

# MapeWrap B UNI-AX

**Unidirectional,  
high strength basalt  
fibre fabric**



## WHERE TO USE

This system is suitable for repairing reinforced cement elements damaged by physical-mechanical stresses, combined compressive and bending stress confinement of concrete elements and for seismic upgrading of structures in high-risk areas.

### Some application examples

- Repairs and static upgrading of damaged or deteriorated structures where the shear strength of sections requires integrating.
- Confining compressed and pre-compressed elements (pillars, bridge piles, chimneys, etc.) to improve their load-bearing capacity or ductility.
- Seismic upgrading and restoration of domed structures without increasing their seismic mass and without the risk of liquids percolating towards their inner surfaces.
- Repairs to structures damaged by fire.
- Strengthening load-bearing elements in buildings whose structural system has been modified due to new architectural requirements or change in use.

## TECHNICAL CHARACTERISTICS

**MapeWrap B UNI-AX** is a unidirectional basalt fibre fabric characterised by its medium modulus of elasticity (89,000 N/mm<sup>2</sup>) and high tensile strength. They may be applied using two different techniques:

- “damp” system;
  - “dry” system;
- using a complete range of epoxy resins comprising:
- **MapeWrap Primer 1** consolidator used to treat the substrate;

- **MapeWrap 11** and **MapeWrap 12** skimming compounds used to even out uneven surfaces and seal porosity (the workability time of **MapeWrap 12** is higher than that of **MapeWrap 11**);
- **MapeWrap 21** fabric impregnator for “damp” systems;
- **MapeWrap 31** fabric impregnator for “dry” systems.

With the “damp” system, the fabric is pre-impregnated with **MapeWrap 21** and then installed, while with the “dry” system, the dry fabric is positioned directly on a layer of **MapeWrap 31** previously applied on the surface of the concrete element to be strengthened.

**MapeWrap B UNI-AX** is 40 cm wide and is produced in two different weights (400 and 600 g/m<sup>2</sup>) to meet the widest range possible of architectonic requirements.

These two fabrics are denominated:

- **MapeWrap B UNI-AX 400 M.E.** = 89,000 N/m m<sup>2</sup>;
- **MapeWrap B UNI-AX 600 M.E.** = 89,000 N/m m<sup>2</sup>.

## ADVANTAGES

Unlike work carried out using conventional techniques, thanks to their extremely low weight, fabrics from the **MapeWrap B UNI-AX** range may be applied by a smaller team of workers. With the “dry” system or the “damp” system (which only requires tools to make impregnation easier), application is carried out extremely quickly and often without having to interrupt the normal activities of the structure.

Compared with the cladding technique with metal plates (beton plaqué), **MapeWrap B UNI-AX** fabrics may be adapted to any form of element requiring repair, they do not require temporary supports during application and

any risk of corrosion to the strengthening is completely eliminated.

## RECOMMENDATIONS

All workers must use protective gloves, goggles and anti-solvent safety masks.

## APPLICATION PROCEDURE

### Preparation of the substrate

The surface on which **MapeWrap B UNI-AX** fabrics are to be applied must be perfectly clean, dry and strong.

If applied on undamaged structures, sandblast the surface to remove all traces of stripping compound, varnish, paint and cement laitance.

If the concrete is deteriorated, remove all damaged parts using a hammer, a jack-hammer or by hydro-scarifying.

Remove all traces of rust from the reinforcement rods and protect them using **Mapefer** two-component anti-corrosion cementitious mortar or **Mapefer 1K** single component cementitious mortar (please refer to the respective Technical Data Sheet for each product for application procedures). Repair concrete surfaces using products from the **Mapegrout** range.

Wait at least three weeks before applying **MapeWrap B UNI-AX**.

If the strengthening operation needs to be carried out immediately, use **MapeWrap 11**, **MapeWrap 12** or **Mapefloor EP19** to carry out repairs.

Seal all cracks in the structure by injecting **Epojet** (suitable only for dry or slightly damp cracks) or with **Foamjet T** or **Foamjet F** (suitable for damp cracks or if water is seeping in).

All sharp corners on elements which are to be strengthened with **MapeWrap B UNI-AX** (such as beams and pillars) must be rounded off with a jack-hammer or other suitable means. We recommend forming a radius of at least 2 cm.

