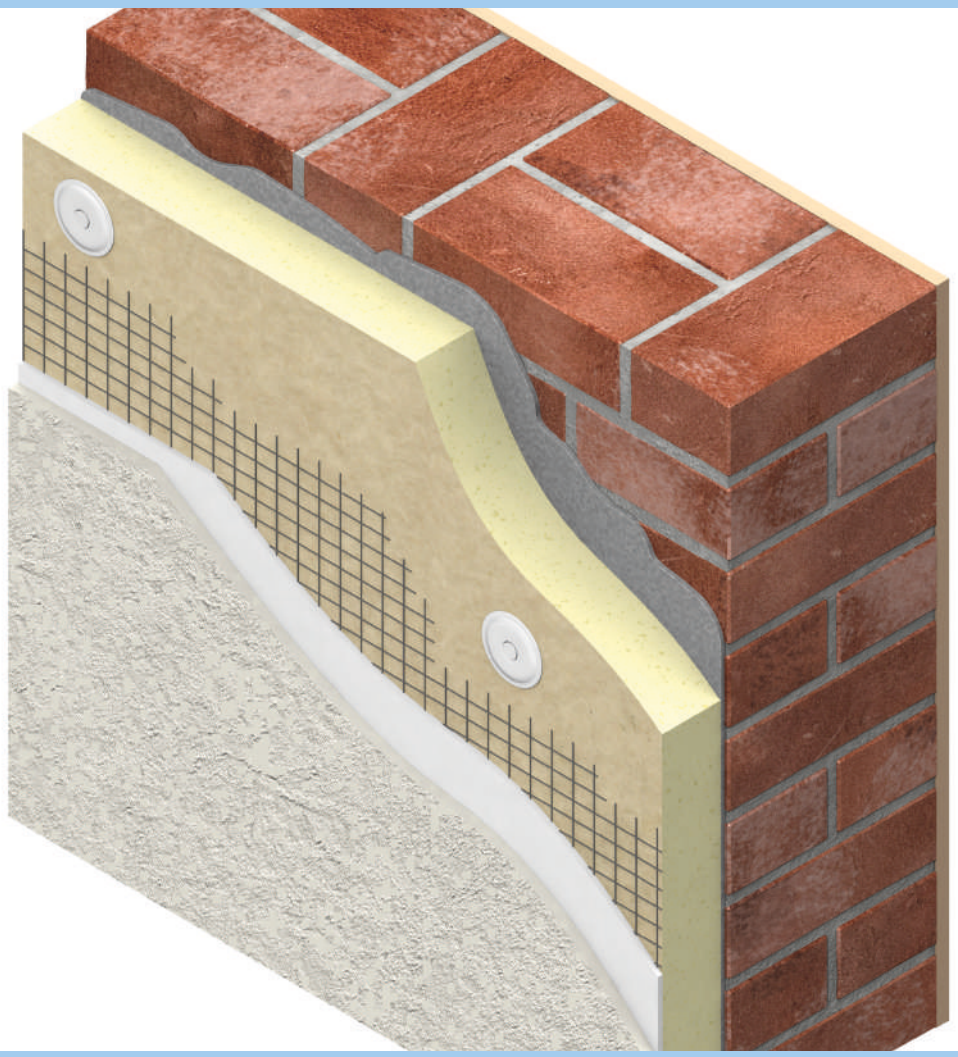
Insulation Manufacturers Association

Best Practice Guide No. 1:

Application of polyisocyanurate (PIR) insulated external wall insulation (EWI) systems when used on existing facades and / or buildings



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This is one of a series of Best Practice Guides produced by IMA for the benefit of designers and installers and their customers.

Insulation Manufacturers Association (IMA) is the Trade Association that represents both the Polyisocyanurate (PIR) and Polyurethane (PUR) insulation industry in the UK. Its members manufacture rigid insulation that provides around 40 per cent of the total thermal insulation market into the UK. IMA's membership comprises all of the major companies in the industry, including manufacturers of finished PIR and PUR insulation products, as well as suppliers of raw materials and associated services.

IMA represents the industry's views across all government and industry stakeholders and decision makers and promotes a positive and dynamic business environment for the PIR and PUR insulation industry in the UK.

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Contents

1. Overview

This guide aims to promote best practice when designing and constructing a building that is to receive an external wall insulation ('EWI') render system which incorporates polyisocyanurate (PIR) rigid thermal insulation boards.

External wall insulation systems, also known as ETICS ('external thermal insulation composite systems'), are suitable for both new and old buildings.

Key benefits of EWI render systems include:

- Improved aesthetic
- Improved energy performance
- Extended serviceable life of a building

There are many different types of EWI systems incorporating PIR insulation boards, featuring a multitude of finishes and methods of application.

External wall insulation is often the logical choice for improving the thermal performance and external façade of an existing or new building.

In some cases an EWI system may be the only practical method of achieving significant thermal and aesthetic upgrades.

