



# TEST YOUR AIR VALVE KNOWLEDGE

Take a look at our latest series of questions and discover the answers from our AVK UK experts

We published a number of questions in a series of polls on social media, testing your knowledge about air valves.

In this document, you can see how the votes were cast in each question, and the correct answers underneath each.

## How did you do?

There was a great response to the poll in general, and a diverse range of answers to some of the questions. You can read through all of the answers in this document, and hopefully improve your knowledge on air valves as well.

## Extending the Whole Life of Pipe Systems

Control of accumulated air within any pipe system will extend the whole life of the pipe system, deliver lower operational costs, reduce health & safety risks, and achieve more efficient hydraulic performance. AVK offers the most comprehensive range of air valves on the market with a sealing range of 0.02 Bar minimum.

Rob Edwards - Smart Water Specialist, pictured right, said: "What this poll has highlighted is that few people really fully understand the function, capability, and benefits of air valves. They are generally not seen as a priority on water networks. This needs to change, as air valves are incredibly valuable assets.



"I hope this Q and A document sheds some light on some of the questions posed around air valves and how they work, and what benefits and protection they offer clean and wastewater pipelines."

If you'd like to learn more about AVK air valves and how they could help you, or you are looking for a specific solution and need expert advice, please contact Rob Edwards on:

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Email: [roed@avkuk.co.uk](mailto:roed@avkuk.co.uk)

We hope you enjoy reading through the air valve questions and answers!



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# QUESTION 1

**Q: What is the single most important benefit of having air valves in a water distribution network?**



- A** – Improved network efficiency **37% (22 votes)**
- B** – Reduced water hammer **18% (11 votes)**
- C** – Elimination of vacuums **37% (22 votes)**
- D** – Assists pump performance **8% (5 votes)**



## ANSWER TO QUESTION 1

There is no definitive objective answer, although 'improved network efficiency' would be a strong candidate as it implies all the other benefit options given.

Air valves both remove excess air from a water network and allow air to enter. Removing excess air from a network reduces water hammer, assists pump performance, reduces pipe cavitation, contributes to optimal network performance and more besides.

Except for extreme vacuum conditions, there will always be air in your pipe network. Pressure and temperature changes act on water to release dissolved air entrained in it. When pressure in your pipeline drops or temperature rises the air release increases. In addition to the release of entrained air in water, air can also be 'sucked' into your network through joints, cracks, pumps, and other network assets.

As the air builds up in the pipe network, the flow rate efficiency of the network reduces; pumps must work harder to maintain flows. Air in the network also increases the risk of water hammer when, for example, valves and hydrants are opened and closed. Correctly located and maintained air valves release air from the network and, thereby, minimise these problems.

Vacuums, the absence of air, in pipe networks can be catastrophic. Vacuums occur for a variety of reasons including the rapid closure of valves, abrupt pump switching and poorly managed emptying of sections of pipeline.

Aristotle postulated that 'nature abhors a vacuum', and water pipelines aren't far behind. Without air valves allowing air to enter, negative vacuums will encourage air (and contaminants) to be sucked into the network through cracks and poorly installed joints and valves. If air cannot enter the network, the vacuum could eventually lead to pipe collapse.

The moral of the story is to ensure air valves are incorporated into your water or wastewater networks. If you have any questions relating to the specification, maintenance, or location of air valves on your network, contact Rob Edwards and the AVK UK smart water team.



## QUESTION 2

**Q: What would be the impact of correctly located and fully maintained air valves on leakage levels across your water network?**



- A** – Don't know - not considered it **4% (1 vote)**
- B** – No impact – all valves working **4% (1 vote)**
- C** – Low impact – at the margins **0% (0 votes)**
- D** – High impact – could be radical **92% (22 votes)**



