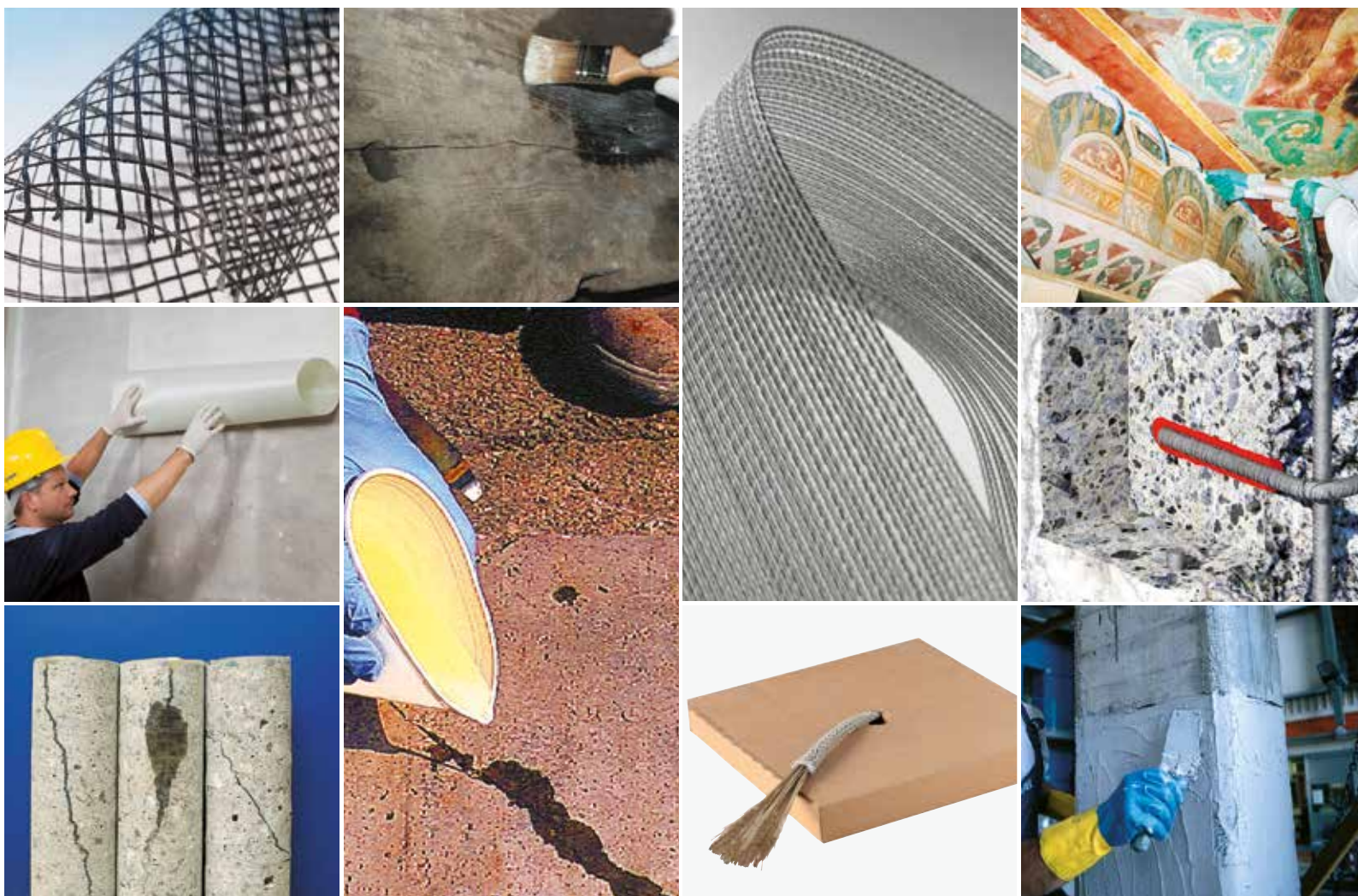


A GUIDE TO CHOOSING COMPOSITES FOR STRUCTURAL STRENGTHENING



A guide to choosing composites for structural strengthening

The use of composites is now one of the consolidated strengthening techniques employed for the static and seismic upgrading of existing reinforced concrete, masonry and wooden structures. MAPEI has a line of products available that have been perfected and consolidated through more than 19 years of experience, from the classic polymer matrix and fibre **Mapei FRP System** to the more modern concept of strengthening based on the use of inorganic matrixes and fibres, the **Mapei FRG System** and **Mapenet EM** System, the innovative anti-seismic protection system, **MapeWrap EQ System**, and the technology of **Planitop HPC**.

Mapei FRP System



A complete range of composites made from very high strength fibres and polymeric resins specially formulated for the strengthening, the static and seismic upgrading of structures made from normal, pre-stressed and reinforced concrete, steel, masonry or wood. Strengthening systems from the **Mapei FRP System** line comply with the indications of the technical reference document CNR DT 200/R1 2013.

Mapei FRG System



A complete range of composites which, unlike traditional FRP, uses an inorganic, pozzolanic binder rather than a polymeric matrix to guarantee excellent chemical-physical and elasto-mechanical compatibility with masonry substrates (stone, bricks and tuff). They may be applied to repair structures in reinforced concrete and masonry.

MapeWrap EQ System



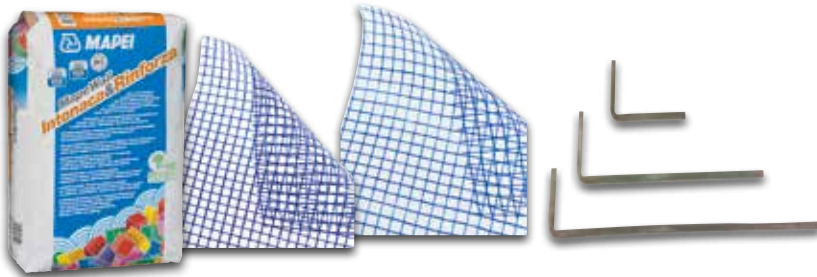
An innovative protection system in the form of “seismic wallpaper” to give people more time to evacuate a building if there is an earthquake. It acts like an “air-bag” for internal and external secondary partition walls (e.g. buffer walls), and stops walls collapsing or tipping over during seismic activity.

