



# Vacuum Breaker / Air

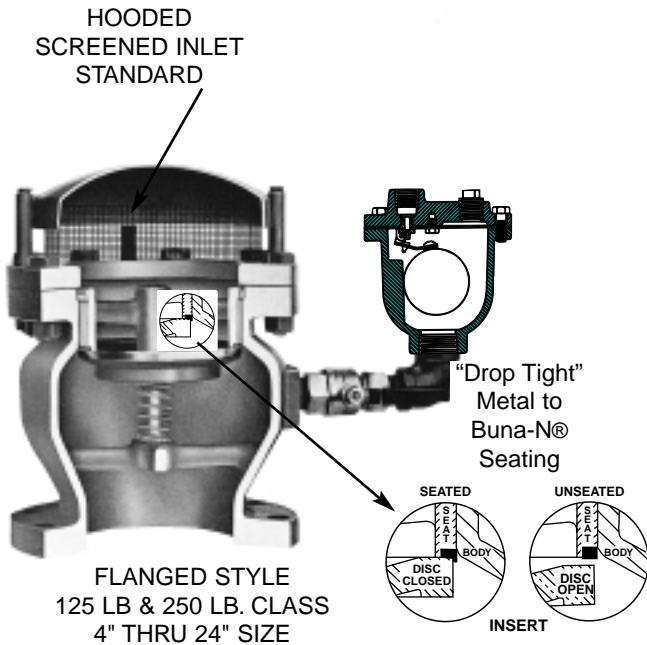
## VACUUM PREVENTION AND SLOW AIR RELEASE FOR PRESSURE SURGE CONTROL

Cla-Val Vacuum Breakers are reliable and economical pipeline surge control components, requiring no regular maintenance.

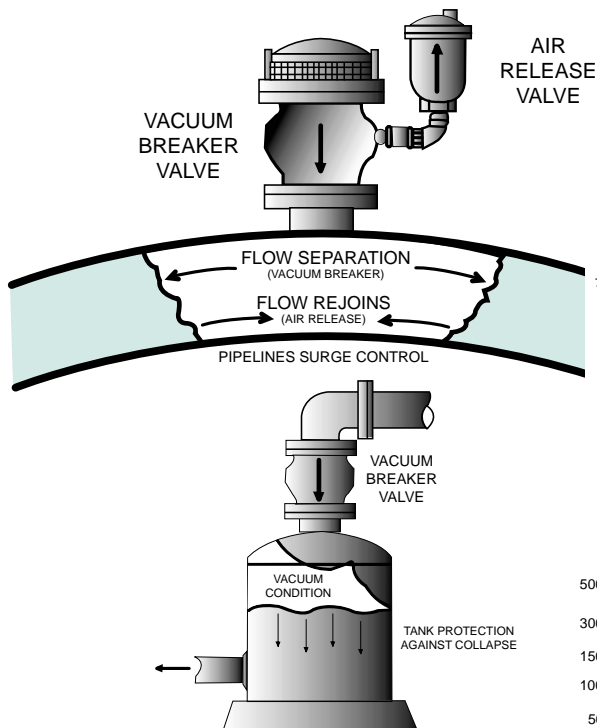
The Vacuum Breaker Valve (Large orifice combined with Air Release Valve (small orifice) are normally closed. But when installed at points where water column separation can occur, both orifices open admitting air into pipeline, then instantly close to trap air and thereby cushioning rejoining of the water column. In this manner severe pressure surge/water hammer is prevented as the system returns to normal operation.

Simultaneously the small orifice Air Release Valve opened...due to vacuum and stays open...venting the discharge of trapped air from pipeline slowly until gradual normal pipeline pressure is achieved. Various small orifice are available. See small orifice chart, Page 45.

Water column separation in a pipeline may create high levels of vacuum only momentarily, but the severe damage, such as a pipeline rupture can occur when the water column rejoins. Also momentarily vacuum conditions can easily cause a thin wall pipeline or sealed water tank to collapse due to vacuum when draining fluid. Metal to Buna-N® insures "drop tight" seal at any pressure. For these reasons it is sound engineering practice to use Cla-Val Vacuum Breaker Air Release Valves to prevent water column separation in pipelines and collapse of tanks.

