



IndiNature®
Bio-based construction systems

IndiBreathe

RETROFIT INSTALL GUIDE

INTERNAL WALL INSULATION (IWI) SYSTEMS

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Installation Guide: Internal Wall Insulation (IWI) systems

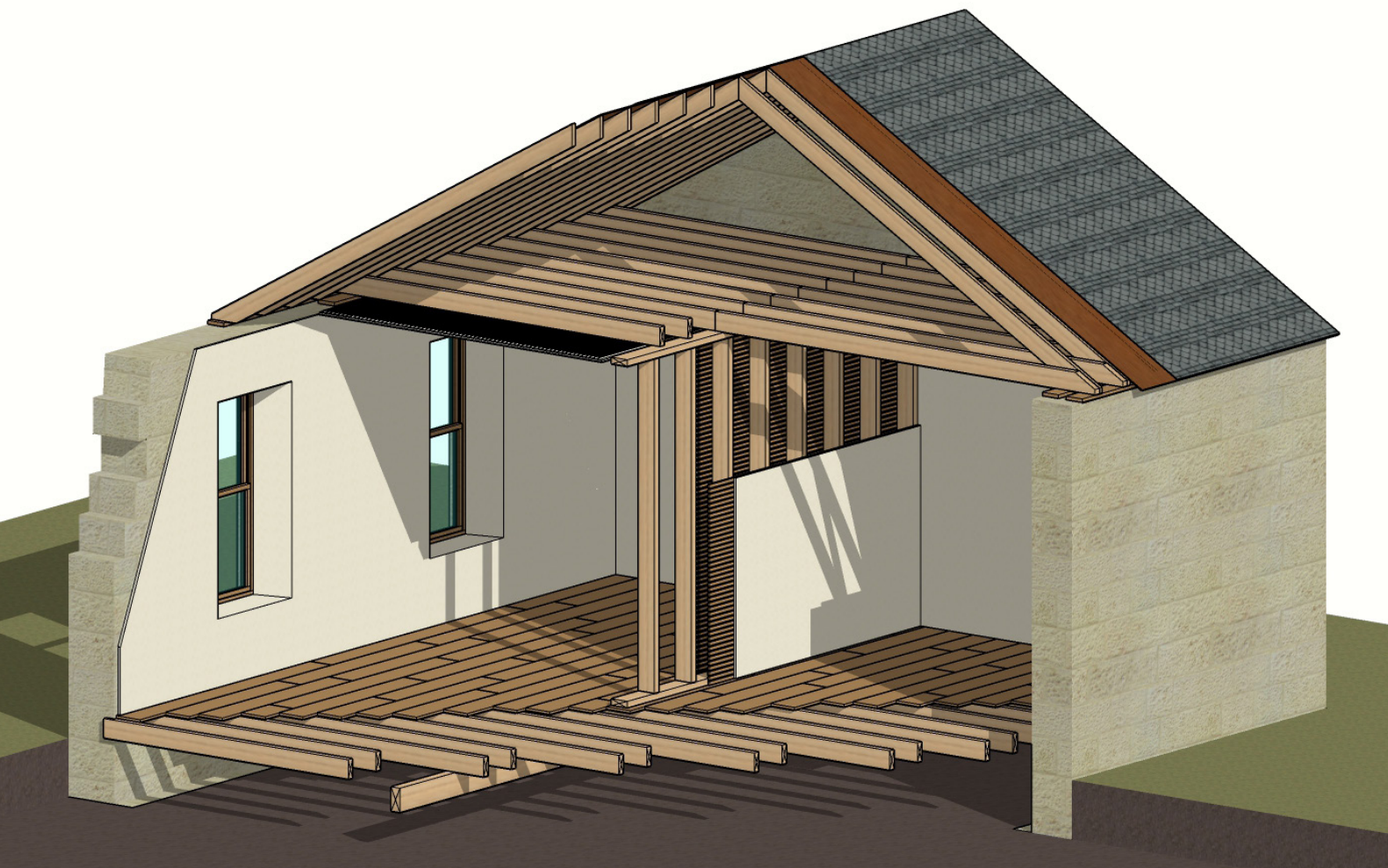
IndiBreathe is a vapour open, 'breathable' and carbon capturing approach to highly energy efficient buildings.

UK grown and made industrial hemp fibres provide excellent moisture and heat management, alongside thermal and acoustic properties, for indoor comfort and healthy buildings.

This chapter provides the detailing guidelines for Internal Wall Insulation (IWI) to ensure the correct installation and optimal performance of IndiBreathe insulation systems - using IndiTherm flexi batts and/or IndiBoard - for this application in retrofit buildings.

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IndiBreathe System Overview

IndiBreathe systems can be applied as Internal Wall Insulation (IWI). There are two parts to the system – a low density flexible ‘batt’ known as IndiTherm and a higher density insulating IndiBoard.

