



# Hydraulic lime mortar

## Application Guide

### Golden Rules

- choose the right type of lime and aggregate for your application.
- the mortar should be very well mixed - balling must be avoided.
- always measure using a gauging box or bucket.
- mortar must not be allowed to dry out too quickly. Dampen surrounding masonry.
- hydraulic lime mortar must be used within two hours and then left to set in the wall
- do not use if the temperature is too low i.e. likely to fall to 5°C or below before carbonation has taken place (note this can be weeks/months after application).
- protect from frost, excessive sunlight and drying winds.
- pointing should be kept moist for 7 days. The carbonation/set can only complete in the presence of water.
- depending on the hydraulic lime and the time of year it should be possible to build at about the same rate as with Portland cement mortars but bear in mind the mortar will continue to gain strength for up to one year although an adequate set will be achieved in a matter of a week or two.

### Mortar strength

It is important to choose the right hydraulic lime for the work being undertaken. A 28 day compressive strength of 1.0 newton/mm<sup>2</sup> should be attainable with an NHL 3.5 which is suitable for most applications (provided average ambient temperature exceeds 10°C. Below this, the rate of build may slow down work). If additional strength is required an NHL5 can be used (see table above).

### Preparing the mix

- mix the lime and aggregate by volume (check the specification for exact mix ratio for the job or refer to the table below), measuring of material must always be with a gauging box or bucket. The sand/aggregate should be sharp, well-graded and washed.
- a conventional cement mixer can be used although for larger projects a roll pan or paddle mixer is preferable. Lime mortars mixed in drum mixers can be prone to balling but use of particular mixing techniques can reduce this. Switch the mixer on and dampen down the inside of the drum as this will help to reduce the amount of dust and prevent the lime from sticking

Application	Type of lime	Suggested Mix Ratio by volume	Notes
Pointing/ Building Stone/ Brickwork	Fat Lime Mortar  Hydraulic Lime NHL3.5/2 St Astier ecoMortar Secil REABILITA Rebobo	Premixed or 3 Sand*: 1 Lime Putty  2.5 Sand*: 1 Hydraulic Lime Dry, Premix Dry, Premix	<ul style="list-style-type: none"> <li>■ The exact ratio will depend on the sand/aggregate used.</li> <li>■ The colour, texture, workability and success of the mortar is predominantly influenced by the selection of sand/aggregate.</li> <li>■ The softer the stone/brick, the softer the mortar must be.</li> <li>■ To match an existing mortar, send a sample to us.</li> </ul>
Flag Stone Bedding	Hydraulic Lime NHL5  Hourdex/ Tradiblanç	2.5 Sand*: 1 Hydraulic Lime Dry, Premix 2.5 Sand*: 1 Hourdex/ Tradiblanç	<ul style="list-style-type: none"> <li>■ For smaller tiles internally use: Adhere Vit for tiles less than 10mm thick. Reboco for tiles between 10-20mm thick.</li> <li>■ Samples are highly recommended.</li> </ul>
Paving, Copings Chimneys	Hydraulic Lime NHL5 Hourdex/ Tradiblanç	2 Sand*: 1 Hydraulic Lime 2.5 Sand*: 1 Hourdex/ Tradiblanç	<ul style="list-style-type: none"> <li>■ For exposed areas, or any high weathering applications.</li> <li>■ For these extreme areas ensure work is done as early as possible in the year as soon as danger of frosts are over.</li> <li>■ Drainage of paving areas is almost paramount.</li> </ul>
*It is important to choose a sharp, well-graded, well washed sand. NHL= Natural Hydraulic Lime.			

too much. Switch the mixer off before adding two thirds of the water and half of the sand followed by all of the lime. Switch the mixer on, allow the water to thoroughly disperse throughout the mix (15-20 minutes) before adding the rest of the sand and more water if required. You will have to experiment for the first mix as the quantity of water will vary with sand moisture content – but be CAUTIOUS, for a 3:1 mix, initially add 6 litres of water, 30 litres of sand and then 20 litres of lime, mix, then add the remaining sand and adjust the water.

- use the mix within 2 hours.
- keep the mortar stiff - mortar for pointing should be kept stiff and dry in order to compress it into the joint without smearing. Take care not to get mortar onto the face of the brick/stonework. Mortar for laying/bedding work needs to be a little wetter but should still be kept as stiff as possible to avoid excessive shrinkage. The mortar needs to be just wet enough to be workable.