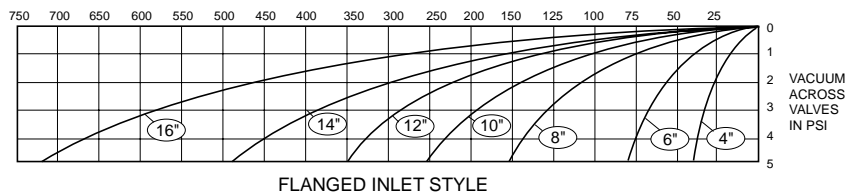
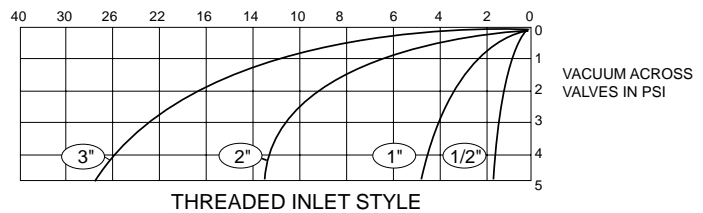


## TYPICAL APPLICATIONS

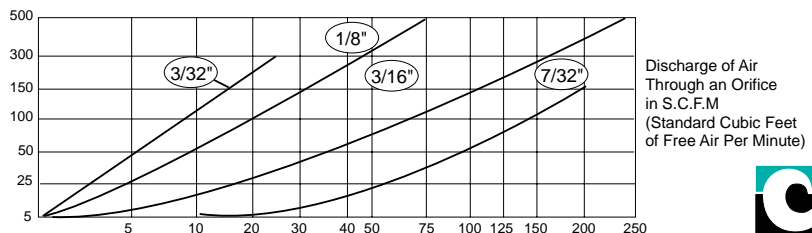


## AIR INFLOW CAPACITY CHARTS IN CUBIC FEET OF FREE AIR/SEC.

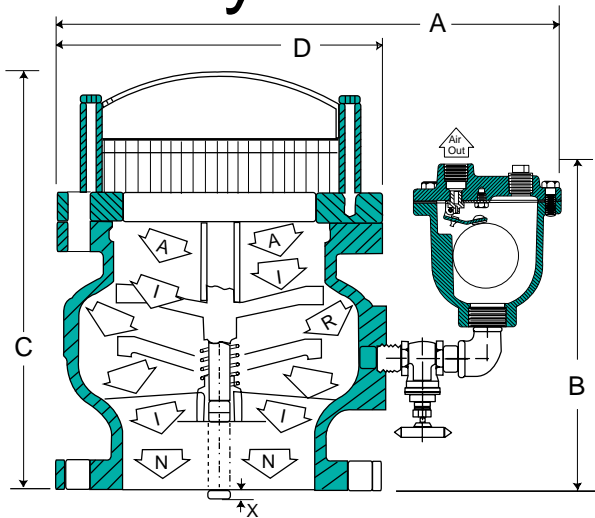
### LARGE ORIFICE AIR INLET/VACUUM BREAKER VALVES



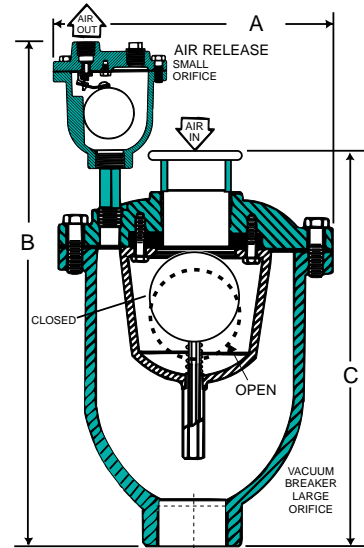
### SMALL ORIFICE AIR RELEASE VALVES



# Vacuum Breaker Air Release Valves in 3 styles:



**STYLE 1.**  
Flanged



**STYLE 2.**  
Threaded

| ANSI CLASS 125                  |           |                   |                   |                     |                   |                   |                   |
|---------------------------------|-----------|-------------------|-------------------|---------------------|-------------------|-------------------|-------------------|
| VACUUM BREAKER WITH AIR RELEASE |           |                   |                   | VACUUM BREAKER ONLY |                   |                   |                   |
| SIZE                            | MODEL NO. | A                 | B                 | MODEL NO.           | C                 | D                 | X                 |
| 3                               | 383VB/AR  | 16                | 15                | 383VB               | 10                | 8                 | 1                 |
| 4                               | 384VB/AR  | 17 <sup>1/2</sup> | 15 <sup>1/2</sup> | 384VB               | 11 <sup>1/4</sup> | 9                 | 1 <sup>3/4</sup>  |
| 6                               | 386VB/AR  | 20 <sup>1/4</sup> | 16 <sup>1/4</sup> | 386VB               | 14 <sup>1/4</sup> | 11                | 2 <sup>1/4</sup>  |