This guide offers three versions the IndiBreathe system:

IWI System 1 - Dry application with timber frame

This system uses a conventional timber frame infilled with the flexible IndiTherm insulation. There is an option to line this either with IndiBoard plus a plaster coat, IndiBoard plus a plasterboard or just line with conventional plasterboard or with a plywood.

One benefit to this system is it is a relatively easy and conventional build, with no wet trades required – depending on the finish. It is also easy to add an additional service void to this system. The disadvantage is that the timber could create cold bridges.

IWI System 2 - Wet adhesive application with plasterboard

This system uses IndiBoard insulation, fixed to the existing wall with a full buttered breathable lime-based adhesive (for example Baunit Multifine RK70) plus minimal mechanical fixings. Ensure no air gaps. Butter both the existing wall and the IndiBoard. Plasterboard is then also applied using the same method, taped and finished.

IWI System 3 - Wet adhesive and plaster coat

Recommended for older properties with rougher stone walls. This system also uses IndiBoard insulation, fixed to the existing wall with a full buttered breathable lime-based adhesive (for example Baunit Multifine RK70) plus minimal mechanical fixings. Ensure no air gaps. Finish is with a conventional breathable lime plaster – see the install section for details of a suggested build up.

There are a range of attractive smooth or rougher natural finishes available – either lime or clay based which will also enhance comfortable indoor air quality by helping with passive regulation of humidity.

Natural fibre insulation has unique benefits

IndiBreathe systems are designed to act just like traditional building materials did for centuries. By safely and naturally ‘breathing’ excess vapour through walls to the outside, IndiBreathe helps keep building structures dry and adds longevity to them just like historic buildings continue to do.

Your building will benefit from added longevity and you will experience improved indoor air quality from the proper installation of natural fibre insulation – it will keep you comfortably warm in winter and cool in summer, with naturally regulated humidity all year long. Plus of course energy costs will be reduced.

To ensure these benefits and reduce risks to your building it is important to follow guidance carefully.

* Please note that the efficacy of the breathability depends on the rest of the elements used in the wall build up. It is essential that all the subsequent external layers are also breathable and that there is sufficient ventilation on the external face. Please get in contact with our technical team if you would like more information regarding creating a build up with effective breathability.

Important - please read prior to install

Allow vapour movement

IndiBreathe systems are designed for vapour open build-ups to allow some water vapour transport out of buildings. They should not be installed in vapour closed systems.

If installed correctly, vapour open systems will work in sympathy with existing structures to keep buildings healthy and add longevity by preventing moisture from being trapped in materials. When buildings are heated, vapour naturally moves from the inside to the outside of building structures.

IWI must be designed and installed with care – correct materials, thicknesses, system build-ups and detailing must be applied. Expert guidance should be sought from specialist conservation architectural technicians for example. The use of modelling using WUFI software is recommended to reduce risks of interstitial condensation. If this guidance is not followed you may be putting your building at risk.

As a rule of thumb when designing wall build-ups, place materials with the higher vapour resistance on the inside of systems – so as vapour is naturally transported toward the exterior it encounters less and less resistance until it reaches the outside.

Resist over-insulating

It is important to note that adding too much insulation increases the risk of interstitial condensation. This occurs at points in a wall build-up which become cold, particularly between two different materials, and cause vapour to condense. Insulating even with only 40mm IWI can increase energy savings by up to 81% and at 80mm this can be as much as 95%. Beyond that it is diminishing returns. A 'sweet spot' of 60mm of IWI insulation can increase energy savings by up to 90% (ASBP Briefing Paper – May 2024).

Glossary

Friction Fit - IndiTherm insulation batts perform optimally when they are 'friction fit' between stud-work. This is achieved by cutting the batt 10mm larger than the space] being filled. If too much excess is left around the edges, this could cause the insulation to bow out and put pressure on plasterboard – when the plasterboard gets wet during skimming it could then pop through the plasterboard screws. The limited compressibility of the batt will allow it to be installed with light force, without leaving gaps along the edges. IndiTherm batts are supplied at 570mm wide as standard. This is the ideal width to achieve a good friction fit between stud-work at 600mm centers. 370mm wide batts are also supplied for studs or joists at 400mm centres.