### “Damp” system application technique for MapeWrap B UNI-AX

#### Application phases

1. Preparation of **MapeWrap Primer 1**.
2. Application of **MapeWrap Primer 1**.
3. Preparation of **MapeWrap 11** or **MapeWrap 12**.
4. Application of **MapeWrap 11** or **MapeWrap 12**.
5. Preparation of **MapeWrap 21**.
6. Impregnation of the fabric with **MapeWrap 21**.
7. Application of **MapeWrap B UNI-AX** fabric.

#### 1. Preparation of MapeWrap Primer 1

The two components which make up **MapeWrap Primer 1** must be mixed together. Pour component B into component A and mix with a low-speed drill with a mixing attachment until the resin is completely blended. Mixing ratio: 3 parts by weight of component A and 1 part by weight of component B. To avoid dosage errors, use the entire contents of the two components. If

only partial quantities are required, use high-precision electronic scales to weigh out the components (this procedure must also be adopted for the other products).

Once prepared, its workability time is approximately 90 minutes at +23°C.

#### 2. Application of MapeWrap Primer 1

Apply an even coat of **MapeWrap Primer 1** on the clean, dry concrete surface with a brush or roller. If the surface is highly absorbent, apply a second coat of **MapeWrap Primer 1** once the first coat has been completely absorbed. Skim over the surface whilst the product underneath is still “fresh”. Use **MapeWrap 11** or **MapeWrap 12** for skimming.

#### 3. Preparation of MapeWrap 11 or MapeWrap 12

Choose whether to use **MapeWrap 11** or **MapeWrap 12** according to the surrounding temperature and workability times (the workability time of **MapeWrap 12** is higher than for **MapeWrap 11**). Pour component B into component A and mix with a low-speed drill with a mixing attachment until a uniform, grey blend is obtained. Mixing ratio for both products: 3 parts by weight of component A and 1 part by weight of component B. At +23°C **MapeWrap 11** remains workable for approximately 40 minutes after mixing, while **MapeWrap 12** remains workable for approximately 60 minutes.

#### 4. Application of MapeWrap 11 or MapeWrap 12

On concrete surfaces which have been previously treated with **MapeWrap Primer 1**, and while it is still “fresh”, apply a 1 cm-thick layer of **MapeWrap 11** or **MapeWrap 12** using a notched spatula, then smooth over the product using a flat spatula to completely remove even the smallest surface defects. Using the same product, fill and round off the corners to form a “fillet” with a radius of at least 2 cm.

#### 5. Preparation of MapeWrap 21

Pour component B into component A and mix with a low-speed drill with a mixing attachment until the resin is completely blended. Mixing ratio: 4 parts by weight of component A and 1 part by weight of component B. The product remains workable for approximately 40 minutes at +23°C.

#### 6. Impregnation of the fabric with MapeWrap 21

##### Manual impregnation

Cut the **MapeWrap B UNI-AX** to the sizes required and impregnate it by dipping it for a few minutes in a rectangular plastic bowl filled approximately 1/3 with **MapeWrap 21**. Remove the fabric from the bowl, leave it to drip for a few seconds and press it between your hands (wear protective rubber gloves) to completely remove any excess resin. Do not wring the fabric as this may damage the fibres.

## TECHNICAL DATA (typical values)

### PRODUCT IDENTITY

Type of fibre: high-strength basalt

Appearance: unidirectional fabric

### MAPEWRAP B UNI-AX

Weight (g/m <sup>2</sup> ):	400	600
Density (g/cm <sup>3</sup> ):	2.75	2.75
Equivalent thickness of dry fabric (mm):	0.143	0.215
Load-resistant area per unit of width (mm <sup>2</sup> /m):	142.5	213.8
Tensile strength (N/mm <sup>2</sup> ):	4,840	4,840
Maximum load per unit of width (kN/m):	680	1,035
Tensile modulus of elasticity (N/mm <sup>2</sup> ):	89,000	89,000
Elongation at breakage (%):	3.15	3.15

### FINAL PERFORMANCE

Bond strength to concrete (N/mm<sup>2</sup>): > 3 (failure of concrete)

### TECHNICAL CHARACTERISTICS OF IMPREGNATED DATA

Characteristic tensile strength of composite (FRP) (N/mm <sup>2</sup> ):	> 2,000
Tensile modulus of elasticity of composite FRP (GPa):	> 85
Elongation at failure (%):	≥ 2.0

### Mechanical impregnation

As an alternative to manual impregnation, simple equipment with a bowl and a series of rollers may be used. This makes it easier and safer for the operator to saturate the fabric and remove the excess resin.

This equipment is particularly recommended when a large number of interventions on large surface areas need to be carried out. Using this system, even distribution of the resin in every part of the fabric is guaranteed. Apply the fabric immediately after impregnation.

