



Halcyan Water Conditioner:

Redefining hard water treatment for engineers

Technical Overview

Redefining hard water treatment for engineers

If you're involved in designing systems that use water, in areas where your clients battle to keep the problems of hard water at bay, then you'll welcome the unique solution that is the Halcyan Water Conditioner.

The Halcyan will not only make your design process much more straightforward, but add long term value for your client, saving them money, and demonstrate your intention to be at the forefront of carbon saving technologies.

The Halcyan is different to other solutions available in a number of key areas, making it the optimum, sustainable solution available:

- **It's 100% chemical and salt free.**
- **Simple installation, and over 30 years product lifespan.**
- **There are no moving parts, which means no maintenance, ever.**
- **The water is potable, WRAS certified, so no separate drinking supply is required.**
- **All minerals remain treated for over 21 days in any system.**
- **No electricity or earthing is required.**
- **It can be fitted in any orientation.**
- **It operates just as effectively with hot and cold water systems.**

With these features the Halcyan can help both designers and engineers by:

Simplifying system design, including removing the need for recirculation requirements.

Improving equipment reliability and ability to perform as designed.

Significantly increasing the lifetime value of capital equipment.

Reducing energy consumption of heating and cooling systems.

Lowering operating costs by reducing replacement parts.

Significantly reducing maintenance and system downtime.

Reducing the volume of chemicals used in systems, including cleaning/sanitization agents plus improve cleaning efficiency (in particular Legionella's regimes).

Increasing the effectiveness of chemical additives (cleanser's, treatments, fertilizers).

Extending the life, and improve the effectiveness, of filters in RO and desalination systems.

Introduction

In operation for over 30 years overseas, the Halcyan Water Conditioner has been repeatedly proven to reduce the following hard water problems in both hot and cold water;

Prevents calcium carbonate scaling.

Dissolves and removes existing scale, improving system pressure and flow.

Reduces energy consumption.

Stops the deposition of salt, and in all cases brings it back into solution.

Inhibits the formation of some algae.

Improves filtration and extends the usable life of filter elements and membranes.

Operation & Design

Each Halcyan Water Conditioner patented alloy core is designed and configured with specially foundry blended metals scientifically selected from both the Cathode and Anode end of the Galvanic Scale. Sized correctly, the patented catalytic alloy core changes the crystalline structure of the minerals in water greatly reducing hard water problems.

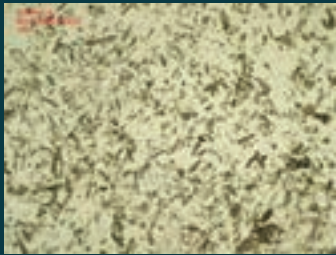
The turbulence generated in the Halcyan Water Conditioner creates an Electro-Chemical (galvanic) reaction between the crystalline minerals in the water and the catalytic alloy core. The Halcyan Water Conditioner core is figured to create a high degree of turbulence to occur in the water flow, and provides a more pronounced exposure and contact between the crystalline mineral particles and the metals in the alloy core. Immediately upon contact with the core the minerals begin to be dispersed into a colloidal solution. Colloids do not settle or precipitate therefore preventing the formation of scale.

Several key occurrences take place that bring about the colloidal formation;

- **The alloy core provides an immediate galvanic site upon which the ions can deposit.**
- **The minerals are attracted and repelled several hundred times before clearing the alloy core.**
- **Electrons are being captured from the water into the core and dispersed from the core back into the water, there is a very definite cathode-anode galvanic action.**
- **Nuclei have been introduced into the system as a result of the cathode-anode reaction and provide a more positive site around which the mineral particles can attract, as opposed to precipitating onto the walls of piping or equipment. The scientific name for this reaction is more readily known as “epitaxial nucleation”.**
- **The Zeta potential and surface tension of the water is reduced.**

Halcyan Water Conditioner

Effect on zeta potential and surface tension

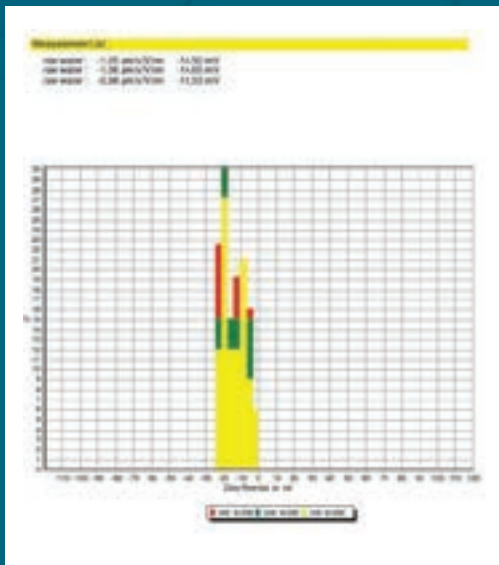


Untreated Water
Zeta Potential -14

Treated Water
Zeta Potential -7

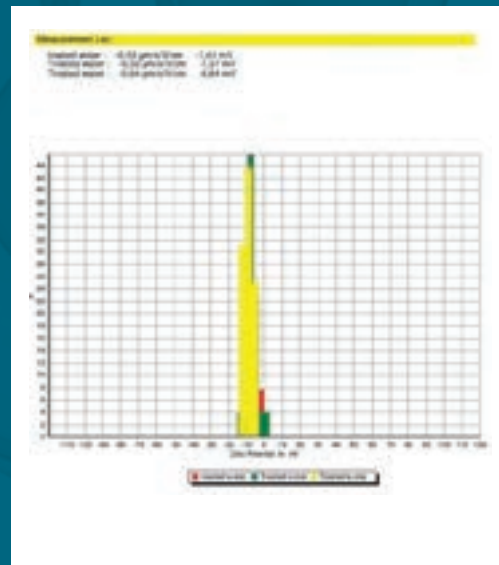
Colloids are held in suspension via a very slight Electro-negative charge on the surface of each particle. This charge is called Zeta Potential. The electrical charge is a function of the total surface area of the particles. Example, a one-inch metal cube has a surface area of 6 square inches. Divide it into small colloids and the area increases to over 5 million square inches each with a small electrical charge.

