

Pressure Reducing Valve

Q & A

... and the effects of pressure on water conservation

INTRODUCTION

Of all the water in the world, only 3% is fresh, and of that, less than 0.3% of this is available to humans. To put it another way, if 100 litres represents the world's water, a little more than half a tablespoon of it is fresh water available for our use. If we cannot increase our supply, then it is necessary to reduce our consumption. Fortunately, it is possible to conserve significantly and in a way which will not seriously affect the lifestyles we have become used to. Our whole philosophy on the use of water is changing and we are finally becoming aware that we have been wasteful over the years and it is now time to get back to reality by adjusting to our actual needs and to practice good conservation principles.

The purpose of this Q&A is to acquaint you with what water pressure is and why we should reduce it to conserve water. The hub of the program is the use of water pressure reducing valves (PRV), an automatic control which is installed at the water meter in homes and other buildings to reduce the city main's pressure to a lower, more functional pressure. Pressure reducing valves are simple, inexpensive products that have a pay-back period of about 12 months. As you will see on the following pages, they can save around 150,000 litres of water per year in the average home alone. If these savings were applied to 1,000,000 typical homes throughout the country, consider the tremendous impact this would have on our national conservation goals. The use of water pressure reducing valves is not only in the national interest but provides a significant benefit to the homeowner.

1 What is a Pressure Reducing Valve?

They are compact, inexpensive devices that perform two functions:

- (1) they automatically reduce the high incoming water pressure from the city mains to provide a lower, more functional pressure in the home;
- (2) they maintain a set pressure in the home, thereby insuring that the home piping and appliances operate under a safe, more moderate, but satisfactory pressure.

2 What is wrong with high water pressure?

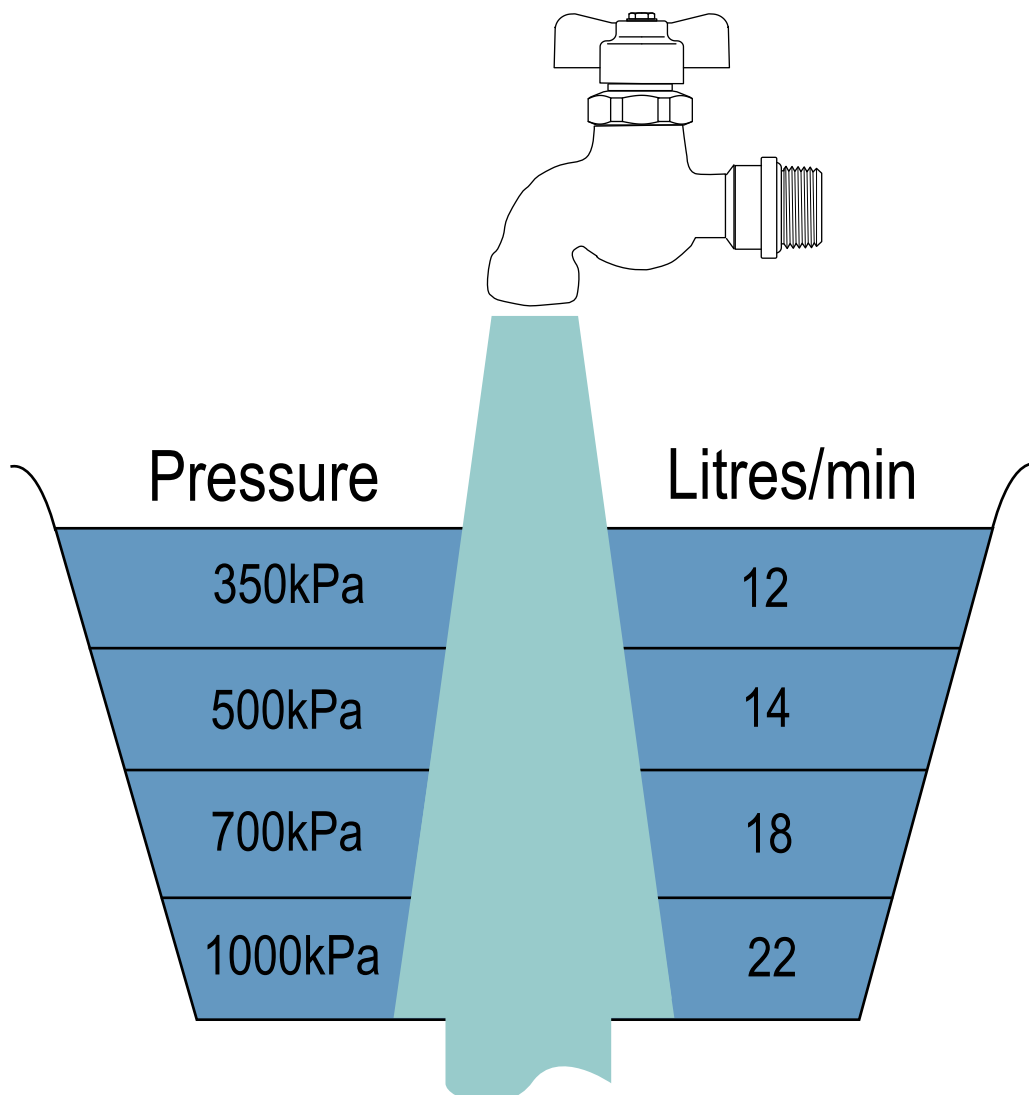
The speed of water that flows from the opened outlet depends on the amount of pressure which exists at that time in the system. High water pressure has some advantages, such as in firefighting systems. However, in the home plumbing system, it can be damaging because water with a lot of pressure can wear away many materials and cause water heaters to leak, banging water pipes, dripping faucets, excessive dishwasher noise and breakdown, and leaking water pipes. Therefore, water flowing at a rate in excess of that necessary to satisfy normal fixture or appliance demands becomes damaging, wasteful and reduces the life expectancy of equipment in the system. But, most important to the average homeowner is that high water pressure can add to the cost of water, energy and waste water bills.

