



# MapeWrap™ 21

**Low-Viscosity, 100%-Solids Epoxy Resin for Impregnation of MapeWrap Fabrics**



## DESCRIPTION

MapeWrap 21 is a 100%-solids, moisture-tolerant, low-viscosity epoxy resin for impregnating MapeWrap composite system fabrics by a wet layup method immediately before they are placed. MapeWrap 21 may be applied by an automated saturation device or manually to provide complete encapsulation of both carbon and glass fiber fabrics. When applied on concrete and masonry surfaces, the resulting cured laminate provides strengthening to these structural elements.

## FEATURES AND BENEFITS

- Low-viscosity epoxy resin for complete encapsulation of all MapeWrap fabrics
- Remains workable for 40 minutes at 73°F (23°C)
- High mechanical strength
- Moisture-tolerant
- Solvent-free and VOC-compliant
- Developed specifically for the MapeWrap composite system

## INDUSTRY STANDARDS AND APPROVALS

| <u>LEED Points Contribution</u>                                     | <u>LEED Points</u> |
|---|--------------------|
| MR Credit 5, Regional Materials* .....                              | Up to 2 points     |
| IEQ Credit 4.2, Low-Emitting Materials –<br>Paints & Coatings ..... | 1 point            |

\* Using this product may help contribute to LEED certification of projects in the categories shown above. Points are awarded based on contributions of all project materials.

## WHERE TO USE

- Use for saturation of all MapeWrap fabrics before placement.
- Use on interior/exterior horizontal, vertical and overhead surfaces.
- Use when additional structural strengthening is required on concrete, masonry, steel and wood elements.
- Use for the repair of large surface areas.

## LIMITATIONS

- Do not thin MapeWrap 21 with solvents.
- Apply MapeWrap 21 when the substrate and ambient temperature are between 50°F and 86°F (10°C and 30°C). Contact MAPEI's Technical Services Department for applications below and above this range.
- Do not use MapeWrap 21 if its mixed components have begun to harden before application.

## SUITABLE SUBSTRATES

- Use on properly prepared, structurally sound, fully cured concrete substrates (at least 28 days old), as well as masonry, steel and wood.

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

## SURFACE PREPARATION

1. Ensure that all substrates are fully cured, structurally sound, stable, clean and free of dust, oil, grease, paint, tar, wax, sealers, curing compounds, form release agents, primers, laitance, loose particles, and any foreign substance or debris that could reduce or impair adhesion.



2. All sharp edges that may be found on rectangular beams and columns must be ground smooth and flush, with a bending radius (bullnose) of not less than 3/4" (19 mm) on all corners.
3. Mechanically prepare the substrate to provide a proper surface profile, as determined by the engineer. The surface profile typically should be a minimum of ICRI CSP #3 to CSP #5. In all cases, it is the responsibility of the engineer to assess and specify the appropriate surface profile required to ensure system performance.
- 4a. Leveling with a fast-setting mortar: Uneven surfaces should be leveled/smoothed. A fast-setting cementitious repair mortar such as MAPEI's *Planitop® X* or *Planitop XS* can be used. Apply a 1/16" (1,5-mm) layer of the repair mortar using a notched trowel. Use a flat trowel to smooth the surface and remove any imperfections. Allow the repair mortar to cure for 24 hours before a *MapeWrap* fabric is applied.
- 4b. Leveling with an epoxy putty: As an alternative method for the required leveling/smoothing of uneven surfaces, an epoxy putty such as MAPEI's *MapeWrap 11* or *MapeWrap 12* can be used. First, prime the surface that needs reinforcement with a brush or 3/8" (10-mm) nap roller and 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 m<sup>2</sup> per L). Very porous substrates may require a second coat after the first coat has been completely absorbed. Once prepared, *MapeWrap Primer 1* has a working time of 90 minutes at 73°F (23°C). While the primer is still wet or tacky (about 2 to 6 hours after installation), apply a 1/16" (1,5-mm) layer of *MapeWrap 11* or *MapeWrap 12* using a notched trowel. Use a flat trowel to smooth the surface and remove any imperfections. The epoxy putty should be fresh or tacky when a *MapeWrap* fabric is applied.
5. Seal any surface cracks with MAPEI's epoxy injection products, such as *Planibond® AE* and/or *Planibond CR 50*.
6. Clean all exposed reinforcement in accordance with the Steel Structures Painting Council (SSPC) and coat with *Planibond 3C* or *Mapefer™ 1K*.
7. The pull-off strength of the concrete should meet a minimum tensile strength of 200 psi (1,4 MPa) and exhibit failure within the concrete substrate. Random pull-off testing (per ACI 503R) should be completed after the appropriate surface preparation has been achieved.
8. If a fast-setting mortar was used for leveling: *MapeWrap Primer 1* should now be applied. Prime the surface that needs to be reinforced with a brush or 3/8" (10-mm) nap roller and 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 m<sup>2</sup> per L). Very porous substrates may require a second coat after the first coat has been completely absorbed. Once prepared, *MapeWrap Primer 1* has a working time of 90 minutes at 73°F (23°C). *MapeWrap Primer 1* should be dry/cured when a *MapeWrap* fabric is applied.

## MIXING

Note: Choose all appropriate safety equipment before use. Refer to the Safety Data Sheet for more information.

1. Combine the two components together that make up *MapeWrap 21* by pouring Part B into Part A.
2. Mix with a low-speed mixer (at 400 to 600 rpm) and a standard Jiffy paint-mixing paddle for about 3 minutes, until the mixture has a smooth, homogenous consistency.
3. Part A and Part B components are pre-proportioned (mix ratio: 4 parts by weight of Part A and 1 part by weight of Part B) and should be mixed as full units. Partial mixing of Part A and Part B is prohibited.

