

Certification Standards - Passivhaus and AECB

Overview

This page gives an overview of the energy standards of the AECB and the Passivhaus Institute. They have varying levels of requirements but follow similar principles – energy modelling through PHPP, evidence requirements, and following a certification procedure.

Benefits

Energy efficiency

Low heating demand and reduced performance gap. This leads to lower energy bills and less impact on the environment.

Superior comfort

Consistent and comfortable temperature throughout the year, with minimal temperature variations and drafts.

Health and wellbeing

Mechanical ventilation maintains indoor air quality for occupant health.

Durability

Buildings are constructed with high-quality materials and designed to be airtight and moisture-resistant, leading to reduced maintenance costs over time.

Improved Quality Assurance

The use of PHPP (Passivhaus Planning Package) improves the accuracy of the energy modelling, and the certification process (evidence collection and certifier reviews) reduces the performance gap.

Key Performance Criteria

Criteria	AECB CarbonLite Standards			Passivhaus Institute Standards		
	Step-By-Step	Retrofit	New Build	PHI Low Energy Building	EnerPHit (retrofit)	Passivhaus
Space heating demand (kWh/(m ² .a))	N/A*	50	40	30	25 (for cool-temperate climate)	15 (or 10 W/m ²)
Air tightness	5.0 m ³ /hm ²	2.0 m ³ /hm ²	1.5 m ³ /hm ²	1.0 ach	1.0 ach	0.6 ach
Primary Energy Renewable (PER) demand (kWh/(m ² .a))	N/A	N/A	75	75	60	60
Overheating (hours > 25°C)	<10% <5% recommended					

* Requires a heat pump system is designed and installed for flow temp <50°C, so may require fabric improvements

Design Principles

Continuous insulation

High levels of insulation with thermal bridges minimised and accounted for in energy modelling.

Form and solar gain

Efficient form factor (low surface area to floor area ratio), with glazing balanced to provide good levels of daylight and winter solar gain, while avoiding overheating.

Air tightness

Airtightness reduces heat loss, improves comfort and protects the building fabric.

High performing windows

Passivhaus in the UK requires triple glazed windows for high comfort levels.

Building services

Passivhaus is flexible on heating strategy, but efficient systems are required to meet the PER target. AECB New Build and Retrofit Step-By-Step require the use of a heat pump, apart from exceptional circumstances where electric heating may be permitted. Continuous mechanical ventilation is required, with Passivhaus requiring MVHR (Mechanical Ventilation with Heat Recovery).

PHPP (Passivhaus Planning Package)

A highly detailed energy modelling tool used for informing building design and demonstrating compliance with AECB and Passivhaus. Includes heating demand, heating load, PER and overheating. This will be used by the PHPP modeller throughout the design process, incorporating any design changes to check compliance with the standards.

Construction

Education and training

Construction team members should be familiar with the requirements of AECB/Passivhaus and would benefit from relevant training such as the Passivhaus Contractor course or training on airtightness.

Team collaboration

Maintain open communication channels between the architect, energy consultant, construction teams, subcontractors, and suppliers.

Air tightness

Employ an air tightness champion and perform interim air tightness tests while the air barrier can still be accessed and remedied.

Quality Control

Focus on high quality workmanship, with an airtight construction with no gaps between insulation,

Evidence

Various evidence is required from the construction phase, including photographs, air test certificates and commissioning certificates. Photographs of specific aspects are required demonstrate the installation is of high quality and matches the design.

Certification Procedure

AECB CarbonLite Certification requires an AECB PHPP modeller and AECB certifier (this can be the same person). Passivhaus requires a 3rd party certifier, separate to the Passivhaus Designer/Consultant.

In both cases PHPP modelling should be carried out at an early stage (before planning) and reviewed by a certifier to check the project can meet the desired standard or explore which targets can be met. A certifier should then review the project again before construction begins, to check the detailed design meets requirements.

The certifier will then review the construction evidence (photographs and certificates etc.) upon completion. They may also make site visits during the construction process. Finally, the as-built PHPP file and supporting evidence are submitted to the AECB/PHI for lodgement.