MAPEI

Mape-Antique F21

Super-fluid, salt-resistant, fillerized hydraulic binder, based on lime and Eco-Pozzolan, for making injection slurries for consolidating masonry and render, including the frescoed one

WHERE TO USE

Consolidating foundations, pillars, vaulted roofs and archways.
Consolidating “cement-core” walls and stone, brick, tuff and mixed masonry in general on old buildings, including those of historical or artistic interest, with cracks, gaps or small to large internal cavities.
Consolidating masonry with the presence of capillary rising damp and soluble salts.
Consolidating structures with murals.
Consolidating render detached from the substrate, including those with murals or of historical and artistic interest.

Some application examples

Super-fluid, volumetrically-stable injection slurry with high resistance to soluble salts for consolidating:

- foundations, pillars, vaulted roofs and archways;
- “cement-core” walls and stone, brick, tuff and mixed masonry in general on old buildings, including those of historical or artistic interest with a conservation order or under the protection of the National Trust, with cracks, gaps or small to large internal cavities;
- masonry with the presence of capillary rising damp and soluble salts;
- structures with murals;
- render detached from the substrate, including those with murals or of historical and artistic interest.

TECHNICAL CHARACTERISTICS

Mape-Antique F21 is a cement-free hydraulic binder in powder form for injection slurry made from lime, Eco-Pozzolan, natural ultra-fine sand and special water-retention additives according to a formulation developed in MAPEI’s research laboratories.
When mixed with water in a suitable clean container, **Mape-Antique F21** forms a super-fluid, volumetrically-stable injection slurry resistant to salts which is easy to inject with a manual or electronic pump, by hand with a large-capacity syringe, such as those used by veterinary surgeons, or by gravity casting.
The properties of slurry made using **Mape-Antique F21**, such as mechanical strength, modulus of elasticity and porosity, are very similar to slurry made using lime, lime-pozzolan or hydraulic lime originally used in the construction of old buildings.
Compared with these types of slurry, however, **Mape-Antique F21** also has properties which make the product resistant to various chemical-physical aggressive phenomena, such as freeze-thaw cycles and alkali-aggregate reactions, and most importantly to soluble salts. In fact, just a few hours after application, it contains no more “free” lime thanks to the reaction between the lime and the Eco-Pozzolan which “consumes” it in a very short space of time. Apart from hardening the slurry, this reaction makes it mechanically stronger with uniform chemical-physical properties throughout the product.
The characteristics and the efficiency of **Mape-Antique F21** for consolidating masonry and render, including those with murals, was verified by

Mape-Antique F21

Detailed view of flow the injection tubes are fastened in place

Injecting Mape-Antique F21 into stone masonry

Injecting Mape-Antique F21 into frescoed wall

the Istituto Centrale del Restauro (ICR, the Central Restoration Institute), now known as the Istituto Superiore per la Conservazione e il Restauro (ISCR, the Higher Conservation and Restoration Institute) during the consolidation operations on murals and the inner and outer faces of the domed roofs on the San Francesco of Assisi Cathedral.
Typical values are shown in the Technical Data table (see Application Data and Final Performance sections) which refer to the main characteristics of **Mape-Antique F21** at both the fresh and hardened states.

RECOMMENDATIONS

- Do not use **Mape-Antique F21** to consolidate structures with large cracks, gaps or cavities (use **Mape-Antique I**).
- Do not use **Mape-Antique F21** for casting into formwork (use **Mape-Antique LC** mixed with aggregates with a suitable grain size).
- Do not use **Mape-Antique F21** for rendering.
- Do not use **Mape-Antique F21** for skimming render (use **Mape-Antique FC Ultrafine**, **Mape-Antique FC Civile** or **Mape-Antique FC Grosso**).
- Never add additives, filler, sand, cement or other binders (lime and gypsum) to **Mape-Antique F21**.
- Do not apply **Mape-Antique F21** if the temperature is lower than +5°C.

APPLICATION PROCEDURE

Preparation of the substrate

Grout and "seal" all cracks and gaps on the masonry facing wall from where the slurry could seep out. On masonry facing walls without murals, drill 20-40 mm diameter holes to a depth of 2/3 of the thickness of the wall, preferably at a square pitch of 50x50 cm. If the wall is thicker than 60 cm, it is better to make holes from both sides. Fasten small tubes or injectors in place to inject the slurry. The day before injecting the slurry, we recommend saturating all the inside of the structure with water through the tubes or injectors previously fastened in place.
Saturate the wall starting with the holes in the highest position. Make sure the structure has absorbed all the water before injecting the slurry.
On walls with murals or on walls of historical or artistic interest, while grouting and "sealing" the cracks and gaps in the substrate, fasten small pieces of rubber tube in place at a suitable pitch. In this case, we recommend that the inside of the structure is not "wetted", in that it could cause irreparable damage to the mural. In fact, **Mape-Antique F21** contains special water-retention additives which hold the mixing water in the slurry to make it easier to flow, including in structures which have not been wetted beforehand.

