



Vacuum Breaker / Air

VACUUM PREVENTION AND SLOW AIR RELEASE FOR PRESSURE SURGE CONTROL

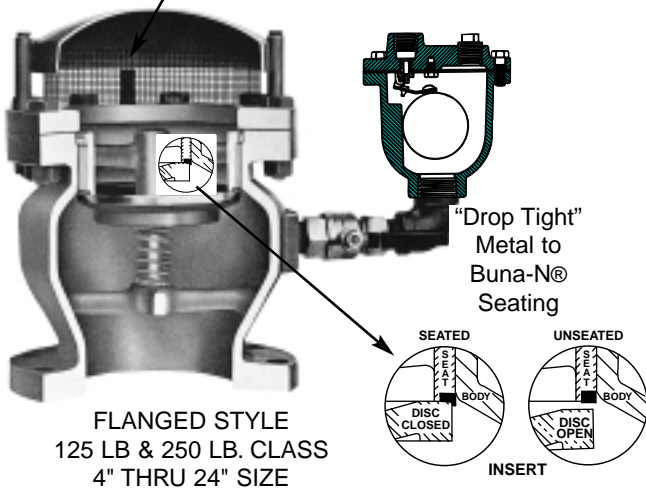
Cla-Val Vacuum Breakers are reliable and economical pipeline surge control components, requiring no regular maintenance.

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.

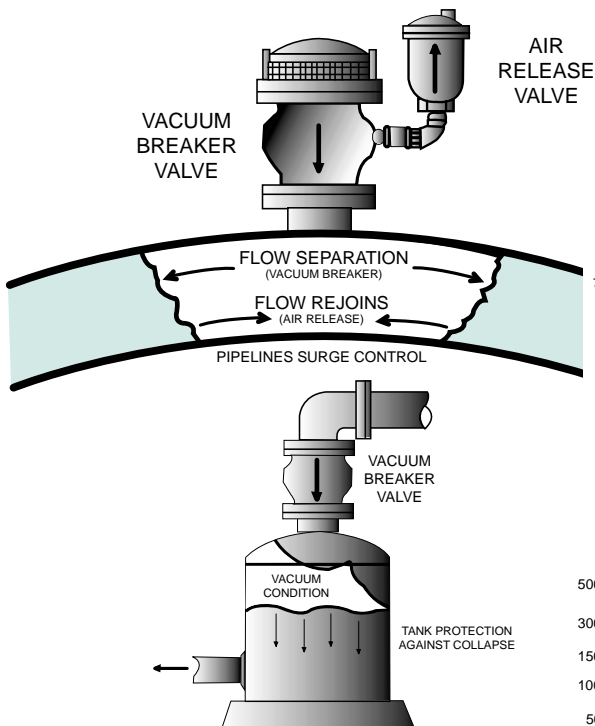
Simultaneously the small orifice Air Release Valve opened...due to vacuum and stays open...venting the discharge of trapped air from pipeline slowly until gradual normal pipeline pressure is achieved. Various small orifice are available. See small orifice chart, Page 45.

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.

HOODED
SCREENED INLET
STANDARD

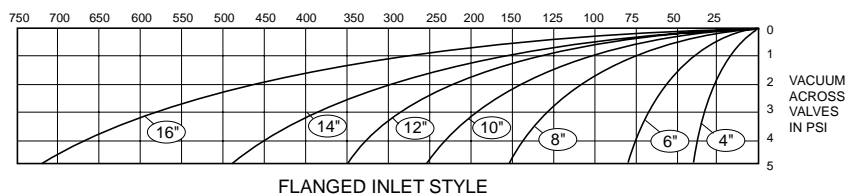
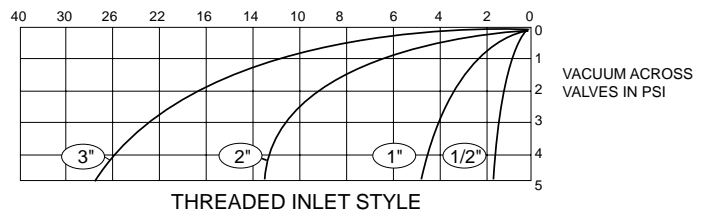


TYPICAL APPLICATIONS

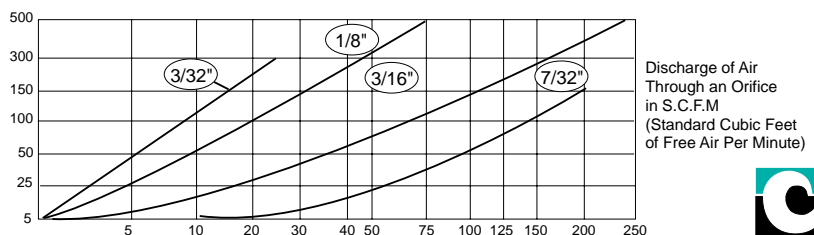


AIR INFLOW CAPACITY CHARTS IN CUBIC FEET OF FREE AIR/SEC.

