

REINFORCED FREEDOM

Basalt FRP Macrofiber MiniBars™
Enabling innovation in concrete structures.
Light! Flexible! Strong!



ReforceTech™
Basalt Fiber Reinforcement Technology

Enabling innovation in concrete structures. Light! Flexible! Strong!

Key MiniBar™ Properties

Basalt Fibre Reinforced Polymer MiniBars™ possess ideal properties for strengthening concrete, grouts and mortars to realize tensile strength capacity or Pre-Reinforced Concrete.



Density

- MiniBars™ are made from Basalt rocks transformed into fibre and bonded into a unique helix shape with a density of 2.1G/cc which is in the same range as the concrete mix.
- ¼ the density of steel
- Enables easy workable concrete
- Pumpable
- Do not float
- Do not sink



Corrosion Resistance

- MiniBars™ are made from Basalt rock a natural material and bonded with a matrix with the highest chemical and alkaline resistance available.
- Tested at IBAC RWTH University of Aachen and University of Florida.
- Meets Florida Department of Transportation standards for ARS after accelerated aging.
- Zero Conductivity.



Continuous Bond

- High Tensile Strength and Bond with Concrete.
- MiniBars™ have tensile strength that is two times greater than the yield point of steel.
- The bonding mechanisms are the critical feature of the MiniBars™.
- Bond Length can be varied for different grades of concrete
- Helix Pitch is optimized for grades of concrete and optimized aggregate size.
- The rough surface bonds with the concrete.
- Tested at University of Akron, Norwegian University of Science and Technology, IBAC RWTH University of Aachen and University of Florida.
- Increases Flexural Tensile Strength and Average Residual Strength.

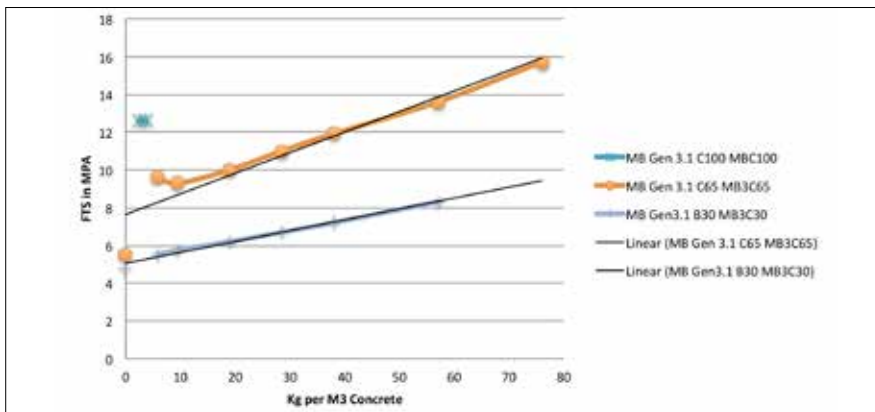
Innovative Applications with MiniBars™

Inner Walls • Façade Panels in situ & precast • Pavements • Floating Infrastructure • Bridge Decks and Beams • Roofing Tiles • Tunnel Elements • Barrier Walls • EPS Block Walls • Power Poles • Barrier Poles • Balconies • Agricultural Products • Seawalls • Jet Piles and Diaphragm walls • Sea Weights

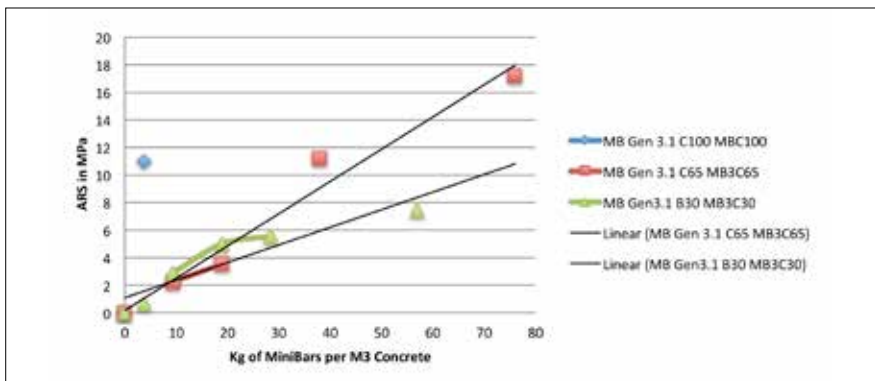


Hardened Concrete Properties

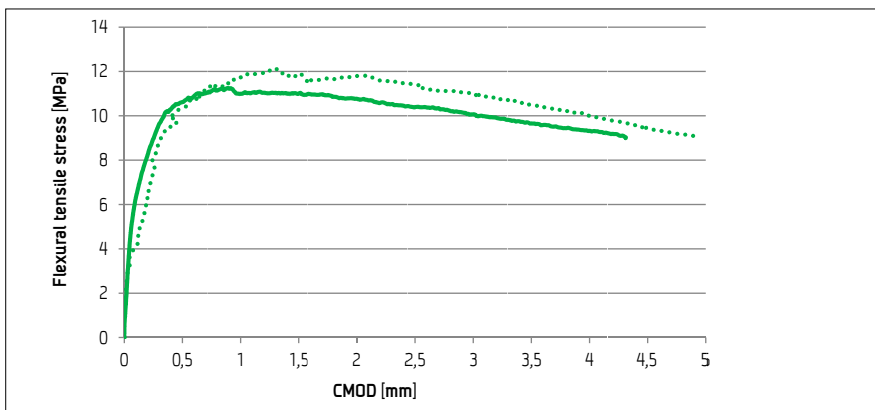
MiniBars™ greatly increase concrete's tensile behaviour leading to Pre-Reinforced™ Concrete



ASTM C 78 Flexural Tensile Strength MPa per Kg of MiniBars per M3 Concrete



ASTM C1399 Average Residual Tensile Strength MPa per Kg of MiniBars per M3 Concrete For 3 grades of concrete



EN 14651 at 2 % VF

Flexural Tensile Strength

- MiniBars™ mixed in concrete lead to a network of randomly placed fibres throughout the concrete.
- As the load is applied to the concrete the MiniBars™ act as crack control and distribute the load through out the beam.
- Increases the Flexural Tensile Strength of the concrete.
- Increases the Average Residual Strength of the concrete.
- Independent testing by University of Akron, Aachen University, Norwegian University of Science and Technology, University of Florida.
- Enhances:
 - Fatigue Behaviour
 - Creep Behaviour
 - Shock Resistance
 - Ductility



MiniBars™ Types, Dosage recommendations

MiniBar™ Properties, Certifications ISO 9001:2008



High Performance Concrete C100 plus

20 mm length Roughly 60,000 MiniBars™ per Kg.

Standard and High Strength Concrete C35+C60

43 mm length Roughly 28,000 MiniBars™ per Kg.

Tensile Strength 1080MPa.
Elastic Modulus 44GPa.

Engineering required to determine the dosage needed for specific applications.

Minimum recommended dosage 5 Kg per M³.

Packaged in 5 Kg and 10 Kg bags.

Mixing instructions available on request. ReforceTech Blower designed for dosing into concrete trucks available to facilitate fast and even dispersion of MiniBars™ at job sites.

MiniBar™ Properties

Diameter	0,65 mm	0,026 inches
Length	20 to 60 mm	0.8 to 2.40 inches
Specific Gravity	19 g/cc	0.069 oz/inch ³
Water Absorption	None	None
E modulus	44 GPa	6380 KSI
Tensile Strength	1080 MPa	156 KSI
Alkaline Resistance	Excellent	Excellent

Specification for MiniBars™ - MasterFormat® Section 03 24 00

Generic: Use macrofibers made from Basalt FRP rods with helix winding geometry and diameters in the range of 0.65mm to 0.70mm. BFRP macrofibers should be fabricated with CBF (continuous basalt fiber) and vinyl ester resin with a minimum Heat Distortion Temperature of 235F (115C) and Modulus of Elasticity of 6380 ksi (44 GPa). The length of the fibers will be from 0.80" to 2.40" (20mm to 60mm) with exact length to be determined by trial batch with guidance from the manufacturer. Dosage will be determined by trial batch up to 130 lbs/cu.yd based on the minimum ARS (average residual strength per ASTM C1399) and FTS (flexural tensile strength per ASTM C1609) established by the engineer-of-record. The BFRP macrofiber reinforced concrete shall be capable of achieving an ARS of 2400 psi (17.2 MPa) and FTS of 2300 psi (15.8 MPa) at maximum dosage.

Specific: Use MiniBars™ by ReforceTech AS. Length of fibers and dosage to be determined by trial batch with guidance from the manufacturer per the requirements for ARS (ASTM C1399) and FTS (ASTM C1609) established by the engineer-of-record for the project.

The information shown here inclusive of all drawings and tables is for informational purposes only. Details are subject to change; every effort has been made to ensure accuracy. The user shall ensure the appropriate guidelines and building codes are followed. ReforceTech has no control over the use of their products and assumes no responsibility for the end products or uses of our materials.



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