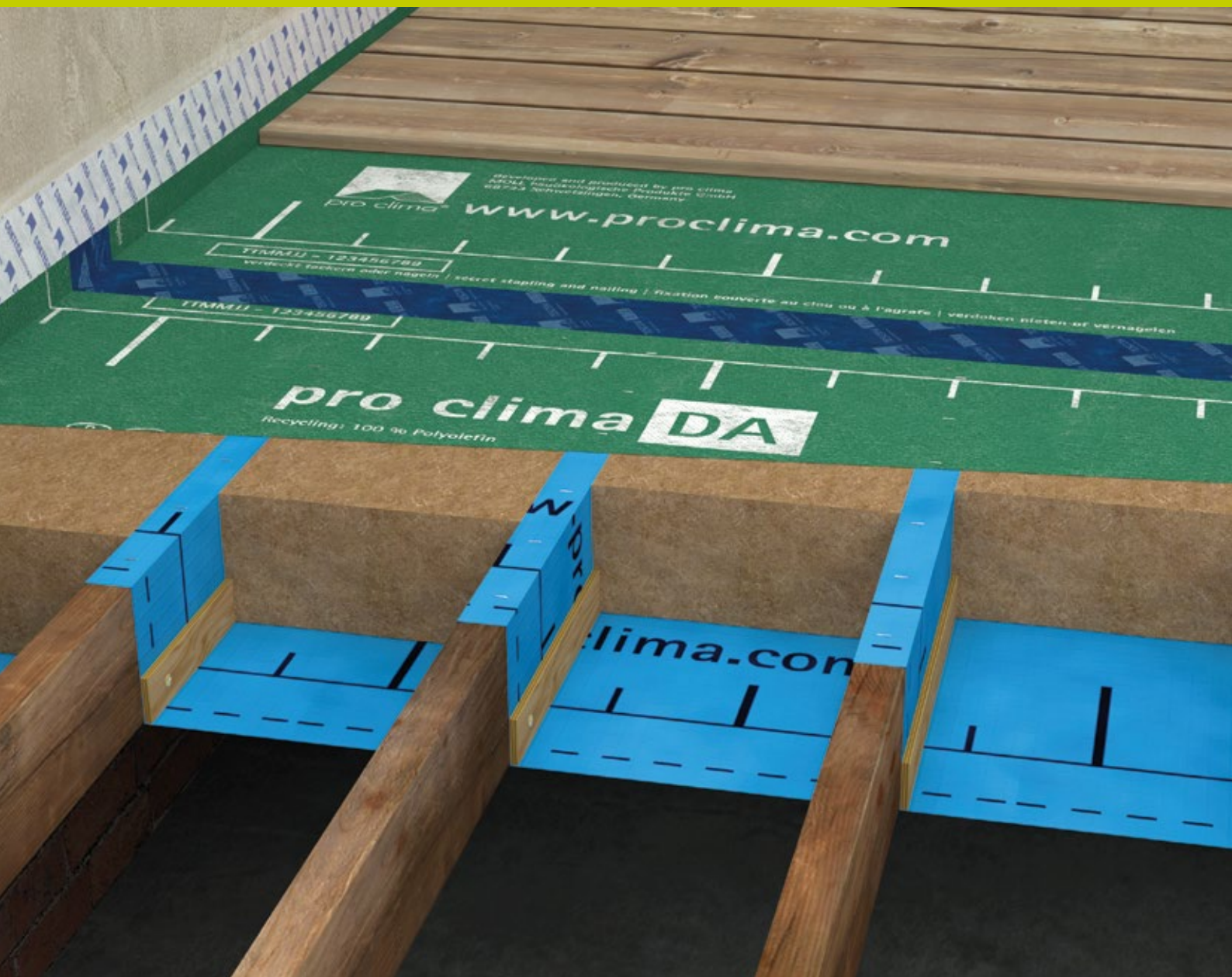


Installation Guide



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How to insulate your suspended timber floor

For most heritage properties, the most effective and appropriate way to insulate a suspended floor and improve its airtightness is to retrofit insulation beneath the floorboards, between the supporting joists.

This usually involves lifting the floorboards to carry out the installation as described in Method 1. Alternatively, if the crawlspace is accessible, the installation can be installed from underneath without disturbing the room above. This is detailed in Method 2.

Whichever method you choose, each will provide improved comfort and warmth to the room.

For additional background information and theory on how these methods work, please refer to our blog post: "A Best Practice Approach To Insulating Suspended Timber Floors" which can be found on our website.

Before you start

Before proceeding, check the moisture levels under the floor. Joists must be dry and any rotting timber must be replaced before beginning work. Please contact us for advice if the ground/soil below is visibly damp or wet or likely to flood.

Once the floorboards and skirting boards have been removed, inspect the joists for any exposed nails or sharp points that could puncture the membrane then remove or rectify any problems, as necessary.

The insulated floor will no longer allow warmth from the room to warm the space underneath. This means water or heating pipes under the floor should be insulated with appropriate lagging to prevent freezing.

Check all air vents. They must all work properly, be open, unobstructed and provide good ventilation to the space.

Contact

If you have any questions not answered by this installation guide, please contact our technical team:

+44 (0) 1228 711 511 (UK)

+353 46 9432104 (Ireland)

info@ecologicalbuildingsystems.com

Method 1

Installation from above with floorboards removed

Materials needed

Please note the following key materials needed and their roles:

- **Pro Clima DA robust vapour control membrane**
Provides airtightness and vapour control
- **Pro Clima Tescon Vana airtightness tape**
For sealing membrane overlaps
- **Pro Clima Contega Solido SL plasterable tape**
For sealing membranes to perimeter masonry walls
- **Pro Clima Tescon Primer RP / Tescon Sprimer**
To prepare rough/uneven surfaces prior to using Contega Solido SL to seal membrane to perimeter wall
- **Pro Clima Orcon F airtight adhesive**
For sealing membrane to rough surfaces
- **Pro Clima Solitex Plus reinforced breathable membrane**
Windtight breathable membrane to support the insulation and prevent air movement through it from below
- **Thermo Hemp Combi Jute natural insulation**
Natural breathable insulation for installation between joists

Install windtight breather membrane

Pro Clima Solitex Plus (laying out and initial fixing with staples)

The windtight reinforced breather membrane Solitex Plus should be installed at right angles to the joists (Fig. 1.1).

It should be laid over the top and down the sides of each joist to form a basket into which the insulation can sit. The smoother blue printed side of the Solitex Plus should be facing up towards the room; this is the side that is ideal for taping.

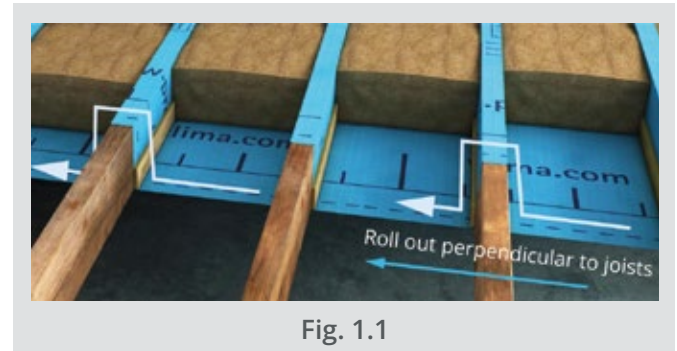


Fig. 1.1

The very first length of membrane should be positioned so it is up against the wall (parallel to it) with as little gap as possible between the wall and membrane. Where the wall is not perfectly straight, you can cut the membrane around any obstacles and make it follow the contour of the wall. You need to make sure the membrane does not go up the wall at any point (Fig. 1.2). This makes it easier to make the membrane taut in a later step and easier to tape to the wall when you are done.



Fig. 1.2

If your walls are not square, the first length of membrane (laid parallel to the wall) may not be at right angles to the joists. This is fine, because the next length can be installed at 90° to the joists and overlap the first to correct any problems (Fig. 1.3).

Where the Solitex Plus meets the adjacent walls (the ones parallel to the joists), it should extend up the wall by approximately 300-500mm so it can be easily trimmed to the correct size and sealed to the wall later.