Vapour control layer membrane – A VCL membrane is designed to resist some water vapour flow but should let some water vapour through. Different VCLs offer different levels of permeability. Some also act as an air barrier – those types are recommended because significant heat loss can occur through air convection. It is recommended to install a VCL on the interior side of an IWI system to allow some vapour out and at the same time resist too much water vapour entering at once. (eg. Pro Clima Intello Plus Vapour Check Membrane)

Please refer to industry guidance [UK Gov BEIS \(2021\) Retrofit Internal Wall Insulation : Guide to Best Practice.](#)

Do:

- Follow this guide.
- Seek expert guidance on design and installation.
- Use WUFI modelling.
- Add a vapour control barrier on the inside of the system - this limits the amount of vapour which will naturally pass through the open system.
- Ventilate right – always allow excess water vapour to escape a building. Ensure continuous airflow on the exterior of a system so transported vapour can be released (e.g. minimum 50mm air gap behind a rain screen)
- Remove any exterior concrete render or pointing. Unlike lime mortar - concrete traps moisture in walls and increases the risk of wall damage.
- Always clean and apply an anti-fungal wash to existing masonry walls and let dry prior to install.
- Store insulation dry.
- Use a wavy bladed insulation saw and sharpen often – natural fibres will cut easily with the correct sharp blades.
- Keep buildings heated, even at low grade temperatures when not in use - so cold spots don't lead to surface or interstitial condensation.

Don't

- Install in a damp space.
- Timber and masonry must be dry and protected and free from leaks.
- Solums should never have standing water, flooding or leaks.
- Block continuous cross airflow where it is required, specifically:
 - Vertically travelling up the exterior of a wall build up (min 50mm behind a rain screen)
 - Crossing from eaves up and along roof sarking (min 50mm)
 - Crossing under a suspended ground floor
- Leave unnecessary gaps in insulation - this can create a risk point for cold spots which can lead to surface condensation.
- Install insulation if wet - if wet, it will dry out naturally if left in a warm ventilated space prior to install.
- Combine with materials which are not vapour open - this risks condensation build-up.
- Avoid drilling with a conventional drill bit – fibres will bind. Ask us about specialised insulation drill bits if required

Auxiliary Products

IndiBoard Fixings - Thermally 'broken' sleeves for screws and masonry nails, with a specifically shaped flange designed to better support and fix the material.

- screw fixings for timber frame
- screw fixings for masonry
- we recommend edge fixings only unless pre drilled boards are used
- pre drilled boards available if required

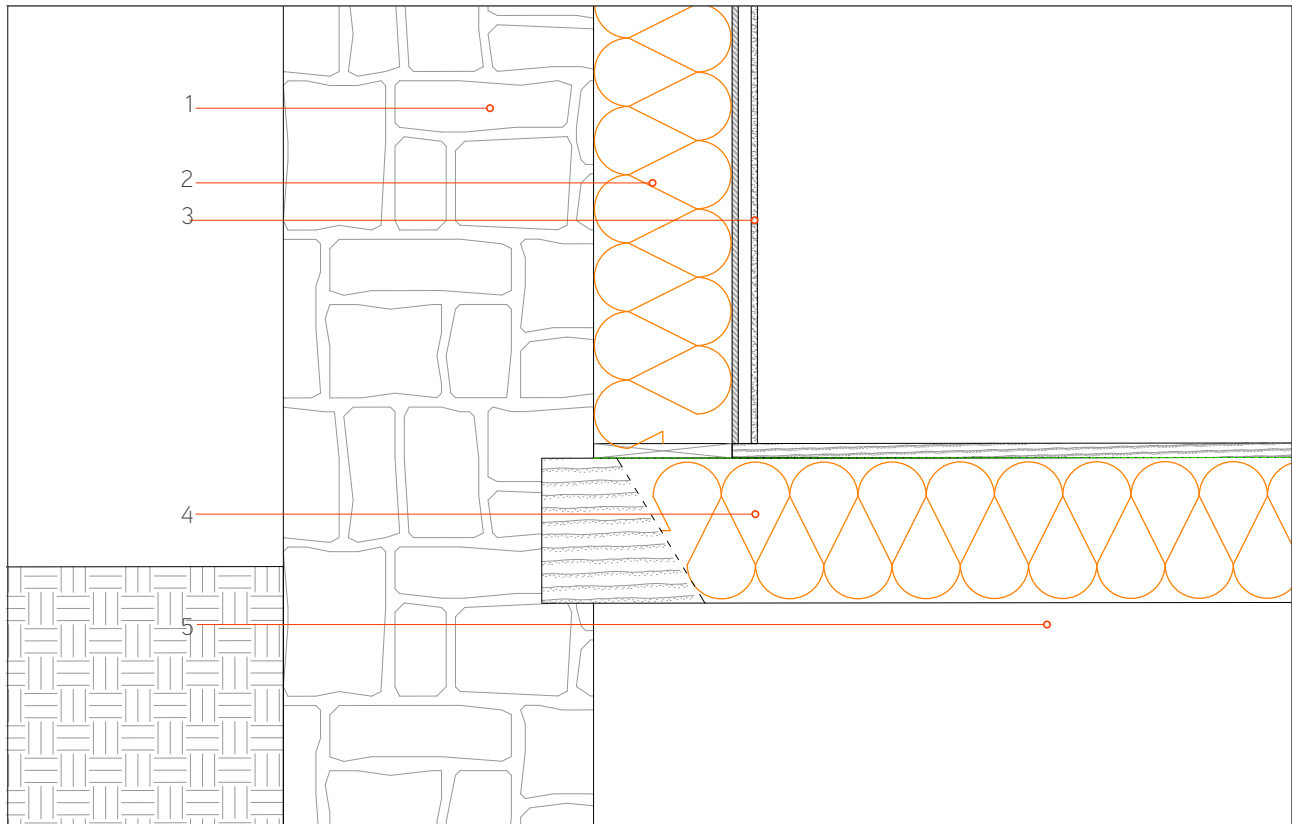
Insulation Saws - An appropriate insulation-specific saw with wavy (not serrated) blade should be used. Sharpening often makes a big difference – handheld sharpeners are available. For example Bahco handsaw and sharpener. Please see cutting guide (p.12).

