

## HEMP MORTARS using St. Astier Natural Hydraulic Limes and Products

Hemp is a natural material suitable for making light weight insulating mortars. Its density vary between 110 and 150 kg. per m<sup>3</sup>. The strands are between 5 and 25mm long. The thermal conductivity of hemp in bulk is 0.05 W/m.K.

Particular attention has to be paid in making sure that hemp is not subject to dampness either due to stocking conditions of the raw material or capillary action in hemp mortars (adequate damp courses if constructing walls or insulating/draining ballast base in concrete should be in place).

The qualities of St. Astier natural hydraulic limes are ideal for making hemp mortars. A special binder, Batichanvre ®, has been prepared for making Hemp mortars.

In comparison with other products using hydrated lime with the addition of hydraulic binders (cement)/pozzolans, Batichanvre ® contains 25% less additions due to the use of St. Astier NHL.

Mixing in paddle mixers	Mixing in drum mixers
Introduce the hemp and the sand. Whilst turning, spray with water mist until the hemp dampens (colour change). Introduce the Batichanvre ® and continue to spray until an homogeneous mix is obtained. Total mixing time is about 5 to 10 minutes.	Introduce about 35 litres of water and the Batichanvre ®. Mix for 3 to 5 minutes to obtain a milky paste with no lumps. Add the loose hemp and mix for about 5 minutes to obtain the required mix adding the rest of the water. The completed mix should be rather dry and lean. Total mixing time is about 8-10 minutes

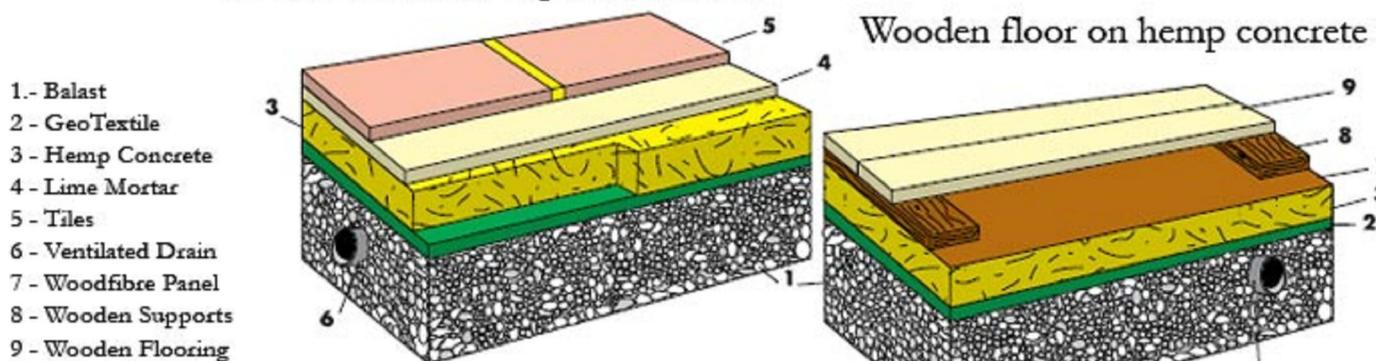


## INSULATING HEMP/LIME CONCRETE

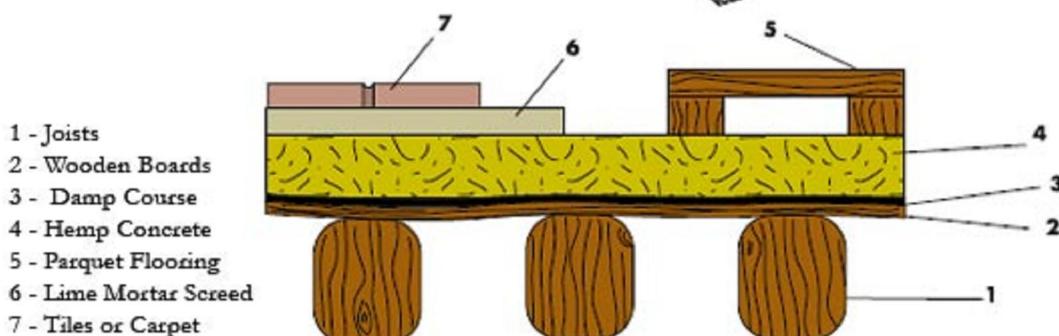
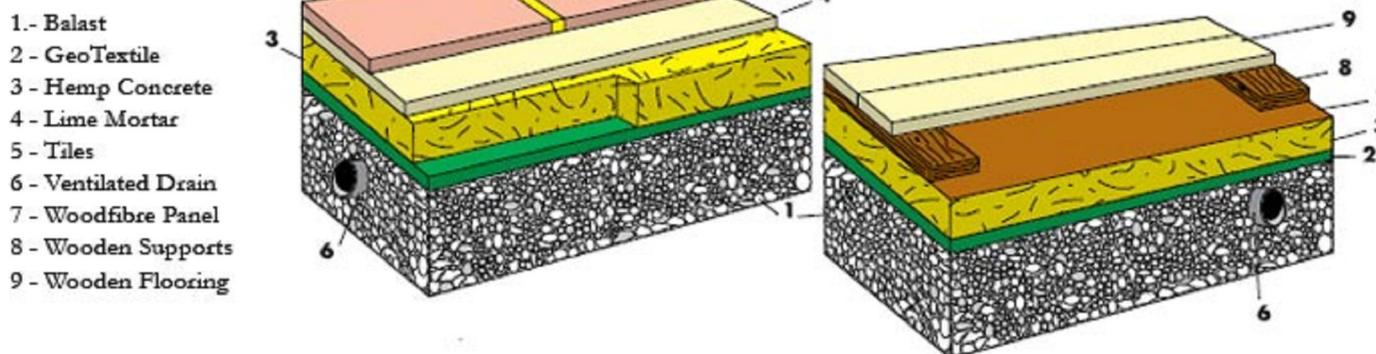
**Dosage: 1 bag of Batichanvre ® ( 25kg) + 100 litres of hemp + (optional) 5 litres of coarse sharp sand (5mm down)**

