



# **RISK ASSESSMENT**

## **FILLSET SYSTEM BAGGED**

**PN Garner &  
Associates cc**

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## 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

<b>Chief Executive Officer – Pete Ferreira</b>		
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
<b>Director – Donald O'Connor</b>		
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
<b>Technical Director – Rod Smart</b>		
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
<b>Financial Director – Lindsay Harris-Dewey</b>		
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
<b>Operations Director – Alfredo Piroddi</b>		
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
<b>Human Resources Manager – Lorraine Coughlan</b>		
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
G van Blomestein	Manager Backfill	Mine Overseers Certificate
W J Crous	Technical Manager	BSc Chemistry

**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	ANUALLY	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 CATAGORIES**

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



**FILLCEM BAGGED**

REQUIRED WORK AND AREAS OF RESPONSIBILITY (SECTION 1)		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
<b>Loading</b>	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	1	1	1

					area representative who will assess the situation and advise the user accordingly.			
	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	1		Supplier has sound maintenance program in place, and uses alternative production lines to ensure continuous manufacturing of products. Supplier has sound working relationship with	1	1	1

					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.			
	Raw material shortage,	1	2	2	Supplier ensures minimum stock levels are maintained. Supplier has alternative raw material suppliers.	1	1	1

<b>Transport</b>	Vehicle not road worthy, Road accidents, personal injury, product damage, delay in delivery, shortage of product on mine, production loss, financial loss	2	2	4	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	2	2
	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	2	4	Track history has proven that the company drivers are cautious and no fatigue is taking place.	2	2	4
	Driver under influence, Road accidents, personal injury, product damage, delay in delivery, shortage of product on mine, production loss, financial loss	3	2	6	Track history has proven that the transport contractor and company drivers are of reputable source.	1	2	2
	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	3	1	3	Supplier uses a reputable transport contractor,	2	1	2

	accidents, personal injury, product damage, delay in delivery, shortage of product on mine, sub standard installation, financial loss.				company drivers and track history is proof of sound driving experience.			
	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

<b>Off loading</b>	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, boxes should be removed or off-loaded manually onto a stable pallet for off-loading by a forklift.	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	2	1	2

					which increases the chance of personal injury.			
	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

<b>Area demarcated for article incorrect</b>	Area not demarcated, wrong product being issued, difficult loading, potential fire hazard if area is near electrical installations for example, Property damage, time delay	2	1	2	Products are supplied in maximum one-ton pallets, which requires a forklift for off-loading and storing pallets, therefore the user to ensure that a specific area is demarcated for the purpose of storing and transporting pallets by forklift with sufficient clearances to prevent any possible damage and injury to person. Preferably the demarcated area should be cool and dry.	1	1	1
<b>Ensure correct stack height</b>	Stacking too high, falling stacks, Injury to person, product damage, financial loss	2	2	4	If space allows, the ideal situation is not to stack pallets on top of each other, to reduce the possibility of falling stacks and damage to bags.	1	1	1
<b>Ensure sufficient clearances between articles and travelling ways</b>	Inadequate clearances, obstructed travelling ways, obstructed escape routes, trip and fall, Injury to person, product damage, financial loss	2	2	4	User to ensure that sufficient clearances are maintained at all times. As far as reasonably practicable pallets must not be stored in travelling or escape routes or near electrical installations which may pose a fire hazard due to shrink plastic, bags and pallet it self.	2	2	4
<b>Ensure sharp ends not</b>	Broken pallets, sharp edges,	2	2	4	User to remove any broken pallets with	1	2	2

<b>protruding from pallet</b>	obstructed travelling ways, slip and trip, Personal injury, property damage falling stack				protruding sharp edges to prevent the possibility of injury or damage.			
<b>Ensure easy accessibility</b>	Inadequate access, difficult loading and off-loading, Personal injury, property damage, product damage	2	2	4	The user to ensure that storing area is easily accessible for loading and off-loading using a forklift to prevent any possible injury or property damage.	1	1	1
<b>Safeguard against natural elements</b>	Rain, sun, poor visibility at night, blind spots and corners, Damage to product, possible injury or property damage	2	1	2	User to avoid storage is direct sunlight, storage must be in dry conditions preferably under cover with area well illuminated and no blind spots or corners which may lead to poor visibility and possible injury and damage.	1	1	1