| 8                               | 388VB/AR  | 23                | 18 <sup>1/4</sup> | 388VB               | 18                | 13 <sup>1/2</sup> | 3 <sup>1/4</sup>  |
| 10                              | 3810VB/AR | 26                | 19 <sup>3/4</sup> | 3810VB              | 21 <sup>1/2</sup> | 16                | 4 <sup>1/4</sup>  |
| 12                              | 3812VB/AR | 29                | 19 <sup>1/4</sup> | 3812VB              | 21 <sup>3/8</sup> | 19                | 5/8               |
| 14                              | 3814VB/AR | 31 <sup>1/4</sup> | 20                | 3814VB              | 22 <sup>3/4</sup> | 21                | 1 <sup>5/16</sup> |
| 16                              | 3816VB/AR | 33 <sup>3/4</sup> | 21                | 3816VB              | 26 <sup>1/2</sup> | 23 <sup>1/2</sup> | 2 <sup>1/8</sup>  |

**VACUUM BREAKER/AIR RELEASE**

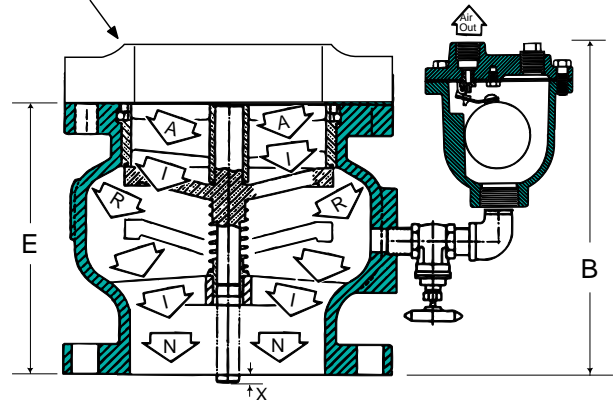
| SIZE NPT | MODEL NO.   | A                 | B                  |
|----------|-------------|-------------------|--------------------|
| 1/2"     | 38.5 VBT/AR | 6 <sup>1/8"</sup> | 14"                |
| 1"       | 381 VBT/AR  | 7 <sup>1/2"</sup> | 15 <sup>1/2"</sup> |
| 2"       | 382 VBT/AR  | 10"               | 18"                |
| 3"       | 383 VBT/AR  | 10"               | 18"                |

**VACUUM BREAKER (ONLY)**

| SIZE | MODEL NO. | A                 | B                 | C   |
|------|-----------|-------------------|-------------------|-----|
| 1/2" | 38.5 VB   | 6 <sup>1/8"</sup> | 7"                | 9"  |
| 1"   | 381 VB    | 7 <sup>1/2"</sup> | 9 <sup>1/2"</sup> | 12" |
| 2"   | 382 VB    | 10"               | 12"               | 14" |
| 3"   | 383 VB    | 10"               | 12"               | 15" |