### 7. Application of MapeWrap B UNI-AX fabric

Make sure the layer of **MapeWrap 11** or **MapeWrap 12** is still “fresh”, then immediately apply the **MapeWrap B UNI-AX** fabric making sure it is applied without any folds or creases. After flattening the fabric out by hand (always wear protective rubber gloves), go over the surface several times with a **MapeWrap** roller in a lengthways direction with respect to the fibres, so that it penetrates perfectly into

the **MapeWrap 11** or **MapeWrap 12** epoxy grout. Then go over the surface again with the **MapeWrap** roller to completely remove all the air bubbles.

### Joints

When binding pillars, the ends of the strips of **MapeWrap B UNI-AX** must overlap the “heads” of the other strips by at least 20 cm. The same procedure must be followed when strips applied in a longitudinal direction have to be joined.

Overlap the joints in the fabric by approximately 2-3 cm in the direction of the width of the fabric to make alignment easier. After laying and pressing the surface using the special roller, **MapeWrap B UNI-AX** fabrics must never be moved.

### “Dry” system application technique for MapeWrap B UNI-AX

#### Application phases

1. Preparation of **MapeWrap Primer 1**.
2. Application of **MapeWrap Primer 1**.

3. Preparation of **MapeWrap 11** or **MapeWrap 12**.
4. Application of **MapeWrap 11** or **MapeWrap 12**.
5. Preparation of **MapeWrap 31**.
6. Application of the first coat of **MapeWrap 31**.
7. Application of **MapeWrap B UNI-AX** fabric.

### 1. Preparation of MapeWrap Primer 1

The two components which make up **MapeWrap Primer 1** must be mixed together. Pour component B into component A and mix with a low-speed drill with a mixing attachment until the resin is completely blended. Mixing ratio: 3 parts by weight of component A and 1 part by weight of component B. To avoid dosage errors, use the entire contents of the two components. If only partial quantities are required, use high-precision electronic scales to weigh out the components (this procedure must also be adopted for the other products).

Once prepared, the workability time of **MapeWrap Primer 1** is 90 minutes at +23°C.

### 2. Application of MapeWrap Primer 1

Apply an even coat of **MapeWrap Primer 1** with a brush or roller on the clean, dry surface of the concrete.

If the surface is particularly absorbent, apply a second coat of **MapeWrap Primer 1** once the first coat has been completely absorbed. Skim the surface using **MapeWrap 11** or **MapeWrap 12** while the product underneath is still “fresh”.

### 3. Preparation of MapeWrap 11 or MapeWrap 12

Choose whether to use **MapeWrap 11** or **MapeWrap 12** according to the surrounding temperature and workability times (the workability time of **MapeWrap 12** is higher than for **MapeWrap 11**). Pour component B into component A and mix with a low-speed drill with a mixing attachment until a uniform, grey blend is obtained. Mixing ratio for both products: 3 parts by weight of component A and 1 part by weight of component B. At +23°C **MapeWrap 11** remains workable for approximately 40 minutes after mixing, while **MapeWrap 12** remains workable for approximately 60 minutes.

### 4. Application of MapeWrap 11 or MapeWrap 12

On concrete surfaces which have been previously treated with **MapeWrap Primer 1**, and while it is still “fresh”, apply a 1 cm-thick layer of **MapeWrap 11** or **MapeWrap 12** using a notched spatula, then smooth over the product using a flat spatula to completely remove even the smallest surface defects. Using the same product, fill and round off the corners to form a “fillet” with a radius of at least 2 cm.

### 5. Preparation of MapeWrap 31

Pour component B into component A and mix with a low-speed drill with a mixing attachment until they form an even, yellow paste. Mixing ratio: 4 parts by weight of component A and 1 part by weight of component B.

After mixing, the product remains workable for approximately 40 minutes at +23°C.

### 6. Application of the first coat of MapeWrap 31

Apply a first, even 0.5 mm thick layer of **MapeWrap 31** on the **MapeWrap 11** or **MapeWrap 12** while they are still “fresh” with a brush or short-haired roller.

### 7. Application of MapeWrap B UNI-AX fabric

Immediately apply the fabric on the **MapeWrap 31** while it is still “fresh”, making sure it is applied without any creases or folds.

After flattening out the fabric by hand (wear protective rubber gloves), apply a second layer of **MapeWrap 31** on the **MapeWrap B UNI-AX** fabric and then pass over the surface several times with a **MapeWrap** roller so that the adhesive completely penetrates into the fibres of the fabric. Pass over the surface of the impregnated fabric with the **MapeWrap** roller to eliminate any air bubbles trapped in the fabric during the previous phases.

