RISE | Retrofit information, support & expertise

Internal Wall Insulation: Assessing and Design

Supply chain advice pack

November 2025

Funded by:

Department for Energy Security & Net Zero

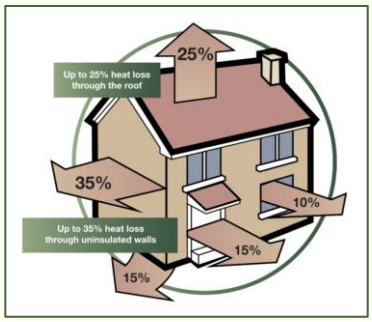
www.riseretrofit.org.uk

Introduction

This pack is part of an Internal Wall Insulation (IWI) series. The other packs can be found here.

Assessing and design → Installation → Maintenance and repairs

- **About IWI:** IWI involves applying insulation material to the internal face of a building's external walls, typically finished with a plaster skim and decorative finish.
- **Benefits of IWI:** It helps to improve energy efficiency by reducing the amount of heat escaping through external walls which, (Energy Savings Trust estimates up to 33%). IWI reduces thermal bridging, a common issue in older buildings, where heat is lost disproportionately though specific elements in the walls e.g. lintels.



Source: eco-uk

Ventilation - The ventilation strategy of any retrofit project is an essential component of the project. IWI is likely to increase how airtight a property is and as such the current ventilation in a property and any upgrades to it must be carefully considered as covered under PAS20235 and PAS2030.

- **When to use IWI:** IWI presents itself as a key measure to improve fabric performance where External Wall Insulation (EWI) may have been discounted for reasons such as cost, planning constraints, leaseholder issues, high rise blocks and access costs. IWI often is often the next option to be considered in terms of insulating walls. This typically applies to solid wall properties but can become relevant if narrow cavities are unsuitable for cavity wall insulation.
- **Funding:** IWI is an eligible measure under the Warm Homes Social Housing Fund (WH:SHF). It is also currently funded by Energy Company Obligation (ECO).
- **Key considerations:** This advice pack will outline key steps to take in effectively assessing a dwelling for the installation of IWI and how to design appropriate systems for dwelling types.
- **Regulations:** The advice pack will also cover legal and regulatory considerations, Planning requirements, warranty requirements, supply chain and bespoke system requirements, and will refer to various best practice guidance.

Why IWI?

Internal wall insulation (IWI) is an important potential energy efficiency measure for properties with solid walls and external architectural features.

Reasons to install IWI:

- **Existing construction**: Solid wall properties are unable to receive cavity insulation as there is no cavity in the external wall and so IWI provides a way to insulate the walls of these properties, especially where external architectural features or local Planning rules prohibit external wall insulation (EWI).
- **To reach a target**: With available Warm Homes grants, some dwellings may require extensive fabric upgrades to reach a performance target, for example a particular Energy Performance Certificate (EPC) banding and IWI may be the only realistic measure to achieve this. Most grant schemes follow PAS 2035 standards which promote a fabric first approach.
- **Retention of external features & regulatory consents**: Unlike external wall insulation (EWI), IWI keeps the exterior of the property unchanged, making it suitable for heritage buildings or homes with unique architectural features. **Reduced energy consumption:** IWI acts as a barrier to heat transfer, keeping the home warmer in winter and cooler in summer, which reduces the load on heating (and cooling) systems.
- **Lower energy bills:** By reducing heat loss, IWI significantly reduces the amount of energy required to maintain a comfortable indoor temperature.
- **Improved thermal comfort**: The insulation eliminates cold spots and draughts, creating a more comfortable living environment.
- **Increased property value**: Energy-efficient homes with lower running costs and improved comfort can be more attractive to potential buyers, making IWI a worthwhile investment. IWI is also generally cheaper than EWI.
- **Reduced carbon footprint:** By improving energy efficiency, IWI helps to lower carbon emissions.
- **Flexible installation:** IWI can be installed room-by-room or as a whole-house application, offering flexibility in the installation process and offers the opportunity to reconfigure or refurbish individual rooms or elevations as part of the works.
- **Soundproofing:** The insulating materials used in IWI can dampen external noise and reduce sound transmission between rooms, leading to a quieter home.

