ARMOFIX MTL

TWO-COMPONENT EPOXY RESIN FOR STRUCTURAL BONDING OF ARMOSHIELD CFK CARBON FIBRE SHEETS AND ANCHORING OF CARBON AND STEEL BARS EVEN IN OVERHEAD APPLICATIONS

DRACO

REFURBISHMENT and PROTECTION LINE

GROUTING AND ANCHORING SOLUTIONS

CE EN 1504-4 · CE EN 1504-6 · STRUCTURAL BONDING STEEL and CONCRETE · GROUTING and GLUING 2 IN 1 · NEW! NEW FORMULA · CHEMICAL RESISTANCE · DRACO STRUCTURAL REINFORCEMENT SYSYEM · CVT N° 11.25-01-19

ARMOFIX MTL is a two-component epoxy resin-based adhesive made of selected fine-grained aggregates and thixotropic agents specifically designed for gluing ARMOSHIELD CFK pultruded carbon fibre sheets and anchoring ARMOSHIELD BC carbon bars and ARMOGRIP connectors. **ARMOFIX MTL** ensures high adhesion to all building materials. It can be used for bonding and structural reinforcement, structural anchoring of composite or steel bars and steel plates (beton plaque technique).

ADVANTAGES

- ✓ **High adhesion** to building materials such as concrete, masonry, wood, steel and natural stone.
- ✓ **High mechanical strength and monolithic bonding**.
- ✓ **Structural bonding:** ARMOFIX MTL is a highly impregnating thixotropic adhesive ideal for structural bonding.
- ✓ **Durability:** ARMOFIX MTL is highly resistant to water, salts, hydrocarbons, aggressive acidic, alkaline and saline solutions and aging.
- ✓ **Injectability:** is a plastic-like adhesive that can be easily injected using a peristaltic pump into support micro nails and macro nails like big tie rods, even in difficult, moist and loose soil, controlling the permeation front.

USES

- ✓ Gluing of ARMOSHIELD CFK composite carbon fibre sheets and steel plates for structural reinforcement.
- ✓ Repair of deteriorated supports by restoring profiles and reconstructing joint edges, sealing and repairing cracks even wider than 1 cm, ensuring monolithic performance.
- ✓ Structural anchoring of horizontal and overhead panel anchors, nails and support bars.
- ✓ Grouting of tie rods into concrete, even in watery soils.
- ✓ Bonding of steel elements using the “beton plaqué” technique.

SUBSTRATE PREPARATION

STRUCTURAL REINFORCEMENT WITH COMPOSITE SHEETS OR STEEL PLATES

The structural reinforcement application cycle with ARMOSHIELD CFK strips or steel plates requires a thoroughly prepared substrate. Roughen the concrete surface by sandblasting or heavy brushing. The substrate must be dry (< 4% humidity) and with no oil, grease or loose parts. The surface must be dust-free. In case of heavily deteriorated substrates, it is necessary to restore the volume with highly resistant FLUECO mortars. It is possible to use **ARMOFIX MTL** to restore edges or repair macro cracks, while in case of micro cracks you should use EPOX INIEZIONE RM2 or RM3. Surface height difference must not exceed 5 mm in 2 metres. Apply ARMOPRIMER 100 with a roller or brush, and then apply ARMOFIX MTL within 16 hours.

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NAILING

Remove dust from the holes using compressed air or a pressure washer. The hole sections must have regular geometries. If the profiles are irregular (volume loss lower than 2 cm), repair the profile using **ARMOFIX MTL**. In case of bigger volume loss, use a FLUECO mortar.

PRODUCT PREPARATION

ARMOFIX MTL is made of:
A – epoxy resin
B – amine hardener

Mix component B until it is homogeneous and pour it into component A pail. Mix with a low-speed drill or suitable mixer until a homogeneous consistency is reached. Using only part of the components is advised against: an incorrect mix ratio can result in improper curing.

PRECAUTIONS IN HOT CLIMATES

- Store ARMOFIX MTL away from direct sunlight.
- Work in the mildest hours of the day.
- Do not work at ambient temperatures above +35°C.

PRECAUTIONS IN COLD CLIMATES

- Store ARMOFIX MTX in a sheltered frost-free place.
- Start work in the warmest hours of the day after ensuring the substrate temperature is at least 8°C.

APPLICATION INSTRUCTIONS

STRUCTURAL REINFORCEMENT WITH COMPOSITE SHEETS OR STEEL PLATES

ARMOFIX MTL can be applied by trowel within 24 hours from the application of ARMOPRIMER 100, at a temperature between 8 and 35°C. Apply a 1 to 3 mm-thick layer of **ARMOFIX MTL** adhesive onto the dry and clean surface and on the side of the sheet to be glued to the support. Then place ARMOSHIELD CFK sheets or steel plates - after properly cleaning them as indicated in the technical data sheet - onto the treated surface. Press them down firmly even by using clamps to ensure proper adhesion.

NAILING

After preparing the substrate and box section or nails to be grouted, inject **ARMOFIX MTL** into the injection pipes using a peristaltic pump, until voids are filled. Start from the bottom so that air can come out and voids can be filled with **ARMOFIX MTL**. If the product goes to the surrounding areas, like for instance in the presence of cracks, lower the injection pressure and remove any residue of **ARMOFIX MTL** from the pipe with compressed air. Wait for at least 3 hours, then continue to inject gradually.

PANEL ANCHORS OR MICRO NAILS

Thoroughly clean the hole and inject **ARMOFIX MTL** resin. Then place the panel anchor or anchor bar by pushing it into the resin with a rotational movement. In overhead nailing applications, if the injected resin is quite thick, it may be useful to press the steel connector to one side so that it is embedded into the hole and cannot move before the resin has completely hardened.

