

Contributions to tunneling and mining

MEYCO Underground Construction

Expanding Horizons

Underground

**MEYCO**



Expanding Horizons

Underground

Our philosophy is based on improving technology, using research to develop innovative and cutting edge solutions. We believe that improving the world beneath us means improving the world that lies above us.

Every day we take on new challenges. Whenever and wherever we are, we are dedicated to helping you to improve your ideas and turn them into extraordinary new creations.

We believe in new ideas and development through dialogue and commitment. Speaking a common language with our client is the key to high quality customized solutions.

MEYCO® Global Underground Construction (MEYCO) and its clients broadens horizons through continued innovation, accepting challenges, commitment and ensuring the safety of our workers and environment.

Expanding Horizons Underground:

- We support the creation of new space – physically expanding horizons underground
- We push back the boundaries of technical limitations wherever they exist through ground breaking chemical and equipment advances – expanding the technical horizon
- Whatever challenges our customers face we will find a solution – expanding intellectual horizons





“Whatever your challenges are in the construction of new space underground, MEYCO Global Underground Construction provides more than purely equipment and chemicals for sprayed concrete.

Its innovative solutions range from the field of TBMs and injection to Waterproofing and Fire Protection, all supported by the expert engineering knowledge of our global team.”



MEYCO is the world's leader in the provision of pioneering, customer-oriented solutions focused on the needs of the tunneling and mining industry.

MEYCO is part of the Construction Chemicals business of BASF, the world's leading chemical company with the extensive support frameworks and resources expected from a worldwide construction chemicals supplier. The division operates production sites and sales centers in more than 50 countries.

MEYCO provides a unique package of chemical technology, equipment and application expertise. This combination enables several outstanding solutions:

- Sprayed Concrete in combination with the latest Logica robotic technology and new technical processes
- Unique sprayable bonded waterproofing membrane that supports composite lining tunnel designs
- Safe and economic injection and membrane technique for the mining environment
- Most comprehensive range of chemical technology which ensures the safe and economical operation of tunnel boring machines

We maximize your potential by providing innovative product solutions to suit your needs, whenever and wherever you are, aimed at saving your money and time and ensuring your continued success.





Tunneling

Total Tunnel Solutions

With over 50 years of commitment to developing truly innovative solutions, MEYCO knows that efficiency is the key to major cost reduction. MEYCO's multi-national team of engineers uses its combined knowledge and experience to evaluate the complete situation underground, providing bespoke integrated solutions rather than simply selling products. These solutions are specifically designed to support underground construction projects where our customers need flexible and smart solutions, often rapidly and early on in the process. To fulfill these requests we integrate the right products, the most suitable equipment and the appropriate level of on-site experience and support. MEYCO fully understands the issues and requirements of underground construction and provides a range of solutions for both new build and existing underground structures. MEYCO continuously maximizes the performance of materials, aiming to shorten installation times and simplify application, thereby maintaining accurate quality management. Together we achieve the best solutions in the most economical and efficient way, optimizing overall underground construction processes.

New Tunnels

MEYCO solutions and the diverse competencies of our professional teams address the many important processes that are carried out throughout tunneling, from ground treatment and excavation to ground support, waterproofing and fire protection.

Tunnel Refurbishment

MEYCO recognises the diverse and critical nature of rehabilitation projects and has developed solutions that take into account the time, space and cost restraints of this unique type of work. Thin, high-performance mortars and unique fully bonded spray applied membranes have been developed for the fire protection and waterproofing of existing underground structures to supplement our extensive and varied portfolio of refurbishment solutions.





Mining

Total Mining Solutions

During mining operations many important processes, are carried out, such as ground support, which safely secures the excavated area. MEYCO's experienced, service minded technicians are capable of solving a wide range of these problems safely and cost effectively using our products. Their core competencies relate to ground support, utilising fibre-reinforced sprayed concrete, rock and cable bolt grouting, specialized injection resins and grouts for ground consolidation and water stopping.

Hard Rock

Concrete repair and abrasion and impact resistant flooring products, are also widely used both above and below ground in the mining industry. High abrasion areas such as at crusher loading areas, ore passes etc. need regular maintenance and repairs. MEYCO has a wide range of products to provide solutions in these areas.

Coal

Our coal mining support products complement the production and safety demands created by Longwall and Continuous Miner mining methods.

MEYCO has a range of polyurethane and high performance urea silicate resins for coal consolidation and void filling. The faster reaction of urea silicate resins and their superior bonding capability improve safety and time saving.

