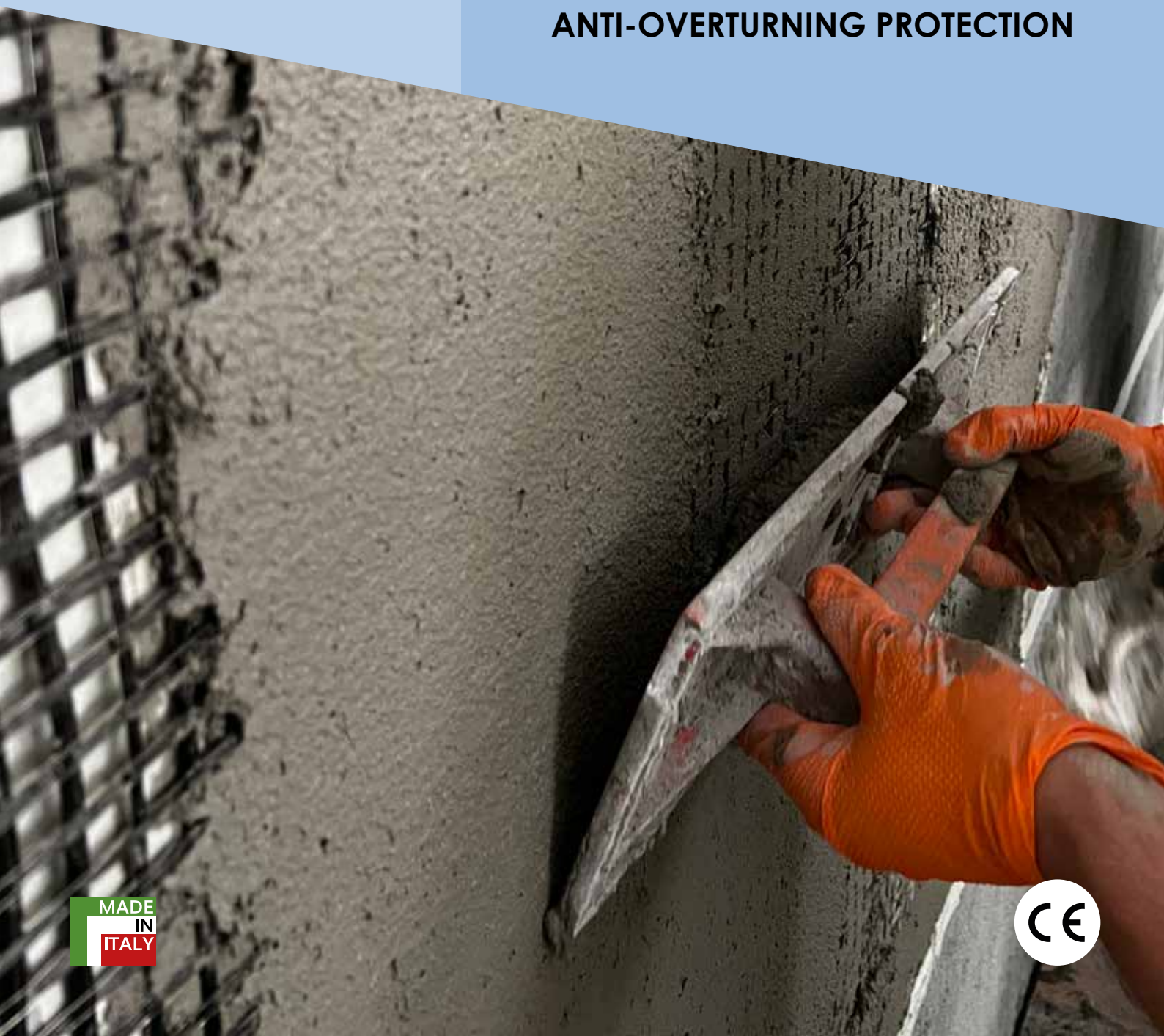
FIBRE NET
composite engineering

FRCM
SYSTEMS
C-MATRIX

REINFORCEMENT AND STRENGTHENING OF MASONRY AND CONCRETE STRUCTURES

ANTI-OVERTURNING PROTECTION



MADE IN ITALY

CE

FRCM
SYSTEMS
C-MATRIX

FIBRE NET composite engineering

C-MATRIX is a complete range of low-thickness FRCM (Fiber Reinforced Cementitious Matrix) reinforcement systems, developed to provide effective and compatible solutions for a wide range of design requirements.

