



# Injection

Solutions for  
Underground  
Construction



# Injection portfolio at a glance



## Polyurethane and Polyurea Silicate Resins

### MasterRoc MP 35I LV

- To stop low- to mid-volume water ingress
- Reaction time: 45 to 60 seconds (depending on the accelerator amount and the ambient and material temperatures)
- Foam factor: 35 to 50
- Ultra-low viscosity
- ANSI/NSF 61 certified
- Single-component pump

### MasterRoc MP 355 IK

- To stop low- to mid-volume water ingress
- Reaction time: 50 to 300 seconds (depending on the accelerator

amount and the ambient and material temperatures)

- Foam factor: 20 to 30
- ANSI/NSF 61 certified
- Single-component pump

### MasterRoc MP 355 IK DW

- To stop low- to mid-volume water ingress
- Reaction time: 60 to 350 seconds (depending on the accelerator amount and the ambient and material temperatures)
- Foam factor: 20 to 30
- Flexible foam
- Single-component pump

### MasterRoc MP 355

- To stop mid- to high-volume water ingress
- Reaction time: 10 to 70 seconds (depending on the accelerator type and amount, as well as the ambient and material temperatures)
- Foam factor: 8 to 20 (depending on the accelerator type and the amount of water)
- Plural-component pump

### MasterRoc MP 358 SC

- To consolidate fractured ground
- Low sensitivity to water
- Reaction time: 30 to 70 seconds
- Foam factor: up to 3
- Plural-component pump

### **MasterRoc MP 367 Foam**

- For cavity filling in rock, gravel, hard rock & coal
- Brittle foam, not sensitive to water
- Foaming time: 20 to 60 seconds
- Foam factor: up to 30
- Plural-component pump

### **MasterRoc MP 368**

- For the consolidation of fractured rock, gravel, and coal
- Dense glue-like cured material, not sensitive to water
- Gel time: 90 seconds
- Solidification time: 160 seconds
- High compressive strength: 3600 psi (25 MPa) in 24 hours
- Foam factor: 1
- Plural-component pump

### **MasterRoc MP 368 TIX**

- Thixotropic resin for the consolidation of very fractured rock and strata
- High compressive strength: 5000 psi (34.47MPa) in 24 hours
- Dense glue-like cured material, not sensitive to water
- Gel time: 140 seconds
- Solidification time: 210 seconds
- Plural-component pump

### **Acrylic Resins**

#### **MasterRoc MP 300**

- For sealing and repairs of tunnel segment joints, dams, sewer and storm pipes, box culvert joints, and concrete cracks. Also used in soil permeation grouting to achieve higher strength when required.
- Ultra-low viscosity
- Adjustable gel times
- Adjustable Water-to-Resin ratios
- Highly flexible gel
- Gel re-swells upon exposure to moisture after dry periods
- Plural-component pump

### **Mineral Grouts**

#### **MasterRoc MP 325**

- For the consolidation and improvement of sand and silt ground, strata, and slope
- Ultra-low viscosity
- Fine fissure penetrations
- Adjustable gel times
- Wide range of working temperatures
- Single-component pump

#### **MasterRoc MP 326**

- For ground improvement and the consolidation of rock slope and strata
- High compressive strength development
- Ultra-low viscosity
- Adjustable gel times
- Wide range of working temperatures
- Single-component pump

## Microfine and Ultrafine Cements

### MasterRoc MP 650

- Microfine cement for ground improvement, soil and rock stabilization, permeation grouting, pre- and post-excavation grouting, groundwater control
- Fast setting
- Colloidal mixer and high-pressure piston pump

### MasterRoc MP 650 SR

- All features of MasterRoc MP 650
- Sulfate resistant

### MasterRoc MP 680

- Microfine cement for ground improvement, soil and rock stabilization, permeation grouting, pre- and post-excavation grouting, and groundwater control
- Sulfate resistant
- Normal setting
- Colloidal mixer and high-pressure piston pump

### MasterRoc MP 900

- Ultrafine cement for geotechnical grouting, ground improvement and ground stabilization, dam foundation grouting, pre- and post-excavation injections, groundwater sealing, and water ingress reduction
- Fast setting
- Colloidal mixer and high-pressure piston pump

### MasterRoc MP 910

- Ultrafine cement for geotechnical grouting, ground improvement and ground stabilization, dam foundation grouting, pre- and post-excavation injections, groundwater sealing and water ingress reduction
- Penetration in tight joints, fissures, and pore spaces
- Sulfate resistant
- Normal setting
- Colloidal mixer and high-pressure piston pump



# Main applications



## Pre-Injection to Avoid the Unexpected

Unexpected water ingress and poor ground conditions during underground construction can significantly increase costs, negatively impact the environment, and cause major delays. To mitigate these risks, a cost-effective strategy is to pre-inject the ground ahead of the advancing face, preventing water ingress and stabilizing the terrain.

