



Window selection for ACT and region

Everyone likes great views, natural sunlight and lots of fresh air, so understandably windows are one of the most popular features in homes today. On average, glazing can account for between 20% and 40% of the wall area of a typical Australian home. With so much glass being used, it is vital to choose the most appropriate glazing and window treatments for our cool temperate climate.

Why is Window Design and Glazing Treatment so important in Canberra?

It is easy to control heat gains and losses through walls and ceilings by adding insulation. Windows are much harder and may be more expensive.

Windows and glazed doors are the weakest link in the building envelope

While glass is excellent at letting in the sun's light and warmth, it can cause great discomfort by letting in the winter cold and the summer heat. Better window treatments, careful window positioning and thermally efficient component selection will mean more comfortable houses, greater energy efficiency, lower greenhouse emissions and lower energy bills.

Canberra's climate has a high diurnal range (large temperature extremes) across 24 hours, typically 20 degrees C. This creates great demands on building designers to keep living conditions comfortable.

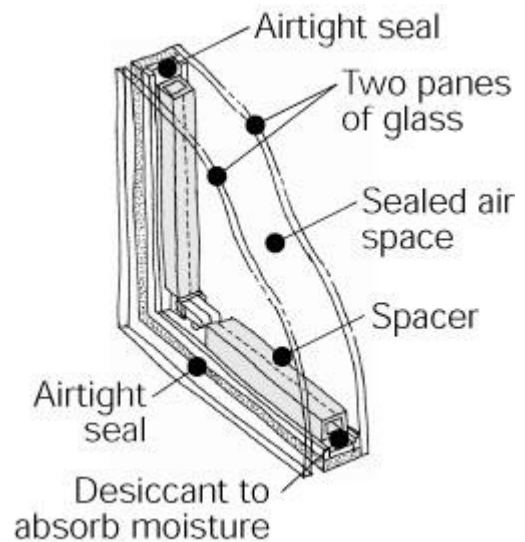
Choosing New Windows

To help you make the right choice for your climate and to understand the characteristics of any window please visit the Window Energy Rating Scheme (WERS) website. www.wers.net/residential/wers-for-residential

The website lists all known window products in Australia, rating their performance and suitability for a particular climate and the best application. A window rating label must appear on all windows sold in Australia in a similar way to the energy rating of appliances.

How Double Glazing works

Double-glazing works by reducing the heat flow through the window glass. By having a thin layer of air (usually 6-15mm) trapped between the two sheets of glass it is much more difficult for heat to be transferred by conduction because air is a poor conductor. Where standard double-glazing uses air between the glass sheets, special gases such as argon can be used to further enhance the windows insulating properties.



Double glazed window frames are available in aluminium, timber, aluminium/timber composite, fibreglass or PVC. Standard aluminium frames are a good conductor of heat, to improve their performance they need a **thermal break**, which is a small strip of glass fibre reinforced nylon, placed between the inner sash and outer frame. Timber, fibreglass and PVC frames possess better insulating properties than aluminium. PVC or fibreglass, with internal insulation rather than air pockets, can perform even better. These are used in very cold climates. PVC may require internal metal structures to maintain frame strength. This may compromise its insulation value and it is also not very dimensionally stable so it may warp and crack when there are large temperature variations such as the variations we experience in Canberra.

Good news for existing homes too!

If you have an existing house there is room for improvement by:

- Shading east and west windows vertically and
- Shading northern windows with horizontal shading above the windows for summer;
- installing well insulated floor to ceiling curtains, honeycomb blinds or air tight polystyrene shutters;
- fitting pelmets above existing/new curtains;
- engaging a company who specialize in **retrofitting** single glazed windows with double or secondary windows, or
- using an after-market product to double or secondary glaze yourself

Double Glazing: How much will it cost?

The cost difference between single and double glazing is **no longer significant** compared with the choice of window frame materials. Fibreglass and PVC windows are becoming more cost competitive as well as being good thermal performers. Fibreglass with double glazing for example is now **only slightly more expensive** than the basic aluminium frame with double glazing but performs much better.

So why choose double rather than single glazing?

Single glazing can be up to 15 times less thermally efficient than a standard insulated wall

AND

Installing standard double-glazing can reduce the heat loss of single glazing by 50% or more.

AND

Double glazing is more efficient during both day and night unlike window coverings which allow increased heat losses when open during the day.

