

MapeWrap G UNI-AX

Uni-directional glass fibre fabric

WHERE TO USE

This system is especially suitable to repair reinforced concrete and masonry elements damaged by physical-mechanical action, for the confinement of axially loaded or bent concrete elements and for seismic strengthening of structures in earthquake areas.

Some application examples

- Repair, maintenance and static upgrade of deteriorated structures, where it is absolutely necessary to reinforce the tensile strength of the section.
- Confinement of axially loaded or damaged concrete and masonry elements (columns, bridge piers, chimneys, reservoirs) in order to improve ductility and load bearing capacity.
- Seismic strengthening and restoration of vaulted structures without the increase of seismic mass and without the danger of liquid percolation towards the internal surface of an archway.
- Reinforcement of load bearing elements in buildings that have been restructured for architectural reasons or change of use.

TECHNICAL CHARACTERISTICS

MapeWrap G UNI-AX is a uni-directional fibre glass fabric that can be placed using two different methods:

- wet system;
- dry system.

Products for the application of the fibres can be chosen from a complete range of epoxy resins:

- **MapeWrap Primer 1**: strengthening treatment for the substrate.
- **MapeWrap 11 and 12**: smoothing compounds to smooth any rough areas or seal porous surfaces (**MapeWrap 12** has a longer workability).
- **MapeWrap 21**: impregnating agent for fabrics using the “wet system”.
- **MapeWrap 31**: impregnating agent for fabrics using the “dry system”.

Using the “wet system”, the **MapeWrap G** fabric is manually dipped into **MapeWrap 21** immediately before placing on the surface. When using the “dry system”, the dry fabric is placed directly on a layer of resin applied beforehand to the concrete element that needs reinforcement.

MapeWrap G UNI-AX is manufactured only in one weight (900 g/m²) and two different widths (30 and 60 cm):

- **MapeWrap G UNI-AX 900/30**;
- **MapeWrap G UNI-AX 900/60**.

ADVANTAGES

Because of their extreme light weight, the fabrics in the **MapeWrap G UNI-AX** range, are less labour intensive than conventional technologies (*béton plaqué*). With the “wet system” (and aid of a machine that helps the impregnation process) or the “dry system”, the application is carried out in an extremely short time and often without downtime of the structure.

Unlike the plating method using steel plates (*béton plaqué*), the use of **MapeWrap G UNI-AX** fabric will adapt to any contours of the element that need repair. It does not need temporary reinforcement during placing and removes all corrosion risks of the applied reinforcement.

RECOMMENDATIONS

- All workers must wear gloves, masks for solvents and protective goggles.

APPLICATION METHOD

Preparing the substrate

The surface onto which **MapeWrap G UNI-AX** fabrics will be applied must be perfectly clean, dry and mechanically strong.

Remove all loose particles, grease, varnishes or paints and cement laitance from sound concrete structures, by sandblasting.

If the concrete is deteriorated, remove damaged parts by manual or pneumatic bushhammering or by hydro-scarifying. Clean the metal reinforcement and remove any traces of rust. Protect them with **Mapefer** (a two-component corrosion-inhibiting cement mortar) or with **Mapefer 1K** (a one-component corrosion-inhibiting cement mortar) following application methods described in the products technical data sheet. Repair the concrete surfaces with products from the **Mapegrout** line.

Wait at least 3 weeks before applying **MapeWrap G UNI-AX**.

If reinforcement must be carried out immediately, repair with **Adesilex PG1**, **Adesilex PG2** or **Mapefloor EP19**.

Seal any surface cracks by injecting **Epojet** or **Epojet LV** (product to be used if there is water seepage) or with **Foamjet T**, **Foamjet F**, **Resfoam 1K** or **Mapegel 50** (product to be used if there is water seepage). All sharp edges in the concrete elements (for example beams or columns) that need to be wrapped with **MapeWrap G UNI-AX**, must be smoothed with a flexible grinding wheel fitted with a diamond blade or any other suitable means. It is recommended to have a bending radius not less than 2.5 cm and to fix the **MapeWrap G UNI-AX** fabric at the foot of the pillars with angle irons fixed with screws and sealed with **Epojet** or **Epojet LV** epoxy resins.

Masonry structures

Remove the existing render and any deteriorated elements (bricks, stones, tuff, etc.) from the structure that needs to be reinforced. Replace with new bricks, stones or tuff that have physical properties very similar to those originally employed. Remove the sharp corners with a flexible grinding wheel to obtain a bending radius not less than 2.5 cm. Sandblast the structure to completely remove any inconsistent material. Remove the surface dust with a vacuum cleaner.

