



RISK ASSESSMENT

CAPRAM

MecTek

INDEX

INTRODUCTION	3
PARTICIPANTS IN THE RISK ASSESSMENT	9
METHODOLOGY	9
RISK MEASUREMENT	10
RISK MATRIX.....	10
RISK RANKING	10
CAPRAM CAPSULES – MANUFACTURE AND QUALITY ASSURANCE	11
LOADING, TRANSPORT AND OFFLOADING OF CAPRAM CAPULES	12
STORAGE OF PRODUCT BY THE USER.....	18
OPERATION OF THE CAPRAM PUMP	19
TECHNICAL DATA SHEETS.....	20
CAPRAM CAPSULE PUMP	21
CAPRAM CAPSULE.....	25
MATERIAL SAFETY DATA SHEET	27
CAPRAM CAPSULE.....	28
CONCLUSION	32
COMPANY PROFILE - MINOVA RSA	33
WRITTEN UNDERTAKING FROM USER – FORMAT EXAMPLE	41

INTRODUCTION

Fosroc Stratabolt was formed in 1997, by the merger of Stratabolt Products, and Fosroc, both leading suppliers of rock support products to the South African Mining industry. Fosroc Stratabolt now trades as Minova RSA, and is a member of the Minova International Group which manufactures and supplies advanced rock-engineering materials in all of the world's major mining countries.

The company operates an integrated research, development and manufacturing facility in the hub of the diverse and technically demanding Southern African Mining Industry. Minova RSA's products are used in every sector of that industry and are exported world-wide.

Through our own research and access to the research of other Minova International companies we aim to ensure that our customers maintain leadership in improving the safety and productivity of underground excavation. The spectrum of products supplied enables mining engineers to choose unique solutions to unique rock engineering problems. We invite the active participation of our customers in product conception and improvement.

We manufacture resin grouting capsules, cement grouting capsules, high-yield and foamed grouts and other advanced technology cements. We also supply backfilling systems.

MAIN PRODUCTS

LOKSET ® polyester resin capsules

Minova RSA manufactures Lokset ® resin rock-bolting capsules under licence from E.I. du Pont de Nemours & Co. (Inc). Lokset ® is the leading rock-bolting resin in Southern Africa and has long held a similar position in North America.

Lokset ® capsules have a unique composition and construction. The resin compartment contains coarse filler particles, which aid in shredding the sheath and then interlock to increase the strength and rigidity of the grout. The catalyst compartment comprises 30 percent of the capsule, which materially improves intermixing of the components. These characteristics give the user unparalleled reliability of installation, tolerance of wide bar/hole annuli and simplicity of operation.

Lokset® is available ex-stock in setting times from 15 seconds to 15 minutes and diameters from 19mm to 35mm. Special setting times and sizes are available on request. The Lokset® capsules manufactured by Minova RSA comply with South African National Standard ("SABS") No. 1534: 1991 and carry the SABS mark of quality.

Minova RSA also manufactures the unique 2-Speedie resin capsule system which contains two different resin set times within the same capsule.

CAPCEM ® cement grouting capsules

Cement capsules are used with grout bars to achieve full-column cement grouting.

The blended cement is encapsulated in a porous sheath, which allows controlled water absorption for correct wetting of the grout.

Capcem® capsules are available in 25mm and 28mm diameters and fast setting times allowing a 500mm length of grout to support a 50 kN load applied to an embedded 16mm rebar, after only 1 hour.

TEKSET® high-yield grouts

These patented high-yield grout formulations are designed to be mixed with a fixed quantity of water and pumped under pressure into high strength polypropylene bags for timber pack pre-stressing. The grout will generate a minimum strength of 0,3 MPa in two hours and achieve a minimum strength of 4 MPa within 7 days.

Their primary use is to pre-stress timber packs, giving semi-active and immediate support as well as making the packs blast-resistant. The grouts are also suitable for void filling.

TEKSET® is supplied in nominal 11kg bags.

AIR-O-CEM® and TEKSEAL® foamed grouts.

When placed with a custom-made pump, these grouts produce low-density foams suitable for void filling and the creation of ventilation, backfill and blast barriers. They are supplied in nominal 25kg bags.

Pumped cement grouting Systems

The Capram ® system is manufactured by Minova RSA under licence from Delkor Technik.

The system is designed to afford an easy method of reliably achieving full column cement grouting in a hole of any size. It can be used for pre- or post- grouting.

The equipment components are a simple pressure-differential axial pump which operates on compressed air (minimum pressure 3 bar) and a lance of 12mm to 30mm diameter. The grout is pre-packed in a porous sheath designed to optimise water absorption. The wetted grout bag is inserted into the pump and the grout ejected through flexible piping and the lance to the back of the hole. The sheath is retained in the pump and discarded after use.

The pumps are available ex-stock and the grouts are supplied in packages of nominal dimensions 90mm x 400mm long. Setting times are medium (2 hours) and slow (4-6 hours).

The Capcem Injection Grout System consists of blended cement grout (each bag sufficient to fill one typical rockbolt hole) and a hand held, air driven injector. The grout is mixed in its bag with water and then pumped into the hole with the injector.

LOKSET ANCHOR PACK pourable resin grouts

Scraper winches and other machinery may be rapidly bolted in place with LOKSET ANCHOR PACKS, which are a high-strength pourable resin grouts. They are supplied as a 10kg two-component pack in a mixing bucket. In use, the two components are mixed and

poured into the anchoring holes, around the hold-down bolts. The equipment may be used within 2 hours.

TEKFLEX® structural membrane

Tekflex is a high-strength flexible coating for rock. When sprayed onto the surface of mine drives or tunnels it quickly forms a membrane which restrains loose rock, inhibits further deterioration and protects against weathering.

CABLESEAL® fire-retardant coating for cable and pipes

Cableseal is applied as a coating on cables and plastic pipes in mines. It prevents spread of fire along the cable or pipe runs. It is strongly adherent but flexible enough to accommodate flexure of the cable or pipe without breaking off.

FIRESHIELD® fire-resistant coating for timber

Fireshield is sprayed or painted onto timber support in underground workings to prevent spread of fire between packs or poles. It has passed stringent tests that convincingly demonstrate that a timber pack protected by Fireshield will remain intact despite adjacent packs burning completely.

FILLSET® AND CONBEX® backfilling systems

Minova RSA has developed additives that make run-of-mine tailings into effective backfill material. The additives bind the tailings and chemically retain water, accelerating strength gain and preventing shrinkage as the backfill sets. Each backfilling operation is unique so Minova RSA provides advice on design of backfill formulations and placing systems.

FACILITIES

LOKSET ® resin capsule production

Four capsule production lines employ mechanised and automated mixing to produce polyester and catalyst mastics for encapsulation by modified Kartridge Pak (KP) chub machines. The production lines are supported by a dedicated analytical laboratory for checking of incoming, in-process and finished goods.

Capacity: 500 tonnes per month

Cementitious grout manufacture

Two automatically controlled blenders produce the grout blends for the packaging lines. Small diameter grouting capsules (Capcem) are formed on 3 banks of automatic filling machines. Large diameter capsules (Capram and Injection Grout) have their own filling section. Two bagging lines produce Tekset, Air-O-Cem, Tekseal and other bagged products. The cements plant has its own Quality establishment, including laboratories for routine quality control and product testing.

