is being filled with water. When this air has been vented completely, water will enter the valve causing the float to seal tightly against the seat to prevent water flow. Secondly, if the line is being drained, either intentionally or as a result of pipeline breakage, the valve responds to the loss in pressure and opens. This allows air to re-enter the pipeline and prevents potentially damaging vacuum from developing.

Note: The Series 35 does not open under pressure to exhaust small quantities of air which may collect at high points during system normal operation. Series 34 Air Release Valve is required for this function.

### Installation

Series 35 Air and Vacuum Valves should be installed at high points or at grade changes within the pipeline. Mount the unit in the vertical on top of the pipeline with isolation valve below each valve in the event servicing is required. A vault with adequate venting and drainage should also be provided.

### Purchase Specification

The air and vacuum valve shall be able to automatically exhaust large quantities of air during filling of a pipeline and allows air to re-enter pipeline during the draining or when a negative pressure occurs.

The inlet and outlet of the air and vacuum valve shall have the same cross-section area as the pipe size. The float shall be guided by a stainless steel bottom guide shaft. The 4" and larger valve floats shall have top and bottom guide shafts of hexagonal cross section and have a protective steel discharge hood.

The float shall be of all stainless steel construction guaranteed to withstanding the design system surge pressure without failure. The body and cover shall be concentrically located and of cast iron and the valve internal parts shall be of stainless steel with Buna-N® rubber seat.

The Air and Vacuum Valve shall be Series 35 from Cla-Val., Newport Beach, CA U.S.A

### General Specifications

#### Sizes

1/2", 1", 2", 3" NPT  
4" through 16"  
125 lb. flanged ANSI Rated  
250 lb. flanged ANSI Rated

#### Pressure Ratings

175 psi  
300 psi

#### Temperature Range

Water to 180°F

Note: Specify when operating  
pressure below 10 PSI

#### Materials

Body and Cover:  
Cast Iron ASTM  
A 126, Class B

Float:  
Stainless Steel

Internal Parts:  
Stainless Steel

Seal:  
Buna-N® Rubber

### When Ordering, Please Specify:

1. Model Number
2. Inlet Size
3. Inlet Pressure Rating

#### Optional:

For anti-shock air valve shut-off order with  
arrestor check device, order valve with  
suffix "AC" see data sheet pages 32 & 33.



# AIR VACUUM VALVE DATA

## Air and Vacuum Valve Sizing

1. Series 35 Air and Vacuum Valves should be sized to handle the maximum amount of air to be exhausted **or** admitted into the pipeline and not exceed an acceptable pressure differential across the valve.
2. Each high point or change in grade must be examined independently when determining valve size. Use the steepest slope for calculations.
3. Use the flow capacity charts (A) and (B) on page 13 to assist sizing Air and Vacuum Valves.
4. Determine the smallest valve size capable of **exhausting** air equal to the filling rate of the pipeline in CFS while not exceeding a pressure differential of 2 psi across the valve orifice. (Based on pump capacity).

The following formula is recommended to calculate the rate of flow in CFS for filling the pipeline:

$$\text{CFS} = \frac{\text{GPM}}{448.83}$$

Where: CFS = Cubic feet per second  
GPM = Gallons per minute

5. Determine the smallest valve size capable of **admitting** air equal to the potential flow in CFS while not exceeding a pressure differential of 5 psi across the valve orifice. (Based on gravity flow).

The following formula should be used to calculate the rate of flow in CFS that can occur within the pipeline under gravity flow conditions. (During Initial Filling • During Intentional Draining • During A Pipeline Rupture)

$$Q = .0007872 C \sqrt{S D^5}$$

Where: Q = Flow of water in cubic feet per second  
C = Coefficient in Chezy's formula = 110  
S = Slope in feet per foot of length  
D = Inside pipe diameter in inches

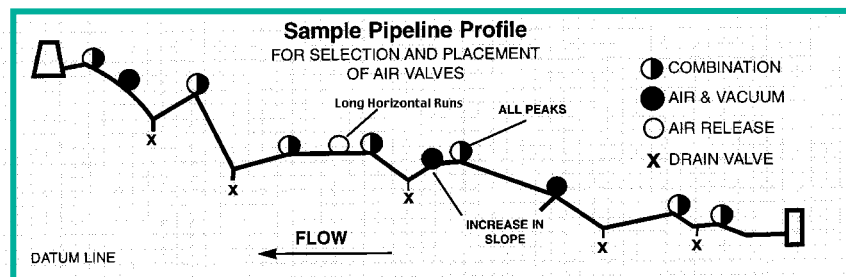
6. If thin wall pipe is being used, the risk of pipeline collapse due to the formation of vacuum must be considered. The following formula may be used to calculate the collapsing pressure of thin walled cylindrical steel pipe using a safety factor of four:

$$P = 16,250,000 \left( \frac{T}{D} \right)^3$$

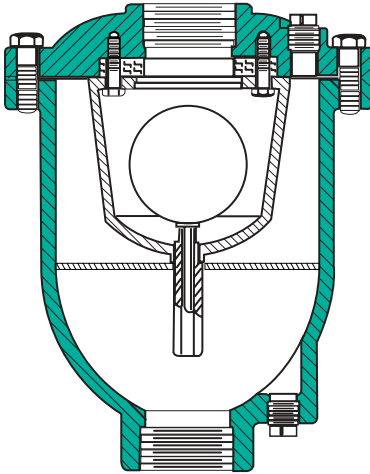
Where: P = Collapsing pressure in psi  
T = Thickness of pipe in inches  
D = Diameter of pipe in inches

7. For other pipe materials or thickness consult pipe manufacturer for pipe collapsing pressure.
8. Determine the smallest valve size capable of admitting the required air in CFS (as found in step 5) without exceeding the collapsing pressure (as found in step 6) or 5 psi, whichever is less. Do not exceed a pressure differential greater than 5 psi.
9. Finally compare the valve size determined in step 4 with the valve size determined in steps 5 or 6. If they differ, always select the larger valve size.