Internal Finishes -Gypsum plaster can be used for internal wall finish, however for maximum breathability a breathable plaster is recommended. (eg. Breathaplasta by Adaptavate)

Adhesive - Breathable adhesive for insulation boards. With high lime content. Always fully butter do not use dot and dab techniques to avoid air gaps which risk condensation spots. For example Baumat Multifine RK70.

1.1 Dry application with timber frame

IWI System 1 - Dry application with timber frame



Detail - layer components

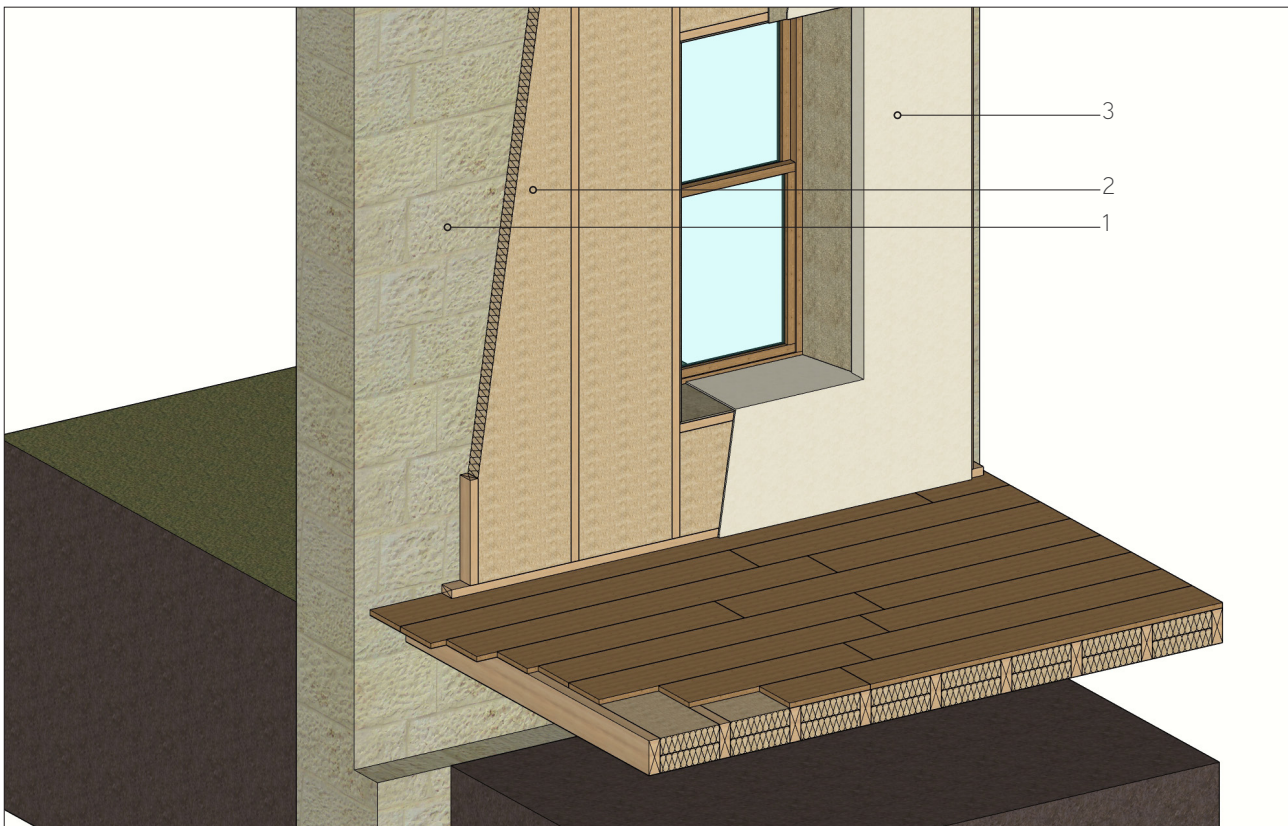
1 - Solid masonry walls.

2 - IndiBoard should be fixed using recommended fixings and care should be taken to avoid gaps between boards.