Challenges of installing IWI:

- **Overcrowding/ Space:** Properties with high occupancy where several inhabitants occupy bedroom spaces or where existing room sizes are smaller may not be suitable for IWI and may impose unacceptable loss of space or amenity on residents.

- **Disruption:** IWI is a disruptive measure and will require temporary decant of some or all rooms, at least to another area of the property, where works are taking place. There may be costs associated with decant or possible compensation of residents for disruption.
- **Removal and reinstatement of fixtures/ fittings:** In certain cases, especially in heritage properties, it may not be possible to remove and reinstate decorative features. Reinstating items such as shelves and wardrobes may not be possible following the installation of IWI.

Table 1: Comparison between different wall insulation methods

External Wall Insulation		Internal Wall Insulation		Cavity Wall Insulation	
Pros	**Cons**	**Pros**	**Cons**	**Pros**	**Cons**
Low resident disruption	Planning permission may be required	Does not require Planning permission	High disruption to residents	Quick installation time	Cannot be installed in solid wall properties
No Loss of internal floor area	Generally expensive	No external change in appearance	Loss of internal floor area	Lower installation cost	Poor or unsuitable installation can lead to moisture problems
Retains thermal mass	Requires regular maintenance checks and provision of access	Typically low maintenance	Increased risk of unwanted condensation build up in the layers of the system ("interstitial condensation")	Low/ no maintenance	Not suitable for all cavity wall constructions

How to Survey for IWI

Desk-based methods:
Desk-based research prior to or after a site visit can provide key information relating to a property's suitability for IWI. Some key aspects to consider during desk-based research are:

- **Planning constraints:** Discovering if the property/properties are subject to any Planning or legal constraints. This could be inclusion within a Conservation Area, being Locally Listed, or having protected internal or external architectural features.

- **Heritage features:** A desk-based survey can be useful for EWI but is trickier for IWI as there may be internal fixtures and detailing which cannot be determined from a remote desktop survey, for example cornice detailing.
- **Hard to treat areas**: Review of the floor plan may give indication as to potentially challenging areas that require bespoke detailing and modelling.
- **Access**: Desk-based methods can be useful for gaining an understanding of site-specific access constraints and parking provisions nearby which is useful information when considering how site teams will go about the installation.
- **Storage**: Storage of materials is an important consideration during IWI installation. A desk survey can begin to identify potential areas for site storage through a 'satellite view' assessment allowing enquiries on land ownership and use for logistics.

Site based methods:

A site visit will be necessary to determine property-specific information which will be required when designing and installing an IWI system. Some key pieces of information to gather during a site visit are as follows:

- **Specific measurements**: Accurate measurements are key when designing an IWI system. Measurements of floor and ceiling level, room areas, location of chimney breasts, fixtures and fittings, incoming mains services should be taken, in addition to the building fabric measurements such as bay windows and door openings.
- **Identification of construction**: You can't always tell from a desk study what the specific construction of a building is, therefore, a site visit is essential to confirm the property construction.
- **Defects and remedials**: Defects in the building fabric and services can cause delays during installation and so it is important these are picked up during a site visit to allow for adequate remediation prior to installation.
- **Site specific restrictions**: IWI will reduce room areas. Therefore, it is important to get accurate measurements of areas due to receive IWI in order to ensure access is not constrained and room sizes are not reduced to an unacceptable level or essential furnishings are not able to be placed as before.
- **Highlighting heritage complexity**: Whilst a desk survey can indicate the likelihood of certain heritage features, a site survey is vital to accurately measure and document actual specific heritage features that may impact IWI design and installation.
- **Wet rooms:** Where elevations containing wet rooms such as bathrooms and kitchens require IWI, the enabling works are more extensive and will typically require refitting kitchen and bathrooms complete. This adds to cost, complexity and disruption for residents.