Installing MapeWrap G UNI-AX with the "wet system"

Operational steps

1. Prepare **MapeWrap Primer 1**.

2. Apply **MapeWrap Primer 1**.
3. Prepare **MapeWrap 11** or **MapeWrap 12**.
4. Apply **MapeWrap 11** or **MapeWrap 12**.
5. Prepare **MapeWrap 21**.
6. Impregnate the fabric with **MapeWrap 21**.
7. Place the **MapeWrap G UNI-AX** fabric.

1. Prepare MapeWrap Primer 1

Mix the two **MapeWrap Primer 1** components together. Pour Part B into Part A and mix with a low speed drill fitted with a stirrer until a completely homogeneous resin is obtained. Mix ratio: 3 parts by weight of A and 1 part by weight of B. Use the whole amount in the packaging to eliminate measuring errors.

After its preparation, **MapeWrap Primer 1** has a pot life of approximately 90 minutes at +23°C.

2. Apply MapeWrap Primer 1

Apply an even coat of **MapeWrap Primer 1** onto a flat (as much as possible) concrete surface with a brush or a roller.

If the substrate is very porous, apply a second coat of **MapeWrap Primer 1** after the first coat has completely absorbed.

3. Prepare MapeWrap 11 or MapeWrap 12

Depending on the temperature and pot life, choose either **MapeWrap 11** or **MapeWrap 12** (**MapeWrap 12** has a longer pot life). Pour Part B into Part A and mix with a low speed drill fitted with a stirrer until an even grey paste is obtained. Mix ratio for both products: 3 parts by weight of A and 1 part by weight of B. Once prepared, **MapeWrap 11** has a pot life of approximately 40 minutes at +23°C while **MapeWrap 12** has a pot life of approximately 60 minutes.

4. Apply MapeWrap 11 or MapeWrap 12

Apply an approximately 1 mm thick coat of **MapeWrap 11** or **MapeWrap 12** with a notched trowel over the concrete surface pre-treated with still "fresh" **MapeWrap Primer 1**. Use a flat trowel to completely level uneven parts of the substrate surface. Use the same product to fill and round the corners in order to create a "profile" with a bending radius not less than 2 cm.

5. Prepare MapeWrap 21

Pour Part B into Part A and mix with a low speed drill fitted with a stirrer until a completely homogeneous fluid resin is obtained. Mix ratio: 4 parts by weight of A and 1 part by weight of B. After mixing, the product has a pot life of approximately 40 minutes at +23°C.

6. Impregnate the fabric with MapeWrap 21

Manually

Cut fabric to the desired size beforehand and manually impregnate the **MapeWrap G UNI-AX** fabric by plunging it into a plastic trough filled 1/3 of the total volume with **MapeWrap 21**. Remove the fabric from the trough, let it drip and then press it between

TECHNICAL DATA (typical values)

PRODUCT IDENTIFICATION

Type of fibre:	glass Type E - CR (corrosion resistant)
Consistency:	uni-directional fabric
Density (kg/dm³):	2.62
Customs class:	7019 40 00

MAPEWRAP G UNI-AX 900/30 AND MAPEWRAP G UNI-AX 900/60

Weight (g/m²):	900
Fabric equivalent thickness (mm):	0.48
Fabric cross area per unit width (mm²/m):	342.2
Tensile strength (MPa):	2,560
Tensile modulus of elasticity (GPa):	80.7
Elongation (%):	3-4

FINAL PERFORMANCE

Bonding to concrete (MPa):	> 3 (concrete failure)
-----------------------------------	------------------------

the hands (protected with rubber waterproof gloves) until the excess resin is removed completely, but without wringing the fabric in order not to damage the fibres.

With impregnating machine

As an alternative, the impregnation can be carried out with a simple machine fitted with a bucket and a series of rollers that automatically saturate and drip the fabric easily and safely.

This machine is particularly recommended for the repair of large surface areas. This system ensures the uniform distribution of the resin over every part of the fabric. Immediately place the fabric after it has been impregnated.

7. Place MapeWrap G UNI-AX

Make sure the coat of MapeWrap 11 or MapeWrap 12 is still fresh and immediately apply MapeWrap G UNI-AX making

sure it is laid without wrinkles. Flatten the fabric (always wear protective rubber gloves), and pass the **Roller for MapeWrap** vertically to the fibres over the surface several times so **MapeWrap G UNI-AX** perfectly penetrates into **MapeWrap 11** or **MapeWrap 12** epoxy putty and to completely eliminate any air bubbles formed during the application.

