



# ecosoft water

Getting tough on hard water



## Ecosoft in Brief

Sized correctly, the Ecosoft complex alloy core changes the crystalline structure of the minerals in water greatly reducing hard water problems!

## Introduction

Designed and manufactured in Australia Ecosoft water conditioners have been proven to reduce the following hard water problems in either hot or cold water;

- Calcium carbonate scaling
- Over time existing scale will dissolve, improving system pressure and flow
- Retards the corrosive action of iron sulphide and iron oxide
- Stops the deposition of free sulphite and in most cases brings it back to solution
- Retards the corrosive action of hydrogen sulphide upon metal (steel)
- 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
- Reverses problems associated with Blue Water Syndrome
- Will reduce maintenance costs and allow equipment to work with greater efficiency



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## Operation & Design

Each Ecosoft 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. The turbulence generated in the Ecosoft creates an Electro-Chemical (galvanic) reaction between the crystalline minerals in the water and the catalytic alloy core. The Ecosoft core is configured 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 (much like milk) therefore preventing the formation of scale.

Several key occurrences take place which 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.



Untreated Water  
Zeta Potential - 14



Treated Water  
Zeta Potential - 7



## Ecosoft's Effect on Zeta Potential and Surface Tension

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.

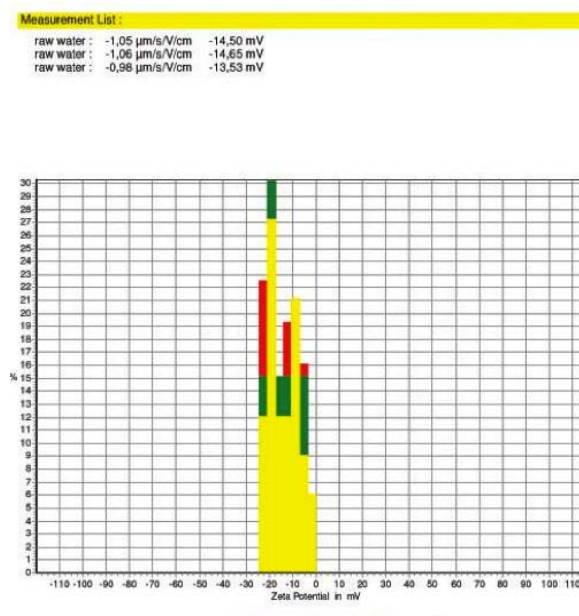


Figure 1: Zeta Potential of particles in raw water

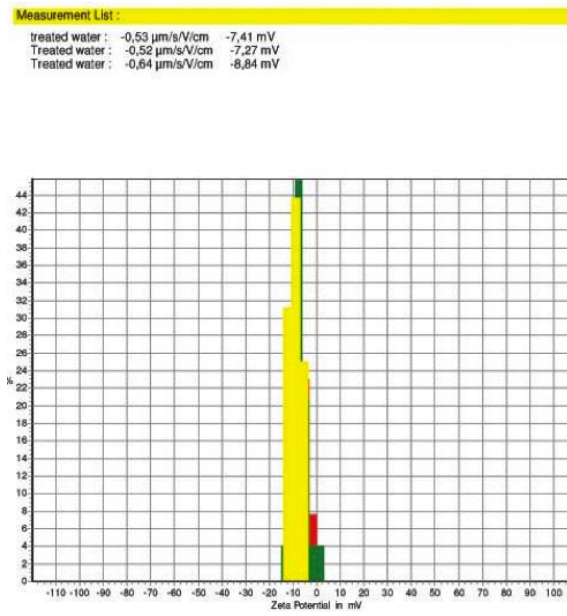


Figure 2: Zeta Potential of particles in Ecosoft treated water

These results show that the Ecosoft 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 Ecosoft.



## Ecosoft's Effect on Zeta Potential and Surface Tension (cont.)

As the surface tension of water is decreased so is its ability to carry mineral. 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 a Ecosoft water softener. Samples of raw and Ecosoft treated water were generated on April 27, 2004 and were shipped to Core Labs in Calgary for analysis.

	Untreated Water		Ecosoft Treated Water	
Date	Room Temp	80 Degrees Celsius	Room Temp	80 Degrees Celsius
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 a Ecosoft water softener 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.