Planitop HPC and Planitop HPC Floor High Performance Micro-Concrete



A system made from High Performance Fibre Reinforced Concrete (HPFRC). The main performance properties characterising this new type of cementitious composite are extremely high compressive strength and its capacity to absorb high fracture energy, or ductility. And lastly, its tensile strength allows for considerably less traditional reinforcement to be used, in accordance with the technical document CNR DT 204/2006 as well as in compliance with the technical specifications of CNR DT 204/2006 and Fib Model Code for Concrete Structures 2010.

Mapenet EM System



System for making composite structural “reinforced” render and concrete with the capacity to withstand the service limits of conventional materials, such as electro-welded mesh.

In fact, it is well known that traditional techniques normally adopted to make *reinforced render* considerably increase the rigidity of walls, thereby increasing the effect of seismic loads on buildings. The high modulus of elasticity of mortars used in the past also caused detachment of the mortar at the interface between the original wall and the conventional strengthening system adopted, due to their different elastic-mechanical characteristics.

The strengthening system proposed here, on the other hand, uses mortar with a low modulus of elasticity reinforced with special, pre-formed GFRP mesh, which enhances the shear strength across the horizontal plane and the flexural strength of the wall without significantly increasing the rigidity of the wall panels.

The system may be calculated as per table C8A.2.2 from explanatory Circular No. 617, issued on the 2nd of February, by taking into consideration the correction factor for reinforced render for safety purposes.

Types of installation using FRP

- Repairing and static and seismic upgrading of unstable or weak structures where flexural and shear strength need to be supplemented;
- confinement of compressed or compressed/flexed members (pillars, bridge piles, chimneys) to improve their load-bearing properties or their ductility where longitudinal reinforcement also needs to be supplemented;
- strengthening flexed members by creating an external sleeve to areas subjected to tensile loads;
- repairing structures with localised impact damage, such as bridge beams hit by trucks carrying tall or wide loads;
- seismic upgrading and restoration of domed structures without increasing their seismic mass and without the risk of liquids percolating towards the internal surface;
- creating sleeves around beam-pillar hinge zones for seismic upgrading;
- strengthening load-bearing members in buildings whose structural system has been modified due to new architectural requirements or change in use;
- repairs to structures damaged by fire.

Types of installation using FRG

- Structural strengthening of facing walls, applied on the internal and/or external face;
- strengthened reinforcement for both concrete and masonry members to distribute stresses induced by seismic activity more uniformly;
- strengthened reinforcement and attachment points to hold load-bearing walls together correctly and more solidly to structures with a reinforced concrete framework.

Advantages of using **Mapei FRP** and **FRG Systems**

There are numerous advantages deriving from the use of products from the **Mapei FRP** and **FRG System** lines compared with traditional repair techniques. The most significant are as follows:

- simple, quick application: thanks to their low weight, they do not require special equipment or lifting gear to put them in place, only a small workforce is required to place the materials in a very short space of time and, in many cases, it is not even necessary to interrupt the normal activities of the structure itself;
- highly durable;
- high mechanical performance;
- unlike repair work by cladding with steel plates (the beton plaqué technique), there is no problem of corrosion of the strengthening materials applied;
- no increase of the mass involved: installations using **Mapei FRP** and **FRG System** do not increase the overall mass of the structural members that have been strengthened. This aspect is extremely important, particularly in the field of seismic upgrading, where the stresses are proportional to the mass involved;
- installations are completely reversible: installations using **Mapei FRP** and **FRG System** are completely reversible, in that the strengthening materials and layers of adhesive may be completely removed and the structure returned to the same condition as before the installation. This characteristic is particularly important when carrying out work to make buildings temporarily safe, especially on those of historical interest.

Mapei Steel Bar and **Mapei Steel Dry**

A new range of high-strength AISI 304 and AISI 316 stainless steel helical bars used in a wide range of applications to strengthen all types of structures.

Their special helical shape helps them form a particularly strong mechanical bond with the substrate, allowing them to be applied dry by simply drilling a pilot hole.

Specific interventions using **Mapei Steel Bar** and **Mapei Steel Dry**

Mapei Steel Bar and **Mapei Steel Dry** bars are particularly recommended for strengthening walls and for the following applications in particular:

