MAPEI

Carboplate

Pultrused carbon fibre plates pre-impregnated in epoxy based resin

WHERE TO USE

Repairing and reinforcing reinforced concrete structures damaged by time and natural causes. Seismic strengthening of structures built on earthquake zones.

Some application examples

- Repair and upgrade of beams for flexural strengthening.
- Repair structures damaged by fire.
- Repair structures damaged by earthquakes.
- Restore bi-dimensional structures such as plates, slabs, small vaults and tanks with high bending radius.
- Reinforce viaduct slabs following an increase of static and/or dynamic loads.
- Reinforce industrial and/or commercial structures following static loads brought on by equipment, machinery, etc.
- Reinforce car park decks in residential and industrial buildings.
- Reinforce structures subject to vibration.
- Seismic strengthening of vaulted structures without having to increase the seismic mass and without danger of liquid percolation towards the internal surface of an archway.
- Reinforcement of load bearing elements in buildings that have been restructured for architectural reasons or change of use.

TECHNICAL CHARACTERISTICS

Carboplate is a range of pultrused carbon fibre plates, pre-impregnated in epoxy based resin, with high resistance and flexibility, for plating prestressed reinforced concrete and steel structures.

Carboplate can replace conventional steel sheets that are used for plating.

Carboplate is available in different widths and with two different modulus of elasticity.

- **Carboplate** E 170
- **Carboplate** E 250

Because of its composition and manufacturing procedure, which ensure constant properties to all of the material, **Carboplate** has the following properties:

- High tensile strength.
- Light weight.
- Reduced thickness.
- Excellent endurance strength.

ADVANTAGES

Unlike work based on conventional methods, the **Carboplate** range of products, thanks to their light weight can be used without the need of special

Carboplate

A view of the bridge during reparation work

Fixing Carboplate in especially created areas on the substrate

A bridge-deck reinforced with Carboplate

machinery or equipment, and in very short time and often without downtime of the structure.

Unlike the plating method using metal plates (beton plaquè method), **Carboplate** does not need temporary reinforcement during placing and removes all risks of corrosion of the applied reinforcement.

Carboplate is quick and easy to install on site.

Because of its degree of flexibility, **Carboplate** can be used to line cylindrical structures (basins, storage bins, holding tanks, etc.) with a bending radius greater than 3 metres.

RECOMMENDATIONS

- Before bonding, make sure that the concrete substrate has a tensile strength > 1.5 MPa.
- Do not use **Carboplate** on concrete that is not cured.

APPLICATION PROCEDURE

Preparing the concrete substrate

The surface must be perfectly clean, dry, mechanically strong and smooth (must not have uneven areas more than 1 mm).

All traces of form-release agents, varnishes, paints and cement laitance must be removed from the substrate by sandblasting.

If the concrete has deteriorated in depth, remove the damaged parts by manual or mechanical or by hidro-scarifying pneumatic bush hammering.

Remove all traces of rust from metal reinforcement rods and protect with **Mapefer**, a corrosion-inhibiting cement mortar (follow application methods described in the product's technical data sheet).

Repair the concrete surfaces with products from the **Mapegrout** line.

Carboplate should be used only on fully cured substrates.

If reinforcement must to be carried out immediately, use epoxy mortar **Adesilex PG1** to repair the deteriorated concrete.

Products to use for bonding

In temperatures between +5°C and +20°C, use **Adesilex PG1**.

Adesilex PG2 should be used in temperatures above +20°C because it has longer workability.

Preparing the product

Mix together the two components of **Adesilex PG1**.

Pour Part B into Part A and mix with a drill fitted with a stirrer until the mix is perfectly smooth and even (the same grey throughout).

The components are already in correct proportions. Do not use part quantities.

Bonding the Carboplate

- **Carboplate** comes in rolls that must be cut on site according to the desired length with an electric saw fitted with a diamond blade.
- During its manufacturing, the side of **Carboplate** that will be bonded is protected by a plastic sheet. This material protects the plate from dirt while cutting.
- Before bonding, this sheet must be removed from the **Carboplate**. The adhesive can now be applied on the plate.
- Apply a uniform 1-1.5 mm thick layer of **Adesilex PG1** with a flat trowel over the **Carboplate** on the side where the protective sheet has been removed.
- Apply a layer of adhesive also on the substrate (that must be clean and dry) that will receive the plate.
- Install the **Carboplate** applying constant pressure over the whole surface. Use a stiff rubber roller and remove the excess resin with a trowel paying attention not to move the plate.
- For plating curved structures, it is necessary to use clamps or supports to hold the plates in place until the resin has completely hardened (usually 24 hours before removing the temporary supports).
- If more layers of **Carboplate** are necessary, sandpaper the smooth side of the already installed plate once **Adesilex PG1** has set before installing the next plate.

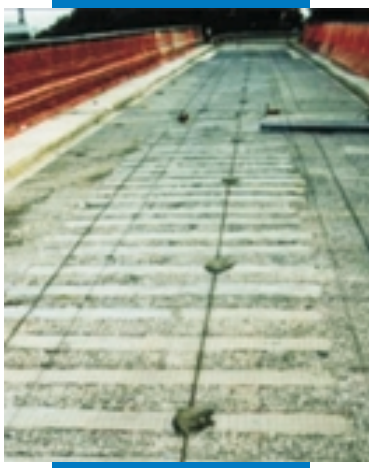
The surface plated with **Carboplate** can be protected with **Mapelastic, Elastocolor** or with a fire resistant paint. The protection coat can be applied 24 hours after the installation of the plates.

Cleaning

Due to the high bonding strength of **Adesilex PG1** and **Adesilex PG2** on metal, it is recommended to clean all tool with solvents (ethyl alcohol, toluene etc.) before the product drys.

TECHNICAL DATA (typical values)

PRODUCT IDENTITY						
Matrix:	epoxy resin					
Reinforcement:	high resistance carbon fibres					
Colour:	black					
PRODUCT CHARACTERISTICS						
	Carboplate E 170			**Carboplate E 250**		
Density (g/cm³):	1.61			1.61		
Fibre content (%):	68			65		
Thickness (mm):	1.4			1.4		
Width (mm):	50	100	150	50	100	150
Resistant section (mm²):	70	140	210	70	140	210
Weight (g/m):	113	225	338	113	225	338
FINAL PERFORMANCES						
Tensile strength (MPa):	≥ 3100			2500		
Modulus of elasticity (GPa):	170			235		
Ultimate elongation (%):	2			0.9		
Shearing strength (MPa):	77			79		
Coefficient of expansion (m/m/°C):	0.6×10^{-6}			0.4×10^{-6}		



Carboplate covered with Mapegrout BM

Applying the epoxy primer

The repaired bridge-deck

PACKAGING
Carboplate is available in 50 m rolls of the following sizes:

– 50 x 1.4 mm
– 100 x 1.4 mm
– 150 x 1.4 mm

COVERAGE OF ADHESIVE
The coverage of **Adesilex PG1** or **Adesilex PG2** depends on the width of the **Carboplate** plates; approximately the following:
– 50 mm plate: approximately 60-200 g/m;
– 100 mm plate: approximately 320-350 g/m;
– 150 mm plate: approximately 480-550 g/m;

STORAGE
Store in a sheltered dry place.

WARNING
N.B. - Although the technical details and recommendations contained in this product report 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 applications: 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.

Carboplate

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1001-6-2001

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