| ANSI CLASS 250                  |             |                   |                   |                     |                   |                   |                   |
|---------------------------------|-------------|-------------------|-------------------|---------------------|-------------------|-------------------|-------------------|
| VACUUM BREAKER WITH AIR RELEASE |             |                   |                   | VACUUM BREAKER ONLY |                   |                   |                   |
| SIZE                            | MODEL NO.   | A                 | B                 | MODEL NO.           | C                 | D                 | X                 |
| 3                               | 383VB/AR.3  | 16                | 15                | 383VB.3             | 10                | 8                 | 1                 |
| 4                               | 384VB/AR.3  | 18                | 15 <sup>1/2</sup> | 384VB.3             | 11 <sup>1/4</sup> | 10                | 1 <sup>3/4</sup>  |
| 6                               | 386VB/AR.3  | 21                | 16 <sup>1/4</sup> | 386VB.3             | 14 <sup>1/4</sup> | 12 <sup>1/2</sup> | 2 <sup>1/4</sup>  |
| 8                               | 388VB/AR.3  | 24                | 18 <sup>1/4</sup> | 388VB.3             | 18                | 15                | 3 <sup>1/4</sup>  |
| 10                              | 3810VB/AR.3 | 26 <sup>3/4</sup> | 19 <sup>3/4</sup> | 3810VB.3            | 21 <sup>1/2</sup> | 17 <sup>1/2</sup> | 4 <sup>1/4</sup>  |
| 12                              | 3812VB/AR.3 | 30                | 19 <sup>1/4</sup> | 3812VB.3            | 21 <sup>3/8</sup> | 20 <sup>1/2</sup> | 5/8               |
| 14                              | 3814VB/AR.3 | 32 <sup>1/4</sup> | 20                | 3814VB.3            | 22 <sup>3/4</sup> | 23                | 1 <sup>5/16</sup> |
| 16                              | 3816VB/AR.3 | 34 <sup>3/4</sup> | 21                | 3816VB.3            | 26 <sup>1/2</sup> | 25 <sup>1/2</sup> | 2 <sup>1/8</sup>  |

**STYLE 3.**  
Flange Style (No Hood) Mating  
Flange required to retain seat  
supplied by customer



| ANSI CLASS 125                  |                |                   |                   |                     |                   |                   |                   |
|---------------------------------|----------------|-------------------|-------------------|---------------------|-------------------|-------------------|-------------------|
| VACUUM BREAKER WITH AIR RELEASE |                |                   |                   | VACUUM BREAKER ONLY |                   |                   |                   |
| SIZE                            | MODEL NO.      | A                 | B                 | MODEL NO.           | E                 | D                 | X                 |
| 3                               | 383VBG/FFAR116 | 16                | 15                | 383VBGFF            | 6                 | 8                 | 1                 |
| 4                               | 384VB/FFAR116  | 17 <sup>1/2</sup> | 15 <sup>1/2</sup> | 384VBFF             | 7 <sup>1/4</sup>  | 9                 | 1 <sup>3/4</sup>  |
| 6                               | 386VB/FFAR116  | 20 <sup>1/4</sup> | 16 <sup>1/4</sup> | 386VBFF             | 9 <sup>3/4</sup>  | 11                | 2 <sup>1/4</sup>  |
| 8                               | 388VB/FFAR116  | 23                | 18 <sup>1/4</sup> | 388VBFF             | 12 <sup>1/2</sup> | 13 <sup>1/2</sup> | 3 <sup>1/4</sup>  |
| 10                              | 3810VB/FFAR116 | 26                | 19 <sup>3/4</sup> | 3810VBFF            | 15 <sup>1/2</sup> | 16                | 4 <sup>1/4</sup>  |
| 12                              | 3812VB/FFAR116 | 29                | 19 <sup>1/4</sup> | 3812VBFF            | 14 <sup>1/4</sup> | 19                | 5/8               |
| 14                              | 3814VB/FFAR116 | 31 <sup>1/4</sup> | 20                | 3814VBFF            | 15 <sup>3/4</sup> | 21                | 1 <sup>5/16</sup> |
| 16                              | 3816VB/FFAR116 | 33 <sup>3/4</sup> | 21                | 3816VBFF            | 17 <sup>5/8</sup> | 23 <sup>1/2</sup> | 2 <sup>1/8</sup>  |

Note:  
Cla-Val Vacuum Breaker Valves are recommended for waste-water application. Be sure to specify

# Series 38VB/AR Release Valve Data and Sizing

## Vacuum Breaker Valve Sizing

Vacuum Breaker Valve Air Intake capacity is the same as for air vacuum valves. Use data below for sizing or use Cla-Val Air Vacuum Valve selector slide rule.

- Series 38 Vacuum Breaker/Air Release valves should be sized to admit the maximum volume of air into the pipeline but not exceed 5 psi pressure differential across the valve inlet orifice.
- Each high point of change in grade must be examined independently when determining vacuum valve size. Use the steepest slope for calculation.
- Use the flow capacity charts located below to assist in vacuum valve sizing.
- 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.

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

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

- If thin wall steel 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

- For other pipe materials or thickness consult pipe manufacturer for pipe collapsing pressure.
- 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.