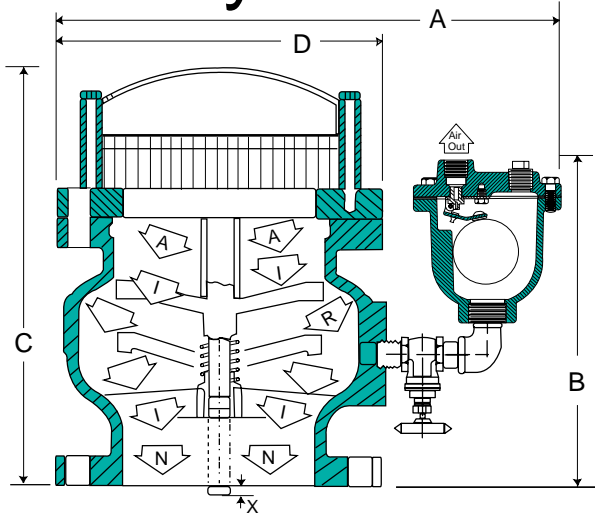
LARGE ORIFICE AIR INLET/VACUUM BREAKER VALVES



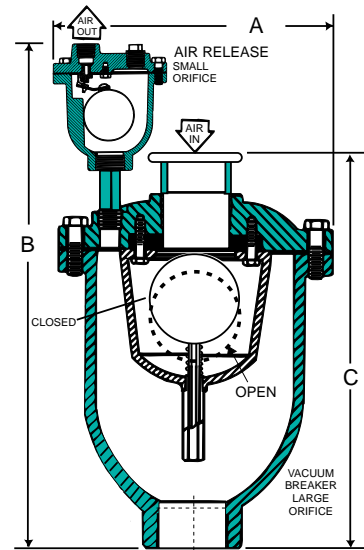
SMALL ORIFICE AIR RELEASE VALVES



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 ^{1/2}	15 ^{1/2}	384VB	11 ^{1/4}	9	1 ^{3/4}
6	386VB/AR	20 ^{1/4}	16 ^{1/4}	386VB	14 ^{1/4}	11	2 ^{1/4}
8	388VB/AR	23	18 ^{1/4}	388VB	18	13 ^{1/2}	3 ^{1/4}
10	3810VB/AR	26	19 ^{3/4}	3810VB	21 ^{1/2}	16	4 ^{1/4}
12	3812VB/AR	29	19 ^{1/4}	3812VB	21 ^{3/8}	19	5/8
14	3814VB/AR	31 ^{1/4}	20	3814VB	22 ^{3/4}	21	1 ^{5/16}
16	3816VB/AR	33 ^{3/4}	21	3816VB	26 ^{1/2}	23 ^{1/2}	2 ^{1/8}

VACUUM BREAKER/AIR RELEASE

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

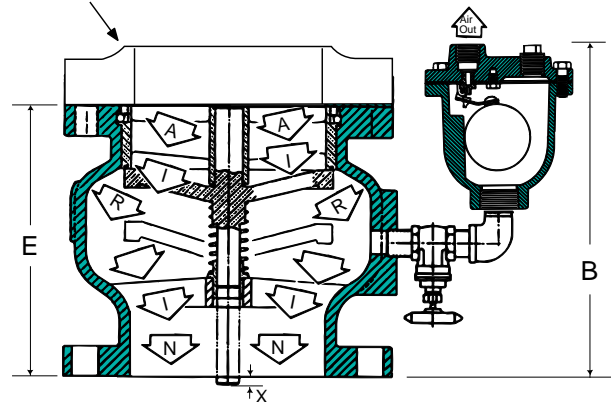
VACUUM BREAKER (ONLY)