Capacity: 2500 tonnes per month

Research and Development

A central laboratory and workshops are available for development and testing of new formulations and components. Equipment includes compressive and tensile testing machines, apparatus for conventional chemical analyses and rigs for testing anchor installation equipment and techniques.

Technical Service

All field staff are experienced in mining and have received training in the characteristics and proper use of all our products. Minova RSA service includes:

- * Product selection
- * Application training and in-use auditing
- * Stock management, transport and packaging

KEY PERSONNEL

Chief Executive Officer – Pete Ferreira		
Educational Qualifications	B.Sc. Eng. (Mining) Pr. Eng, MDP, DPLR, AEP, FSAIMM	
Experience	Section Manager	Anglo American Corporation
	Business Unit Manager	Cementation Mining
	Contract Manager	M&R RUC Ltd – Mining Division
	Operations Manager	M&R RUC Ltd – Mining Division
	Manager Marketing and Business Services	M&R RUC Ltd
	General Manager Mining Services	Murray and Roberts, Cementation (Pty) Limited
Director – Donald O’Connor		
Educational Qualifications	B.Sc. Hons (Geophysics), MBA	
Experience	Project Leader	Western Deep levels Mine
	Project Manager	NPI Group
	General Manager	Strataloc Resins
	Managing Director	Dantex Explosives
	Technical Director	RSA Products
Technical Director – Rod Smart		
Educational Qualifications	Ph.D (Chemistry) Post Doctoral study - Pennsylvania State University, USA	
Experience	Product Development Manager	Fosroc Technology, UK
	Technical Manager	Fosroc South Africa
	Technical Director	Minova RSA
Financial Director – Lindsay Harris-Dewey		
Educational Qualifications	B. Comm., B. Acc., C.A. (S.A.)	
Experience	Audit Senior	Ernest and Young – Springs
	Financial Manager	Bevcan - a Division of Crown Nampac
	Commercial Manager	Bevcan - a Division of Crown Nampac
	Financial Manager	P.F.G. Building Glass
Operations Director – Alfredo Piroddi		
Educational Qualifications	BSc Hons (Management and Industrial Technology)	
Experience	Maintenance Foreman	MCMS
	Production Manager	Coca Cola South Africa
	Factory Manager	Fosroc Stratabolt
	Operations Manager	Minova RSA
Human Resources Manager – Lorraine Coughlan		
Educational Qualifications	B Com. (Personnel Management) Hons	
Experience	Human Resources Manager	HMR and Noristan
	Personnel Consultant	Johann Ribbens and Associates
	Personnel Officer	ESD

The following members contributed in forwarding information in the assessment:

- Dr. R. Smart - Technical Director - 18 Years experience
- W.J. Crous - Technical Manager - 7 Years experience
- J. Bester - Loading Controller - 10 Years experience
- J. Ferreira - Technical demonstrator - 25 Years experience

PARTICIPANTS IN THE RISK ASSESSMENT

PARTICIPANT	POSITION HELD	QUALIFICATIONS
JV James	Independent Consultant	PhD Mining Engineering, BSc(Hons) Geology, Adv. Certificate in Rock Engineering
PN Garner	Independent Consultant	HND Min Eng., Adv. Cert. Rock Engineering, MDP

METHODOLOGY

A risk assessment generally involves identifying the potential hazards, which could lead to injury to persons or property loss, and giving them a risk rating. Suitable controls are then put in place to reduce the risk to one which is acceptable in terms of the relevant sections of the mines Health and Safety Act and Occupational Health and Safety Act.

NOTE: In terms of the Mines Health and Safety act, a manufacturer is regarded as any person or organisation which designs, manufactures, imports, sells or supplies any article for use at work. Legislation requires that articles used at work must be safe and without risk to the safety and health of the user when properly used.

- A **HAZARD** is something that has the potential to cause **HARM**. This includes substances, machines, methods of work or other aspects of the work organisation.
- **SEVERITY** is a figure attached to the amount of damage or harm that could be incurred should an incident take place.
- **PROBABILITY** is the likelihood that harm from a particular hazard will occur;
- **RISK RANKING** is the product of **SEVERITY** and **PROBABILITY**.
- The extent of the risk depends not only on the severity of the harm to a person that may occur but also on the number of people who may be involved or the extent of property damage or financial loss.

In this case the approach taken was to break down the different activities into small components and seeing where failure may occur and then assessing the severity in terms of the degree of harm or damage which may occur.

The matrix below was used to determine the criticality and risk ranking of the hazards and associated risks identified.

RISK MEASUREMENT

Once hazards have been identified, it is necessary to prioritise them so that action plans can be programmed so they can be dealt with in such a way to satisfy the **reasonably practicable** requirement in the Mines Health and Safety Act. The aim of risk assessment is to create a tool which management can use to enable them to make better decisions. It in itself does not make the decisions. It simply provides the basis for better decision making.

RISK MATRIX

PROBABILITY (P)		1 TO 5 YEARS	ANNUALLY	MONTHLY	WEEKLY
SEVERITY (S)		1	2	3	4
MINOR OR NO LOSS <R5000	1	1	2	3	4
REPORTABLE LOSS R5000 – R50 000	2	2	4	6	8
FATALITY LOSS R50 000 – R500 000	3	3	6	9	12
MULTIPLE FATAL LOSS >R500 000	4	4	8	12	16

RISK RANKING

1 TO 2 IS CONSIDERED TO BE A LOW RISK

3 TO 6 IS CONSIDERED TO BE A MEDIUM RISK

8 TO 16 IS CONSIDERED TO BE A HIGH RISK

CONSEQUENCE OF THE ABOVE CATEGORIES

RISK RATING	HEALTH & SAFETY	PRODUCTION LOSS	POTENTIAL COST
1 – 2	Minor or no loss. No lost time.	No significant production loss.	<R5,000
3 – 6	Reportable incident possible disabling.	Time lost ranging from a few hours to 5 days.	R50,000 to R500,000
8 - 16	Fatality or multiple fatality.	5 shifts or more.	Greater than R500,000

CAPRAM CAPSULES – MANUFACTURE AND QUALITY ASSURANCE

REQUIRED WORK AND AREAS OF RESPONSIBILITY		RISK RANKING – NO CONTROLS IN PLACE			REMEDIAL CONTROLS / RECOMMENDATIONS	RISK RANKING WITH CONTROLS IN PLACE		
ACTIVITY / MATERIALS OR EQUIPMENT	POTENTIAL / OBSERVED HAZARD	P	S	RR		P	S	RR
Product manufacture – incorrect blend at Slagment and incorrect material delivered to client	Product does not cure as per design specification resulting in inadequate support of the underground workings.	4	4	16	<p>Product blended at Fosroc under ISO 9002 conditions.</p> <p>Each bulk blend is tested prior to being put into capsules. Should the specifications not be met, the batch is quarantined and adjusted and re-tested until within specification.</p> <p>Each batch of the finished product is tested in the Capram pump. Should the specification not be met, the batch quarantined and adjusted and re-tested until within specification.</p>	1	3	3

