

Conserv. Technical File – Natural Hydraulic Lime Mortar



Technical File

Natural Hydraulic Lime Mortar

Manufactured by
Stone Tech (Cleveland) Ltd, Lee Road, Bolckow Industrial Estate,
Middlesbrough, North Yorkshire, TS6 7AR, UK.

SECTION:1

Product Data: NHL2 plaster base

Product Name: plaster base

Binder: NHL2 to BS EN 459-1:2010

Aggregates: to BS EN 13139:2002

Particles: good blend, 60mu to 5mm

Distribution*:

60mu	2%
125mu	14%
250mu	18%
500mu	16%
1mm	14%
2mm	15%
3.35mm	10%
4mm	8%
5mm	3%

*Per 100mg aggregate sample

Mortar type: feebly hydraulic, HLM2

Texture: coarse

Colour: Light brown/fawn

Bed size: 10mm>

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Packaging*:

- 5kg
- 10kg
- 15kg
- 25kg
- Bulk (FIBC) dumpy bag

*all pre-blended and gauged in waterproof packaging.

Alternatively FIBC, blended only for onsite gauging. No waterproof packaging needed.

Mixing:

- cement drum mixer
- forced action mixer
- plaster or mortar whisk

Water: mix to workable consistency based on application requirements

Application:

- Plaster base for scratch and float coat.

Storage:

- keep dry and frost-free
- shelf life is 6 months (when unopened)

Protection: mask alkaline sensitive materials (e.g. lead and copper flashings)

Typical Performance* (on full cure)

Resistance to freeze thaw	low (10 cycles)
Resistance to Sulphate exposure	high (26-50 cycles)
Resistance to freeze thaw in Sulphate conditions	low (10 cycles)
Carbonation rate	high
Capillary rise (mm's in 6 hrs.)	Very high (126-50)
Typical compressive strength	0.53MPa/7 days 1.36MPa/28days@10-15C
Compressive strength at 91 days	1.5MPa typical at 91days@10-15C
Flexural strength	0.28/28days and 1.08/6months
Vapour permeability on complete carbonation (gr air m ² x hrs. x mm hg)	0.76
Mortar durability class	3 to 4
Minimum application temperature	5°C and rising
Mix Ratio	3 to 1

*actual performance will depend upon various factors; including water content, site mixing, site curing, workmanship and weather conditions

SECTION: 2

Instructions for use

Mixing

- natural hydraulic lime mortar comes in a number of different formats
- inside the packaging, you will find a pre-mixed blend of aggregates and natural hydraulic lime
- the product usually comes pre-gauged, meaning it can be placed directly into a mixing vessel
- can be supplied un-gauged in bulk bags (FIBC) but must be proportioned on site before mixing (using the supplied gauge bucket)

Follow these steps to mix your mortar:

1. place the product in a suitable mixing vessel (a traditional cement mixer, forced action mixer or paddle, whisk and Trug)
2. add the aggregate first, then the lime
3. dry mix for 2 to 5 minutes, depending upon quantity
4. add a small amount of water and mix together for 5 minutes until a stiff consistency has been reached
5. leave to stand for 10 minutes before slowly adding more water to achieve your desired application consistency
6. mix for no less than 15 minutes (this gives the sand enough time to absorb the lime and help plasticity, with any water raised to the surface being absorbed back into the aggregate and lime by the remixing process)

The mixture will set overnight, although it will take 91 days to fully cure and harden.

Application

Preparation: follow good working practices, ensuring that the background is thoroughly clean. If removing vegetable growth using biocides check that these would not react with the plaster causing stains.

Causes of damp should be remedied and cracks should be cleaned out, (packed with low fire clay tiles or slate if necessary) and sealed with an NHL pointing mortar and allowed to cure for 1 or 2 days before rendering starts. Where there has been prolonged water penetration through the core of the wall it might be necessary to grout the cavity.