Other benefits are:-

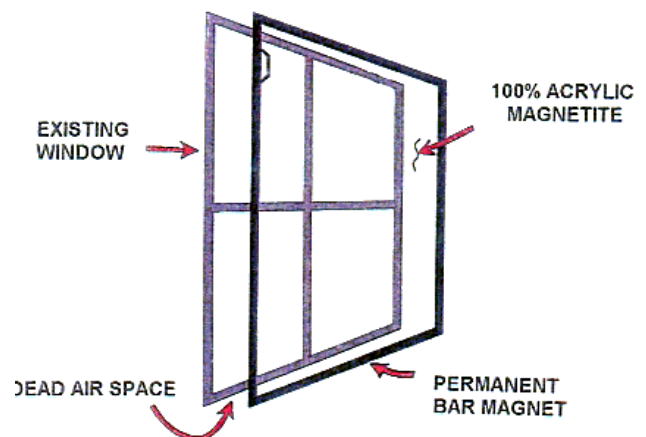
- reduced heat loss in cold months and heat gain in hot months saving on energy bills;

- increased strength of glazing and framing components, mean that windows will last longer whilst helping to protect against accidental breakage, criminal damage or forced entry;
- increased fire resistance (single glazing can shatter quickly when exposed to intense heat);
- dramatically reduced noise from outside;
- easier to meet government and local council energy efficiency compliance standards and
- improved market value of your home and more attractive as a rental property.

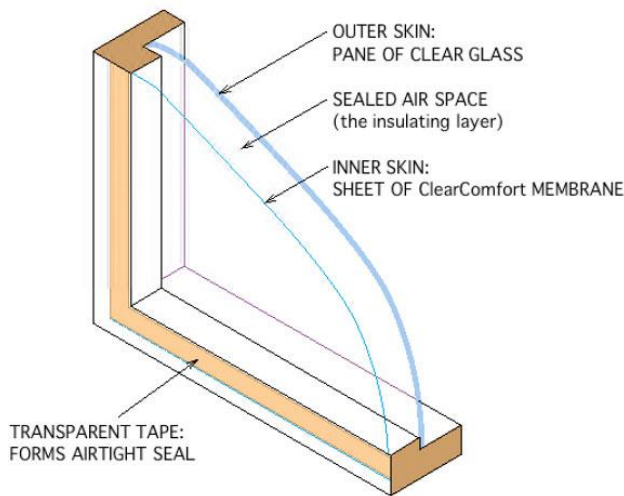
Alternatives to Replacement

If you are not able to replace your windows consider these alternatives:-

1. For timber windows – the sashes can be replaced with new double glazed sashes and fixed panels can be replaced with double glazed unit (DGU) inserts. This is approximately one third to one half the cost of new timber double glazing and can be completed faster.
2. For aluminium windows – a secondary window set is installed in the sill with an air gap to the main windows. Again the price is one third to half that of new windows and is very fast to replace. Its thermal performance would normally be better than double glazed aluminium window because of the improved thermal frame separation and air gap size.
3. For either type – acrylic with a magnetic frame can be fitted in the sill. This secondary window also has good thermal performance. The cost is about half that of new double glazed windows.



- The cheapest secondary window solution is to fit a transparent membrane to the window architrave or onto a separate timber frame to be fitted into the sill. This has the same thermal performance as double glazing if well-fitted but has less durability. It costs about 5% of the cost of double glazing and is an excellent solution where it cannot be easily damaged.



Please remember that if you decide to use secondary glazing make sure you understand how you open the outer window for summer, you may have to remove and store a panel during summer. Generally secondary windows are not as flexible as double glazed windows.

No “thermally improved” single glazed window performs as well as a double glazed unit simply because there is no insulating air gap between two layers of glazing. They are not recommended for the cool temperate Canberra climate and may cause excessive condensation on the inside surface of the window.

Advice for the New Home Builder

If you are building a new home and must choose between double glazing and thick window coverings always choose to start with the best thermal performance windows you can afford with cheap coverings rather than the opposite. It is easy to upgrade curtains later, but much harder and more expensive to upgrade your windows.

The best orientation in Canberra for living areas is North and is where you should place your large windows. If you intend to have large windows facing east or especially west then you must protect your windows with good internal window treatments and external shading. You do not need to shade south facing windows. In winter all other orientations apart from north have a net heat loss which means you lose heat through these windows, increasing your heating energy requirements through winter.

Window tints and special treatments:

Avoid window films as they stop winter heat gain. Only low e coatings in double glazed units work for both winter and summer.

As Canberra is primarily a heating climate, **HEAT** recommends using adjustable or removable external shading where possible. This reduces unwanted heat gain in summer while gaining the warmth during the winter months. If you wish to reduce ultra violet (UV) deterioration of carpets and furniture but retain heat inside your house then add low e films to your double glazed units.

