

natural hydraulic lime (NHL)

FOR THE PRODUCTION OF MORTARS,
RENDERS AND PLASTERS

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why use...

NATURAL HYDRAULIC LIME (NHL) based mortars, renders and plasters?

THE BEST WAY TO ANSWER THIS QUESTION IS TO LOOK AT THE ADVANTAGES LIME-BASED MORTARS HAVE OVER CEMENT-BASED MORTARS, ADVANTAGES WHICH HAVE BECOME APPARENT FROM EXPERIENCE AND RESEARCH. THESE CAN BE CONSIDERED UNDER TWO BROAD HEADINGS: SUSTAINABILITY AND DESIGN (BASED ON DE VEKEY, 2005*).

SUSTAINABILITY

Bricks and blocks contain the majority of the embodied energy in a unit of wall. Cement-based mortars have higher bond strengths than lime-based mortars and masonry laid using cement-based mortars cannot readily be separated, cleaned and reused at the end of its life. By contrast, masonry laid using lime-based mortar has lower bond strength, so the mortar can be cleaned off the bricks easily, allowing them to be reused. The manufacture of limes or natural hydraulic limes (NHLs) consumes less energy and produces less greenhouse gases than that of Portland cement per unit weight. Binders can be produced from limestone only by high-energy inputs.

Significant efforts are continually being made by binder producers to reduce their energy consumption – and, more recently, their carbon dioxide emissions – by switching from hydrocarbons to other fuels and by improving their production processes. The total energy content per tonne of lime-based mortar has the potential to be between 75 and 90% of that for cement-based mortars. Over a period of years of exposure to the atmosphere, lime-based mortars absorb most or all of the carbon dioxide that was driven off during their high temperature manufacturing process – known as calcination i.e. re-carbonate; by contrast, cement-based mortars do not normally fully re-carbonate.

DESIGN

Walls built with lime-based mortars have more tolerance to movement caused by thermal and moisture action.

- Movement within masonry walls built with lime-based mortars can be accommodated in the individual bed joints between the masonry units, reducing the need for vertical movement joints.
- Walls have improved 'breathability' to water and water vapour which reduces the likelihood of frost failure of the unit materials and improves the internal environment.



- Lime-based mortars are capable of self-healing microscopic cracks by plastic flow and diffusion.
- Lime-based mortars are less susceptible to sulphate attack.

WHEN SHOULD LIME BASED MORTARS AND RENDERS BE USED?

It is possible to use lime-based mortars and lime-based renders in many applications but it is important that the decision is made early in the design and planning process so all involved in the design and construction can make adjustments to the design and to the programme of work.

NEW BUILD

Lime-based mortars can be used in all aspects of new build construction but have gained most acceptance in the construction of masonry walls.

REFURBISHMENT

Some aspects of refurbishment can be considered as conservation, for example the matching of repair and replacement mortars to those already in the building, but they may also provide opportunities for using lime-based mortars in the construction of extensions or rebuilding of structures as part of the refurbishment.

CONSERVATION AND REPAIR

This is the area of construction with the longest history of use as it includes the conservation and restoration of historic buildings. In this application it is important to establish the composition of the original mortar – both the binder and the aggregate – and to attempt to match the new mortar to the original provided that there is no evidence that the original mortar has been detrimental to the masonry.

“The manufacture of limes or natural hydraulic limes (NHLs) consumes less energy and produces less greenhouse gases than that of Portland cement per unit weight.”



Application		NHL Type	Typical Mix Ratio
Masonry Mortar		NHL 3.5	1 NHL : 2.5 Sand
Pointing Brickwork		NHL 2	1 NHL : 2.5 Sand
		NHL 3.5	1 NHL : 2.5 Sand
Pointing Stonework		NHL 2	1 NHL : 2.5 Sand
		NHL 3.5	1 NHL : 2.5 Sand
Internal Plastering	Scud Coat (3-5mm)	NHL 3.5	1 NHL : 1.5 Sand
	Base Coat (15-20mm)	NHL 3.5	1 NHL : 2.0 Sand
	Finish Coat (3-5mm)	NHL 2	1 NHL : 2.5 Silica Sand
External Rendering	Scud Coat (3-5mm)	NHL 3.5	1 NHL : 1.5 Sand
	Base Coat (15-20mm)	NHL 3.5	1 NHL : 2.0 Sand
	Finish Coat (5-10mm)	NHL 3.5	1 NHL : 2.5 Sand

* Source: nhbcfoundation.org



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