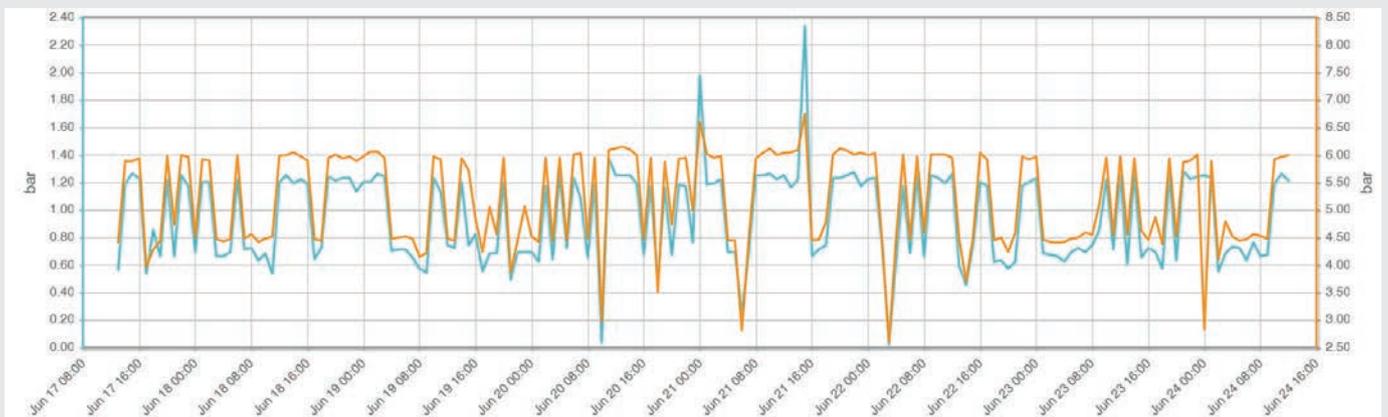
## ANSWER TO QUESTION 2

The most likely answer is that they could have a radical impact on leakage levels (option D).

Excess air or vacuums, the two scenarios remedied by correctly specified air valves, put a network under stress. Cavitation, water hammer, pump damage and more: they all make your network work harder than it should have to. In many cases, these stresses, over time, take their toll on joints, fittings, and other network assets. This in turn contributes to network leakage.

Lowering pressure across your network is one strategy used to reduce leakage. Lower pressures can lead to the entrained dissolved air in water being released. Therefore, correctly located, and maintained air valves are fundamental to the success of a low-pressure leakage reduction strategy.

The moral of the story, if you are reducing water pressures to cut leakage, is to ensure your air valves are working effectively. Speak to us for more information.

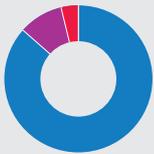


This graph shows the pressures of two different ARISENSE air valves simultaneously over an eight-day period, hourly. These can then be inspected to see if there is any irregularities between certain air valves suggesting a possible burst/leak.



## QUESTION 3

**Q: Where is the most important place to locate air valves on a water network?**

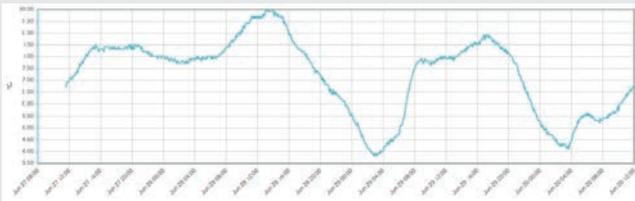


**A** – High points on the network **86% (18 vote)**

**B** – Long level or inclined runs **0% (0 votes)**

**C** – Near pumps **10% (2 votes)**

**D** – Alongside regulating PRVs **5% (1 vote)**



This graph illustrates the temperature of an air valve over a four day period.

## ANSWER TO QUESTION 3

Although the answer can be influenced by specific network variables, we suggest that the most important location for air valves is at the high points on a network.

This is, however, not a binary decision. Air valves should be located at any point on a network where there is a risk of air pockets or vacuums. High points or peaks on the network are one obvious location, as are any network assets that can cause water flow to stop or change direction suddenly such as pumps or certain valves. Most water companies stipulate that even on long pipe runs with a shallow incline an air valve should be installed every 500m – 1,000m.

Contact us if you have any questions relating to the specification, maintenance, or location of air valves on your network.