## Vacuum Breaker/Air Release Valve Specifications

Vacuum Breaker valves shall be flanged sizes 4" thru 42" or threaded 1/2" thru 3" and automatically open to admit large volumes of air into a system to break a vacuum. Optionally: an air release valve may be connected to the vacuum breaker valve to release air under pressure. Sizes 4" thru 10" must accept a wafer butterfly valve directly connected, without disc interference.

The valve shall have a spring-loaded plug, center guided and in-flow area equal to valve size. The valve must have a screened protective hood and be installed vertically. The valve must crack open at 0.25 psi and full open at 2 psi pressure differential. All internals shall be field replaceable.

The valve seating shall be metal with Buna-N seal for zero leakage at high and low pressure without seal damage.

### Materials of Construction:

Valve Body and Cover . . . . .Cast Iron ASTM A126B Option: Ductile Iron ASTM A563 65-45-12  
Valve Seat/Plug . . . . .Bronze ASTM B584 Alloy C 83600  
Optional: Stainless Steel ASTM A351 CF8M  
Spring . . . . .Stainless Steel ASTM A313 T302

### Option When Specified:

Supply automatic Air Release Valve with the Vacuum Breaker Valve, for release of air when the system is operating.

### Description/Materials:

Valve body inlet shall be threaded with hexagonal shape for wrench use. The shut-off orifice button shall be Buna-N or Viton. Valve Body and Cover, Cast Iron; Float (unconditionally guaranteed); trim stainless steel type 304; all field replaceable. Non-Metallic linkage not acceptable.

Valve exterior shall be coated with high quality, alkyd metal primer.

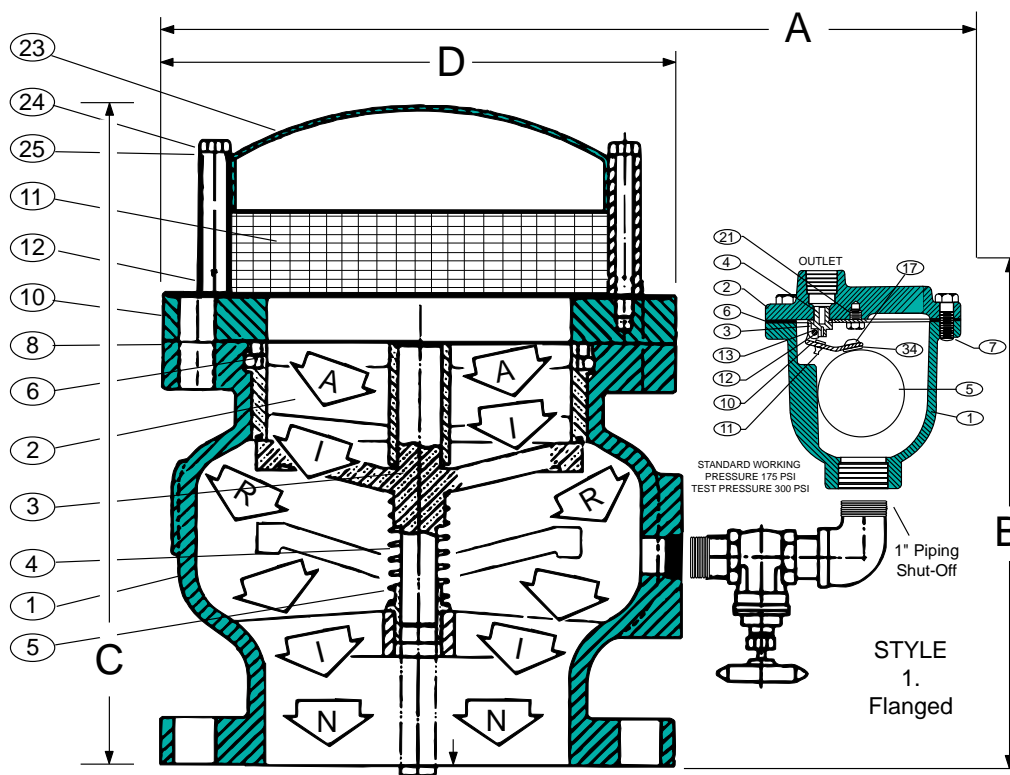
Air release valves shall comply with AWWA C512-92 standards and tested at 1.5 times the working pressure. Test certificates; drawings; parts list; O&M materials shall be provided as requested.

