A.R.I.

Wastewater

D-020 PN 16

Combination Air Valve for Wastewater

Description

The D-020 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 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, 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 will 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 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 throttling effect as would a partially closed valve. In extreme cases this will cause complete flow stoppage.
- Obstruction of efficient hydraulic transmission due to air flow disturbances.
- Accelerate cavitation damages.
- Pressure transients and surges.
- Corrosion in pipes, fittings and accessories.
- Danger of a high-energy burst of compressed air.
- Inaccuracies in flow metering.

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 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 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 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 the system.

Main Features

- Working pressure range: 0.2 - 16 bar.
- Testing pressure: 25 bar.
- Maximum working temperature: 60° C.
- Maximum intermittent temperature: 90° C.
- 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:
• **The conical body shape:** 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 air release component. Release of air will occur only after enough air accumulates.
• **The Rolling Seal Mechanism:** less sensitive to pressure differentials than a direct float seal. It accomplishes this by having a

comparably large orifice for a wide pressure range (up to 16 bar).
• **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.
- 1½" threaded discharge outlet enables removal of excess fluids.
- Dynamic design allows for high velocity air discharge while preventing premature closure.
- 1" ball valve releases trapped pressure and drains the valve body prior to maintenance.

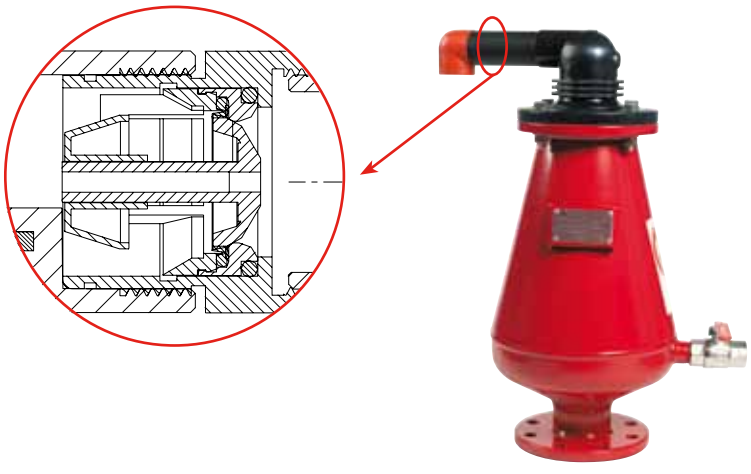
Valve Selection

- Size range 2" – 8".
- These valves are manufactured with flanged ends to meet any requested standard
- The 2" valve is also available with a threaded BSP or NPT connection.
- Standard metal body, also available with a stainless steel body.
- Valve body coating: fusion bonded epoxy coating according to the standard DIN 30677-2.
- Other coatings are available upon request.
- Additional accessories:
• With a One-way, Out-only attachment, allows for air discharge only, prevents air intake.
• 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.

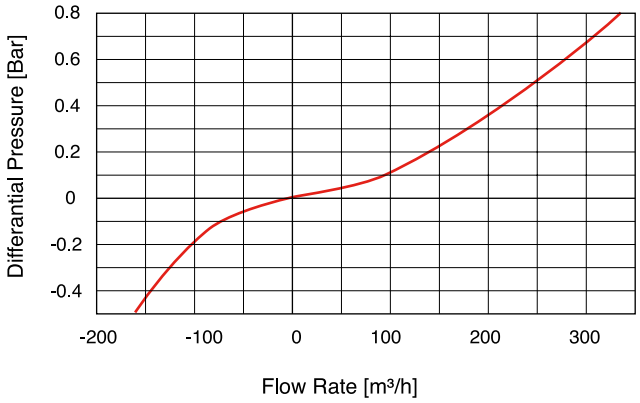
D-020 Non-Slam Single Orifice Add-on Component Data Table

Nominal Size	Discharge orifice	Total NS area	NS orifice	Switching point	Flow at 0.4 bar
2" (50mm) 3" (80mm)	37.5 mm	12.6 mm^2	4 mm	Spring loaded normally closed	17.5 m^3/h

