



MS Aqualevel

General Description

MS Aqualevel

The MS Aqua Level water valves are ideal for maintaining a specific water level in drinking bowls, water containers and other vessels.

The Aqua Level is suitable for:

Weaners, finishers, sows in gestation units, sows in insemination and control units, and gestating sows in loose-housing systems.

Benefits

Improved water consumption by newly weaned pigs facilitated by the constant water level. The resulting positive effects on early daily growth rates are well documented.

Improved water consumption and milk production of nursing sows thanks to the constant water level. Documented water savings of 50% in relation to conventional drinking bowls for weaners and finishers. Water wastage is also considerably reduced in farrowing units.

Like float valves, Aqua Level valves maintain a constant water level. However, Aqua Level valves provide a higher degree of hygiene and allow easier cleaning as no mechanical parts are in contact with the drinking water but are located in the valve housing more than 1 metre above the water level.

Operating principle

The MS Aqua Level functions by means of a vacuum which causes a rubber diaphragm to shut off the water supply. The vacuum is formed as water absorbs the air contained in the valve chamber and removes it via the water flow.

As long as the water level is lower than the end of the pipe, air will be simultaneously sucked into the valve to equalise the vacuum. As soon as the water level prevents air intake, suction on the rubber diaphragm closes the nozzle through which water is injected into the valve housing. When the water level again falls below the end of the pipe the vacuum is equalised and the valve opens.

The valve has a built-in shut-off mechanism so that individual valves can be closed manually.

The water valve is designed to be fitted direct to a 3/4" horizontal pipe. It can also be connected via a 1/2" external thread on the rear of the valve housing.



Preconditions for reliable operation

The MS Aqua Level water valves are extremely reliable. However, a necessary precondition for reliable operation is that all water installations are precisely dimensioned and adjusted.

The valve opens automatically when pressure drops inside the valve housing. Under correct conditions, this occurs when the water level falls below the end of the pipe, allowing air to be sucked into the valve through the pipe, thus equalising the pressure.

If water is supplied at insufficient pressure, a vacuum will not be created and the valve will not close. Similarly, the valve may also open unintentionally if the vacuum is equalised by leaks in the valve housing.

The following instructions should be followed when dimensioning an Aqua Level installation.

The same calculation formula is used to dimension main pipes and service pipes. It is assumed that **not all** Aqua Level valves will be activated simultaneously.

Two-step dimensioning:

1. Measure the dynamic working pressure and perform the following calculation.
Working pressure is defined as the water pressure measured at the point on the main pipe at which the service pipe to the valves is connected.

Measurement must be made while the water pipe is in use.

$$\text{Main pipe/service pipe output (L/min)} = \frac{2 \times \text{no. of valves}}{\text{Water working pressure}}$$

2. Select the correct dimension for main and service pipes.
This means that main and service pipes must be capable of providing the calculated output (L/min) at the measured working pressure and with the actual number of valves.
Select the necessary main-pipe diameter from the table below.

Main pipe	Output at 2 bar
½"	7 l/min
¾"	24 l/min
1"	60 l/min
1 ¼"	90 l/min
1 ½"	160 l/min
2"	240 l/min
2 ½"	440 l/min
3"	680 l/min

Important! All piping and connections ahead of the main pipe must be of equal or greater diameter than the main pipe from which the MS Aqua Level service pipes originate.

Recommendations

- Other forms of consumption from the main pipe or service pipes must be taken into consideration. For example, supplying considerable quantities of water to a wet-feed tank may periodically cause the working pressure to drop dramatically. In such cases, it may be necessary to provide separate water supplies.
- Long troughs for gestating sows, approx. 20 sows per valve. Two valves per trough is optimal as this reduces the risk of feed blocking the distribution of water along the trough if one of the sows ceases feeding.
- Installation of a pressure regulator to offset considerable periodic changes in water pressure.
- Installation of a central cleaning filter to remove grains of sand, lime scale and other foreign matter that may cause deposits to form within the valve.
- If the valve housing is disassembled in order to clean the nozzle or diaphragm, it is recommended that the outer 15 mm of the diaphragm be lubricated with a slipping agent before reassembling the valve. This ensures that the valve can be subsequently reopened without difficulty.
We recommend SC-4 silicone grease.

Requirements

- The optimum water pressure is 2.0 bar (working pressure). The minimum working pressure is 0.7 bar and the maximum working pressure 4.0 bar.
- If the valve is supplied without piping, an airtight seal must be created during installation in order to prevent false air intake.

Operating problems and their solution

Unintended valve opening may be caused by:

Low water pressure

The general water pressure in the main pipe is sufficient, but too many valves are connected in series with small-diameter hoses, thus dramatically reducing the actual water pressure at the valve.
Connecting individual valves direct to the main pipe is always preferable.

Low water pressure

The general water pressure is insufficient. A minimum pressure of 0.7 bar is required, even during water consumption.

Low rate of flow

If the piping is under-dimensioned, the quantity of water supplied per minute may be too low despite sufficient water pressure. The water pressure will therefore drop dramatically as soon as water is consumed.

High water pressure

Sometimes, especially at night, water pressure may exceed the recommended maximum pressure. A pressure of 3 bar measured during the day may rise to 7-8 bar at night. In such cases, it is necessary to install a pressure regulator.

Leaky valve housing

The vacuum formed in the valve housing is lost due to false air intake. Leaks may be caused by:

- The two sections of valve housing being incorrectly connected.
- The water inlet O-ring not forming an airtight seal.
- The pipe thread not being correctly sealed.

Diaphragm coatings

If the diaphragm is coated with deposits of iron, ochre, lime scale or other foreign matter, it may not be able to close.
The problem can be solved by cleaning or replacing the diaphragm.

Valve fails to open:

Blocked nozzle

Impurities in the water may block the diaphragm nozzle. It is recommended that the water supply be equipped with a central cleaning filter.

Blocked pipe

This impedes pressure equalization when the water level drops, thus preventing the valve from opening. The pipe must not be installed along the sides of the trough as the end of the pipe may become blocked by feed residues, thus preventing the valve from opening. An alternative solution is to insert a T-piece into the pipe from below. This will be continuously agitated by the animals, thus preventing blockages from occurring.

50% Water savings

Two trials were performed over a six-week post-weaning period at the ISOWEAN pig farm in Spain in October 2001. In pens equipped with Aqua Level, higher daily growth rates and lower feed consumption were observed for the first 14 days after weaning. The results allow the following conclusions to be drawn.

- *The expected improvements in post-weaning growth rates that were observed result from easier access to water during the first 14 days when weaners experience difficulty in activating drinking valves and water intake is critical for growth.*
- *Aqua Level troughs were tipped regularly to keep the water clean. The older the animals, the more often it was necessary to tip the troughs.*
- *Water consumption was considerably higher in pens with drinking bowls without this leading to improved production figures. This indicates relatively high water wastage levels when drinking bowls are used, a fact that is confirmed by the videos that were filmed.*