



Well positioned external shading can block up to 90 percent of heat from entering your home, and when installed on sun exposed north, east and west facing walls and windows, shading can greatly reduce the impact of Alice Springs' summer temperatures.

# Shading

## Why install external shading?

Unprotected glass and sun exposed walls can be the greatest source of unwanted heat entering your home. In fact, direct sun can generate the same heat as a single bar radiator over each square metre of the surface of your home. The radiant heat from the sun passes through the glass and is absorbed by the building, and even the furnishings, and becomes 'trapped'. While 'trapping' radiant heat may be ideal for those colder winter nights it should be avoided in the summer in order to maximise your comfort and minimise cooling costs.

Installing blinds or curtains on the inside of windows can reflect some of this heat back out, but unless they effectively trap air against the window, the heat still ends up inside the room. Keeping the heat off walls and windows before it gets inside is much more effective. Consider how hot it gets in a car that is parked in the sun on a hot day, compared to a car that is parked in the shade. The same comparison can be made with your house.

If your home is made of bricks or concrete, which are very good at storing heat, the shading of sun exposed walls is very important, especially those that are east or west facing. If heat is allowed to pass through the walls, this can result in significant use of air conditioners, resulting in large electricity bills. Dark coloured walls will absorb more heat than light coloured walls. Again consider the example of the car. A dark coloured car is hotter inside than a light coloured car on a hot day.



# Types of shading

**Shading requirements can vary according to house orientation, the surrounding terrain and vegetation, and the size and shape of your home.**

Stop the sun before it reaches your windows



## East and west facing windows and walls

### Adjustable shading

East and west facing windows receive low morning and afternoon sun and are best shaded by adjustable vertical shade devices such as retractable window and verandah awnings. They control the heat coming into your home, while still allowing you to manipulate lighting levels and views. Adjustable shade devices also allow you to maximise the benefits of the sun to keep you warmer in the winter months.



Second skin protecting west facing walls

### Thermal skins

East and west facing walls can also be protected by an external thermal 'skin' made from a durable, lightly coloured building material suitable for external mounting (e.g. corrugated iron). The thermal 'skin' is installed with either an unsealed air gap with a layer of reflective foil facing the air gap, or with bulk insulation filling the gap. Both methods will shade and insulate the wall during summer. During winter it reduces heat loss from inside the home, particularly with the addition of bulk insulation.

### Paint it white

Another way to reduce heat gain on sun exposed walls is to paint them white or a light colour. This reflects heat away from the walls, keeping them cooler. However, white walls will give off a bright glare in the sunlight, which may be undesirable, so an off-white colour may be preferred. Vegetation such as climbing vines along the wall, or on a vertical trellis installed adjacent to the wall can also help to reduce the glare. Trees and large pergolas can also be utilised to shade these areas.





External blinds can be lowered or raised to manipulate the amount of sun



Vertical shading can be lowered to combat higher angle summer sun, but allows lower angle winter sun to warm the house

## North facing windows and walls

North facing walls and windows receive the summer sun from a higher angle. Walls and windows that are not shaded by adequate eaves, including north facing two storey walls are likely to get too much sun in the warmer months. They are best shaded by a well designed horizontal structure like an overhanging roof or eave that will also let in welcome sun during winter when the sun is at a lower angle. If your house has been built without adequate eaves, adjustable shading will allow you to block out the summer sun but still allow the winter sun to warm the house.

Shading appropriate for northern orientations includes adjustable awnings or horizontal louvre systems, removable shade cloth over pergolas, or shade sails or pergola's with angled roof slats. A second skin may also be appropriate for north facing walls.

## North-east and north-west orientations

Adjustable shading is recommended for these orientations as they receive a combination of high and low angle sun throughout the day. Ideally, shading solutions for northern, eastern or western elevations, need to integrate readily adjustable shading that excludes all sun in summer, allows full sun in winter, and manipulates sun levels at other times.

Adjustable shading on a patio area can help to cool your house and may even increase your living area during the summer months.

## Other factors impacting on heat gain to your home

### Got a two storey home?

The top floor of a two storey house is generally more sun exposed than the ground floor and can be difficult to shade. The top floor may receive less shade from trees and other buildings, and is likely to pick up rising hot air from the ground floor. As a result the top floor is usually much hotter in summer than the ground floor.



Adjustable awnings on a west facing balcony

External shading is the preferred way to keep the top floor cool naturally. This can be achieved with similar devices to those used in single storey houses. Wide eaves, horizontal shading structures and vertical awnings over sun exposed windows or walls are generally very effective, however it may be difficult to raise or lower standard awnings on a top floor because it is likely to be out of reach from the ground. An alternative is to install external awnings that can be wound up/down from inside the house or even going to the expense of electrically operated awnings or shutters. Installing thermal 'skins', especially on sun exposed west and east facing walls can also be very effective.