Microfine and ultrafine cement, along with mineral grout, offer an economical solution that enhances safety and environmental sustainability.

## Water Stopping

Foaming and water-sensitive polyurethane resins provide an effective and rapid solution for controlling water ingress. A combination of drainage and fast-reacting foaming resins can efficiently resolve even the most challenging water-related issues.

## Ground Consolidation

Fast-reacting, non-water-sensitive polyurea silicate systems effectively stabilize weak ground conditions. Additionally, less water-sensitive polyurethane resin systems are ideal for strengthening the ground, while high-foaming systems serve as excellent solutions for void filling.

## Crack Sealing and Concrete Rehabilitation

Acrylic resins are well-suited for rehabilitation injections in cast concrete, segment linings, and brick or masonry-lined tunnels, ensuring long-term durability and structural integrity.



# Micro-cements



## Fast Setting, Enhanced Productivity

MasterRoc micro-cements are a range of superfine and ultrafine Portland or blended cements. Due to their exceptional fineness, these micro-cements can penetrate fine cracks and granular soils, ensuring superior watertightness, stability, and durability.

A key technological advantage of MasterRoc micro-cements is their rapid and controlled setting. This innovative feature enables uninterrupted injection sequences, significantly improving efficiency and productivity.

## Stable, Penetrating Grout

Grout stability is critical for effective penetration into rock formations - something ordinary cement cannot achieve. A stable grout can travel further without losing effectiveness, reducing drilling and pumping requirements, thus saving time and resources.

MasterRoc MP micro-cements excel in penetrating small cracks and intergranular spaces while maintaining stability under high pumping pressures. Additionally, they are compatible with standard cement injection equipment, ensuring ease of application.

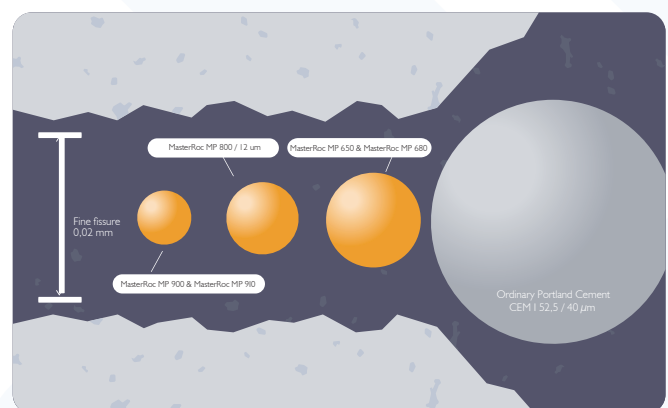


## Controlled Grout Travel with Accelerated Setting

The setting time of micro-cement grout can be precisely controlled using a specially formulated alkali-free accelerator. This method allows for adjustable open times, ranging from as little as 1–2 minutes to approximately 20 minutes, keeping the grout pumpable before it solidifies.

This controlled setting is particularly beneficial when limiting grout spread is necessary, such as in highly permeable rock masses and soils. It is also ideal for cold groundwater conditions where rapid setting is required.

For specialized applications, MasterRoc MP micro-cements are available upon request in slower-setting, sulfate-resistant versions and various grades based on maximum particle size, as indicated by the D95 values shown in the image below.



# Polyurethane and Polyurea Silicates

## Water Stopping and Water Sealing

MasterRoc Polyurethane (PU) resins are specially engineered for water-stopping and sealing applications, addressing the evolving demands of the civil construction, tunneling, and mining sectors. This comprehensive product range includes user-friendly single-component systems ideal for minor leak repairs and high-performance two-component formulations designed to effectively control and seal heavy water inflows.

## Ground Consolidation and Stabilization, Cavity Filling

MasterRoc series of plural-component polyurethane (PU) and polyurea silicate (PUS) systems are designed for use in underground environments to enhance ground stability through targeted consolidation, structural stabilization, and effective cavity filling. They are well-suited for treating fractured rock formations, loose or unconsolidated soils, and underground voids by delivering high-strength, rapid-setting solutions. With formulations available in expansive foams and compact resins, these materials support the reinforcement of weak ground and ensure the safe continuation of excavation and construction activities.

Many of the products within the MasterRoc MP range can be tailored on-site by varying the type and dosage of accelerators, enabling precise adjustment of reaction times and mechanical properties to meet specific project requirements. All MasterRoc PU and PUS systems are solvent-free and have undergone rigorous testing and certification by independent institutes, ensuring compliance with technical performance standards and health and safety regulations.

## Wide Range of Products

Master Builders Solutions offers a wide range of rock bolting solutions. Besides reactive resins from the MasterRoc RBA 38X range, the portfolio includes ready-to-use cementitious products and admixtures for OPC based grouts to adjust the behavior in terms of shrinkage compensation, corrosion protection, pumping capacity and bond improvement.



