Buildwise
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Technical installations edition


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Data management: a major challenge for the installation sector

The building sector is taking decisive steps towards increasing digitalisation. This evolution is taking shape through the use of new technologies such as scanning, drones, 360° cameras and IoT devices (Internet of Things). We often hear data being described as the new black gold. This comparison highlights the **potential of using such data** to address a wide range of challenges, from improving productivity and efficiency to tackling energy problems.

Charlotte Euben,
Innovation Manager

For the technical installations sector, it goes without saying that this data should be used optimally since it enables the operation of the installations to be monitored and adjusted virtually in real time in order to reduce consumption, improve user comfort or detect anomalies such as water leaks. Efficient data management also helps with implementing the **preventive maintenance** of installations (see Buildwise Article 2024/04.08). There are plenty of opportunities for companies in the technical installations sector, provided they are able to manage this mass of information.

> There are lots of opportunities for companies in the technical installations sector, provided they are able to manage the mass of information.

Logically, that management raises issues. The first step is the structuring of the data (see pages 22-23). In the short term, tools based on artificial intelligence (AI) will make it possible not only to fully utilise such data but also to **interlink data from different devices**. During a recent workshop organised by the 'Heating and Climate Control' Technical Committee, the impact of AI – both in the short term and the long term – was analysed and discussed. For instance, a number of pioneers are using it already. However, a number of uncertainties regarding the sustainability and social footprint of this new technology also came to light during the meeting. In our opinion, AI should be seen as a **tool to serve people**: the core activities of installers will not change but certain aspects of those activities will become easier.

Our **Data Connection Center (DCC)** was set up to fully utilise the potential of data and support the whole sector. This demonstration area gives professionals the opportunity to discover the possible real-world applications of monitoring data, IoT devices and innovations. Besides demonstrations, the infrastructure also lends itself to the development of test and innovation projects.

Visits to the DCC at our site in Zaventem can be made by appointment. Sign up without delay by scanning the adjacent QR code.

Storage and production of SHW: PCM battery or electric boiler?

Buildwise studied a number of batteries that use a phase-change material to produce sanitary hot water. One of those batteries was compared with a classic enamelled electric boiler. The result: a more compact, sustainable solution that requires less maintenance but is twice to 4.5 times more expensive.

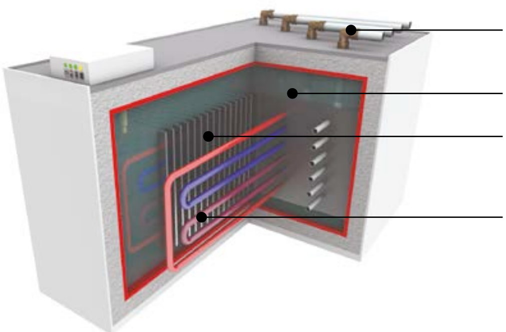
C. Jacques, B. Poncelet, Buildwise

How does a PCM battery work?

Unlike a classic boiler that stores sanitary hot water (SHW), **a PCM battery (phase change material) absorbs thermal energy in latent form** by means of phase transition. This battery uses a specific material – often a hydrated salt – that changes state at a certain temperature, usually around 60 °C for the production of sanitary hot water.

Storage of heat

When the PCM reaches its phase change temperature, it melts and changes from a solid to a liquid. During this change, a large amount of energy – also known as 'latent heat' – is absorbed without increasing the temperature of the material. This principle makes it possible to store more thermal energy with the same volume as a classic system. Just like a boiler, a PCM battery is charged by an electrical resistor (see figure 1) or an external heat source (e.g. heat pump or thermal solar panels).



1 Cross-section and internal parts of the PCM battery tested.

Release of heat

When cold water flows through the built-in heat exchanger in the PCM, this material will solidify. The stored heat released in the process heats the sanitary water directly. As long as the material maintains its phase change temperature (≈ 60 °C), it releases a constant and stable energy.

> The main difference between a PCM battery and an electric boiler lies in the way in which the energy is stored. It will depend on the practical benefits of each technology as to which one you choose.

Results of comparative tests

Buildwise carried out tests to evaluate the performances of a PCM battery (V40 ([1]) = 105 l) compared with an enamelled electric boiler (V40 = 114 l).

Unless otherwise specified, the results presented are specifically for the models tested, under clearly defined conditions. Therefore they cannot be generalised. Performances may differ depending on the brand and the configuration of the battery.

Points of attention for PCM batteries

- **Compactness:** the PCM battery tested is approximately 1.5 times more compact than the electric boiler tested for an equivalent amount of energy. While boilers often

([1]) Volume of mixed hot water at 40 °C obtained by mixing sanitary hot water from the boiler or the PCM battery with cold water at 10 °C.

stand upright (some can be mounted on the wall) and can only be connected underneath, the PCM battery studied must necessarily be positioned horizontally (on the floor, in a cupboard, etc.) but has various connection options (left, right or rear).

- **Service life:** the PCM battery tested has a 10-year warranty (7,500 cycles) and should last for 40,000 cycles which equates to a service life of around 50 years for two cycles per day. Generally, enamelled electric boilers have a 5-year warranty (sometimes extended to 10 years) and the estimated service life is around 10 to 15 years.
- **Flexibility:** besides the production of sanitary hot water, the PCM battery tested can also be used for (pre)heating, depending on the number of integrated exchangers (with a maximum of two).
- **Maintenance:** if the water hardness is less than 15 °f, no regular maintenance is necessary which is not the case with boilers (e.g. replacement of the anode).
- **Destratification:** this phenomenon which occurs in boilers reduces the actual quantity of sanitary hot water available compared to the stored volume. PCM batteries, on the other hand, retain all stored energy.
- **Initial cost price:** a PCM battery costs 2 to 4.5 times more than an equivalent electric boiler in terms of volume and configuration (2).
- **Additional equipment:** the manufacturer recommends a lot of accessories that increase the cost price and the space required for installation:
  - a thermostatic three-way mixing valve which limits the temperature of the sanitary hot water (which can go up to 75 °C) in order to protect the pipes and prevent scalding
  - a pressure reducer
  - a water softener if the hardness of the cold water is higher than 15 °f (very common in Belgium)
  - an expansion tank, although this is also recommended for a traditional boiler
  - a bypass valve, when connected to a heat pump without an integrated valve.

Equivalent criteria

- **Sanitary hot water temperature:** when water is drawn off, the temperature varies according to the state of the PCM (from 75 to 45 °C when the electrical resistor is off). In the case of a boiler, the temperature is fairly stable and drops gradually. As the draw-off temperature is usually between 38 and 42 °C, the user will not normally notice a variation above 45 °C.
- **Reactivity:** with both the boiler and the PCM battery, the water at the outlet is immediately at its maximum temperature.
- **Energy efficiency:** the PCM battery tested uses 8% less electrical energy than the boiler (with uninsulated pipes) to produce the same amount of heat.
- **Electric charging time:** the time required to fully charge the two solutions is almost identical (the PCM battery charges approximately 1.1 times faster than the boiler, for a similar electrical output).
- **Photovoltaic self-consumption:** both systems can store electrical energy in thermal form thanks to a power converter that controls the power of the electrical resistor, thus optimising the self-consumption of photovoltaic energy produced.
- **Presence of legionella:** this criterion was not investigated during these tests.

2 Test station where the performances of a PCM battery (1) are compared with those of an enamelled electric boiler (2).

This article was drawn up as part of C-Tech Technological Services, subsidised by Innoviris.

(2) This price comparison relates to both the PCM battery model tested and all PCM battery models from the same manufacturer. Prices may vary according to the manufacturer, the volume and the number of exchangers. Additional equipment has not been taken into consideration.

Water-saving toilets: problem-free discharge!

Technical Information Note (TIN) 265 which is dedicated to the design and dimensioning of waste water discharge systems concerns flush volumes of 6 litres or more. New recommendations are now aimed at facilitating the installation of more water-efficient toilets: an adjustable flush volume, combined with limitation of the length and number of bends in the pipe, taking account of user behaviour.

T. Delwiche, L. Vos, C. Jacques, B. Poncelet, B. Bleys, Buildwise

Reduced water consumption

Water-saving toilets use approximately 4.5 litres of water for a full flush and 2 litres for a half flush. This type of installation will not only reduce your water bill but also have a positive impact on the environment and society, which is even more important as Belgium is one of the countries facing a risk of water shortages. However, reducing the flush volume has an impact on the capacity to transport solids, thus increasing the risk of blockages.

