



D-020

PATENTED



Combination Air Valve For Wastewater “SAAR”

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° f.
- Maximum working temperature for short time period: 194° 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 designed to ensure a large initial air/gas pocket, maintaining the maximum distance between the liquid and the Sealing Mechanism; while allowing minimum body height.
- A spring supported joint between the stem and the upper float assures that vibrations of the lower float will not unseal 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 composite materials.

- 1 1/2" threaded discharge outlet enables removal of excess fluids.
- The valve discharges air at high flow rate without premature closing.

Valve Selection

- These valves are manufactured with flanged ends to meet ASA 150 standard or any requested standard. The 2" valve is also available with NPT male threads.
- The main part of the air valve's body is made of Stainless Steel SAE 316 or Steel DIN St.37
- The cover and top of the air valve are made of Reinforced Nylon or Stainless Steel SAE 316.
- With a Vacuum Guarding, Out-only attachment, which only allows air discharge, not allowing air intake.
- With a Vacuum Breaking, In-only attachment, which only allows air intake, not allowing air discharge.
- With a Non-Slam, discharge-throttling attachment, which allows free air intake, but throttles air discharge.

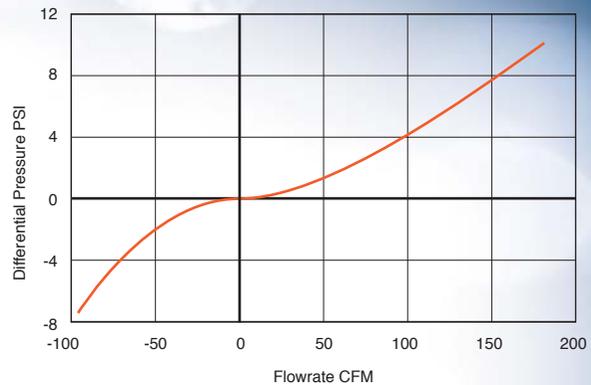
DIMENSIONS AND WEIGHT

Nominal Size	Dimensions				Weight Lbs.	Orifice Area Sq.in	
	A	B	internal	C external		Air & Vacuum	Auto.
2" Threaded	18.2	25.4	1.4	2.1	34.6	1.246	0.018
2" Flanged	18.2	23.8	1.4	2.1	36.6	1.246	0.018
3"	18.2	23.8	1.4	2.1	40.7	1.246	0.018
4"	18.2	23.8	1.4	2.1	42.9	1.246	0.018
6"	18.2	24	1.4	2.1	46.2	1.246	0.018
8"	18.2	24	1.4	2.1	52.9	1.246	0.018

PARTS LIST AND SPECIFICATION

No.	Part	Material
1.	Flushing Connection	Polypropylene
2.	Seal Plug Assembly	Reinforced Nylon+E.P.D.M+St.St.
3.	Float	Foamed Polypropylene
4.	Clamping Stem	Reinforced Nylon
5.	Body	Reinforced Nylon /Stainless Steel SAE 316
6.	Bolt	Stainless Steel SAE 316
7.	Cover	Reinforced Nylon /Stainless Steel SAE 316
8.	O-Ring	BUNA-N
9.	Crown Nut	Stainless Steel SAE 316
10.	Stopper	Polypropylene
11.	O-Ring	BUNA-N
12.	Spring	Stainless Steel SAE 316
13.	Washer	Stainless Steel SAE 316
14.	Stem	Stainless Steel SAE 316
15.	Ball Valve 1"	Stainless Steel SAE 316
16.	Float	Polycarbonate /Stainless Steel SAE 316
17.	Body	Stainless Steel SAE 316 / Steel DIN St.37

AIR & VACUUM FLOWRATE



AUTOMATIC AIR RELEASE

