



# MapeWrap 31



**Medium viscosity epoxy resin for impregnation of MapeWrap with “dry system”**



## WHERE TO USE

**MapeWrap 31** is used for the impregnation of **MapeWrap** fabrics, when concrete, reinforced concrete and masonry elements need repair or strengthening by using the “dry system”.

## TECHNICAL CHARACTERISTICS

**MapeWrap 31** is a gelatinous solvent-free epoxy resin based adhesive specially developed in the MAPEI Research & Development laboratories for the impregnation during application using the “dry system” of **MapeWrap** fabrics.

**MapeWrap 31** is made up of two pre-measured components (component A = resin and component B = hardener) that must be mixed together before use. After having mixed the two parts together, **MapeWrap 31** remains workable for approximately 40 minutes at +23°C.

Once hardened, **MapeWrap 31** acquires excellent dielectric properties and high mechanical strength.

**MapeWrap 31** responds to the principles defined in EN 1504-9 (“*Products and systems for protecting and repairing concrete structures: definitions, requirements, quality control and conformity evaluation. General principles for the use and application of systems*”), and the minimum requirements for EN 1504-4 (“*Structural bonding*”).

**MapeWrap 31** is part of the **MapeWrap C UNI-AX** carbon fibre system. The mechanical performance characteristics and durability has been certified by the American institute ICC-ES (International Code

Council Evaluation Service) under various environmental conditions and achieved the report ESR - 3499.

## RECOMMENDATIONS

- **MapeWrap 31** must not be used once the hardening reaction begins.
- Apply **MapeWrap 31** over the still fresh **MapeWrap 11** or **MapeWrap 12**.

## APPLICATION PROCEDURE

### Preparing MapeWrap 31

Mix the two components of **MapeWrap 31** together. Pour component B into component A and mix with a slow speed drill fitted with a stirrer until the resin is completely homogeneous. Mix ratio: 4 parts by weight of component A and 1 part by weight of component B. Do not use partial quantities. To avoid the risk of accidental ratio errors, use the whole package: if only partial quantities are required, use precision electronic scales to weight at the components.

### Applying MapeWrap 31 and placing the MapeWrap fabrics

Apply a uniform first coat of **MapeWrap 31** over the still wet **MapeWrap 11** or **MapeWrap 12**, with a brush or with a short bristle roller. Immediately apply the **MapeWrap** fabric making sure it is laid without creases. After having flattened the fabric wearing protective rubber waterproof gloves, apply over the **MapeWrap** fabrics a second coat of **MapeWrap 31** by brush or roller. Press it several times using a stiff rubber or

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Applying MapeWrap 31 with a roller on the still fresh MapeWrap 11 (or MapeWrap 12)



Applying pressure on the fabric with the Roller for MapeWrap so that MapeWrap 31 can penetrate well into the fabric

metal roller (**Roller for MapeWrap**) so the adhesive can completely penetrate through the fibres of the fabric.

Pass over the impregnated fabric with the **Roller for MapeWrap** with a worm screw in order to completely eliminate any air bubbles formed during the application.

## PRECAUTIONS TO BE TAKEN BEFORE APPLICATION

No special precautions need to be taken at temperatures between +5°C and +30°C. In hot weather do not expose the material to direct sunlight and bonding should be carried out during the cooler hours.

During the winter, if applications need to be carried out outdoors at temperatures below +5°C, it is recommended before repairing or reinforcing with **MapeWrap** fabrics, to warm the substrate 24 hours before bonding and arrange for having adequate insulation systems in order to avoid any danger of frost. The thermal insulation should be maintained for at least the next 24 hours. Before use, store the product in a heated area.

## Cleaning

Due to the strong adhesion of **MapeWrap 31** also on metal, it is recommended to wash the working tools with solvents (ethyl alcohol, toluol, etc.) before the product dries.

## CONSUMPTION

Consumption depends on the type of fabric (unidirectional, bi-directional and quadri-directional) and the height:

### MapeWrap C (CARBON fabrics)

Type of fabric	Consumption (g/m <sup>2</sup> )	Height (cm)	Consumption (g/m)
UNI-AX 300 or UNI-AX HM 300	1000-1100	10	100-110
		20	200-220
		40	400-440
UNI-AX 600 or UNI-AX HM 600	1500-1550	10	150-155
		20	300-310
		40	600-620
BI-AX 230	1000-1100	20	200-220
		40	400-440
BI-AX 360	1250-1400	20	250-280
		40	500-560
QUADRI-AX 380	2000-2100	30	600-700
		48.5	970-1020
QUADRI-AX 760	3500-3700	30	1050-1100
		48.5	1700-1800

### MapeWrap G (GLASS fabrics)

Type of fabric	Consumption (g/m <sup>2</sup> )	Height (cm)	Consumption (g/m)
UNI-AX 900	900-1000	30	270-300
		60	540-600
QUADRI-AX 1140	1300-1400	30	390-420
		48.5	630-680

## PACKAGING

5 kg units (component A = 4 kg, component B = 1 kg).