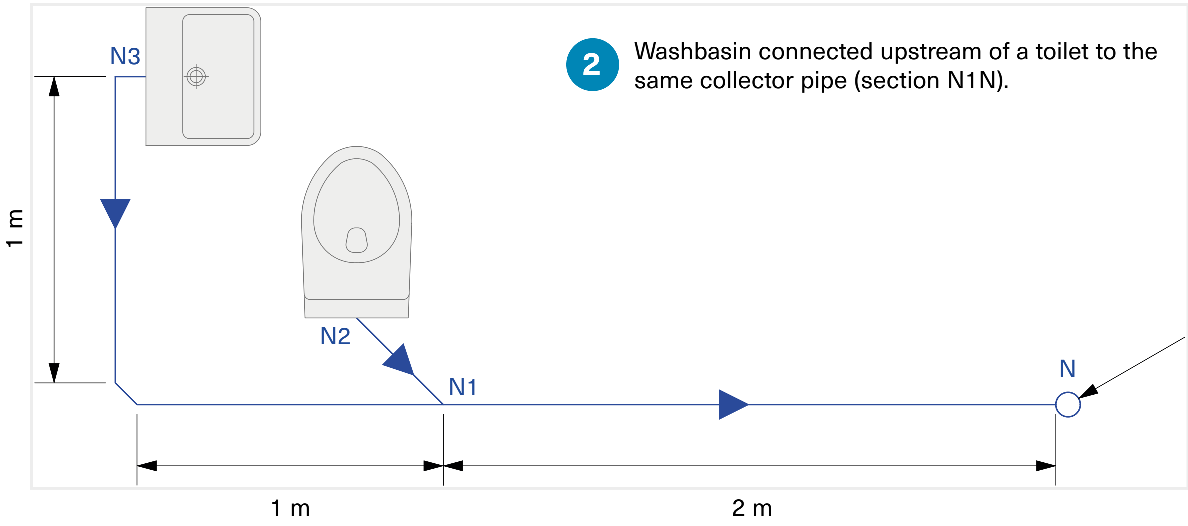
Preference for an adjustable flush volume

The risk of blockages can be managed by opting for adjustable flush volumes that can go up to at least 6 litres if necessary. For optimum performances, the discharge system should be dimensioned for a flush volume of 6 litres. To prevent having to increase the flush volume, it is recommended to limit the length of the pipe and the number of bends (compared to what is suggested in TIN 265).

Performance of discharge tests

Buildwise carried out tests using a water-saving toilet (see figure 1). The test set-up consisted of a pipe with a diameter of 90 mm and two 45° bends, without an end vent. We measured the distance covered by a mixture of artificial stools and paper. The results can be found in table A on the next page.

1 Test set-up equipped with transparent pipes.



2 Washbasin connected upstream of a toilet to the same collector pipe (section N1N).

As solids often remain in the pipe and only get flushed away when the toilet is next flushed, we found the presence of a lot of solids between two consecutive flushes acceptable. The permissible length of the pipe was determined based on this assumption.

Limitation of the pipe length and the number of bends

For a single toilet connected to a down pipe by means of a pipe with a diameter of 90 mm, we recommend limiting the length of that pipe and the number of bends to the values shown in table A below. To be able to increase the flush volume to 6 litres, the discharge system must also meet the requirements from TIN 265 which specifies an end vent or adjusted dimensioning in certain cases.

A Permissible length for a discharge pipe with a diameter of 90 mm.

Gradient	Permissible length	Number of bends (not counting the toilet exit bend)
0.5%	4.5 m	1
1%	5.5 m	2
1.5%	8 m	3
2%	10 m	3

Presence of other sanitary appliances

The toilet is often connected to a collector pipe in which the waste water from other appliances ends up. Figure 2 shows that the water from the toilet connection pipe (section N2N1) and the washbasin connection pipe (section N3N1) flows into the collector pipe (section N1N).

The **appliances upstream of the toilet** can help transport solids. However, if the maximum flow rate of those appliances is less than 0.8 l/s – which is the case for the washbasin (0.5 l/s) – that help will not be sufficient (*). In that case, the same recommendations as the ones for a single toilet apply, over the whole length of the pipe connecting the toilet to the down pipe (section N2N).

User behaviour

The full flush (4.5 l) must always be used to discharge solids – even if they only consist of paper – because the half flush (2 l) only has limited transport capacity. For that reason, some operators prefer to install toilets with a single button in places where users are not familiar with the facilities.

This article was drawn up as part of the Standards Antenna 'Water and roofs' subsidised by NBN. The recommendations from this article are the result of a study that was carried out for Cluster H_2O (Tweed vzw), with the support of Circular Wallonia and the Walloon Recovery Plan.

(*) The maximum flow rate for various sanitary appliances is specified in table 2 from TIN 265.

SHW circulation systems: the design makes the difference

Except for in family homes, it is usually necessary to install circulation systems for sanitary hot water (SHW) in buildings. However, these can lead to significant energy consumption. It is therefore best to involve installers during the design phase in order to limit the costs of implementation and use.

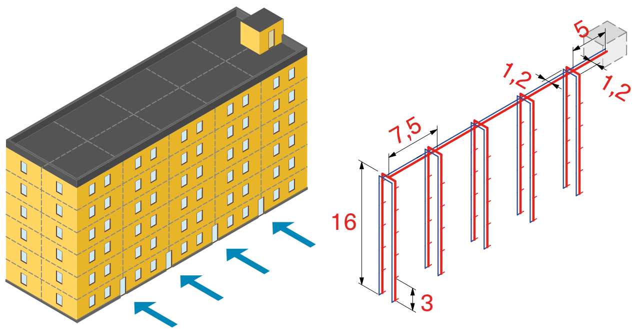
B. Poncelet, C. Jacques, Buildwise

Why install a circulation system for sanitary hot water?

SHW circulation systems serve two main purposes:

- **to reduce the waiting time** between the opening of the valve and the actual arrival of the SHW at the draw-off point
- **to keep the SHW at a minimum temperature** in order to prevent the development of certain bacteria such as legionella.

Sometimes the presence of a circulation system is stipulated by regional regulations.



1 Basic configuration.

In a family home?

In principle, it is **not necessary** to install an SHW circulation system in a family home, provided that the draw-off points are not situated too far from the heat generator (generally no more than 15 m away) or that the pipe connecting the heat generator to the draw-off points does not contain too much water (maximum of 3 l). If that is not the case, then it may be worthwhile installing a second smaller heat generator – such as an SW heater – under the sink.

And in other buildings?

In most cases, it is **necessary** to install an SHW circulation system. Thanks to a number of strategies, it is possible to limit the associated heat losses. To illustrate the suggested solutions, simulations were carried out on a 6-storey building containing 60 apartments, with a boiler room on the roof (see figure 1).

The **basic configuration** of the network with SHW circulation system is as follows:

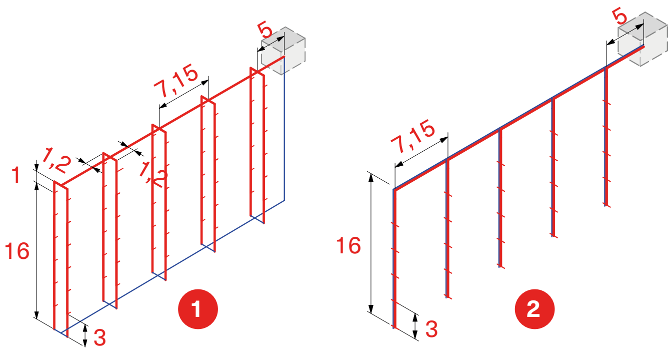
- the outlet and return collectors are installed on the roof (outside the protected volume)
- a single circulation system supplies six apartments located on top of each other (i.e. ten circulation systems)
- the pipes and connections are insulated according to the EPB regulations (version in force in Flanders).

If we assume that each apartment is occupied by an average household (2.41 persons), with each occupant using 35 litres of water a day at 60 °C, then that equates to an annual useful demand of around 1,825 kWh per apartment. In the basic configuration, heat losses amount to 560 kWh/annum per apartment, which means energy wastage of more than 30% of the useful demand!

Strategy 1: limit the length of the SHW pipes

There are two more cost-effective possible variants for the basic configuration, in terms of both investment and use (see figure 2 on the next page).

Variant 1: reduce the length of the return pipes by **installing the return collector opposite the outlet collector**. Heat losses then drop by 15% compared with the basic configuration.



2 Limitation of the length of the sanitary hot water pipes: variants 1 and 2.

Variant 2: bring together the rooms with moisture considerations (kitchens, bathrooms) of two adjacent apartments in a single shared vertical shaft so that **a single circulation system serves two apartments per floor**. Heat losses then drop by 38% compared with the basic configuration.

Strategy 2: run the circulation systems through the protected volume

It is preferable to run the circulation systems **through the protected volume**. By doing this, losses are limited and some can be reused for space heating during the cold season.

Variant 3: move the pipes in the protected volume (e.g. in the suspended ceiling of the corridor on the top floor). Heat losses then drop by 10% compared with the basic configuration.

Strategy 3: guarantee highly efficient and continuous insulation

In view of the high temperature of the sanitary hot water (55 to 60 °C), it is essential to provide highly efficient and continuous insulation:

- **highly efficient insulation:** satisfy or exceed the requirements from EPB regulations

  Variant 4: double the insulating capacity of the pipes on the roof (from 50 to 100 mm). Heat losses then drop by more than 20% compared with the basic configuration.