<b>Loading material cars</b>	No forklift for loading, Delay, handling bags by hand. Injury to workers while manually loading	3	2	6	The user must as far as reasonably practicable use a forklift for loading articles and prevent loading by hand as far as possible to reduce any possibility of injury or over exertion by workers. Should manual loading take place the user then to ensure that employees performing the task use the correct PPE such as gloves, goggles, rubber boots and dust masks.	1	1	1
	Unsafe loading with forklift, Property damage, product damage, possible injury	2	1	2	User to ensure that a competent forklift operator is used for loading the pallets due to the size of pallets, to reduce the possibility of injury or damage.	1	1	1
	Using a defective Forklift for loading , Property damage, product damage, possible injury	2	1	2	User to ensure that a well maintained forklift which is in order is used for loading the pallets due to the size of the pallets to reduce the possibility of injury or damage.	1	1	1
	Using an unskilled forklift operator, Property damage. product damage, possible injury	2	1	2	User to ensure sufficient demarcated areas and required space for loading and off-loading articles with a forklift to reduce the possibility of injury or damage.	1	1	1
	By-standers in vicinity whilst forklift loading forward/transporting articles, Property damage, product damage, possible injury	2	1	2	User to ensure that a competent forklift operator is used for loading the pallets due to the size of the pallets to reduce the possibility of injury or damage.	1	1	1
	Unsafe stacking of articles on material car, Property damage, product damage, possible injury	2	1	2	User to ensure that personnel not related to task being performed to be well cleared from area when forklift is loading pallets to reduce the possibility of injury or damage.	1	1	1
	Unsafe stacking of articles on material car, Property damage, product damage, possible injury	1	2	2	Users to load cement bags in a proper material car allocated for this purpose and not load on flat cars to prevent any unsafe loading, when using a material car with closed sides the car not to be over-loaded to prevent falling bags and subsequent damage to the product	1	1	1
	Loose or damaged pallets/ product being loaded, Property damage, product damage, possible injury	2	1	2	Avoid loading any material that is damaged or broken, which may be used on application and result in a sub standard application, which may	1	1	1

					have serious consequences.			
	Loading on an unsecured material car, Property damage, product damage, possible injury	3	1	3	User to ensure material car is properly secured for loading to prevent a run away car that may cause personal injury or damage to the product or property	2	1	2
	Over-loading of material car, Property damage, product damage, possible injury	3	1	3	User not to load in excess of the rim of material car to avoid bags protruding from the top of the car, which may cause bags falling off car during transit, which may cause product damage or injury.	2	1	2
	Incorrect material car used for loading, Property damage, product damage, possible injury	3	1	3	As far as reasonably practicable the user only to use proper enclosed material cars for the transport of the articles to reduce the possibility of falling bags during transit if a flat car were to be used.	2	1	2
	Using a defective material car, Property damage, product damage, possible injury	3	1	3	User to ensure material car is in order with no defects for transport of articles, a defective car may cause incidents which may result in down time or injury and damage to the product.	2	1	2
	Handling of bags by hand, Back injuries, hand injuries, eye injuries, pollution	3	2	6	Users to ensure sufficient assistance for loading of cement bags, the bags have a weight of 25kg / bag and should be loaded by two people at any time.	2	2	4

<b>Transport underground</b>	Derailments on tracks, Property damage, product damage, personal injury,	2	1	2	User to ensure that a well maintained material car is used for transport to reduce the possibility of any derailments.	1	1	1
	Bags falling off car, Product loss	4	1	4	User not to load in excess of the rim in material car.	1	1	1
	Transport at high speed, Product damage, personal injury, property damage	2	2	4	User not to over-load material car and keep to underground speed limits.	1	2	2
	Bags protruding from material car, Loss of product	3	1	3	User not to load in excess of the rim of material car.	1	1	1
	Bags transported to incorrect destination, Time delay	3	1	1	User to clearly demarcate material cars for designated areas to prevent incorrect off-loading in wrong area, due to the fact that the item is classified as a critical support item.	2	1	2