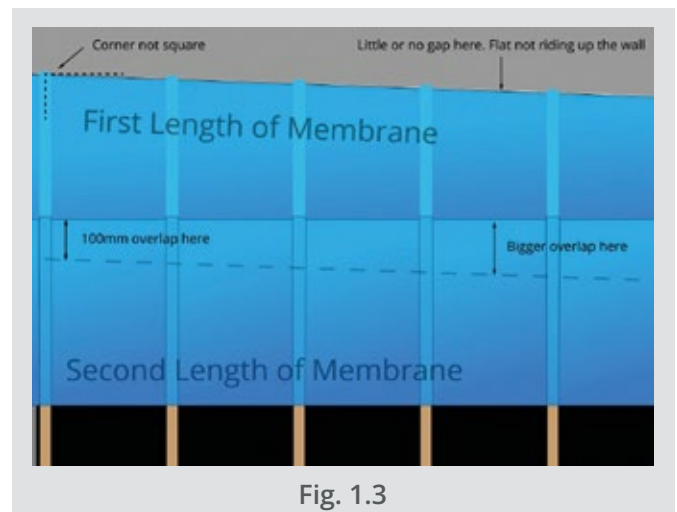
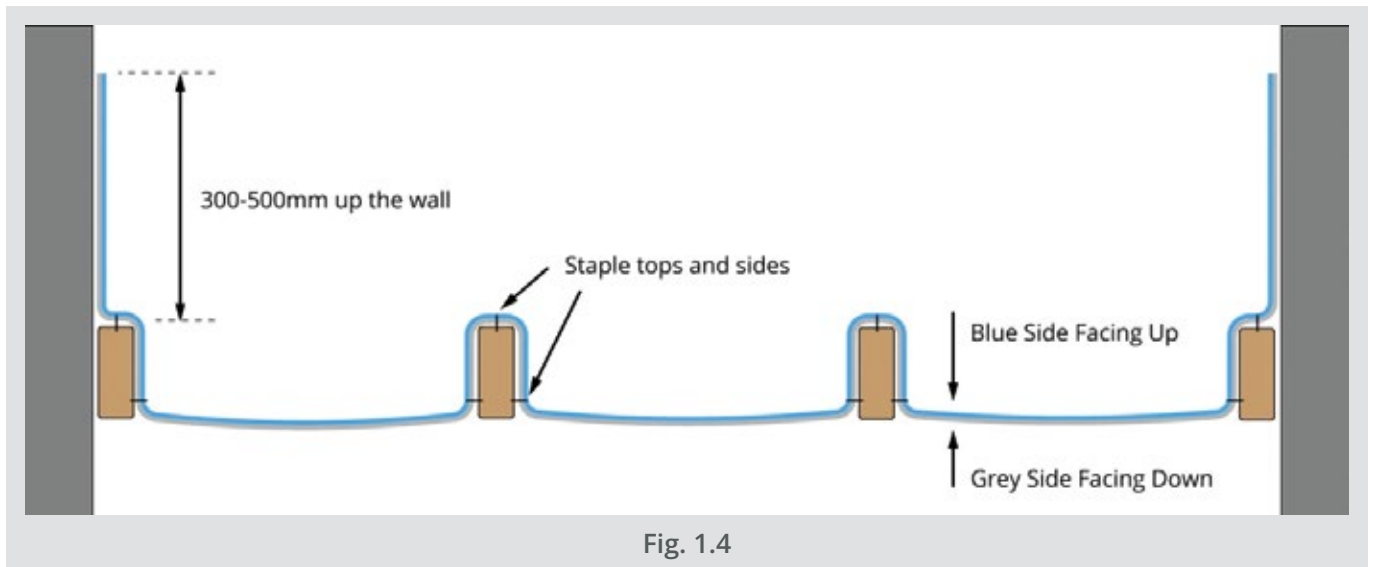


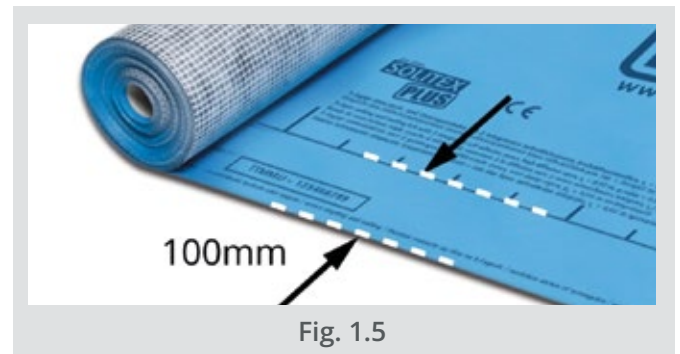
Fig. 1.3



The Solitex Plus should be held in place with 8mm deep x 10mm wide galvanised staples added to the top and sides of each joist approximately every 300mm. These staples are not the final fixings for the membrane; they simply hold the membrane in position as you work from one end of the room to the other. The Solitex Plus does not need to be taut at this point; just try to ensure it is not saggy (Fig. 1.4). Any staples that do not go all the way in or miss the joist should be removed and taped over with Tescon Vana airtight tape to prevent any potential air leakage.

The second length of membrane should then be laid out at right angles to the joists. As the first length is parallel to the wall, you may need to have a bigger overlap at one end to make sure the second length goes on at right angles to the joists (see Fig. 1.3).

As you lay down more lengths of Solitex Plus, overlap each by 100mm. There is a line printed on the edge of the Solitex Plus to help you judge the correct overlap width (Fig. 1.5).



Pipe and cable penetrations

If there are any pipes or cables passing through the floor where the membranes will be, they will need to be sealed to each membrane with a Pro Clima Kaflex Post Airtight Retrofit Grommet (Fig. 1.6) or with some carefully applied Tescon Vana.

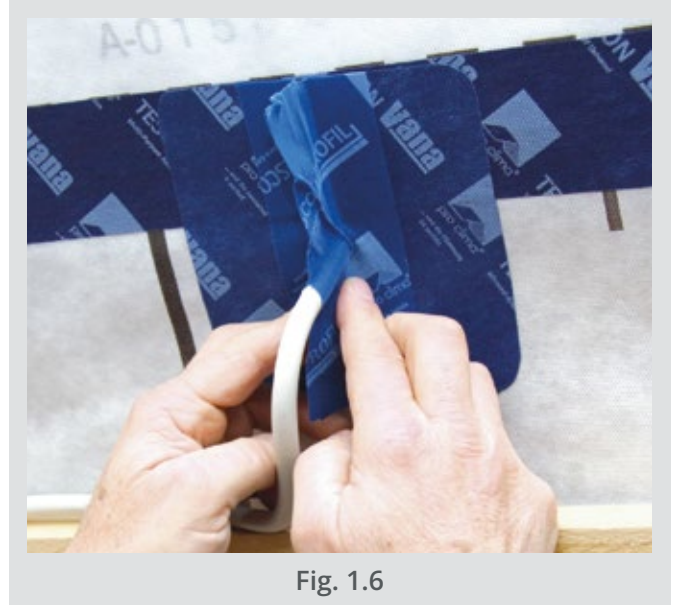


Fig. 1.6

The Kaflex Post Grommet wraps around the pipe or cable so can be installed onto any pre-existing pipe or cable.

The Pro Clima Kaflex or Roflex Grommets (Fig. 1.7) are suitable if one end of the pipe or cable is accessible for you to slide the grommet onto. When upgrading a floor, the pipes and cables are usually already connected to something at both ends and inaccessible, so the Kaflex Post Grommet will be the most convenient choice.

