Lightweight clay insulation aggregate/ NHL Limecrete Floor

Technical Information Sheet
The clay aggregate is a lightweight expanded clay aggregate which provides an insulated floor. This is fine for existing buildings but will not realistically conform to current building regulations for new build or conversion. If an insulatated floor is required for new build or conversions, then there is no breathable insulation that can be used without excessive excavation. Limecrete can be used with a modern insulation in these circumstances if desired for a non breathing floor.

Clay insulation can be laid as a coated loosefill insulation under a floor slab, and also as an uncoated aggregate mixed with natural hydraulic lime (NHL5) to make a limecrete slab.

Limecrete offers a number of advantages:

- increased vapour permeability, which is important in older properties
- hydraulic lime is more environmentally friendly compared to cement
- it can be designed to meet the insulation requirements of building regs

We can offer advice on the design of limecrete floors. As a major supplier of both the clay aggregate and the NHL we also offer unbeatable prices.

Thermal Values
Clay insulation has a K-value thermal performance of 0.1W/m2k. The greatest insulation is provided by the looselay beneth the limecrete slab as mixing with a binder reduces the thermal performance.
The uncoated clay insulation aggregate mixed with NHL5 is not certificated but a mix with cement has been and offers a k-value of approximately 0.2 W/m2k. The figures from this might reasonably be extrapolated and used as an assumption of thermal performance when mixed with NHL5.

The 2006 revision of Part L building Regulations specifically allows a get out from the Building Regs. if those regulations are contrary to the well being of a traditionally built property. For example, a damp proof membrane or exeecessive depth of insulation required to meet Part L undermining the shallow foundations.

Using the K-values as above, here are some examples of u-values that may be achieved using different depths;

100mm of limecrete slab with 200mm of coated loose lay = 0.39
100mm of limecrete slab with 300mm of coated loose lay = 0.28
100mm of limecrete slab with 400mm of coated loose lay = 0.22

Guidelines
It is important to match the design of the limecrete to the needs of the building. Factors include the type of construction for both floor and walls, floor area and groundwater levels.

Typical installation

- levelled and compacted ground
- breathable membrane
- loose fill clay insulation 10 - 20mm size coated for reduced capillary action
- breathable membrane
- limecrete based on 3 parts clay aggregate to 1 part NHL 5
- lime screed based on NHL 5 and sand, normally to bed flagstones, tiles etc.

The thickness of each component depends on a number of factors on which we can advise. Some installers use NHL 3.5 which is moderately hydraulic compared to NHL 5 which is termed eminently hydraulic. NHL 3.5 based limecrete will take much longer to cure than NHL 5 and this will be an important consideration in winter working.

Typical Specification
1. Layer of geotextile
2. Loosefill. A 220mm layer of coated clay insulation loose fill easily achieves a 0.45 W/m²k thermal value 230mm of the clay insulation is equivalent to 50mm of extruded polystyrene.

Area of oversite (m²)	**Depth of Optiroc LWA insulation fill required (mm)**		
	Clay	Sand or Gravel	Homogeneous Rock
0 - 50	200	210	210
50 - 100	180	200	210
100 - 150	150	190	210

3. Layer of geotextile

4. Limecrete
9 bags of Clay aggregate to 5 bags of NHL 5 is 3 to 1 ratio (1 x 25kg bag NHL5 volume is approx 30 - 35 litres 1 x bag clay aggregate volume is 50 litres)

Example for 3 / 1 mix: 81 bags (4m3) of 0-20mm uncoated clay aggregate to 45 bags NHL 5 will lay a 40m² floor at 100mm. This equates to a mix of 3 x parts clay aggregate, to 1 part NHL 5, mix together and slowly add enough water to clump the mix together when compressed in the palm of the hand. For some applications a galvanised reinforcing mesh or boards will be required to aid working once the loose lay is applied to reduce the chances of crushing the clay insulation or disrupting the levels.

If you use NHL 3.5 this has a lower density, a 25kg bag of NHL 3.5 is 35 - 40 litres. Its greater volume means that the above ratio would become 9 bags of clay aggregate to 4 bags of NHL 3.5 to achieve a 3 to 1 ratio.

5. Screed A typical screed of 2 / 1 sand & NHL 5 is between 20mm and 50 mm thick depending on application. Flags or breathable tiles can be placed on top. Always give careful consideration to the build-up and final finish of your floor if you require it to be vapour permeable.

We also supply in 1.2 or 2 cubic metre bulk bags. These represent a significant saving on 50 litre bags but obviously require onsite handling.