



MapeWrap C QUADRI-AX 760

Balanced high-strength quadridirectional carbon fibre fabric

WHERE TO USE

This system is recommended for the repair and static upgrading of reinforced concrete structures damaged by physical and mechanical phenomenon and the effect of aggressive environmental and/or accidental conditions where it is difficult to predict the exact trend of isostatic tensile loads.

Some application examples

- Restoring two-dimensional structures such as plates and sheets, domed covers and storage tanks without having to consider the exact trend of tensile loads.
- Seismic upgrading and restoration of domed structures without increasing their seismic mass and without the risk of liquids percolating towards the intrados.
- Cladding beam-pillar hinge points to upgrade their seismic capacity.
- Strengthening load-bearing members in buildings whose structural system has been modified due to new architectural requirements or change in use.

TECHNICAL CHARACTERISTICS

MapeWrap C QUADRI-AX 760 is quadridirectional, carbon fibre fabric with a balanced weight characterised by its high modulus of elasticity (comparable to that of steel) and very high tensile strength that may be applied using two different methods:

- wet application method;
- dry application method.

Using a complete range of epoxy resin products consisting of:

- **MapeWrap Primer 1**, recommended to consolidate substrates.

- **MapeWrap 11** and **MapeWrap 12**, recommended for skimming surfaces with 2 mm or more of surface roughness. Application is also recommended to improve adhesion and to make application of heavy fabrics easier (600 g/m² or more) (the workability time of **MapeWrap 12** is higher than **MapeWrap 11**).
- **MapeWrap 21** for impregnating fabric using the “wet” application method.
- **MapeWrap 31** for impregnating fabric applied using the “dry” application method.

With the “wet” application method, the fabric is pre-impregnated with **MapeWrap 21** and then applied, while with the “dry” application method the fabric is placed directly over a layer of **MapeWrap 31** previously applied on the surface of the concrete element to be strengthened.

MapeWrap C QUADRI-AX 760 is a quadridirectional carbon fibre fabric. It weighs 760 g/m² and is available in two different widths (30 and 48.5 cm) in the following versions:

- **MapeWrap C QUADRI-AX 760/30**;
- **MapeWrap C QUADRI-AX 760/48**.

MapeWrap 31 is a solvent-free, epoxy resin-based product with gelatinous consistency used to impregnate **MapeWrap** fabric and consists of:

- component A (resin);
- component B (catalyser).

MapeWrap 21 is a solvent-free, epoxy resin-based product with a super-fluid consistency used to impregnate **MapeWrap** fabric and consists of:

- component A (resin);
- component B (catalyser).

MapeWrap 11 / MapeWrap 12 are epoxy grouts with a thixotropic consistency used to level off surfaces and to form structural bonds and consist of:

- component A (resin);
- component B (catalyser).

MapeWrap Primer 1 is an epoxy primer used to prepare the surface of concrete, reinforced concrete and masonry elements and helps to improve the bond of **MapeWrap** fabrics. It consists of:

- component A;
- component B.

MapeWrap 31, MapeWrap 21, MapeWrap 11 and **MapeWrap 12** comply with the principles defined in EN 1504-9 (*“Products and systems for protecting and repairing concrete structures: definitions, requirements, quality control and conformity assessment. General principles for the use of products and systems”*), and the minimum requirements of EN 1504-4 (*“Structural bonding”*).

ADVANTAGES

Unlike work carried out using conventional techniques, thanks to their extremely low weight, fabrics from the **MapeWrap C QUADRI-AX 760** range may be applied by a smaller team of workers. With the “dry” application method and “wet” application method (which only requires simple tools to make it easier to impregnate the fabric), application is very quick and often without having to interrupt the normal activities of the structure.

Compared with the cladding technique with metal plates (beton plaqué), **MapeWrap C QUADRI-AX 760** fabrics may be adapted to suit any shape of elements requiring repair, they do not require temporary supports during application and any risk of corrosion to the strengthening package is completely eliminated.

