

MBRACE[®] FIBRE

The MBrace Fibre System is a Fibre Reinforced Polymer (FRP) system for structural strengthening of concrete and timber structures. The system comprises of Carbon, Aramid or Glass fibre sheeting enveloped in a site applied MBrace Saturant epoxy.

DESCRIPTION

MBrace Fibre sheet reinforcement materials are enveloped in **MBrace Saturant** resin to yield a range of high performance composites with many features.

The **MBrace Fibre** Reinforcement Systems include:

- **MBrace Fibre CF 230/4900** and **MBrace Fibre CF 640/2650** uni-directional tow sheet carbon fibres.
- **MBrace Fibre AR 120/2900** uni-directional aramid fibres.
- **MBrace Fibre GE 73/3400 & GA 65/3000** bi-directional glass fibres.

Each type of fibre used within the finished **MBrace Fibre Reinforced Polymer (FRP)** system, permits high strength to cross section ratio, and structural integrity as an alternative to bonding steel plates to concrete, masonry, timber and steel surfaces.

RECOMMENDED FOR

- Flexural and shear strengthening elements that may not be planar (flat)
- Increasing compressive strength via axial confinement of columns
- Seismic retrofitting of columns and piles for earthquake resistance
- Enhancement of fatigue resistance under repetitive loading conditions
- Walls, beams, slabs, silos, chimneys, tanks, pipes, tunnels, piles etc

FEATURES AND BENEFITS

MBrace Fibres (in general)

- Lightweight (Easy to apply)
- Durable (non corroding)
- Control of crack propagation
- High strength to thickness ratio (non-obtrusive)
- Used with MBrace Resicem Saturant when breathability is required
- Colours: Carbon Fibre – Black, Aramid Fibre – Yellow, Glass Fibre - White

MBrace Carbon Fibre

- Increased strength particularly for
 - Flexure, Shear, Confinement & Fatigue enhancement
 - End anchoring of MBrace Laminates

MBrace Aramid Fibre

- Increased strength particularly for
 - Impact resistance
 - Blast (Explosion) resistance

MBrace Glass Fibre

- Low modulus ideal for Seismic (Earthquake) Retrofitting
- Retrofit of masonry structures or low strength substrates
- “AR” type for alkali resistant requirements

PERFORMANCE DATA

MBrace Fibre AR 120/2900 (High Impact strength Aramid Fibre (AR) Reinforcement)

Fibre Reinforcement	Aramid
Fibre Density	1.45 g/cm ³
Fibre Modulus	120 GPa
Fibre Weight (g/m ²)	
MBrace Fibre AR 120/2900 290/30	290
MBrace Fibre AR 120/2900 420/30	420 g/m ²
Thickness ⁽¹⁾	
290, 420 g/m ²	0.200, 0.290 mm
Ultimate Tensile Strength ⁽²⁾	2,900 MPa
Ultimate Tensile Elongation (strain)	2.5%
Ult Tensile force ⁽³⁾ (@ ult. strain /m width (in kN))	MBrace Fibre AR 120/2900 290/30: 446 kN MBrace Fibre AR 120/2900 20/30: 647 kN
Roll Length	150 m
Sheet Width	300 mm

MBrace Fibre GE 73/3400 & GA 65/3000

E-Glass (GE) & AR-Glass (GA) Reinforcement

Fibre Reinforcement	GE or (GA-Glass)
Fibre Density	2.6 (2.68) g/cm ³
Fibre Modulus	73 (65) GPa
Fibre Weight	
GE 73/3400 & GA 65/3000 50/50	(both directions) 175 /m ²
GE 73/3400 & GA 65/3000 90/10A	(main direction) 400 g/m ²
GE 73/3400 & GA 65/3000 90/10B	(main direction) 800 g/m ²
Thickness (1)	
GE 73/3400 & GA 65/3000 50/50	0.067 (0.065) mm
GE 73/3400 & GA 65/3000 90/10A	0.154 (0.149) mm
GE 73/3400 & GA 65/3000 90/10B	0.308 (0.299) mm
Ult Tensile Strength Fibre ⁽²⁾	3,400 (3,000) MPa
Ult Tensile Strength Impregnated Fibre ⁽⁴⁾	2,400 (1,700) MPa
Ultimate Tensile Elongation (strain)	4.5 (4.3)%
Tensile force (3) (@ ult. strain /m width (in kN)) GE 73/3400 & GA 65/3000 50/50	(both directions) 115 (79)
GE 73/3400 & GA 65/3000 90/10A	(main direction) 264 (181)
GE 73/3400 & GA 65/3000 90/10B	(main direction) 528 (362)
Roll Length	50 m
Sheet Width	670 mm

