

SUMMARY OF REPORT TNO (projnr. 03478838)

TNO (the Dutch counterpart of BSRIA) has calculated whether equipment for automatic deaeration, apart from already known benefits such as reduction of maintenance and noise, also leads to energy savings.

Water will always contain a certain amount of air which will materialise in the following 3 phases:

1. Free air
2. Micro bubbles
3. Dissolved air.

Dissolved air and micro bubbles are not a direct problem in view of energy efficiency, but micro bubbles will form larger bubbles and in due course shall gather into free air somewhere in the installation. These bubbles will not carry and transfer heat in the way the system water does. This in fact may cause a radiator not to heat up as it should.

Depending on the position of such radiator and the lay-out of the system, this effect may cause a increase of energy required, even up to 25%!. It is therefore important that air in which ever phase is removed from the installation in an effective way.



TNO has calculated the effects of air in a heating installation. As soon as air gathers in air-pockets the heat transfer of a radiator is affected in a negative way. This will lead to complaints because some rooms in a house will not heat up properly. Depending on the way the temperature is controlled in the house on the reaction of the family members on the differences in room temperature the energy use may increase with up to 25%.

Different set-ups have been evaluated in the report and demonstrate the effects on energy consumption due to the lack of proper deaeration or better the benefits of permanent deaeration with a SpiroVent.

Based on the TNO report 3 cases have been reported:

Case 1: One-Family Apartment

Situation: A single-level one-family apartment with a gas consumption of 1200 m³ per annum.

Problem: A large air bubble is taking up 50% of the space within the radiator in the living room. In order to get up to the desired room temperature, the temperature of the water in the central heating system is increased automatically. So the boiler has to burn more fuel. As a result, the temperature in the other radiators also increases, causing overheating. Turning off the radiators does not solve the problem directly. The logical reaction to this is to increase the ventilation in the rooms which are now actually being heated too much.



Consequence: Ventilation and the higher supply temperature will increase consumption by approximately 25% to 1500 m³ per annum. Costs: € 135.00 per annum.

Solution: A deaerator will avoid the extra costs. It will normally pay for itself in less than a year.

Case 2: One-Family House

Situation: A single-level one-family apartment with a gas consumption of 1200 m³ per annum.

Problem: Loft spaces are difficult to heat. Air often collects in the topmost radiator. In order to heat a loft space sufficiently, the thermostat in the living room is turned up by 1 °C. As a result, all the rooms become one degree hotter.

Consequence: Energy consumption increases by 10%. This results in an increase in gas consumption of 180 m³ per annum, costing more than € 80.00.

Solution: Electric heating generating 2000 watts helps but consumes 5 kWh per day. Based on 100 fuel days, this will cost € 110.00. A deaerator is far more efficient and will often pay for itself in less than a year.



Case 3: Office Building

Situation: A single-level one-family apartment with a gas consumption of 1200 m³ per annum.

Problem: The north side heats up slowly as a result of which the system setting is adjusted. However, some rooms remain cold. The cause of this is an air bubble which is stopping the flow around the system.

Consequence: The efficiency of the central heating system drops by 10%. This equates to 560 m³ of gas per annum, an increase of just under € 252.00.

Solution: A good deaerator will enable the central heating system to achieve optimum efficiency and will avoid this increase in energy consumption



It is therefore important for air to be removed from the system in an effective manner. Spirotech has the solution: reliable deaerators that continuously extract all the air from the system water - thus avoiding any unnecessary fuel costs. Proven by TNO.