	Transporting material car by hand Product loss, time delay, personal injury, property damage	3	2	6	User not transport material using flat cars pushed by hand, rather enclosed material cars using a locomotive to reduce the possibility of injury and damage.	1	1	1
	Not securing material car in cage for transport, Product loss, time delay, personal injury, property damage	2	3	6	User not to load in excess of the rim of material car, and ensure car is secured in cage.	1	1	1
	Handling of bags by hand, Back injuries, hand injuries, eye injuries, pollution	3	2	6	Users to ensure sufficient assistance for transporting of cement bags, the bags have a weight of 25kg / bag and should be transported by two people at any time.	2	1	2

<b>Off-loading underground</b>	Unsafe off-loading, Product loss, personal injury	2	1	2	Off-loading to be done in designated areas and at all times the employees to take caution to not stand on top of the material car for off-loading.	1	1	1
	Off-loading in wrong area, Time delay	3	1	3	User to clearly demarcate material cars for designated areas to prevent incorrect off-loading in wrong area, due to the fact that the item is classified as a critical support item.	2	1	2
	Insufficient assistance for off-loading, Time delay, product damage, financial loss	3	1	3	Always ensure sufficient assistance for off-loading to reduce the possibility of damage to the bags or person.	1	1	1

<b>Ensure a safe area for underground storage purposes</b>	Loose, hang or side wall, old and abandoned area, no ventilation, accumulation of fumes or gasses, excessive ground water, unsupported area, Personal injury, loss of product, financial loss	3	2	6	User to ensure competent person ensures area for storage purpose is safe, by barring, and ensuring no old or abandoned areas are used for storage where there might be a shortage of ventilation which may cause a build up of fumes or gas which may affect the health and safety of employees.	2	2	4
<b>Area demarcated for article storage</b>	No demarcated area, Loss of product, financial loss, damage to property, product becoming inferior, sub standard application	2	1	1	User to demarcate area for storage purposes, area should be well ventilated, well illuminated, dry and controlled to ensure a good rotation of the articles. Demarcated area should preferably not be close to travelling or	1	1	1

					escape routes, which may cause these routes to be obstructed if articles are not stored properly.			
<b>Ensure correct stack height</b>	Bags stacked too high, Loss of product	2	1	1	It is recommended that bags are not stacked higher than one meter from the ground floor level, to minimize damage to the product, should bags fall from stack and to facilitate easier access for transport purposes.	1	1	1
<b>Ensure sufficient clearances between articles and travelling ways</b>	Inadequate clearances, obstructed travelling ways, Personal injury, product damage	2	2	4	User to ensure area is properly demarcated and no travelling or escape routes are obstructed in any way to minimize the probability of personal injury or product damage.	1	2	2

**FILLCEM SYSTEM**

REQUIRED WORK AND AREAS OF RESPONSIBILITY (SECTION 1)		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	Pipeline blocks	1	1	2		1	1	2
	Run away of Paddock	1	3-4	3-4	Contract – quality control systems (every batch) Mine Quality Control Systems (Not all Mines)	1	3	3
	Liquification of Backfill in paddock after rockburst	1	2	2	Contract – quality control systems (every batch) Mine QC Systems (Not all Mines)	1	2	2
	Cut and Fill 1) non-rideable	1	4	4	Contract – quality control systems (every batch)	1	4	4
	Cut and Fill 2) Dilution	1	3	3	Contract – quality control systems (every batch)	1	3	3
	Drift and Fill (Room and Pillar)	2	4	8	Contract – quality control systems (every batch)	1	4	4
	1) Collapse of high wall 2) Run away of fill into workings	1	4	4	Quality control while pumping by mine (not Minova RSA)	1	4	4