Vacuum breaker valves shall be Series 38VB/AR for water or wastewater as supplied by Cla-Val, Newport Beach, California.



# Series 38VB/AR

## Vacuum Breaker / Air Release Valve Flanged Style



### Series 34 Air Release Valve

| Detail No. | Part Name  | Material                 | Detail No. | Part Name      | Material                         |
|------------|------------|--------------------------|------------|----------------|----------------------------------|
| 1          | Body       | Cast Iron ASTM A126      | 1          | Body           | Cast Iron ASTM A126 Class B      |
| 2          | Seat       | Bronze ASTM B584         | 2          | Cover          | Cast Iron ASTM A126 Class B      |
| 3          | Plug       | Bronze ASTM B584         | 3          | Lever Frame    | Stainless Steel T304 ASTM A240   |
| 4          | Spring     | Stainless Steel Type 302 | 4          | Seat           | Stainless Steel T303 ASTM A276   |
| 5          | Bushing    | Bronze ASTM B584         | 5          | Float          | Stainless Steel T304 ASTM A240   |
| 6          | Seat       | Stainless Steel Type 304 | 6          | Gasket         | Garlock #3000 (Non-Asbestos)     |
| 8          | Gasket     | Lexide                   | 7          | Cover Bolt     | Alloy Steel SAE Grade 5          |
| 10         | Ring Plate | Steel                    | 10         | Float Arm      | Stainless Steel T304 ASTM A240   |
| 11         | Ring Bolts | Steel                    | 11         | Orifice Button | Viton                            |
| 12         | Screen     | Stainless Steel          | 12         | Pivot Pin      | Stainless Steel T303 ASTM A276   |
| 23         | Hood       | Steel 1020               | 13         | Pin Retainer   | Stainless Steel PH 15-7 Mo       |
| 24         | Steel      | Cadmium Plated           | 17         | Float Retainer | Stainless Steel T304 ASTM A276   |
| 25         | Steel      | Cadmium Plated           | 21         | Locator        | Stainless Steel T-18-8 ASTM A276 |
|            |            |                          | 34         | Lock Washer    | Stainless Steel T304 ASTM A204   |

Larger Sizes Available

| ANSI CLASS 125                  |           |                   |                     |           |                   |                   |                   | WT.<br>LBS |
|---------------------------------|-----------|-------------------|---------------------|-----------|-------------------|-------------------|-------------------|------------|
| VACUUM BREAKER WITH AIR RELEASE |           |                   | VACUUM BREAKER ONLY |           |                   | X                 |                   |            |
| SIZE                            | MODEL NO. | A                 | B                   | MODEL NO. | C                 |                   | D                 |            |
| 3                               | 383VB/AR  | 16                | 15                  | 383VB     | 10                | 7 <sup>1/2</sup>  | 1                 | 45         |
| 4                               | 384VB/AR  | 17 <sup>1/2</sup> | 15 <sup>1/2</sup>   | 384VB     | 11 <sup>1/4</sup> | 9                 | 1 <sup>3/4</sup>  | 62         |
| 6                               | 386VB/AR  | 20 <sup>1/4</sup> | 16 <sup>1/4</sup>   | 386VB     | 14 <sup>1/4</sup> | 11                | 2 <sup>1/4</sup>  | 160        |
| 8                               | 388VB/AR  | 23                | 18 <sup>1/4</sup>   | 388VB     | 18                | 13 <sup>1/2</sup> | 3 <sup>1/4</sup>  | 170        |
| 10                              | 3810VB/AR | 26                | 19 <sup>3/4</sup>   | 3810VB    | 21 <sup>1/2</sup> | 16                | 4 <sup>1/4</sup>  | 270        |
| 12                              | 3812VB/AR | 29                | 19 <sup>1/4</sup>   | 3812VB    | 21 <sup>3/8</sup> | 19                | 5 <sup>8</sup>    | 375        |
| 14                              | 3814VB/AR | 31 <sup>1/4</sup> | 20                  | 3814VB    | 22 <sup>3/4</sup> | 21                | 1 <sup>5/16</sup> | 460        |
| 16                              | 3816VB/AR | 33 <sup>3/4</sup> | 21                  | 3816VB    | 26 <sup>1/2</sup> | 23 <sup>1/2</sup> | 2 <sup>1/8</sup>  | 600        |