3 Does high water pressure cause “water hammer”?

Yes. Water hammer is the noise created by the shocks of high-speed water flowing in a pipe when a fixture is suddenly closed. This abrupt stoppage causes a “bounceback” of the water and is called water hammer, causing banging pipes, noisy systems and damage to appliances. It might be compared to driving your car at slow speed into a wall where the effect is negligible. However, if you drove the car at a much higher speed, the impact would be greater and, consequently, so would the bounceback or shock. This principle is also applicable to water in the home. By reducing the pressure in your home, the water will flow at a slower speed and as a result, the shock when the water is turned off at the fixture would be minor.

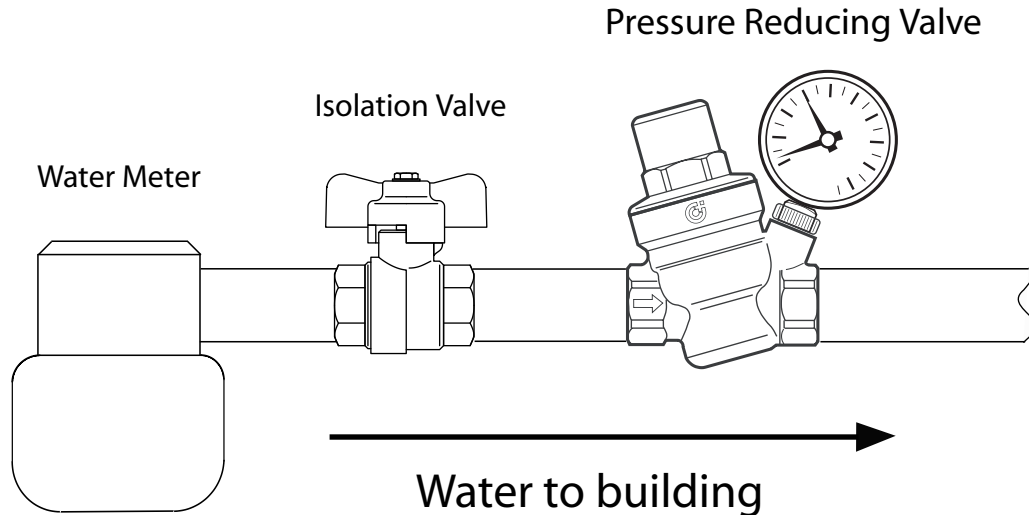
4 What is the difference in water flow from a fixture at different pressures?

