

Limecrete flooring

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1. GRADES OF HYDRAULIC LIME & NON HYDRAULIC LIME FOR BUILDING WORKS

BSEN 459 PART 1 gives details and performance standards for the grades of building limes in use within the EU and can be summarised as follows:

1. CL90 – Non Hydraulic Lime
2. Natural Hydraulic Lime (NHL) 2
3. Natural Hydraulic Lime (NHL) 3.5
4. Natural Hydraulic Lime (NHL) 5
5. Formulated Limes (FL) 2, 3.5, 5
5. Hydraulic Lime (HL) – the regulations allow this grade to include cement

The grading of the hydraulic limes refers to their strength therefore NHL 2 is the weakest and NHL 5 the strongest.

Strength and frost resistance can also be varied by altering the mix ratio, typically the ratios will range between 1 lime: 1.5 Sand to 1 lime: 3 Sand (by volume). Generally exterior hydraulic lime mortars will be 1 lime: 2 or 2.5 Sand.

- a) Contact Singleton Birch for technical advice and assistance
- b) Refer to the following books

1. 'Building with lime' by Stafford Holmes and Michael Wingate ISBN 1 85339547/1 Revised 2001. Published by Intermediate Technology.
2. Hydraulic Lime for Mortar for Stone Brick and Block Masonry. Published by Donhead, ISBN 1873394640.

In 1998, UK Government funded research into hydraulic limes began at the University of Bristol resulting in the publication of the second book listed above in 2003. To date this book remains the definitive reference to the performance of most hydraulic limes.

2. LIMECRETE FLOORING

2.1 General Principles For Preparation of Successful Hydraulic Limecrete Floorings

Before the introduction of Portland Cement in the nineteenth century nearly all buildings were constructed using lime in the foundations. Floors too often incorporated lime. Today differential

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movement of new extensions to old buildings of this type is a real possibility and can be avoided by use of similar foundations using lime mixed with a coarse aggregate.

The replacement of ground floor breathable lime or wooden floors in old buildings with damp proof membrane and concrete in some cases forces ground water up into walls. This can result in wood rot and damage to plaster as well as decoration. Greater interest in the improved thermal and environmental properties of lime are encouraging owners and developers to consider the use of lime for foundations and floors.

Traditional methods of construction using materials employed over centuries may not these days meet Building Regulations. As a result, early in the planning stage Building Control should be consulted with a view to getting them 'on board'. In some parts of the country where for example there are large numbers of period timber framed or listed buildings Building Control Officers may be sympathetic, even well used to lime and limecrete requests. However this is not always the case and sometimes it may be necessary to employ an engineer experienced in this type of construction to allay concerns of Building Control. In any event it will be essential to calculate the loadings on Limecrete foundations and floors to ensure that the mixes employed have an adequate safety factor.

3 Matters affecting the strength of the mix are:

3.1 The type of aggregate.

For foundation and flooring sharp sands must be used. Substrates should have a well graded aggregate from 40mm to dust. Indeed for foundations broken clay bricks and tiles can be added and will have a beneficial effect increasing the strength of the Lime Crete.

Generally a 1 lime : 2 aggregate mix will be adequate using an NHL 3.5, NHL 5, FL3.5, FL5, HL 3.5 or HL 5 3. Additional pozzolan can be added at a ratio of no more than 15% of the lime content.

In general terms the maximum strength that it is possible to achieve using a lime based mix is around 16 newtons/mm². This exceeds the strengths likely to be needed in domestic construction by a considerable margin of safety.

3.2 Storage of Lime & Aggregate

Our Hydraulic Lime is supplied in 25kg paper bags which must not be allowed to become wet. Once opened the exposure to air will start to weaken the hydraulic set. As a result any opened part bags left at the end of the day should be carefully folded over at the top and put into a dry store. In this state the lime will remain useable for a further 2 or 3 days. Thereafter it should be discarded. For larger orders the individual bags will be supplied with up to 40 on a pallet.

Aggregate should also be covered since if left exposed fines can be washed out and the material as a whole can gradually separate. The result will be to make the aggregate less well graded and this may impair durability of the mortar. Covering the aggregate will also stabilise the water content and make mixing more consistent.

3.3 Water Content

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The water content of the Limecrete mix has a major effect on final strength. It should never be mixed so weak that it will flow. An ideal mix will be dry enough for the material to stand without being so dry that it appears crumbly. It should be homogenous

3.4 Application

When mixing and placing Limecrete it is best remembered that there is no hurry. If large quantities are required a pan mixer is best. With conventional drum mixers each mix will need at least 20 minutes. After placing each mix will require levelling out and gently tamping down. Aftercare The longer water is retained in the mix the better will be the final result. It is important to prevent rapid drying through the action of the sun or wind. Equally Limecrete requires protection from rain and frost. Therefore covers will be needed for external work. It is unlikely that the work will have hardened sufficiently in under one week to allow walking over. Whenever possible planks should be used for as long as feasible after laying and during the curing period.

4 HEALTH & SAFETY INFORMATION

Detailed Health & Safety Data Sheets are available to download from <https://www.singletonbirch.co.uk/health-safety>

Disclaimer

Singleton Birch cannot accept any liability for incorrect use or application of Hydraulic Lincolnshire Lime. Recommended 'best practice' should be followed at all times.

If in doubt, please call us on Tel: 01652 686000 for advice or assistance.