



Beattie Passive

Technical FAQs

Why is there a drive in the construction industry to build Passivhaus?

Passivhaus is the fastest growing energy performance standard in the world. Passivhaus strengths lie in the simplicity of its approach; a building that has excellent thermal performance and exceptional airtightness with Mechanical Ventilation and Heat Recovery.

Does Passivhaus only apply to homes or houses?

No. This is a common misconception that is unfortunately caused by including 'house' in the name of the standard. The Passivhaus standard would be a more complete term. Passivhaus can be applied to any building. Beattie Passive Build System can be used for any type of building e.g. offices, schools, flats, community centres, houses, bungalows and care homes.

What's special about a Passivhaus certified window?

Just as windows allow light into a room, they also allow the sun's energy to warm the building. Passivhaus windows are triple glazed, gas filled with well-insulated frames. With good design, accounting for the 'pathway' of the sun throughout the year and the reducing or inducing of shading on the windows, Passivhaus windows can effectively act as the radiators of the building. During winter, more energy will be allowed in to the building than out. Conversely in summer when the sun is higher in the sky and the additional energy is not desired, the solar gains are reduced.

Why is airtightness so important?

Other than insulation, this is the single most important factor in achieving Passivhaus Standard. Conventional buildings suffer from draughts caused by unwanted air infiltration through gaps and joints. Draughts are the enemy of home energy efficiency because of the amount of heat that is lost. It is essential to create an airtight building 'envelope' with a continuous airtight layer. Beattie Passive's design methodology details each junction for air tightness and achieves levels of $0.50\text{m}^3/\text{hm}^2$ (@50pa) and lower. Retrofit is slightly lower as it is more challenging to airtight the existing ground floor. The TCosy™ air tightness level is: $1.0\text{m}^3/\text{hm}^2$ (@50pa).

What is the most challenging aspect of Passivhaus construction?

Traditionally Passivhaus has been considered an expensive and challenging method to achieve. The Beattie Passive system has been designed specifically to deliver all of the Passivhaus principles as standard. The very simple Beattie Passive system achieves Passivhaus easily and eradicates any risk associated with implementing Passivhaus standards (e.g. airtightness and thermal bridges).

Can Passivhaus airtight construction lead to moisture or air quality problems?

No. Passivhaus uses a rigorous building physics approach to eliminate thermal bridges, a major cause of mould in standard construction. Due to bad design, many new homes are being incorrectly built too airtight without proper consideration for ventilation. This traps moisture inside, leading to mould and indoor air quality problems.

Unlike most other new construction methods, Passivhaus employs an appropriate vapour barrier and then a mechanical, balanced ventilation system with heat recovery, which assures superior air-quality and comfort by continually changing the indoor air. Moisture and other potentially unhealthy pollutants are safely removed, (for example off-gassing from carpets or furniture). Also, allergies can be easily controlled with the inclusion of custom filters (within the MVHR system) for specific medical needs.

MVHR ensures there are complete air changes in each room 5 times per hour, taking away the stale air and circulating fresh-filtered air.

What is MVHR?

Mechanical ventilation with heat recovery (MVHR) is a whole building ventilation system, driven by fan power. Systems comprise a network of ducts connected to a central heat exchanger (the main unit). Stale, moist air is extracted from kitchens and bathrooms, and passes over a heat exchanger before being expelled. This pre-heats fresh incoming air, which is then fan driven around the house. In winter months, a simple in-line heater tops up the incoming cold air.

Air transfer between rooms via circulation spaces (stairs, corridors etc.) through gaps beneath doors of proprietary grills. The system is balanced so that the total volume of air extracted matches the volume supplied.



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Technical FAQs continued...

Do we need a ventilation system: are there problems with bacteria, noise and drafts?

The ventilation system in a Passivhaus is a fresh air supply system, not an air conditioning system that recirculates inside air. Bacterial growth is only a problem in poorly maintained recirculating air systems. The fan and valve noises resulting from the ventilation system are almost completely eliminated by sound control measures such as vibration isolation mounts, low air speed and acoustic lining in ducts. Jet nozzles guide incoming air along the ceiling, where it uniformly diffuses throughout the room at velocities that are barely perceptible. MVHR Units are sometimes installed in bedroom cupboards – they are so quiet and they don't need a large space away from residents.

This also overcomes the “feeling” of a draft, as the duct terminals, where they enter each room, have a greater surface area than a conventional window trickle vent. It is this smaller rammed air inlet where draughts are felt and consequentially often taped closed! With MVHR, rooms are a similar temperature all over – no cold window sills.

Is a Passivhaus comfortable in hot weather?

Yes. The insulation in a Passivhaus doesn't just keep the property warm in winter; it keeps the heat out in summer. Induced shading on the windows (either from deep windows or external automated blinds) reduces the solar gains of the property significantly. External brise soleil can also be used to help with shading. With the additional use of ventilation, both temperature and humidity can be effectively controlled.

How can buildings really stay warm without conventional heating or cooling system?

Time and again, Passivhaus certified buildings have proven that it is possible to build structures requiring so little energy, that conventional heating and cooling systems are rendered unnecessary. During cold periods, the small amount of heat that can be added to incoming fresh air through a ventilation system is sufficient to keep a Passivhaus at a comfortable temperature. During warmer periods, strategic shading and aeration is typically enough to keep a Passivhaus comfortably cool, although in warm, humid climates, some type of small-scale air conditioning may be required.

There is often a lot of press coverage about Passivhaus overheating – is this true?

Passivhaus can overheat mostly in flats if constructed with too much thermal mass e.g. concrete or bricks walls and floors which retain the heat. Unlike lightweight construction, such as Beattie Passive, which heats up quickly but also releases heat by night-time flushing. This ensures a consistent comfortable temperature is maintained.

***“Passivhaus
isn't scary or
rocket science
– it's an easy
and cost
effective way
to build a very
comfortable,
highly energy
efficient home”***