**Water addition : 35 to 40 litres**

Terracotta tiles on hemp concrete floor



Wooden floor on hemp concrete



Hemp floors on wooden boards

### Application

Directly on soil: on a well levelled and compacted soil, if necessary stabilised , construct a 15-20cm. ballast base. Soil can be stabilised by rotovating 200kg. of NHL 5 to 1m<sup>3</sup> of damp soil. Extra water can be added in dry soil. Do not saturate to avoid a longer drying time.

Do not use any plastic sheeting.

On wood: provide a 2 cm. layer of hemp directly on the surface without plastic sheeting.

Apply the hemp concrete in layers of 5 cm. maximum and level with a rake. Compact by tamping. The final layer will be levelled with a straight edge, compacted and floated with a wooden float.

The minimum thickness of the hemp/lime insulating concrete is 10 cm. At this thickness the thermal conductivity of the concrete will be between 0.09 to 0.10 W/m.K depending on the compaction. The compressive strength at 90days will be about 1.8 N/mm<sup>2</sup>.

The yield is 900 to 950 litres of mortar per m<sup>3</sup> of hemp + 10 bags of Batichanvre ®, depending on compaction.

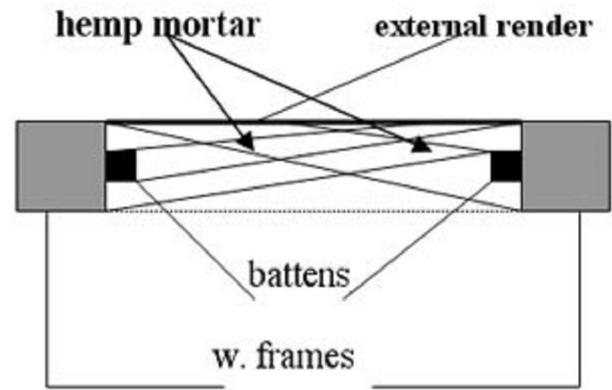
Tiles, wooden floors or carpeting can be laid on a further 4cm. lime concrete screed suitably finished after the total drying of the work (up to 90 days depending on thickness and climatic conditions). Keep area well ventilated and avoid forced drying.

## Walls construction

**Mortar dosage, mixing and Water addition:** same as Hemp/Lime concrete

### Timber framed walls

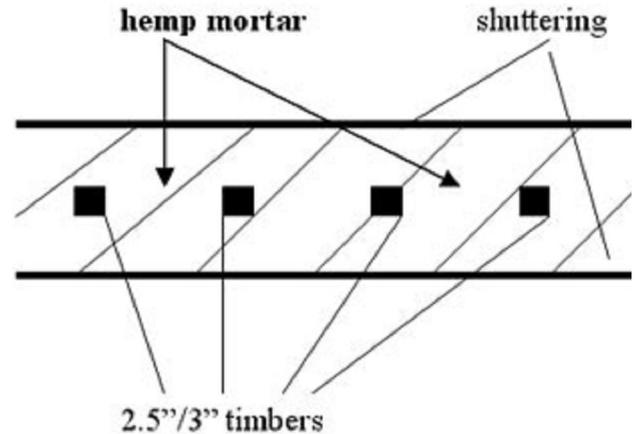
Fix 2 x 2 wooden battens at the middle of each frame  
Should the hemp mortar be finished with a render/plaster, shuttering between frames must leave place to final render/plaster (15-20mm).  
Place the mortar in layers of 5-10cm. and compact before next layer.



## Shuttered Walls

Construct shuttering to allow for the required thickness of the final render/plaster. Timbers should be totally covered by the mortar with a thickness of minimum 7 cm. depending on the size of the timbers used (see table below). Place the mortar in layers of 10 to 15cm. and compact before next layer. Pipes, plugs etc. should be positioned previously or as the work goes on.

Timbers thickness	4 cm	6 cm	8 cm	10 cm	12 cm
Minimum hemp mortar cover	7 cm	8 cm	9 cm	10 cm	12 cm



Shuttering max. 1 m. high.

