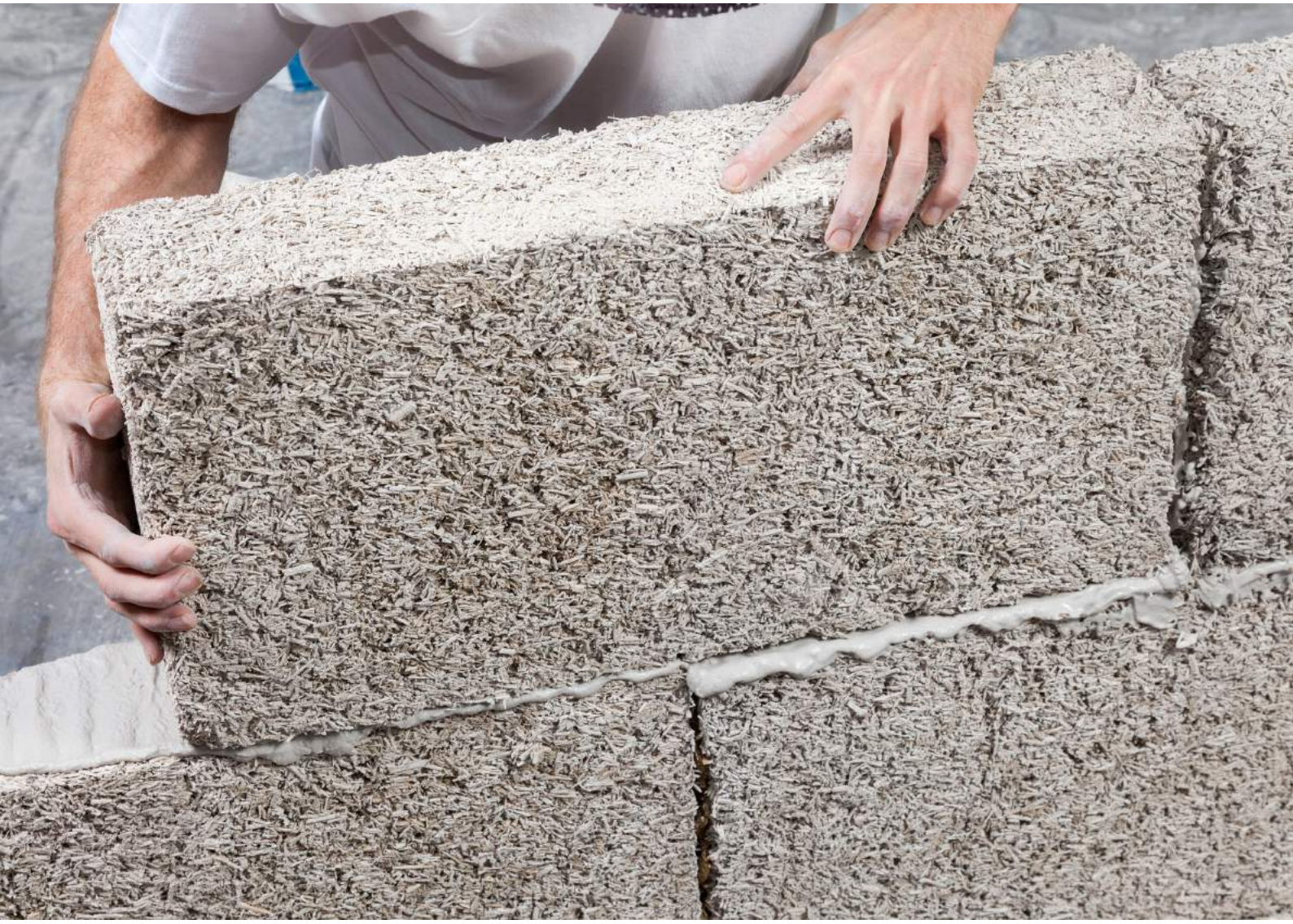
ISOHEMP
NATURAL BUILDING

INSULATING HEMP BLOCK



INSTALLATION INSTRUCTIONS

PRECAUTIONS

These IsoHemp installation instructions summarise the techniques for construction using IsoHemp hemp blocks.

All information is for informational purposes and is intended to guide contractors and designers in their use of IsoHemp products.

These explanations cover a number of the scenarios frequently encountered and must be adapted dependent on the construction site and the intended application.

At your request, IsoHemp technical service can provide you with other details or advice on the implementation and construction of your hemp block projects.

Range of IsoHemp blocks: from 6 to 30 cm thick.

CONTENTS

1. EQUIPMENT REQUIRED

Suitable equipment is essential for correct and rapid construction using IsoHemp hemp blocks:

Trowel

Adhesive comb

Rendering grater

Mallet

Level

Bucket

Mixer

Large tooth saw

Alligator saw

Bandsaw

Slot-drilling machine

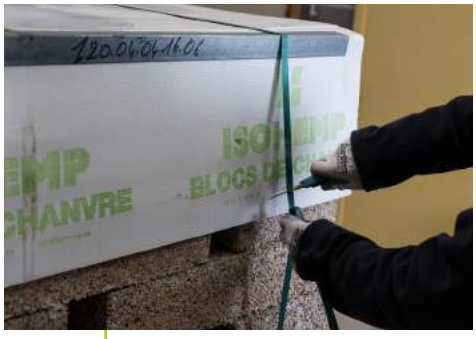
Concrete mixer

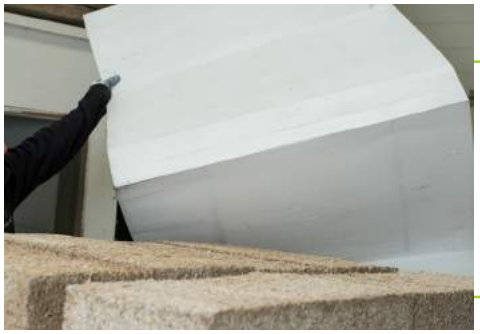
2. PALLETS: OPENING AND PROTECTION

When setting up the site, make sure you site the pallets optimally to reduce traffic time and movement of materials.

