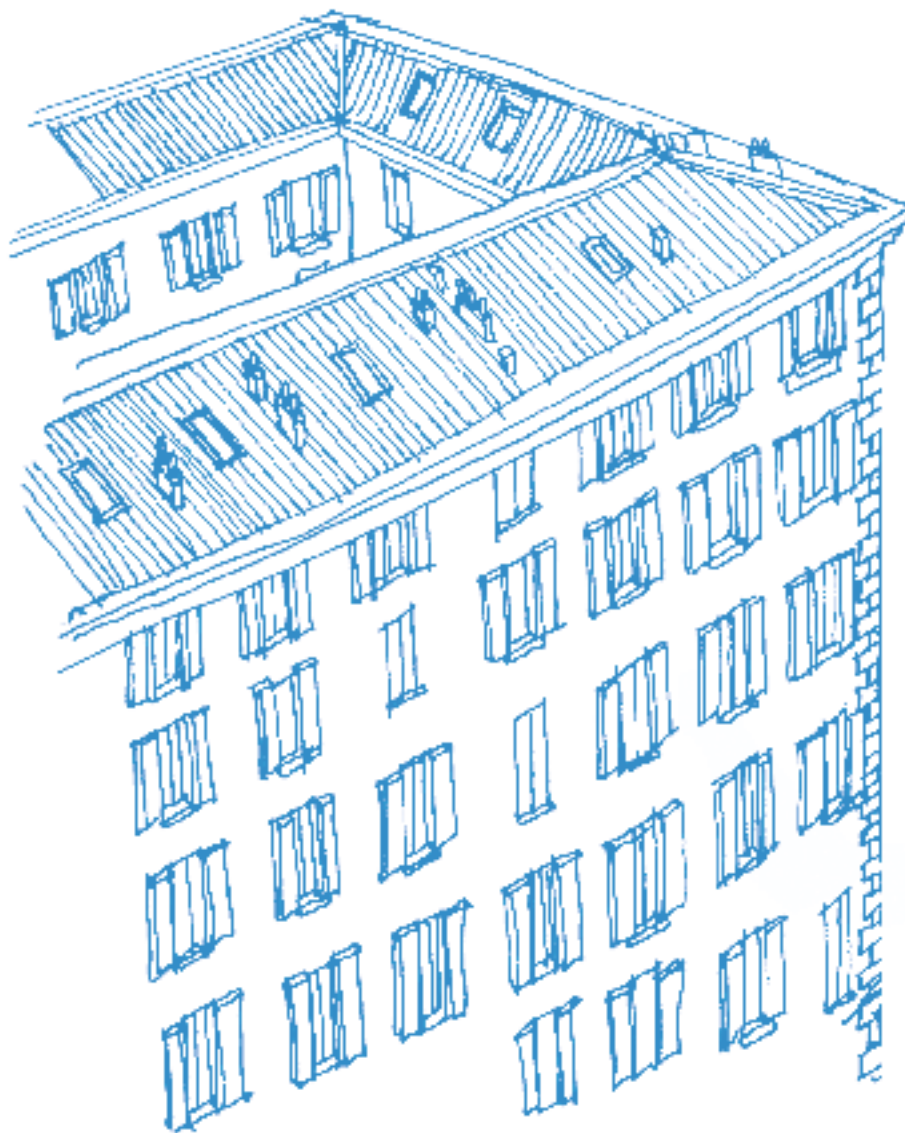


# *Mape-Antique*

**LIME-based, cement-free products and systems for restoring masonry buildings**

Consolidation, dehumidification, protection and decoration

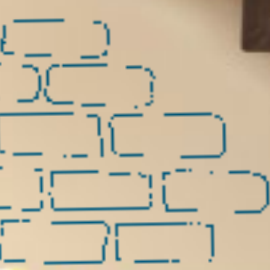






## *Mape-Antique*

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Eco-sustainable  
solutions  
for the quality  
of life



## Products and systems for restoring masonry buildings

The restoration of masonry buildings, whether they are residential ones or of historical and artistic interest, must only be carried out after establishing the exact cause of the deterioration or the actual state of the structure by means of a thorough visual inspection and, where necessary, diagnostic analysis. The correct intervention techniques and the most suitable materials for each phase of the intervention must then be identified, based on the performance requirements and characteristics of the products employed.

Apart from a brief description of the characteristics and properties of the MAPE-ANTIQUÉ range, this brochure also presents the products from the range divided into categories, and identifies for each product its areas of use, main data and final performance characteristics. All this is done to help specifiers, designers and users identify the most suitable material for restoration and renovation work on buildings.

The categories identified in this brochure are as follows:

- Injection slurries
- Binders for making mortars
- Mortars for dehumidifying renders
- Mortars for transpirant and “structural” renders
- Masonry mortars
- Skimming mortars
- Protective and waterproofing coating



Eco-sustainable  
solutions: turn  
every project  
into a success





## Rediscovering traditional binders: lime and pozzolan

Amongst the most antique components used to construct buildings, the first place without a doubt goes to lime in all its variations. The first documented evidence of the production and application of lime dates back to the Roman era. It is thanks to the publication of “De Architectura” by Vitruvio, around 13 B.C., that details have been passed down through the ages about not only the amount of lime and sand to be mixed together, but also on the preparation of hydraulic lime made by combining aerated lime with sand and purple-red volcanic tuffs; these ones have been taken from the Naples area, mainly Pozzuoli, from which the name “pozzolan” is derived (from its Latin name pulvis puteolana).

*“Pozzolan is a type of sand which seems to come from crushed pumice and porous lava spewed out by Vesuvius and other volcanic eruptions, and then spread by the winds over a considerable distance. This material took its name from the city of Pozzuoli, from where it would seem the Romans took the first batches and used it for the first time.”*

*(Vitruvio, Book II, Chapter VI)*

The preparation of mortar using aerated lime and volcanic sand, however, dates back to the Phoenicians, who were known as a highly advanced civilisation, and to which the melting and smelting of metals is attributed.

The knowledge about the production processes and use of lime binders was passed down to the Cretans and Etruscans and then to the Romans, who made wide use of it. It was the Romans who made improvements to the application phases and techniques of mortar, as well as to the various mixing ratios of the ingredients of mortar.

Today, apart from the different types of oven used and the way it is “slaked”, the production of lime is not different from the system used in the past by the Romans. In fact, the production of lime consists in breaking up selected limestone into rough chunks and then baking it at a high temperature (calcination takes place at around +900°C). This type of stone is extremely common and has a high calcium carbonate (CaCO<sub>3</sub>) content, around 95%, and less than 5% of impurities (mainly clay, as well as smaller traces of silica, iron oxide, magnesium carbonate, etc.), in particular the clayey one.

This process forms calcium oxide (CaO), also known as “quicklime”, and carbon dioxide. The “quicklime” is then made to react with water through a hydration process which generates a large amount of heat. This process is known as “slaking” the “quicklime”, and the material resulting from this process, known as “slaked lime”, is nothing more than hydrated lime [Ca(OH)<sub>2</sub> – calcium hydroxide]. Once it has been applied as masonry or render mortar, paint or a coating material,



the hydrated lime reacts with the carbon dioxide present in the surrounding atmosphere to form calcium carbonate again. This process, known as lime “carbonation”, is an extremely slow process which causes the product to harden. From a chemical-physical point of view, a compound forms at the end of this reaction which is similar to the one at the start of the entire process, but with a considerable loss in volume due to the mixing water evaporating off.

When hydrated lime is mixed with volcanic sand, pumice, fossil fragments and tuff (natural pozzolan), or with roof tiles, hollow flat tiles, furnace refuses with metakaolin and terracotta in the form of fragments or dust from baked, ground bricks or pottery (artificial pozzolan) or flying ashes, silica fumes and blast furnace slags (synthetic pozzolan), it develops hydraulic properties and, therefore, it has the capacity to set and harden in water. This process consists of a chemical reaction between calcium hydroxide  $\text{Ca}(\text{OH})_2$  and silica ( $\text{SiO}_2$ ) or alumina ( $\text{Al}_2\text{O}_3$ ), if required, which are present in the pozzolan, and with water, to form calcium silicate hydrates (C-S-H) and calcium alumina hydrates (C-A-H) which are stable in water. This reaction named pozzolanic activity or pozzolanic behaviour, is rather slow, and determines both the hardness of the mortar and higher mechanical strength, higher than the one of the lime itself.

The combined use of lime and pozzolan or terracotta guaranteed, therefore, that the mortar used in the past became particularly hard, so that today we can still admire imposing infrastructures which are still standing after so many centuries, such as roads, bridges and aqueducts, along with villas and monuments, all constructed during the period of the Roman Empire.







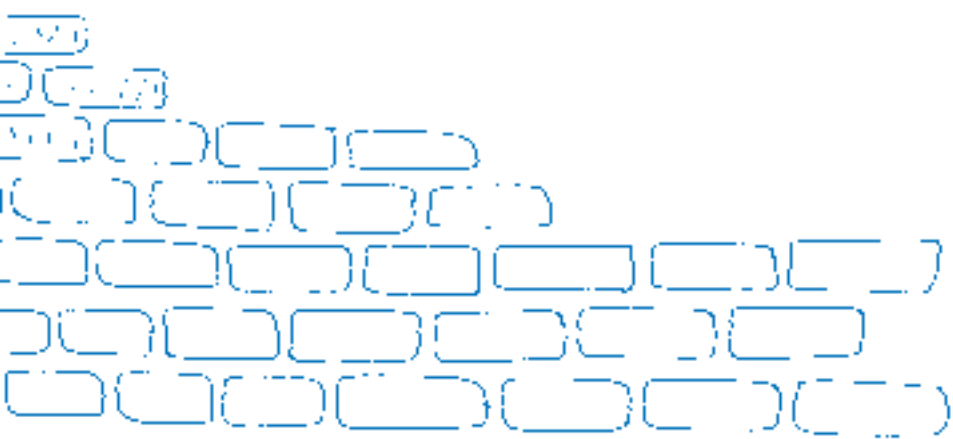
## **From traditional to modern pozzolan: Eco-Pozzolan**

The rediscovery of the extraordinary chemical and mechanical performance characteristics of lime combined with natural pozzolan or terracotta has inspired the Mapei Research & Development laboratories into developing innovative products and systems for the restoration of buildings, including those of historical and artistic interest, using “modern” pozzolanic materials. The result of the research work carried out is the use of a special product with a pozzolanic reaction, Eco-Pozzolan; a very light coloured inorganic material particularly rich in amorphous silica, with a highly-reactive, large specific surface area.

Thanks to these characteristics, Eco-Pozzolan has the capacity to set off the hardening process of the lime after a very short time, unlike in the past when the process was extremely slow, so that restoration mortar and injection slurries are highly resistant to soluble salts just a few days after application.

*Pieve di San Donato  
Polenta - Bertinoro  
(Forlì-Cesena) - Italy*





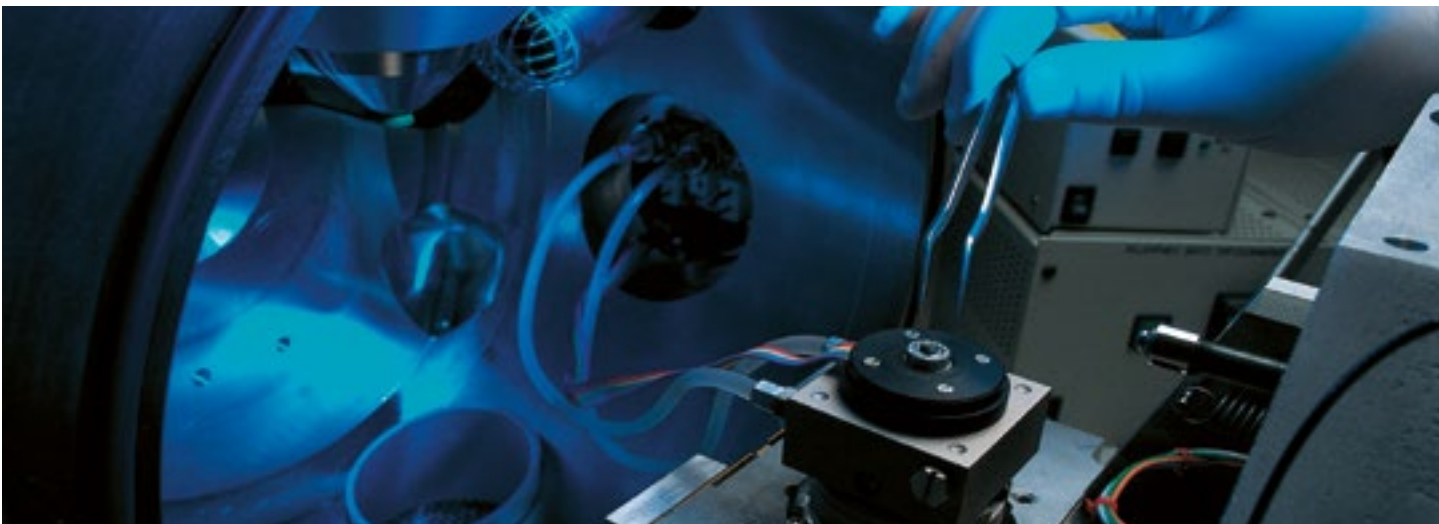
## What is Eco-Pozzolan?

With the term “ecological” we mean the branch of inter-disciplinary science which investigates environmental problems and possible ways of addressing imbalances. It has all to do with the relationship between living beings and organism and the surrounding environment. Other terminology is now commonly used too, such as ecological architecture, bio-architecture, bio-construction, sustainable building, etc. These terms are sometimes used improperly as synonyms, often as a support for advertising or commercial messages, yet they often have a precise meaning.

Amongst these terms, a particularly significant one is bio-construction. Used for the first time in Germany - *Baubiologie* – and then introduced in Italy at the beginning of the Nineties, it identifies a process whereby the attention is no longer on the building itself, but rather on its intended use. Bio-construction is based on the concept that man, buildings and the environment must live in perfect synergy and harmony. In fact, the suffix bio means “in favour of life” and, therefore, the term bio-construction in the everyday language means the use of technology and materials which respect people and their health, along with the environment in which new constructions are localised.

Two other words go hand in hand with bio-construction: eco-sustainability (which refers to the environment) and bio-compatibility (which refers to our health). It is precisely with their attention towards the environment on the one hand and the requirements of the modern building industry on the other, and particularly to improving living comfort, that the Mapei Research & Development laboratories have evaluated the characteristics of an eco-sustainable material: to construct by limiting the consumption of non-renewable resources, reduce its impact on

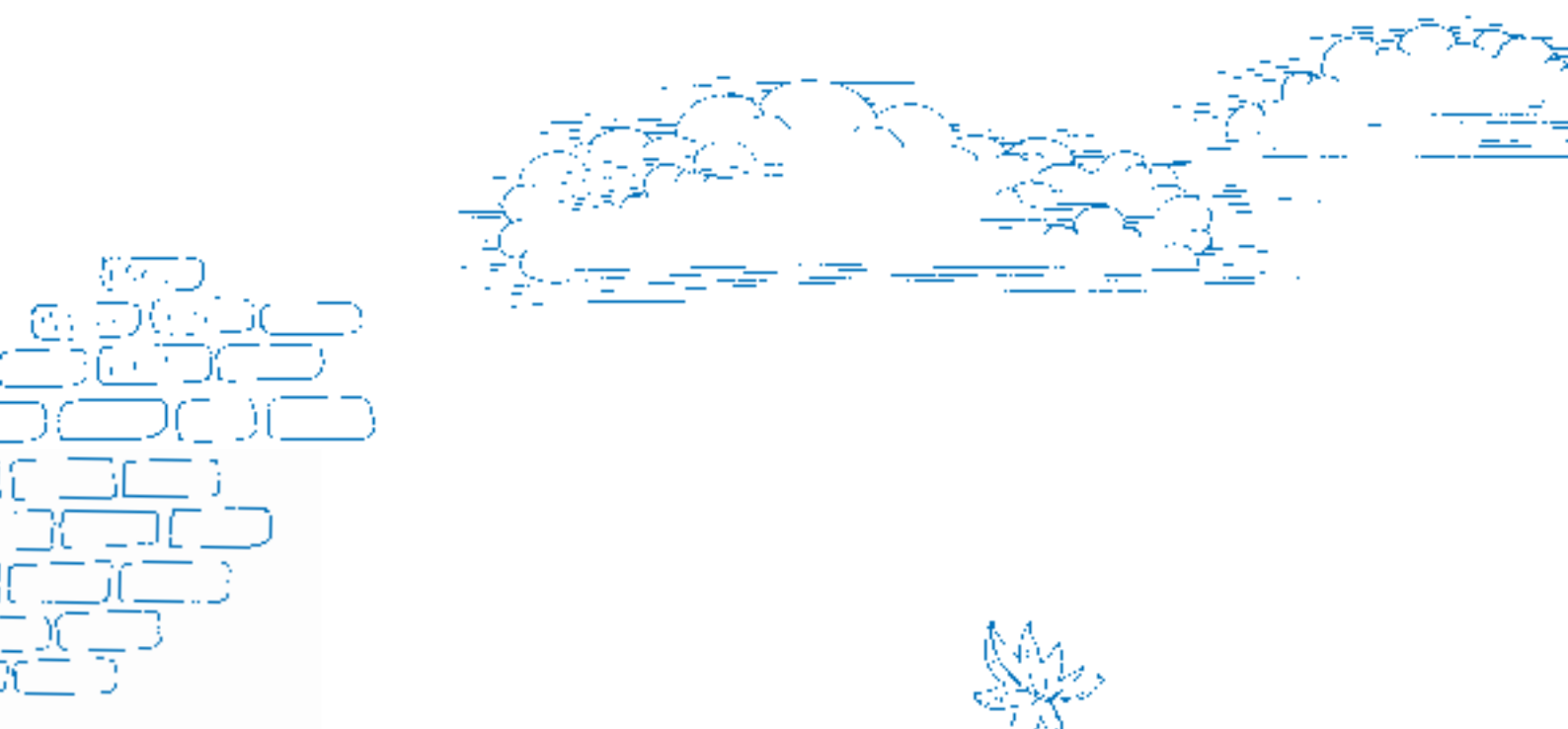
*FEG environmental scanning electron microscope (ESEM), used in the Mapei R&D laboratories*



the environment to a minimum and, at the same time, be bio-compatible by containing no volatile organic compounds (VOC). This product is Eco-Pozzolan. The aim of the latest directives is to considerably reduce emissions into the atmosphere, especially CO<sub>2</sub>, and promote the use of alternative energy.

