

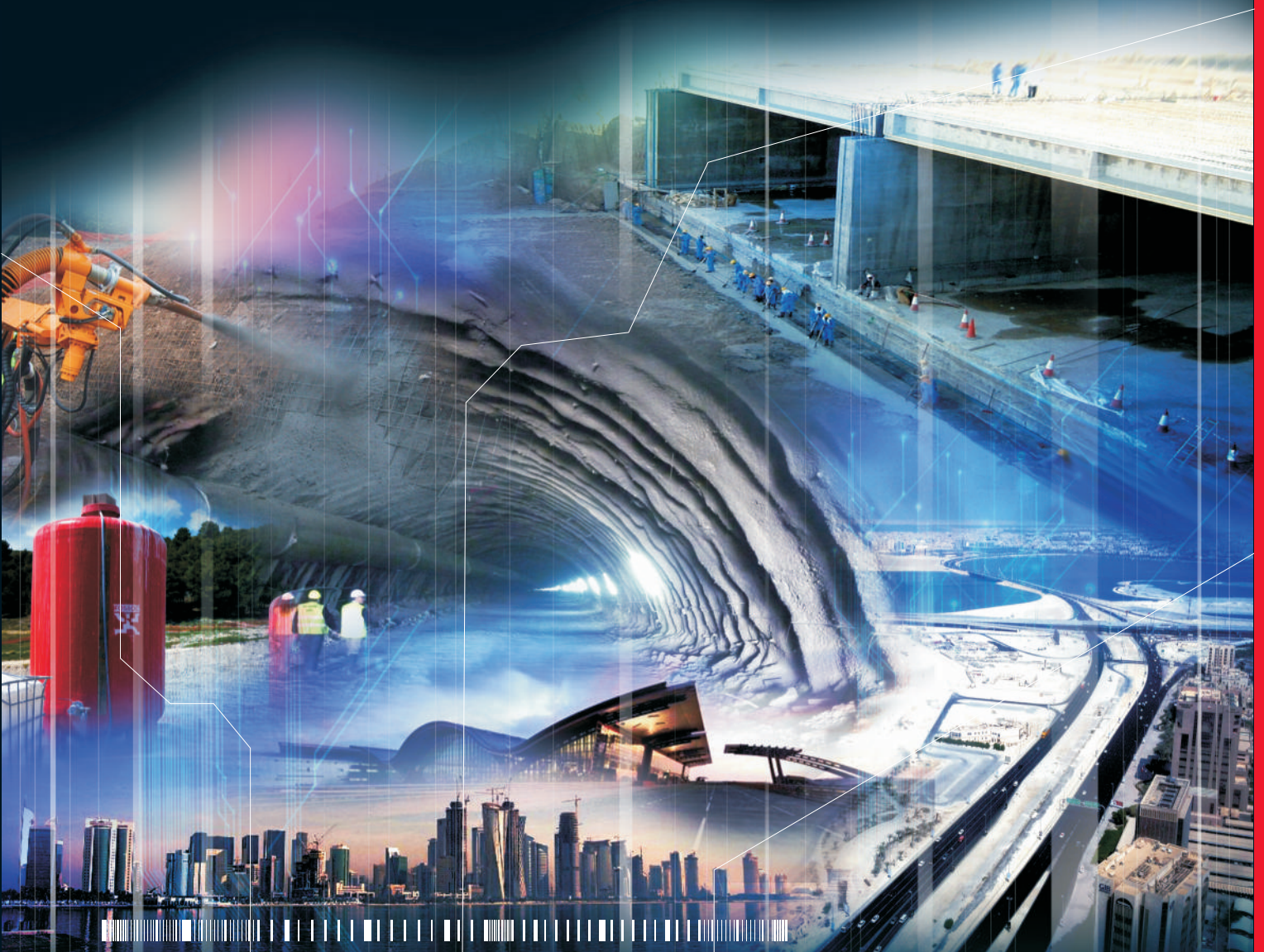
FOSROC



constructive solutions

Tunnelling Solutions

High performance technology for concrete, waterproofing and repairs





constructive solutions

Our profile

Since the company's beginnings in the UK, Fosroc has developed into an International leader in delivering Constructive Solutions for projects across a broad range of market segments including transport, power, industrial and general buildings.