Figure 1



Zeta Potential of particles in raw water

Figure 2



Zeta Potential of particles in Halcyan Water Conditioner treated water

These results show that the Halcyan Water Conditioner has a great influence on zeta potential. In fact for water from the same origin, Zeta Potential is decreased by a factor of almost two. Very slight changes in the Electro-negative charge of the minerals in water can produce large effects downstream of the Halcyan Water Conditioner.

As the surface tension of water is decreased so is its ability to carry minerals. Surface tension and mineral charge are most easily understood if we think of positive charges and increased surface tension as scale forming or concentrating and negative charges and decreased surface tension as scale retarding or dissipating. Water surface tension is dramatically decreased after a single pass through an Halcyan Water Conditioner. Samples of raw and Halcyan Water Conditioner treated water were analysed.

Date	Untreated Water		Halcyan Water Conditioner (Treated Water)	
	Room Temp	80 Degrees C	Room Temp	80 Degrees C
May 5, 2004	79.0 dynes/cm	N/A	69.5 dynes/cm	N/A
May 25, 2004	79.1 dynes/cm	69.2 dynes/cm	77.4 dynes/cm	67.5 dynes/cm

An 8 day old water sample having had a single pass through an Halcyan Water Conditioner demonstrated a lower surface tension of 9.5 dynes/cm which exhibits a surface tension similar in magnitude to water that has been heated to 80 degrees C.

This whole area of study is known as Colloidal Chemistry, Physical Chemistry, Surface Change, or Zeta Potential. It is a mixture of both physics and chemistry.



Frequently Asked Questions

How do Halcyan Water Conditioner's work?

There are a number of reactions that take place in a Halcyan Water Conditioner unit as water contacts the complex alloy core. The patented catalytic alloy in the Halcyan Water Conditioner generates an electro-chemical (galvanic) reaction causing the calcium ions to flocculate as a colloid. Colloids do not settle or precipitate (form scale) but always stay in solution. Milk is a colloid, with billions of nano sized particles which stay permanently in solution.

These generated reactions change the crystalline structure of the minerals in the water creating a very fine non sticking deposit (colloid).

What happens to these very fine non sticking deposits?

The crystalline colloids will either flow through an open loop system in colloidal suspension, settle at the low point of a system (which can be flushed during routine maintenance) or can be easily filtered down stream of the Halcyan Water Conditioner and any residue left on a surface is easily removed.

Will existing scale be removed and how long does it take to clean the system?

Several factors need to be taken into consideration.

- The thickness, hardness and type of scale.
- The length of the scaled area from the Halcyan Water Conditioner
- The volume of water flowing through the system.

In many instances the thickness of scale in the water carrying system has taken a number of weeks, months or years to build up. Once installed Halcyan Water Conditioner will begin to work immediately. It may take equally as long to remove the existing scale as it took for the scale to build up.

Will Halcyan Water Conditioner affect water pressure and flow rates?

No. It is important to select the correct size Halcyan Water Conditioner for the application. Selection of a Halcyan Water Conditioner is very simple, all you need to know is;

- The flow rates of the system.
- If the Halcyan Water Conditioner is to be installed in a mains pressure system or a pump driven system.

Should your flow rate fall between models, and if pressure is critical, we will advice selection of the larger of the two units otherwise select the smaller unit! The harder the Halcyan Water Conditioner works the better the result.

Does Halcyan Water Conditioner soften water?

Yes, because of the definite change in the characteristics of the minerals, the electrical charge of the water is reduced giving you softer water.

Does the Halcyan Water Conditioner alloy core need to be replaced?

No, the Halcyan Water Conditioner alloy core is not a sacrificial anode and therefore does not need to be replaced. There are units working that were installed over 30 years ago, and no units have been returned due to diminishment or cessation of functionality.

Does the Halcyan Water Conditioner unit require ongoing maintenance?

No, once installed Halcyan Water Conditioner does not require any maintenance.

Is it necessary to earth the Halcyan Water Conditioner?

No, Halcyan Water Conditioner does not need to be earthed and can be installed above or below ground, in any orientation.

Why use Halcyan Water Conditioner as opposed to a salt water softener?

Salt water softeners may solve one problem but introduce others by adding unwanted pollutants to the water system and in addition can cause health and safety issues. They usually consume large amounts of water as they recharge, and their water is not suitable for plants and watercourses. Halcyan Water Conditioner is chemical free and therefore 100% environmentally and plant friendly.

What is the difference between Halcyan Water Conditioner and Magnetic and Powered water conditioners?

Magnetic and Powered water conditioners are clamped to the outside of a pipe and generate a magnetic field through which the water travels. The powered units only operate whilst there is power. Halcyan Water Conditioner has no plug, the water contacts our scientifically engineered alloy core and it works effectively with either a laminar or turbulent supply of water in hot or cold water.

Is Halcyan Water Conditioner easy to install?

Yes, Simply remove the corresponding length of pipe and install the Halcyan Water Conditioner supplied with the appropriate fittings.

We're here to help

To find out more please
contact us on:

Call **0345 5040 656**

Email **commercial@halcyanwater.com**

Visit **www.halcyanwater.com**

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