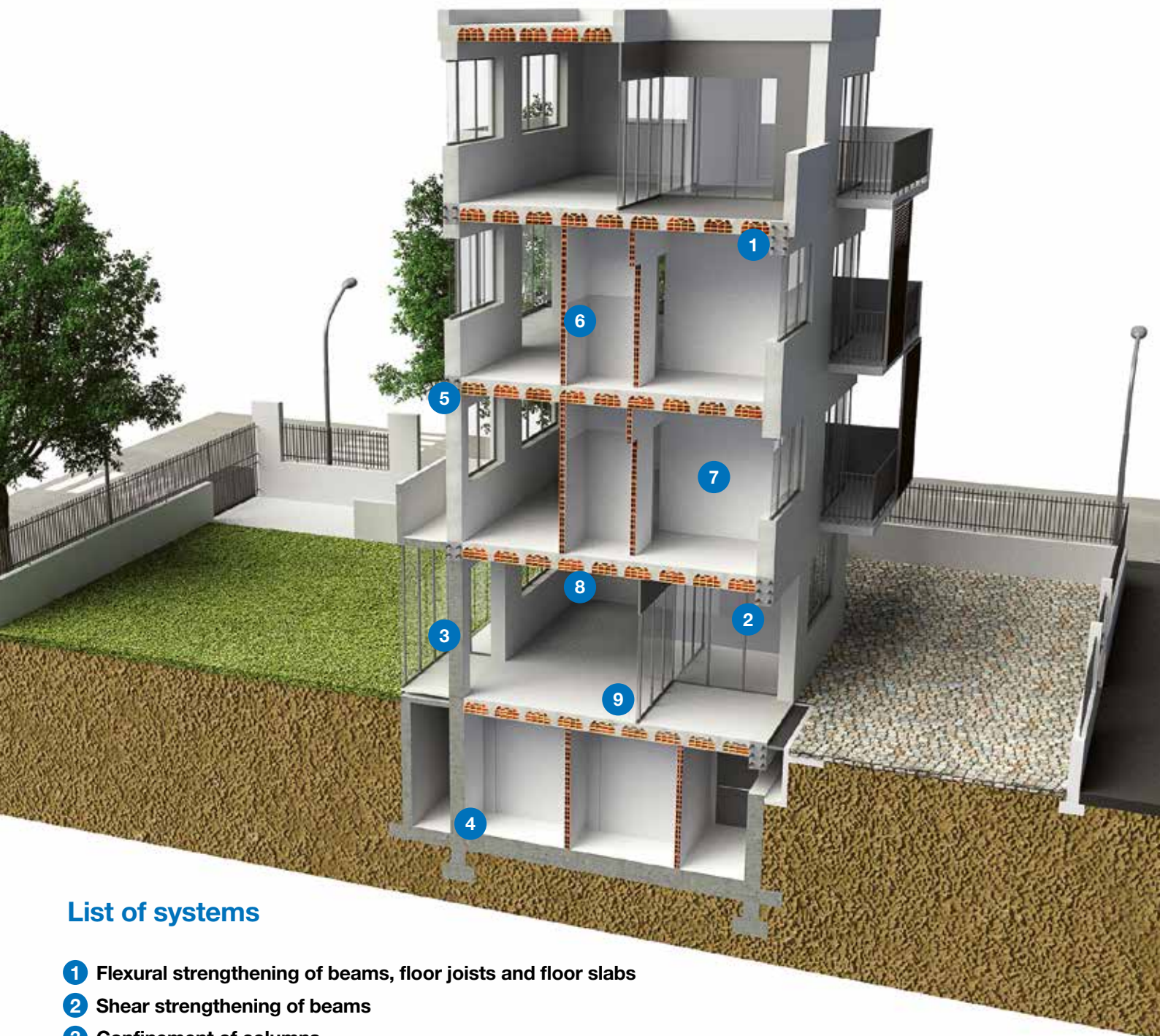
- reinforced stitching to restrain corner walls and intersecting walls;
- repairing cracks;
- connecting double-lined bearing walls;
- reinforced pointing.

They may also be used for strengthening wooden floors, especially for:

- connecting floors to the surrounding walls;
- forming connections between an old wooden floor structure and a new structural screed to create a rigid in-plane floor diaphragm.

They may also be used for second pours when lining structures with products such as micro-concrete from the **Planitop HPC** line.

Strengthening reinforced concrete buildings



List of systems

- 1 Flexural strengthening of beams, floor joists and floor slabs
- 2 Shear strengthening of beams
- 3 Confinement of columns
- 4 Combined compression/flexural strengthening at the base of pillars embedded in the foundations
- 5 Strengthening frames: confinement of column-beam junctions
- 6 Anti-seismic protection for non structural partition walls
- 7 Anti-overturning system for buffer walls
- 8 Anti-collapse system for floor slabs
- 9 Strengthening the outer face of floor slabs

1 Flexural strengthening of beams, floor joists and floor slabs



The strengthening system may be applied using Carboplate pultruded carbon fibre plates such as:

- **Carboplate E 170**
- **Carboplate E 200**
- **Carboplate E 250**

(**ref. Application cycle for Carboplate plates)



The strengthening system may be formed by applying carbon fibre, glass fibre, basalt fibre or steel fibre fabric such as:

- **MapeWrap C UNI-AX**
- **MapeWrap C UNI-AX HM**
- **MapeWrap G UNI-AX**
- **MapeWrap B UNI-AX**
- **MapeWrap S Fabric**

(***ref. Application cycle for MapeWrap fabric)

(***ref. Application cycle for MapeWrap steel fibres)

2 Shear strengthening of beams



The strengthening system may be formed by applying carbon fibre, glass fibre, basalt fibre or steel fibre fabric such as:

- **MapeWrap C UNI-AX**
- **MapeWrap C UNI-AX HM**
- **MapeWrap C BI-AX**
- **MapeWrap C QUADRI-AX**
- **MapeWrap G UNI-AX**
- **MapeWrap B UNI-AX**
- **MapeWrap S Fabric**

(***ref. Application cycle for MapeWrap fabric)

(***ref. Application cycle for MapeWrap steel fibres)

③ Confinement of columns



Compressive strength and ductility may be increased by applying one of the following:

- **MapeWrap C UNI-AX** or
- **MapeWrap C UNI-AX HM**

Ductility may be increased by applying one of the following:

- **MapeWrap G UNI-AX** or
- **MapeWrap B UNI-AX**

(**ref. Application cycle for MapeWrap fabric)

④ Combined compression/flexural strengthening at the base of pillars embedded in the foundations



The strengthening system may be formed by carrying out the following operations:

1) Bending and axial load strengthening using one of the following:

- **MapeWrap S Fabric** or
- **MapeWrap C UNI-AX** or
- **Carboplate E 170/E 200/E 250**

2) Anchoring ropes using one of the following:

- **MapeWrap S Fabric** or
- **MapeWrap S FIOCCO**

3) Confinement of pillars:

- **MapeWrap C UNI-AX**

(**ref. Application cycle for Carboplate plates)

(***ref. Application cycle for MapeWrap fabric)

(***ref. Application cycle for MapeWrap steel fibres)

⑤ Strengthening frames: confinement of column-beam junctions



The strengthening system may be formed by carrying out the following operations:

1) Shear strengthening: **MapeWrap S Fabric**

2) Increasing shear strength of column-beam junction:

MapeWrap C QUADRI-AX

3) Confinement of the ends of pillars: **MapeWrap C UNI-AX**

4) Shear strengthening of the ends of beams:

MapeWrap C UNI-AX

(**ref. Application cycle for MapeWrap fabric)

(***ref. Application cycle for MapeWrap steel fibres)

⑥ Anti-seismic protection for non structural partition walls



The strengthening system is formed by applying:

- **MapeWrap EQ Net**
- **MapeWrap EQ Adhesive**

7 Anti-overturning system for buffer walls



The strengthening system is formed by applying:

- **Planitop HDM/Planitop HDM Maxi**
- **Mapegrid G 120**
- **MapeWrap S FIOCCO**

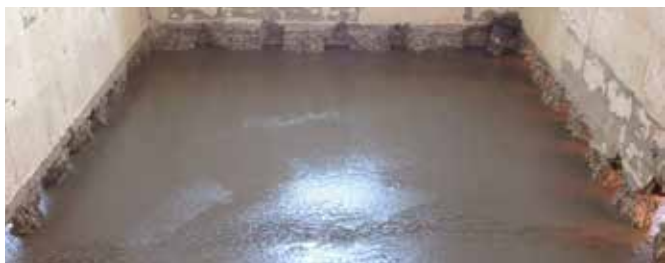
8 Anti-collapse system for floor slabs



The strengthening system is formed by applying:

- **MapeWrap EQ Net**
- **MapeWrap EQ Adhesive**

9 Strengthening the outer face of floor slabs



The strengthening system is formed by applying:

- **Planitop HPC Floor**

Sleeves made from **Carboplate plates are formed by applying the following epoxy system:

- 1 - Epoxy primer – **MapeWrap Primer 1**
- 2 - Epoxy adhesive – **MapeWrap 11 (or MapeWrap 12)**
- 3 - **Carboplate** carbon fibre plates
- 4 - Epoxy adhesive – **MapeWrap 11 (or MapeWrap 12)**
- 5 - Surface dusting with sand – **QUARTZ 1.2/QUARTZ 1.9**

***Sleeves made from **MapeWrap** fabrics are formed by applying the following epoxy system:

- 1 - Epoxy primer – **MapeWrap Primer 1**
- 2 - Epoxy adhesive – **MapeWrap 11 (or MapeWrap 12)**
- 3 - Epoxy adhesive to impregnate the fabric using the “dry system” - **MapeWrap 31**
- 4 - Epoxy adhesive to impregnate the fabric using the “wet system” - **MapeWrap 21**
- 5 - **CARBON / GLASS/ BASALT** fibres
- 6 - Surface dusting with sand – **QUARTZ 1.2/QUARTZ 1.9**

****Sleeves made from **MapeWrap** steel fibres are formed by applying the following epoxy system:

- 1 - Epoxy primer – **MapeWrap Primer 1**
- 2 - Epoxy adhesive – **MapeWrap 11 (or MapeWrap 12)**
- 3 - **STEEL** fibre fabric
- 4 - Surface dusting with sand – **QUARTZ 1.2/QUARTZ 1.9**

Strengthening masonry and wooden buildings



List of systems

- 1 Structural strengthening of masonry arches and vaults using inorganic matrix composites - **Mapei FRG System**
- 2 Structural strengthening of masonry arches and vaults using organic matrix composites - **Mapei FRP System**
- 3 Reinforced render and concrete for bay walls - **Mapenet EM System**
- 4 Shear strengthening of bearing walls using inorganic matrix composites - **Mapei FRG System**
- 5 Flexural strengthening of wooden structures
- 6 Reinforced stitching for disconnected masonry (corner and “T” intersections)
- 7 Flexural strengthening for a wooden floor - **Planitop HPC Floor T**
- 8 Tie area strips
- 9 Strengthening masonry with reinforced pointing in the joints

(*) the characteristics of the products correspond precisely with those listed in the RELUIS GUIDELINES for the Repair and Strengthening of Structural Elements, Buffer Walls and Partition Walls.

① Structural strengthening of masonry arches and vaults using inorganic matrix composites – *Mapei FRG System*



The strengthening system may be formed by applying:

- **Planitop HDM Restauro**
- **Mapegrid G 220**

Or

- **Planitop HDM Restauro**
- **Mapegrid B 250**

Dedicated connections are recommended to protect the strengthening using: **MapeWrap G FIOCCO** or **MapeWrap B FIOCCO**



The strengthening system may be formed by applying the following systems:

- **Planitop HDM/Planitop HDM Maxi**
- **Mapegrid G 220**

Or

- **Planitop HDM Restauro/Planitop HDM Maxi**
- **Mapegrid B 250**

Dedicated connections are recommended to protect the strengthening using: **MapeWrap G FIOCCO** or **MapeWrap B FIOCCO**

② Structural strengthening of masonry arches and vaults using organic matrix composites – *Mapei FRP System*



The strengthening system may be formed by applying dedicated bands of carbon fibre, glass fibre or basalt fibre fabric such as:

- **MapeWrap C UNI-AX**
- **MapeWrap C BI-AX**
- **MapeWrap C QUADRI-AX**
- **MapeWrap G UNI-AX**
- **MapeWrap G QUADRI-AX**
- **MapeWrap B UNI-AX**

(**ref. Application cycle for MapeWrap fabric)

Dedicated connections are recommended to protect the strengthening using: **MapeWrap G FIOCCO** or **MapeWrap B FIOCCO**

③ Reinforced render and concrete for bay walls - *Mapenet EM System*



The strengthening system may be formed by applying:

- **MapeWall Render & Strengthen**
- **Mapenet EM30 / EM40**

The strengthening system may be formed by applying:

- **Mape-Antique Strutturale NHL**
- **Mapenet EM30 / EM40**

The mesh is fastened monolithically to the structure using **Mapenet EM Connector** fasteners.