Joining

When wrapping columns, the **MapeWrap G UNI-AX** strip must be overlapped at least 20 cm with the same fabric. The same procedure must be followed when several strips need to be joined longitudinally.

Overlapping is not necessary for the width of the fabric. The different strips of fabric need to be applied one next to the other. After applying and passing the **Roller for MapeWrap** over the fabric, **MapeWrap G UNI-AX** must not be disturbed.

Installing MapeWrap G UNI-AX with the “dry system”

Operational steps

1. Prepare **MapeWrap Primer 1**.
2. Apply **MapeWrap Primer 1**.
3. Prepare **MapeWrap 11** or **MapeWrap 12**.
4. Apply **MapeWrap 11** or **MapeWrap 12**.
5. Prepare **MapeWrap 31**.
6. Apply a final coat of **MapeWrap 31**.
7. Place **MapeWrap G UNI-AX**.
8. Apply a second coat of **MapeWrap 31**.

1. Prepare MapeWrap Primer 1

Mix the two **MapeWrap Primer 1** components together. Pour Part B into Part A and mix with a low speed drill fitted with a stirrer until a completely homogeneous resin is obtained. Mix ratio: 3 parts by weight of A and 1 part by weight of B. Use the whole amount in the packaging to eliminate measuring errors.

Once prepared, **MapeWrap Primer 1** has a pot life of approximately 90 minutes at +23°C.

2. Apply MapeWrap Primer 1

Apply an even coat of **MapeWrap Primer 1** onto a flat (as much as possible) concrete surface with a roller or a brush. If the substrate is very porous, apply a second coat of **MapeWrap Primer 1** after the first coat has absorbed completely.

3. Prepare MapeWrap 11 or MapeWrap 12

Depending on the temperature and pot life, choose either **MapeWrap 11** or **MapeWrap 12** (**MapeWrap 12** has a longer pot life). Pour Part B into Part A and mix with a low speed drill fitted with a stirrer until an even grey paste is obtained. Mix ratio for both products: 3 parts by weight of A and 1 part by weight of B. Once prepared, **MapeWrap 11** has a pot life of approximately 40 minutes at +23°C, while **MapeWrap 12** has a pot life of approximately 60 minutes.

4. Apply MapeWrap 11 or MapeWrap 12

Apply an approximately 1 mm thick coat of **MapeWrap 11** or **MapeWrap 12** with a notched trowel, over the concrete surface pre-treated with still “fresh” **MapeWrap Primer 1**. Use a flat trowel to completely level uneven parts of the substrate surface. Use the same product to fill and round the corners in order to create a “profile” with a bending radius not less than 2 cm.

5. Prepare MapeWrap 31

Pour Part B into Part A and mix with a low speed drill fitted with a stirrer until an even green paste is obtained. Mix ratio: 4 parts by weight of A and 1 part by weight of B. The product remains workable for approximately 40 minutes at +23°C.

6. Apply a first coat of MapeWrap 31

Apply an even first coat of **MapeWrap 31** approximately 0.5 mm thick with a brush or short-haired roller over the still “fresh” **MapeWrap 11** or **MapeWrap 12**.

7. Place MapeWrap G UNI-AX

After applying a first evenly thick coat of **MapeWrap 31** over the still “fresh” **MapeWrap 11** or **MapeWrap 12** with a brush or short-haired roller, immediately place **MapeWrap G UNI-AX**, ensuring no wrinkles are present.

After having accurately flattened it (hands must be protected by rubber waterproof gloves), apply a second coat of **MapeWrap 31** over **MapeWrap G UNI-AX**. Pass over the fabric with the **Roller for MapeWrap** so the adhesive can completely penetrate through the fibres of the fabric and eliminate any air bubbles formed during application.

8. Apply the second coat of MapeWrap 31

To complete the work, apply a last coat of **MapeWrap 31** over the still “fresh” first coat with a brush or short-haired roller, so it completely penetrates the fabric. Immediately re-pass **MapeWrap G UNI-AX** surface several times with the **Roller for MapeWrap** longitudinally to the fibres.

Joining

When wrapping columns, the **MapeWrap G UNI-AX** strip must be overlapped at least 20 cm with the same fabric.

The same procedure must be followed when several strips need to be joined longitudinally.