The application is performed using the fresh-on-fresh technique, employing reinforcement meshes, either dry or impregnated, combined with inorganic matrices based on natural hydraulic lime or cementitious binders.
The use of transverse connectors, when necessary, enhances the effectiveness of the intervention.

CE

EPD ITALY

MESHES
dry and impregnated basalt-steel, glass, and carbon fiber meshes

CONNECTORS
in glass and carbon fibers

STRUCTURAL MORTARS
based on hydrated lime and/or natural hydraulic binders

APPLICATION FIELDS

Masonry Structures

- Structural reinforcement and seismic enhancement of existing structures
- Increase in strength and ductility at both local and global levels
- Prevention of local and/or global failure mechanisms
- Reinforcement of arches and vaults, including those with reduced thickness
- Confinement and reinforcement of columns
- Top ring beams

Concrete Structures

- The system is applied to cases of structural elements deficient under purely static loads, enabling an increase in shear capacity, flexural strength, and confinement of predominantly compressed members

CHARACTERISTICS AND ADVANTAGES

INCREASE IN PERFORMANCE WITHOUT STIFFENING

The load-bearing capacity of the reinforced elements is increased without significantly increasing the stiffness or mass of the structure.

VERSATILITY

The reduced intervention thickness (starting from 8 mm) and the flexibility of the meshes make the system ideal for elements with complex geometries such as intricate vaults or facades featuring pilasters and cornices.

REVERSIBILITY OF THE INTERVENTION

The system complies with the reversibility criteria established for works on protected heritage, enabling removal without causing permanent damage to the existing structure.

DURABILITY AND COMPATIBILITY

The mesh-matrix interaction has been optimized to provide excellent adhesion and chemical-physical compatibility with any substrate, ensuring the long-term durability of the intervention.

EASE OF APPLICATION

The lightweight and manageable meshes allow for quick and easy application of the reinforcement, reducing installation times and operational disruptions on site.

ENVIRONMENTAL SUSTAINABILITY

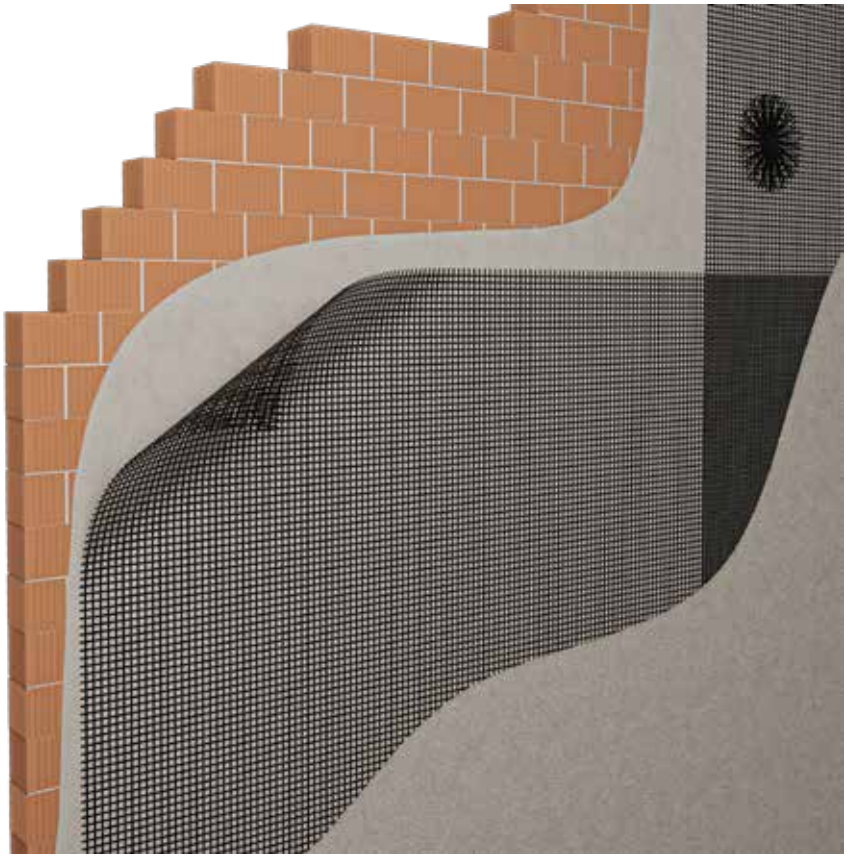
The systems, EPD certified, are eco-friendly and exhibit low environmental impact.