### Pointing - Preparing the surface

- loose, existing mortar must be raked out and dust removed, usually to a depth equal to twice the width of the joint. Sound mortars should be left. Great care should be taken if removing a hard, cement mortar as damage can easily be done to the stone/brickwork.
- dampen all stones/bricks and adjoining surfaces by spraying with water or immersing in water, otherwise they will 'suck' the moisture out of the mortar before it carbonates/sets, causing it to fail.

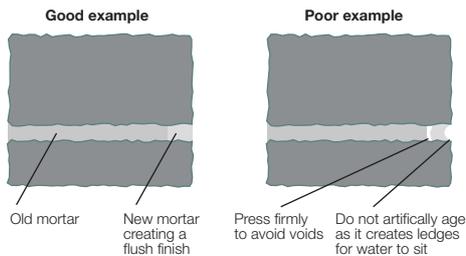


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- trials/test panels should be produced to find the appropriate tools and methods for achieving the correct finish and colour for the building.
- large holes should be packed with lumps of stone or bricks, as large volumes of mortar will shrink.
- push the mortar firmly into the joint to avoid voids in the wall.



Cross sections of good and bad pointing.

- bring out mortar joints in layers of up to 10 - 15mm thick to allow carbonation, using a pointing or finger trowel from a small plastic hawk.
- leave each coat until it is hard i.e. set, but not dried out - the mortar should be 'too hard to dent with a knuckle and soft enough to mark with a thumbnail.'
- it should be left to 'stiffen up' for up to 24 hours (depending on the speed of drying).
- brush or scrape back when firm with a churn brush, to compress and achieve desired finish. The ideal is to finish the mortar flush with the stone/brickwork so as not to create ledges for the water to sit on. A good, even surface is the best protection for the building. This is an important process to get right for the long term success of the job.



Leave unfinished for approximately 24hrs, brush or scrape back flush when firm.

### Protection & after care for hydraulic lime mortars

#### Effects of rain and temperature

Without doubt the most significant difference to the user between OPC and lime based mortars is the rate of build in cold weather. This can result in:

- slower rate of laying.
- requirement for protection against water saturation and frost. In mild winter weather work with hydraulic lime mortars can proceed normally provided there is provision of **immediately available protection** in the event of rain and/or frost. e.g. hessian and tarpaulin.

In order to understand the need for protection, specifiers and contractors should appreciate that the rate of set of hydraulic lime is more dependant on temperature than cement.

While mortars laid in the summer months may achieve frost resistance in a month, work done at cooler times

of the year will undoubtedly take much longer and will therefore require protection from frost longer too - perhaps for the remainder of the winter. Without doubt the worst combination is heavy rain followed by clear skies and a frost. Saturated walls with under-strength mortars will suffer frost damage much more easily than walls protected from the rain. Driving rain poses less of a risk than rain entering from the top of the wall.

As a precaution, covers (e.g. tarpaulins) should be placed on the top of the work overlapping, say 300mm each side will do much to keep the wall dry thereby reducing the risk of damage.

Another factor to bear in mind relates to porosity of masonry units. Porous materials hold very large quantities of water. Lime mortars are designed to aid evaporation. This process of evaporation causes a drop in temperature, so the mortar in new walls holding large quantities of water will set slower because of this drop in temperature. A great deal of the water in the masonry units will evaporate out through the mortar joints.

This effect will ensure a permanently low temperature in the lime mortar until the whole wall begins to dry.

Cement mortars are much less permeable and a high percentage of the water will have to evaporate from the face of the masonry units. As stated previously wet masonry is much more vulnerable to frost, frost protection is essential.

### Storage

- store lime airtight, dry and frost-free.
- use within 4 weeks of purchase.

### Further information

See manufacturer's technical sheets for further information on building, grouting and bedding mortars.

### Health and Safety Information

**WARNING** Skin Irritation 2 H315 Causes skin irritation.  
**STOT SE 3** H335 May cause respiratory problems.



**DANGER** Eye Damage 1 H318 Causes serious eye damage.



### Precautionary Statements

- P102** Keep out of reach of children.
- P280** Wear protective gloves, eye protection/face mask.
- P305 + P351 + P338** If in eyes rinse cautiously with water for several minutes and immediately get medical assistance.
- P352 + P352** If on skin, wash affected parts immediately with plenty of soap and water.

For further information about the whole subject and illustrated diagrams of lime plastering and pointing techniques, see **The Lime Handbook** now available to order on [www.lime.org.uk](http://www.lime.org.uk)

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