N.B. This guide should be read in conjunction with the appropriate technical guidance notes as issued by the system designer / supplier and is not intended to supersede, but supplement guidance.

Definition of a EWI System Designer: An EWI system designer's primary role is to design, manufacture and supply certified external wall insulation systems in a range of insulation materials and finishes to meet the needs of the UK, European and worldwide markets.

It is IMA's recommendation that an approved EWI system should be purchased and installed via an accredited system supplier. This is the only way to ensure quality, safety and long term performance.

2. Recognised Installer / Applicator

Installation of the system/s is to be carried out by a recognised installer organisation, using suitably skilled and experienced operatives.

System designers operate recognised installer schemes for their systems, under which operatives from the recognised installer organisation are trained, assessed, and approved by the system designer.

Once operatives from the recognised installer company have been trained, assessed and approved by the system designer operatives are issued with an appropriate training / competency cards.

The system designer, in addition to the above carries out regular reviews of the recognised installer companies to demonstrate they are competent to carry out installation in accordance with the certification for their systems.

3. Site survey, pre-installation survey and preliminary work

Survey and preparation of the building is key to obtaining a successful specification and finished installation. If this is not done competently the success of the EWI system and / or the existing fabric will most certainly be compromised.

Visiting the site is essential before works are commenced in order to survey the building and elevations that are to receive the system. This is done to determine whether remedial works need to be carried out prior to installing the EWI system.

Preparing the substrate in order to receive the chosen EWI system is extremely important. If the substrate is not prepared to receive the chosen system as intended then this can have severe implications on the performance and aesthetics of the system.

For example, if the wall is not straight or plumb then the overall finish will not be straight or plumb, as the system will follow the contour of the existing substrate.

The following is a suggested list to outline the necessary procedures that need to be put in place on a project before installing the system.

- In the case of old buildings, the causes of rising damp, efflorescence and similar problems should be identified, remedied and allowed to dry out sufficiently
- Any wall defects should be identified before system preparation and installation i.e. such as cracks, spalling, movement, bulging, leaks, damage due to impact, settlement or frost damage. Structural engineers or other relevant competent persons are typically engaged to do this

- Additional precautions are required for non-traditional construction types e.g. buildings constructed using concrete, steel or timber frames as the primary load bearing structure, with panels of various materials used to sheath and complete the walls. Advise should be sought from the system designer, structural engineer and guarantee provider when dealing with non-traditional construction types
- The existing substrate should be tested for pull out loads so that fixing type and quantities can be determined, relevant to wind loading considerations. Use and refer to ETAG 014 -Plastic Anchors for Fixing of ETICS with Rendering
- Check whether the substrate will need dubbing out for alignment or a complete bedding coat
- Remov moss, lichen and mould
- Record any difficult detailing and agree solutions
- Determine if any architectural features need preserving or replicating in order to be repositioned and placed within / on the new EWI system
- Evaluate access to the property, heights of the building, security of tenants
- Contact the local planning department to evaluate if planning permission is required, this is of particular importance if the property is situated in a conservation area, area of outstanding natural beauty, if the property is listed etc
- Contact the local building control authority (unless using an installer organisation who is part of a Solid Wall Insulation Competent Person Scheme (CPS). These organisations can self-certify that their work complies with the relevant building regulations without the need for a separate assessment by the local building control authority
- Discuss finishes, colours and textures (including samples) with the client and interested parties
- Evaluate the need for repositioning of or temporary removal and / or extension of services such as overhead electricity, TV, telephone and broadband connections / equipment, gas or oil pipework, electricity or gas meters, lights, rainwater goods, flues, ventilation ducts, etc. and that the relevant contractors / competent persons and utility supplier are engaged to do this
- Make provision for waste disposal from site

Once the building survey and pre installation survey have been completed, drawings and specifications for each elevation that is to receive an EWI system should be prepared, agreed and instigated prior to the project starting.

The drawings and specification should include some or all of the following:

- Position of starter tracks and render beads
- Position and amount of reinforcement scrim, corner mesh and scrim patches for corners / corners of openings
- Detailing around doors, windows, eaves, projecting balconies, coping details and special details such as abutments, extensions (robust standard solution / typical design details are available from the system certificate holder / system designer)
- Damp proof course level
- Location and type of weather seals to be used
- Areas where sealants are to be used
- Position of fire barriers (if required)
- Type of system to specify i.e. when adding a EWI system to an old and / or existing rendered substrate the insulation / system is to be both bonded and mechanically fixed in place
- Location of movement joints
- Location and positioning of beads and trims
- Flashing details
- Window and door sill details
- Architectural features i.e. quoins, external cornicing , stringers, keystones, window headers, window sills, window architraves, corbels, arches, flat bands, raised or recessed bands, ashlar cuts and columns etc
- Coping details and special details such as abutments, extensions
- Attachments such as gates and fences, clothes lines and satellite dishes

4. EWI System – General make up / assembly

The types of components that make up the system generally consist of the following (although advice should always be sought from the actual system supplier):

