



Salt-resistant masonry mortar - natural hydraulic lime and ECO-POZZOLAN.

IS IT:

Product

Technology

Equipment

APPLICABLE FOR:

Restoration

Rehabilitation

New Construction

APPLICABLE ON:

1. Foundations and underground structures

2. Vertical structures

3. Horizontal structures and vertical connections

4. Roof and terraces

5. Façade and building envelope

6. Finishes and completion elements

7. Integrated services

8. General strategies for building recovery

Related companies: *No companies; university research; structural study.*

DESCRIPTION

This type of mortar (e.g., Mape-Antique Allettamento) is a pre-blended, cement-free masonry mortar in powder form made from natural hydraulic lime, Eco-Pozzolan, natural sand, special additives, and micro-fibers. It is a salt-resistant masonry mortar for installation layers and pointing on “natural finish” masonry.

WHY TO USE

Pozzolanic additives are added to lime mortar to accelerate its initial set and also to increase its durability in exposed locations. The most commonly used pozzolans are brick dust made by crushing and sieving soft, under-burnt bricks; volcanic ash called ‘trass’; and calcined china clay (Calcined Lime (Calcium Oxide)) sold under the name of Polestar or Metastar.

- Installation layers and pointing on internal and external stone, brick, tuff and mixed “natural finish” load bearing and buffer walls, including those of historical and artistic interest.
- Making installation and “reinforced” joints using rebar or composites.
- Building facing walls using mortar with guaranteed performance characteristics. \
- Touching-up and plumbing facing walls with gaps and/or uneven surfaces.

HOW TO USE AND APPLY

PREPARATION OF THE SUBSTRATE:

Remove all traces of loose or crumbly material, dust, mold, and any other material which could compromise the bond of Mape-Antique Allettamento either manually or with mechanical means until the substrate is clean, sound, and compact. Remove any weak installation mortar between the masonry blocks; then clean the wall with low-pressure water jets to remove any efflorescence or salts present on the surface. Repeat this operation several times if necessary. If weak substrates need to be consolidated, apply several coats of Consolidate or Primer.

Before applying the mortar, the substrate must be saturated to prevent absorbing water from the mortar and compromising the final performance characteristics of the mortar. Excess water must be left to evaporate so that the masonry is saturated, and the surface is dry (s.s.d. condition). Compressed air may be used to speed up this process. If the substrate cannot be saturated with water, it is recommended that it is at least dampened to allow the mortar to bond correctly.

MIXING:

Prepare the product with a vertical cement mixer. Small amounts of the product may be prepared using a low-speed electric drill with a mixing attachment. Mixing the product by hand is not recommended. After pouring the minimum amount of clean water required into the mixer (e.g., 4.5 litres per 25 kg bag of Mape-Antique Allettamento), slowly add the powdered mortar in a continuous flow. Mix for approximately 3 minutes and check that the blend is well mixed, even and free of lumps and that no material has stuck to the sides and bottom of the mixer. Add a further amount of water if required up to a total of 5 litres per bag, including the water added at the start of mixing. Then, mix again for a further 2-3 minutes to obtain an even, “plastic” and thixotropic blend.

APPLICATION:

The mortar should be applied with a trowel in layers at least 5 mm thick. If the mortar is used to point “natural finish” masonry, apply the mortar between the blocks with a slight pressure to help it bond well. Any excess mortar must be removed immediately after application, including from masonry construction elements. If necessary, clean the joints with a damp sponge or with a millet brush. For “natural finish” masonry, form a “laying bed” and then lay the construction elements in place by pressing them down well to make sure they are held in position. Remove the excess mortar with a trowel.

Even though this type of mortar contains products which constrict the formation of micro-cracks, it is good practice to apply the mortar when the wall is not exposed to direct sunlight and wind. In such cases, such as during hot and/or particularly windy weather, take special care when curing the mortar, especially during the first 36-48 hours. Spray water on the surface or employ other systems to prevent the mixing water evaporating off too quickly.

