

Extracts from the Swedish consumer magazine Råd & Rön;
Test of air-air heat pumps December 2004

(8 air-air heat pumps of various makes were tested by SP (the Swedish state testing agency))

In the home of Hans and Ingegerd Lindroth in Tumba outside Stockholm an air-air heat pump is quietly humming away above the entrance door. The outside temperature is +5°C. Inside it is 23°C in the entire house and only one of the 14 radiators in the house is switched on, the one in the bathroom. Hans is pleased to see the electric bill when it arrives. "Our cost for electricity is down from 1600kr to 900kr per month" (180€ to 100€)

As a bonus, the heat-pump attracts dust which is collected in the filter of the internal unit. This makes the house less dusty. However, if the filters are not cleaned on a regular basis, the efficiency of the heat-pump is decreased, and so is the life expectancy of the machine. For this reason Hans vacuum clean the filters every second week. The filters should be easily accessible.

Open plan

The Lindroth's house is a typical Swedish bungalow built in the seventies. Open plan with electric radiators in every room. The first thing they did when they bought the house was to invest in the air-air heat-pump. 25000kr (2800€) was the total cost including installation. "It is just like a piggy-bank, we save a lot of money with the heat-pump, I also like that we can use it for cooling in the summer"

The prices for air-air heat pumps have dropped dramatically since 2001 when Råd & Rön magazine did the last test. At that time, the pumps in the test did cost between 24000 - 35 000kr (2700 - 3900€) Installation cost used to be another 5000-1000kr (550 - 1100€)

In the current test the price span was between 14000 – 27000kr (1600 - 3000€)

The quality of the heat-pumps has generally improved. The tested pumps worked well down to -15°C. They were tested in temperatures down to -18°C because some suppliers claim to have pumps that work in such temperatures. At -18°C the COP(Coefficient Of Performance) was down to between 1.0 and 2.1

All pumps managed the de-icing well. It is of great importance that the de-icing works well and that the pump does not start de-icing when not necessary as this would waste electricity.

No radiators

Air-air heat-pumps are easier to install than any other heat-pumps. No pipes to be dug into the garden, no deep holes need to be drilled into the ground. It also does not require central heating and radiators.

It consists of one external part and one internal part. The external part takes the heat out of the external air. The heat is transferred to the internal part, which spreads the heat into the house with a built-in fan. These two components are connected via two insulated pipes through the wall. It important to position the external part correctly. It needs to be protected from snow and rain. The inner part is installed high on an internal wall where the air can easily flow into the house.

Good complement

Air-air heat-pumps are generally considered to be a cheap and good complement to existing heating systems. But remember, it works best with an open plan so that the heat can spread around easily. For the same reason, it is important to position the internal unit in a good position. Other forms of heat should be switched off or reduced when the heatpump is used.

All the pumps tested are inverter type. This means that they automatically adjust the speed of the compressor up and down instead of a simple off-on switch. This means less wear and a longer life-span of the compressor.

Heat factor COP (Coefficient Of Performance) is an important measure of the efficiency of a heatpump. It is a measure of how much heat it gives off in relation to the amount of electric energy used. The COP factor drops when the external temperature drops but a good pump still gives a COP factor of better than 2 at -15°C.

The discussions about installations and refrigerant.

The question of who should be allowed to install heatpumps in Sweden goes on. Most suppliers of heat pumps use their own installers or they have agreements with installers. Some suppliers sell the pumps off the shelf and the customer has to get an installer or do it themselves. The Association of Refrigeration Suppliers and the Energy and Heat-pump Association, as well as other competitors are critical of this. The critics claim refrigeration products should only be installed by professionals and never by the end consumer.

The refrigeration medium (same as in a domestic refrigerator) is a liquid or gas contained at high pressure. The media used today are much improved over the freons used in the past.

Facts air-air heatpump

Advantages

- Cheap and easy to install.
- Can be used as an air-conditioner for cooling and also as a dehumidifier.
- Good alternative for houses with no water based central heating system.
- Short payback time compared to most alternatives.

Drawbacks

Less efficient than a well-installed geothermal heatpump. At exterior temperatures below -10°C, additional heat is sometimes required.

Heat is only coming from one location, the internal unit.

Another possible drawback is the noise of the fan, both inside and outside. For some users it is so annoying that the unit is switched off at times. The outside part makes noise as well and this is something to consider if the neighbours are very close.