LOADING, TRANSPORT AND OFFLOADING OF CAPRAM CAPULES

REQUIRED WORK AND AREAS OF RESPONSIBILITY		RISK RANKING – NO CONTROLS IN PLACE			REMEDIAL CONTROLS / RECOMMENDATIONS	RISK RANKING WITH CONTROLS IN PLACE		
ACTIVITY / MATERIALS OR EQUIPMENT	POTENTIAL / OBSERVED HAZARD	P	S	RR		P	S	RR
Loading.	Loading incorrect product, Production loss, financial loss, down time	2	2	4	Loading controller ensures and over inspects load being loaded for dispatch. If the user receives the incorrect product the supplier or area representative should be notified so that the correct action can be taken to prevent a re-occurrence. The supplier will supply the user with the correct product within 24hours as far as reasonably practicable.	1	1	1
	Under loading of truck, User running out of stock, down time	3	1	3	Loading controller over inspects and ensures correct loading of truck.	1	1	1
	Uneven spreading of load, Road accidents, down time, loss of product, using inferior product, insurance claims, increased premiums	2	2	4	Loading controller and driver over inspects truck to ensure load is evenly spread. If the user observes an uneven load he should notify the supplier, or area representative who will assess the situation and act accordingly or advise the user alternatively.	1	2	2
	Transport contractor/ own drivers going on strike, Financial loss, shortage of product to client, down time, production loss	3	1	2	Supplier uses alternative transporters or trucks hired by them to ensure deliveries reach users on time. Supplier will notify the user of any business interruptions at the supplier's earliest convenience. The supplier has its own transport vehicles delivering product to user.	1	1	1
	Pallets not secured, Unstable load, falling load, road accidents, personal injury, financial loss, down time	2	2	4	Loading controller and driver ensures competent load before truck leaves the premises. User to notify the supplier and area representative if any unsecured pallets are observed to ensure the correct action is taken to prevent a re-occurrence.	1	1	1
	Loading damaged products or pallets, Financial loss, loss of stocks, down time, using inferior products	2	1	2	Loading controller and driver over inspects load before the truck leaves the premises to ensure the load is in order for delivery. Should the user observe any damaged products or pallets the user should notify the supplier and area representative who will assess the situation and advise the user accordingly.	1	1	1

	Loading incorrect quantities, User running out of stock	2	1	2	Loading controller over inspects and ensures correct loading of truck. User to notify supplier if the incorrect quantity is delivered. The full load will be delivered at no additional costs to the user or credit will be forwarded for the next delivery.	1	1	1
	Forklift off-loading pallet incorrectly on truck, Damaged pallets or product, use of inferior products, possible injury, possible property damage, financial loss	3	2		Loading controller and driver over inspects the loading of pallets onto the truck to reduce the possibility of the pallets being damaged during loading. Forklift drivers receive training in house with the supplier to ensure the products are correctly loaded.	1	2	2
	Contractor truck not available for loading, Financial loss, shortage of product to client, down time, production loss	2	1	2	Supplier uses alternative transporters or uses trucks hired by them to ensure deliveries reach users on time. Supplier will notify the user of any business interruptions at the supplier's earliest convenience.	1	1	1
	People not trained for proper loading, Personal injury, incorrect loading of product, no stock, down time	2	2	4	The supplier runs an in house training program, forklift drivers are trained and licensed and re-checked every second year. If the user observes any defects as far as the product or loading there of is concerned, the supplier and area representative to be notified so that the necessary investigation can take place and relevant issues be resolved in due time.	1	1	1
	Forklift breakdown or operators on strike at supplier, Delay in loading, financial loss, loss of production	3	1	3	Supplier has a service agreement in place with forklift supplier, regular maintenance is conducted on forklifts. On site a total of four forklifts are operating. Supplier has sound working relationship with employees and in the past twenty-five years only one strike was recorded but no clients were affected.	1	1	1

	Plant breakdown or strike by supplier employees, Delay in loading, financial loss, loss of production	3	4	12	Supplier has sound maintenance program in place, and uses alternative production lines to ensure continuous manufacturing of products. Supplier has sound working relationship with employees and in the past twenty-five years only one strike was recorded but no client was affected. The supplier has contingency plans in place for alternative supply from sister companies.	1	1	1
	Material shortage,	1	2	2	Supplier ensures minimum stock levels are maintained. Supplier has alternative material suppliers.	1	1	1

Transport	Vehicle not road worthy, Road accidents, personal injury, product damage, delay in delivery, shortage of product on mine, production loss, financial loss	2	4	8	Supplier uses reputable transporters and uses alternatives if necessary. Track history proves that trucks used are road worthy and in good condition for transport. The supplier uses own vehicles for transport.	1	4	4
	Driver fatigue due to long / local distances, Road accidents, personal injury, product damage, delay in delivery, shortage of product on mine, production loss, financial loss	2	4	8	Track history has proven that the company drivers are cautious and no fatigue is taking place.	1	4	4
	Driver under influence, Road accidents, personal injury, product damage, delay in delivery, shortage of product on mine, production loss, financial loss	3	4	12	Track history has proven that the transport contractor and company drivers are of reputable source.	1	4	4
	Hi-jacking of truck, Loss of load, financial loss, shortage of stock, production loss	3	3	9	Trucks equipped with satellite tracking, drivers equipped with communication systems, supplier can have hi-jacked load replacement on the road to user in a matter of a few hours.	2	2	4
	New driver not familiar with destination, Delay in delivery, shortage of stock on mine	3	1	3	Communication systems are used and drivers are in possession of maps for specific destination.	1	1	1
	Incorrect choice of truck for loading, Short loads, delay, overloads, financial loss, short or over supply on order	2	1	2	Pre-load planning is done on a daily basis and the correct size of truck is arranged for loading.	1	1	1
	Traffic and public roads, Road accidents, personal injury, product damage, delay in delivery, shortage of product on mine, sub standard installation, financial loss.	3	1	3	Supplier uses a reputable transport contractor, company drivers and track history is proof of sound driving experience.	2	1	2

	Poor communication with drivers, Delay in delivery, shortage of stock on mine	2	1	2	Communication systems are fitted in the truck, which gives direct communication with drivers, and contractor attends supplier meetings where relevant issues are discussed and resolved.	1	1	1
	Speeding trucks and ignoring road rules, Road accidents, personal injury, product damage, delay in delivery, shortage of product on mine, sub standard installation, production loss, financial loss	3	2	6	Trucks are governed by national speed limits, track history is proof of transport contractors, and company drivers sound operations as far as speeding and road rules are concerned. Company drivers attend an annual in house driving course.	2	2	4

