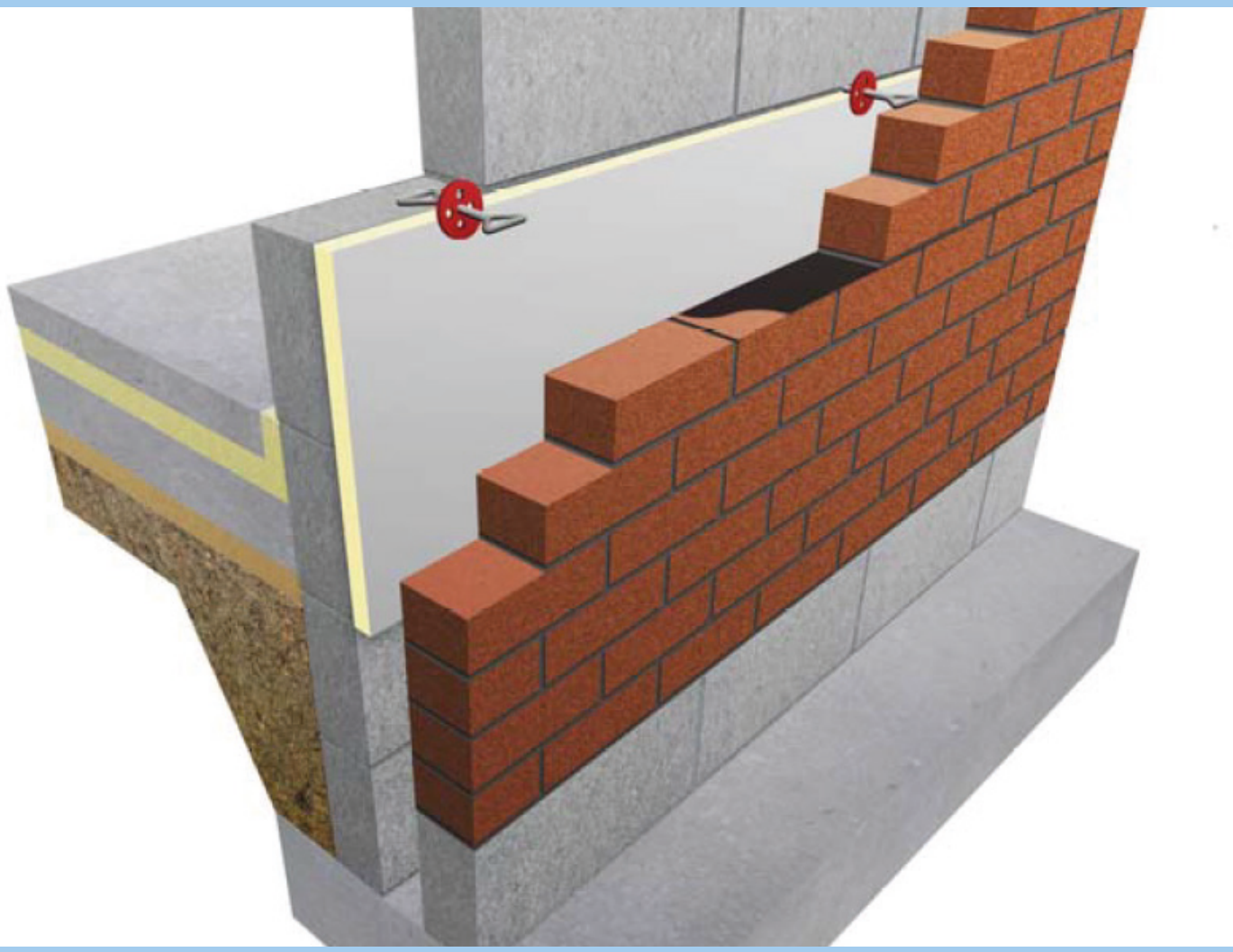
Insulation Manufacturers Association

Best Practice Guide No. 2:

Design and installation guidelines for partial fill cavity wall boards



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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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Introduction

This Guide has been prepared to assist designers and installers to ensure that PIR insulation products, when properly installed, work to their optimum ability in use. It does not supersede or replace product specific advice and/or guidance given by manufacturers, but is complimentary to that advice/guidance.

Design considerations

General

When choosing a PIR board for partial fill cavity insulation, care should be taken to ensure:

- That the product is suitable for the intended application (check the individual manufacturer's data sheet)
- The product meets the requirements of BS EN 13165 (check the manufacturer's Declaration of Performance)
- The product is covered by a current BBA certificate (check www.bbacerts.co.uk)
- That the product chosen is manufactured by an IMA member (check the IMA website www.insulationmanufacturers.org.uk)

U-values

Always refer to individual manufacturer's literature to see how their products will assist in meeting the requirements of any national Building Regulations. All U-value calculations should be project specific to take into account the performance characteristics of all materials being used and all IMA manufacturers offer a calculation service, undertaken in accordance with the principles of BR443 and other applicable standards, and in some cases under the Competent Person Scheme operated by the BBA.