MBrace Fibre CF 640/2650 (High Modulus CF)

Fibre Reinforcement	Carbon - High Modulus
Fibre Density (minimum)	2.1 g/cm ³
Fibre Modulus	640 GPa
Fibre Aeral Weight (carbon fibre only)	400 g/m ²
Thickness ⁽¹⁾	0.19 mm
Ultimate Tensile Strength ⁽²⁾	2650 Mpa
Ultimate Tensile Elongation (strain)	0.4%
Design tensile force ⁽³⁾ (@ 0.2% strain /m width)	200 kN
Roll Length	50 m
Sheet Width	300 mm



The Chemical Company

MBRACE® FIBRE

MBrace CF 230/4900 (High Tensile CF)

Fibre Reinforcement	Carbon – High Tensile
Fibre Density (minimum)	1.76 g/cm ³
Fibre Modulus	230 GPa
Fibre Aeral Weight (carbon fibre only)	
MBrace Fibre CF 230/4900	200, 300, 400, 600 g/m2
Thickness ⁽¹⁾	
MBrace Fibre CF 230/4900 200/30	0.114 mm
MBrace Fibre CF 230/4900 300/30	0.17 mm
MBrace Fibre CF 230/4900 400/30	0.227 mm
MBrace Fibre CF 230/4900 600/30	0.34 mm
Ultimate Tensile Strength ⁽²⁾	4,900 MPa
Ultimate Tensile Elongation (strain)	2.1 %
Design tensile force ⁽³⁾ (@ 0.7% strain /m width)	
200, 300, 400, 600 g/m2	186, 277, 370, 555 kN
Roll Length (All)	100 m
Sheet Width	300 mm typical (or 500 mm on order)

Notes:

⁽¹⁾ Design thickness (mm/ply) is based on the total thickness of fibres (only) in a unit width. It is calculated by dividing the fibre weight by the density. The actual cured thickness of fibre with saturant is on average between 0.6 to 1.0 mm/layer.

⁽²⁾ Fibre tensile strength (MPa) and tensile modulus (GPa) are derived from the strength or modulus per sheet width divided by the design thickness. ^{(3),(4)} Allowable tensile strengths/forces for design include various safety and reduction factors (0.8), based on design loading and application conditions. Refer to design procedures for full details.

Values given in the Performance Data table are mean values obtained from regular, quality assurance testing. Some variation may occur dependant on batch, size, and test method sensitivity. Allowance should be made for this in the design process. The structural designer is advised to satisfy themselves, by prior testing if necessary, that the grade chosen will conform to the performance criteria for their specific design requirements.

APPLICATION (Brief Instructions)

For detailed instructions, refer to the “MBrace Application Guidelines for FRP Fabric (Sheet) Materials” document. Fibres must be completely saturated in resin. Carry out work only under appropriate environmental conditions.

PACKAGING

Refer to specific material Performance Data tables for details.

MAINTENANCE

Periodically inspect the applied material and repair localised areas as needed. Consult your BASF Construction Chemicals representative for additional information. These products are for professional and industrial use only; application directions must be followed.

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.

Store in cool, dry area 10 to 32°C away from direct sunlight, flame or other hazards. Do not bend fibres or they may break and become unusable.

SPECIFICATIONS

Professional consulting engineers and designers may also make use of standard specification details. Please make sure that you obtain a copy of the “MBrace Fabric Specification” from your local office.

MBrace Fabric is typically designated on drawings as per the example below:

“Apply two layers of **MBrace Fibre CF 230/4900** carbon fibre x 300 mm wide, positioned at 600 mm centres x 8000 mm long, as located on the drawings. Typical installation is to be in accordance with manufacturer’s recommendations.”

SMBraceFib/9/0910

STATEMENT OF RESPONSIBILITY

The technical information and application advice given in this **BASF Construction Chemicals** 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. **BASF Construction Chemicals data sheets are updated on a regular basis and it is the user's responsibility to obtain the most recent issue.**

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 Construction Chemicals**, are responsible for carrying out procedures appropriate to a specific application.

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