Fosroc has an extensive network of offices and manufacturing locations across Europe, the Middle East, India, North and South Asia, and is further represented in other regions across the world by distributor and licensee partners (for your local details please refer to www.fosroc.com).

Selecting from the full portfolio of Fosroc products and services and integrating expert technical support, world class customer service and innovation, Fosroc goes beyond just product selling to ensure that we partner with our customers to deliver complete constructive solutions.

- Concrete Admixtures
- Cement Grinding Aids
- Surface Treatments
- Grouts & Anchors
- Waterproofing
- Joint Sealants
- Concrete Repairs
- Surface Coatings
- Industrial Flooring



Fosroc support

For a tailored total protection solution for your project, please contact your local Fosroc office where experienced staff will assist, providing you with a high level of support, including;

- CAD details
- Project specifications
- Site-support as required
- Seminars

Technology developments

Due to the growing concern from environmental issues and the decrease of available urban land, the demand for tunnel construction is on the increase. Alongside these demands, the technological developments in construction methods, applications and products have shown substantial progress in recent years.

Searching for efficiency

In today's tunnel construction market, clients and contractors are searching for new ways to be more efficient which will result in tangible cost savings. Fosroc recognise this and have developed their business to give guidance to Engineers and Contractors, providing them with the tools to choose the best possible system solutions, specifically tailored to meet their individual project requirements. Fosroc are constantly improving the technology performance of their products, striving to provide solutions that reduce tunnel construction times, maintenance and safety concerns whilst simplifying installation methods and increasing long term durability.

The Fosroc Solution

Fosroc Tunnelling can provide you with customised solutions which include;

- On-site support.
- Our site specialists advise on the most efficient and economical solution for your project in close collaboration with the project site personnel. Supported by regional development and research centres, our tailored solutions are innovative, practical and economical.
- Project specific mixes using admixtures that deliver low hazard, high productivity, long term durable concrete and shotcrete.
- Multi-system choices for waterproofing, grouting, repairs, injection resins, waterstops, drainage membranes, polypropylene fibres, release agents and surface retarders.
- Accelerators for high performance shotcrete.
- Technical specifications, testing and reports.



Shotcrete

Latest tunnelling methods adopt shotcrete to control surface deterioration of the surrounding rock in a number of ways. The most common method is to prevent the loosening of the substrate and to preserve the in situ moisture content of certain types of rock.

Shotcrete can be applied without reinforcement, but usually it is reinforced with steel mesh or more commonly with fibres. Fosroc's range of innovative accelerators enable the shotcrete to adhere to the substrate, even in overhead applications, and develop high early strength for the consolidation of the rock structures. It is usually installed with other forms of rock support, such as rock-bolts, anchors and dowels or in severe cases with steel sets (arches). When shotcrete and rock reinforcement are used together, they form a composite support system with reinforcement supporting the rock mass as a whole and the shotcrete layer maintaining the integrity of the surface and rock reinforcement.

Shotcrete is straightforward to apply but consideration should be given to the correct mix design, additives (hydration control, fast setting agents etc.) and which equipment is required. Nozzle handling is also a key factor for successful applications. Fosroc is your ideal partner to provide assistance from design phase through to on-site support, selecting from their extensive range of shotcrete admixtures.

Product	Benefits
Sprayset HBP	Low rebound - less wastage. High build up with minimal slump - faster application. Safe to handle.
Sprayset SL	Rapid set – fast application. Minimum rebound – less wastage. Excellent for overhead surfaces.
Fibrecrete FR	Reduced 'shrapnel' effect. PP fibres therefore no corrosion problems.
Sprayset HBL42	Alkali-free and low dust emission – improved working environment. Rapid set – fast application. Low rebound – less wastage.
Sprayset HBL44	Alkali-free and low dust emission – improved working environment. High performance rapid setting, low rebound, economic accelerator.
Fibrecrete ST750	PP fibres therefore no corrosion problems. >750J energy absorption. Economical system.