Note: Cla-Val has available upon request, a Slide Rule Air Vacuum Valve Calculator that greatly reduces the amount of time necessary to size valves for pipeline service.



## AND SIZING GUIDE



1/2" Through 3" Sizes

Model No.	Inlet Size	Outlet Size	Max. W.P.	Height	Width	Wt.Lbs
350-AV.3	1/2" NPT	1/2" NPT	300 PSI	7"	6 1/8"	15
351-AV.3	1" NPT	1" NPT	300 PSI	9 1/2"	7"	26
352-AV.3	2" NPT	2" NPT	300 PSI	12"	9 1/2"	48
353-AV.3	3" NPT	3" NPT	300 PSI	12"	9 1/2"	50

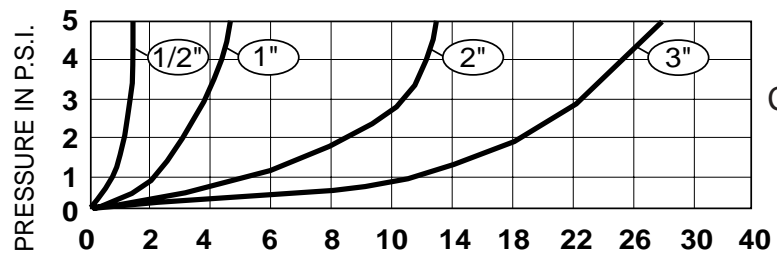
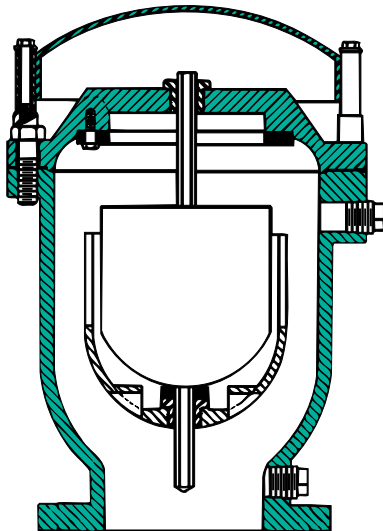


Chart A

AIR FLOW DISCHARGE CAPACITY IN CUBIC FEET OF FREE AIR/SEC.



4" Through 24" Sizes

Model No.	Inlet Size/Class	Outlet Size	Max. W.P.	Height	Width	Wt.Lbs
354-AV	4" FLG-125lb	4"	200 PSI	17"	12"	105
354-AV.3	4" FLG-250lb	4"	500 PSI	17"	12"	115
356-AV	6" FLG-125lb	6"	200 PSI	20"	14"	160
356-AV.3	6" FLG-250lb	6"	500 PSI	20"	14"	175
358-AV	8" FLG-125lb	8"	200 PSI	23"	18"	208
358-AV.3	8" FLG-250lb	8"	500 PSI	23"	18"	255
3510-AV	10" FLG-125lb	10"	200 PSI	26"	20"	370
3510-AV.3	10" FLG-250lb	10"	500 PSI	26"	20"	400
3512-AV	12" FLG-125lb	12"	200 PSI	31"	24"	590
3512-AV.3	12" FLG-250lb	12"	500 PSI	31"	24"	640
3514-AV	14" FLG-125lb	14"	200 PSI	34"	27"	681
3514-AV.3	14" FLG-250lb	14"	500 PSI	34"	27"	740
3516-AV	16" FLG-125lb	16"	200 PSI	34"	30 1/2"	879
3516-AV.3	16" FLG-250lb	16"	500 PSI	34"	30 1/2"	930

8" through 16" available with flanged outlet in place of hood.

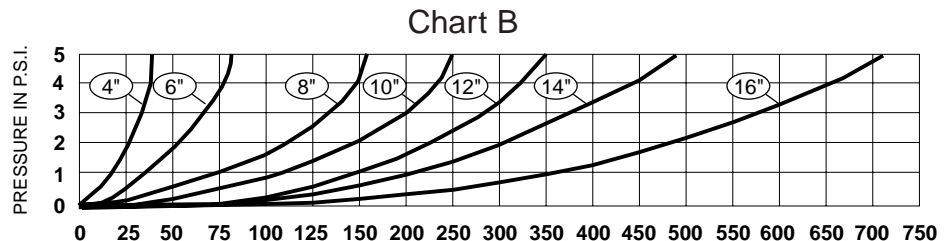


Chart B

AIR FLOW DISCHARGE CAPACITY IN CUBIC FEET OF FREE AIR/SEC.

For sizes 18" and larger consult factory.

When Ordering,  
Please Specify:

1. Model Number
2. Inlet Size (NPT)
3. Inlet Pressure Rating
4. Orifice Size
5. If Operating Pressure Below 20 PSI