

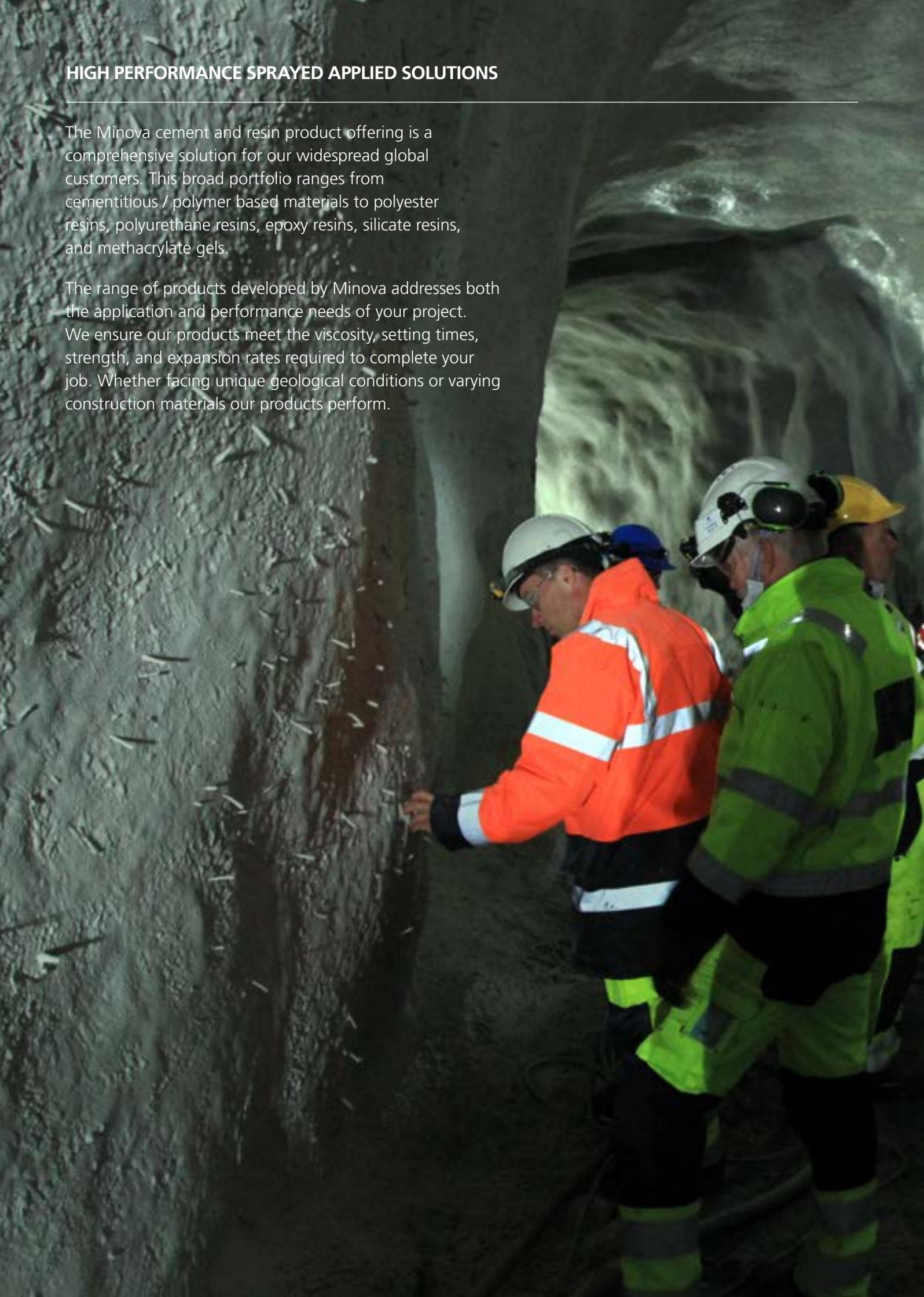
SPRAYED STRUCTURAL &
WATERPROOFING MEMBRANES



HIGH PERFORMANCE SPRAYED APPLIED SOLUTIONS

The Minova cement and resin product offering is a comprehensive solution for our widespread global customers. This broad portfolio ranges from cementitious / polymer based materials to polyester resins, polyurethane resins, epoxy resins, silicate resins, and methacrylate gels.

The range of products developed by Minova addresses both the application and performance needs of your project. We ensure our products meet the viscosity, setting times, strength, and expansion rates required to complete your job. Whether facing unique geological conditions or varying construction materials our products perform.



SPRAYED STRUCTURAL AND WATERPROOFING MEMBRANES



With over 135 years of experience, Minova is a leading global manufacturer and supplier of chemical and mechanical earth control products, adhesives and support equipment. We provide leading edge geotechnical solutions as well as consulting, design and applications expertise for use in the mining, tunnelling, civil construction and structural remediation industries.

