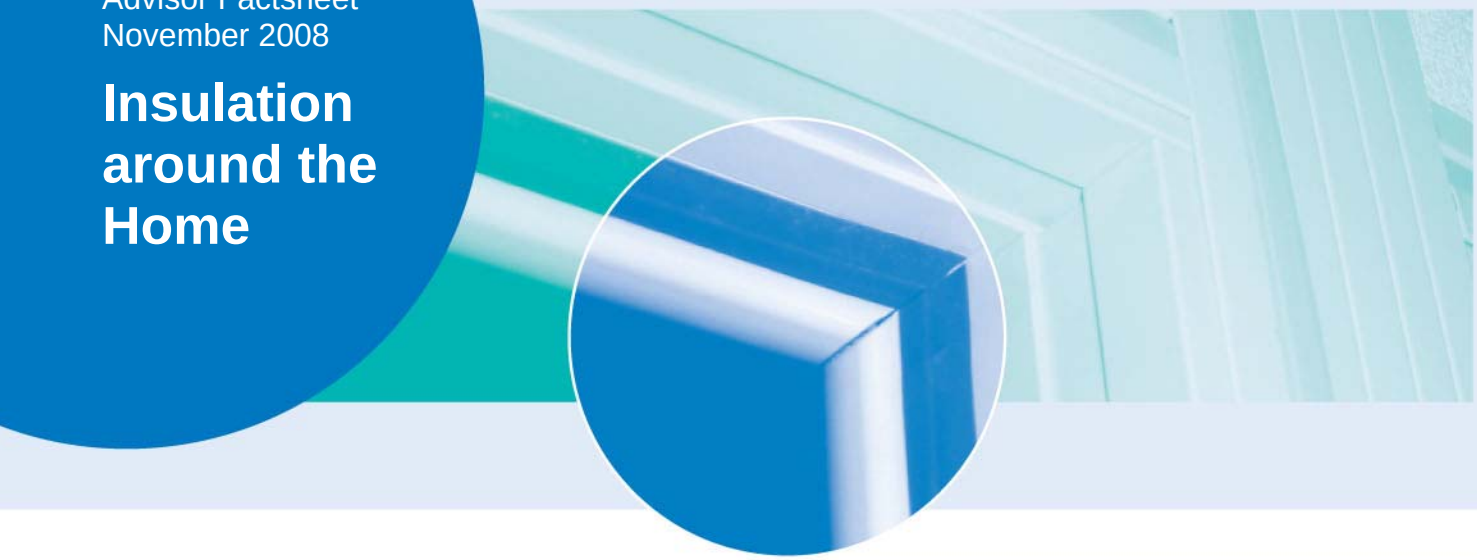
Advisor Factsheet
November 2008

Insulation around the Home

This document is intended for energy advice professionals only, and not the consumer



Key Points

- Draught proofing of windows and doors, and blocking gaps in floors and skirting boards, not only saves energy by reducing heat loss, but can also make the home more comfortable.
- If dwelling has a separate hot water tank, pipes should be lagged and hot water tank insulated if not already done so.
- Reflective radiator panels can be placed behind radiator on external walls.
- If renovation work is being carried out, this is a good time to consider floor insulation – although this can be done at any time.

Behaviours

The heating requirement for a well-insulated home will be less, and heating up and cooling down times for the home will change.

Encourage to also think about:

- Turning the thermostat down by 1 degree can reduce fuel bills by 10%.
- Are radiator valves (TRVs) being used correctly?

Further Information

- For further information on installed draughtproofing:

  National Insulation Association (NIA)
  Tel: 01525 383313
  www.nationalinsulationassociation.org.uk

- For advisors: Energy Saving Trust GPG 224 ‘Improving airtightness in dwellings’.

Savings Potential

If everyone in the UK fully draught proofed their home, we could save over £200 million and over one million tonnes of CO_2 a year.