Off loading	Truck on unstable / uneven surface for off-loading, Personal injury, product damage	2	2	2	User to ensure that a demarcated even area is available for off-loading to ensure safe off-loading of product.	1	1	1
	Inadequate moving space for off-loading, Personal injury, property damage, product damage, delay	2	2	4	User to ensure that adequate space for off-loading is available for trucks to enter and exit without any restriction.	1	2	2
	Unsafe off-loading by forklift, Personal injury, property damage, product damage, delay	3	2	6	User to ensure that only a competent forklift driver is used for off-loading pallets, due to the weight of the pallets, ranging up to a ton requires a competent person for off-loading.	1	2	2
	Off-loading unbalanced or damaged pallets, Personal injury, property damage, product damage, delay	3	2	6	Pallets are inspected before leaving the supplier to ensure pallets are in tact. Should a pallet be damaged or unbalanced on arrival, the user should off-load the pallet with at most care, if pallet is badly damaged, individual packets should be off loaded manually.	1	2	2
	Off-loading in wrong area, Delay	2	1	2	Supplier issues driver with a delivery note, which is verified by client for correct delivery.	1	1	1
	No forklift available for off-loading, Delay	3	1	3	At all cost the user to ensure that a forklift is available for off-loading to prevent pallets being stripped to enable manual off-loading which increases the chance of personal injury.	2	1	2
	Off-loading in wet weather, Loss of product, personal injury, inferior product going underground, financial loss	3	2	6	If off-loading has to be done in wet weather the user to ensure a covered area is available for off-loading or alternatively wait until rain has stopped, then off-load, pallets are wrapped and covered with a shrink-wrapping.	2	1	2
	Off-loading at night, Product damage, personal injury, property damage	4	2	8	If off-loading has to take place during night time, the user to ensure the area for off-loading is well illuminated to prevent any damage or injury taking place due to poor visibility.	3	1	3
	Off-loading incorrect product, Delay, financial loss, run out of stock	2	1	2	Supplier uses a delivery note by which the user confirms correct product delivery, should the incorrect product be delivered the user to notify the supplier and supplier will deliver correct product within 24hours.	1	1	1

STORAGE OF PRODUCT BY THE USER

REQUIRED WORK AND AREAS OF RESPONSIBILITY		RISK RANKING – NO CONTROLS IN PLACE			REMEDIAL CONTROLS / RECOMMENDATIONS	RISK RANKING WITH CONTROLS IN PLACE		
ACTIVITY / MATERIALS OR EQUIPMENT	POTENTIAL / OBSERVED HAZARD	P	S	RR		P	S	RR
1. Area demarcated for capsule storage.	Area not demarcated. Product stored in the wrong area. Product exposed to elements such as rain and cold. The product may “go off” and not perform to specification when sent underground.	2	3	6	The product should be stored in demarcated areas under suitable cover.	1	3	3
2. Stacking of product.	Stacked too high and possibly falling and injuring people	2	3	6	Ideally the pallets should not be stacked on top of each other. If due to space constraints this is not possible, stacks to be only 2 high. The forklift driver to ensure that the stacks area stable and the pallets area not damaged in any way.	1	3	3
3. Storing of material underground.	1. Material stored in wet area resulting in the product “going off” and not being available when required.	2	3	6	Capsules to be stored in a dry demarcated area.	1	3	3
	2. Material stored too close to tracks or travelling ways resulting in damaged product or injury to people.	2	3	6	Mine standards to be adhered to when storing material. Minimum clearance distances to be maintained from tracks and travelling ways.	1	3	3

OPERATION OF THE CAPRAM PUMP

REQUIRED WORK AND AREAS OF RESPONSIBILITY		RISK RANKING – NO CONTROLS IN PLACE			REMEDIAL CONTROLS / RECOMMENDATIONS	RISK RANKING WITH CONTROLS IN PLACE		
ACTIVITY / MATERIALS OR EQUIPMENT	POTENTIAL / OBSERVED HAZARD	P	S	RR		P	S	RR
Hose Connections.	Hoses leak resulting in waste or hose not correctly secured to the pump. The air hose may come loose and strike someone.	4	2	8	Hoses to be checked for leaks prior to operating the pump and the air hose must be properly secured using the correct clamp as per mine standards.	1	2	2
Locking mechanism on pressure vessel.	During operation, the locking mechanism not properly engaged causing the top of the vessel to burst off and striking someone.	4	2	8	Through correct training, the operator to properly lock off the locking mechanism prior to operation. The safety chain must always be in good order and attached.	1	1	1
Pressure vessel.	The pressure vessel may burst causing injury to person or persons.	3	2	6	The vessel must adhere to all engineering specifications and be examined by a competent person on a regular basis for defects. Should any defects be observed, the pump must not be used.	1	2	2
Grout hose.	The grout hose may block and burst, resulting in grout spraying into someone's eyes.	4	2	8	Operator to always wear P.P.E. including goggles. The hoses are to be properly flushed both backwards and forwards prior to operating the pump and again on completion of using the pump.	1	2	2
Adding the water.	Water contains organics such as oil, which affects the final strength of the grout and the final quality of the bolt installation.	4	4	16	Only clean water should be used with the Capram system. Drain water for example should not be used under any circumstances.	1	4	4
General.	System not correctly used or maintained resulting in unnecessary injuries.	4	4	16	All persons operating the equipment must be adequately trained. A record of the training should be kept up to date at all times. The correct P.P.E. to be worn by all persons involved at all times.	1	1	1

TECHNICAL DATA SHEETS

Capram Capsule Pump

Pump

Uses

For easy grouting in rock anchoring applications, particularly overhead roof bolting as Encountered in mining and tunneling.

Advantages

- Full Column grouting achievable on every installation.
- Eliminates mixing equipment.
- Cost effective system due to quick and easy installation.
- Pump retains capsule skin.
- Minimum maintenance and cleaning of equipment.

Technical Data

Weight	: 60kg, (slimline) 80kg, MK1).
Pump Size	: 1.5m high x 0.8m wide.
Pump Capacity	: One Capram cement capsule
Pump Pressure Rating:	Min working pressure 3.5 bar
	: Max working pressure 6.0 bar
	: Recommended 4.0 – 6.0 bar
Pump Design displacement	: Air driven positive

Application instructions for the Capram Capsule Pump

Equipment required

- Capram Pump with piping and lance.
- Capram capsules.
- Mine compressed air, pressure 4-6 bar.
- Bucket filled with water.
- Safety goggles and gloves.
- Anchor.

Step 1: Site Preparation

- Check the hole length with the anchor.
- Check that all equipment is to hand.

Step 2: Inserting the grouting Capsule

- Place the required number of Capram Capsules in water for the prescribed time (normally 8 – 10 minutes).
- Make sure that all fittings and hoses are securely connected to the pump before opening compressed air to pump.
- Unscrew and remove the top bayonet cap.
- Check that the piston of the Capram pump moves freely up and down by moving the air control valve to the up and down positions.

- Move piston up until reaches the top of its travel.
- Insert a wetted Capram capsule while simultaneously changing the control valve to the down position.
- Allow the Capram capsule to slide down the inside of the piston sleeve as the piston moves downwards.
- Once the piston has reached the bottom, move the control valve to the middle position, tear off the stitched end of the capsule and spread the capsule skin open.
- Lock the top bayonet cap securely in place by turning cap firmly against the stop blocks.
- Make sure that there are no kinks, obstructions or blockages in the delivery hose attached to the pump outlet and insert the lance to the back of the hole to be grouted.
- Change the air control valve to up position to inject the contents of the Capram capsule through the hose and lance into the hole.

Step 3: Grouting the Anchor Hole

- The first Capram capsule will fill the hose and lance (dependant on the length of hose attached).
- When the piston has reached the top of its travel, move the air control valve to the center (neutral) position and remove the top cap by unscrewing.
- Remove the capsule skin and insert another capsule while simultaneously changing the control valve to the down position.
- The second capsule will push the grout from the first capsule out of the lance and into the hole.
- Allow the grout filling the hole to push the lance out of the hole
- Stop the pump by closing the air control valve (centre position) when the piston reaches the top of its travel or \pm 30cm before the lance is pushed out of the hole. (The lance can be marked to indicate when to close the valve).
- Remove the lance from the hole and insert the anchor.
- Open the top cap and remove the capsule skin.
- Repeat this process for grouting all other holes.
- The pump operator must wear protective goggles and gloves at all times while operating the pump.

