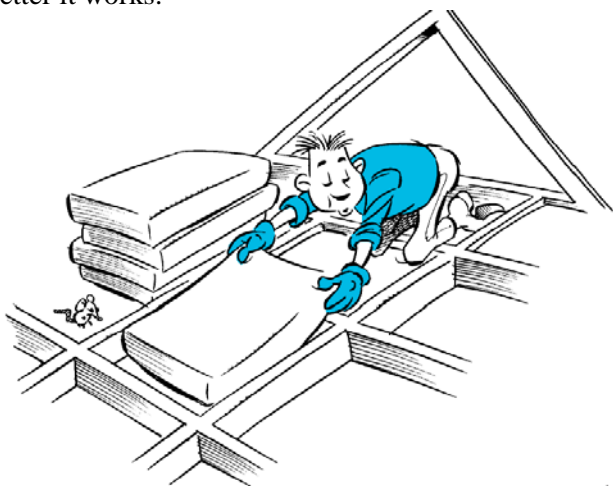




Insulation

Why install insulation?

Insulation acts as a barrier to heat flow. It can make your home more comfortable by reducing the amount of warmth escaping in winter and reducing the amount of heat entering in summer. By insulating you can significantly reduce your heating and cooling bills and help to reduce greenhouse gas emissions. The higher the R-value of insulation the more it slows heat flow and the better it works.



What sort of insulation should I use?

The important thing to remember with insulation is that R-value determines the effectiveness of the insulation. The type of insulation will depend on the circumstances of the project and personal preference. For example, wool batts rated at R2 will function exactly the same way thermally as Polyester Batts rated at R2. Check to ensure the insulation you choose passes Australian standards.

How much insulation do I need?

We recommend R 4 to R 5 in the ceiling; R1.5 to R 2 in the walls; and R 1 to R 1.5 under suspended floors or around slab edges. When installing you should prioritise the roof first, then walls, then floor. You can lose up to 40% of the heat in your home through the roof, up to 25% through walls and up to 15% through the floor.

Types of insulation

There are two types of insulation products that work in different ways:

Bulk insulation

Works by trapping tiny pockets of still air within its structure. This air provides a barrier or resistance to heat flow. Resistance to heat flow (R value) is not seasonally dependent for bulk insulation. See below for types of bulk insulation.

Reflective insulation

Works by a combination of reflecting large amounts of heat away from its polished metallic surface and/or by reducing the radiant heat being emitted from the surface. To be fully effective there needs to be an air gap of 25mm beside the reflective side of the insulation. Because reflective insulation works by reflecting radiant energy, it is more effective at higher temperatures and generally has a higher rating for summer R-values than for winter values. E.g. A layer of foil under roof tiles might be R0.23 for winter rating but R0.9 for summer.

Because Canberra has a climate that requires far more heating than cooling it is generally easier to get adequate levels of insulation using bulk insulation rather than foil insulation.

Tips for installation

- Fit: Avoid gaps in the insulation. If only 5% of an area is left un-insulated, up to 30% of the potential benefits may be lost. When using bulk insulation cut the insulation carefully to ensure good fitting around windows, ceiling fans, etc.
- Keep bulk insulation dry at all times.
- Have your wiring inspected by a licensed electrician to ensure it can be safely covered by insulation.
- Avoid loose-fill insulation if your roof space is excessively draughty, unless a sealant can be added to bond its top surface.
- Reflective foil should be installed with a still air gap of at least 25mm width next to the reflective surface. Tape up any holes, tears or joins in the foil.
- Caution! **Allow clearance** around appliances and fittings. Do not install insulation within 90mm of hot flues, or recessed light fittings. (Retain a clearance of 90mm for low voltage downlights). Restrain loose-fill insulation with non-combustible barriers.



Retrofitting insulation to roofs with attic-type spaces is generally straightforward as access is relatively easy and there is adequate space for the bulk insulation. In general it is a good idea to avoid covering ceiling joists as this may create a safety hazard unless a catwalk is installed.



Types of bulk insulation.

Cellulose fibre

Composition: Finely shredded waste paper.

Borax and boracic acid are added as fire retardants and to deter insects and rodents. Cellulose fibre is pumped or blown into ceilings by contractors to the required depth for the R-value purchased. Depending on the installation method, this material may settle over time with an associated reduction in performance. It is recommended that your contractor cite installation to the Australian standard and guarantee the settled depth and R-value.

Glasswool (fibreglass) batts

Composition: Melted glass spun into a mat of fibres.

