LIME IN MORTARS

LIME IN MASONRY MORTARS – BENEFITS AND GENERAL GUIDANCE

Lime in masonry mortars delivers long term sustainable and economic solutions for masonry buildings. Lime used in mortars has a proven history over centuries and its performance has been demonstrated by scientific work. Combining many beneficial properties, both in the fresh and hardened state, no other material can equal or replace lime in masonry mortars.

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Benefits

Owner / Client

In any new building or a renovation project the owner and client will want to use materials which are environmentally sustainable and contribute to a durable construction and a healthy comfortable living space.

The use of lime in masonry mortars allows moisture vapour to escape at the same time as preventing water penetration into the building fabric, contributing to better moisture control within the structure and in the building. In addition, lime mortars are able to accommodate minor movements due to thermal or settlement forces without permanent large cracking or separation from the masonry.

Designer / Engineer

The designer and engineer will seek to use materials which give optimum performance. Using lime in masonry mortars improves bond quality between brick and mortar, helps to minimize water penetration and assists moisture control in the building, avoids the cracking and debonding which can be caused by over-strong, brittle mortar in masonry, and provides an attractive durable solution.

Contractor / Craftsman

The contractor and craftsman will want to use materials which assure good progress with minimum problems. During construction, lime-based mortars are generally more fluid as well as being more cohesive, which gives a long working life and easy working properties – all these factors encourage good workmanship and rapid progress.

Figure 1. On left: high strength non-lime mortar (thermal and shrinkage movements cause cracking & separation). On right: mortar containing lime (natural movements accommodated without damage).

Figure 2. Durability testing after 4 years. On left: mortar without lime. On right: mortar containing lime.

General guidance

If you are using / prescribing factory made "readymix" or "silo" masonry mortars

Ask the supplier if hydrated or hydraulic limes are used in the mixes. The current standards allow mortars to be produced both with and without lime. Remember that strong, hard and brittle mortars are never advisable for long term durability.

In order to get the benefits mentioned in this document, at least 20% of the binder by mass of the mortar (in general 5% of the total mortar mass) should be air lime.

Eurocode 6, the building design code, with its national annexes, has harmonized local rules, traditions and guidelines. European countries now have common building codes which describe the performance of mortars in terms of their compressive strength (e.g. M2,5 for 2,5 Newtons / square millimetre), as well as the different types of mortars allowed. Factory made mortars must comply with the European Standard EN 998-2, and are subject to mandatory CE-marking.

Classes of mortars – general guide on application (ref. Eurocode 6 / EN1996-1-1:2005):

- **M2,5** – internal work or sheltered location; lightweight insulating units & lightweight concrete blocks,
- **M5** – most general brick & masonry work above ground,
- **M10** – work in severely exposed locations or below ground.

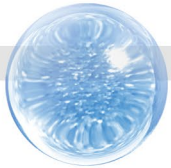
If you are making masonry mortars on site

Site made mortars are not subject to the requirements of European Standard EN 998-2. The specifications on the mortar strength are given by the architects or engineers specification documents possibly referring to national reference documents. The ingredients for the mortars require to be CE-marked, for example cement (EN 413 or EN 197), lime (EN 459), sand & filler for mortars (EN 13139) and any additives (EN 934-1 and EN 934-3). Suggested mix proportions for general masonry applications are given in the table below.

Type of masonry	Volume proportions Cement : Lime : Sand	Typical compressive strength
Internal masonry	1 : 2 : 9	2,5 MPa
External masonry	1 : 1 : 6	5 MPa
External masonry below ground	1 : 0,5 : 4,5	10 MPa

Table 1. Cement (EN 197-1), Lime (EN 459-1 CL90-S), Aggregates (EN 13139). Mixing proportions should be checked according to local recommandations.

You should measure the ingredients by volume, using a gauging box or a bucket rather than a shovel for measuring the amounts of lime, sand & cement. Add a small amount of water to the mixer first & then the lime and sand. Mix for at least 10 minutes before adding cement and finally adjusting the workability with water.



EuLA - European Lime Association
Rue des Deux Eglises 26, B-1000 Brussels, Belgium
Tel. +32 2 210 44 10, Fax +32 2 210 44 29
info@eula.eu, www.eula.eu