

Solutions for Rock Bolting

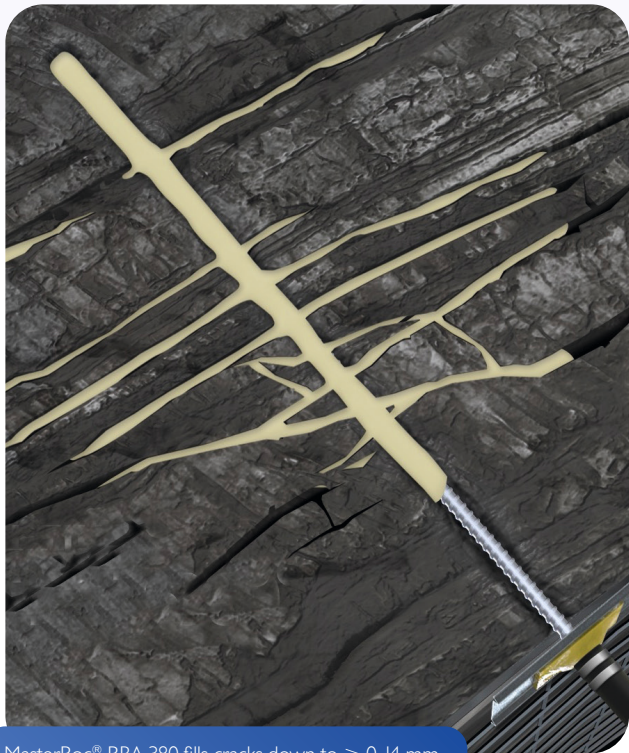


Innovative Solutions for Improved Control

The demand for the world's mined resources is forcing mine operators to work at ever greater depths. Increased excavation depths lead to higher geotechnical challenges, such as higher rock stresses affecting the stability of the strata. Working at ever greater depths with potentially unstable strata increases the need for enhanced personnel safety within the mine environment.

How fast and how safely a mine can be developed is a critical factor of efficient mining. Master Builders Solutions® offers products that facilitate safe ground stabilization while improving mine productivity. Developed for placement of cable and rock bolts in underground mines, our innovative solutions improve cycle times for both cable and rock bolt installation, while increasing worker safety and strata control.

Tested in operational mines and exposed to the most challenging of working conditions, our solutions for grouting and anchoring make mining at all conditions a safer, more productive environment.



MasterRoc® RBA 380 fills cracks down to ≥ 0.14 mm.

Tensile test with hollow rock bolts

Test No.	Setting Time	Rock Bolt Type	Maximum Tensile Load [kN]	Accompanying Displacement [mm]
1	4 hours	R32S	358	31
2	4 hours	R32S	346	22
3	4 hours	R32S	378	33