3 - Architect's internal finish specification. (here a service void is also shown).

4 - IndiTherm insulation batts, friction fit between timber floor joists with a breathable membrane to the underneath of insulation.

5 - Ventilated void below existing suspended timber floor. All air vents should be open/unobstructed and provide cross ventilation. Min depth between ground and timber suspended floor should be at least 350mm.



Installation/Specification

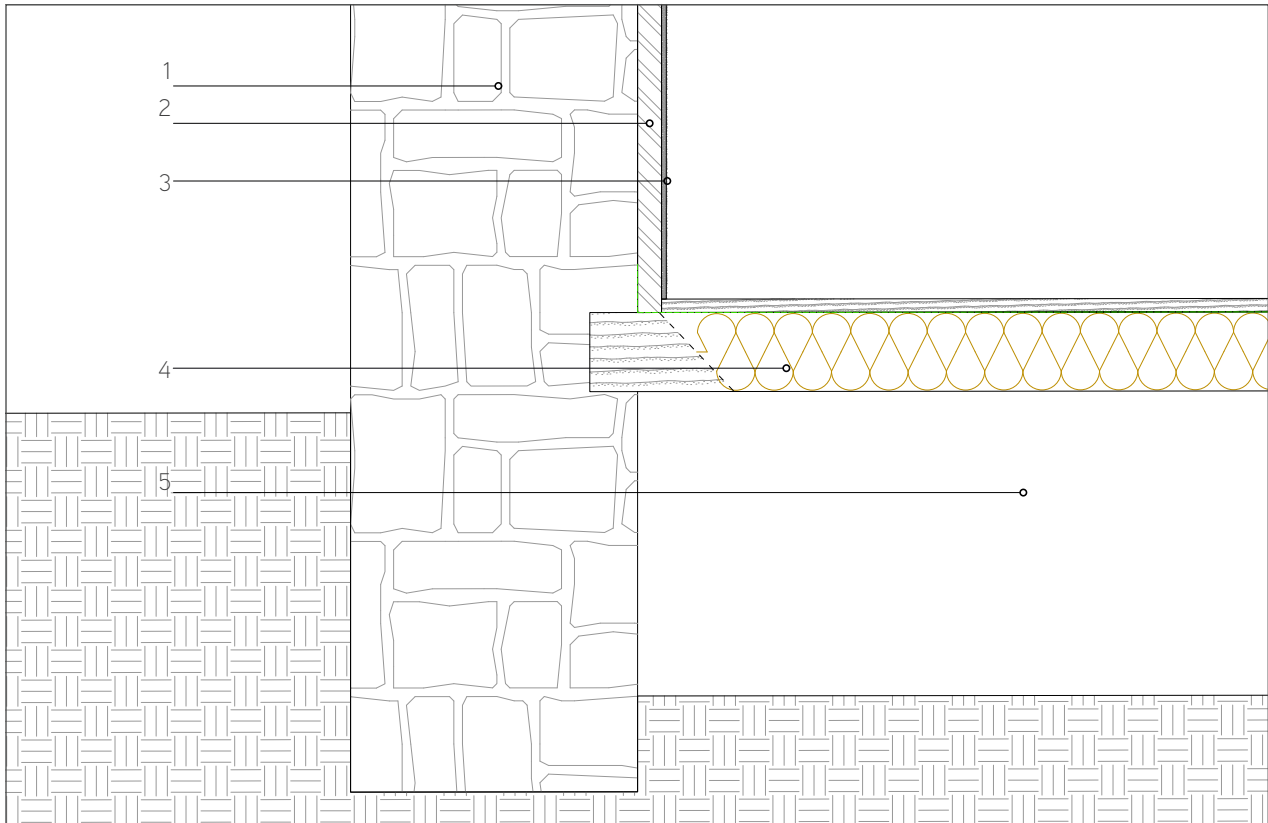
1 - Solid masonry walls, typically between 500mm and 600mm thick, with a sandstone exterior face. These walls are typically vapour open, although interior finishes may reduce the permeability.

2 - IndiTherm insulation batts to be friction fit between the stud-work. No fixings are needed to keep the batts in place. batt thickness should be within 10mm of the stud thickness (e.g. a 140mm batt should be used between 145x45mm timbers).

3 - Internal finish to Architects specifications. Shown here is a timber frame with IndiTherm friction fitted, plasterboard and plaster skim. The plasterboard should be fixed to the timber frame using appropriate fixings. The plaster skim should be hemp or lime based as this will ensure maximum breathability.

