

# FiReP GRP Bolts

Bolting systems for mining  
and tunnelling



Solutions from Materials Technology





## FiReP GRP Bolts overview

In comparison to aluminium or steel, glass fibre reinforced plastics (GRP) have advantages that can be traced to the properties of the composite material: High resistance to corrosion and higher specific strength. Depending on the application and at constant load, a GRP bolt can yield a high weight reduction.

The application of glass fibre reinforced plastics (GRP) offers various possibilities. In cooperation with FiReP International AG (Switzerland) the Minova Group offers a range of GRP bolts which utilises the results of these findings, and are manufactured using the latest manufacturing technologies. The material offers high mechanical solidity and favourable long-term behaviour for the anchor technology.

Different GRP bolting types are available:

- ▼ POWERTHREAD all-thread bolts (solid and hollow rod)
- ▼ SPINMAX self-drilling bolts
- ▼ CABLEX cable bolts





GRP All-thread Bolts  
(solid and hollow bolts)  
with additional equip-  
ment



## FiReP POWERTHREAD GRP Bolts (Solid and hollow bolts)



The POWERTHREAD GRP Bolt K60/J64 was developed for strata support in mining and tunnelling as well as for slope and face stabilisation.

Due to its continuous thread the bolt can be trimmed to length if needed. The bolt has a high ultimate load and due to its profile it offers maximum load transfer with all types of grouting material. The cuttability protects machinery and equipment and prevents damage to machinery while drifting and enlarging tunnels. The bolt has a high corrosion resistance and is ideally suited for permanent support.

The high flexibility is well suited for application without couplings in confined locations. Due to its high tensile strength the bolt has a high and immediate load bearing capacity if applied with fast setting resin capsules. The low weight facilitates easy handling.

The solid bolts can be applied using either cement mortar or resin capsules and the hollow bolts can be applied using a variety of injection materials.

A comprehensive rock bolting system with various components such as plastic, GRP and steel nuts, plastic and GRP plates, couplings, adapters and injection connections are available.

For technical data please refer to the table on page 7.





SPINMAX Self-drilling Bolt with drill bit, coupling and nut

## FiReP SPINMAX Self-drilling Bolts (Hollow bolt)



The SPINMAX Self-drilling Bolt can be used for slope stabilisation, face stabilisation, fore poling, and ground support in soft rock, loose or disturbed rock formations. The use of self drilling bolts in these applications is today regarded as state of the art.

Due to its cuttability the GRP Self-drilling Bolt is an economical alternative. Furthermore the cuttability protects the machinery and avoids obstructions while drifting or enlarging tunnels. The bolt has a high radial pressure resistance for injections with resins or grout, and is corrosion resistant for permanent support.

The bolt offers a high tensile strength and is able to carry high loads. Its low weight combined with high torsional strength makes the bolt ideally suited for work in loose rock up to a maximum rock hardness of 60 MPa.

The SPINMAX GRP Self-drilling Bolts can be applied using machines with both clockwise and counter clockwise drilling with reduced percussion. Different rotary bits are available to suit a variety of rock types and conditions.

A comprehensive rock bolting system with various components is available.

For technical data please refer to the table on page 7.



CABLEX  
GRP Cable Bolts

## CABLEX Cable Bolts



The CABLEX Cable Bolt with its wide range of products serves all applications that require long bolts, e.g. long bolting of pilot tunnels, in confined space, or bolting set from a parallel tunnel. It can also be used for face stabilisation or slope protection.

Due to the easy mounting the GRP Cable Bolt can be assembled at the factory or delivered loose on site. It is therefore possible to meet the customer's requirements at site (confined location, complicated transport).

The GRP Cable Bolt has a high corrosion resistance for durable and permanent support. In spite of its low weight it has a high load bearing capacity.

Due to the large surface area of cable bolt strands a maximum load transfer with all grouting products can be achieved.

A comprehensive rock bolting system with various components is available.

For technical data please refer to the table on page 7.