2.5 kg units (component A = 2 kg, component B = 0.5 kg).

## STORAGE

The product must be stored in original sealed packaging at temperatures not below +5°C.

## SAFETY INSTRUCTIONS FOR PREPARATION AND APPLICATION

**MapeWrap 31** component A is irritant for the skin and eyes, both component A and component B may cause sensitization in contact with the skin of predisposed subjects.

**MapeWrap 31** component B is corrosive and may cause burns. Furthermore it is harmful if swallowed and if inhaled. The product contains epoxy resins with low molecular weight that can cause sensitization if in contact with other epoxy components. During use wear protective gloves and goggles and take the usual precautions for handling of chemicals. If the product comes in contact with eyes or skin wash immediately with plenty of water and seek medical attention. When applying the product, we recommend working in well ventilated areas. In case of poor ventilation, we recommend wearing the mask with filters. When the product reacts it generates considerable heat. After mixing components A and B we recommend applying the product as soon as possible and to never leave the container unguarded until it is completely empty.

**MapeWrap 31** component A and B are dangerous for aquatic life. Do not dispose of them into the environment.

For further and complete information about the safe use of our product please refer to the latest version of our Material Safety Data Sheet.

PRODUCT ONLY 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](http://www.mapei.com)

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

## TECHNICAL DATA (typical values)

### PRODUCT IDENTITY

	component A	component B
Consistency:	paste	liquid
Colour:	yellow	transparent yellow
Specific gravity (g/cm <sup>3</sup> ):	1.05	1.12
Brookfield viscosity (mPa·s):	17.000 (shaft 5 - rev. 10)	110 (shaft 2 - rev. 100)

### APPLICATION DATA (after 7 days at +23°C - 50% R.H.)

Mix ratio:	component A : component B = 4 : 1
Mix consistency:	gelatine paste
Colour of mix:	yellow
Specific gravity of the mix (g/cm <sup>3</sup> ):	1,060
Brookfield viscosity (mPa·s):	6,500 (shaft 3 - rev. 10)
Workability time: - at +10°C: - at +23°C: - at +30°C:	60' 40' 20'
Setting time: - at +10°C: - at +23°C: - at +30°C:	90' 50' 30'
Application temperature:	from +5°C to +30°C
Adhesion to concrete (N/mm <sup>2</sup> ):	> 3 (after 7 days - concrete failure)
Tensile strength* (ASTM D 638) (N/mm <sup>2</sup> ):	≥ 40
Tensile strain* (ASTM D 638) (%): - after 28 days:	≥ 1.6
Compressive strength (ASTM D 695) (N/mm <sup>2</sup> ):	≥ 70
Flexural strength* (ISO 178) (N/mm <sup>2</sup> ):	≥ 70
Modulus of elasticity under compression (ASTM D 695) (N/mm <sup>2</sup> ):	≥ 3,000
Modulus of elasticity in flexion (ISO 178) (N/mm <sup>2</sup> ):	≥ 2,500
Tensile modulus of elasticity* (ASTM D 638) (N/mm <sup>2</sup> ):	≥ 2,600
Glass transition temperature T <sub>g</sub> (°C) (ASTM E 1640-09):	≥ 70 (after 3 days at +23°C + 4 days at +60°C)

### FINAL PERFORMANCES

Performance characteristic	Test method	Requirements according to EN 1504-4	Performance of product
<b>BONDED MORTAR OR CONCRETE</b>			
Compressive strength (N/mm <sup>2</sup> ):	EN 12190	≥ 30	> 70
Shear strength (N/mm <sup>2</sup> ):	EN 12615	≥ 6	> 10
Compressive modulus of elasticity (N/mm <sup>2</sup> ):	EN 13412	≥ 2,000	> 3,000
<b>STRENGTHENING USING BONDED PLATE</b>			
Shear strength (N/mm <sup>2</sup> ):	EN 12188	≥ 12	50° > 40 60° > 35 70° > 30
Bond strength: - pull out (N/mm <sup>2</sup> ):	EN 12188	≥ 14	> 20
Bond strength: - inclined shear strength (N/mm <sup>2</sup> ):	EN 12188	50° ≥ 50 60° ≥ 60 70° ≥ 70	50° > 90 60° > 85 70° > 100

\* 5 sample coupons per test series (testing temperature +23°C (+73°F) - 50% H.R.)



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