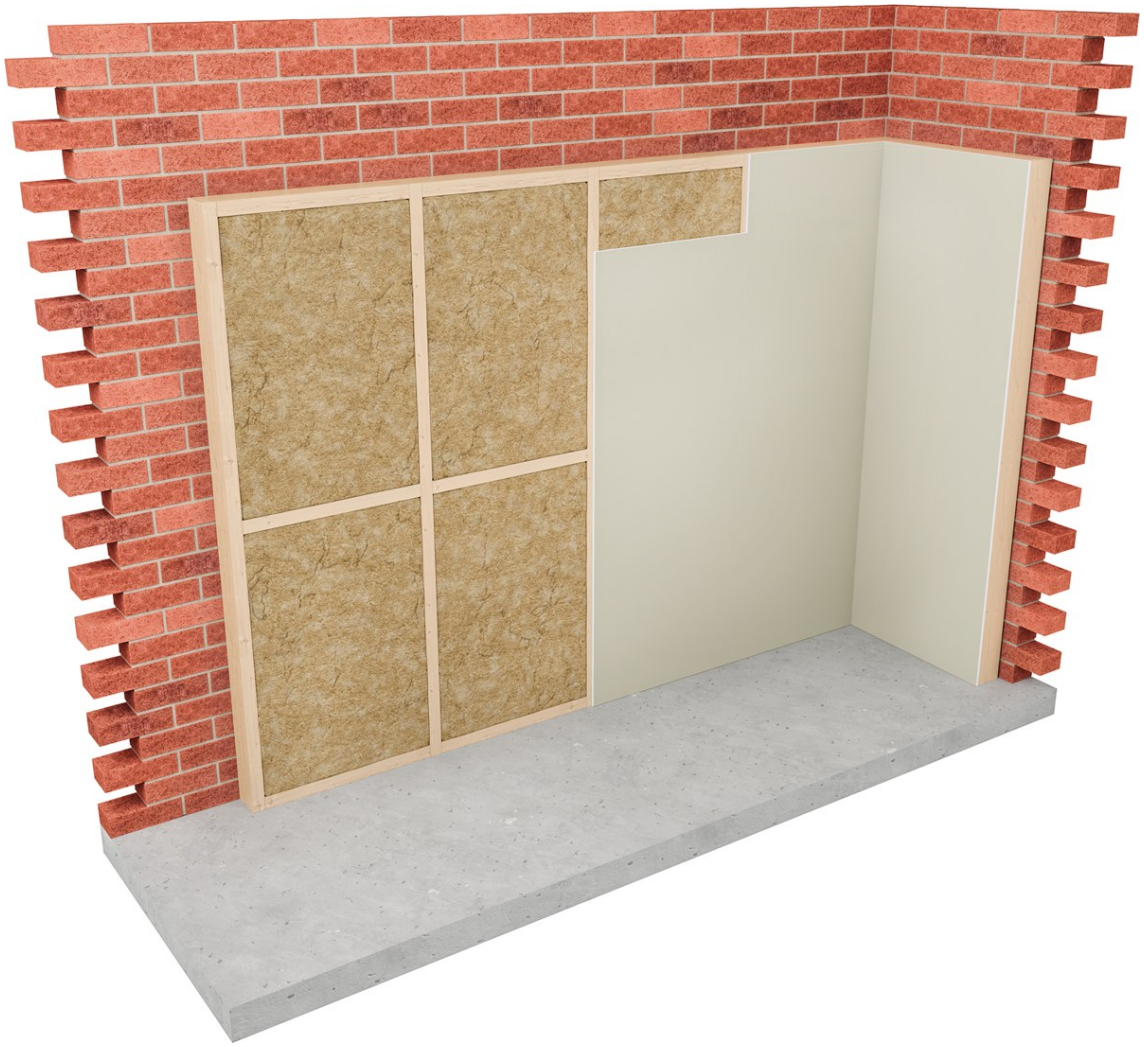
SkillBuilder | EZY FIT Insulation Systems

THE COMPLETE GUIDE

Internal Wall Insulation

How to assess your home, choose the right system, and avoid the mistakes that cost people thousands.



A practical guide for homeowners and self-builders, produced by Skill Builder with Ezy Fit

CONTENTS

What's in this guide

01 Why insulate a solid wall

02 How internal wall insulation works

03 The three types of system

04 Matching the system to the building

05 Building suitability checklist

06 How much space you will lose

07 Ventilation and moisture

08 Preparing for installation

09 Where it goes wrong

10 DIY or professional

11 Ezy Fit systems

How to use this guide. Sections 5 and 8 are working checklists. Print them, walk round the house with a pen, and be honest about what you find. If a box will not tick, that is the job to do first, before any insulation goes near the wall.