Eco-Pozzolan has all the characteristics to be defined as an eco-sustainable material, in that its sustainability is inversely proportional to the amount of energy consumed. In fact, it is a product which is already present on the market and is the result of previous processes. As a result, it may be used without consuming any more energy either to produce it or make it suitable for use.

Also, Eco-Pozzolan, as volcanic sand and terracotta, has all the right properties to make a system based on lime, which we know is an aerated binder, into a hydraulic system. If combined with lime, this light-coloured product, particularly rich in amorphous silica with a highly-reactive large specific surface area, has the capacity of setting off the hardening process of the material after a very short time, reacting with the “free” lime present and completely “consuming” it after just a few days. Apart from the hardness of the mortar, this reaction also makes the mortar stronger, homogenises its chemical and physical characteristics, makes it insensitive to the leaching action of rain and gives it high chemical resistance to both aggressive atmospheric agents and soluble salts.

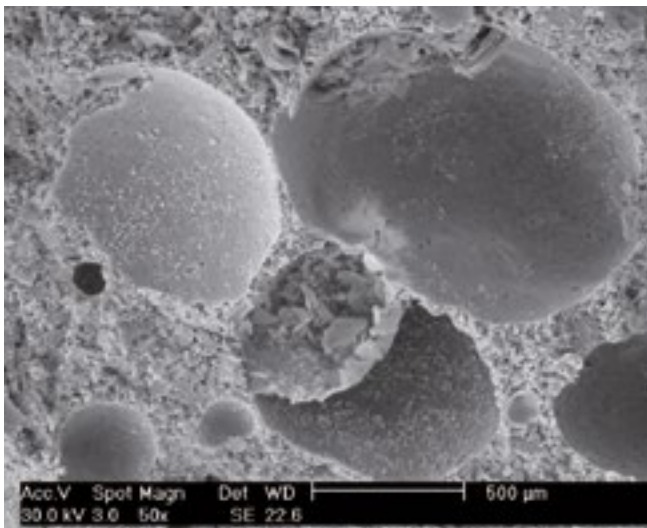


## **Mape-Antique range: Technology that respects tradition**

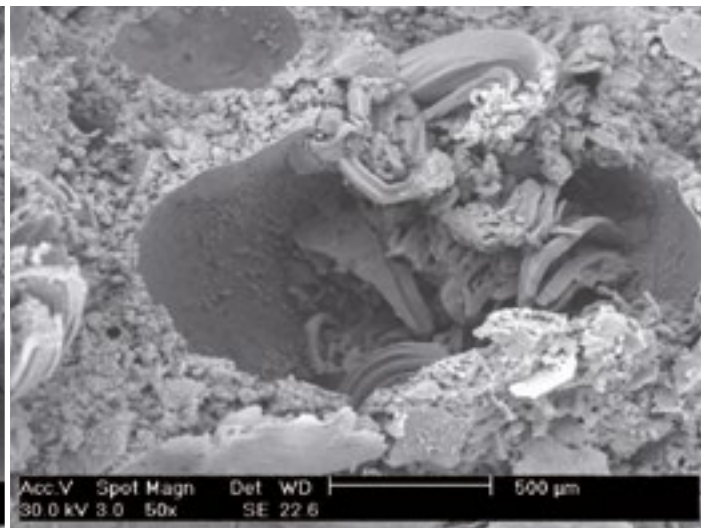
The combined use of lime and Eco-Pozzolan has led to Mapei formulating a specific range of dedicated products called MAPE-ANTIQUÉ for the consolidation and restoration of brick, stone, tuff and mixed masonries, including the masonries of buildings of historical or artistic interest.

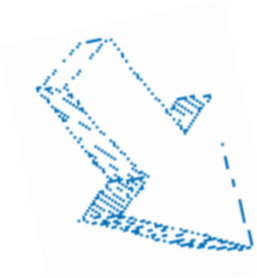
The products in the MAPE-ANTIQUÉ range have physical and mechanical characteristics similar to masonry and render mortars used in the past and, as such, they are more compatible with any type of original structure. At the same time, they have high mechanical strength and resistance to the aggressive chemical action from both the environment, such as acid rain, freeze-thaw cycles and pollutant gases, and from within the masonries itself, such as soluble salts and damp. Thanks to their macroporous structure (photo 1) in the case of dehumidifying renders, most of the products in the MAPE-ANTIQUÉ range are highly transpirant and porous, with a much higher capacity to encourage the evaporation of water from the masonries compared with traditional cementitious or lime-cement render mortars. Whether humidity or damp is caused by weather conditions or rising damp, this process allows damp structures to dry off and provide healthier, more comfortable surroundings. Also, if soluble salts are present in the masonries, they crystallise in the macropores (photo 2) without generating stresses which could potentially deteriorate the renders. Unlike mortars normally used for repair work, such as those made

*PHOTO 1 - Macropores in dehumidifying mortar from the MAPE-ANTIQUÉ range*



*PHOTO 2 - Crystallisation of salts in the macropores of dehumidifying mortar from the MAPE-ANTIQUÉ range*





from hydraulic lime and natural hydraulic lime which has levels of residual "free lime" for longer, and which also harden through a process of carbonation (see EN 459-1), the reaction between lime and Eco-Pozzolan forms silica-alumina compounds whereby the "free" lime is completely "consumed" after just a few days, so that restoration mortar and injected slurries are completely resistant to soluble salts usually present in the masonries. The mortars mentioned previously, however, even if they are sufficiently porous and mechanically compatible with the materials originally used, are not immune to the risk of aggression from chemicals.

In fact, the "free" lime contained in these materials may chemically react with the sulphates in the masonries and with C-A-H (calcium alumina hydrates) and C-S-H (calcium silica hydrates) in the original mortar or in mortar used for repair, to produce compounds called *ettringite* and *thaumasite*, which then expand and cause the renders to crack and/or crumble.

With the products in the MAPE-ANTIQUÉ range, on the other hand, this phenomenon does not occur because there is absolutely no "free" lime after just a few days. From a morphological point of view, it is thanks to this particular characteristic that the structure of the products from the MAPE-ANTIQUÉ range is similar to that of "historical mortar" made from aerated lime and pozzolan, but which only forms after a number of years (photos 3 and 4).

PHOTO 3 - Micrograph of ancient mortar. Notice how the amorphous mass is completely carbonated

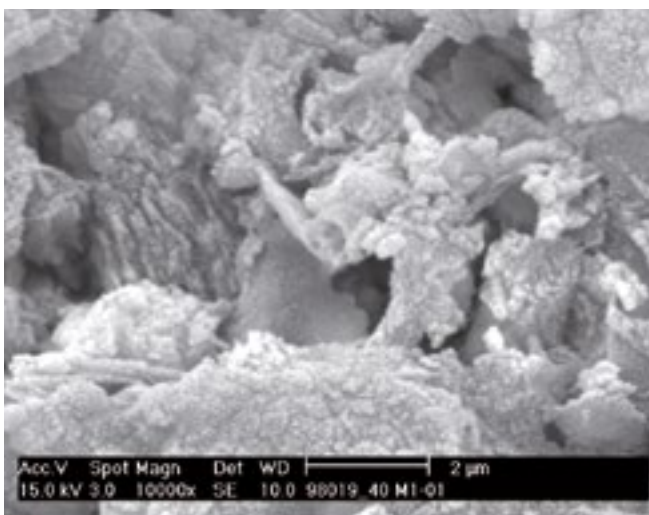


PHOTO 4 - Micrograph of MAPE-ANTIQUÉ mortar after 8 days of "ageing". Notice the rounded structure typical of a stabilised system





## ***Mape-Antique range: properties***

*Former Cerere pasta works  
Rome - Italy*

- Mechanical strength similar to the one of traditional hydrated lime and hydraulic lime-based systems.
- Elastic and mechanical properties compatible with those of the materials originally used to construct buildings.
- Workability similar to the one of the highest quality hydrated lime-based systems.
- Highly transpirant and porous, with the capacity to eliminate the risk of condensation forming on the surface, meaning healthier, more comfortable surroundings.
- High resistance to soluble salts, thanks to the chemical reaction between the lime and the Eco-Pozzolan, which “consumes” all the “free” lime very quickly.
- No alkali-aggregate reaction.
- Negligible thermal conductivity due to the low level of “free” lime, which also eliminates the formation of efflorescence.
- It may be tinted on site with coloured powders or oxides.



## **Mape-Antique range: a system perfected and consolidated through more than 20 years of experience\***

*Rocca di San Floriano - San Floriano (Gorizia) Italy*



*Ancient apartment block in Pisa - Italy*



*Cathedral of Santa Margherita Montefiascone (Viterbo) - Italy*



*Duchy of Canevaro Zoagli Castle (Genoa) - Italy*



*Balbanello Villa Como - Italy*



*Ancient building in Florence - Italy*



*Hotel Mirò - Rapallo (Genoa) - Italy*



*National School of the Arts - Havana Cuba*



**1992**

**1993**

**1994**

**1995**

**1996**

**1997**

**1998**

**1999**

**2000**

**2001**

**2002**

**2003**



*Ancient building in Bagnacavallo (Ravenna) Italy*



*Church of Santa Giulia, Livorno - Italy*



*San Paternian Bridge, Venice - Italy*



*Basilica of San Francesco d'Assisi Assisi - Italy*



*Spilberk Castle Brno - Czech Republic*



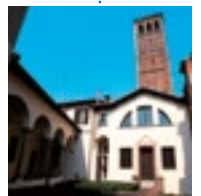
*Palazzo Bonini, Massa Carrara Italy*



*St. Apollinare, Ravenna - Italy*



*Acaya Castle Venerole (Lecce) Italy*



*Oratory of the Passion, St. Ambrogio - Milan Italy*

\* Reference projects carried out using products from the Mape-Antique range





*Cambrai Railway Station - France*



*Negova Castle Slovenia*

*Corpus Christi Convent - Vila Nova de Gaia - Portugal*

*Le 5 Corti apartment complex Varese - Italy*

*Carlo Bridge Prague - Czech Republic*

*Palazzo dei Normanni - Palermo Italy*



*Pieve di San Donato a Polenta - Bertinoro (Forlì-Cesena) - Italy*



*Casa degli artisti Milano - Italy*



*Victoria Theatre Singapore*



2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017



*Palazzo Zaccagna Carrara (Messina) Italy*



*Tosi Residence Sassuolo (Modena) Italy*



*"Minuto Pesce" Town Square Molfetta (Bari) - Italy*



*Jesuit Fathers Monastery - Poland*



*Incis residential complex Campobasso - Italy*



*Sanctuary "Santa Maria del Fonte" Caravaggio (BG) Italy*



*Monastery of St. Benedict Norcia (PG) - Italy*

## **Mape-Antique range: A host of products and solutions for all your needs**

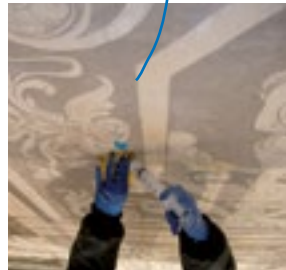
Injecting consolidating slurry into a rubble masonry



Pointing between brickwork



Re-establishing the adhesion of a render



Macroporous dehumidifying render



Application of a transpirant undercoat/base coat



"Reinforced" render



Reconstructing a masonry wall



Spreading a transpirant, smooth texture skim coat

Application of a "scratch-coat" layer



Building a facing wall



Pointing "an exposed" masonry



Applying a scratch coat



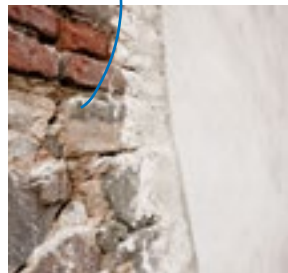
Cladding work



Waterproofing and protecting a "cover"



Dehumidifying render mixed on site



Reconstructing a masonry wall



Restoring the adhesion between masonry and frescoed render



Injecting consolidating slurry into masonry



Pointing between brickwork





## **Mape-Antique range: The products**

The MAPE-ANTIQUE range includes super-fluid, volumetrically-stable, injectable fillerized slurries, binders to be mixed with assorted aggregates on site to make mortars, macroporous dehumidifying mortars, transpirant and “structural” mortars, masonry mortars and skimming mortars in various textures and colours. All the products in the range are **cement-free** and are based on **lime** and **Eco-Pozzolan**, and their transpiration capacity, porosity, thermal conductivity and very low emission of volatile organic compounds (VOC) meet today’s application requirements and the fundamental principles of eco-sustainability to protect the environment, and bio-compatibility to safeguard people’s health. Also, their elastic and mechanical properties are similar to those of existing masonries, including the ones of historical and artistic interest.

### **Injection slurries**

Mape-Antique I	page 23
Mape-Antique I-15	page 25
Mape-Antique F21	page 27

### **Binder for making mortars**

Mape-Antique LC	page 29
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### **Mortars for dehumidifying renders**

Mape-Antique Rinzafo	page 35
Mape-Antique CC	page 37
Mape-Antique MC	page 39
Mape-Antique MC Macchina	page 41

### **Mortars for transpirant and structural renders**

Mape-Antique Intonaco NHL	page 45
Mape-Antique Strutturale NHL	page 49

### **Masonry mortars**

Mape-Antique Colabile	page 55
Mape-Antique Allettamento	page 59
Mape-Antique Strutturale NHL	page 61

### **Skimming mortars**

Mape-Antique FC Ultrafine	page 63
Mape-Antique FC Civile	page 65
Mape-Antique FC Grosso	page 67

### **Protective and waterproofing coating**

Mape-Antique Ecolastic	page 69
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## Consolidation of a cracked wall



**1** Brickwork vaulted roof

**2** *Mape-Antique Allettamento*

**3** *Mape-Antique F21*

**4** *Mape-Antique Intonaco NHL*

**5** *Silancolor Base Coat*

**6** *Silancolor Tonachino*



#### **Pointing mortar**

- Highly transpirant
- High chemical and mechanical resistance
- It does not induce the formation of efflorescence
- It does not release soluble salts



#### **Injection slurry**

- High chemical and mechanical resistance to soluble salts
- Volumetrically stable
- It does not induce the formation of efflorescence
- Recommended for small cavities



#### **Transpirant render**

- It impedes the formation of mould and bacteria
- It does not release soluble salts
- It prevents the formation of surface condensation



#### **Silicate-based undercoat**

- Highly transpirant
- High filling capacity
- Excellent adhesion
- It does not change over the years



**Caen Castle - Caen - France**

***Intervention***

*Consolidation and safety work on the north-western section of the castle ramparts by injecting a super-fluid, cement-free, volumetrically-stable slurry to bring the structure back to its original state.*





## Mape-Antique I



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



### Areas of use

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

- foundations, pillars, vaulted roofs and archways;
- “rubble masonries”;
- stone, brick, tuff and mixed masonries in general of existing buildings with cracks, voids and internal cavities, including buildings with a national heritage protection order and listed buildings;
- masonries with capillary rising damp and soluble salts

### Product details, application guide and final performance data

Maximum size of aggregate:	100 µm (EN 1015-1)
Bulk density of fresh mortar:	1,900 kg/m <sup>3</sup> (EN 1015-6)
Appearance of mix:	Super-fluid
Bleeding:	Absent (NorMaL M33-87)
Fluidity of mix:	< 30 s (initial) (EN 445) < 30 s (after 60 min.)
Compressive strength (after 28 days):	18 N/mm <sup>2</sup> (EN 196-1)
Reaction to fire:	Class A1 (EN 13501-1)
Resistance to sulphates:	High (Anstett test method)
Saline efflorescence (after semi-immersion in water):	Absent



### Packaging

20 kg bags

### Colour

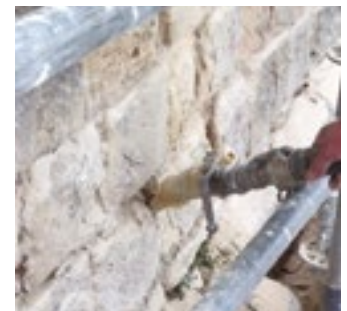
White

### Consumption

approx. 1.40 kg/dm<sup>3</sup>  
(of cavities to be filled)

### Application

By injection or pouring



Consolidation of “rubble masonry” stone masonry



Consolidation of a brick parapet wall

Injection slurries

Binder for making mortars

Mortars for dehumidifying render

Mortars for transparent and structural renders

Masonry mortars

Skimming mortars

protective waterproofing coating



**Parish Church – San Marco in Preturo (L'Aquila) - Italy**

***Intervention***

*Consolidation of masonry by injecting super-fluid, volumetrically-stable, guaranteed-performance bonding slurry.*



## Mape-Antique I-15



Salt-resistant, fillerized hydraulic binder, based on lime and Eco-Pozzolan, for making highly-fluid injection slurry for consolidating masonry



### Areas of use

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

- foundations, pillars, vaulted roofs and archways;
- “rubble masonries”;
- masonry in general made from stone, bricks, tuff and mixed materials where cracks, gaps and internal cavities in existing buildings are present, including buildings with a national heritage protection order and listed buildings;
- masonry with capillary rising damp and/or contaminated by soluble salts.