PRECAUTIONS

Wear rubber gloves and goggles both while working and while cleaning tools. Avoid contact of skin, mucous membranes and eyes with the resin. In case of accidental contact, wash thoroughly with neutral soap and water. Do not apply on frozen or wet substrates.

CONSUMPTIONS

Product consumption depends on project specifications. For the application of 1 sq m of ARMOSHIELD CFK sheets we recommend using approximately 1.50-1.70 kg of ARMOFIX MTL resin per mm of thickness.

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PACKAGING AND STORAGE

ARMOFIX MTL is available in the following container sizes:

2.5 kg + 2.5 kg = (A+B) 5 kg pails

5 kg + 5 kg = (A+B) 10 kg pails

If stored properly in undamaged unopened, original packaging, in dry conditions at temperatures between +8 and +35°C, the product maintains its characteristics for a year.

PRODUCT CHARACTERISTICS

APPEARANCE	paste
MXING RATIO	1:1
CONSISTENCE	thixotropic
DENSITY - UNI EN ISO 2811-1	1.65 g/cm^3
SHELF LIFE	12 months
PACKAGING	2.5 kg + 2.5 kg pails 5 kg + 5 kg pails

APPLICATION SPECIFICATIONS (+20 °C and 65% R.H.)

MIX COLOUR	grey
BULK DENSITY - UNI EN ISO 1675 (*)	1.5 g/ml
WORKING LIFE AT 23°C	80 min.
OPEN TIME - UNI EN 12189	120 s.
SET TIME AT 20 °C	approx. 4-5 hours
FULL CURE TIME AT 20 °C	10 days
APPLICATION TEMPERATURE	+8 °C to + 35 °C
APPLICATION THICKNESS	Gluing of sheets and plates: 1-3 mm Nailing: up to 20 cm
CONSUMPTION	1.65 kg/m^2 per mm of thickness

(*) Official tests certified by an independent laboratory.

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PERFORMANCE CHARACTERISTICS (+20 °C and 65% R.H.)

PERFORMANCE CHARACTERISTIC	TEST METHOD	REQUIREMENTS (EN 1504-4)	PRODUCT PERFORMANCE
COMPRESSIVE STRENGTH	UNI EN 12190	≥ 30 MPa	55 MPa
MODULUS OF ELASTICITY IN FLEXURE	UNI EN ISO 178	≥ 2000 N/mm^2	6100 MPa
SHEAR RESISTANCE	UNI EN 12188	≥ 12 MPa	19.4 MPa
MODULUS OF ELASTICITY IN COMPRESSION	UNI EN 13412	≥ 2000 N/mm^2	6500 MPa
GLASS TRANSITION TEMPERATURE (*)	UNI EN 12614	≥ 40°C	57.6°C
COEFFICIENT OF THERMAL EXPANSION (*)	UNI EN1770	≤ 100 × 10^{-6} for K	18x10^{-6}/K
SHRINKAGE AFTER CURING	UNI EN 12617-1	≤ 0.1%	0.04%
SUITABILITY FOR INJECTION	UNI EN 12618-2	Cohesive fracture in concrete substrate	Meets specification
BOND STRENGTH TO CONCRETE TYPE MC (0.40) - EN 1766 (*)	UNI EN12636	Cohesive fracture in concrete substrate	Meets specification - Substrate fracture (4.17 MPa)
SHEAR DURABILITY AFTER TEMPERATURE-HUMIDITY CYCLES	UNI EN 13733	Compressive shear stress > tensile strength of the concrete. No rupture in steel test specimens	Meets specification
ANCHORING OF REINFORCING STEEL BAR (UNI EN 1504-6)			
PULL-OUT Testing of anchoring products by pull-out method from wet concrete substrate MC 0.4 (EN1766) - Hole Ø 20 mm; bar length 150 mm; bar Ø 16 mm	UNI EN 1881	Pull-out ≤ 0.6mm at load of 75 kN	Ultimate strength > 135 kN (bar rupture) Pull-out at 75 kN < 0.35 mm
CREEP UNDER CONTINUOUS LOAD for polymer products PC - Hole Ø 20 mm; bar length 150 mm; bar Ø 16 mm	UNI EN 1544	Displacement ≤ 0.6 mm after continuous loading of 50 kN for 3 months	Load 75 kN Pull-out at 75 kN after 90 days < 0.38mm
OTHER PROPERTIES			
TENSILE STRENGTH (*)	UNI EN ISO 527	13 MPa	
TENSILE MODULUS OF ELASTICITY (*)	UNI EN ISO 527	2824 MPa	
ADHESION TO STEEL (*)	UNI EN 12188	20.01 MPa	

(*) Official tests certified by an independent laboratory.

SPECIFICATIONS ITEM

ARMOFIX MTL structural thixotropic adhesive to be applied on concrete, iron, wood etc. surfaces for the structural bonding of ARMOSHIELD CFK pultruded carbon fibre sheets or steel plates among the elements. The product must ensure excellent resistance to water, oils, petrol, aggressive acidic and alkaline solutions and saline solutions. The product can also be applied on moist surfaces. **ARMOFIX MTL** is suitable for overhead structural nailing and panel anchoring. The product must be applied following the instructions contained in the APPLICATION INSTRUCTIONS. **ARMOFIX MTL** must be used following the recommendations of the manufacturer DRACO Italiana S.p.A. which will provide technical assistance upon request.

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