Source: fobizz AI-generated

Submodule 2: Problem and conflict resolution on the solar thermal system

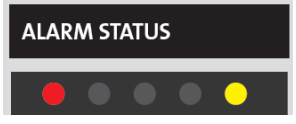
➔ The solar pump no longer delivers solar fluid

Initial scenario

In the meantime, the solar thermal system has been fully installed, tested for function and put into operation. After one year, you carry out maintenance on the solar thermal system.

You realise that the solar pump is malfunctioning (see message below!). When removing the pump, you notice that the pump is stuck and that the solar fluid has changed considerably. The pH value of the solar fluid has dropped to pH=4.

Source: Viessmann (2008) Solar thermal planning manual, https://community.viessmann.de/viessmann/attachments/viessmann/customers-solar/139/1/Planungshandbuch%20Solarthermie.pdf; accessed 25.02.2025



Source: Grundfos (2020) Instructions UPM3(K) Auto

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When asked, the customer describes the operation of the system since commissioning:

- The first summer was very warm with many hours of sunshine. On many summer days, there was more solar heat available than the customer could use. The system therefore often switched off even though the sun was shining.
- The following winter, there were very few hours of sunshine, so the system was not in operation over the winter months.

Your job is to describe to the customer in writing how the poor condition of the system could have come about. You also give the customer a list of tips on how to minimise these problems in the future.

Expectation horizon / possible solution:

Description of the cause:

According to the customer's description, the weather was very good in the summer of the first year of operation, with many hours of sunshine. During this time, the solar heat could often not be fully utilised, which meant that the solar thermal system often went into stagnation. As a result, the solar collector heat transfer medium evaporated, causing the water-glycol mixture to change colour, structure and pH value (acidic with pH<7). The acidic liquid caused corrosion in the system, causing the pump to "rust solid".

Possible solutions:

To avoid or at least reduce stagnation in the summer months, I would recommend the customer to adapt their usage behaviour. For example, it would make sense to use the hot water when the sun is shining and the solar heat gains are high.
This would allow the customer to shower/bathe at midday or in the evening when the sun is strong, instead of in the morning when the cylinder has cooled down. It would also be possible to connect the washing machine and dishwasher to the hot water and also use these appliances, possibly with the timer function, during periods of strong sunlight. This cools down the heat storage tank and counteracts possible stagnation.
It would also be possible to shade the collectors for longer periods without heat demand, e.g. when the customer is on holiday.

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