



HydroCare HC-44

Hard Water Problems

Hard Water Costs You Money!

Limescale originates in the components of the water's carbonic rigidity-calcium carbonate (lime), magnesium carbonate, calcium sulfate, calcium phosphate and sediment formations. The higher the PH level and temperature, the larger the quality of limescale. Temperature has a great impact on limescale formation: for example, 80-degree water will leave six times more limescale than will 60-degree water. The settling of limescale on heating elements creates insulation that reduces their efficiency: it can even cause them to corrode, leading to direct failure & damage.

PROBLEMS IN HOT WATER HEATERS, BOILER SYSTEMS AND PIPES

Limescale Build-up contributes to inefficient and costly operation of water-using appliances. When the water is heated the hard water salts, usually deposit as encrusting limescale. The build up on the heat exchangers creates an isolating layer that decreases the efficiency of the heater, and causes an increase in the energy needed to heat the water and increase the amount of money you pay for the energy.

Limescale deposits can also contribute to the complete failure of such appliances. Pipes can become clogged with scale that reduces the water flow and ultimately requires pipe replacement.

Limescale has been known to increase your energy bills by an average of 25% or more!

PROBLEMS IN DISHWASHERS

When washing dishes & glassware, especially in a dishwasher, hard water may cause spotting and filming on your dishes and glassware. The minerals from hard water are released faster when it comes into contact with heat, causing an increase in the amount of spotting and filming that occurs. This problem is not a health risk, but it can be a nuisance to clean, and reduces the quality of your dishes and glassware.

PROBLEMS IN LAUNDERING

Clothes washed in hard water often look dingy and feel harsh and scratchy. The hardness minerals combine with some soils to form insoluble salts, making them difficult to remove. Continuous laundering in hard water can damage fibers and shorten the life of clothes by up to 40%.

PROBLEMS WITH LIMESCALE IN SOLAR HEATING SYSTEMS

Solar often used for heating swimming pools and houses is prone to limescale buildup, which can reduce the efficiency of the electronic pump and therefore the overall system and performance will deteriorate. A low cost solution to this problem is to install a HydroCare unit before the pump to prevent buildup and remove existing limescale.

Limescale and it's Effect on Heat Exchangers



<Boiler heating element w/limescale



<Plastic hose covered in limescale



<Inside of Boiler w/limescale build-up



<Heating element covered in limescale build-up

HydroCare HC-44

A major problem of domestic heating systems without the installation of the HydroCare HC-44 is the scale formation inside the homes pipework. HydroCare prevents scale build-up and will in most cases dissolve existing scale. The patented water treatment technology within the HydroCare HC-44 represents a major breakthrough in the treatment of water and is recommended in the UK by British Gas and in Israel by the Pazgaz group, Israel's Gas Utility Company. It simply clips on the cold water feed pipe before the hot water heater or boiler, plug it in and switch it on. No professional installation required or needed.

Features of the HC-44

- Effective on standing water
- No flow necessary.
- Easy to Install
- No Installation needed.
- Maintenance free
- Low running costs
- No chemicals, No Salts

Benefits of the HC-44

- Prevents limescale formation
- Removes existing limescale
- Cuts Energy Costs
- Extends the life of Appliances & Equipment
- Treats the whole house 24 hours a day



How does the HydroCare HC-44 Work?

This limescale prevention method is based on the creation of randomly changing electrical fields that are induced in the water and distributed throughout the pipe system. (this system holds US & Worldwide patents). This leads to the formation of crystallized nuclei everywhere in the system. When the water is heated, the hard salts in the water (those which usually settle as limescale that builds up on the walls) grow as a suspension and are washed away with the water flow. The electric field that forms in the area of contact between the water and the pipe repels the limescale crystallized nuclei and prevents them from settling on the walls.

The induction of the electric field is accomplished without intervention in the pipe system and is based on an accessory that is mounted around it. The electrical field is transferred by the pipe system and water themselves. The impact of the process is continuous, independent of the water flow (yet the intensity of the field changes according to the intensity of the flow) and does not require the addition of chemicals or salts.

As a result of high costs it had incurred from limescale damage to instant water heaters, British Gas conducted a long-range experiment in which it compared several limescale prevention devices. As part of the experiment, the method of action and structure of the devices were described. Only devices whose operation does not require the addition of chemicals or salts to the water were tested. The experiment results revealed a clear advantage to the HydroCare devices: Systems in which they were installed became clogged after only 200 weeks or more, while all the systems treated by other devices clogged within 40-100 weeks.

HydroCare is different from other devices of its kind in terms of the following:

- Its efficiency does not decrease in high temperatures.
- It is also active when there is no flow in the system
- Its action is felt throughout the whole house up & down stream, with no additional devices needed within the system.