RECOMMENDATIONS

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

APPLICATION PROCEDURE

Preparation of the substrate

The surface on which **MapeWrap C QUADRI-AX 760** fabrics are to be applied must be perfectly clean, dry and strong. For masonry structures, remove all crumbling or loose parts and any parts at risk of becoming detached before applying the fabric and, where required, level off the surface by applying a layer of **Planitop HDM Maxi**.

In the case of concrete structures with no significant damage, sandblast the surface to remove all traces of stripping compound, varnish, paint and cement laitance.

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

Remove all traces of rust from exposed steel reinforcement and apply a coat of **Mapefer** two-component anti-rust cementitious mortar or **Mapefer 1K** one-component, anti-rust cementitious mortar (refer to the respective Technical Data Sheet of each product for application procedures).

Repair concrete surfaces using products from the **Mapegrout** range.

Wait at least three weeks before applying **MapeWrap C QUADRI-AX 760**.

If strengthening work needs to be carried out immediately, use **Adesilex PG1** or **Adesilex PG2** to carry out repair work.

Seal any cracks present in the structure by injecting them with **Epojet** or **Epojet LV** (to be used only if there is no water seeping into the cracks) or with **Foamjet T** or **Foamjet F** (in the case of cracks with water seeping into them).

Round off all sharp edges and corners on concrete or masonry elements and structures which are to be strengthened with **MapeWrap C QUADRI-AX 760** (such as beams and pillars) with a jack-hammer or other suitable tools.

It is recommended to round them off to a bending radius of at least 2 cm (in compliance with CNR_DT 200 R1/2013).

Application of MapeWrap C QUADRI-AX 760 using the “wet” application method

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 C QUADRI-AX 760** 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 drill at low-speed with a mixing attachment until the resin is completely blended. Mixing ratio: 3 parts by weight of component A with 1 part by weight of component B. To avoid dosage mistakes, 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 may also be adopted for the other products). Once prepared, the workability time of **MapeWrap Primer 1** is around 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 with **MapeWrap 11** or **MapeWrap 12** while the primer is still wet.

3. Preparation of MapeWrap 11 or MapeWrap 12

Choose whether to use **MapeWrap 11** or **MapeWrap 12** according to the surrounding temperature and their workability time (the workability time of **MapeWrap 12** is higher than for **MapeWrap 11**). Pour component B

TECHNICAL DATA (typical values)

PRODUCT IDENTITY

Type of fibre:	high-strength carbon fibre
Appearance:	balanced quadridirectional fabric
Density (g/cm ³):	1.79
Weight (g/m ²):	760
Equivalent thickness of dry fabric:	0.106
Resistant area per unit of width (mm ² /m):	106.1
Tensile strength (MPa):	> 4800
Maximum load per unit of width (kN/m):	> 500
Tensile modulus of elasticity (GPa):	230
Elongation at failure (%):	2.1

FINAL PERFORMANCE

Adhesion to concrete (MPa):	> 3 (failure of concrete)
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into component A and mix with a drill at low-speed with a mixing attachment until an even, grey paste is obtained. Mixing ratio for both products: 3 parts by weight of component A with 1 part by weight of component B. At +23°C **MapeWrap 11** remains workable for approximately 35 minutes after mixing, while **MapeWrap 12** remains workable for approximately 50 minutes. **MapeWrap 11** is particularly recommended if the surrounding temperature is between +5°C and +23°C, while **MapeWrap 12** is recommended for higher temperatures.

4. Application of MapeWrap 11 or MapeWrap 12

On concrete surfaces treated with **MapeWrap Primer 1**, apply a layer around 1 cm thick of **MapeWrap 11** or **MapeWrap 12** with a notched spreader, then smooth over the surface with a flat spreader to eliminate any imperfections on the surface. Using the same product, fill and round off the corners to form an edge with a bending radius of at least 2 cm.

5. Preparation of MapeWrap 21

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

6. Impregnating the fabric with MapeWrap 21

Manual impregnation

Cut pieces of **MapeWrap C QUADRI-AX 760** fabric to the sizes required with scissors and impregnate them by dipping them for a few minutes in a rectangular plastic bowl filled approximately 1/3 with **MapeWrap 21**.