④ Shear strengthening of walls using inorganic matrix composites – Mapei FRG System



The strengthening system may be formed by applying the following:

- **Planitop HDM Restauro**
- **Mapegrid G 220**

Or

- **Planitop HDM Restauro**
- **Mapegrid B 250**

Dedicated connections are recommended to protect the strengthening using: **MapeWrap G FIOCCO** or **MapeWrap B FIOCCO**



The strengthening system may be formed by applying the following:

- **Planitop HDM/Planitop HDM Maxi**
- **Mapegrid G 220**

Or

- **Planitop HDM/Planitop HDM Maxi**
- **Mapegrid B 250**

Dedicated connections are recommended to protect the strengthening using: **MapeWrap G FIOCCO** or **MapeWrap B FIOCCO**

⑤ Flexural strengthening of wooden structures



Flexural strengthening of wooden beams using **Carboplate** pultruded carbon fibre plates such as:

- **Carboplate E 170**
- **Carboplate E 200**
- **Carboplate E 250**

(**ref. Application cycle for Carboplate plates)

Flexural strengthening of wooden beams using carbon fibre, glass fibre, basalt fibre or steel fibre fabric such as:

- **MapeWrap C UNI-AX**
- **MapeWrap C BI-AX**
- **MapeWrap G UNI-AX**
- **MapeWrap B UNI-AX**
- **MapeWrap S Fabric**

(***ref. Application cycle for MapeWrap fabric)

(****ref. Application cycle for MapeWrap steel fibre fabric)



Flexural strengthening of wooden beams using pultruded carbon fibre or glass fibre bars such as:

- **Maperod C**
- **Maperod G**

used in combination with **MapeWood Paste 140** thixotropic epoxy adhesive or **Mapefix EP 385** epoxy chemical anchor

6 Reinforced stitching for disconnected masonry (corner and “t” intersections)



Reinforced stitching is carried out using **Carbotube** and **Injectors Ø23** in combination with:

- **Epojet** and **Epojet LV** epoxy resins;
- **Mape-Antique I**, **Mape-Antique F21** or **Mape-Antique I-15** fluid slurry

Reinforced stitching using dry-applied **Mapei Steel Dry 316** high-strength AISI 316 stainless steel helical bars after drilling a series of pilot holes.

7 Strengthening wooden floors



The strengthening system is formed by applying:

- a structural screed made from **Planitop HPC Floor T** micro-concrete
- Connectors made from **Mapei Steel Dry 316** stainless steel helical bars bent at 90°

8 Tie area strips



The strengthening system may be applied using carbon fibre, glass fibre or basalt fibre fabric such as:

- **MapeWrap C UNI-AX**
- **MapeWrap G UNI-AX**
- **MapeWrap B UNI-AX**

(**ref. Application cycle for MapeWrap fabric)

Dedicated connections are recommended to protect the strengthening using: **MapeWrap C FIOCCO**, **MapeWrap G FIOCCO** or **MapeWrap B FIOCCO**

9 Strengthening masonry with reinforced pointing in the joints



The strengthening system by using reinforced pointing in the joints is carried out with:

- **Mapei Steel Bar 304 / 316** stainless steel helical bars
- **Planitop HDM Maxi** mortar