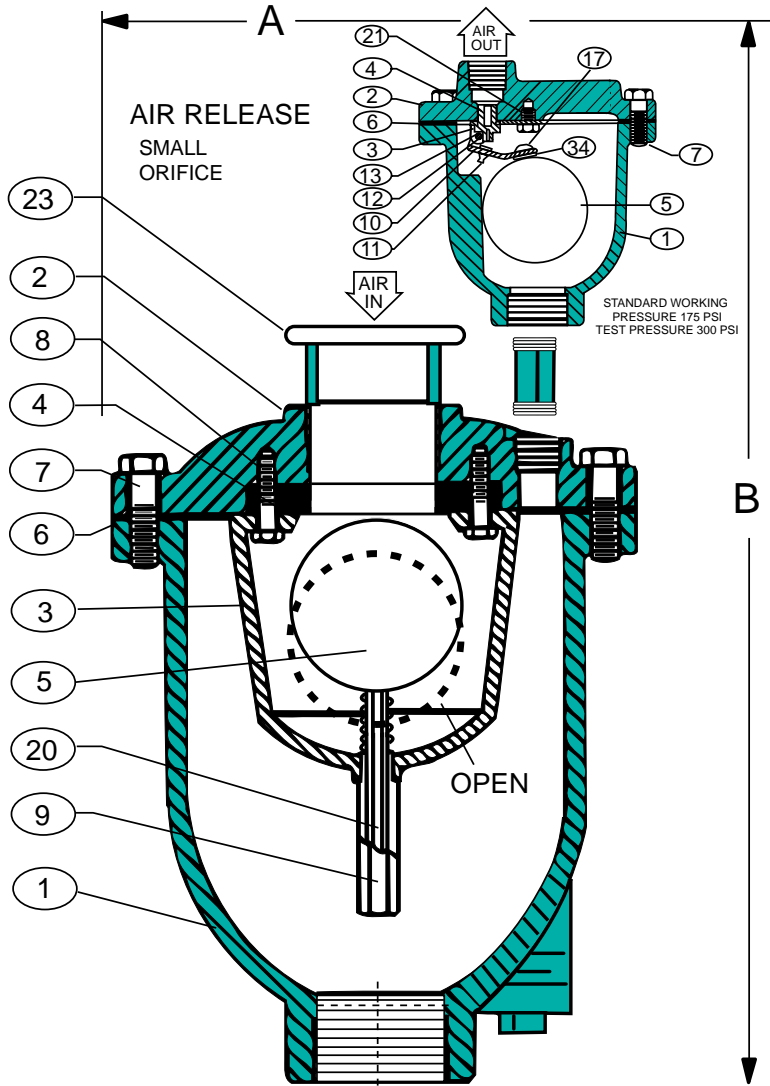
| ANSI CLASS 250                  |             |                   |                     |           |                   |                   |                   | WT.<br>LBS |
|---------------------------------|-------------|-------------------|---------------------|-----------|-------------------|-------------------|-------------------|------------|
| VACUUM BREAKER WITH AIR RELEASE |             |                   | VACUUM BREAKER ONLY |           |                   | X                 |                   |            |
| SIZE                            | MODEL NO.   | A                 | B                   | MODEL NO. | C                 |                   | D                 |            |
| 3                               | 384VB/AR.3  | 17                | 16                  | 384VB.3   | 10                | 8 <sup>1/4</sup>  | 1                 | 45         |
| 4                               | 384VB/AR.3  | 18                | 15 <sup>1/2</sup>   | 384VB.3   | 11 <sup>1/4</sup> | 10                | 1 <sup>3/4</sup>  | 62         |
| 6                               | 386VB/AR.3  | 21                | 16 <sup>1/4</sup>   | 386VB.3   | 14 <sup>1/4</sup> | 12 <sup>1/2</sup> | 2 <sup>1/4</sup>  | 160        |
| 8                               | 388VB/AR.3  | 24                | 18 <sup>1/4</sup>   | 388VB.3   | 18                | 15                | 3 <sup>1/4</sup>  | 170        |
| 10                              | 3810VB/AR.3 | 26 <sup>3/4</sup> | 19 <sup>3/4</sup>   | 3810VB.3  | 21 <sup>1/2</sup> | 17 <sup>1/2</sup> | 4 <sup>1/4</sup>  | 270        |
| 12                              | 3812VB/AR.3 | 30                | 19 <sup>1/4</sup>   | 3812VB.3  | 21 <sup>3/8</sup> | 20 <sup>1/2</sup> | 5 <sup>8</sup>    | 375        |
| 14                              | 3814VB/AR.3 | 32 <sup>1/4</sup> | 20                  | 3814VB.3  | 22 <sup>3/4</sup> | 23                | 1 <sup>5/16</sup> | 460        |
| 16                              | 3816VB/AR.3 | 34 <sup>3/4</sup> | 21                  | 3816VB.3  | 26 <sup>1/2</sup> | 25 <sup>1/2</sup> | 2 <sup>1/8</sup>  | 600        |