### Product details, application guide and final performance data

Maximum size of aggregate:	100 µm (EN 1015-1)
Bulk density of wet mortar:	1,950 kg/m <sup>3</sup> (EN 1015-6)
Consistency of mix:	Super-fluid
Bleeding:	Absent (NorMaL M33-87)
Fluidity of mix:	< 30 s (initial) (EN 445) < 30 s (after 60 min.)
Compressive strength (after 28 days):	15 N/mm <sup>2</sup> (EN 196-1)
Reaction to fire:	Class A1 (EN 13501-1)
Resistance to sulphates:	High (Anstett test method)
Saline efflorescence (after semi-immersion in water):	Absent



**Packaging**  
20 kg bags

**Colour**  
White

**Consumption**  
approx. 1.50 kg/dm<sup>3</sup>  
(of cavities to be filled)

**Application**  
By injection or pouring



Fastening the small rubber injection tubes in place



Injecting Mape-Antique I-15

Injection slurries

Binder for making mortars

Mortars for dehumidifying render

Mortars for transparent and structural renders

Masonry mortars

Skimming mortars

protective waterproofing coating



## **Basilica of St. Francesco and Holy Convent - Assisi - Italy**

### ***Intervention***

*Consolidation of the internal and external faces of the vaulted roofs with frescoes by Giotto and Cimabue in the Upper Basilica, by injecting a cement-free, super-fluid, volumetrically-stable slurry to fill the cracks and internal cavities and to re-establish the adhesion between portions of detached frescoed renders and the masonries. Other interventions included the repair and reconstruction of collapsed roofs and strengthening to the entire vaulted roof structure.*



## 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



### Areas of use

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

- foundations, pillars, vaulted roofs and archways;
- “rubble masonries” and stone, brick, tuff and mixed masonries in general of existing buildings with cracks, voids and internal cavities, including buildings with a national heritage protection order and listed buildings;
- masonries with capillary rising damp and soluble salts;
- structures with frescoes;
- renders detached from masonries, including renders with frescoes or of historical and artistic interest.

### Product details, application guide and final performance data

Maximum size of aggregate:	100 µm (EN 1015-1)
Bulk density of fresh mortar:	1,650 kg/m <sup>3</sup> (EN 1015-6)
Appearance of mix:	Super-fluid
Bleeding:	Absent (NorMaL M33-87)
Fluidity of mix:	< 30 s (initial) < 30 s (after 60 min.) (EN 445)
Compressive strength (after 28 days):	10 N/mm <sup>2</sup> (EN 196-1)
Reaction to fire:	Class A1 (EN 13501-1)
Resistance to sulphates:	High (Anstett test method)
Saline efflorescence (after semi-immersion in water):	Absent



### Packaging

17 kg bags

### Colour

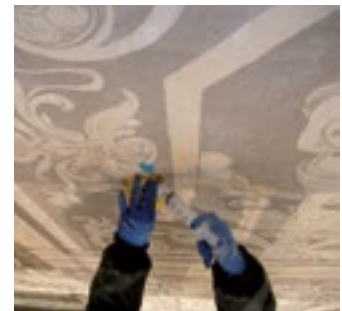
White

### Consumption

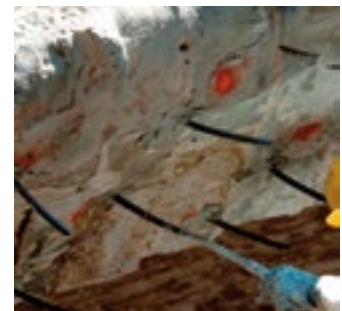
1.04 kg/dm<sup>3</sup> (of cavities to be filled)

### Application

By injection or pouring



Re-establishing the adhesion of decorated render



Consolidation of stone masonry

Injection slurries

Binder for making mortars

Mortars for dehumidifying render

Mortars for transparent and structural renders

Masonry mortars

Skimming mortars

protective waterproofing coating



**Ferdinando of Savoia barracks - Rome - Italy**

***Intervention***

*Interventions were carried out on F block which houses the administration offices, and comprised consolidation of the vaulted and wooden roofs and patching-up the walls and making them plumb. Other operations have been the installation of the new flooring.*

## Mape-Antique LC



Salt-resistant, hydraulic binder based on lime and Eco-Pozzolan, to be mixed with aggregates in various grain sizes to make dehumidifying renders and masonry mortars



### Areas of use

- Macroporous, dehumidifying mortars for the restoration of masonries deteriorated by capillary rising damp and soluble salts on existing buildings, including buildings with a national heritage protection order and listed buildings.
- Constructing new dehumidifying renders or reconstructing existing lime-based renders on stone, brick, tuff and mixed masonries.
- Masonries mortars for building and/or reconstructing stone, brick, tuff and mixed facing walls.
- Masonries mortars for pointing between stone, brick, tuff and mixed “exposed” masonries on facing walls.
- Masonries mortar for touching-up and plumbing facing walls with gaps and/or uneven surfaces.

### Product details, application guide and final performance data

#### Mix No. 1

MAPE-ANTIQUÉ LC	500 kg/m <sup>3</sup>
Fine sand 0.5-2.5 mm	1,000 kg/m <sup>3</sup>
Water	225 l/m <sup>3</sup>
Bulk density of fresh mortar:	1,725 kg/m <sup>3</sup> (EN 1015-6)
Appearance of mix:	Plastic-thixotropic
Compressive strength (after 28 days):	4 N/mm <sup>2</sup> (EN 1015-11)
Adhesion to substrate (brickwork):	> 0.3 Failure mode (FP) = B (EN 1015-12)
Thermal conductivity ( $\lambda_{10, dry}$ ):	0.70 W/m·K (EN 1745)
Reaction to fire:	Class A1 (EN 13501-1)
Resistance to sulphates:	High (Anstett test method)
Saline efflorescence (after semi-immersion in water):	Absent



### Packaging

20 kg bags

### Colour

White

### Consumption

According to the type of mortar to be prepared. Approximate consumption (per cm of thickness):

- 5.0 kg/m<sup>2</sup>  
(with fine sand 0.5-2.5 mm)
- 4.5 kg/m<sup>2</sup>  
(with coarse sand 0.5-5 mm)
- 4.0 kg/m<sup>2</sup>  
(with gravel 0-8 mm)

### Application

By trowel or by pouring into formwork



Application of dehumidifying render



Compacting the dehumidifying render with a straightedge

Injection slurries

Binder for making mortars

Mortars for dehumidifying render

Mortars for transparent and structural renders

Masonry mortars

Skimming mortars

protective waterproofing coating

## Mape-Antique LC

### Mix No. 2

MAPE-ANTIQUÉ LC	450 kg/m <sup>3</sup>
Coarse sand 0.5-5 mm	1,150 kg/m <sup>3</sup>
Water	210 l/m <sup>3</sup>
Bulk density of fresh mortar:	1,810 kg/m <sup>3</sup> (EN 1015-6)
Appearance of mix:	Plastic-thixotropic
Compressive strength (after 28 days):	5 N/mm <sup>2</sup> (EN 1015-11)
Adhesion to substrate (brickwork):	> 0.3 Failure mode (FP) = B (EN 1015-12)
Thermal conductivity ( $\lambda_{10,dry}$ ):	0.77 W/m·K (EN 1745)
Reaction to fire:	Class A1 (EN 13501-1)
Resistance to sulphates:	High (Anstett test method)
Saline efflorescence (after semi-immersion in water):	Absent



Casting mortar into formwork



Reconstructing masonry



Pointing between brickwork



### Carlo Bridge - Prague - Czech Republic

#### Intervention

Repositioning the original blocks of sandstone and new mortar and repairs to the mortar between the rows of stone using a masonry mortar mixed on site with locally-sourced aggregates. Repair work was also carried out around the pillars below the water line.



**Mix No. 3**

MAPE-ANTIQUE LC	400 kg/m <sup>3</sup>
Gravel 0-8 mm	1,300 kg/m <sup>3</sup>
Water	200 l/m <sup>3</sup>
Density of mix:	1,900 kg/m <sup>3</sup> (EN 1015-6)
Appearance of mix:	Plastic-thixotropic
Compressive strength (after 28 days):	7 N/mm <sup>2</sup> (EN 1015-11)
Adhesion to substrate (brickwork):	> 0.3 Failure mode (FP) = B (EN 1015-12)
Thermal conductivity ( $\lambda_{10, dry}$ ):	0.83 W/m-K (EN 1745)
Reaction to fire:	Class A1 (EN 13501-1)
Resistance to sulphates:	High (Anstett test method)
Saline efflorescence (after semi-immersion in water):	Absent



Injection  
slurries

Binder for  
making mortars

Mortars for  
dehumidifying render

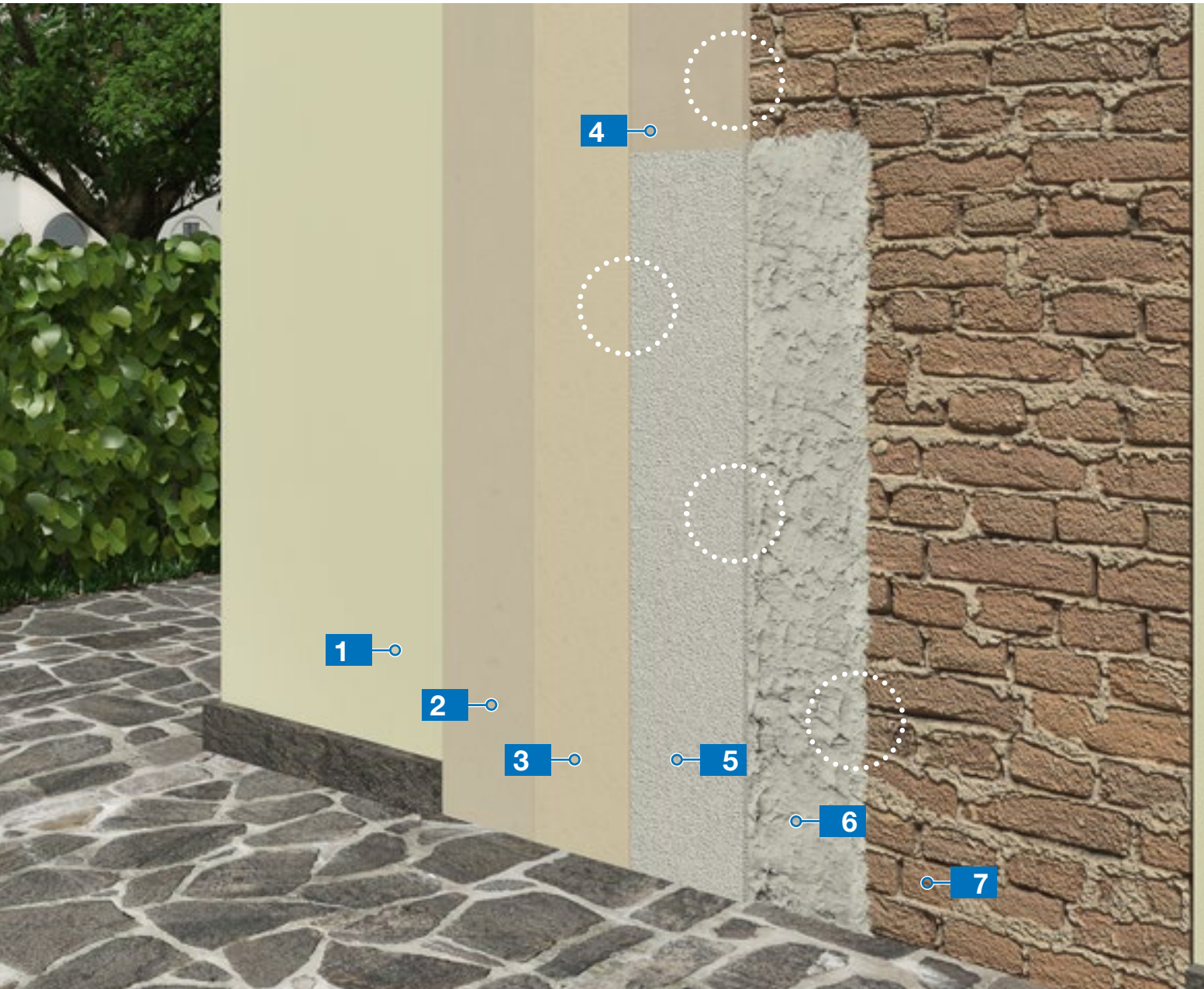
Mortars for transparent  
and structural renders

Masonry  
mortars

Skimming  
mortars

protective  
waterproofing coating

## Renovating masonry with rising damp



- 1** *Silexcolor Pittura*
- 2** *Silexcolor Primer*
- 3** *Mape-Antique FC Civile*
- 4** *Mape-Antique Intonaco NHL*

- 5** *Mape-Antique MC*
- 6** *Mape-Antique Rinzafo*
- 7** **Brickword substrate**



***Transpirant render***

- It impedes the formation of mould and bacteria
- It does not release soluble salts
- It prevents the formation of surface condensation



***Transpirant skimming layer***

- Highly transpirant
- High chemical resistance to soluble salts
- Natural finish



***De-humidifying base render***

- Highly transpirant and porous
- It promotes the drying of damp walls
- High chemical resistance to soluble salts



***Transpirant scratch-coat layer***

- Improved render's adhesion
- It evens out the absorption of substrates
- High chemical resistance to soluble salts
- It slows down the transfer of salts



### **Jesuit Fathers Monastery – Stara Weis - Poland**

#### ***Intervention***

*Installation of a horizontal chemical barrier to reduce the amount of damp in the masonries as much as possible. Reconstruction of the areas where the old renders had been removed and application of a new, macroporous dehumidifying renders. Application of a thin layer of coloured siloxane-based coating paste on all the surfaces.*

## Mape-Antique Rinzafo



Salt-resistant, transpirant scratch-coat mortar, based on lime and Eco-Pozzolan, used as first layer when applying dehumidifying, transpirant and “structural” renders



### Areas of use

MAPE-ANTIQUÉ RINZAFFO must be used as the first layer for the following:

- internal and/or external macroporous, dehumidifying renders on existing masonries with capillary rising damp;
- internal and/or external macroporous, dehumidifying renders on stone, brick, tuff or mixed masonries with saline efflorescence;
- dehumidifying renders on masonries in lagoon areas or close to the sea;
- new dehumidifying renders or reconstruction of old lime-based renders on stone, brick, tuff and mixed masonries, including buildings with a national heritage protection order and listed buildings;
- new transpirant and “structural” renders on particularly difficult masonries, such as in stone or mixed material, or on porous or weak masonries.

