



April 2012

Section 3.2.2

Internal Wall Insulation



energy saving



warmth



quietness



fire protection



sustainability

Internal Wall Insulation



Thermal comfort

An internal wall insulation system enables comfortable room temperatures to be achieved more quickly than with an external wall insulation system. Heating time periods can be reduced, particularly in intermittently heated buildings such as dwellings.

Air leakage

Existing buildings can suffer from excessive air leakage which, if not treated, can lead to high energy costs, occupant discomfort from draughts and external noise, as well as a reduction in indoor air quality.

To ensure that upgrading of external walls is as effective as possible, it is very important to prevent air leakage through the structure or at least keep it to an absolute minimum. Air leakage can be between the interior and exterior, as well as between different elements of the building envelope.

Air leakage through the masonry wall occurs through cracks and gaps where there is poor adhesion between the mortar and the masonry units, or diffusion through the masonry units themselves. Where the plaster has been removed and air leakage through the wall is thought to be excessive, it should be tackled before the internal insulation system is installed by applying a parge coat to the inner surface of the existing wall.

Condensation

Interstitial condensation occurs when warm, moist air from inside a building penetrates into the fabric of a structure and meets a cold surface, where it cools, reducing its ability to carry water vapour and increasing the risk of condensation forming within the construction.

Interstitial condensation does not occur within external walls that have been upgraded by the installation of internal wall insulation. This is due to the presence of a vapour control layer (vcl) on the warm side of the insulation which can take the form of foil backed plasterboard or a separate vcl such as a sheet of polyethylene.

Surface condensation will not occur as the internal face of the insulation system is kept warm and above the dewpoint temperature by the presence of the thermal insulation behind it.

Thermal bridging

Thermal bridging can occur when the continuity of the insulation layer is broken, especially when a material with lower thermal resistance, such as timber and metal components are the bridging materials. Junctions between internal and external walls require treatment as do window and door jambs, sills and heads.

Masonry separating walls can present the most significant thermal bridges and if left untreated can be the cause of additional heat loss and also increase the risk of surface condensation and mould forming.

The effect on the separating wall can be reduced by returning the internal wall insulation up the separating wall (back into the room) by approximately 400mm, which is usually sufficient to minimise the effect of the thermal bridge.

Dampness in walls

The most common causes of dampness in solid masonry external walls are, penetrating damp (often caused by deterioration of the existing mortar, blocked gutters or faulty rainwater goods), rising damp and condensation, particularly surface condensation.

Dampness can have a negative effect on the physical properties of the materials used to construct the wall. Best practice is to cure any damp problems before installing an internal insulation system to protect the building fabric from long term damage.

For instance, missing or damaged render should be reinstated, faulty or missing flashings should be repaired or replaced and areas suffering from mortar deterioration should be re-pointed with a suitable mortar mix.

Solution optimiser and pathfinder

Knauf Insulation solution

ThermoShell Internal Wall Insulation System

Product: Earthwool EcoBatt and EcoStud

See page: 168

U-values

0.43 0.42 0.41 0.40 0.39 0.38 0.37 0.36 0.35 0.34 0.33 0.32 0.31 0.30

IWI01



Key

 Thermal insulation achievable by constructions within this document.

 Find online. Visit knaufinsulation.co.uk and key in construction code to find the most up to date information on your chosen solution.

Internal Wall Insulation

ThermoShell Internal Wall Insulation System

Earthwool EcoBatt and EcoStud



IWIO1

- Innovative use of EcoStud prevents thermal bridging and reduces thickness of system
- Friction fitting between EcoStuds closes joints, preventing air movement and infiltration through or around the insulation
- Quick and easy to install so rooms are out of commission for the minimum period
- BBA certified and LABC approved

Earthwool EcoBatts

- Non-combustible with a Euroclass A1 reaction to fire rating
- A+ Generic BRE Green Guide rating
- Zero Ozone Depletion Potential (ODP)
- Zero Global Warming Potential (GWP)

EcoStuds

- Zero Ozone Depletion Potential (ODP)
- Global Warming Potential (GWP) <5



Products

Earthwool EcoBatt is semi rigid slab of glass mineral wool with a water repellent additive, its manufacture has a very low impact on the environment.

EcoStud is a thermally engineered composite of high performance extruded polystyrene bonded to Oriented Strand Board (OSB). The extruded polystyrene content is classified as Zero ODP with a GWP of less than five.

Typical construction

An existing masonry solid or cavity wall thermally upgraded by the installation of an internal wall insulation system delivering high levels of additional thermal performance.

EcoStuds are mechanically fixed to the existing solid wall and infilled with EcoBatt high performance water repellent glass mineral wool slabs. The system is overlaid with a vapour control layer (stapled to the EcoStuds) and 12.50mm standard plasterboard.

Installation

ThermoShell IWI System

Before installing the ThermoShell IWI System a comprehensive property survey should be carried out to establish the condition of the building, its suitability to receive the system and identify any remedial work needed prior to starting the upgrade process.