Overlapping is not necessary for the width of the fabric. The different strips of fabric need to be applied one next to the other. After applying and passing the **Roller for MapeWrap** over the fabric, **MapeWrap G UNI-AX** must not be disturbed.

Installing several layers of MapeWrap G UNI-AX while still “fresh” (within 24 hours)

Repeat the following steps for the “wet system”:

- Impregnate the fabric with **MapeWrap 21**.
- Place the **MapeWrap G UNI-AX** fabric.

For the “dry system”:

- Place the **MapeWrap G UNI-AX** fabric over the fresh coat of **MapeWrap 31**.
- Apply another coat of **MapeWrap 31**.

Note: *If more layers of fabric are applied after 24 hours, the last hardened coat must be sanded. Even better, apply sand over the surface before the resin dries. This is in order to make the surface suitable to receive the next layers.*

PROTECTIVE COATING

The protective coating can be carried out after the epoxy systems used have completely hardened (approximately 2-3 days at +23°C). Different methods can be used:

– with a render

In this case, the last still fresh coat of **MapeWrap 21** or **MapeWrap 31** must be

dusted with dry sand to ensure the bonding of the render that will need to be admixed with **Planicrete**, synthetic rubber latex for cementitious mortar.

If sand is not used, the still fresh surface of **MapeWrap 21** or **MapeWrap 31** must be sanded and then **Eporip**, epoxy resin for cold joints, must be applied. This is to ensure the bonding of the render to the composite material.

– with **Mapelastic**: elastic cementitious mortar that is applied with a trowel or spray (for the application, refer to the product's technical data sheet).

– with **Elastocolor**: elastic acrylic paint (for the application, refer to the product's technical data sheet).

The above mentioned products create an effective barrier against U.V rays. The use of these products is especially recommended when the structures are exposed to direct sunlight.

PRECAUTIONS TO BE OBSERVED BEFORE AND AFTER APPLICATION

- Application temperature must not be below +5°C and the structure must be protected from rain and dust.

- After application, the temperature of the treated surfaces should be kept above +5°C.

- Protect from rain for at least 24 hours if the minimum temperature does not go below +15°C and for at least 3 days if the temperature is lower.

RECOMMENDATIONS FOR HANDLING THE PRODUCTS

It is absolutely necessary that the workers wear rubber waterproof gloves, protective goggles and masks for solvents when preparing and placing the above described epoxy systems. Avoid contact with skin and eyes and if necessary wash with plenty of running water and soap and contact a doctor. If application is carried out in closed spaces, provide for good ventilation in order to ensure a continuous change of air. For further information, carefully read the product safety data sheet.

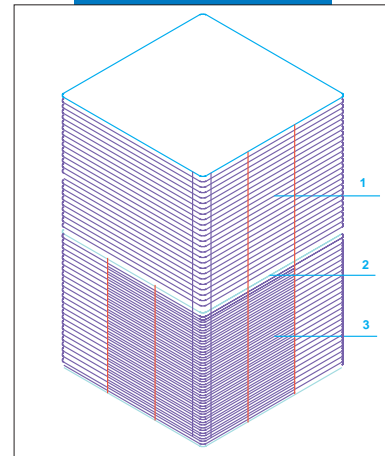
Cleaning

Due to the strong bonding strength of the described epoxy systems, it is recommended to wash working tools with solvents (ethyl alcohol, toluol, etc.) before the products dry.

PACKAGING

MapeWrap G UNI-X fabrics are available in 50 m rolls packed in carton boxes with the following names:

	Weight (g/m ²)	Height (cm)	Surface (m ² /m)	Surface (m ² /roll)
MapeWrap G UNI-AX 900/50	900	30	0.3	15
MapeWrap G UNI-AX 900/100	900	60	0.6	30



An example of a joint:
1. Overlapping the top part 20 cm;
2. Placing the two strips next to each other;
3. Overlapping longitudinally 20 cm

EPOXY SYSTEM CONSUMPTIONS

Surface priming, levelling and smoothing

	Consumption (g/m ²)
MapeWrap Primer 1	250-300
MapeWrap 11 or MapeWrap 12	500-1600 (per mm of thickness)

Impregnating MapeWrap G UNI-AX fabric

	Type (UNI-AX)	Consumption (g/m ²)	Height (cm)	Consumption (g/m)
MapeWrap 21	900	700-800	30	210-240
			60	420-480
MapeWrap 31	900	900-1000	30	270-300
			60	540-600



Coating with **Elastocolor**