Minova is an industry innovator and leader both in technology and application expertise. Our product and applications specialists from around the globe provide on-site technical support for your projects no matter the location.

With a focus on safety, Minova success comes from customer-connected engineers and chemists who continually innovate and perfect solutions, raising industry standards.

We work in the following coating and linings-application areas:

- Anchoring, Rock Bolting and Soil Nailing
- Concrete Repairs
- Construction Adhesives
- Customer Support Services & Advice
- Erosion Control
- Filling of Voids, Cavities and Backfilling Operations
- Ground Consolidation
- Micropiling and Underpinning
- Mine Gas Sealing & Ventilation Control
- Non-potable Water Pipe Repairs
- Pumps and Ancillaries
- Joint Sealing
- Slope Stabilization
- Structural Repair
- Water Sealing

This brochure represents a general overview of the most common solutions for structural coatings, linings and waterproofing membranes used by the mining and construction industries around the world.

Please visit, www.minovaglobal.com for more details.

Minova is forward thinking and offers integrated solutions with sustainable results. Specialising in total solutions using leading edge technologies designed to meet your challenges.



STRUCTURAL COATINGS, LININGS AND WATERPROOFING MEMBRANES

Minova supplies a broad range of wet and dry sprayed products which function as either structural or waterproofing membranes. These pre-blended products offer the simplicity and flexibility of dry-spraying, which is ideally suited to applications where small volumes are needed, the timing of application is unpredictable, or the work site is very constrained. Production can also be scaled up for projects requiring larger volumes.

Spray applied waterproofing membranes

This innovative technology is increasingly popular for waterproofing in low water pressure environments. In 2013, ITAtech published guidance on the design, specification and application of spray applied waterproofing membranes.

Since then, spray applied waterproofing has been used on many projects, including the high profile “Crossrail” underground stations in London. The ability of the sprayed membrane to naturally bond to wall surfaces means that linings can be designed as composite structures which is ideal for use in combination with sprayed concrete. The bond prevents the migration of water that may occur with other traditional membranes.

Sprayed applied structural membranes

Thin Spray-on Liners (TSL) were originally developed in the mining industry to cope with rock burst. Minova engineered polymer modified cements are designed to provide fast acting, highly ductile rock support and are ideal for immediate rock support in challenging ground conditions. Minova structural membranes are a high-performance alternative to conventionally sprayed concrete where fast acting support is needed, small volumes are required, or space is limited. This makes Minova TSLs highly suitable for application behind the Front Support, in hard rock gripper TBMs, or in mining and tunnel repair projects.

Minova developed TekFlex® in 2000 as a structural membrane for mining. By working with our customers Minova has been able to expand the capabilities of TekFlex to perform as a spray applied flexible waterproofing membrane.

The TekFlex Family is a cement modified polymer coating with excellent adhesive qualities, good flexibility and tensile strength. The product forms a flexible barrier and support membrane that enables the rock to retain its initial integrity by eliminating the degrading effects of scaling, spalling and weathering. Available in black or white, TekFlex can be manufactured with or without additional fibre reinforcement for added tensile strength. It comes as either a single component, dry sprayed material, or a dual component, liquid and powder, wet sprayed material. The formulation chosen is driven by application requirements and desired product finish.

TekFlex DS-W for tunnelling

Minova TekFlex DS-W is a single component, dry sprayed material developed for use in Tunnelling. A 3-4mm thick coating creates a durable membrane with good resistance to freeze-thaw zone exposure and chemical attack. TekFlex DS-W bridges small cracks by adding a superlative waterproofing element.

Reinforcing concrete may be cast or sprayed onto the TekFlex DS-W membrane bonding with it. This bond prevents and seals off any migration of water from permeating through cracks in the substrate.

- Key advantages include:
- Bonds well to concrete and other materials
 - Complies with Eurocode (XA3 exposure class)
 - Forms a tunnel composite shell lining
 - Bond Strength: > 0.5 mPa
 - Crack Bridging: > 6mm for 4mm layer
 - Curing: ~5 days
 - Elongation: > 400%
 - Tensile Strength: > 1.7 mPa

