

> climate and comfort

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This fact sheet presents background information relating to climate zones in Victoria, their impact on residential energy requirements and factors influencing our perception of thermal comfort.

Climate zones in Victoria

The climate of where you live needs to be taken into consideration when designing a home for comfort and energy efficiency. Across Victoria, there can be considerable differences between maximum and minimum temperatures in summer and winter, as well as temperature differences between day and night, and the length of the heating and cooling seasons. Good building design should account for these climate variations and be tailored to the specific area in which you live.

House design in different climate zones

Winter heating is the predominant concern of householders throughout all of Victoria, with summer cooling requirements being less significant.

To achieve the best results, the choice of housing design and construction materials should be appropriate to the climate of a region (macro-climate). While each climate zone has different heating and cooling needs, the same principles of energy efficient house design

apply, with their application varying slightly, e.g. different levels of insulation or thermal mass or variations in window sizes.

In addition to general energy efficient design principles, houses in cooler zones require attention to higher insulation levels, winter window protection, draught proofing and summer shading.

Thermal comfort

Thermal comfort refers to the range of conditions in which the majority of people feel comfortable. This is a limited range, as we need to maintain a relatively stable body temperature of 37°C.

Our bodies produce heat mainly through activity, and give off heat according to the surrounding environmental conditions.

As shown in Figure 1, heat is lost from the body in three main ways:

- > radiation 45%
- > convection 30%
- > evaporation 25%.

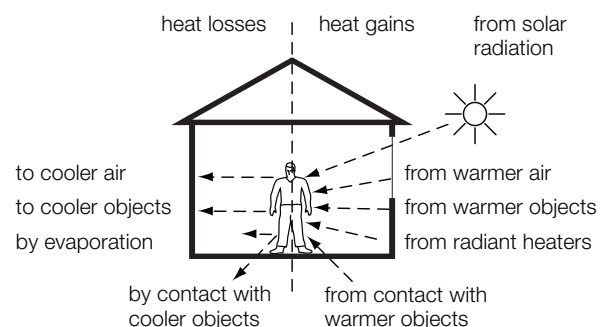


Figure 1: Main factors affecting body heat gains and losses inside a building

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Thermal comfort variables

Comfort is influenced by the six main variables listed below:

1. **air temperature** (also called dry bulb temperature): the most common measure of thermal comfort
2. **mean radiant temperature**: the weighted average temperature of all exposed surfaces in a space. Discomfort may be experienced when there is a large difference between internal surface temperatures (e.g. uncurtained windows) and the internal air temperature, causing radiant heat to be lost from the body to the cooler surfaces
3. **relative air velocity**: important in warm weather, as air moving across the skin increases heat loss by convection, lowering the perceived air temperature
4. **humidity**: the moisture content of the air is defined as relative humidity and may cause discomfort when above 70% or below 30%
5. **activity levels**: lower air temperatures are acceptable when users of the space have higher activity levels, reducing their heating needs
6. **thermal resistance of clothing**: lower air temperatures are acceptable if users of the space wear warm clothing or use enough blankets to lower their heating needs (e.g. in bedrooms at night).

Building design affects the first four of these thermal comfort variables, while the last two depend on the behaviour and actions of people. With an understanding of the effect of building design on thermal comfort, designs may be manipulated to achieve particular comfort levels.

Perception of comfort

There are considerable individual differences in perception of comfort. For example, older people tend to have different heating requirements. There are also differences between the sexes. These differences are often reflected in varying energy costs for homes.

The general rule for combining comfort and energy efficiency is to aim for the **lowest comfortable temperature** in winter, and the **highest comfortable temperature** in summer. For example, the recommended winter heating temperature range for living areas in Melbourne is 18–21°C, and 24–27°C for summer cooling. Keeping thermostats to these settings can considerably lower heating and cooling energy needs and costs.

Further information

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www.saveenergy.vic.gov.au

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