



D-023 250 PSI



Combination Air Valve for Wastewater **PATENTED**

Description

The D-023 Combination Air Valve combines an air & vacuum orifice and an air release orifice in a single body. The valve is specially designed to operate with liquids carrying solid particles such as wastewater and effluents. The combination air valve discharges air (gases) during the filling or charging of the system, admits air into the system while it is being emptied of liquid and releases accumulated air (gases) from the system while it is under pressure and operating. The valve's unique design guarantees complete separation of the liquid from the sealing mechanism and provides optimum working conditions.

Applications

- Pump stations for sewage, wastewater & water treatment plants.
- Wastewater, effluent water and sea water supply lines.

Operation

The air & vacuum component discharges air at high flow rates during the filling of the system and admits air into the system at high flow rates during its drainage and at water column separation.

High velocity air should not blow the float shut. Water will lift the float which seals the valve.

At any time during system operation, should internal pressure of the system fall below atmospheric pressure, air will enter the system.

The smooth discharge of air reduces pressure surges and other destructive phenomena.

The intake of air in response to negative pressure protects the system from destructive vacuum conditions and prevents damage caused by water column separation. Air re-entry is essential to efficiently drain the system.

The air release component releases entrapped air in pressurized systems. Without air valves, pockets of accumulated air may cause the following destructive phenomena:

- Impediment of effective flow and hydraulic conductivity of the system along with a throttling effect as would a partially closed valve.

In extreme cases this will cause complete flow stoppage.

- Accelerate cavitation damages.
- High-pressure surges.
- Accelerate corrosion of metal parts.
- Danger of high-energy bursts of compressed air.

As the system starts to fill, the combination wastewater valve

functions according to the following stages:

1. Entrapped air/gas is discharged by the valve
2. When the wastewater level reaches the valve's lower portion, the lower float is lifted, pushing the sealing mechanism to its sealing position.
3. The entrapped air is confined in a pocket between the wastewater and the sealing mechanism. The air pressure is equal to the system pressure.
4. Increases in system pressure compress the trapped air in the upper section of the conical chamber. The conical shape guarantees the height of the air gap. This assures complete separation of the liquid from the sealing mechanism.
5. Entrapped air (gas), accumulating at peaks along the system, rises to the top of the valve, and displaces the liquid in the valve's body.
6. When the liquid level is lowered to a point where the float is no longer buoyant, the float drops, unsealing the rolling seal. The air release orifice opens and allows part of the air that accumulated in the upper portion of the valve to be released to the atmosphere.
7. Liquid re-enters the valve. The float rises, pushing the rolling seal to its sealing position. The remaining air gap prevents the wastewater from fouling the mechanism.

When internal pressure falls below atmospheric pressure (negative pressure):

1. The floats will immediately drop down, opening the air & vacuum and air release orifices.
2. Air will reenter the system.

Main Features

- Working pressure range: 3 - 250 psi .
- Testing pressure: 360 psi bar.
- Maximum working temperature: 140° F.
- Maximum intermittent temperature: 194° F.
- The valve's unique design prevents any contact between the wastewater and the sealing mechanism by creating an air gap at the top of the valve. Those features are achieved by:
 - **The conical body shape and the external lever:** designed to maintain the maximum distance between the liquid and the sealing mechanism and still obtain minimum body length.
 - **Spring loaded joint between the stem and the upper float:** vibrations of the lower float will not unseal the automatic valve. Release of air will occur only after enough air accumulates.

- **Funnel-shaped lower body:** designed to ensure that residue wastewater matter will fall back into the system and be carried away by the main pipe.
- All inner metal parts made of stainless steel.
- Unique design of external lever prevents contact between the wastewater and the sealing mechanism, prevents clogging by floating solids and ensures drip-tight sealing.
- The D-023's orifice plug-disc linkage assembly is external, keeping the levers and pins outside the air valve body and its corrosive atmosphere.

Valve Selection

- Size range availability: 3", 4" & 6".
- Valves manufactured with flange ends to meet ASA 150 standard or any requested standard.
- Standard metal body, also available with a stainless steel body.

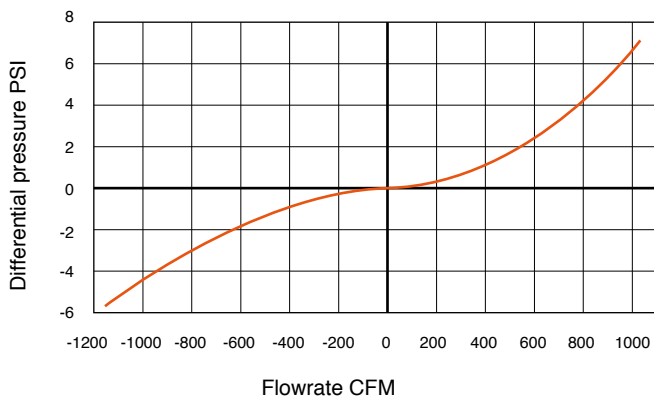
- Valve body coating: baked epoxy coating according to the international standard DIN 30677-2.
- Additional coatings available upon request.

