

INNOVATING GROUND SUPPORT.



SECURING PERFORMANCE. TOGETHER.

We are an international producer of high-performance ground support products for the mining, construction and energy industries.

Our products are engineered to provide safety, efficiency and certainty to your operations wherever you are.

We can provide you with tailored solution offerings for a variety of applications whatever it takes.

We can help you increase project performance and overcome application challenges through a flexible product portfolio with a wide range of differing characteristics, wherever you go.

SOLUTIONS THROUGH PARTNERSHIPS.

We are a premium provider of ground-support solutions with over 135-year history.

We take great pride in providing customers with peace of mind, supported by a relentless attention to safety, cutting-edge performance, productivity improvements and dedication to sustainability.

OUR INNOVATIONS

Underground mining operations must overcome a wide range of geological challenges to ensure safe and productive operations.

Our ground support solutions focus on delivering optimised solutions that support productivity improvements and reduced risk profiles.

Our innovations include:

- Surface to Seam Ground Support
 - Pumpable Cribs
 - Ventilation Seals
 - Injection of Chemicals
 - Cable Bolt Grout
- Non-Metallic Face Support
- Resin Injection
- Optimised Ore Recovery



SURFACE TO SEAM GROUND SUPPORT.

PUMPABLE CRIBS

We are the original developers of the technology for dual component long distance pumping, grouting and liquid cement systems.

Key features:

- Automatic batching system quickly delivers product underground (15min to pump a crib)
- Bag capacity 200-500T (steel & cuttable wire reinforced)
- Bag diameters 760-1,000 mm
- Over 15 years experience in USA supplying pumpable crib technology
- CIMA plant digital batching system ensures accurate water ratio control for guarantee of design strength performance



over **15 years**
of experience

In supplying pumpable crib technology.

under **15 mins**
installation time

Our pumpable cribs are quickly installed, driving your site efficiency.

200-500 T
bag capacity

Allowing to optimise the right amount of grout for your site.

760-1,000 mm
bag diameter

Adapting to your site size.

GROUTING PRODUCTS.

CIMA DELIVERY SYSTEM

An automated batching system that delivers grout based products from the surface to underground via a borehole or portal.

The system is managed, operated and delivered from the surface minimising the labour footprint.



TEKPAK P

Minova's Tekpak Pumpable Crib System has been specifically developed to provide enhanced standing and roof support in underground coal mining.

The system provides a more productive means to install roof support in longwall mining operations, providing increased safety for operational personnel and more cost effective mine production.

ADVANTAGES

Limited personnel needed

Delivers 30 cubes of product per hour

Mixing process takes 3 minutes and is ready to pump

Allows for continuous batching

Plug in system, easy to relocate

ADVANTAGES

Patented Technology - two part chemical system Tekcem and Tekbent

FRAS Rated Design - Crib bags specially designed for Australian applications

Save time and resources - pump cribs from the surface in 15 minutes

Quality assurance - quality controlled application

Product excellence - crib design enables over 400 tonnes load bearing capacity

SURFACE TO SEAM VENTILATION.

Our team have more than 20 years of experience of design and installation (including live and engineered designs) in Australia.

As every mine has different challenges and requirements, our team have developed an extensive database of ventilation designs for even the most challenging applications.

Key benefits:

- We are the only contractor to have completed live explosion testing of ventilation seal designs
- Complete ventilation plug seal from the surface in 4-6 hours using high yield grouts
- Manage accurate water ratio every time, with our CIMA surface mixing system

CUSTOMER CHALLENGES: UNDERGROUND SEAL

We worked with a NSW coal mine to develop an approved design for the surface to seam plug seals.

FB200 plug seals with a 120psi rating, were pumped 160m deep down a borehole and 700m horizontally to complete six bulkheads.

More work completed:

- 40m long stopping rated to 40kPa
- 6m wide stoppings, 7m high, rated to 35kPa



20 years

of experience

In ventilation design and installation.

4-6 hours

installation time

Ventilation systems are quickly assembled to speed up your production time.

PLUG SEALS.

We have installed ventilation seals throughout Australian coal mines for more than 15 years. Our concrete and plug seals can be individually designed to suit the strata conditions and roadway dimensions of most underground mines.

We offer full roadway evaluation, seal design and contract installation of explosion rated seals.

Our installed structures are fully rated and quality control tested to ensure construction is completed according to design specifications.

Plug seals are typically constructed using our pumpable high yield grouts including FB200 and Tekseal. Explosion rated Tekseal plug seals have been tested to withstand blast pressures up to 120psi.



FB200

FB200 is a low viscosity grout used for rockfill consolidations, cavity filling, pillar replacement, mullock consolidation and ventilation seals. FB200 is also a high volume grout, allowing less amounts of material to be transported into the mine or tunnel. Considerably larger outputs are possible when mixing FB200 compared to traditional cement grouts.