SUMMARY

As it was pointed out at the beginning, the theoretical background and the research carried out by British Gas Company indicate a device that can contribute greatly to the prevention of limescale in hot water systems.

The device prevents limescale and reduces the damage it causes, extending the life cycle of standard home appliances and hot water systems. It increases the efficiencies and dramatically reduces energy cost.



THEORY OF OPERATION

Theory of Operation

The HydroCare Patented Technology - a unique and new approach to physical water treatment

The most important feature of the HydroCare technology that sets it apart from that of any other technology, is the efficient manner by which the electric field is directionally generated through the entire water system. This unique advantage, protected by international patents, singularly delivers consistently beneficial results in industrial, commercial, and domestic applications.

Most plumbing systems must be regarded as an open circuit from the electrical point of view. It would be impractical and expensive to form a reliable circuit from a domestic or industrial plumbing system whereby an electrical current flows through every section of the plumbing system.

To generate a reasonable flow of electrons in an open circuit conductor, it is necessary to provide a source of high frequency to a conductor that is long enough to generate a standing wave voltage over its length.

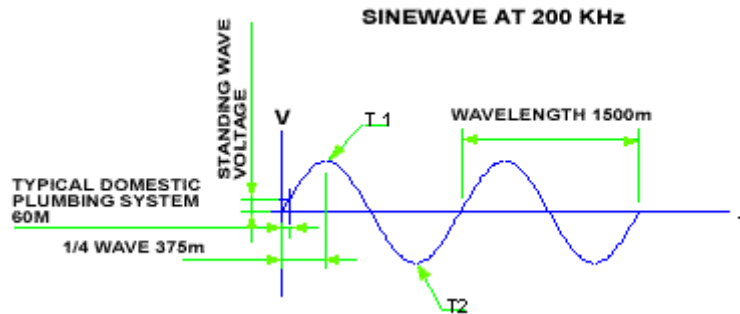


Fig. 1 shows a sine wave of 200 KHz. The wave length is 1500m, the 1/4 wave length is 375m. A domestic plumbing system including the feed pipe, central heating, cold water and hot water is about 60 m.

If the source is 10V then the standing wave voltage will be $[\sin((60/375)*90)]*10 = 2.49V$ between one end of the plumbing system and the other. This voltage difference between the extremities of the plumbing system is caused by a substantial flow of electrons from one end to the other of the system.

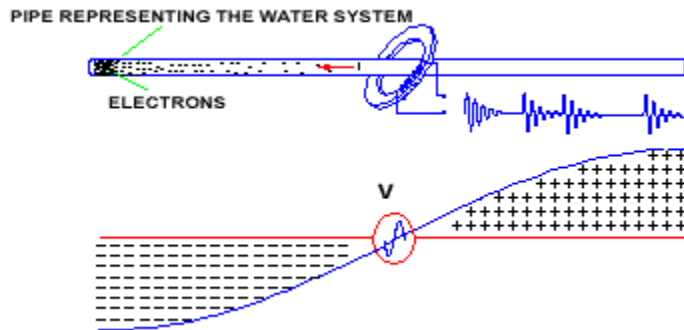


Fig.2 represents the position at T1 on Fig.1 and Fig. 3 represent the position at T2 on Fig.1. To achieve this flow of electrons in the plumbing system a voltage must be generated in the water in the direction of the pipe. This is achieved by utilising a high frequency transformer. This transformer consists of a ferrite ring around the water pipe. A primary coil is wound around the ferrite ring. Any conductor, the water and the pipe (if it is a conductive material) will form parallel secondary windings of the transformer. The signal that is fed to the primary coil is a high frequency diminishing wave with random wait periods. This wave is designed to allow the formation of seed crystals for a variety of crystal forming salts that may be present in the water.

Fig.2 and Fig.3 illustrate the diminishing wave and the voltage V over the plumbing system at specific times marked T1 and T2 in Fig.1, as well as the position of the electrons, and the positively charged atoms in the conducting water (and pipe), at maximum voltage position. V is the voltage generated by the ferrite ring and, I is the accelerated charge generated due to the standing wave. It is this acceleration that forms the electromagnetic field. The electric component is responsible for the generation of nuclear clusters that act as seed crystals to prevent the formation of encrusting scale.

BRITISH GAS TEST RESULTS

The following are excerpts from a report conducted by British Gas, to evaluate the performance of the water softening device sold in Europe by same manufacture that is producing the HydroCare in the US.

British Gas evaluated a selection of magnetic and electromagnetic water Conditioning and automatic chemical dosing devices in order to establish Their effectiveness in protecting appliances from scaling and identify the potential benefits from reduced service and maintenance.