ThermoShell EcoStuds are mechanically fixed to the existing wall using corrosion resistant screws and universal wall plugs. A minimum fixing penetration of 40mm is required into the existing masonry wall (excluding thickness of plaster). Five fixings per stud are required but the number can be increased as required, or as dictated by site conditions. Position the fixings at 600mm maximum centres and 75mm from the end of each stud.

Friction fit Earthwool EcoBatts between the EcoStuds ensuring the insulation zone is completely filled. There should be no gaps between the slabs and they should be installed so as to be in intimate contact with the vapour control layer and fully fill the space between the studs.

Where insulation requires cutting, it should be cut 5mm wider than the space it is intended to fill.

Staple or nail a vapour control layer to the studs before screw fixing 12.5mm standard plasterboard to the EcoStuds using 38mm drywall screws, or wood screws, at nominal 300mm horizontal and vertical centres, reducing to 200mm centres at corners, finish with a plaster skim coat or using standard drylining techniques.

The vapour control layer should be free from holes, any gaps should be made good, with tears repaired and overlaps sealed with aluminised tape.

Seal all joints at the perimeter of the plasterboard using Knauf Multi Purpose Sealant to prevent air movement through the system.

Performance

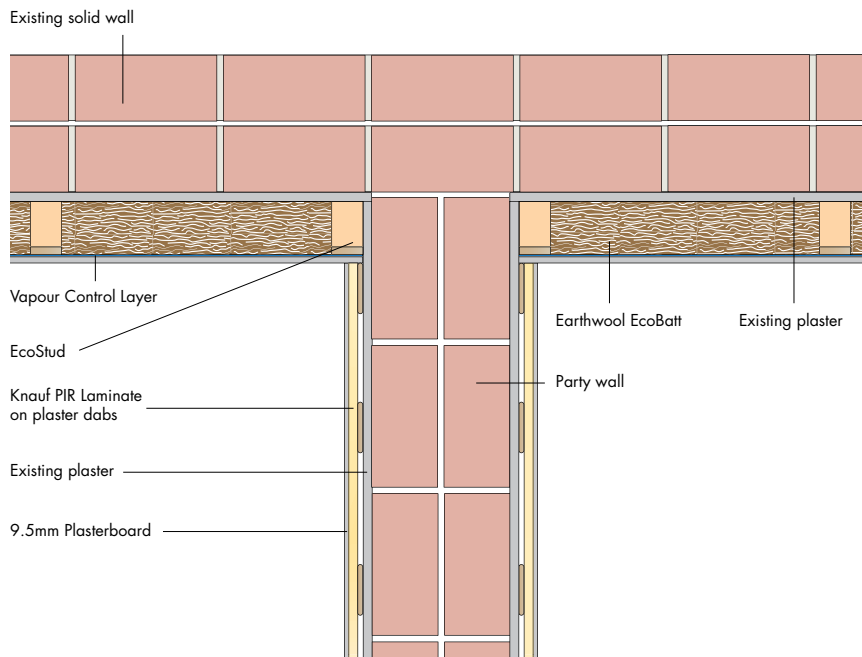
Fire performance

Earthwool EcoBatt is non combustible and classified as Euroclass A1 to BS EN ISO 13501-1.



Installed by approved installers.
For details visit ThermoShell.co.uk

Typical junction detail with party wall



Typical specification

EcoStuds to be mechanically fixed to the existing wall using the methods and materials recommended in Knauf Insulations ThermoShell Internal Wall Insulation Design Guide.

nbsPlus

Alternatively, consult the National Building Specifications, Standard version clause/clauses...

K10/185 and P10//210 and 310.....

Knauf Insulation specification clauses can be downloaded from knaufinsulation.co.uk/nbs

Table 18 - Thermal performance of ThermoShell IWI components

Thermal performance		
Thickness (mm)	Thermal conductivity (W/mK)	Thermal resistance (m ² K/W)
Earthwool EcoBatt		
95	0.032	2.95
80	0.032	2.50
65	0.035	1.85
EcoStud		
95	N/A	2.40
80	N/A	1.97
65	N/A	1.58

Table 19 - Typical U-values for an existing 225mm brick solid wall

EcoStud thickness (mm)	U-values (W/m ² K)		
	EcoStud with EcoBatt	EcoStud with EcoBatt and 35mm Knauf PIR Laminate	EcoStud with EcoBatt and 50mm Knauf PIR Laminate
65	0.43	0.29	0.25
80	0.34	0.25	0.21
95	0.30	0.22	0.19
2 x 65	0.24	0.19	0.17



For project specific calculations contact our Technical Advice and Support Centre on 01744 766666.

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it's time to save energy

Disclaimer

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Wherever possible, products are manufactured to the appropriate British Standard (BS), or harmonised European Standards, (BS EN) and are supplied subject to our Terms and Conditions of Sale, a copy of which is available on request.

Information within this book

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