REQUIRED WORK AND AREAS OF RESPONSIBILITY (SECTION 1)		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
Mine control of mixes and Specific Gravity	Incorrect mix or SG, Pipeline blocks	1	1	2	Mine standards procedures and quality control monitors mixing continually. If substandard mixes are used they are discarded	1	1	2
	Incorrect mix or SG, Run away of Paddock	1	3-4	3-4	Mine standards procedures and quality control monitors mixing continually. If substandard mixes are used they are discarded	1	3	3
	Incorrect mix or SG, Liquification of Backfill in paddock after rockburst	1	2	2	Contract – quality control systems Mine standards procedures and quality control monitors mixing continually. If substandard mixes are used they are discarded	1	2	2
	Incorrect mix or SG, Cut and Fill 1) non-rideable	1	4	4	Mine standards procedures and quality control monitors mixing continually. If substandard mixes are used they are discarded	1	4	4
	Incorrect mix or SG, Cut and Fill 2) Dilution	1	3	3	Mine standards procedures and quality control monitors mixing continually. If substandard mixes are used they are discarded	1	3	3
	Incorrect mix or SG, Drift and Fill (Room and Pillar) 3) Collapse of high wall 4) Run away of fill into workings	2 1	4 4	8 4	Mine standards procedures and quality control monitors mixing continually. If substandard mixes are used they are discarded	1 1	4 4	4 4

**FILLSET SYSTEM**

REQUIRED WORK AND AREAS OF RESPONSIBILITY (SECTION 1)		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
FILLGEL MINE HANDLING					Protective clothing as specified – goggles, gloves and shoes. Procedures			
Tapping from storage tank to bowser	1) Spillage, falls, burns etc 2) Splashing, burns etc	3 3	2 2	6 6		2 2	2 2	4 4
Rupture of bowser during transport	As above				See Mine Code of Good Practice for shafts and railage	1	2	4
Emptying of bowser in tank – pumped	As above				As above			
<b>Transport underground</b>	Derailments on tracks, Property damage, product damage, personal injury,	2	1	2	User to ensure that Bowsers are well maintained to reduce the possibility of any derailments.	1	1	1
	Transport at high speed, Bowser damage, personal injury, property damage	2	2	4	User to keep to underground speed limits.	1	2	2
	Bowser transported to incorrect destination, Time delay	3	1	1	User to clearly demarcate material cars for designated areas to prevent incorrect off-loading in wrong area, due to the fact that the item is classified as a critical support item.	2	1	2
	Transporting Bowser by hand Product loss, time delay, personal injury, property damage	3	2	6	.	1	1	1

**FILLSET SYSTEM**

REQUIRED WORK AND AREAS OF RESPONSIBILITY (SECTION 1)		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
FILLGEL DELIVERY	Up to arrival at Mine. Responsibility of INEOS							
	Pipe connection, injury of personnel, pollution, wastage	2	2	2	Gloves, goggles, personal protective clothing	2	1	
	Spillage by failure of pipes, over-filling or leaking pipes injury of personnel, pollution, wastage	3	2	5	Special locking connections All storage tanks on stands and to have retaining wall to prevent spreading of spills	1	2	2
	1) Slipping and burns 2) Material entering draws, sewers and water courses	1	3	3		1	1	1
Mixing Nozzle in paddock	1) Burns of nozzle operator 2) Failure of hose and burns of stope crew etc	2	2	4	Personal Protective equipment issued Procedures in place on mine– safety, flushing	1	2	2
	3) Solidifying in hose	2	2	4	Procedures for flushing	1	2	2

**TECHNICAL INFORMATION**



**Two-component additive system for cemented backfill.**

**Uses**

The Fillset system can be used to produce a stiff cemented backfill, the characteristics of which can be designed to suit specific backfilling requirements.

**Advantages**

- Classification of the tailings is not necessary.
- Slimes and water run-off are reduced. Reduction in slimes and water run off results in improved conditions in gullies drains and ore-passes.
- Little or no shrinkage of the backfill occurs so that no topping up is required, and contact with the hanging wall is more easily maintained.
- Retention of volume reduces filling time.
- Additives are non-flammable, non-toxic.

**Description**

The Fillset system consists of two components, a powder, FILLCEM and a liquid, FILLGEL. When added to tailings slurry, the components react in time to form a homogeneous hardened backfill.

FILLCEM is a blend of specially selected powders proportioned to give a long pipe life and optimum strength development in the backfill.

FILLGEL is an inorganic liquid additive, which when added to the slurry reacts rapidly with the components of FILLCEM to accelerate solidification with minimal water loss.