SECTION 01

Why insulate a solid wall

More heat leaves an uninsulated house through the walls than through any other single part of the building. Walls are also the part most people never get round to.

Loft insulation gets done. Windows get replaced. The walls carry on leaking, year after year, and the room never quite feels warm no matter how long the heating runs.

Do I have solid walls?

Look at the brick bond. A solid wall shows header courses, which are the short ends of bricks appearing at regular intervals. A cavity wall is stretcher bond, so you see only the long faces. As a rule of thumb, houses built before the 1920s are usually solid walled, and by the mid 1930s cavity construction had become the norm. Between those dates it varies by region and by builder, so check the brickwork rather than the date alone. Rendered walls hide the bond, in which case measure the wall thickness at a window or door reveal.

What you could save

Which? put the saving from insulating solid walls at between **£150 and £550 a year** on heating costs. Energy Saving Trust figures work out at around £310 a year for a typical semi and £450 for a detached house.

> Those figures assume the whole house treated by a professional installer, with a mains gas boiler and average occupancy. A single room done as a DIY job will not get you there. Treat them as the ceiling, not the expectation.

It is not only about money

A cold wall surface is where condensation forms. Warm that surface up and you remove the conditions mould needs, which is why properly executed internal wall insulation often fixes a damp problem rather than causing one.

You also get a room that heats up faster and holds the heat once the heating goes off, and walls that are no longer unpleasant to sit next to. In practice that usually means running the thermostat a degree or two lower for the same comfort.

Your boiler or heat pump also has less work to do. It cycles less often and runs at lower output for the same result, which often extends the working life of the appliance as well as cutting what it costs to run.

SECTION 02

How internal wall insulation works

A lot of UK housing, particularly anything built before the 1920s, has solid walls. No cavity, and nowhere easy to add insulation.

External wall insulation can be a better technical answer, but it is expensive, it needs scaffolding, and it changes the appearance of the building, which rules it out for conservation areas and most terraces. It is also only as good as its installation, and there are currently a lot of externally insulated homes with problems caused by poor fitting.

Internal wall insulation is the practical alternative, and it generally delivers more improvement per pound spent. Done properly it works very well.

The thing you are actually managing

Warm air inside a house carries moisture, and warm moist air always moves towards colder, drier air. If it reaches a cold surface it condenses.

Before insulation, that cold surface is the inside face of the wall, where you can see it. Add insulation and you move the cold surface behind the boards, where you cannot. Condensation forming inside the build-up is called **interstitial condensation**, and it is the single biggest risk with this type of work.

Ventilation has to be considered alongside the insulation rather than after it. Warmer air holds more moisture, so a warmer, tighter room needs a way of getting that moisture out. The two work as a pair, and treating them separately is where a lot of problems start.

> **This is why detailing matters more than product choice.** A cheap system installed carefully will outperform an expensive one installed badly. Every system on the market can fail if warm moist air is allowed to reach a cold surface behind it.

Two philosophies

Every internal wall insulation system answers the moisture question in one of two ways. Either it stops moisture getting into the wall at all, or it lets moisture move through and dry out again. Both work. They work in different buildings.

SECTION 03

The three types of system

1. Vapour closed, rigid board

Typically a phenolic or PIR foam core with a foil facing, bonded to plasterboard. The foil is a vapour control layer, so the system works by keeping moisture out of the wall entirely.

Best thermal performance per millimetre, so the thinnest build-up for a given U-value. Least forgiving of poor detailing. Every joint, socket, reveal and perimeter has to be sealed, because one gap undermines the whole system.

2. Vapour open, fire rated

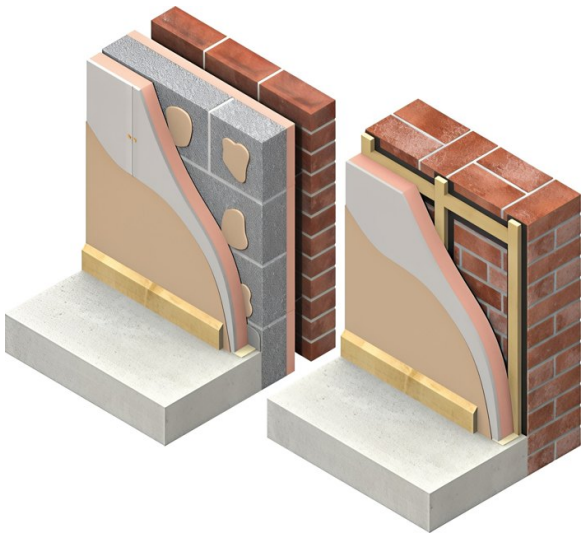
Usually high density mineral wool between timber studs, with a vapour control layer, plasterboard and sealant. Mineral wool is non-combustible, which is where the fire rating comes from.