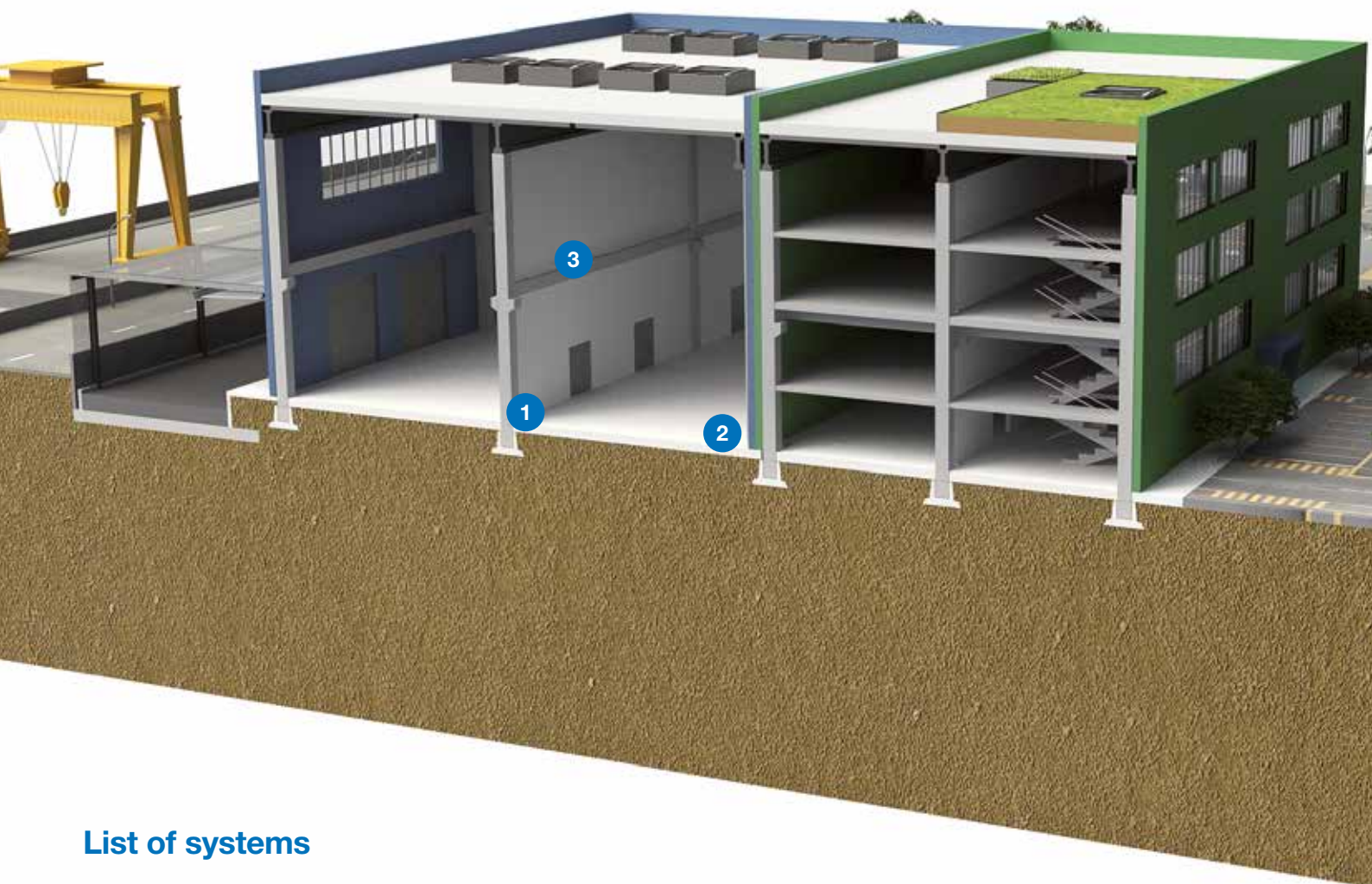
or

- **Mapei Steel Bar 304 / 316** stainless steel helical bars
- **Planitop HDM Restauro** mortar

or

- **Mapei Steel Bar 304 / 316** stainless steel helical bars
- **MapeWrap 11 / MapeWrap 12** epoxy adhesive

Strengthening prefabricated industrial buildings



List of systems

- 1** Combined compressive and bending stress strengthening around the pillar's base using fibre-reinforced composites with "anchoring ropes"
- 2** Confinement and combined compressive and bending stress strengthening around load strengthening at the pillar's base by forming a sleeve in high performance fibre-reinforced concrete (HPFRC)
- 3** Connecting buffer walls to load-bearing structures using an anti-overturning system

() the characteristics of the products correspond precisely with those listed in the "Guidelines for localised and global interventions on single store industrial buildings not designed according to anti-seismic criteria" issued after the earthquake in Emilia Romagna, Italy*

① Combined compressive and bending stress strengthening around the pillar's base using fibre-reinforced composites with "anchoring ropes"



The strengthening system may be formed by carrying out the following operations:

- 1) Combined bending and axial load strengthening using one of the following:
 - **MapeWrap S Fabric;**
 - **MapeWrap C UNI-AX**
- 2) Anchoring ropes using one of the following:
 - **MapeWrap S Fabric;**
 - **MapeWrap S FIOCCO**
- 3) Confinement of pillars: **MapeWrap C UNI-AX**

(***ref. Application cycle for MapeWrap fabric)

(***ref. Application cycle for MapeWrap steel fibres)

② Confinement and compressive and bending stress strengthening at the pillar's base by forming a sleeve in high performance fibre-reinforced concrete (HPFRC)



The strengthening system is formed by applying:

- **Planitop HPC**

③ Connecting buffer walls to load-bearing structures using an anti-overturning system



The strengthening system is formed by applying:

- **Planitop HDM/Planitop HDM Maxi**
- **Mapegrid G 120**
- **MapeWrap S FIOCCO**

Carboplate



- ▶ Pultruded carbon fibre plate with a protective plastic film on both faces.

Carbotube



- ▶ Pultruded carbon fibre tube impregnated with epoxy resin for reinforced stitching in masonry.

Epojet



- ▶ Two-component, super-fluid epoxy resin for injections and anchorings.

Epojet LV



- ▶ Two-component epoxy resin with a very low viscosity for injecting into micro-cracks, also on wet surfaces.

Injectors Ø 23



- ▶ Plastic injectors with a non-return valve for injecting epoxy resin.

Mape-Antique F21



- ▶ Super-fluid, salt-resistant, hydraulic binder with fillers made from lime and ECO-POZZOLAN applied by injection for consolidating masonry and render, including the frescoed ones.

Mape-Antique I



- ▶ Super-fluid, salt-resistant, lime and ECO-POZZOLAN-based, hydraulic binder with fillers applied by injection for consolidating masonry.

Mape-Antique I-15



- ▶ Salt-resistant, fillerized, lime and ECO-POZZOLAN-based hydraulic binder for making super-fluid injection slurry for consolidating masonry.

Mape-Antique Strutturale NHL



- ▶ High-performance transpirant mortar for render and masonry work made from natural hydraulic lime and ECO-POZZOLAN, particularly suitable for making "reinforced" and installation mortar.

Mapefix EP 385/585



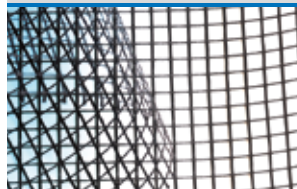
- ▶ Pure epoxy, resin-based chemical anchor for structural loads. Certified for threaded bar, construction bars, core-drilled holes and C1 seismic loads.

Mapegrid B 250



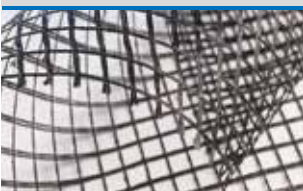
- ▶ Alkali-resistant, primed basalt-fibre mesh for structural "reinforced" strengthening of stone masonry, brick, tuff and concrete surfaces.

Mapegrid G 120



- ▶ Pre-primed, alkali-resistant (A.R.) glass fibre mesh, for localised reinforced "strengthening" of masonry substrates.

Mapegrid G 220



- ▶ Alkali-resistant, pre-primed glass fibre mesh for structural "reinforced" strengthening of stone, brick and tuff and mixed masonry structures.

Mapei Steel Bar



- ▶ Ultra high-strength helical bars in AISI 304 and AISI 316 stainless steel for reinforced pointing on masonry structures.

Mapei Steel Dry 316



- ▶ Ultra high-strength "dry-applied" helical AISI 316 stainless steel bars for strengthening reinforced concrete, masonry and wooden structural members. Available in 6, 8 and 10 mm diameter.

Mapenet EM 40



- ▶ Pre-impregnated alkali-resistant A.R. glass fibre mesh (FRP) used to make "reinforced" structural render on concrete and masonry structures.

