

## All Municipal Water Not the Same

There are over 53,000 municipal water districts in the United States, each maintaining and delivering unique water supplies. The Environmental Protection Agency sets minimum standards for contaminants when regulating municipal drinking water quality. Water treatment by municipalities must conform to these EPA guidelines for ensuring the integrity of safe drinking water; however, this does not mean that water supplied to commercial buildings is free from all contaminants and other bothersome constituents.

All municipal water contains minerals and chemical elements specific to its location and can cause irregularities in taste, smell, and feel. Some of these elements, when heated, also contribute to calcium deposits that can require costly repairs and unnecessary maintenance. Calcium deposits can collect:

- On heating elements of water heaters and boilers
- On kitchen/bath fixtures and shower doors
- In appliances that heat water such as dishwashers and coffee equipment
- In large commercial heating and plumbing systems

These deposits are typically referred to as “scale” or “lime scale”, and typically consist of calcium and magnesium. This what most people call “hard water problems”.

## Hard Water - Often Misunderstood

Water treatment, water filtration, water conditioning, and water softeners are terms often used interchangeably and sometimes incorrectly by construction/design professionals and the public when describing the solutions to hard water problems. Since the early mid-1900's, the most common technology to combat hard water and scale problems involved “softening” water through a process called ion-exchange. Simply stated, this process replaces one part of calcium and magnesium with two parts sodium chloride (NaCl). The salt-laden water is supplied

to the home or commercial building while large amounts of salt brine are flushed to septic drainfields or public sewage plants. The average home or apartment can consume many hundreds of pounds of salt each year, and a commercial building can consume salt in the thousands of pounds per year.

In recent years, many municipalities have banned salt-based water softeners in their communities because of the detrimental effects to the environment and aquatic life. The salt-laden water is especially problematic for the growing number of communities who depend on reuse of treated wastewater for irrigation, agriculture and consumption.

## Chlorine Compromises Taste and Smell of Water

Along with scale-inducing minerals, water from municipalities contains chlorine or chloramines (chlorine + ammonia) used to prevent bacterial growth. While experts have mixed opinions on the effect of chlorine and chloramines on humans, it is well-known that it negatively affects the taste and smell of water; not to mention its harsh effect on skin and hair. Tap water can also contain constituents such as natural and synthetic organic compounds that release highly objectionable odors.





The World Health Organization (WHO) has studied the addition of chlorine with controversial research results. Scientists have shown that there are links between adverse health conditions, such as cardiovascular disease and cancer, to excessive amounts of chlorine in drinking water. According to WHO, these risks are reduced as long as the chlorine content in water is carefully controlled and monitored.

The conventional solution for hard water issues are water softeners which remove the healthy minerals in water and replace them with salt. These solutions, while sometimes effective in combating scale, do nothing to improve the water quality, and come with an economic and environmental cost. The ideal solution would control the effects of scale, improve the quality of the water, and have no adverse environmental effects.

### LifeSource. Clean Water. Green Living.

**Water filtration** systems include a variety of types, including granular activated carbon, carbon block and reverse osmosis systems. These systems are used to improve aesthetics and combat smells and odors and remove impurities in the water. **Water conditioning** is used to provide relief from scale forming minerals in the water supply that can negatively affect plumbing and heating equipment and pipes – increasing maintenance and labor costs.

LifeSource provides a complete whole building, point-of-entry solution that combines a proprietary, blended methodology for filtration and conditioning together. The system removes chlorine and conditions hard water without the use of salt, providing a better alternative over conventional water softeners, reverse osmosis or point-of-use carbon systems. This sustainable and preferable option is ideal for both residential and commercial applications. Each solution is configured to the specific water quality requirements for clean water and scale reduction and prevention.

According to a 2013 survey by the Water Quality Association (WQA), more consumers consider the purchase of a water filtration system a necessity, rather than a luxury, due to concerns for reducing contaminants for better health.

