RISE | Retrofit information, support & expertise

External Wall Insulation: assessing and design

Supply chain advice pack

September 2025

Funded by:

Department for Energy Security & Net Zero

www.riseretrofit.org.uk

Introduction to External Wall Insulation

- **About EWI:** External Wall Insulation (EWI) is a retrofit solution that involves applying insulation material to the exterior of a building's walls, typically finished with a protective render or cladding system. It helps to improve energy efficiency by reducing the amount of heat escaping through external walls which, according to the Energy Saving Trust, can account for up to 33% of total heat loss in uninsulated homes. EWI can lead to lower energy bills, especially when combined with other retrofit measures.
- **When to use EWI:** There are several reasons to consider EWI
    - As an insulation solution for solid wall properties and for narrow cavity properties which are not suitable for cavity wall insulation.
    - As a measure to eliminate thermal bridging - a common issue in older buildings, where heat is lost though elements in the walls e.g. lintols.
- **Funding:** Government funding for EWI has been available for several years and is an eligible measure under the Warm Homes funding schemes. The effective application of EWI can greatly improve energy efficiency of dwellings in the housing sector and helps alleviate fuel poverty by reducing energy bills for residents.
- **Key considerations:** This advice pack will outline the key knowledge requirements to effectively assess a dwelling for the installation of EWI, considering key measurements, notable features, defects and more.
- **Regulations:** The advice pack will also outline essential considerations when designing an EWI system, such as EWI suppliers and systems, material properties and Insulated Render and Cladding Association (INCA), a trade body.

Ventilation - The ventilation strategy of any retrofit project is an essential component of the strategy. EWI 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 specified by PAS20235 and PAS2030'

Why EWI?

External wall insulation (EWI) can be one of the most effective methods for insulating a dwelling for several reasons. While it can be costly and may cause some disruption during installation, there are compelling reasons why EWI is often chosen as the preferred insulation solution for certain types of properties.

Reasons to install EWI:

- **Existing construction**: Solid wall properties are unable to receive cavity insulation so EWI provides a way to insulate the walls of these properties with minimum disruption to the resident. Properties with narrow cavities may be unsuitable for cavity wall insulation making EWI or IWI the alternative choices.
- **To reach a target**: Some dwellings may require extensive fabric upgrades to reach a performance target, for example a particular Energy Performance Certificate (EPC) banding, where EWI may be the most technically feasible measure to achieve this.
- **Retention of thermal mass**: When considering solid wall insulation, EWI is often preferred over internal wall insulation (IWI) as it retains the thermal mass of the building within the thermal envelope, reducing temperature fluctuations.

  Thermal mass - is the ability of a material absorb, store and release heat. When thermal mass is inside any added insulation layer is will help to regulate the indoor environment and temperature

- **Stabilisation of external fabric:** EWI can form part of a structural stabilisation method, improving the integrity and durability of the building envelope whilst protecting it from further weathering and deterioration.
- **Lower disruption for residents:** installing EWI has a much lower impact on residents than IWI and therefore is often the most preferred method for insulating solid walls.
- **No loss of internal floor area:** As the insulation is mounted externally it does not lead to a reduction in usable floor area.

Comparison between different wall insulation methods

	External Wall Insulation	Internal Wall Insulation	Cavity Wall Insulation
Suitability	Usually chosen when CWI or IWI are unsuitable.	May require redecoration which can be more disruptive for occupants in-situ.	Cannot be installed in solid wall properties and may be unsuitable for some narrow cavity properties.
Planning permission	May be required	Usually does not require planning permission	Usually does not require planning permission
Installation time	Higher	Higher	Shorter
Resident disruption	Lower	Higher	Lower
External appearance changes	Higher	N/A	Lower
Loss of floor area	N/A	Higher	N/A
Average costs	Higher	Higher	Usually lower
Technical notes	Requires regular maintenance checks. Retains thermal mass.	Higher Risk of interstitial condensation.	Poor or unsuitable installation can lead to moisture problems.

