

# LIME IN MORTARS

LIME IN RENDERS

– BENEFITS AND GENERAL GUIDANCE



Renders are widely used for finish and protection to masonry buildings throughout most of Europe. Lime has long been an essential component of renders and continues to offer important benefits.



## Benefits

### Designer

Architects are obliged to follow many design principles; designed buildings must be durable, economically justified, with minimum environmental impact and cost-effective to maintain.

Building materials used for construction should, where possible, be from natural sources. Those materials need to be of low toxicity, non-radio-active and should not emit harmful volatile chemicals. Renders based on lime should always be considered as one of the most appropriate and sustainable building materials available. They are durable, long lasting, widely available and compatible with most construction materials.

Lime in the form of calcium hydroxide -  $\text{Ca}(\text{OH})_2$ , is chemically pure and contains no impurities that are hazardous to human health. Additionally, lime is not only a versatile binder but also ensures resistance to biological growth and provides permeability to water vapour.

### Contractor

Lime renders are versatile and compatible with most commonly used masonry units e.g. clay bricks, silica bricks, aerated concrete blocks and concrete. Lime-based mortars can be used for both interior plastering and for renders of building facades, which decreases the costs of the construction process. Lime enhances properties of the render, such as good workability, plasticity, high water retention and extends the working time of fresh mortar, encouraging good quality and efficient workmanship and increasing cost effectiveness of construction.

### End-user

Render is a kind of protective coat for a building. It should withstand the deleterious action of wind, temperature changes, precipitation and pollution and should be durable.

Ingress of water coming from rain or snow causes damage and degradation to the building fabric. In addition, exposure to the sun, resulting in heat cycling and UV radiation, also has a strong influence on the durability of building facades.

The maintenance cost of buildings is directly related to the render quality. Lime reduces the thermal expansion coefficient of renders, therefore lowering sensitivity to temperature changes. Lime aids in the drying process of damp renders. Lime also has self-healing properties – renders containing lime tend to develop many tiny cracks instead of fewer larger ones in response to thermal and other movements, and when small cracks form in the mortar or render, lime provides the ability to fill and seal these cracks by the action of natural moisture movements in the render layer.



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## General guidance

Renders normally are applied as multilayers. The multilayer comprises three **layers**, which are different in material composition and function:

- **scratch coat** – provides the bonding to the substrate and storage of salts,
- **brown coat** – is used for levelling uneven masonry surface; provides a barrier against water ingress and wind penetration into the masonry surface,
- **finishing coat** – top layer is not only for decoration (it may be coloured and or textured) but also allows for evaporation of water vapour and dampness.

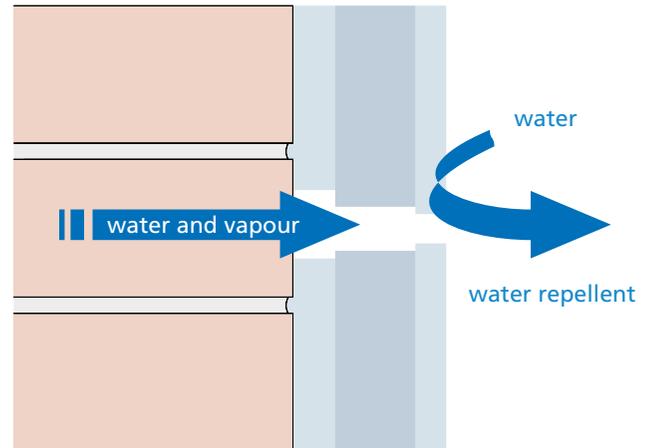


Figure 1. Three layer render – natural suction pump that evaporate dampness from wall.

Proposed mix proportions for the different layers and their related properties are summarized in the Table 1 below. The multilayer system is also commonly used in mortars dedicated to the renovation of older buildings.

Type of layer	Volume proportions Cement : Lime : Sand	Typical compressive strength
Final coat (3-5 mm)	0 : 1 : 3	≤ 1 MPa
Final coat (3-5 mm)	1 : 3 : 10	1 MPa
Under coat (15 mm)	1 : 2 : 9	2,5 MPa
Base coat (5 mm)	1 : 1 : 6	5 MPa

Table 1. Cement (EN 197-1), Lime (EN 459-1 CL90-S), Aggregates (EN 12620). Mixing proportions should be checked according to local recommendations.