Step 4: Cleaning up

- Clean the piston chamber of the pump with plenty of water and ensure that the piston moves freely up and down by moving the air control valve to the up and down positions.
- Clean the bayonet cap and the delivery hose with water and ensure that all residual wet cement is removed.
- Ensure that no blockages remain in the delivery hose.

Technical information, Maintenance of Pump

- DO NOT lubricate the inner working parts of the pump with oil via the air supply as this action will damage the seals and render the pump useless.
- Always clean the pump properly when grouting is complete – hardened grout will damage the inner seals and the piston sleeve, causing air leaks at best and permanent damage at worst.
- Do not operate the pump against a total blockage as continued pressure may cause the piston shaft to bend.
- If a blockage is suspected, reverse the air control lever to the down position and suck the grout back into the pump to relieve pressure before opening the top cap.

Precautions

Health and safety

Capram® Capsules are non-toxic, but like all cements, are alkaline in nature. Goggles and gloves should be worn at all times when grouting with the Capram® Pump. Splashes should be removed from skin and eyes by washing with plenty of clean water. In the case of splashes in the eyes, medical attention should be sought immediately.

Technical Support

Minova RSA provides a technical advisory service supported by a team of specialists in the field. The service includes on site assistance and advice on evaluation trials and laboratory work.

Additional information

Minova RSA is a market leader specialising in the supply of high performance chemical products for the mining and tunnelling industries.

The Minova RSA range of mining products includes anchoring and backfill systems, bagged cement products, high yield grouts, mine sealants, equipment and accessories.

Important note

Minova RSA 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 Minova RSA 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.

Minova RSA
Reg. No. 2001/027226/07, ISO 9002 Company

Head Office and Resin Factory:
Cnr. Anvil & Brewery Streets
Isando
1600
South Africa

Tel: (011)923-1900 International (+2711)923-1900
Fax: (011) 923-1935 (+2711) 923-1935

E-Mail: info@minovarsa.co.za
Web Page: www.minovainternational.com

Cement Factory & Research Centre:
25 Botha Street
Alrode
1449
South Africa

Tel: (011)908-1980 International (+2711)908-1980
Fax: (011)864-4311 (+2711)864-4311

® trade mark of MINOVA RSA

Capsule Pump

Parts

No.	Description	Qty	Code
1	Pump outer casing	1	CRP01
2	Control valve complete	1	CRP02
3	Control valve exhaust silencer	2	CRP03
4	Control valve hose nipple fittings	6	CRP04
5A	Pump frame complete – slimline	1	CRP05A
5B	Pump frame complete – MK1	1	CRP05B
6	Wheels	2	CRP06
7	Top bayonet cap	1	CRP07
8	Top sleeve	1	CRP08
9	Bayonet cap “O” Ring	1	CRP09
10	Top piston – Aluminium	1	CRP10
11	Top piston – Nylon	1	CRP11
12	Top piston cup seal	1	CRP12
13	Top piston pre-drilled plate	1	CRP13
14	Top piston cup seal screws	3	CRP14
15	Top piston poly “U” seal	1	CRP15
16	Middle divider plate – Aluminium	1	CRP16
17	Middle divider plate – Nylon	1	CRP17
18	Middle divider shaft poly “U” seal	1	CRP18
19	Middle divider shaft wiper seal	1	CRP19
20	Middle divider “O” Ring	1	CRP20
21	Bottom piston – Aluminium	1	CRP21
22	Bottom piston – Nylon	1	CRP22
23	Bottom piston “U” seal	2	CRP23
24	Piston shaft	1	CRP24
25	Shaft nut – nyloc 19mm A/F	2	CRP25
26	Shaft nut back-up washer	4	CRP26
27	Bottom casing dome – Slimline	1	CRP27
28	Bottom flange c/w bolts – MK1	1	CRP28
29	Bottom flange gasket – MK1	1	CRP29
30	Glue kit	1	CRP30
31	Complete seal kit – Slimline	1	CRP31
31	Complete seal kit – MK1	1	CRP31
32	Top coupling set (sleeve & cap)	1	CRP32

Capram Capsule Pump

Repair Procedure

1. Clean pump in preparation for repairs
2. Remove bayonet cap and loosen top cup seal screws.
3. Loosen top piston shaft bolt and remove top piston.
4. Lie pump down on its side.
5. Remove bottom frame protection plate.
6. Disconnect air connection.
7. Remove bolts from bottom flange.
8. Loosen bottom piston shaft nut and remove bottom piston.
9. Knock shaft down from the top using a wood or aluminium protection block.
10. Remove complete shaft.
11. Remove air fittings from middle divider plate.
12. Loosen and remove bolts securing middle divider plate.
13. Remove middle divider plate.
14. Clean all parts properly.
15. Check casing inside and out for cracks or damage.
16. Re-assemble as follows :
 - Fit new wiper and lip seals to middle divider plate.
 - Fit new “O” Ring to middle divider plate.
 - Mark position of air connection and re-fit middle divider plate fastening the bolts finger tight only.
 - Fit new seals to top piston and attach top piston to shaft.
 - Insert shaft with top piston attached from the top of the pump far enough so that the bottom piston can be attached.
 - Replace “U” Seals on bottom piston.
 - Fit and tighten bottom piston to the shaft.
 - Fit new gasket to bottom flange and replace bolts and nuts to secure bottom flange.
 - Reconnect air pipes to bottom flange and middle divider plate.
 - Replace bottom frame protection plate.
 - Turn pump upright and fit new top cup seal and tighten the top cup screws being careful not to strip the threads.
 - Connect all air pipes.
 - Now tighten middle divider plate bolts being careful not to strip the threads by overtightening.

17. Connect to air supply and operate pump to see that the piston moves freely in both directions.
18. Fit new "O" Ring into top cap.

Tips for Seal Assembly

1. Insert seals into hot water prior to fitting them.
2. Once seals are fitted in place, coat each seal lightly with grease.
3. Top piston seal – "U" seal groove to face upwards.
4. Insert silicone sealant under top piston shaft washer securing top piston to prevent air leakage.
5. Middle divider plate "U" seal – groove to face downwards to bottom piston.
6. Middle divider plate Lip seal – Lip to face upwards.
7. Bottom piston "U" seals – top seal groove to face up and bottom seal groove to face down.



Capram Capsule

Cementitious Pumped Anchoring Grout

Uses

For easy grouting of rock anchors, particularly of overhead roof bolts as encountered in mining and tunnelling applications.

Advantages

- Encapsulated
 - Controller water : powder ratio.
 - Eliminates mixing equipment.
 - Minimises wastage of grout.
- Non-shrink
Expansion agents counteract shrinkage and ensure effective contact.
- Chloride-free
Rapid strength development without the use of chlorides promotes absence of corrosion.
- Thixotropic
Minimum loss of grout even from overhead holes due to the thixotropic nature of the grout.

