

Energy Action Scotland Advisors Toolkit

Chapter III. Insulation and Other Physical Measures

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*“Working to end fuel poverty and achieve warm,
dry homes for all.”*

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Draughtproofing

Draughtproofing is one of the cheapest and most efficient ways to save energy in any type of building. It should be fitted to:

- windows
- doors
- chimneys and fireplaces
- floorboards and skirting boards
- loft hatches

Windows: For windows, there are 2 main types of material:

- self-adhesive foam strips – the cheapest option, and easy to install, however may not last as long as other methods.
- metal or plastic strips with brushes or wipers attached – these are long-lasting, but cost a little more.

Make sure the strip is the right size to fill the gap in the window. If the strip is too big it will get compressed and damaged and it may be difficult to close the window. If it's too small there will still be a gap.

For sliding sash windows, it's best to fit brush strips or consult a professional. Foam strips do not work well.

For windows that don't open, a silicon sealant can be used.

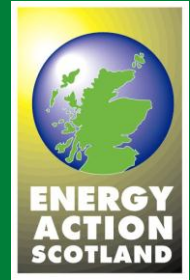
Doors: Draughtproofing for outside doors can save a lot of heat and will only cost a few pounds.

There are 4 main things to think about:

1. the gap at the bottom – use a brush or hinged flap draught excluder
2. gaps around the edges – fit foam, brush or wiper strips like those used for windows
3. the keyhole – buy a purpose-made cover that drops a metal disc over the keyhole
4. the letterbox – use a letterbox flap or letterbox brush. Remember to measure the letterbox before buying.

Internal doors need draughtproofing if they lead to a room not normally heated, like the spare room or kitchen. Keep doors to unheated rooms closed as much as possible to stop the cold air from moving into the rest of the house.

Internal doors between two heated rooms don't need draughtproofing – it's ok to let warm air circulate between different rooms.



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Chimneys and fireplaces: If the fireplace is unused, the chimney is probably a big source of unnecessary draughts.

There are 2 main ways to draughtproof a chimney:

1. fit a cap over the chimney pot – this might be better done by a professional
2. buy a chimney balloon – an inflatable cushion which blocks up the chimney.

Floorboards and skirting boards: block cracks using filler.

Floorboards and skirting boards often contract, expand or move slightly with everyday use, so a filler that can tolerate movement should be used – these are usually silicon-based.

Fillers block gaps permanently so be careful when applying them and wipe off any excess or mess with a damp cloth before it dries. Fillers may break down over time, but can easily be re-applied.

Loft hatches: Draughtproofing the loft hatch is essential, since hot air rises and is lost into the cold space in the loft.

Cold air can also blow in through the gaps around the loft hatch. Loft hatches can be draughtproofed by using strip insulation, like on a door.

Which rooms don't need draughtproofing?

Be careful about draughtproofing rooms that need good ventilation, including:

- areas where there are open fires or open flues – It is essential that areas like this have adequate ventilation.
- rooms where a lot of moisture is produced, such as the kitchen, bathroom or utility room. Good ventilation helps reduce condensation and damp. See also Factsheet VII – 3.

Draughtproofing products and installers

For a list of registered installers see the National Insulation Installers website - www.nationalinsulationassociation.org.uk

For information on products, installers and manufacturers, see the Draughtproofing Advisory Association website - www.dpaa-association.org.uk



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Tank & Pipe Insulation

Both tank and pipe insulation keep water hotter for longer by reducing the amount of heat that escapes.

The most common type of water heater blanket (jacket) is fibreglass insulation with a vinyl film on the outside. The insulation is wrapped around the tank and the ends are taped together. It is important that the blanket be the right size for the tank and not block air flow or cover safety and drainage valves, the controls, or block airflow through the exhaust vent, if any.

Insulating a hot water cylinder is one of the simplest and easiest ways to save energy and money.

Fitting a jacket around a cylinder will cut heat loss by over 75%. A well-fitted 75mm thick hot water cylinder jacket will save around £40 per year. A jacket costs less than half that. Fitting a jacket to a hot water cylinder is a straightforward DIY job.