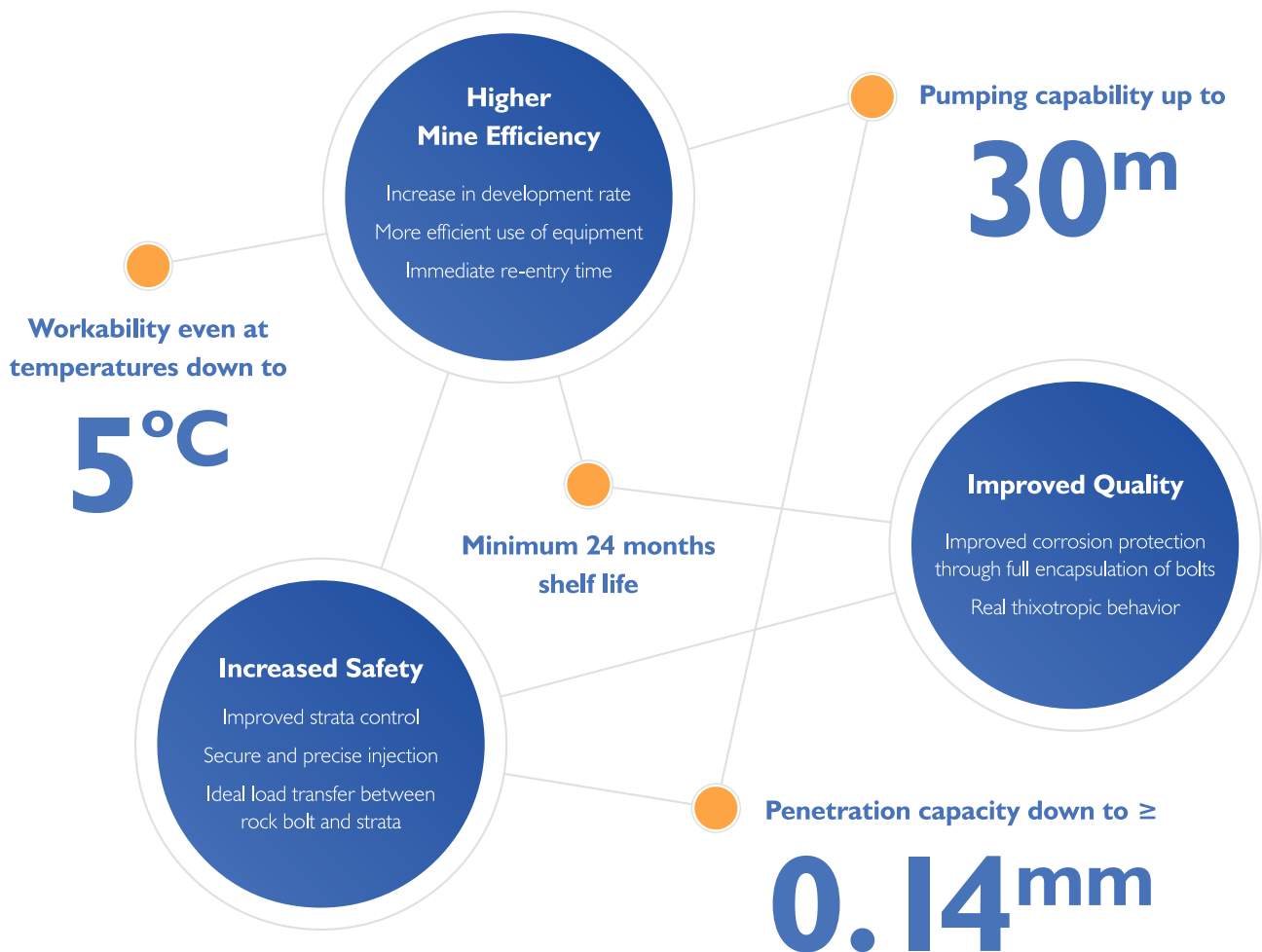
Tensile pull strength testing with 600 mm encapsulation length according to DIN 21521.
In additional external tests, Master Builders Solutions® could prove final load bearing capacity after a few minutes only.

Improve Your Rock Bolting Performance

The MasterRoc RBA 38X series consists of fast reacting 2 component polyurea silicate injection resins for rock bolt installations. They offer many advantages due to their unique thixotropic behavior which allows for overhead applications

without additional sealing. The mixed resin fills even the smallest cracks ($> 0,14 \text{ mm}$). The long-distance pumping capability is up to 30 meters. It keeps miners safe during bolting due to its fast curing and strength development.

Benefits at a glance:



Versatile System Tailored to Your Underground Construction Needs

The conditions underground vary from mine to mine: Rock temperatures ranging from -5 °C up to 60 °C influence the curing speed of reactive resins. Different pumping lengths require different set times. The Master Builders Solutions® specialists advise customers about the optimum product choice for their application.

For the installation of various rock bolt types:

- Self-drilling anchors (SDA)
- Full rebars
- Cable bolts
- Composite fiber bolts
- Hollow bars



Self-drilling anchor with MasterRoc® RBA 380

Rock Bolting portfolio

Master Builders Solutions® offers a wide range of rock bolting solutions. Besides reactive resins from the MasterRoc® RBA38X range the portfolio includes also ready-to-use cementitious products and various admixtures for OPC based grouts to adjust the behavior in terms of shrinkage compensation, corrosion protection, pumping capacity, and bond improvement.