- Adhesive (usually acrylic or cement-based)
- Insulation material i.e. PIR insulation boards
- Anchors / Fixings to ETAG 014 (if required)
- Base coat render
- Reinforcement (glass fibre mesh, metal lath, cage)
- Finishing coat / top coat with system primer and/or paint coating

Ancillaries used with the system generally consist of the following:

- Fungicidal wash
- Spray insulation
- Insulation material suitable for use below DPC
- Base profile / starter tracks
- Wall copings
- Sills (under and over sills)
- Capping trims, curved trims, stop beads and corner beads, end stop trims
- Movement joints (structural and render only)
- Service ducts with removable covers (louvered / access panels)

Supporting Documentation

Many system designers should provide supporting documentation such as the following:

- System specific / generic method statements (project specific method statements are to be produced by the Installation Company to the construction client outlining what is to be done on the specific project/s, which may include information from the system specific method statement from the system supplier as part submission)

- Robust standard solution drawings (junction detailing, detailing around services, flues etc.)
- Project specific detailed drawings (the system designer will work with the Installer to develop bespoke details for non-standard junction, service details which do not otherwise exist)
- Third party / independent certification
- Pre installation survey template, robust standard solutions checklist and assessment of the building templates
- Installation checklist template
- Operation and maintenance manual templates

Moisture Protection and Temperature Control

Care should be taken on site during construction as follows:

- Avoid insulation boards getting wet
- Ensure that base and top coats are applied to the system designer's specification i.e. thickness, number of layers, positioning of the mesh / reinforcement, applied within the correct temperature (typically above 5 degrees Celsius)
- Enough time is left for curing / drying of base coats, top coats and adhesives

N.B. All of the above prevents unwanted visual effects from appearing post installation.

5. Requirements for the insulation material

The insulation component is a vital part of the system. Its essential characteristics are indicated on a label, which should be on every pack that leaves the manufacturing plant.

The main characteristics for thermal insulation products detailed on the 'CE label' and in the DoP ('Declaration of Performance') are thermal conductivity (which is declared to the 90% statistically confident 'lambda 90/90 value'), the Euro-classification of Reaction to Fire, length, width and area. The manufacturer and / or system manufacturer guarantee that these values are met by their products. Prior to installation the approved installer should check that the PIR materials to be used are compatible with the chosen EWI system. It is IMA's recommendation that an approved system should be purchased and installed via an accredited system supplier. This is the only way to ensure quality, safety and long term performance

5.1 What is PIR insulation?

PIR insulation boards are made by reacting a liquid polyol with a liquid polymeric isocyanate known as MDI in the presence of a blowing agent and other additives. The mixed components then react exothermally to form a rigid thermosetting polymer. Since the blowing agent evaporates during this reaction a rigid closed cell low density insulation product is created. Excellent insulation performance is achieved because the gas trapped within the closed cell structure has a very low thermal conductivity and there is minimal heat conduction through the solid cell walls due to the low density. Approximately 97% of the volume of the foam is trapped gas. The manufacture of Polyisocyanurate Foam (PIR) insulation is a continuous lamination process onto facing materials.

The facers top and bottom are tailored to match end use, foil faced and glass tissue are the most common.

Polyisocyanurate (PIR) insulation boards have been extensively used in building applications in walls, roofs and floors in both new build and refurbishment of residential, commercial and industrial buildings.

5.2 Thermal performance

Thermal conductivity and thermal resistance values for the insulation boards are quoted in accordance with the principles of the relevant harmonised European standard, using so called 90/90 principles in line with procedures for the determination of the 'aged' values of the thermal resistance and thermal conductivity.

The European standard EN 13165 'Thermal insulation products for buildings – factory made polyurethane (PU) products – specification', typically gives the thermal conductivity achieved for glass faced Polyisocyanurate (PIR) insulation boards are as follows:

The boards achieve a thermal conductivity (λ–value) of:

0.026 W/m.K (insulant thickness < 80 mm);
0.025W/m.K (insulant thickness 80 – 119 mm); and
0.024 W/m.K (insulant thickness ≥ 120 mm).

5.3 Storage of PIR insulation boards

If PIR insulation boards are to be stored on site prior to installation then, ideally, boards should be stored inside. However, if outside storage is the only option then boards should be stacked clear of the ground and covered with an opaque polythene sheet or weatherproof tarpaulin. Boards that have been allowed to get wet prior to installation should not be used unless they have been dried out and assessed fit for purpose.

5.4 Cutting PIR insulation boards

Cutting of the boards is to be carried out using a fine toothed saw in a ventilated area; this is the most common and easiest method for cutting the insulation boards, especially thicker layers of insulation.

Thinner thicknesses of board can also be cut with a fine toothed saw; alternatively thinner thicknesses can also be cut by scoring the board's with a sharp knife, snapping the board over a straight edge and then cutting the facing on the other side.

Ensure accurate trimming to achieve close–butting joints and continuity of insulation.