1

Open the pallet by cutting the protective strapping.



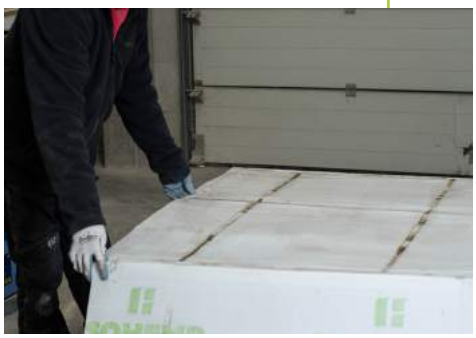


2

Remove the upper cellular protective packaging and keep it carefully for the remainder of your site work.

3

At the end of the day, ensure the protection is replaced over the open pallet to protect the blocks from the rain. This precaution means the blocks remain dry so that dry construction can be achieved.



The cellular protective packaging can also be used to protect the masonry during the night or against adverse weather during construction.

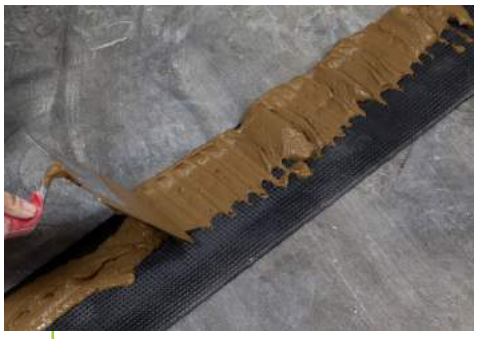
Precautions for storage of IsoHemp hemp blocks: At most 3 months outside or 2 years under cover. They must be protected against the rain but not wrapped in plastic film or a tarpaulin.

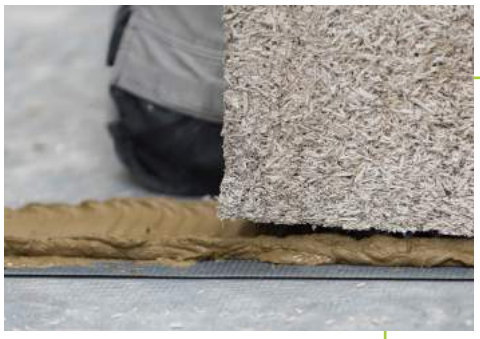
3. LAYING THE FIRST COURSE

Ensure the levelling course substrate is dry, clean and level before starting building with IsoHemp hemp blocks. Define the highest point of the bottom slab that will be the starting point for laying the blocks.

1

In all applications IsoHemp hemp blocks* must be protected to prevent rising damp (moisture rising by capillary action into the blocks). Therefore a damp proof course (DPC) must be fitted to form a barrier against rising damp extending upwards for 2 cm along the length of the block.



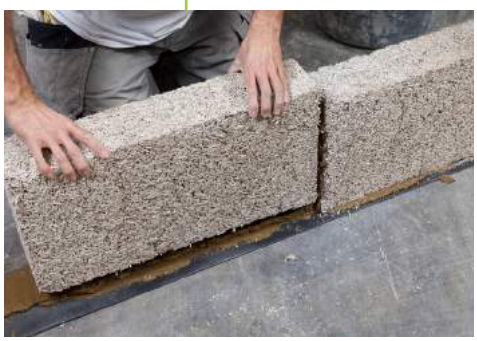


2

Then apply a mortar bed of thickness 1 to 2 cm sufficient to allow the first row of blocks to be laid so that they are perfectly perpendicular and level. The mortar must be evenly spread so that the entire surface of the blocks rests on it.

3

Apply mortar over the whole of the vertical face and position the next block. If necessary use a mallet to achieve a thin vertical joint of approximately 3 mm.



4

It is essential that this first course is perfectly level for the construction of the wall. It is recommended to wait a day before applying the subsequent courses so that the mortar is completely dry.

The first course can also be laid using IsoHemp adhesive mortar* where the foundation slab is perfectly flat and there is no risk of rising damp. With a wooden substrate (partitions), the first course can be laid using suitable adhesive foam.

When IsoHemp hemp blocks are positioned on external masonry, they must always be positioned at least 15 cm above ground level. In this case it is recommended that the first course is positioned on a rot-proof substructure. For more information, see page 14.

* All products followed by a * are available in our product catalogue.

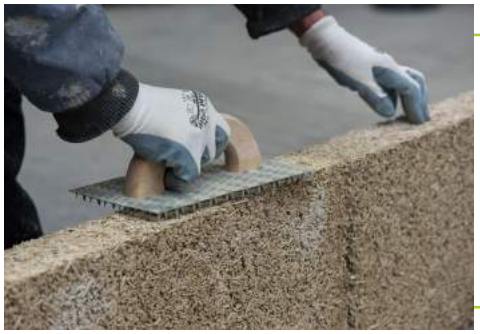
4. LAYING SUBSEQUENT COURSES (a)

1

Subsequent IsoHemp hemp blocks are laid using IsoHemp adhesive mortar*. Only this product is perfectly adapted for building using the blocks.