Works with the wall rather than sealing it. Moisture can move and the wall can dry. Suits older solid walls that were built to breathe. Thicker than option 1 for the same performance, but considerably more forgiving.

3. Vapour open, natural

Hemp or wood fibre. Breathable, moisture buffering, and with far lower embodied carbon than the foam based systems.

The best match for traditional and heritage buildings, and the obvious choice if carbon matters to you. Natural does not mean foolproof. Fitted badly onto a damp wall it fails exactly like anything else.



Two vapour closed build-ups. Rigid board bonded to blockwork, and rigid board on timber battens over solid brick.

A note on vapour control layers. Some mineral wool systems can be specified with either an open or a closed vapour control layer. That single choice changes how the whole build-up behaves, so check which one you are being quoted.

SECTION 04

Matching the system to the building

There is no best system. There is only the system that suits your wall, your room and your budget.

IF YOUR BUILDING IS	LOOK AT
Solid brick, older, exposed to driving rain	Vapour open. The wall needs to be able to dry.
Rendered, clad or sheltered, with a ventilation strategy	Vapour closed is viable and gives you the thinnest build-up.
Traditional, listed or in a conservation area	Vapour open natural. Hemp or wood fibre.
A flat or a building with height or boundary constraints	Fire rated mineral wool. Check the limits carefully.
A small room where every millimetre counts	Vapour closed, and accept that the detailing has to be perfect.
Showing any sign of damp at all	Nothing. Fix the damp first.

Fire and height restrictions. Rigid foam systems carry restrictions on external walls above certain heights. In England and Scotland that threshold is generally 11 metres; in Wales and Northern Ireland it is 18 metres. Scotland also restricts use within one metre of a boundary. Always check the specific certificate for the specific product, and take advice for flats and multi occupancy buildings.

This table is a starting point, not a specification. A proper survey is what identifies the right system for a particular house. Exposure varies enormously across the country, and a wall on the west facing side of a building in a high rainfall area behaves very differently to the same wall somewhere sheltered and dry. A good surveyor will also assess the ventilation strategy for the whole house rather than looking at one room in isolation.

Other things that decide it

- How much floor area you can afford to lose
- Whether the room is a bathroom or kitchen, which changes the moisture load
- Whether you are doing one room or the whole house
- Your own skill level, honestly assessed

SECTION 05

Building suitability checklist

Work through this before you buy anything. Every one should be a yes, or a job already done.

Damp and water

- [ ] Is there a functioning damp proof course, and will the insulation sit above it without bridging it?
- [ ] Are external finishes such as render and pointing sound, with no blown, cracked or spalled brickwork?
- [ ] Is there any evidence of moisture in the walls?
- [ ] Are the guttering, downpipes and external drainage in good condition and running clear?
- [ ] Are the external wall finishes suitable for the exposure the building actually gets, including wind driven rain?
- [ ] Is there any evidence of damp, surface condensation or mould growth on the internal walls?

Construction and system

- [ ] Is the construction type suitable for the system you are considering?
- [ ] If vapour closed: is the building clad or rendered, sheltered from damp penetration, and is there a ventilation strategy in place?
- [ ] If vapour open: does the building already breathe, and does it have an exposed brick outer face likely to get wet?
- [ ] Does the building have fire rating requirements because of its height, its use or its proximity to a boundary?
- [ ] Do the green credentials of the material matter to you?
- [ ] Can you actually source the right product for your property, in the thickness you need?
- [ ] Are there rooms with external walls that cannot practically be insulated, such as a bathroom or a fitted kitchen?

> **Rooms you cannot insulate.** Bathrooms and fitted kitchens are often left out, because there is no space to lose or because stripping fitted units is not viable. Best practice guidance allows this, but only under conditions: whole rooms rather than parts of rooms, only wet rooms such as kitchens, bathrooms, shower rooms and utility rooms, those rooms heated to at least 18 degrees, and continuous mechanical extract ventilation fitted. A good surveyor will confirm whether your house meets those conditions.

> If any box in the damp and water section will not tick, stop. Insulation does not fix damp. It hides it, and then makes it worse, because the wall behind the boards is now colder and slower to dry.

SECTION 06

How much space you will lose

People underestimate this. What comes off the room is not just the insulation thickness. It is the insulation, plus the plasterboard, plus whatever holds it on the wall.