Typical applications;

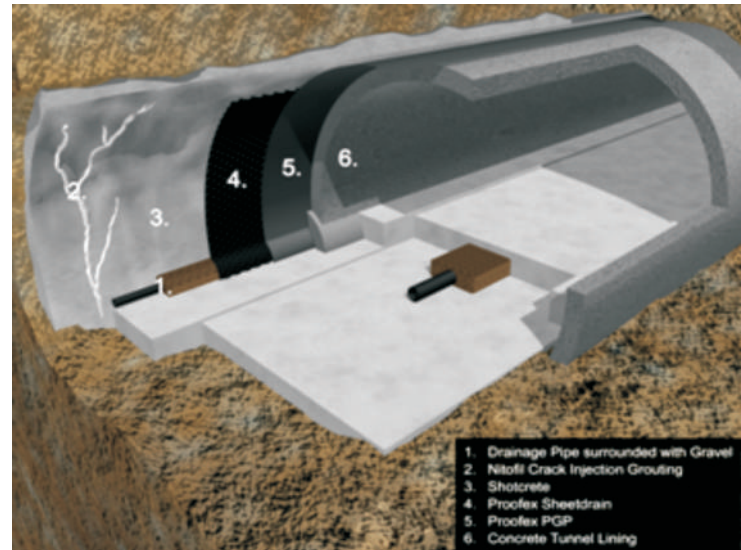
- Road and rail tunnels
- Hydropower tunnels
- Concrete repair
- Water channels
- Slope stabilization
- Artificial rock

Waterproofing

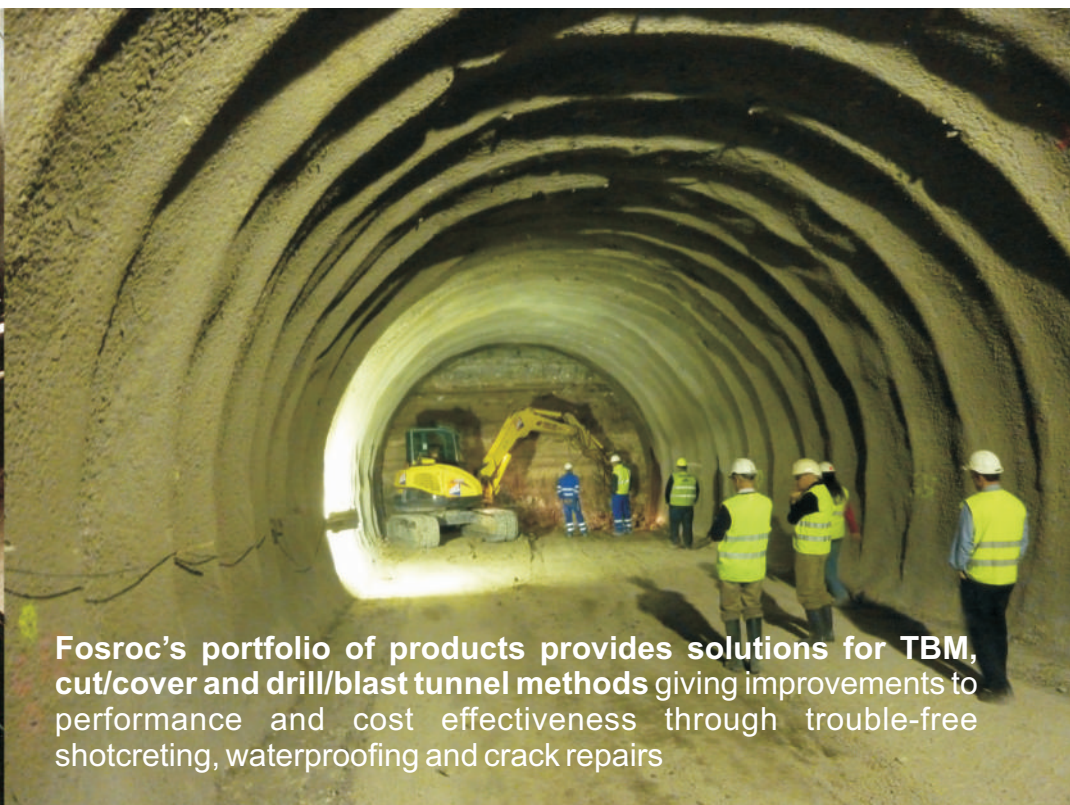
Most major decisions for tunnelling projects begin with adequate knowledge of the specific ground conditions and how to design the structure around these. The method of dealing with water from the surrounding ground is one of the important considerations, and if not assessed properly and the subsequent waterproofing system not applied correctly the first time, will cause leakages resulting in expensive remedial costs.

