

External wall insulation

Introduction

This update provides additional guidance relating to how the Functional Requirements in the Technical Manual may be satisfied when external wall insulation (EWI) is used as a part of your project.

EWI involves mechanically fixing Insulation boards on the external façade of a property and finishing the external makeup with a render finish. This article will discuss some of the main risks associated with this type of build up and put forward how our Functional Requirements can be satisfied; the topics that will be covered are:

- [What are EWI systems?](#)
- [Fixing requirements](#)
- [Key points during Installation of the EWI system](#)
- [Window and door reveals](#)
- [Condensation risk analysis](#)
- [Render compatibility](#)
- [Movement joints](#)
- [Damp proof courses, cavity trays, flashings and weep holes](#)
- [External fixtures](#)
- [Risks associated with framed structures](#)
- [Compliance with Building Regulations](#)
- [Warranty position](#)

What are EWI systems?

These are systems applied to the exterior walls of existing or new buildings, comprising of an insulant and a protective render finish. The insulation type can vary from expanded polystyrene insulation (EPS), extruded polystyrene insulation (XPS), phenolic insulation or mineral wool insulation

A third party product approval such as a BBA certificate will be required for the 'combined render and insulation system' and must clarify which type of wall substrate the EWI system has been assessed to be applied too (eg. for a masonry or framed substrate). A full manufacturer's specification for the installation of the system to the substrate must be provided. Please note, the specification may vary depending on the type of substrate and wind driven rain exposure the project is located in. For warranty purposes a drained and vented will be required.

The only exception from this rule is for new and existing solid masonry structures where the masonry wall is of a sufficient thickness to meet PD 6697 for a given exposure zone. Such walls must be in sound condition and free from dampness.

It should be noted that most third party product approvals will state the EWI system will only 'contribute towards' the weather resistance of the wall, ie, not give full weather resistance. Therefore the substrate must also be constructed to provide adequate resistance to water penetration. This can be identified by reference to either BS 5628-3:2005 Table 11 or PPD 6697, depending on the wall thickness and site exposure.

[Back to contents](#)

Also; the certificate will say the EWI provides a means to 'improve' the thermal performance of the external wall construction. Therefore **any proposed installation must account for the overall thermal performance of the wall construction** and the provision of a cavity to meet our warranty requirements.

For installation on insulated concrete formwork (ICF) substrates, a third party product approval certificate must be present, stating the EWI system is suitable for use with ICF substrates to provide the necessary weather resistance without the need of a cavity (ICF structures do not generally have proof of weather resistance without a suitable cladding system to provide this.) All of the conditions within the certificate must be carefully reviewed by your designer and must be forwarded to your warranty surveyor for approval prior to works starting on site.

Fixing requirements

Insulation may require to be keyed to receive the basecoat and render system, please refer to the manufacturer's specification for additional guidance. Insulation boards should be fixed in accordance with the manufacturers requirements. The density of proprietary fixings should be designed on a site specific basis by a suitably qualified structural engineer.

This generally consists of a minimum of five fixings per full insulation board/8/m² with additional fixings to corners and reveals. A pull out test report confirming fixing type and length will be required in accordance with the Construction Fixings Association and made available to the warranty surveyor. If the fixing for the insulation boards are to pierce a breather membrane, a site specific installation guide must be provided from either the EWI manufacturer, breather membrane manufacturer or frame manufacturer (timber or light gauge steel frame) detailing how this should be completed without compromising the effectiveness of the breather membrane.

Please note:

- 1. For warranty purposes, dot and dab method of fixing using adhesives is not acceptable on masonry substrates. A full coat of approved adhesive (often the manufacturer's adhesive base coat) must be applied across the full face of the substrate with a tamped finish as per the manufacturer's specifications.*
- 2. EWI comprised of EPS/XPS and phenolic insulations or any other combustible EWI system not achieving European class A2, s1, d0 or A1 are not acceptable for use in buildings 11m / 18m high (Scotland /England-Wales).*

For coastal environments and areas of severe and very severe wind driven rain exposures the third party product approval for the EWI system must explicitly confirm the complete the system is suitable for use in a coastal environment or severe/very severe wind driven rain exposure. Furthermore, all external metals must have suitable corrosion protection for the intended environment. Further guidance can be found in our [Technical Manual 'Appendix C - Materials, Products, and Building Systems'](#). For further information please see Appendix B of our Technical Manual which provides further guidance on additional requirements for developments within coastal locations.

Key points during installation of the EWI system

The EWI system must be installed by an approved installer from the EWI manufacturer. Evidence of the installer being approved should be provided to the warranty surveyor before works start on site. When installing an insulated render system, the following should be observed:

- The render (either the finish or the base coats) must not be applied onto saturated substrates as this may affect the bond strength and adhesion
- Protection must be provided when applying either the insulation boards or the finish render in rain or other inclement weather; to avoid trapping moisture in the system
- Render coats must not be applied in temperatures below 5°C
- Vented cavities should not be blocked, nor should any 'weep holes'
- The use of timber supports and blocks within the insulated render system should not be used
- Ensure all fixtures and fittings which penetrate the insulation system e.g. flues, ventilation pipes, water pipes etc. are appropriately sleeved and fully sealed in accordance with the system manufacturer's recommendations
- The installation of EWIs at window/door reveals often fail due to poor detailing or support (often by wooden boards). The manufacturer's details must be followed and appropriate trims should be provided at openings, corners, angles and interfaces etc
- Depending on the manufacturer's specifications, the insulation board may require to be keyed to receive the desired render base coat and reinforcement

Window and door reveals

Insulation is used in all construction projects to ensure buildings are kept warm and in turn reduce energy loss, however any break in the insulation line can often lead to condensation issues (in particular interstitial condensation). With EWI systems, insulation is often missed around window and door reveals leading to condensation issues around the reveals.