- **continuous insulation:** avoid interruptions in the insulation at brackets, couplings (bends, T-pieces), valves (shut-off valves, control valves) and accessories (pumps). A study showed that the heat resistance efficiency of the pipes drops:
  - by 50% when only the pipes are insulated
  - by 25% when the pipes and connections are insulated
  - by 10% when the pipes, connections, valves and accessories are insulated.

Variant 5: do not insulate the connections in the basic configuration. Heat losses then increase by 54%.

Variant 6: insulate valves and accessories. Heat losses then drop by 17% compared with the basic configuration.

Strategy 4: opt for pipe-in-pipe circulation systems

It is also possible to install special circulation systems where the return pipe is inserted in the outlet pipe (pipe-in-pipe). This solution results in:

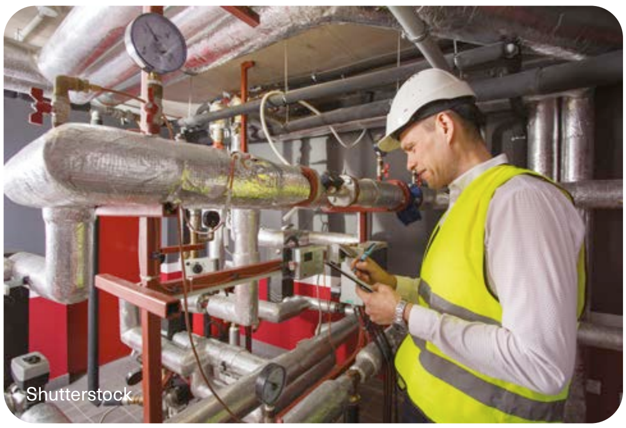
- a significant reduction in the heat loss surface of the pipes
- limited space required in vertical shafts (one single pipe)
- a reduction in the number of brackets and therefore in the installation time.

Variant 7: replace the circulation systems with pipe-in-pipe models. Heat losses then drop by 24% compared with the basic configuration.

Combined strategies

Naturally, it is also possible to combine various strategies. By applying variants 2, 3 and 6, for example, heat losses drop by 55% compared with the basic configuration: they then amount to just 250 kWh/annum per apartment instead of 560!

This article was drawn up as part of the Standards Antenna 'Water and roofs' subsidised by NBN. It is based on the results of a development project commissioned by VEKA, in collaboration with Wonen in Vlaanderen.



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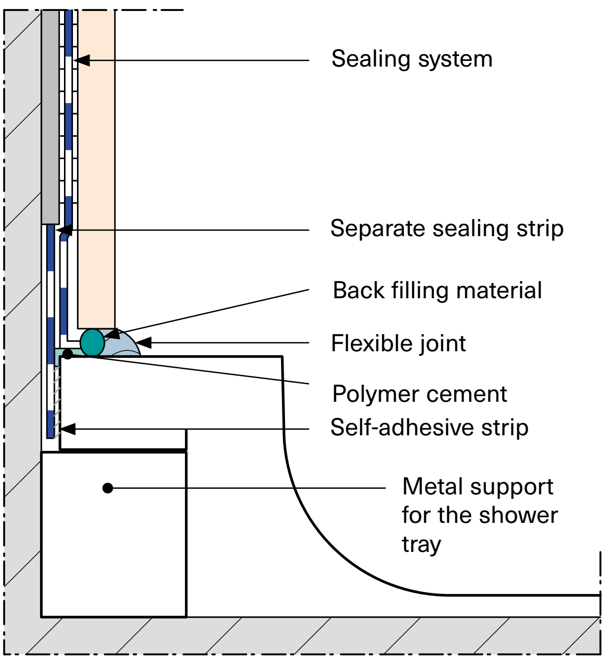
Tips for ensuring stability when installing a shower tray

If the edges of a shower tray can move under load (sag or bend), the flexible joint between the tiling and the shower tray will be repeatedly stretched and compressed in turn. Over time, this can lead to a break, allowing moisture to get behind this flexible joint. It is therefore essential to provide good support for the shower tray.

B. Bleys, J. Van den Bossche, Buildwise

To prevent moisture penetrating the tiled walls of a shower, you should apply a waterproof cement or a sealing system (see Buildwise Article 2024/03.06) behind the tiles. You should also make sure that there is a **durable watertight connection** between that sealing system and the shower tray by providing good support for the latter and installing a separate sealing strip. It is also important to carry out annual maintenance on the flexible joints between the tiling and the shower tray as they form the first moisture barrier.



1 Surface-mounted installation with full support.

If they are damaged, they must be replaced immediately (see also TIN 227 and Buildwise Article 2022/03.07).

Installation methods for shower trays

Surface-mounted installation with full support or raised design

With this traditional method of installation, the shower tray is placed **directly on a stable surface** and protrudes a few centimetres above the adjacent floor finish. The entire underside of the tray must then make contact with the floor. When this method is used, the tray is often placed on a layer of flexible mortar or adhesive. The edges of the tray must be continuously supported – by means of metal profiles, for example – which are fixed in the walls of the shower (see figure 1). The edges that are not adjacent to walls can be supported by blocks (e.g. bricks or cellular concrete blocks).

If the shower tray is sufficiently rigid, the full support can be replaced with **blocks** (e.g. bricks or cellular concrete blocks) which are placed underneath the shower tray. The edge of the shower tray is then supported in the same way as it is with full support.

Simply spraying with PUR is not a suitable method because it does not provide sufficient rigidity and support underneath the shower tray.

Built-in installation

Built-in installation involves **sinking** the shower tray (almost) completely **in the floor** so that the top is flush with the bathroom floor (walk-in shower). This method requires a recess the size of the tray to be cut out in the screed with space for the drain underneath.

Installation using a mounting frame and/or on legs

For this method, the shower tray is installed on adjustable legs or a mounting frame. This frame consists of horizontal profiles that are supported by vertical supports at the corners and at fixed intervals as specified in the manufacturer's installation instructions (e.g. every 50 cm). This creates space for the trap and drain pipes underneath the tray without having to break up the floor.

Sufficiently rigid shower trays can also be solely supported by legs, without a horizontal mounting frame. When using this method, it is crucial for the tray to be level and to rest stably on all legs. The manufacturer's instructions must be followed here too.

Installation instructions

Installation instructions and the support required may vary depending on the type of shower tray. It is always recommended to follow the manufacturer's instructions. **Acrylic shower trays** are lightweight and quite flexible, for example, as a result of which they require good support. This can be provided using a mounting frame that bears the weight of the whole edge. **Steel or enamel shower trays** are more rigid and do not need to be supported at as many points.

When installing the shower tray, it is essential that the **surface is sufficiently stable** and that the loads transferred can be absorbed without creating indentations in the surface.

A **concrete surface** is extremely stable and retains its shape, thus making it suitable for heavy shower trays. However, a concrete floor is usually slightly less level.

A good (cement-based) **screed** provides a level and stable surface. It is important for the screed to be sufficiently thick and hardened so that it does not sag or crumble under the weight of the shower tray. If using insulating screeds and installing on legs, the legs must be placed on reinforcement (e.g. 10 x 10 cm slab) on top of the screed to prevent the legs from sinking.

Wooden floors (wooden joists with planks/OSB) are more susceptible to deflection. Additional reinforcement may be necessary.

Sometimes, a shower tray may be installed on an **existing tiled floor**. Although tiles can be hard and stable, you must ensure that the tiles adhere properly and that the underlay is firm.

A shower tray must never be placed directly on an **unpaved surface** such as sand.

A Pros and cons of the different installation methods.

Installation method	Surface-mounted installation	Built-in installation	Mounting frame and/or legs
Example	 Shutterstock	 Shutterstock	 MEPA
Accessibility	⚠ Limited	✔ Good	✘ Poor
Installation height	⚠ Limited	✔ None	✘ High
Accessibility of the pipes	✘ Difficult	✘ Difficult	✔ Good
Need for a level surface	✘ High	✘ High	✔ Lesser

Residential ventilation with bag filters: no need to worry about filter maintenance

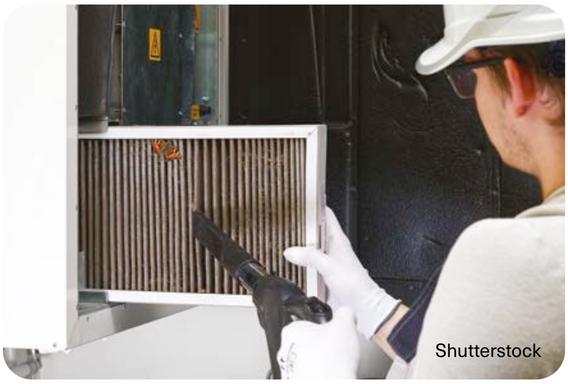
Bag filters have been used for years in ventilation systems of large buildings. A lesser known fact is that they also offer major benefits for residential balanced ventilation systems (type D). For instance, not only do fine bag filters noticeably improve the quality of the outside air supplied, they also maintain a stable and low drop in pressure over time – without requiring maintenance between annual filter replacements.

