

PassiveHaus and EnerPHit

'Passive House' vs 'passive house'

There is a significant difference between the building concept known as 'PassivHaus' or 'Passive House' and a 'passive house' design.

A PassivHaus (or Passive House) is a well-defined industry design standard which is the subject of a certification process overseen by The PassivHaus Institute. A 'passive house' typically relates to a building with certain passive design features.

What is 'passive house' design?

Passive design minimises the energy requirements of a building, making the best use of natural factors. Passive buildings often have a passive solar strategy, by means of a highly glazed south façade, sun space or conservatory, combined with a high level of thermal efficiency to reduce heating and artificial lighting requirements. These buildings may also be specified with a natural ventilation system.

One of the benefits of this approach is that there are fewer active mechanical and electrical systems to maintain. However, the success of this approach is highly reliant on the building orientation and format. Heat may be lost through



natural ventilation and some passive solar designs have also been prone to overheat during hot months.

What is PassivHaus?

The PassivHaus movement was developed in Germany in the 1990s and is a leading comfort and energy standard for buildings. It sets targets for heat and electrical energy used by a building and provides a detailed process to ensure that target is achieved.

A PassivHaus incorporates some features of passive design. However a key difference is that the fresh incoming air is pre-heated to meet the heating requirement of the building - which is an 'active' approach. Whilst this allows the design to be more flexible, a very low specific space heating requirement of 15 kWh/(m² a) must be achieved, and the ventilation system must be correctly specified, designed and commissioned.

PassivHaus assessment and certification Buildings

To achieve the PassivHaus Standard in the UK a building requires:

→ **Accurate design modelling using the Passive House Planning Package (PHPP)**

This tool considers a wide range of variable characteristics which affect heat loss, energy use and internal comfort, allowing a superior fit between predicted energy use and real-world performance. It is used to assess compliance with the defined criteria for success.

→ **Extremely high performance windows with insulated frames**

U-values for windows and doors need to be 0.8 W/m²K or less (for both the frame and glazing). This requires the window frame to incorporate insulation and most likely triple glazing.

→ **Very high levels of insulation**

Opaque U-values must be less than 0.15 W/m²K.

→ **Airtight building fabric** Maximum of 0.6 air changes per hour at 50 Pascals pressure;

→ **Thermal bridges which cannot be avoided must be minimised as far as possible.**

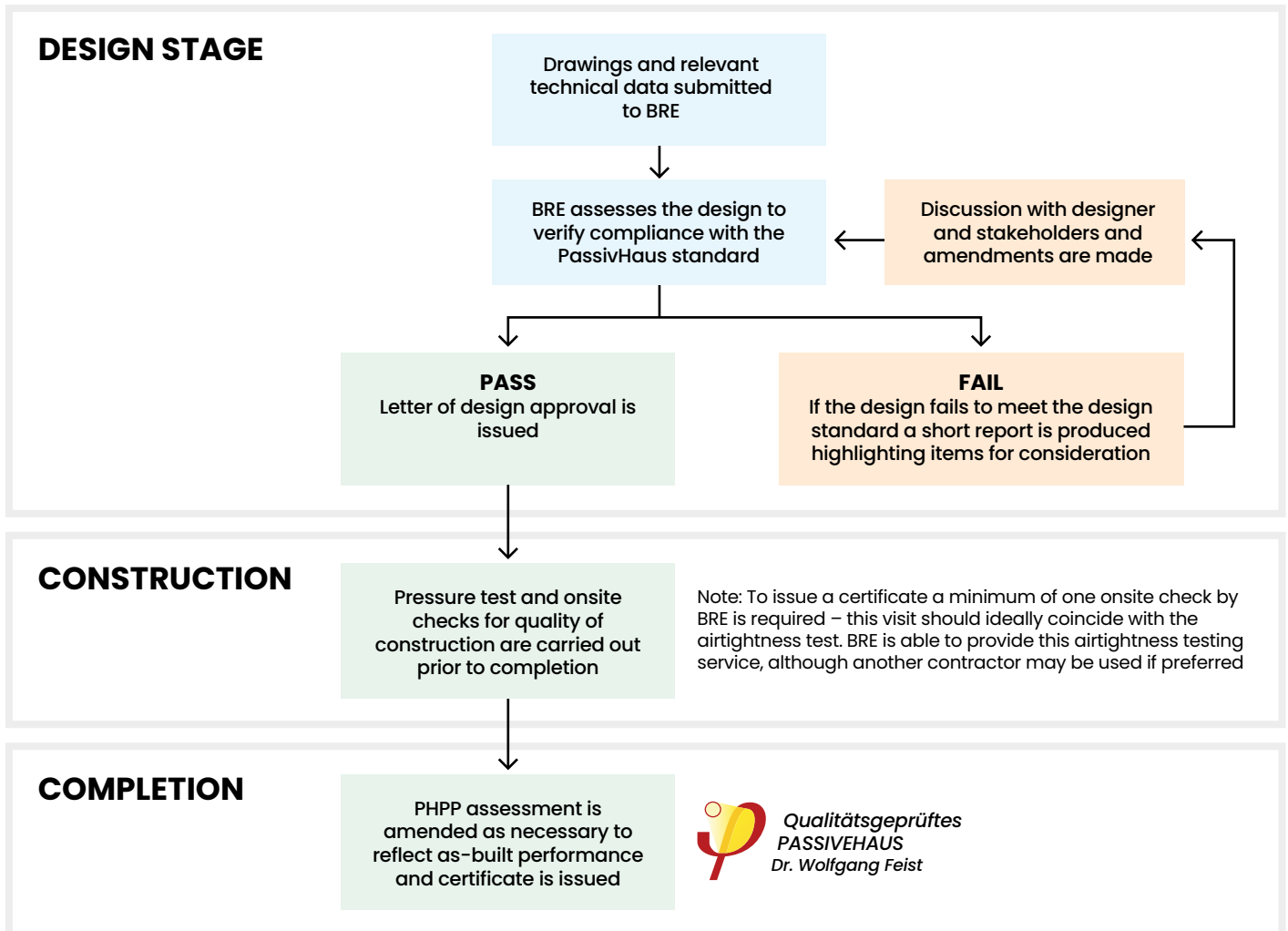
→ **A mechanical ventilation system with highly efficient heat recovery**