Existing projections that cannot be removed and / or repositioned, for example, water pipes, floor projections, conduit, etc. should still be insulated in order to prevent cold bridging.

One such way of insulating the existing projection as mentioned in the above paragraph would be to cut / chase the PIR insulation boards in order to accommodate the existing projection.

As a guide remove no more than 30% of the PIR thickness used when cutting / chasing out the back of the insulation board/s, ensure no joints between boards occur over the projection where the insulation has been cut / chased as board ends and / or joints should be fully supported. It would also be advisable to provide additional restraint to the insulation board/s when they have been cut / chased to accommodate an existing projection, therefore it would be advisable to use additional fixings or adhesive to further restrain the insulation board/s.

6. Substrate and fixing requirements

6.1 Installing PIR insulation boards

As EWI systems are proprietary and utilise different mechanisms for attaching the insulation board to the structure, guidance is to be sought from the EWI system certificate holder for the specific EWI system under consideration relative to the project in question.

In the absence of any other guidance, the considerations laid out below may be adopted when installing PIR insulation boards. Please note this guidance is not intended to supersede or negate advice from the EWI system certificate holder / system designer. In all cases refer to the system certificate holder / system certificate designer for fixing type, advice and specification.

PIR insulation boards are to be restrained to the substrate with adhesive and mechanical fixings when the system is to be fixed to an existing building.

The requirement for additional fixings and / or adhesive is dependent upon the system components under consideration; building location and height of the building may also influence the need for additional restraint. Further advice should always be sought from the relevant system designer or a competent structural engineer.

The insulation panels must be fixed to a level and plumb substrate so that the surface to which the render base and top coats are applied is level and even throughout, this is important to achieve since base coats must be maintained to an even thickness.

Substrates should be free of dust, clean, flat, and free from protrusions. Where an uneven surface remains, a bedding compound is to be applied to the substrate prior to fixing the insulation boards.

If the substrate is reasonably even apart from localised hollows then the hollows are to be dubbed out to create an even surface so that the insulation boards can be attached. Dubbing out is the filling in of localized hollows in the background and its thickness should not be considered as contributing to the thickness of the render system. If dubbing-out is needed, it should be done well in advance of the application of the insulation boards and allowed to harden before the insulation boards are applied.

PIR insulation boards are to be fixed from bottom (commencing from the starter track) to top, lightly butted together in a break – bond pattern as illustrated below.

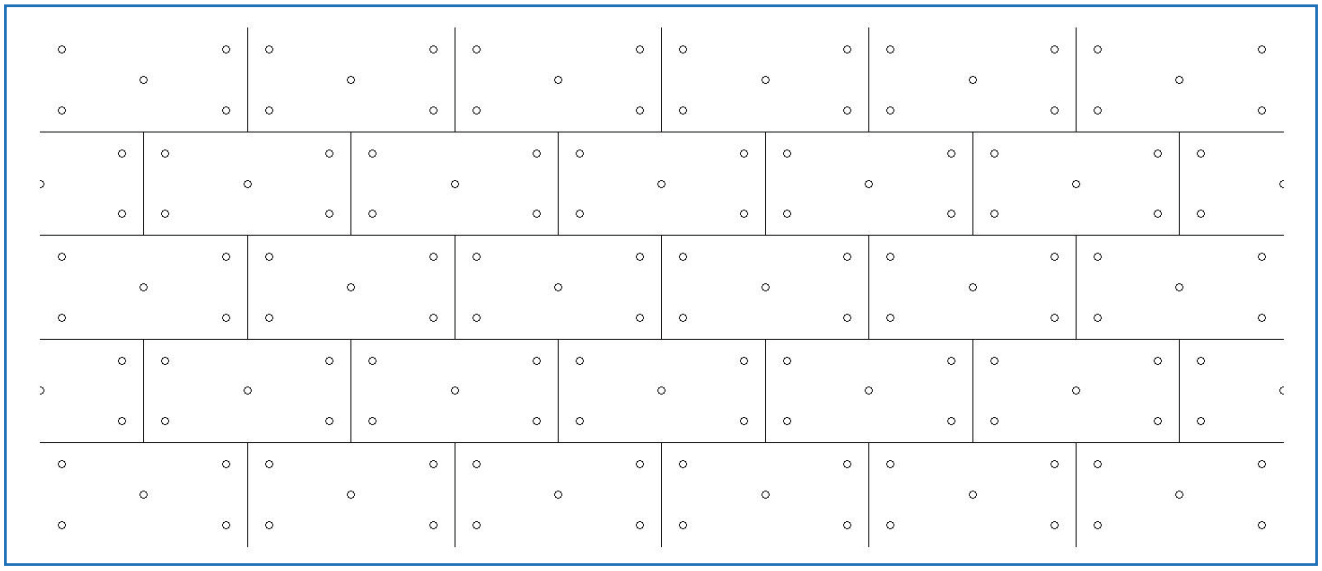

Illustration of break-bond pattern for insulation boards

A reduced thickness of PIR insulation maybe adopted at the junctions of a building, those such as window reveals, heads and sills, soffits etc.in order to prevent additional heat losses, localised condensation and / or mould growth forming at the buildings junction/s.

