



# D-023

PATENTED



## Combination Air Valve for Wastewater “GALIL”

### Description

The Combination Air Valve combines an Air & vacuum large orifice and an Automatic small orifice in a single body. The valve is specially designed to operate with liquids carrying solid particles such as wastewater and effluent. The combination air valve discharges air (gases) during the filling or charging of the system, admits air to the system while draining and at water column separation and discharges accumulated air (gases) from the system while operating under pressure. The valve's unique design guarantees separation of the liquid from the sealing mechanism and provides optimum work conditions.

### 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. Water entry to the lower portion of the valve will cause the sealing of the valve. At any time during system operation, should internal pressure of the system fall below atmospheric pressure, air will re-enter the system. The smooth release of air prevents pressure surges and other destructive phenomena. Admitting 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 automatic component releases entrapped air from pressurized systems where the valve is installed.

#### **Without air valves, pockets of accumulated air may cause the following destructive phenomena:**

- Obstruction to effective flow and hydraulic conductivity of the system along with a throttling effect similar to a partially closed valve. In extreme cases this will cause complete flow stoppage.
- Accelerate cavitation damages.
- High-pressure surges.
- Accelerate corrosion.
- Danger of a high-energy burst of compressed air.

#### **As the system starts to fill, the valve functions in the following stages:**

Air is discharged by the valve.  
When the wastewater level reaches the valve's lower float, it rises, and draws the "seal plug" to its sealing position.  
The entrapped air is confined in a pocket between the wastewater and the sealing mechanism. The air pressure is equal to the system pressure.

Increased pressure compresses the trapped air in the upper section of the cone shaped chamber. Due to the conical shape, the large initial air pocket guarantees the height of the air gap. This assures complete separation of the liquid from the sealing mechanism. Entrapped air (gas) accumulating at peaks and at the crown of the pipe at locations along the system rises to the top of the valve, and displaces liquid in the valve's body.

When the liquid level drops to a point where the float is no longer buoyant, the float will descend, peeling the rolling seal. This action opens the valve's orifice and allows part of the air that accumulated in the upper portion of the valve to be released to the atmosphere. Liquid enters the valve. The float rises, unrolling the rubber seal to its sealing position. The remaining air gap prevents the wastewater from fouling the sealing mechanism.

#### **When internal pressure falls below atmospheric pressure:**

1. Both orifices will be immediately unplugged as the floats drop.
2. Air is admitted to the system.

### Main Features

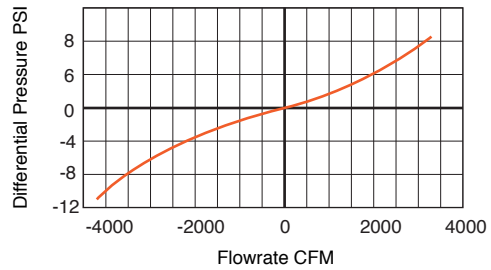
- Working pressure range: 3 - 250 psi.
- Testing pressure: 360 psi.
- Working Temperature: 140<sup>o</sup> f.
- Maximum working temperature for short time period: 194<sup>o</sup> f.
- The valve's unique design prevents any contact between wastewater and the sealing mechanism by creating an air gap at the top of the valve. This air gap is guaranteed even under extreme conditions.
- These features are achieved by:
  - The conical body shape and the external lever designed to assure a large initial air/gas pocket, maintaining the maximum distance between the liquid and the Sealing Mechanism; while allowing minimum body height.
  - 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.
  - A spring supported joint between the stem and the upper float assures that vibrations of the lower float will not unseat the air release orifice of the air valve. Release of air will occur only after enough air accumulates.
- The Rolling Seal Mechanism in the valve design is less sensitive to pressure changes than a direct float seal. It allows a comparably large orifice for a wide pressure range (up to 250 psi).

- Funnel-shaped lower body is designed to ensure that residue wastewater matter will drain to the pipe, to be carried away by the flow, and will not remain in the valve.
- All internal metal parts are made of stainless steel. The floats are made of plastic materials.
- 1 1/2" threaded drainage outlet enables removal of excess fluids.
- The valve discharges air at high flow rate without premature closing.

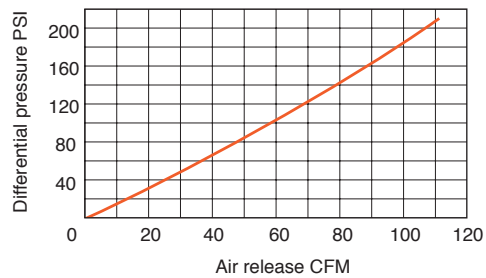
### Valve Selection

- These valves are manufactures with flanged ends to meet ASA 150 standard or any requested standard.
- Available with a controlled air release valve mechanism (NS) as an hammer reducing valve and prevents slam D-023 NS.

