

# The importance of a properly insulated floor

**Simon Blackham**, chairman of the **Insulation Manufacturers Association's** technical committee, provides insight for contractors on the design and installation of PIR floor insulation in newbuild and retrofit projects

In order to address downward heat loss, a floor should be properly insulated. Using PIR insulation is one of the best ways to significantly improve the U-value of both new and existing floors in domestic and non-domestic properties.

When choosing a PIR board for a floor insulation project, care should be taken to ensure that the product is suitable for the intended application and that it carries a CE mark, indicating that it meets the requirements of BS EN 13165. The product may also be covered by a third-party certificate such as one from the British Board of Agrément (BBA).

## Calculations

Individual manufacturer's literature must be referred to see how their products will assist in meeting the requirements of any national building regulations and codes. All U-value calculations should be project-specific to take into account the performance characteristics of all materials being used. 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.

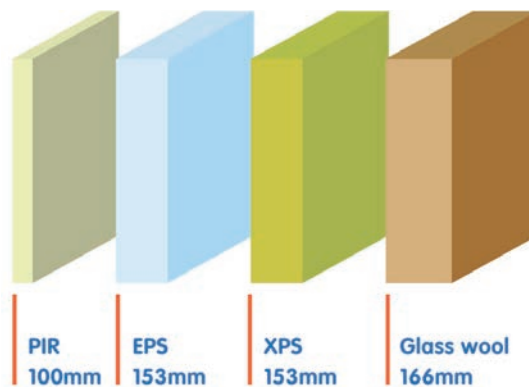
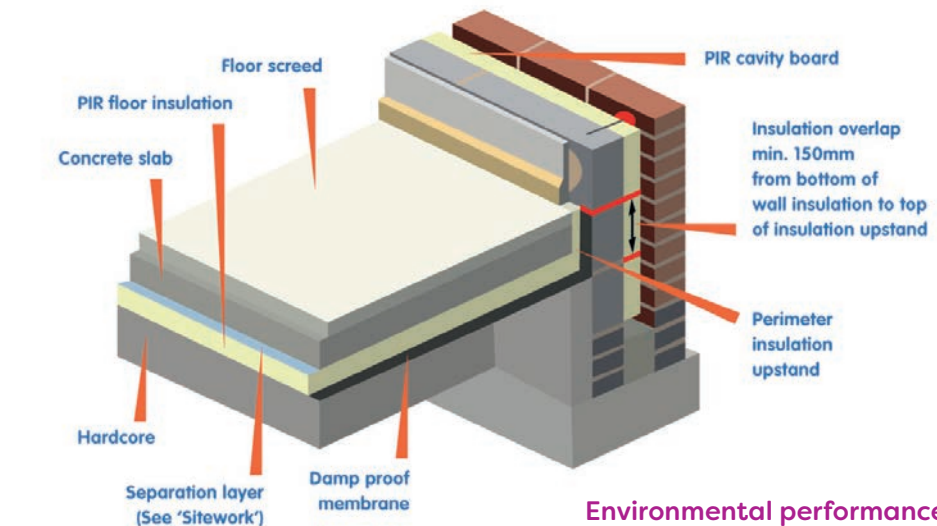
In order to work out the amount and thickness of insulation required to comply with building regulations, contractors need to calculate the P/A (perimeter/area) ratio, which is a measure of the degree to which the perimeter of the floor is exposed:  $P/A = \text{exposed perimeter (m)} / \text{floor area (m}^2\text{)}$ .

In short, the lower the P/A ratio, the better the thermal performance of the floor. The floor area is calculated from the internal surfaces of the external walls, and includes all heated spaces, but not unheated spaces that are outside of the insulated body of the building.

For underfloor heating applications, floors should be highly insulated for optimum performance of the heating system. U-values of around 0.15 W/m<sup>2</sup>K should be considered. The advice of the underfloor engineer should be consulted before installation of the insulation, particularly when installed below a slab.

## Thermal bridging

Particular attention needs to be made to linear thermal bridging, which is the heat loss that occurs at junctions between two, or more, construction elements, which ultimately leads to a drop in internal temperature and an increased demand for heating. This can also increase the risk of surface



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condensation and mould growth. The correct installation of PIR boards and careful detailing is essential to ensure continuity of the insulation layer with adjacent building elements (e.g. floor/wall). Manufacturers can provide standard details highlighting installation best practice and heat loss measurements represented by Psi-Values ( $\psi$ -value).

In many applications, a perimeter upstand of insulation is installed to increase the distance the heat must pass through to escape at the junction. The low thermal conductivities and ease of installation makes PIR insulation an ideal solution for these scenarios.

In terms of fire performance, the product will be contained within the floor by the overlay until the overlay itself is destroyed. Therefore, the product will not contribute to the development stages of a fire.

## Environmental performance

All PIR insulation boards produced by members of the Insulation Manufacturers Association (IMA) are manufactured with a blowing agent that is CFC/HCFC free and has zero Ozone Depletion Potential (ODP) with a low Global Warming Potential (GWP). Many manufacturers' products achieve a Green Guide rating of A+, but nevertheless PIR insulation has a generic Green Guide 2008 rating of A, making it one of the best performing insulation products available.

## Installation best practice

In order to meet the design values of a project, insulation should be correctly fitted with the appropriate attention paid to airtightness and cold bridging.

Competency in installation is vital because when a high performing product such as PIR/PUR is not installed correctly, it could compromise that performance. This led to the IMA producing a series of installation guides for the differing applications of the products including floor insulation.

The IMA Best Practice Guide No. 3 provides design and installation guidelines for PIR floor insulation in four of the most widely used applications – below concrete slabs, below floor screed, insulation between battens under a timber floor and block and beam.

Contractors need to make sure that, not only the levels of site supervision are of a good standard, but that products are properly installed to avoid cold bridging and other problems. Eliminating poor installation will drastically reduce heat loss and result in a more energy efficient building fabric from the outset. **rci**