FIXING METHOD	ADDS	WHY
Bed of adhesive (recommended)	around 15mm	Continuous adhesive layer, no void behind the board
Dot and dab (avoid)	around 15mm	Adhesive dabs and the air gap behind them
Timber battens	around 25mm	Depth of the batten
Metal wall liner (avoid)	varies	Metal conducts heat, so studs become cold bridges
Studwork with mineral wool	stud depth	Determined by the insulation thickness required

A worked example

A rigid board with 50mm of insulation bonded to 12.5mm plasterboard is 62.5mm before it goes near the wall. Bed it on adhesive and you are at roughly 77mm off the room. Put 80mm on timber battens and you are close to 120mm, the best part of five inches.

Do that on two external walls of a small bedroom and you have lost close to a square metre of floor area.

Use a continuous bed of adhesive, not dabs. Government best practice guidance is explicit on this. Dot and dab carries the highest risk of interstitial condensation and should be avoided, because the dabs leave air gaps behind the insulation where moisture can collect and nothing will dry it out. A continuous layer of adhesive is the recommended approach, with fixings of the correct type, number and spacing so the board is held tight to a wall that is smooth and flat before you start. The one exception is a ventilated cavity specified in the design, which is a deliberate detail rather than an accident of the fixing method.

More is not always worth it. On a typical solid brick wall, going from 50mm to 80mm of rigid insulation improves the U-value, but not in proportion to the extra 30mm of room you give up. Work out what the thickness is worth in that room before defaulting to the thickest board.

Metal framed and foil systems. Metal conducts heat extremely well, so metal studs become repeated cold bridges through the insulation unless the design mitigates them. If in any doubt about which build-up suits your wall, refer to the government best practice guidance at gov.uk/government/publications/retrofit-internal-wall-insulation-best-practice.

Do not forget

- Window and door reveals need insulating too, in a thinner board

SECTION 07

Ventilation and moisture

When you insulate and seal a room, you change how the building handles moisture. If you do not change the ventilation to match, you have created a problem.

An old draughty house ventilates itself, badly and expensively, through gaps. Insulating internally removes a lot of those gaps. The moisture that people generate by breathing, cooking, washing and drying clothes still has to go somewhere.

What to check and upgrade

- [ ] Existing ventilation provision assessed for every room being insulated
- [ ] Extract fans in kitchens and bathrooms working, and rated correctly for the room
- [ ] Trickle vents present and actually left open
- [ ] Airbricks and subfloor ventilation clear and not blocked by the new work
- [ ] Any existing ventilation plates identified before boarding starts
- [ ] Consideration given to continuous mechanical extract or heat recovery where the whole house is being treated

Thermal bridges

A thermal bridge is a path where heat bypasses the insulation. Cold spots form there, and condensation follows. The usual culprits are window and door reveals, internal walls where they meet the external wall, floor and ceiling junctions, and the ends of floor joists buried in the wall.

> **Joist ends deserve particular attention.** Where timber floor joists are built into a solid external wall, insulating the inside face makes that wall colder. Timber that was previously dry can start to hold moisture, and the rot happens where nobody can see it until the floor moves. Take advice before insulating a wall that carries joist ends.

SECTION 08

Preparing for installation

Preparation is most of the job. Work through this before the first board goes up.

- [ ] Remove wallpaper and paint from the walls where possible, since these trap damp behind the insulation. Where removal is not possible, score or scratch the surface thoroughly.
- [ ] Remove fixtures and fittings from the walls, including skirting boards, dado rails and coving. Leaving timber on the wall behind insulation traps damp, so take it all off rather than boarding around it.
- [ ] Identify every service. Plug sockets, light switches, pipes and radiators all need addressing by a suitably qualified person.
- [ ] Remove or cut back carpets and floor coverings to allow for the new internal wall position.
- [ ] Plan studwork carefully, especially at junctions and wall edges. Planning the studwork to suit the insulation reduces cutting, mess and waste.
- [ ] Mark all main cable and pipe runs on the walls before you start, so you do not drill into them.
- [ ] Treat any mould or fungal growth before boarding.
- [ ] Inspect existing timbers for wet rot, dry rot and insect attack. Replace anything decayed.
- [ ] Allow damp proofing treatments, where applied, to dry fully before fixing anything.
- [ ] Confirm the ventilation strategy for the room, and for the house as a whole.
- [ ] For kitchens and bathrooms, get advice before you start, particularly if the room is going to be left uninsulated because of limited space.
- [ ] Where you are bonding a rigid board system, plan for a continuous bed of adhesive rather than dabs, plus fixings to the manufacturer's specification.