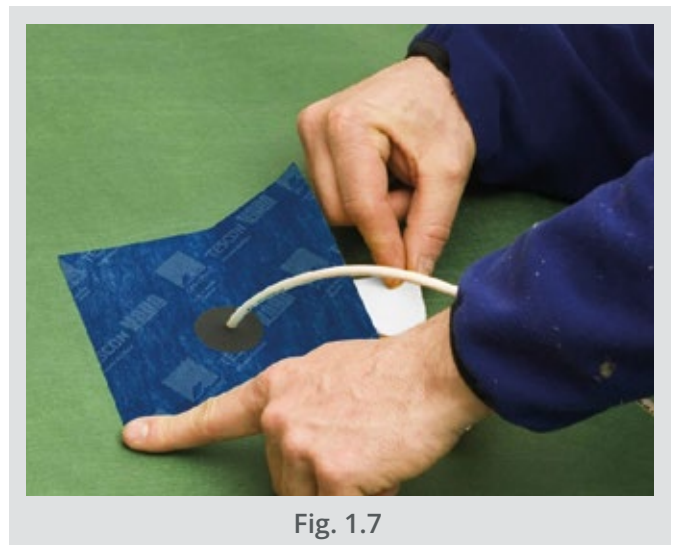


Fig. 1.7

Seal overlaps in Solitex Plus

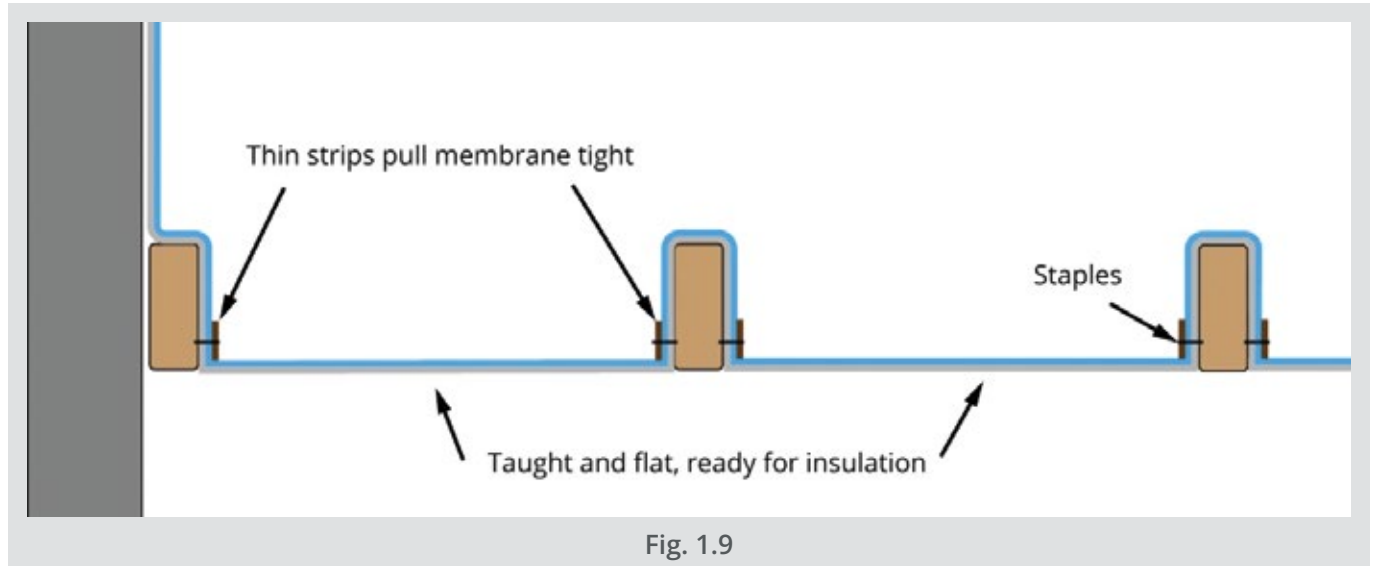
Once the entire floor area is covered with Solitex Plus, all the overlaps should now be sealed windtight with Pro Clima Tescon Vana airtight tape (Fig. 1.8).

A Pro Clima Pressfix Tool should be used to press the tape into the membrane surface and achieve maximum adhesion.



Fig. 1.8

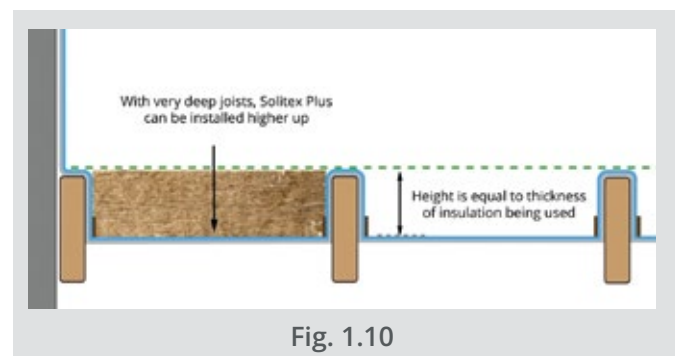
Final fixing of Solitex Plus to joists



Once the overlaps are sealed and fully windtight, thin strips of hardboard, wooden lath or 3mm thick MDF can be fixed (with staples) on top of the Solitex Plus along the bottom edge of each joist (see Fig. 1.9). These strips make it easy to pull the membrane taut (without tearing it) and help form a flat-bottomed cradle between the joists. The strips should be approximately 30mm wide. Staple through the strip and membrane every 100-150mm to hold the Solitex Plus tightly in place up against the joist. The staples must go all the way through the strip and hold it tight up against the joist to be permanently airtight.

Staples can be used on their own to tighten the Solitex Plus membrane, but this can increase the risk of tearing at each staple point which leads to lower levels of windtightness. The optimum thermal performance of the floor is achieved by preventing any wind-washing of the insulation layer due to draughts coming from the well-ventilated crawl space below.

Please note: If your joists are very deep (more than 140mm) you may not wish to fully fill that space with insulation. In that case, it is important to position the Solitex Plus so the cradle formed is only as deep as the insulation you will be using (see Fig. 1.10).

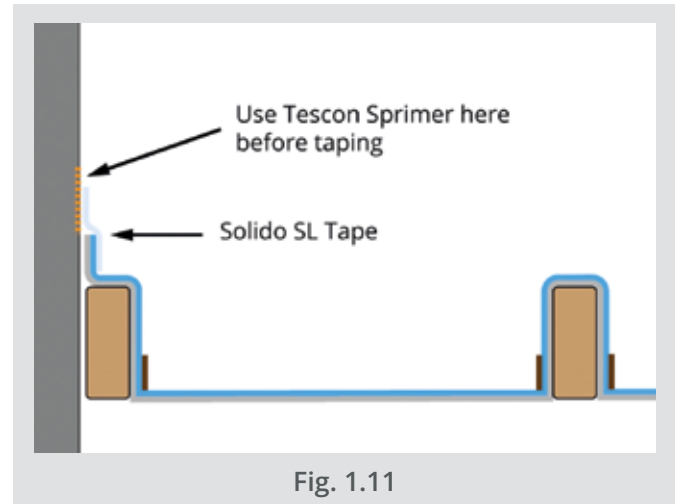


Seal the Solitex Plus

Walls parallel to the joists

On the walls that are parallel to the joists, the Solitex Plus edges must be sealed airtight with Pro Clima Contega Solido SL airtight tape. First trim the Solitex Plus with a sharp knife so there is approximately 30-40mm of it on the wall; This will ensure the membrane is not too far up the wall and that there is enough room to seal the vapour control membrane in the next step and cover it all up with skirting board when complete (Fig. 1.11).

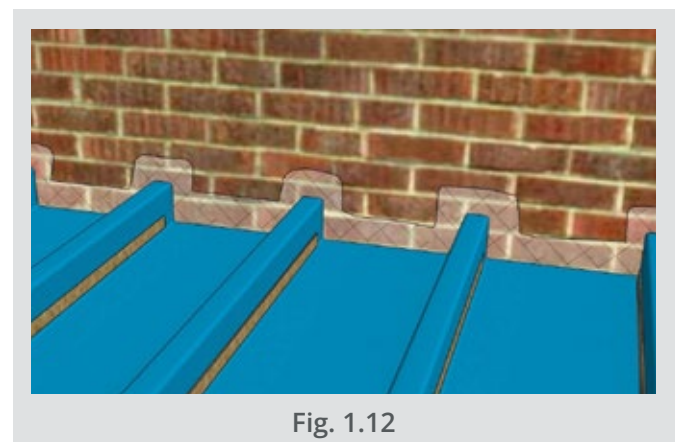
Before applying the Solido SL tape, the wall will need to be clean, free of dust and debris and primed with Pro Clima Tescon Sprimer or Tescon Primer RP before the Solido SL tape is applied (Fig. 1.11). Pro Clima Orcon F airtight sealant can be used (with primer first) to seal any difficult or very uneven areas where tape is unsuitable. Use a Pressfix Tool to fully press the tape to the wall and achieve maximum adhesion.



