

"Better design practices can counteract corrosion"



In an SBUF project, Rafael Ospino has investigated the problems of corrosion in liquid-borne systems. Photo: Rafael Ospino, Louise Rosén

The problems with corrosion in heating and cooling systems are growing. To prevent this, the consultants must become better at writing construction documents. That is the opinion of Rafael Ospino, one of the authors behind a new report.



Louise Rosén
Redaktör VVS



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Corrosion in liquid-borne systems can create scaling and precipitation that reduces the effective flow area in pipes or increase the pressure drop in heat exchangers. This disrupts the operation. In addition, if there is penetration in the pipes, water damage can occur. The service life of the plant is shortened and energy is wasted. These are some consequences that corrosion can lead to.

In a research project funded by the Swedish Construction Industry Development Fund, SBUF, the extent of the problems has been mapped and attempts have been made to find connections between system designs and various problems.

Several different risk factors

Rafael Ospino has been the project manager for the research. At Nordbygg, he presented the final results, which are presented in the report "Sustainable and energy-efficient installations".

An important issue that is addressed is various risk factors. These include high gas levels, low pH values, the presence of pollutants and high levels of nutrients that can come from filling water, residues of glycol or small animals.

- Glycol water is often used to pressure testing underfloor heating systems. Glycol is an excellent nutrient that can initiate various biological as well as chemical processes. Then it is not uncommon for insects or small animals. In a strainer filter I found the remains of an entire mouse family, says Rafael Ospino.

He states that the systems that have the least problems are those that at some point heat the system a bit over 60 degrees.



Caption: Lack of flushing leaves pollutants that disrupt circulation. Photo: Rafael Ospino

It is important to check the water values

Within the research project, 28 different systems were analyzed based on ten key parameters to indicate the presence or risk of corrosion, see the fact box below.

- None of the systems met all the requirements set. Nine of them were exposed to risk and five of them showed great risk. The main reason was probably large refills of make-up water, says Rafael Ospino.

He believes that many of these parameters can be examined by the operating staff themselves. Much of the analysis equipment needed can be bought in a regular aquarium store for a few hundred bucks.

- It would be good if the operating staff checks the water values early and at regular intervals so that they do not deviate too much. Because if you detect deviations at an early stage, they are much easier and cheaper to fix.

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The construction documents should be specific

Many of the errors that have been identified in the project can be relatively easily prevented, says Rafael Ospino. Basically, it is about the fact that the construction design documents need to be more specific. To more accurately describe how steps such as cleaning and de-gassing should be done and which results that are required.

- The consultant must prescribe how, for example, the cleaning /flushing should be done. More templates are also needed so that the consultant adapts the systems to the circumstances.

//FACTS // Risk factors

In the project, the authors have concluded that the following are the single largest risk factors for corrosion in liquid-borne systems:

- High gas content - caused by lack of pressure maintenance and open expansion vessels
- Low pH values (acidic water)
- High presence of contaminants from production, such as metal and plastic chips
- High levels of nutrients - from filling water, residues of glycols, insects or small animals
- Low flow temperatures

//FACTS // Key parameters

Key parameters and setpoints to indicate the presence of ongoing corrosion or the risk of corrosion.

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| • Visually: | Clear |
| • Odor: | None irrelevant |
| • Particles: | None visible |
| • Oil residues: | None visible |
| • Alkalinity: | > 40 mg / l HCO ₃ |
| • Conductivity: | 10-40 mS / m |
| • pH value: | 8.5-10 |
| • Copper: | 0.2 mg / l |
| • Iron: | 0.5 mg / l |
| • Hardness: | <0.5 German degrees of hardness (° dH) |

External links

Download the report "Sustainable and energy efficient installations"

<https://vpp.sbuf.se/Public/Documents/ProjectDocuments/1cc11bb5-195e-4cbb-adde-374b32b56043/FinalReport/SBUF%2014005%20Slutrapport%20H%C3%A5llbara%20och%20energieffektiva%20installationer%20V%C3%A4tskesystem%20over%203.pdf>