



Water Softeners: Health and Environmental Risks

- ① Water softeners, widely used to remove limescale, can pose a serious danger to both human health and the environment.
- ① These devices, installed in homes, offices, bars, restaurants and hotels, work mainly through an ion exchange process which, although effective against scale, can lead to significant negative consequences.
- ① The problem mainly concerns ion exchange systems which, while protecting pipes and appliances, alter the mineral composition of drinking water, with potentially harmful effects on the cardiovascular system and nutritional balance..

The Problem of Limescale in Water

"Hard" water

Almost all drinking water is characterised by a high 'hardness', with a significant presence of calcium and magnesium ions.

Formation of Encrustations

The combination of these ions generates limescale deposits when the water is heated above 40°C, causing problems for pipes and appliances.

Technical Consequences

Scale causes malfunctions and reduced energy efficiency of appliances, requiring frequent maintenance.



How Ion Exchange Water Softeners Work

System Components

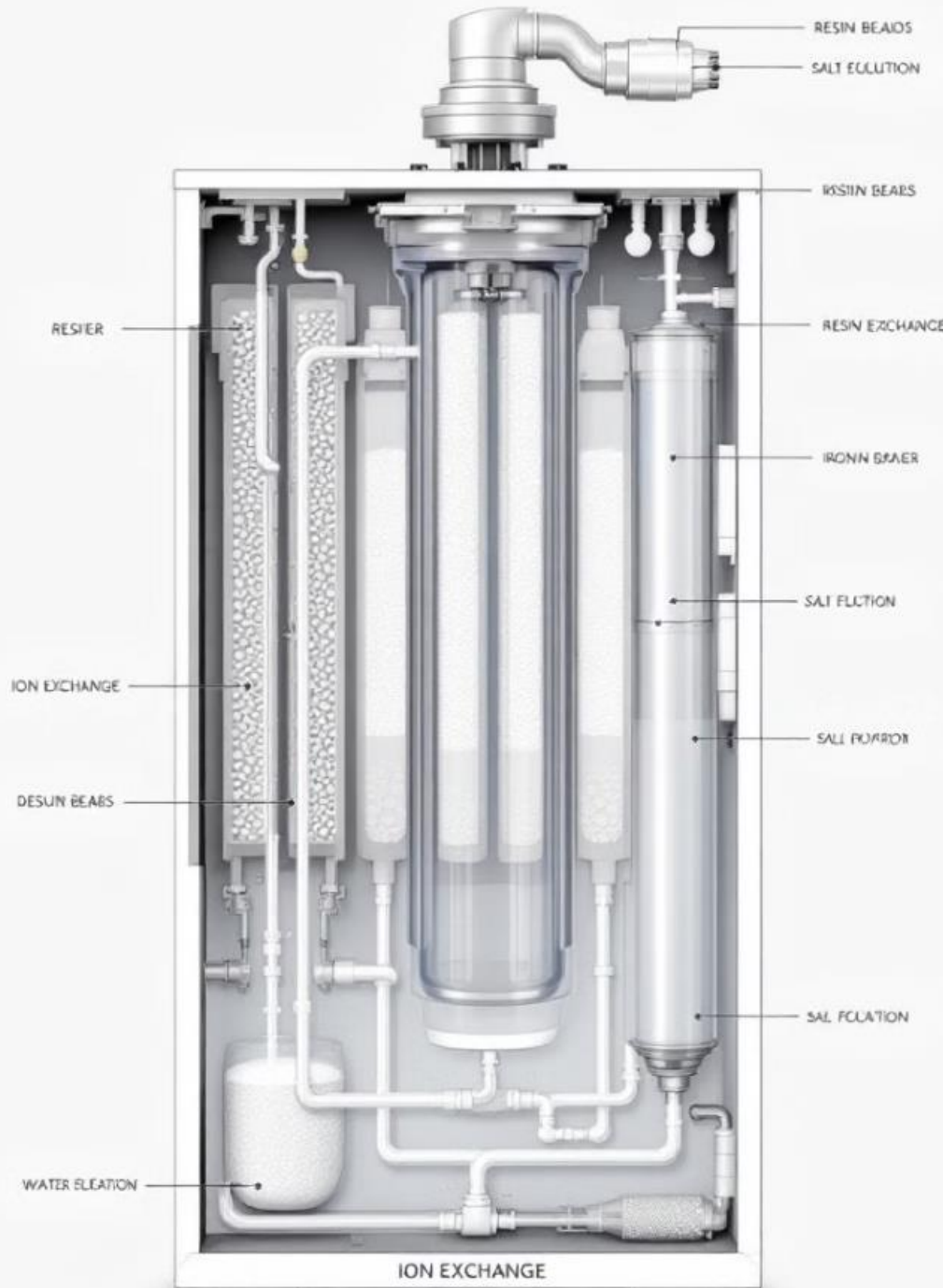
Water softeners consist of a container for the resins, one for the salt and an electronic device that manages the regeneration process.