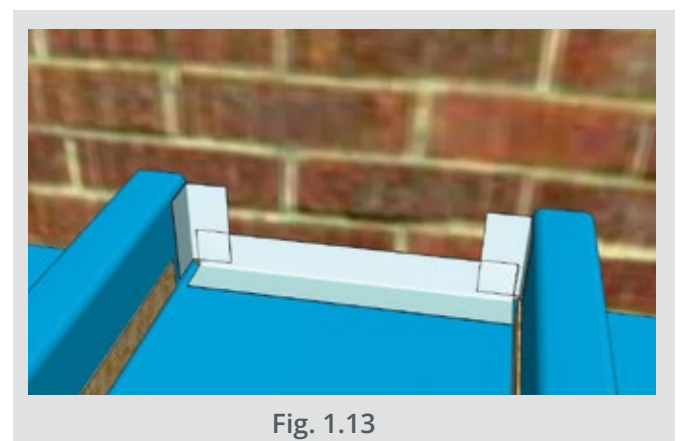
Seal the Solitex Plus

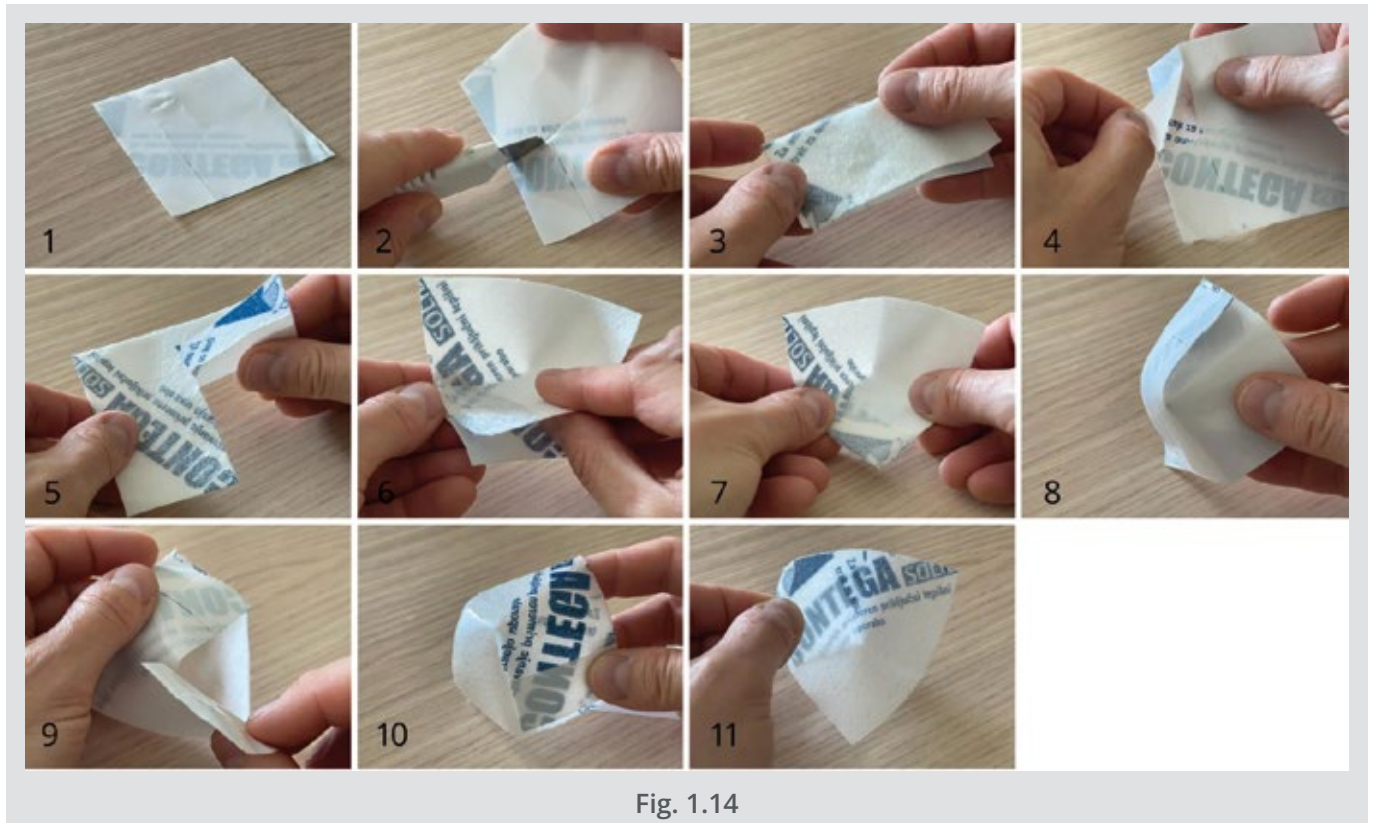
Walls at right angles to joist

First ensure the wall is clean, free of dust and debris and is primed with Tescon Sprimer or Tescon Primer RP. Apply the primer to the areas where tape will be applied (the shaded area of Fig. 1.12).



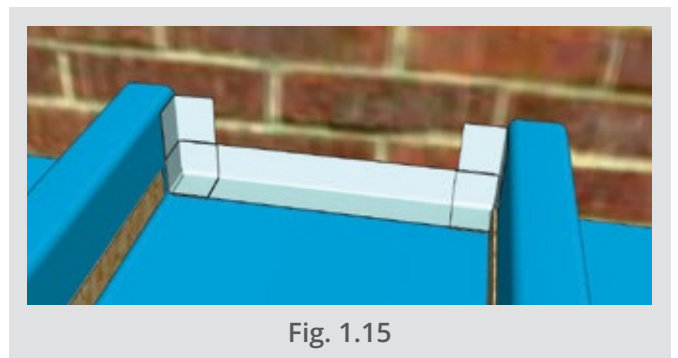
Measure the width of the bottom and the height of the sides of the U-shaped Solitex Plus cradle between each joist. Cut lengths of Solido SL airtight tape to match those dimensions. Apply the tape to seal the bottom of the cradle, then apply tape to seal the sides (Fig. 1.13).



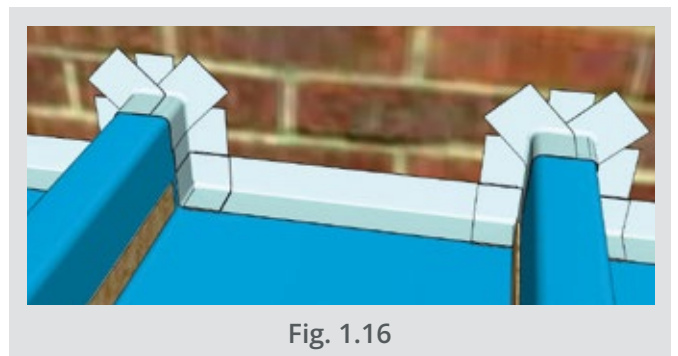


To seal the bottom corners, cut an 80mm length of Solido SL then make a cut in the middle of the edge with the 20mm release strip. Remove the 20mm release paper on one side of the cut and fold the tape, with the fleecy side inwards, and press together forming it into a corner shape. (Fig. 1.14 steps 1-8).

When ready to install, remove the remaining release paper (Fig. 1.14 steps 9-11) from the corner shaped tape and carefully press one into each corner (Fig. 1.15). Several corner shapes can be prepared in advance if you find that easier.

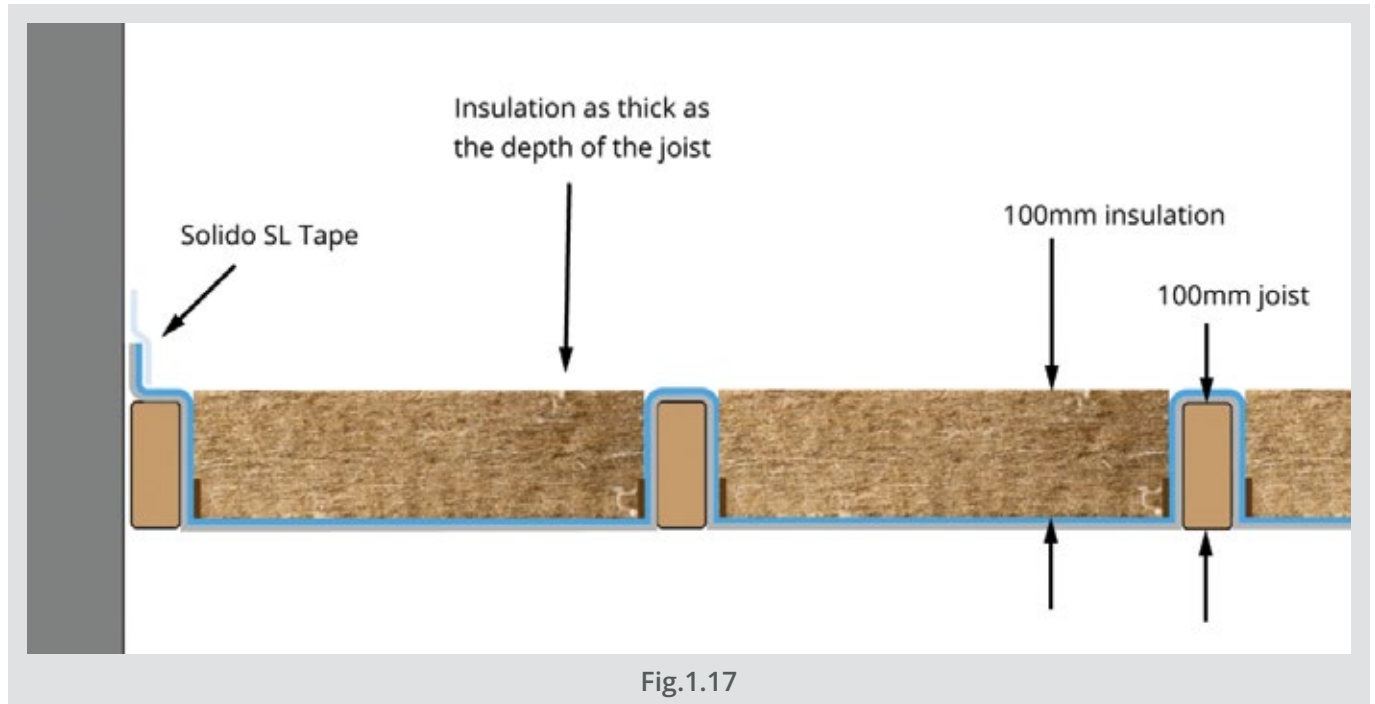


Next seal at the tops of the joists with more Solido SL. Tape the horizontal top with a piece of Solido SL as wide as the joist, then cut two more similar sized pieces and apply diagonally, stretching it around each corner to complete the seal (Fig. 1.16).



Install natural insulation

Thermo Hemp Combi Jute



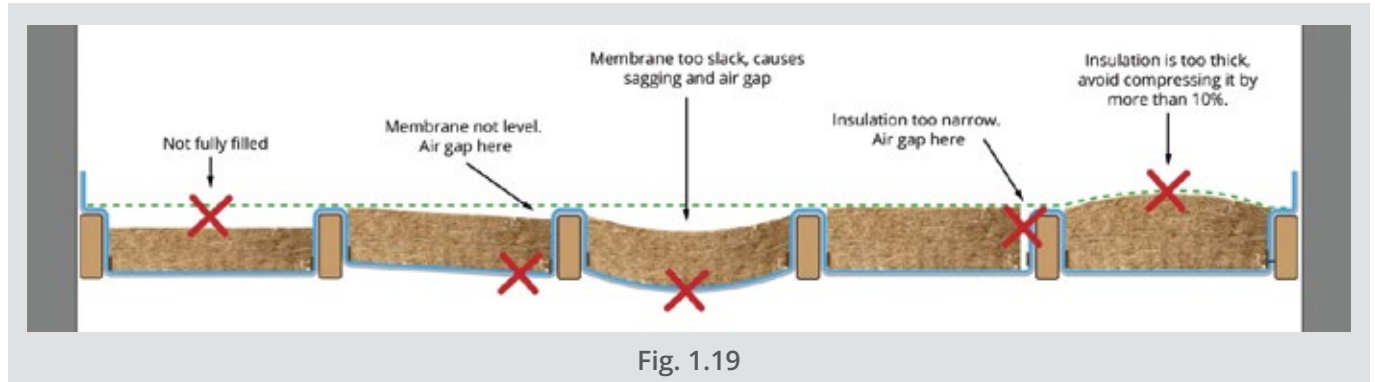
The space between the joists can now be fully filled with Thermo Hemp Combi Jute natural insulation. Filling the space with no air gaps will maximise the thermal benefit of the insulation. Use offcuts for filling any gaps that remain once all the mats have been installed. It is very easy to tear the natural insulation into smaller pieces to fill small gaps (Fig. 1.17).

The Thermo Hemp Combi Jute, should be installed slightly oversized to ensure a good friction fit between the joists. The width of insulation used should therefore be 20-40mm wider than the measured gap between the joists. When slightly oversized, the insulation is compressed slightly and pushes against the sides of the timbers, meaning it will stay in place better without slumping. Compression of up to 10% will not affect the thermal performance.

As natural insulation is very hard to cut with a knife, we strongly recommend using a Bahco Profcut Insulation Saw (Fig. 1.18) to create clean straight cuts with minimal effort. The saw is supplied with a sharpener and should be resharpened regularly to continually provide perfect cuts. The Profcut Insulation Saw is perfect for precise cutting making it easier to achieve a good friction fit for the insulation.



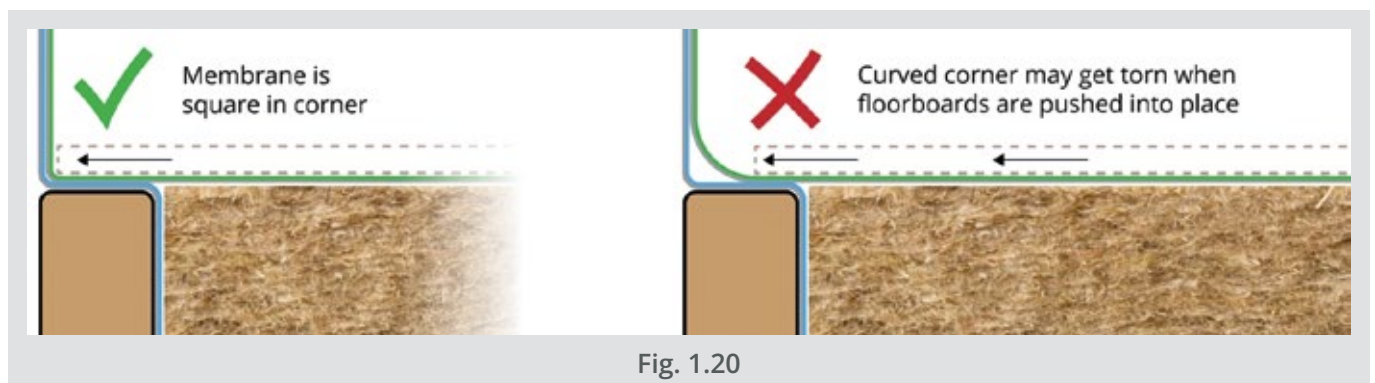
Things to look out for...



Please check the installation for the following problems, it is best to rectify any of these before installing the final membrane over the top.

Install airtight vapour control membrane

Pro Clima DA



Once the space between the joists is fully filled with Thermo Hemp Combi Jute, the airtight vapour control membrane, Pro Clima DA, should be installed over the top of the insulation.

The dark green side of the membrane should face up towards the ceiling. Lay the DA membrane over the insulation at right angles to the joists (in the same direction as the Solitex Plus). Make sure the DA membrane extends up the wall approximately 200mm (see Fig. 1.21). The DA membrane should be pressed into the corner so there is minimal curve between the wall and floor (see Fig. 1.20).



Staple the DA to the tops of the joists approximately every 150mm (Fig. 1.22). Make sure each staple goes into the joist, any that miss the joist should be removed and taped over with Tescon Vana to maintain the airtightness.

As you lay down more lengths of DA membrane, overlap each by 100mm. There is a line printed on the edge to help you judge the correct overlap width. The overlaps should then be sealed airtight with Tescon Vana. Use a Pressfix Tool to press the tape onto the membrane and achieve maximum adhesion.



Fig. 1.22

Seal Pro Clima DA membrane to the walls

Make note of where your skirting boards will be and trim the DA membrane so it will be at least 50mm below the top of the skirting. This allows for 40-50mm of Solido SL tape to be applied to the wall without it being visible once the skirting has been re-installed (see Figs. 1.23 and 1.24).

If the skirting will be fixed to the wall with screws, be mindful of where the screws will go so you can avoid having to screw through the membrane when securing the skirting.



