



An introduction to Limecrete

Whilst the current use of insulating lightweight limecrete ground floors has no direct historical precedent, there are early examples of surviving light weight limecrete from the Roman period, most notably the lime/tufa based infill within the walls of the Pantheon in Rome.

More recently at first or second floor levels fireproof lightweight lime ash floors can be found from the 17th centuries onwards throughout England and lime/anhydrite gypsum ground and first floors can be found regionally in the Derbyshire/Midlands Area.

With the need to improve the insulation of all the external envelope in old buildings, now insulating floors have an important role to play and the use of insulating breathable free draining subbases and insulating limecretes have become common place.

The need for the floors in old buildings to breathe is essential. There are many examples of plastic/damp proof membranes and cement based concretes that have been used in old building with dire consequences. Unlike modern construction where the damp proof membranes run under the walls as well as the floor, in the refurbishment of old buildings the membranes have to finish at the walls resulting in concentrations of dampness in these areas and rising damp where it had not previously existed.

Limecrete floors offer an alternative to impervious, non flexible cement concrete floors. These floors are also chosen for ecological new builds using natural materials such as straw and wood because it uses less energy in production, avoids the use of cement and is recyclable at the end of its useful life.

Why do these floors provide good insulation values: The use of Expanded Fire Clay Balls and Foamed Glass sub-bases

The principal insulation within these modern limecrete floors comes from the use of free draining light weight sub bases as a replacement for clean lime stone or recycled hardcore.

These sub bases consist of expanded fired clay balls or foamed glass aggregate, with fines excluded to prevent water being pulled up in to them through capillary suction. It is the air trapped with the fired clay balls or foamed glass that provides the insulation.

U values which meet current building regulations for new build can be achieved with between 125mm and 250mm depths of sub-base dependant on the ratio of exposed perimeter wall to floor area.

Insulating Lightweight Limecrete

To create a robust weight bearing, air tight, but breathable covering with further insulation above the sub-bases described above it is common to use untreated lightweight fired clay aggregate balls in a size of 0–20mm, or crushed pumice, mixed with eminently hydraulic lime. Usually at a mix of 1 part lime to 3 parts light weight aggregate. Whilst some companies will lay these floors at 125mm thick it is usually recommended at 150mm deep.

Limecrete is never left without a covering of tiles, flags or engineered timber on battens and these are laid on a screed and bedding mortar above the insulating limecrete.

The screed mix is designed to retain heat, acting as a thermal store and transmit heat from any water based under floor heating to the surface of the floor. It usually consists of 1 part eminently hydraulic lime (NHL5) mixed with 3 parts 5mm down sharp sand. Crushed glass is sometimes used as an alternative but it no greener and is not as easy to use and no better at transmitting heat.



Laying Insulating Breathable Floors

Before laying a breathable insulated floor with no damp proof membranes it is essential to check that the water table would never get higher than half the depth of the sub base and that the site immediately around the building is well drained.

Often addition drainage work can be incorporated as part of the works especially if the property sits on sloping ground. In addition the foundations of the walls should never be compromised by removing ground from below the level of the existing foundations, without incorporating a ring beam to prevent any movement of the ground away from its compacted state under the wall or without digging in to the room at an angle of 45 degrees.

With both the above factors in mind dig out to a depth to allow for a sub base of between 125 and 250mm, a layer of insulated limecrete at a depth of 150mm and a 65mm screed and bedding mix plus the depth of the floor finish.

Then on level and compacted ground lay the loosefill sub base before a geotextile membrane to prevent the next layer, the limecrete slab (made of 3 parts clay aggregate to 1 part NHL5 by volume), contaminating the sub base. For wet based underfloor heating pipes over the top of the limecrete slab lay down a 65mm screed of 3 parts sharp sand to 1 part NHL5.

No special skills are required for installing the limecrete flooring system, it is not unlike laying a conventional cement-based concrete floor; any builders with experience in laying floors should be willing and able to do it.

For larger floors, a range of mixers that will attach to bobcats or tractors are available to buy or hire to speed up the mixing process.

Suitable Floor Finishes

To compliment the breathable floor structure it is often finished with stone flags pointed with lime mortar, heavy quarry tiles or engineered wood floors carried on treated or hardwood battens resting on the screed.

For further info on products call Lincolnshire Lime 01469 531227 or 077 433 62408