Once completed the first level, fix the second level panels and apply a second layer of mortar, about 25cm. and compact.

Only then the lower panel can be removed.

Remove with a lateral sliding movement.

The first level mortar has to remain enclosed for min. 30 minutes. Apply same method to the remaining levels.

If a plaster or render is going to be applied, movement joints should be used every 9m<sup>2</sup>.

## LOFT INSULATION MORTAR

This lightweight mortar does not have high mechanical performance.

**Mixing:** in paddle or drum mixers (same procedure as described in the Hemp/Lime concrete section),

**Dosage:** 1 bag of Batichanvre ®) + 200 liters of Hemp + 35 to 40 liters of water.

**Consumption:** 1m<sup>3</sup> of insulating mortar requires 1.05 m<sup>3</sup> of Hemp and 200 litres of Batichanvre ®.

**Thermal conductivity** of this mortar is: 0.06 to 0.07W/m.K.

**Mortar density:** 150 to 200 kg/m<sup>3</sup>

**Application:** loosely apply about 2 cm. of dry hemp between the floor timbers. Place the mortar above this layer at a thickness of min. 15 cm./max. 25 cm. Make sure that the hemp mortar level is about 1 - 2 cm. over the final required level to allow for compaction. Lightly compact the mortar to bring it to the required level. If a floor is required, make sure that there is a space of about 2 cm between the top level of the insulating mortar and the floor boards.



### Hemp Renders

**Mortar 2 bags of BATICHANVRE ® (or TRADECO ®) + 100 litres of Hemp Water addition: 50 - 55 litres**

**On solid background** properly prepared apply a **stipple coat** as follows: 1 volume of NHL 5 to 2 volumes of coarse sharp sand. Let it dry for 2 - 3 days (more in damp or cold conditions).

The Hemp mortar is applied at a total thickness of minimum 4 cm, in max. 2cm coats (30 - 90 minutes interval). The last coat, if a finishing mortar is not required, is applied 3 - 4 days from completion of the previous coat.

Application of finishing mortar has to be on a dry hemp mortar. Wait 90 days or more depending of the weather conditions (the hemp render must be protected from rain, frost, direct strong sun or wind).

In **external work**, use St. Astier ready mixed Ecomortar™ WP as a finishing mortar. Available in a range of colours, this mortar has very low capillarity, ensuring that the hemp mortar is adequately protected. Ecomortar WP has a maximum granulometry of 1.3mm and is applied at a maximum thickness of 8mm. For straight work it is suggested to apply 10mm and scratch it back to 8mm before floating it with a sponge float. Highly compacted metal float finishes are NOT recommended. The waterproofer in Ecomortar WP will not have a negative effect on the mortar breathability as it is not film forming.

If site mixed mortar or coarser finishes are required, manually or spray applied, use well graded coarser sands with St. Astier NHL 2 or Tradeco ® at 1: 2.5 binder:sand ratio.

**Hemp renders should be kept clear from the soil (15cm minimum) to avoid moisture penetration by capillary action.**

Protect external work from adverse weather conditions.

Maximum areas allowed: 3m<sup>2</sup> for wooden frames and 9m<sup>2</sup> for walls

In external work, if lime paints are used, mix Uniprotect on the final paint coat.



## INTERNAL RENDER/PLASTER

On a properly prepared background apply a stipple coat as follows:

1 volume of NHL 5 to 2 volumes of coarse sharp sand.

The hemp/lime mortar can be applied wet on wet (after 12 hours or so) by laying on or casting on.

The hemp/lime mortar dosage for a natural finish is:

2 bags of NHL 2 (or Tradeco ®) + 100 litres of hemp + 60 litres of water.

Consumption: 25kg of NHL2 (or TRADECO ®)+ 50 litres of Hemp for 1 m<sup>2</sup> of render at 5cm thickness.

The thickness of the render averages 5cm (up to 8cm.). It is applied in layers of 2-3 cm. at about 20 to 90 minutes interval between each pass. The last coat (2 cm.) to be applied 24 - 48 hours after the previous coat. This coat will be floated to achieve the required finish.

If a decorated finish is required use Batichanvre ® instead of NHL 2 and proceed as above. The decorative finish (lime wash, Ecomortar, stucco etc) can be applied after a drying period of 45-90 days. The thermal conductivity of the above renders/plasters will be between 0.13 to 0.14 W/m.K. The density of this mortars will be between 0.75 and 0.95 kg. per litre, depending on the compaction. In all cases the surfaces should not exceed 15m<sup>2</sup> without movement joints. Walls should have a damp course to avoid moisture transfer by capillary action.

### Data Sheets and further Information:

[Tradeco Data Sheet](#)

[Ecomortar WP](#)

[Batichanvre Data Sheet](#)

[NHL 5 Data Sheet](#)

[Lime paints Data Sheet](#)

[NHL 2 Data Sheet](#)

[Uniprotect Data Sheet](#)

**The information supplied in this document is for general guidance only.**

**It is recommended that test panels are constructed in all cases**

**For further Guidance, contact your St Astier Distributor or [St Astier Technical Enquiries](#).**

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