ARMOX®

Technical Data Sheet

Material

ARMOX® is the first plaster of the world which, thanks to FRM (Fiber Reinforced Mortar) patented technology and its unconventional inorganic binders, revolutionizes masonry buildings anti-seismic reinforcement.

For further information, please look at the brochure on www.trimaterials.com.

General informations

Granulometry:	0 - 1 mm	
Aspect - Color:	Powder - Grey, brown.	
Components:	Aluminum Silicate, Quartz, Sulphoaluminate cement	
Water quantity:	Mix with 26% of H_2O for 3 minutes until mix is homogeneous	
Binder:	Unconventional high-performance hydraulic binder (Ferrite, Alumina, Calcium Sulphate)- no organic additives	
Packaging:	26 kg paper bags / On 1040 kg pallet inside the paper bag there is a 1 kg plastic bag with double hooked steel fibers	
Application:	By hand	By machine
Application temperature:	5 - 35 °C	
Yield:	16,0 Kg_{powder}/m^2	Referred to 1 cm thickness
Lowest thickness:	1 cm	
Setting time:	45 min.	Referred to a 20 °C temperature and 50% relative humidity
Hardening time:	< 2,5 hours	

Application fields

- Seismic strengthen of masonries. It can be applied also on one only wall face
- **ARMOX®** can be used in Historical Heritages like churches, historical buildings, Cultural Heritages and so on.
- Suitable under-layers: Masonry walls with bricks and hollow bricks, new or historical ones, poroton, stone, tuff.
- Forbidden under-layers: Gypsum and any other kind of plaster, powder layers, not listed layers.

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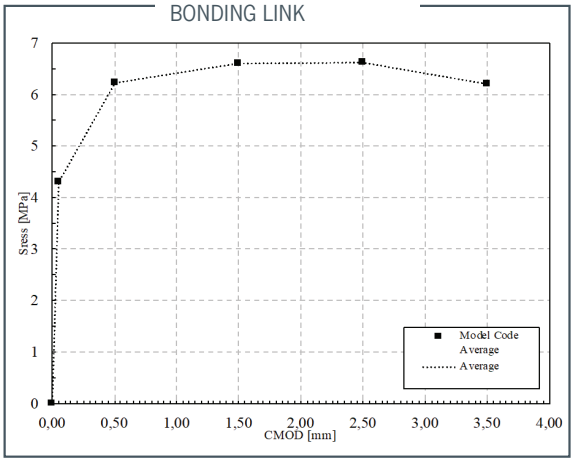
Steel Fibers quality				
Quality	Traction resistance	Fiber Length (L_f)	Nominal aspect ratio	shape
High-Carbon steel	>3100 [MPa]	30	86	Double Hooked - End

	Standard	MU	Value	Notes
Compressive stregth classification	UNI EN 206		C 32/40	
Flexural strength of hardened mortar	UNI EN 1015-11	[MPa]	6,84	Test after 28 days
Consistency	UNI EN 12350-2		S 3	
Compressive strength of hardened mortar	UNI EN 1015-11	[MPa]	40,3	Test after 28 days
Elastic Modulus (Young modulus)	EN 12390-1	[MPa]	20433	
Workability	UNI EN 1015/9	[min]	28	
Post-cracking residual tensile strength	UNI EN 1015/11 + Model Code 2010	BONDING LINK 		

f_L	f_{R1}	f_{R2}	f_{R3}	f_{R4}
[MPa]	[MPa]	[MPa]	[MPa]	[MPa]
4,30	6,24	6,61	6,62	6,21

Free shrinkage	ASTM C 157-04	[microstrain]	609,60	Value after 110 days
FRC classification (post-cracking)	UNI EN 14651	[MPa]	3 d	

N.B. Pietro Pisa Laboratory at Brescia University executed independently all experimental and Standard tests

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Application

Essential tools

In addition to usual tools for wall plastering with classic civil plaster, consider as following:

- use **very strong 50 liters plastic barrels** to mix material. A cement mixer can be used, too, but keep attention to its cleaning. The short hardening time can cause its blocking;
- **Connectors** to apply if necessary (see Pic 1) to avoid geometric instability. The connector's quality depends by the wall variety. Fischer and screws can be used as well.
- To avoid **rocking behavior** caused by the stiffness increment of the structure, it is possible to down inside the thickness of the plaster **8 mm diameter steel rebars**, bonding them to foundation using epoxy resin (See Pic 2).

Pic 1: connector sample

WARNING : wrong water percentages give back an usefulness product.

Preparation of the support

N.B. Suitable supports: solid, perforated, new and old brick masonries; poroton, stone, mixed and rubble walls, tuff.

- clean the masonry from any cladding until the arrival to the bearing structure (concrete, bricks, stones);
- when the wall is completely clean, scrape it off by using iron or sorghum brushes in order to remove all the inconsistent parts as much as possible.
- later, dunk the masonry until it is totally wet. It **is very important to employ the material on the wet support** to guarantee the adhesion on building surface;
- wherever possible, use a pressure washer to clean and eliminate the inconsistent elements on the surface that must be plastered.
- To avoid geometric **instability** problems, apply, where it is necessary, connectors (see Pic 1) down the thickness of the material 4 per m^2

Pic 2: Steel rebars to connect plaster to foundation and connector application sample

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Implementation

Layer	Thickness Quantity	Water	Fiber	Mixing times
1° layer	0,4 cm	6,5 L/bag	NO	2 minutes
Connectors	4/m^2			
2° layer	1,4 cm	6,5 L/bag	**YES (1kg/bag)**	30 sec.+ 1,5 min
3° layer (finishes)	0,2 cm	6,5 L/bag	NO	2 minutes

Mixture:

- put the precise quantity of water (6,5 liters) in the mixing barrel (see table above);
- put one whole bag of ARMOX® inside the mixing barrel (it is better to mix one bag at the time);
- follow mixing times in the table above;
- if you are mixing the **first layer,** mix for 2 minutes without adding any structural fiber
- if you are mixing the **second layer**, after 30 seconds **add structural fiber plastic bag** in the mixing and continue to mix for other 90 seconds.
- if you are mixing the **last layer,** mix for 2 minutes without adding any structural fiber

WARNING: Once mixing is ended, **apply immediately the product**. Fast hardening times - from 25 to 45 minutes depending by the environmental temperature

Application:

- once material is mixed, apply the first layer (without structural fibers) on the wet masonry wall with a thickness of about 4 mm;
- if it is necessary to avoid geometric instability, insert connectors in the wall (4-6 per m^2)
- apply the second layer (with structural fibers) with a thickness of 1,4 cm
- apply the last layer (without structural fibers with a thickness of 2 mm

Finishes

ARMOX® is one-component layer material. It is possible to apply one more layer on top of it like colored plasters based on limestone binders or like siloxane, silicate or limestone paints

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