Optional Accessories:

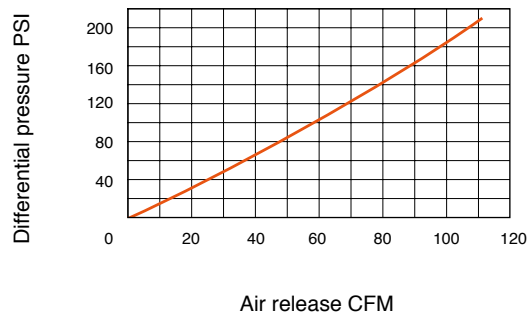
- With a Vacuum Breaker, In-only attachment, allows for air intake only, prevents air discharge.
- With a Non-Slam discharge-throttling attachment, allows for free air intake, throttles air discharge.
- For best suitability, it is recommended to send the fluid chemical properties along with the valve request.

Upon ordering, please specify: model, size, working pressure, threads standard and type of liquid.

AIR & VACUUM FLOWRATE



AUTOMATIC AIR RELEASE

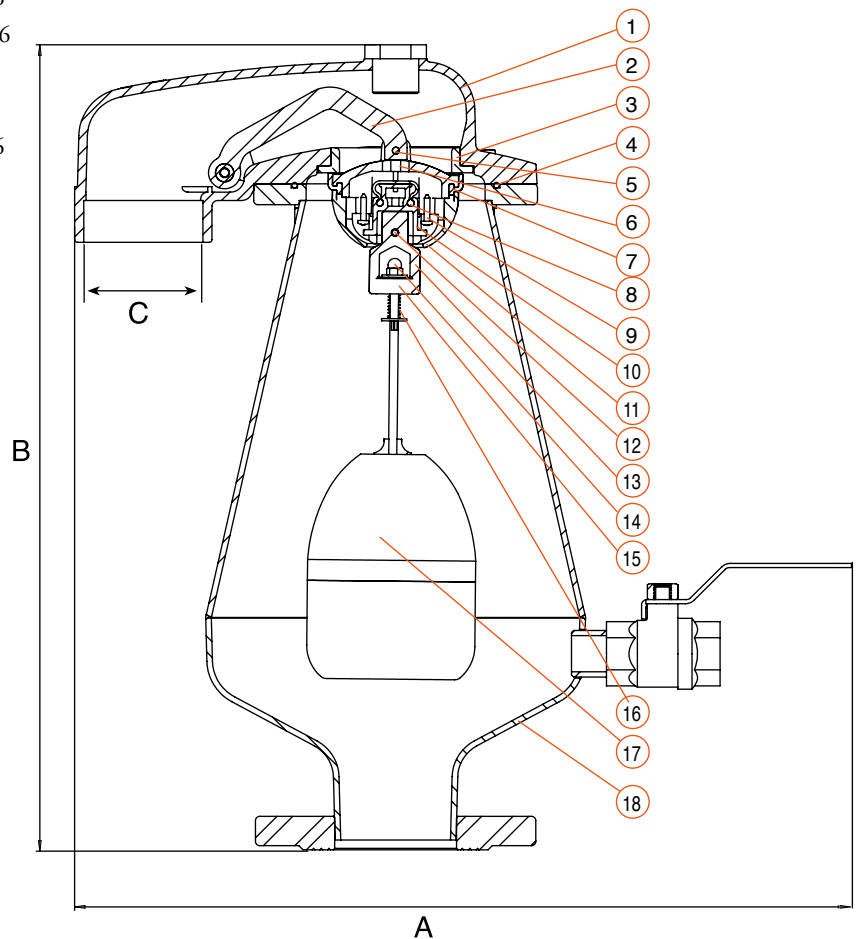
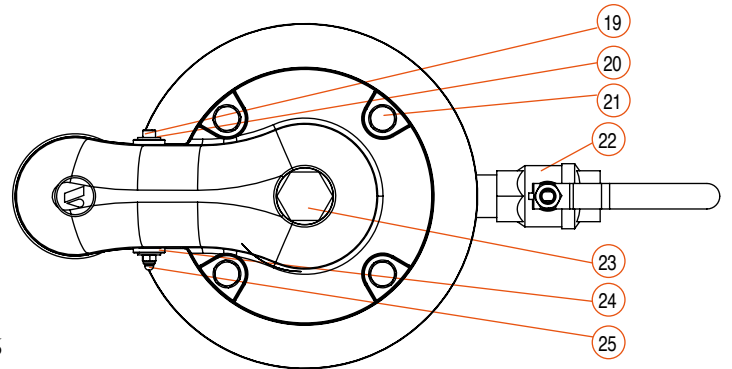


DIMENSIONS AND WEIGHTS

Nominal Size	Dimensions inch				Weight Lbs.	Orifice Area Sq.in	
	A	B	internal C	external		Air & Vac.	Auto.
3"	22.8	21.8	3	3.86	48.5	7.787	0.024
4"	22.8	21.8	3	3.86	50.7	7.787	0.024
6"	22.8	21.8	3	3.86	54	7.787	0.024

