

# High performance mortars for a sustainable future



Lime has a long history of use in building, dating back to before the Romans: these historical applications bear testimony today to the enduring qualities of this natural product . . .

. . . but lime has evolved!

# High performance mortars for

The limes available today bear little resemblance to the materials used of old.

Today's hydrated lime is a quality assured product, the output of highly controlled and sophisticated manufacturing processes operated at the highest standard of both chemical purity and environmental impact.

The hydrated lime available through Builders Merchants or as a component of premixed mortar is a uniform product manufactured to meet both British and European Standards and offers the builder a consistent and reliable product to meet and exceed the demands of today's building requirements.

Lime when used in mortar gives a superior performance as well as offering a sustainable and environmental solution to today's construction needs.

Using lime in mortar offers benefits in both the application and in the finished product:

## Plastic properties

**Workability**

**Water retention**

**Air content**

**Cohesion**

## Hardened properties

**Bond strength**

**Reduced water penetration**

**Freeze-thaw resistance**

**Flexibility**

**Vapour permeability**

**Self - Healing**

**Compressive strength**

**Proven performance**

## Benefits of lime mortar - in use

### Workability

One of the most important properties of plastic mortar is its workability. Lime is the primary contributor to workability of cement-lime mortars.

Hydrated lime provides good workability without the addition of excessive amounts of air entrainment additives that could negatively impact bond strength.

### Water retention

The fine particle size of hydrated lime improves the ability of plastic mortar to retain water when applied to a porous material such as brick.

Water retention enhances workability and extends board life to ensure there is enough water to fully hydrate the cement in the mortar.



# a sustainable future

## Air Content

Lime can deliver improved workability, thus reducing the possibility of over dosing with air entrainer.

The addition of excess air entrainer in cement mortars can lead to a reduction in bond strength. Hydrated lime will give improved workability with lower air content.

## Cohesion

Hydrated lime increases the cohesion of mortar to both the trowel and masonry units, thus reducing wastage from droppings.

## The benefits of lime mortar – the lasting effect

There are numerous benefits to be gained by using lime cement mortar:

### Bond strength

Bond strength is required to resist stresses such as impact and wind.

A high lime mortar fills the irregularities in the brick face and ensures the best level of adhesion between the binder and the brick.

Air bubbles in cement only mortars can reduce the bond. High cement content mortars will shrink and may disrupt the bond with the brick after initial hydration.

### Reduced water penetration

Lime cement mortars produce a smooth finish which will resist water more easily than a porous air-entrained mortar.

The bricklayer will be able to produce a more watertight bond using lime cement mortars aiding the prevention of water penetration.

## Freeze-thaw resistance

Not only does lime mortar reduce the risk of water ingress – vapour permeability allows any transmitted moisture to evaporate. Thus reducing the risk of freeze thaw deterioration.

## Flexibility

High lime content mortars are slower hardening and remain more flexible than cement sand mortars.

Lime, therefore, enhances the ability of the brickwork to accommodate stresses caused by building movement and cyclical changes without excessive cracking.

The need for expansion joints is reduced in masonry bonded with high lime content mortars.

## Vapour Permeability

Modern buildings are efficiently designed to minimise ingress of moisture and draughts. This can lead to buildings which are unable to “breathe” to have problems with condensation, damp and unhealthy internal environments.

The vapour permeability of mortar improves with increasing lime content. A high lime mortar can act as a “wick” to allow water vapour to pass out from the building.

## Self - Healing

Should hairline cracks develop in the mortar, the combination of hydrated lime, moisture and carbon dioxide from the air can help to seal the crack by the formation of limestone



(calcium carbonate). The crystals formed by this process help to plug the hairline cracks.

## Compressive Strength

Hydrated lime improves the strength of the mortar in three main ways:

Cementitious reactions - Pozzolanic reactions can occur between hydrated lime and silica compounds in the mortar mix.

Carbonation - Hydrated lime reacts with carbon dioxide in the atmosphere to form limestone. This provides the mechanism for self-healing as well as long-term strength development of the mortar.

pH - Hydrated lime helps to maintain high pH levels in the mortar mix. This makes siliceous materials more soluble and reactive.

These three main mechanisms result in a controlled strength increase over the first few years in the life of the structure.

# Lime has evolved!

## Proven Performance

### Look around you!

The world in which we live is, in many cases, held together by lime mortars; from the brick built chimneys of our Victorian heritage to the houses and offices that fill our modern skyline.

Lime mortars have stood the test of time. They offer the flexibility and strength to achieve greater imagination in our built environment.

Lime is a product for the 21<sup>st</sup> Century which has proven its worth over the preceding millennia. It has developed into a high performance, high specification and highly engineered material which can be used in a variety of applications and methods.

The British Lime Association contains a wealth of expertise and experience in the use of lime in mortars. If you have any questions or would like help in understanding how lime in mortar can benefit your construction project contact the BLA or visit our website at [www.britishlime.org](http://www.britishlime.org).

**Lime has proved over the years that it can build the future.**



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## References

- BS EN 459-1:2001  
Building Lime. Definitions, specifications and conformity criteria.
- BS 5628: Part 3: 2001  
Code of Practice for use of masonry. Materials and components, design and workmanship.
- BRE Digest 362 - Building Mortar.
- Brick Development Association  
The BDA Guide to successful brickwork.
- National House Building Council - NHBC Regulations.

// *In use, lime mortar provides a cohesive material for the bricklayer to roll with the trowel, to bed bricks to the line, to apply cross joints and to joint-finish as work proceeds. Lime mortar generates good adhesion at the brick and mortar interface to ensure effective long-term weathering properties.* //

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Guild of Bricklayers.



The British Lime Association is part of the Mineral Products Association, the trade association for the aggregates, asphalt, cement, concrete, lime, mortar and silica sand industries.