

# MAPEROD C MAPEROD G

Pultruded carbon fibre or glass fibre bars for repairing and structural strengthening damaged concrete, wooden and masonry elements.

**Maperod C:** high tensile bars pre-formed with epoxy resin.

**Maperod G:** deformed bars pre-formed with epoxy-modified vinylester



## WHERE TO USE

Repairs and structural strengthening for reinforced concrete, brickwork, stone, wooden and tuff elements damaged by physical-mechanical stress or natural causes.

**Maperod C** and **Maperod G** are used in combination with fabrics from the **MapeWrap** range to improve anchorage, especially when interventions are carried out to increase flexural and shear strength (for concrete, masonry and wood).

### Some application examples

- Upgrading seismic performance of structures in high-risk zones.
- Setting terminal anchors and anti-delamination connectors in composite systems.
- Studding and micro-stitching.
- As a valid substitute for metal through tie-rods in masonry for reinforced structural strengthening (reinforced stitching method).
- Reducing deformation under service loads (increase in stiffness).
- Increasing load-bearing capacity (e.g. re-qualifying structures due to change in final use).
- Increasing fatigue strength.
- Increasing overall durability of the intervention.

## TECHNICAL CHARACTERISTICS

**Maperod C** is a range of deformed, pultruded carbon fibre bars in an epoxy matrix with a peel-ply film, characterised by their high tensile strength. **Maperod C** is a valid alternative to metal bars.

The bars in the **Maperod C** range are 10 mm in diameter and have a modulus of elasticity of 155 GPa.

**Maperod G** is a range of deformed, pultruded glass fibre bars in an epoxy-modified vinylester matrix, characterised by their high tensile strength.

The bars in the **Maperod G** range are 10 mm in diameter and have a modulus of elasticity of 40.8 GPa.

Thanks to their composition and production process, which guarantees constant properties throughout the bars,

**MapeWrap C** and **MapeWrap G** have the following characteristics:

- high tensile strength;
- lightweight;
- modulus of elasticity compatible with and suitable for the requirements of concrete and other materials used in constructions;
- easy to apply.

## ADVANTAGES

Unlike interventions using traditional methods, thanks to their extremely low weight, products from the **Maperod** range may be applied extremely quickly without using special handling or lifting equipment, and often without interrupting the use of structures.

Compared with the cladding technique using metal plates (*béton plaqué*), **Maperod** does not require temporary supports during application and there is no risk of corrosion of the strengthening materials applied.

Compared with cladding using fabric impregnated directly on site, bars from the **Maperod** range may be applied very quickly and the quality of the installation is less dependent on the experience and skill of the workers.

## RECOMMENDATIONS

- Before bonding, make sure the tensile strength of the substrate is sufficient.
  - Do not apply **Maperod** on substrates which are not fully cured.
  - On particularly absorbent substrates or on concrete in areas with a high level of R.H. (underpasses, underground rooms, cellars, etc.), we recommend priming the substrates with a coat of **MapeWrap Primer 1** before bonding **Maperod** (see relative technical data sheet for preparation and application instructions). Application of **MapeWrap 11** or **MapeWrap 12**, or as an alternative **Mapefix EP**, must be carried out while **MapeWrap Primer 1** is still “fresh”.
- For applications on wooden substrates, we recommend using an epoxy adhesive from the **Mapewood** range (please refer to the respective technical data sheet).

## APPLICATION PROCEDURE

Application phases:

1. Drilling the holes.
2. Preparation of **MapeWrap Primer 1**.
3. Application of **MapeWrap Primer 1**.
4. Preparation of **MapeWrap 11**, **MapeWrap 12** or **Mapefix EP**.
5. Application of **MapeWrap 11**, **MapeWrap 12** or **Mapefix EP**.
6. Inserting the **Maperod** bars.

### 1. Drilling the holes

#### Preparation of masonry

Drill a series of holes or incisions slightly larger than the diameter of the bar in the face of the wall. The depth of the holes or incisions must be calculated by a design engineer.

#### Preparation of concrete

Drill a series of holes or incisions around 1.5 times the diameter of the bar in the concrete. The depth of the holes or incisions must be calculated by a design engineer.

#### Preparation of wood

Drill a series of holes or incisions of the appropriate size, which must be calculated by a design engineer, also in view of a possible recoat.

### 2. 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 low-speed drill 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 must also be adopted for the other products).

