

NATURAL HYDRAULIC LIME

EN 459-1: 2010 - NHL 2, NHL 3,5



bringing materials to *life*™

Lafarge has a long and strong track record of producing Natural Hydraulic Lime stretching back to the mid 1800s. Since this time over 200 million bags (25kg) have been manufactured and used for a wide range of projects from renovating churches and castles to new build construction. It is of high quality and manufactured from specially selected limestone containing clay and other impurities. This enables the material to set without exposure to air and even under water.

The Lafarge lime works in 1870



Historic internal wall repaired with Lafarge Natural Hydraulic Lime mortar

We offer the following range of products:

- **NHL 2**
A feebly hydraulic lime suitable for internal works and exterior pointing/rendering on soft or crumbly masonry in sheltered areas
- **NHL 3,5**
A moderately hydraulic lime suitable for general-purpose use for mortar/pointing/rendering of most masonry

Our products contain no additives, mineral additions or other binders and are quality assured to EN 459-1: 2010 Natural Hydraulic Limes with independent third-party certification. They also carry a CE Mark.

Applications

Natural Hydraulic Lime can be used for both the conservation and renovation of historic buildings, and in new build applications. Mortars made with natural hydraulic lime gain strength by a combination of hydraulic setting and carbonation. The lower strength and greater permeability of natural hydraulic lime mortars when compared with cement-based mortars is particularly suitable for repairs to older buildings and for traditional style new build. Natural hydraulic lime mortars have good workability and plasticity and can accommodate some differential movement within the building.



A Grade II listed building in Warwickshire repaired with Lafarge Natural Hydraulic Lime mortar

Mortars

Typical hydraulic mortar mixes and their applications are shown below:

Application	Proportions (lime : sand by volume)	
	NHL 2	NHL 3.5
Internal walls	1:3	1:4
External walls	1:2	1:2 – 1:3
Facing to solid construction	1:2	1:2 – 1:3
Walls below ground	N/A	1:1 -1:2
Parapets, sills, lintels and cornices	N/A	1:2
Copings and cappings	N/A	1:2
Chimneys	N/A	1:1
Earth Retaining walls	N/A	1:1
Submerged masonry	N/A	N/A

Note: This information is for guidance purposes only. It is strongly recommended that trial mixes are carried out before use and that local exposure conditions are taken into account.

Renders

The selection of suitable render mixes, whilst following the guidance for mortars, must also consider the nature of the substrate to which the render will be applied. The type of sand used will also affect the final finish obtained. Guidance on selection of mixes for different substrates is given on the right.

Substrate	Proportions (lime : sand by volume)		
	Base Coat	Finish Coat	NHL Class
Weak or porous (soft brick)	1:2	1:2.5	NHL 2, NHL 3.5
Medium strength	1:2.5	1:2.5	NHL 2, NHL 3.5
Impervious or dense brick	1:2.5	1:2.5	NHL 3.5
Plasterwork	1:2	1:3	NHL 2, NHL 3.5

Note: As a general rule, each successive coat should be weaker and/or thinner as you move away from the substrate.

Batching and Mixing

Sand

Sand for lime mortars and renders should be sharp sand, clean and well graded, free of clay or silt. Building (soft) sands, or sands containing clay and silt, can cause excessive shrinkage.

Water

Mixing water should be clean and potable. Adding too much water should be avoided as it leads to a reduced strength and open structure susceptible to frost attack

Batching

Mortars and renders containing natural hydraulic lime should always be batched by volume using batch boxes.

Mixing

Sufficient mixing is required to ensure that the lime is uniformly dispersed throughout the mortar or render. Mechanical mixing is preferred and mixing times should be significantly longer than for cement-based mortar. The workability of the mortar improves with increased mixing time (however, avoid over mixing in hot weather). Allowing the mortar to stand in the mixer drum for a short period of time (10-15 mins) before a final remixing will also improve workability.

Working Temperatures

Do not use at temperatures below 5°C or above 30°C without taking precautions to protect new work from freezing or drying out.



Lafarge Natural Hydraulic Lime used for pointing new build construction

Use of Admixtures and Additions

The use of proprietary admixtures with natural hydraulic lime is not usually necessary as the workability and frost resistance of mortars or renders based on natural hydraulic lime is adequate for most applications.

In certain circumstances however, the addition of materials such as pozzolans or ground blastfurnace slag may be used to increase the mortar strength. The addition of Lafarge Hydralime (hydrated lime) can also be used to improve the plastic properties of the mortar and/or reduce its strength. Trial mixes are always recommended.

Storage

Lafarge Natural Hydraulic Lime should be stored in unopened bags clear of the ground in cool dry conditions and should be stacked in a safe and stable manner.

Information on the maximum storage period can be found on the bag.

Technical Support

Further information or specification advice on Lafarge Natural Hydraulic Lime and the full range of Lafarge Cement products can be obtained through the contacts listed on the following page.

Health and Safety

Contact between natural hydraulic lime and body fluids (eg, sweat and eye fluids) may cause irritation, dermatitis or burns. Natural hydraulic lime releases alkali when mixed with water, and the use of protective goggles, gloves and clothing during batching, mixing and application is recommended. For further information, refer to the Lafarge Health and Safety information sheet for Natural Hydraulic Lime.

Typical Key Properties (Not to be used for specification purposes)

Property	Lafarge NHL 2	Lafarge NHL 3,5
	Typical Value	Typical Value
28 day Compressive Strength (MPa)	4.3	5
Initial Set (min)	330	350
Final Set (hrs)	8.7	8.5
Bulk Density (kg/m ³)	615	590
Colour (L*)	89	90
Available lime (%)	43	44