### Product details, application guide and final performance data

Maximum size of aggregate:	2.5 mm (EN 1015-1)
Bulk density of fresh mortar:	1,850 kg/m <sup>3</sup> (EN 1015-6)
Appearance of mix:	Semi-fluid
Porosity of fresh mortar:	6% (EN 1015-7)
Compressive strength (after 28 days):	>10 N/mm <sup>2</sup> (EN 1015-11) Category CS IV
Adhesion to substrate (brickwork):	≥ 0.7 N/mm <sup>2</sup> Failure mode (FP) = B (EN 1015-12)
Capillary action water absorption:	Category W 1 (EN 1015-18)
Coefficient of permeability to water vapour:	≤ 30 μ (EN 1015-19)
Thermal conductivity (λ <sub>10,dry</sub> ):	0.73 W/m·K (EN 1745)
Reaction to fire:	Class E (EN 13501-1)
Resistance to sulphates:	High (Anstett test method)
Saline efflorescence (after semi-immersion in water):	Absent



### Packaging

20 kg bags

### Colour

White

### Consumption

7.5 kg/m<sup>2</sup>  
(for a 5 mm thick layer)

### Application

By trowel or with a continuous-mixing rendering machine



Application of a scratch-coat layer by trowel



Application of a scratch-coat layer with a rendering machine

Injection slurries

Binder for making mortars

Mortars for dehumidifying render

Mortars for transpirant and structural renders

Masonry mortars

Skimming mortars

protective waterproofing coating



**Palazzo Orsucci - Lucca - Italy**

***Intervention***

*Pointing between the rows of bricks of exposed masonries and treatment with a water-repellent product. Application of macroporous, dehumidifying renders and potassium silicate-based paint. Other interventions have been the installation of new screeds and of the flooring and waterproofing treatment for some of the concrete structures below ground level*

## Mape-Antique CC



Macroporous, salt-resistant dehumidifying render, based on lime and Eco-Pozzolan, for restoring old masonry, including on buildings of historical interest



### Areas of use

- Internal and/or external macroporous, dehumidifying renders for existing masonries with capillary rising damp.
- Internal and/or external macroporous, dehumidifying renders on existing stone, brick, tuff or mixed masonries with saline efflorescence.
- Dehumidifying renders for masonries in lagoon areas or close to the sea.
- New dehumidifying renders or reconstructing existing lime-based renders for stone, brick, tuff and mixed masonries, including buildings with a national heritage protection order and listed buildings.
- “Plumbing” and “touching up” facing walls with gaps and uneven surfaces.
- Pointing between rows of stone, brick and tuff on “exposed” masonries.

### Product details, application guide and final performance data

Maximum size of aggregate:	2.5 mm (EN 1015-1)
Bulk density of fresh mortar:	1,700 kg/m <sup>3</sup> (EN 1015-6)
Appearance of mix:	Plastic-thixotropic
Porosity of fresh mortar:	> 20% (EN 1015-7)
Compressive strength (after 28 days):	Category CS II (EN 1015-11)
Adhesion to substrate:	≥ 0.4 N/mm <sup>2</sup> Failure mode (FB) = B (EN 1015-12)
Capillary action water absorption:	3.5 kg/m <sup>2</sup> (EN 1015-18)
Coefficient of permeability to water vapour:	≤ 10 μ (EN 1015-19)
Thermal conductivity (λ <sub>10,dry</sub> ):	0.61 W/m·K (EN 1745)
Reaction to fire:	Class A1
Resistance to sulphates:	High (Anstett test method)
Saline efflorescence (after semi-immersion in water):	Absent



### Packaging

25 kg bags

### Colour

Light pink

### Consumption

15 kg/m<sup>2</sup>  
(per cm of thickness)

### Application

Trowel



Compacting the dehumidifying render with a straightedge



Pointing between brickwork

Injection slurries

Binder for making mortars

Mortars for dehumidifying render

Mortars for transparent and structural renders

Masonry mortars

Skimming mortars

protective waterproofing coating



**Bard Fortress - Bard (Aosta) - Italy**

***Intervention***

*New macroporous, dehumidifying renders inside the fortress in the area known as Opera Ferdinando. Other operations have been the installation of new flooring.*



## Mape-Antique MC



Macroporous, salt-resistant dehumidifying render, based on lime and Eco-Pozzolan, for restoring old masonry, including on buildings of historical interest



### Areas of use

- Internal and/or external macroporous, dehumidifying renders on existing masonries with capillary rising damp.
- Internal and/or external macroporous, dehumidifying renders on existing stone, brick, tuff or mixed masonries with saline efflorescence.
- Dehumidifying renders for masonries in lagoon areas or close to the sea.
- New dehumidifying renders or reconstructing old lime-based renders on stone, brick, tuff and mixed masonries, including buildings with a national heritage protection order and listed buildings.
- “Plumbing” and “touching up” facing walls with gaps and uneven surfaces.
- Pointing between rows of stone, brick and tuff on “exposed” masonries.

### Product details, application guide and final performance data

Maximum size of aggregate:	2.5 mm (EN 1015-1)
Bulk density of fresh mortar:	1,700 kg/m <sup>3</sup> (EN 1015-6)
Appearance of mix:	Plastic-thixotropic
Porosity of fresh mortar:	> 20% (EN 1015-7)
Compressive strength (after 28 days):	Category CS II (EN 1015-11)
Adhesion to substrate:	≥ 0.4 N/mm <sup>2</sup> Failure mode (FB) = B (EN 1015-12)
Capillary action water absorption:	3.5 kg/m <sup>2</sup> (EN 1015-18)
Coefficient of permeability to water vapour:	≤ 10 μ (EN 1015-19)
Thermal conductivity (λ <sub>10,dry</sub> ):	0.61 W/m·K (EN 1745)
Reaction to fire:	Class A1
Resistance to sulphates:	High (Anstett test method)
Saline efflorescence (after semi-immersion in water):	Absent



### Packaging

25 kg bags

### Colour

White

### Consumption

15 kg/m<sup>2</sup>  
(per cm of thickness)

### Application

Trowel



Compacting the dehumidifying render with a straightedge



Levelling off the dehumidifying render

Injection slurries

Binder for making mortars

Mortars for dehumidifying render

Mortars for transparent and structural renders

Masonry mortars

Skimming mortars

protective waterproofing coating



**Private farm - Robbiano di Mediglia (Milan) - Italy**

***Intervention***

*New macroporous, dehumidifying renders on the lower areas of the building with capillary rising damp and transpirant renders on all the other surfaces. The surfaces were then decorated with siloxane-based coating paste after applying a base layer of coloured filler.*

## Mape-Antique MC Macchina



Macroporous, salt-resistant, de-humidifying render, based on lime and Eco-Pozzolan, for restoring old masonry, including on building of historical interest



### Areas of use

- Internal and/or external macroporous, dehumidifying renders on existing masonries with capillary rising damp.
- Internal and/or external macroporous, dehumidifying renders on existing stone, brick, tuff or mixed masonries with saline efflorescence.
- Dehumidifying renders for masonries in lagoon areas or close to the sea.
- New dehumidifying renders or reconstructing existing lime-based renders on stone, brick, tuff and mixed masonries, including buildings with a national heritage protection order and listed buildings.

### Product details, application guide and final performance data

Maximum size of aggregate:	2.5 mm (EN 1015-1)
Bulk density of fresh mortar:	1,700 kg/m <sup>3</sup> (EN 1015-6)
Appearance of mix:	Plastic-thixotropic
Porosity of fresh mortar:	> 20% (EN 1015-7)
Compressive strength (after 28 days):	Category CS II (EN 1015-11)
Adhesion to substrate:	≥ 0.4 N/mm <sup>2</sup> Failure mode (FB) = B (EN 1015-12)
Capillary action water absorption:	3.5 kg/m <sup>2</sup> (EN 1015-18)
Coefficient of permeability to water vapour:	≤ 10 μ (EN 1015-19)
Thermal conductivity (λ <sub>10,dry</sub> ):	0.61 W/m·K (EN 1745)
Reaction to fire:	Class A1
Resistance to sulphates:	High (Anstett test method)
Saline efflorescence (after semi-immersion in water):	Absent



### Packaging

25 kg bags

### Colour

White

### Consumption

16 kg/m<sup>2</sup>  
(per cm of thickness)

### Application

Continuous-mixing rendering machine



Compacting the dehumidifying render with a straightedge



Application of dehumidifying render

Injection slurries

Binder for making mortars

Mortars for dehumidifying render

Mortars for transparent and structural renders

Masonry mortars

Skimming mortars

protective waterproofing coating

## ***Transpirant render***



- 1** *Silexcolor Pittura*
- 2** *Silexcolor Primer*
- 3** *Mape-Antique FC Grosso*
- 4** *Mape-Antique Intonaco NHL*
- 5** **Tuff block substrate**



***Transpirant base render***

- It impedes the formation of mould and bacteria
- It does not release soluble salts
- It prevents the formation of surface condensation



***Transpirant skimming coat***

- High chemical resistance to soluble salts
- Volumetrically stable
- It does not induce the formation of efflorescence
- Recommended for small cavities



***Silicate-base coating***

- For internal and external use
- Highly breathable
- Excellent adhesion
- It does not change over years



**“La Mattonaia” residential complex - Pietrasanta (Lucca) - Italy**

***Intervention***

*The intervention consisted of the construction of new residential units. Detailed work included the application of lime-based transpirant renders on the internal and external surfaces of each structure, skimming the surfaces with fine-texture skimming mortar to create a natural finish and decorating the surfaces with siloxane paint. Other interventions have been waterproofing the structures below ground level, the application of macroporous dehumidifying renders to prevent capillary rising damp, the installation of new screeds and the installation of floorings and parquet.*

## Mape-Antique Intonaco NHL



Transpirant base render based on natural hydraulic lime and Eco-Pozzolan, for application on existing masonry, including that of historical interest, and on new construction



### Areas of use

- New internal and external transpirant renders applied with a machine or by trowel on stone, brick, tuff and mixed masonries without capillary rising damp.
- New renders or reconstructing existing lime-based and/or weak renders on stone, brick, tuff and mixed masonries, including buildings with a national heritage protection order and listed buildings.
- “Plumbing” and “touching up” facing walls with gaps and uneven surfaces.
- Pointing between rows of stone, brick and tuff on “exposed” masonries.

### Product details, application guide and final performance data

Maximum size of aggregate:	1.4 mm (EN 1015-1)
Bulk density of fresh mortar:	1,750 kg/m <sup>3</sup> (EN 1015-6)
Appearance of mix:	Thixotropic
Porosity of fresh mortar:	20% (EN 1015-7)
Compressive strength (after 28 days):	Category CS II (EN 1015-11)
Adhesion to substrate:	≥ 0.3 N/mm <sup>2</sup> Failure mode (FP) = B (EN 1015-12)
Capillary action water absorption:	Category W 0 (EN 1015-18)
Coefficient of permeability to water vapour:	≤ 12 μ (EN 1015-19)
Thermal conductivity ( $\lambda_{10,dry}$ ):	0.57 W/m·K (EN 1745)
Reaction to fire:	Class A1



### Packaging

25 kg bags

### Colour

Light hazel

### Consumption

approx. 14.5 kg/m<sup>2</sup>  
(per cm of thickness)

### Application

Continuous-mixing rendering machine or trowel



Compacting the transpirant render with a straightedge



Levelling off the transpirant render

Injection slurries

Binder for making mortars

Mortars for dehumidifying render

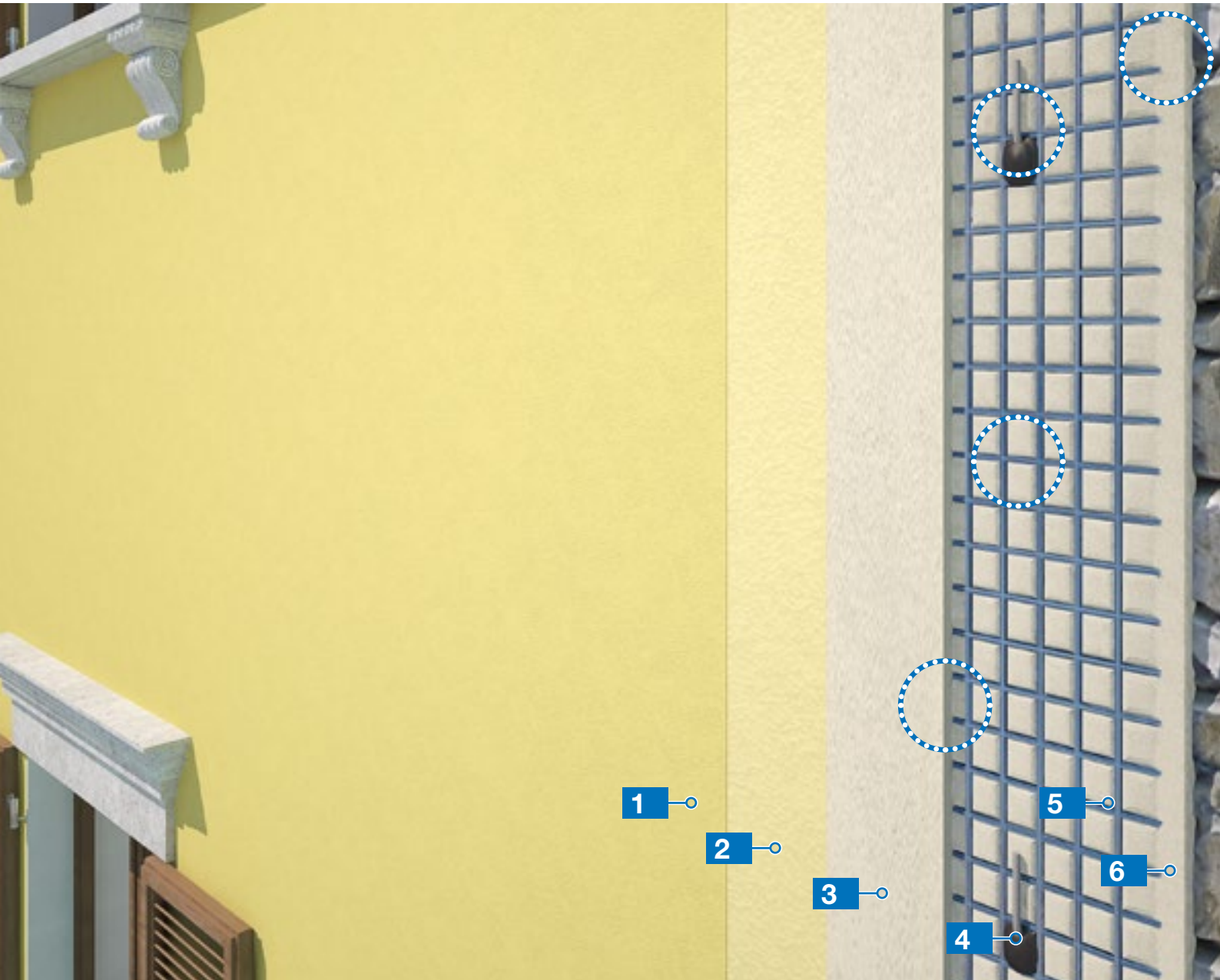
Mortars for transpirant and structural renders

Masonry mortars

Skimming mortars

protective waterproofing coating

## Consolidating and strengthening weak walls



- 1** *Silexcolor Tonachino*
- 2** *Silexcolor Base Coat*
- 3** *Mape-Antique Strutturale NHL*
- 4** *Mapenet EM Connector*

- 5** *Mapenet EM 40*
- 6** *Mape-Antique Strutturale NHL*
- 7** **Stone masonry**





7



**Fibre-reinforced transpirant render (1<sup>st</sup> layer)**

- It contains inorganic fibres
- High mechanical performance
- Used in combination with galvanized or composite mesh



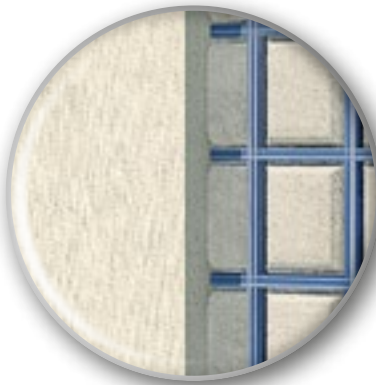
**Fasteners to hold mesh in place**

- Made from alkali-resistant glass fibre and heat-hardening resin
- Easy to apply
- High chemical resistance



**Glass-fibre mesh**

- High shear strength
- Resistant to atmospheric agents
- High dimensional stability
- Unchangeable and resistant to chemical actions (alkali-resistant)



**Fibre-reinforced transpirant render (2<sup>nd</sup> layer)**

- It contains inorganic fibres
- High mechanical performance
- Used in combination with galvanized or composite mesh



**Duca degli Abruzzi Complex (IACP) - Bari - Italy**

***Intervention***

*The intervention consisted of re-doing all the external masonry with high-strength rendering mortar reinforced with glass fibres and then applying a thin layer of coloured siloxane-based coating paste to protect the new renders. Other interventions included repairing deteriorated concrete elements, work on some parts of the structure to increase its static load-bearing capacity and a waterproofing treatment for the flat roofs.*

## Mape-Antique Strutturale NHL



High-performance mortar for transpirant render and masonry work, based on natural hydraulic lime and Eco-Pozzolan, particularly suitable for making “reinforced” and installation mortar



### Areas of use

- New internal and external high-performance transpirant renders on stone, brick, tuff and mixed masonries without capillary rising damp.
- New renders or rebuilding existing renders on masonries, including buildings with a national heritage protection order and listed buildings.
- New mortar “reinforced” with electro-welded zinc-plated or composite mesh on weak masonries without capillary rising damp.
- “Reinforced capping” with strengthening metal or composite mesh on the outer face of vaulted roofs.