- “Although all the devices had some physiochemical effect on calcium carbonate in the water, none of the physical permanent magnetic devices were significantly effective in preventing the water from scaling.”
- “The electrolytic, electromagnetic and electrosonic devices were only able to increase the time to failure by approximately 50%.”
- “It is considered that the ideal device for reducing or eliminating hard water scaling problems should be continuously effective, cheap, and simple in operation, need no constant attention from the user and have long periods of operation without the necessity for service.”
- “This water conditioning device came close to this ideal on our test rig and it surpasses the Performance of all the other non-dosing devices by a large margin.”
- “It is clear that the device has provided a level of performance under the severe test regime, almost three times better than the best of the other water conditioning devices. This is the first non-chemical water conditioning device, of the type required by British Gas, to show potential for reducing the scale formation and to offer economic benefits for reducing service and maintenance on gas fired water heaters and boilers.”
- “The unit is unique in the way in which the electromagnetic field is applied to the water and the way the device varies the strength of the fields .according to flow rate, monitored by the sensor in the transducer unit. Theses two factors are critical to the propensity for this device to work effectively to prevent scale deposition at low and high temperature under varied heat flux conditions.”
- “The device operates continuously and is not dependent upon flow although it does sense it, and by its AC pulsed field it holds and releases nuclei continuously throughout the system.
- “There is no diminution in the activity of the devise on scale reduction at higher temperatures.”

CONCLUSION

“The technology is in large measure substantiated according to the claims of the manufacturer and it is the only device to approach an ideal device for reducing/preventing scale formation on a continuous operation basis at high temperature. This is an essential and unique feature required by gas fired water heating appliances.”

BENEFITS

Health Benefits of Hard Water

Hard water is not a health hazard. In fact the National Research Council (National Academy of Sciences) states that hard drinking water generally contributes towards total calcium and magnesium human dietary needs.

Environmentally Friendly w/HydroCare Unit

No Salt affecting ground water supply, which is a major concern of localities and harms plant life.

Reduces water consumption that is required for flushes in salt and chemical based solutions.

Save Money with HydroCare USA

Extended Life Expectancy of Household Appliances w/HydroCare Unit

Appliance	Average Cost	Hard Water Life Expectancy	HydroCare Life Expectancy	Replacement Cost Savings/Yrs	Average \$ Saved per yr
Dishwashers	\$500.00	7.5 yrs	10 yrs	\$125.00 / 2.5 yrs	(+) \$50.00
Washing Machines	\$750.00	9.75 yrs	13 yrs	\$187.50 / 3.25 yrs	(+) \$55.00
Hot Water Heaters - Electric	\$350.00	10.3 yrs	14 yrs	\$92.50 / 3.7 yrs	(+) \$25.00
Hot Water Heaters - Gas	\$450.00	8.25 yrs	11 yrs	\$112.50 / 2.75 yrs	\$41.00
Boilers/Hot Water Coil	\$4195.00	22.5 yrs	30 yrs	\$1048.75 / 7.5 yrs	(+) \$140.00
Average Yearly Savings per household on Appliance Replacement Costs.					\$273.00
<i>Life Expectancy Sources taken from oldhouseweb.com Average Costs taken from Consumer Reports Costs based on bottom line Appliance replacements</i>					

Average Monthly Residential Utility Bill Savings w/ HydroCare Unit

<i>Based on a 25% savings **</i>				
City	Avg. Mthly Bill	w/HydroCare	\$ Monthly Svgs	\$ Yr Svgs
Austin, TX	\$300.48	\$225.36	\$ 75.12	\$ 901.44
Boston, MA	\$442.83	\$332.13	\$110.70	\$1328.40
Denver, CO	\$222.40	\$166.80	\$ 55.60	\$ 667.20
Los Angeles, CA	\$345.03	\$258.77	\$ 86.26	\$1035.12
Average Utility Savings= 4 cities divided for average yearly savings of \$983.04				

**Average Monthly Residential Utility Bills Rates based as of 1/1/2003 report by City of Memphis

Combined Yearly Savings on Appliance Replacement & Utility Costs on average w/HydroCare Installed Average Annual Household Savings \$983.04 (Utility) + \$273 (Replacement Costs)

\$1,256.04

SAVINGS

How limescale buildup affects appliances and boiler energy costs

Water described as "Hard" is high in dissolved minerals, specifically calcium and magnesium. Hard water is not a health risk, but a nuisance because of mineral buildup that shortens the life or leads to the complete failure of such appliances. Pipes can become clogged with scale that reduces water flow and ultimately requires pipe replacement.

Limescale has been known to increase energy costs by 25% or more.