1.2 Wet adhesive application with plasterboard

IWI System 2 - Wet adhesive application with plasterboard



Detail - layer components

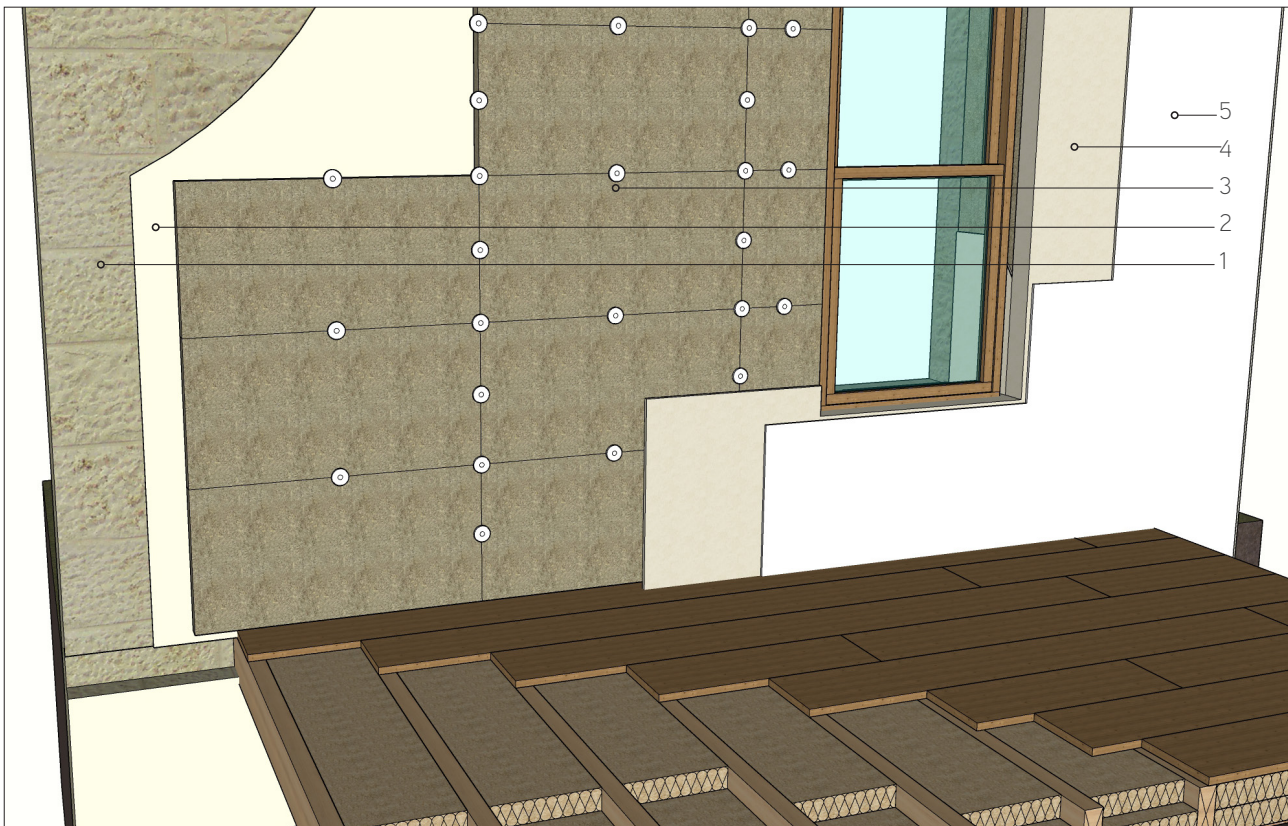
1 - Solid masonry walls.

2 - IndiBoard should be fixed using recommended fixings and care should be taken to avoid gaps between boards.

3 - Architect's internal finish specification.

4 - IndiTherm friction fitted between timber suspended floor joist with a breathable membrane to the underneath of insulation.

5 - Ventilated void below existing suspended timber floor. All air vents should be open/unobstructed and provide cross ventilation. Min depth between ground and timber suspended floor should be at least 350mm.



Installation/Specification

1 - Solid masonry walls, typically between 500mm and 600mm thick, with a sandstone exterior face.

2 - Adhesive to be used to bond IndiBoard to existing wall.
(eg. Baumat Multifine RK70)