# Series 38VBT/AR

## Vacuum Breaker / Air Release Valve Threaded Style



### Series 34 Air Release Valve

| Detail No. | Part Name      | Material                         |
|------------|----------------|----------------------------------|
| 1          | Body           | Cast Iron ASTM A126 Class B      |
| 2          | Cover          | Cast Iron ASTM A126 Class B      |
| 3          | Lever Frame    | Stainless Steel T304 ASTM A240   |
| 4          | Seat           | Stainless Steel T303 ASTM A276   |
| 5          | Float          | Stainless Steel T304 ASTM A240   |
| 6          | Gasket         | Garlock #3000 (Non-Asbestos)     |
| 7          | Cover Bolt     | Alloy Steel SAE Grade 5          |
| 10         | Float Arm      | Stainless Steel T304 ASTM A240   |
| 11         | Orifice Button | Viton                            |
| 12         | Pivot Pin      | Stainless Steel T303 ASTM A276   |
| 13         | Pin Retainer   | Stainless Steel PH 15-7 Mo       |
| 17         | Float Retainer | Stainless Steel T304 ASTM A276   |
| 21         | Locator        | Stainless Steel T-18-8 ASTM A276 |
| 34         | Lock Washer    | Stainless Steel T304 ASTM A204   |

### VACUUM BREAKER/AIR RELEASE

| SIZE NPT | MODEL NO.   | A      | B       | WT. |
|----------|-------------|--------|---------|-----|
| 1/2"     | 38.5 VBT/AR | 6 1/8" | 14"     | 23  |
| 1"       | 381 VBT/AR  | 7 1/2" | 15 1/2" | 34  |
| 2"       | 382 VBT/AR  | 10"    | 18"     | 60  |
| 3"       | 383 VBT/AR  | 10"    | 18"     | 66  |

### VACUUM BREAKER (ONLY)

| SIZE | MODEL NO. | A      | B      | C   | WT. |
|------|-----------|--------|--------|-----|-----|
| 1/2" | 38.5 VB   | 6 1/8" | 7"     | 9"  | 16  |
| 1"   | 381 VB    | 7 1/2" | 9 1/2" | 12" | 28  |
| 2"   | 382 VB    | 10"    | 12"    | 14" | 54  |
| 3"   | 383 VB    | 10"    | 12"    | 15" | 60  |

| Detail No. | Part Name | Material                         |
|------------|-----------|----------------------------------|
| 1          | Body      | Cast Iron ASTM A126, Class B     |
| 2          | Cover     | Cast Iron ASTM A126, Class B     |
| 3          | Baffle    | Ductile Iron ASTM A536-51T       |
| 4          | Seat      | Buna-N®                          |
| 5          | Float     | Stainless Steel ASTM A-240, T304 |
| 6          | Gasket    | Garlock #3000 (Non-Asbestos)     |

| Detail No. | Part Name       | Material                       |
|------------|-----------------|--------------------------------|
| 7          | Cover Bolt      | Alloy Steel ASTM A449, Grade 5 |
| 8          | Retaining Screw | Stainless Steel ASTM A449,     |
| 9          | Guide Bushing   | Stainless Steel ASTM A276 T303 |
| 14         | Pipe Plug       | Malleable Iron                 |
| 20         | Guide Shaft     | Stainless Steel ASTM A276 T303 |
| 23         | Hood            | Steel 1020                     |