**Properties**

**Setting time**

FILLCEM is formulated to have a long life in the backfill pipeline (typically 6-8 hours depending on ambient temperatures). However, once mixed with the FILLGEL the reaction is very rapid giving gelation within minutes.

**Strength development**

Typical strength development using 5% FILLCEM and 1% FILLGEL with quartzitic tailings slurry with 34% water content (R.D. = 1.7) is detailed below.

Age (days)	U.C.S. (MPa)
1	0.15
7	0.50
14	0.62
28	1.00

**Water retention**

The following table illustrates the reduction in water run-off which is obtained using quartzitic tailings slurry at R.D = 1.7 at various additions.

Addition level (%)		Water run-off
FILLCEM	FILLGEL	(% of total water)
5	1	6.5
7	1	4.6
9	1	3.5

**Estimating**

**Pack size**

FILLCEM	25 kg bags or bulk
FILLGEL	200 litre drums or bulk

**Addition rates are selected on the basis of the following criteria: -**

- The type and particle size distribution of the tailings, classified or unclassified.
- Water content of the slurry (i.e. the R.D.).
- Degree of water retention desired.
- Backfill strength required.
- The pH of the tailings slurry to be used.

In order to obtain the correct addition level, a detailed investigation must be carried out by Minova RSA on the actual mine tailings to be used.

**Storage/Shelf life**

When stored in dry, cool conditions, unopened FILLCEM and FILLGEL have shelf lives of 12 months each.

**Precautions**

**Health and Safety**

Both FILLCEM and FILLGEL are alkaline, consequently the use of gloves and goggles is recommended. Splashes should be removed from the skin and eyes by washing with plenty of water. In the case of splashes in the eyes, medical attention should be sought immediately, refer to Material Safety Data Sheet.

When FILLCEM is being slurried with water before being added to the backfill, waterproof clothing should be worn to protect against splashing.

Both FILLCEM and FILLGEL are non-flammable and non-toxic.

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### 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 tunneling industries.

Minova RSA range of mining products includes anchoring and backfill systems, bagged cement products, high yield grouts, mine sealants, equipment and accessories, for which a product brochure is available on request.

### 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.

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® trade mark of MINOVA RSA



=====

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

-----

**Application** : Mine tailings stabilization binder.

**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, calcium hydroxide, inorganic fillers.

-----

<b>Hazardous Ingredient(s)</b>	<b>Symbol</b>	<b>Risk Phrases</b>	<b>Other Information</b>	<b>%</b>
Cements	Xi	R36/37/38	Cas No: -----	>25<50
Calcium hydroxide	Xi	R38, 41	Cas No: 1305-62-0	>2.5<10

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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**

-----

Irritating to eyes, respiratory system and skin.

**IRRITANT**

=====

**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. Remove contaminated clothing immediately. Obtain medical advice if skin disorders develop.

**Inhalation** : Remove from exposure, rest and keep warm and obtain medical attention urgently.

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

=====

**5. FIRE FIGHTING MEASURES**

-----

**Suitable Extinguishing Media** : None, not flammable.

**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 watercourses.
- Decontamination Procedures** : Avoid the creation of dust in atmosphere. Gather into containers. Residues may be flushed to drain with large volumes of water.

## 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 :-

Substance	8-Hour TWA	STEL	Source/Other Information
Calcium hydroxide	5mgm <sup>-3</sup>	---	EH 40
Cement			EH 40
Total inhalable dust	10mgm <sup>-3</sup>	---	
Respirable dust	5mgm <sup>-3</sup>	---	

- Engineering Control Measures** : Atmospheric levels of dust must be maintained within the Occupational Exposure Limit. 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 / Off White.
- Odour** : Odourless.
- pH (working dilution)** : 12.
- Boiling Point / Range (°C)** : Not applicable.
- Flash Point (closed, °C)** : None.
- Auto flammability (°C)** : Not applicable.
- Oxidising Properties** : Not determined.
- Relative Density (at 20°C)** : 1.4. (Loose bulk)
- Water Solubility** : Partially soluble.