Maperod C



- ▶ High tensile pultruded carbon fibre rebars impregnated with epoxy resin for structural strengthening of damaged concrete, wooden and masonry elements.

Mapenet EM 30



- ▶ Pre-impregnated alkali-resistant A.R. glass fibre mesh (FRP) used to make "reinforced" structural render on concrete and masonry structures.

Mapenet EM Connector



- ▶ Pre-formed "L" shaped fasteners made from alkali-resistant glass fibre and thermo-setting vinyl ester-epoxy resin available in different lengths (20, 50, 70 cm).

Maperod G



- ▶ Pultruded glass fibre rebar pre-impregnated with epoxy-modified vinyl ester resin for structural reinforcement of damaged reinforced concrete, brick, stone and tuff elements.



MapeWall Render & Strengthen



- ▶ High strength natural hydraulic lime-based transparent rendering and masonry mortar with very low emission of VOC for making structural render, "reinforced" structural render and installation mortar.



Mapewood Paste 140



- ▶ Thixotropic epoxy adhesive for restoring wooden structural elements.

Mapewood Primer 100



- ▶ Fluid epoxy impregnator in water dispersion for consolidating and priming wooden structures.

MapeWrap 11



- ▶ Two-component, normal-setting, thixotropic epoxy grout for evening out concrete surfaces and for structural bonding.

MapeWrap 12



- ▶ Two-component, slow-setting, thixotropic epoxy grout for evening out concrete surfaces and for structural bonding.

MapeWrap 21



- ▶ Two-component, super-fluid epoxy resin for impregnating MAPEWRAP using the "damp system".

MapeWrap 31



- ▶ Two-component, medium-viscosity epoxy adhesive for impregnating MAPEWRAP using the "dry system".

MapeWrap B FIOCCO



- ▶ Unidirectional high strength basalt fibre cord to be impregnated with MAPEWRAP 21 (two-component super-fluid epoxy resin) to make "structural connections".



MapeWrap B UNI-AX

▶ Unidirectional, high strength basalt fibre fabric.



MapeWrap C FIOCCO

▶ High-strength carbon fibre cord to be impregnated with MAPEWRAP 21 (two-component, super-fluid epoxy resin) to make "structural connections".



MapeWrap C UNI-AX

▶ High-strength, unidirectional carbon fibre fabric with a high modulus of elasticity.



MapeWrap EQ Adhesive



▶ One-component, ready-to-use, polyurethane-based adhesive in watery dispersion with very low emission level of volatile organic compounds (VOC) for impregnating MAPEWRAP EQ NET bi-directional, primed glass fibre fabric.



MapeWrap G FIOCCO

▶ High-strength glass fibre cord to be impregnated with MAPEWRAP 21 (two-component, super-fluid epoxy resin) to make "structural connections".



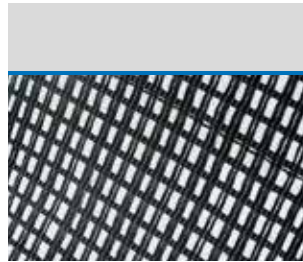
MapeWrap G UNI-AX

▶ Unidirectional, high strength glass fibre fabric.



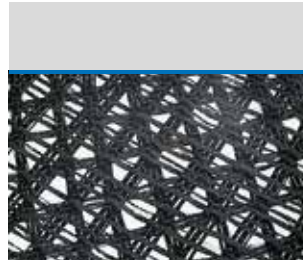
MapeWrap S Fabric 650

▶ High-strength uni-directional galvanized steel fibre fabric for structural strengthening.



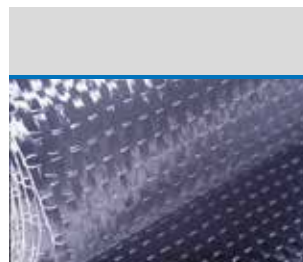
MapeWrap C BI-AX

▶ Balanced, high-strength, bi-directional carbon fibre fabric.



MapeWrap C QUADRI-AX

▶ Balanced, high-strength, quadri-directional carbon fibre fabric.



MapeWrap C UNI-AX HM

▶ High-strength unidirectional carbon fibre fabric with very high modulus of elasticity.



MapeWrap EQ Net



▶ Bi-directional, primed glass fibre fabric to protect secondary partition walls in buildings from seismic activity and to prevent brick-cement floors collapsing.



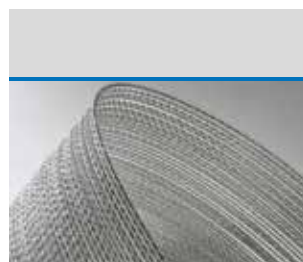
MapeWrap G QUADRI-AX

▶ Balanced, quadri-directional glass fibre fabric.



MapeWrap Primer 1

▶ Two-component epoxy primer specifically formulated for the MAPEWRAP system.



MapeWrap S Fabric 2000

▶ Unidirectional, high-strength galvanized steel fibre fabric for structural strengthening.

MapeWrap S FIOCCO



- ▶ High-strength, steel fibre cord for structural strengthening.



Planitop HDM Maxi



- ▶ Two-component ready-mixed, high ductility pozzolan-reaction, fibre-reinforced mortar for structural "reinforced" strengthening work, when used in combination with mesh from the MAPEGRID line, and for smoothing and levelling concrete and masonry.



Planitop HPC



- ▶ Two-component ultra high performance shrinkage-compensated free-flowing high ductility fibre-reinforced cementitious mortar with stiff steel fibres for restoring and repairing concrete.

N.B.: PLANITOP HPC is sold with FIBRES HPC (1.625 kg of FIBRES HPC per 25 kg bag of PLANITOP HPC).

Planitop HPC Floor T



- ▶ One-component, very high performance, high ductility, fibre-reinforced, compensated-shrinkage, semi-fluid cementitious mortar for strengthening the underside of floors.