The Future

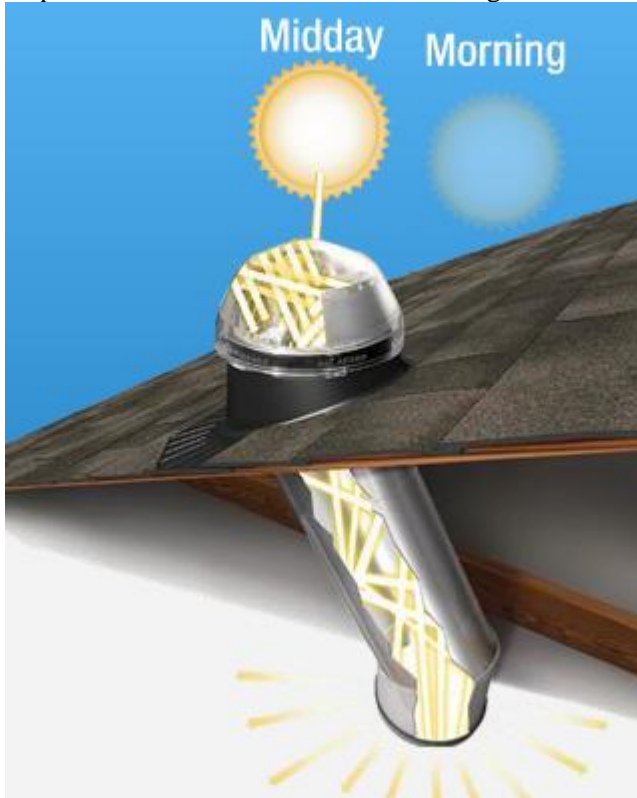
Double glazing will be needed in Canberra for all new houses to meet an energy efficiency rating. Double glazing with Argon and low e coating will often be used in new houses making them much more comfortable but with lower heat demands than a house built only 5 years ago.

In the future there will be double glazing available with suspended internal clear films creating the equivalent of triple or quad glazing without the weight or thickness of multiple glazing units. When filled with Argon or Krypton and with double low e coatings and insulated frame air sealed windows will be very high performers. Nevertheless they will continue to be the weakest point of the building envelope.

Skylights or Roof Glazing

Roof glazing also requires careful thought! Poorly planned skylights can result in large temperature extremes compared with wall windows, and are not usually recommended for Canberra.

The best way of achieving light without substantial heat loss or gain is to use a “**daylighting device**” which collects and concentrates light through a lens, then through a smooth reflective tube down to another dispersion lens in the room where the light is needed.



This gives good lighting colour and brightness without the thermal issues. Fans can also be attached to these devices for bathrooms, kitchens and laundries where they may be needed.

If you wish to use skylights then ensure that they are well insulated, enable moisture to escape where needed, incorporate an adjustable shading device and can be fully sealed.

Window Checklist:

1. Ask yourself, whether you require windows that are facing the wrong direction, and if so, whether their surface area can be reduced. Converting these windows to wall will be more efficient than any window you can buy;
2. If you can't afford to fully double glaze or secondary glaze your whole house, think about double glazing windows in your primary living area or those facing west;
3. Be aware of the WERS rating of any window you are considering;

4. As a rule of thumb, keep the total glass area between 20-30% of the total floor area of your home;
5. Provide adequate sized, adjustable external shading for your glazing to maximize winter and summer performance.
6. Maximize north facing windows, some to the east and minimise southerly and westerly orientations if possible – if you can't do this, plan for the most appropriate shading, well insulated windows and window treatments.
7. Be careful in your selection of skylights – use for natural light and ventilation – and keep them small or where possible use daylighting devices. Remember it is always cheaper to run a low wattage compact fluorescent than to have a skylight. Cleaning and waterproofing of skylights can be additional difficulties.

Window Treatments

Window treatments are an essential aspect of achieving good thermal conditions, especially in the Canberra climate where there are such great temperature extremes.

To obtain the best thermal conditions it is best to have the best windows and window treatments you can afford, so consider window treatments such as:

- Thick curtains that seal around the edges and drop down to the floor with block out attached, but not bonded, and pelmets OR
- honeycomb blinds fitting snugly within the window reveal OR
- tight polystyrene shutters.

Minimize the air leaks around the window to improve the insulation level.

For further tips about energy efficiency within your home look at our other Fact Sheets.



Home Energy Advice Team