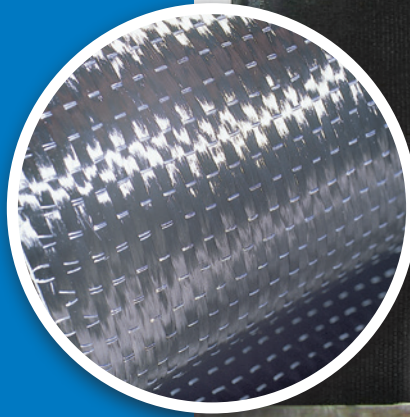




MapeWrap[®] C Uni-Ax 600

**High-Strength,
Uni-Directional
Carbon Fiber Fabric**



DESCRIPTION

MapeWrap C Uni-Ax 600 is a high-strength, uni-directional carbon fiber fabric that, when used with the *MapeWrap* family of two-component epoxy adhesives, forms an externally bonded fiber-reinforced polymer (FRP) reinforcement system. *MapeWrap C Uni-Ax 600* is part of an engineering solution that allows for an increase in the strength of structural elements without increasing the dead load supported by the structure.

FEATURES AND BENEFITS

- Use for confinement, shear or flexural strengthening.
- High tensile modulus and strength
- Lightweight fabric for use in areas of limited access
- Non-corrosive
- Low aesthetic impact (easily concealed, with minimal change to profile)
- Excellent resistance to a wide range of environmental conditions
- Alkali-resistant
- Flexible; will conform to the shape of complex surfaces
- Installs quickly with no special machinery or equipment

WHERE TO USE

- Restores structural integrity to damaged or deteriorated concrete surfaces caused by fire, impact or aging
- Improves seismic strength of masonry or concrete shear walls, column-beam connections and concrete columns

- Increases ductility and load-bearing capacity of concrete beams, slabs, columns and walls due to design defects, change of use and increased service loads in buildings
- Seismic strengthening and restoration of vaulted elements and arches found in historical buildings, tunnels and highway structures
- Confines axial-loaded structures such as columns, chimneys, tanks and silos

LIMITATIONS

- Application temperature of the epoxy adhesive being used should be between 41°F and 86°F (5°C and 30°C). Contact MAPEI's Technical Services Department for installation recommendations when ambient temperatures are above or below this temperature range.
- Design calculations and project review should be carried out by an independent licensed engineer with carbon-fiber-reinforced polymer (CFRP) design experience, and in accordance with all state, provincial and federal building codes. Additional design examples/guidelines are available upon request from MAPEI's Technical Services Department.

SUITABLE SUBSTRATES

- Use for interior/exterior applications on 28-day-old cured concrete, masonry, wood and steel.

Consult MAPEI's Technical Services Department for installation recommendations regarding substrates and conditions not listed.

SURFACE PREPARATION

- Concrete surfaces must be fully cured, clean, sound, and dry and free of cavities or protrusions.



- Remove all fins and sharp protrusions, and detail element as illustrated on the engineering documents.
 - Remove all bond-inhibiting materials – including dust, laitance, oils, impregnations, coatings, form-release agents and any surface contaminants – before installation.
 - Defects in the concrete substrate must be repaired and any surface cracks greater than 10 mils must be sealed with MAPEI's epoxy injection products, such as *Planibond® AE* and/or *Planibond CR 50*.
 - Clean all exposed reinforcement in accordance with the Steel Structures Painting Council (SSPC) and coat with *Planibond 3C* or *Mapefer™ 1K*.
 - Mechanically prepare the substrate to provide a proper surface profile, as determined by the engineer. The surface profile typically should be a minimum International Concrete Repair Institute (ICRI) concrete surface profile (CSP) of #3 to #5. In all cases, it is the responsibility of the engineer to assess and specify the appropriate surface profile required to ensure system performance.
 - Test the prepared surface, as directed by the engineer. Adhesive strength to concrete should meet a minimum tensile strength of 200 psi (1.38 MPa) and exhibit failure within concrete substrate. Random pull-off testing (per ACI 503R) should be completed after the appropriate surface preparation has been achieved.
5. On concrete surfaces sealed with *MapeWrap Primer 1* but requiring smoothing/leveling, apply a layer (average thickness of 1/32" [1 mm] and maximum thickness of 1/6" [4 mm]) of *MapeWrap 11* or *MapeWrap 12*, using a notched trowel, while the primer is still wet or tacky. Use a flat trowel to smooth the surface and remove any imperfections. For greater thicknesses, use *Planitop® X* or *Planitop XS*.
 6. For wrapping columns, *MapeWrap C Uni-Ax 600* must be overlapped by 8" (20 cm) with the same fabric.

