

CORROSION OF PIPES



The filter is changed when necessary, initially a few times a year.

The electromagnetic, chemical-free water treatment device is installed into thousands of Finnish housing companies' water- and heating systems. It slows down corrosion of pipes and prevents pitting corrosion and clogging by processing the water so that the water components no longer stick onto the pipes. Water flows better, existing deposits are removed and there are no new obstructions. There are no more pipe leakages and the pipe repairs can be moved ahead towards the end of the pipes' service life.

When installed into the heating supply with a filter, the device will clear the pipes, valves and radiators and the circulating water from impurities. The water starts to heat all apartments evenly. Energy and money are saved.

is a problem in many buildings

Pitting corrosion in water pipes focuses on certain areas but there are several reasons for why it happens. Several housing companies have been helped by a water treatment device installed after the water meter into the instrument room's household water system.

TEXT AND IMAGES: **Anna-Liisa Pekkarinen**

Viitasaaren Vuokratalot purchased the Bauer Watertechnology Ltd's water treatment devices to the water supply of their 25-30-year-old apartment buildings in order to postpone pipe repairs and decrease service visits. Almost all apartment buildings had pitting corrosion in their copper household water pipes. Repairs had to be performed monthly. The expenses for repairing water damages could accumulate into large sums.

About every tenth of the 450 rental apartments is vacant. No one wishes to raise the company's reasonable average rent level, 8,50 €/m², with water damage repairs or a poorly functioning heating.

CEO Kalle Kautto's predecessor purchased the first three water treatment devices as an experiment in April 2011. Positive experiences caused for Kautto to purchase more.

- Our copper pipes were cor-

roded. When we redid a length of pipe, soon another pit would appear right next to it, Kautto describes.

Prevents leakage damages

The water in Viitasaari is soft but contains a lot of iron and manganese, which might be causing incrustation to the pipes and speed up the development of pitting corrosion. One device installed into the household water system cost around 7000 euros. It can take care of several buildings attached to the same water meter. The water damages stopped almost right away.

Kimmo Partinen (left), the representative of Bauer in Central Finland has noticed that Viitasaari is pitting corrosion district, like many others. Kalle Kautto, the CEO of Viitasaaren Vuokratalot, has managed to avoid pipe repairs by installing a water treatment device to the apartment buildings.



There are beginning to be research results

The development fund for water supply plants funded FCG Planeko Ltd's research in 2008 into the durability of metal household water pipes. It was found that corrosion is impacted by water quality, design of household water systems, installation, implementation and changes in circumstances.

TEXT: **Anna-Liisa Pekkarinen**

The ability of copper to withstand corrosion is based on the protective layer formed on its surface.

- If the plumbing is not thoroughly flushed before first use, dirt may cause pitting corrosion. The pipes must be used as soon as possible after the flushing, and long-term periods where the water is not flowing must be avoided, says **Riina Liikanen**, the water supply engineer from the Finnish Water Utilities Association. Lack of oxygen in the flushing water may prevent the protective oxide layer from forming. On the other hand excessive flow rates at pipe joints can lead to erosion corrosion.

The water quality, especially variations in pH values, are linked to the damage in copper piping. Liikanen says that pH -levels are generally raised in Finland by adding lime to the water.

- The groundwater in Finland is naturally acidic, so the pH must be raised to prevent the water from accelerating the corrosion process. In cold water the lime is dissolved but as water temperatures increase it can become coagulated and even cause

blockages to the heating water systems.

Remove blockages

Simo Pehkonen, Professor of Water Chemistry at the University of Eastern Finland, studied together with Cupori Ltd the effect that Bauer's electromagnetic water treatment device had on copper piping. Pehkonen is convinced that the device will help slow down corrosion and decrease deposits.

The research is backed by scientific articles and user experiences. Several pilot buildings in Haapavesi and Joensuu have improved their water quality and ended the leakages in copper pipes using the device.

- Based on these results the technology is useful in preventing deposits and blockages in the pipes and minimizing corrosion, Pehkonen says.

VTT has also studied the effect that Bauer's electromagnetic water treatment device has had on the deposits, pipe corrosion, and water quality in an apartment building in Espoo. In the bulletin they published in 2009 about the purchasing and service models for plumbing renovations, VTT states that on the chemical-

free water treatment device market there are also devices that can't even work in the way promised by the manufacturer.

General terms of delivery for water supply plants state that the customer must plan, build, and maintain the water and sewage systems on their property in such a manner that they do not cause damage to the property, the plant or any third party, and that the water correspond to the quality requirements set by the overseeing authorities. According to building regulations, devices that change the tap water's microbiological or chemical quality must not be installed on the property's water system.

The Ministry of Environment sees that the composition of tap water must not be changed using external devices.

- With the Bauer Water-technology device nothing is removed or added into the water. The method is physical. The dissolving of old pipe deposits happens in a controlled manner and in such small particles that they are not even visible to the naked eye, clarifies **Mikko Timonen**, the product manager of Bauer Watertechnology Ltd.

Pipe repairs can be moved ahead by 10-20 years.

- If using this device will prevent even one major water damage incident from happening, it has been worth the money invested, Kautto illustrates. The expenses for water damages can rise up to tens of thousands of euros if the leakages are not discovered on time and there is sufficient time for them to damage the structure of the flats beneath.

Last year the company also purchased a water treatment device to the heating system in a building where heat was unevenly divided and the thermostats on the radiators would get stuck. Now the heat is evenly distributed to each flat and the need to change the thermostats has decreased.

According to studies, copper pipes are not always of uniform quality. The thickness can vary and a thin part is more easily corroded. Other factors that affect durability are water quality and flow rate.

- Plumbing should last for longer than 30 years, Kautto says.



Product manager Mikko Timonen checks the filter in the instrument room of a Viitasaari apartment building.



If we prevent even one major water damage incident using this device, it has been worth the investment, explains Kalle Kautto, the CEO of Viitasaaren Vuokratalot.

In addition to Bauer, he considered other products on the market that aim for the same end result, but rejected them due to lack of research data, and because he considered a method that does not require chemical additives safer.

- We wanted the device installed also in our newest building, Kautto states.

Others share the same problem

The student housing company Joensuu Elli has a dozen water treatment devices on their premises. The real estate that Elli has is still fairly new. There have been no plumbing renovations, apart from a few sewer coatings. The technical manager Kari Mustonen says that pitting corrosion has formed on the copper household water pipes. The pipe joints also

seem to be more susceptible to leakages.

- A device is cheap if it prevents the leakage damages, Mustonen encapsulates. Joensuu Elli has also used Bauer to address blockage and heating system adjustment problems with great success.

The property management company MB-Kiinteistöpalvelu from Lohja has water treatment devices in its five apartment buildings, because the copper pipes have pitting corrosion. The corruptions are particularly a problem in houses built in the 80s and 90s.

- The composition of pipes in that period might have an effect on the matter, speculates property manager Risto Karjalainen.

There have been no further incidents of pitting corrosion in the houses that have a Bauer water treatment device.

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vakuutukset kunnossa?

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Helsinkiläiset Markus ja Mirka tykkäävät katsoa yhdessä leffoja netistä.