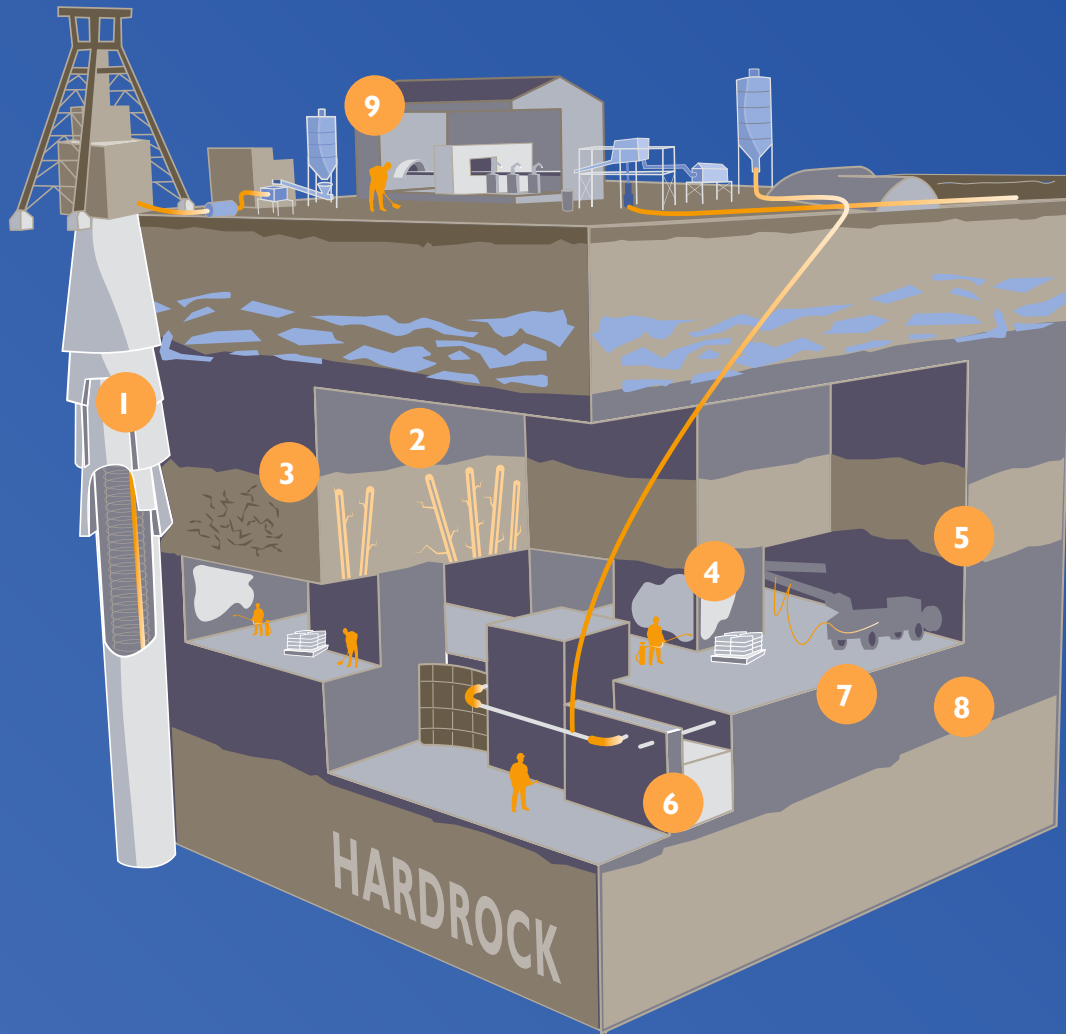


Cementitious grout with corrosion inhibitor



Cementitious grout without corrosion inhibitor

Our Comprehensive Portfolio for Mining



- | | | | | | |
|---|---------------|---|---------------------------|---|------------------------|
| 1 | Pre-Injection | 4 | Thin Spray-on Liner (TSL) | 7 | Admixture for Concrete |
| 2 | Rock Bolting | 5 | Sprayed Concrete | 8 | Roadway Concrete |
| 3 | Injection | 6 | Mine Backfill | 9 | Grinders |