## 10. STABILITY AND REACTIVITY

- Stability** : Stable.
- Conditions to avoid** : None known.
- Materials to avoid** : Strong acids.
- Hazardous Decomposition Products** : None.

=====

## 11. TOXICOLOGICAL INFORMATION

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### Health Effects

<b>On Eyes</b>	:	Irritating and may injure eye tissue if not removed promptly.
<b>On Skin</b>	:	Irritation.
<b>By Inhalation</b>	:	Irritating to respiratory system.
<b>By Ingestion</b>	:	May cause irritation of mouth, throat and digestive tract.
<b>Chronic</b>	:	Repeated and prolonged skin contact may lead to skin disorders.

=====

## 12. ECOLOGICAL INFORMATION

-----

<b>Environmental Assessment</b>	:	Little detailed information is available on the ecological effects of this product, but its overall environmental impact is not regarded as significant.
<b>Mobility</b>	:	Partially soluble in water.
<b>Persistence and Degradability</b>	:	Not readily biodegradable.
<b>Bioaccumulative Potential</b>	:	Not determined.
<b>Ecotoxicity</b>	:	Not determined.

=====

## 13. DISPOSAL CONSIDERATIONS

-----

**Disposal must be in accordance with local and national legislation.**

<b>Unused Product</b>	:	Disposed of in an approved manner.
<b>Used/Contaminated Product</b>	:	As for Unused product.
<b>Packaging</b>	:	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**

-----

<b>Hazard Label Data</b>	:	-
<b>Symbol(s)</b>	:	Xi
<b>Risk Phrases</b>	:	Irritating to eyes, respiratory system and skin..
<b>Safety Phrases</b>	:	Do not breathe dust. 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. Wear suitable gloves and eye / face protection.
<b>EC Directives</b>	:	Dangerous Substances Directive, 67/548/EEC and adaptations. Dangerous Preparations Directive, 88/379/EEC. Safety Framework Directive, 89/391/EEC. Safety Data Sheets Directive, 91/155/EEC.
<b>Statutory Instruments</b>	:	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).
<b>Codes of Practice</b>	:	Waste Management. The Duty of Care.
<b>Guidance Notes</b>	:	Occupational skin diseases : Health and Safety Precautions (EH 26). Dust in the workplace : general principles of protection (EH 44). Occupational exposure limits (EH 40).

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**16. OTHER INFORMATION**

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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 that 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.



=====

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

-----

**Application** : Mine tailings stabilization accelerator.

**Company** : Minova RSA

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

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

=====

**2. COMPOSITION / INFORMATION ON INGREDIENTS**

-----

**Composition** : Sodium silicate solution.

-----

<b>Hazardous Ingredient(s)</b>	<b>Symbol</b>	<b>Risk Phrases</b>	<b>Other Information</b>	<b>%</b>
Sodium Silicate	Xi	R36/38	Cas No: 1334-09-8	>2.5 <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**

-----

Irritating to eyes and skin.

**IRRITANT**

=====

**4. FIRST AID MEASURES**

-----

**Eyes** : Irrigate immediately with copious quantities of water for several minutes. Obtain medical attention urgently.

**Skin** : Wash thoroughly with soap and water or suitable skin cleanser as soon as possible. Obtain medical attention if irritation persists.

**Inhalation** : Remove from exposure, rest and keep warm and obtain medical attention urgently.

**Ingestion** : Wash out mouth with water and give sips of cold water to soothe the affected parts. **DO NOT** induce vomiting. Obtain medical attention.

=====

**5. FIRE FIGHTING MEASURES**

-----

**Suitable Extinguishing Media** : Use water fog to keep containers cool.

**Special Exposure Hazards** : None.

**Special Protective Equipment** : None.

---

## 6. ACCIDENTAL RELEASE MEASURES

---

<b>Personal Precautions</b>	:	Wear rubber boots in addition to the recommended protective clothing. Wear suitable protective clothing, gloves and eye/face protection. Split product presents a significant slip hazard.
<b>Environmental Precautions</b>	:	Prevent entry into drains, sewers and watercourses.
<b>Decontamination Procedures</b>	:	Soak up with inert absorbent or contained and removed by best available means. Gather into containers.