Low-emissivity

Where manufacturers use different facings on partial fill cavity boards, ensure the product is installed the correct way round to get the full benefit of the low emissivity claims for the foil (i.e. increased thermal resistance for the clear cavity). If in any doubt, consult the individual manufacturer regarding print coverage on the foil and correct positioning of the boards.

Thermal bridging

Linear thermal bridging is concerned with heat loss at junctions. The correct installation of PIR boards is necessary to ensure continuity of the insulation layer with adjacent building elements. This means careful detailing at junctions between elements (e.g. floor/wall and wall/roof) to minimise the effects of thermal bridging. The correct use and installation of cavity closers will limit thermal bridging around doors and windows. Advice should be sought from the manufacturer if required.

Each design should be assessed individually. If no account of junction details is taken in SAP or SBEM calculations, improved fabric performance (i.e. even lower U-values) will generally be required to offset the likely heat loss due to thermal bridging.

For further guidance on reducing thermal bridging Accredited Construction Details (ACDs) and Enhanced Construction Details (ECDs) have been developed to assist the construction industry achieve the performance levels required to aid compliance with the energy efficiency requirements of Approved Document Part L England and Wales, Section 6 of the Scottish Technical Handbook) and Technical Booklets F1 and F2 for Northern Ireland.

Gable walls

At gable ends, the wall insulation should be continued 250mm above the height of the internal ceiling insulation and cavity tray should be installed over.

Moisture resistance

A cavity wall, by design, should resist the passage of moisture. A wall must not show signs of rain penetration or damp from ground moisture. Where PIR boards are installed in a situation where they bridge the damp proof course, if detailed in accordance with current Building Regulations, moisture should not penetrate to the inner leaf.

Air tightness

The trend in modern construction is to achieve higher levels of air tightness to minimise the loss of warm/heated air through the building fabric. Partial fill PIR cavity boards should be installed tight to the inner leaf, with no air gaps around boards that could allow cold air to circulate. A low vapour resistance tape may be used to help seal the board joints on the outside face of the insulation layer.

Fire

PIR insulation installed in a partial fill masonry cavity wall will not prejudice the fire resistance properties of the wall. Refer to each manufacturer's BBA certificate for more information.

Residual Cavity Width

A clear cavity prevents moisture ingress to the inner leaf. PIR insulation boards should only be fixed to the inner leaf otherwise the correct performance of the wall cannot be guaranteed.

In areas of severe and very severe exposure and for buildings over 12m high (and for NHBC and other guarantee providers), a minimum 50mm residential clear cavity is required. In less exposed areas, for buildings up to 12m high, a residual cavity of at least 25mm is required. Building Regulations determine the residual clear cavity required to resist passage of moisture ingress by use of an index number for a given location.

Local factors such as site topography can change acceptable exposure zone ratings, and a Building Control Officer or Approved Inspector should be consulted.

Wall Ties

The correct type of wall tie should be selected based on factors such as the type of building under construction, the thicknesses of masonry specified in the construction and the overall width of the cavity. Always follow the recommendations of the fixing manufacturer, and if in doubt seek further advice from them. A retaining clip suitable for the specified wall tie should be used to hold the PIR insulation boards in position against the inner leaf.

Storage

Insulation boards should be stored dry, flat and clear of the ground. Only as much material as can be installed during a single working period should be removed from storage at any one time. If boards are stored under tarpaulins, care should be taken to prevent rope damage to boards

Handling

- Take care when handling boards and do not drop them
- Use a sharp knife or fine tooth saw to cut the boards
- Wear eye protection when cutting boards
- Do not use damaged boards

Installation procedure

- Prior to installation, ensure the wall is dry, sound and free from contaminants. Mark out the finished board position on the substrate
- Construct the inner leaf first, with the insulation boards held in position using retaining clips
- Install wall ties with the drip of the tie downward, approximately half way across the residual cavity and wall tie slightly sloping down from inner to outer leaf

- For solid concrete floors: install the first row of wall ties in the inner leaf at 600mm horizontal centres and a minimum of one course of blocks below the damp proof course (DPC) or 150mm below the top of the ground floor edge insulation
- For suspended timber floors: install the first row of wall ties in the inner leaf at 600mm horizontal centres and 200mm below the top surface of the ground floor edge insulation

- Raise the leading leaf two courses of blocks to the level of the next row of wall ties, normally at 450mm vertical centres. Clean any excess mortar from the inner leaf before installing the boards
- Fit the next and subsequent rows of wall ties at maximum 900mm horizontal centres to retain the tops of the boards
- Additional ties may be required for structural stability and to ensure adequate retention of the boards against the inner leaf
- Build the outer leaf to the level of the boards and repeat the process
- Fit insulation boards between the two rows of wall ties, tightly butted and secured by the retaining discs at a minimum of three points
- Install subsequent rows of boards with all joints tightly butted and vertical joints staggered in a brick-bond pattern. Boards with damaged edges or corners should not be used
- A double layer of insulation boards may be used as long as vertical joints do not coincide and the thickest layer is positioned outermost
- At all stages of the work, ensure the residual cavity is kept clean and free from mortar droppings or other debris. Use of a cavity board is recommended in order to protect board edges and maintain a clear cavity
- Ensure all joints are accurately cut in order to maintain the continuity of the insulation layer

Site working practice

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

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

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