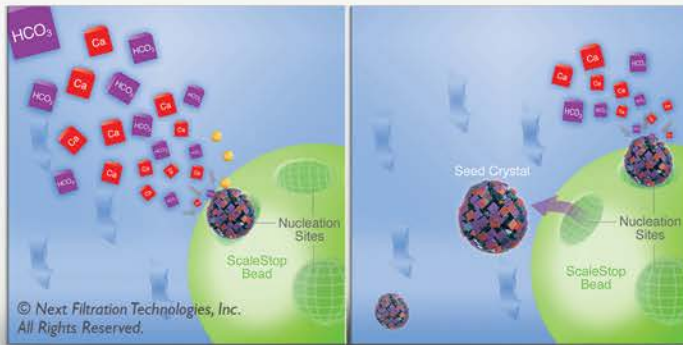
### Introducing ScaleSolver™ Conditioners

LifeSource ScaleSolvers are proven, groundbreaking technology to treat hard water problems without the use of salt. In conventional water softeners, heavy doses of salt are used, exchanging minerals, primarily calcium and magnesium in the water supply for sodium. In the process, excess salt brine is released into wastewater systems which can pollute the environment.

### How ScaleSolvers Work

ScaleSolvers, on the other hand, use a superior, proprietary media technology called Template Assisted Crystallization (TAC), developed by Next Filtration, Inc., affiliated with LifeSource through OEM license agreements. With TAC-based media, water is conditioned without using salt, chemicals, magnets or electronic components. LifeSource ScaleSolvers retain natural and beneficial minerals, such as calcium and magnesium while adding nothing to the water. And, most important, there is no wastewater discharge during the process. This allows city conservation and water reuse programs to operate with a better, more efficient methodology.

By studying the action of water molecules and the formation of scale, scientists tested the impact of a water process that would convert the components of the hardness minerals into inert microscopic crystals.

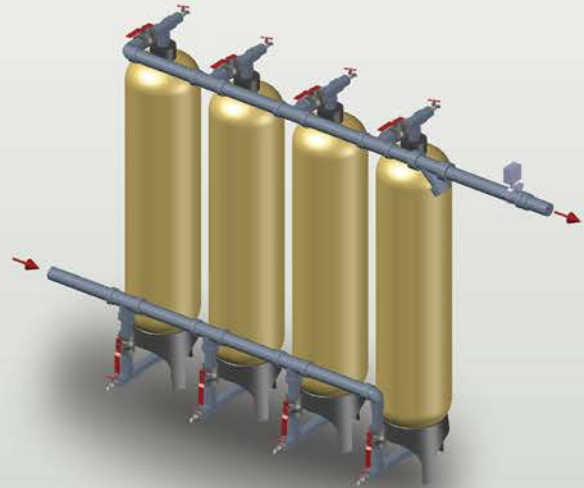


Microscopic crystals grow to a certain size and are released – effectively isolating the  $\text{CaCO}_3$  from water chemistry and anything the water comes into contact with.

TAC-based systems have been extensively researched and tested on heating elements and found to not only prevent scale formation but to reduce old scale accumulation.

Test results from independent researchers at Arizona State University demonstrate startling results, showing that when compared with other types of conditioning systems (i.e., ion exchange with salt, electronic precipitation, electromagnetic or capacitive de-ionization) there is no other technology that prevents hard scale buildup and works as well as Template Assisted Crystallization used in ScaleSolver systems.

In order to properly size a system, the installation is contingent upon water main pipe sizes, flow rates, water usage, and space available for the installation. Most commercial ScaleSolver systems have smaller footprints than conventional, salt-based water softeners and can fit in small mechanical rooms, or outside connected to main water lines..



A typical 4 tank ScaleSolver solution for a 100 unit apartment complex

ScaleSolvers reduce and prevent the accumulation of scale on boilers, hot water heaters, dishwashing equipment, plumbing fixtures, and showerheads with minimal preventive maintenance.