Typical savings for installing these measures in a gas-heated home:

		Further Insulation & Controlling Ventilation			
		Flat	Mid Terrace	Semi Detached	Detached
Draught proofing	**£ / yr**	**£18**	**£25**	**£30**	**£34**
	kgCO2/yr	91 kg	128 kg	153 kg	176 kg
Hot water tank jacket	**£ / yr**	**£38**			
	kgCO2/yr	195 kg			
Pipe Insulation	**£ / yr**	**£12**			
	kgCO2/yr	64 kg			
Chimney Balloons	**£ / yr**	**£17**	**£19**	**£20**	**£23**
	kgCO2/yr	80 kg	89 kg	93 kg	106 kg
Single radiator panel	**£ / yr**	**around £1**			
	kgCO2/yr	4 kg			
Floor insulation	**£ / yr**	**£22**	**£30**	**£48**	**£68**
	kgCO2/yr	113 kg	153 kg	247 kg	346 kg
Block gaps in skirting boards	**£ / yr**	**£8**	**£21**	**£25**	**£33**
	kgCO2/yr	**43 kg**	110 kg	129 kg	169 kg

All figures are based on a gas heated property. For full energy saving assumptions, see the accompanying note.

Energy Efficiency Partnership for Homes

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Frequently Asked Questions

Where are the most common draughts found?
The most common place for draughts are around the frames of external wooden doors and windows. This is usually caused by either poorly fitting doors or windows, or seasonal variation. This is when the timber expands or contracts depending on the moisture content. Other areas where draughts can be found are between the frames of doors and windows and the brick work, also under the window sills. They are also found where services or waste pipes come through the walls of a building.

How can I tell if there is a draught?
The easiest way to identify a draught is by wetting the back of your hand and passing it over the area where you suspect a draught may be, there should be a noticeable difference in temperature when a draught is felt. Alternatively draughts can be identified by a professional who may use a smoke pencil or match.

Does draught proofing come with a guarantee?
If professionally installed all draught proofing installations should have a minimum 12 month guarantee.

How long will draught proofing measures last that I have installed?
Providing that the draught proofing materials are installed in accordance with manufacturers instructions it would be realistic to achieve a life expectancy of between 5 – 10 years. However, it would be recommended to look for products carrying the British Standard Kite Mark BS7386, as these products can last up to 20 years.

Is it worth insulating my floor?
Heat loss through the floor amounts to about 8%. If you have well insulated walls and loft, then floor insulation is worth considering. In most cases it is only the ground floor that is insulated as the heat loss from the other floors benefits the floors below. This may be easier and more cost effective when carrying out other floor refurbishments, although this depends on the type of house and floor.

Can any type of floor be insulated?
Yes, although the method used to insulate a solid floor will be different to a suspended, timber floor. Solid floors can have a layer of insulation applied on top of the existing floor. This will raise the floor level, so doors will need to be shortened.

Can I install a chimney balloon if I still use my fire occasionally?
Yes. If you occasionally use your fireplace to light a fire, the chimney balloon can simply be deflated and reinserted when you have finished. It is worth bearing in mind that an open fire is one of the least efficient ways to heat your home – and can be as low as 25% efficient.

Can radiator panels be used on internal walls?
Usually, radiators are found on the external wall. If there are radiators on internal walls, some savings can be made if the room is kept at a higher temperature than the rest of the house e.g. in the main living space, if this space has TRVs. However, these savings will be much smaller than those made on installing radiator panels on external walls, and so this is not recommended.

How can I tell if I should insulate my hot water tank?
Most cylinders fitted in the last 20 years will have been factory insulated. This is usually with sprayed polyurethane foam characterised by an 'orange peel' type surface finish. If this is marked with the relevant British Standard (BS1566, BS 699 or BS 3198) then its heat loss is probably acceptable. If the cylinder is either un-insulated or has a badly fitting old lagging jacket then a new lagging jacket is always a first priority, as payback times are short.

What is primary pipework?
This is the pipework which runs between the boiler and the hot water tank/cylinder. Insulating this stretch of pipework can lead to significant energy, financial and carbon dioxide savings.

Key Customer Questions

Some key questions to ask an installer when improving the air tightness of a dwelling:

- Is the installer of draughtproofing recommended by the National Insulation Association (NIA)?
- Can the installer explain and confirm how they have left and/or made appropriate provision for necessary ventilation? This is very important in gas-heated dwellings

Background

Whilst ventilation in the home is essential, controlling unwanted ventilation with draught proofing, blocking of gaps in floors and the blocking of unused chimneys will both improve comfort levels, and save energy. The improvement in comfort levels may also lead to further energy savings - as householders feel warmer due to the lack of cold draughts, they may be less likely to boost their heating or turn their thermostat up.

