

Corrosion in water systems and how to prevent it

A well-maintained heating system should last for many years, if not decades. At Eskimo one of the lifecycle-of-the-product disciplines we employ at design stage is to consider the needs of the property owner(s) after the initial purchaser of our products has moved on. As one of the components of the system without moving parts the radiators and towel warmers should operate trouble free for many, many years, and indeed we still know of Eskimo radiators installed from when we started over twenty years ago that are still heating happy owners today.

However, well-maintained systems are not always a given. Over the years we have heard from many clients suffering lower than anticipated life expectancies for their radiators and the rest of the heating system. A badly designed, installed or maintained heating system can shorten the life of its components dramatically. The record for this in our experience was a penthouse apartment in Dublin where, due to a grossly oversized water pump causing a phenomenon known as cavitation erosion, several radiators, most of the pipework and the pump itself, developed multiple leaks and had to be replaced after a period of only 3 months in service.

That kind of problem is extremely rare, but less dramatic corrosion problems are commonplace, so ensuring that your system is correctly dosed with a corrosion inhibitor should be part of an annual service regime. If you're unsure of whether your system is being properly maintained, or would like a check or second opinion we recommend the use of Fernox's System Health Checks – a cheap and easy independent lab test that can be carried out by post.

Sample Fernox Report

The page below shows an actual sample Fernox report from an existing Eskimo customer who reported leaks and associated problems not only with their radiators but also their towel warmers and heat pump as well. As you can see from the report the cause is clear. The PH was too high (high alkalinity is particularly corrosive to aluminium components of radiators and boilers/heat pumps). The chloride level was much too high, this time potentially highly corrosive to steel and stainless (the materials from which 99% of towel rails are manufactured). The water was too soft and the hardness deposition percentage was too high indicating further corrosive potential.

Carrying out the test

This can be carried out by an installer, but sometimes the homeowner may prefer to take the test independently of the installer, for example in instances of potential dispute.

Any competent person can handle the Fernox test.

When taking a water sample – there is often a specific drain off point somewhere discrete on the heating system, usually at the lowest point of the building. If one can't be found, then a small amount of water can be drained from the vent of one of the radiators, but this will likely be more messy – we'd recommend putting old towels down and a large receptacle underneath the radiator to catch the system water coming from the radiator and prevent staining of floor coverings. This can then be decanted into the relevant plastic bottle that comes with the Fernox kit.

Fernox will respond via email within a week or so. This information can then be shared with both the installer and the heating system components suppliers to decide upon any necessary action.



System Health Check Report

5403

X

Lab reference number: **493465**
 Sample kit number: PPC150526365
 Age of system (years): 10
 Age of boiler (years): 0
 Date sample taken: 03.03.19
 Date sample received: 05.03.19
 Date of report: 05.03.19
 Your reference: Not Stated
 Site:

Test	Mains Water Results *	System Water Results	Recommended levels
Appearance	0	0	0 (2 max.)
pH	7.9	8.8	6.6 - 8.5
Conductivity uS/cm	686	1003	More than mains water
Chloride ppm	39	154	Less than 125 ppm
Excess Chloride ppm		115	Less than 50 ppm
Total hardness as CaCO ₃ ppm	262	3	50 to 200 ppm
Hardness deposition %		98	Less than 30%
M - alkalinity as CaCO ₃ ppm	243	326	300 ppm > mains
Sodium ppm		187	Depends on treatment
Potassium ppm		2	Less than 60 ppm
Aluminium ppm		0	Less than 3 ppm
Iron ppm		0	Less than 80 ppm
Copper ppm		0	Less than 3 ppm
Phosphorous ppm		0	Less than 80 ppm
Boron ppm		4	Depends on treatment
Molybdenum ppm		9	Depends on treatment

Appearance: 0 = Clear, 1 = Slightly turbid, 2 = Turbid, 3 = Very turbid or sediment visible

ppm = parts per million

* Average mains water quality from post code area

Interpretation of Results

System Condition	Status review	Comment
Appearance	Action recommended	Risk of pitting corrosion indicated Feed water may have been artificially softened
Chloride contamination		
Boiler scaling		
Aluminium		
Iron	Action recommended	Inhibitor concentration is low or absent
Copper		
Alkalinity		
pH	Action recommended	Water is likely to be corrosive
Inhibitor concentration:	Not a Fernox product	Test criteria for other treatments are not known

Recommendations

Clean entire system with Fernox Cleaner F3 - use at least 1 pack per 100 litre system Treat the system with Fernox Protector F1 - use at least 1 pack per 100 litre system

Conclusion:

Action recommended!

Note: Interpretation is based on the samples being representative of the system as a whole and treatment being with Fernox products