J. Van Herreweghe, S. Caillou, Buildwise

Context and current situation

Standard filters are installed in residential ventilation systems to protect the ventilation device against dust and dirt. These are usually ISO Coarse filters (G4) (*). To reduce the particulate matter ($PM_{2.5}$) in the supply air, these filters can be replaced with a finer ISO ePM_1 or $ePM_{2.5}$ filter (F7).

Air filters come in various forms, the most common of which are:
- the pleated panel filter (see figure 1)
- the bag filter (see figure 2).



1 Pleated panel filter.

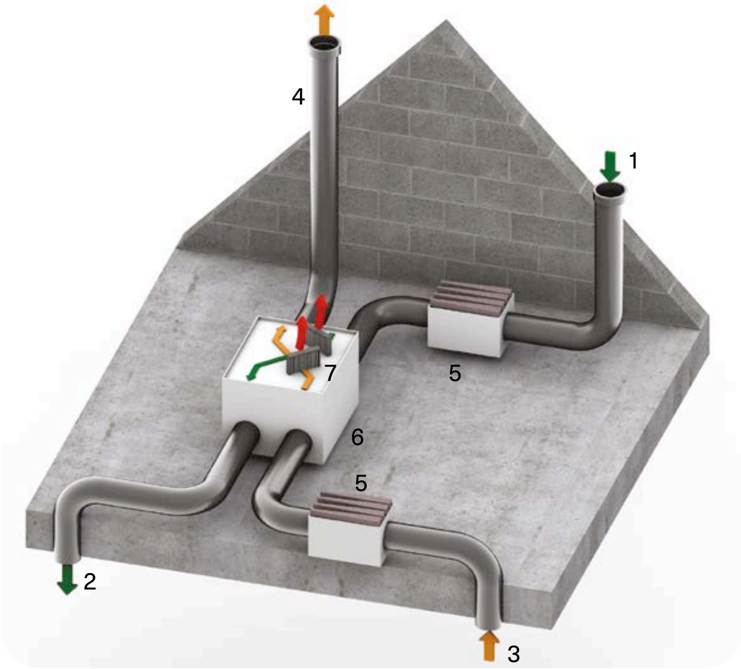
2 Bag filter in a filter box.

Panel filters: compact but become clogged quickly

Residential systems use pleated panel filters which are inserted into the ventilation system (see figure 1). However because of their design, dirt quickly collects on the surface. This results in a sharp increase in the pressure drop across the filter which in turn can lead to a reduced ventilation rate and/or higher energy consumption.

To limit this, **regular maintenance** is required by vacuuming the filters every three months and replacing them at least once a year, for example. In addition, our own measurements in the field show that the fine filters currently being used

(*) The names of the filters are based on the classification according to the current standard NBN EN 16890-1:2017. The classification according to the previous standard NBN EN 779 is shown in brackets because these names are still being used in practice.



1. Intake air
2. Supply air
3. Extracted air
4. Exhaust air
5. Filter box with bag filter
6. Balanced ventilation system
7. Removal of the standard filters from the ventilation system

3 Schematic representation of the application of bag filtration in residential balanced ventilation.

in ventilation systems only reduce particulate matter to a limited extent.

Bag filters: better performance as well as more maintenance-friendly

Bag filters consist of multiple bags made of filter material which are placed in a frame (see figure 2 on the previous page). These filters offer a number of benefits over a pleated panel filter. However, they cannot be installed directly in the ventilation system due to their size. Because of that, they are installed in **filter boxes** on the intake and extracted air pipes before the ventilation system (see figure 3). The pleated panel filters provided in the ventilation system as standard may be removed.

Installing a bag filter (e.g. an $ePM_{2.5}$ 70% filter (F7)) in the filter box connected to the intake air protects the system and improves air quality. Practical experience shows that these bag filters require **no interim maintenance** (vacuuming): instead, it is sufficient to replace the intake filter once a year. The used intake filter can then be reused as an extraction filter. Consequently, you only need to purchase one new filter a year, resulting in a significant saving. Besides the lower energy consumption thanks to the limited drop in pressure, this ensures that your investment in filter boxes will pay for itself within three years.

Test results

The design from figure 3 was developed based on research which involved us studying the performances and pressure drop of various filter types over a 1-year period. The design was then applied to a residential balanced ventilation system and monitored for two years.

The results show that an $ePM_{2.5}$ 70% bag filter (F7) **reduces the $PM_{2.5}$ particulate fraction in the supply air by 59% on average**. This is generally sufficient to reduce the concentration to below the limit value of 5.0 µg/m³ set by the World Health Organisation.

Measurements show that after two years, the filter still performs well. But that's not all: **filter efficiency even increased to 68%** due to the formation of a filter cake. In addition, the increase in the drop in pressure – even without maintenance – is limited: from 30 to 34 Pa at a rate of 120 m³/h. That is because bag filters provide a larger surface area for air filtration which means that they do not become clogged as quickly.

Microbiological analysis has proven that even after two years, the filter **has no impact on the number or types of moulds in the supply air**, despite being exposed to damp air due to it being installed on the intake air pipe for the heat exchanger. After being used as an intake filter for a year, the filter can therefore serve as an exhaust filter for another year without any problems.

Still room for optimisation

Current filter boxes (500 x 300 x 300 mm) and bag filters take up a relatively large amount of space. However, because of their exceptional performance, it makes sense to **improve this design** by developing shorter boxes and shorter filters with more bags, for example. In addition, a **universal connection** to the ventilation system – regardless of the brand – could also make the installer's job easier.

This article was drawn up as part of the 'Out2In' project and C-Tech Technological Services, subsidised by Innoviris.

Low-temperature heating thanks to the cooling system

A lot of office buildings are equipped with four-pipe end units which make it possible to heat (heating battery) and cool (cooling battery) different rooms at the same time. The larger size of the cooling batteries enables them to be used during renovations for low-temperature heating, in conjunction with a heat pump.

X. Kuborn, Buildwise
P. Despierres, Heat 4T°

Initial configuration

In the initial configuration before the renovation (see figure 1), hot water is produced at a high temperature (e.g. 80 °C) by one or more boilers while the cold water (e.g. 6 °C) is produced by a cooling unit.

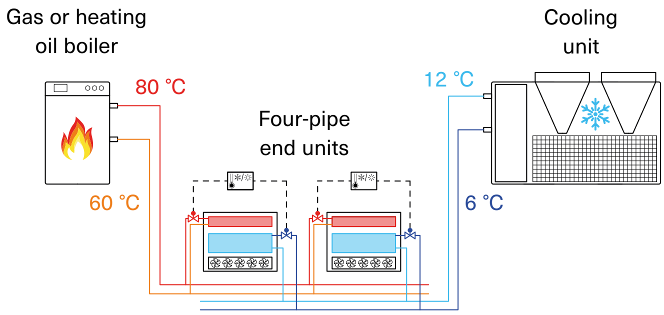
A four-pipe end unit (see figure 2) is connected to a hot water distribution circuit and a cold water distribution circuit. Depending on user needs, each unit is fed separately by one of the two circuits, for heating or cooling.

In those end units, the heating battery is smaller than the cooling battery because the difference in temperature (ΔT) between the water circuit and the environment is greater in the case of heating than in the case of cooling (see table A).

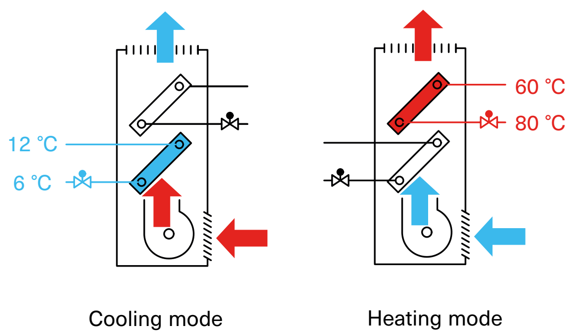
To reduce fuel consumption, **the boiler can be replaced with an air-to-water heat pump**. This works best for water temperatures below 45 °C and higher rates than the boiler. The existing pipes and heat release systems must therefore be compatible with this new temperature regime and these new rates. As the heating batteries are designed for a high temperature, they will no longer deliver sufficient output if the temperature drops to 45 °C. In addition, the increase in the flow rate also means more noise in the pipes and higher electricity consumption for the circulator.

A Example of the difference in temperature (ΔT) for the heating and cooling of offices.