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Rake out joints to provide a key (at least every other joint).

Clear any loose mortar. Wet background well (old bricks will absorb a lot of water) to control suction and minimize shrinkage.

Suction Control: if necessary, apply sufficient water to reduce excessive suction, especially on bricks and porous stone. On many occasions this is done the day before, if necessary several times with the last damping just before application starts. Apply water starting at the top of the structure.

Old bricks require more water than new ones. The top of the structure will dry out before the bottom. In base coats this means that scouring back and keying of the lower section might have to be done later than the upper section. Always dampen down before applying subsequent coats.

Keying: Sometimes joints are raked back (normally 10mm), this is not always necessary with

NHL plasters unless the background is very smooth and not porous. Stipple or Spatter dash coats can provide adequate keying to the background.

Crisscross patterns using a pointed wooden lath are much preferred to combing when a key is being provided to the scratch coat.

On laths the keying should be undertaken diagonally so as not to disturb the rivets on the back of the lath

Dubbing Out: Defaced surfaces or in areas with a large amount of damaged joints it may be necessary to apply a dubbing out coat to provide a relatively level surface. In most cases this will be sufficient and joints or holes will not have to be filled with rubble unless quite deep. When a dubbing out coat is used let it set sufficiently (10 hours) before keying it.

The most efficient way to apply a dubbing coat is by harling. The strength should, as always, be compatible with the type of background. Apply base coat or scratch coat after approx, 5 days or more, site conditions will dictate.

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Setting Properties of NHL Mortars: The setting properties of NHL mortars require less time for protection against adverse weather conditions compared with fat lime mortars.

Precautions are however necessary and for further advice contact us for further details.

Protect from frost, heavy rain, strong wind or direct sun for a minimum of: -

NHL 2: - 96 hours

The preferred form of moisture control is mortar fleece or hessian cover which, which can be pre-dampened to contribute towards curing the mortar.

Work should not start in frost conditions or with temperatures below 5°C. In working with

NHL 2 or in rendering with fine finishing coats, this should be 8°C.

Reworking: NHL mortars can be reworked (up to 24 hours with NHL 3.5 and NHL 2). This is due to the absence of cement or gypsum in the lime and due to the minimal quantity of aluminates. Material left covered overnight can be reworked in with fresh material the following day

Method: **3 coat work**

A Stipple or Spatter dash Coat (optional): can be used on strong, smooth and variable backgrounds. The normal thickness varies between 3 and 5 mm. This coat has to provide sufficient bonding to support the remaining coats of plaster. The thickness of the first coat depends on the nature of the background, the overall thickness required and the keying function.

Setting time: should be allowed in-between each coat of plaster. 1 day per mm thickness of plaster is recommended.

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1st/ Undercoat/Scratch Coat: (use plaster base) to be applied 2 days (or more, depending on atmospheric conditions) after completion of the stipple coat. Thickness can vary according to the overall thickness required but it is normally between 10 and 15 mm. It must not be applied over 20 mm thick. If this is required it should be done as an extra coat (two intermediate coats) each not above 20 mm. The thicker the intermediate coats the longer the waiting time before each application. Key the mortar in readiness for subsequent coats.

2nd/Float Coat: (use plaster base) to be applied 3-4 days (or more, depending on atmospheric conditions) after completion of the scratch coat. The thickness should be kept between 10 and 15 mm.

3rd/ Finishing Coat: (use plaster finish), 4mm. This can be applied in two thin coats immediately after each other.

Plastering on Different Materials: Where different materials meet, and where there are timber lintels and other changes in the background material it is necessary to insert a metal mesh at the joint (at least 100 mm. each side). Consider the different suction characteristics of the background material. Hair or alkali resisting fibres can be added to the first coat or applied to metal Riblath to increase the bond and tensile strength.

