



phoenix

Mediagon® the physical solution to scale problems

The build-up of scale deposits is a common and costly problem in industrial, commercial and domestic water supplies. In Britain alone, costs attributed to scale are estimated to be in excess of £1bn per annum. Traditionally, scale has been controlled by either base-exchange processes or other chemical treatments, but whilst these methods are extremely effective they have many disadvantages when compared to Phoenix physical water conditioners.

In recent years there has been huge interest in physical water conditioners for the reduction of scale formation. Many UK and international companies now manufacture such devices with questionable success claims and, as a result of the ensuing 'bad press', acceptance of them has been slow in coming. Fortunately, however, there are some systems that do have proven scientific backing, and the Goodwater Phoenix devices lead the field in this respect.

The Phoenix Mediagon® range has been used in industrial and domestic applications for over 20 years. There have been numerous successful field tests and with worldwide sales in excess of 40,000 units the unique Phoenix

physical water conditioners



Mediagon® range can be used with the total confidence a high quality product guarantees.

The problem

Rainwater is slightly acidic (soft). Hardness in water is created by calcium and magnesium salts dissolved into the rainwater from the substrate through which the rainwater flows. The resulting 'hard water' consists of both temporary and permanent hardness. Temporary hardness is generally associated with calcium and magnesium carbonates and bicarbonates. These scale-forming compounds, invisible to the eye, are held in solution unless acted upon by an external force, such as temperature or pressure. These forces will cause the water to become supersaturated as carbon dioxide is driven away resulting in the deposit of scale on hot or rough surfaces such as calorifiers, pipes, heat exchangers, kettles or other heat-transfer surfaces (see figs. 2a, 2b and 2c). Permanent hardness is mainly due to calcium and magnesium sulphate and is not generally affected by external forces.

The chemistry simplified:

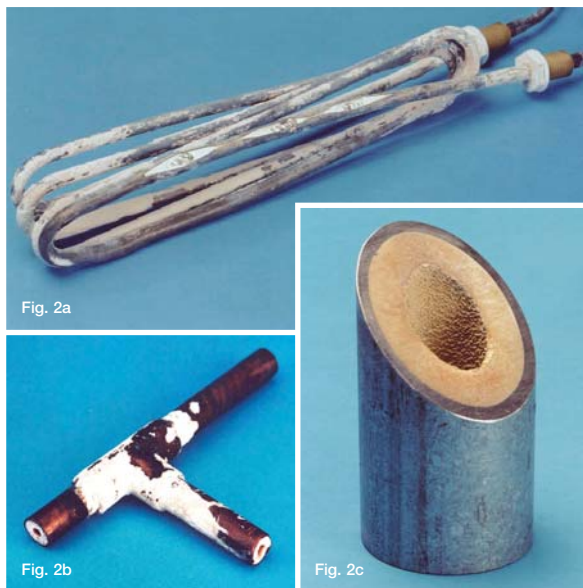


As the rainwater passes through a calcereous substrate, CaCO₃ is dissolved resulting in:





physical water conditioners



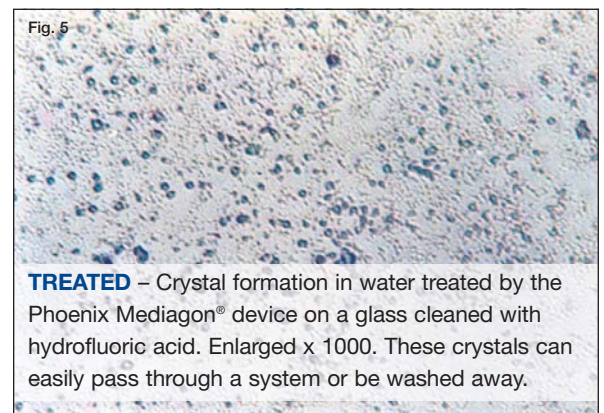
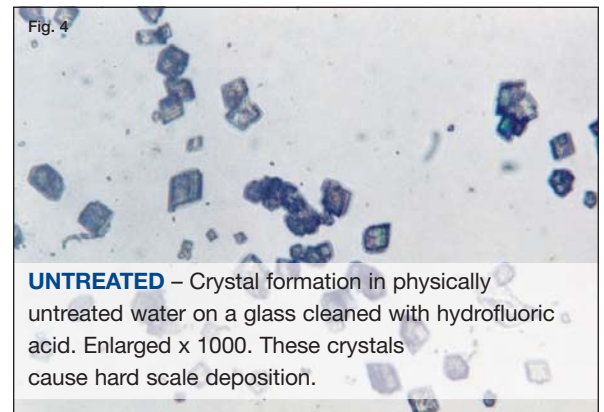
The solution

Traditional methods for preventing scaling - such as base exchange processes (eg. the Goodwater Pegasus range) - are highly effective and should not be discounted. However, there has been a big move in recent times toward physical water conditioning. Basically, hard water containing calcium and magnesium is excellent for human health, so why remove it? Base-exchanged softened water cannot be consumed as it removes hardness and replaces it with sodium. The Phoenix Mediagon® device does not chemically alter the water, meaning it remains safe and wholesome to drink.