Batts with different R-values are available. Glasswool batts are flexible and easily cut and installed by a householder or a contractor. A dust mask, gloves and a long sleeved shirt should be worn during the installation process. Fibreglass blankets with foil backing are also available and are typically used under the roof as insulation and a moisture (condensation) barrier. Gaps around and between the edges of batts can impact on the overall effectiveness of insulation. If you choose batts make sure they are installed without gaps.

Once installed, it does not release dust or fibres and is not known to have any ill effects on health.

Polyester batts

Composition: Polyester fibres spun into a mat.

These are similar to fibreglass batts, except that polyester is not known to cause irritation during installation. Foil-backed polyester blankets are also available.

Polystyrene foam boards

Composition: Polystyrene shaped into boards.

These have excellent insulating and water resistant properties. They can be used in double brick and brick veneer walls and against solid concrete and rammed earth walls. They can be rendered so are an alternative to bricks for cladding.

Rockwool

Composition: Melted volcanic rock (basalt) spun into fibres.

Available in loose fill form for vertical wall cavities and as batts and blankets for ceilings and frame walls. Rockwool is denser than fibreglass and possesses superior thermal and acoustic insulation properties, but is usually more expensive. The same precautions should be taken when installing rockwool as when installing fibreglass.

Common problems that reduce the effectiveness of insulation

Downlights and Penetrations

As mentioned earlier, even small gaps in insulation can compromise the effectiveness of insulation. For this reason, penetrations in the ceiling should be kept to a minimum. Recessed downlights are particularly bad culprits in this area as a 20m² room with 8 downlights would have an uninsulated area of only 1% by area, but this could increase heat loss by 15%, not including heat losses due to infiltration (warm air venting out through the downlights themselves).

Gaps and Cracks

Though not strictly speaking an insulation issue, many existing buildings, especially older ones, lose a significant amount of heat through drafts through gaps and cracks. Sealing these gaps and cracks is one of the most cost effective ways you can save energy and increase your comfort level.

In particular look for:

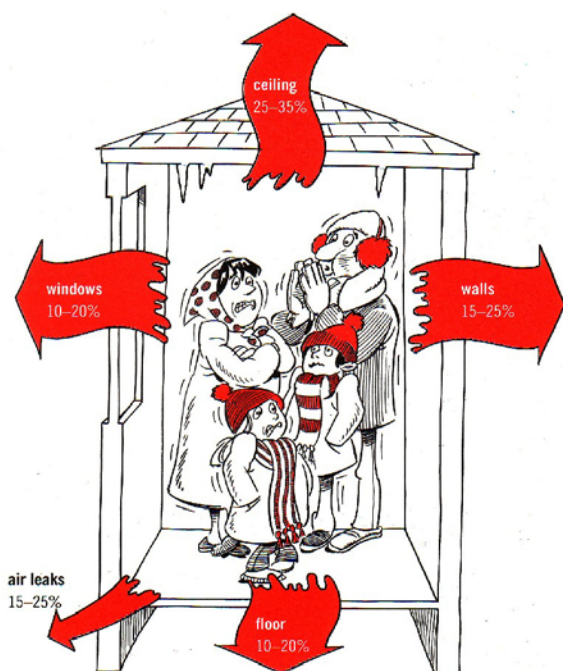


Wall vents:

Canberra has a dry continental climate. There is no need for wall vents as witnessed by their absence in new houses. Remove and plaster over, or otherwise seal your wall vents for improved comfort.

Gaps around the skirting board:

This is particularly true for double brick houses but also holds true in brick veneer houses. A sizeable gap is often present where the wall meets the floor. Depending on the size of the gap, a silicon sealant, expandable foam, or additional skirting board will eliminate this problem.



Exhaust fans:

Are necessary for kitchen and bathroom ventilation but are typically open all the time. Installing a hinged cover in the roof cavity over existing fans or using fans that 'blade close' when not in operation will help reduce unwanted heat losses and gains.

Fixed Ventilation in bathrooms:

Many older houses have a hole or screened window that does not have any glass. Again, such permanent ventilation is not necessary. Consider replacing the screen or hole with glass or other suitable building material and crack open a window for low level ventilation at times when it is needed.

Gaps around Windows:

Especially in older houses, there may be gaps between the walls and the window frame. Treat these in the same manner as gaps between the floor and walls. In addition, windows may not seal properly due to wear or warping. It is usually possible to use weather-stripping (adhesive-backed foam strips) to improve the seal of existing windows. In extreme cases, window replacement may be appropriate.

More information

This fact sheet is produced by the Home Energy Advice Team (HEAT) to provide you with some basic information on insulation. If after reading it you'd like more free information about this or any other topic to do with saving energy in your home, don't hesitate to contact us:

A range of other fact sheets on saving energy and money in your home are available from HEAT