### Product details, application guide and final performance data

Maximum size of aggregate:	2.5 mm (EN 1015-1)
Bulk density of fresh mortar:	2,000 kg/m <sup>3</sup> (EN 1015-6)
Appearance of mix:	Thixotropic
Porosity of fresh mortar:	7% (EN 1015-7)
Compressive strength (after 28 days):	> 15 N/mm <sup>2</sup> Category CS IV (EN 1015-11) Class M 15
Adhesion to substrate:	≥ 0.7 N/mm <sup>2</sup> Failure mode (FB) = A/C (EN 1015-12)
Initial shear strength (f <sub>voK</sub> ):	0.15 N/mm <sup>2</sup> (EN 998-2 Appendix C)
Chloride content:	< 0.05% (EN 1015-17)
Capillary action water absorption:	< 0.2 [kg/(m <sup>2</sup> ·min <sup>0.5</sup> )] (EN 1015-18) Category W 2
Coefficient of permeability to water vapour:	60 μ (EN 1015-19)
Thermal conductivity (λ <sub>10,dry</sub> ):	1 W/m·K (EN 1745)
Reaction to fire:	Class B S1 - do



**Packaging**  
25 kg bags

**Colour**  
Light hazel

**Consumption**  
approx. 17 kg/m<sup>2</sup>  
(per cm of thickness)

**Application**  
Continuous-mixing rendering machine or trowel



Checking the gap between the mesh and substrate



Application of the “structural” render with a rendering machine

Injection slurries

Binder for making mortars

Mortars for dehumidifying render

Mortars for transpirant and structural renders

Masonry mortars

Skimming mortars

protective waterproofing coating

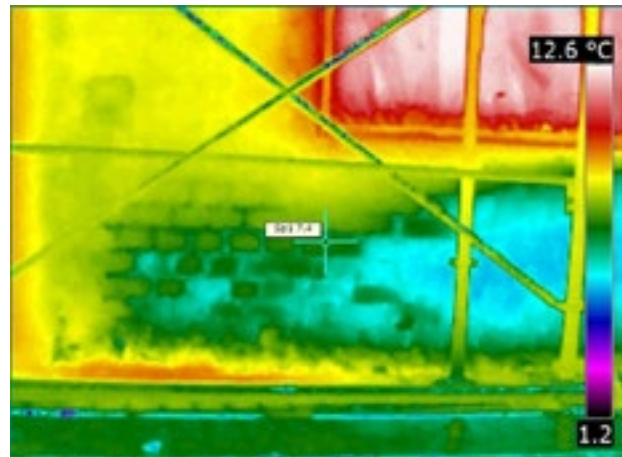


## Improvement works

### How they affect the characteristics of masonry

As a general rule, we only know the characteristics of masonry in new buildings in which the stratigraphic structure and the materials used are clear.

As far as historic and listed buildings are concerned, and for existing buildings in general, it is difficult to determine the mechanical performance characteristics of the structures. It is possible to measure these values through laboratory tests or by carrying out *moderately destructive* tests on site, such as by core-sampling or by carrying out flat-jack or penetrometer tests, or through *non-destructive* testing such as a thermographic survey or through sonar readings.



Thermographic surveys

Carrying out these kinds of tests, is often impossible as well as very expensive. It is often preferable, therefore, to deduce its mechanical characteristics or to use table C8 A.2.1 attached to the Explanatory Memo of Ministerial Decree DM 2008 (MIT 2009 – *Memo No. 617 of 02.02.09*), which contains the average values for compressive strength, shear strength and normal and tangential modulus of elasticity.

Table C8 A.2.1 considers a masonry structure made up of two masonry walls built close together, or with a thin nucleus between the two masonry walls, with characteristics according to the following conditions:

- mortar with poor mechanical properties;
- joints that are not particularly thin and without rows of elements at a regular pitch forming an even pattern, particularly along the horizontal plane of the rows;
- masonry that is not well consolidated;
- masonry walls simply built next to each other or which are poorly connected, that is, without sufficient transversal connections (or in which the elements are not interlocked between the two masonry walls);



- walls with a perfectly regular texture (when built from regular shaped elements);
- masonry without cracks.

If the texture of the elements is incorrect (the vertical joints are not staggered sufficiently and the rows are not flat along the horizontal plane), the values in the table must be reduced accordingly.

If the masonry is in a different condition from those listed in the table, or if it's provided for carrying out improvement works on the masonry, the parameters in table C8 A.2.1 must be corrected by applying an increasing coefficient according to the nature of the structural consolidation employed. These values can be found in Table C8A.2.2. The following is an extract from the table:



Table C8A.2.2

Type of masonry	Good quality mortar	Thin joints (< 10mm)	Rows	Transversal connection	Poor and/or large cavity	Injected with binding mix	Reinforced render*
Masonry built from stone in an irregular pattern (cobbles, irregular shaped stones)	1.5	-	1.3	1.5	0.9	2	2.5
Masonry built from rough-cut stone with thin walls	1.4	1.2	1.2	1.5	0.8	1.7	2
Masonry built from cleft stone with a regular pattern	1.3	-	1.1	1.3	0.8	1.5	1.5
Masonry built from blocks of soft stone (tuff, calcarenite)	1.5	1.5	-	1.5	0.9	1.7	2
Masonry built from regular blocks of stone	1.2	1.2	-	1.2	0.7	1.2	1.2
Masonry built from solid bricks and lime mortar	1.5	1.5	-	1.3	0.7	1.5	1.5

\* Values to be reduced accordingly in the case of particularly thick walls (e.g. > 70 cm)

The multiplication coefficients must be applied to all the parameters in table C8 A.2.1, with the exception of pointing work, transversal connections and inserting artificial bondstones, which only effect the average compressive and shear strength of masonries ( $f_m e_{\tau 0}$ ).

It is very important to understand that, if we consider reinforced render made, for example, using transversal connectors (bondstones, ties or transversal rods), you cannot apply the correction coefficients simultaneously for both the render and the transversal connectors. If the transversal connectors do not meet these conditions, the multiplication coefficient for the reinforced render must be divided by the coefficient for the transversal connector in the table.





The above values for consolidated masonry may be taken as a reference if it is not possible to measure the precise effectiveness of an intervention through experimental testing and if it is not possible to ascertain the values to be used in the calculations with a sufficient number of tests.





## **“Reinforced” structural render**

One of the most widely adopted improvement measures is undoubtedly the use of “reinforced” render.

MAPE-ANTIQUE STRUTTURALE NHL, a fibre-reinforced mortar with excellent mechanical performance properties, used in combination with composite material meshes such as MAPENET EM 30 and MAPENET EM 40 or with galvanized steel mesh, is the ideal solution for strengthening brick, stone, tuff and mixed masonries, in that it complies with the guidelines for FRCM (Fibre Reinforced Cementitious Matrix) qualification, which prescribes the need to qualify the complete strengthening system.

Its compliance with these guidelines has been verified through laboratory tests at the Federico II University of Naples, which issued test reports to certify the performance properties of these matrix/strengthening systems.





**Church of San Bernardino - L'Aquila - Italy**

***Intervention***

*The intervention involved the consolidation of masonry, repairs to areas of deteriorated render, reconditioning the masonry for the bell tower and repairs and conservative renovation of all the internal surfaces.*



## Mape-Antique Colabile



Shrinkage-compensated, fibre-reinforced mortar for concrete repair



### Areas of use

Mixing free-flowing, volumetrically stable masonry mortar with high resistance to soluble salts for filling large internal cracks, gaps and cavities when reconditioning and consolidating structures such as:

- foundations, pillars, vaulted roofs and archways;
- “rubble masonries”;
- stone, brick, tuff and mixed masonry in general on existing buildings, including buildings with a national heritage protection order and listed buildings.

### Product details, application guide and final performance data

Maximum size of aggregate:	2.5 mm (EN 1015-1)
Bulk density of wet mortar:	2,050 kg/m <sup>3</sup> (EN 1015-6)
Consistency of mix:	Fluid – free-flowing
Porosity of wet mortar:	7% (EN 1015-7)
Compressive strength (after 28 days):	Class M15 (EN 1015-11)
Adhesion to substrate:	1.0 N/mm <sup>2</sup> Failure mode (FB) = B (EN 1015-12)
Slip-resistance of rebar (Ø 16 mm) Maximum adhesion stress:	8 N/mm <sup>2</sup> (EN 1881 mod.)
Slip-resistance of glass rods: (Maperod G 40/10) Maximum adhesion stress:	8 N/mm <sup>2</sup> (EN 1881 mod.)
Initial shear strength (f <sub>vok</sub> ):	0.15 N/mm <sup>2</sup> (EN 998-2 Appendix C)
Chloride content:	< 0.05% (EN 1015-17)
Capillary action water absorption:	< 0.1 [kg/(m <sup>2</sup> -min <sup>0.5</sup> )] (EN 1015-18)
Water vapour permeability coefficient:	15/35 µ (EN 1015-19)
Thermal conductivity (λ <sub>10,dry</sub> ):	1 (P=50%)
Modulus of elasticity:	10,000 N/mm <sup>2</sup> (EN 13412)
Reaction to fire:	Class A1 (EN 13501-1)
Resistance to sulphates:	High (Anstett test method)
Saline efflorescence (after semi-immersion in water):	Absent



### Packaging

25 kg bags

### Colour

White

### Consumption

approx. 1.83 kg/dm<sup>3</sup>  
(of cavities to be filled)

### Application

By pouring or pumping



Pouring the mortar made from Mape-Antique Colabile and Gravel 6-10



An area of the masonry mortar after pouring

Injection slurries

Binder for making mortars

Mortars for dehumidifying render

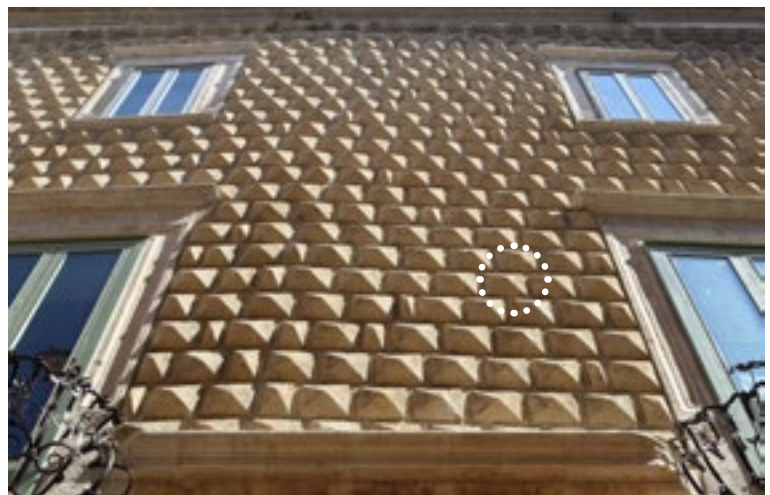
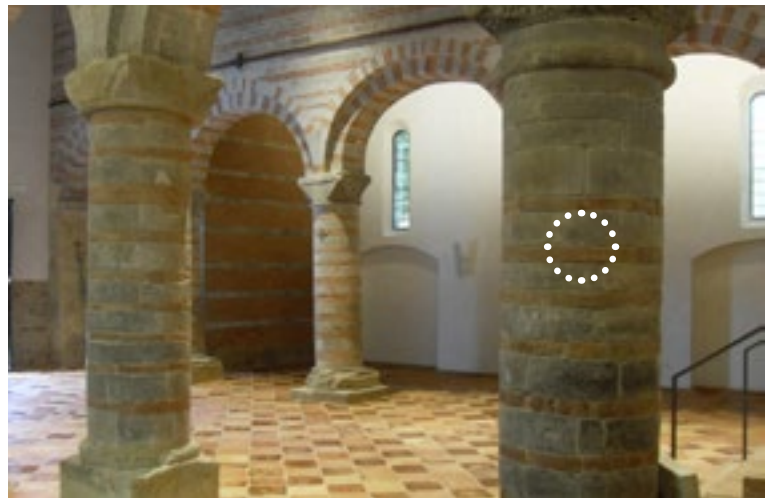
Mortars for transparent and structural renders

Masonry mortars

Skimming mortars

protective waterproofing coating

## Rebuilding and pointing “exposed” masonry walls

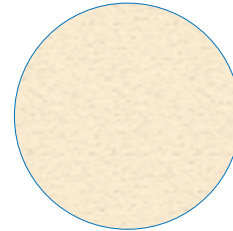


**1** Mape-Antique Allettamento

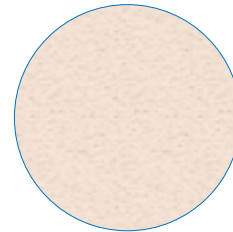


**Mortar for pointing on masonry structures**

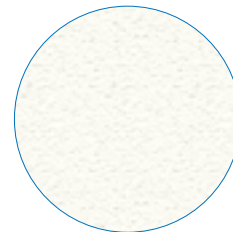
- Highly transpirant
- High chemical resistance to soluble salts
- It does not induce the formation of efflorescence
- It does not release soluble salts



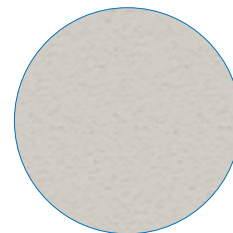
**TUFF**



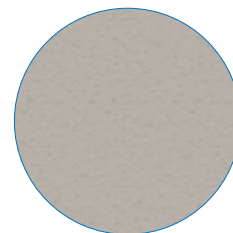
**CREAM**



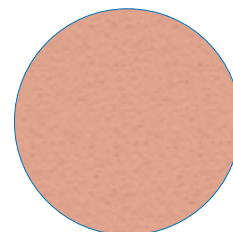
**IVORY**



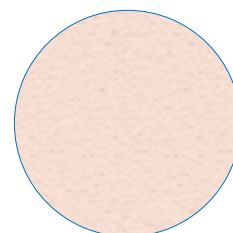
**GREY**



**DOVE-GREY**



**BRICK-COLOURED**



**PINK**

*Due to the printing process involved, the colours should be taken as merely indicative of the shades of the actual product*



**Palazzo Vecchio (rear façade) - Florence - Italy**

***Intervention***

*“Exposed” pointing between the stone and structural strengthening of the balcony.*

## Mape-Antique Allettamento



Salt-resistant masonry mortar, based on natural hydraulic lime and Eco-Pozzolan, for installation layers and pointing on “natural finish” masonry



### Areas of use

- Building new masonries and restoration of existing masonries, including masonries of buildings with a national heritage protection order and listed buildings.
- Pointing between stone, brick and tuff on “exposed” masonries.
- Installation joints, including joints “reinforced” with rebar or composites (such as MAPEROD).
- Build facing walls using masonries mortar with guaranteed performance characteristics.
- “Plumbing” and “touching up” facing walls with gaps and uneven surfaces.

### Product details, application guide and final performance data

Maximum size of aggregate:	1.5 mm (EN 1015-1)
Bulk density of fresh mortar:	1,950 kg/m <sup>3</sup> (EN 1015-6)
Appearance of mix:	Thixotropic
Porosity of fresh mortar:	6% (EN 1015-7)
Compressive strength (after 28 days):	Class M 5 (EN 1015-11)
Adhesion to substrate:	≥ 0.5 N/mm <sup>2</sup> Failure mode (FB) = B (EN 1015-12)
Initial shear strength (f <sub>vok</sub> ):	0.15 N/mm <sup>2</sup> (EN 1052-3)
Chloride content:	< 0.05% (EN 1015-17)
Capillary action water absorption:	< 0.3 [kg/(m <sup>2</sup> ·min <sup>0.5</sup> )] (EN 1015-18)
Coefficient of permeability to water vapour:	15/35 μ (EN 1015-19)
Thermal conductivity (λ <sub>10,dry</sub> ):	0.77 W/m·K (EN 1745)
Reaction to fire:	Class A1
Resistance to sulphates:	< 0.02% (ASTM C 1012 mod.)
Saline efflorescence (after semi-immersion in water):	Absent



### Packaging

25 kg bags

### Colour

Available in 7 colours

### Consumption

16.5 kg/m<sup>2</sup>  
(per cm of thickness)

### Application

Trowel



Building stone masonry



Pointing “exposed” masonry

Injection slurries

Binder for making mortars

Mortars for dehumidifying render

Mortars for transparent and structural renders

Masonry mortars

Skimming mortars

protective waterproofing coating



**“Minuto Pesce” town square - Molfetta (Bari) - Italy**

***Intervention***

*Renovation and conservative restoration work was carried out on the entire structure and included new macroporous dehumidifying renders, the application of transpirant renders and the reconstruction and consolidation of the facing walls and vaulted roofs using high-strength masonry mortars. The surfaces were then decorated with a thin layer of coloured siloxane-based coating.*

## Mape-Antique Strutturale NHL



High-performance mortar for transpirant render and masonry work, based on natural hydraulic lime and Eco-Pozzolan, particularly suitable for making “reinforced” and installation mortar



### Areas of use

- Building new masonries and restoration of existing masonries, including masonries of buildings with a national heritage protection order and listed buildings.
- Levelling off the outer face of vaulted roofs with an uneven surface.
- Pointing between stone, brick and tuff on “exposed” masonries.
- Installation joints, including joints “reinforced” with rebar or composites (such as MAPEROD).
- Building facing walls using a mortar with better mechanical characteristics than conventional lime mortar.
- “Plumbing” and “touching up” facing walls with gaps and uneven surfaces.