### Joints

When binding pillars, the ends of the strips of **MapeWrap B UNI-AX** must overlap the “heads” of the other strips by at least 20 cm.

The same procedure must be followed when strips applied in a longitudinal direction have to be joined. Overlap the joints in the fabric by approximately 2 cm in the direction of the width of the fabric to make alignment easier.

After laying and pressing using the special roller, **MapeWrap B UNI-AX** fabrics must never be moved.

### Procedure for the “fresh” application technique (within 24 hours) of more layers of MapeWrap B UNI-AX

Using the “damp” system technique, repeat the following operations:

- Impregnation of the fabric with **MapeWrap 21**.
- Application of **MapeWrap B UNI-AX** fabric.

Using the “dry” application technique:

- Apply a first coat of **MapeWrap 31** and apply the **MapeWrap B UNI-AX** fabric.
- Apply a further coat of **MapeWrap 31**.

### Note

*If further layers of fabric are applied after 24 hours, the previous layer must be roughened up by sanding.*

### PROTECTIVE DRESSING

A protective dressing coat may be applied once the epoxy system has completely hardened (approximately 1-2 days at +23°C), such as **Mapelastic** two-component, flexible cementitious mortar or **Elastocolor Paint** flexible acrylic paint (please refer to the Technical Data Sheet for each product for application instructions). These products form an efficient barrier against UV rays, which make them particularly recommended for structures exposed to direct sunlight.

### PRECAUTIONS TO BE TAKEN DURING AND AFTER APPLICATION

The temperature during application operations must be at least +5°C and the structure must also be dry and protected from rain and dust carried by the wind. After completing the application operations, make sure the treated surface is kept at a temperature of at least +5°C.

Protect the surface from rain for at least 24 hours if the temperature does not drop

below +15°C and for at least 3 days if the temperature is lower.

### Cleaning

Epoxy systems form an extremely strong bond and we recommend cleaning all work tools with solvent (such as ethanol, toluene, etc.) before the products harden.

### STORAGE

Store in a covered, dry area.

### PRECAUTIONS TO BE TAKEN WHEN HANDLING THE PRODUCTS

Workers must wear protective, waterproof rubber gloves, goggles and anti-solvent safety masks when preparing and applying these epoxy systems. Avoid the products coming into contact with the skin and eyes. If they come into contact, wash off with plenty of soap and water and seek medical attention. If the products are applied in closed environments, make sure they are well ventilated to guarantee a continuous circulation of fresh air. While using or handling these products, never use naked flames and do not smoke.

### PACKAGING

**MapeWrap B UNI-AX fabrics are supplied in 50 m long rolls packaged in cardboard boxes, denominated as follows**

	Weight (g/m <sup>2</sup> )	Width (cm)	Surface (m <sup>2</sup> /m)	Surface (m <sup>2</sup> /roll)
<b>MapeWrap B UNI-AX 400/40</b>	400	40	0.4	20
<b>MapeWrap B UNI-AX 600/40</b>	600	40	0.4	20

### CONSUMPTION OF EPOXY SYSTEMS

#### Priming, evening out and skimming surfaces

	Consumption (g/m <sup>2</sup> )
<b>MapeWrap Primer 1</b>	250-300
<b>MapeWrap 11 or MapeWrap 12</b>	1500-1600 per mm of thickness

#### Impregnation of MapeWrap B UNI-AX

	Weight (g/m <sup>2</sup> )	Consumption (g/m <sup>2</sup> )	Width (cm)	Consumption (g/m)
<b>MapeWrap 21</b>	400	1600-1700	40	640-680
	600	1800-1950	40	720-780
<b>MapeWrap 31</b>	400	1350-1400	40	540-560
	600	1500-1550	40	600-620

PRODUCT FOR PROFESSIONAL USE.

**WARNING**

*Although the technical details and recommendations contained in this product data sheet correspond to the best of our knowledge and experience, all the above information must, in every case, be taken as merely indicative and subject to confirmation after long-term practical application: for this reason, anyone who intends to use the product must ensure beforehand that it is suitable for the envisaged application: in*

*every case, the user alone is fully responsible for any consequences deriving from the use of the product.*

**Please refer to the current version of the Technical Data Sheet, available from our web site [www.mapei.com](http://www.mapei.com)**

**All relevant references for the product are available upon request and from [www.mapei.com](http://www.mapei.com)**