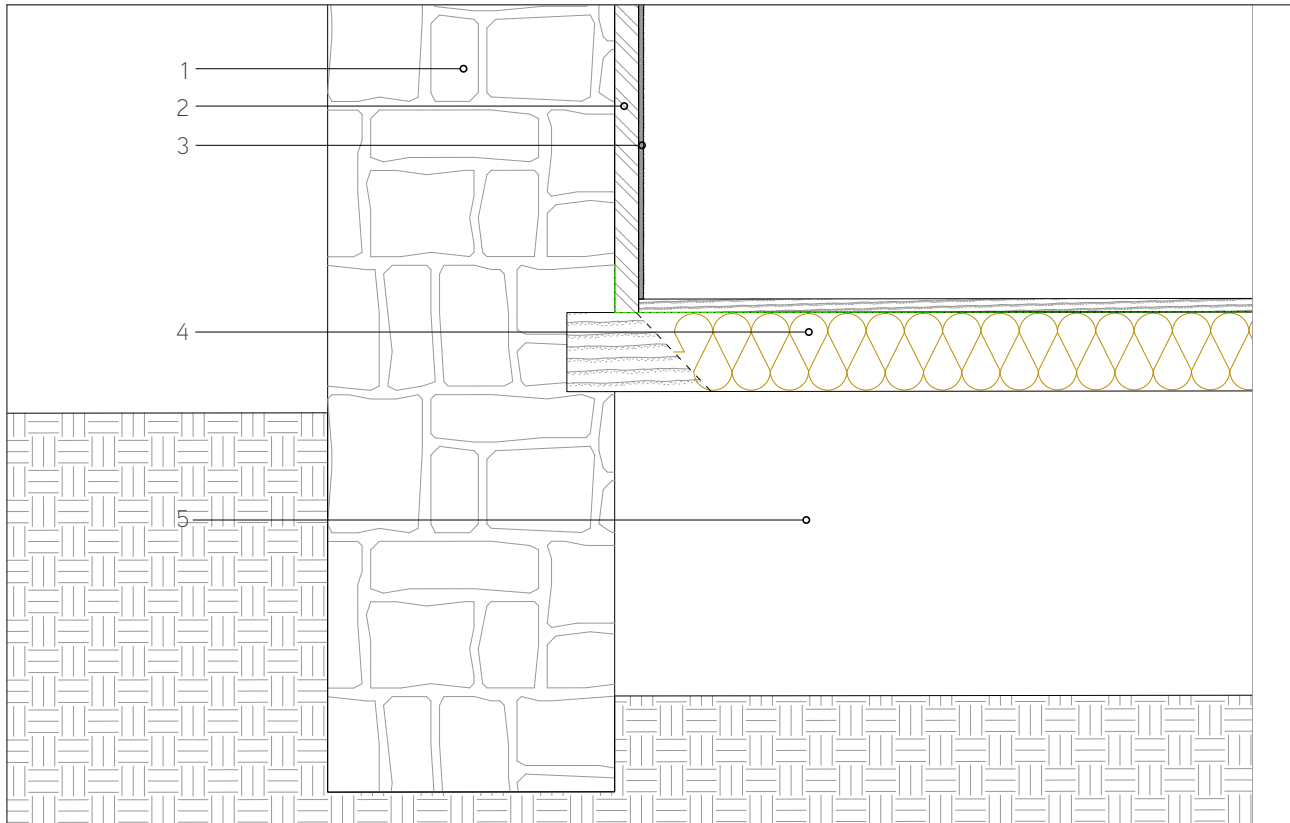
3 - Edge fixing - For additional support IndiBoard is recommended to be fixed at corners and/or mid-point of each edge in line with u-value calculations. Care should be taken to minimise gaps between square edge boards. 'Thermally Broken screws', with a specifically shaped flange are designed to provide support and fix the material.
(eg. Ejot STR U 2G fixings)

4 - Adhesive to be used to bond plasterboard to IndiBoard.
(eg. Baumat Multifine RK70)

5. Internal finish to Architects specifications. Shown here is a natural fibre based board, IndiBoard with plaster skim and ideally breathable interior paint. The plaster skim should be hemp or lime based as this will ensure maximum breathability.

1.3 Wet adhesive and plaster coat

IWI System 3 - Wet adhesive and plaster coat



Detail - layer components

1 - Solid masonry walls.