The design for the EWI system should be carefully reviewed by all parties to ensure the insulation boards are present around the window and door reveals and there are no breaks in the insulation line. The design review should be aided by regular checks by the site management team to ensure the workmanship for the EWI system meets the requirements of the warranty provider, EWI manufacturer and third party product approval certificate.

A continuation of the breather membrane and vapour control layer (VCL) must be catered for around the window and door reveals where the EWI is applied to a framed substrate.

Allowance must also be made to ensure window cills adequately project beyond the finished surface of the EWI (render/brick slip etc.) - to ensure any throating is correctly positioned clear of the finish, and that opening lights/ventilators are correctly installed to allow correct opening without being restricted by the EWI system.

Drainage deflection beads should be incorporated into the system to deflect water present in the drainage cavity around openings, other penetrations or items that block the drainage cavity.

Condensation risk analysis

As with the above point, EWI systems have an inherent risk interstitial condensation – therefore a condensation risk analysis should be carried out in accordance with BS 5250 to ensure the building fabric meets the required performance standard. If a vapour control layer is required then this must be installed to the warm side of the insulation and the type must be approved and suitable for the application.

Please note, providing a condensation risk analysis doesn't negate the need for thorough and robust checks on the design, workmanship and materials by the site management team and installers.

Particular attention should also be given to detailing around DPC level to ensure that there are no thermal breaks between the wall and floor construction and that any products used below DPC are suitable and accredited for use in that location.

Render compatibility

As stated above, only the render system stated on the third party product approval certificate can be used – we cannot accept any other render system or site made render to be applied to the EWI system. In accordance with the render system manufacturer's recommendations appropriate beads should be provided at openings, corners, angles and interfaces etc. Reinforcement mesh should be accommodated throughout the base coat application with additional reinforcement to vulnerable areas and corners of openings etc. If there are any concerns regarding straight line joints or other areas where there are unusual constructions requirements an additional layer of mesh should be installed to these locations

Movement joints

Movement joints in the backing substrate should be mirrored through the insulated render system and formed in accordance with the EWI and timber frame/light gauge steel frame (LGSF) manufacturer's recommendations

Damp proof courses, cavity trays, flashings and weep holes

- The EWI system must not bridge any horizontal damp proof course.
- Where cavity trays are installed eg. over openings or roof abutments, provision for draining the cavity tray will be required through the system as well as the correct construction of any flashing
- Weep holes should be clear and functioning correctly (i.e. not blocked by the EWI system or render finish)

External fixtures

All fixings, down pipes, rainwater pipes, cables, fence posts, external light fittings, satellite dishes and other ancillary fittings and fixtures should be installed carefully after the insulated render system has been completed and properly supported from the substrate construction and not solely fixed to the EWI.

In addition, where the EWI is installed as part of a refurbishment project, the following should be observed:

- Remove existing and provide temporary downpipes and avoid allowing the temporary downpipes to spill water over the render system
- If required, reset all drainage gullies to accommodate the insulation system thickness
- If required, ensure that any gap around the window and door frames is correctly sealed against rain penetration before application of the insulated render system

Risks associated with framed structures

Where an insulated render system is used as a cladding to a timber framed structure a drained and vented cavity will be required. A suitable breather membrane must also be provided to protect the sheathing board and framing system from water penetration reaching the internal finishes. The EWI system must have a third party product approval certificate confirming it can be used on the outside of a timber frame or LGSF structure.

EWI systems applied to LGSF should have a drained cavity only with limited ventilation. Cavity ventilation might decrease U-value and introduce additional condensation/corrosion risk – please make sure installation is carried out in accordance with the design and condensation risk analysis provided.

Compliance with Building Regulations

EWI systems should be specified and installed in line with the Building Regulations standards. Particular attention should be paid to fire safety and the risk of external fire spread (AD B, B4 England and Wales).

Cavity barriers

Depending on the type of insulation used in the EWI system, cavity barriers will be required around window and door openings, at compartment floors and walls, party wall junctions and at the edge of cavities.

The cavity barriers will be required to cover both the cavity and (in the case of EPS, EXS or phenolic insulation) the zone of flammable insulation construction around an opening or compartment position, ie, this type of insulation must not bridge the cavity barrier.

For further information please speak to your designer and Building Control provider. Evidence of the installation may be requested as part of a quality assurance process document.

In areas where fire stopping is required, combustible insulation material should be replaced with non-combustible material. For application to second storey and above, it is recommended that the designer considers at least one stainless steel fixing per square metre and fire barriers in line with compartment walls and floors, as advised in BRE Report BR 135:2013

Height

EWI comprised of EPS/XPS and phenolic insulations or any other combustible EWI system not European class A2, s1, d0 or A1 are not acceptable for use in buildings 11m/18m high (Scotland/England-Wales).

Within 1m of boundary

If the EWI systems is proposed within 1m of a boundary, the entire system must be tested to BS EN 13501:1 and achieve a fire classification rating of B-S3, D2 or better. For further information please speak to the system manufacturer and your building control provider.

Boiler flues

Boiler flues should be appropriately sleeved to meet the requirements of Approved Document B. For further information, please speak to your Building Control provider.

Warranty position

This article has provided some background into what EWI systems are and the main risks for us as an insurance provider. Before works start onsite, all of the above points should be discussed with your warranty surveyor to ensure a robust system is installed.

Every care was taken to ensure the information in this article was correct at the time of publication. Guidance provided does not replace the reader's professional judgement and any construction project should comply with the relevant Building Regulations or applicable technical standards. For the most up to date Premier Guarantee technical guidance please refer to your Risk Management Surveyor and the latest version of the [Premier Guarantee Technical Manual](#).

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