Description

Capram Capsules are supplied as a ready to use dry powder encapsulated in a water permeable skin. When required for use, the capsules are soaked in water which is absorbed through the skin to form a thixotropic non-shrink grout.

Additives impart controlled expansion to the grout and reduce water requirement to achieve grout workability. **The low water/cement ratio ensures high early strengths, particularly at low temperatures.** Cohesiveness of the grout allows it to be used in wet hole conditions.

Grout Properties:

Pump Life (minutes, 25°C)	30
Set time (minutes, 25°C)	150 (typical)
Pull Strength* (hours)	12
Grout Yield (litres/capsule)	2.5 (typical)

* Maximum time to achieve 5 tons/500mm bond, 16 mm deformed rebar, 25°C.

It must be noted that rock temperatures will influence rate of set and strength gain; the higher the temperature the faster the set and more rapid the strength gain.

Application instructions

The required number of Capram Capsules are removed from their packaging and soaked in clean water for approximately 10 minutes then removed from the water and inserted into the Capram Pump. For optimum results it is recommended that the capsule be used immediately after soaking. For full application instructions, refer to the Capram Pump data sheet.

Packaging

Capram Capsules are available in woven polypropylene carrying bags (2 capsules per bag) with an inner polythene liner or in water resistant boxes (4 capsules per box).

Storage/Shelf life

Capram Capsules have a shelf life of 6 months when stored in cool, dry conditions in the original packaging.

Precautions

Health and safety

Capram Capsules are non-toxic, but like all cements, are alkaline in nature. The use of gloves and goggles is recommended. Splashes should be removed from skin and eyes by washing with plenty of clean water. In the case of splashes in the eyes, medical attention should be sought immediately.

Technical Support

Minova RSA provides a technical advisory service supported by a team of specialists in the field. The service includes on site assistance and advice on evaluation trials and laboratory work.

Additional information

Capram Capsules can also be used in conjunction with Lokset resin capsules for full column grouting with a point anchor at the back of the hole for immediate support. Spinning in of the bolt is then required to mix the resin.

Minova RSA is a market leader specialising in the supply of high performance chemical products for the mining and tunnelling industries.

Minova RSA range of mining products includes anchoring and backfill systems, bagged cement products, high yield grouts, mine sealants, equipment and accessories.

Important note

Minova RSA 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 Minova RSA 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.

Minova RSA
Reg. No. 2001/027226/07, ISO 9002 Company

Head Office and Resin Factory:
Cnr. Anvil & Brewery Streets
Isando
1600
South Africa

Tel: (011)923-1900 International(+2711)923-1900
Fax: (011)923-1935 (+2711)923-1935

E-Mail: info@minovarsa.co.za
Web Page: www.minovainternational.com

Cement Factory & Research Centre:
25 Botha Street
Alrode
1449
South Africa

Tel: (011)908-1980 International(+2711)908-1980
Fax: (011)864-4311 (+2711)864-4311

MATERIAL SAFETY DATA SHEET

=====

1. IDENTIFICATION OF THE SUBSTANCE / PREPARATION AND OF THE COMPANY / UNDERTAKING

Application : Anchoring grout.

Company : Minova RSA

Address : P.O. Box 52, Isando, 1600.

Telephone : (011) 908-1980 **Telefax** : (011) 864-4311

=====

2. COMPOSITION / INFORMATION ON INGREDIENTS

Composition : Cements, additives.

Hazardous Ingredient(s)	Symbol	Risk Phrases	Other Information	%
Cements	Xi	R36/37/38	Cas No.: 65997-15-1	>50

All constituents of this product are listed in EINECS (European Inventory of Existing Commercial Chemical Substances) or ELINCS (European List of New Chemical Substances) or are exempt. Refer to Section 8 for Occupational Exposure Limits.

=====

3. HAZARDS IDENTIFICATION

Long term skin contact may cause health problems.

=====

4. FIRST AID MEASURES

Eyes : Irrigate immediately with copious quantities of water for several minutes. Obtain medical attention if irritation persists.

Skin : Wash immediately with copious quantities of water. Obtain medical advice if skin disorders develop.

Inhalation : Remove from exposure. If feeling unwell obtain medical attention.

Ingestion : Wash out mouth with water. **Do NOT** induce vomiting. Obtain medical attention.

=====

5. FIRE FIGHTING MEASURES

Suitable Extinguishing Media : This product is non-combustible, use extinguishing media appropriate to surrounding fire.

Special Exposure Hazards : None.

Special Protective Equipment : None.

=====

6. ACCIDENTAL RELEASE MEASURES

- Personal Precautions** : Wear rubber boots in addition to the recommended protective clothing.
- Environmental Precautions** : Prevent entry into drains, sewers and water courses.
- Decontamination Procedures** : Avoid the creation of dust in atmosphere. Gather into containers. Residues may be flushed to drain with large volumes of water. Prior consent must be obtained from the local Water Company if discharged to sewer.

=====

7. HANDLING AND STORAGE

- Handling** : Avoid creating dust. In case of insufficient ventilation, wear suitable respiratory equipment. Avoid skin and eye contact.
- Storage** : Store in a cool, dry area.

=====

8. EXPOSURE CONTROL / PERSONAL PROTECTION

- Occupational Exposure Limits** :- None assigned.
- Engineering Control Measures** : Use only in well ventilated areas. Where mechanical methods are inadequate or impractical, appropriate personal protective equipment must be used.
- Personal Protective Equipment** : Impervious gloves (eg PVC). Goggles / Safety Glasses. Approved dust mask.

=====

9. PHYSICAL AND CHEMICAL PROPERTIES

- Physical State** : Powder supplied in capsule skin.
- Colour** : Grey.
- Odour** : Odourless.
- pH (working dilution)** : >10.
- Boiling Point / Range (°C)** : Not applicable.
- Flash Point (closed, °C)** : None.
- Autoflammability (°C)** : Not applicable.
- Oxidising Properties** : Not determined.
- Relative Density (at 20°C)** : 1.5.
- Water Solubility** : Partially soluble.

=====

10. STABILITY AND REACTIVITY

- Stability** : Stable.
- Conditions to avoid** : Exposure to air. Contamination with water.
- Materials to avoid** : Strong acids.
- Hazardous Decomposition Products** : None.

=====

11. TOXICOLOGICAL INFORMATION

Health Effects

On Eyes	:	May cause transient irritation.
On Skin	:	May cause transient irritation.
By Inhalation	:	May cause transient irritation.
By Ingestion	:	May cause irritation of mouth, throat and digestive tract.
Chronic	:	Repeated and prolonged skin contact may lead to skin disorders.

=====

12. ECOLOGICAL INFORMATION

Environmental Assessment	:	Little detailed information is available on the ecological effects of this product, but its overall environmental impact is not regarded as significant.
Mobility	:	Partially soluble in water.
Persistence and Degradability	:	Not readily biodegradable.
Bioaccumulative Potential	:	Not expected to be bioaccumulative.
Ecotoxicity	:	Not expected to be ecotoxic to fish / daphnia / algae.

=====

13. DISPOSAL CONSIDERATIONS

Disposal must be in accordance with local and national legislation.

Unused Product	:	Disposed of in an approved manner.
Used/Contaminated Product	:	As for Unused product.
Packaging	:	The method of disposal must be acceptable to the local authority.

=====

14. TRANSPORT INFORMATION

This product is NOT classified as dangerous for transport.