### Product details, application guide and final performance data

Maximum size of aggregate:	2.5 mm (EN 1015-1)
Bulk density of fresh mortar:	2,000 kg/m <sup>3</sup> (EN 1015-6)
Appearance of mix:	Thixotropic
Porosity of fresh mortar:	7% (EN 1015-7)
Compressive strength (after 28 days):	> 15 N/mm <sup>2</sup> Category CS IV (EN 1015-11) Class M 15
Adhesion to substrate:	≥ 0.7 N/mm <sup>2</sup> Failure mode (FB) = A/C (EN 1015-12)
Initial shear strength (f <sub>vok</sub> ):	0.15 N/mm <sup>2</sup> (EN 998-2 Appendix C)
Chloride content:	< 0.05% (EN 1015-17)
Capillary action water absorption:	< 0.2 [kg/(m <sup>2</sup> ·min <sup>0.5</sup> )] (EN 1015-18)
Coefficient of permeability to water vapour:	60 μ (EN 1015-19)
Thermal conductivity (λ <sub>10,dry</sub> ):	1 W/m·K (EN 1745)
Reaction to fire:	Class B - S1 do



### Packaging

25 kg bags

### Colour

Light hazel

### Consumption

approx. 17 kg/m<sup>2</sup>  
(per cm of thickness)

### Application

Trowel



Reconstruction of a facing wall



Reconstruction of a stone facing wall

Injection slurries

Binder for making mortars

Mortars for dehumidifying render

Mortars for transpirant and structural renders

Masonry mortars

Skimming mortars

protective waterproofing coating



## **Villa Mazzanti - Rome - Italy**

### ***Intervention***

*Reconstruction of the removed renders using transpirant rendering mortar and skim coats on some of the surfaces using ultra-fine texture mortar to create a smooth finish. Skim coats on the remaining surfaces using smooth texture mortar to create a natural finish. The surfaces were then decorated with siloxane-based coating paste after applying a base layer of coloured filler.*



## Mape-Antique FC Ultrafine



Salt-resistant, transpirant ultrafine-texture skimming mortar, based on lime and Eco-Pozzolan, for a smooth finish on render



### Areas of use

- Smooth finish for internal/external coarse texture, dehumidifying, macroporous renders when repairing masonries deteriorated by capillary rising damp and soluble salts.
- Smooth finish for coarse texture dehumidifying renders on masonries in lagoon areas or close to the sea.
- Smooth finish for new dehumidifying renders or existing lime-based renders on stone, brick, tuff and mixed masonries, including buildings with a national heritage protection order and listed buildings.
- Smooth finish for coarse texture transpirant or “structural” base renders.

### Product details, application guide and final performance data

Maximum size of aggregate:	100 µm (EN 1015-1)
Bulk density of fresh mortar:	1,700 kg/m <sup>3</sup> (EN 1015-6)
Appearance of mix:	Plastic
Compressive strength (after 28 days):	2.5 N/mm <sup>2</sup> Category CS II (EN 1015-11)
Adhesion to substrate:	≥ 0.8 N/mm <sup>2</sup> Failure mode (FB) = B (EN 1015-12)
Capillary action water absorption:	Category W 0 (EN 1015-18)
Coefficient of permeability to water vapour:	≤ 20 µ (EN 1015-19)
Thermal conductivity (λ <sub>10,dry</sub> ):	0.39 W/m·K (EN 1745)
Reaction to fire:	Class E
Resistance to sulphates:	High (Anstett test method)
Saline efflorescence (after semi-immersion in water):	Absent



### Packaging

20 kg bags

### Colour

White

### Consumption

approx. 1.3 kg/m<sup>2</sup>  
(per mm of thickness)

### Application

Flat metal trowel



Application of the second layer of ultra-smooth texture skimming mortar



Smoothing over the surface with a flat metal trowel

Injection slurries

Binder for making mortars

Mortars for dehumidifying render

Mortars for transpirant and structural renders

Masonry mortars

Skimming mortars

protective waterproofing coating



**Private farm - Lucca - Italy**

***Intervention***

*New "structural" renders using high-strength mortars reinforced with glass fibres. Skimming of the surfaces with a fine texture skimming mortar to create a natural finish. Application of a siloxane paint after applying a base layer of coloured filler.*

## Mape-Antique FC Civile



Salt-resistant, transpirant fine-texture skimming mortar, based on lime and Eco-Pozzolan, for a natural finish on render



### Areas of use

- Natural finish on internal/external coarse texture, dehumidifying, macroporous renders when repairing masonries deteriorated by capillary rising damp and soluble salts.
- Natural finish on coarse texture dehumidifying renders on masonries in lagoon areas or close to the sea.
- Natural finish on new dehumidifying renders or existing lime-based renders on stone, brick, tuff and mixed masonries, including buildings with a national heritage protection order and listed buildings.
- Natural finish on coarse texture transpirant or “structural” base renders.

### Product details, application guide and final performance data

Maximum size of aggregate:	400 µm (EN 1015-1)
Bulk density of fresh mortar:	1,800 kg/m <sup>3</sup> (EN 1015-6)
Appearance of mix:	Plastic
Compressive strength (after 28 days):	10 N/mm <sup>2</sup> Category CS IV (EN 1015-11)
Adhesion to substrate:	≥ 0.6 N/mm <sup>2</sup> Failure mode (FB) = B (EN 1015-12)
Capillary action water absorption:	Category W 2 (EN 1015-18)
Coefficient of permeability to water vapour:	≤ 15 µ (EN 1015-19)
Thermal conductivity (λ <sub>10,dry</sub> ):	0.67 W/m·K (EN 1745)
Reaction to fire:	Class E
Resistance to sulphates:	High (Anstett test method)
Saline efflorescence (after semi-immersion in water):	Absent



### Packaging

25 kg bags

### Colour

White  
Light pink

### Consumption

approx. 1.4 kg/m<sup>2</sup>  
(per mm of thickness)

### Application

Flat metal trowel



Application of fine texture skimming mortar



Finishing off the surface with a sponge float

Injection slurries

Binder for making mortars

Mortars for dehumidifying render

Mortars for transpirant and structural renders

Masonry mortars

Skimming mortars

protective waterproofing coating



**Post Office - Cesenatico (Forli-Cesena) - Italy**

***Intervention***

*New macroporous, dehumidifying render followed by skimming the surfaces with large texture mortar. Application of a siloxane paint after applying a base layer of coloured filler.*

## Mape-Antique FC Grosso



Salt-resistant, transpirant large-texture skimming mortar, based on lime and Eco-Pozzolan, for a rough finish on render



### Areas of use

- Rough finishing for internal/external macroporous, dehumidifying renders when repairing masonries deteriorated by capillary rising damp and soluble salts.
- Rough finishing for dehumidifying renders on masonries in lagoon areas or close to the sea.
- Rough finishing on new dehumidifying renders or existing lime-based renders on stone, brick, tuff and mixed masonries, including buildings with a national heritage protection order and listed buildings.
- Rough finishing for transpirant or “structural” base renders.

### Product details, application guide and final performance data

Maximum size of aggregate:	700 µm (EN 1015-1)
Bulk density of fresh mortar:	1,700 kg/m <sup>3</sup> (EN 1015-6)
Appearance of mix:	Plastic
Compressive strength (after 28 days):	6 N/mm <sup>2</sup> Category CS IV (EN 1015-11)
Adhesion to substrate:	≥ 0.5 N/mm <sup>2</sup> Failure mode (FB) = B (EN 1015-12)
Capillary action water absorption:	Category W 2 (EN 1015-18)
Coefficient of permeability to water vapour:	≤ 15 µ (EN 1015-19)
Thermal conductivity (λ <sub>10,dry</sub> ):	0.45 W/m·K (EN 1745)
Reaction to fire:	Class E
Resistance to sulphates:	High (Anstett test method)
Saline efflorescence (after semi-immersion in water):	Absent



### Packaging

25 kg bags

### Colour

White

### Consumption

approx. 1.4 kg/m<sup>2</sup>  
(per mm of thickness)

### Application

Flat metal trowel



Application of coarse texture skimming mortar



Finishing off the surface with a sponge float

Injection slurries

Binder for making mortars

Mortars for dehumidifying render

Mortars for transpirant and structural renders

Masonry mortars

Skimming mortars

protective waterproofing coating



**Fountain in Capo di Ponte – Brescia – Italy**

***Intervention***

*Application of a protective waterproofing coating on the basin of a stone fountain.*

## Mape-Antique Ecolastic



Two-component, elastic, salt-resistant, cement-free, lime and Eco-Pozzolan based coating for waterproofing and protecting construction elements, including in listed buildings



### Areas of use

- Waterproofing and protecting irregular shaped surfaces, brick vaulted roofs, screeds, roofs, storage tanks, fountains and features such as cornices, skirt roofs, small columns, etc. on existing structures, including buildings with a National Heritage protection order and listed buildings.
- Waterproofing and protecting important structures below ground level subjected to positive or negative hydraulic lift.
- Protecting rendered masonry exposed to atmospheric agents.
- Protecting the surface of rendered masonry at risk of coming into contact with seawater, de-icing salts or soluble salts in general.
- Elastic protective layer for new and repaired rendered masonry structures with small cracks caused by deformations, temperature variations or stress loads.

### Product details, application guide and final performance data

Colour of the mix:	light hazel
Mixing ratio:	comp. A : comp. B = 2 : 1
Application temperature range:	from +5°C to +35°C
Pot life of mix:	approx. 60 min.
Applicable thickness per layer (mm):	2
Adhesion to brickwork:	0.8 N/mm <sup>2</sup>
Adhesion to concrete – after 28 days at +20°C and 50% R.H.:	1.2 N/mm <sup>2</sup>
Adhesion to Mape-Antique Strutturale NHL (at 28 days):	1.24 N/mm <sup>2</sup>
Adhesion after immersion in water:	0.52 N/mm <sup>2</sup> (EN 14891-A.6.3)
Adhesion after heat exposure:	1.06 N/mm <sup>2</sup> (EN 14891-A.6.5)
Adhesion after freeze-thaw cycles:	0.59 N/mm <sup>2</sup> (EN 14891-A.6.6)
Crack-bridging ability at +23°C:	2.62 mm (EN 14891-A.8.2)
Crack-bridging ability at -5°C:	1.16 mm (EN 14891-A.8.3)
Impermeability to positive hydraulic lift (1.5 bar for 7 days) expressed as water penetration:	no penetration, increase in weight 5 g
Impermeability to negative hydraulic lift (1.5 bar for 7 days) expressed as water penetration:	no penetration



### Packaging

10 kg bags and 5 kg tanks

### Colour

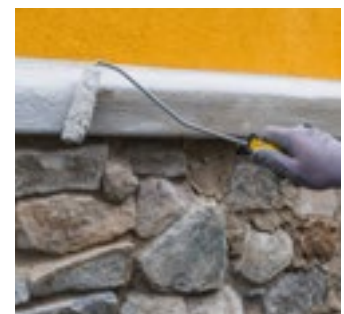
Light hazel

### Consumption

- by brush, roller or trowel  
1.65 kg/m<sup>2</sup>  
(per mm of thickness)
- by spray 2.2 kg/m<sup>2</sup>  
(per mm of thickness)

### Application

Brush, roller, trowel or by spray



Waterproofing a wall cap with Mape-Antique Ecolastic



Protecting the cornice of a window with Mape-Antique Ecolastic

Injection slurries

Binder for making mortars

Mortars for dehumidifying render

Mortars for transparent and structural renders

Masonry mortars

Skimming mortars

protective waterproofing coating

## **MAPE-ANTIQUE line:** *products according to UNI EN 998 European standards*

EN 998, the “European Standard for Mortar for Masonry”, which has been in force in Italy since February 2005, comprises the following:

- EN 998-1:2010 – Rendering and plastering mortar
- EN 998-2:2010 – Masonry mortar

**EN 998-1** is applicable to factory-made rendering and plastering mortar made from inorganic binders applied on external and internal walls, ceilings, columns and partition walls, except for those in which calcium sulphate is the main active binder.

The term **Rendering and plastering mortar** refers to a mix of one or more inorganic binders, aggregates, water and, where required, admixtures and/or additives, that is used for rendering and plastering external and internal surfaces.

Depending on which test methods are adopted, this standard specifies the requirements and properties of rendering and plastering mortar at both the wet state (such as density, workability time and air content) and the hardened state (such as compressive strength, water absorption and thermal conductivity) according to their areas of use and their exposure conditions.

The properties of rendering and plastering mortars depend essentially on the type or types of binder used and their proportions in the mix. Special properties may be obtained by using different types of aggregates, admixtures and/or additives.

Rendering and plastering mortars are defined according to the following:

### CONCEPT

#### ■ **Guaranteed performance mortars**

Performance concept: mortar whose composition and production method are chosen by the manufacturer in order to obtain the properties specified

#### ■ **Specified composition mortar**

Recipe concept: mortar manufactured using pre-determined proportions, the properties of which are the result of the declared proportions of the ingredients

### PRODUCTION METHODS

- factory made mortar
- semi-finished factory-made mortar
- mortar made on site

### PROPERTIES AND/OR USES

- GP: general purpose mortar for render and plaster
- LW: lightweight mortar for render and plaster
- CR: coloured mortar for render
- OC: one-coat rendering mortar
- R: renovation mortar for render and plaster

T: thermal insulating mortar for render and plaster

**EN 998-2**, on the other hand, specifies the requirements of factory made masonry mortar for use on walls, columns and partition walls (such as external and internal walls and load-bearing and non load-bearing walls) for building and civil engineering.

The term **Masonry mortar** refers to a mix of one or more inorganic binders, aggregates, water and, where required, admixtures and/or additives, that is used for filling (pointing), connecting and laying walls. This standard defines the performance characteristics for wet mortar such as workability time, chloride content, air content, density and adjustment time (for thin layers of mortar only). For hardened mortar it defines, for example, performance characteristics such as compressive strength, bond strength and density, measured in compliance with corresponding test methods contained in separate European standards.

Masonry mortars are defined according to the following:

### CONCEPT

#### ■ **Guaranteed performance mortars**

Performance concept: mortar whose composition and production method are chosen by the manufacturer in order to obtain the properties specified

#### ■ **Specified composition mortar**

Recipe concept: mortar manufactured using pre-determined proportions, the properties of which are the result of the declared proportions of the ingredients

### PROPERTIES AND/OR USES

- G: general purpose masonry mortar
- T: masonry mortar applied in thin layers
- L: lightweight masonry mortar

### PRODUCTION METHODS

- factory made mortar
- semi-finished factory made mortar
- mortar made on site

Whichever European standard a mortar is covered by, whether it is for rendering and plastering or for masonry, it must have the minimum requirements and specific properties to be able to carry CE Marking, a symbol which is essential in order to market and use the mortar in member states of the European Union. Products excluded from carrying CE Marking, on the other hand, are injection slurries and binders used to make mortar, in that they are not included in the list of products that comply with the aforementioned European standards.





