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HEALTH 16 May 2025 | 3 min read

Why do you breathe better in a Passivhaus home?

Indoor air can be up to 5 times more polluted than outdoor air. Discover how Passivhaus mechanical ventilation guarantees clean, filtered and healthy air.

The real problem: the air inside the home

We spend roughly 90% of our time indoors, yet we rarely stop to think about the quality of the air we breathe there. According to the World Health Organization, the indoor air of a conventional home can be between two and five times more polluted than the outdoor air, even in urban environments with heavy traffic.

The sources of indoor pollution are many and often invisible: volatile organic compounds emitted by furniture, paints and cleaning products; dust particles and mites; excess humidity that encourages the growth of mould; and the very CO_2 we exhale, which in poorly ventilated spaces builds up to levels that affect concentration and rest.

The traditional solution, opening the windows, presents an obvious problem: when you ventilate naturally, you lose all the energy you have invested in conditioning the space. In winter, the warm air escapes; in summer, the hot air from the street comes in. The result is a constant dilemma between health and energy efficiency that most households resolve in the worst possible way: by ventilating little and badly.

Passivhaus ventilation: renewing the air without losing energy

Controlled mechanical ventilation (MVHR) with heat recovery is one of the fundamental pillars of the Passivhaus standard, and probably the one with the most direct impact on the health of the occupants. The system works continuously and automatically: it extracts stale air from the wet rooms (kitchen, bathrooms, utility room) and introduces filtered fresh air into the dry rooms (bedrooms, living room, study).

The heart of the system is a high-efficiency heat exchanger. In the case of the Zehnder ComfoAir Q350, one of the units we routinely install in our projects, the recovery rate reaches 96%. This means that the fresh air entering the home is preheated (or precooled, in summer) thanks to the energy of the outgoing air, without the two flows ever mixing. The result is air that is always renewed and at the right temperature, with a practically negligible energy cost.

The F7 filters incorporated into the system retain fine particles, pollen, mould spores and suspended dust with an efficiency above 90%. For people with allergies or asthma, this constant filtration means a drastic improvement in quality of life. In addition, the unit's operation is practically inaudible: the sound level sits below 25 dB, lower than the murmur of a library.

> In our homes, the CO_2 sensors record levels below 800 ppm consistently, without anyone having to open a single window or think about it. This is what it means to automate wellbeing.

The benefits are felt from the first day

People who move into a home with MVHR usually describe an immediate sensation of freshness and lightness in the atmosphere. There are no stale odours, the humidity stays at healthy values throughout the year and the temperature is uniform across all rooms, without the typical differences between north-facing and south-facing rooms.

From a health point of view, the benefits are widely documented: fewer allergy episodes, better sleep quality and a reduction in respiratory problems. For families with young children or older people, these factors take on a special importance. At K-Valld'Or, a family with an asthmatic child noted a significant reduction in respiratory episodes during the first year in the home.

Energy savings are the other major benefit. By eliminating the need to open windows to ventilate, the system avoids heat losses in winter and the entry of hot air in summer. The heat recovery unit reclaims up to 96% of the energy of the outgoing air, so that the home's climate control works with a much higher efficiency than that of any conventional house.

Maintenance: simple and affordable

One of the most common concerns is the maintenance of the MVHR system. The reality is that it is far simpler than most people imagine. The F7 filters must be replaced every six to twelve months, depending on the environment (in areas with more pollen or dust, the frequency may be somewhat higher). The change is an operation that anyone can do in five minutes, without special tools.

The annual cost of the filters sits between 60 and 100 euros, depending on the unit model. Beyond the filters, an annual technical inspection is recommended that includes cleaning the exchanger and checking the air flows. Compared with the maintenance of a conventional gas boiler, the cost is similar or lower, with the advantage that there is no combustion, no emissions and no associated risks.

After more than 120 homes delivered, our experience confirms that well-installed MVHR systems work reliably for decades. The key lies in the quality of the initial installation: rigid ducts, correctly insulated and with the appropriate slopes to facilitate the drainage of condensation.

And what if I want to open the windows?

This is, without doubt, the question we are asked most. And the answer is simple: of course you can open the windows. A Passivhaus home is not an airtight or sealed space; it is a space that does not need you to open the windows to have impeccable indoor air. The difference is subtle but fundamental: you are not obliged to, but you are completely free to do so.

On a spring afternoon with a pleasant breeze, opening the windows is a pleasure no one wants to miss. In fact, in summer, natural night-time ventilation through windows is a strategy that complements the MVHR perfectly in a Mediterranean climate: you take advantage of the night-time coolness to cool the building structure, and during the day the mechanical system maintains the air quality without bringing in heat from outside.

What changes is that, during winter nights, working hours, days of intense pollination or summer heatwaves, the home ventilates itself impeccably. The peace of mind of knowing that your home breathes for you, twenty-four hours a day, is a comfort that, once experienced, becomes hard to give up.