

# MasterEmaco S 286 FR

**Cement-free lime and pozzolan masonry mortar, fiber-reinforced with HPF fibers to ensure high strength and ductility for reinforcement interventions on masonry.**

## MATERIAL DESCRIPTION

MasterEmaco S 286 FR is a cement-free, pozzolanic lime masonry mortar made with natural siliceous aggregates with a maximum diameter of 2 mm and reinforced with sprayable, very high tenacity polymeric fibers. It guarantees a compressive strength > 15 MPa and is therefore classifiable as an M15 type masonry mortar according to the European standard UNI EN 998/2.

## FIELDS OF APPLICATION

MasterEmaco S 286 FR thanks to its high mechanical resistance, despite being a cement-free lime mortar, is used for the consolidation of masonry structures in many situations such as:

- reinforced plates;
- reinforcement of vaults, also reinforced with carbon fiber or aramid bars from the MasterBrace BAR range;
- bedding for foundations of curtain walls or for works in general that require high-strength masonry mortars;
- CEMENT-FREE concretes: for thicknesses greater than 5 cm, aggregates of suitable granulometry are added to MasterEmaco S 286 FR, thus obtaining high-strength grouts or lime concretes.



## FEATURES AND BENEFITS

The peculiar characteristics of MasterEmaco S 286 FR are:

- Ductile behaviour, thanks to the use of special high tenacity polymeric fibers that also allow the spray application of the product: It therefore guarantees high resistance to dynamic stresses, impacts or hydraulic stresses as well as high durability and a better

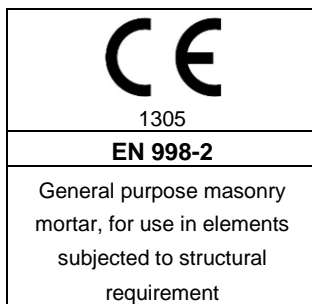
distribution of stresses on structures;

- complete absence of cement: the absolute absence of cement makes MasterEmaco S 286 FR a product fully compatible with the masonry that you want to consolidate;
- high mechanical performance: high mechanical strengths are exceptional requirements for a lime product, which thus combines historical and technological requirements with structural and executive ones;
- high adhesion to masonry; both by shear (important for bedding) and by direct traction (important for reinforced slabs and reinforced vaults);
- very low content of water-soluble salts: MasterEmaco S 286 FR is in fact characterized by a low value of electrical conductivity, does not add salts containing sulphates, chlorides, nitrates, potassium and sodium and does not contribute to the phenomena of chemical-physical degradation linked to the formation and crystallization of salts themselves;
- versatility and simplicity of application: by trowel or spray it is used for consolidation interventions in thicknesses up to 5 cm. For interventions with a thickness of > 5 cm, it can also be used for casting, adding aggregates to the mortar in order to obtain high-strength mortar or lime concretes;
- high permeability to water vapor: important to allow normal transpiration of the masonry;
- low capillary absorption: important so that water from the outside does not enter the masonry;
- no reaction to fire: the material is not combustible and does not produce fumes (Euroclass A1).

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In compliance with the European Regulation (EU No 305/2011 and EU No. 574/2014) the product is provided with the CE marking according to UNI EN 998-2 and the relative DoP (Declaration of Performance).



## CONSUMPTION

- Mortar: 18 kg / m<sup>2</sup> per cm of thickness.
- Concrete: approx. 13 kg / m<sup>2</sup> per cm of thickness (adding 35% gravel or crushed stone).

## PACKAGING

MasterEmaco S 286 FR is available in 25 kg bags.

## STORAGE

Store the product in a dry and sheltered place at a temperature anywhere between 5 and +35°C.