CE Marking



- Pictograms that identify:
- where to apply the product
  - How to apply the product
  - application temperature range
  - amount of water required
  - min and max applicable thickness
  - workability time



Quantity



Marking Certification EMICODE

Reference standard

Type of classification of the product

Colours available

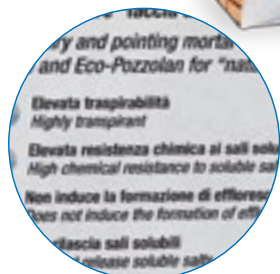


Helps to gain credits for LEED certification of buildings

Characteristic product detail



Identifies the type of substrate (masonry) on which the product may be applied

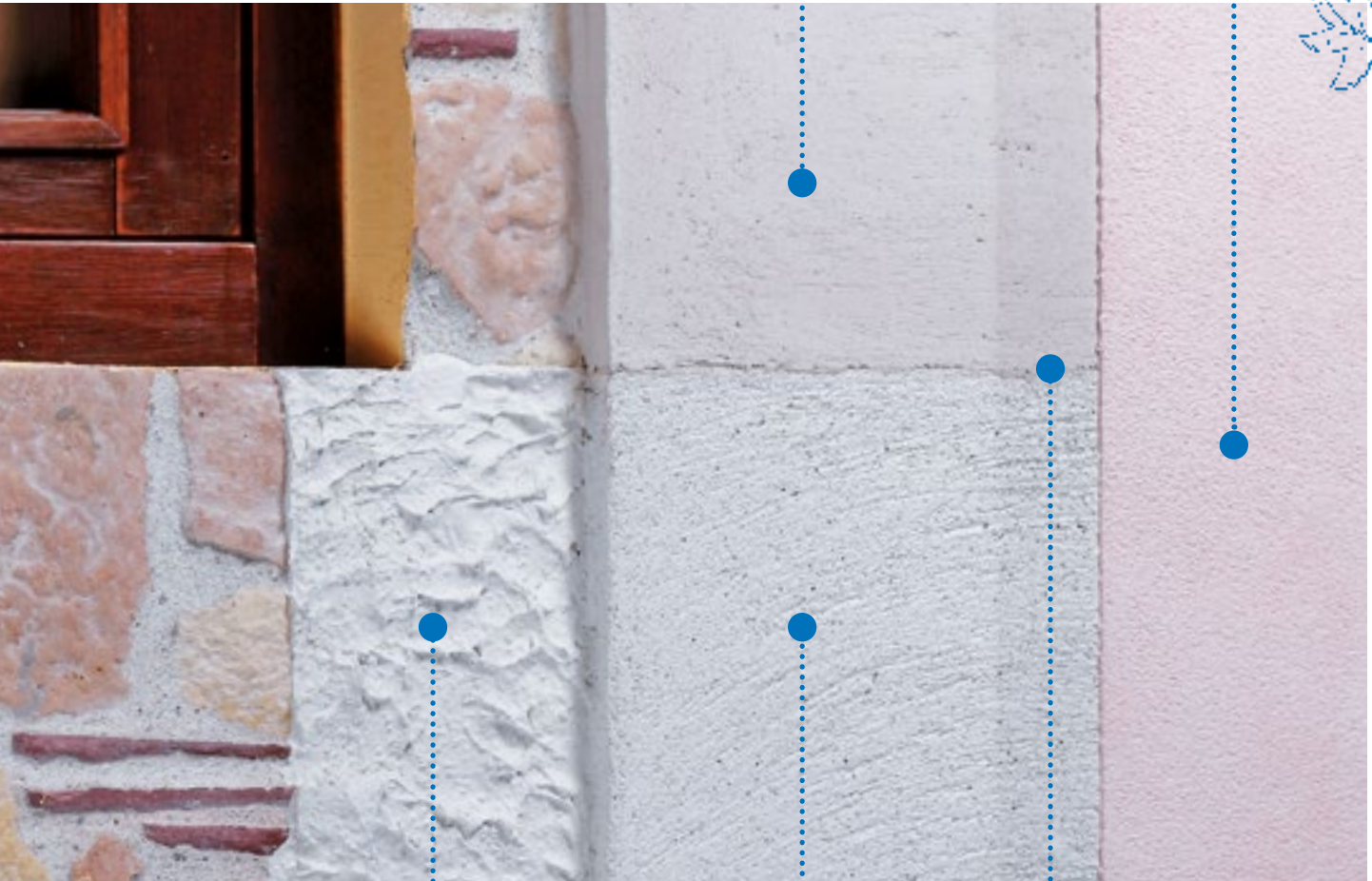


Product advantages



**Mape-Antique  
Intonaco NHL**

**Silexcolor  
Tonachino**



**Mape-Antique  
Rinzaffo**

**Mape-Antique  
MC**

**Silexcolor  
Primer**



## Colour and decoration

The high water vapour transpiration capacity of thin layers of coloured paints and coatings, along with their resistance to the leaching action of rain and their perfect adhesion to the substrate, are fundamental requirements of any type of finishing product used in renovation and restoration work of the buildings which make up the rich historical and artistic heritage of our cities, especially when this type of work is carried out using cement-free, lime-based products, characteristics common to all the products from the MAPE-ANTIQUÉ range.

The solution recommended for these types of intervention contemplates the use of finishing products from the SILEXCOLOR range, potassium silicate-based products which conform to DIN 18363 standards. These finishing products have the capacity to form a “single body” with the renders by means of a “silicatisation” reaction, which consists in the transformation of the potassium silicate into calcium silicate due to the content of lime in the underlying mortar. Unlike traditional paints and renders, even though the products from the SILEXCOLOR range contain pigments and fillers, they do not block the passage of water vapour and, therefore, allow the characteristics and properties of the mortar made using products from the MAPE-ANTIQUÉ range to remain unchanged.

Also, crystallisation of the potassium silicate in the pores of the mortar gives the substrate a certain degree of waterproofness, and thus protect the mortar against the leaching action of rainwater. And lastly, unlike finishing products made entirely from lime, that is, without any added latex component, the mineral products from the SILEXCOLOR range resist against the aggressive chemical action of acid rain and are insensitive to the disintegrating action of sulphuric acid which, through a “sulfidation” reaction, attacks the protective film containing calcium carbonate.

### Note:

*As an alternative to the products from the SILEXCOLOR range, if a coloured finishing product with a higher degree of water repellence is required, thin layers of paint or coating from the SILANCOLOR range may be used, siloxane-based systems which combine the advantages of traditional mineral products, such as their transpiration capacity, with the advantages of “synthetic” materials, such as water repellence.*





## ***Silexcolor range: Properties***

- Perfect adhesion of the products to the substrate, with which they react chemically by means of a “silicatisation” reaction, differently from the traditional finishing products.
- High transpiration of water vapour, thus encouraging the evaporation of water contained in the masonries.
- It increases the capacity of the renders to “repel” rainwater, due to crystallisation of the potassium silicate in the pores of the mortar.
- Insensitive to the disintegrating action of acid rain.
- Numerous aesthetic and decorative effects may be obtained by combining products and colours.

## ***Silexcolor range: The products***

The SILEXCOLOR range includes a series of materials which meet all the various aesthetic and functional requirements for “colouring” the products mortars from the MAPE-ANTIQUÉ range used in renovation and restoration work on buildings. The products in the range include smooth texture paints applied by brush, roller or spray such as SILEXCOLOR PAINT, coloured coating products in various textures applied in thin layers such as SILEXCOLOR TONACHINO and SILEXCOLOR GRAFFIATO, and ultra-fine texture skimming mortars such as SILEXCOLOR MARMORINO. All the products mentioned above must only be used after applying SILEXCOLOR PRIMER transparent primer or SILEXCOLOR BASE COAT undercoat, which have the capacity to even out the absorption of the substrate and encourage adhesion of the paint or coloured textured coating.





## ***Mape-Antique range on the web: Information, references and solutions***

All the information about the MAPE-ANTIQUE range is available at the Mapei website [www.mapei.it](http://www.mapei.it) in the **Products** section, by selecting **Products for restoring masonries from the drop-down Menu**.

Inside this section you will find **Main areas of use of the products according to the most common problems**, for example:

- Consolidating masonries and renders by injecting slurries
- Dehumidifying masonries with binders and mortars for renders
- Lime-based transpirant renders
- “Reinforced” renders and masonry mortars
- Skimming transpirant and/or dehumidifying renders

Once you have selected the problem you are interested in, go to the menu where you will find a list of all the products in alphabetical order and all the information about the product selected, such as its **Technical Data Sheet**, **Safety Data Sheet**, etc.



[www.mapei.it](http://www.mapei.it)

Selected Product Range

Documentation available for download

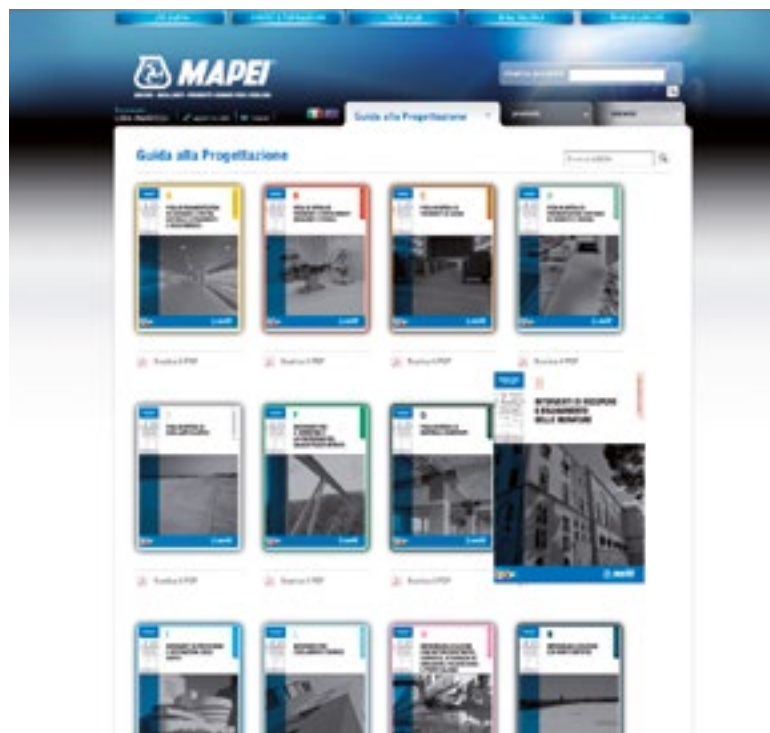
Main areas of use of the products according to the most common problems

Product Ranges menu



## Design centre

The **Mapei Design Guide** represents a new, key element in the relationship between Mapei and the world of design, a fundamental relationship which will become even more solid thanks to this initiative. The **Mapei Design Guide** is a technical “community” just a click away, enabling technicians from the design sector to interact directly with Mapei specialists through a dedicated e-mail address (*grandiprogetti@mapei.it*), and construct their project *step-by-step*. The **Mapei Design Guide** currently comprises 17 sections which discuss 17 different design themes, including section **H** entitled “**Restoration and Renovation Work on Masonries**”.



It is an interactive manual created in such a way that each user can identify the best solution for a design problem from within an ample range of proposals, based on the experience gained over the years directly on site by the whole Mapei Group.





The awareness that a durable, sustainable intervention may only be achieved by thinking in terms of Systems rather than Products, has led us to preface each Technical Specification with detailed **Procedures** which, if followed correctly, will enable you to design and perfectly carry out your work.



**MAPEI**  
Mape-Antique Allestamento

Malta da muratura resistente ai sali, a base di calce idraulica naturale ed Eco-Pozzolana, per la stesura e l'allestimento di murature "faccia a vista"

**CAMPI DI APPLICAZIONE**

- Stesura e allestimento irregolari di murature portanti e di tamponamento "faccia a vista" in pietra, mattoni, tufo e mattoni, anche di pregio storico ed artistico, all'interno e all'esterno.
- Realizzazione di nuove murature portanti e di tamponamento a ricostruzione di quelle esistenti.

**Alcuni esempi di applicazione**

- Realizzazione di nuove murature e tamponamento di quelle esistenti, anche di pregio storico ed artistico, sotto tutela delle Soprintendenze per i Beni Architettonici ed Ambientali.
- Stesura del corso in pietra, mattoni e tufo di murature "faccia a vista".
- Realizzazione di giunti di allestimento, anche "sempri" con barre di acciaio e in maniera completa (per Muratori).
- Realizzazione di paramenti murari con una malta da muratura a prestazione garantita.
- Realizzazione di intonaci "irregolari" e di "secco quasi" di paramenti murari, dove sono previsti sull'uso ibridato.

**CARATTERISTICHE TECNICHE**

Mape-Antique Allestamento è una malta premiscelata in polvere da muratura, esente da cemento, composta da calce idraulica naturale ed Eco-Pozzolana, sabbie naturali, speciali additivi, inerti, secondo una formula sviluppata nei laboratori di ricerca MAPEI in base alla norma EN 998-2. Il prodotto è classificato come C: "Malta da muratura a prestazione garantita per usi generali per i rifacimenti in elementi soggetti a requisiti specifici", di Classe M 3, in quanto

raggiunge una resistenza a compressione > 3 N/mm<sup>2</sup>. Mape-Antique Allestamento, dopo la miscelazione con acqua, dà all'opera in Betonero, e inoltre in una malta da muratura resistente ai sali di consistenza pratica/realistica, facilmente lavorabile e resistente. Grazie alla sua composizione Mape-Antique Allestamento presenta un alto grado di elasticità che riduce in modo drastico il rischio di comparsa di fessure sulla malta, inoltre presenta delle proprietà che rendono il prodotto resistente alle diverse aggressioni chimiche (come ad esempio, gli acidi solforici, il sale di gesso, il cloruro, l'azione ossidante delle acque piovane ed alla reazione alcali-aggregato).

Nella tabella dei dati tecnici (nella sezione Dati Applicativi e Prestazioni) sono riportati alcuni valori base, legati alle principali caratteristiche su cui sono basati i requisiti di Mape-Antique Allestamento.

**AVVISI IMPORTANTI**

- Mape-Antique Allestamento deve essere applicato in uno spessore non inferiore a 5 cm.
- Non utilizzare Mape-Antique Allestamento come malta da intonaco senza l'aggiunta di Mape-Antique LC, miscelato con aggregati di opportuna granulometria.
- Non utilizzare Mape-Antique Allestamento come soluzione consolidante da mettere nella struttura (impiegare Mape-Antique F o Mape-Antique F2).
- Non utilizzare Mape-Antique Allestamento per realizzare intonaci "sempri" (impiegare Mape-Antique Strutturale N4).
- Non aggiungere additivi, cemento o altri leganti (sali e grassi) a Mape-Antique Allestamento.



The rule to construct correctly dictates that a complete, detailed cycle must be supplied, which starting from the substrate preparation and, followed by a description of the various application phases of each different material and its specific function, enables to deliver perfectly completed work. By following the various **Procedures**, developed and perfected for the most complex, articulated work cycles, it is possible to consult each single **Technical Specification** and execute a project in its entirety. You can also easily and immediately consult and attach the **Technical Data Sheet** for each single product, along with drawings of certain operations which can be represented more easily through images.

## Quantify your work

Mapei engineers have also identified the main types of intervention and a price analysis is available on request.