Dry layup

1. Spread an even first coat of *MapeWrap 31* with a brush or short-nap roller at a thickness of 20 mils (0.5 mm) and rate of 40 to 45 sq. ft. per U.S. gal. (0.98 to 1.10 m² per L), while the *MapeWrap 11* or *MapeWrap 12* is still wet or tacky.
2. Immediately place *MapeWrap C Uni-Ax 600* over the still tacky or wet *MapeWrap 31*, using a gloved hand (refer to the SDS for proper PPE) to thoroughly flatten out the fabric, and then use a hard plastic roller to smooth out any wrinkles or air pockets. The roller should be run only in the direction of the primary fibers in the fabric.
3. Use a rubber roller to push the epoxy through the fibers on both sides of the fabric, and then apply a second coat of *MapeWrap 31* over the exposed surface to completely encapsulate the fabric. Use an aluminum worm screw roller to completely eliminate any remaining air bubbles formed during the application.
4. Broadcast sand to rejection onto the wet surface of *MapeWrap 31* and cover with a protective coating – such as *Mapelastic®*, *Elastocolor® Coat* or *Elastocolor Paint* – to provide an effective barrier against ultraviolet rays, particularly in direct sunlight.

Wet layup

1. *MapeWrap C Uni-Ax 600* should be impregnated with *MapeWrap 21* using an automated, mechanically driven saturation device. This is a simple machine fitted with a bucket and a series of rollers that automatically saturates the fabric and allows any excess saturant to drip from the fabric easily and safely.
2. As an alternative, *MapeWrap C Uni-Ax 600* can be plunged into a plastic trough filled with 1/3 of the total volume with *MapeWrap 21*. Remove the fabric from the trough, let it drip and press it between gloved hands until the excess resin is completely removed. Take precaution not to wring the fabric or damage the carbon fibers.
3. Once saturated, apply *MapeWrap C Uni-Ax 600* over the still wet *MapeWrap 11* or *MapeWrap 12* that covers *MapeWrap Primer 1*, or over *MapeWrap Primer 1* alone if a fast-setting mortar was used. Use a gloved hand (refer to the SDS for proper PPE) to thoroughly flatten out the fabric, and then use a hard plastic roller to smooth out any wrinkles or air pockets. The roller should be run only in the direction of the primary fibers in the fabric.

MIXING

Choose all appropriate safety equipment before use. Refer to the Safety Data Sheet for details.

1. Refer to MAPEI's individual Technical Data Sheets (TDSs) for the appropriate epoxies to be used with *MapeWrap C Uni-Ax 600*.
2. Do not dilute or modify epoxies.

PRODUCT APPLICATION

MapeWrap C Uni-Ax 600 can be installed using the "dry" or "wet" layup method. However, local restrictions vary by jurisdiction and must be followed. Caltrans, for example, only permits the "wet" layup method for its projects.

Common to both dry and wet layup

1. The installer and owner should read and follow all recommended personal protection equipment (PPE) procedures while preparing and installing *MapeWrap C Uni-Ax 600* and its adhesives.
2. When the product is applied in a closed environment, provide good ventilation. For further information, carefully read the SDS of each of the products used.
3. Cut *MapeWrap C Uni-Ax 600* to the desired length.
4. Prime the surface to be reinforced with an even coat of *MapeWrap Primer 1* at a rate of 150 to 190 sq. ft. per U.S. gal. (3.67 to 4.65 m² per L). Very porous substrates may require a second coat after the first coat has been completely absorbed.

