

18: Passivhaus Refurbishment

What is the Passivhaus standard?

Passivhaus is a rigorous construction standard developed to minimise energy use for heating in new and existing properties. Core principles of a Passivhaus rely upon the design and specification of super insulation and highly airtight thermal bridge free fabric, combined with whole house mechanical ventilation with heat recovery. Using this approach, a building has minimal heat losses through the fabric, and is supplied with permanent fresh air and regulated humidity, with no uncomfortable draughts. A Passivhaus must have a total heating demand of 15 kWh/m²/year or less, or 25 kWh/m²/year or less (assessed through the EnerPHit standard) if it is a retrofit. By comparison, the average heating consumption for the existing UK building stock is 180 kWh/m²/year, 100 kWh/m²/year when renovated and 50-60 kWh/m²/year if it is a new build. Before adopting a Passivhaus retrofit, take note of the 10 key issues listed below.

Mark Dowson, Buro Happold, October 2012

Key Issues

- There should be an understanding at the outset that Passivhaus cannot be applied to all retrofit projects due to potential disruption, technical issues and heritage restrictions.
- Before adopting Passivhaus, the project team should be fully trained on the work methodologies required to achieve certification. Specifically air-tightness.
- Passivhaus projects greatly benefit from the services of a contractor with specialist expertise as the process requires a step change in build quality.
- It is a good idea to smoke test before retrofit works commences, as this will identify the key elements to be addressed. Party walls are a particular problem.
- To avoid remedial works, all airtight tapes/barriers and services penetrations must be properly sequenced before the glazing and insulation is installed.
- Allow plenty of time for specialist items such as triple glazing, external doors & the MVHR, since the UK market for Passivhaus compliant products is currently underdeveloped.
- Do not cover up the materials and joints forming the air-tight barrier until the installation quality has been inspected and the air tightness has been verified.
- Agree contractual 'hold-points' for air-tightness and smoke testing to take place after all significant fabric upgrades. Review the programme and costs at each stage of the project.
- Having an 'Air Tightness Champion' on-site full/part time that understands and can predict the problems and associated with refurbishment is an advantage.
- Proper onsite training and inductions of all sub-contractor site staff is essential before they are allowed on site to avoid uncertainty of Passivhaus requirements.

Links

- UK Passivhaus website: <http://www.passivhaus.org.uk/>
- EnerPHit standard at the UK Passivhaus trust website: <http://www.passivhaus.org.uk/page.jsp?id=20>
- German Passivhaus institute website: <http://www.passiv.de/>
- 'Retrofit for the Future' case studies: <http://www.retrofitforthefuture.org/>
- BRE Passivhaus certification website: <http://www.bre.co.uk/accreditation/page.jsp?id=2648>