Internal solid wall insulation

A thermal layer on the inside walls

Around half of all the heat lost from a typical solid-walled home escapes through the walls. Insulating these walls will keep the warmth inside for longer and greatly reduce your heating bills.

Solid walls can be insulated internally (from the inside) and externally (from the outside) - both are significant undertakings in terms of cost and disruption. This leaflet looks at internal solid wall insulation.

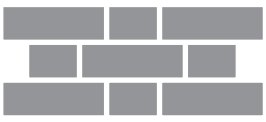
Internal solid wall insulation may be suitable for homes made from brick, stone or concrete, and works by adding a layer of thermal material to the existing inside wall. Although insulation will reduce the size of your room, it'll be warmer, so you'll be comfortable and enjoy the space more.

Internal solid wall insulation is particularly appropriate where you need to maintain the external appearance of the building, such as a heritage site.

How do I know if my home has solid walls?

If your home is made of brick, and the bricks have an alternating long-short-long pattern, then the walls are likely to be solid. If you can see only the long edge of the bricks, then it's almost certainly a cavity wall.

Solid wall



Cavity wall

If the bricks aren't visible, then measuring the thickness of the wall will help. A solid brick wall is usually about 22cm thick, a cavity wall between 27cm and 30cm and a solid stone wall as much as 50cm thick. The age of your home is also a good indicator; if it was built before the late 1920s it is likely to have solid walls.

Repair of the ceiling cornicing after internally insulating this solid walled terraced house

Types of internal solid wall insulation

There are various ways to insulate a solid walled building from within, but they broadly fall into four categories:

1) Rigid insulation boards

These come in a variety of materials and thicknesses, which have different energy saving properties. Some types have pre-attached plasterboard which makes the installation process more straightforward.

2) Stud frames with infill

Here, wooden or metal stud frames are fixed to the walls, insulation is fitted between them and then plasterboard laid over the top. A variety insulation materials can be used including mineral wool or sheeps wool, wood fibre, hemp and recycled bottles. The battens can hold more weight than boards on their own, so you can attach heavier items such as bookcases or kitchen cupboards to them. Walls that are rough and uneven – such as those found in some stone properties – can be made smooth and even in this way.

3) Flexible thermal lining

This comes in rolls like thick wallpaper, and it's glued to the wall with a special adhesive. It doesn't provide the same level of insulation, but can be installed by a competent DIYer. Flexible linings tend to be no more than 10mm thick so can be a good option for small rooms.

4) Insulated plaster

This is a mix of plaster and insulating material, such as cork. Trowelled or sprayed on, it is a good option for uneven walls and can help achieve good levels of airtightness.

Managing moisture

Most solid walls are vapour permeable, which means that that moisture can pass through them. Therefore you need to make sure that by adding insulation you don't create an impermeable barrier that will cause condensation for form between the panels and the wall.

For this reason you should use breathable insulation materials and finishes which won't stop moisture moving between the inside and outside. Materials like wood fibre can manage moisture and distribute it, stopping moisture from getting trapped inside the wall that will lead to damp, mould and damage to the building. Lime based plasters will also allow moisture to move in and out of the wall. There is no point using a vapour permeable insulation material if a non vapour permeable plaster is used over the top.

An alternative is to use less permeable materials that create a continuous vapour barrier so that no vapour can get between the insulation and your walls. You are likely to need to take the advice of a specialist installer.

Average cost and savings

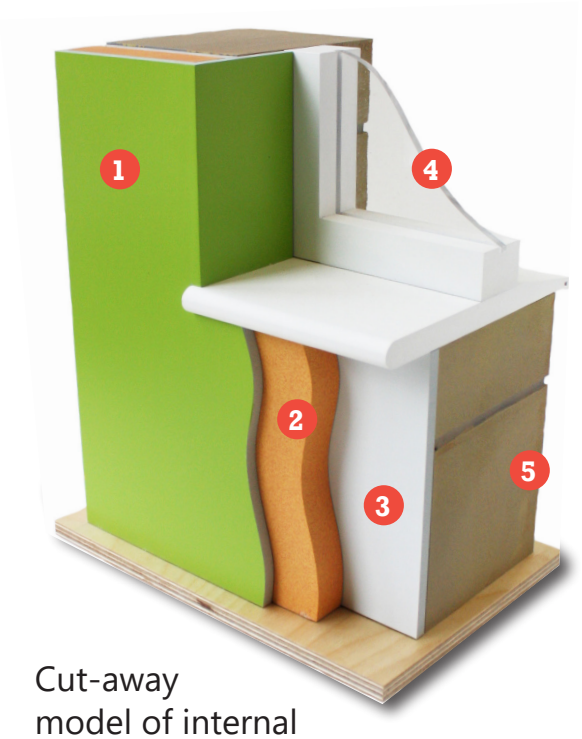
It costs around £8,500 to install internal solid wall insulation in an average 3-bedroom, semi-detached house, depending on the number of rooms being renovated and the type of insulation used. It's generally less expensive than external solid wall insulation because of the lower cost of materials and labour.If this home used gas heating, the savings would be in the region of around £475 a year on heating bills. A detached house could save around £603 per year.*

Disruption

Internal solid wall insulation inevitably involves a degree of disruption:

- Rooms may not be usable while work is ongoing. You might need to remove furniture and kitchen units temporarily.
- Anything against the walls to be insulated needs to be removed. This includes fittings such as radiators, skirting boards, windowsills and plug sockets.
- Pipe work and wiring may need to be re-laid.
- The works will produce dust and could be noisy at times.
- A skip may be required, and contractors will require water and power and the use of a toilet.
- The newly insulated walls and adjacent surfaces will need to be re-decorated when the work has finished.

* Figures from Energy Saving Trust and National Housing Model.



Cut-away model of internal solid wall insulation.

1. **Surface coating.** This is the new plasterwork that covers the insulation layer. Just like a normal internal wall, it can be painted (green in this case) or papered
2. **Insulation.** This is the layer that prevents warmth escaping through the outside walls of the house. In this case, rigid insulation boards have been used.
3. **Internal wall.** This is the old internal plaster,now covered by the new insulation board and plasterwork.
4. **Windows.** Ideally, the insulation board is fitted to the inside of the window recess to prevent cold patches developing where condensation forms. But, as is the case here, this is not always possible.
5. **External wall.** From the outside your property will look exactly the same.

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Our Home Energy Team offers free advice on domestic energy use to householders in central southern and southwest England.