Lokset SiS resin capsules

## Resins and grouts used with GRP bolts



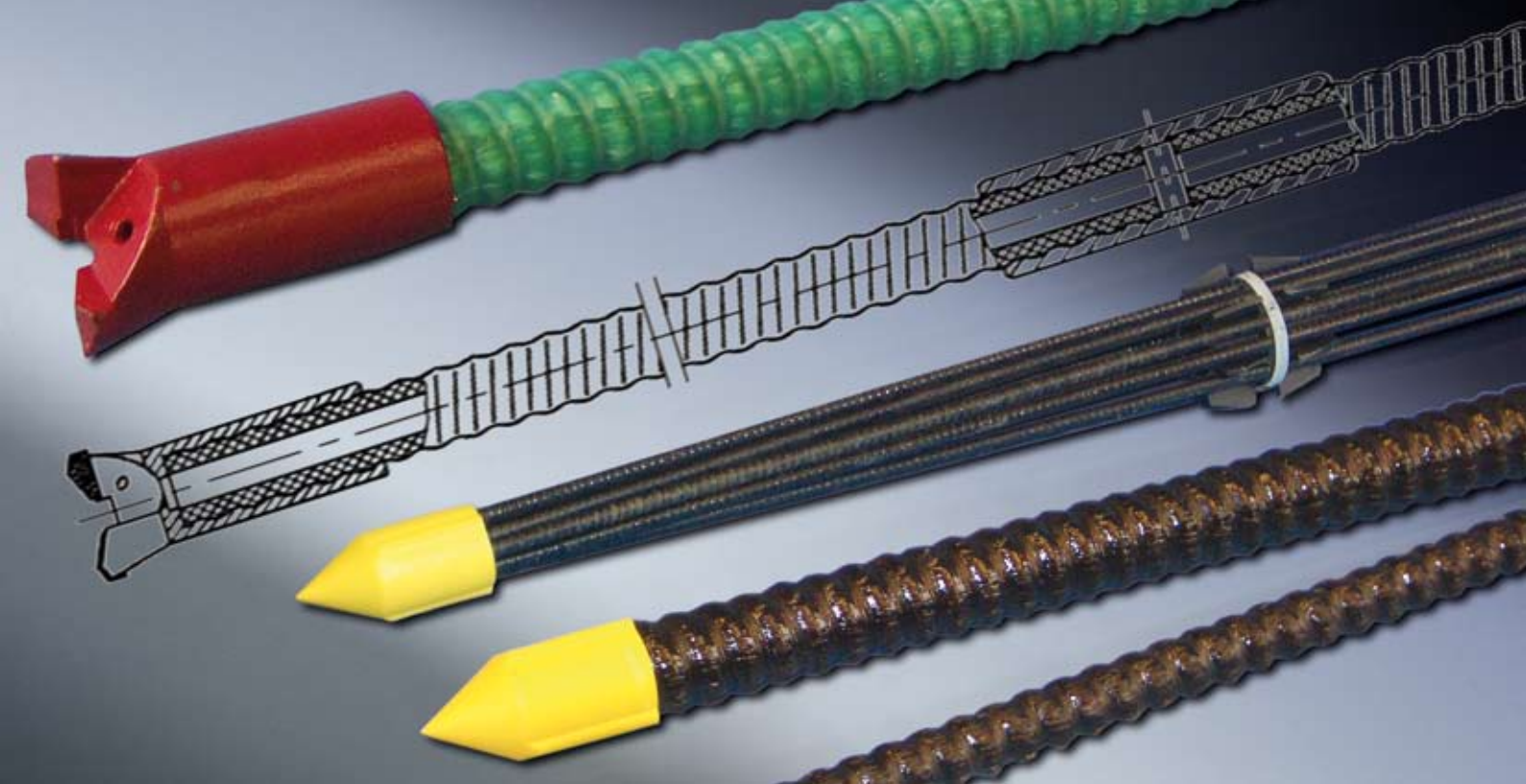
With **CarboLith Thix**, **CARBOTHIX** and **Lokset resin capsules** the Minova Group is able to offer 2 component injection resins and individually packaged bolting resins which are especially suited for bonding GRP bolts.

**CarboLith Thix** and **CARBOTHIX** are rapid-hardening and fast curing silicate resins which are both CFC and halogen free. Both resins may be used in overhead boreholes with large diameters since they harden very quickly after mixing. Once both components have been mixed together, the resins begin to harden and become viscous and can only flow into large cracks under pumping pressure. The mixtures then cure into a hardened resin.

**Lokset resin capsules** are 2-component capsules. They contain resin and hardener in two separate chambers. The resin contains an unsaturated polyester resin, fillers, and anti-sedimentation agents. The hardener marked with white contains diluted organic peroxide. The standard capsule is fitted with a retaining element, which prevents the capsule from slipping out when used in vertical boreholes.

Numerous commercially available materials can be used in connection with the bolting grouts. These are, for example, hydraulic ready-mix grout for rock bolts and injection work. The grout has to be easily handled and pumped, has to be suitable for injecting, and should not have a tendency to bleed or segregate. To guarantee overhead work as well, the utilized grout should always be thixotropic and rapid setting.





# Technical Data FiReP GRP bolts



	Unit	POWERTHREAD				SPINMAX	CABLEX	
		Solid Bolt			Hollow Bolt	Self-drilling Bolt	Cable Bolt	
		K60 - 25	K60 - 27	K60 - 32	J64 - 25	R32/15	6-12 brins	13-20 brins
Outer/Inner diametre	mm	25	27	32	25/12	R32/15	50	70
Cross section	mm <sup>2</sup>	430	490	700	310	332		
Stress at cross section	mm <sup>2</sup>	346	400	580	230	332		
Ultimate load	kN	> 350	> 400	> 560	250	365	210-420	455-700
Ultimate strength	N/mm <sup>2</sup>	> 1.000	> 1.000	> 960	> 1.000	1.100	> 1.200	> 1.200
Ultimate load (shearing 90°)	kN	160	190	250	120	150		
Shear strength	N/mm <sup>2</sup>	> 460	> 460	> 430	460	400		
Ultimate strain	%	2,5	2,5	2,5	2,5	2,5	2,5	2,5
E-Modulus	N/mm <sup>2</sup>	40.000	40.000	40.000	40.000	40.000	40.000	40.000
Weight	g/m	900	1.040	1.500	630	950	300-600	650-1.000

More diameters (18 mm to 25 mm) on request.



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