## FIBER

The special HPF fibers contained in MasterEmaco S 286 FR have the following characteristics:

Characteristics	
Fibre shape	linear
Material	HPME
Length (mm) - according to EN 14889-1 (mm): 30	12
Diameter (mm) - according to EN 14889-1 (mm): 0,38	
Tensile Strength (N/mm <sup>2</sup> ) - according to EN 14889-1	2800 MPa
Modulus of elasticity (GPa) - according to EN 14889-1	86 GPa
Elongation at break - according to EN 14889-1 (%)	3.5

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Technical Information		
Granulometry		Max 2,0 mm
Chloride content EN 1015-17		<0.05%
Colour of mix		Light hazelnut
Mixing ratio		4.5-5.0 l for bag (18-20%)
Consistency of mix		Thixotropic
Temperature of application		From 5°C to 35°C
Packaging		25 kg bag.
Consumption		17 kg/m <sup>2</sup> for 1 cm
Workability time (at 20°C)		60 minutes
Minimum thickness		5 mm
Maximum thickness in single laye		15 mm
Maximum thickness		50 mm
Essential characteristic in accordance to UNI EN 998-2 with a dosage of water of 19%		Performances
Vapor diffusion coefficient	UNI EN 1015/19	$\mu < 35$
Capillary absorption and water penetration of the hardened mortar	UNI EN 1015-18	0,2 Kg·m <sup>-2</sup> ·min <sup>-0.5</sup>
Fire reaction	EN 13501	Euroclasse A1
Compressive strength	UNI EN 1015/110.	>18 MPa Class M15
Thermal conductivity	UNI EN 1745	0.83 W/mK
Flexural strength	UNI EN 1015/11	4.0 MPa
Adhesion	UNI EN 1015/1	> 1,0 MPa, Failure mode: A
Shearing test	UNI EN 1015/3	$\tau_0 > 0,80$ MPa
Resistance to extraction of steel bars and the MasterBrace BAR line	RILEM-CEB-FIP RC6-78	> 6 MPa
Modulous of elasticity	UNI EN 13412	16.000 MPa
Toughness class	(Guidelines for the identification, qualification, technical assessment certification and acceptance control of FRC fiber-reinforced concrete)	Class 2a
Test method for metallic fibre concrete - Measuring the flexural tensile strength (limit of proportionality (LOP), residual)	minimum requirements according to EN 14651	ffcf, Lk = 3,43 MPa fR,1k = 2,00 MPa fR,2k = 1,14 MPa fR,3k = 1,01 MPa fR,4k = 0,74 MPa

By adding a gravel Dmax 20 mm to MasterEmaco S 286 FR, a lime concrete with consistency S3, UNI EN 206/1, is obtained, characterized by compressive strength > 15 MPa.

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## APPLICATION SHEET

### PREPARING THE SUBSTRATE

The degraded plaster must be removed by demolition with electric or compressed air hammers or by simple chiselling. Furthermore, any residual efflorescence and any other substance that could compromise good adhesion to the substrate must be eliminated. Before applying the mortar, the substrate must be cleaned and saturated with low pressure water. If necessary, repeat this last operation several times. Saturation is necessary to prevent the substrate from removing water from the mortar; an inaccurate saturation could cause loss of adhesion and cracking of the filler mortar. If the substrate cannot be saturated, it is still advisable to carry out a minimum wetting to allow correct adhesion of the mortar.

### APPLICATION TEMPERATURE

MasterEmaco S 286 FR can be applied when the ambient temperature is between +5°C and +35°C. When the temperature is between 5 ÷ 10°C mechanical resistances develop more slowly. We therefore recommend storing the bags in a heated environment and applying the mortar in the mid-hours of the morning.

### PLACING ADDITIONAL STRUCTURAL REINFORCEMENTS

In the case of reinforcement interventions using the reinforced slab or reinforced vault technique, the reinforcement mesh must have a concrete cover of at least 2 cm and must be detached from the support by at least 1 cm using spacers. The minimum thickness of intervention in the presence of reinforcing mesh cannot therefore be less than 4 cm.

### PREPARING THE MIXTURE

MasterEmaco S 286 FR must be mixed with clean water, free from salts or organic particles in the ratio of 4.5 ÷ 5 liters per bag (equal to 18 ÷ 20% of the total weight). The mixing should preferably be carried out with a vertical axis mixer to favour the dispersion of the fibers and continue until a plastic, homogeneous and lump-free mixture is obtained. Hand mixing is not recommended.