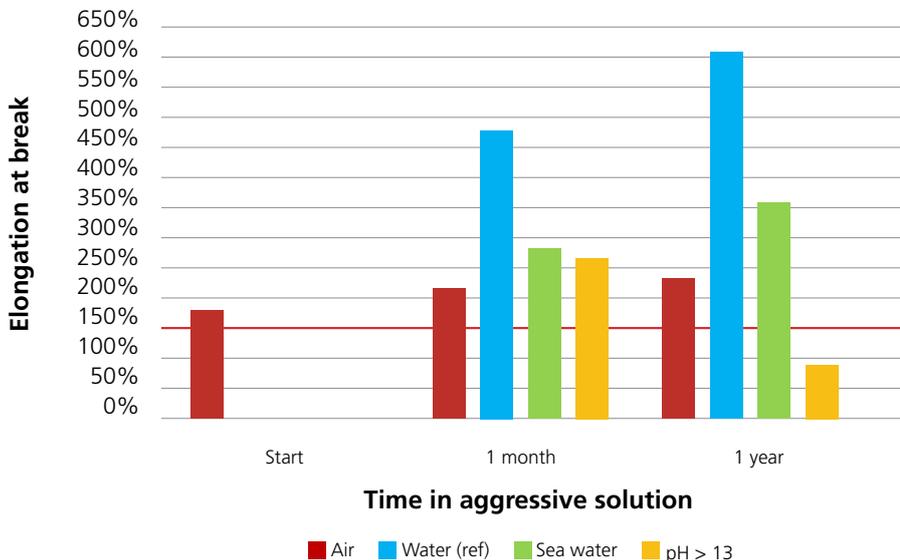
Minova TekFlex Dry Spray

Minova TekFlex Dry Spray coating is a patented high tensile strength sealant specially designed for use in the construction and mining industries. It is used to permanently stabilize the integrity of rock structures while accommodating the stresses associated with strata movement while providing a barrier to moisture degradation.

Application of TekFlex products may be performed with traditional spraying equipment or with dry spray shotcrete (Gunit) equipment.

Minova supplies a broad range of dry and wet sprayed TekFlex® products which function as structural or waterproofing membranes.