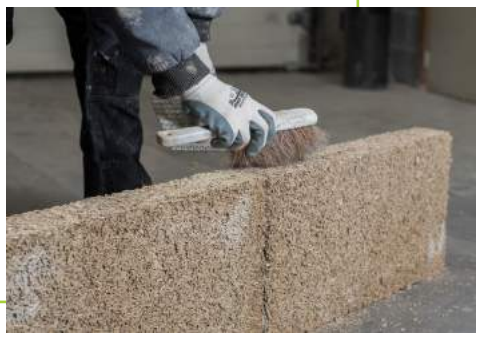
2

Prepare the IsoHemp* adhesive mortar by mixing one bag of 25 kg with 7 to 8 l of water (see packaging). The mix must become fluid and virtually liquid. The adhesive working time is approximately 1 hour.



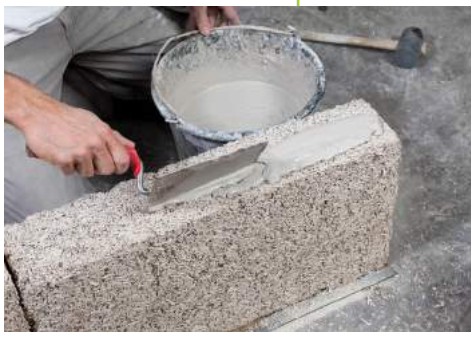
3

Before laying the second course, determine the high points using a straight edge by sliding it from left to right. Sand using a scraper or plane to remove any irregularities.



4

Remove any dust from the substrate using a soft brush. This operation will ensure optimum adhesion between the blocks.



5

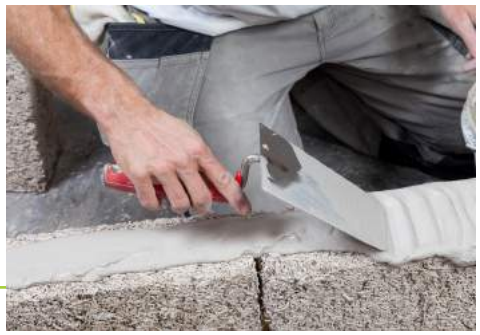
The adhesive is applied using a notched towel/comb or using a conventional brick-laying trowel.

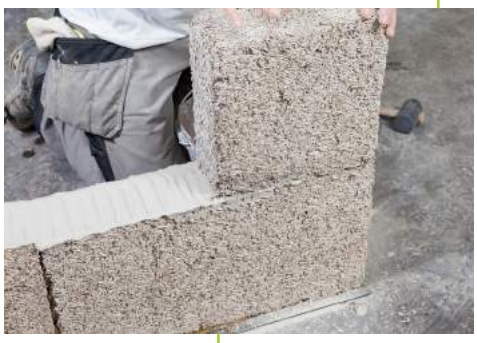
* All products followed by a * are available in our product catalogue.

4. LAYING SUBSEQUENT COURSES (b)

6

Apply the IsoHemp adhesive mortar* over the entire horizontal face of the block to ensure leak tightness of the joint. Form small ripples or streaks to achieve optimum adhesion between the blocks.



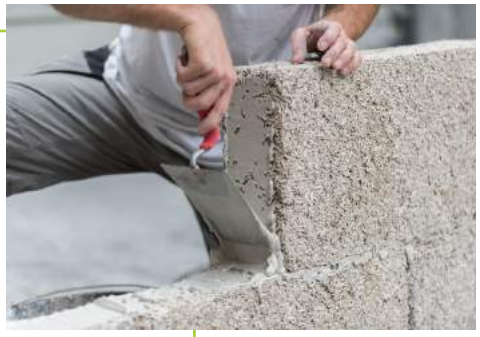


7

The blocks are laid with offset joints and it is essential that a covering of at least one third of the length of the blocks (between 20 and 40 cm for whole blocks) is obtained.

8

Next apply adhesive to the vertical face of the last positioned block and position the next block using a spirit level to ensure vertical and horizontal alignment.



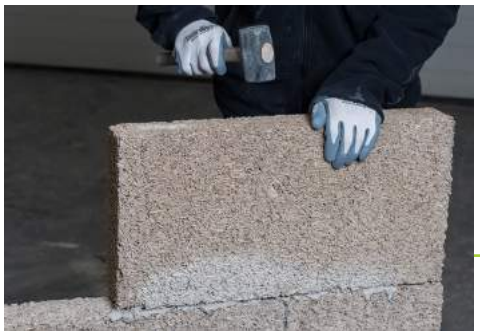
9

Apply the hemp block directly to the adhesive to obtain blockwork with thin joints of approximately 3 mm.

During construction, if the air temperature is high (summer), a more liquid adhesive mix may be necessary or wetting down of the blocks prior to laying may be required to prevent them from absorbing the water present in the mix too quickly.

* All products followed by a * are available in our product catalogue.

4. LAYING SUBSEQUENT COURSES (c)



10

If necessary, adjust with a mallet.

11

During this operation, the adhesive must project slightly from the joints thus indicating correct application. Then remove the surplus with a trowel.

5. LAST COURSE

The hemp blocks of the last course are cut so that only a minimum space (no more than 2 cm) is left between the blocks and ceilings.
Then the space is closed using mortar, flexible insulator or adhesive foam.

6. CUTS AND ADJUSTMENTS

Cutting of the IsoHemp hemp blocks is very easy. To limit losses and waste to the absolute minimum, use broken blocks or blocks with missing corners for making the cuts and necessary adjustments.

1 Alligator saw

IsoHemp hemp blocks can be cut using a power alligator saw. This saw has a fixed guide driving two blades with reciprocating movements.

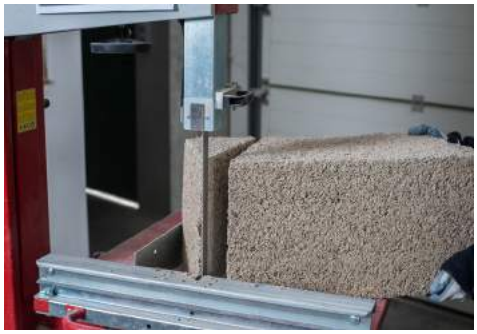
2 Manual saw

For smaller projects, a coarse large tooth cutting manual saw will provide adequate cuts.

