

Water Hammer Fact Sheet

4 August 2026

The following information has been compiled to raise awareness of water hammer and its effects, and to support understanding of the factors that influence its occurrence within plumbing systems. It is based on content from *The Plumbers Handbook, Tenth Edition*, published by the International Copper Association Australia Ltd, and has been adapted for clarity and relevance.

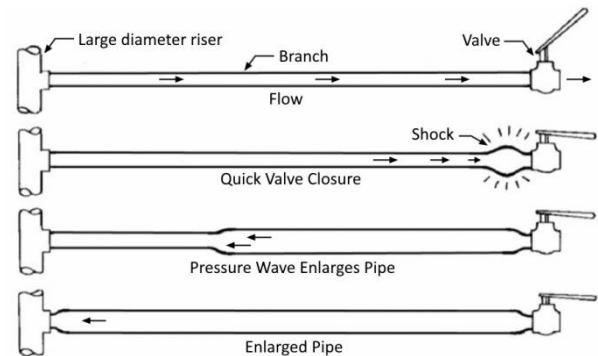
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What is Water Hammer?

Hydraulic shock in plumbing systems is commonly referred to as water hammer. Water hammer occurs when water flowing through a pipe is subjected to a sudden change in velocity.

Changes in flow conditions can arise during normal operation of the system, including the use of taps, mixers, valves, appliances and pumps.

The resulting noise and pipe movement are caused by a hydraulic shock wave travelling through the plumbing system.



Water hammer is one of the most common causes of noise and vibration in plumbing systems.

Effects of Water Hammer

When pipes are inadequately supported, or where long pipe runs exist, pressure waves can cause pipework to vibrate and strike surrounding structures, creating the noise commonly associated with water hammer.

It can occur in both metallic and plastic pipe systems and, if left unmanaged, may contribute to damage of pipework, appliances, valves, fittings and flexible hoses

The severity of a water hammer event is influenced by factors including:

- Water pressure
- Flow velocity
- Pipe support and clipping
- Pipe layout and run lengths
- The presence or absence of suitable water hammer suppression devices

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Common Causes of Water Hammer

- Hammer suppression devices installed in the wrong position.
- Hammer suppression device not installed and excessive pressure in the line.
- Loose pipes and faulty valves, sometimes caused by shock waves.

More Facts About Water Hammer

- Water hammer will occur with or without noise.
- When a quick closing lever tap or solenoid valve closes it can produce a shock wave of up to 3000 kPa and more.
- Tests show that if a quick closing valve is closed when only trickle of water is coming from it, the shock wave is still around 2000 kPa.
- AS/NZS 3500 states that to disconnect the water meter, taps, appliances and other fixtures that may be damaged when testing the water service at 1500 kPa. Then consider the damage being caused at 3000 kPa every time a quick closing valve is closed.
- The harder the pipe material the greater the noise but it is not the noise causing damage it is the shock waves.
- Pipe work and fixtures can be damaged with or without noise if water hammer is not controlled. The noise provides a warning, therefore, any potential damage can be eliminated.

- All water services, which contain a quick closing valve, should be fitted with a hammer suppression device as recommended by AS/NZS 3500.

Note: A hammer suppression device refers to a Hammer Arrestor and an Air Chamber.

Steps in Preventing Water Hammer

- If the water pressure is above 500 kPa always install a 500 kPa pressure-reducing valve at the water meter.
- Ensure all pipework is clipped and supported as per AS/NZS 3500, preferably using stand off clips. If the pipe runs along a stud install extra clips.
- Always install at least one hammer suppression device on the cold supply and one on the hot supply downstream of quick-closing valves or solenoid-operated appliances
- Use ball valves in place of loose jumper valves where possible. (E.g. at the meter when the meter is fitted with a non-return valve). If a loose jumper valve must be installed, use a spring-loaded washer.
- When penetrating a stud, ensure the silicon is evenly distributed around the pipe.
- If a non-return valve is required prior to the dishwasher, install it as far away as possible from the dishwasher.

If all water hammer is to be prevented, it would be advisable to install a hammer suppression device at each automatic

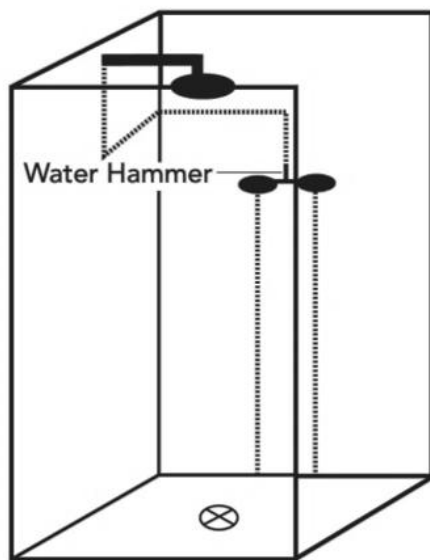
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appliance solenoid and quick closing valve. To control costs, eliminate noise and minimise the impact of shock waves, a fabricated air chamber may be installed as an alternative.

The installation of air chambers and the reduction of water pressure below 500 kPa (as per AS/NZS 3500 requirements) was found to eliminate water hammer noise in virtually all instances.

Reverse Water Hammer

Reverse water hammer occurs when hydraulic shock develops between a quick-closing valve and the outlet due to an extended downstream pipe run. For example, where pipework to a shower rose has been extended to an outlet on a different wall from the taps.



The effects of reverse water hammer may be minimised by:

- Installing a hammer suppression device as close as possible to the taps on the outlet side,
- Reducing water pressure to 350kPa, and/or
- Limiting the volume of water to the outlet.

Preferred Devices That Will Help to Eliminate Water Hammer

- 500kPa pressure limiting valve.
- Hammer suppression devices, including:
 - a) **Hammer arresters.**
Advantage: long lasting, some have a life time guarantee if installed as per manufacturers specifications.
Disadvantage: greater cost
 - b) **Air chambers.**
Advantage: cheaper cost.
Disadvantage: progressively lose air and gradually become ineffective therefore they will need to be recharged with air.

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