=====

15. REGULATORY INFORMATION

Hazard Label Data :-

This product is NOT classified as dangerous for supply in the UK.

- Safety Phrases** : Avoid contact with skin and eyes.
Wear suitable gloves and eye / face protection.
In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
After contact with skin, wash immediately with plenty of soap and water.
- EC Directives** : Dangerous Substances Directive, 67/548/EEC and adaptations.
Dangerous Preparations Directive, 88/379/EEC.
Safety Data Sheets Directive, 91/155/EEC.
- Statutory Instruments** : Chemicals (Hazard Information and Packaging for Supply) (Amendment) Regs. 1996 (SI 1092).
Health & Safety at Work etc. Act 1974.
Control of Substances Hazardous to Health Regs. 1994 (SI 3246).
- Codes of Practice** : Waste Management. The Duty of Care.
- Guidance Notes** : Occupational skin diseases : Health and Safety Precautions (EH 26).
Dust in the workplace : general principles of protection (EH 44).
Occupational exposure limits (EH 40).

=====

16. OTHER INFORMATION

Minova RSA is an ISO 9002 accredited company.

The data advice given apply when the product is used for the stated application or applications. The product is not sold as suitable for any other application. Use of the product for applications other than as stated in this sheet may give rise to risks not mentioned in this sheet. The product should not be used other than for the stated application or applications without seeking advice from Minova RSA.

If this product has been purchased for supply to a third party for use at work, it is the purchaser's duty to take all necessary steps to secure that any person handling or using the product is provided with the information in this sheet.

It is the responsibility and duty of the employer to inform employees and others who may be affected of any hazards described in this sheet and of any precautions which should be taken.

This sheet does not constitute or substitute for the users own assessment of workplace risk, as required by other health and safety legislation.

CONCLUSION

This risk assessment is not absolute and should always be seen as a live document, because risk assessment in any form is a process and not a once-off activity.

Part of this process is that the user receiving the risk assessment from the supplier should scrutinize it, make recommendation or relevant comments and contribute to the assessment to make it more suitable and sufficient and thus more applicable for the proper use of the articles.

Should any recommendations be made from the user, or the supplier should add or remove anything as far as the design of the article is concerned, such recommendations or changes should be incorporated into this risk assessment, thus, the risk assessment should be revised for its adequacy.

Most importantly is that the user should take the recommended specified steps made by the supplier, evaluate them for practical implementation, and incorporate the information into the organizations specific training material, and train employees accordingly. This must be done to ensure the employees responsible for using the articles are familiar with potential hazards and risks they or any other employee might be exposed to.

Only then one can ensure as far as reasonably practicable the articles will be used properly.

If any significant problems or health and safety issues is identified by the user, and the user would like to bring it under the attention of the supplier, the supplier can be contacted at the following numbers:

Office - **011-908-1980; or**

E-mail - **info@minovarsa.co.za**

COMPANY PROFILE - MINOVA RSA



**MANUFACTURERS
OF
ROCK ENGINEERING SOLUTIONS**

THE MINOVA RSA COMPANY

Fosroc Stratabolt was formed in 1997, by the merger of Stratabolt Products, and Fosroc, both leading suppliers of rock support products to the South African Mining industry. Fosroc Stratabolt now trades as Minova RSA, and is a member of the Minova International Group which manufactures and supplies advanced rock-engineering materials in all of the world's major mining countries.

The company operates an integrated research, development and manufacturing facility in the hub of the diverse and technically demanding Southern African Mining Industry. Minova RSA's products are used in every sector of that industry and are exported world-wide.

Through our own research and access to the research of other Minova International companies we aim to ensure that our customers maintain leadership in improving the safety and productivity of underground excavation. The spectrum of products supplied enables mining engineers to choose unique solutions to unique rock engineering problems. We invite the active participation of our customers in product conception and improvement.

We manufacture resin grouting capsules, cement grouting capsules, high-yield and foamed grouts and other advanced technology cements. We also supply backfilling systems.

Witwatersrand Mining Supply Corporation (Wimico), a sister company in Minova International, is a specialist mining contractor, undertaking rock stabilization, void filling and underground construction.

The combination of Minova RSA and Wimico enables us to provide complete solutions to our customers.

MAIN PRODUCTS

LOKSET® polyester resin capsules

Minova RSA manufactures Lokset® resin rock-bolting capsules under licence from E.I. du Pont de Nemours & Co. (Inc). Lokset® is the leading rock-bolting resin in Southern Africa and has long held a similar position in North America.

Lokset® capsules have a unique composition and construction. The resin compartment contains coarse filler particles, which aid in shredding the sheath and then interlock to increase the strength and rigidity of the grout. The catalyst compartment comprises 30 percent of the capsule, which materially improves intermixing of the components. These characteristics give the user unparalleled reliability of installation, tolerance of wide bar/hole annuli and simplicity of operation.

Lokset® is available ex-stock in setting times from 15 seconds to 15 minutes and diameters from 19mm to 35mm. Special setting times and sizes are available on request. The Lokset® capsules manufactured by Minova RSA comply with South African National Standard ("SABS") No. 1534: 1991 and carry the SABS mark of quality.

Minova RSA also manufactures the unique 2-Speedie resin capsule system which contains two different resin set times within the same capsule.

CAPCEM® cement grouting capsules

Cement capsules are used with grout bars to achieve full-column cement grouting.

The blended cement is encapsulated in a porous sheath, which allows controlled water absorption for correct wetting of the grout.

Capcem® capsules are available in 25mm and 28mm diameters and fast setting times allowing a 500mm length of grout to support a 50 kN load applied to an embedded 16mm rebar, after only 1 hour.

TEKSET® high-yield grouts

These patented high-yield grout formulations are designed to be mixed with a fixed quantity of water and pumped under pressure into high strength polypropylene bags for timber pack pre-stressing. The grout will generate a minimum strength of 0,3 MPa in two hours and achieve a minimum strength of 4 MPa within 7 days.

Their primary use is to pre-stress timber packs, giving semi-active and immediate support as well as making the packs blast-resistant. The grouts are also suitable for void filling.

TEKSET® is supplied in nominal 11kg bags.

AIR-O-CEM® and TEKSEAL® foamed grouts.

When placed with a custom-made pump, these grouts produce low-density foams suitable for void filling and the creation of ventilation, backfill and blast barriers. They are supplied in nominal 25kg bags.

PUMPED CEMENT GROUTING SYSTEMS

The Capram® system is manufactured by Minova RSA under licence from Delkor Technik.

The system is designed to afford an easy method of reliably achieving full column cement grouting in a hole of any size. It can be used for pre- or post- grouting.

The equipment components are a simple pressure-differential axial pump which operates on compressed air (minimum pressure 3 bar) and a lance of 12mm to 30mm diameter. The grout is pre-packed in a porous sheath designed to optimise water absorption. The wetted grout bag is inserted into the pump and the grout ejected through flexible piping and the lance to the back of the hole. The sheath is retained in the pump and discarded after use.

The pumps are available ex-stock and the grouts are supplied in packages of nominal dimensions 90mm x 400mm long. Setting times are medium (2 hours) and slow (4-6 hours).

