

Insulation in more detail

There is a difference between knowing the basics about the options available and having an in depth understanding of the practicalities around the installation process.

This resource provides more detailed information for each of the key types of insulation, including how it's installed, what materials can be used, DIY options and other things to take into consideration.

There are different types of insulation that can be considered to improve the energy efficiency of a home. The measures that are discussed in this resource are listed below. It is also worth referring to the resources on finding an installer, understanding costs and benefits, and the importance of behaviour change in making improvements work.

- Loft insulation, including loft conversions and loft hatch insulation
- Cavity wall insulation
- Internal wall insulation
- External wall insulation
- Flat roof insulation
- Floor insulation
- Draught proofing
- Glazing
- High performance thermal doors

Loft insulation

Installation

Loft insulation usually only takes a few hours for a professional to install, with little disruption providing there is easy access to your loft space. However, certain precautions and procedures should be taken to ensure it is done correctly.

Lofts should be cleared to install insulation. Installer firms and other organisations, such as Home Improvement Agencies, often provide loft clearance services to help with this process if needed.

Wiring should rest on top of the insulation, rather than underneath. Wiring should not be stretched, and an electrician should move any wiring that gets in the way.

Pipework and tanks should be insulated properly to avoid freezing during cold weather.

Condensation should be avoided through the provision of adequate ventilation to the roof space. This can be achieved through ventilation points in the eaves, on the roof ridge or between the tiles. Sheet insulation installed on the sloping underside of roofs should have an air gap behind to allow ventilation of the timber rafters.

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It is also a good idea to fit loft hatch insulation at the same time. This can be done by attaching matting enclosed in plastic or a sheet attached to the hatch itself, or by gluing sheet insulation to the inside of the loft hatch door.

If you're having a loft conversion, insulation should be installed between the rafters on the sloping part of the roof. Speak to your builder about types and specifications of insulation before proceeding.

Materials

As there is such a range of materials available, the types are broken down below, and details given of some of the advantages and disadvantages of each.

Matting

This insulation comes in blanket or quilt form and is usually packaged in 100-200mm thick rolls. It can simply be cut to size and rolled between and on top of ceiling joists.

Advantages

- DIY friendly
- Easy to install (simply rolled into place)
- Good for easily accessible spaces
- Generally quite cheap

Disadvantages

- Can't fit into small spaces
- Some types can irritate and should only be installed using protective equipment

Examples of products

Mineral wool. Made from glass or rock fibre. Example: Rockwool | www.rockwool.co.uk

Polyester. Made from recycled plastic bottles. Example: Eco wool | www.eco-wool.co.uk

Sheep's wool. Example: Thermafleece | www.thermafleece.com

Hemp fibre. Example: Black mountain insulation | www.blackmountaininsulation.com

Loose Fill

This insulation comes in small pieces in bags, so can be poured out into areas directly where it is needed. Care should be taken to ensure there are no holes in the ceiling to ensure the insulation doesn't end up coming out of places it shouldn't!

Advantages

- DIY friendly
- Fits into tight spaces, nooks and crannies
- It's useful for topping up existing insulation

Disadvantages

- It can be blown around when installed into draughty places

Examples of products

Cork granules. Example: Anglo-Portuguese Cork | www.apcork.co.uk

Recycled newspaper. Example: Warmcel 100 | www.warmcel.co.uk

Vermiculite. Example: Micafil or Silvaperl – various suppliers

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Blown-fibre

This is professionally installed loose insulation. It is ideal for properties where the roof space is not readily accessible.

Advantages

- Quick and hassle free
- Products are often quite environmentally sustainable e.g. recycled newspaper

Disadvantages

- Not a DIY option
- It can be blown around when installed into draughty places

Examples of materials

Recycled newspaper. Example: Warmcel | www.warmcel.co.uk

Mineral wool. Example: Rockwool | www.rockwool.co.uk

Sheet insulation

This type of insulation is designed for insulating the sloping underside of roofs rather than the loft floor and is therefore often used when a loft is converted into a room.

General advantages

- It can be used when undertaking a loft conversion

General disadvantages

- It tends to be more expensive than other forms of loft insulation
- This approach is only suitable if the loft is to be kept warm. As most lofts are not used, they should not be heated unnecessarily

DIY

Laying loft insulation is relatively straightforward for DIY enthusiasts. There are video guides available online such as this one: www.bit.ly/HTtJzW and you can find written guidance such as this leaflet from Wickes: www.bit.ly/z3XrCT

For whichever product you choose, always ensure that you read the manufacturer's guidance before installing.

Considerations

You may wish to consider the following variables when choosing a loft insulation product:

- Level of fire resistance
- Thermal conductivity
- Ability to absorb water
- Mould and vermin resistance
- Natural or man made
- Embodied energy (from manufacture and transport)
- Safe to install or requires protective equipment
- Whether it's recyclable
- Cost

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Cavity Wall insulation

Installation

Cavity walls tend to be insulated by drilling holes on the outside of the wall and injecting insulation directly into the cavity.

Installers drill the walls with a specific pattern to ensure that when insulation is injected the cavity is completely filled with insulation. This is particularly important around windows.

After the insulation is installed, a filler material is inserted into the drilled holes. Most installers will try to match the colour of the filler they use to the colour of the plaster or paintwork on the wall. However it's always worth checking first and you may wish to have the wall painted afterwards if the filled holes are still quite obvious.

Generally the installation takes less than three hours. However, parts of some properties are more difficult to access, and may require scaffolding, for example when accessing a wall above a conservatory or garage. This means that in some cases works can take significantly longer.

Materials

Mineral wool - glass or rock based fibre. Example: Rockwool | www.rockwool.co.uk

Polystyrene beads – small beads blown into the cavity and coated with a binding agent to hold them inside the wall. Example: Diamond Bead | www.diamondbead.co.uk

Melamine or Polyurethane expanding foam - injected as a fluid but foams up and dries out over time. This is the only material suitable for narrower or 'hard-to-treat' cavities

Other considerations

If installed correctly, and in the right circumstances, cavity wall insulation rarely causes problems for the householder. However, cavity wall insulation should not be retrofitted into houses which are prone to damp or have faults or cracks in the external render. If the structural integrity of a wall is already compromised, insulation could act as a bridge for moisture ingress and may cause damp problems. Similarly, walls which are exposed to driving rain or are in close proximity to the sea should not have cavity wall insulation installed.

You should check that the installer is able to offer you a Cavity Insulation Guarantee Agency warranty (CIGA, www.ciga.co.uk). This ensures the homeowner is covered for defects in the insulation product or workmanship and lasts for 25 years.

If a cavity has been deemed 'hard-to-treat' for whatever reason, such as narrow cavities, non-standard construction, partially filled cavities or in high-rise buildings, then insulating the cavity may be problematic and become more costly. A householder might consider external or internal wall insulation instead in these circumstances.

Internal solid wall insulation

Installation

The installation method is dependent on the type of insulation chosen, as shown in the factsheet in

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chapter one. A brief description of each method is outlined, giving some indication of when you might choose each method, and what the implications are in terms of disruption.

Materials

Rigid insulation boards. Examples: Ecotherm, Celotex

Dry lining. Examples: Kingspan, Marmox

Flexible thermal lining. Example: Sempatap

DIY

It is generally not recommended to install internal wall insulation yourself, unless you are experienced at DIY. If you do decide to take the job on, ensure you consult guidance from the manufacturer of whichever product you are using. Furthermore ensure that you measure up correctly to determine how much insulation you need and avoid wastage. Bear in mind that although the cost of the job will be far cheaper if you do it yourself, you won't be able to access Green Deal finance unless you use an accredited installer.

Other considerations

As well as the degree of disruption detailed in the factsheet in chapter one, there are various other considerations to make.

Householders who have internal wall insulation fitted need to be aware that it can limit what fixtures and fittings can be installed in the future. For example, if fitting dry lining insulation into a kitchen, battens must be located correctly to enable units to be attached to the wall. Should a kitchen be remodelled in the future, the location of where units could be installed will be limited by the location of the battens within the wall system.

Also, a vapour barrier is usually installed into an internal wall insulation system. If this is damaged in some way there is a risk that interstitial condensation may occur within the wall system. This can lead to damp issues and should be avoided.

For these reasons, the location of the battens should be recorded for future reference. A diagram depicting the wall system could be kept safe to ensure you (or a future resident) have the relevant information to hand when planning further developments.

Thermal bridging

Where there is a break in insulation, for example around windows and where an external wall becomes an internal wall, heat can transfer from the internal to the external surface and be lost into the atmosphere. This is one type of what is known as 'thermal bridging'. To avoid this it is worth installing an extra margin of insulation to wrap insulation fully around wall junctions rather than stopping at a junction directly. It is worth asking installers how they will design and fit an internal wall insulation system to avoid thermal bridging.

Non-standard homes

It can be more difficult to install internal wall insulation onto uneven walls, though a fixing system using dabs of plaster can be used to help make application more even. Also some historic buildings should not have insulation installed due to the increased risk of dampness caused by reduced breathability.

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External wall insulation

Installation

As detailed in the factsheet in chapter one, insulation is fitted to the exterior of the home, then coated in a render or cladding. For an average house, this process can take about 2 weeks of on-site work, but this is often spread over 3-4 weeks to allow for drying of renders as well as the extra work involved in replacing any attachments, erecting and removing scaffolding, and extending the roof. As much of the work involves rendering it is weather dependent, therefore work can be delayed in cold, wet or hot weather.

Materials

Rigid insulation boards are generally made from a mix of materials containing mineral wool and expanded polystyrene. Manufacturers include Knauf, Weber, Kingspan and Celotex.

Other considerations

As part of the installation, all existing fittings (satellite dishes, washing lines etc.) will be refitted onto a timber plinth attached to the original masonry wall. However, if householders wish to carry out work later on, they will be unable to attach any new fittings directly to the insulation. Instead, they must use extra-long fixings to attach fittings directly through the insulation into the original wall underneath.

Non-standard homes

Many different types of property can benefit from EWI. However, because insulation can radically change the appearance of a building, it is not appropriate for many historical, listed and heritage buildings or those located within a designated conservation area. Check with your local authority planning department if you have concerns.

Flat roof insulation

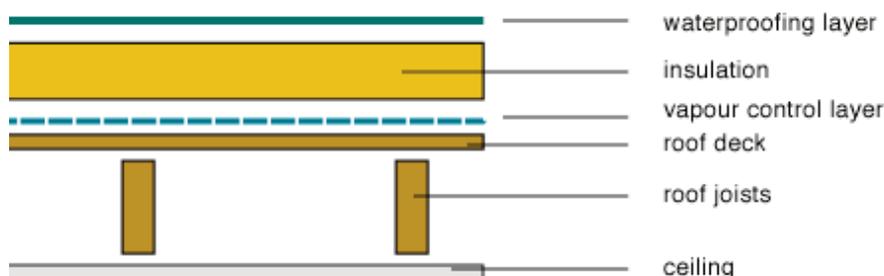
Installation

Flat roofs tend to be refurbished regularly as they are prone to leaks and deterioration. Insulation can be installed in conjunction with necessary repairs, or can be installed as a standalone activity.

There are two main ways to insulate a flat roof. These are known as 'warm roof' and 'inverted warm roof'.

Warm roof insulation

This system involves fitting insulation to the top of a roof deck (this tends to be timber or concrete) and fitting a waterproof layer on top. The roof deck is kept warm and so condensation is avoided.

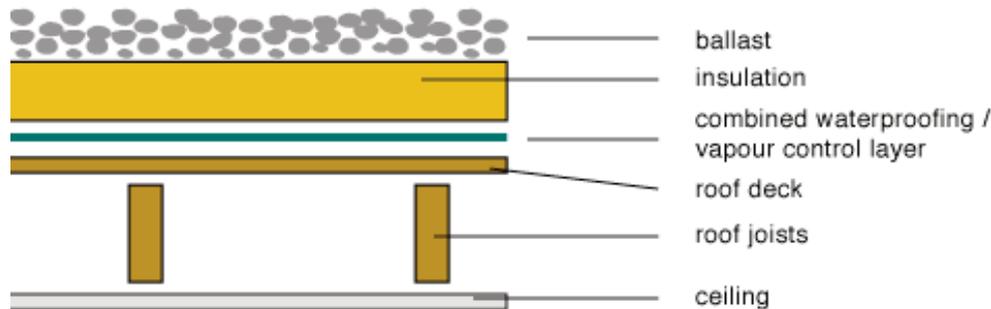


Picture taken from www.greenspec.co.uk/timber-flat-roof-insulation.php

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Inverted warm roof insulation

This system involves putting insulation on top of the waterproof membrane. It protects the membrane from wear through exposure to UV light and extremes of temperature.



Picture taken from www.greenspec.co.uk/timber-flat-roof-insulation.php

This type of system is less effective as an insulator because the water permeates through the ballast and insulation layers to cool the deck area.

What work is involved in installation?

The old roof is usually stripped back to fit the new system. Refurbishment of the roof could take anything from a few days to weeks depending on the nature of the job. Wet weather may also hinder works. As most of the work happens outside the property, disruption should be kept to a minimum. However, it will be noisy and dirty around the actual building site. It is also likely that contractors will need access to a toilet.

Materials

Rigid flat roof insulation products are available from Celotex, Kingspan and Ecotherm.

DIY

It is not recommended to install flat roof insulation yourself unless you are very experienced at DIY.

Other considerations

It is important that the roof is designed properly to avoid condensation. Flat roofs are also notorious for having leaks and it might be sensible to consider whether the installation of a pitched roof is a feasible alternative during any planned refurbishment.

Floor insulation

Installation

The method depends on whether the property has suspended timber floors or solid concrete floors, and in both cases can either be done from above or below. You would be most likely to insulate a solid concrete floor only when the floor needs replacing and therefore it would cause some level of disruption and building work and could take a considerable amount of time.

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Insulating a suspended timber floor is generally a quicker and easier job, and can be carried out room by room to minimise disruption. It is also possible to carry out DIY floor insulation, either from above by lifting any carpet and the floorboards, or from below if you have a cellar, by fitting insulation between the joists and holding it in place with netting.

Materials

You can insulate a floor generally using mineral fibre, which comes in rolls and is usually used in lofts. This will probably be the cheapest material to use, but you might prefer to use a rigid insulation board with a better U-value, where you might be able to install a thinner layer to achieve the same results. A rigid board will also be easy to cut to size and not irritating to the skin during installation.

Rigid insulation foam is used to insulate concrete floors and should be installed by a professional.

Other considerations

When replacing a concrete floor, consider insulating below the concrete in south facing rooms, as the concrete will absorb the heat and prevent overheating in summer.

If you opt to insulate above a concrete floor, bear in mind that you could end up with a higher floor level than previously, which could impact on door openings, skirting boards and sockets.

When insulating a timber floor, ensure that you consider fire proofing and consult your local building control if in doubt about the method or materials to use.

If any of your floor timbers are affected by damp or rot then ensure that this is rectified before insulating.

When insulating below a timber floor where the floorboards are exposed, you should consider installing draught proofing strips in the gaps at the same time (see section below).

Draught proofing

Installation

Draught proofing is one of the primary 'easy-wins' with regard to energy saving at home. It can often make a significant difference to a householder's thermal comfort as well as preventing heat loss through draughts and unwanted ventilation.

It is also usually a comparatively quick job and in many cases it can be completed in only a few hours. It is not particularly disruptive and costs very little (relative to the savings it can generate). Most draught proofing installations are within the capabilities of even DIY amateurs.

Materials

The range of products available for draught proofing is vast and a few of them are covered in the factsheet in chapter 1. A few exemplar solutions are detailed below:

- For gaps in floorboards: www.draughtex.co.uk
- For sash windows: www.gapseal.co.uk
- For internal doors: www.tinyurl.com/cg5pf6u
- For open chimneys: www.mgcltd.co.uk/sempaflue-chimney-balloons

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Other considerations

Most draught proofing strips are designed to be used within a certain 'gap' range e.g. 3-5mm. You should make sure that the product used in your home meets the correct specifications.

For external doors and windows a compression of 3mm should be accounted for. This will allow for gap expansion and contraction due to seasonal fluctuations in temperature.

Often it can be tricky to fit correctly sized draught proofing products due to a variable gap width around a window/door. Again, this can be countered by specifying a product with an adequate compression allowance.

Remember not to block up vents, which are necessary in rooms where fuel is burnt and carbon monoxide is a danger. As well as letting oxygen in, vents are present to remove excess moisture and prevent condensation.

Glazing**Installation**

If you are installing new efficient glazing there will be some level of disruption as your older windows are removed and replaced. Depending on how many windows you are replacing, you may wish to move out of the property while it's being done. Scaffolding will be required for upstairs windows.

If you are keeping your original windows for conservation reasons or to save on costs, you can install secondary glazing, which can be done yourself or by a professional if you prefer, and the disruption will be minimal.

Materials

The energy efficient glazing factsheet talks through how to choose which windows are best for you. Speak to a range of installers about the options and compare U-values of the different types of glass available before making a decision.

The materials available for secondary glazing vary depending on the level of efficiency and permanency you want to achieve. They range from temporary thin film to rigid plastic sheeting or even glass, with semi-permanent fixings.

Other considerations

As with other insulation measures, ensuring that there is adequate ventilation is a key factor to prevent moisture build up and damp.

High performance thermal doors**Installation**

Replacing a door is a reasonably straightforward job with minimal disruption. It might be something you do at the same time as replacing windows, or alongside other building work.

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Materials

A variety of materials are available, with or without glazed panels. The choice you make is dependent on the look you want to achieve. As usual it pays to shop around, and ask installers plenty of questions.

Other considerations

It's probably only worth installing a high performance thermal door if your current door is in need of replacement. Compare the cost of a high performance door to a regular door, or consider simply installing draught proofing or a curtain on your current door which could be enough to improve comfort levels in the home.