

TRIANGULAR WAVE

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THE TRIANGULAR WAVE SYSTEM GIVES ALL OF THE BENEFITS OF SOFT WATER WITHOUT THE HARMFUL SALTS

The TWT Deposit Control is a new revolutionary breakthrough in the of treatment of hard water and its effect on water-based applications. The system is non-invasive and non-chemical by design, and is suitable for practically all applications requiring hard water treatment.

Sources of Water

Drinking water primarily comes from two sources—the bodies of water on the earth's surface and the subterranean wells which gather groundwater after it is filtered through the top layers of the earth's strata. After the groundwater passes through the uppermost layers of the earth's surface, it contains carbon-dioxide (CO_2), a carbonic acid. In the lower strata of the earth, the carbonic acid-enriched water dissolves lime (CaCO_3) from the subterranean rock and converts it to calcium-hydrogen carbonate. The calcium-hydrogen carbonate is the source of lime deposits and incrustations (scale) which form in water systems.

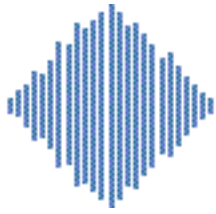
Hardness in Water

Regardless of the source of drinking water, water typically contains carbon-dioxide (CO_2) and the earth's alkalines, such as calcium and magnesium. The total hardness of water is determined by the sum calcium-hydrogen carbonate, magnesium-hydrogen carbonate and the non-carbonate starches which include calcium and magnesium component solutions. Consequently, the water "hardness" is dependent upon the amount of lime in the water. There are **several methods of preventing lime deposit formation** (scale and incrustation) in water systems.

- In one method, ion exchanging mechanisms are used to remove the calcium ions Ca^{2+} and the calcium-hydrogen carbonate from the water by exchanging the calcium ions and the calcium-hydrogen carbonate in the water for sodium ions from sodium chloride (NaCl).
- Another method uses phosphate chemicals as an additive mechanism to prevent the formation of crust deposits. The lime is either contained by the added chemicals or it forms a sediment which is flushed by the water moving through the system.
- A third method for preventing the formation of lime deposits uses an electronic deposit controller, (**Triangular Wave System**) which generates an electronically modulated frequency, and amplified, triangulated waveform, which is then oscillated to change the separation characteristics of calcium and carbonates before they enter the water system. That immediately neutralizes the hardness, and functionally "softens" the water. The process is purely physical as it uses no chemical additives.

The Triangular Wave Deposit Control System Will:

1. **Give the benefits of soft water without adding harmful salt or removing health giving minerals.**
2. **Prevent any further hard scale build-up in and on water equipment and fixtures.**
3. **Remove the existing scale that is inside the water system.**
4. **Soften the existing hard scale around taps, basins, and toilets, etc.**
5. **Reduce soap scum and improve the lather of soap.**
6. **Make the water feel silkier.**
7. **Reduce the harsh effects of hard water on skin and clothes.**



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8. *Reduces water spotting on fixtures and surfaces in contact with the water.*
9. *Provides a much more environmentally friendly solution to hard water – no salts or chemicals.*
10. *The water will taste better, as pipes will be cleared of both mineral and biological deposits.*
11. *Plants that receive the treated water will grow better.*

How does Triangular Wave electronic deposit control technology work?

This electronic deposit control method is based on frequency modulation technology. The electronic deposit control technology uses a signal cable that is wrapped around a pipe. The cable is connected to an electronic unit that sends a complex, dynamic current with rapidly changing polarity, frequency and amplitude to produce an extremely small time-varying magnetic field inside the pipe. The time-varying magnetic field produces an induced, oscillating electric field inside the pipe, the phenomenon that is well-known as Faraday's law. The induced, oscillating electric field provides the necessary molecular agitation for scale prevention and removal.

The key to the systems success and its unique approach is that different particles respond to different frequencies and amplitudes of the signal. The microprocessor rapidly varies the frequency and amplitude of the signal to deliver the various combinations to treat nearly 100% of the particles in the water.

Bacteria and scale-forming colloids in the water receive a strong boost in their natural surface charge. The particles repel one another and remain in stable suspension, rather than uniting to form scale or colonizing to form biofilm or other system fouling. The Triangular Wave Deposit Control System treats all incoming water as it passes the coil and alters the characteristics of the calcium so that it does not stick and form hard scale. It is important to remember that the calcium is still in the water and will be visible in appliances that are not subject to free flowing water, (if it is desirable to

remove calcium, this can be accomplished with a companion TWT filtration system).

The system requires no chemicals for operations. It is designed for non-professional installation, and it is portable. The operating costs for the residential system are approximately \$8.00 per year, based on \$0.10 per KWH electricity cost.

Use With a Salt Water Softener

If a salt softener is currently being used, it should be disconnected, and the plumbing bypass valves should be opened/closed, to experience the sole effect of the **Triangular Wave System**. If the softener is not bypassed, the Triangular Wave System should be installed downstream of the softener, or else the calcium held in the ion exchange bed will quickly redissolve, causing a flood of extra-hard water. It is recommended that salt softening be eliminated for the best possible economic and ecological results.

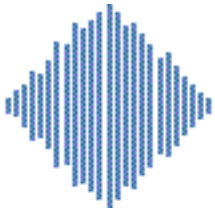
How to know the system is working

The amount of time required before experiencing the effects of the system varies from home to home, depending on the amount of water used. Generally, signs of aggressive descaling are seen within 1 to 2 weeks. Note: The system may initially seem to become "less effective" at times. This is due to the removal of the existing scale, which is brought back into solution and will briefly create the effect of increased hardness. Once the scale has been removed from the system, the full effectiveness of the system will return.