Calculating the projected savings from limescale removal from appliances

The calculation is divided into two parts:

1. Extended life expectancy of household appliances

Studies done on appliance life expectancy on Websites such as oldhouseweb.com, find that the standard life expectancy from appliances such as hot water heaters (14 yrs), dishwashers (10 yrs), washing machines (13 yrs) and boilers (30 yrs). After looking at the Limescale buildup in appliances due to hard water in the home, we find in reality they are decreased from 25% - 40% in life expectancy, therefore if we take the out of pocket cost on replacing these appliances before their time, at 25% on average before the end of their life expectancy, we are spending an average of \$273 per year on replacement costs not needed.

2. Average monthly residential utility bill savings

Sources: 2003 Utility Bill Comparisons for Selected U.S. Cities: Electricity, Natural Gas, Water and Wastewater. Compiled by Memphis Light, Gas and Water Division's Economic Development department. Only firm rates are used in the calculations of the bills

Our study was done by the City of Memphis, in 2003, covering over 14 cities in the United States. By taking the average savings of 25% of utility costs, with the removal of hard water from the home appliances, allowing them to work more smoothly and therefore use less energy, we find the Average Household with an Energy Savings of \$983.04 on average per year.

For a projected savings to the average homeowner of over \$1250 per year on average.

FAQ

FREQUENTLY ASKED QUESTIONS

How does HydroCare Work?

HydroCare breaks up hard water clogs and prevents mineral buildup in your entire water system. You simply clip the compact HydroCare unit to the pipe that leads to your water heater, and then plug it into an outlet. HydroCare begins working right away, transmitting a patented signal into your entire water system. When your water is heated, this signal prevents minerals from depositing on the inside of your pipes. Plus, it dissolves existing buildup of limescale and treats the water throughout your entire house. It's safe, harmless, maintenance-free and guaranteed.

What effect does it have on drinking water?

HydroCare does not change the chemical composition of the water in any way; it works purely on a physical basis. Essential minerals for healthy drinking and good taste are retained in the water.

Is HydroCare easy to install?

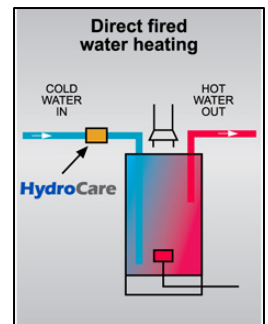
Yes, the HydroCare unit simply clips to the pipe, is plugged into an outlet and is switched on.

Where should I fit the HydroCare?

We recommend it is placed on the cold feed to the hot water tank. *(SEE IMAGE TO RIGHT)*

Will HydroCare descale as well as prevent scale?

It will descale existing clogs, and depending on the severity it may be a gradual process over a period of months. HydroCare dissolves the already formed lime scale. However, not all blockage is lime scale - some scale buildup cannot be dissolved and can only be removed by acid cleaning. Once a system is cleaned it is less likely to scale up again.



What is Lime scale?

Minerals that are naturally in the water supply will clump together and attach to surfaces when heated up. They increase in diameter over time and reduce the water pressure in the pipes and are similar to having clogged arteries. *(SEE IMAGE TO LEFT)*

Does HydroCare work on plastic/lead pipes?

Yes, the technology ensures that the unique field propagates through the entire system regardless of the type of pipe work material.

Does HydroCare protect the central heating system?

Yes, the signal transmits through the water in the copper cylinder itself, via the heat exchange coil. The water inside the central heating system is flowing freely without mineral buildup, thereby protecting the boiler and other components.

Will HydroCare protect the cold water going to the kitchen etc.?

Yes. HydroCare is not dependent on water flow like other devices; i.e. the water does not have to flow past the unit in order to be treated. Rather than taking the water to the treatment, we are taking the treatment to the water. Our patented signal transmits along conductive materials, e.g. water or metal, and therefore throughout the whole system (primary and secondary), protecting it 24 hours a day.

Is there any special electrical or plumbing work required?

No, it's easily installed on existing pipes and plugs into any outlet. The unit comes with the required plug/transformer. The unit emits a long wave radio signal on a frequency of 120-140kHz, and will not effect sensitive electrical equipment.

OPERATIONAL COMPARISON CHART

	HYDROCARE	WATER SOFTENER	MAGNETIC	ELECTRO-MAGNETIC	SINGLE WOUND WIRE ELECTRONIC	DOUBLE WOUND WIRE ELECTRONIC	ELECTROLYTIC	PHOSPHATE DOSING
Treats Still Water	●							
Treats running water	●	●	●	●	●	●	●	●
24 hour system Treatment	●							
No Plumbing	●				●	●		
No Maintenance	●				●	●		
No Corrosion	●							●
No Chemicals	●		●	●	●	●	●	
Environmentally Friendly	●		●	●	●	●	●	
Consistence	●	●						
*Operational temps	●	●						●
Whole system treatment	●							

* All Normal temperatures 68 - 208 F typical heating system.

* A voltage of not less than 0.5 volts can be measured throughout the system.