Whilst 60% of the UK's homes have good levels of draught proofing*, there are still many homes with an insufficient amount.

There are also other opportunities to insulate the home, once the walls and loft space or roof have been considered. Also, where appropriate, hot water tank and pipe insulation should be recommended.

*80% or more draughtproofing.

Different Technologies - Unwanted Ventilation

Adequate ventilation is important in all dwellings, but vitally so if there are solid fuel fires, gas fires or a boiler with an open flue. This is in order to maintain the safety of the home - for example, by minimising the risks of the build-up of the poisonous gas carbon monoxide gas emitted from a faulty boiler.

Installing trickle vents in windows and extractor fans in kitchens and bathrooms provides controlled ventilation.

Common air leakage paths from the home	
Underfloor ventilator grilles.	Service penetrations through ceilings.
Gaps in and around suspended timber floors.	Vents penetrating the ceiling/roof.
Leaky windows or doors.	Bathroom wall vent or extract fan.
Pathways through floor/ceiling voids into cavity walls and then to the outside.	Gaps around bathroom waste pipes.
Gaps around windows.	Kitchen wall vent or extractor fan.
Gaps at the ceiling-to-wall joint at the eaves.	Gaps around kitchen waste pipes.
Open chimneys.	Gaps around floor-to-wall joints (particularly with timber frame).
Gaps around loft hatches.	Gaps in and around electrical fittings in hollow walls.

Draught proofing

Draughts and heat escaping through gaps in the frames of windows, doors and loft hatches can be a cause of major discomfort within the home, and they cause cold, damp air to be forced in. In a typical home 20% of all heat loss is through poor ventilation and draughts.

- Draughts can be found in many different areas of the home (see table above), although commonly are found around windows, at the bottom of external doors, around your loft hatch and around the letterbox.
- Easy DIY job although can be installed professionally – which also means the product will be guaranteed.
- Brushes, foams, sealants and shaped rubber or plastic draught excluders can be used:
  - **Compression seals**: Particularly well suited for external doors as this allows for seasonal movement of the door. Wide variety of synthetic rubbers, sheathed foam or nylon brush, with rigid PVC-U or aluminium carriers nailed or screwed to the frame of the door. Care needed when repainting.
  - **Brush Seals:** Suitable for most doors and windows – particularly sliding - these are typically self-adhesive and made of nylon brush in a variety of widths for different sized of gaps. Care needed when repainting.
  - **Wiper Seals:** Rubber blade wiper seals good for wooden doors and casement windows.
  - **Sealants and fillers:** Larger gaps, including those at the heads of windows, can be filled using silicone or polyurethane sealants which, when correctly applied, expand, set and harden to permanently fill the gap. Gun-applied sealants require careful application to be effective – surfaces should be clean and dry.
  - **Chimney balloons:** These can be used to block unused chimneys, and are installed as a DIY option.

Consult 'Improving airtightness in dwellings' (GPG224) for further information.

Plugging Gaps

Filing gaps in areas such as skirting boards and floorboards with beading, sealant or newspaper to stop heat escaping and cold air entering.

Solid floors

- Air can leak through the small gap under the skirting board, causing a cold draught across the floor.
- Gaps and cracks may develop in solid floors as the concrete cures and shrinks away from the walls, providing small air leakage paths.

Suspended timber floors

- Many gaps around the boards, at the junctions with walls and around service pipes.
- Airtightness of suspended timber floors can be improved by laying hardboard sheeting over the top, to cover any gaps between the floorboards, sealing around the edges of the room.

Different Technologies - Further Insulation

Radiator Panels

Radiator panels increase the energy efficiency of a home by reflecting heat back into the room and reducing heat loss through the wall.

- This is an easy DIY job.
- These are cut to fit the size of radiator and slot behind the radiator, reducing the amount of heat lost through the wall.

Floor Insulation

Heat loss through floors can be reduced by up to 60% by insulation. If the walls and loft or roof space are well insulated, then floor insulation is worth considering, although this may be easier if other renovation work is being carried out on the home.

There are two types of floor construction: suspended timber and solid concrete, and these are generally insulated in different ways. As with all insulation, it is essential that air is allowed to circulate to reduce the risk of damp.

Installation can be through a professional installer, although DIY installation is possible.