MEYCO's Thin Spray-on Liner (MEYCO TSL) technology is a recent improvement. This unique sprayable membrane, which is flame retardant, is fast gaining ground as a 'fast-track' surface protection medium with multiple application areas such as ventilation control in mines.

Our pumpable non-shrink and aerated cement grouts provide added benefits to the coal mining industry.





Unique Organization

Global Presence

With many underground projects attracting international contractor and design teams, our global presence permits seamless technology and service transfer to any of your projects. Through its continual, proactive involvement in tunneling and mining projects, our MEYCO Global Development Center based in Zurich, Switzerland, is constantly developing new products and innovative processes to meet your specific requirements. We recognize that your success is based on delivering solutions that meet, if not exceed, your customers' valid needs.

Dedicated Development Team

Our team is committed to developing solutions for solely for challenges in underground construction. Established long-term relationships with leading universities and being part of the powerful BASF R&D community ensure that we provide the option of cutting edge technologies.

The multi-disciplinary group brings the following key assets: state-of-the-art testing and investigation equipment, expertise in cement chemistry, concrete technology, organic and inorganic chemistry, material science, mining, engineering, geology, surface science. ISO 9001:2008 and ISO 14001:2004 certifications guide our quality and environmental oriented development processes.

Flying Engineers

Our local MEYCO representatives are supported by a specialist international team that can be with you wherever and whenever needed: these are our expert "flying engineers" providing technical support, training, site set-up or problem solving.

Close cooperation between MEYCO technical site support teams and the MEYCO Development Center ensures efficient and tailor-made products.





Outstanding Service

Widest Experience

Set up almost 20 years ago, our team of more than 350 professionals uses its combined resources from around the world to provide you with a huge “database” of expertise, products and experience. Our internal technology transfer system is second to none, ensuring you benefit immediately from any new breakthroughs or practices wherever they happen. A first class service provided locally, based on a global foundation.

Key to Success

Service is second nature to us, we know successful projects are based on close relationships between supplier and customer. We assist you from start-up and understand the issues important to you, ensuring your success. MEYCO is close to you, speaks your language, adapts technologies to your local requirements and can communicate with you on all technical issues.

Total Package Approach

Our total package and innovative solutions include:

- Sprayed concrete admixtures and equipment
- Sprayable waterproofing membranes
- Fire protection
- Anchoring and grouts
- Ground and structure injection
- TBM product systems
- Mine backfill and thin spray-on liners
- Pre-cast and in-situ concrete linings
- Workshops, on-site training and continuous project support





Sprayed Concrete

Workers' Safety

The demand for high quality, durable sprayed concrete which imposes lower health risks and fewer negative impacts on the environment is ever increasing. Worldwide, there has been a dramatic shift from dry to wet mix applications in underground construction, in both the tunneling and mining sectors. This change, together with the latest technology in equipment and alkali-free accelerators, has dramatically improved the working environment and lowered the health risks. In addition, the tunneling industry has recognized the value of permanent sprayed concrete tunnel linings, while single shell structures are approaching a stage where they will soon be state of the art, delivering substantial cost and programme savings over conventional tunnel designs.

Continuous Strength Development

In order to achieve early and long-term strength to meet the demands of the underground construction market, MEYCO offers the following key ingredients that allow durable sprayed concrete structures to be constructed successfully and safely:

High Durability

- MEYCO SA range of alkali-free liquid accelerators, a family of products developed to suit your site conditions, offering compatibility to local cements and excellent long-term durability. At the same time it ensures rapid and safe progress through its high early strength and continuous strength development
- GLENIUM® range of state-of-the-art superplasticisers giving you a very low w/c ratio coupled with high and extended workability
- DELVO® CRETE hydration control admixtures designed to prolong the workability of your concrete mix to allow flexible site logistics
- MEYCO TCC bond improving admixtures added at the batching plant to internally cure the sprayed concrete immediately after spraying
- A range of other additives such as silica fume, colloidal silica, steel and polypropylene fibres





Spraying Equipment

Tradition of Innovation

MEYCO Equipment invented the first «gunite» machine operating according to the rotor principle – the MEYCO GM in 1957. This started a tradition of innovation which has continued through to the present day, providing further breakthroughs and new benchmarks in the industry.

Advanced Equipment Systems

Design of equipment is focused on the application optimization of sprayable products underground. We provide the most accurate dosing systems, pulsation-free pumping, specialized spraying manipulators, some incorporating laser guidance and various levels of automation, for every type of profile.