The Capcem Injection Grout System consists of blended cement grout (each bag sufficient to fill one typical rockbolt hole) and a hand held, air driven injector. The grout is mixed in its bag with water and then pumped into the hole with the injector.

LOKSET ANCHOR PACK pourable resin grouts

Scraper winches and other machinery may be rapidly bolted in place with LOKSET ANCHOR PACKS, which are a high-strength pourable resin grouts. They are supplied as a 10kg two-component pack in a mixing bucket. In use, the two components are mixed and poured into the anchoring holes, around the hold-down bolts. The equipment may be used within 2 hours.

TEKFLEX® structural membrane

Tekflex is a high-strength flexible coating for rock. When sprayed onto the surface of mine drives or tunnels it quickly forms a membrane which restrains loose rock, inhibits further deterioration and protects against weathering.

CABLESEAL® fire-retardant coating for cable and pipes

Cableseal is applied as a coating on cables and plastic pipes in mines. It prevents spread of fire along the cable or pipe runs. It is strongly adherent but flexible enough to accommodate flexure of the cable or pipe without breaking off.

FIRESHIELD® fire-resistant coating for timber

Fireshield is sprayed or painted onto timber support in underground workings to prevent spread of fire between packs or poles. It has passed stringent tests that convincingly demonstrate that a timber pack protected by Fireshield will remain intact despite adjacent packs burning completely.

FILLSET® AND CONBEX® backfilling systems

Minova RSA has developed additives that make run-of-mine tailings into effective backfill material. The additives bind the tailings and chemically retain water, accelerating strength gain and preventing shrinkage as the backfill sets. Each backfilling operation is unique so Minova RSA provides advice on design of backfill formulations and placing systems.

FACILITIES

LOKSET @ resin capsule production

Four capsule production lines employ mechanised and automated mixing to produce polyester and catalyst mastics for encapsulation by modified Kartridge Pak (KP) chub machines. The production lines are supported by a dedicated analytical laboratory for checking of incoming, in-process and finished goods.

Capacity: 500 tonnes per month

Cementitious grout manufacture

Two automatically controlled blenders produce the grout blends for the packaging lines. Small diameter grouting capsules (Capcem) are formed on 3 banks of automatic filling machines. Large diameter capsules (Capram and Injection Grout) have their own filling section. Two bagging lines produce Tekset, Air-O-Cem, Tekseal and other bagged products. The cements plant has its own Quality establishment, including laboratories for routine quality control and product testing.

Capacity: 2500 tonnes per month

Research and Development

A central laboratory and workshops are available for development and testing of new formulations and components. Equipment includes compressive and tensile testing machines, apparatus for conventional chemical analyses and rigs for testing anchor installation equipment and techniques.

Technical Service

All field staff are experienced in mining and have received training in the characteristics and proper use of all our products. Minova RSA service includes:

- * Product selection
- * Application training and in-use auditing
- * Stock management, transport and packaging

QUALITY MANAGEMENT

Minova RSA gives quality management the highest priority. All incoming materials are checked against specifications before acceptance into process. Checks on the materials and process conditions are carried out at defined regular intervals, with feedback to operations to ensure continuous compliance. Samples of finished goods are rigorously tested for conformance with specifications and specimens are retained for reference. All key materials are lot-traceable through the process.

Regular analysis of the testing data is carried out to identify trends and areas for improvement. Critical areas of the plants are automated to reduce product variability.

The quality management systems used in the production of Lokset ® resin capsules and cement grouting products are listed by the South African Bureau of Standards (SABS) as complying with the requirements of ISO 9002/1994. Lokset ® has been granted the SABS mark for quality conforming to the requirements of National Standard SABS 1534:1991 for rock bolting resin capsules. The SABS conducts six-monthly audits of the quality systems as well as tests on the mark-bearing products.

KEY PERSONNEL

MANAGING DIRECTOR: DONALD O'CONNOR

Educational Qualifications B.Sc. Hons (Geophysics), MBA
Experience: **Project Leader:** Western Deep levels Mine
Project Manager: NPI Group
General Manager: Strataloc Resins
Managing Director: Dantex Explosives
Technical Director: RSA Products

SALES & MARKETING DIRECTOR: PIERRE LOTTER

Educational Qualifications Diploma - Metalliferous Mining
Experience: Mine Managers Certificate of Competency
Explosives Engineer & Sales Manager - AECI
Marketing Manager - Sasol Explosives
Marketing Director - VAC AIR Technology

TECHNICAL DIRECTOR: ROD SMART

Educational Qualifications Ph.D (Chemistry)
Experience: **Post Doctoral study:** Pennsylvania State University, USA
Product Development Manager: Fosroc Technology, UK
Technical Manager: Fosroc South Africa
Technical Director: Minova RSA

FINANCIAL DIRECTOR: LINDSAY HARRIS- DEWEY

Educational Qualifications B. Comm., B. Acc., C.A. (S.A.)
Experience: **Audit Senior : Ernest and Young** – Springs
Financial Manager: Bevcan - a Division of Crown Nampac
Commercial Manager: Bevcan
Financial Manager: P.F.G. Building Glass

HUMAN RESOURCES MANAGER: LORRAINE COUGHLAN

Educational Qualifications B Comm (Personnel Management) Hons
Experience: **Human Resources Manager** - HMR and Noristan
Personnel Consultant – Johann Ribbens and Associates
Personnel Officer – ESD

OPERATIONS MANAGER: ALFREDO PIRODDI

Educational Qualifications National Diploma (Operations Management)
Experience: **Maintenance Foreman** – MCMS
Production Manager – Coca Cola South Africa
Factory Manager – Fosroc Stratabolt
Operations Manager - Minova RSA

CORPORATE INFORMATION

Official Company name

Minova RSA - trading name of Stratabolt (Pty) Limited
Company No.: 2001/027226/07

Physical Addresses:

Head Office: Isando Cnr Anvil & Brewery Roads, Isando
Resin Factory: Isando Cnr Anvil & Brewery Roads, Isando
Cements Factory: Alrode No. 25, Botha Road, Alrode

Postal Addresses: PO Box 52, Isando, 1600

Telecommunications:

TELEPHONE NUMBERS (011) 923-1900 Isando
(011) 908-1980 Alrode
International: +(2711)

FAX NUMBERS ISANDO: (011) 923-1935 Main Office
ALRODE: (011) 864-4311 Technical Office
(011) 908-5640 Main Office
(011) 908-1977 Sales Office
(011) 908-2389 Purchasing & Despatch
International: +(2711)

E-MAIL info@minovarsa.co.za

WEBSITE www.minovainternational.com

Bankers:

Standard Bank of South Africa
Stratabolt (PTY) Ltd T/A Minova RSA
Isando 01-25-42-43
020133049

Auditors

Ernst & Young
Johannesburg

WRITTEN UNDERTAKING FROM USER – FORMAT EXAMPLE

Organisation:

Division:

Mine:

Date:

Herewith a written undertaking, to take all specified steps sufficient to ensure, as far as reasonably practicable, that the articles will be used properly, and in such a manner that it will not effect the health and safety of persons working there with or in the vicinity of working with the articles.

It is herewith we the user accepts the information supplied to be sufficient in ensuring the proper use of the articles.

Signed on the _____ of _____ 2001, at
_____.

Manager:

Engineer:

Risk Manager:

Quality Control Officer:

Training Manager: