



Hard Water

Hard water can lead to the formation of limescale in cold and hot water systems, and in domestic appliances. Some people choose to use a water conditioner or softener to reduce the effects of hard water.

There are a number of different devices available to reduce the effects of hard water and limescale formation.

Physical Water Conditioners

The most common types are electric water conditioners and magnetic water conditioners; both types operate in a similar way. When hard water is heated limescale forms as tiny crystals. The shape of these crystals promotes the build-up of limescale. In theory, physical water conditioners change the shape of the limescale crystals, which prevents them from sticking to surfaces leaving them suspended in the water. This effect is thought to be temporary, so for best results the device should be fitted as close as possible to the unit heating the water. Physical water conditioners do not remove the calcium and magnesium minerals from the water. As they do not soften the water you are unlikely to notice any impact on the amount of soap or detergent used, or a reduction in the amount of limescale forming in your kettle. However, because they do not change the chemistry of the water it remains safe to drink.

Chemical Water Conditioners

The most common types of chemical conditioner dose phosphate. These devices work by adding a small amount of polyphosphate to the water, which combines with the calcium and magnesium minerals preventing them from precipitating out of solution. These units should always be installed by a qualified person to ensure they do not affect the quality of your drinking water.



Water Softeners

Water softeners are used to remove the calcium and magnesium minerals from the water. Removing the calcium and magnesium minerals from the water means limescale will not be produced when the water is heated. Unlike physical water conditioners, the effect is permanent. It also means you will use less detergent and soap. The two most common types of device fitted in domestic properties are ion exchange salt softeners and reverse osmosis systems.

Ion exchange salt softeners replace the calcium and magnesium minerals with sodium. The water passes through resin beads contained within the unit. The sodium ions on the resin are swapped with the calcium and magnesium ions in the water. Eventually there are not enough sodium ions left and the resin needs to be regenerated. This is done by flushing the resin with a salt solution, which replenishes the sodium ions. This type of softener is relatively cheap to buy and operate, and easy to install. However, because they increase the level of sodium in the water, it is recommended that at least one tap in the property is supplied by un-softened water for drinking and cooking purposes.

Reverse osmosis systems not only remove calcium and magnesium from the water, they also remove other minerals and metals that may be present in the water. They work by forcing the water through a semi-permeable membrane. The membrane has lots of microscopic holes big enough to let water molecules through whilst excluding larger molecules. This type of device is normally more expensive than ion exchange softeners and requires more power to operate.

With both types of softener it is important to ensure they are installed by a qualified person in accordance with the Water Supply (Water Fittings) Regulations 1999. Home treatment units should always be operated and maintained in accordance with the manufacturer's instructions. It is also recommended that a bypass is installed to provide you with a water supply should the unit fail or malfunction.