External Scale

It is a good idea to use external scale as a tracking reference to determine whether or not the system is working. Areas to identify for this are:

1. ***Scale around taps, sinks, etc. it will begin to soften, provided that the newly treated water is in regular contact with the area. Once softened, these deposits can be removed using a stiff scouring pad, or other appropriate device.***



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2. *Surfaces in contact or splashed with water become easier to clean.*
3. *Scale on showerheads softens and can be removed. During descaling, some deposits may collect inside the nozzle. These can easily be rinsed away.*
4. *Water spotting on fixtures and surfaces will begin to diminish.*

Internal Scale

1. *As the hot water heating coil is descaled, water heating will become progressively more efficient. The descaled heater coil will heat the water faster. Therefore, it is possible to save considerable energy by reducing thermostat settings.*
2. *If the water system was severely scaled, an improvement in water flow also may occur.*

Important Notes:

1. For some time after installation, the unit will be descaling preexisting scale in the water system. This often results in the water appearing to be harder, and calcium deposits increase in places like showerheads. Once descaled inside, the water system will be scale-free and calcium marks outside the system should easily wipe away.
2. Water Softeners - Water softener often leave deposits inside a water system; therefore if a softener is in use, allow the Deposit Control System to remove the deposits before the softener is switched off. In that case, leave the softener and the Deposit Control System on together for about 1 month. Remember, install the TWT Deposit Control unit down stream of the water softener, if planning to run them together.

Typical User Experiences . . .

Silky Water Feeling

The treated water is immediately altered and will start dissolving scale build-up in the pipes. The scale dissolves one particle at a time; therefore, there are few problems with clogging filters or screens in the plumbing system.

If a water softener was never used before, the water user will experience a dramatic difference in the "feel" of the water. The water will have a silky feeling, and hair will be "squeaky clean" after a shampoo.

Soap, Scum, and Skin Effects

As the hard water effects of the calcium diminish, you will usually notice:

1. *A reduction of around 30% in soap and detergents needed.*
2. *Less water spotting on fixtures and surfaces in contact with water.*
3. *Less scum formed on the bathtub, and an improved soap lather.*
4. *A great improvement in skin condition for anyone suffering from dry skin. Even those with normal skin can expect improvements and reduction in the use of hand creams, etc.*

Chlorine

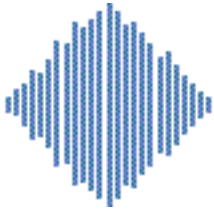
Chlorine may be smelled as it dissipates in the air, if the water has been chlorinated. That is because the **TWT Deposit Control System** reduces the surface tension of the treated water. The chlorine controls organisms inside the plumbing; however, it is not good for people, their hair, or their skin. Therefore, it is ideal to have the chlorine perform its function in the water, and then have it dissipate before drinking or bathing.

Water Taste

Users of the **TWT Deposit Control System** will notice a great improvement in the taste of their water, due to the cleaner pipes and the softening effect. Water used in coffee, drinks, ice cubes, and for cooking will taste better.

Replacing a Salt-Based Water Softener

If a salt softener is replaced, the user may notice the water becoming harder as the scale begins dissolving, and he may wonder,



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“What have I done here?” Do not worry, this is a consequence of descaling, and the condition will improve daily as the scale is removed. The plumbing took years to get full of scale; however it only takes a short time to clean it up with the **Triangular Wave System**. This period may be brief for a newer home, or several months for older homes with low water usage. It is recommended that water heaters be drained regularly to shorten the descaling process. The shorter the descaling period, the more money will be saved.

First Ninety Days

All descaling should be complete, and you will be left with:

1. Soft feeling water from every tap!
2. Clean pipes!
3. A savings in energy and detergent expenses!
4. Cleaner, fresher water for drinking and cooking.
5. Less water spotting.

Typical Customer Questions . . .

What does a softener do that an electronic deposit control system does not?

1. The water softener removes calcium from the water by replacing the calcium with sodium (salt).
2. The softener gives a feeling that one cannot get rid of soap from one's body.
3. The water softener makes skin dry.
5. The water softener requires that salt be purchased and replaced periodically.
6. Water softeners are not environmentally friendly.
7. Water softeners require on-going maintenance.

What does the Triangular Wave System do that a water softener does not?

1. The Triangular Wave System gives all of the benefits of soft water without the salt.

2. It removes calcium build-up in hot water heaters (Saves energy costs and extends the life of the heater).
3. Save money (No salt purchases).
4. Provides salt-free water, a concern for many health conscious people.
5. Provides environmentally clean water, while eliminating the discharge of salt-laden water into the water table as a result of the normal regeneration cycle of conventional water softeners.
- 6 Reduces the consumption of detergents. Big savings for commercial users, and a big benefit for the environment.
7. Removes both mineral and biological deposits but leaves the benefits of the minerals, so water used is cleaner and healthier.
8. Reduces water spotting on fixtures and surfaces.
9. Does not require on-going maintenance.

If there is a water softener already installed, how should the Triangular Wave System be installed?

Is it possible to use both a water softener and the Triangular Wave System?

It is possible to use both a water softener and the TWT Deposit Control System. The TWT Deposit Controller should be installed “downstream” of the water softener, because the Deposit Control System will cause the calcium ions attached to the ion exchange resin to be released back into the water. Because existing scale build-up in the plumbing will be dissolved into the water, the use of a water softener may help to diminish the effects of this increase in hardness. After approximately 1 month, put the softener on “by-pass”.