SIZE	MODEL NO.	A	B	C
1/2"	38.5 VB	6 1/8"	7"	9"
1"	381 VB	7 1/2"	9 1/2"	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 ^{1/2}	384VB.3	11 ^{1/4}	10	1 ^{3/4}
6	386VB/AR.3	21	16 ^{1/4}	386VB.3	14 ^{1/4}	12 ^{1/2}	2 ^{1/4}
8	388VB/AR.3	24	18 ^{1/4}	388VB.3	18	15	3 ^{1/4}
10	3810VB/AR.3	26 ^{3/4}	19 ^{3/4}	3810VB.3	21 ^{1/2}	17 ^{1/2}	4 ^{1/4}
12	3812VB/AR.3	30	19 ^{1/4}	3812VB.3	21 ^{3/8}	20 ^{1/2}	5/8
14	3814VB/AR.3	32 ^{1/4}	20	3814VB.3	22 ^{3/4}	23	1 ^{5/16}
16	3816VB/AR.3	34 ^{3/4}	21	3816VB.3	26 ^{1/2}	25 ^{1/2}	2 ^{1/8}

STYLE 3.

Flange Style (No Hood) Mating
Flange required to retain seat
supplied by customer



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

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 ^{1/2}	15 ^{1/2}	384VBFF	7 ^{1/4}	9	1 ^{3/4}
6	386VB/FFAR116	20 ^{1/4}	16 ^{1/4}	386VBFF	9 ^{3/4}	11	2 ^{1/4}
8	388VB/FFAR116	23	18 ^{1/4}	388VBFF	12 ^{1/2}	13 ^{1/2}	3 ^{1/4}
10	3810VB/FFAR116	26	19 ^{3/4}	3810VBFF	15 ^{1/2}	16	4 ^{1/4}
12	3812VB/FFAR116	29	19 ^{1/4}	3812VBFF	14 ^{1/4}	19	5/8
14	3814VB/FFAR116	31 ^{1/4}	20	3814VBFF	15 ^{3/4}	21	1 ^{5/16}
16	3816VB/FFAR116	33 ^{3/4}	21	3816VBFF	17 ^{5/8}	23 ^{1/2}	2 ^{1/8}

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.

1. 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.
2. Each high point of change in grade must be examined independently when determining vacuum valve size. Use the steepest slope for calculation.
3. Use the flow capacity charts located below to assist in vacuum valve sizing.
4. 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

5. 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

6. For other pipe materials or thickness consult pipe manufacturer for pipe collapsing pressure.
7. 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.

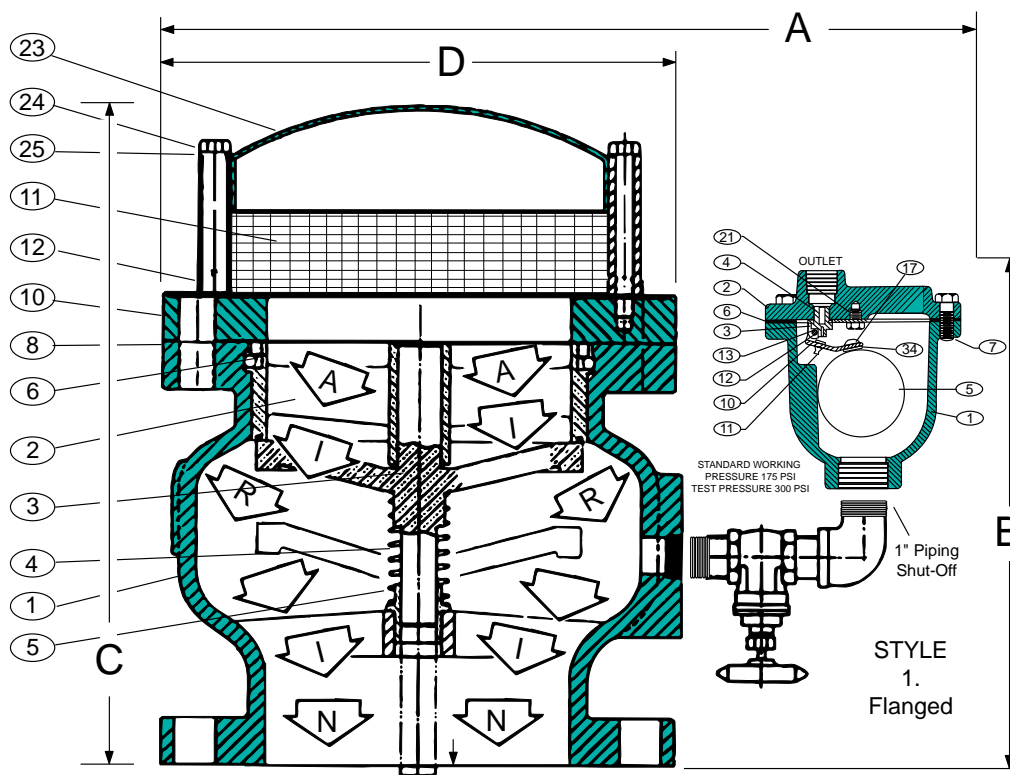
Air release valves shall comply with AWWA C512-92 standards and tested at 1.5 times the working pressure. Test certificates; drawings; parts list; Q&M materials shall be provided as requested.