### AIR & VACUUM FLOWRATE

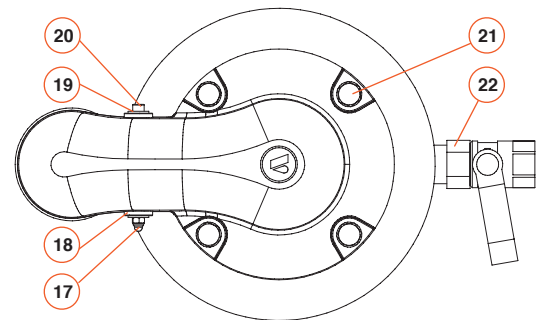


### AUTOMATIC AIR RELEASE



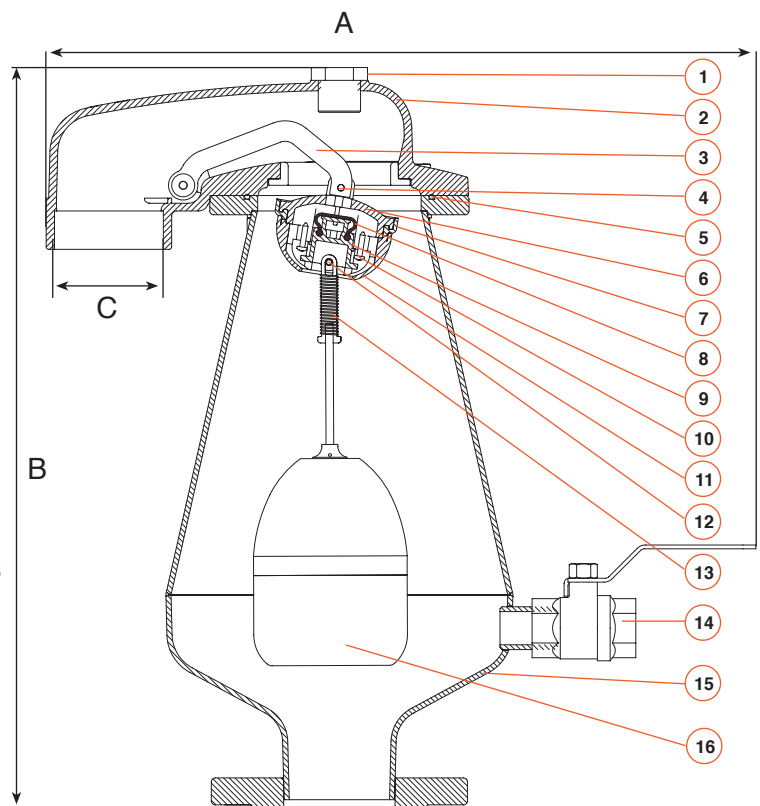
### DIMENSIONS AND WEIGHTS

Nominal Size	Dimensions				Weight Lbs.	Orifice Area Sq.in	
	A	B	internal	C external		Air & Vac.	Auto.
3" 4"	22.8	21.8	3	3.86	48.5	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.	Spring	Stainless Steel SAE 316
14.	Ball Valve	Stainless Steel SAE 316
15.	Body	St.St. SAE 316/ Steel DIN St.37
16.	Float Assembly	Polycarbonate+St.St. / St.St. SAE 316
17.	Crown Nut	Stainless Steel SAE 316
18.	Bushing	Acetal
19.	Washer	Stainless Steel SAE 316
20.	Bolt	Stainless Steel SAE 316
21.	Bolt, Nut& Washer (X4)	Stainless Steel SAE 316
22.	Ball Valve 1"	Stainless Steel SAE 316



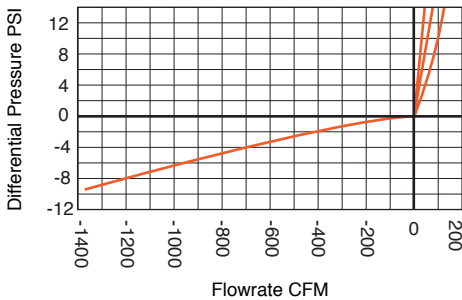
## Combination Air Valve for Wastewater -Non Slam

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).

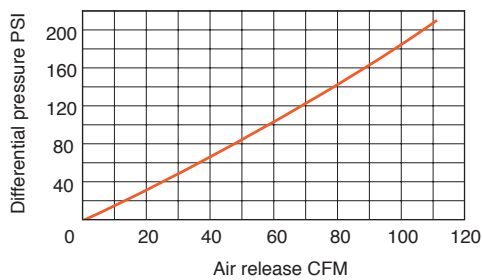
This valve integrates a kinetic air valve, automatic air valve and (normally closed) check valve installed at its discharge outlet



**AIR & VACUUM FLOWRATE** With 1/2/3 holes

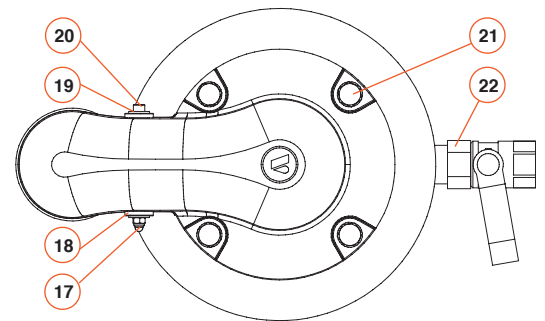


**AUTOMATIC AIR RELEASE**



### DIMENSIONS AND WEIGHTS

Nominal Size	Dimensions				Weight Lbs.	Orifice Area Sq.in	
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### PARTS LIST AND SPECIFICATION

No.	Part	Material
1.	Plug	Polypropylen
2.	Cover	Stainless steel SAE 316 /Ductile Iron
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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.	Spring	Stainless Steel SAE 316
14.	Ball Valve	Stainless Steel SAE 316
15.	Body	St.St. SAE 316/ Steel DIN St.37
16.	Float Assembly	Polycarbonate+St.St. / St.St. SAE 316
17.	Crown Nut	Stainless Steel SAE 316
18.	Bushing	Acetal
19.	Washer	Stainless Steel SAE 316
20.	Bolt	Stainless Steel SAE 316
21.	Bolt, Nut& Washer (X4)	Stainless Steel SAE 316
22.	Ball Valve 1"	Stainless Steel SAE 316
23.	Check Valve	Polypropylen