3 Bandsaw

For building projects above a certain size, use of a bandsaw is recommended. This tool is ideal for achieving blockwork with thin joints by making cuts that are perfectly straight and square.

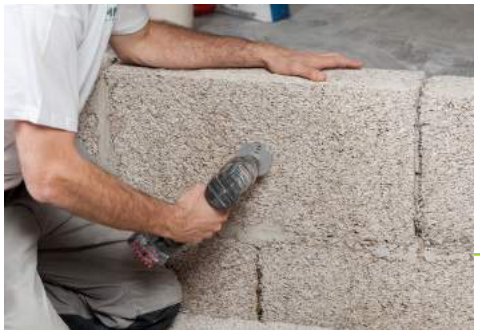
It is also very easy to achieve rounded cuts and angled cuts at angles other than just 90°.



Attention, do not use an electric reciprocating saws, they do no provide very accurate cuts.

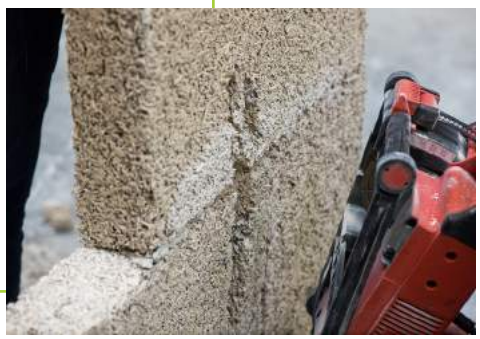
7. CHANNELS AND CONDUIT

To cut channels for electrical or other services, use a slot-drilling machine and an adapted hole saw.



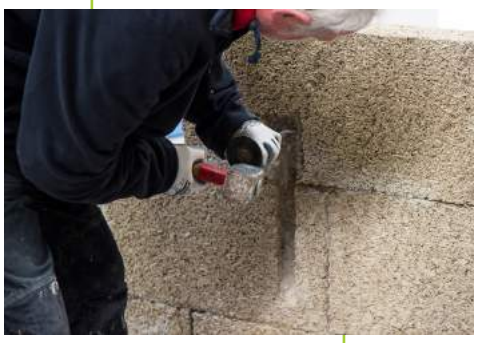
1

Drill the holes for the electrical boxes with the hole saw.



2

Then cut the channels with the slot-drilling machine.



3

Finish the openings manually.

4

Fix the electrical boxes and ducts and fill the channels and openings with a suitable sealing product (gypsum plaster, etc.). Always use a filling plaster that is compatible with the finish.

8. FIXING THE MASONRY (a)

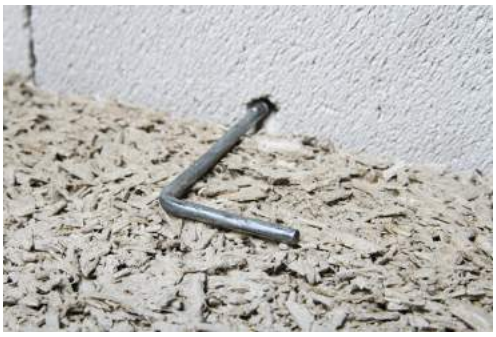
IsoHemp blockwork must always be attached to a supporting structure. Dependent on the application and the masonry environment, several attachment methods are possible:

1 Mechanical fixing

The connection with supporting masonry or an existing wall is made using suitable fasteners. In this way a strong mechanical link is created between the two walls of masonry. There are three possible techniques:

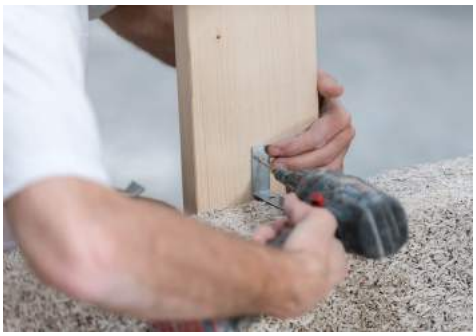
Masonry hook

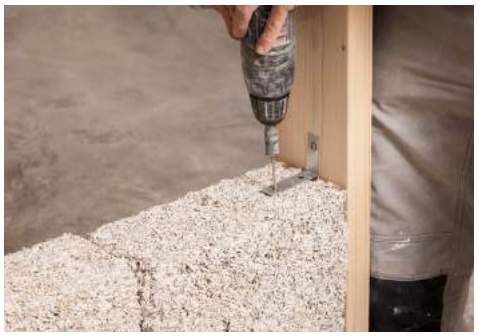
The use of masonry hooks* (to be hammered or screwed in) is to be favoured. These are fixed in the existing wall and positioned at the level of the joints between the hemp blocks such that they are locked in the bed of IsoHemp adhesive mortar*. It is recommended that they are installed during building of the blockwork and that they are forced into the hemp block by tapping lightly from above. In this way they will not be proud when applying the adhesive.
Five fastenings per square meter must be provided. This technique is ideal when there is a blank space between the existing wall and the blockwork wall, notably for the renovation of old buildings that have walls which are not straight. Where walls in poor condition are being lined or where fastening is difficult, we recommend grouting the hook in the joints instead of screwing or hammering it into place (see photo 1).



Connecting angle

Another technique for linking the two walls, particularly recommended for use with wooden structures, is the use of connecting angles* available in two different lengths. The angle is screwed to the wall or wood and fixed to the block by a 6 mm diameter screw of at least 80 mm length.
This connection must be made as soon as possible within the framework of a wood-frame assembly and five fastenings per square metre are necessary when lining a wood frame or an existing wall. This technique is also used when there is a blank space between the existing wall and the blockwork wall, notably for the renovation of old buildings that have walls which are not straight.
These connection angles can also be used for the mounting of doors or window frames in the IsoHemp blockwork.