VOCE DI CANTOLATO																																
N.	H.10.2.3	INTONACO DEUMIDIFICANTE MACROPOROSO MAPE-ANTIQUE MC																														
<p><b>MALTA PER INTONACO DEUMIDIFICANTE MACROPOROSO RESISTENTE AI SALI A BASE DI CALCE ED ECO-POZZOLANA PER IL RIMANIMENTO DI MURATURE ESISTENTI, ANCHE DI PREGIO STORICO</b></p> <p>Finitura a vista in opera di intonaco deumidificante, resistente ai sali, a base di calce ed Eco-Pozzolana, esente da cemento, sabbie naturali, speciali additivi e microbolle a bassissima emissione di anidride carbonica (EMICODE EC1-R Plus) (tipo Mape-Antique MC della Mapei S.p.A.) per il mantenimento di edifici esistenti, anche di pregio storico ed artistico, interessati dalla presenza di umidità di risalita capillare e sal salubri.</p> <p>La malta dovrà comportarsi di realizzare in cantiere degli intonaci deumidificanti macroporosi, facilmente applicabili e resistenti alle diverse aggressioni chimico-fisiche, in particolare alla presenza di sali solubili, in caso di gelatazioni e all'azione distruttiva delle acque piovane. L'applicazione dell'intonaco deumidificante dovrà essere effettuata previa adeguata preparazione del supporto (in particolare a pareti) e, comunque, solo dopo aver applicato un primo strato di intonaco (tipo Mape-Antique Risalstop della Mapei S.p.A.), al fine di uniformare l'assorbimento del supporto, migliorare l'adesione dell'intonaco e ottenere il trasferimento dei sali. Effettuare l'istruttivo della superficie al fine di rimuovere qualsiasi materiale e sostanza che possa pregiudicare l'adesione del prodotto che saranno impiegati successivamente, sino ad ottenere un supporto pulito, sano e compatto, privo di parti frastolose, polvere, sporco, muffe e sali solubili. Applicare lo strato di intonaco a spessore in uno spessore di ca. 5 mm, a forte spessore del supporto da intonacare, partendo dalla parte bassa della muratura. Attendere il "raggrinzimento" del intonaco, quindi, applicare l'intonaco deumidificante a spessore in un unico strato (max 30 mm), partendo dalla parte bassa della muratura verso la sua sommità. Nel caso in cui lo spessore da riportare sia superiore a 30 mm, applicare l'intonaco in più mani, avendo l'accortezza di realizzare i diversi strati successivi, su quello precedente non lisciviato. Dopo l'applicazione attendere alcuni minuti prima di procedere alla lustratura con staggio di alluminio ad "H" e a soffio, con passaggi in senso orizzontale e verticale, sino ad ottenere una superficie piana. Rimuovere le guide verticali, qualora utilizzate, mangiando i muri con lo stesso prodotto. Rifinire la superficie dell'intonaco con frastaglio di spugna leggermente umidita.</p> <p>In accordo alla norma EN 998-1, il prodotto è classificato come R: "Malta per intonacamento. Malta progettata per intonaci intensionati, utilizzati su pareti di muratura umide contenenti sali solubili in acqua", di Categoria CS II.</p> <p>Il prodotto dovrà avere le seguenti caratteristiche prestazionali:</p> <table border="0"> <tr> <td>Aspetto:</td> <td>polvere</td> </tr> <tr> <td>Colore:</td> <td>bianco</td> </tr> <tr> <td>Dimensione massima dell'aggregato (EN1218-1) (mm):</td> <td>2,5</td> </tr> <tr> <td>Massa volumica apparente della malta fresca (EN 1015-6) (kg/m<sup>3</sup>):</td> <td>1.700</td> </tr> <tr> <td>Porosità della malta allo stato fresco (EN1218-7) (%):</td> <td>&gt; 20</td> </tr> <tr> <td>Resistenza meccanica a compressione a 28 gg (EN 1015-11):</td> <td>Categoria CS II</td> </tr> <tr> <td>Adesione al supporto (laterizio) (EN 1015-12) (N/mm<sup>2</sup>):</td> <td>&gt; 0,4 (Malta di natura PEI) + B</td> </tr> <tr> <td>Assorbimento d'acqua per capillarità (EN 1015-18):</td> <td>3,5</td> </tr> <tr> <td>Coefficiente di permeabilità al vapore acqua (EN 1015-19) (g):</td> <td>&lt; 10</td> </tr> <tr> <td>Conduttività termica (λ<sub>0,10</sub>) (EN 1745):</td> <td>0,81</td> </tr> <tr> <td>Reazione al fuoco (EN 13501-1):</td> <td>G1</td> </tr> <tr> <td>Resistenza ai soffi (Chappa di Annet):</td> <td>40</td> </tr> <tr> <td>Differenziale salino (stato semi-immersione in acqua):</td> <td>40</td> </tr> <tr> <td>Spessore minimo applicabile (mm):</td> <td>20</td> </tr> <tr> <td>Spessore massimo applicabile per strato (mm):</td> <td>30</td> </tr> </table> <p>Comprende e comprende nel prezzo per metro cubo il lavoro finito a regola d'arte, secondo le pr...          = stirovaggio della superficie e saturazione con acqua del supporto immediatamente pr...          = applicazione dello strato di intonaco;          = applicazione e lustratura dell'intonaco deumidificante;          = staggio e lustratura della superficie;          = accurata stagionatura della malta, applicata nelle prime 24-30 ore, realizzando an...</p> <p>Dem. esclusi:          = preparazione del supporto;          = portaggi e attrezzature usati per l'esecuzione della lavorazione.</p> <p><b>COSTO:</b> €</p>			Aspetto:	polvere	Colore:	bianco	Dimensione massima dell'aggregato (EN1218-1) (mm):	2,5	Massa volumica apparente della malta fresca (EN 1015-6) (kg/m <sup>3</sup> ):	1.700	Porosità della malta allo stato fresco (EN1218-7) (%):	> 20	Resistenza meccanica a compressione a 28 gg (EN 1015-11):	Categoria CS II	Adesione al supporto (laterizio) (EN 1015-12) (N/mm <sup>2</sup> ):	> 0,4 (Malta di natura PEI) + B	Assorbimento d'acqua per capillarità (EN 1015-18):	3,5	Coefficiente di permeabilità al vapore acqua (EN 1015-19) (g):	< 10	Conduttività termica (λ <sub>0,10</sub> ) (EN 1745):	0,81	Reazione al fuoco (EN 13501-1):	G1	Resistenza ai soffi (Chappa di Annet):	40	Differenziale salino (stato semi-immersione in acqua):	40	Spessore minimo applicabile (mm):	20	Spessore massimo applicabile per strato (mm):	30
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ANALISI PREZZI						
N.	H.10.2.3	INTONACO DEUMIDIFICANTE MACROPOROSO	UNITA' DI MISURA	QUANTITA'	PREZZO	IMPORTO
<p><b>MALTA PER INTONACO DEUMIDIFICANTE MACROPOROSO, RESISTENTE AI SALI, A BASE DI CALCE ED ECO-POZZOLANA PER IL RIMANIMENTO DI MURATURE ESISTENTI, ANCHE DI PREGIO STORICO</b></p>						
Per ogni			m <sup>3</sup> x 2,5 cm			
PRODUZIONE			m <sup>3</sup> /h	10.000		
MATERIALE			kg			
	(*)	MAPE-ANTIQUE Risalstop (2,5 cm di spessore)	kg	7.000	€ 1,37	€ 9,59
	(**)	MAPE-ANTIQUE MC (2 cm di spessore)	kg	30.000	€ 0,76	€ 22,80
MOLTIPLIEZZATURE						
		Purgino cassero 10 g/l	h	0,0100	€ 10,00	€ 0,10
		Motogeneratore	h	0,0100	€ 10,00	€ 0,10
		Attrezzi vari	h	0,1000	€ 5,00	€ 0,50
		Autocarro con gru fino a 20 g/l	h	0,0010	€ 50,00	€ 0,05
		Computista	h	0,0100	€ 5,00	€ 0,05
MANO D'OPERA (M)						
		Operaio Qualificato (n.1)	h	0,2967	€ 20,01	€ 7,97
		Operaio Comune (n.2)	h	0,5100	€ 25,36	€ 13,53
			Totale parziale			€ 12,07
			Spese generali al netto dei costi della sicurezza 10%			€ 7,90
			Totale parziale			€ 20,97
			IVA 10%			€ 2,32
			Totale Euro			€ 23,29
			<b>COSTO m<sup>3</sup> / 2,5 cm:</b>	<b>€</b>		<b>66,43</b>

(\*) Prezzo €/kg (costo da 20 kg) - listino febbraio 2023  
 (\*\*) Prezzo €/kg (costo da 25 kg) - listino febbraio 2023  
 (E) Il costo orario della mano d'opera è riferito al Prezzario A22NPRE21, ANCI (luglio 2015) per Milano e province



Antonino Salinas  
Archaeological Museum  
Palermo - Italy

## References

The following references represent the most significant projects where renovation and restoration work has been carried out on existing masonries, including the masonries of buildings of historical and artistic interest, to testify the use of products from the MAPE-ANTIQUE range.

More references are available at the Mapei website at the following address:  
[www.mapei.it](http://www.mapei.it)

In alphabetical order:

99-spout Fountain - L'Aquila - Italy

Acaya Castle - Venerole (Lecce) - Italy

Ancient building in Via Orsanmichele - Florence - Italy

Ancient City Walls of Florence - Florence - Italy

Ancient masonries building - Bagnacavallo (Ravenna) - Italy

Ancient residential building - Nepi (Viterbo) - Italy

Angevin Castle - Copertino (Lecce) - Italy

Antonino Salinas Archaeological Museum - Palermo - Italy

Banks of the Navigli - Milan - Italy



Basilica of St. Francesco and Holy Convent of Assisi - Assisi - Italy

Basilica of Arcimboldi - Milan - Italy

Bell tower of the Parish Church of St. Martino - Novara - Italy

Building alongside Villa Asnagli - Paderno Dugnano (Milan) - Italy

Caen Castle - Caen - France

Clay Castle - Sibiu - Romania

Cappuccini Convent - Savona - Italy

Carlo Bridge - Prague - Czech Republic

Casa degli artisti - Milan - Italy

Capo di Ponte fountain - Brescia - Italy

Cathedral of St. Margherita - Montefiascone (Viterbo) - Italy

Church and Monastery of the Perpetual Worshippers of the Most Holy Sacrament  
- Vigevano (Pavia) - Italy

Church of Montesion - Palma di Majorca - Spain

Church of San Pedro of Versailles - Mattanza - Cuba

Church of Santa Chiara of the Pantheon - Rome - Italy

Church of St. Bernardino - L'Aquila - Italy

*Revenue authority  
of Florence - Italy*



*Villa della Porta Bozzolo  
Casalzuigno (Varese) - Italy*

- Church of St. Costanzo - Naples - Italy
- Church of St. Nicola - Ostrava - Czech Republic
- Church of St. Pancrazio - Vedano Olona (Varese) - Italy
- Church of the Most Holy Annunziata - Ispica (Reggio Emilia) - Italy
- Domus Aurea - Rome - Italy
- Duca degli Abruzzi Complex (IACP) - Bari - Italy
- Duchy of Canevaro Zoagli Castle (Genoa) - Italy
- Ferdinando of Savoia barracks - Rome - Italy
- Flavio Amphitheatre - Rome - Italy
- Forlì art gallery - Forlì (Forlì-Cesena) - Italy
- Former Cerere pasta works - Rome - Italy
- Fortress of Bard - Bard (Aosta) - Italy
- Gentile College - Fabriano (Ancona) - Italy
- Hotel Mirò - Rapallo (Genova) - Italy
- Hotel Life Palace - Šibenik - Croatia
- “Incis” Residential Complex - Campobasso - Italy
- Jesuit Fathers Monastery - Stara Weis - Poland



“La Mattonaia” residential complex - Pietrasanta (Lucca) - Italy

“Le 5 Corti” residential complex - Caronno Pertusella (Varese) - Italy

Malay Heritage Centre Museum - Singapore

“Minuto Pesce” Town Square - Molfetta (Bari) - Italy

Monastery of St. Benedict - Norcia (Perugia) - Italy

Oratory of the Passion in St. Ambrogio - Milan - Italy

Peggy Guggenheim Museum - Venice - Italy

Palace of the Asturian Centre - Havana - Cuba

Palazzo Arrivabene - Mantova - Italy

Palazzo Bonini - Massa Carrara - Italy

Palazzo dei Normanni - Palermo - Italy

Palazzo della Carovana: High School in Pisa - Italy

Palazzo Ducale - Sassuolo (Modena) - Italy

Palazzo Ferro - Trapani - Italy

Palazzo Gradari - Pesaro (Pesaro-Urbino) - Italy

Palazzo Orsucci - Lucca - Italy

Palazzo Pretorio - Peccioli (Pisa) - Italy

*Oratory of the Passion  
in St. Ambrogio  
Milan - Italy*



*"Minuto Pesce" Town  
Square - Molfetta (Bari)  
Italy*

- Palazzo Vecchio (rear facade) - Florence - Italy
- Parish Church - san Marco in Pretura (L'Aquila) - Italy
- Pieve di San Donato in Polenta - Bertinoro (Forlì-Cesena) - Italy
- Pieve di St. Stefano di Sorano - Filattiera (Messina) - Italy
- Post Office - Cesenatico (Forlì-Cesena) - Italy
- Private farm - Lucca - Italy
- Private farm - Robbiano di Mediglia (Milan) - Italy
- Revenue authority of Florence - Italy
- Rocca di S Floriano (Treviso) - Italy
- Roof terrace in Vicolo Savelli - Rome - Italy
- Sanctuary "Santa maria del Fonte" - Caravaggio (Bergamo) - Italy
- Sant'Apollinare Nuovo - Ravenna - Italy
- Senate of the Republic - Rome - Italy
- Spielberk Castle - Brno - Czech Republic
- St. Felice Dam - Venice - Italy
- St. Maria of Tiglieto Abbey - Genoa - Italy
- St. Paternian Bridge - Venice - Italy





Teatro alla Scala - Milan - Italy

The Friars' bell-tower of the St. Ambrogio Basilica - Milan - Italy

Venere Castle - Trapani - Italy

Villa Asnaghi - Paderno Dugnano (Milano) - Italia

Villa Brancati - Marzamemi (Syracuse) - Italy

Villa del Balbaniello - Lenno (Como) - Italy

Villa della Porta Bozzolo - Casalzuigno (Varese) - Italy

Villa Ghirlanda - Cinisello Balsamo (Milano) - Italy

Villa Mazzanti - Rome - Italy

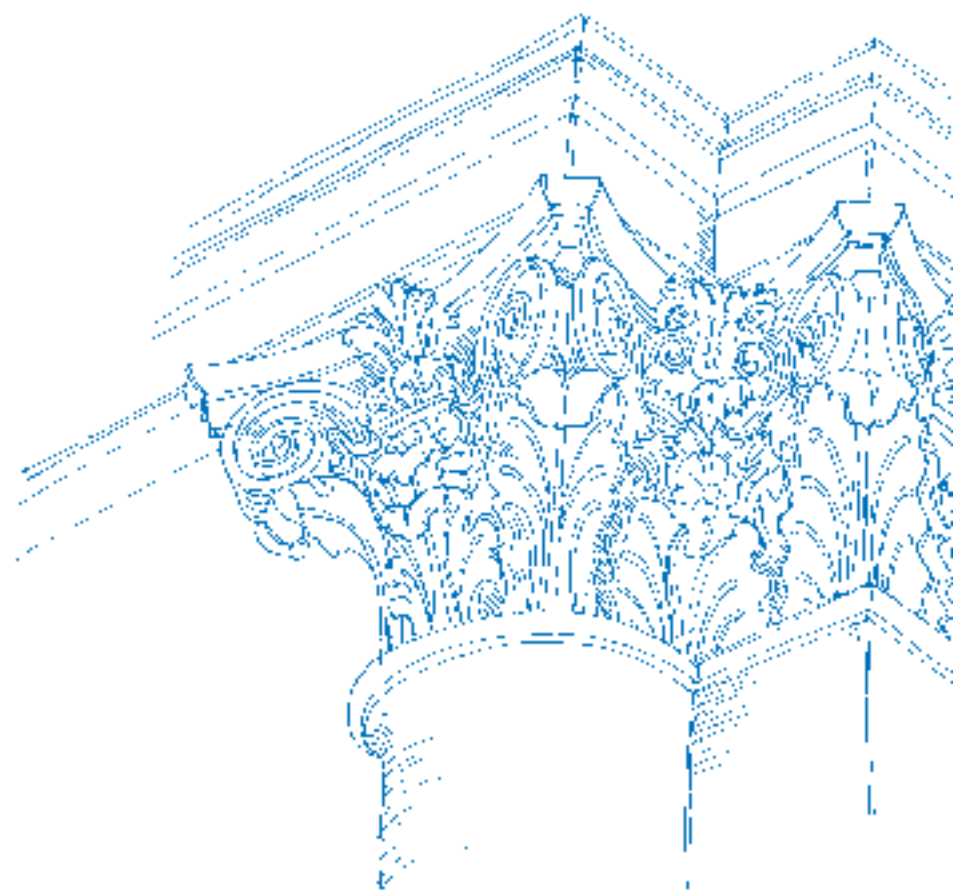
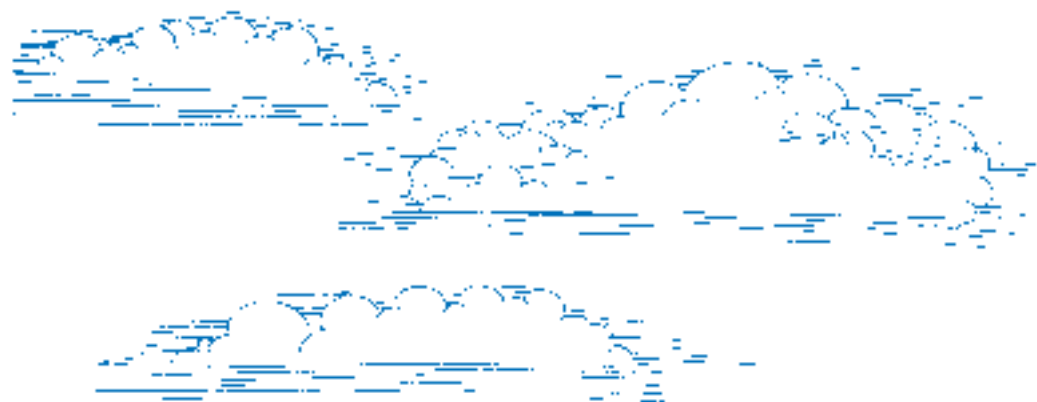
Villa Medici - Florence - Italy

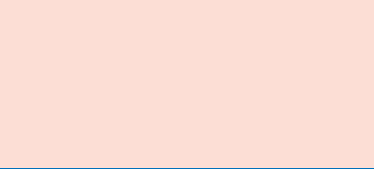
Villa Reale - Monza - Italy

Walls of Jericho - Jericho - Israel

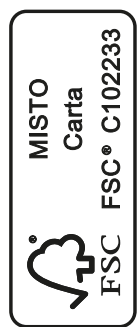
*Villa Reale  
Monza - Italy*







C.P. MK 674130 (GB) 05/17



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