

# D-023 SB 250 PSI



## Underground Air Valve System for Wastewater

### Description

The D-023 SB is a complete product package that combines the reliable and efficient properties of the A.R.I. D-023 combination wastewater air valve with the added feature of a sub-surface valve that can be buried below ground. A specifically designed gear box operated horizontal sliding disc valve - situated at the base of the D-023 SB assembly - allows for the air valve disconnection and maintenance from ground level.

This shut-off valve is equipped with a safety mechanism enabling disconnection and removal of the D-023 air valve from its subsurface housing, even when the system is under pressure. Since service and maintenance operations of the unit are performed entirely from the surface, there is no need for safety considerations associated with confined space entry.

The D-023 Combination Air Valve combines an air & vacuum orifice and an air release orifice in a single body. The valve is specifically 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 during drainage and releases accumulated air (gases) from the system while it is under pressure and operating. The valve's unique design enables the separation of the liquid from the sealing mechanism and assures optimum working conditions.

### Applications

- Pump stations for sewage, wastewater & water treatment plants.
- Wastewater and effluent water transmission 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 drainage and at water column separation.

High velocity air will not blow the float shut. Water will lift the float which activates the sealing of 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 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 hydraulic disturbances:

- Restriction of effective flow due to a reduction of the flow area. In extreme cases this will cause complete flow stoppage.
- Obstruction of efficient hydraulic transmission due to air flow disturbances.
- Acceleration of cavitation damages.
- Increase in pressure transients and surges.
- Internal corrosion of pipes, fittings and accessories.
- Dangerous high-energy bursts of compressed air.
- Inaccuracies in flow metering.

### As the system fills and is pressurized, the combination wastewater air valve functions in the following stages:

1. Air/gas is discharged by the valve.
2. When the liquid 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 liquid 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 assures the height of the air gap. This enables separation of the liquid from the sealing mechanism.
5. Entrapped air (gas), accumulating at peaks and along the system, rises to the top of the valve and displaces the liquid in the valve's body.
6. When the liquid level lowers 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 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 enter into the system.

## Main Features

### D-023SB Underground Air Valve System for Wastewater:

- The D-023 SB incorporates an integral, flat, gear box operated horizontal sliding disc valve with a 3" full bore passage.
- The shut-off valve is operated from the surface.
- Easy and efficient back flushing can be achieved while the air valve is in its sub-surface housing.
- All connections utilize quick connectors to facilitate easy usage during:
  1. Handling (quick connector from adaptor to shut-off valve)
  2. Maintenance operations (quick connectors on both the inlet & outlet flushing positions).
- Safety elements: Disengaging the air valve is safeguarded: unless the shut-off valve is in the "closed" position and the internal pressure is released, it is not possible to extract the air valve.
- Pipe connections: 3" threaded (NPT) or flanged, in accordance with all standards.
- All parts are corrosion resistant: Metal parts made of Stainless Steel or steel, Composite material parts made of Nylon, PA, and PVC

### D-023 Combination Wastewater Air Valve:

- Working pressure range: 3 – 250 psi.
- Testing pressure: 360 psi.
- Maximum working temperature: 140° F.
- Maximum intermittent temperature: 194° F.
- A combination air valve for wastewater, with a large air & vacuum orifice and a small air release orifice integrated into one body.
- The unique design of the valve prevents contact between the wastewater and the sealing mechanism by creating an air gap at the top of the valve. These features are achieved by:
  1. 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.
  2. Spring-guided linkage between the lower float/rod assembly and the upper float sealing mechanism: allows free movement of the float and rod. Vibrations and movement of the lower float due to turbulence will not unseal the upper float sealing mechanism.
  3. 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.

## Advantages and Benefits

- Relatively lightweight and convenient to install.
- Sub-surface installation.
- Low installation costs:
  1. No need for expensive, large excavation.
  2. No need for expensive, human-accessible manholes.
- Low maintenance costs:
  1. No need for specialized tools or safety equipment.
  2. One person for operation and maintenance.
  3. Clean and environmentally friendly.
  4. Complete service and maintenance system, including an integral disassembly mechanism to ensure easy back flushing and servicing, while reducing the need for spare changeable valves.
- Safe in operation:
  1. Greatly reduces the danger of contact with local fauna – snakes and scorpions, etc!
  2. Entirely operated and maintained from ground level.
- Reliable and efficient operation:
  1. Dynamic design allows high velocity air discharge while preventing premature closure.
  2. Since the valve is a sub-surface (underground), it is more resistant to frost conditions.