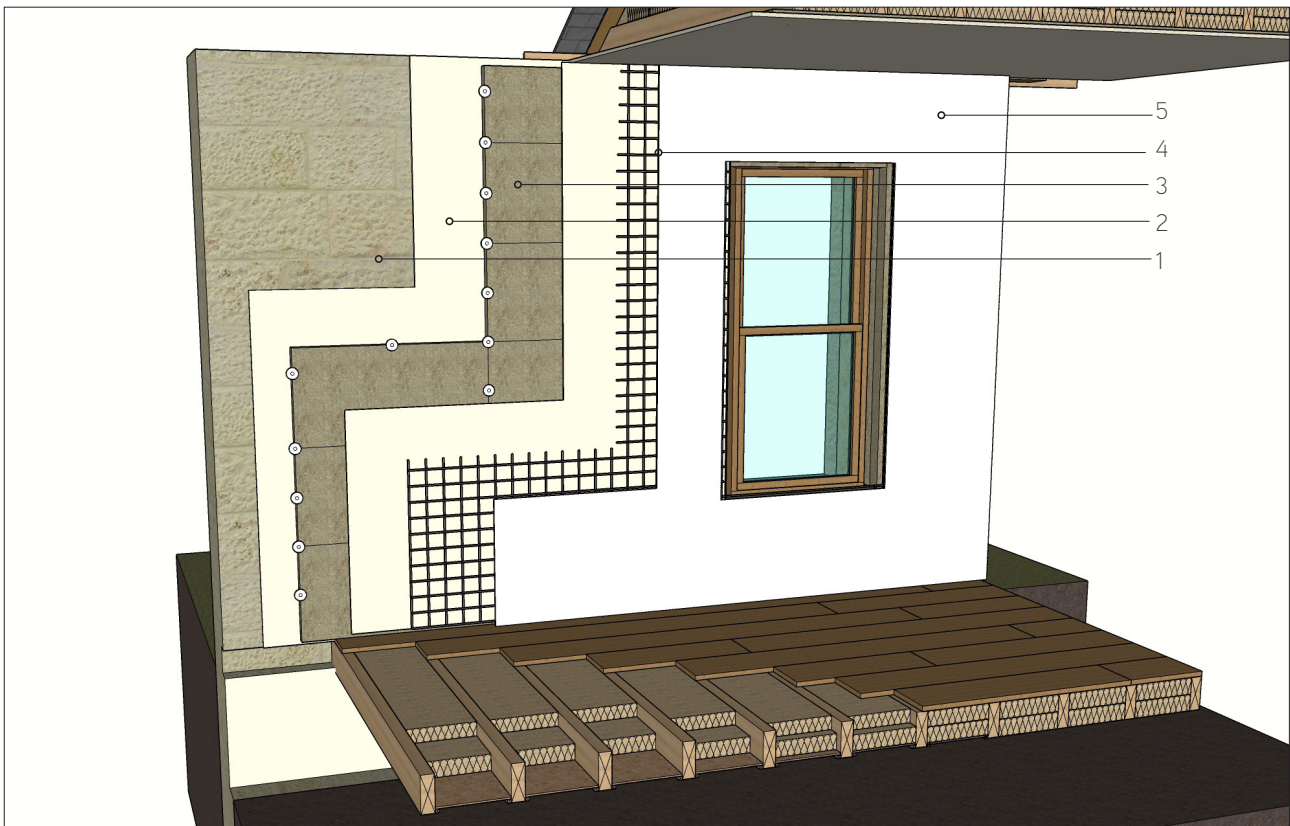
2 - IndiBoard should be fixed directly to existing wall using a suitable adhesive and thermally broken fixings.

3 - Architect's internal finish specification.

4 - IndiTherm insulation batts, friction fit between timber floor joists.

5 - Ventilated void below existing suspended timber floor.

All air vents should be open/unobstructed and provide cross ventilation. Min depth between ground and timber suspended floor should be at least 350mm.



Installation/Specification

1 - Solid masonry walls, typically between 500mm and 600mm thick, with a sandstone exterior face. These walls are typically vapour open, although interior finishes may reduce the permeability.

2 - Adhesive used to bond IndiBoard to existing walls.

3 - Edge fixing - For additional support IndiBoard is recommended to be fixed at corners and/or mid-point of each edge in line with u-value calculations. Care should be taken to minimise gaps between square edge boards. 'Thermally Broken screws', with a specifically shaped flange are designed to provide support and fix the material. (eg. Ejot STR U 2G fixings)

4 - Mesh and primer as per plastering manufacturer's instructions.

5 - Internal finish to Architects specifications. Shown here is a natural fibre based board, IndiBoard with plaster skim and ideally breathable interior paint. The plaster skim should be hemp or lime based as this will ensure maximum breathability.

Equipment: Product Cutting guide

IndiNature's products can be cut to size using a number different tools.

This sheet provides guidance and examples of recommended tools for cutting easily and quickly. Other tools are available.

Bahco Insulation Specific Hand Saw & Knife

Bahco manufacture a hand saw with 'wave-formed' blade which are specifically designed to cut insulation and is preferable to dulled hand saws while still being and inexpensive solution. This saw can easily be found in online trade stores.

Maintenance: blade sharpener supplied separately and recommended before each installation. Silica in the hemp will dull blades over time.



DeWalt Cordless Alligator Saw

DeWalt manufacture a cordless saw capable of cutting a range of materials. This solution is a more expensive one, but is worth considering for larger projects or tradesmen who will be working frequently with insulation materials. This tool can easily be found in online trade stores.



Festool Cordless Insulation Saw

The Festool Insulation Material saw is specifically designed for cutting insulation materials quickly, with minimal effort, and maximum precision. It can be bought with a range of guides and accessories to ensure a precise cutting. It is much more compact than the DeWalt alligator saw which increases its convenience in both transport and use. It is the most expensive tool on this list, and as such we would only recommend this for very large projects or trade use.



End cutting

Product widths are designed to fit 400, 470 & 600 joists for tight friction fit.

If cutting the edge or end of a flexi-batt:

- **Less than 20mm** – No need to cut. The material should compress for a good friction fit.
- **Up to 50mm** – draw a line or compress with timber board on top of the batt and cut along the edge to help accuracy and avoid an uneven cut.