Fig. 1.23

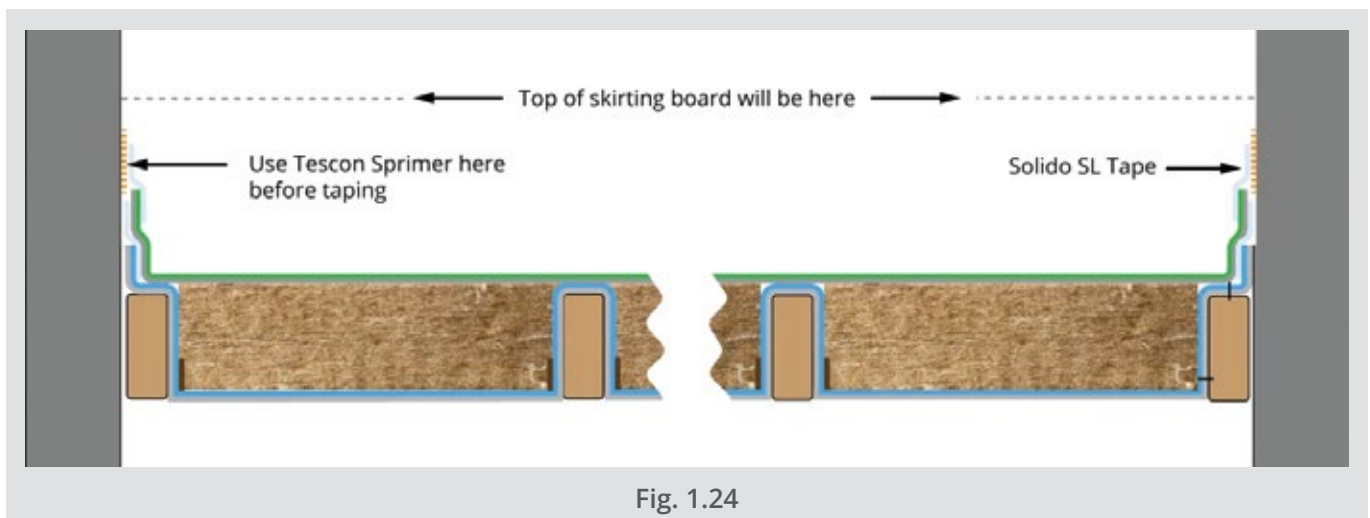


Fig. 1.24

The perimeter edge should then be sealed to the wall with Solido SL airtight tape. Orcon F airtight sealant can be used to seal any difficult (very uneven) areas where the tape is unsuitable. Before applying the Solido SL tape or Orcon F sealant, the wall will need to be clean, free of dust and debris and primed with Pro Clima Tescon Sprimer or Tescon Primer RP.

Final steps

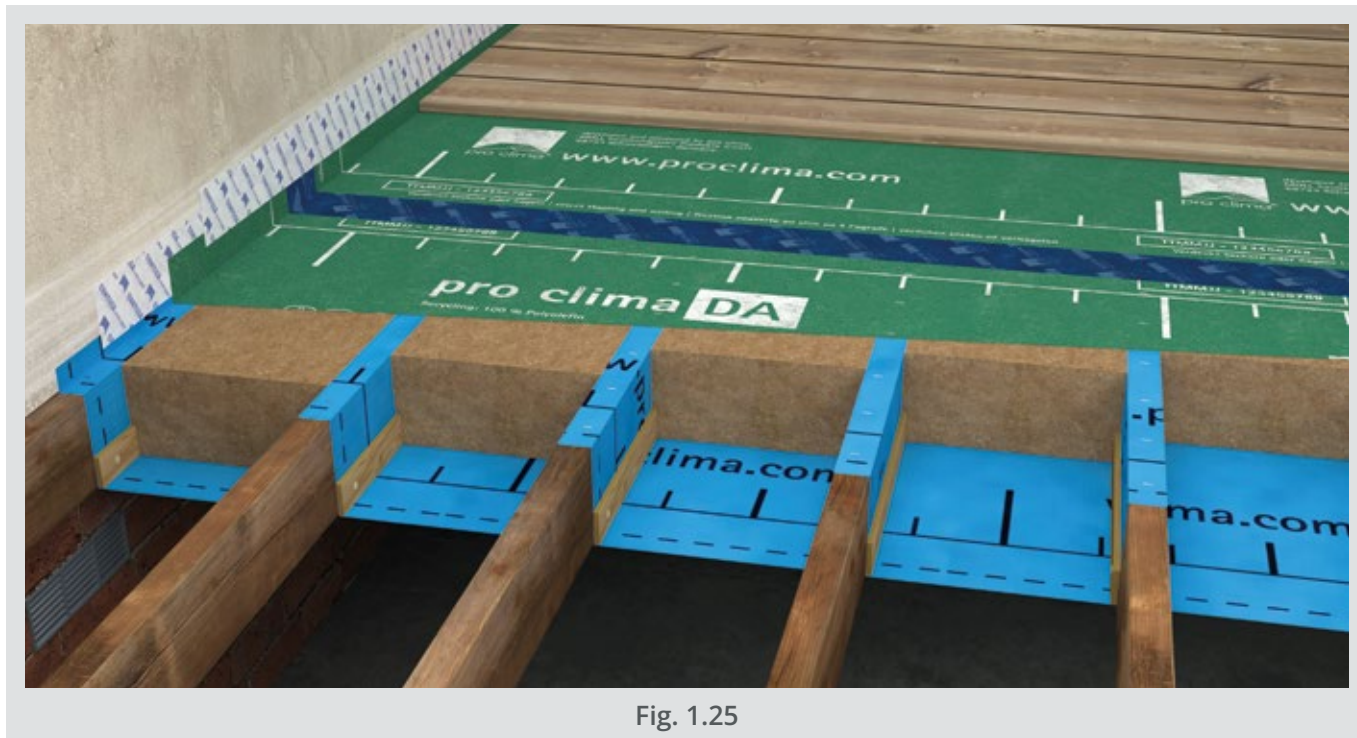


Fig. 1.25

The floor is now ready for the floorboards and skirting to be reinstated. This computer-generated cut-away view (Fig. 1.25) shows how all the layers of the completed suspended timber floor build-up will look when complete.

Method 2

Installation from underneath without disturbing the room above

If the conditions are appropriate, and accessibility is adequate, insulating from below presents the opportunity to significantly reduce heat loss, reduce energy costs and improve thermal comfort without having to remove or damage internal finishes.

Before you start

It should be noted that in geographic areas susceptible to flooding alternative solutions should be sought and this should be discussed with our technical team before starting any installation work.

If the subfloor is exposed soil and no damp proof membrane (DPM) is installed on top of it, contact our technical team for guidance.

Vents are installed in opposite external walls to provide adequate circulation of fresh air to keep timbers dry and prevent decay. Where tassel/sleeper/dwarf walls are present under the floor, they typically include ventilation gaps in the block work to ensure adequate air circulation. If the installation of under floor insulation results in this cross-ventilation being blocked or reduced, an additional ventilation provision should be provided. This may include the removal of bricks, installation of additional external vents, or tapering the thickness of the insulation near the walls to maintain the original ventilation rate. Airtight sealing of membranes to tassel/sleeper/dwarf walls would use the same method as for sealing to external walls.

If there are any signs of dry or wet rot, seek professional guidance immediately. Any existing penetrating moisture due to poor maintenance of water goods, drainage or damaged pointing or plaster externally must be addressed before commencing.

Check and note the following:

- Condition of the floor structure: ensure it is free from rot (dry and wet rot) especially at the abutment to any external walls, tassel/sleeper/dwarf walls
- Evidence of existing dampness, staining or condensation on surfaces under the floor
- Evidence of infestation (e.g. woodworm bore holes or active infestation)
- Type, suitability and condition of floor timbers, substrates and any openings
- Type and condition of floorboards or pre-existing breather membrane
- Any room space ventilation requirements

If there are any issues or questions raised by the checklist, contact our technical team for guidance.

Health and safety considerations

When working under the floor, it is the responsibility of the installer to undertake a comprehensive risk assessment before any works are undertaken. Always wear strong suitable clothing and a dust mask/respirator. It is also important to ensure the crawlspace is well ventilated in accordance with guidance set out in BS 5250. Use a portable light to see clearly and beware of any sharp points, nails and splinters on the subfloor and above your head. Wearing a hard-hat or some form of head protection is recommended. Care should be taken in the event asbestos or other potentially harmful materials are present upon inspection.