PARTS LIST AND SPECIFICATION

No.	Part	Material
1.	Cover	Stainless Steel / Ductile Iron
2.	Disk Arm Assy.	Stainless Steel SAE 316
3.	Orifice (Ductile Body only)	Stainless Steel SAE 316
4.	O-Ring	BUNA-N
5.	Rivet	Stainless Steel SAE 304
6.	Air & Vacuum Disc	St.St SAE 316 / Reinforced Nylon
7.	Air & Vacuum Disc Seal	E.P.D.M.
8.	Air Release Disc Seal	E.P.D.M.
9.	Bolt	Stainless Steel SAE 316
10.	Air Release Disc	Reinforced Nylon
11.	Air Release Disc Cover	Reinforced Nylon
12.	Pin	Stainless Steel SAE 316
13.	Rod Adaptor	Polypropylene
14.	Domed Nut	Stainless Steel SAE 304
15.	Stopper	Polypropylene
16.	Spring	Stainless Steel SAE 316
17.	Float Assy.	Polycarbonate+St.St.316 / St.St.316
18.	Body	Stainless Steel / Steel Din St.37
19.	Bolt	Stainless Steel SAE 316
20.	Washer	Stainless Steel SAE 316
21.	Bolt, Nut And Washer	Stainless Steel SAE 316
22.	Ball Valve	Stainless Steel SAE 316
23.	Plug	Polypropylene
24.	Bushing	Acetal
25.	Domed Nut	Stainless Steel SAE 316



Combination Air Valve for Wastewater - Non Slam

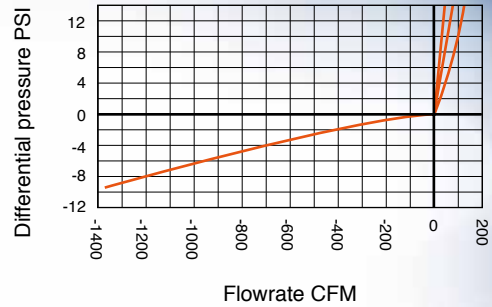
The combination air valve Model D-023 NS protects system components from water hammer in the pipeline under conditions of separation of water head or rapid filling of the line with liquid.

When assembled on a controlled air release valve mechanism (NS), it becomes a hammer-reducing valve and prevents slam (D-023 NS).

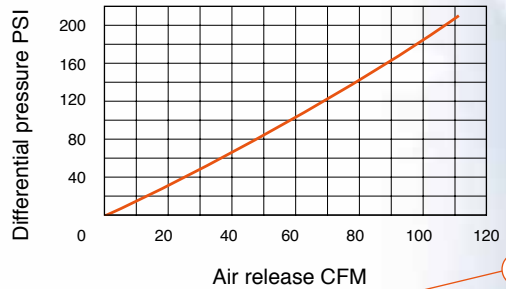
This valve integrates a kinetic air valve, automatic air valve and (normally closed) check valve installed at its discharge outlet



AIR & VACUUM FLOWRATE



AUTOMATIC AIR RELEASE



DIMENSIONS AND WEIGHTS

Nominal Size	Dimensions inch				Weight Lbs.	Orifice Area Sq.in	
	A	B	internal C	external		Air & Vac.	Auto.
3"	22.8	21.8	3	3.86	49.5	7.787	0.024
4"	22.8	21.8	3	3.86	51.7	7.787	0.024
6"	22.8	21.8	3	3.86	55	7.787	0.024

PARTS LIST AND SPECIFICATION

No.	Part	Material
1.	Plug	Polypropylen
2.	Cover	Stainless steel SAE 316 /Ductile Iron
3.	Disc Arm Ass.	Stainless Steel SAE 316
4.	Rivet	Stainless Steel SAE 316
5.	O-Ring	BUNA-N
6.	Kinetic Disc	St.St. SAE 316/ Reinforced Nylon
7.	Kinetic Disc Seal	E.P.D.M.
8.	Automatic Disc Seal	E.P.D.M.
9.	Automatic Disc	Reinforced Nylon
10.	Bolt	Stainless steel SAE 316
11.	Kinetic Disc Cover	Reinforced Nylon
12.	Pin	Stainless Steel SAE 316
13.	Domed Nut	Stainless Steel SAE 304
14.	Rod Adaptor	Polypropelene
15.	Stopper	Polypropelene
16.	Spring	Stainless Steel SAE 316
17.	Ball Valve 1"	Stainless Steel SAE 316
18.	Float Assembly	Polycarbonate+St.St. / St.St. SAE 316
19.	Body	St.St. SAE 316/ Steel DIN St.37
20.	Check Valve	Polypropylen
21.	Crown Nut	Stainless Steel SAE 316
22.	Bushing	Acetal
23.	Washer	Stainless Steel SAE 316
24.	Bolt	Stainless Steel SAE 316
25.	Bolt, Nut& Washer (X4)	Stainless Steel SAE 316