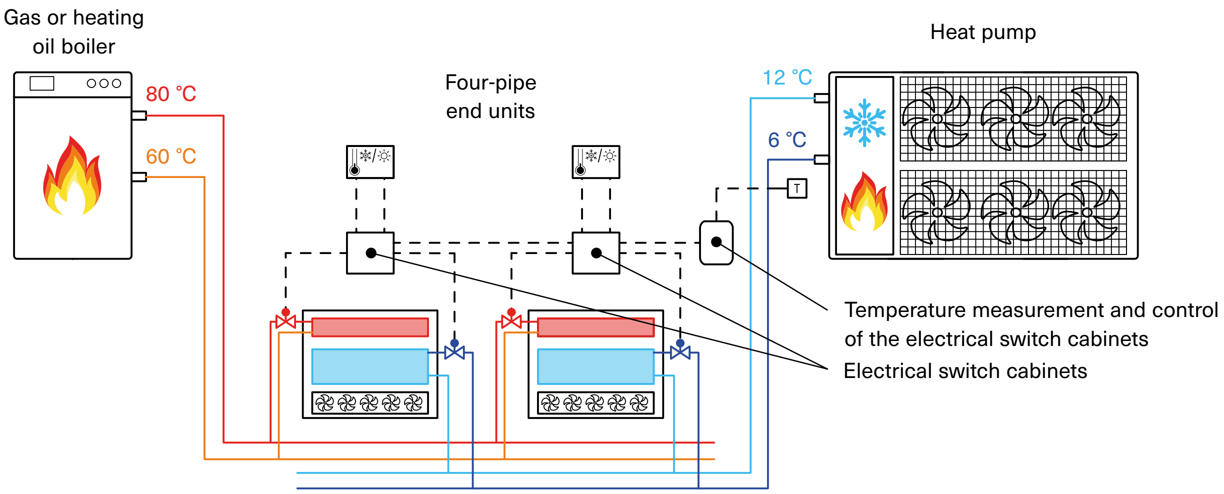
	Heating	Cooling
T_{av} liquid	70 °C (80-60 °C regime)	9 °C (6-12 °C regime)
T_{av} environnment	20 °C	27 °C
ΔT	50 °C	18 °C



1 Current initial configuration for the heating and cooling of office buildings.



2 Four-pipe end unit in cooling and heating mode.



3 Replacement of the cooling unit with a reversible two-pipe heat pump.

Solutions for low-temperature heating with cooling batteries

An initial solution is to **keep the boiler and replace the existing cooling unit with a four-pipe heat pump** that can heat at the same time. As the existing cooling unit is not connected to the heating network in the first instance, new pipes will have to be laid to the hot water distribution circuit. A suitable control system will also have to be installed for the purpose of managing the heat and cold distribution by the new heat pump (e.g. changeover valves and controller).

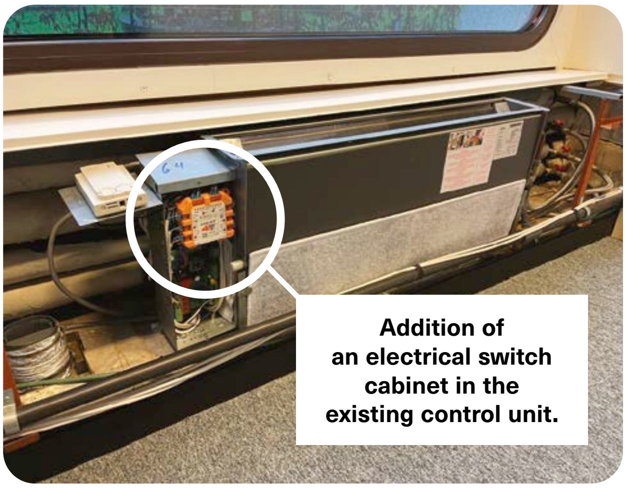
It is not always easy to lay new pipes, especially if the boiler is a long way from the cooling unit. In addition, the heat pump will have to operate at high temperatures in heating mode which reduces efficiency. In very cold weather, the output may not be sufficient and the boiler will have to take over. The heat pump will then have to control the boiler.

A second solution is to **keep the boiler and replace the cooling unit with a reversible two-pipe heat pump** (see figure 3) which is only connected to the cold distribution network. This network is ideal for low-temperature heating (42/36 °C) as the cooling batteries are larger. In this case, the hydraulic adjustments are minimal. The reversible heat pump is more efficient than the boiler and cheaper than the four-pipe model. However, a two-pipe heat pump cannot heat at low temperature and cool at the same time. The controller of the end units will then have to:

- if there is a request for heating, be able to activate the heating battery (open the valve) when the boiler is in operation
- if there is a request for heating, be able to activate the cooling battery when the heat pump is in heating mode
- if there is a request for cooling, activate the cooling battery when the heat pump is in cooling mode.

However, the controllers of the existing end units do not permit this type of control. They are unable to activate the cooling battery when there is a request for heating, for example. There are two solutions to this:

- **replace the existing controllers with programmable controllers:** the new controllers are programmed to activate the cooling battery (and not the heating battery) when they receive information (via their communication bus) stating that the heat pump is in heating mode
- **adapt the existing controllers:** this involves electrically switching over the command from the existing controller so that the cooling battery is activated instead of the heating battery when the cold water network is hot. That switching is controlled by measuring the temperature of the cold water network (see figures 3 and 4).



4 Adaptation of the control system of an end unit (Heat 4T°® system).

Ventilation of buildings that are accessible to the public: solutions for existing buildings

A lot of buildings that are accessible to the public do not have a ventilation system. In addition, there are numerous technical limitations in existing buildings that make the task of designing such a system difficult. The solutions that are suggested in this article are suitable for the renovation of existing buildings and can reduce investment costs by 70% compared with classic systems in certain cases.

S. Bernard, S. Caillou, Buildwise

The importance of indoor air quality and the role of ventilation for users' health is widely recognised. During the coronavirus pandemic, the high risk of infection in buildings accessible to the public showed that these spaces do not have sufficient ventilation. These buildings should therefore be equipped with a ventilation system in order to guarantee **good indoor air quality**.

In terms of regulations, new directives are currently being drawn up on air quality in buildings accessible to the public, based on the law dated 6 November 2022. These new requirements will be introduced gradually. Additional information on applicable standards and regulations (EPB, regulations for workplaces, regulations for places accessible to the public) can be found on the website of the Standards Antenna 'Ventilation and indoor air quality'.

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Ventilation: a challenge in existing buildings

In existing buildings, the task of designing and installing a ventilation system brings with it major technical challenges. For instance, the **available space** for the ventilation system and ducts is often limited. This makes the integration of the system difficult because it takes up a lot of room and may possibly have a significant impact on the building envelope. The **investment costs** involved often put off operators too.

In the PublicVent project, various innovative ventilation concepts were investigated as a solution to these limitations. Besides sufficient air quality, these systems also offer a number of benefits over the classic systems that are required for new buildings such as the fact that they take up less space and lower investment costs.

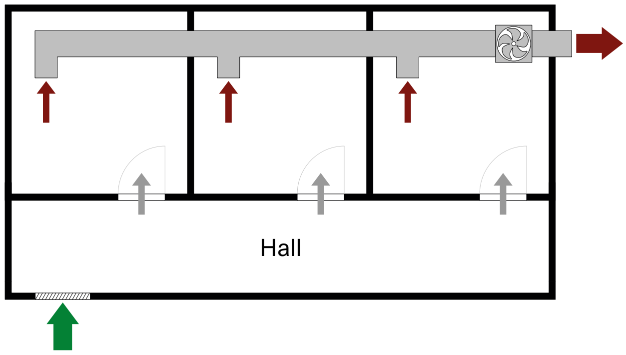
System C Hall

The system C hall is based on the principle of system C (natural supply and mechanical extraction) with the following special feature: the natural supply is located in a hall or corridor adjacent to the space to be ventilated (see figure 1 on the next page).

To facilitate integration in existing buildings, the supply opening can be created by replacing the glass in a window with a grille, for example. This solution reduces the impact on the building envelope and makes installation easier, especially if the window frames do not need to be replaced.

This principle also has other benefits compared with the classic system C: because the opening is located in an unoccupied space, the risk of cold draughts in the winter and noise pollution from outside is reduced.

This system can be used in small restaurants and theatres, for example, where limited space is available for the ventilation system.



1 Principle of the system C hall: the natural supply is located in a hall or corridor.

Boost system

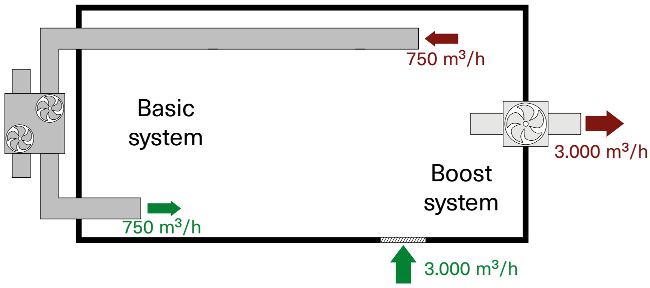
The boost system is particularly suitable for spaces with varying occupancy rates such as a multipurpose hall.