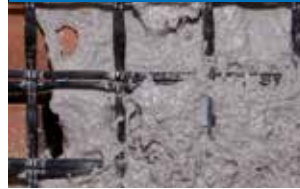
Planitop HDM



- ▶ Two-component, high-ductility, pozzolan-reaction mortar applied in layers up to 6 mm thick for "reinforced" structural strengthening of masonry substrates in combination with the MAPEGRID meshes and for smoothing and levelling surfaces in concrete, stone, brickwork and tuff.



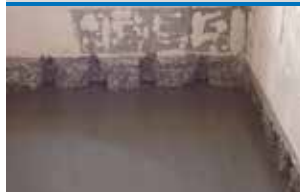
Planitop HDM Restauro



- ▶ Two-component, pre-blended, high-ductility, fibre-reinforced, hydraulic lime (NHL) and ECO-POZZOLAN-based light-coloured mortar, particularly recommended for "reinforced" structural strengthening of masonry substrates in combination with the MAPEGRID meshes and for evening out stone, brickwork and tuff substrates.

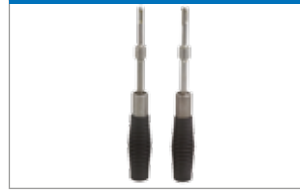


Planitop HPC Floor



- ▶ One-component, ultra-high strength, highly ductile, highly fluid, fibre-reinforced, compensated shrinkage cementitious mortar for strengthening the external face of floor slabs.

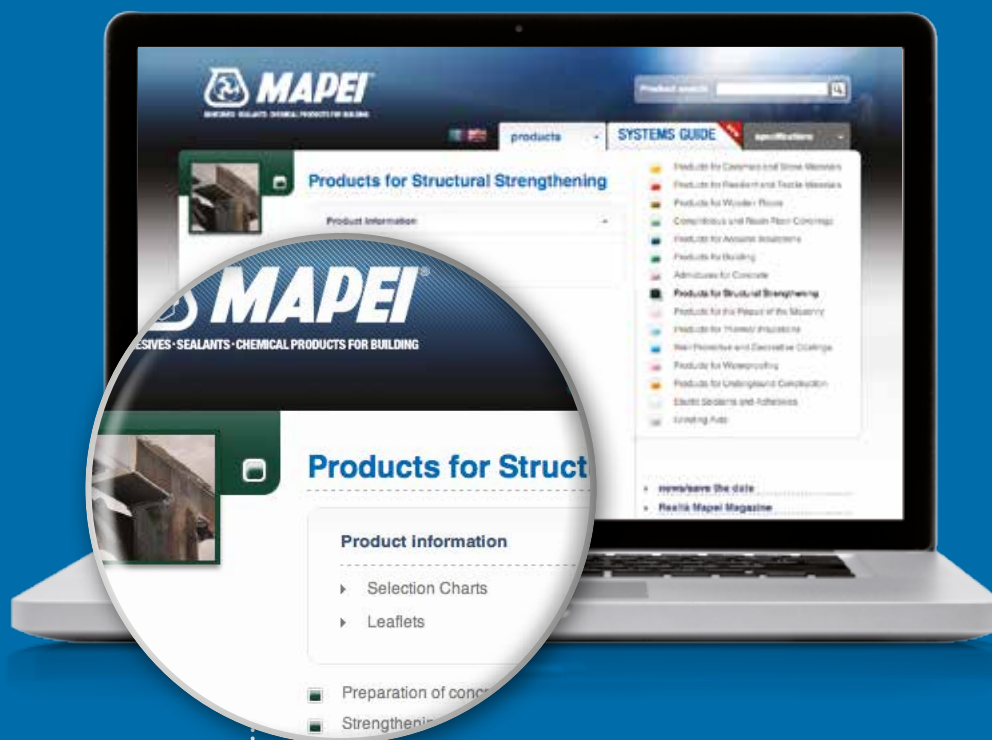
Spindle for Mapei Steel Dry



- ▶ Special spindle for inserting "MAPEI STEEL DRY" AISI 316" spiral rods. Complete with adapter for SDS hammer drill for dry application.

PRODUCT SUMMARY

		Carboplate Pultruded carbon fibre plates	MapeWrap C UNI-AX Carbon fibre fabric	MapeWrap C UNI-AX HM Carbon fibre fabric	MapeWrap C BI-AX Carbon fibre fabric	MapeWrap C QUADRI-AX Carbon fibre fabric	MapeWrap G UNI-AX Glass fibre fabric	MapeWrap G QUADRI-AX Glass fibre fabric	MapeWrap B UNI-AX Basalt fibre fabric
PROBLEM									
Reinforced concrete structures	Flexural strengthening for reinforced concrete beams	●	●	●			●		●
	Flexural strengthening for reinforced concrete floor joists	●	●	●			●		●
	Flexural strengthening for reinforced concrete floor slabs	●	●	●			●		●
	Shear strengthening for reinforced concrete beams	●	●	●	●	●	●	●	●
	Confinement of reinforced concrete pillars, piles and chimney stacks		●	●					
	Combined compression / flexural strengthening at the base of pillars embedded in foundations		●	●		●			
	Confinement of column-beam junctions		●	●		●		●	
Mixed structures	Flexural strengthening for wooden beams	●	●		●		●		●
	Anti-seismic protection for non structural walls								
	Anti-overturning system for non structural walls								
	Anti-collapse system for floor slabs								
	Strengthening the outer face of floor slabs								
Masonry structures	Confinement of masonry columns		●				●		●
	Strengthening reinforcing ribs in vaults		●				●	●	●
	Strengthening vaults and arches							●	
	Shear strengthening of bearing walls							●	
	Reinforced render and concrete of bearing walls								
	Stitching corner intersections (and "T" intersections) of walls								
	Tie area strips		●				●		●
	Reinforced pointing in the joints								



● **Technical documentation**

From the technical area menu you can view the technical documentation divided per product lines and type of document.

HEADQUARTERS

MAPEI SpA

Via Cafiero, 22 - 20158 Milan

Tel. +39-02-37673.1

Fax +39-02-37673.214

Internet: www.mapei.com

E-mail: mapei@mapei.it