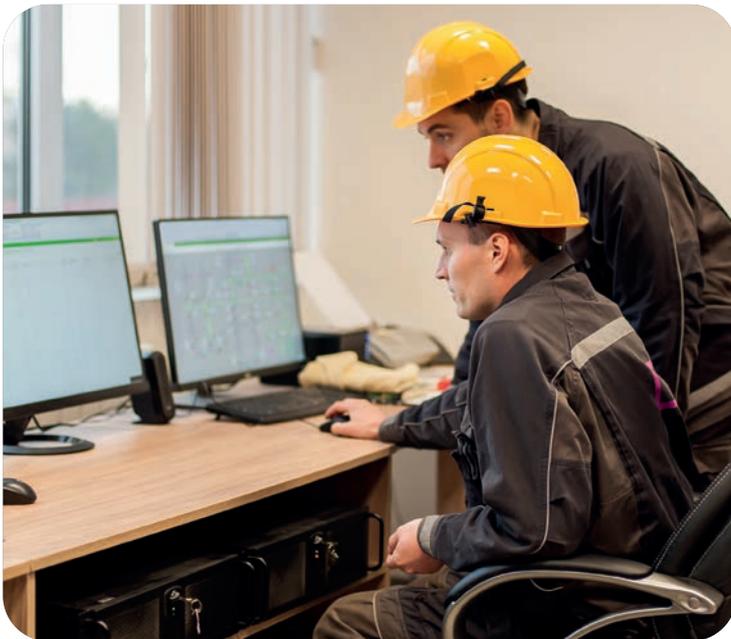


## QUESTION 4

### Q: What is the optimal air valve maintenance strategy?



- A** – No maintenance needed **7% (1 vote)**
- B** – Periodic planned maintenance **93% (14 votes)**
- C** – Reactive maintenance **0% (0 votes)**
- D** – Act on smart air valve alerts **0% (0 votes)**



### ANSWER TO QUESTION 4

Water networks are subject to changes in ground conditions, temperatures, flows, pressures and more; this creates a challenging environment. Given this environment, air valves on water and wastewater networks are likely to need maintenance from time to time, but which ones?

Periodic maintenance is well-intentioned. The sheer number of air valves on a network, however, means that maintenance periods on all but the most critical air valves are likely to be ineffective. Pressures on maintenance budgets and reductions in engineering manpower are also combining to focus maintenance activities on assets such as pumps and valves. Periodic maintenance may also be compromised if you don't know where air valves on your network are located!

Reactive maintenance may appear to be a sensible option. The problem is that the reaction is often to the network issue caused by the faulty air valve rather than to the air valve itself. Root cause analysis may eventually trace the issue back to the air valve but the disruption to supply and customer service can be considerable; not to mention the cost of putting the issue right.

In the case of AVK smart air valves, you are automatically alerted if the valve's functionality breaches set parameters. The communication can even be to your mobile phone. Action can be taken before a problem even arises. Furthermore, the AVK smart air valve communicates the valve's GPS co-ordinates so it can be easily located by your engineers.



## QUESTION 5

**Q: What percentage of air valves in your water network are operating correctly?**



**A** – 75%-100% **16% (4 votes)**

**B** – 25%-75% **16% (4 votes)**

**C** – Less than 25% **56% (14 votes)**

**D** – We don't know where they are! **12% (3 votes)**



## ANSWER TO QUESTION 5

The simple answer is that you are unlikely to know the answer to the question (unless you answered 'D – We don't know where they are!').

Periodic maintenance can provide an approximation of your air valves operating efficiency. Given the number of air valves that are on, or should be on!, your network, periodic maintenance on all but the most critical valves are likely to extremely 'periodic'.

AVK smart air valves regularly communicate with your control system confirming normal operation or indicating there is a problem. You can set parameters to trigger alerts should there be an issue. Importantly, AVK smart air valves also transmit their GPS co-ordinates enabling them to be easily found should maintenance work be required.

The moral of the story is to install smart air valves if you want to know that 100% of your air valves are operating correctly. To find out more about AVK air valves, or if you are looking for a bespoke solution and need expert advice, please speak to Rob Edwards. Contact details are listed on the first page of this document.

### Talk to us.

To find out more about air valves, if you are looking for a bespoke solution, need expert advice or would like training for you and your team - at your premises or at one of our UK manufacturing sites - please speak to Rob Edwards Tel: +44 (0) 7562 622111 Email: [roed@avkuk.co.uk](mailto:roed@avkuk.co.uk)