The principle is based on a combination of two systems (see figure 2):

- **a balanced ventilation system (with double flow) with heat recovery**, dimensioned for the ventilation requirement for the primary use of the space (750 m^3/h in the example from figure 2)
- **a boost system**, dimensioned for a higher ventilation requirement (secondary use of the space). This is a single-flow system, possibly decentralised, to reduce the space occupied and costs involved (3,000 m^3/h in the example from figure 2).

Let us take as an example a multipurpose hall suitable for 30 people in the case of normal use up to 150 people for events such as parties or receptions. The design flow rates, calculated for a requirement of 25 m^3/h per person, are shown in table A.

Compared with a single system with balanced ventilation with a capacity of 3,750 m^3/h, the combination of two systems takes up less space and is cheaper, while heat recovery is still carried out for the primary use of the space.



2 Combination of a basic system with balanced ventilation (double flow) and a boost system with single flow.

A Examples of design flow rates for the combination of a basic system and a boost system for a multifunctional hall.

Type of system	Number of people	Design flow rate
Basic system	30	750 m^3/h
Boost system	120	3.000 m^3/h
Combination of the systems	150	3.750 m^3/h

This article was drawn up as part of the 'PublicVent' project subsidised by the FPS 'Economy, SMEs, Self-employed and Energy' and C-Tech Technological Services, subsidised by Innoviris.

Together we will take on the challenge!

In the next phase of the 'PublicVent' project, we want to implement one or more of these innovative solutions in buildings in order to assess their effectiveness in practice. **We are therefore looking for buildings that are accessible to the public** (with or without a ventilation system) that we can use for this research. Do you know of a building that would be suitable? Contact us by scanning the QR code.

Heat pump maintenance: elements that should be inspected

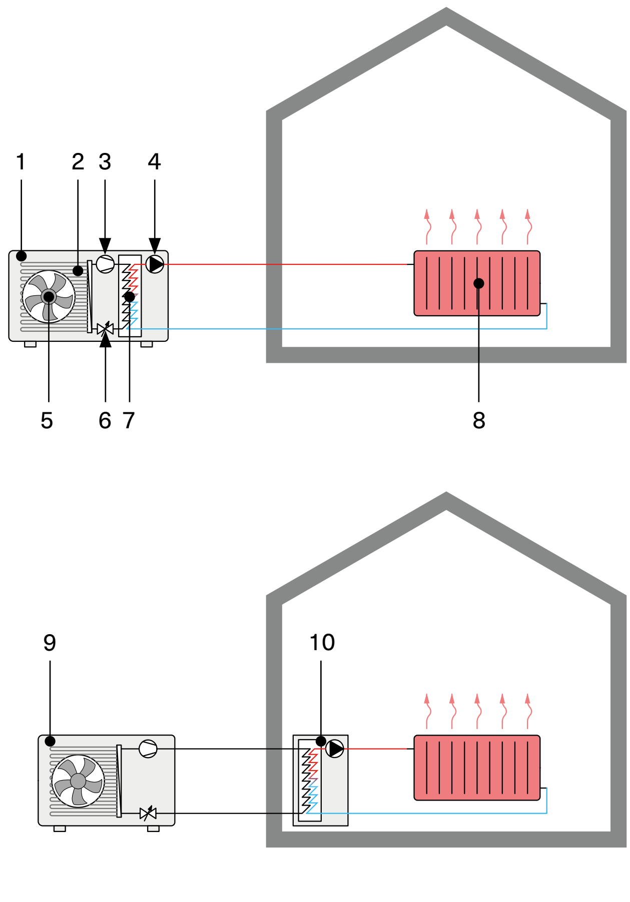
Heat pump maintenance needs to be carried out in order to maintain optimum performance, guarantee service life and reduce the risk of faults and refrigerant leaks into the atmosphere. The high installation and electricity costs are also an incentive to carry out such maintenance. In this article, you will find an overview of the main points for attention with regard to the maintenance of household air-to-water heat pumps.

X. Kuborn, B. Poncelet, Buildwise

Regulations

Unless otherwise specified by the manufacturer, maintenance should be carried out on heat pumps **at least once a year**. All interventions in respect of the refrigerant circuit should be carried out by a category 1 refrigerant technician.

In our three regions, regular maintenance is mandatory for heat pumps. That also includes checking for refrigerant leaks. However, below a certain threshold value determined by the capacity of the heat pump (12 kW) or by the amount of refrigerant (5 t CO_2 eq.) depending on the region, that periodic maintenance is not mandatory.



1. Monoblock
2. Evaporator (heating mode)
3. Compressor
4. Circulator
5. Ventilator
6. Pressure reducer
7. Condenser (heating mode)
8. Heat release system
9. Outdoor unit
10. Indoor unit

1 Schematic representation of the various parts of a heat pump.

Heat pump maintenance

Before starting any maintenance activities, we recommend that you turn on the heat pump and listen for any unusual noises such as grinding or vibration noises. Then switch off the heat pump, disconnect the power supply and wait a few minutes before continuing.

The sections below take a more detailed look at the main technical components of a heat pump (see figure 1) that need to be inspected, namely:

- the controller and electrical connection
- the compressor
- the pressure reducer
- the evaporator and outdoor unit
- the condenser.

Controller and electrical connection

Some heat pumps are equipped with instruments that enable you to view general parameters on the state of the heat pump, via a mobile app or a control screen, for example,

and provide information on:
- a drop in pressure in the refrigerant circuit (source of efficiency loss)
- the number of times that the heat pump starts up per day or per annum (load on the compressor)
- the level of overheating and undercooling
- the performances of the installation.

The operation of the four-way valve that reverses the cycle (defrost or cooling mode) must also be checked.

During maintenance, it is important to check the following elements:
- the fault log
- the electrical connections to the connector blocks and the earth
- the protection of parts that are sensitive to rain and moisture (e.g. motherboard and inverter).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Compressor

Maintenance should never be carried out on the compressor (see figure 1, no. 3) which is in a sealed casing. In the event of a defect, it should be replaced. Each time it starts up, a small amount of oil is sent to the refrigerant circuit which returns to the compressor after a short time. To guarantee proper lubrication and extend the service life of the compressor, the heat pump controller limits the number of starts to approximately seven to eight per hour.

Pressure reducer

The pressure reducer (see figure 1, no. 6) regulates the drop in pressure and the refrigerant flow rate by changing the flow section of the refrigerant. It adjusts its position constantly to guarantee good operating conditions for the evaporator. The presence of impurities (e.g. solder residue) and/or moisture in the refrigerant circuit can lead to the blockage or freezing of the pressure reducer, resulting in the poor performance of the heat pump. During maintenance, you should:
- check that the position of the pressure reducer changes regularly
- check the state of the filter dryer located upstream of the pressure reducer and replace it if necessary.

Evaporator and outdoor unit

In heating mode, the evaporator (see figure 1, no. 2) transfers heat from the outside air to the refrigerant with the help of pipes containing the refrigerant and fins that promote the exchange of heat. A fan (see figure 1, no. 5) provides a forced air flow to the evaporator.

Maintenance consists of the cleaning and inspection of:
- the fan blades in order to guarantee the nominal air flow rate, limit noise nuisance and extend the service life of the fan
- the evaporator fins according to the manufacturer's instructions (e.g. using a soft brush and a specific cleaning product or a steam cleaner). If any fins are bent, it is recommended to straighten them using a suitable comb
- the tray and the condensate drain in order to prevent clogging
- the insulation of the pipes containing water or refrigerant
- the provisions for acoustic insulation (e.g. insulation panels and silent blocs)
- the whole unit because it is easier to see traces of oil which indicate a leak on a clean machine. Cleaning should always be carried out according to the manufacturer's instructions in order to prevent damage to the quality of the surfaces.

Condenser

In heating mode, the condenser (see figure 1, no. 7) ensures that the heat pump transfers the heat extracted from the outside air to the water in the heating circuit. This is usually a plate heat exchanger which is sensitive to the presence of sludge and contamination. During maintenance, you should therefore:
- check the quality of the fill water and clean the filter or the sludge separator in the return pipe of the heating circuit (see also TIN 278)
- check the pressure in the hydraulic circuit and, if necessary, trace the source of any leaks (e.g. inspect the expansion tanks and automatic vents)
- inspect the other elements that can affect water quality and contaminate the condenser (e.g. expansion tank and storage tank).

This article was drawn up as part of the COOCK 'RECOVER' project subsidised by VLAIO.

How do you reduce the noise a heat pump makes?

The noise heat pumps make can be annoying. To prevent potential nuisance for owners and neighbours, it is best to take sound conditions into account during the design phase. This can be done through well thought-out selection and positioning, even on smaller plots. Additional noise reduction measures, such as an enclosure, are only necessary in exceptional cases.

A. Dijckmans, Buildwise

Sound conditions

Belgian standard NBN S 01-400-1 imposes a number of restrictions relating to the noise produced by technical installations inside and outside a home. The criteria in this standard apply as rules of good practice for residential buildings. In certain cases, regional or local regulations apply (see Buildwise Article 2023/01.14). Finally, the Flemish code of good practice provides guidelines for the noise emitted by the outdoor units of small, residential heat pumps.