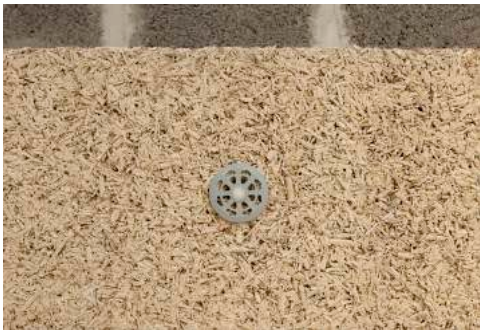


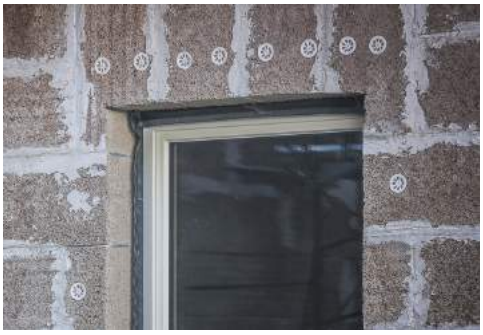
* All products followed by a * are available in our product catalogue.

8. FIXING THE MASONRY (b)

Insulation rose

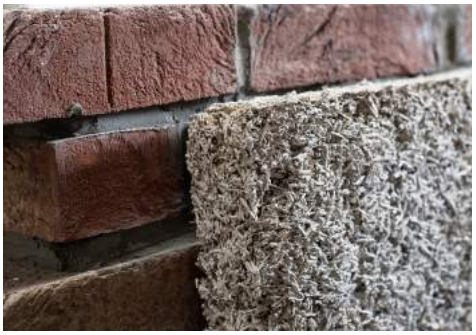
The insulation rose* can only be used when using hemp blocks against an existing structure without a gap between the two masonry walls. This technique is to be favoured when building with blocks in more sensitive areas, such as above a window opening or a door or when it is difficult to use hooks or connecting angles. In these locations two fastenings per block are then recommended. In other cases five fastenings per square meter must be provided.

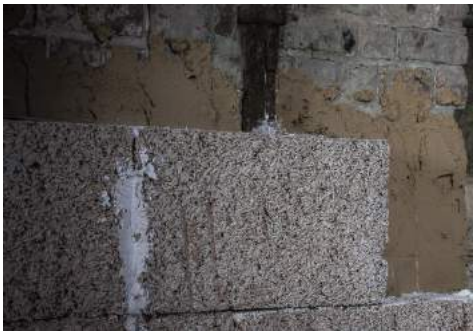




2 Bonding

This technique is only to be used for the application of 6 cm IsoHemp hemp blocks*. The bonding of blocks must only be used against an existing level wall. The use of a special adhesive mortar matched to the substrate to which the blocks will be glued is recommended, with the mortar applied according to the manufacturer's instructions. Do not attach to wood by gluing. The same precautions as described above for mechanical fastening apply.





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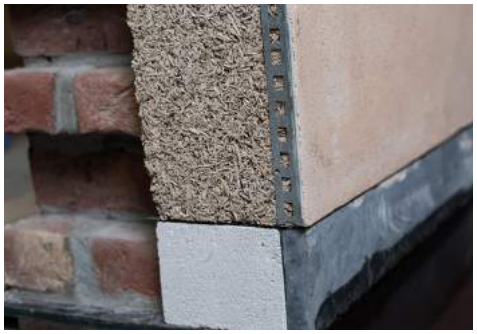
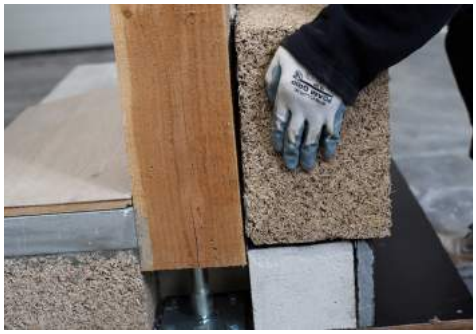
9. FEET OF EXTERNAL WALLS

Hemp blockwork must always start at a minimum of 15 cm above the level of the ground. There are two possible solutions:

1 On a rot-proof substrate

When using IsoHemp hemp blocks* in exterior masonry, the blocks must be protected against rising damp. In this case, the masonry will be implemented on an insulating, rot-proof, resistant block. It is to start at least 15 cm above the level of the outside ground. A DPC is to be positioned and the blockwork can be constructed.

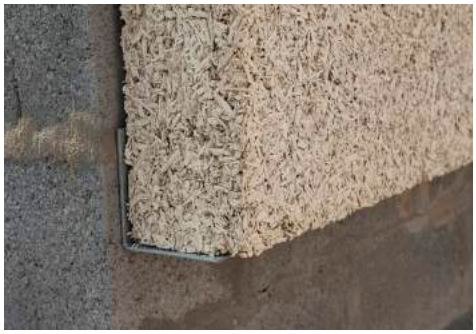




2 On an angle bar

Substructure angle bars* are to be used when it is not possible to position the IsoHemp hemp block* masonry on a rot-proof insulating block or where adequate foundations are not available. This situation may occur when insulating the outside of an existing wall. Before proceeding with this implementation, the adequate resistance of the load bearing wall must be checked.

The substructure angle bars* are securely fixed in the existing wall at least 15 cm from the level of the exterior ground. Each block is then mechanically fixed in the holes provided for this purpose in the horizontal part of the angle bar using a 6 mm diameter screw of at least 80 mm length. The correct alignment of the first course is then ensured and each block is mechanically fixed to the existing wall using a hook* or a connecting angle* (see point 7).



