



the benefits and limitations of

hemp lime plaster

An Introduction to Hemp



Hemp has been used for millennia in a wide range of applications, from sacks and rope through to paper and oil. It is thought that Hemp for food and fibre began at least 12,000 years ago. From 10,000 BC to 1883 AD Hemp was the largest agricultural crop in the world.

Hemp is now grown extensively again in Europe and North America and can be found more locally in East Yorkshire in Britain. Hemp is usually planted in April and harvested at the end of August. Hemp is a fast growing plant, reaching a height of 3-4 metres at Harvest with no need for pesticides or herbicides after planting.

Whilst buildings account for 50% of all carbon dioxide emissions to build, run and maintain, using hemp within a new build or renovation can help offset

these emissions. The hemp plant absorbs carbon dioxide whilst it grows and locks carbon in its woody structure as it develops. Its use in building therefore helps to create more carbon neutral sustainable development using a renewable resource.



Hemp and its use in plaster/render

Once harvested, cut hemp is sometimes allowed to dry initially in the field, before the shiv (the woody central core) is separated from the outer fibres. The shiv or hemp hurd is in plentiful supply in this plant with 77% of its content being cellulose (wood produces 60% cellulose) This Shiv is then shredded into chips/strands ready for mixing in plaster.

The best hemp plaster is produced using quick lime and hemp shiv with addition of pozzolanic material to ensure it cures within the deeper depths of the plaster. Some hemp plasters rely on crushed glass to achieve this initial set or are mixed with a small amount of strong Vicat hydraulic lime admix just before use. The latter proving more effective.

Sand and crushed glass should be limited within any mix to avoid the plaster being too dense and therefore less effective at preventing heat loss.

Hemp Lime Plaster

Most hemp/lime plasters are supplied as pre-mixed wet mortars, with much hemp straw being sourced from this country. They are very effective in improving the air tightness and insulation value of a traditional solid wall construction, without compromising or isolating the thermal mass properties of the wall, which can occur with modern polyurethane insulation materials. These modern materials and vapour barriers often risk the build up of condensation and rot in old buildings.

The principal long term set of the insulating hemp lime plaster occurs as the Calcium Hydroxide in the mix absorbs carbon dioxide out of the air or from thin layers of water surrounding it to carbonate to calcium carbonate. The initial hydraulic set results from the formation of calcium silicates or aluminate crystals.

The thermal conductivity of the hemp lime is 0.07-0.09 W/mK. This offers lower insulation values than polystyrene or polyurethane insulation but has hemp and lime plaster appears to be more effective at storing and regulating heat loss than initial thermal conductivity suggests. (Please see monitoring results from buildings constructed in Haverhill, Suffolk and monitoring by the BRE). The hemp lime plasters work well with old walls allowing them to buffer internal moisture fluctuations and to continue to breathe moisture vapour through them.



This is a caption for the photograph above

Using Hemp Lime Plaster

Hemp lime plaster can be used on all solid walls but has greatest thermal benefit on the inside face of external walls where it should be applied between 35 and 50mm thick. On other walls it only needs to be applied to sufficient depth to straighten the walls or can be substituted with traditional haired lime plaster.

It is better to use Hemp Lime plaster in the warmer months or in buildings where constant background heat can be provided to allow it to cure and dry in an acceptable period of time.

It is important that before works start the wall is free from salts and other contaminants and that there is sufficient key or suction provided by the wall substrate. In many instances applying a stipple coat of hydraulic lime and sharp sand can control the suction and improve the key before the hemp lime plaster is applied.

The Hemp Lime Plaster is best applied in 20mm layers leaving a few days between undercoats. The insulated hemp lime plaster undercoats are finished with a traditional Fine Stuff lime plaster finish coat. For aesthetic affect and additional reinforcement this can also have fine hemp fibres mixed in with it. The fine stuff should only be applied after the undercoats are fully dry. The surface must then be dampened down before the finish coat is applied.

Hemp plaster is very alkaline (pH 12) in a wet state that prevents decay and mould growth but care must be taken to avoid burning the skin or eyes.



This is a caption for the photograph above

Decorating Insulating Hemp Lime Plaster

It is important that all finishes remain vapour permeable. If they do not, trapped moisture might eventually build up to affect the thermal performance and, if untreated, will potentially degrade the hemp shiv.

A number of decorative finishes are affective at retaining the breathability. These include lime wash (but not casein or oil bound distemper), water glass mineral paints and natural emulsions. The best paint to use has to take account of the use of the room and the amount of dampness that the wall permits to pass through it.



This is a caption for the photograph above

Further Advice

Further advice and support is available from...

Womersley's Ltd
Walkley Lane, Heckmondwike,
West Yorkshire, WF16 0PG

