

GFRP Custom Fully Threaded Bolts

normet

ROCK REINFORCEMENT

Glass Fiber Reinforced Polymer (GFRP) Bolting System

TECHNICAL DATA SHEET

DESCRIPTION

Normet's range of Glass Fiber Reinforced Polymer (GFRP) rock reinforcement provides an alternative to steel products for applications where steel is unsuitable. GFRP is a composite material made of high-tensile fibers embedded in a polyester or epoxy resin matrix. This composition offers unique properties, including exceptional tensile strength, light weight, corrosion resistance, and durability. Additionally, GFRP is chemically inert, non-magnetic, and easy to cut or crush, allowing mechanized equipment to mine through the installed reinforcement without damaging processing equipment if the product contaminates the extracted ore.

GFRP PRODUCT MATRIX

Product Code	Description	
GFRP Custom Fully Threaded Bolts		
Thrust Bolts		Solid bolts with increased head capacity for permanent applications
Injected Thread Bolts		Hollow bolts with increased head capacity for temporary or permanent applications

GFRP Custom Fully Threaded Bolts offers increased head capacities as compared to GFRP Standard Fully Threaded bolts. Refer to GFRP Standard Fully Threaded Bolts TDS for reference and comparison.

KEY BENEFITS

GFRP bolts are typically installed in applications where non-steel reinforcement is preferred. Below are the main GFRP characteristics:

- › **Stronger than Steel:** GFRP reinforcement offers exceptionally high tensile strength compared to its steel counterparts. This higher specification can result in cost-saving design opportunities and optimizations
- › **Lightweight:** GFRP reinforcements are four times lighter than steel, resulting in ease of handling, faster installation, and cost savings on labour and transportation.
- › **Corrosion Resistant:** GFRPs are non-steel, durable materials that prevent premature bolt failure. Its exceptional corrosion and chemical resistance results in long durability and a long lifespan, making it an ideal and cost-effective alternative to coated steel.
- › **Cuttability:** GFRPs are easily cuttable and crushable, reducing concerns about steel being hauled and transported on conveyors into crushers, where steel elements can cause significant damage. It also

eliminates resources and efforts associated with removing support elements from excavated ground.

- › **Sustainability:** GFRPs offer direct reductions in embodied carbon, and their higher strengths provide opportunities for further material reduction through design optimization.

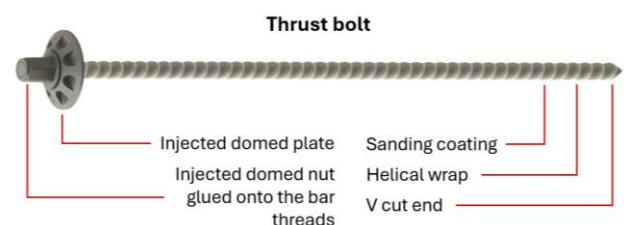
TYPICAL APPLICATIONS

- › Temporary or permanent applications in mining and tunnelling
- › Radial/systematic bolting
- › Face bolting applications
- › Tunnel and civil projects

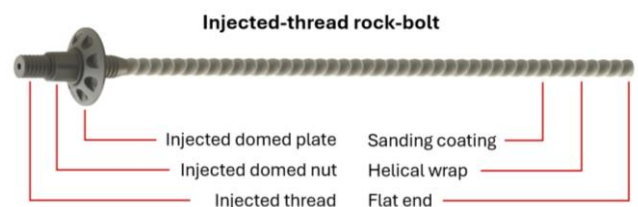
FUNCTIONALITY & INSTALLATION

GFRP Custom Fully Threaded Bolts feature an engineered rock bolt head assembly that is either injected or glued into the bar threads, providing a higher tensile load capacity compared to standard fully threaded GFRP rock bolts.

The GFRP bar features a helical wrap and a sanding coating, providing a coarse surface along its length. This mechanism improves bonding to grout and is equivalent to a fully threaded steel rock bolt.



- › **Thrust bolts** are designed for permanent applications and rockbolting using resin cartridges. Its v-cut end is designed to penetrate cartridges, and the helical pattern allows for efficient cartridge mixing.



- › **Injected-thread rock bolts** are designed for both permanent and temporary applications, as well as post-grouting using cement or pumpable resins.

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GFRP bolts are typically installed similarly to steel bolts, with careful control over percussion, rotation speed, torque, and drilling rate, especially with self-drilling installations. Contact your local Normet representative for installation guidelines specific to your application.

TECHNICAL DATA

Thrust bolts

Outer Diameter		25 mm	32 mm	35 mm
Solid Bar	Nominal Dia.	25.4 mm	32.3 mm	35.0 mm
	Nominal CSA	510 mm ²	819 mm ²	962 mm ²
	Fiber	ECR		
	Resin	Epoxy (Permanent)		
	Ult. Tensile Load	350 kN	450 kN	550 kN
	Ult. Tensile Str.	690 MPa	550 MPa	550 MPa
	MoE	45 GPa	45 GPa	45 GPa
Injected Domed Plate	Dimensions	Ø 150mm x 10mm		
	Breaking Load	≥220 kN		
Nut	Outer dia	74 mm		
	Length	85 mm		
	Transverse Shear	124 MPa		
	Torque	200 N·m	300 N·m	350 N·m
	System Breaking Load	≥100 kN	≥130 kN	≥150 kN

Injected-thread rock bolts

Product		Grade 45T	Grade 45P
Hollow Bar	Fiber	ECR	
	Resin	PE (Temporary)	VE (Permanent)
	Outer Dia.	32 mm	
	Inner Dia.	13 mm	
	Nominal Dia.	31.75 mm	
	Nominal CSA	665 mm ²	
	Ult. Tensile Load	350 kN	
	Ult. Tensile Strength	526 MPa	
Injected Threads	Major Dia. x Pitch	Ø 39.5 x 7.0 mm	
	Thread Length	384 mm	
	Breaking Load	≥150 kN	
Injected Domed Plate	Dimensions	Ø 150 mm x 10 mm	
	Breaking Load	≥220 kN	
Injected Domed Nut	Major Dia. x Pitch	Ø 40 mm x 7 mm	
	Length	85 mm	
	Breaking Load	≥150 kN	

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