If the property is located in a high-radon area, a radon barrier may need to be installed. Presence of radon gas makes the requirement for ventilation in subfloor areas even more vital to prevent its build up. Where radon is a serious issue, the installed insulation may need to incorporate a membrane capable of preventing the gas from leaking into the property (regardless of whether this was in situ prior to the installation) or other remedial measures such as sumps and positive ventilation. Further details can be found on the following links: ukradon.org, epa.ie

Materials needed

Please note the following key materials needed and their roles:

- **Pro Clima Intello Plus intelligent airtight vapour control membrane**
Provides airtightness and vapour control
- **Pro Clima Tescon Vana airtightness tape**
For sealing membrane overlaps and sealing damaged areas of Intello Plus and Solitex Plus
- **Pro Clima Contega Solido SL plasterable tape**
For sealing membranes to perimeter masonry walls
- **Pro Clima Tescon Primer RP / Tescon Sprimer**
To prepare rough/uneven surfaces prior to using Contega Solido SL to seal membrane to perimeter wall
- **Pro Clima Orcon F airtight adhesive**
For sealing Intello Plus to rough floor joists
- **Pro Clima Solitex Plus reinforced breathable membrane**
Windtight breathable membrane applied under insulation to limit air movement through the insulation from below (thermal bypass) and to allow the assembly to breathe
- **Pro Clima Aerosana Visconn Fibre** (depending on floor detail).
Airtight fibre reinforced paint. Aerosana Visconn Fleece may also be required depending on specific circumstances.
- **Thermo Hemp Combi Jute natural insulation**
Natural breathable insulation for installation between joists
- **Gutex Multitherm** or **Gutex Multiplex Top** (optional). Breathable rigid woodfibre insulation for installation below joists for additional thermal benefit if space permits

Install airtight vapour control membrane

Pro Clima Intello Plus

When floorboards and skirting cannot be removed, installation of underfloor insulation from underneath (within the crawlspace) is the next most common method. This brief guide will highlight the method of sealing for airtightness and vapour control as well as offering some helpful tips.

When installing airtightness from underneath, Pro Clima Intello Plus intelligent airtight vapour control membrane is recommended instead of Pro Clima DA membrane. This membrane is available in 30m² or 75m² rolls and offers an effective and robust way of managing moisture within the floor build-up.

Please refer to Fig. 2.1 and Fig. 2.2 for diagrams of the finished floor build up.

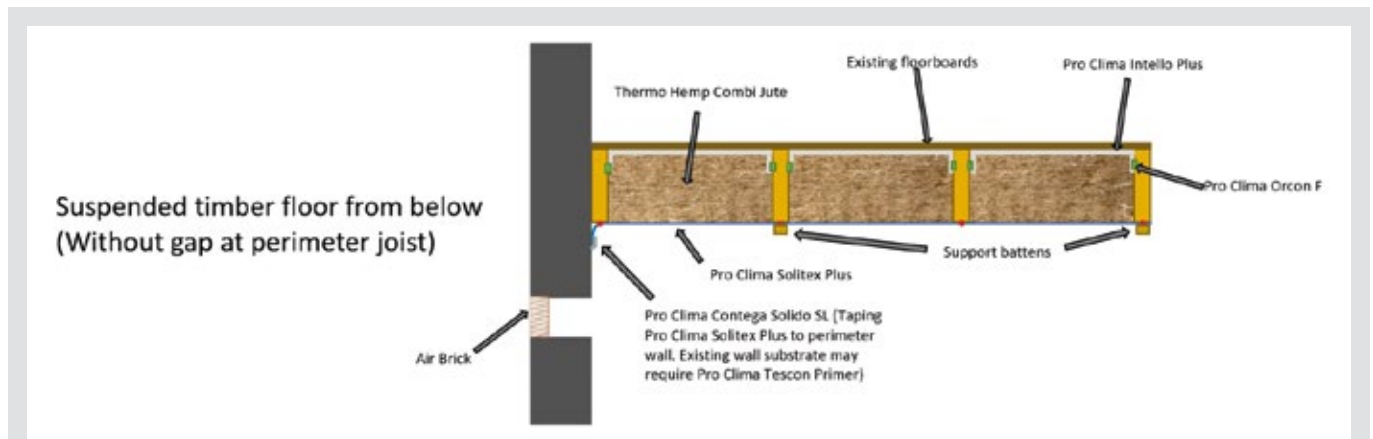


Fig. 2.1. Suspended timber floor without gap at perimeter wall

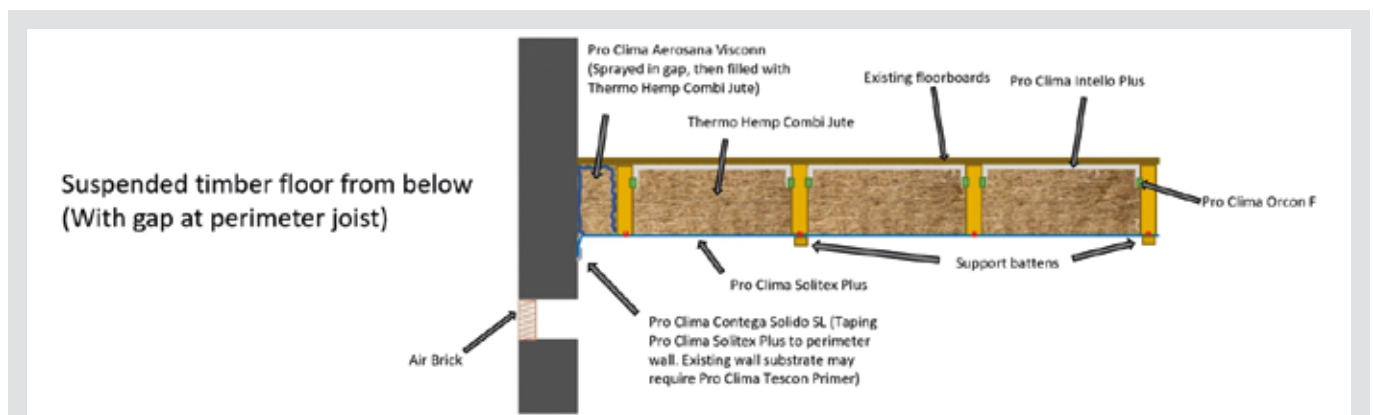


Fig. 2.2 Suspended timber floor with gap between joist and perimeter wall

First measure the gaps between the joists and make sure any loose material, dirt and dust is brushed off the joists and walls. Intello Plus should then be cut into strips and installed between each floor joist. The strips should be stapled with 8mm deep x 10mm wide galvanised staples to hold them up against the underside of the floorboards (see Fig. 2.1). If a pneumatic stapler is available for you to use, this will simplify and speed up the stapling process and lead to less risk of damaging the membranes while working in a confined area.

Each strip should be 100mm wider than the gap between joists. This gives 50mm of extra membrane at the edges for sealing it to the joists. The roll of membrane is 1.5m wide, so 500mm x 1.5m strips are easy to make and handle under the floor. Or, to reduce the number of overlaps or strips required, you can unroll a length as long as the joists and then cut that long-ways into three full-length strips.



Sealing Intello Plus to joists with Orcon F Airtight Sealant

The staples can be applied directly into the floorboards or into the tops of the joists to hold the Intello Plus in place. Please note, if Intello Plus is stapled directly to the floorboards and the floorboards are later removed, the membrane will be damaged and need replacing or repair.

Starting in one corner of the room, the first strip of membrane should be installed parallel to the joists as close as possible to the wall without it folding down onto the wall. Press the membrane between the joists so there is approximately 50mm of membrane extending down onto each joist and the membrane goes right into the corners. Then staple it to hold it in place. Lift the edge and apply a continuous 5-8mm bead of Orcon F Flexible Airtight Sealant to the joists approximately 25mm below the floor level and then lightly press the membrane onto the bead to make contact and create an airtight seal. It is important not to flatten the bead completely to ensure long-term elasticity and flexibility. This can be done by pressing either side of the bead rather than directly on it. If not using one long strip of membrane, each strip should overlap the previous strip by at least 100mm. Then seal the overlap with Tescon Vana Airtight Tape.

Once the membrane is sealed to the joists with Orcon F, the other edges (the short edge in contact with the wall) can be sealed to the perimeter wall with Solido SL Airtight tape as detailed in Method 1; our “from above” installation guide. This method helps avoid tricky folds or cuts at all the wall/joist/floor corners.

If there is an OSB or Plywood board under the finished floor, the OSB or Plywood can act as a reliable airtightness layer in conjunction with Aerosana Visconn Fibre airtightness paint and Pro Clima sealing tapes. It may be more practical to apply an Aerosana Visconn Fibre airtightness paint directly to the underside of the OSB/Plywood. Aerosana Visconn Fibre can be used to seal the boards to adjacent joists and adjoining walls to create a continuous airtightness layer. It is important to strictly follow installation guidelines for Aerosana Visconn Fibre. Where gaps of larger than 20mm occur a suitable Pro Clima airtight sealing tape such as Tescon Vana can be used to tape over the large gap or Aerosana Visconn Fleece can be used and then painted over with Aerosana Visconn Fibre (following the Aerosana Visconn Fleece installation guide precisely).

