FactSheet
February 2022

AIR TIGHTNESS IN BUILDINGS & OSB

The energy consumed in running a home is a growing concern for home owners and governments, but the role of air-tightness is often not well understood. A lack of air-tightness in the home raises energy bills, as owners pay to heat or cool the air in the home, only for this to be quickly replaced by the hotter or cooler air out-side. High performance building and the 'Passive House' method are increasing in the Australian setting as a result. This factsheet aims to shed some light on these topics including the role Oriented Strand Board (OSB) can play.

Those in the industry will be familiar with the multitude of uses for OSB. Available in range of depths and sheet sizes, it is commonly used for structural bracing, cladding backing, roof underlay and flooring. More recently OSB has been used to enhance air-tightness of the building envelope, as a more robust alternative to specialised membranes.

Both ventilation and air-tightness are important for a comfortable and thermally efficient home. Let's define these terms further.

Ventilation involves intentionally introducing air from the out-side to ensure air quality, such via open windows or exhaust fans. Conversely, air-tightness aims to minimise unintended air movement to and from the external environment. Common sources of air leakage are shown below in Figure 1:

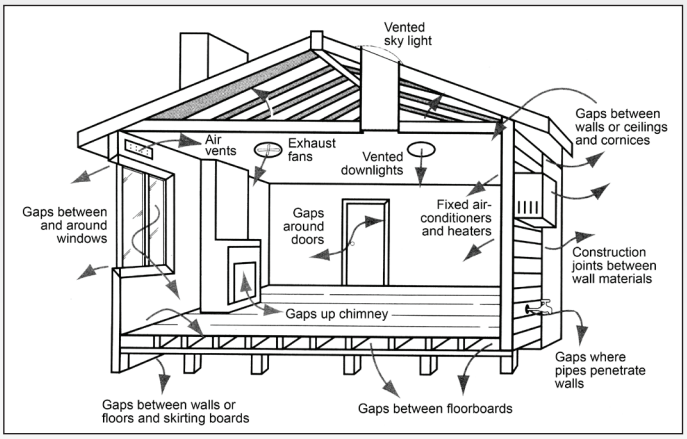

Figure 1 - Common Air Leakage Points (Source: yourhome.gov.au)

Air-tightness is generally measured in air changes per hour @ 50 Pascals pressure (ACH50). Meaning the number of times the total air volume in the home is exchanged every hour.

Australian building practice has traditionally resulted in quite 'leaky' homes. A CSIRO (2015) study confirmed this with newly built homes in Australia measured at an average of 15.4 air changes per hour. The National Construction Code in Australia does not quantify minimum standards for air-tightness.

By comparison the rigorous 'Passive House' design standard which originated in Germany requires buildings achieve 0.6 ACH50 or less. To achieve certification every build must meet this air-tightness standard in a 'Blower Door Test'. A small mechanical ventilation and heat recovery system is required to ensure fresh air through-out the dwelling.

OSB is proven as an air-tight layer, with Meyer Timber® supplying this to a number of successful Passive House projects in Australia. Generally thicker sheets (15mm) are used, with joins between sheets taped. However future developments may show thinner layers, such as 6mm, have a role to play in air-tightness. The advantage here, is that it serves a double purpose as a bracing unit.

It is important that OSB is sourced from a reputable supplier with tested specification, as air permeability can vary dramatically between different grades of OSB and manufacturers.

So, all set to pull up the plaster of your home and line with air-tight OSB? Not so fast. Unless movement of water vapour is considered, a jump in air-tightness may lead to condensation, potentially causing mould and even eventual structural damage.

In fact, vapour permeability and condensation sound like a great topic for another Meyer Timber® factsheet.

Thomas

Further reading:

- https://www.yourhome.gov.au/passive-design/ventilation-airtightness
- https://research.csiro.au/energyrating/wp-content/uploads/sites/74/2016/05/House-Energy-Efficiency-Inspect-Proj.pdf