

NORDIC GEO SUPPORT

Basalt fibre products

Mesh, structural fibres, bars & bolts



Reinforcement Solutions Page



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NORDIC GEO SUPPORT offers Innovative Basalt solutions from ReforceTech with two composite technologies available. The environmentally Basalt based technologies make work lighter, faster and easier while providing a stronger solution that has higher chemical resistance features!

Light! Flexible! Strong!.

Nordic Geo Support Solutions

Drilling Consumables

High Performance rock drilling tools and consumables:

- DTH Hammers
- Bits
- Shanks
- Rods
- Drill Pipes
- Adapters
- Augers, Accessories

Injection Grouts

Leading edge resin injection technology for demanding cases:

- Water Stopping
- Sealing
- Ground Consolidation
- Ground Stabilisation
- Construction and structural repairs

Anchoring & Bolting Grouts

Grouting technologies offering ease of use, clean and fast setting:

- Capsules
- Cartridges
- Pumpable grouts
- Additives

Anchoring & Bolting

A broad range of rock bolting and anchoring technologies:

- Double and single coated protected steel
- Steel Self Drilling Anchors
- GFRP bolrs of all types
- Standard bolts and meshes

Cement-Based Additives

Cement based admixtures and additives:

- Concrete Repair
- Admixtures
- Modifiers
- Waterproofing
- Joint Sealants

Pumps & Accessories

Cement and resin mixing and pumping technologies:

- Cement Pumps
- Resin Pumps
- Transfer systems
- Dataloggers
- Hoses, lances, packers

Water control

Waterproofing, drainage and pumping:

- TunnelDrain innovative strip drainage system
- Drainage pipes
- Waterproofing grouts, additives and sealants
- A broad range of dewatering pumps

Ventilation

Air quality, ventilation and safety solutions:

- Ventilation bags and systems, including Mecanicad's rigid ducts
- Fans & inline coolers
- Water atomisers

Re-usable Hangers

Developed in the Nordics, fast, easy to use & reuse:

- Services Hooks for ventilation systems, water and pneumatic lines, electrical cables and distribution boards
- Blasting hooks

Other products

A range of other products:

- Coatings & sealants
- Personal protective products
- Mining accessories

Basalt Bars and Mesh Technology

ENVIRONMENTAL PRODUCTS ENABLING INNOVATION IN CONCRETE STRUCTURES

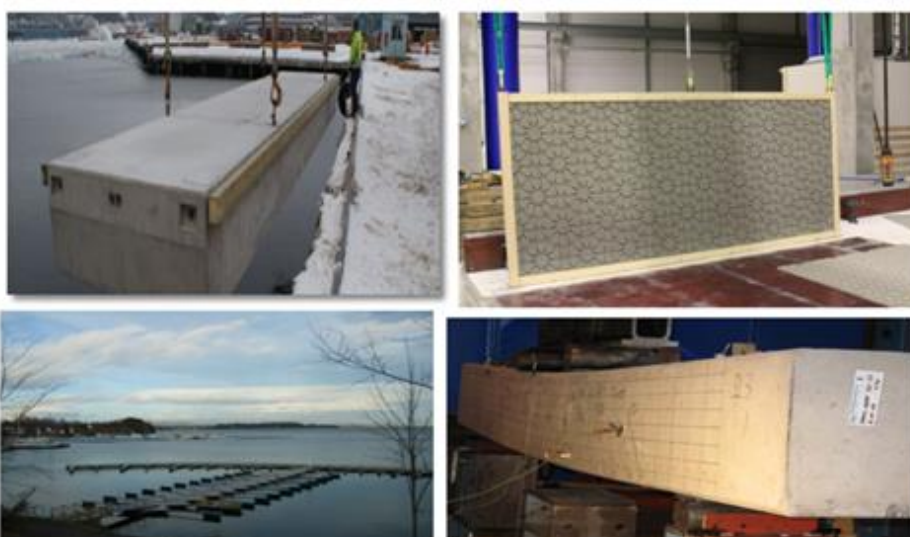
Unique advantages in Basalt Fibre Technology:

