

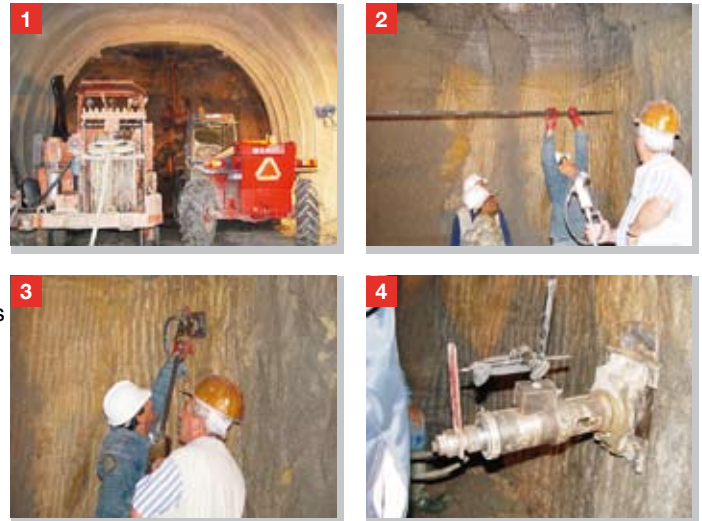
## OMEGA-BOLT®



# Omega-Bolt®

## Advantages and Characteristics

- Immediate full load bearing capacity over the complete bolt length
- Low-sensitive against vibrations caused by blasting works
- Safe and simple installation
- No extra building material required for installation
- Flexibility in case of different or varying borehole diameters
- Quality check during every single installation



1 Excavation works; 2 – 3 Installation of OMEGA-BOLT®  
4 Rock Bolt Testing

The OMEGA-BOLT® is available in different types:

- Type ERB 120
- Type ERB 160
- Type ERB 240

The main application of the OMEGA-BOLT® is temporary rock reinforcement in Mining and Tunneling.

Bonding forces between the friction bolt and the rock mass are caused by form closure and friction transfer between the borehole wall and the rock bolt, which is expanded by hydraulic pressure.

## Technical Specifications

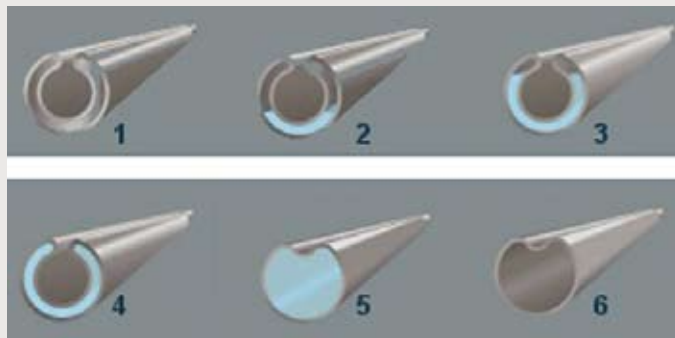
	Unit	ERB 120	ERB 160	ERB 240	ERB 120+	ERB 160+	ERB 240+
Minimum ultimate load, expanded profile*	[kN]	120	160	240	115	150	220
Typical load, expanded profile*	[kN]	–	–	–	120	160	240
* According to EN 10002-1 where applicable							
	Unit	120/120+	160/160+	240/240+			
Profile diameter	[mm]	27,5	36	36			
Material thickness	[mm]	2	2	3			
Original tube diameter	[mm]	41	54	54			
Upper bushing diameter	[mm]	28	38	38			
Bushing head diameter	[mm]	30/36	41/48	41/48			
Recommended borehole diameter	[mm]	32-39	43-52	43-52			
Optimum borehole diameter	[mm]	35-38	45-51	45-51			
Delivery lengths	[m]	1.0-8.0	1.0-8.0	1.0-8.0			
Inflation pressure	[bar]	300	250	300			

## General Design and Manufacturing

The OMEGA-BOLT® Type ERB 120, 160 and 240 is a temporary rock bolt for tunneling and mining.

It is shaped into a greek “Omega” out of a 2.0 or 3.0 thick strip metal according to EN 10149-2 for versions ERB 120, ERB 160 and ERB 240.

For versions ERB 120+, ERB 160+ and ERB 240+, which provide higher elongation capacity, metal strip of higher steel quality is used.



## Installation Description

The OMEGA-BOLT® is pushed into the borehole (phase 1) and expanded by high pressure water (phases 2-5). The rock bolt is pressed onto the borehole wall due to elastic and plastic deformations of the tube. Finally, the water pressure is released and bolt installation is completed (phase 6).

Thus, both immediate form closure and friction transfer are caused between the rock bolt and the borehole wall.

## Application of the OMEGA-BOLT® at the Mato Forte Tunnel

Installation of OMEGA-BOLT® at the Mato Forte Tunnel / the A10 expressway section between Bucelas and Arruda dos Vinhos, Portugal

**A** 260 km long expressway that includes a twin tube tunnel is being built 15 km north of Lisbon. Each tunnel tube, with a headroom of 5.1 m and a width of 15.5 m, contains three driving lanes that can be widened to four lanes in the future.

The new A10 expressway between Bucelas and Arruda dos Vinhos offers to the cities North of Lisbon a new connection to the capital.

The capital spending volume for the tunnel construction is EUR 18 million. However, the Mato Forte Tunnel helps reducing the impact of the motorway on nature to a minimum in this area.

The geological conditions with uniform 1 m thick horizontal layers of marl and limestone allowed for an advance of up to 3 m per day.

DSI Portugal supplied OMEGA-BOLT® in lengths of 6 m.



**i** **Client** BRISA - Autoestradas de Portugal S.A., São Domingos de Rana, Portugal  
**+++ General Contractor** JV consisting of ZAGOPE, Lisbon, Portugal; EPOS, Lisbon, Portugal; PAVIA ACE, Lisbon, Portugal  
**+++ Engineer** CENORGEOL Lisbon, Portugal

**DSI Unit** DSI Portugal, Lisbon, Portugal

**DSI Services** Supply of OMEGA-BOLT® in lengths of 6 m; rental equipment

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