MAPEI

MapeWrap C UNI-AX 600

High strength & high modulus uni-directional carbon fibre fabric

WHERE TO USE

This system is suitable to strengthen reinforced concrete elements damaged by physical-mechanical action, for the confinement of axial loaded and for seismic strengthening of structures in earthquake zones.

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 elements (columns, bridge piers, chimneys) in order to improve ductility and load bearing capacity.
- Seismic strengthening and restoration.
- Repair of structures damaged by fire.
- Reinforcement of load bearing elements in buildings that have been restructured for architectural reasons or change of use.

TECHNICAL CHARACTERISTICS

MapeWrap C UNI-AX 600 is mono-directional carbon fibre fabric characterised by a high (252,000±2 N/mm^2) modulus of elasticity respectively. It may be laid using two different techniques:

– wet system;
– dry system

by using the following range of epoxy resins:

– **MapeWrap Primer 1 SP,** strengthening for the treatment of the substrate.
– **MapeWrap 31 SP,** impregnating agent for fabrics.

Using the “wet system”, the **MapeWrap** fabric is manually dipped into **MapeWrap 31 SP** to saturate the fabrics before placing on the surface. When using the “dry system”, the dry fabric is placed directly on a layer of **MapeWrap 31 SP** which has been applied to the concrete element that needs reinforcement. The fabric is then coated with a second layer of **MapeWrap 31 SP**. The trapped air must be removed using a ribbed roller.

To meet a wide range of design requirements, **MapeWrap C UNI-AX 600** is available in different widths (10 cm, 20 cm, 50 cm and 60 cm), indicated respectively as follows:

– **MapeWrap C UNI-AX** 600:
M.E. = 252,000±2 N/mm^2;

MapeWrap C UNI-AX 600

ADVANTAGES

Because of their extreme light weight, the fabrics from the **MapeWrap C UNI-AX 600** range, are less labour intensive than conventional technologies (steel plate bonding). With the “wet system” (and with the 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 with minimum downtime.

Unlike the plating method using steel plates (beton plaquè method), the use of **MapeWrap C UNI-AX 600** fabric will adapt to any contours of the element that needs repair. It removes all risks of corrosion of the applied reinforcement.

RECOMMENDATIONS

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

DIRECTIONS FOR USE

Preparing the substrate

The surface onto which **MapeWrap C UNI-AX 600** fabrics will be applied must be perfectly clean, dry and be mechanically strong.

Remove traces of form release oils, varnishes or paints and cement laitance from sound structures, by shotblasting or appropriate means.

If the concrete is deteriorated, remove damaged parts by manual or pneumatic bushhammering or by scarifying. Clean metal reinforcement and remove any traces of rust. 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.

If reinforcement must be carried out immediately, repair with **Adesilex PG2 SP** or **Mapefloor EP19 SP** or fast set mortar. Seal any surface cracks by injecting **Epojet LV** (suitable if the cracks are dry or slightly moist) or with **Resfoam 1 KM** (suitable if the cracks are wet or with water infiltrations).

All sharp edges in the concrete elements (for example beams or columns) that need to be wrapped with **MapeWrap C UNI-AX 600**, must be smoothed with a grinder or any other suitable means. It is recommended that the bending radius be not less than 2 cm.

Installing the MapeWrap C UNI-AX 600 with the “wet system”

Operational steps

1. Prepare the **MapeWrap Primer 1 SP**.
2. Apply the **MapeWrap Primer 1 SP**.
3. Prepare the **MapeWrap 31 SP**.
4. Impregnate the fabric with **MapeWrap 31 SP**.
5. Place the **MapeWrap C UNI-AX 600**.

1. Prepare the MapeWrap Primer 1 SP

Mix together the two **MapeWrap Primer 1 SP** components. Pour component B into component A and mix with a low speed drill fitted with a stirrer until a completely homogeneous fluid 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 dosage errors.

Once **MapeWrap Primer 1 SP** has been prepared, it remains workable for approximately 60 minutes at +30°C.

2. Apply the MapeWrap Primer 1 SP

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

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

3. Prepare the MapeWrap 31 SP

Pour component B into component A and mix with a low speed drill fitted with a stirrer until a completely homogeneous fluid resin is obtained. Mix ratio: 3 parts by weight of A and 1 part by weight of B. The product remains workable for approximately 60 minutes at +30°C.

TECHNICAL DATA (typical values)	
PRODUCT IDENTIFICATION	
Type of fibre:	high-strength carbon fibre
Appearance:	mono-directional fabric
MAPEWRAP C UNI-AX 600	
Weight (g/m²):	600
Density (kg/m³):	1,800
Equivalent thickness of dry fabric (mm):	0.331
Load-resistant area per unit of width (mm²/m):	331.3
Tensile strength (N/mm²):	≥4,900
Maximum load per unit of width (kN/m):	> 1,600
Tensile modulus of elasticity (N/mm²):	252,000 ± 2%
Elongation at breakage (%):	≥2
FINAL PERFORMANCE	
Bond strength to concrete (N/mm²):	> 3 (failure of support)

4. Impregnate the fabric with MapeWrap 31 SP

Manually

Cut fabric with a pair of scissors/cutter to the desired size beforehand and manually impregnate the **MapeWrap C UNI-AX 600** fabric.

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 saturates and drips the fabric easily and safely.

