



Structural Systems

QUANTOM[®] Bar



GFRP Bar

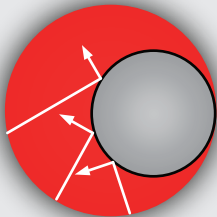
QUANTOM[®] Bar

GFRP bar for reinforced concrete structures

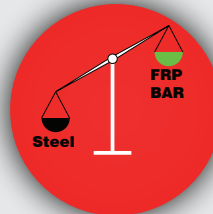
Description

QUANTOM[®] Bar is a reinforcing bar made of corrosion resistant glass fibres that are bound by an epoxy resin. The high quality components and the unique manufacturing process result in an outstanding material.

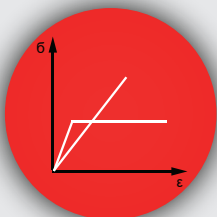
QUANTOM[®] Bar is



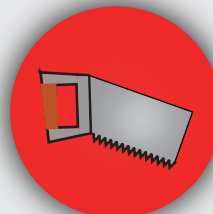
not electrically or thermally conductive
corrosion resistant and highly durable



significantly lighter than steel.



much stronger than steel



easily machinable



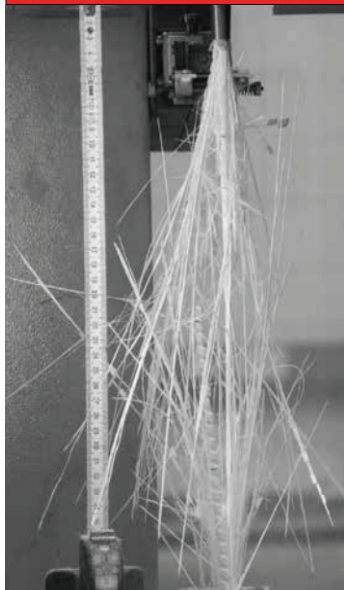
not magnetic or magnetisable

GFRP Bar

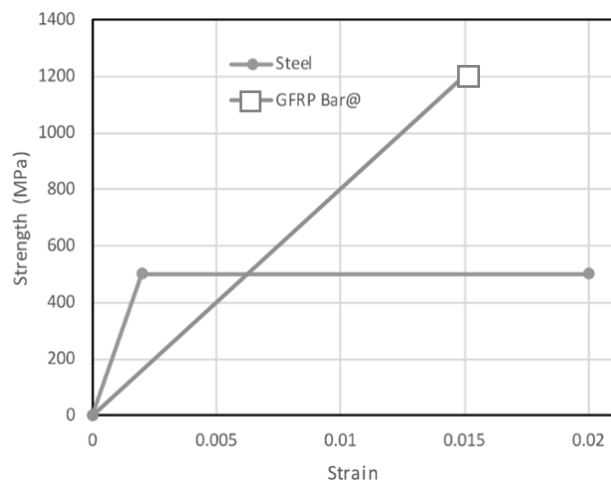
Technical properties

Properties	Steel	QUANTOM® Bar
Ultimate tensile strength f_{tk} (N/mm ²)	600	>1000
Yield strength f_{yk} (N/mm ²)	400	No yielding.
Strain at ultimate state ‰	2.2	7.5
Tensile modulus of elasticity E_{yk} (N/mm ²)	200,000	60,000
Minimum required concrete cover (mm)	25	10
Density (gr/cm ³)	7.85	2.2
Thermal transmittance coefficient (W/mK)	60	longitudinal: 0.7 radial: 0.5
Longitudinal expansion coefficient (1/k)	8-12×10 ⁻⁶	6×10 ⁻⁶
specific resistance (μΩcm)	1-2×10 ⁻⁵	10 ¹²
magnetisable?	Yes	No

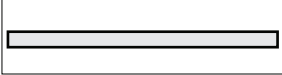
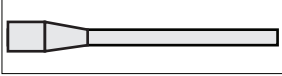
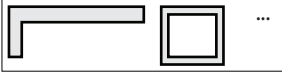
FRP bar in failure



Stress-strain diagram



GFRP Bar

Product	Schematic view	Available diameter (mm)	description
Straight bars		4, 6, 8, 10, 12, 14, 16, 18	up to ø12: Delivery in 50m coil for greater than ø12: Delivery in 12m bars ø20 up to ø40 are produced on request
Straight bars with end head		Contact us	This product is used for where attainable bond length is less than required bond length.
Bent bars, stirrups		Contact us	FRP Bars can't be bent in the field, if needed they are produced in bent shape in the factory.

Where to Use

This product can be used in different RC structures, in which using steel rebar is not appropriate option. QUANTOM[®] Bar is an alternative to steel rebar in following cases:

- QUANTOM[®] Bar does not conduct electric current. it is, therefore , ideally suited for installation in : power plants, transformers, reactors, switchyards, industrial facilities and etc.
- QUANTOM[®] Bar is electromagnetically non-conductive and therefore ideally suited for installation in: Hospitals (MRI), nano-technology centers, laboratories for solid-state physics, industrials floors of driverless transport systems.
- QUANTOM[®] Bar is ideal for installation in aggressive environments , such as: shoreline reinforcements and quay walls, facade elements, parking garages (even without coatings), industrial floors, swimming pools, waste water treatment plants, harbours and dams.
- QUANTOM[®] Bar does not corrode and does not conduct electric currents. it is, therefore, the perfect reinforcing material for installation in : bridge decks, bridge caps, barrier walls on bridges, sound barriers, ballasted rail slabs, airfields and etc.
- QUANTOM[®] Bar is easily machined. it is, therefore, ideally suited for components which need to be cut or drilled through, such as: soft-eyes in shaft walls at tunnelling projects, diaphragm walls, drilled pile walls, form-work anchors, temporary concrete buildings.

Design Guidelines

- ACI 440.1R (2001 and 2006), "Guide for the Design and Construction of Structural Concrete Reinforced with FRP Bars," published by ACI
- ACI 440.3R-04 (2004 and 2012), "Guide Test Methods for Fiber-Reinforced Polymers (FRPs) for Reinforcing or Strengthening Concrete Structures," published by ACI
- "AASHTO LRFD Bridge Design Guide Specifications for GFRP Reinforced Concrete Bridge Decks and Traffic Railings" (2009), published by the American Association of State Highway and Transportation Officials (AASHTO)
- "Interim Guidance on the Design of Reinforced Concrete Structures Using Fiber Composite Reinforcement" (1999), published by the Institution of Structural Engineers
- CAN/CSA-S806-12 (2002 and 2012), "Design and Construction of Building Structures with Fiber-Reinforced Polymers," published by CSA
- CAN/CSA-S807-10 (2010), "Specification for Fiber Reinforced Polymers," published by CSA
- CAN/CSA-S6-06 (2006) plus CAN/CSA S6S1-10 (2010)Supplement), "Canadian Highway Bridge Design Code," published by CSA
- CNR-DT 203/2006 (2006), "Guide for the Design and Construction of Concrete Structures Reinforced with FiberReinforced Polymer Bars," published by the Italian National Research Council (CNR)