Quality and Service

MEYCO Equipment is certified to the highest current industrial and environmental standards. This is reflected in the Customer Service philosophy: “available around the globe, around the clock”.

Equipment with Added Value

- MEYCO Logica for safe, easy and extremely accurate application through automatic and semi-automatic modes combined with quality management tools such as profile measurement and data analysis.
- Wet-spraying machine MEYCO Suprema with site-proven reliability and unsurpassed dosing accuracy to produce the highest possible quality end-product.
- MEYCO Potenza, for civil tunneling, available with either the legendary MEYCO Robojet or the huge MEYCO Maxima manipulator.
- The fully equipped, truck mounted MEYCO Roadrunner with power take off guaranteeing absolute flexibility and mobility.
- MEYCO Cobra and MEYCO Poca, compact and very robust mobiles for tighter profiles in tunneling and mining.
- Tailor-made spraying systems for TBMs and shafts for less cluttering and more efficiency on back-up rigs and platforms.





Injection

Higher Productivity and Safety with Pre-injection

Unexpected water ingress during underground construction usually escalates project costs and inevitably causes significant delays. To counteract these risks, an economical approach is pre-injection of the ground ahead of the advancing face, with microcements and mineral based grouts. Of course, there are circumstances calling for post-injection, stabilisation of soils and even structural repairs using high performance chemical injection products. MEYCO offers a complete range of products and technical support to suit any problem you encounter.

Controlled Setting

- The RHEOCEM® range of microcements represents a significant technological advantage in cementitious injection. Its unique feature is rapid and controlled setting, allowing uninterrupted blasting rounds or continued injection sequences, thereby enhancing productivity considerably.
- MEYCO's polyurethane and urea-silicate resins, such as MEYCO MP350, 355, 357, 364 and 367, are for waterproofing, strata stabilisation and void filling in mining and tunneling applications.
- We offer a range of high performance acrylic gels for ground stabilisation and durable, structural concrete crack injection.

Ecologically Friendly

- A unique addition to the MEYCO injection family is MEYCO MP320, a mineral-based grout. MEYCO MP320 is stable and consists only of natural ingredients, making it non-hazardous and ecologically friendly. Due to its very low viscosity, MEYCO MP320 penetrates finer fissures than any cement based products and ensures unrivalled penetration and permanent stabilisation of fine, silty sands.





Waterproofing

Composite Lining

Technology development in this area of underground construction has remained quite static until recently. Conventional sheet membranes are the norm, but are often susceptible to leakages that are notoriously difficult to rectify. Furthermore, they are unsuitable for complex tunnel configurations.

Excellent Bond

In response to industry demand, MEYCO has developed a new spray applied waterproofing membrane that is suitable for sandwich construction between sprayed or cast concrete shells.

As there is sufficient bond strength, the spray applied membrane facilitates the construction of composite linings, while mitigating the risk of water ingress by eliminating potential water paths. The system's waterproofing performance results from the excellent bonding properties between the membrane and concrete.

The MASTERSEAL® waterproofing concept has the following features that can assist you throughout your project:

- Highly economical, strength optimized tunnel design
- A reliable waterproofing composite system for complex geometries
- Enables efficient tunnel refurbishment through a thin extra layer
- Uses standard dry spraying equipment
- Simple and safe to apply
- Up to 100m² per hour application rate with three operators
- Can be applied by fully automated robotic system (MEYCO Logica) at up to 180m² per hour
- Sprayed final lining concrete with fibres is easily applied to membrane

Easy Application





Fire Protection

Fast Application

With the recent, highly publicised tunnel fires and consequential damage to the tunnel linings, national authorities have clearly identified the need for fire protection in underground structures. Fire protection in tunnels is currently viewed as a means to significantly reduce repair time and costs, reopen a tunnel sooner following a fire and, in some instances, save lives. The only solution to effectively prevent explosive concrete spalling, and a reduction in structural concrete strength, or loss in reinforcement tensile strength during a tunnel fire is a thermal barrier.

Highest Requirements

MEYCO's unrivalled solution is known as MEYCO Fireshield 1350, a cementitious sprayed thermal barrier with unique properties that can be applied with robotic systems providing high production rates, even finish and controlled thickness. The thermal barrier system is relatively thin and ideal for both new tunnels and existing unprotected tunnel linings where, typically, the space envelope is always limited.

