

## Next-ScaleStop Science and Technology Overview

### ScaleStop – Physical Vs. Chemical Treatment

**ScaleStop** does not require chemicals such as sodium, potassium, acids or phosphates to produce a scale-free effect in water distributions systems and especially water heating equipment. **ScaleStop** is a far simpler “physical water treatment” and does not extract or sequester the water hardness constituents of calcium and magnesium, but rather consistently influences the crystal structures of these minerals in such a manner that no scale is formed on interior surfaces. **ScaleStop** neither adds chemicals nor removes chemicals from the water.

To be more specific, rather than attempting to prevent the natural tendency of hard water to form scale (by removing or adding chemicals), **ScaleStop** treatment actually promotes and redirects scale formation in such a manner that the scale remains suspended in the water rather than forming on surfaces within the water system.

### How Does ScaleStop Work?

In cold water, calcium ions (Ca<sup>2+</sup>), magnesium ions (Mg<sup>2+</sup>) and bicarbonate ions (HCO<sub>3</sub><sup>-</sup>) are surrounded by “layers” of electrochemically-attracted water molecules, which “insulate” against the natural tendency of the oppositely-charged ions to come together and form crystals. Atomic level templates on the surface of the **ScaleStop** media act as catalysts and reduce the ability of water molecules to prevent calcium, magnesium and bicarbonate ions from coming together to form crystals of calcium and magnesium scale. This process that we refer to as Template Assisted Crystallization (TAC) results in the creation of microscopic crystals of scale (seed crystals), which rapidly form in the treated water, not on the contact surfaces of the water system, and are carried downstream in colloidal suspension through the water system.

- In *untreated* water, the scale forms on the inside walls of pipe, exterior of fixtures and all heating surfaces.
- In **ScaleStop** treated water, the seed crystals themselves provide a far greater surface area for new scale formation. Therefore, new scale preferentially deposits on this continuously replenished stream of suspended crystals rather than on the water contact surfaces – especially those surfaces that are at elevated temperatures.  
Since scale formation is not static (it is constantly forming and dissolving), the existence of continuously generated seed crystals not only eliminates further deposition of scale on water contact surfaces, but in fact will cause deposited scale to gradually dissolve back into the water and deposit on passing seed crystals in the water (from contact surfaces to solution to seed crystals).

### ScaleStop Vs. Water Softeners

- The calcium and magnesium removed by traditional salt-using softeners are essential nutrients, while the sodium added is suspected to aggravate certain cardiovascular health problems and contribute to weight gain.
- **ScaleStop** systems do not add anything or remove anything from the water, retaining the important naturally occurring minerals, especially calcium and magnesium.

- Salt-using softeners must be regularly recharged by adding more salt and back-flushing with fresh water, which is costly, inconvenient, corrosive to pipes and water heaters, harmful to the environment and wasteful of a precious resource.
- It is becoming increasingly common for municipalities to ban the use of automatic water softeners, as the need to recycle water becomes a necessity.
- **ScaleStop** requires virtually no maintenance; no residual costs and does not harm the environment, pipes or water heaters.
- Salt-using softeners cannot always be easily installed and require more than twice the space of a **ScaleStop** system. Softeners also require a drain connection and electrical power.
- **ScaleStop** systems can be installed where space is very limited.

#### **Residential & Commercial Applications Benefits**

- Eliminates the need for salt softeners
- No need for salt or corrosive chemicals
- Removes existing scale deposits
- Longer life expectancy for appliances
- Reduced energy expenses
- Increased efficiency of hot water tanks
- Environmentally friendly
- No electrical power required
- Virtually maintenance free
- Easy to install and requires no drain connection or electrical power

#### **Industrial Applications Benefits**

- Eliminates scale prevention chemicals
- Other chemical costs can be reduced
- No more acid baths or pressure washing
- Reduced maintenance and downtime
- Increased design/operating efficiencies
- Removes existing scale deposits
- Longer life expectancy for capital equipment
- Can be installed on all piping materials
- Easy to install and virtually no maintenance
- Economical and permanent solution to hard water problems