FSA
FILTER SYSTEMS AUSTRALIA

Sioux Chief Hydra-Rester™

The Hydra-Rester™ series has been specifically designed for hydraulic hammer arresting applications. Featuring the latest diaphragm technology, Hydra-Rester™ shock arresters are built to reduce or eliminate hydraulic shock, otherwise known as water hammer.

Hydra-Rester™ shock arresters are best used at the point of shock and should be installed close to the valve or piping where shock originates from.

Installation

Water Hammer Arresters are always recommended when you install a water filter system. Water Hammer can cause serious damage over time to all water filtration components and in some cases can cause complete system failure, leading to thousands of dollars in damage due to flooding.

The Hydra-Rester™ unlike other hammer arresters on the market, can be installed in any position – Vertical, Horizontal or at any angle.

There are 2 main positions for the Hydra-Rester™ to be installed:

1. If you have a dish washer under the sink that does not already have an anti-hammer device you should install the Hydra-Rester™ there.

2. The most common installation of a Hydra-Rester™ would be on the cold-water inlet of a washing machine. NOTE: The Hydra-Rester™ is fitted with a ¾" Male-Female BSP tee fitting for installation on washing machines & dishwashers that use standard ¾" connections.

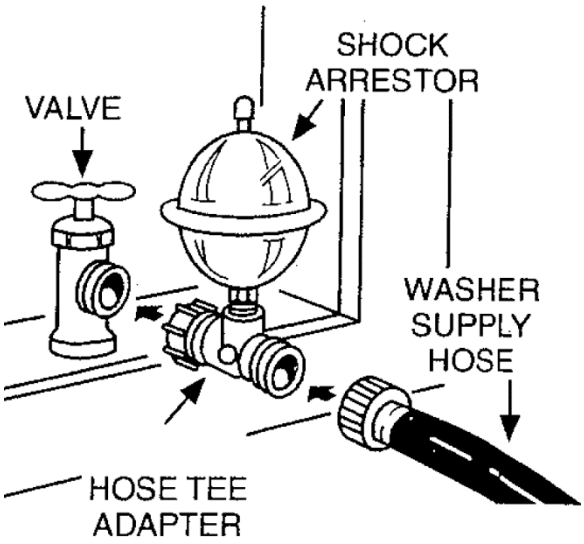
If you have a large home where there is a large distance of pipe work OR if you have a dishwasher & Washing Machine, it can be beneficial to install a second Hydra-Rester™ closer to the water filtration system.

Water Hammer & Water Filtration

With plumbing set ups and water filtration, unfortunately the water filtration components are what you would call "the weak link".

Our housings have been independently tested to AS3479 standards in an approved laboratory and also tested here in our warehouse under strict conditions to meet "WaterMark" levels required for installation. This includes pressure testing to 300psi for a period no less than 15 minutes.

Given this testing you would assume that they would not give way under pressure. The thing is that they are not designed for constant pressure spikes, water hammer or thermal



expansion. This puts a whole new kind of stress on these housings which they are not designed to accommodate.

If a system contains an appreciable amount of water, the inertia of the water mass could offer a significant resistance to any sudden change in the velocity. Water hammer is an increase in pressure due to rapid changes in the velocity of water flowing through a pipeline, and this could cause rupture or damage to pumps, piping, filtration housings or fittings.

This dynamic pressure change is the result of transformation of the kinetic energy of the water moving mass into pressure energy. When the flow of water is suddenly stopped, the water tries to continue in the same direction. In the area where the velocity change occurs, the water pressure increases dramatically due to the momentum force. As it rebounds, it increases the pressure in the region near it and forms an acoustic pressure wave. This pressure wave travels down the pipe at the speed of sound in the water. If we assume the liquid is water, rigid pipe and ambient temperature, the wave velocity is 4,720 ft/sec. Further, the acoustic wave will be reflected when it encounters an obstruction, such as a pump, housing, fitting or valve.

Appliances that can cause water hammer:

- Washing Machines & Dish Washers
- Fast start or shut off pumps
- Power interruptions
- Check valves

The momentum force due to water hammer is a function of the speed of valve closure, the water velocity in the pipe prior to the start of valve closure, and the velocity of the pressure wave along the pipe. The magnitude of this pressure wave also depends upon the ratio of the wall thickness to the inside pipe diameter, the modulus of the pipe material, and the modulus of elasticity of the water.

Surge pressures on shutdown may range from the pump shut-off head to impact heads five or six times normal static pressures, or even more. Similar surge pressures are encountered on start-up. Resulting damage actually experienced has included split or burst housings, deformed check valve discs, bent or broken pump shafts, damaged impellers, and cracked or broken mains. Less obvious or easily attributable effects may include shortening of the life of the piping systems and acceleration of the frequency of leaks.

Given that the impact can be five or six times greater the normal static pressure you could assume that on standard mains water pressure including a 350kpa pressure limiting valve the pressure spike can actually rise up to 1750kpa and even greater. This can occur without the customer even being aware of the problem as not all water hammer can be heard.

The objective of a water hammer investigation should be to suppress transient pressures to acceptable limits and avoid pipeline bursts, leaks and/or damage to equipment, such as filtration, pumps and valves. The undertaking of a water hammer analysis and selection of protection measures should be an integral part of the design phase.

As you can see from the above “Water Hammer” can be a very concerning, expensive issue if not addressed correctly.

We here, are also under the belief that the Australian law that submits that every household be fitted with non-return valves can also increase the damage caused by Water Hammer. Given the “hammer” can enter a premise and then not escape gives a double whammy, especially when it comes to water filtration as the PLV’s that are used on water filtration kits are also fitted with non-return valves. This in turn will allow water hammer to enter the filtration kit and not allow it to escape essentially causing the “hammer” to bounce back and forth within the filtration kit until it is capable to dissipate. If you were to have just one instance of water hammer this could be damaging enough, but if you were to have more than one in a short period of time this can be devastating with the amount of built up pressure and spikes that the filtration kit and housing would be exposed to.