PIR insulation boards are to be mechanically and adhesively fixed to the exterior of masonry or steel framed and sheathed external walls.

For fixing patterns and minimum number of fixings required to restrain the insulation board to the substrate then please refer to the relevant insulation manufacturers and / or system designer's product literature / guidance.

6.2 Type of fixing / anchor

- When using plastic anchors, anchors must comply with the requirements of ETAG 014 as well as national requirements
- Fixings are to be matched to the existing substrate in accordance with the categories for use specified in ETAG 014 i.e. Category A plastic anchors for use in normal weight concrete, 11 Category B plastic anchors for use in solid masonry, Category C plastic anchors in hollow or perforated masonry etc., etc
- If the existing substrate cannot be clearly classified, anchor pull out tests should be carried out on the construction site)
- As mentioned earlier additional precautions are required for non-traditional construction types e.g. buildings constructed using concrete, steel or timber frames as the primary load bearing structure, with panels of various materials used to sheath and complete the walls. Seek advice from the system designer, structural engineer and guarantee provider when dealing with non-traditional construction types
- In the case of lining concrete walls, the anchors must be anchored in the core concrete
- The anchors must be selected in such a way that, taking into account any render or mortar filling and the evenness of the anchoring ground, they are adequately resistant to being pulled out of the substrate
- The washer diameter of the anchors will depend on the insulation material used and can differ in dimension, however only a 50mm (minimum) diameter washer is required when using PIR insulation boards
- Use the appropriate drill bit size (diameter to use should be stated on the side of the anchor / fixing)
- Drilling of the insulation boards should only commence once the adhesive has hardened sufficiently (generally 24 hours)

6.3 Adhesive

Adhesives for fixing PIR Insulation boards to a wide variety of substrates can be supplied in various forms; however the most common adhesive types used are acrylic adhesives or cement-based adhesives. These are usually pre-mixed and supplied in in bags.

Adhesive can be applied by hand or machine to restrain the insulation boards using a partially bonded method or a fully bonded method, additional mechanical fixings may also be required in addition to the adhesive i.e. when applying the system to existing building adhesive and mechanical fixings should be used.

When using a partial bond method a minimum adhesive surface area of 40 % is to be applied. This is usually achieved by applying the adhesive to the perimeter of the insulation board i.e. a border of adhesive around the circumference of the board. 3 additional spots / dabs of adhesive are then applied to the middle area of the insulation boards. Once the adhesive has dried / set mechanical fixings can then be applied (if required).

The manufacturer's / system designer's instructions should always be followed when mixing the chosen adhesive.

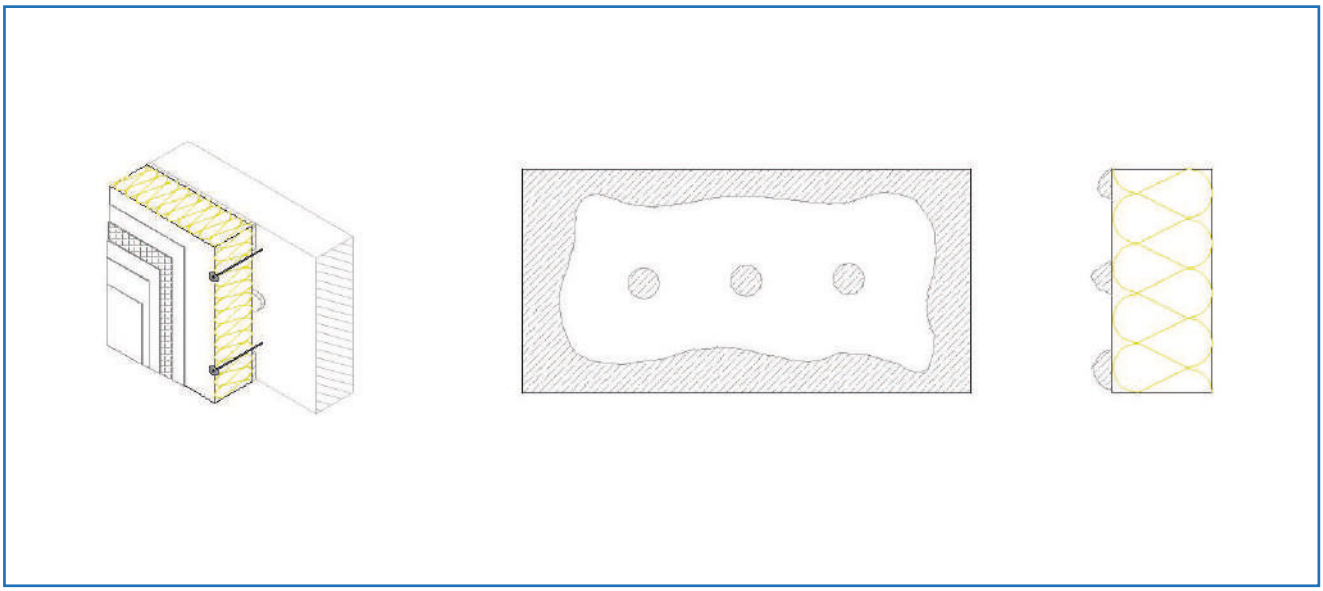

Illustration of partial bonded method

When using the fully bonded method a minimum adhesive surface area of 100 % is to be applied to the insulation board. A notched trowel is used to apply the adhesive to the back of the Insulation boards in order to provide a good key.