Identifying features: worked example

Below is an example of a dwelling for which IWI would be an applicable upgrade. It has a solid wall, a large uninsulated heat loss area, is in a Conservation Area, and has typical Victorian architectural features externally such as cornices, banding, pillars and window surrounds.

There are several features however which could pose challenges in the design of the IWI system and potentially lead to errors during installation. The annotated image below highlights some key features and aspects to consider when assessing the dwelling, and how these aspects can be addressed in design and installation.

Source: Baily Garner

Annotated considerations

Shelving & in-built cupboards – where the IWI system will require to extend to cover the entire inside face of the external wall, a clash will exist with existing shelving and in-built cupboards. This can impact electrical infrastructure potentially located here. This requires careful thought, liaison with resident and for meters the statutory provider.

Plasterwork – architectural features such as decorative coving and cornices may need to be retained as part of listed building or planning consent.

Mechanical, electrical, plumbing – Radiators, sockets, ventilation and pipework will require re-siting to the inside face of the new IWI and fitted with proprietary fixings compatible with the IWI system (acceptable fixings can be advised by the IWI system manufacturer). The impact can be worse in wet rooms.

Image 1 - Worked example

Source: Zoopla

Chimney breasts – PAS2035 requires IWI to be returned 400mm at the party wall. Is there sufficient distance to achieve this to any chimney breasts or is bespoke thermal modelling required under BR IP1/06 Assessing the effects of thermal bridging at junctions and around openings?

Furniture – Room sizes will be reduced by the IWI, will this impact furniture and will some reconfiguration be required in liaison with the landlord/ resident?

Curtain rails, skirtings – Where IWI is installed any curtain rails or skirtings that require refitting will need consideration as to fixings and necessary pattress supports (for heavier fixtures) once the IWI is in place. Intermediate floor voids need to be insulated to stop damaging cold spots. It is not recommended to insulate one side of a pair of semidetached houses.

Designing IWI

To achieve the necessary guarantees and warranties, IWI will be supplied by a system supplier who will coordinate all the components required into a standard system for installation.

Systems and suppliers all have individual benefits and drawbacks which should be carefully considered prior to the design phase to ensure the most appropriate system for the project is chosen.

Table 2: Essential considerations when choosing a system supplier

Consideration	Explanation
System performance and Components	IWI systems contain a variety of materials (See Table 3) which impact U-values, thermal bridging, fire safety and much more. It is important to select the system which best suits the specific needs of an individual project or property.
Supply chain availability	The availability of the system components should also be considered; this is more pertinent for large projects which rely on a steady flow of products to remain on programme and achieve efficiencies of cost.
Responsiveness & customer service	System suppliers often provide differing levels of technical support/ customer service. If you have queries when designing or installing the wall insulation system, it is important to know that the supplier is responsive before and after the installation.
Details	Different suppliers will often have their own suite of details and designs which work for their specific system, the quality and extent of these details and designs should be considered when choosing a system.
Compatibility	When installing IWI as part of a range of retrofit measures, it is important to understand the compatibility of the various retrofit measures where they interact. Some window manufacturers have particular requirements for terminating IWI systems which may or may not work in practice. Liaison across the specialisms early in assessment and design is advised.

Types of IWI System recognised in PAS

1) Rigid insulation boards

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

2) Stud frames with infill

Here, timber or metal stud frames are fixed to the walls, insulation is fitted between them and plasterboard applied over the top. Various insulation materials can be used including mineral wool. 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.

Types of IWI System not currently recognised in PAS

3) Flexible thermal lining

This comes in rolls like thick wallpaper and is adhesive-fixed to the wall with proprietary adhesive. It doesn't provide the same level of insulation but tends to be no more than 10mm thick so can be a good option for small rooms. The availability of warranted systems should be checked.

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. The availability of warranted systems should be checked.

IWI Materials

There are several insulation materials which can be used for an IWI system, some common materials are outlined below. When considering the combustibility of materials to be attached to the building, expert fire safety guidance should be sought).

Note: materials such as cork, wood fibre and hemp are outside the scope of this paper.