The selection of the most suitable C-MATRIX system for specific design requirements must be based on the following factors:

- type of substrate (masonry in brick, stone, tuff, or concrete elements);
- composition of the inorganic matrix (based on natural hydraulic lime or cementitious binders);
- type of fibers employed in the reinforcement meshes (alkali-resistant glass, carbon, basalt, and steel);
- required mechanical performance (bond strength, elastic modulus, and mesh grammage).

MASONRIES

The application of FRCM systems for strengthening vertical masonry elements (wall piers and floor bands) increases their load-bearing capacity in both shear and flexural-compression without changing their original stiffness. The effectiveness of the intervention can be improved by introducing transverse connectors in critical sections. The reduced thickness of the reinforcement and the flexibility of the meshes make this technique especially suitable for load-bearing masonry featuring architectural decorative elements, as well as for interventions on non-load-bearing masonry.



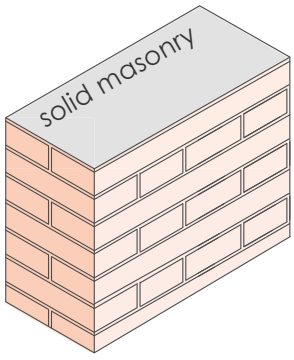
A. SURFACE PREPARATION:

- removal of existing plaster and any loose materials;
- optional raking out of joints;
- rounding of sharp edges with a radius of curvature no less than 20 mm;
- thorough cleaning of masonry surfaces by washing;
- application of any surface leveling layer on the masonry;
- creation of holes for accommodating transverse connectors, where applicable.

B. APPLICATION OF THE STRENGTHENING SYSTEM:

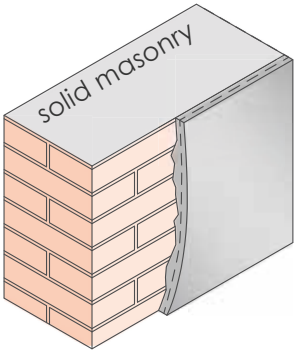
- placement of the first mortar layer;
- application of the mesh;
- subsequent placement of the second fresh-on-fresh mortar layer.

INSTALLATION PROCEDURE



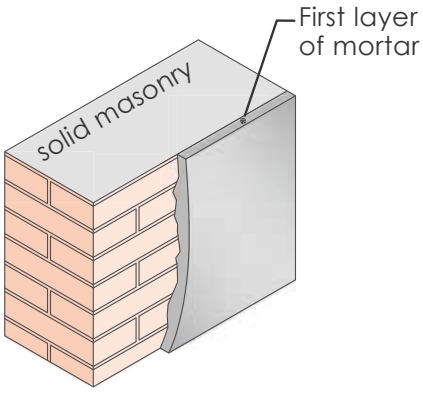
1

REMOVAL
OF THE PLASTER



2

LEVELING
OF THE SUBSTRATE



3

FIRST MORTAR LAYER

VAULTS

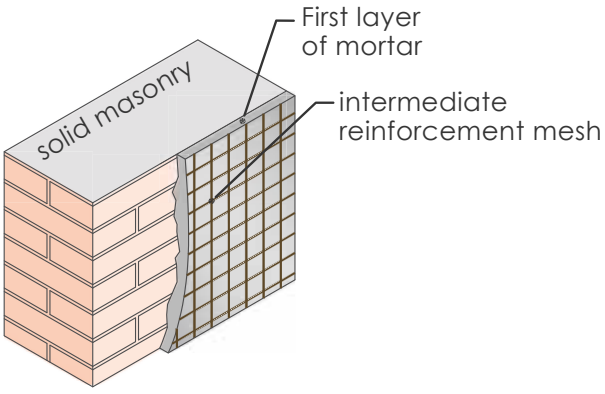
The reinforcement intervention with FRCM systems on arches and masonry vaults aims to compensate for the lack of tensile strength in the masonry, counteracting hinge openings and thereby preventing the activation of collapse kinematic mechanisms. The FRCM system is characterized by low thickness and the possibility of being applied either continuously or in strips, thus adapting to various geometric configurations and levels of intervention. The reinforcement can be applied both to the intrados and extrados and connected to the masonry elements and substrate not only through adhesion but also via connectors.