Chemical resistance - elongation





STRUCTURAL COATINGS, LININGS AND WATERPROOFING MEMBRANES

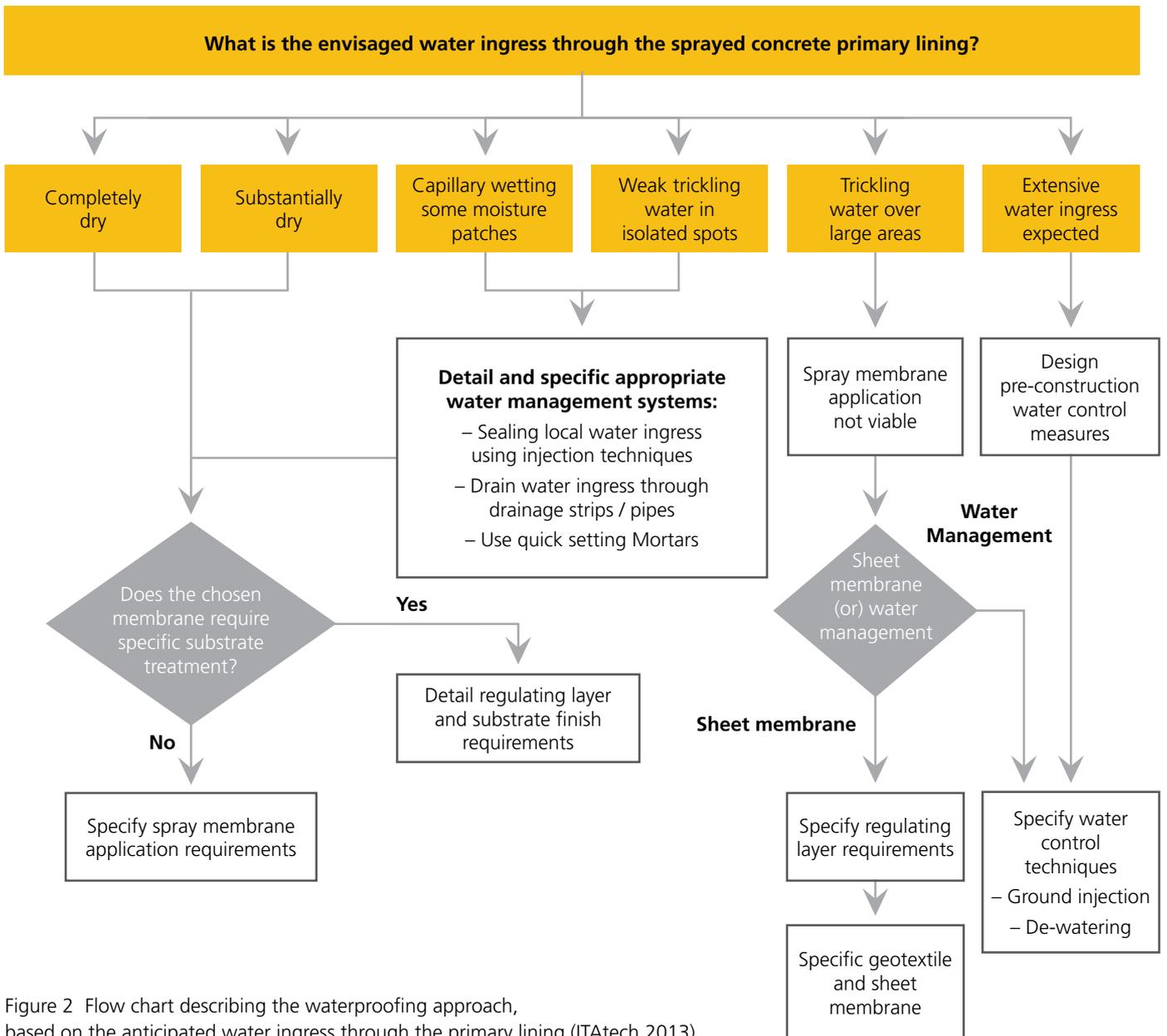


Figure 2 Flow chart describing the waterproofing approach, based on the anticipated water ingress through the primary lining (ITAtch 2013)

STRUCTURAL COATINGS AND LINING SYSTEMS

Minova offers a range of Coatings and Thin Sprayed Liners for the construction and mining sectors that provide immediate, flexible rock support for use in the toughest environments.

Dry Sprayed Products

Within the field of dry sprayed concrete, Minova offers many product options to meet your job requirements. Examples of our product offering are TekCrete Pro 1500™ and Minotor C® both are fast-acting, high quality structural shotcretes. Ideal for structural repairs or small volume applications such as ad-hoc rock support behind an open face TBM or a smoothing layer before applying TekFlex.

Flexible Structural Liners

The TekFlex® coating is a high tensile strength flexible coating for use as an alternative for surface rock support. TekFlex has been successfully applied in a wide range of applications in mining and construction for consolidation of loose rock surfaces, protection against weathering and construction of ventilation walls.

TekFlex is safe to handle and apply using conventional systems. Application can be performed mechanically or by hand requiring only typical PPE and no special ventilation requirements.

Ultra-Rapid High Strength Coatings and Liners

TekCrete® Fast is an ultra-rapid setting high strength coating. It is a high performance, dry sprayed fibre reinforced shotcrete.

TekCrete Fast offers:

- Ultra-Rapid High-Early Strengths: leads to structural application use
- Superior Adhesion: bonds to the most difficult of surfaces
- Safe: Produces minimal dust, the high modulus polymer fibres are safe to handle
- Ideal for Aggressive Environments: very low permeability rating against Chloride Ion Penetration
- High Build Rates: rapid strength gain allows for high build rates
- Fibre-Reinforced: fibres create strain hardening and excellent post peak failure characteristics (flexural tensile strength = 10 mPa after 1 day)

The Minova TekCrete family of products offers an unparalleled dry spray concrete for rock support and structural repair.

COMPLETING THE SOLUTION

Minova offers a complete range of products to solve your coating, lining and membrane project needs. Sprayed structural coatings and waterproofing membranes are often used in combination with other types of Minova products such as water-stopping injection resins and surface preparation layers.

Water-stopping injection resins

Before applying coatings, linings or membranes, injections to the ground may be required to control / stop water seepage or inflows. Stopping water depends on many factors such as the type of water inflow, temperature and the specific geology.

Our range of polyurethane and silicate based resins can be used to stop water, consolidate ground, seal cracks and more. Product examples are:

CarboPur®, a fast-acting, two component polyurethane resin which works in dry conditions, but expands into a high strength foam when contacting water, and CarboStop®, a single component product that performs comparably but with lower strengths.

Our family of resins are safe to use with normal precautions and do not present a hazard to the environment once they have reacted.

Surface preparation products

Surface preparation is an important step in the efficient application of spray applied waterproofing membranes.

For dry application areas, Minotor C®, a fine-grained dry spray mortar, is an excellent product.

For damp application patches, Minostop®, a rapid setting mortar can be applied to seal against seepage, under lower water pressure. Once cured Minostop forms an impermeable layer of protection.

FT-30®, a single component super-sulphate cement with fine-grained aggregate and modifying admixtures, can be dry-sprayed on areas of seepage as well as areas under pressurized water ingress. Due to its permeable structure immediately after spraying, water can still seep through the material without creating delamination. After a couple of days, as FT-30 hardens the structure becomes impermeable.



Australia
+61 2 4939 3756

Germany
+49 201 80983 500

Sweden
+46 8 681 43 00

Austria
+43 4245 65166 0

Italy
+39 02 3932 6262

Taiwan
+886 2 28982221

Canada
+1 800 341 7615

Poland
+48 34 317 6644

Ukraine
+382 062 345 4916

China
+86 22 29469789

Russian Federation
+7 3842 570 092

United Kingdom
+44 1226 280 567

Czech Republic
+420 596 232 801

South Africa
+27 11 923 1900

United States
+1 800 626 2948

Latin America
+56 2 7153867

Spain
+34 98 566 9911

All offices and product
information available at
www.minovaglobal.com

