

Heat pumps in residential buildings

Checklist for individuals

1. Planning phase



The planning phase takes place during a personal discussion/interview/visit on-site (!) with an installer and/or an energy advisor and is always mandatory before to the preparation of a quotation by the installer.



Detailed information can be found in the **explanation** of the checklist.



Click on the bold text to access the **explanations**.

Is my **flow temperature** (temperature of the heating water as it leaves the heater) maximally 55 °C?

Yes No

Is a **heat load calculation of the rooms** (calculation of the required heating power per room) planned?

Yes No

Is a **thermal insulation of the thermal envelope** (façade, roof, etc.) planned?

Yes No

What type of heat pump is compatible with my specific situation?

Air/water heat pump (usually with an external unit)

Geothermal heat pump (**deep drilling**, collectors, baskets, or ice storage)

Is the heat pump used as the sole heating system or as a hybrid solution with the existing heating system (e.g. in combination with gas)?

Sole heating system Hybrid solution

What permits do I have to apply for?

Municipality (installation options and noise protection in the case of air/water heat pumps with an external unit)

Water Management Authority (in case of deep drilling)



Have the selected heat pump and its settings explained by an expert (installer and/or energy advisor)!

- Selection of the required thermal power of the heat pump?
_____ kW
- What **bivalence point** (outside temperature at which the heating rod starts to assist) was selected and what is the estimated operating time of the heating rod?
Bivalence temperature: _____ °C Operating time : _____ kWh per year
- What is the intended maximum flow temperature?
_____ °C
- How much power is the heat pump expected to consume (including controller and heating rod)?
_____ kWh per year

The following technical aspects should be considered:

- Electricity meter and heat meter accounted for in the quotation?
Yes No
- “Hydraulic balancing” accounted for in the quotation?
Yes No
- **Noise protection threshold** respected for an air/water heat pump with external unit?
Yes No Not applicable
- Is the heat pump **eligible for a Klimabonus subsidy** (= state subsidy scheme)?
Yes No
- Is a “**Heizungsscheck**” of the existing system available?
(compulsory one-off inspection by the installer)
Yes No

2. Installation phase by the installer



Is the **pre-pressure** of the expansion vessel set correctly?

Yes No

Has the **hydraulic balancing** been carried out by the installer and have I received the associated documentation?

Yes No

Are the **pipelines** up to the appliances sufficiently insulated?

Yes No

Have the electricity and heat meters been installed and can I, as a customer, read these data?

Yes No

3. Operational phase



Has the installer explained the structure of the system to me?

Yes No

Have I been instructed on how to use the system? Including the remote control and app if applicable?

Yes No

Have the **settings** that I can make as a customer been explained to me?

Yes No

Has the **setting of the circulation pump** (for domestic hot water and heating water) been discussed with me?

Yes No Not applicable

Who is the point of contact in the event of a malfunction?

Can the **power consumption and heat production** be read **in the menu of the heat pump**?

Yes No



> If yes, note and observe the power consumption of the heat pump (including controller and heating rod) as well as heat production.



Calculate the **Seasonal Performance Factor** (SPF is the efficiency value) or have it calculated by the installer.

Does the **refrigerant** (= operating resource) in my heat pump have a Global Warming Potential (GWP) above 5?

Yes No

Occasional visual inspections

For all systems: what fluids are circulating in my system? Are there any potential leaks (refrigerant/heating water/**glycol**) and if so, where?

Is the heat exchanger (fan) of the external unit (in case of an air source heat pump) clean? Can **condensed water drain off** freely?



The heat pump should be serviced at regular intervals in accordance with the manufacturer's specifications.



If possible, take out a service contract with the installer for regular checking.