### Doors and windows left open during the day

For the same reason that we keep windows and doors closed on cold winter days to stop heat escaping, it's very important to keep doors and windows closed on summer days to keep your house as cool as possible for longer.

On the mornings of hot days, close up the house and shade all windows to block out the summer heat. Be mindful to allow some fresh air to enter the house if you are home, preferably from the shaded (and therefore cooler) side of your house. It is particularly important to keep the house closed up on a hot day if the ceiling is insulated, because if hot air can enter from outside, the insulation will trap that heat inside.



Horizontal awnings used to shade paved or concreted areas

### Concrete & paving

Large areas of unshaded concrete, rocks or paving around your house absorb sun and heat during the day. They then radiate that heat back on to walls and windows, heating up the house well after the sun has gone down and often into the night. If concrete or paving abuts your house without a gap, the heat can transfer easily through the slab of the floor, heating the inside of the house. Therefore consider shading not just windows and walls, but pavers and concrete paths beside the house as well. This can be done with vegetation such as pot plants, or if this is not possible, by shade sails or even painting the concrete white. Using gravel to cover this area (i.e. instead of concrete/paving) will also reduce the heat transfer through the slab of the house floor.



Vegetation used to shade windows

### Vegetation

Vegetation can be used to reduce the ground temperature and the amount of reflected heat on your walls or windows, and can provide a cooling effect through plant transpiration. Of course, plants can often take years to grow sufficiently to provide adequate sun protection, so they are considered a longer term solution.



## Tips for using plants for shading

Match plant characteristics (such as foliage density, canopy height and spread) to shading requirements. Choose local native species with low water requirements wherever possible. Local nurseries can give advice on appropriate plants. Be mindful of planting trees with invasive root systems too close to buildings.

- In addition to providing shade, plants can assist cooling by transpiration. Plants also enhance the visual environment and create pleasant filtered light. Deciduous plants allow winter sun through and exclude summer sun. Trees with high canopies are useful for shading roofs and large portions of the building structure, though shading the entire roof will make solar hot water and solar power systems unfeasible.
- Shrubs are appropriate for more localised shading of windows.
- Wall vines and ground cover insulate against summer heat and reduce reflected radiation.
- Vines and climbing plants can provide a shaded enclosure for verandahs and walls.



## Do it yourself shading options

If professionally manufactured and installed shading devices are beyond your budget or you are a rental tenant, consider these more affordable DIY options:

- Purchase inexpensive bamboo curtains or 'matchstick blinds' from a hardware store and hang them externally to help shade north, east, or west facing windows from the hot summer sun. They generally won't last more than a few summers, and don't block out all the sun, but for less than \$100 per blind, they will make your house more comfortable.
- Purchase prefabricated external blinds made out of shade cloth. They are a relatively inexpensive solution at around \$200 per blind. Hung externally from a fascia board or verandah they will help keep the hot summer sun off windows and walls.
- Purchase prefabricated shade sails and install them strategically to effectively shade walls and windows. Alternatively, buy shade cloth in bulk and sew your own blinds or even build your own frame and attach shade cloth to protect north, east and west facing walls and windows. A common DIY option is to hang shade cloth or sails from the fascia to the edge of a fence (check with your neighbour and your building certifier to ensure building regulations are met).

## Advice for new home builds

With good design you can minimise the need to rely on heating and cooling to remain comfortable in your home.

- Minimise shading to any portion of the glass in winter to allow full winter solar access, or increase the distance between the window head and the underside of the eave, but consider the effect it will have in summer.
- Use adjustable shade screens or deep overhangs (or a combination of both) to the east and west. Deep covered balconies or verandas shade and cool incoming air and provide pleasant outdoor living space.
- Consider adding a shaded courtyard next to the main living areas to act as a cool air well, filled with plants or a water feature for a natural cooling effect. Tall, narrow courtyards are the most effective option, positioned so that they are shaded from the summer sun by the house.
- Use planting instead of paving, to reduce the retention of summer heat, lower ground temperatures, and to reduce the amount of reflected heat.
- Drive around Alice Springs and talk to others to see what designs work and don't work. What's good for coastal capital cities is not likely to work well in our climate.

### Need More Information?

For further information on all aspects of sustainable housing, refer to the Your Home technical manual – 300 pages of practical technical solutions for builders, designers and homeowners which is also available on-line, [www.yourhome.gov.au](http://www.yourhome.gov.au)