### APPLICATION

The application of MasterEmaco S 286 FR can be done with a trowel or spray with a non-continuous cycle

plastering machine and always with a vertical axis mixer. For more details on the plastering machine contact our Technical assistance. In the case of application by hand, it is recommended to apply a thin layer of 2 ÷ 3 mm of rough coat with a trowel, made with the same material, with a semi-liquid consistency, so as to uniform the absorption of the masonry and improve its adhesion.

The mortar will then be applied in successive layers with a thickness of 1 - 1.5 cm taking care to apply the next layer when the previous one is not completely hardened.

If the application substrate is very absorbent, as occurs for example in the presence of tufa stone, it is recommended to apply the rough coat with MasterEmaco S 286 FR, in order to limit the absorption of the bottom of the water mortar mix.

After applying MasterEmaco S 286 FR with a trowel, the mortar must be smoothed in order to obtain the flatness of the surfaces.

When the substrate is made up of heterogeneous materials (brick, stone, tuff, etc.), characterized by different thermal behaviours, it is recommended to insert an alkali-resistant fiberglass mesh, in order to counteract the risk of cracking. This precaution is also valid in correspondence with the edges of openings (doors, windows, etc.) where concentrations of tensions are generated which can cause cracking phenomena.

### TROWELLING

The trowelling of MasterEmaco S 286 FR must be carried out using a sponge trowel, after a suitable time -from application depending on the climatic conditions.

The time interval between application and finishing with a trowel is established according to the first stiffening of the mortar, which is determined when, by placing a hand on the surface, the fingers do not sink but leave a light imprint on the plaster. Correct trowelling will be essential to effectively counteract the formation of micro-cracks resulting from plastic shrinkage. To improve curing, it is recommended to lay a polyethylene sheet on top of MasterEmaco S 286 FR, if it is possible as in the case of screeds and vaults, for a duration of about 1 day from application, in order to maintain high humidity and contain plastic shrinkage.

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## FINISHING

After applying MasterEmaco S 286 FR it is recommended to make a millimeter smoothing with MasterEmaco N 215 FC, in order to create the optimal base for both thick finishes and paints. The most appropriate finishes will be those that do not prevent the transpiration of the wall and of the materials previously applied

## WARNING

The combination of lime and pozzolanic reactive initially leads, if the mixture takes place in an environment with poor ventilation or in the presence of large quantities of humidity, to assume a color tending to dark green. The coloring is the result of the chemical reaction of the two compounds combined together which leads to the formation of mainly hydrated calcium silicate (CSH) and hydrated gehlenite (C2ASH8). After a few days and in contact with air, this color will return to its original light color.

## SAFETY INSTRUCTION

For information on the correct and safe use, transport, storage and disposal of the product, consult the most recent Safety Data Sheet.

## OTHER SERVICES

For price analysis, specifications, supplementary brochures, references, reports and technical assistance, visit the website [www.master-builders-solutions.com/it-it](http://www.master-builders-solutions.com/it-it) or contact [infomac@mbcc-group.com](mailto:infomac@mbcc-group.com).

Scan the QR code to visit the product page and download the latest version of this datasheet.



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Since 16/12/1992, Master Builders Solutions Italia Spa has been operating under a Certified Quality System compliant with the UNI EN ISO 9001 Standard. Furthermore, the Environmental Management System is certified according to the UNI EN ISO 14001 Standard and the Safety Management System is certified according to the UNI ISO 45001 Standard.

### Master Builders Solutions Italia Spa

Via Vicinale delle Corti, 21 – 31100 Treviso – Italia  
T +39 0422 429200 F +39 0422 421802  
[www.master-builders-solutions.com/it-it](http://www.master-builders-solutions.com/it-it)  
e-mail: [infomac@mbcc-group.com](mailto:infomac@mbcc-group.com)

For further information, please consult the local Technician of Master Builders Solutions. The technical advice on how to use our products, either written or verbally given, are based on the current state of our scientific and practical expertise, and does not imply the assumption of any guarantee and/or responsibility for the final results of works executed using our products.

Therefore, the customer is not exempted from the exclusive task and responsibility of verifying the suitability of our products for the intended use and purposes.

This version supersedes all the previous ones.