Exchange Process

The system retains calcium (Ca) and magnesium (Mg) ions in the resins, releasing sodium ions into the water that do not produce scale.

Regeneration

The device periodically starts (usually every 4 days) the regeneration process of the resins, which are otherwise subject to bacterial proliferation.





Risks of Water Demineralization

1

Micronutrient Loss

The ministerial guidelines warn of the risks of excessive demineralization of water and consequent lower intake of micronutrients and essential mineral salts for the consumer.

2

Impact on Diet

Calcium and magnesium play a crucial role in the diet, and water is a primary source, especially important for lactose intolerant individuals and vegans.

3

Need for Information

Users of these devices should be informed of the changes in mineral composition caused by the treatments and the possible consequences on total nutrient intake.

IMPACT OF IMPACTS OF Excess Sodium On the Cardiovascular System

The diagram shows a cross-section of the human heart, highlighting the four chambers: the right and left atria and ventricles. The heart is shown in a frontal view, with the major blood vessels (aorta, pulmonary artery, and pulmonary veins) entering and exiting. The diagram is color-coded, with red representing oxygenated blood and blue representing deoxygenated blood. The heart muscle (myocardium) is shown in a lighter shade of red, and the internal structures like the valves and the coronary arteries are also visible.

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Water treated with an ion exchange softener is enriched with sodium, an element added to replace calcium and magnesium during the ion exchange process.

Sodium is notoriously harmful to the cardiovascular system, increasing the risk of hypertension and other cardiovascular diseases when consumed in excess.

For these reasons, the standards that set drinkability parameters establish minimum hardness thresholds and maximum sodium concentration thresholds in water intended for human consumption.

The Benefits of Calcium and Magnesium in Water



Cardiovascular protection

Hundreds of epidemiological studies have confirmed the existence of a protective effect of dissolved calcium and magnesium content against the onset of cardiovascular diseases.



Cellular Functions

Calcium ion is the second most common messenger in eukaryotic cells, transmitting a wide variety of stimuli, from growth factors to neurotransmitters, into the cell.



Natural Source

Water represents the most precious source of daily intake of these fundamental trace elements that the human body is not able to produce autonomously.



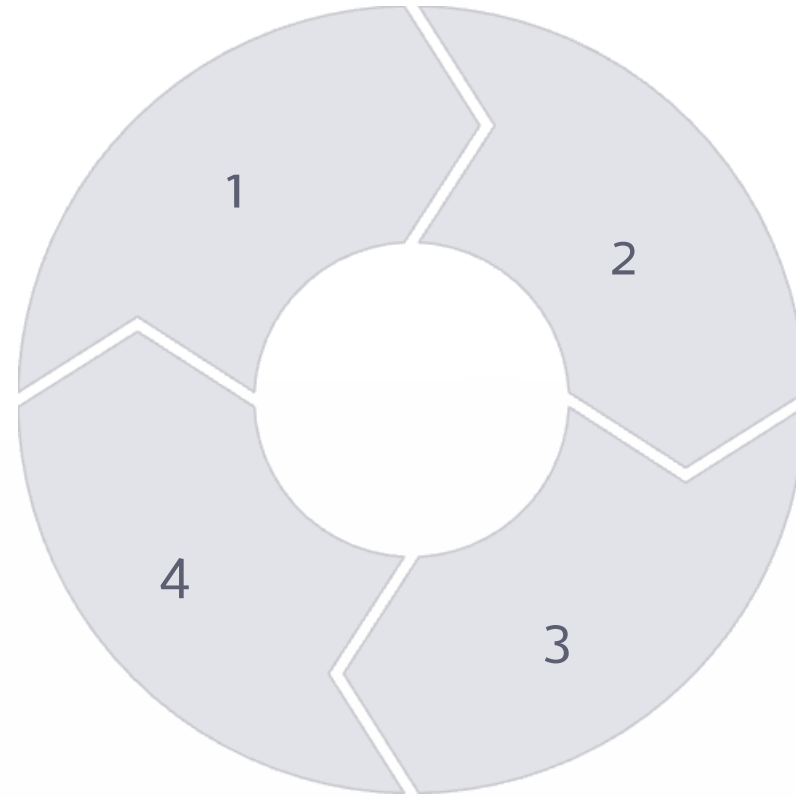
The Environmental Impact of Water Softeners