ADVANTAGES

Productivity gain – rapid placement and quick strength gain

Flexibility – grouts can be remotely pumped

Product performance – rapid gelling quickly seals leakage paths

Quality assurance – quality controlled application

Operating environment – yields to ground pressure thereby reducing stress concentration

Safety – non-shrinking and low alkalinity making product safe to handle



TEKSEAL

Life foaming grout used for construction of ore pass plugs, ventilation seals and cavity filling to enable safe working environments.

ADVANTAGES

Explosive resistant ventilation seals

General cavity or void filling

Excellent durability

Long distance pumping

Rapid placement

INJECTION OF CHEMICALS TO SURFACE.

“WE PIONEERED
THE FIRST RESIN,
APPLICATION
SYSTEMS
AND DESIGN
FORMULATIONS
INTO AUSTRALIAN
MINES BASED
ON THE GERMAN
TECHNOLOGY”

95%
activity eliminated

Our pumpable chemicals give you the right flexibility to optimise your operational efficiency.

up to **3,000 m**
hose length

Our pumps ease accessing the hard to reach areas.

Pump up to 3,000m from the surface using a variety of pumping methods, eliminating 95% of activity.

As every mine has different challenges and requirements, our team have developed an extensive database of ventilation designs for even the most challenging applications.

Key benefits:

- Increased rate of installation and independent from diesel vehicles
- Limited transportation of materials underground
- No manual handling requirements
- Reduced manning levels
- Hosing system for quick access of different locations in the mine site (via boreholes)
- Licence held for all injection chemicals



CARBOFILL

Instant foaming two component phenolic resin system for the filling of cavities in underground roadways, and for the stabilisation and prevention of gas accumulation. Suitable for lower strength cavity and void filling.

ADVANTAGES

- Rapid reaction time minimises form work requirements
- High foam factor (low product consumption for transport & handling)
- Low reaction temperature
- Fire resistant
- Can be used to form temporary ventilation seals
- Long shelf life under correct storage conditions



BEVEDAN / BEVEDOL

Two component PUR injection system for consolidation, stabilisation and sealing of highly convergent wet or dry strata.

Bevedan/ Bevedol is available in a variety of grades to suit numerous application situations.

ADVANTAGES

- Yields to ground pressure, accommodating subsequent movement
- Low viscosity allowing good penetration into small fissures
- Excellent adhesive strength forming strong bond with strata
- Quick reaction time to reduce migration and loss of material
- Seals against water with hydrostatic pressure



GEOFLEX

Non foaming two component silicate injection system with extremely high bond strength for strata injection, sealing of injection anchors, and stabilisation of debris.

ADVANTAGES

- Rapid reaction and strength development
- High adhesive strength after 1 hour
- Low exothermic reaction
- Fire resistant
- High elasticity

NON-METALLIC FACE SUPPORT.

Spray less product, without dust and from the surface.

We manufacture and supply an extensive range of sprayed coating and sealing systems, including a range of dry bagged shotcrete and specially developed plaster.

Key benefits:

- Fibre-reinforced, rapid-setting sprayed concrete for rib and surface support
- Immediate and permanent support in one operation
- High strength using less materials
- Transport up to 60% less materials

Products and systems include:

- Rappass for applications requiring abrasion and impact resistance
- Sprayplast for low strength and cost sensitive applications
- Tekflex is a versatile alternative to steel mesh scat control

“OUR PRODUCTS
INCLUDE SPRAYED
COATING AND
SEALING SYSTEMS”

up to **60%**
less material
transported

Our products help you make savings on the operational cost of your site.



RAPPASS

High strength abrasion and impact resistant high performance dry or wet mix shotcrete. Specially designed for lining ore passes, draw points, crushers, chutes and other areas subjected to heavy and frequent equipment impact.

ADVANTAGES

- High early strength
- Excellent abrasion resistance
- Excellent impact resistance
- Minimum rebound
- Chloride free, non-corrosive to steel



SPRAYPLAST

Sprayplast is a rapid hardening, single component, product used primarily in the construction of rated ventilation structures and scat control using dry shotcrete application equipment.

ADVANTAGES

- High build and high yield
- High early strength development
- Minimal respirable dust content
- Natural product, gypsum product
- Quickly self supporting due to rapid set



TEKFLEX

Cement based spray material designed with excellent flexibility, high tensile strength and excellent adhesion qualities. Tekflex was developed for specific use as an alternative to the use of steel mesh for scat control in underground mining excavations.

ADVANTAGES

- Excellent tensile strength with high flexibility maintaining coating integrity
- Excellent adhesion to rock surfaces assuring long lasting coating
- Can be applied on continuous basis with up to 600m² applied per shift
- No unusual storage, ventilation requirements, equipment clean-up or waste disposal procedures
- Non-toxic and non-flammable

OPTIMISED ORE RECOVERY.

Many hard rock mines have sterilised rich ore, vertical and horizontal pillars, left behind.