## Valve Selection

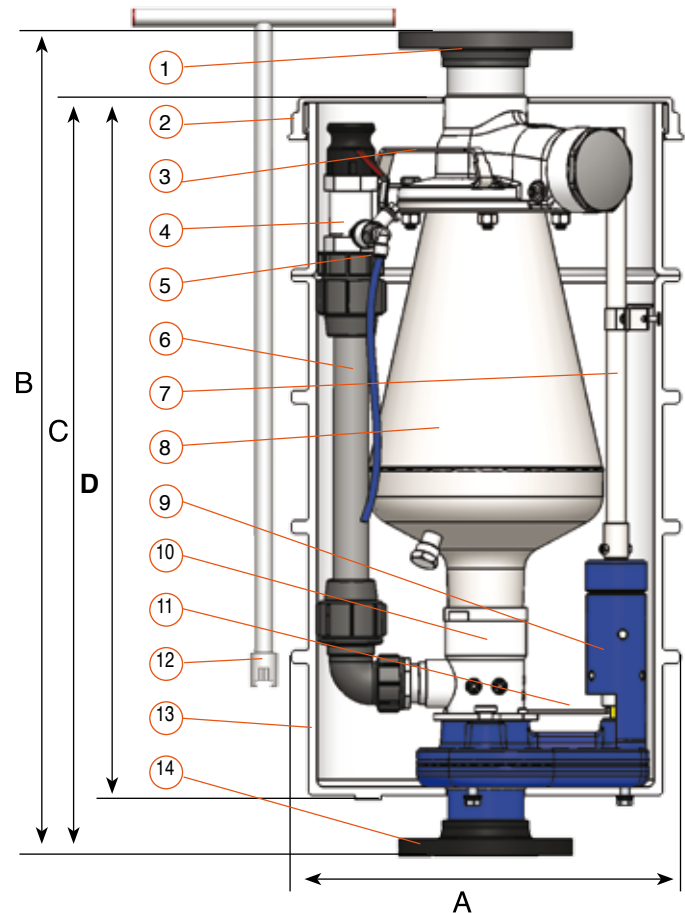
- Air valve body and cover: Stainless steel, available also in welded / cast steel.
- Valve body coating: fusion bonded epoxy coating according to the standard DIN 30677-2.
- Other coatings are available upon request.

## Note

- The D-023 SB air valve is intended for use with raw wastewater. For use with aggressive liquids, please consult with our application engineers or with the marketing dept.
- 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, thread and flange standard and type of liquid.

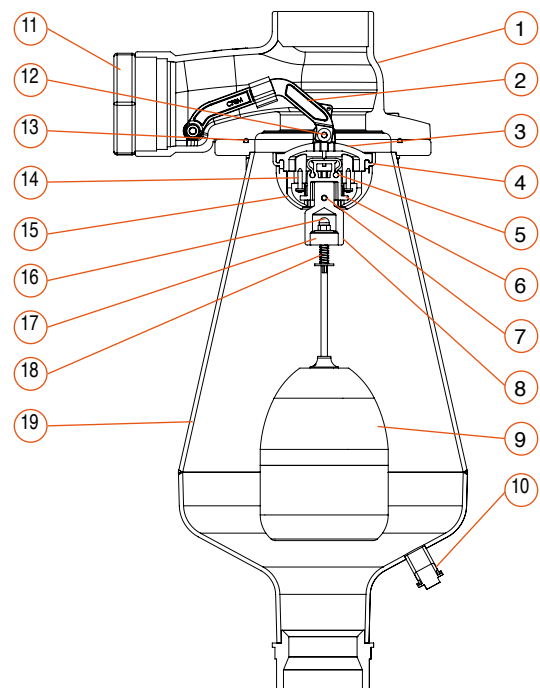
## UNDERGROUND AIR VALVE SYSTEM PARTS LIST AND SPECIFICATION

No	Part	Material
1.	Flanged Outlet	Polypropylene
2.	Valve Box Cover	Polyethylene
3.	Lifting Handle	Stainless Steel SAE 316
4.	Ball Valve 1 1/2"	Stainless Steel SAE 316
5.	Pressure Relief Valve	Stainless Steel SAE 316
6.	Back Flushing Assembly	Polyethylene
7.	Operating Rod	Stainless Steel SAE 316
8.	D-023 Air Valve	see below
9.	Sliding Disc Valve w/ Gear Box	DI+STST+E.P.D.M. /STST+STST+E.P.D.M.
10.	Adaptor - Quick Connector 3"	Stainless Steel SAE 316
11.	Safety Handle	Stainless Steel SAE 316
12.	"T" Key	Stainless Steel SAE 316
13.	Valve Box	Polyethylene
14.	Flange 3"	Reinforced Nylon /Stainless Steel SAE 316