Suspended timber floors

There are three common ways to insulate a suspended timber floor:

- Laying rigid insulation on top of the floor boards (see *Solid floor* below).
- By lifting the floor boards and adding mineral wool quilts, held in place with netting, or blown insulation between the floor joists.
- If there is a cellar or basement, quilt insulation can be held up with netting, and blown insulation can be installed by installing a board below the joists. Alternatively, rigid insulation (see *Solid floor* below) can be held in place with nails or battens.

Some important considerations before insulating a suspended timber floor:

- This is most cost-effective when the floorboards need to be lifted for other work, or when there is access from below (e.g. from a basement).
- All timbers should be inspected for damp, rot or infestation, and remedial works carried out before insulation.
- It is very important to ensure that there is adequate ventilation of the underfloor area, to avoid condensation problems.
- Floors above cellars or cellar insulation itself must achieve the correct fire resistance performance. The local authority building control office will be able to advise.

Solid floor insulation

Where the floor is being excavated and replaced, insulation can be included within or underneath the new floor – a rare but one-off opportunity to increase insulation. It is more likely that an existing floor will be insulated.

- Any existing chipboard or flooring needs to be removed, as this could rot.
- Rigid insulation is installed and then a new floor deck, commonly made from chip board, added on top.
- Rigid insulation is commonly expanded polystyrene.

Some important considerations before insulating a solid floor:

- Any problems with damp related to the floor should be rectified before insulation.
- This type of insulation will raise the floor level and so effectively reduce the room height. It usually requires re-fixing of skirting boards and reduction of door heights.

Pipe insulation and tank jackets

Fitting a jacket to a hot water cylinder is a straight forward DIY job, and fitting insulation to pipes is easy if the pipes are accessible.

Fitting a British Standard 'jacket' around an uninsulated cylinder will cut heat loss by over 75%. This is a priority measure.

Tank jackets

It is important that the hot water tank has adequate insulation:

- Most cylinders fitted in the last 20 years will have been factory insulated usually with sprayed polyurethane foam characterised an ‘orange peel’ type surface finish.
- If the cylinder is factory insulated and marked as compliant with the relevant British Standard (BS1566, BS 699 or BS 3198) then its heat loss is probably acceptable.
- If space permits then an additional separate insulation jacket can be cost effective, particularly on older cylinders.
- If the cylinder is either un-insulated or has a badly fitting old lagging jacket then a new lagging jacket is always the first priority.
- Any hot water jacket less than 80mm thick should be upgraded.

Pipe insulation

Insulating pipe work will minimise heat loss when hot water is travelling to the desired location.

- Primary pipework – between the boiler and hot water cylinder.
- If there is loft insulation, tanks and pipework in the loft should always be insulated.

Either preformed insulation (a tube with slit at top) or wrap around insulation is available.

Door Insulation

Like windows, doors present not only an opportunity to controlled unwanted ventilation with draught proofing but also are another surface through which heat can be lost from the home.

- Replacement doors, whether unglazed or half-glazed, should have insulated cores i.e. insulation between the two outer surfaces.
- Insulated doors are available which achieve U values as low as 0.6W/m2K.

Compliance

There are building regulations relating to draught proofing, doors, floors, and pipe insulation when renovating a dwelling. Householders should contact the local building control office of their local authority if they have compliance questions, but the following serves as an overview:

- **Draught proofing:** New and replacement windows and doors should be draught-proofed.
- **Doors:** When replacing doors which lead onto an ‘unconditioned’ part of the dwelling or externally, there is a maximum U-value allowed. This applies to glazed and unglazed doors.
- **Floors:** When floors are replaced, there is a maximum U-value allowed. Also, Floors above cellars or basements must achieve the correct fire resistance performance. The local authority building control office will be able to advise.
- **Pipes:** When heating systems are replaced or extended, pipes should be insulated to a minimum standard. Speak to your heating engineer for further advice.

In addition, there are building regulations when extending or implementing ‘change of use’ of a dwelling. Customers should seek advice from the building control office of their local authority. Further information can be found at www.planningportal.gov.uk.

There are some exceptions for historical and listed buildings. Customers should seek the advice of the conservation office of their local authority.

Finding the Product

DIY insulation products are available from large DIY outlets and some smaller independents.

Professional installers will supply products for the householder as part of the installation.

Recent and Future Developments

There are no expected industry developments in these areas over the next 12 months.

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