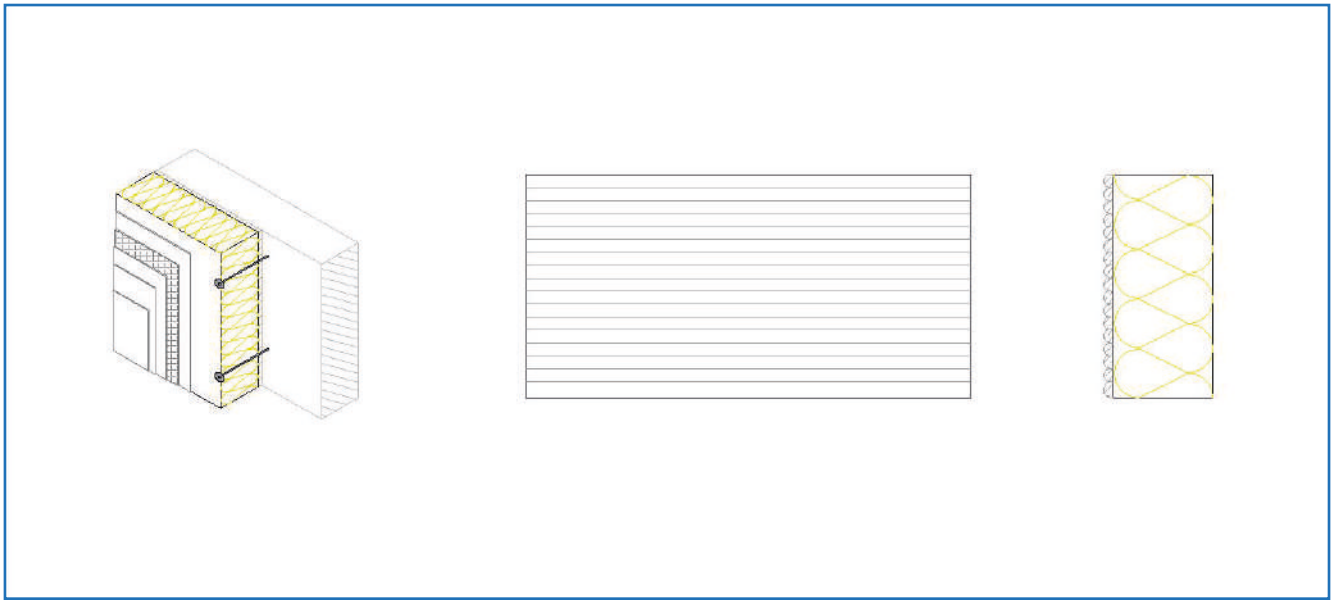

Illustration of fully bonded method

Further advice on adhesive type, pattern and additional restraint via mechanical fixings should always be sought from the relevant system designer and at the very least an assessment against wind loading should be undertaken for the specific site / project.

6.4 Additional reasons for full restraint (adhesive and mechanically fixed)

It is most important to keep the insulation boards restrained to the substrate so that no external air can circulate between the insulation boards and the substrate otherwise this can lead to a chimney effect which can result in large heat losses.

7. Levelling of irregularities in the insulation material post installation

PIR insulation boards cannot be sanded or rasped to level out any irregularities, once insulation boards have been installed should there be any irregularities in the external surface of the insulation boards (site and insulation thickness tolerances may cause the boards to project out from one another), this can be evened out by applying a daub / dab of base coat in to the irregularity of the insulation, as mentioned earlier dub out the hollow and bear in mind its thickness should not be considered as contributing to the thickness of the overall render system.

Allow sufficient time for the daub / dab within the hollow/s of the insulation board/s to dry out before applying the first consistent layer of base coat to the insulation boards.

Bear in mind if the insulation boards finished surface is out of line once installed, additional costs may be incurred due to more base-coat material being required to level out the external surface of the insulation board/s.

8. Application of the base and top coats

Base cementitous render application should be in two coats and incorporate a scrim or metal lath reinforcement layer between them and completed with a finishing coat.

All render coats should be strictly applied in accordance with the system designer's accreditation and their current application guidance, paying particular attention to thickness and cure times between layers.