Fosroc have extensive worldwide experience in the waterproofing of below-ground structures and can offer several solutions for the tunnel sector from their broad portfolio. Fully bonded waterproofing systems provide the highest level of waterproof protection, these can be either in sprayed form or by pre-applied membrane.

For assistance in the choice of the best waterproofing system for your particular tunnel project please contact your local Fosroc office.



Application	Product	Benefits
Fully bonded waterproofing	Proofex Engage	Assured waterproofing due to mechanical bond to fresh concrete. Excellent non water-tracking performance. Easy, quick installation.
	Fosroc Polyurea WPE	Shortened construction times due to rapid setting properties. Spray-applied seamless system.
Loose-laid waterproofing	Proofex PGP	Established waterproofing method. High puncture resistance and elongation.
Drainage membrane	Proofex Sheet Drain	Rapid water dispersion due to high flow capacity. Single cusped for ease of application.
Concrete joints	Supercast PVC/SW	Basic polymer swellable waterstops giving excellent long term wet/dry cycle durability. Economical PVC profiles.
	Expoband H45	Hypalon bandage giving high movement capability.
Segment gaskets	Fosroc Aquaprene C	Easy, quick installation. Excellent long term wet/dry cycle durability. Can withstand 35bar hydrostatic pressure.



Fosroc's portfolio of products provides solutions for TBM, cut/cover and drill/blast tunnel methods giving improvements to performance and cost effectiveness through trouble-free shotcreting, waterproofing and crack repairs



For information on all Fosroc products and services please visit www.fosroc.com where datasheets, MSDS etc can be downloaded