Gas appliances and flues. Anything involving a gas fire, a boiler, a flue or an open fireplace on a wall you are insulating must be assessed by a Gas Safe registered engineer. Insulation can affect ventilation provision for combustion appliances, and any material coming into contact with a flue has to be suitable for the heat. Getting this wrong carries a carbon monoxide risk, so it is not a job to work around.

Cable derating. Insulation restricts the air cooling of electrical cables. Where cables are covered or enclosed by insulation, current carrying capacity is reduced and the circuit may need reassessing. This is a job for a qualified electrician, not an afterthought.

References: BEIS, *Retrofit Internal Wall Insulation: Guide to Best Practice*, September 2021, and PAS 2035, mandatory for government funded retrofit schemes.

SECTION 09

Where it goes wrong

When internal wall insulation fails, it fails silently. By the time it shows on the surface, the damage behind is already done.

The five most common mistakes

1. Nobody assessed the building. Almost every failure traces back to this. Insulation went onto a wall that had a problem, and the problem carried on out of sight.

2. The vapour control layer was punctured and not resealed. Sockets, switches, pipe runs and fixings all breach it. Each one is a route for warm moist air to reach a cold surface.

3. The insulation was not continuous. Gaps at reveals, corners, floor and ceiling junctions become cold bridges, and cold bridges become condensation magnets.

4. Ventilation was never upgraded. The room got tighter, the moisture load stayed the same, and it had nowhere to go.

5. The wrong system for the wall. A vapour closed system on a wall that needed to breathe, or a breathable system on a wall that was already wet.

What failure looks like

- Mould growing behind the boards, unseen
- Joist ends rotting in a wall that is now cold and damp
- Bathrooms steaming up worse than before
- A musty smell nobody can trace
- Plaster blowing, and black spots creeping out around window reveals

> Putting it right usually means taking the whole lot out. Boards, timber, and sometimes the wall finish itself. Every pound saved on heating gets spent twice over on repairs.

In October 2025 the National Audit Office reported on quality failures in wall insulation installed under government schemes. Free audits are available through TrustMark for affected homes. If you have had insulation installed under a grant scheme and something does not feel right, it is worth checking.

SECTION 10

DIY or professional

This is a bigger job than it looks. It is not sticking boards to walls.

A competent DIYer can absolutely do internal wall insulation. But be clear about what the job actually contains before you commit to it.

YOU WILL BE DEALING WITH	WHICH MEANS
Electrical sockets, switches and cable derating	Qualified electrician
Radiators and pipework moving forward	Qualified plumber or heating engineer
Airtightness and vapour control continuity	Patience and attention to detail throughout
Studwork, junctions and edge detailing	Planning before you start, not as you go
Window and door reveals	The hardest detail in the job
Ventilation upgrades	Often building control involvement
Making good, skirting, architrave and decoration	More time than you have allowed

Get a professional involved if

- The building is listed or in a conservation area
- There is any history of damp, however minor
- Floor joists are built into the wall you are insulating
- The building is a flat, or has height or boundary restrictions
- You are treating the whole house rather than one room
- You are unsure which system suits the wall

> Whichever route you take, the assessment comes first. Print sections 5 and 8, walk the building, and be honest about what you find. That single step prevents most of the failures in this guide.

SECTION 11

Ezy Fit systems

Ezy Fit manufacture internal wall insulation systems covering all three approaches described in this guide.

K IWI System

Vapour closed. Rigid phenolic board with foil facings, bonded to 12.5mm plasterboard. Insulation thicknesses from 25mm to 80mm. BBA Agrément Certificate 24/7246. The thinnest build-up for a given performance, suited to rooms where space is tight and the wall is sheltered or rendered.

M IWI System

Vapour open and fire rated. High density mineral wool with timber studs, vapour control layer, plasterboard and sealant. Non-combustible insulation. Suited to older solid walls that need to breathe, and to situations where fire performance drives the specification.

Green IWI System

Vapour open and natural. Hemp based, breathable and low in embodied carbon. Suited to traditional construction, heritage buildings and restoration work, and to anyone prioritising the environmental impact of the material.

Getting advice. Ezy Fit can advise on which system suits your building, correct thicknesses for the U-value you are targeting, and installation detailing. Their trained installer network can carry out the work where you would rather not do it yourself.

Ezy Fit Limited
Commer House, Tadcaster Enterprise Park, Station Road, Tadcaster, North Yorkshire LS24 9JF
Telephone 01937 222091
sales@ezy-fit.co.uk
www.ezy-fit.co.uk

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