

# MBRACE<sup>®</sup> LAMINATE

## LM, MM & HM

Ready to Use Carbon Laminates (Fibre Reinforced Polymer) for the Reinforcement of Concrete, Metal and Wood Members with Mbrace<sup>®</sup> FRP 'Laminate' System

### Description of Product

MBRACE<sup>®</sup> LAMINATE is a ready to use pultruded carbon LAMINATE that provides a high tensile strength (that is higher than steel bars used in the precast industry) and is indicated for flexural reinforcement (plate bonding) of concrete, metal and wood members with MBRACE<sup>®</sup> FRP LAMINATE system.

### Features and Benefits

To reinforce affected structures with strong elements in taut areas (plating) MBRACE<sup>®</sup> FRP LAMINATE enables the traditional technique of plating with steel plates to be replaced with extremely light materials that are easy to install (plate bonding) and to:

- Reduce deformation to the working loads (increase in rigidity).
- Increase the load-bearing capacity (e.g. structural conversion following a change in capacity load).
- Increase the fatigue strength.
- Limit or cover the fissuring states (increase in durability).
- All laminates are supplied with peel ply to both faces which gives better adhesion to the substrate and to the subsequent coatings.

The MBRACE<sup>®</sup> FRP LAMINATE also:

- Enables the amount of reinforcement to be calculated in relation to the performance required or the stress flow.
- Allows faster maintenance, thereby reducing costs.
- Increases the durability of the structure by protecting it against the aggressive action of chlorides and freezing and thawing cycles.

### Technical Data/Typical Properties

Performance of MBRACE <sup>®</sup> FRP LAMINATES					
	LM		MM		HM
Typical tensile strength	2100 MPa		3100 MPa		2500 MPa
Typical tensile modulus	160 GPa		170 GPa		260 GPa
Width	50 mm	100 mm	120 mm	150 mm	
Thickness	1.2 mm	1.4 mm	1.4 mm	1.4 mm	
Elongation at break %	1.3		1.9		0.95
Fibre content %	65		70		68
Density g/cm <sup>3</sup>	1.54		1.61		1.61
Inter Laminar Shear Strength	70 MPa		70 MPa		79 MPa
Thermal Expansion m/mm/°C	0.6 x 10 <sup>-6</sup>		0.6 x 10 <sup>-6</sup>		0.4 x 10 <sup>-6</sup>



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Note:

Values above are typical mean values obtained from regular testing. Some variation may occur dependant on batch, size, and test method sensitivity. Allowance should be made for this in the design process.

The designer is advised to satisfy himself, by prior testing if necessary, that the grade chosen will conform to the performance criteria for his specific design.

Application Procedure

Preparation of Substrate

The surfaces of elements that are still in good condition or restored with putty from the MBRACE® RANGE should be sanded down. With degraded structures, the whole damaged area should be removed by scarifying, hydrodemolition or such like and then structural restoration carried out with mortar of the EMACO® range of products.

Remove oils, grease, dust or any other loose material from the surface.

Application

Apply one coat of MBRACE® PRIMER by roller or brush and wait until dry to apply the second coat.

If necessary, apply a coat of MBRACE® PUTTY using a putty knife, to fill any blow holes or imperfections to the concrete or timber surfaces.

Remove protective peel ply film from surface of LAMINATE to be adhered.

If the grade of LAMINATE being used does not have a peel ply surface then clean up the LAMINATE surface with suitable solvent (MEK or Acetone).

Apply one layer of MBRACE® LAMINATE ADHESIVE 1 – 1.5 mm thick on both the surfaces (concrete and LAMINATE).

Apply MBRACE® LAMINATE and using the correct roller, exert a constant pressure by moving the tool both ways in the direction of the fibres.

Clean up.

Packaging

Available in rolls 30 Kg in weight

Storage

Store at ambient temperatures, out of direct sunlight, in cool, dry warehouse conditions.

Shelf Life

Up to 12 months if stored according to manufacturer's instructions.

Watchpoints

Design and detailed specification should be carried out by appropriately qualified and competent person(s).

Installation should only be carried out by trained and experienced specialist contractors. Site quality control should be the responsibility of an independent organisation appointed by the client or his representatives.

Surfaces exposed to U.V. rays should be protected within two days (maximum seven days) with a selected product from the MASTERSEAL® line in order to ensure perfect bonding between the protective layer and FRP.

Technical details of adhesives, primers and coatings can be found on the technical data sheets for the respective products.

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### Health and Safety

\*For full information on Health and Safety matters regarding this product the relevant Health and Safety Data Sheet should be consulted.

The following general comments apply to all products.

As with all chemical products, care should be taken during use and storage to avoid contact with eyes, mouth, skin and foodstuffs, (which may also be tainted with vapour until the product is fully cured and dried). Treat splashes to eyes and skin immediately. If accidentally ingested, seek medical attention. Keep away from children and animals. Reseal containers after use.

### Solvent Based Products

Use in well ventilated areas; avoid inhaling. Suitable respiratory equipment may be needed, eg when spraying. Can cause skin, eye irritation. Wear protective eye shields and gloves during use. Do not smoke or allow sparks or naked lights when stored or in use.

### Powder Products

Should be handled to minimise dust formation; use light mask if excessive dust unavoidable. Cement powders when wet or moistened can cause burns to skin and eyes which should be protected during use.

### Resin Products

Can cause irritation, dermatitis or allergic reaction. Use protective equipment particularly for skin and eyes. Use only in well ventilated areas.

### Spillage

Chemical products can cause damage; clean spillage immediately.

### Disclaimer:

This information and all further technical advice is based on our present knowledge and experience. However, it implies no liability or other legal responsibility on our part, including with regard to existing third party intellectual property rights, especially patent rights. In particular, no warranty, whether express or implied, or guarantee of product properties in the legal sense is intended or implied. We reserve the right to make any changes according to technological progress or further developments. The customer is not released from the obligation to conduct careful inspection and testing of incoming goods. Performance of the product described herein should be verified by testing, which should be carried out only by qualified experts in the sole responsibility of a customer. Reference to trade names used by other companies is neither a recommendation, nor does it imply that similar products could not be used.