Pipe insulation is used to prevent heat loss and gain from pipes, to save energy and improve effectiveness of thermal systems. In addition to reducing costs and environmental impacts of energy consumption, the benefits include:

- ✓ Reducing or eliminating condensation on cold pipes
- ✓ Protection from dangerous pipe temperatures
- ✓ In domestic hot-water systems, the water temperature at the point of use can be closer to the temperature at the water heater, and wait time for hot water can be reduced
- ✓ Control of noise
- ✓ Reduction of unwanted heat gain to air-conditioned spaces.

Insulation for hot water pipes will cost around £10 and can save around £15 a year.

Fitting insulation to pipes is easy if the pipes are accessible, but professional help may be required to fit insulation to harder-to-reach pipework, which would incur extra cost.



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Loft Insulation

As much as a third of the heat produced in a home could be escaping through the roof. Most loft insulation materials work by preventing the movement of heated air through the material. Loft insulation is located between the joists on the loft floor of a property (roof insulation is located between the tiles and the rafters).

The materials most commonly used are quilted mineral wool, blown mineral wool and blown cellulose (usually recycled newspaper).

Quilts: Sold in flexible blankets of different thicknesses. Made from glass or rock fibre, some of which will have been recycled. Mineral wool is the most common form of loft insulation quilt in the UK.

Blown insulation: Blown loose into specific, sectioned-off area to the required depth. Blown cellulose fibre or mineral wool should only be installed by professionals.

Loft insulation quilts should be laid horizontally between the joists and reach the top of the joist. Typically, this will make the insulation around 100mm to 150mm deep. More layers should then be added at right angles, to close up any gaps between the joist and the quilt, and to bring the depth to the recommended 270mm. Quilts are suitable for DIY installation, but blown insulation should only be installed by professionals with specialist equipment.

Air vents (and soffit, tile or ridge vents) must be kept clear to help prevent condensation. All electric wires, cables and light fittings must be kept visible to avoid overheating. If in doubt, it may be best to contact a professional installer.

The recommended depth for loft insulation is 270 mm for glass wool, 250 mm for rock wool or 220 mm for cellulose.

Remember to insulate the pipes and water tank. Insulating between the joists of a loft will keep a house warmer but make the roof space above colder. So, without their own insulation, pipes are more likely to freeze. Also, the cooler air of an insulated loft could mean cold draughts through the hatch, so this should also be insulated.

For a list of professional installers, see the National Insulation Association website - www.nationalinsulationassociation.org.uk

Loft insulation can help lower heating bills (annual saving of between £25 and £175), lower wear and tear on boilers and reduce global warming and climate change.

There are a number of grants and schemes available to home owners which can substantially reduce the cost of installing these products.

See Chapter IV.



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Cavity Wall Insulation

The external wall of a house is constructed of two masonry (brick or block) walls, with a cavity (gap) of at least 50mm between. Metal ties join the two walls together.

The cavity wall is injected with insulating material by drilling holes in the external wall, through the mortar joint. Holes are generally of 22-25mm diameter and are 'made good' after injection. Each hole is injected in turn, starting at the bottom.

Before the installation, the installing firm will undertake an assessment of a property to confirm that it is suitable for insulation.

There are several different types of insulation:

- bonded bead (polystyrene beads)
- glass or rock wool (yellow/white or grey/brown in colour)
- urea formaldehyde foam (white foam)

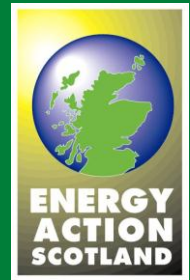
Note: both glass wool and rock wool are known as 'mineral wool'.

All systems of CWI have been tested, assessed and approved by the British Board of Agrément (BBA) or the British Standards Institution. All are suitable for their purpose. Except for Urea Formaldehyde foam, the systems can be used in all parts of the UK. All systems have a similar insulation value.

A technician must undertake checks before and after installation, including a check of any heating appliances, so it is essential that they have access inside the property.