Cost-effective solutions

World class customer service

International coverage

Understanding customer needs

Tailored products

Innovative technology

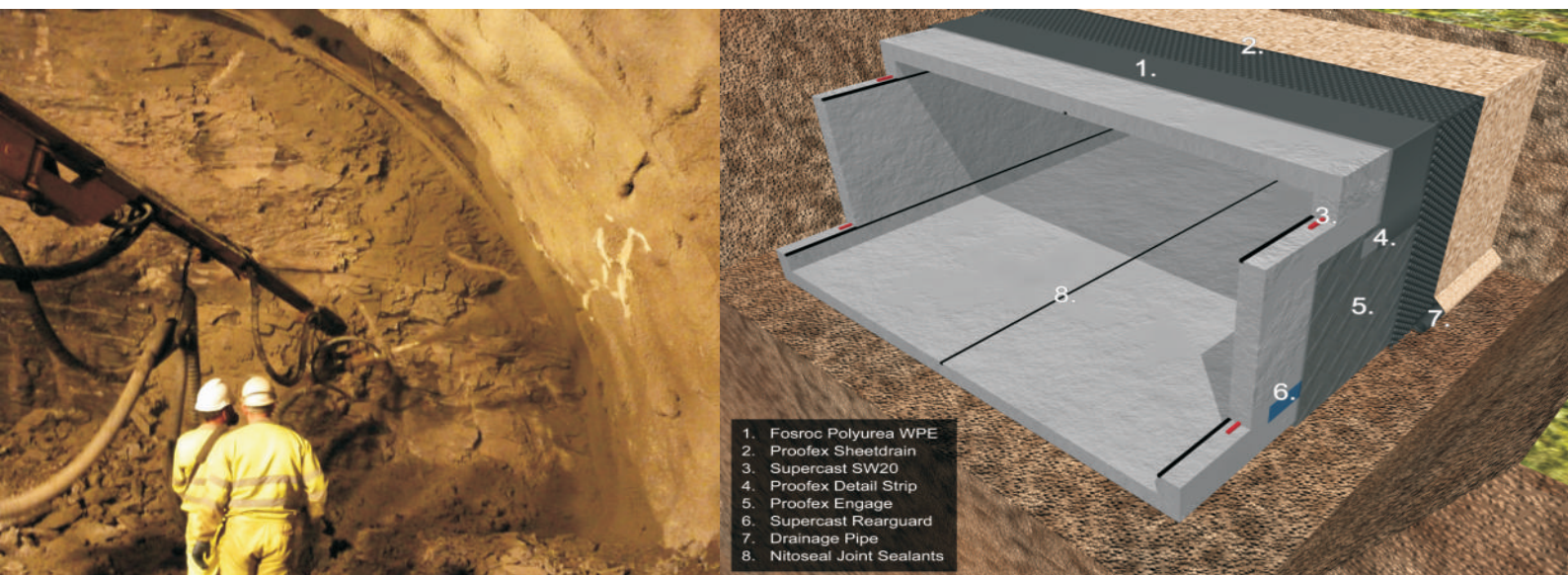


**The
Solutions
Provider**



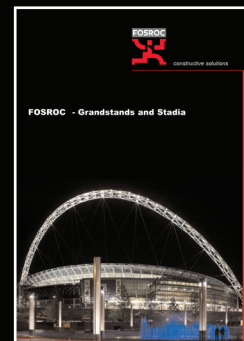
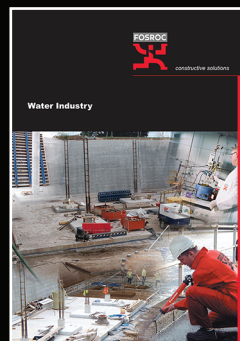
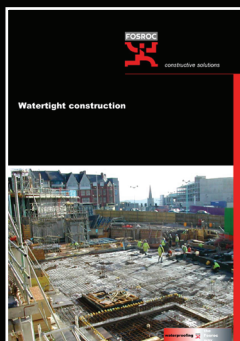
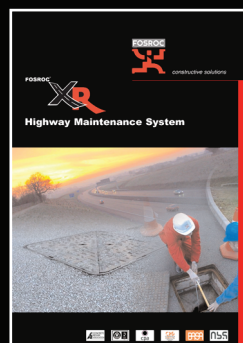
Fosroc tunnel solutions range

Application	Product	Benefits
Precast concrete	Auracast PC admixtures	excellent rheology at low w/c ratios leading to high quality finish.
In-situ concrete	Auramix PC admixtures Structuro PC admixtures	Increased early & long term strength of concrete. Reduced bleeding and segregation. Reduced overall application costs.
	Conplast SP Superplasticiser admixture	Reduced w/c ratio. Improved strength development. Improved fresh and hardened concrete properties. Reduced overall application costs.
	Conplast R Conplast HC Hydration control admixture	Improved flexibility in site logistics and application.
Underwater concrete	Conplast UW Conbextra UW	Minimises washout of concrete placed underwater.
Fibre reinforcement and passive fire protection	Fibrecrete PP fibres Fosroc PPF	No HSE concerns. No long term corrosion issues. Reduced equipment wear – less downtime and maintenance costs.
Concrete repair	Renderoc range of hand, spray or flow applied mortars	Fast setting, high strength, high-build, low shrinkage.
Crack repairs	Nitofil EPLV Nitofil WS60 Nitofil UR63	Resin injection – dry repairs. Resin injection – water stopping repairs. Resin injection – flexible resin.
Anchoring	Lokfix range	1K and 2K systems for vertical, overhead & horizontal.
Grouting	Cebex and Conbextra range	Cementitious and resin systems. Thixotropic and pumpable grades.
Mould release	Auramol	Biodegradable, easily sprayed, clean quick stripping of formwork.



www.fosroc.com

Fosroc offers a full range of construction solutions, helping to protect structures throughout the world. Please refer to our other brochures, which include:



Details of your local Fosroc office can be found at
www.fosroc.com

Important Note

Fosroc products are guaranteed against defective materials and manufacture and are sold subject to its standard terms and conditions of sale, copies of which may be obtained on request. Whilst Fosroc endeavours to ensure that any advice, recommendation, specification or information it may give is accurate and correct, it cannot, because it has no direct or continuous control over where or how its products are applied, accept any liability either directly or indirectly arising from the use of its products, whether or not in accordance with any advice, specification, recommendation or information given by it.