Product Performance Properties

Laboratory Tests	Results
Fiber material	High-strength carbon
Color	Black
Primary fiber direction	0° (uni-directional)
Shelf life	Unlimited in proper storage conditions; store in a dry place with no exposure to direct sunlight

Dry Fiber Properties

Property	Typical Test Value
Base	High-strength, uni-directional carbon fiber fabric
Ultimate tensile strength	≥ 710,000 psi (4.90 GPa)
Tensile modulus	36.5 x 10 ⁶ psi +/- 2% (252 GPa +/- 2%)
Elongation at break	>/- 2.0%
Weight	18 U.S. oz. per sq. yd. (600 g per m ²)
Nominal thickness (t _i)	0.0131" per ply (0.331 mm per ply)

Cured Laminate Properties with MapeWrap 21

Property	Average Value	Design Value**	ASTM Test Method
Tensile strength*	136,000 psi (938 MPa)	119,000 psi (821 MPa)	D3039
Tensile modulus*	8,208,000 psi (56 607 MPa)	8,208,000 psi (56 607 MPa)	D3039
Elongation at break*	1.7%	1.4%	D3039
Ply thickness – inch (mm)*	0.0589 (1.496)	0.0589 (1.496)	–

Cured Laminate Properties with MapeWrap 31

Property	Average Value	Design Value**	ASTM Test Method
Tensile strength*	236,000 psi (1 628 MPa)	210,000 psi (1 448 MPa)	D3039
Tensile modulus*	11,875,000 psi (81 897 MPa)	11,875,000 psi (81 897 MPa)	D3039
Elongation at break*	2.0%	1.76%	D3039
Nominal layer thickness*	0.0397" (1.01 mm)	0.0397" (1.01 mm)	–

* 24 sample coupons per test series according to ACI 440. Testing is in accordance with ASTM D3039.

** Average value minus 3 standard deviations, according to ACI 440.2R (Section 4.3.1)

Packaging

Size
Roll: 164 ft. (50.0 m) long and 3.94" (10 cm) wide
Roll: 164 ft. (50.0 m) long and 7.87" (20 cm) wide
Roll: 164 ft. (50.0 m) long and 15.75" (40 cm) wide

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4. Pass over the impregnated fabric with a worm screw roller in order to completely eliminate any air bubbles formed during application of the fabric.
5. Broadcast sand to rejection onto the wet surface of *MapeWrap 21* covering *MapeWrap C Uni-Ax 600*. Then cover it with a protective coating – such as *Mapelastic*, *Elastocolor Coat* or *Elastocolor Paint* – to provide an effective barrier against UV rays, particularly in direct sunlight.

CLEANUP

Due to the high bond strength of *MapeWrap 11*, *MapeWrap 12*, *MapeWrap 21* and *MapeWrap 31* on metal, tools should be cleaned with approved solvents (ethyl alcohol, toluene, etc.) before the product dries. Cured materials can only be removed mechanically. Discard in accordance with local disposal regulations.

Refer to the SDS for specific data related to health and safety as well as product handling.

For information on MAPEI's commitment to sustainability and transparency, as well as how MAPEI products may contribute to green building standards and certification systems, contact sustainability_USA@mapei.com (USA) or sustainability-durabilite@mapei.com (Canada).

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 nor replace requirements per the TDS in effect at the time of the MAPEI product installation. For the most up-to-date TDS and warranty information, please visit our website at

www.mapei.com. **ANY ALTERATIONS TO THE WORDING OR REQUIREMENTS CONTAINED IN OR DERIVED FROM THIS TDS SHALL VOID ALL RELATED MAPEI WARRANTIES.**

Before using, the user must determine the suitability of our products for the intended use,

and the user alone assumes all risks and liability. **ANY CLAIM SHALL BE DEEMED WAIVED UNLESS MADE IN WRITING TO US WITHIN FIFTEEN (15) DAYS FROM DATE IT WAS, OR REASONABLY SHOULD HAVE BEEN, DISCOVERED.**

We proudly support the following industry organizations:



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For the most current product data and BEST-BACKED™ warranty information, visit www.mapei.com.

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