Take the fabric from the bowl, leave it to drip for a few seconds and then remove all the excess resin by squeezing it gently with your hands without wringing it to prevent damaging the fibres. Wear rubber gloves when carrying out this operation.

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 need to be carried out on a structure over a large area of the surface. This system will guarantee that the resin is distributed evenly in every part of the fabric. Apply the fabric immediately after impregnation.

7. Application of MapeWrap C

QUADRI-AX 760 fabric

Make sure the **MapeWrap 11** or **MapeWrap 12** is still wet, then immediately apply the **MapeWrap C QUADRI-AX 760** fabric making sure there are no folds or creases.

After flattening the fabric out by hand (always wear protective and waterproof rubber gloves), go over the surface several times with a **MapeWrap Roller** in the same direction as 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. While the resin is still wet, broadcast the surface with 1.2 mm to 1.9 mm quartz sand. (For further information on the technical characteristics of each resin product used in the **MapeWrap C QUADRI-AX 760** strengthening system refer to the relative Technical Data Sheets).

Jooints

Overlap the ends of the strips of **MapeWrap C QUADRI-AX 760** by at least 20 cm.

The same procedure must be followed when strips applied in a longitudinal direction have to be joined.

After applying and going over the fabric with a roller, the **MapeWrap C QUADRI-AX 760** fabric must not be moved or adjusted.

Procedure for applying MapeWrap C QUADRI-AX 760 using the “dry” application technique

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 C QUADRI-AX 760** 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 drill at low-speed with a mixing attachment until the resin is completely blended. Mixing ratio: 3 parts by weight of component A with 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 may also be adopted for the other products).

Once prepared, the workability time of **MapeWrap Primer 1** is around 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 with **MapeWrap 11** or **MapeWrap 12**.

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 drill at low-speed with a mixing attachment until an even, grey paste is obtained. Mixing ratio for both products: 3 parts by weight of component A with 1 part by weight of component B. At +23°C **MapeWrap 11** remains workable for approximately 35 minutes after mixing, while **MapeWrap 12** remains workable for approximately 50 minutes. **MapeWrap 11** is particularly recommended if the surrounding temperature is between +5°C and +23°C, while **MapeWrap 12** is recommended for higher temperatures.

4. Application of MapeWrap 11 or MapeWrap 12

On concrete surfaces treated beforehand with **MapeWrap Primer 1**, apply a layer around 1 cm thick of **MapeWrap 11** or **MapeWrap 12** with a notched spreader, then smooth over the surface with a flat spreader to eliminate any imperfections on the surface. Using the same product, fill and round off the corners to form an edge with a bending radius of at least 2 cm.

5. Preparation of MapeWrap 31

Pour component B into component A and mix with a drill at low-speed with a mixing attachment to form an even yellow paste. Mixing ratio: 4 parts by weight of component A with 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 layer of **MapeWrap 31** around 5 mm thick over the **MapeWrap 11** or **MapeWrap 12** while they are still wet with a brush or roller.

7. Application of MapeWrap C QUADRI-AX 760

While the **MapeWrap 31** is still wet, immediately apply the **MapeWrap C Quadri-AX 760** fabric, making sure it is applied by hand (wear waterproof rubber gloves), without any creases or folds and pass over the surface several times with a **MapeWrap Roller** so that the adhesive penetrates into the fibres of the fabric.

Apply a second coat of **MapeWrap 31** over the **MapeWrap C Quadri-AX 760** fabric and go over the surface of the impregnated fabric with a **MapeWrap Roller** to eliminate any air bubbles trapped in the fabric. While the resin is still wet, broadcast the surface with 1.2 mm to 1.9 mm quartz sand. (For further information on the technical characteristics of each resin product used in the **MapeWrap C QUADRI-AX 760** strengthening system refer to the relative Technical Data Sheets).

Jooints

Overlap the ends of the strips of **MapeWrap C QUADRI-AX 760** by at least 20 cm.

The same procedure must be followed when strips applied in a longitudinal direction have to be joined.