Table 3: IWI material comparison

Material	Conductivity (W/mK)	Benefits	Drawbacks	Combustibility
EPS	0.03-0.04	Cost-effective, good thermal performance	Not breathable, can be damaged on impact, low fire resistance	Combustible (Class E)

Mineral Wool	0.035-0.045	Fire-resistant, breathable	More expensive, can absorb water if not protected	Non-Combustible (Class A1)
Phenolic Foam	0.02-0.025	Low conductivity, thin profile	Brittle, expensive, can produce toxic fumes if burned	Limited contribution to fire spread but combustible (Class B-C)

Different insulations are useful for different purposes. For example, an EPS insulation is often used to insulate below the damp proof course due to its non-vapour permeable construction. In contrast a mineral wool insulation will often be used for solid walled properties due to its vapour permeable nature. It is important to choose the most appropriate insulation material based on the specifics of a chosen property or project to ensure intended outcomes are delivered.

Are there any industry standards?

There are a variety of best practice guides that sit alongside the Building Regulations including Part L. The Solid Wall Insulation Guarantee Agency (SWIGA) and the Insulation Assurance Authority (IAA) both produce guidance for the design, specification and installation of IWI. The Centre for Sustainable Energy (CSE) has useful guidance on IWI, types of insulation system, and pros and cons of IWI for different building types.

Key documentation to be included in the design:

- Technical details and drawings
- System specification
- Ventilation strategy
- Any thermal bridging calculations
- Any Planning specific document requirements

Practicality

The installer will need to identify how these issues will be managed within the construction phase plan:

- **Disruption**: Rooms may not be usable while work is ongoing. Installers might need to remove furniture, shelving, wardrobes and in-built cupboards temporarily. Works can be dusty and noisy at times and may require resident decant.
- **Property access**: How will materials be moved into and around working areas?
- **Site storage**: Where will insulation materials be stored on site to ensure they are safe and kept sheltered from the elements?

- **Deliveries and traffic plans:** How will deliveries of products be handled and how this may impact the local community?
- **Site access requirements**: Where will the main access to the site be and will this impact on the surrounding community? If yes, can this be mitigated?
- **Waste management**: How will waste from the site be managed, will there be skips, if yes, where will these skips be placed to reduce the impact on the local community?

Mitigating the risks of poor IWI

Installing IWI is a complex process and requires good knowledge of industry practices and strong communication between multiple stakeholders to ensure positive outcomes. Without the correct processes in place, IWI can, and does, go wrong, with a variety of less positive impacts. It is for these reasons that the PAS2030 and 2035 standards were developed and must be followed to avoid poor outcomes.

The assessment and design phases described by the PAS standards are critical to ensuring that risks which may occur during the installation phase are reduced as much as practically possible. This is achieved through an extensive survey which identifies all relevant features requiring consideration and allows for difficult details to be correctly designed, improving efficiency and delivering the right level of information to on-site teams.

Conclusion

To conclude, IWI is a key measure used to improve the energy efficiency of buildings. It is important when considering an IWI installation that adequate information about the building is known. This is achieved through a combination of on-site and desk-based surveys which aim to capture all relevant information to ensure an accurate design of the system can occur.

The design phase of an IWI installation can be extensive, and it is critical that as much information about the system is defined during this stage.

If a dwelling has a detailed survey and extensive design it is likely that many risks which could occur from IWI installation will be mitigated, ensuring the highest possible chance of the intended project outcomes being met, leaving the residents with a warm and comfortable home for years to come.

Resources

Podcast: All RISE podcasts are available here.

PAS podcast: "PAS for Warm Homes projects" available here.

Masterclass: All RISE masterclasses are available here.

PAS masterclass "PAS 2035 compliance" available here.

Advice pack: All RISE advice packs available here.

EWI advice pack: "assessing and design" available here).

This pack aims to share insights, good practices, and lessons learned from the sector. It is intended for informational purposes only and does not constitute as recommendations or endorsements of specific suppliers, products, or services or as legal advice. Please always check the latest regulations.

www.riseretrofit.org.uk

RISE – Retrofit information, support & expertise