

MBRACE® FRP Composite Strengthening Systems

Fibre Reinforced Polymer (FRP) composite systems for the external reinforcement of concrete, masonry and timber elements

DESCRIPTION

The **MBRACE FRP Composite Strengthening System** is a family of lightweight FRP materials, externally bonded to the surface of structures. They comprise of either ready to use **carbon laminate** adhered directly to the surface or **carbon, aramid or glass fibre sheets** impregnated in-situ, with a saturant resin system, on the substrate surface. **MBRACE FRP** systems provide very high tensile strength and are utilised for flexural and shear reinforcement and axial compression confinement of concrete, masonry and timber elements.

The system consists of the following components:

- **MBRACE Primer** – improves the bonding of the composite to the substrate.
- **CONCRECISE 1444/1446** to even out any imperfections in the base (pitting, macro roughness etc.)
- **MBRACE Saturant** for wetting out the fibre sheet materials in a “Dry or Wet Lay-Up”, to form the composite in-situ.
- **MBRACE Resicem Saturant** for wetting out the fibre sheet materials in a “Dry or Wet Lay-Up”, to form the composite in-situ, which is vapour permeable.
- **MBRACE Laminate Adhesive** for adhesion of carbon laminates (and a levelling compound).
- **MBRACE Fibre (Carbon, Aramid or Glass)** fibre sheet reinforcement for “Dry or Wet Lay-Up.”
- **MBRACE Laminate** prefabricated composite carbon fibre laminate.
- **Barracryl D** acrylic topcoat, resistant to UV rays.



FEATURES AND BENEFITS

MBRACE FRP systems enable the traditional strengthening techniques such as plating with steel plates or increasing section dimensions, to be reconsidered.

MBRACE FRP materials are:

- **High strength** – 5 to 10 times steel
- **Lightweight** – normally < 1 kg/m²
- **Easy and quick to install** – reduced labour costs
- **Non corrosive** – high durability
- **Cost-effective** – lower installed costs
- **Versatile** – different forms available
- **Thin and inconspicuous** – aesthetic results

MBRACE FRP systems provide a strength increase in:

- **Flexure** – Fibre Sheets and Laminate
- **Shear** – Fibre Sheets
- **Axial Confinement** – Fibre Sheets
- **Seismic (Earthquake)** – Fibre Sheets
- **Impact Resistance** – Fibre Sheets

MBRACE FRP systems can provide:

- **An increase in load-bearing capacity** (e.g. in structural conversion, following a change in load capacity).
- **A reduced deflection due to serviceability/working loads** (increase in rigidity/stiffness).
- **An increase in structure fatigue strength.**
- **An ability to limit or assist in crack control** (increase in durability from chlorides and freeze/thaw).
- **An exact amount of reinforcement to be calculated and placed in relation to the performance required or the flow of stress.**
- **Less and faster maintenance**- thereby reducing long-term, ongoing costs.

MBRACE FRP systems may be used on:

- Concrete, Masonry, Timber, Steel

MBRACE FRP systems have typically been used for:

- Beams, Slabs and Walls for flexure
- Beams and Walls for shear
- Slabs and Walls for trimming around penetrations
- Silos and Tanks for crack control and increased capacity
- Poles and chimneys for lateral load resistance
- Marine Structures for increased durability
- Blast and Impact Resistance
- Historic masonry structures to supplement inherent low strength materials
- High ductility against seismic and dynamic stress

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APPLICATION

- Ensure the substrate has an inherent tensile strength of at least 1.0MPa for sheet materials and 1.5MPa for laminate materials.
- Angle grind, grit blast, or needle gun repair surfaces, to remove smooth, cement paste rich surface (laitance) and ensure aggregate is exposed and the substrate surface has a sufficient profile.
- Remove oils, grease, dust or any other loose material from the surface that may impair adhesion.
- Apply a layer of **MBRACE Primer** by roller or brush.
- If necessary, apply a coat of **CONGRESIVE 1444** to ensure surfaces are within allowable levelness and flatness tolerances.

MBRACE FRP FABRIC SHEET "DRY LAY-UP"

- The first coat of **MBRACE Saturant** may be applied by brush or by roller, over the still tacky **MBRACE Primer**.
- Apply **MBRACE Fibre** and remove air by rolling with a ribbed roller in the fibre direction only.
- Apply a second coat of **MBRACE Saturant** using a roller, working in the direction of the fibre.
- Ensure complete wet-out of the fibre by using a squeegee to remove excess **MBRACE Saturant**.
- Repeat the last four steps for subsequent layers of **MBRACE Fibre**.

MBRACE FRP CARBON FIBRE LAMINATE

- Remove the "peel ply" protection layer from the **MBRACE Laminate**
- Apply one layer of **MBRACE Laminate Adhesive** 1-1.5mm thick on the substrate and laminate surfaces.

- Apply **MBRACE Laminate** and using a hard rubber roller, exert a constant pressure by moving the tool both ways in the direction of the fibres to remove excess air.

For more information about application, please obtain a copy of the BASF "Application Guide for MBRACE FRP Fabric (Sheet) Materials and MBRACE Laminates" from your local representative.

PRECAUTIONS

For the full health and safety hazard information and how to safely handle and use this product, please make sure that you obtain a copy of the BASF Construction Chemicals **Material Safety Data Sheet (MSDS)** from our office or our website.



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STATEMENT OF RESPONSIBILITY

The technical information and application advice given in this **BASF** publication are based on the present state of our best scientific and practical knowledge. As the information herein is of a general nature, no assumption can be made as to a product's suitability for a particular use or application and no warranty as to its accuracy, reliability or completeness either expressed or implied is given other than those required by law. The user is responsible for checking the suitability of products for their intended use.

NOTE

Field service where provided does not constitute supervisory responsibility. Suggestions made by **BASF** either orally or in writing may be followed, modified or rejected by the owner, engineer or contractor since they, and not **BASF**, are responsible for carrying out procedures appropriate to a specific application.

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