* All products followed by a * are available in our product catalogue.

10. LINTELS (a)

IsoHemp offers two solutions to support the masonry at the openings:

1 IsoHemp lintels

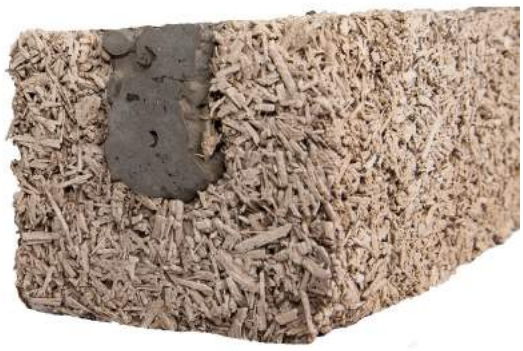
A large range of IsoHemp lintels* is available for openings of up to 2.4 metres. These lintels are prefabricated by pouring reinforced concrete inside hemp blocks which have been machined in advance and have the same characteristics as the masonry blocks. Their use prevents the formation of thermal bridges and ensures an overall continuous insulating envelope is obtained while also simplifying application of the finishing render. They are bonded using IsoHemp adhesive mortar* in the same way as the blocks. Before installing these lintels, ensure that the masonry support is sufficiently strong.

Table of references

References	Max. opening (cm)	Dimensions (cm)			Max. weight (kg)	Max. linear load (N/m)
		L Length	t Thickness	h Height		
Thickness 9 cm						
Lin09-120	80	120	9	15	24	2,900
Lin09-160	120	160	9	15	31	2,200
Lin09-200	160	200	9	15	39	1,800
Lin09-240	180	240	9	15	47	1,500
Thickness 12 cm						
Lin12-120	80	120	12	15	25	3,900
Lin12-160	120	160	12	15	32	2,900
Lin12-200	160	200	12	15	40	2,400
Lin12-240	180	240	12	15	48	2000
Thickness 15 cm						
Lin15-120	80	120	15	15	36	4,900
Lin15-160	120	160	15	15	47	3,700
Lin15-200	160	200	15	15	59	2,900
Lin15-240	180	240	15	15	70	3,700
Lin15-280	220	280	15	15	81	3.200
Lin15-300	240	300	15	15	87	2,900
Thickness 20 cm						
Lin20-120	80	120	20	15	41	6,500
Lin20-160	120	160	20	15	53	4,900
Lin20-200	160	200	20	15	66	3,900
Lin20-240	180	240	20	15	79	4,900
Lin20-280	220	280	20	15	91	4,200
Lin20-300	240	300	20	15	98	3,800
Thickness 30 cm						
Lin30-120	80	120	30	20	73	9,800
Lin30-160	120	160	30	20	98	7,400
Lin30-200	160	200	30	20	121	5,900
Lin30-240	180	240	30	20	146	7,400
Lin30-280	220	280	30	20	170	6,300
Lin30-300	240	300	30	20	182	5,900

IsoHemp SA declines any responsibility in the event of incorrect interpretation of this table. In case of doubt, contact IsoHemp technical service directly.

10. LINTELS (b)



Several elements must be respected:

- The minimum support length of IsoHemp lintels* is 20 cm on each side of the masonry.
- The load may not exceed the allowable load (see the table of references on page 15).
- The concrete must always be aligned towards the top so that it is covered by the masonry of blocks that it supports.

How to choose the required lintel?

Depending on the desired thickness and the opening to be crossed, you will find the appropriate lintel in the table of references (see page 15). It is essential that there is always a support length of at least 20 cm on each side of the opening for openings up to 2 m. For openings of more than 2 m, a support length of 30 cm must be provided on each side.

The lintel choice is therefore made as follows: range to be crossed + (2 x 20 cm or 30 cm) = minimum length of the lintel.

Attention, certain precautions must be taken when transporting and positioning IsoHemp lintels. The lintels must always be stored and transported with the concrete face towards the top. Likewise they must always be supported on wedges at the two ends and must only be handled, manually or mechanically, by these same ends. Under no circumstances must the lintels be lifted at the middle.

2 Angle for opening penetration

The use of angles* is recommended to maintain the hemp blocks in place above door and window openings when the use of an IsoHemp lintel is not planned. This solution is to be favoured for interior renovation, mainly when the height to insulate above the bay is not great and there are only a few more courses of blocks to lay.

The angles are positioned every 60 cm at the junction between two hemp blocks as shown in the photo above. It is essential that the angle is matched to the thickness of the hemp block and to use screws of at least 6 mm diameter for fastening the angle to the substrate. After positioning the block on the angle, they must be mechanically connected (with a screw of 6 mm diameter) at the horizontal part of the screw. To ensure better quality of finishing, the block can be cropped over several millimetres at the level of the angle so that the latter does not project.

* All products followed by a * are available in our product catalogue.

11. INSTALLATION AS GROUND INSULATION

Use of the hemp blocks as ground insulation provides long lasting durable and high performance insulation. The high compressive strength of 15t/m² is ideal for many types of project.

1

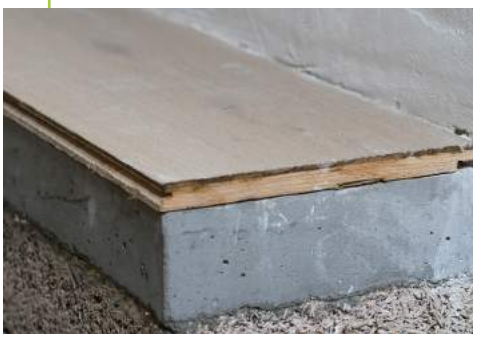
The block can be placed on various substrates: stabilised or concrete slab. Check that the foundation is fully leak-tight before installing the hemp blocks.