With the placement of backfill adjacent to these resources, our solutions support safe and optimal ore recovery operations with unique products and methodologies:

- Increased revenue from additional mined ore
- Cost effective usage of waste rock
- Providing structural elements of a known strength for mine life extension
- Improved management of HSE risk

What can cause sterilisation?

- Dry filled stopes
- Unfilled stopes
- Narrow unstable pillars
- Low grade pillars

Key features:

- + 15 years of S.O.R. experience
- 100% Success Rate
- Recovering lost profits, extracting valuable resources
- 0% Dilution

OUR SOLUTION

Since 2001, we have invested technology and resources into developing the correct methodology and perfect product to form an artificial rockfill pillar.

FB200 was developed as a low viscosity, flowable, high yield cement grout with complete void penetration, easy pumpability and dimensional stability.

Our technical team conduct site analysis, numerical modelling of stopes to determine stability during extraction and consolidation thickness and test the rockfill permeability.

Our specialist operations team then mobilise the equipment and complete the product application.

**“ TO DATE, FIVE
PILLARS HAVE BEEN
CONSOLIDATED
ALLOWING US
TO MINE 116,000
OUNCES OF
GOLD EARLIER
THAN PLANNED
AND ACCESS AN
ADDITIONAL 23,000
OUNCES ”**

Newcrest, PTNHM Indonesia



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TEKSEAL

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Explosive resistant ventilation seals

General cavity or void filling

Excellent durability

Long distance pumping

Rapid placement



SELF DRILLING ANCHOR

Productive reinforcement bolting solution for unstable ground conditions such as sand, gravel, silt, clay and in soft to medium fractured rock formations. The anchor rod features a hollow bore for flushing or simultaneous drilling and grouting. A left hand rope thread enables easy connection to standard drill tooling.

ADVANTAGES

Quality assurance – rigorously tested to ensure the best quality and reliability

Operating environment – Available in a hot dip galvanised version for corrosion protection

Improved product performance – increased yield strength with a rolling process that refines the grain structure of the steel and produces a durable drill rod that is suitable for a range of applications

Client:
Round Oak Jaguar

Location:
Western Australia

Mine:
Bentley Mine

Contractor:
Minova

Duration:
June - August 2018

Products Offered:
FB200
Tekseal

Industry Sector:
Underground Metalliferous
Mine



OPTIMISED ORE RECOVERY

We have helped customers recover sterilised ore reserves and improve extraction outcomes in unmined areas for more than 18 years, delivering substantial financial benefits safely and efficiently.

Round Oak Jaguar approached Minova to assist with a solution that could maximise the recovery of stopes at their Bentley Underground Mine.

One of the principal mining methods used historically is the Avoca method which requires all development in a given area to be completed before stopeing commences in a bottom-up sequence (both the conventional and modified variants are used at Bentley, which rely on end-on and central access respectively). Stope voids are sequentially back-filled with loose R.O.M waste rockfill.

The 3900 AOS level is positioned below a previously extracted Avoca zone; as such loose rockfill is situated in the 3920 AON immediately above.

Stopes in the 3900 were originally earmarked to have rib and sill pillars to maintain control of the existing backfill, however due to several factors including a shift in mining economics over time, options to achieve full extraction were reviewed.

Scope

To optimise extraction of this level, a 150m long section of consolidated rockfill was required in the 3920 AON to provide a stable exposure to mine underneath and ensure minimal dilution of the ore body during extraction.

Our Solution

We supplied technical advice, product, specialised equipment and operations capability to support Round Oak Jaguar during the consolidation program.

FB200 grout was selected for its unique rapid gel times, quick strength, low viscosity and high water content, allowing for controlled placement through carefully designed borehole patterns and maximum penetration of the rockfill. Tekseal, another high yield grout, was used to create grout curtains to control the placement of the FB200 within the rockfill.

The Result

With the help of our 18 years of product ingenuity and experience in recovering sterilized ore, Round Oak Jaguar were able to adapt their mining method to a primary/secondary sequence, utilising the stabilised rockfill sill in conjunction with CAF backfilled primary stopes, which enabled the extraction of the previously planned rib and sill pillars.

We provided 360 tonnes of FB200 to Round Oak Jaguar and consolidated the rockfill in the 3920 ore drive in 3 weeks, working round the clock. To date, all the primary stopes have been extracted with minimal dilution observed, with extraction of the secondary stopes still to occur. We are currently undertaking further work at Jaguar to unlock and extract value within the mine.

Achievements:

- Primary stopes have been extracted to full height, including the originally designed ore sill pillars. This represents an average 20% increase in ore tonnes on the initial design for these stopes.
- Dilution within the consolidated rockfill sill has averaged less than 3%.

Quality Control:

- Grout samples were taken during application to ensure the correct ratio of product would achieve the correct strength.
- Samples were tested by Minova and a third party to ensure compliance.

New South Wales

Kurri Kurri
Smithfield
Nowra
Orange

Queensland

Mackay
Townsville

South Australia

Adelaide

Westen Australia

Perth

Customer Service

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