75% efficient or better, with a low specific fan power.

Tests ensure these targets and criteria are met which completes the quality assurance process. A certificate is only issued by a PassivHaus certifier if the **defined criteria** have been met without exception.



BRE is registered with the PassivHaus Institut in Germany to issue PassivHaus certificates for dwellings, offices, schools and industrial buildings. The certification process through BRE is as follows:



EnerPHit standard: refurbishment and retrofit

PassivHaus certification can be achieved on very low energy retrofit projects and is assessed under the certification EnerPHit.

This is a less demanding standard for retrofit projects, where the existing architecture and conservation issues mean that meeting the PassivHaus standard is not achievable.

	Passivhaus	EnerPHit
Primary energy demand	≤120 kWh/m ² . yr	≤120 kWh/m ² . yr + heat load factor
Space heating demand	≤15 kWh/m ² . yr	≤25 kWh/m ² . yr
Specific cooling demand	≤15 kWh/m ² . yr	≤25 kWh/m ² . yr
Specific cooling load	≤10 W/m ² .	≤10 W/m ² .
Airtightness	≤ 0.6 air changes/hr @ n50	≤ 1.0 air changes/hr @ n50

Why PassivHaus?

PassivHaus is backed by 30 years of evidence and is available to address the demands originating in the built environment which relate to the global climate emergency.

It provides a range of proven approaches to deliver net-zero-ready new and existing buildings which are optimised for a decarbonised grid and positively address the needs of their occupants' health and wellbeing.

1. Lower carbon emissions

The PassivHaus model is one of the most effective ways of reducing carbon emissions.

Conventional buildings consume up to 40 percent of global energy use and contribute up to 30 per cent of annual global greenhouse gas emissions. The PassivHaus Standard gives a range of approaches for our journey to net zero and is applicable across all building types.

2. Health and wellbeing

Indoor and outdoor air quality is becoming a growing concern. PassivHaus designs have mechanical ventilation systems that deliver clean fresh air to each individual unit year-round. Efficient buildings usually have a better build quality which provides a catalyst for multiple benefits in terms of the occupants' health and wellbeing; no draughts, mould or condensation; less overheating; stable temperatures year round; peaceful and quiet environments which are affordable and resilient.

3. Resilience

There is increasing variability in weather and related concerns about the security of the electrical grid in the face of natural disturbances. The high level of insulation and air tightness keeps a PassivHaus building comfortable for far longer than a normal building.

About Morgan Lovell

As office design and fit out specialists, we transform workplaces, bringing brands to life and inspiring a different way of working – so your teams can perform at their peak. Our approach to every project focuses on the long term, as we aim for results that protect and enhance the environment by reducing carbon emissions.

Morgan Lovell's company-wide commitment to low carbon and sustainability means we have reduced our own emissions by 64 percent since 2010, as we continue to work towards our net zero target by 2030. We work closely with each client and our supply chains to help them achieve their own low carbon goals.

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