



UPGRADING SUBFLOOR INSULATION

Renovating existing buildings is an ideal time to improve insulation to current standards from that required when the house was built. One common change is replacing subfloor foil with another product.

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Good insulation not only helps keep a building warmer in winter, but also cooler in summer. Improving energy efficiency has become a priority for many in recent years, and now consumers are demanding greater insulation levels in their houses.

Foil often used in past

Traditionally, subfloor insulation requirements for new houses were met by using perforated aluminium foil draped between the floor joists. Often this didn't perform to the minimum Building Code requirements due to poor installation techniques that failed to create the necessary still air gap between the foil and the underside of the flooring. In addition, foil frequently loses its reflectivity as it ages due to oxidation and dust accumulation, and its performance can be compromised by wind and other damage.

Options to upgrade

Retrofitting insulation to a suspended floor can be a relatively easy job (if you don't mind spiders!) and is normally done from below the floor, provided there is sufficient space for the installer. Where the existing flooring is being removed during an alteration, installing the product from the top may be far simpler.

There are a variety of products on the market that can be easily retrofitted in subfloor spaces. These include:

- sheets of polystyrene friction fitted between the joists
- segments of polyester material held or fixed to floor joists
- fibreglass or wool insulation. This needs dry subfloors, so damp ground should be

covered with polythene and ventilation should meet the requirements of E2/AS1 and NZS 3604:1999 *Timber framed buildings*.

Fitting is critical

The fitting of the insulation is important for whatever product you chose. It needs to be snug – not forced in or compressed.

Insulation works by creating still air within the product. Compressing products reduces the amount of still air the product can hold, thus reducing its effectiveness (R-value) as an insulation material.

The other key point is that insulation should not be cut too loose with gaps around the material. This allows air movement around the product, again significantly reducing the effectiveness of the insulation.

Installation preparation

Before insulating the subfloor, see whether any maintenance is required first:

- Check for dampness by rubbing the soil on your hands. If it leaves a stain, the subfloor is too damp. Lay polythene sheet over the ground and tape it to all piles and so on. This will also make it easier to install the insulation.
- Check for mould – if found, get some specialised advice on how to treat the mould and what safety equipment you should wear.
- Check that all timber is sound.
- Check for any visible signs of leaks from baths and showers located above – any damaged flooring or framing will need to be replaced.
- Check around the subfloor perimeter for signs of water leaks through the cladding – if there are signs of water problems, the cause

needs to be identified and remedied before insulation work is done.

Safety of paramount importance

There have been a number of serious accidents where installers have stapled or nailed through electrical wiring that is fixed to the joists. Appendix B in NZS 4246:2006 *Energy efficiency – Installing insulation in residential buildings* has detailed advice on safety precautions to take, but always:

- locate any gas, electricity or water services fixed to or passing through subfloor members and mark for future reference
- connect electrical cords for tools or lighting to either a transformer or RCD (sometimes, it may be more appropriate to turn the power off at the main, see NZS 4246:2006 Appendix B)
- isolate the power supply to cables within the subfloor while installing the insulation
- for old buildings with wiring run in metal conduit, get an electrician to check that the metal conduit is not 'alive' and is properly earthed.

Out with the foil

Before starting work, establish if there is adequate access to the subfloor space and sufficient space between the joists and the ground to allow access to all of the floor area. BRANZ recommends removing existing foil. Run a sharp craft knife down each side of the joist and pull the foil away. Remember electrical safety and to dispose of it sensibly.

Installing polystyrene

When installing polystyrene, push it firmly against the underside of the floor. Usually the friction →



The thermal performance of many houses could be improved by replacing the old foil with another insulation product.

will hold it in place, but an alternative to make it more secure is to fix a timber batten or plastic trim to the joist to hold it in place.

Some products have ridges designed to maintain an air space between the floor and the insulation. Ensure the ends of all gaps are closed off to stop convection heat loss.

SEPARATE WIRING AND POLYSTYRENE

Electrical wiring needs to be separated from the polystyrene (typically sleeved or placed in a conduit). A reaction between the polystyrene and the cable sheathing (called plasticiser migration) can make the cable sheathing become brittle, possibly exposing live wires.

Installing polyster, fibreglass or wool

Always follow the manufacturer's instructions, as many systems are unique. Avoid tucks, folds and any gaps. Usually products are fitted directly under the flooring and must be fixed in place to avoid sagging. Some bulk insulation products are available with wings or flaps on the side. The material is fitted snugly to the underside of the floor and the wings stapled to the joist.

Some systems use a 20 x 20 mm plastic strip that can be stapled through. In this case, you should use a good heavy duty staple gun. Using a hammer type stapler could result in the material being damaged during installation.

Fill material (which is supported by plastic tape or battens to ensure it doesn't fall out) can have a gap between the insulation and the floor – the bottom of the insulation lines up with the bottom of the joists. The gap must be closed off at the ends and the insulation well fitted to the whole bay to prevent any airflow above the insulation, which would reduce the insulation R-value.

Insulate water pipes

Where water pipes are located in the subfloor, these should also be insulated. Insulating hot water pipes is done with a premade expanded foam tube. This will reduce heat loss between the water heater and the outlet. Insulating cold water pipes may prevent the pipes freezing and bursting where freezing is possible.

Aim to exceed Code minimums

Remember that subfloor insulation in the Building Code's Acceptable Solutions is a minimum requirement. There is no barrier in the Building Code or Building Act 2004 to exceeding the Code's minimum requirements.

BRANZ has previously published information on retrofitting thermal insulation in Bulletin 496 Retrofitting thermal insulation and in Build 111, April/May 2009, pages 25–26. ◀