The Phoenix Mediagon® devices can be used in many applications for the purpose of scale reduction - domestic water services, cooling towers and humidifiers, to name but a few. They can also be used in conjunction with Goodwater Dorado (chlorine dioxide), and Tucana (UV) systems to give protection against both scale and bacteriological fouling.

How does it work?

The main objective of the Phoenix Mediagon® is to retain the anions and cations in the water in numerous weak electrostatic fields. It concentrates these locally so that spontaneous nucleation of CaCO_3 can occur in the homogenous solution without requiring external surfaces such as pipe walls. Numerous CaCO_3 nuclei are held in suspension in a colloidal and dispersed form. This causes the nuclei to compete with other surfaces (pipe walls, calorifiers, etc.) and protects them from heterogeneous growth of adhesive CaCO_3 by means of their larger surface and shorter diffusion distances (see figs. 4 and 5).





physical water conditioners

Since a water molecule is a dipole (two poles) with a positive and negative charge, it can be manipulated with both electrostatic and magnetic fields. The Phoenix Mediagon® range uses electrostatic fields to polarise the dissolved hydrogen carbonate anions in the water leading to the crystallisation of colloids. The unique manufacturing technique employed in the making of the Phoenix Mediagon® devices ensures that, as water passes through each unit, it is subjected to these electrostatic forces many times. It is these numerous weak electrostatic fields, brought about by a painstaking manufacturing process that have afforded the Phoenix Mediagon® devices their success. By polarising the water the devices provoke the flight of carbon dioxide and, as this gas is released, there is a colloidal precipitation of CaCO₃ (soft scale). The greater the number of field changes the more CO₂ is released. It is not the strength of the field that matters but the number of field reversals experienced.



Fig. 6

Advantages of the Phoenix Mediagon®

The careful construction of the Phoenix Mediagon® device is such that numerous weak electrostatic fields are created in conjunction with water flow meaning its' success does not rely on frequent change of electrical fields.

The huge number of electrostatic fields created as a result of the Phoenix Mediagon's® cooling, pressing and hardening process ensure that the water is polarised many times. As such, it leads the industry as its conditioning effect can last between 2 and 10 days. Some of its closest competitors - such as those using transducers - claim only 30 minutes of residual effect.

- The device itself requires no maintenance.
- Environmentally friendly – no chemicals are used.
- No electrical requirements.
- No running costs.
- No pressure losses.
- Low installation cost.
- Smaller than base exchange systems.
- Can reduce existing scaling: as CO₂ (which is acidic) is released it can dissolve existing scale.
- The technology is based on weak electrostatic fields (not strong magnets), therefore blockages are not caused by attraction of iron particles.
- In some instances corrosion can be reduced.
- Overall reduction in the use of detergents.

Installation

Installation of the Phoenix Mediagon® device is very simple. The device consists of two half-shells which are placed around the pipe through which the water to be treated flows. These shells are then joined by four bolts. No cutting of pipes is required and no head loss is experienced, as they are externally mounted. The device can be installed vertically or horizontally, but must be on a straight section of pipe (see figs. 6 and 7).



physical water conditioners

Location

The success of the Phoenix Mediagon® device is due to the careful selection of its application and location within a system. No physical water device is successful in 100% of situations and treatment can be affected by parameters such as water pH, pressure etc. Your Goodwater representative will assess individual cases before issuing recommendations.

Maintenance

Whilst the Phoenix Mediagon® device itself does not require maintenance the water system on which they are installed will. Physical water conditioning, as previously explained, does not remove scale unlike the base exchange process – it simply alters its structure. Whilst most of the soft scale passes through a water system to drain there may still be some soft scale deposits. These deposits should be brushed or wiped off as part of a standard cleaning regime. Showers, for example, should be cleaned at least once a month.

In accordance with our own recommendations and those of ACoP L8, hot water cylinders, calorifiers and plate heat exchangers should be inspected annually or more frequently if required. Where the Phoenix Mediagon® is used there may be some soft scale particles at the base of these plant items which should be hosed away. Where used in cooling towers this de-scaling process will be more frequent in accordance with legislation.



Fig. 7

The Phoenix Mediagon® range has been successfully used worldwide. Listed below are a small selection of clients:

- | | |
|---------------------------|-------------------|
| - ASDA | - Pirelli |
| - JJB Sports | - AEG |
| - Sunrise Assisted Living | - HOESCHT |
| - Excel Centre | - Kraft |
| - Swissair | - Samsung |
| - Hyundai | - Rhône-Poulenc |
| - Shell | Chemicals Ltd |
| - Nestlé | - Mannesman Sachs |