2

Installation is easy, simply place the blocks one against the other without bonding or mechanical fastening. The small differences in level of a few millimetres are negligible.

3

Then it is necessary to cover it using a reinforced compression covering of at least 6 cm. This will evenly distribute future loads and achieve a perfectly level surface.



4

This level surface is suitable for all possible finishes.

12. INSTALLATION OF DOORS AND FRAMES

Doors, frames and thresholds can be attached directly to the hemp block masonry.

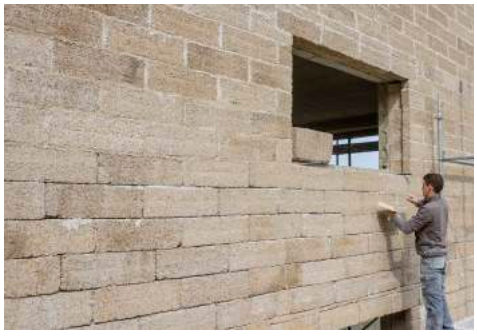
If necessary, it is possible to work with a metallic wedge which will be cut to measure on site. The frames are screwed and/or glued to the blockwork. The window will can likewise be directly positioned on the blockwork. To prevent water running down the wall, the window sills must always project at least 5 cm from the facade and must include a raised bead on both sides.

13. POINTING AND FILLING

In some cases, it will be necessary to point the masonry joints after construction with the hemp blocks.

In this case prepare a thicker IsoHemp adhesive mortar* mix by slightly reducing the amount of water in the mix. Another solution is to prepare a mix of pre-formulated ProKalk* lime and IsoHemp* hemp. In this way an aesthetic finish to the masonry is obtained.

Attention, the necessity for pointing the wall must be checked with the specification and implementation of the facing or final rendering, notably to avoid the appearance of 'ghost' joints in the final finish.



* All products followed by a * are available in our product catalogue.

14. FINISHES (a)

Numerous finishes can be used on the IsoHemp blockwork.

1 Exterior

Mineral renders

Mineral renders are favoured for the exterior finish. Implementation is generally by means of two coats: a first render coat to even out irregularities and a top through-coloured render coat of several millimetres. This total thickness must be between 15 and 25mm. Before rendering, the surfaces must be wetted down (preferably the day before) and this operation repeated during hot and dry weather. Where possible, it is recommended that pointing is not carried out in order to avoid 'ghost' joints.

A number of manufacturers offer mineral renders suitable for IsoHemp blockwork. The technical data sheets and application instructions are available from IsoHemp technical service upon request.

Cladding (Wood, panels, ...)

Cladding can be attached to IsoHemp blockwork. It can be directly attached to the hemp blockwork without attachment to the load bearing structure. This does not create any thermal bridging. In all cases the blocks must be protected against the weather. Therefore a rain barrier or an exterior render must be applied.

Bricks or briquettes

A brick wall may be used as an external finish. In this case, a ventilated cavity of at least 4cm must be maintained between the IsoHemp blockwork and brickwork according to the manufacturer's instructions. In this case the hemp blockwork can be pointed.
Likewise briquettes can be glued directly onto the IsoHemp blockwork according to the manufacturer's instructions.

14. FINISHES (b)

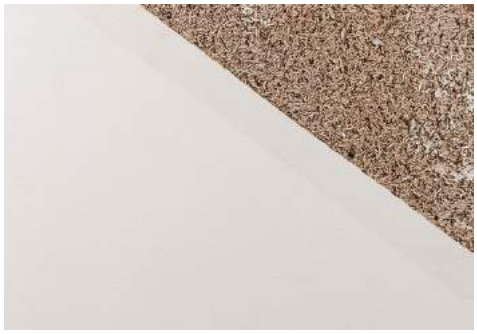
Natural or local stone

Masonry from natural or local stone can also be used as an exterior stone facing. In certain cases a ventilated cavity will be implemented, to be specified in conjunction with IsoHemp technical service. The stone facing must be mechanically fixed to the hemp blockwork (example photo below).

2 Interior

Gypsum PCS plaster or other plasters

IsoHemp* gypsum PCS plaster is a mixture of gypsum, lime and sand ideal for plastering your interior walls in renovation projects and for new builds. It combines the advantages of the ease of application of gypsum plaster with the permeability to water vapour resulting from the use of lime. The result is a smooth and modern finish that is ready for painting. Other plaster types can also be used.



Lime plasters

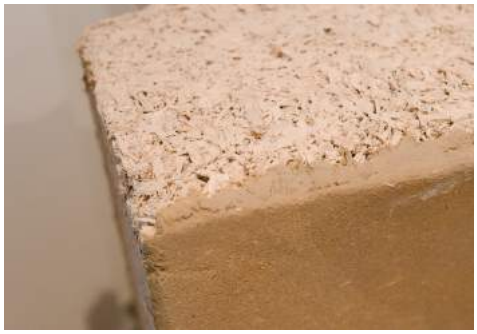
Lime plasters are ideal for IsoHemp blockwork. They provide a breathable wall that permits the passage of water vapour with different types of possible renders. Applied in one or two coats according to the manufacturer's instructions.

* All products followed by a * are available in our product catalogue.

14. FINISHES (c)

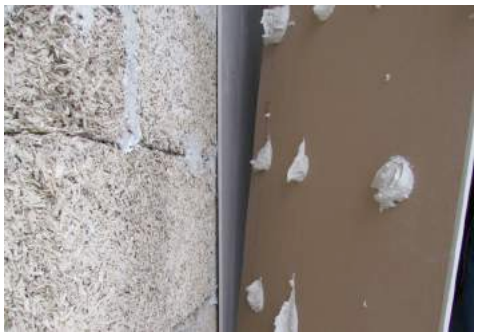
Clay plasters

Clay plasters are fully compatible with IsoHemp blockwork. These products deliver a high level of comfort in your dwelling thanks to their inherent thermal, humidity and acoustic regulation. Applied in one or two coats according to the manufacturer's instructions.