Minimum total render thicknesses should average 8mm and not drop below 6mm in any event. This guidance is not intended to supersede or negate existing advice from the system certificate holders/ system designers / supplier's advice.

It is advisable to consider the following checklist when applying the base and top coats in order to maintain quality control:

- Daily working records / sign off sheets to record information (As outlined in daily working practice to record the project procedure that is / has taken place)
- Material returns as a control
- Minimum aggregate size used

8.1 Achieving the render (Base and Top Coat) thickness

The use of appropriate render thickness gauges / render depth indicators are to be considered when installing the render base and top coats, this ensures thickness continuity throughout and prevents the base or top coats from being installed below the minimum thickness specification. Ways of achieving the required base coat / top coat thickness would be the following:

- Use a serrated edge trowel which allows the thickness of the first basecoat to be checked
- Tyre gauge tool, again to allow the thickness of the first basecoat to be checked
- Post installation checking of thickness would be to drill a pilot hole and carry out a manual measure and then refill once complete

If the base and / or top coats are applied below the minimum thickness this can also:

- Affect the aesthetic appearance of the façade once complete i.e. the insulation board / board joints can be visible in certain lights, time of day, angle of the sun etc
- Weather resistance of the system can be compromised, therefore leading to the possibility of penetrating damp which can also affect the systems thermal performance
- The system's fire performance could be affected if the render base and top coats are installed below the minimum thickness specification

9. Daily working practice

At the completion of each day's work, or whenever work is interrupted for extended periods of time, PIR board edges and joints should be protected from inclement weather.

It would be advisable to provide appropriate supervision on site to ensure quality control i.e. The correct specification is followed and maintained and to ensure standards of workmanship are kept high.

In addition to providing appropriate supervision it would be advisable to produce pre installation, intermediate installation and post installation sign off sheets in order to record the project procedure that has taken place. N.B When working on ECO projects then this is a mandatory process for Installers so that the core requirements of PAS:2030 are achieved and complied with.

10. Potential reasons for interruption of works

In addition to the normal reasons why works may be interrupted, such as weekends, public holidays, programming considerations etc. adverse weather conditions can also be a factor. Some components of EWI systems have limitations on temperatures between which they can be installed, as well as additional requirements which can involve limiting exposure to precipitation or strong sun light (particularly in warmer climates) during installation to control rates of drying, or prevent excess moisture being trapped within the system.

Therefore to protect boards during a break in works, or from on-going adverse weather conditions temporary weather protection may be required to protect installed components which are not fully weatherproofed.

11. Recommendations for temporary weather protection

The precise nature of this protection may vary depending on the cause of the requirement for the temporary protection (e.g. to provide shading, or to protect from precipitation), the area of system required to be protected and the expected timescale over which it would be expected to be in place, although may typically include the use of items such as opaque tarpaulin / damp proof membranes or rolls of nylon-reinforced polyethylene plastic temporarily restrained to the structure or scaffolding. In practical terms the actual protection provided will vary based upon the specific nature of the project and construction site, and responsibility in this regard should be managed by the project team in consultation with the EWI system supplier.

12. Ventilation strategy

When upgrading and improving the insulation levels of an existing building the ventilation strategy must also be considered at the design stage for reasons outlined below.

When suitably designed, external wall insulation can control the risk of interstitial and surface condensation on the upgraded walls, however a consequence of this renovation work is that the air tightness (air infiltration through cracks, gaps in the external existing fabric) can be improved as the wall becomes sealed via the new external wall insulation system, therefore potentially reducing the number of existing air changes that occur each hour.

If the ventilation strategy of the existing building / property is not considered within the design stage process and accounted for by the provision of adequate controlled ventilation, for example, natural ventilation with intermittent extract fans, mechanical extract ventilation (MEV), Mechanical

Ventilation with Heat Recovery (MVHR), Natural Ventilation with Passive Stack Ventilators etc. This can have un-expected implications, increasing the relative humidity levels.

Older building techniques did not concentrate on the 'air tight / build right ' principle therefore uncontrolled air movement often met or in most cases exceeded the required level of air changes per hour required to control the internal humidity levels. It should also be noted that this air movement often leads to an increased effect on the building's energy levels as a lot of the heat inside the building / property is lost via the uncontrolled ventilation routes.

Therefore by constructing a more air tight building / property / facade there may need to be an increase in controlled ventilation if there is no or very little existing ventilation strategy to make up for the shortfall in lost fortuitous air movement.

For further information on ventilation please refer to Approved Document F1 for England and Wales, Section 3.14 of the Scottish technical handbook and / or the Domestic or Non Domestic Building Services Compliance Guide on how to comply with the ventilation regulations.

13. Viewing the finished system

The line of the rendered surface will largely be determined by the line of the substrate, which is why the insulation boards are to be restrained on to a flat and plumb substrate.

As stated in BS EN 13194 – 1: 2005 – Design, preparation and application of external rendering, when inspecting a finished externally rendered surface, it should be viewed in daylight, standing at ground level, from a generally accessible viewing position. Where possible it should be viewed at a distance of 10 m, with the sunlight, if any, not falling on the surface in a glancing direction.