Ensuring a Level Surface: To achieve a level surface vertical timber battens are fixed on the wall at 2-2.5 m. intervals. If the wall is uneven use spacers and check that battens are straight with a plumb level. Screed off excess mortar between battens with a wooden straightedge spanning between the battens.

When battens are taken down, fill in strips with the same mortar. An alternative is to make running screeds 10 cm. wide at regular intervals using the battens as described above and applying the base coats in between them.

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Scour back and key with a devil float after initial setting. Check for shrinkage during the first

2 days and, if necessary, lightly dampen the relevant area, scour back and re-key. Do not apply a finishing coat until undercoat is adequately firm and any small amounts of shrinkage are complete. See setting times, this is especially critical on timber lathed ceilings.

Note: in all plaster, coats should be applied firmly to exclude air and any excessive moisture. Suction needs to be carefully controlled at all times.

Plastering on Wooden Lath: It is recommended that wood lath backgrounds should be soaked for at least a week before fixing or if that's not achievable immersed in water the day before fixing, and again 2 hours before work proceeds.

This will ensure that the lath is wet when fixed. It will then shrink and pull tight so that when the plaster is applied it can only expand back to its original fixing position. The constant principal is that at no time should the lath be so dry that it will absorb moisture rapidly from the first coat when it is applied. If the wall becomes dry in patches, these areas should be damped again to ensure uniform adhesion.

Hair must be added to all but the finishing coat at the rate of 2 grams per kilo of plaster. Hair should be long, curly as possible and preferably from animals overwintered outdoors. Straight hair should be avoided if possible and the hair teased into the plaster at the point of mixing and just prior to application. The mortar for the first coat should be stiff enough to hold up when laid, but sufficiently plastic to squeeze easily through gaps between the laths. Lath spacing should be no more than twice the width of the largest particle size in the plaster base (which is 5mm in our products) so would require 10mm spacing between the laths.

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The type of lath used would typically be specified by the architect or conservation officer. This could be sawn or riven. Sawn are usually Larch and riven are usually chestnut or oak.

You will require approx 100 linear feet of sawn larch per sq. mtr Supplied in bundles of 200 ft in 4 ft lengths. Other types of lath would vary. These are general fixed using stainless steel annular ring shank nails. Although nail guns are more commonplace the nails should be nonferrous.

The first coat should be laid in a diagonal direction across the lath firmly pushing the plaster through the lath spacing's, which will form rivets behind that laths, the hair will reinforce the rivets. After the surface has steadied up provide a crisscross key with a pointed wooden lath. The first coat should be laid to aprox12mm. Subsequent coats are applied and looked after in the same way as is described above but the first coat must be sufficient hard enough not to snap the rivets whilst applying subsequent coats.

Protection:

- protection of your completed work is critical.
- strong sunlight and high winds will accelerate the drying process, leading to shrinkage whilst rain may wash out the mortar and temperatures below zero may freeze it
- Mortar Fleece can provide comprehensive protection until the product is fully cured
- Hessian Sheeting can also be used, but do not use plastic sheeting as it is ineffective
- if the masonry being worked on has been recently laid, or is subject to heavy rain, ensure that it remains protected for a long enough period

If the mortar is for external use, do not apply in temperatures under 5°C. The material must be protected from the weather during placement and curing. Winter working will greatly increase the curing period and may reduce performance.

European Standard

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 	Ref Standard: BS EN 998-1:2010 Designation: Mortar for masonry. Plastering mortar for internal use using hydraulic lime. Instructions: Please read the documents attached Manufactured By: Stone Tech (Cleveland) Ltd Lee Road, Bolckow Ind Est, Middlesbrough. TS6 7AR
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Other Information:

- sample panels should be prepared and approved before full application of this product
- the information contained in this data sheet is, to the best of our knowledge, true and accurate (last updated April 2013)
- prepared in accordance with Directive 2001/58/EC & UK Statutory Regulations (CHIP 3)
- Conserv is registered trademark of Stone Tech (Cleveland) Ltd