FINISHING COAT:

If a transpiring water-repellent treatment is to be applied, especially for constructions particularly exposed to rain, wait until the mortar is completely cured and apply siloxane resin impregnator in solvent solution, or siloxane resin impregnator in water solution.

TECHNICAL CHARACTERISTICS

This type of products is classified as G according to EN 998-2 Standards: “Guaranteed-performance, general-purpose masonry mortar for external use on elements with structural requirements”, Class M 5, with compressive strength > 5 N/mm².

When mixed with water in a cement mixer, a salt-resistant masonry mortar with a plastic-thixotropic consistency and good trowel ability is formed. It should have an extremely low rate of hygrometric shrinkage which drastically reduces the risk of the formation of cracks in the mortar. It is also recommended to obtain properties which make the product resistant to various chemical-physical aggressive phenomena, such as soluble salts, freeze-thaw cycles, the leaching action of rainwater and alkali-aggregate reactions.

Lime mortar types and mixes are presented below in the table (Young, 2020):

Table 2: Lime mortar types and mixes

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Mortar type	Pure lime	Lime + pozzolan	Natural Hydraulic Lime (NHL)	Sacrificial lime	Narrow joint
Nominal mix	1:3	1:3	1:2.5 ¹	1:4	1:1.5
Binder	Quicklime or lime putty ²	Quicklime or lime putty ²	NHL 2 or NHL 3.5	Quicklime or lime putty ²	Lime putty
Pozzolan		10% FA, GGBFS or 20% trass ³			± 5% FA, GGBFS or 10% trass ³
Sand	2–3 parts	2–3 parts	1.5–2.5 parts	3–5 parts	1–1.5 parts
Porous aggregate	± Por. agg. replacing 0.5 part of sand	± Por. agg. replacing 0.5 part of sand	± Por. agg. replacing 0.5 part of sand	Por. agg. replacing 0.5–1 part of sand	
Filler	± Finely ground limestone/marble	± Finely ground limestone/marble	± Finely ground limestone/marble		Finely ground limestone, up to 0.5 part
Admixtures	± Air-entrainer ± Water-retainer	± Air-entrainer ± Water-retainer	± Air-entrainer ± Water-retainer	Air-entrainer Water-retainer	± Air-entrainer ± Water-retainer
Alternative mixes	Fresh hydrated lime can be used but its density must be allowed for	Less pozzolan (e.g. half the above %); Other pozzolans; NHL mixes	NHL + putty; NHL + pozzolan; Lime + pozzolan mixes	Lime + 5% pozzolan or NHL 2 + 25% putty for exposed locations	NHL 2 + 25% putty for exposed locations

Notes:

1. Nominal mixes for NHLs (1:2.5) are richer than for pure limes (1:3) because NHLs contain a proportion of inert material.
 2. Quicklime produces richer mixes than lime putty, that are more akin to traditional mortars.
 3. Pozzolans are measured as a percentage of the lime content; their proportion depends on their hydraulic reactivity.
- ± This symbol means 'plus or minus' the pozzolan, porous aggregate, filler or admixture, depending on the circumstances.

RECOMMENDATIONS AND OTHER INFORMATION

Pozzolans shall be natural materials such as trass or pozzuolana, or by-products such as fly ash (FA) or ground granulated blast furnace slag (GGBFS). Some manufactured pozzolans, such as metakaolin and silica fume, are too reactive for use in lime mortars.

EXAMPLES

[See attached images at the end of this sheet].

REFERENCES / SOURCES AND LITERATURE

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The Building Lime Forum

<http://www.buildinglimesforum.org.uk>



WEBSITE OF THE COMPANY

<https://www.mapei.com/ae/en/products-and-solutions/products/detail/mape-antique-allettamento>

www.peletico.com

IMAGES AND CAPTIONS



Fig.1: a) Pointing the joint in a stone wall, b) Finishing the surface with a millet brush, c) Finishing the surface with a sponge. ©www.mapei.com/ae/en/home-page



Fig.2: a) Removing the excess mortar, b) Cleaning the mortar joints with a millet brush, c) Finishing the mortar joints. ©www.mapei.com/ae/en/home-page