Clean evaporators on heat pumps regularly

Evaporators on air-to-water heat pumps become soiled over time. The constantly increasing film of dirt on the fins diminishes the heat transfer. This leads to higher energy consumption and higher operating costs.

Action

Clean the evaporator every 2 years. Cleaning intervals depend on the location, and they may be considerably shorter or longer depending on the degree of soiling.

Requirement

A squeaking or whirring fan that causes louder noises than usual indicates that the evaporator is soiled.

Systems with a heavily soiled evaporator consume up to 45 per cent more energy.

What to do

The evaporator becomes soiled by dust, pollen, leaves or exhaust gases from the ambient air. Therefore, clean it as follows:

- Study the manufacturer's operating manual (safety, cleaning instructions)
- Switch the heat pump off and disconnect it from the power grid (switch it off via a circuit breaker, or remove the fuses)
- Remove the cover
- Clean the evaporator from both sides.
- Be careful not to damage the fins as you do this (also see overleaf).
- Clean the housing, grid(s) and fan
- Fit the cover back in position
- Switch on the evaporator and the fan
- Perform the listening check again.
- If the fan is still squeaking or whirring, contact the service specialist for the heat pump.

Costs – effort

- Your own labour: approx. 2 hours per evaporator
- Cost of fin comb: approx. CHF 25, available from refrigeration and air conditioning equipment wholesalers

Please note!

- It is best to clean the heat exchangers in autumn, before the heating season, when the trees have already shed their leaves.
- If you clean earlier in the year, it is best to do so after pollen is released into the air – in June.

Additional explanations

Cleaning methods

High-pressure water cleaner: When using a high-pressure water cleaner, make sure that the water is always sprayed straight onto the evaporator so the fins are not deformed.

Compressed air or vacuum cleaner: Wherever dirt does not stick, an industrial vacuum cleaner or compressed air can be used for cleaning. Rule when using compressed air: Always blow the air straight onto the evaporator to avoid bending the fins out of shape. Please note: When used indoors, compressed air blows the dry dust into the room.

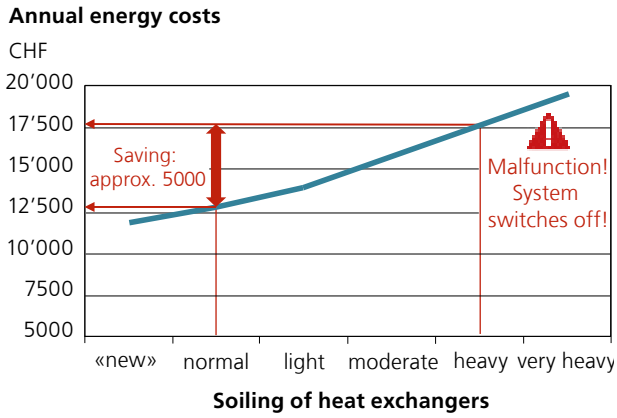
It is essential to observe the manufacturer's instructions for all cleaning methods that involve high pressures. The instructions usually state the maximum pressure, the minimum distance to be kept from the air or water jet (e.g. 200 mm), and the working direction (e.g. perpendicular to the pipe register, maximum deviation ±5 °).[1]

Severely deformed fins

If the fins on the heat exchanger are severely deformed, full flowthrough will be impeded. The exchanger's "power" diminishes and energy efficiency suffers. Deformations are caused by mechanical damage, for example by spraying the fins obliquely with the high-pressure cleaner. If more than one quarter of the fins are deformed, you should re-align them. To do this, use the devices known as "fin combs". If you do not have any, or if the fins are very severely deformed, you can do this by hand. Align one fin at a time, using long-nose pliers and a 2-mm screwdriver.[1]

When an increase in consumpti on goes unnoticed

Cleaning the evaporator improves heat transfer between the ambient air and the refrigerant. This increases the efficiency of the heat pump system because without cleaning, the energy consumption increases continuously – but you do not notice this happening. A study by the German Mechanical Engineering Industry Association (VDMA)[2] shows that if refrigeration systems (which, of course, include heat pumps) are not maintained for two years, they exhibit a 25 to 45 per cent increase in energy consumption.[3] Air-to-water heat pumps are likely to become soiled rather less quickly than refrigeration systems, because the evaporator is cleaned slightly during every defrosting process. This washes out some of the dust or pollen. However, leaves and grease remain behind and form deposits, so the evaporator gradually becomes clogged and energy efficiency also decreases significantly.



Annual energy costs of a system with (evaporator) power of 210 kW with different degrees of soiling of heat exchangers.

Additional information

- Guideline with measures to optimise refrigeration systems
- Guide to refrigeration: maintenance and energy
- Heat pumps: planning – optimisation – operation – maintenance

Sources
1 Guideline with measures to optimise refrigeration systems
2 Research Council for Refrigeration Technology of the German Mechanical Engineering Industry Association (VDMA), Study FKT 37/97, Saving Energy through Maintenance, 2016
3 Guide to refrigeration: maintenance and energy

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