# GOOD PRACTICES IN SME

## Circulation pumps in heating installations

*Designed by freepik*

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## Why is it important to choose a circulation pump with the right power rating?

The optimal performance of domestic hot water (DHW) and air conditioning installations require circulation pumps which ensure the flow of the heating medium in the installation.

As an essential component of the hydraulic installation, the circulation pump must be appropriate for the installation. The circulation pump should cooperate with the boiler, as to optimally replenish heat losses. A pump with less power than the demand can be the cause of underheated rooms and clocking the boiler, which means recurrent turning the on and off, resulting in decreased performance. This is the result of the heat consumption being too low, meaning the temperature of the supply increases abruptly, the boiler reaches its maximum temperature and shuts down. In theses cases comfort decreases (underheating, and more importantly, fuel consumption costs rise, as the boiler work inefficiently (the shorter the operation cycle, the worse the match between the boiler's heat performance together with the pumps efficiency and the demand). On the other hand, a circulation pump with more power than the demand increases the cost of purchase, energy consumption, temperature fluctuations in the rooms, and what is more, clocked or inefficient boiler operation (higher fuel consumption).

*Source: KAPE based on „Pompa obiegowa w instalacji", dr inż. Jan Siedlaczek, 2018*


*Pic. 1 onninen: throttle circulation pump*


*Pic. 2 saga: non-throttling circulation pump*

## Which pump type to choose?

Non-throttling pumps are the most used type, primarily in low efficiency installations. (e.g. residential buildings). This pump is characterized by quiet operation, low energy consumption and long reliability. It consists of plain bearings using water as lubricant. The absence of water can lead to seizures even after one rotation, which means proper water flow and ventilation are essential before the pump is turned on. Non-throttling pumps ensure faster water flow, which allows for the use of lower-diameter pipes, decreasing the cost of the heating installation. Installations using non-throttling pumps react quicker to temperature variations and are simpler to regulate. Their disadvantage is lower overall efficiency, and a lower starting torque in comparison to throttling pumps. This means that if the pump does not work for a longer period (e.g. summer, where demand for heating is low), its bearings may bind together through calcification, essentially preventing operation.

Throttling pumps are mainly used in high performance installations (industry or large commercial buildings). They have a higher overall efficiency.

*Source: KAPE based on: „Pompa obiegowa w instalacji", dr inż. Jan Siedlaczek,2018; „Pompa obiegowa c.o. – rodzaje, dobór, prawidłowy montaż. Najważniejsze pytania i odpowiedzi", Onninen, 2020*

## How to recognize if a pump is working improperly or damaged?

The sound of a hammer hitting a pipe from the heating installation is a sure sign of an improperly functioning circulation pump. It is most often caused by hydraulic equipment (sudden pressure spike in the installation caused by a rapid change in the heating medium's flow).

Damage can be caused by power surges, a lack of ventilation, too low or too high flow, or high medium viscosity, or a too high ambient temperature. A tell-tale sign is the motor overheating.

*Source: KAPE based on: „Pompa obiegowa w instalacji", dr inż. Jan Siedlaczek,2018; „Pompa obiegowa c.o. – rodzaje, dobór, prawidłowy montaż. Najważniejsze pytania i odpowiedzi", Onninen, 2020*

## Are energy efficient pumps cost-effective?

Energy efficient pumps self-regulate their performance. As pumps in heating installations can work up to 5000h annually, investing in a device with the highest energy performance class (A) is worth it. This lowers the operational costs of the installation, by reducing the amount of energy consumed by the pump. The difference between regular fixed rotation pumps (unregulated, often overpowered) can and a self-regulating energy efficient pump can be as high as 80%.

The performance of these pumps is adjusted to the actual parameters of the installation and regulated by a constant or variable pressure difference. Moreover, this type of pump often has a night-mode, in which the number or rotations is decreased, so that under a lower heating load, the pump still operates efficiently. These pumps are also often equipped with a display showing the current power consumption in each time span, giving further possibilities of regulation. They can also have automatic venting capabilities.

*Source: KAPE*