Acidic Water

The treatment processes return water with an altered pH, tending towards acidity.

Pollution

Water softener discharges contribute to surface and groundwater pollution.



High Chloride Concentration

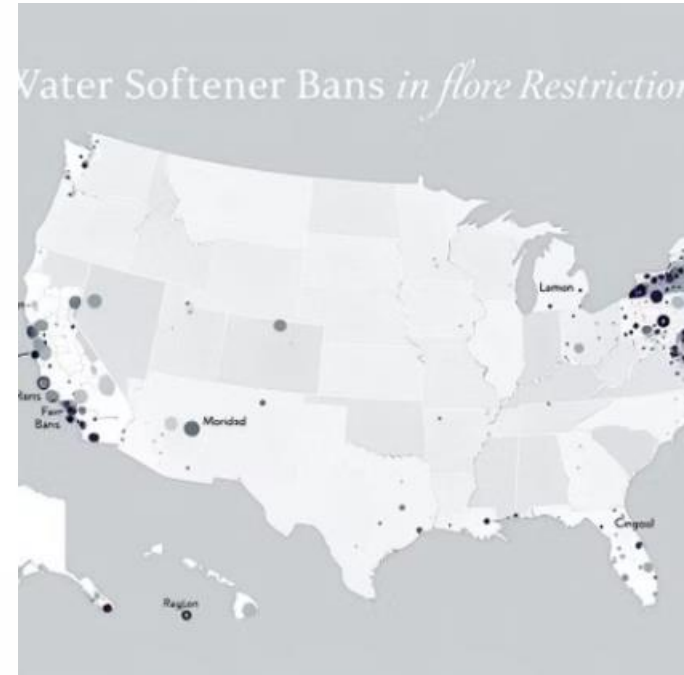
The wastewater contains high amounts of chlorides released during the process.

Corrosive effect

Treated water becomes highly corrosive to water infrastructure.

For these reasons, in many countries water softeners are only allowed for very specific technical uses and never for the treatment of water intended for human consumption. In the United States, where this technology has had a wide development, several states have banned such systems precisely because of their devastating impact on the environment.

International Regulations and Restrictions



In many countries around the world, awareness of the risks associated with ion exchange softeners has led to the introduction of strict regulations. These devices are often only permitted for specific technical applications, such as heating systems or industrial machinery, and never for water intended for human consumption.

In the United States, a pioneer in the adoption of this technology, several states have implemented total or partial bans on the use of traditional water softeners, mainly due to their negative environmental impact and potential risks to public health.



Recommendations for Water Softener Owners

Periodic checks

Anyone who has equipped their home or office with ion exchange water softeners should have them professionally inspected periodically to ensure the safety of water intended for human consumption.

Limit Use

Consider using water softeners only for closed circuits (such as heating systems) or for specific appliances, avoiding treating water intended for consumption.

Monitor the Parameters

Perform periodic analyses of treated water to check the levels of sodium, calcium and magnesium, ensuring that they are within the safety parameters established by the regulations.

Evaluate Alternatives

Learn about alternative technologies available that do not alter the chemical composition of the water but still reduce limescale formation.

IWS Technology Physical Water Treatment



Transforming limestone

Limescale increases maintenance costs and requires longer cleaning times. Water treated with IWS forms aragonite crystals, which prevent scale in the pipes.



Hygiene under control

Ensuring a hygienic environment is essential in the restaurant industry. IWS ensures that the water used in your establishment is of superior quality, helping to maintain the highest standards of hygiene.