Once prepared, the workability time of **MapeWrap Primer 1** is approx. 90 minutes at +23°C.

### 3. Application of MapeWrap Primer 1

After drilling and preparing the holes, apply **MapeWrap Primer 1** inside the holes using a bottle brush.

If the surface is particularly absorbent, apply a second coat of **MapeWrap Primer 1** once the first coat has been completely absorbed. Then apply **MapeWrap 11**, **MapeWrap 12** or **Mapefix EP** while the product underneath is still “fresh”.

### 4. Preparation of MapeWrap 11, MapeWrap 12 or Mapefix EP

#### MapeWrap 11 or MapeWrap 12

**MapeWrap 11** or **MapeWrap 12** must be chosen according to the surrounding temperature and workability time (**MapeWrap 12** has a higher workability time than **MapeWrap 11**).

Pour component B into component A and mix with a low-speed drill with a mixing attachment until they form an even, grey paste.

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 around 35 minutes after mixing, while **MapeWrap 12** remains workable for around 50 minutes.

#### Mapefix EP

**Mapefix EP** is a two-component product supplied in bi-axial 385 ml cartridges and comprises two separate components, A (resin) and B (catalyser). They are mixed together during extrusion from the cartridge through a static mixer supplied

with the product. This product may be applied at +5°C to +40°C.

## 5. Application of MapeWrap 11, MapeWrap 12 or Mapefix EP

Completely fill the holes previously treated with **MapeWrap Primer 1** while it is still “fresh”. Apply **MapeWrap 11** or **MapeWrap 12** in the holes using an empty sealant cartridge filled with product and an extrusion gun, and **Mapefix EP** through the static mixer supplied with the product using an extrusion gun.

## 6. Inserting the Maperod bars

**Maperod C** and **Maperod G** are supplied in lengths of 2 meters and 6 metres respectively, and are cut to length on site using a diamond cutting disk. Insert the **Maperod** bars while applying a constant pressure along their entire length. Insert the bar down to the bottom of the hole so that it pushes the epoxy anchoring product out from the hole. Remove excess resin with a trowel, taking care not to move the bars.

When applied on curved elements, the bars must be held in position with clamps or stays until the resin has completely hardened (24 hours is usually enough before the clamps or stays can be removed).

## PRECAUTIONS TO BE TAKEN DURING AND AFTER APPLICATION

- The temperature during application must be at least +10°C and the structure must be protected from rain and dust carried by the wind.
- After completing application, make sure the treated surface is kept at a temperature of at least +10°C until the products are completely cured.
- Protect the surface from rain for at least 24 hours if the temperature does not drop below +15°C, or for at least 3 days if the temperature is lower.

## CLEANING

**MapeWrap 11** and **MapeWrap 12** form a strong bond, including on metal. Cleaning tools with solvent (such as ethanol, toluene, etc.) before they harden is recommended.

## PACKAGING

**Maperod C** and **Maperod G** are supplied in boxes of 10x2 metre lengths and 10x6 metre lengths respectively.

**Maperod C** and **Maperod G** are supplied in 10 mm diameter lengths.

## STORAGE

Store in a covered, dry area.

## SAFETY INSTRUCTIONS FOR PREPARATION AND APPLICATION

**Maperod C** and **Maperod G** are articles and referring to the current European regulations (Reg. 1906/2007/EC - REACH) do not require the preparation of the 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.

TECHNICAL DATA (typical values)		
PRODUCT IDENTITY		
	Maperod C	Maperod G
Matrix:	epoxy resin	epoxy-modified vinylester
Appearance:	solid, round structural element	
Colour:	black	white
PRODUCT CHARACTERISTICS		
	Maperod C	Maperod G

Density (g/cm <sup>3</sup> ):	1.54	1.995
Fibre content (%):	71	75
Cross-section area (mm <sup>2</sup> ):	73.9	71.26
Nominal diameter (mm):	9.7	9.53
<b>FINAL PERFORMANCE</b>		
Tensile strength (N/mm <sup>2</sup> ):	2,000	760
Modulus of elasticity (N/mm <sup>2</sup> ):	155,000	40,800
Elongation at failure (%):	1.5	2
Coefficient of longitudinal thermal expansion (m/m/°C):	6 -10 x 10 <sup>-6</sup>	6-10 x 10 <sup>-6</sup>
Coefficient of transversal thermal expansion (m/m/°C):	–	21-23 x 10 <sup>-6</sup>

## 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)

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