How to survey for EWI

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

- **Planning constraints:** Discovering if properties are subject to any planning or legal constraints. This could be location within a conservation area, being locally listed, or being part of a period street scene.
- **Heritage features:** A quick desk-based survey will highlight whether a property has any significant heritage features that need to be considered, or which may make EWI unfeasible.
- **Hard to treat areas**: Desk based analysis is good for identifying hard to treat properties such as those with tile hanging or cross wall construction. Design solutions are often more difficult to achieve for these types and so alternative measures may need to be explored before EWI is chosen.
- **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 need to operate during the installation.
- **Storage**: storage of materials is an important consideration during EWI 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 to be made.

Site-based methods:
A site visit is necessary to determine property-specific information that is required to design and install an EWI system. Some key pieces of information to gather during a site visit are as follows:

- **Specific measurements**: Accurate measurements are key when designing an EWI system: measurements of DPC level, rainwater goods, externally fixed utilities and soffit depth should be taken, in addition to the building fabric measurements such as bay windows and porches.
- **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 important to confirm the building's 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**: EWI will reduce the width of access routes, therefore it is important to get accurate measurements of areas to receive EWI to ensure access is not constrained.
- **Highlighting heritage complexity**: While a desk survey can identify heritage features, a site survey is important to accurately measure and document specific heritage features that may impact EWI design and installation.

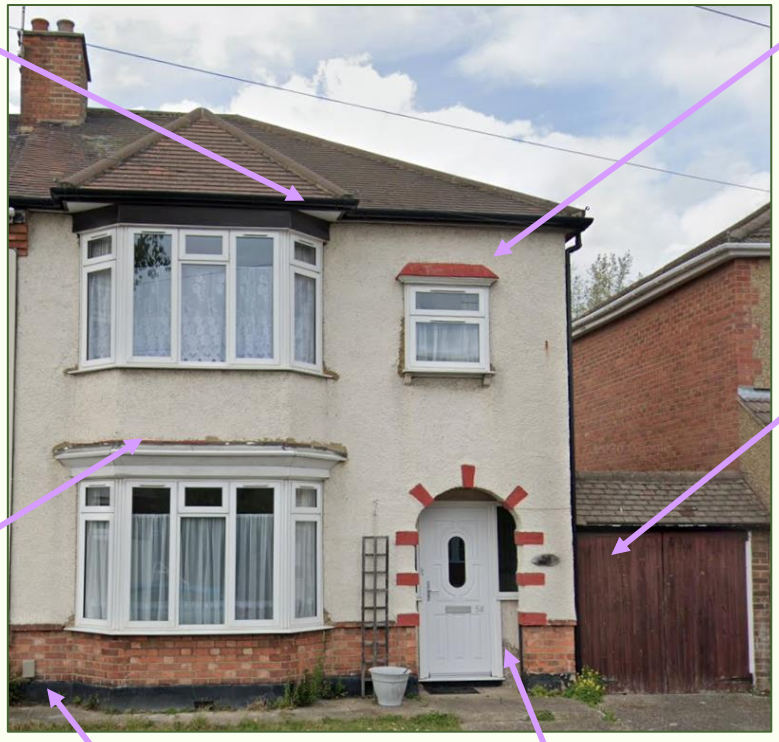
Identifying features: worked example

Below is an example of a dwelling for which EWI would be a suitable improvement. It has a solid wall, a large uninsulated heat loss area, is not in a conservation area, and has a relatively simple form with limited architectural features.

There are several features however which could pose challenges in the design of the EWI system and potentially lead to errors during installation. Below is annotated image to highlight some key features to consider when assessing the dwelling, and how these aspects might lead to challenges in future stages.

Soffit depth – the soffit depth can have a significant impact of EWI installation, potentially requiring the eaves to be extended to achieve the required overhang, sufficient measurements should be taken to ensure accurate design of this detail.