The sound power level (L_{WA}) is different to the **sound pressure level** (L_{pA}) that you perceive at a certain distance from the heat pump. To check the sound conditions, you must estimate the sound pressure level based on the sound power level and the positioning of the chosen device. Simple calculation tools and detailed case studies that take distance attenuation, reflections and shielding of existing structures into account can help you choose the optimum location (see the 'Case study' box on the next page).

Choosing and positioning the outdoor unit

The amount of noise a device produces is indicated by the **sound power level** (L_{WA}). The sound power during normal operation can be found on the Ecodesign label. At maximum capacity, a heat pump makes more noise than it does in normal operating mode; an undersized heat pump will run at maximum capacity for longer. Correct dimensioning based on the need for heating and cooling is therefore also important from an acoustic perspective. If the outdoor unit was installed without the required vibration isolation (see Buildwise Article 2019/05.02), it may produce extra contact noise.

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Solutions for existing installations

In the case of heat pumps that have already been installed, **simple measures** can sometimes suffice in order to reduce the noise the pumps make. The first is to check the device for defects. Also check that the heat pump has been maintained on a regular basis and that the required vibration isolation has been provided. A custom setting such as silent night mode, for example, can reduce nuisance at critical times.

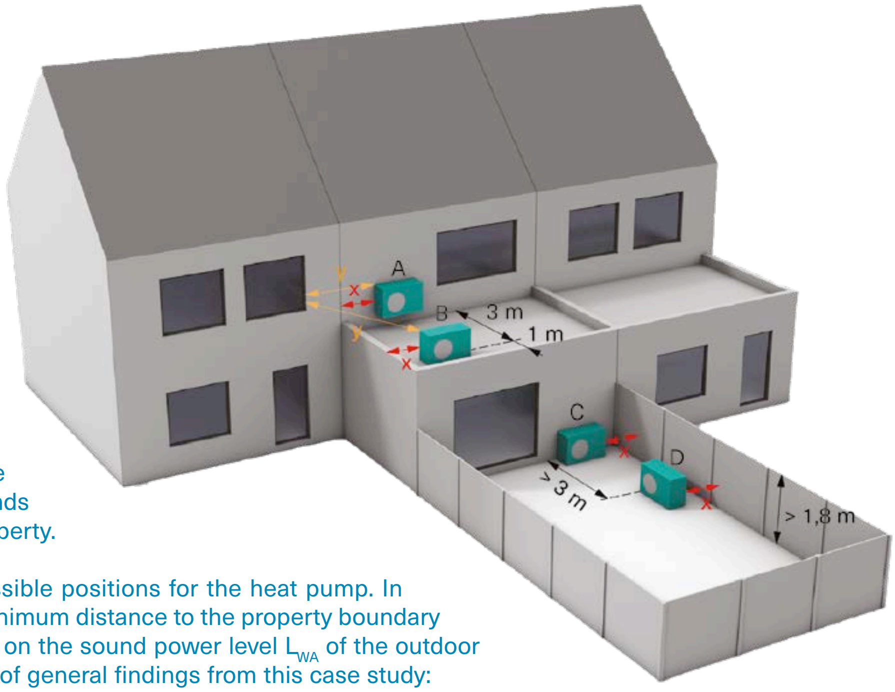
If that is not enough, a noise screen or a sound-damping enclosure may be required but it is important to ensure that there is correct air circulation to prevent efficiency loss. Another option is to move the outdoor unit.

This article was drawn up as part of the COOCK 'RECOVER' project, subsidised by VLAIO, and C-Tech Technological Services, subsidised by Innoviris.

An **Innovation Paper** is due to be published shortly in which acoustic points for attention with regard to heat pumps will be further explained and simple case studies discussed. Buildwise is also in the process of developing a calculation tool for checking the sound conditions in a specific situation.

Case study

A terraced house with an extension is equipped with a heat pump. The garden is fully enclosed by a 1.8 m-high garden wall. Where can you position the outdoor unit if the sound pressure level L_{pA} at the neighbours' property must not exceed 40 dB as specified in the standard NBN S 01-400-1?



In our example, the sound pressure level on the plot was evaluated at a height of 1.5 m. For the sound pressure level at the window, a correction was applied for the façade reflection so that the result corresponds to the situation without a neighbouring property.

The image on the right shows various possible positions for the heat pump. In order to adhere to the noise condition, a minimum distance to the property boundary must be respected (distance x), depending on the sound power level L_{WA} of the outdoor unit (see table A). We can derive a number of general findings from this case study:

- the minimum distances for the heat pump with a sound power level of 60 dB are **difficult for terraced houses and apartments to achieve**. A quieter heat pump means fewer acoustic restrictions with regard to positioning
- **positioning against the façade** (positions A and C) **is less favourable** than positioning away from it (positions B and D). That is because the façade will reflect some of the noise
- if there is **no garden wall** (> 10 kg/m²; e.g. brick wall, concrete panels or solid wooden fence), positioning in the garden (positions C and D) is sometimes not possible on narrow plots without additional noise reduction measures. Note: a hedge and open or lightweight fences (e.g. wire mesh fencing with foil, reed screens, willow screens or open wooden panels) will not hold back the noise or work as acoustic barriers
- on the roof (positions A and B), the unit can be positioned slightly closer to the property boundary because **the roof edge will partly shield the noise**. However, ensure that it is at a sufficient distance from opening windows and ventilation grilles in neighbouring properties (distance y)
- if installing on the roof, a **vibration isolating set-up** is crucial. Without vibration isolation, the roof can also vibrate and emit extra noise, both inside your own home and outside. Stability permitting, in the case of lightweight roofs it is recommended to position the outdoor unit on a load-bearing base
- although there are no conditions relating to **the noise on your own property**, it is still best to take that noise into account when deciding on where to position your unit. Discuss this with the client and ensure a minimum distance to the terrace and to opening windows and ventilation grilles in bedrooms.

A Minimum distances for adhering to a sound condition of 40 dB for neighbouring properties.

Position	Minimum distances (*)	
	Heat pump L_{WA} = 60 dB	Heat pump L_{WA} = 55 dB
A	x ≥ 2 m and y ≥ 7 m	x ≥ 1 m and y ≥ 4 m
B	x ≥ 2 m and y ≥ 5 m	Always met
C	x ≥ 3 m (without garden wall : x ≥ 7 m)	x ≥ 1,5 m (without garden wall : x ≥ 3,5 m)
D	x ≥ 2,5 m (without garden wall : x ≥ 5 m)	Always met (without garden wall : x ≥ 3 m)

(*) Value 'x' corresponds to the distance to the closest property boundary and 'y' to the distance to the closest opening window of the nearest property.

Maintenance of technical installations: structure your data

Maintenance data can be a powerful instrument for optimisation… as long as it is structured! A good way to organise this information efficiently is by using standardised classification systems such as those applied in BIM models (Building Information Modelling). Choosing this approach today will put maintenance companies in a strong position when it comes to using operational data strategically and preparing for the transition to predictive maintenance.

S. Bernard, J. Vinel, Buildwise
D. Vanderlinden, VMA Maintenance

During the utilisation phase of the building, the maintenance company plays a key role in ensuring the performance of the technical installations and user comfort.

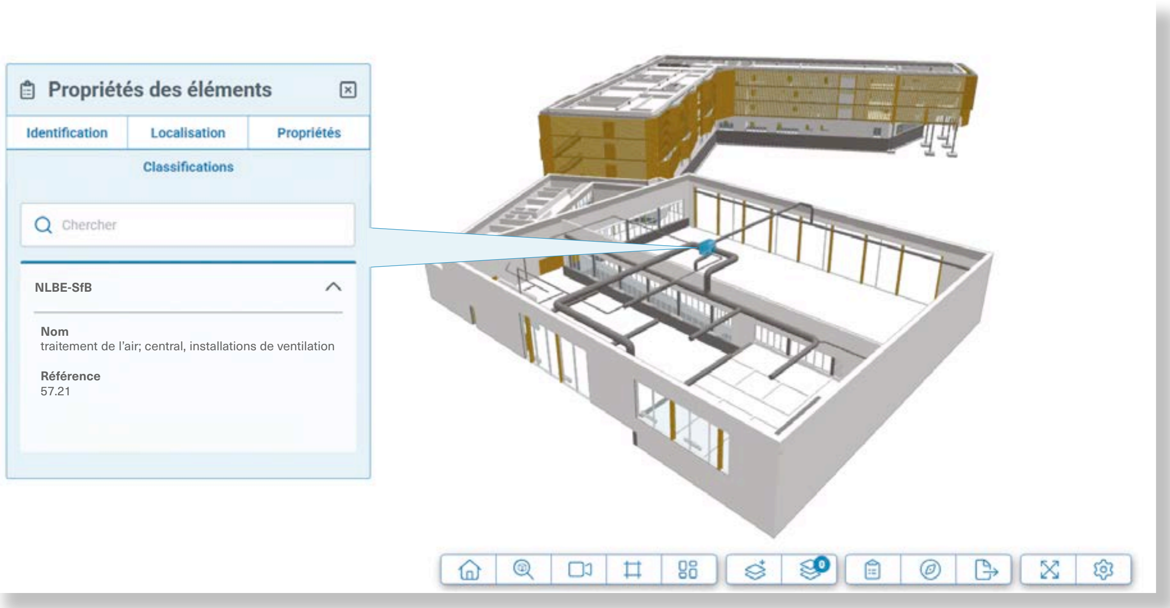
The use of a **computerised maintenance management system** (CMMS or FMIS for Facility Management Information System) is essential, especially for companies responsible for large buildings. The main function of these tools is to schedule preventive and corrective maintenance activities and monitor them with the help of work orders (also known as tickets). Each stage of the process is documented, from the initial request to the completion of the maintenance intervention. This documentation therefore serves as a valuable tool for **gaining insight into maintenance performance and identifying points for improvement**.