Preparation of the slurry

Prepare **Mape-Antique I** in a suitable clean container using a low-speed electric drill with a mixing attachment. Mixing by hand is not recommended. After pouring in approximately 10 litres of clean water for each 17 kg bag of **Mape-Antique F21**, slowly add the powdered binder in a continuous flow. Mix for approximately 5 minutes and check that the mix is well-blended, super-fluid (the first litre of slurry should flow from a Marsh cone with a 4 mm diameter hole in < 30 seconds according to ICR specifications), with an even consistency and that it contains no lumps. Make sure none of the powder sticks to the sides or bottom of the container. Inject the slurry within 40 minutes of preparation.

Injecting the slurry

Inject **Mape-Antique F21** through the small tubes or injectors previously fastened in place with an electric or electronic pump at a pressure of up to 1 bar at the nozzle. If the slurry is injected manually, use large-capacity syringes such as those used by veterinary surgeons. Inject the product starting from the bottom working upwards to help expel air in the structure and fill all the cavities. When the slurry seeps out of a tube or injector near the one being injected, stop injecting, close the injector used and continue the operation from the tube or injector from which the slurry seeped out. Follow this pattern until the slurry seeps out of the highest hole. When the consolidation procedure has been completed, remove all tubes and injectors and grout the holes with a suitable mortar from the **Mape-Antique** range.

Cleaning

Slurry may be removed from tools with water before it hardens. Once hardened, cleaning is difficult and must be carried out mechanically.

PACKAGING

17 kg bags.

CONSUMPTION

1.04 kg/dm^3 (of cavities to be filled).

STORAGE

12 months in a dry, covered environment in its orginal, unopened packaging.

SAFETY INSTRUCTIONS FOR PREPARATION AND APPLICATION

Mape-Antique F21 contains special hydraulic binders which, in contact with perspiration or other bodily fluids, may produce an irritating alkaline reaction to the eyes or skin. Use protective gloves and goggles.
For further and complete information about the safe use of our product please refer to

TECHNICAL DATA (typical values)

PRODUCT IDENTITY	
Appearance:	powder
Colour:	white
Maximum size of aggregate (EN 1015-1) (µm):	100
Bulk density (kg/m^3):	1,110
Hazard classification according to EC 1999/45:	irritant. Before using refer to the “Safety instructions for preparation and application” paragraph and the information on the packaging and Safety Data Sheet

APPLICATION DATA OF PRODUCT (at +20°C - 50% R.H.)	
Mixing ratio:	100 parts of **Mape-Antique F21** with 60 parts of water (10.2 litres of water per 17 kg bag of product)
Consistency of the mixture:	super-fluid
Bleeding (NorMaL M33-87):	absent
Fluidity of mix (EN 445) (s):	< 30 (initial) < 30 (after 60 minutes)
Bulk density of fresh mortar (EN 1015-6) (kg/m^3):	1,650
Application temperature range:	from +5°C to +35°C
Workability time of fresh mortar (EN 1015-9):	approx. 40 minutes

FINAL PERFORMANCE (60% mixing water)		
Performance characteristic	**Test method**	**Performance of product**
Compressive strength after 28 days (N/mm^2):	EN 196-1	10
Reaction to fire:	EN 13501-1	class A1
Resistance to sulphates:	Anstett Test	high
Saline efflorescence (after semi-immersion in water):	/	absent

Mape-Antique F21

our latest version of the Material Safety Data Sheet.

PRODUCT FOR PROFESSIONAL USE.

WARNING
Although the technical details and recommendations contained in this product data sheet correspond to the best of our knowledge and experience, all the above information must, in every case, be taken as merely indicative and subject to confirmation after long-term practical application: for this reason, anyone who intends to use the product must ensure beforehand that it is suitable for the envisaged application: in every case, the user alone is fully responsible for any consequences deriving from the use of the product.

Please refer to the current version of the Technical Data Sheet, available from our website www.mapei.com

Our Commitment To The Environment
More than 150 MAPEI products assist Project Designers and Contractors create innovative LEED (The Leadership in Energy and Environmental Design) certified projects, in compliance with the U.S. Green Building Council.
GREEN INNOVATION

All relevant references for the product are available upon request and from www.mapei.com

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