

# A Complete Guide to Water Hammer How It Works and Its Effects

## WHAT IS WATER HAMMER?

Water hammer is a phenomenon that can occur in any piping system where valves are used to control the flow of water or steam. Water hammer is the result of a pressure surge, or high-pressure shockwave, that propagates through a piping system when a fluid in motion is forced to change direction or stop abruptly. This shockwave is also commonly referred to as a hydraulic shock or hydraulic surge, and may be characterized by a marked banging or knocking sound on the pipes immediately after shutoff.

### Effects of Water Hammer

- Weakened pipe joints and connections
- Leaks
- Damaged pumps
- Ruptured pipe walls
- Deformed pipes, valves, and discs
- Damaged instruments
- Weakened supports and hangers



### Preventing Water Hammer

- Silent or spring-assisted check valves
- Flushing old systems
- Installing pressure reducers and regulators in the supply line
- Reduce operating pressure
- Invest in piping systems that feature air chambers as part of the design
- Reduce pressure severity with silent check valves
- Slowing the closure speed of control valves



## THE TRUE COST OF WATER HAMMER



### Leaks

Water hammer can damage fittings, joints and connections, resulting in leaks. These leaks often start slowly, gradually increasing in intensity over time.



### Flow System Damage

Repeated water hammer may also cause significant damage to pumps, existing valves and instruments, lead to the catastrophic failure of gasketed joints and expansion joints, and affect the integrity of pipe walls, welded joint, pipe hangers and supports.



### Ruptured Pipes

Ruptured pipelines due to pressure spikes are especially expensive to repair. Rupture results in local pipeline failure and can cause the entire system and other equipment to fail.



### Accidents

Pipeline rupture can also endanger the health and safety of employees and maintenance personnel.



### External Property Damage

If left unchecked, water leaks can damage electrical equipment and or lead to the corrosion of equipment or infrastructure.



### Downtime/Maintenance

Property damage can lead to costly repairs or equipment replacements.



### Environmental Issues

Pipeline ruptures can cause the discharge of environmentally unsafe liquids.