

GAS FORMATION AND NOISE IN HEATING SYSTEMS

The Radiatori 2000 Spa warranty is valid only for radiators installed according to industry standards and by qualified personnel. 

Even when a heating system is designed according to the best practices and installed correctly, issues may still arise during operation, especially in the initial phase. These can include gas formation inside components and noise in the heating bodies. The causes of these problems are numerous. Below, the necessary interventions to resolve these issues are discussed.

****Gas Formation****

There are three main causes of gas formation in heating systems:

1. ****Air Introduced into the System****:

Air can enter the system with the filling or replenishing water, where it is dissolved. Due to the heating process, dissolved gases separate in the boiler, forming air pockets at the top of the radiators, because of their different density compared to water. This phenomenon is temporary and resolves within a short period. It may reoccur only if the system is emptied and refilled. Therefore, draining the system is generally not recommended unless absolutely necessary.

2. ****Presence of Organic Materials****:

The system may contain processing residues or materials such as hemp used in hydraulic joints. These materials, through decomposition, can produce methane gas that accumulates at the top of the heating bodies. This phenomenon is also temporary and will stop once the organic material is fully decomposed.

3. ****Quality of the Filling Water****:

One of the more persistent causes of gas formation is the quality of the water used to fill the system. Depending on its aggressiveness, water can react with the metallic components of the system, initiating chemical and electrochemical processes (such as corrosion), which generate gases, primarily hydrogen. This phenomenon can last for the entire heating season, causing damage to the system, particularly if UNI-CTI 8065 regulations for water treatment are not followed.

If the causes of gas formation are present simultaneously, the gas mixture released from the radiators is composed of:

- Carbon dioxide (CO₂)
- Nitrogen (N₂)
- Hydrogen (H₂)
- Methane (CH₄)
- Oxygen (O₂)

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The main issues caused by the presence of gas in the system are:

- Noise in the thermal fluid circulation
- Reduced or blocked water circulation in the heating bodies
- Insufficient heating of spaces due to impaired thermal performance of the radiators
- Corrosion of system components

****Remedies and Proposed Interventions****

To address the issues related to gas formation, the following interventions are recommended:

- **System Flushing**

It is essential to perform a thorough flushing of the system with water to remove residues that contribute to gas formation. After several hours, the water should be drained by opening the bottom valve for system drainage.

- **Filling with Quality Water**

The system should be refilled with potable water, ideally having a hardness of 12-14 French degrees and a pH between 6.5 and 8 (never use softened water). Once the system is refilled, it is important to raise the water temperature to 85-90°C to promote the separation of dissolved air.

- **Air Venting**

Air pockets that have formed should be removed by manually venting the radiators and riser columns using manual air valves. This is effective only if the water quality meets the parameters mentioned above.

- **Interventions for Aggressive Water**

If the filling water has hardness and pH levels outside the recommended limits, gas formation may be more significant due to the aggressiveness of the water, which triggers corrosion. In this case, it is advisable to:

- Equip the radiators and riser columns with automatic valves with a float for gas venting.
- Add film-forming aliphatic polyamines, such as Cillit HS 23 Combi, to prevent corrosion and gas formation.
- Avoid fully closing the radiator shut-off valves to allow gas to flow toward the automatic air vent valve, thus preventing overpressure and potential radiator breakage.

****Noise****

Radiators are often wrongly blamed for noise in the heating system. However, detailed checks have shown that the radiators themselves are not the direct cause; they simply transmit noises originating from other issues. The main causes of noise are:

- **Water Speed and Turbulence**

Excessive water flow entering the radiators can create a hissing sound similar to an open faucet.

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- Air in the Radiators

Air trapped in the top of the radiators produces characteristic water flowing sounds due to partial filling of the upper cavity. This does not occur in radiators with bottom inlet connections, as is the case in mono-pipe systems.

- Circulation Pump

If the pump operates outside the expected flow rate and head, it can cause resonance phenomena in the system, especially in the radiators.

- Misaligned Support Brackets

Misaligned support brackets can cause noises similar to metallic clinks due to unbalanced thermal expansion.

- Pipes Blocked in Concrete

Pipes embedded in concrete without sufficient freedom of movement generate repetitive noises every time thermal changes occur.

****Remedies and Interventions for Noise****

- Water Speed and Turbulence

To eliminate the hissing caused by water speed, adjust the regulating valve to match the water flow rate with the design values. If the issue persists, it is possible to install an Ø18 mm probe to redirect the water to the opposite element.

- Air in the Radiators

Noise caused by air in the radiators can be eliminated by installing an automatic air vent valve.

- Pump Resonance

Resonance phenomena caused by the pump can be eliminated by adjusting the flow rate, head, and motor speed to the system's specifications. In some cases, it may be essential to install anti-vibration joints between the pump and pipes.

- Support Brackets and Thermal Expansion

Use plastic-coated brackets to avoid noises from thermal expansion.

- Piping Noise

To prevent noise from pipes expanding under floor screed, use insulating sleeves that allow the pipes to move freely.

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