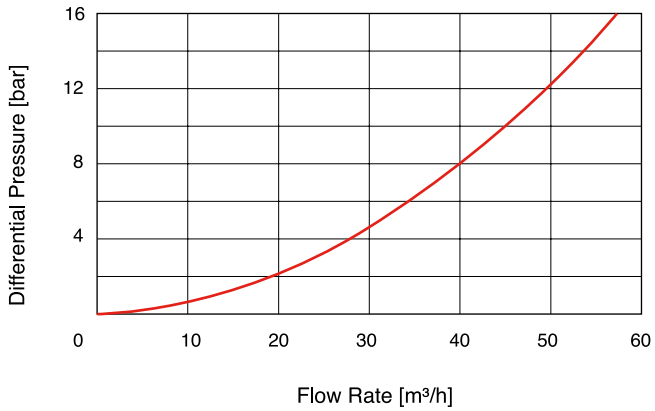


D-020-NS

AIR & VACUUM FLOW RATE



AUTOMATIC AIR RELEASE FLOW RATE

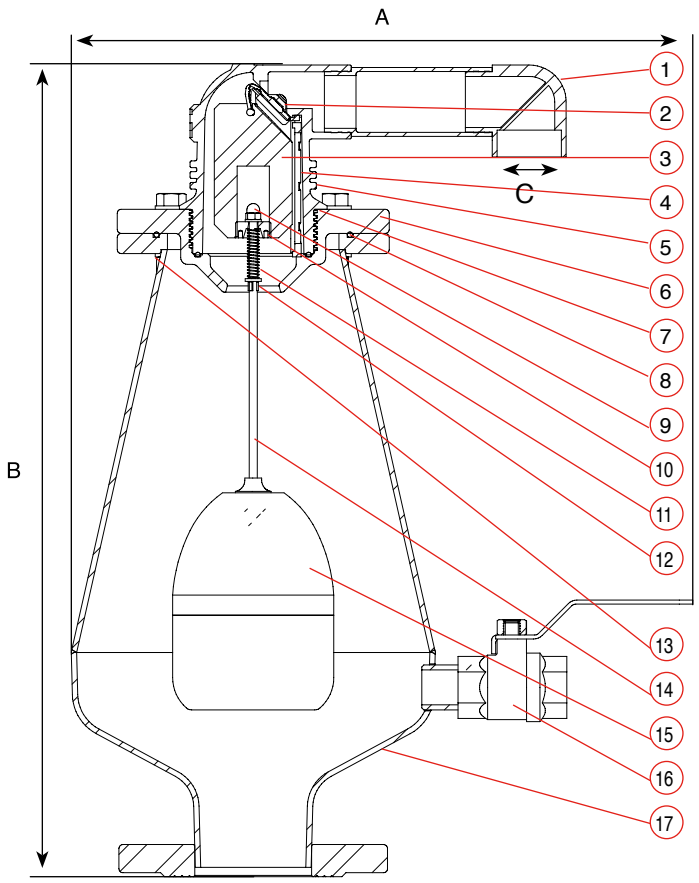


DIMENSIONS AND WEIGHTS

Nominal Size	Dimensions mm A	B	Connection C	Weight Kg. Steel	ST ST	Orifice Area mm² Auto.	A / V
2" (50mm) Threaded	550	644	1½" BSP Female	16.5	15.8	12	804
2" (50mm) Flanged	550	605	1½" BSP Female	17.5	17.0	12	804
3" (80mm)	550	605	1½" BSP Female	18.5	18.5	12	804
4" (100mm)	550	605	1½" BSP Female	19.5	19.5	12	804
6" (150mm)	550	610	1½" BSP Female	21.0	21.0	12	804
8" (200mm)	550	610	1½" BSP Female	24.0	22.0	12	804

PARTS LIST AND SPECIFICATION

No	Part	Material
1.	Discharge Outlet	Polypropylene
2.	Rolling Seal Assembly	Nylon + E.P.D.M. + ST ST
3.	Float	Foamed Polypropylene
4.	Clamping Stem	Reinforced Nylon
5.	Body	Reinforced Nylon / ST ST SAE 316
6.	Cover	Reinforced Nylon / ST ST SAE 316
7.	O-Ring	BUNA-N
8.	O-Ring	BUNA-N
9.	Crown Nut	Stainless Steel SAE 304
10.	Stopper	Polypropylene
11.	Spring	Stainless Steel SAE 316
12.	Washer	Stainless Steel SAE 316
13.	Bolt & Nut	Stainless Steel SAE 316
14.	Stem	Stainless Steel SAE 316
15.	Float	Polycarbonate / ST ST SAE 316
16.	Ball Valve 1"	Brass ASTM A124 Chrome Coated / ST ST SAE 316
17.	Body 4" - 8"	Steel DIN St.37 / ST ST SAE 316
	2", 3"	Steel DIN St.37 / ST ST SAE 316 / Steel ASTM A216 WCB / ST ST ASTM A744 CF8M



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