Global Network of Underground Specialists

Master Builders Solutions®, with its global underground construction team, is a world leader in the provision of reliable, customer-oriented solutions focused on your needs in the tunneling and mining industries. We recognize that your success is underpinned by our ability to deliver solutions that meet or exceed your critical needs.

By accompanying you from the start of your project and understanding the issues that are important to you, we can contribute to your success. We support you with product training and quality control, and our professional technical services team is on hand around the clock, helping you with technical advice and trouble shooting.



Hands-on exercises and training



Master Builders Solutions® provides technical injection training courses on a frequent basis centrally located in the Hagerbach underground facility in Switzerland. The courses are organized both as demonstration workshops in realistic underground settings and as practical injection operators training. The demonstration workshops are “show-and-tell” sessions that aim to visualize and explain the possible types of application and the technical performance of our injection systems. The practical injection operators training is offered

exclusively to injection customers who are working with Master Builders Solutions® injection systems. During this training the participants are given the chance to work in small groups, taking part in hands-on exercises under the supervision of experienced instructors. The main objective is to gain practical skills for the correct application and execution of injection work. In addition, customized training is available for individual projects worldwide when required by customers.

Master Builders Solutions®

As Master Builders Solutions®, we are a leading global producer of responsible solutions for the construction industry, focussed on delivering our vision: [Inspiring people to build better](#).

We provide value-added technology and market-leading R&D capabilities to improve the performance of construction materials and to enable the reduction of CO₂ emissions in the production of concrete. The comprehensive portfolio under the Master Builders Solutions® brand encompasses concrete admixtures, cement additives, and solutions for underground construction.

We collaborate across areas of expertise and regions and draw on the experience gained from countless construction projects worldwide, leveraging global technologies, as well as our in-depth knowledge of local building needs, to develop innovations that help make you more successful and drive sustainable construction.

Founded in 1909, Master Builders Solutions® operates 35 production sites globally, supporting you in mastering your building challenges of today and tomorrow – for a decarbonised future.



Our comprehensive portfolio:

- Concrete admixtures
- Cement additives
- Chemical solutions for underground construction

Master Builders Solutions® for the Construction Industry

MasterAir®

Complete solutions for air entrained concrete

MasterCast®

Solutions for the manufactured concrete product industry

MasterCem®

Solutions for cement manufacture

MasterCO₂re™

Solutions for low-clinker concrete

MasterEase®

Low viscosity for high performance concrete

MasterFinish®

Solutions for formwork treatment and surface improvement

MasterFiber®

Comprehensive solutions for fiber reinforced concrete

MasterGlenium®

Solutions for high performance concrete

MasterKure®

Solutions for concrete curing

MasterLife®

Solutions for enhanced durability

MasterMatrix®

Advanced rheology control for concrete

MasterPel®

Solutions for hydrophobization, anti-efflorescence and surface protection

MasterPolyheed®

Solutions for mid-range concrete

MasterPozzolith®

Solutions for water-reduced concrete

MasterRheobuild®

Solutions for high strength concrete

MasterRoc®

Solutions for underground construction and surface improvement

MasterSet®

Solutions for set control

MasterSphere®

Solutions for guaranteed freeze-thaw resistance

MasterSuna®

Solutions for sand and gravel in concrete

MasterSure®

Solutions for extraordinary workability retention

Master X-Seed®

Advanced accelerator solutions for concrete

Quantified sustainable benefits. Advanced chemistry by Master Builders Solutions®.

Let the numbers do the talking: We have portrayed some of our most eco-efficient product solutions for concrete and precast production, construction, civil engineering, and flooring.

sustainability.master-builders-solutions.com

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