Reducing the pressure from 1000kPa to 500kPa will result in a saving of approximately 1/3 because 1/3 less water flows at this lower pressure. Some areas in Sydney have 1500kPa or even higher. At this pressure, twice as much water flows through at this pressure compared to 500kPa, most of which is wasted. The diagram below shows the litres per minute that flows through a tap at different pressures.



5 Where are Water Pressure Regulators most commonly used?

Water pressure regulators are commonly installed at the meter in residential, commercial and industrial buildings. This location is desirable because it then controls the water pressure flowing to all appliances and outlets within the building and provides an inexpensive means of supplying lower, more functional water pressure to outlets and appliances.



6 How much does a typical family of four use?

A lot of water is wasted because so many people don't think about where it comes from and where it goes after they use it. The developed countries of the world (such as Australia, the United States and Great Britain) have high consumption rates of water per person ranging from 350 to 1000 litres per day. In developing countries (such as Africa) where there is not much water, as little as five litres may be used per person per day. In a typical family of four people, around 700,000 litres may be used per year. As seen in the next question, there is a large potential for saving water.

7 How do Pressure Reducing Valves save water?

As mentioned before, 1/3 less water flows at 1000kPa than at 500kPa. Therefore, when you reduce the mains pressure to a more moderate pressure of 500kPa, you can look forward to conserving up to 1/3, or more, of the water previously consumed. This may not be the case for some appliances that require a certain amount of water to operate. For example, a toilet may need 6L per flush or a dishwasher may need 40L per cycle. However, when using the shower which can use up to 120L per person or when watering the garden, significant reductions in water usage can be made.

8 How do Regulators save on maintenance?

We have previously described the effects of high water pressure on piping and appliances. By having these appliances work under a lower pressure, their life expectancy will be much longer. Use of lower pressure will also cut down on service calls caused by problems with dish washers and clothes washers, leaky water heaters, leaking water pipes and the potential water damage which could result. A point to note is that many manufacturers will often void warranty on products that are exposed to higher than their recommended pressure.

9 Do codes require Water Pressure Reducing Valves?

Yes. They are required under the Australian Standard for Plumbing and Drainage (AS3500.3.3.4). The requirement states that: "Provision shall be made to ensure that the maximum operating pressure at any outlet, other than a fire service outlet, within a building does not exceed 500kPa." However because of the recently acknowledged advantages of regulators conservation wise, regulators could be economically installed even where supply pressures are in the vicinity of 350 – 400kPa because of the water and energy saving benefits they can provide.

10 Should we consider using other water and energy conservation devices?

Certainly. The water pressure regulator we're talking about today is the hub of a conservation program; but you should also consider other flow control devices such as low-flush toilets, improved water heating equipment and better disciplined usage habits. However, if none of these other devices were installed, the water pressure regulator would still serve to contribute important and significant savings in energy and water.

11 How do I know if I have high water pressure?

A rule of thumb is: If you hear banging pipes in your home or observe water splashing in your sink, you probably have excessive pressure. However, for a precise reading, your local plumbing contractor or utility can test your pressure with a gauge.

12 How can I get a Water Pressure Regulator installed?

The easiest way would be to call your local qualified plumbing contractor who can provide you with an estimate and also advise of the various type regulators available and the one best suited for your home. Although regulators are fairly simple to install and could be a do-it-yourself project, there are some laws which provide that only a licensed plumber be permitted to work on the home potable drinking water system for health and safety purposes.