Explanations of the checklist

1. Planning phase



- Ensure the lowest possible **flow temperature!** When operated with radiators, the flow temperature should not exceed 55 °C! This should be sufficient even when outside temperatures are low in winter!
> The lower the flow temperature can be set, the more efficiently the heat pump will work, the lower the power consumption and consequent electricity costs will be!
- If a **thermal insulation of the thermal envelope** (exterior walls, roof, windows, foundation slab) is planned, the insulating measures should – ideally or where possible – be carried out before the replacement of the heating system so that the sizing of the new heating system can be designed directly in accordance with the lower energy consumption after the insulation (saving of heating system costs).
> Subsequently, calculate the heat load again!
- If the “**Heizungsscheck**” of the existing system has not yet been carried out, this should be done so that the replacement bonus/adaptation bonus as part of the Klimabonus subsidy can be applied for.
- The calculation of the heat load of a building is used to determine the optimal size of the heating system. In addition to that, a **heat load calculation of the rooms** should be done in every case, as this is the basis for the hydraulic balancing. Subsequently, have the hydraulic balancing done as part of the heating system replacement and, if necessary, replace the radiators (optimise and, if necessary, enlarge the heating surfaces).
- The **hydraulic balancing** is the calculation of the necessary heating power per room and the corresponding setting of the radiators. It ensures an even distribution of heat.
- Geothermal heat pump with **deep drilling**: with this alternative, the environmental energy of the soil is used. This is the most common type of geothermal heat pump. The average drilling depth is between 100 and 150 m depending on the location.
- **Hybrid solution**: combination with the existing heating system, with the heat pump covering most of the heating requirement. The hybrid solution as a transitional solution is a useful alternative, for example, if insulation measures are planned.
- **Bivalence point**: this stands for the outside temperature at and below which a second heat generator (usually an electric heating rod) operates to support the heat pump.
> Sizing or selecting the heat pump to match the building is the basic prerequisite for a good and energy-efficient (i.e. cost-saving) mode of operation of the system.
- Pay attention to compliance with the **noise protection limit values** in the case of an air/water heat pump with an external unit; request the installer to provide you with a report from the Luxembourg noise calculator (www.schallrechner.lu) as proof of compliance with the limit value.
- If desired, have the installer assure you (note on the quotation if necessary) that the heat pump system meets the requirements for a **Klimabonus subsidy** (important: in addition to the Klimabonus state subsidy, further grants are available (municipalities, electricity and gas supply companies, etc.); see the subsidy simulator from Klima-Agence aides.klima-agence.lu)

2. Installation phase by the installer



- The expansion vessel is located in the backflow of the heating system and ensures efficiency and safety. The pressure in the expansion vessel (**pre-pressure**) should always be somewhat lower than the pressure in the heating system.
- Insulation of the **pipelines**: the provisions of the *Règlement grand-ducal modifié du 9 juin 2021 concernant la performance énergétique des bâtiments* apply.

3. Operational phase



- Have the **settings** explained that I as a customer can adjust/optimize myself (if necessary with the support of the installer) in order to save potential energy costs, such as the setting of the heating curve(s) and other parameters.
- Discuss the **setting of the circulation pump** with the installer (potential energy costs savings by optimizing the operating times and flow rates).
- If **electricity consumption and heat production** cannot be monitored **in the menu of the heat pump**, external electricity and heat meters need to be installed. Have them explain how to read them!
- The **Seasonal Performance Factor (SPF)** is calculated from the heat quantity produced by the heat pump (the heat meter measures how many kWh are produced per year), divided by the quantity of electricity consumed by the heat pump (including controller and electric heating rod) (the electricity meter measures how many kWh are consumed per year); the higher the SPF, the more efficient (and cheaper) the system is running. Observe the development from year to year.
- The operating resource of a heat pump is a **refrigerant** that can absorb heat at very low temperatures (below zero) and low pressure and give off heat again at higher temperatures and higher pressure. Heat pumps whose refrigerant has a higher Global Warming Potential (GWP) than 5 must be registered with the Chambre des Métiers (Chamber of Skilled Trades and Crafts). **Glycol** is a mixture of water and anti-freeze and is used in geothermal heat pumps.
- **Condensate drain** (for air-water heat pumps): When outside temperatures are low and humidity high, water in the air can freeze on the heat pump's outdoor unit (heat exchanger). The ice formed in this way must be regularly defrosted and the resulting condensate (condensation water) drained off.

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For more information on optimizing
your energy consumption,
click here or scan the QR code.