After applying and going over the fabric with a roller, the **MapeWrap C QUADRI-AX 760** fabric must not be moved or adjusted.

Application of additional layers of MapeWrap C QUADRI-AX 760 while the resin is still wet (within 24 hours)

For the “wet” application method repeat the following operations:

- Impregnate the fabric with **MapeWrap 21**.
- Apply the **MapeWrap C QUADRI-AX 760** fabric.

For the “dry” application method:

- Apply a layer of **MapeWrap 31**.
- Apply the **MapeWrap C QUADRI-AX 760** fabric.
- Apply another coat of **MapeWrap 31**.

Note: if additional layers of fabric are applied after more than 24 hours the previous layer must be roughened up by sanding.

PROTECTIVE COATING

Once the resin-based products used in the system have hardened (approx. 1-2 days at +23°C), the surface may be finished off with a skim-coat of fine-textured cementitious compound such as **Planitop 200** or **Planitop 210** (refer to the relative Technical Data Sheet of each product). For external applications, protect the system once the resin products have completely hardened by applying a coat of **Mapelastic** two-component cementitious mortar. This product forms an efficient barrier against UV rays, which makes it particularly recommended for structures exposed to direct sunlight. To protect the system from fire it may be dressed with fire-resistant panels, which are usually made from calcium-silicate, or with a layer of intumescent render, as specified in article 4.8.2.3 of CNR DT 200 R1/2013.

PRECAUTIONS TO BE TAKEN DURING AND AFTER APPLICATION

- The temperature during application operations must be at least +5°C (or +10°C if **MapeWrap Primer 1** has been used) and the structure must also be dry and protected from rain and dust carried by the wind.
- After completing the work, keep treated surfaces at a temperature of more than +5°C (+10°C if **MapeWrap Primer 1** has been used).
- Protect surfaces 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.

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 epoxy systems. Do not allow the products to come into contact with the skin or 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. Never use naked flames and do not smoke while using or handling these products.

For further information please refer to the Safety Data Sheet for each product.

Cleaning

Epoxy systems form an extremely strong bond and it is recommended to clean all work tools with solvent (such as ethanol, toluene, etc.) before they harden.

STORAGE

Store in a dry, covered area.

SAFETY INSTRUCTIONS FOR PREPARATION AND APPLICATION

MapeWrap C QUADRI-AX 760 is an article and referring to the current European regulations (Reg. 1906/2007/CE - REACH) does not require the preparation of the Safety Data Sheet. During use it is recommended to wear protective gloves and goggles and follow the safety requirements of the workplace.

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 website www.mapei.com

LEGAL NOTICE

The contents of this Technical Data Sheet ("TDS") may be copied into another project-related document, but the resulting document shall not supplement or replace requirements per the TDS in force at the time of the MAPEI product installation.

The most up-to-date TDS can be downloaded from our website www.mapei.com.

ANY ALTERATION TO THE WORDING OR REQUIREMENTS CONTAINED OR DERIVED FROM THIS TDS EXCLUDES THE RESPONSIBILITY OF MAPEI.

All relevant references for the product are available upon request and from www.mapei.com

PACKAGING

MapeWrap C QUADRI-AX 760 fabric is available in 50 metre rolls in a cardboard box in the following versions:

	Weight (g/m ²)	Width (cm)	Surface area (m ² /m)	Surface area (m ² /roll)
Mapewrap C Quadri-AX 760/30	760	30	0.3	15
Mapewrap C Quadri-AX 760/48	760	48.5	0.485	24.25

CONSUMPTION OF EPOXY SYSTEMS

Priming, levelling off and skimming surfaces

	Consumption (g/m ²)
MapeWrap Primer 1	250-300
MapeWrap 11 o MapeWrap 12	1500-1600

Impregnating MapeWrap C QUADRI-AX 760

	Type (QUADRI-AX)	Consumption (g/m ²)	Width (cm)	Consumption (g/m)
MapeWrap 21	760	3150-3500	30	950-1050
			48.5	1530-1700
MapeWrap 31	760	3500-3700	30	1050-1100
			48.5	1700-1800