## PRODUCT APPLICATION

- 1a. Automated saturation: Cut the *MapeWrap* fabric to the desired length and begin the impregnation process with an automated, mechanically driven saturation device and *MapeWrap 21*. 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. This system is particularly effective on large surface areas and ensures even distribution of resin over every part of the fabric.
- 1b. Trough saturation: As an alternative, after the *MapeWrap* fabric is cut to length, it can be plunged into a plastic trough filled with 1/3 of the total volume of the mixed *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 to not wring the fabric and damage the carbon fibers.
2. Once saturated, the *MapeWrap* fabric should be applied over the still tacky *MapeWrap 11* or *MapeWrap 12* or over the dry/cured *MapeWrap Primer 1* (depending on the leveling method). Use your gloved hand (refer to the SDS for proper Personal Protection Equipment [PPE]) to thoroughly flatten out the fabric. 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. Apply a second coat of *MapeWrap 21* by brush or 3/8" (10-mm) roller. Press several times with a hard plastic or aluminum worm screw roller to allow the resin to completely penetrate the fibers of the fabric.
4. Pass over the impregnated fabric with a hard plastic roller in order to completely eliminate any air bubbles formed during application of the fabric.
5. When applying the products in a closed environment, provide good ventilation. For further information, carefully read the SDS of each product.

### Product Performance Properties\*

| Laboratory Tests                                    | Results                 |
|---|-------------------------|
| Consistency (mixed)                                 | Liquid                  |
| Color (mixed)                                       | Transparent yellow      |
| Specific gravity (g per cm <sup>3</sup> )           | 1,1                     |
| Mix ratio (by weight)                               | Part A : Part B = 4 : 1 |
| VOCs  | < 50 g per L            |
| <b>Set times</b>                                    |                         |
| – At 50°F (10°C)                                    | 90 minutes              |
| – At 73°F (23°C)                                    | 50 minutes              |
| – At 86°F (30°C)                                    | 30 minutes              |
| Complete curing                                     | 7 days                  |
| Adhesion to concrete at 7 days and 73°F (23°C)      | > 435 psi (> 3 MPa)     |
| Tensile strength (ASTM D638) at 7 days              | 5,600 psi (38,6 MPa)    |
| Tensile elongation (ASTM D638) at 7 days            | 3.6%                    |
| Compressive strength (ASTM C579) at 7 days          | 12,659 psi (87,3 MPa)   |
| Flexural strength (ISO 178)                         | 7,975 psi (55 MPa)      |
| Modulus of elasticity under compression (ASTM C579) | 290,000 psi (2,000 MPa) |
| Modulus of elasticity in flexion (ISO 178)          | 362,500 psi (2,500 MPa) |

\* Based on testing of cured samples per ASTM D638 at 72°F (22°C) and 40% relative humidity

### Shelf Life and Application Properties

|                      |   |
|----------------------|---|
| Shelf life           | 2 years in original, unopened container in a covered area                   |
| Storage conditions   | 50°F to 86°F (10°C to 30°C). Protect from freezing in shipment and storage. |
| <b>Working times</b> |   |
| – At 50°F (10°C)     | 60 minutes  |
| – At 73°F (23°C)     | 40 minutes  |
| – At 86°F (30°C)     | 20 minutes  |

### Packaging

| Size                                      |
|---|
| Kit (Parts A and B), 1 U.S. gal. (3,79 L) |

### Approximate Coverage for a 2-coat application

| When used with        | Amount of fabric that can be applied                               |
|-----------------------|--|
| MapeWrap C Uni-Ax 300 | 34 to 37 sq. ft. per U.S. gal. (0,83 to 0,91 m <sup>2</sup> per L) |
| MapeWrap C Uni-Ax 600 | 23 to 25 sq. ft. per U.S. gal. (0,56 to 0,61 m <sup>2</sup> per L) |
| MapeWrap C Bi-Ax 230  | 34 to 37 sq. ft. per U.S. gal. (0,83 to 0,91 m <sup>2</sup> per L) |
| MapeWrap G Uni-Ax 900 | 56 to 64 sq. ft. per U.S. gal. (1,37 to 1,57 m <sup>2</sup> per L) |

# MapeWrap™ 21



## CLEANUP

- Due to the high bond strength of *MapeWrap 21* on metal, clean tools with approved solvents (ethyl alcohol, toluene, etc.) before the product dries. Cured material can only be removed mechanically. Dispose of cured material in accordance with local disposal regulations.

Refer to the SDS for specific data related to VOCs, health and safety, and handling of product.

## STATEMENT OF RESPONSIBILITY

Before using, user shall determine the suitability of the product for its intended use and user alone assumes all risks and liability whatsoever in connection therewith.

**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:



### MAPEI Headquarters of the Americas

1144 East Newport Center Drive  
Deerfield Beach, Florida 33442  
1-888-US-MAPEI (1-888-876-2734) /  
(954) 246-8888

### Technical Services

1-800-992-6273 (U.S. and Puerto Rico)  
1-800-361-9309 (Canada)

### Customer Service

1-800-42-MAPEI (1-800-426-2734)

### Services in Mexico

0-1-800-MX-MAPEI (0-1-800-696-2734)

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For the most current **BEST-BACKED™** product data and warranty information, visit [www.mapei.com](http://www.mapei.com).

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