Swedish Energy Agency

Test of air-source heat pumps

Model/Manufacturer	**Panasonic E9EKEB**
Heating capacity	3,6 kW*
Energy savings in various cities and houses Malmö (8,2°C) Energy need 9 100 kWh/p.a. Energy need 16 600 kWh/p.a. Borås (6,1°C) Energy need 11 000 kWh/p.a. Energy need 20 000 kWh/p.a. Luleå (1,3°C) Energy need 15 400 kWh/p.a. Energy need 28 000 kWh/p.a.	 6 100 kWh/p.a. 10 400 kWh/p.a 7 000 kWh/p.a. 11 200 kWh/p.a. 8 100 kWh/p.a. 12 000 kWh/p.a.
Measurement points – outside temperature	+7°C, +2°C, -7°C, -15°C
Heating in kW Compressor running at 100 % Compressor running at 75 % Compressor running at 50 %	 3.6, 3.8, 3.2, 2.4 2.7 1.8, 1.9
COP (Coefficient Of Performance) Compressor running at 100 % Compressor running at 75 % Compressor running at 50 %	 4.2, 3.0, 2.5, 2.1 4.1 4.2, 3.1
Noise level Outdoor unit Indoor unit	 63 dB(A) 56 dB(A)
Measurements (w x h x d) Outdoor unit Indoor unit	 78 x 55 x 30 cm 80 x 28 x 19 cm
Lowest outdoor temperature	-20°C
User manual	Good
Cooling medium	R410A
Additional information	Normal filter Fine filter with anti bacterial, antivirus and antiallergenic function. Ionising air cleaner.
*At +7°C/+20°C	

Explanations
The heat pump has been tested at the Swedish National Testing and Research Institute, www.sp.se
Heating capacity: Measured at outside temperature of +7°C and indoor temperature +20°C.
Energy savings in various cities and houses: Calculated from average yearly temperature in Malmö, Borås and Luleå, with heating able to reach all rooms. The actual savings may be smaller since the test assumes ideal conditions. The energy saving is calculated compared to electrical heating. The energy need only covers heating. Energy needs for hot water and electricity are additional.
Heating in kW: The heating generated by the indoor unit at +20°C indoor temperature, at highest fan speed, the air vent at minimum resistance and with normal filter. The test was performed at varying outdoor temperature, relative humidity and heating generated at a load of 100, 75 and 50 percent. The EN Standard for air-source heat pumps has set -15°C as the lowest test temperature. At this test the heat pump was also tested at -18°C, where Panasonic E9EKEB achieves COP 1.8.
COP (Coefficient of Performance): The efficiency of the heat pump relative to the electricity it consumes. The COP will increase at higher outdoor temperatures when the compressor is not operating at full power. The COP will decrease with lower outdoor temperatures.
Noise level: The outdoor and indoor units' noise level in decibel, dB(A) measured according to international standard. Humans register an increase of noise of 10 dB(A) as a doubling of the noise level. The noise level has been measured with the heat pump operating at maximum airflow.
Measurements: Does not include the distance needed between outdoor unit and outside wall, 10 to 20 cm.
Lowest outdoor temperature: According to manufacturer.
User Manual: Readability, contents, relevance.
Cooling medium: The liquid or gas that carries heat from the outdoor unit to the indoor unit. R410A and R407C do not contain chloride but can increase global warming if there is a leak.

Tests of household items

The Energy Agency's Testlab tests energy consuming equipment used in the home. The purpose of the tests is to verify claims made by manufacturers. Other characteristics such as function and noise are assessed.

The results may impact both manufacturers' product development and purchase behaviour of consumers.

Testlab tests mostly large equipment such as washing machines and tumble dryers, cookers and ovens, as well as vacuum cleaners. Testlab does not perform all tests in-house but also uses other labs in Sweden and abroad, for example tests of pellet boilers, heat pumps and energy efficient windows.

Impact on manufacturers

Some tests are done on assignment from the manufacturer. Sometimes the manufacturer orders tests of prototypes so that they can be improved before it is marketed. Testlab can thus influence the manufacturers and get the products better adopted for consumers. Testlab may also decide to perform tests on a particular product category if many questions and queries have been raised, or if there is a suspected problem.

The lab sees usability as highly important and has established requirements and limits for how different products should be designed for high levels of usability. The risk for injuries may increase if the product is used in the wrong manner. The noise level is also measured. All functions are benchmarked according to predetermined requirements and limits. A grade in the scale 1-5 is then awarded.

The tests are designed to be as true to normal usage as possible. The lab uses reference equipment and programs in order to compare how well e.g. products wash clothes and clean dishes during different test periods and in comparison with other test labs.

Impartial tests

Tests performed by Testlab are impartial and are performed according to national or internationally approved methods. Testlab participates actively in the development of test methods within the European Union. The quality is guaranteed through using ISO 17025.

Testlab used to belong to the Swedish Consumer Agency. Testlab is a part of the Energy Agency since 1st January 2006. The focus of Testlab will be on tests of energy consuming equipment and increased testing of electronic equipment for the home.

About

The Swedish Energy Agency, which was formed in 1998, works towards transforming the Swedish energy system into an ecological and economically sustainable system through guiding state capital towards the area of energy. This is done in collaboration with trade and industry, energy companies, municipalities and the research community.

The transformation of the energy system will occur by way of effective and lasting Swedish energy application with low negative impacts on health, the environment and climate as well as through securing access to electricity and other energy at competitive prices.

As well as promoting new energy techniques and energy production the Swedish Energy Agency maintains comprehensive research funding in order to make energy use more effective, not least within industry. The authority is in charge of significant areas of the system of certification in electric energy services, which will promote production of electricity from renewable energy sources. Additionally, we make special contributions to wind power.

In collaboration with the municipal energy advisors and the regional energy offices the authority disseminates knowledge and information so that consumers, industry and the public sector are stimulated toward the area of more effective energy use. The authority also works towards promoting the introduction on to the market of new energy-effective techniques.

The Swedish Energy Agency supervises net companies in accordance with electricity regulations as well as supervising the natural gas market. We will monitor and analyse the electricity market and play an expert role in issues relating to the sale of electricity.

Internationally collaboration takes place in several forums, not least within the EU. Among other things climate efforts motivated by energy politics are carried out through collaboration in the Baltics and Russia.

The Swedish Energy Agency is the authority in times of emergency for oil, coal and gas.

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