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## Frequently Asked Questions

**Q. How does ECOSOFT work?**

A. There are a number of reactions that take place in a ECOSOFT unit as water contacts the complex alloy core. The patented catalytic alloy in the Ecosoft Water Softener 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).

**Q. What happens to these very fine non sticking deposits?**

A. 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 ECOSOFT. Any residue left on a surface is easily removed.

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

A. Several factors need to be taken into consideration.

- The thickness, hardness and type of scale.
- The length of the scaled area from the ECOSOFT.
- 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 ECOSOFT will begin to work immediately. It may take equally as long or longer to remove the existing scale as it took for the scale to build up.

**Q. Does ECOSOFT soften water?**

A. Yes, because of the definite change in the characteristics of the minerals, the surface 'tension' of the water is reduced giving you softer, "wetter" water.

**Q. Is ECOSOFT easy to install?**

A. Yes, Simply remove the corresponding length of pipe and install the ECOSOFT.





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**Q. Will ECOSOFT affect water pressure and flow rates?**

- A. No. It is important to select the correct size ECOSOFT for the application. Selection of a ECOSOFT is very simple; all you need to know is;
- The flow rate of the system.
  - If the ECOSOFT is to be installed in a mains pressure system or a pump driven system.
- Simply compare the flow rate you have against the ECOSOFT specifications data sheet and select the corresponding unit. Should your flow rate fall between models, and if pressure is critical, select the larger of the two units otherwise select the smaller unit! The harder Ecosoft works the better the result

**Q. Does the ECOSOFT alloy core need to be replaced?**

- A. No, the ECOSOFT alloy core is not a sacrificial anode and therefore does not need to be replaced. We still have units working that were installed over 20 years ago!

**Q. Does the ECOSOFT unit require ongoing maintenance?**

- A. No, once installed ECOSOFT does not require any maintenance.

**Q. Is it necessary to earth the ECOSOFT?**

- A. No, ECOSOFT does not need to be earthed and can be installed above or below ground.

**Q. Why use ECOSOFT as opposed to a salt water softener?**

- A. Salt water conditioners may solve one problem but introduce others by adding unwanted pollutants to the environment and in addition can cause safety and health issues. ECOSOFT is chemical free and therefore 100% environmentally friendly!

**Q. What is the difference between ECOSOFT and Magnetic and Powered water conditioners?**

- A. 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. ECOSOFT 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.



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## Ecosoft Models & Approximate Pressure Drops

Model	Min Flow Rate L/min	Pressure Drop (PSI)	Max Flow Rate L/min	Pressure Drop (PSI)	Header	Table E Flange
ECO18	10	0.42	28	3.27	3/4" / 20mm BSPT	
ECO34	24	2.45	45	6.19	3/4" / 20mm BSPT	
ECO56	46	1.81	80	2.44	1" / 25mm BSPT	
ECO90	81	3.05	110	5.62	2" / 50mm BSPT	
ECO122	111	5.7	190	14	2" / 50mm BSPT	
ECO220	191	4.96	280	10.66	2" / 50mm BSPT	
ECO335HF	220	2.54	450	10.52		2" / 50mm
ECO335	281	4.13				2.5" 65mm
ECO500HF	335	2.48	800	13.98		2.5" 65mm
ECO500	451	4.48				3" / 80mm
ECO900HF	500	1.81	1400	14.08		3" / 80mm
ECO900	801	4.63				4" / 100mm
ECO1600HF	900	1.09	2500	8.38		4" / 100mm
ECO1600	1401	2.64				5" / 125mm
ECO2840HF	1600	3.12	3500	14.85		5" / 125mm
ECO2840	2501	7.59				6" / 150mm
ECO4000HF	2840	5.71	4900	16.98		6" / 150mm
ECO4000	3501	8.68				8" / 200mm
ECO5400HF	4000	4.86	6500	12.82		8" / 200mm
ECO5400	4901	7.29				10" / 250mm
ECO7000HF	5400	5.66	8000	12.41		10" / 250mm
ECO7000	6501	8.2				12" / 300mm

DISCLAIMER – Pressure drops are software generated and do NOT take into consideration the condition or equipment installed in your water carrying system.

**There is an Ecosoft Water Conditioner for every type and size of water carrying system!**

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