

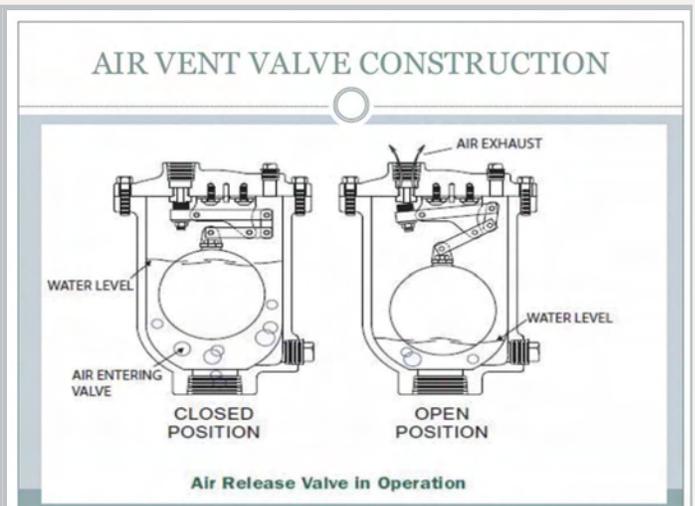
The Importance of Air Relief Valves - Too Often Forgotten

The wastewater utility notified KDHE after discovering a broken air relief valve. The operators were told to add lime around the valve box to reduce odors and stabilize the area where wastewater discharged.

Air Relief Valves or ARV's, sometimes also referred to as Air Release Valves, are probably the most forgotten valves in water or wastewater systems. The main reason they are so often forgotten is that they work so well. And until they develop a leak, they do not usually cause issues with operations of the water or wastewater system. In the past year I have assisted several utilities that had issues with their air relief valves. The problems were mostly due to leaks from the valve. Another had leaks due to corrosion of the piping, flooding the valve pit/manhole and which resulted in a by-pass of wastewater. Sewer by-passes must be reported to the Kansas Department of Health and Environment as required by the utility's permit requirements of incident reporting.

What is the purpose of an air relief valve? Well, it's just that. The valve releases air from the utility pipeline system. The valves are designed to release the air buildup from the force main or from the water lines from pumping stations or from pipelines when there are significant changes in grade. The valves release the entrapped air that collects at the high points of pressurized systems. Once the air is released the valve closes. There are no air relief valves on gravity sewer lines.

Air can enter a water or wastewater system in several ways. Air will be introduced during breaks in the system as air enters through the open piping, or e.g., at a lift station due to holes in piping. Most public water supply well piping includes an air relief valve to release air due to startup of the well pump. Trapped air can cause inefficiency, reduced flow during pumping that requires longer pumping times and thus uses more power and increases operating costs. In extreme cases in rural water systems, the entrapped air can actually lock up a



This graphic shows an air relief valve in the open and closed position.



The typical difference between a water or wastewater air relief valve is that, as shown here, the wastewater devices are normally taller to prevent the solids and wastewater from being released.

waterline, preventing flow.

Combination air/vacuum relief valves allow air to enter the system during breaks at which time the valve acts as a vacuum relief valve to reduce chances of pipeline collapse.

Air relief valves are designed to release the entrapped air automatically. When enough air is built up in the system, the float in the valve moves, allowing the air to be released. Then after enough air is released the float is moved by the water/wastewater entering the device and the valve closes. There are slight differences between water and wastewater air relief valves due to the solids in the wastewater.

The selection of valves made of proper materials needs to be considered as well. This is because of the corrosiveness of the material being



Galvanized fittings were used for the original installation of this air relief valve. Severe corrosion resulted in a leak. A plastic fitting will replace the corroded fitting.



A wastewater operator proceeds with the disassembly of an air relief valve.



This photo shows an air relief valve made of cast iron installed on a public water system main.

pumped such as wastewater versus potable water. Air relief valves are made of several types of material including plastic, cast iron, steel, and stainless steel.

While air relief valves generally function with little attention, the valves do need routine maintenance as any other valve in a water or wastewater system. The valves should be cleaned and maintained according to the manufacturer's recommendations. Most manufacturers recommend cleaning every six to twelve months. Examples of methods of cleaning can be as simple as connecting a hose and backflushing the valve. Others may require removing the valve and cleaning the internal valve and float.

All air relief valves have one thing in common; they have a shut off valve below the valve to allow for repair and replacement. The shut off valve should be operated regularly as well. It's important for operators to pay attention to how an air relief valve is connected to a pressure main. It could be with a saddle valve clamp or by direct tap into the pipe, depending on when the line was constructed. If the shut off to the air relief valve breaks it will need to be replaced. So, it is important to have any potential repair parts on hand should replacement be necessary.

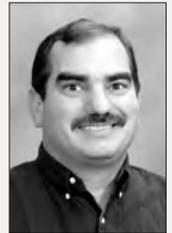
Air relief valves are intended to be operating at all times. This means the shut off valve below the valve needs to be in the open position to allow air to be released. If the lower shut off is not open, obviously the valve cannot operate as designed.

Operators should note that the maintenance schedule, as recommended by the manufacturer, should be followed to reduce chances of

bypasses of wastewater or water loss. I recommend that the specifications of the valve or a photo of the devices with name plate and sizes be part of the water or wastewater utility's operation

and maintenance program guide to ensure parts can be acquired when needed.

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