- Zero Corrosion / Non-conductive / Non-magnetic
- Low weight (density 1/4 of steel) enables easy handling at manufacturing plant or construction site
- 33 to 48% less CO2 emission in final concrete structures due to material optimization
- Reduced concrete cover layer enables less concrete weight and lighter structures
- Solutions for pre and post-tensioning
- Labor saving techniques optimize total element costs through innovative geometries and construction kits
- Longer lifetime and lower life cycle costs

Applications for resin Injection

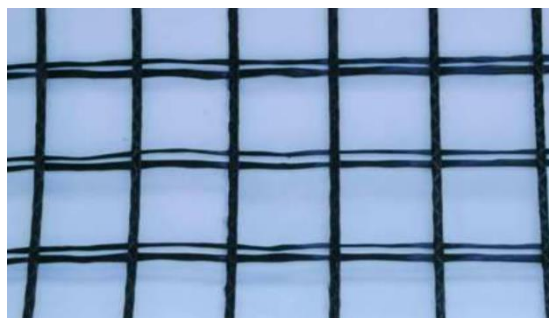
- Rock or concrete
- Water ingress applications
- Roof Support
- Gravels and sands
- Cavity and void filling

Materials	Steel	Basalt Fibres	Basalt FRP
Tensile Strength (MPa)	500	2900	1100
E-Modulus GPa	210	88	44
Density (g/cc)			



Basalt Reinforcing Mesh

Basalt reinforcing mesh is designed for reinforcing road and highway overlays to prolong the pavement lifespan by reducing the effects of reflective cracking caused by traffic loading, age hardening and temperature cycling. Pavement life between maintenance can be prolonged significantly. Basalt reinforcing mesh makes it possible to reduce thickness of asphalt concrete pavement up to 20%.



Features and Benefits

- Higher mechanical strength and modulus, more resistive to chemical aggressive environment than Eglass mesh.
- The melting point of basalt fibers is 1450°C. Typical paving temperatures will not cause any loss of strength or distortion which may occur with synthetic material.
- Lower application temperature than for synthetic material that is especially important for north regions.
- Lower elongation before breaking than for synthetic material.
- Easily milled using typical milling equipment. Does not stretch and pull like polymer meshes.
- No special equipment is required to install the reinforcement.
- Basalt mesh is environment friendly and based on naturally occurring material that is found worldwide

ReforceTech can offer two types of Basalt Reinforcing Mesh for roads: Open cell normal and open cell strengthened.

	Open cell	Open cell, Strengthened
Window Size (mm)	30x30	25x25
Density, g/m ²	260+/- 10	330+/-33
Breaking load, W rap, kN/m	≤ 55	≤ 50
Breaking load, W eft, kN/m	≤ 55	≥ 100
Elongation warp, %	2.5 1/- 1.0	2.5 1/- 1.0
Elongation weft, %	2.5 1/- 1.0	2.5 1/- 1.0
Binder Content %	≥ 10	≥ 10
Width of the roll, cm	100, 200, 400	100,200,300, 400
Length of the roll, cm	1000	500



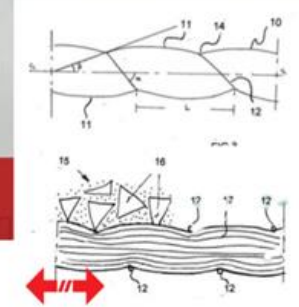
Comparison of basalt and other fibres used for road reinforcement

Properties of single Filaments (ASTM D2101)	BasFibre	E Glass	AR Glass	Polypropylene
Tessile Strength, MPa	4000-4300	3450-3800	3500	450-600
Tensile Modulus GPa	84-87	72-76	72	13

Enabling innovation in concrete. Light! Ductile! Strong! Environmentally Friendly

Key MiniBar™ Properties

Fiber Reinforced Polymer (FRP) Composite MiniBars™ possess ideal properties for Pre-Reinforced Concrete.



Basalt Fibre Technologies for Non-Structural Applications

Basalt MiniBars are made from Basalt rocks transformed into fibre and formed into a twisted shape with a specific gravity of 2.1, similar to that of concrete. Characteristics of ReforceTech's Basalt MiniBars include:

- ¼ the density of steel
- Enabling workable concrete
- Easily pumped
- No floating or sinking
- Class A1 according to Din Flammability testing
- Non-corrosive, non-conductive, non-magnetic

Basalt MiniBars have high tensile strength similar to that of steel with an elastic modulus similar to that of the concrete. The Basalt MiniBars also have a high fibre count per weight similar to that of synthetic fibres. These features allow for optimal reinforcement of concretes in non-structural applications.

Flexural Tensile Strength

Basalt MiniBars™ mixed in concrete lead to a network of randomly placed fibres throughout the concrete. As the load is applied to the concrete the Basalt MiniBars™ act as crack control and distribute the load throughout the concrete. This action increases the Flexural Tensile Strength of the concrete, whilst increasing the Average Residual Strength of the concrete.

Basalt MiniBars have 4 strengthening mechanisms in concrete:

- 1) Length for friction resisting pull out
- 2) Rough Surface to increase friction
- 3) Helix to utilize inter-fiber shear to resist pull out
- 4) Diameter

Results: Enhanced Fatigue and Creep Behaviours as well as shock resistance and ductility.

Properties and Specifications

	Metric	Imperial
Nominal Diameter	0.72mm	0.028 inches
Length	20 to 55mm	0.8 to 2.17 inches
Density	2.1 g/cc	0.071 ox/in ³
E Mod Min	44GPa	6380KSI
Minimum Tensile Strength	900MPa	131KSI

Basalt MiniBars come in boxes of:

Diameter	20mm	30mm	43mm	55mm
Box Weight	20Kg	15Kg	10Kg	8Kg
Count (MB)	62,000/Kg 28,000/lb	42,350/Kg 18,710/lb	28,850/Kg 13,000/lb	22,500/Kg 10,180/lb

*Also available in bags

Specification for MiniBars - MasterFormat® Section 03 24 00

Generic: Use macrofibers made from Basalt FRP rods with helical winding geometry and diameters in the range of 0.45mm to 0.70mm. FRP macrofibers should be fabricated with CBF (continuous basalt fiber) and vinyl ester resin with a minimum Heat Distortion Temperature of 115C (235F) and Modulus of Elasticity of 44 GPa (6380 ksi). The length of the fibres will be from 20mm to 60mm (0.80" to 2.40") with exact length to be determined by trial batch with guidance from the manufacturer. Dosage will be determined by trial batch using up to 63Kg/m³ or 130 lbs/cu.yd. based on the minimum ARS (average residual strength per ASTM C1399 or EN14651) and FTS (flexural tensile strength per ASTM C1609) established by the engineer-of-record. Dosing instructions are available on the ReforceTech website.

Specific: Use RFT-Basalt MiniBars by ReforceTech AS. Length of fibres and dosage to be determined by trial batch with guidance from the manufacturer based on the application requirements for ARS (ASTM C1399 or EN14651) and FTS (ASTM C1609) established by the engineer-of-record for the project.

Typical Applications

Flooring Slab on Ground
 Screed
 Rafts (MiniBars give crack control in a hybrid design)
 Foundations
 Inner Walls precast and in-situ
 Façade Panels precast and in-situ
 Precast Sandwich Panels
 Edge Beams (Hybrid)
 Sea Walls and Weights
 Floating Pontoons
 Shotcrete



Certifications of Basalt MiniBars:

- DIBt (German National Approval) for Non Structural Applications
- Tested extensively at IBAC Aachen University Germany and NTNU in Norway
- Approved by Kontrollrådet

Independent testing by University of Akron, Aachen University, Norwegian University of Science and Technology, University of Florida.



Warranty Statement

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 and Nordic Geo Support have 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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