### Additional ScaleSolver Benefits:

- Consistent scale control performance
- No salt or chemicals required
- Economical
- Energy efficient (uses no additional electricity)
- Maintenance-free operation
- Retains beneficial minerals
- Does not release any discharge of salt brine or chemicals back into the environment

ASU Study							
Water Type	Treatment Device Used	Scale scraped off of heating element	% Ca scale formed	Ca formed in solid scale precipitate (g Ca)	Scale from bath and heating element dissolved with HCl (g Ca as $\text{CaCO}_3$ )	Total calcium formed during test (g $\text{Ca as CaCO}_3$ )	Photo of heating element with scale
Tempe Tap Water	No Treatment	-	NA	0.00	8.36	8.36	
	TAC	0.00	NA	0.00	0.12	0.12	
	EIP	0.68	34.88	0.24	3.60	3.84	
	MAG	1.44	34.88	0.50	3.47	3.97	
	CDI	0.00	NA	0.00	1.41	1.41	

TAC-based systems showed superior results in the ASU study

## LifeSource Improves Water Quality

LifeSource Water Filtration systems incorporate a granular activated carbon (GAC) media, made from coconut shells, a renewable resource. The materials used in the filters are safer for the environment and provide an odor free, flavorful water source free of salt, potassium chloride and other undesirable chemicals. These filters remove impurities in tap water while retaining healthy minerals that improve the taste and smell of water through every tap and shower in a home or building.

LifeSource Water Filtration systems are used in multi-family apartments, condos, senior living facilities, hotels, universities/schools, restaurants, and many other commercial and industrial settings. The eco-friendly use of renewable materials, preservation of water nutrients and clean water discharges make it the preferred choice for the green practitioner for water filtration. As an added benefit, clean tasting water also eliminates the need to purchase bottled water resulting in a tremendous environmental benefit.

The benefit of choosing clean water is clear. The average cost of bottled water is approximately \$2.50 per gallon compared to the cost of tap water at \$2.50 per 750 gallons.

According to the Natural Resources Defense Council *there are no federal filtration or disinfection requirements for bottled water – the only source-water protection, filtration, or disinfection provisions for bottled water are completely delegated to state discretion, and many states have adopted no such meaningful programs.*<sup>1</sup>

In addition to securing safe drinking water, the choice of filtering water in homes and businesses also reduces the amount of plastic water bottles in the environment. As of last year, 60 million plastic water bottles are used each day in the U.S. and of those 78% are not recycled and end up in landfills. The manufacturing of plastic bottles wastes energy and an estimated 2,500,000 tons of a carbon dioxide was produced in the manufacturing of the plastic bottles each year.<sup>ii</sup>

By installing an engineered filtration system that produces no waste, needs little maintenance and retains valuable nutrients while delivering great tasting water, businesses save money and help the environment.

## LifeSource - Customized To Fit

LifeSource Water Filtration systems can be combined with ScaleSolvers and are sized for both small and large commercial projects. Multiple tanks are plumbed together when specifications dictate each configuration.

As with LifeSource ScaleSolvers, when sizing a system the project engineer will base the complete system contingent upon the water main pipe size, flow rates and water usage within the building. LifeSource Water Filtration system automatic controls include advanced timers for backwash and rinse cycles and for the clean-out of sediment in the filter bed. The backwash is free of contaminants and is potable water, safe to be reused for irrigation. The turbulent rinse cycle in the filter washes the granular activated carbon providing longer service life and greater efficiency.



LifeSource Water Filtration systems sized to fit many commercial applications



## Choose A Healthier Water System

LifeSource Water Systems has been designing, manufacturing and distributing eco-friendly water filtration and conditioning systems for residential, commercial, and industrial applications since 1984. These products have earned a Gold Seal certification by the Water Quality Association and have the longest service life in the industry.

Striving to maximize green design, LifeSource Water System's advanced, proprietary methodologies for water filtration and conditioning enable developers, architects, engineers and owners to integrate water quality into their commercial projects.

Improving water quality becomes an essential amenity that benefits the health of residents, guests, staff members, and all occupants within their communities. It also extends the life of plumbing equipment – generating attractive ROIs for investors, businesses and home owners. Water quality is one of today's most important issues as aging water delivery infrastructures, increase in pollutants, and a scarcity of water threaten our water supply systems.

LifeSource improves the overall quality of water for drinking, cooking, bathing, cleaning, and washing. LifeSource provides a nutritious, healthy source of water and is a superior, sustainable design solution for both commercial and residential projects.

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<sup>1</sup> <http://www.nrdc.org/water/drinking/bw/exesum.asp>

<sup>2</sup> <http://www.safebottles.co.nz/News/Plastics+and+the+Environment.html>

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