# Acrylic Resins

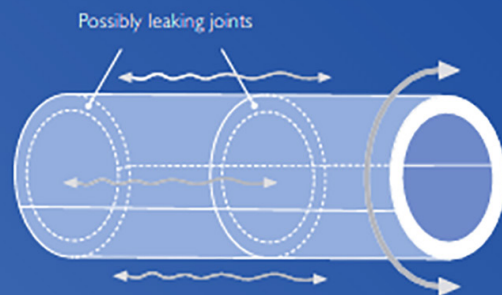
## Strong and Durable Gels for Crack Sealing and Concrete Rehabilitation

MasterRoc high-performance acrylic resins are specifically engineered to permanently seal even the finest cracks in concrete, offering long-term durability and protection. Thanks to its inherent flexibility and swelling capability, the cured resin can accommodate limited structural movement, making it highly effective in dynamic environments. It is particularly well-suited for curtain injection applications behind leaking tunnel linings and diaphragm walls, where conventional sealing methods may fall short.

In addition to crack repair, MasterRoc acrylic resins are also effective in stabilizing weak soils and sands, providing immediate structural reinforcement and water sealing. These versatile properties make the products an essential solution in large-scale infrastructure projects - such as power station generator housings - where permanent waterproofing of concrete defects is critical to operational integrity and longevity.



### Crack injection in tunnel linings



Goal of injection into sections and barriers:  
subsequently removing water



Mastering underground construction challenges requires the right partner. Continuous innovation and customized solutions ensure that customers using Master Builders Solutions® operate successfully and to the highest safety standards.

# Mineral Grout

MasterRoc mineral grouts are composed exclusively of natural ingredients - quartz sand, water, and salt - making them an environmentally conscious solution for ground improvement. These grouts consist of a stable liquid dispersion of discrete, nanometric spherical particles made entirely of amorphous silicon dioxide.

Designed for use in jointed rock formations and fine-grained soils, MasterRoc mineral grouts are often employed alongside micro-cement injections to achieve optimal performance in challenging geotechnical conditions. They are especially effective in applications requiring durable, long-term water sealing and ground stabilization.

With a viscosity comparable to water, MasterRoc mineral grouts can easily infiltrate fine soils and rock fissures, enabling superior penetration and lasting stabilization of fine, silty sands. Their gel time is adjustable - from 10 minutes to 2 hours - providing flexibility to meet the specific requirements of each project.

Unlike traditional sodium silicate-based products (commonly referred to as water glass), MasterRoc mineral grouts do not alter the pH of groundwater, ensuring minimal environmental impact. Additionally, they offer long-term durability, with strength that continues to develop over time. In the event of future rehabilitation or repair, leaks can be addressed more easily and efficiently compared to conventional waterproofing systems.



## Training and Education

Master Builders Solutions regularly offers specialized technical injection training courses at the centrally located Hagerbach underground facility in Switzerland. These courses are designed to provide both theoretical insight and hands-on experience through two key formats: demonstration workshops and practical operator training.

The demonstration workshops are conducted in realistic underground environments and are practical “show-and-tell” sessions. They aim to visually and interactively present the various application methods and technical performance characteristics of Master Builders Solutions’ injection systems.

The practical operator training is offered exclusively to customers actively using our injection technologies. These sessions focus on hands-on instruction, where participants work in small groups under the guidance of experienced instructors. The primary goal is to develop practical skills and ensure the correct application and execution of injection techniques in the field.

Additionally, Master Builders Solutions offers customized training programs tailored to specific project requirements anywhere in the world, ensuring our clients receive targeted support whenever and wherever it's needed.

## Technical Services

At Master Builders Solutions, we offer more than just a comprehensive range of injection products - we deliver complete solutions. Supporting our customers in selecting the most appropriate injection system, defining the optimal injection method, and providing on-site training and initial supervision for their personnel are all integral components of our service approach.

We collaborate closely with trusted suppliers of injection equipment and accessories to ensure the delivery of fully integrated, cost-effective, and high-performance technology solutions tailored to each project's specific needs.



# Master Builders Solutions

## About Master Builders Solutions

Master Builders Solutions is a globally recognized leader in the manufacturing of concrete admixtures and sustainable solutions for the construction industry. Committed to its vision of **Inspiring People to Build Better**, the company delivers cutting-edge technology and industry-leading R&D capabilities to enhance the performance of construction materials while driving the reduction of CO<sub>2</sub> emissions in concrete production. Established in 1909, Master Builders Solutions operates 35 production sites worldwide with a team of 1,600 employees dedicated to helping customers overcome today's building challenges and paving the way for a more sustainable, decarbonized future.

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