Ventilators supplying combustion air to fuel burning appliances must be safeguarded. Similarly ventilators at ground level that ventilate below timber floors must be safeguarded. A technician will investigate them to check they are already sleeved. If they are not, the technician will remove them and seal around them to stop them being blocked by the insulation. Other vents, which may be redundant, such as cavity vents or vents that are used to supply air to open fires in bedrooms may be closed off. Redundant airbricks may be filled.

CIGA (Cavity Insulation Guarantee Agency) issue an independent 25 year guarantee covering materials and workmanship. All professional approved installing firms are members of CIGA and can apply for a CIGA Guarantee, for properties built with traditional cavity walls.



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With CWI, a house should hold its temperature for longer, therefore the time between heating cycles may be longer. The result should be a more even temperature throughout the house and/or a reduced fuel bill. A saving of up to £135 per year is possible.

Filling cavity walls is not a DIY job. Installation must always be carried out by a professional installation company, registered with one of the following organisations:

1. National Insulation Association (NIA)
2. Cavity Insulation Guarantee Agency (CIGA)
3. British Board of Agreement (BBA)

There are a number of grants and schemes available which can substantially reduce the cost of installing cavity wall insulation.

See Chapter IV on Sources of Help and Funding



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Solid Wall Insulation

Internal and External Insulation

Solid wall properties tend to be more difficult and expensive to improve in terms of adequate insulation and heating. Solid walls lose heat more quickly than cavity walls, but because they are solid there is no easy way to insulate them. Solutions include external and internal wall insulation.

External wall insulation

This involves adding a decorative weather-proof insulating treatment to the outside of the house. The thickness of the insulation needs to be between 50mm and 100mm and is usually installed where there are severe heating problems or the exterior of the building requires some form of other repair work, providing the opportunity of adding insulation.

External insulation systems are made up of an insulation layer fixed to the existing wall, using a combination of mechanical fixings and adhesive - depending on the insulation material used. This is then covered completely with a protective render or cladding finish. Most external renders consist of either thick sand/cement render applied over a wire mesh, or a thinner, lighter polymer cement render applied over a 'GRP scrim'.

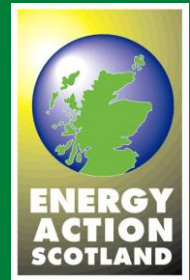
External wall insulation must be fitted by a specialist installer trained by approved system designers. To find such an installer visit the Insulated Render & Cladding Association (INCA) website or the National Insulation Association (NIA) website. The installer will need full access to all the walls from the outside. It is not recommended for homes with structurally unsound outer walls that cannot be repaired.

To prevent condensation, recessed areas around windows must be insulated as well as the walls – with the depth of insulation depending on the width of the window frame.

External insulation is likely to change the appearance of a home and will cover up existing brickwork. Planning permission may therefore be required.

For information on planning permission in Scotland, visit the Scottish Government Building Standards webpage

www.scotland.gov.uk/Topics/Built-Environment/Building/Building-standards



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Internal wall insulation

Solid walls can also be insulated by applying internal wall insulation, usually ready-made insulation/plaster board laminates or wooden battens in-filled with insulation or flexible linings.

Thermal boarding is a composite board made of plasterboard with a backing of insulation. The insulation backing can be specified in a variety of thicknesses. Insulation in excess of 60mm will typically be required to achieve best practice performance. Up to 100mm of insulation can be included. Thermal boards are fixed to the wall surface using continuous ribbons of plaster or adhesive, plus additional mechanical fixings.

Insulation/plaster board laminates consist of plasterboard backed with insulating material typically to a total thickness of up to 90mm. Installing them involves the boards being fitted directly to the inside of the wall and the thicker the board the better the insulation.

Alternatively, wooden battens in-filled with insulation and covered with a plasterboard finish can be fitted to a wall. Flexible insulating linings (a form of dry lining) can also be used. These are cheaper and less disruptive to install, though savings on energy bills are lower. Flexible thermal linings are insulation on a roll specifically for use in solid wall homes, mansard roofs and dormer ceilings.



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