A. SURFACE PREPARATION:

- possible removal of material of the vault (for extrados applications);
- cleaning of the extrados/intrados surfaces of the vault from loose materials and dust;
- possible restoration of deteriorated parts (e.g., by repointing or stitch-repair techniques);
- thorough cleaning of the vault surface by washing;
- drilling of holes to fit any connections.

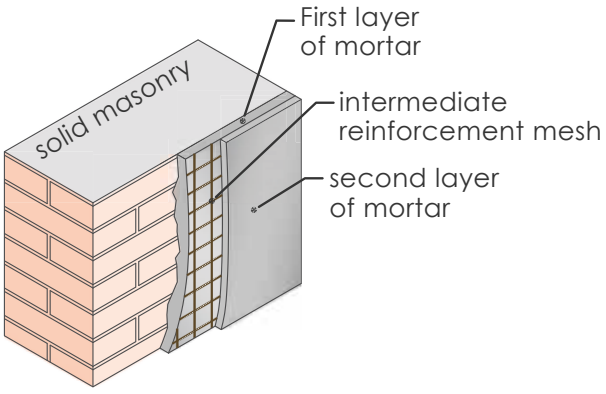
B. APPLICATION OF THE STRENGTHENING SYSTEM:

- application of the first mortar layer;
- application of the mesh;
- subsequent application of the second layer of fresh to fresh mortar.



4

INTERMEDIATE REINFORCEMENT MESH

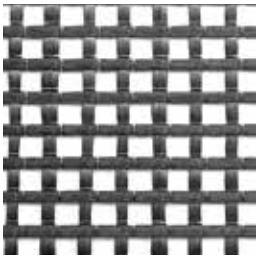


5

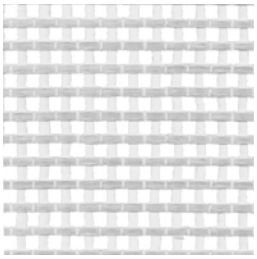
SECOND LAYER OF MORTAR

MESHES — IMPREGNATED AND DRY

Basalt and stainless steel meshes



Carbon fiber meshes



Glass fiber meshes

STRUCTURAL MORTARS

Structural mortar based on hydraulic lime NHL, compressive strength up to 15 MPa

Structural mortar based on hydrated lime and hydraulic binders, compressive strength 15–25 MPa

