

Environmentally Sustainable Design and Energy Efficiency Information Sheets

Information Sheet – Building Materials

The materials you use to construct your new dwelling or addition can have a significant impact on the carbon footprint of the building, and also how energy efficient the building will be. It is important to consider your building materials up front because it can be difficult and more expensive to retrofit an existing building. In addition, while the initial costs may be higher in order to incorporate these materials, they can pay off over the lifetime of the building.

Insulation

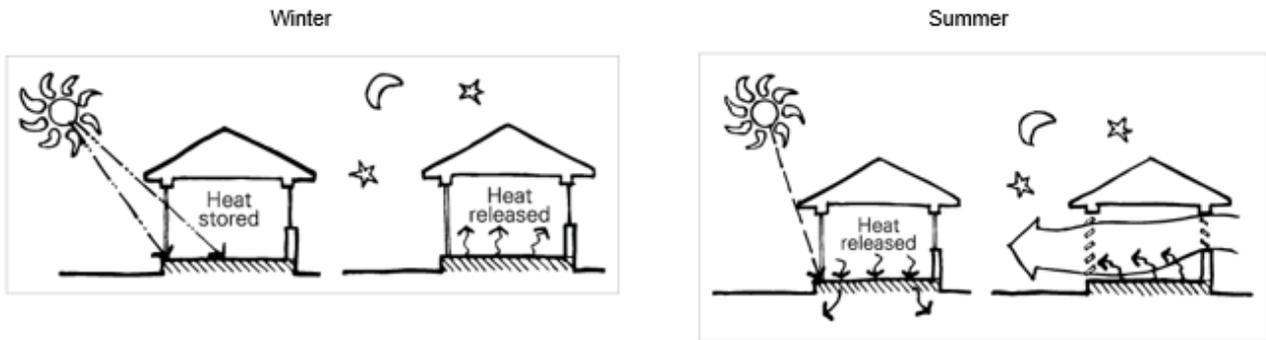
- All building materials allow heat to pass through them. Insulation helps to reduce the transfer of this heat depending on the seasons.
- Using insulation in your building can assist with minimising heat loss in winter and preventing heat gain in summer
- In winter, insulation acts like a thermos and keeps the heat in, and in summer, it acts like an esky to keep the heat out
- Insulation should be incorporated throughout the building, including in the ceiling, roof, walls and floor
- Insulation is most effective in conjunction with good building orientation and siting on the property
- Common types of insulation include polyester batts, polystyrene sheets, glass wool batts and sheep's wool batts
- Insulation comes in two main categories – bulk and reflective. To determine the effectiveness of each different type, we need to measure their resistance to heat flow, which is known as their 'R-value'. A higher 'R-value' will result in a higher level of insulation.
- Renovations are often an ideal time to install new insulation in your floors and walls



Thermal Mass

- Thermal mass is the capacity of building materials to store and absorb heat, and then release it at a later time
- During the summer, the heat is absorbed and released at night to cooling breezes or the clear night sky, ensuring the building does not get too hot, while in winter, the heat from the sun is stored to be released internally at night, to assist with keeping the building warm
- Different materials have different thermal mass – brick, concrete or straw bale typically have a higher thermal mass, while weatherboard and corrugated iron have a lower thermal mass
- Like insulation, thermal mass works best with good building design; glazing facing appropriate directions, appropriate levels of shading, insulation and thermal mass

- When used appropriately, thermal mass can make a big difference to the interior comfort of a building and can minimise the need for mechanical heating and cooling



Source: www.yourhome.gov.au

Construction Materials

- It is important to consider the materials you use when constructing your building, as different materials can have a different impact on the environment
- Each material has a different amount of 'embodied energy' used to produce it (from raw resource extraction, its manufacture, and transporting and delivery of the material)
- It is important to use a range of different materials in the construction of your building. You should look at incorporating certain materials to enable a high thermal mass, but also using other materials to which enable low energy consumption.
- If you are demolishing an existing dwelling, it is beneficial to use existing building materials such as bricks, timber and windows
- The majority of new buildings use new materials, which is not always environmentally friendly. Incorporating materials that traditionally have a longer lifespan is better for the environment.
- Materials which are produced locally can assist with reducing transport omissions
- Different building materials have different benefits, and it is important research which construction material will have the best environmental benefits for your building.
- Some common building materials include brick, concrete, corrugated steel, weatherboard, straw bale, mud brick, rammed earth, autoclaved aerated concrete (AAC) and earth brick.