How do I know the airtightness layer has been applied correctly?

Following the installation of the airtightness layer it is important to carry out a visual inspection to ensure any gaps or unsealed areas are sealed as well as possible. Once the insulation is installed it will no longer be possible to access the airtightness layer.

The most effective way to find leakages at this stage is to carry out a positive airtightness test. This induces a positive air pressure in the room above with a high-powered fan (i.e. a blowerdoor) and creates the conditions at which the installer below will more easily locate any leaks which can then be rectified.

Install flexible natural insulation

Thermo Hemp Combi Jute



Thermo Hemp Combi Jute natural flexible insulation

Once the Intello Plus airtight membrane has been installed, Thermo Hemp Combi Jute or Gutex Thermoflex natural, breathable insulation can be friction fitted between the joists. Measure the gap then cut the insulation 20mm larger than needed. The insulation can then be squeezed into place. Note, it can be compressed by upto 10% without affecting the thermal performance.

To help hold the insulation securely before the weathertight membrane is installed, you can use twine or make 50mm wide straps from off-cuts of membrane and staple that between the joists to pin the insulation in place.

Install windtight breather membrane over the insulation

Pro Clima Solitex Plus

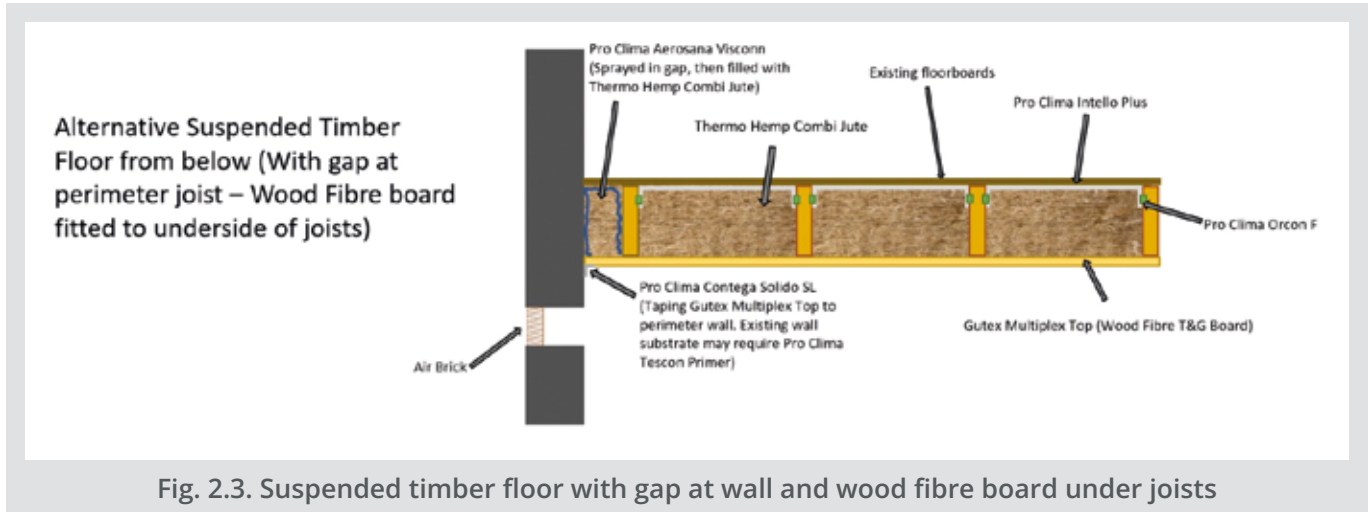
Once the insulation is installed, Solitex Plus windtight breathable membrane should be installed with the blue side facing you perpendicular to the joists (across the joists) and stapled to the underside of the joists using 8mm deep x 10mm wide galvanised staples.

The very first length of membrane should be positioned perpendicular to each joist and right up against the wall with as little gap as possible between the wall and membrane. Where the wall is not perfectly straight, you can cut the membrane around any obstacles and make it follow the contour of the wall. You need to ensure the long edge of membrane does not fold down onto the wall at any point. When finished, you should end up with the start and end of each length of Solitex Plus folding down 300-500mm onto the wall, with the perimeter edges flat and close as possible to the wall (not folding down). As each length of Solitex Plus is laid out, you should overlap the previous one by at least 100mm. Once the entire area is covered with Solitex Plus, the overlaps can be sealed airtight with Tescon Vana airtight tape.

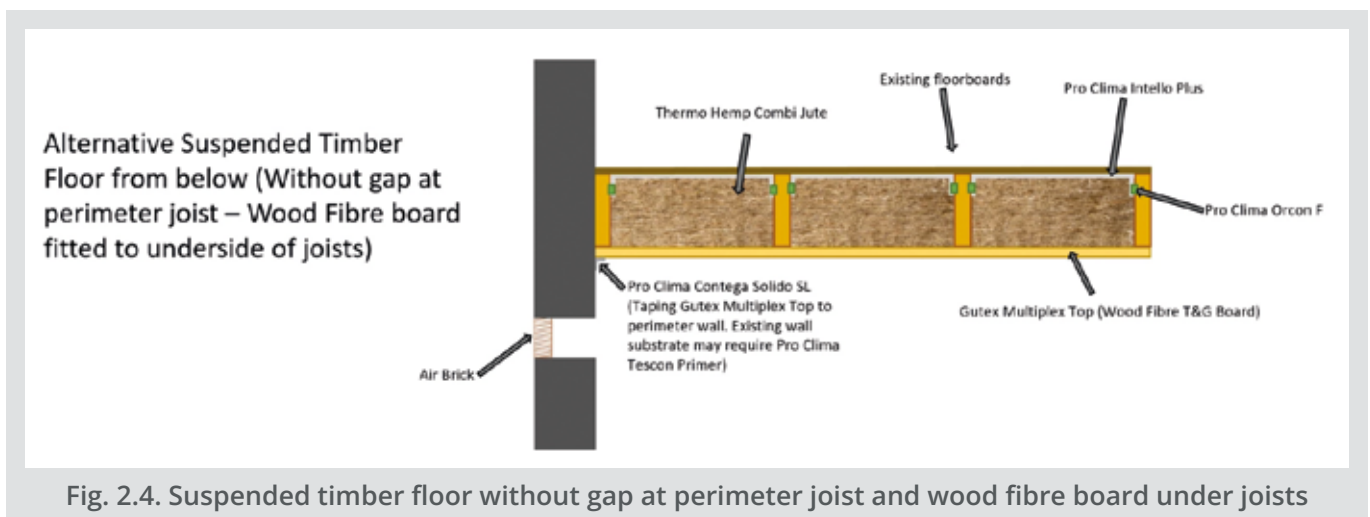
The perimeter can now be sealed. Use Solido SL to tape the membrane to the wall along all edges. For the corners, use the method described in Method 1; the "from above" installation guide.

For secure long-term support of the weight of the insulation, a timber batten (e.g., roofing batten or 2x1) should be fixed to the underside of the joists. This batten may be positioned to follow the direction of the joists, covering over all the staples from end-to-end or perpendicular to the joists.

Going the extra mile: Insulating under each joist



Including insulation between the joists will significantly reduce heat loss, nevertheless, the exposed length of the floor joists is a repeating thermal bridge where significant heat transmission can still occur. When one considers at least 11% of the average suspended floor is represented by the floor joists, insulating these joists will ensure complete thermal continuity over the whole floor area. To offset the impact of this thermal bridge, if space and headroom is available, a suitable insulation may be applied directly to the underside of the floor joists. It is important to bear in mind that this will add additional weight to the floor joists.



In such cases a breathable woodfibre insulation such as Gutex Multitherm or Gutex Multiplex Top may be mechanically fastened to the underside of the floor joist (see Fig. 2.3 and 2.4). These may be held in place with an additional batten or a thermally broken mechanical fixing such as Fischer Termofix 6H-NT.

These Gutex boards are inherently windtight and weatherproof at all tongue and groove joints. Butt joints (e.g. where the board is cut to fit) must be primed with Tescon RP Primer or Tescon Sprimer and taped with Tescon Vana. The perimeter of the Gutex boards can also be sealed using Contega Solido SL to tape the Gutex board to the wall along all edges. For the corners, use the method described here in the “from above” installation guide.

This will not only improve the overall U value of the floor and offset thermal bridges, but it can also act as an effective breathable windtightness layer, negating the need for the Solitex Plus breathable membrane to be applied.



If you have any questions not answered by this installation guide, please contact our technical team:

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