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
1	Body	Cast Iron ASTM A126
2	Seat	Bronze ASTM B584
3	Plug	Bronze ASTM B584
4	Spring	Stainless Steel Type 302
5	Bushing	Bronze ASTM B584
6	Seat	Stainless Steel Type 304
8	Gasket	Lexide
10	Ring Plate	Steel
11	Ring Bolts	Steel
12	Screen	Stainless Steel
23	Hood	Steel 1020
24	Steel	Cadmium Plated
25	Steel	Cadmium Plated

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

Larger Sizes Available

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

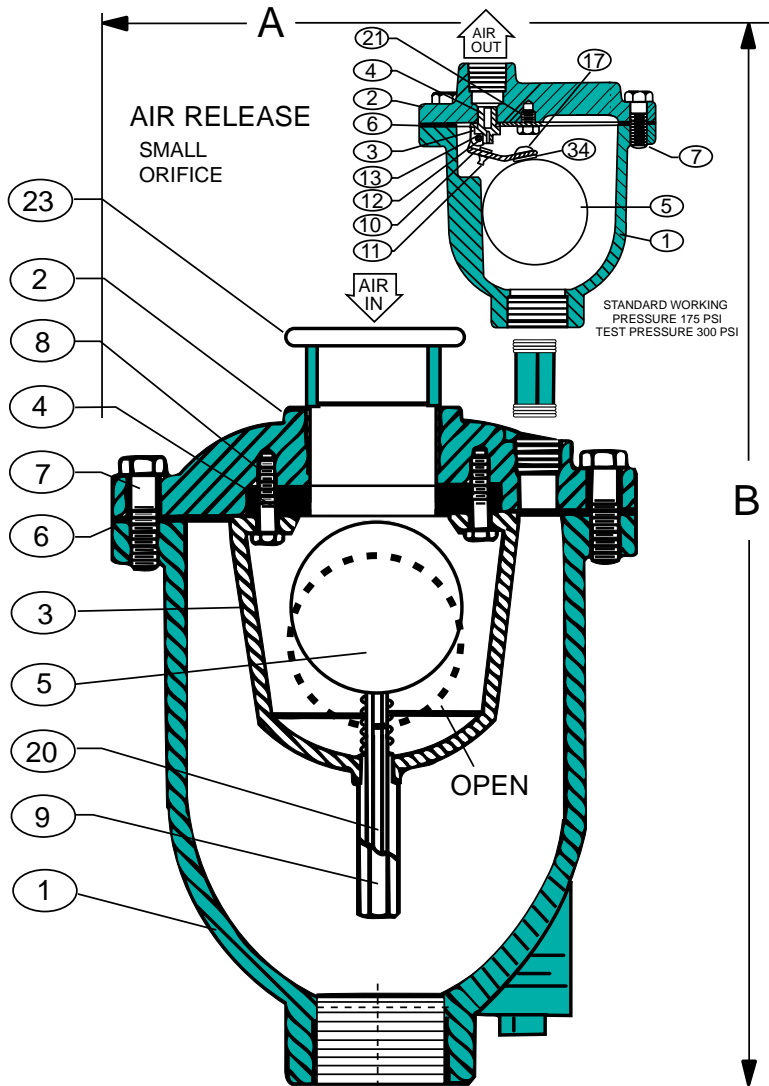
ANSI CLASS 250							
VACUUM BREAKER WITH AIR RELEASE				VACUUM BREAKER ONLY			
SIZE	MODEL NO.	A	B	MODEL NO.	C	D	WT. LBS
3	384VB/AR.3	17	16	384VB.3	10	8 ^{1/4}	45
4	384VB/AR.3	18	15 ^{1/2}	384VB.3	11 ^{1/4}	10	62
6	386VB/AR.3	21	16 ^{1/4}	386VB.3	14 ^{1/4}	12 ^{1/2}	160
8	388VB/AR.3	24	18 ^{1/4}	388VB.3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