Thixotropic cementitious polymer-modified mortar, compressive strength 45 MPa

Structural cementitious mortar, polymer-modified, compressive strength 40 MPa

CONNECTIONS

Bowed bars in carbon fiber

Bowed bars in glass fiber

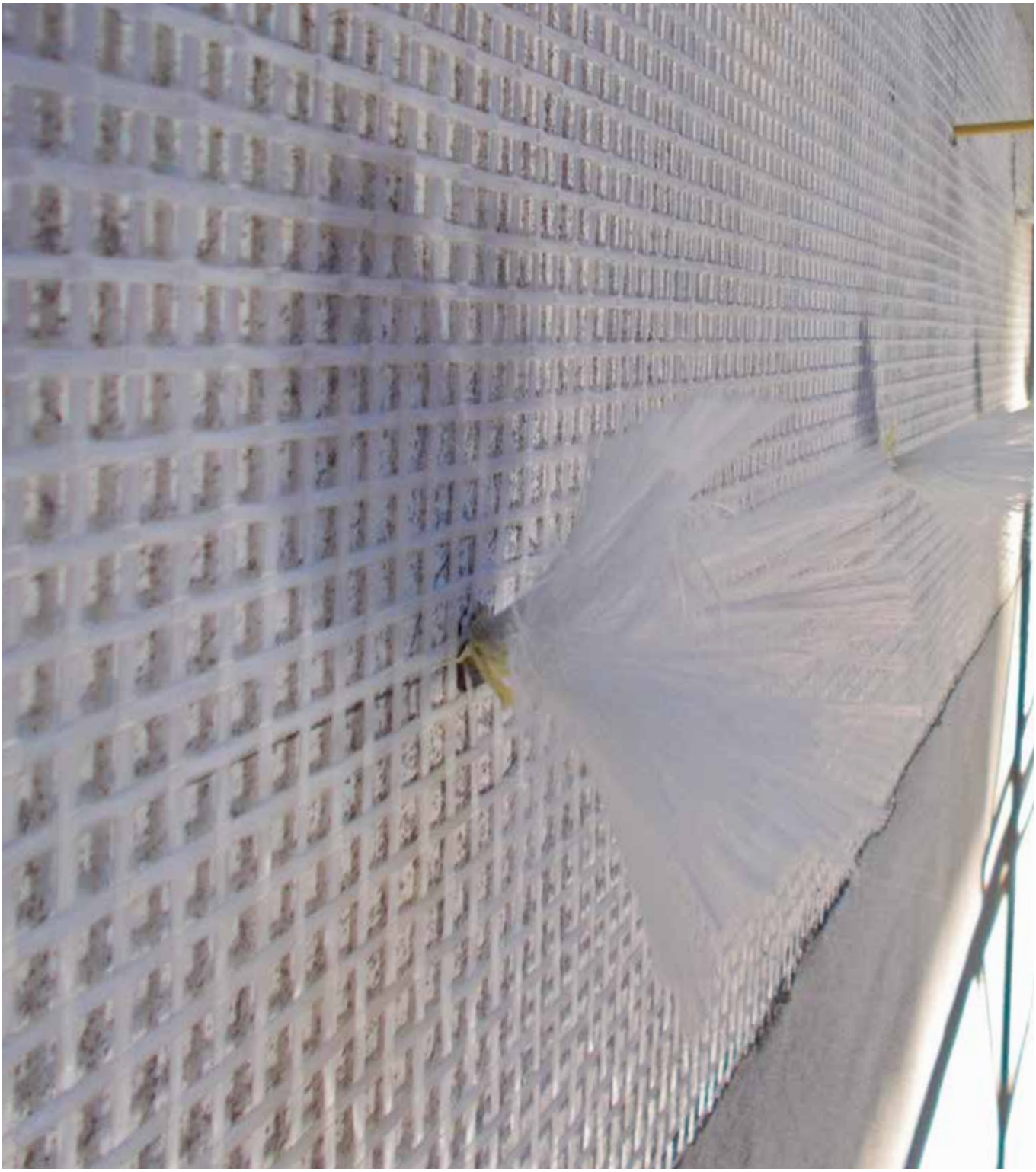
Carbon fiber and glass fiber bows

Helical bars made of stainless steel

CHEMICAL ANCHORS AND ADHESION PROMOTERS

Two-component promoter Water-based

Chemical anchor Epoxy, vinylester, or polyester



REFERENCE STANDARDS

IDENTIFICATION AND QUALIFICATION

- EAD 340275-00-104 - Externally_bonded composite systems with inorganic matrix for strengthening of concrete and masonry structure
- Italian guideline for the identification, qualification, and acceptance control of fiber-reinforced inorganic matrix composites (FRCM) to be used for the structural strengthening of existing constructions. February 2022

Design

- CNR-DT 215/2018 – Italian instructions for the Design, Execution, and Control of Static Strengthening Interventions using Fiber-Reinforced Inorganic Matrix Composites.

01/2026 - M-542-0126

FIBRE NET
composite engineering

FRCM
SYSTEMS
C-MATRIX

REINFORCEMENT AND STRENGTHENING OF MASONRY AND CONCRETE STRUCTURES
ANTI-OVERTURNING PROTECTION

ISO 45001 IIL-C (Certification)
ISO 14001 IIL-C (Certification)
ISO 9001:2015 SGS Certification
UNI/PDR 125:2022 SGS Certification
CSI RECYCLABLE COMPOSITES Licence FRP140001

Fibre Net S.p.A.
Via Jacopo Stellini, 3
Z.I.U. - 33050
Pavia di Udine (Ud) ITALY
Tel. +39 0432 600918
info@fibrenet.it
fibrenet.it