LIME IN MORTARS

LIME IN PLASTERS
– BENEFITS AND GENERAL GUIDANCE

For most of us, much of our lives is spent inside buildings, so it is important that the indoor climate is comfortable and healthy. Finishing interior walls with lime-based plasters helps to provide and maintain these properties.

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Benefits

Owner

Comfort – the level of comfort of the indoor climate depends on different factors, in particular the temperature and the humidity. Because of their physical structure and vapour permeability lime--based plasters are able to maintain the humidity levels within an indoor environment. They absorb water vapour when humidity is high, and release it again when the humidity becomes low.

Health – the humidity of the internal air affects both comfort and health. High levels of humidity can cause condensation on the walls and promote the development of mould, fungi, bacteria, etc. The properties of lime plasters allow for water vapour to be absorbed, thus preventing the walls from becoming wet. Thanks to the higher alkalinity of lime, microbiological growth is inhibited. When the humidity of the indoor environment is too low, there is an associated increase in the occurrence of colds and flu and some skin problems. As lime-based plasters help to regulate the internal humidity, they help in reducing these effects. Lime based plasters do not emit any harmful substances to the environment, such as VOCs (volatile organic compounds).

Designer / Contractor

Aesthetic – for the finish, various options are available. The surface of the hardened plaster can be painted and finishing coats of different grain sizes, structures and colours can be applied. For smooth surfaces lime levelling compounds deliver the highest quality finish.

Mechanical properties – lime-based plasters show good workability in a fresh state and have excellent adhesion properties. When applied correctly, lime-based mortars are resilient and minimise the potential for the formation of cracks.

General guidance

Application

The substrate must be dry, clean and free from loose particles. Any film-forming substances have to be removed before the lime-based plaster is applied.

The hardening of air lime depends on the lime reacting with carbon dioxide from the air. The full carbonation reaction of 10 mm of plaster will require approximately 3 months from the time of application. For a situation requiring greater thicknesses, the application of several layers is advisable – in order to facilitate hardening and carbon dioxide uptake. The plaster must be protected from drying too quickly.

To preserve the beneficial properties of the lime-based plaster, care must be taken in the selection of the final paint or finish, using only highly permeable coatings.

Recipe

Lime-based plasters are available as ready mixed mortars/renders according to EN 998-1 and normally apply to the compressive strength classes CS I, maximum CS II.

Alternatively, they can be mixed on site. Suggested mix proportions (derived from former German Standard DIN 18550) are shown in the table below. As the table shows, high strengths are not necessary and should be avoided as leading to impermeable final hardened material, and increased risks of shrinkage & cracking.

Type of mixed mortar	Volume proportions Cement : Lime : Sand	Typical compressive strength
Air lime mortar / plaster (CL90-S)	0 : 1 : 3	≤ 1 MPa
Mortar with "hydraulic lime" (e.g. FL 2 or 3,5)	0 : 1 : 3	1 MPa
Mortar with "high hydraulic lime" (e.g. FL 5)	0 : 1 : 3	2,5 MPa
Cement Lime mortar (CL90-S)	1 : 2 : 9	2,5 MPa

Table 1. Cement (EN 197-1), Lime (EN 459-1), Aggregates (EN 13139). Mixing proportions should be checked according to local recommandations.

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