Decorative lintol above first floor window – this could result in thermal bridge if not removed.



Bay window - These features can often pose significant challenges when it comes to designing and installing insulation due to their many variations and unique features such as the cornice on the image shown. Ample measurements should be taken to allow for effective design.

Garage - This garage may impact the continuity of the thermal envelope leading to thermal bridges. Insulation to the wall inside the garage would likely be required but consideration should be given to how this would impact accessibility for the resident.

Source: Baily Garner

Externally mounted services – Services such as meter boxes and electricity cabling can cause significant difficulties when installing EWI, it is important that any services are identified so provisions can be made for moving and reinstating them.

Entrance porch – this could impact the thickness of EWI able to be applied to this area, therefore impacting targets for U-value performance and thermal bridging requirements. Measurements of this area are required to allow for U-value and thermal bridge calculations.

Designing EWI

To achieve the necessary guarantees and warranties, EWI 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 your project is chosen.

Essential considerations when choosing a system supplier

Consideration	Explanation
System performance and components	EWI systems contain a variety of materials (See below table) 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.
Responsiveness	System suppliers often provide differing levels of technical support and customer service. If you have queries when designing or installing the wall insulation system, it is important to know that you will receive a fast response from the supplier.
Details	Different suppliers often have their own collection of details and designs which work for their specific system. The quality and variety of these details and designs should be considered when choosing a system.
Customer service	The level of customer support provided by the supplier should be a key consideration in choosing an EWI system. This includes support before, during and after the installation to ensure the whole process is as smooth as possible.

EWI materials

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

Material	Conductivity (W/mK)	Benefits	Drawbacks	Combustibility
EPS	0.03-0.04	Cost-effective, good thermal performance	Not breathable, can degrade under UV, 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)
Wood Fibre	0.038-0.05	Sustainable, breathable, good moisture regulation	Lower insulation performance, more expensive	Combustible (Class E-D)
Phenolic Foam	0.02-0.025	Low conductivity, thin profile, good fire resistance (with facing)	Brittle, expensive, can produce toxic fumes if burned	Limited combustibility (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?

INCA is the "Insulated Render and Cladding Association", a trade body representing the EWI industry. INCA provides access to technical guidance, best practice documentation, and updates on evolving industry standards and regulations. This is especially useful when navigating compliance with building regulations, thermal performance targets, and fire safety requirements.

INCA provides a suite of details for brick slip and render finished EWI, which is often relied upon by design professionals when specifying EWI.

Importantly, INCA's details are proven to reduce thermal bridging, a critical factor in achieving high levels of energy efficiency and compliance with Part L1 of the Building Regulations. By addressing junctions and interfaces where heat loss is most likely to occur, these details help to maintain the integrity of the building envelope and improve overall thermal performance. If INCA details are used in designs to mitigate thermal bridging and weathering, PAS2035 considers these designs to be compliant with the standards requirements.

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 the following issues will be managed within the construction phase plan:

- **Site storage**: Where insulation materials will be stored on site to ensure they are safe and kept sheltered from the elements.
- **Deliveries and traffic plans:** how deliveries of products will be handled and how this may impact the local community.
- **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 EWI

Installing external wall insulation is complex and requires good knowledge of industry practices and strong communication between multiple parties to ensure positive outcomes. Without the correct processes in place, external wall insulation can, and does, go wrong and has impacts on several stakeholders. It is for these reasons that the PAS 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, reducing the guesswork required by on-site teams.

Conclusion

External wall insulation is a key measure used to improve the energy efficiency of buildings. It is important when considering an EWI 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 EWI installation can be extensive and it is critical that as much information about the system is defined within this stage.

If a dwelling has a detailed survey and extensive design it is likely that many risks which could occur from EWI 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

RISE advice packs:

Supply chain advice packs available here.

RISE podcasts:

Published weekly and available here.

RISE masterclasses:

Supporting the supply chain playlist 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