It is also worth noting that the aesthetics of a building is often raised after completion of the EWI system when the facade is viewed in bright conditions with sunlight falling directly on the surface in a glancing direction. This can identify every minor surface undulation to specific area/s at certain times of the day. More often, the effect "disappears" within a 20 minute period as the earth revolves around the sun.

As mentioned in the above paragraph such irregularities should not be apparent when viewed at ground level, at a distance of 10m, without sunlight falling on the surface.

14. General finished appearance

Rendering on external walls or onto an insulation board such as PIR is to be reasonably consistent in texture, finish, colour and line. However, rendering cannot be expected to provide a perfect finish such as pre finished cladding systems for example, therefore the following information which is referenced within BS EN 13194 – 1: 2005 – Design, preparation and application of external rendering is to be observed:

Some minor surface cracking and crazing is likely to occur and tooling marks, patches and day work joints may be visible, but should not be unduly obtrusive.

It is also worth noting the aesthetics of a project can be extremely subjective and it is difficult to comment on the overall appearance of insulated render finishes, particularly when the application has been applied in accordance with the system designers requirements and / or recommendations and is, as such, technically correct.

The system designer may recommend an acceptable level of variation over a given length at any point; however, it is important to note that the system finishes are hand applied and reliant on the skill and attention to detail of the system / base and top coat applicator. In addition to this the alignment of the rendered surface is determined by the line of the substrate, which itself can be outside the scope of works of the system applicator.

On retrofit / refurbishment projects it may be necessary to identify and agree in advance, the extent of preparatory works required, to ensure an acceptable standard is achieved.

Should further information be required on the design, preparation and application of external renderings then please consult the standard mentioned above i.e. BS EN 13194 – 1: 2005 – Design, preparation and application of external rendering.

15. European Technical Approvals (ETA'S)

ETA's are issued in relation to systems, which obliges all involved in the construction work of EWI to adhere to the system in its entirety. This also ensures traceability of the system in the event of a claim (see below).

In ETA's the individual components of the system are described in the relevant system's ETA under point 2. If such components are substituted this could significantly affect any existing guarantee in the event of a claim, for example, the guarantee could be voided should it be discovered the incorrect components have been used.

In the United Kingdom, in addition to ETA's, there are certification bodies who provide independent assessment for the suitability of External Wall Insulation systems in the form of an agrément approval, whilst further validating the systems essential characteristics they can also

provide assessment against the ability to meet Building Regulation requirements and locational considerations, wind loads etc.

16. Traceability of EWI systems

Each component that makes up the certified EWI System is to be marked accordingly by the manufacturer or system designer in order to ensure traceability of the complete system.

This enables products to be checked when delivered to the construction site in order to confirm that the individual components that make up the system belong to the relevant certificated system.

System designers are obliged to sell complete EWI systems that have been approved by an awarding body in accordance with ETAG004 or corresponding CUAP, and carry the CE mark symbol, which is now a mandatory requirement in the UK as of the 1st July 2013.

Traceability also forms a very important part of a guarantee process, for example PAS2030 may require evidence of material traceability in order to prove to the supply chain the correct materials / systems have been installed for each property therefore enabling the 'appropriate guarantee' required for Green Deal and / or ECO projects to be issued.

17. Advantages of EWI generally

- Protects the fabric of the building
- Improves thermal performance
- Ensures consistent U-values
- Reduces thermal bridging, thereby minimising condensation and heat loss
- Reduces thermal stress on the structure or substrate
- Transfers the dew-point outside the structural wall element
- Improves the airtightness of the construction, reducing draughts and heat loss
- Maximises the effect of thermal mass, reducing internal temperature fluctuations
- May contribute to improvements in sound insulation
- Improves aesthetics

- Is available in a wide range of finishes and colours
- Is relatively easy to install, leading to faster construction
- Makes quality control easier as the insulation coverage is clearly visible

18. Advantages of EWI in refurbishment applications

- Brings major aesthetic improvements to old dilapidated buildings
- Improve property values, by extending the life of the building, and modernising its appearance
- Renews ageing exteriors
- Lower maintenance costs
- Limits disruption to interior décor and occupants and can avoid internal building works
- Can strengthen the existing structure
- Increases life expectancy of the building as the new system protects the existing substrate from rain, snow and solar gain
- Can help upgrade the property to a mortgageable standard
- Can be installed while occupants remain inside the property i.e. no temporary removal of tenants whilst work proceeds
- Does not reduce the size of rooms internally as system added externally
- Permits the installation of higher levels of insulation
- Helps to eliminate problems of damp, condensation and mould growth (when accompanied by appropriate heating and ventilation of the inside environment)
- Can eliminate the need for extensive re-pointing, therefore saving time and money

For more details on the benefits of PIR insulation please visit: insulationmanufacturers.org.uk

IMA
Insulation Manufacturers Association

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