## D-023 PARTS LIST AND SPECIFICATION

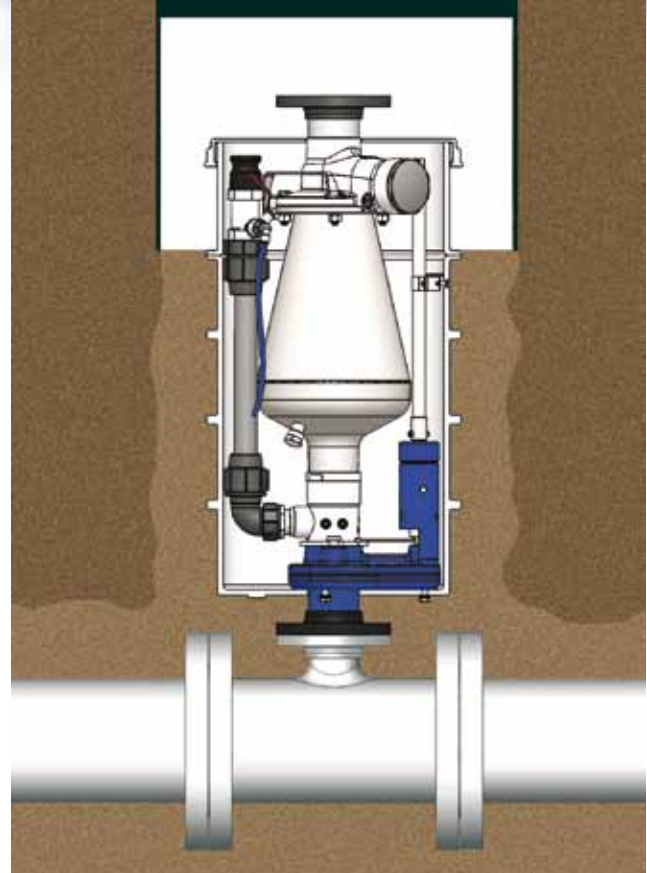
No. Part	Material
1. Cover	ST ST ASTM A744 CF8M
2. Disk Arm Assembly	ST ST ASTM A744 CF8M + E.P.D.M.
3. Air & Vacuum Disc	ST ST ASTM A744 CF8M / Reinforced Nylon
4. Air & Vacuum Disc Seal	E.P.D.M.
5. Air Release Disc Seal	E.P.D.M.
6. Air Release Disc	Reinforced Nylon
7. Pin	Stainless Steel SAE 316
8. Stopper	Polypropylene
9. Float Assy.	Polycarbonate + ST ST 316 / ST ST
10. Plug	Stainless Steel SAE 316
11. Plug	PVC
12. Rivet	ST ST SAE 316
13. O-Ring	BUNA-N
14. Bolt	Stainless Steel SAE 316
15. Air Release Disc Cover	Reinforced Nylon
16. Domed Nut	Stainless Steel SAE 316
17. Rod Adaptor	Polypropylene
18. Spring	Stainless Steel SAE 316
19. Body	ST ST SAE 316 / Steel Din St.37



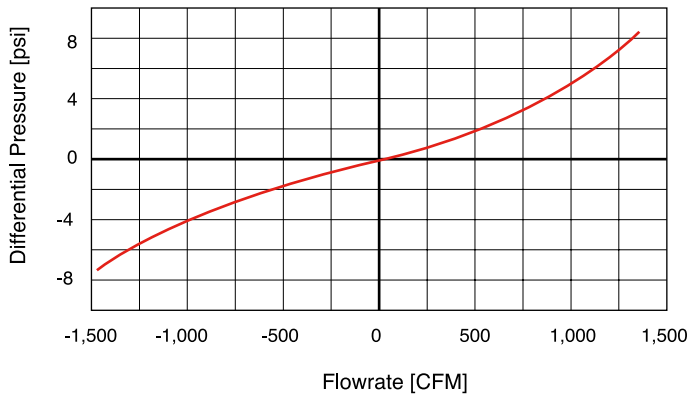
## DIMENSIONS AND WEIGHTS

Model	Dimensions Inch.				Weight Lbs.
	A	B	C	D	
D-023 SB 32	17.8	37.5	34.4	31.7	119.5
D-023 SB 40	17.8	44.5	42.3	39.6	120.6

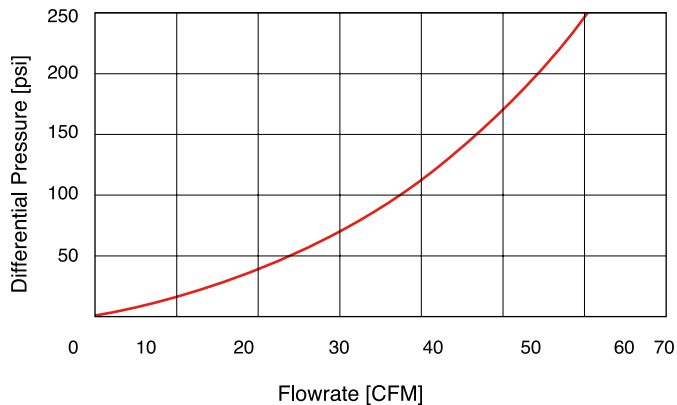
## Sample Installation Scheme



## AIR & VACUUM FLOWRATE



## AIR RELEASE FLOWRATE



Prior to site preparation and installation, please refer to the D-023 SB Installation and Maintenance Manual for all the relevant instructions and information. The manual can be obtained by contacting the A.R.I. marketing dept. or downloading the file from our website.