This equipment is particularly recommended when a large number of works on large surface areas need to be carried out. This system ensures the uniform distribution of the resin over every part of the fabric. Immediately place the fabric after it has been impregnated.

5. Place the MapeWrap C UNI-AX 600

Make sure that the coat of **MapeWrap Primer 1 SP** is still fresh, and immediately apply the **MapeWrap C UNI-AX 600** making sure it is laid without wrinkles. Flatten the fabric, always wear protective rubber gloves, and pass a ribbed roller onto the fibres several times over the surface to completely eliminate any air bubbles formed during the application.

Joining

When wrapping columns, the **MapeWrap C UNI-AX 600** strip must be overlapped at least 20 cm with the same fabric.
No overlap is necessary in the direction of the width of the fabric. After laying and pressing using the ribbed roller, **MapeWrap C UNI-AX 600** must not be moved.

Installing the MapeWrap C UNI-AX 600 with the "dry system"

Operational steps

1. Prepare the **MapeWrap Primer 1 SP**.
2. Apply the **MapeWrap Primer 1 SP**.
3. Prepare the **MapeWrap 31 SP**.
4. Apply the **MapeWrap 31 SP**.
5. Place the **MapeWrap C UNI-AX 600** fabric.

1. Prepare the MapeWrap Primer 1 SP

Mix together the two **MapeWrap Primer 1 SP** components. 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: 3 parts by weight of A and 1 part by weight of B. Use the whole amount in the packaging to eliminate dosage errors.

Once **MapeWrap Primer 1 SP** has been prepared, it remains workable for approximately 60 minutes at +30°C.

2. Apply the MapeWrap Primer 1 SP

Apply an even coat of **MapeWrap Primer 1 SP** onto the clean and dry concrete surface with a roller or a brush. If the substrate is very porous, apply a second coat of **MapeWrap Primer 1 SP** after the first coat has been completely absorbed.

3. Prepare the MapeWrap 31 SP

Pour component B into component A and mix with a low speed drill fitted with a stirrer until an even yellow paste is obtained. Mix ratio: 3 parts by weight of A and 1 part by weight of B. The product remains workable for approximately 60 minutes at +30°C.

4. Apply a first coat of MapeWrap 31 SP

Spread an even first coat of **MapeWrap 31 SP** approximately 0.5 mm thick with a brush or short haired roller over the still fresh **MapeWrap Primer 1 SP**.

5. Place the MapeWrap C UNI-AX600

Immediately place the **MapeWrap C UNI-AX 600** fabric over the still fresh **MapeWrap 31 SP**, ensuring no wrinkles are present. After having flattened it (hands must be protected by rubber waterproof gloves), apply a second coat of **MapeWrap 31 SP** over the **MapeWrap C UNI-AX 600**. Pass over with the ribbed roller so that the saturant can completely saturate through the fibres and to eliminate any air bubbles formed during application.

Joining

When wrapping columns, the **MapeWrap C UNI-AX 600** strip must be overlapped at least 20 cm with the same fabric.

No overlapping is required in the direction of the width of the fabric. After laying and pressing using the special roller, **MapeWrap C UNI-AX 600** must not be moved.

Installing several layers of MapeWrap C UNI-AX 600 while still fresh (within 24 hours)

With the "wet system" repeat the following steps:

- Impregnate the fabric with **MapeWrap 31 SP**.
- Place the **MapeWrap C UNI-AX 600** fabric.

With the "dry system":

- Apply a first coat of **MapeWrap 31 SP**, place the **MapeWrap C UNI-AX 600** fabric.
- Apply another coat of **MapeWrap 31 SP**.

Note: *If more layers of fabric are applied after 24 hours, the last hardened coat must be sanded.*

PROTECTIVE COVERING

The protective covering can be carried out once the epoxy system has cured by the use of **Mapelastic**, two-component flexible cement mortar, or with **Elastocolor**, flexible acrylic or other means approved by the engineer. For the application of these products, refer to the relative technical data sheets. The above mentioned products create an effective barrier against U.V. rays. The use of these products are especially recommended when the structures are exposed to direct sun light.

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 adhesion of the described epoxy systems, it is recommended to wash the working tools with solvents (ethyl alcohol, toluene, etc.) before the products dry.

STORAGE

Store in a sheltered dry place.

SAFETY INSTRUCTIONS FOR PREPARATION AND APPLICATION

MapeWrap C UNI-AX 600 is an article and referring to the current regulations does not require the preparation of the material safety data sheet. During use it is recommended to wear gloves and goggles and follow the safety requirements of the workplace.

PRODUCT FOR PROFESSIONAL USE.

PACKAGING

MapeWrap C UNI-X 600 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 C UNI-AX 600/10	600	10	0.1	5
MapeWrap C UNI-AX 600/20	600	20	0.2	10
MapeWrap C UNI-AX 600/50	600	50	0.5	25
MapeWrap C UNI-AX 600/60	600	60	0.6	30

EPOXY SYSTEM CONSUMPTIONS

Surface priming

	Consumption (g/m^2)
MapeWrap Primer 1 SP	250-300

Impregnating MapeWrap C UNI-AX 600

	Weight (g/m^2)	Consumption (g/m^2)
MapeWrap 31 SP	600	800-1000

MapeWrap C UNI-AX 600

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 website www.mapei.com.sg

All relevant references for the product are available upon request

(FAR EAST)

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