Other possibilities: Tiles, wood cladding, plasterboard, etc.

It is also possible to apply other types of finishes to the IsoHemp blockwork such as tiling in rooms exposes to water, mechanically fastened wood cladding or indeed plasterboard bonded directly to the blocks.



15. ATTACHMENT OF OBJECTS

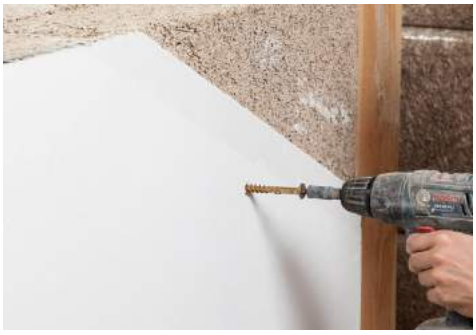
Hemp blockwork is an ideal substrate for the attachment of all types of objects. There are a large number of suitable fastenings available on the market. IsoHemp also offers a number of fastenings within its product range, its technical service can advise you in case of doubt about an application.

1 Screw: 15 kg or 25 kg per fastening

To attach light loads, we recommend use of wood screws screwed directly into the wall:

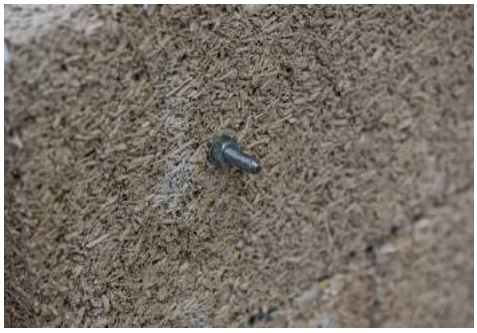
- Support of maximum loads of up to 15 kg per attachment point by use of screws of size 8x80 mm or longer.
- Support of maximum loads of up to 25 kg per attachment point by use of screws of size 10x80 mm* or longer.

The anchoring depth must always be 80 mm or more. To make the screw head as concealed as possible, countersink the part that will accommodate the screw in advance. N.B. the use of plastic rawlplugs is not necessary. All that is required is drilling of a pilot hole in the plaster using a thin bit to prevent cracks forming in the plaster.



2 Grouting: 50 kg per fastening

For heavy loads, such as the attachment of radiators, kitchen cabinets, etc., the use of stronger fastenings is necessary. The use of commercially available grouting products for the fastenings to be fabricated is recommended.
The anchoring depth must always be 80 mm or more to achieve a fastening load of 50 kg.



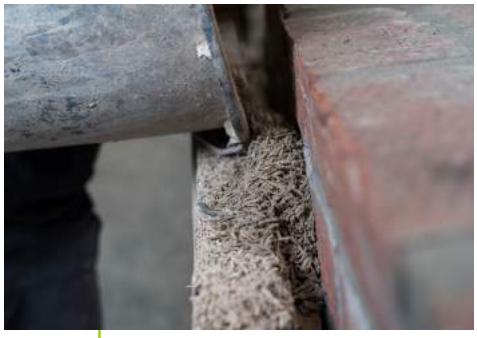
3 Anchor for 6 cm block: 15 kg per fastening

Where hemp blocks of 6 cm thickness are used, the use of self-supporting plastic anchors of no more than 50 mm length is recommended. In this case, a pilot hole of smaller size must be made before inserting the anchor. You can then use a screw suitable for the fixing the desired object to the wall.

* All products followed by a * are available in our product catalogue.

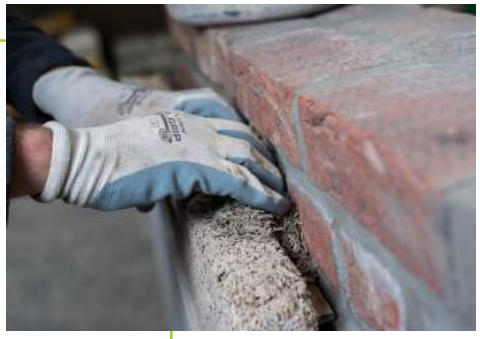
16. FILLING FOR LINING OF EXISTING WALLS

During interior or exterior renovation of old buildings, IsoHemp blockwork is sometimes constructed against a wall that is out of plumb. In this case voids can then appear between the two walls. It is then necessary to fill this void with a suitable mix.



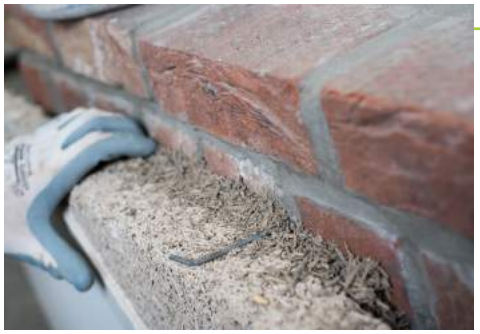
1

Use of a light mix of IsoHemp hemp* and Prokalk lime* according to the proportions indicated on the technical sheet of each product is recommended. To do this, mix the two products with water in a mixer of adequate size.



2

Manually fill the gaps as soon as possible.



3

This technique can be used to fill all the voids between the existing wall and the blockwork wall. This prevents future moisture problems at the interfaces of the different materials.

In certain cases, the IsoHemp blockwork is placed 5 or even 10 cm from the existing wall.
This operation makes it easier to fill the light mix into the cavity thus created.
The light hemp concrete marries perfectly to the shape of the existing wall.

* All products followed by a * are available in our product catalogue.

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