Data, yes, but structured!

In some organisations, maintenance interventions are reported in a free field which the technician has to fill in manually in order to describe the task performed. This approach provides a high level of operational flexibility but is not particularly suitable for enabling the information to be used. The diversity of formulations and the lack of a coherent structure limit the possibilities for large-scale statistical analysis.

To enable intervention reports to be used efficiently, it is crucial for the **information to be structured**: the data will then be entered in clearly defined fields instead of in free text. Not only does this method facilitate analysis, it also serves as a better way to log the technicians' implicit knowledge.

Although the structuring of tickets brings with it organisational changes in the reporting process, **it is still best to get started on this development early** in order to build up a sufficient and usable data history. As we already established during a pilot project, it is not possible to structure tickets containing free text retrospectively: the risk of misinterpretation is too high to guarantee the reliability of the analysis.



1 Air-conditioning plant with NLBE-SfB classification in a BIM model.

Where to start?

Introducing a **classification system based on the type of installation** is an important first step that already delivers concrete benefits. That information can be used to identify trends based on the type of installation such as the number and frequency of malfunctions and their seasonality. These indicators can be particularly helpful when it comes to deciding which installations should be analysed first for a transition to predictive maintenance.

BIM reference systems are particularly relevant for applications of this type. In the context of construction projects, the classification system **NLBE-SfB** is recommended for the functional classification of elements in Belgium and the Netherlands. This is an optimised version of NL-SfB, the result of a harmonisation between the two countries. This system identifies the building elements using a code comprising a maximum of four digits, each representing a hierarchical level. For example, the code for a heat pump (56.21) is configured as follows:

- level 1: **(5):** technical installations
- level 2: **(56):** heating and cooling systems
- level 3: **(56.2):** central production
- level 4: **(56.21):** heat pump.

More information on classification systems and BIM can be found on our website.

In practice, more and more CMMS tools are allowing you to link to an existing BIM model. When reporting, the technician can then select the relevant installation directly from the 3D view of the building or via a QR code applied to the installation.

One step further

The classification of interventions by type of installation is essential but not sufficient to exploit the full potential of intervention reports. It is also crucial to **categorise interventions based on their type**, at least distinguishing between corrective and preventive maintenance. By integrating the maintenance plan in the CMMS tool, that information can be filled in automatically when creating the ticket, without any manual action by the technician.

Other fields can be added to supplement the information on the tickets but they must be carefully defined so as not to make data entry unnecessarily difficult for the technician. Generally, all information that can be entered automatically in advance (e.g. date, time and name of the technician) should actually be filled in already.

Giving technicians a say in the introduction of this new way of working increases their involvement and improves the quality of the data entered. Thanks to their knowledge of the field, they can find concrete, practice-oriented solutions that can be used directly to improve quality.

For some information such as the symptoms or causes of faults, there is no standard system for categorisation or uniform nomenclature. The internal development of such a system is possible but remains a challenge.

This article was drawn up as part of the 'PREMAi' project and C-Tech Technological Services, both subsidised by Innoviris. The aim of this project is to bridge the gap between information from building management systems and maintenance activities.

Building automation: new European requirements on the way

The energy landscape is changing rapidly: heat pumps, electric vehicles, renewable energy production… To deal with this situation optimally, technical building systems should work together as much as possible. A smart and centralised system can then map their energy consumption, detect losses and optimise their operation. Legislation in Europe and in Belgium is also focused on this.

P. D'Herdt, Buildwise

European regulations and focus on building modernisation

The European Energy Performance of Buildings Directive 2024/1275 (EPBD for short) covers numerous requirements for energy-related measures in buildings. Since 2018, the directive has also focused on **the modernisation of buildings and the integration of smart technologies** such as:

- the detection of technical problems or energy losses
- the informing and raising of awareness of the building user regarding their energy consumption
- the detection and rectification of defects that have an impact on the service life of components.

Besides energy savings, Europe also sees **economic benefits** that building automation can deliver by extending the service life of systems and enabling more efficient management of the electricity network and the renewable energy generated. The regulations apply to both new and existing buildings.

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Requirements for building automation: which buildings, what, when?

The EPBD introduces a number of requirements for building automation that will be implemented gradually. Since 2025, these apply to **non-residential buildings** with large technical installations (outputs greater than 290 kW); from 2030, they will also apply to non-residential buildings with smaller installations (outputs from 70 kW). In the buildings in question, a **building automation and control system** (or BACS) must be provided that can perform a number of actions:

- **energy monitoring and control:** continuously monitor, track, analyse and adjust energy consumption
- **benchmarking and information:** check the energy efficiency of installations, detect efficiency losses and inform the person responsible for the installation
- **compatibility and interoperability:** enable communication and interaction with connected systems and other devices in the building.

In addition, another two extra requirements will be introduced for buildings with large installations: by the end of May 2026 at the latest, **indoor environmental quality** (or IEQ) must be monitored and by the end of 2027 at the latest, **automatic lighting control** which reacts based on presence detection must be installed. From 2030, both requirements will also apply to non-residential buildings with smaller installations.

As far as **residential buildings** are concerned, the requirements for automation only apply to new buildings or to buildings undergoing major renovation. While these do not require the installation of a specific system, a number of functions must be provided in the building in order to respond to the changing energy landscape. These can usually be fulfilled by an EMS (energy management system):

- **monitoring and information:** continuous electronic tracking of efficiency and notification of the user in the case of deviations and/or need for maintenance
- **control:** effective means of optimising the generation, distribution, storage and use of energy
- **interaction with the electricity grid:** the possibility to adjust energy consumption based on external signals.

What does that mean for Belgian buildings and installations?

The European member states transpose a European Directive into national regulations. In Belgium, it is a regional responsibility. The basic requirement for non-residential buildings with high-power installations – namely the installation of a building automation system – is the only one that has already been formally implemented in each of the regions.

Implementation currently differs slightly from region to region in respect of various aspects:

- **the buildings affected:** in Flanders, only non-residential buildings having installations with a nominal power of more than 290 kW have to meet the requirement. In Wallonia and Brussels, the requirement also applies to mixed buildings containing both residential and non-residential units. If more than 50% of the floor area has a non-residential purpose, the building must fulfil the requirement
- **timing:** in Flanders and Wallonia, buildings must meet the requirement by 31 December 2025 at the latest; in Brussels, the deadline of 1 January 2025 was set
- **description of the requirements:** in Flanders, the mandatory properties were taken verbatim from the EPBD. In Brussels and Wallonia, reference is made to the standard NBN EN ISO 52120-1:2021 (*) and building automation must comply with class B from this standard.

The standard NBN EN ISO 52120-1:2021 contains a structured list of various possible smart services in a building and the extent to which these can deliver more advanced functions (functionality levels). A classification system is used to establish the functions that must be satisfied as a minimum in order to achieve a certain class.

Opportunities and needs

The European requirements relating to building automation will encourage owners to explore such systems. Installers can advise them on these or guide them towards the most sensible solutions. At the same time, the presence of mandatory hardware and software will also present a number of opportunities for installers to offer their customers **additional paid services** relating to monitoring, energy advice and optimisation.

However, further explanation and assistance are required in the form of information, practical support, inspection guidelines and, where necessary, training. Both within the regions themselves and at Buildwise, there are ongoing initiatives to support the practical implementation of the requirement and make the most of opportunities – by building users and construction professionals.

This article was drawn up as part of C-Tech Technological Services, subsidised by Innoviris.

(*) For both regions, the regulation still refers to the standard NBN EN 15232. This standard was withdrawn and replaced by the standard NBN EN ISO 52120-1. The two standards are nearly identical in terms of content.

Trade fairs and events

Install Day

This year's leading event for professionals from the technical installations sector will take place on **Friday 17 October**.

Discover the latest trends in installations via technical presentations, demonstrations, reference documents, specially designed apps and much more besides.

Put all your questions to our specialists from Buildwise or share your expectations with them.

You can find all the information you need at www.installday.be.

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Colophon

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