Fully Bonded Solution

- MEYCO Fireshield 1350 system:
- Significantly higher compressive strength than conventional thermal barriers
- Durable throughout service life and in fires
- Externally tested by several institutes
- Resistant to 1400°C
- A fully bonded solution requiring no reinforcement mesh
- Applied by MEYCO Logica to a tolerance of ± 4 mm
- Also available as pre-cast panels to suit tunnel geometry
- Variable thickness of thermal barrier to suit all fire loads
- Can be painted to enhance surface finishing
- Comprehensive technical backup including Design Guide for different fire loads





TBM Solutions

Higher Efficiency and Optimum Performance

MEYCO has broken ground in addressing the needs of TBM tunnel customers. We believe our total solution approach brings a new dimension to this challenging sector, enhancing the efficiency and performance of TBM drives, even in more challenging ground conditions. MEYCO offers the broadest range of products and services available to cater for the needs and problems TBM tunnel, whether using soft ground shielded methods or open hard rock methods. Our main portfolio consists of:

Effective Sealing

- MEYCO SLF range of foams for EPB soil conditioning in any geology
- MEYCO SLF P range of polymers for EPB soil conditioning and slurry machines
- RHEOSOIL® anti-clay agents for EPB, Slurry and Hard Rock TBMs
- MEYCO TSG range of tail sealants to suit all possible site demands
- MEYCO BSG range of excluder greases for effective sealing of the main bearing
- MEYCO ABR anti-abrasion and dust suppression agents for Hard Rock TBM machines
- A wide range of annulus grout admixture products to improve performance and cost effectiveness through trouble-free grouting operations
- State-of-the-art segment and lining concrete admixtures, mould release agents, curing agents, fibres and repair materials, ensuring highly durable tunnel structures
- Modular, custom-made robotic manipulators and pumps for sprayed concrete



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Mine Backfill

Chemical Solution

Backfill, the process of back filling material into the underground voids created by mining, is essential in many underground operations for the holistic extraction process. Backfill material types and processes are numerous but normally utilize the tailings from the mill with binder and fillers to provide the required restraint to enable massive strategic support for the underground extraction sequence of the ore.

Cost Reduction

Mine backfill is becoming more and more important due to the trends in mining to: mine deeper, optimize ore recovery, optimize water recovery, improve backfill material properties, decrease environmental impact and decrease total cost. There is a more scientific approach to this challenge that helps miners to understand and run backfill operations at lower risks.

Flow Optimization

Advanced admixtures can solve various problems associated with Backfill processes. From Paste to CAF (Cement Aggregate Filler) types of backfill, chemical solutions are available for increasing solids content, reducing friction and segregation, modifying rheology and flow and reducing binder content and hence costs. We extend the physical limits with our existing technologies (e.g. retarders, water reducers, superplasticizers, viscosity modifying admixtures -VMAs-, etc) and we are working hard to go even farther in all segments of the backfill operation. Depending on our customers' requests, we can individually control and achieve: retardation, acceleration, rheology control (viscosity, yield point, pumping pressure, fines stabilization in the matrix, slime run off, in situ settling, porosity, etc), strength development, binder optimization etc.

MEYCO's industry leading technology should always be considered when planning any new mining venture as it creates opportunities for the mine owner to be more efficient, environmentally compliant, and safer, which is now mandatory in the mining industry.





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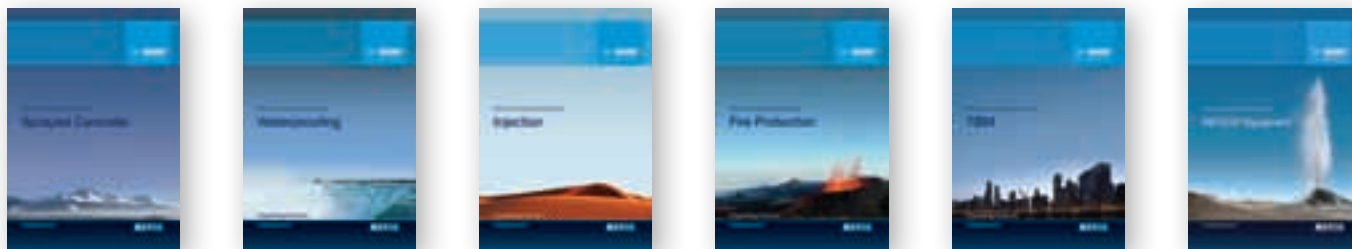
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