---

## 7. HANDLING AND STORAGE

---

<b>Handling</b>	:	Do not eat, drink or smoke whilst using this product. Avoid skin and eye contact.
<b>Storage</b>	:	Protect from frost. Do not store at temperatures above 50°C. Store away from acids.

---

## 8. EXPOSURE CONTROL / PERSONAL PROTECTION

---

<b>Occupational Exposure Limits</b>	:-	None assigned.
<b>Engineering Control Measures</b>	:	No specific ventilation requirement noted. Local exhaust ventilation is recommended if solution is sprayed or forms an airborne aerosol.
<b>Personal Protective Equipment</b>	:	Avoid skin and eye contact. Impervious gloves (eg PVC). Goggles / Safety Glasses. Approved dust mask. Change contaminated clothing immediately and clean before re-use. An eye wash station must be available.

---

## 9. PHYSICAL AND CHEMICAL PROPERTIES

---

<b>Physical State</b>	:	Thin syrup.
<b>Colour</b>	:	Colourless.
<b>Odour</b>	:	Odourless.
<b>pH (working dilution)</b>	:	>11.
<b>Boiling Point / Range (°C)</b>	:	~100°C.
<b>Flash Point (closed, °C)</b>	:	None.
<b>Autoflammability (°C)</b>	:	Not applicable.
<b>Oxidising Properties</b>	:	Not determined.
<b>Relative Density (at 20°C)</b>	:	1.40.
<b>Water Solubility</b>	:	Soluble.

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## 10. STABILITY AND REACTIVITY

---

<b>Stability</b>	:	Stable.
<b>Conditions to avoid</b>	:	Temperatures (°C) above 50°C.
<b>Materials to avoid</b>	:	Strong acids. Aluminium, zinc and tin and their alloys.
<b>Hazardous Decomposition Products</b>	:	None.

=====

## 11. TOXICOLOGICAL INFORMATION

-----

The following toxicological assessment is based on a knowledge of the toxicity of the product's components :  
Expected oral LD50, rat > 2g/kg.  
Classified as an eye and skin irritant.

### Health Effects

<b>On Eyes</b>	:	Irritating and may injure eye tissue if not removed promptly.
<b>On Skin</b>	:	Irritation.
<b>By Inhalation</b>	:	Mist and vapours may cause irritation to nose and respiratory tract.
<b>By Ingestion</b>	:	May cause irritation of mouth, throat and digestive tract.
<b>Chronic</b>	:	Prolonged skin contact can result in chemical burns.

=====

## 12. ECOLOGICAL INFORMATION

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<b>Environmental Assessment</b>	:	Capable of causing harm in biological treatment systems and recommendations for its final disposal must be closely followed.
<b>Mobility</b>	:	Soluble in water.
<b>Persistence and Degradability</b>	:	Inherently biodegradable.
<b>Bioaccumulative Potential</b>	:	Not expected to be bioaccumulative.
<b>Ecotoxicity</b>	:	Expected to be ecotoxic to fish/daphnia/algae.

=====

## 13. DISPOSAL CONSIDERATIONS

-----

**Disposal must be in accordance with local and national legislation.**

<b>Unused Product</b>	:	Classified as a special waste. Dispose of through an authorized waste contractor to a licensed site.
<b>Used/Contaminated Product</b>	:	As for Unused product.
<b>Packaging</b>	:	May be steam cleaned and recycled.

=====

## 14. TRANSPORT INFORMATION

-----

This product is NOT classified as dangerous for transport.

=====

## 15. REGULATORY INFORMATION

-----

<b>Hazard Label Data</b>	:	-
<b>Named Ingredients</b>	:	Sodium Silicate Solution
<b>Symbol(s)</b>	:	Xi
<b>Risk Phrases</b>	:	Irritating to eyes and skin..
<b>Safety Phrases</b>	:	Avoid contact with skin and eyes. In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. Wear suitable gloves and eye / face protection.
<b>EC Directives</b>	:	Dangerous Substances Directive, 67/548/EEC and adaptations. Dangerous Preparations Directive, 88/379/EEC. Safety Data Sheets Directive, 91/155/EEC.
<b>Statutory Instruments</b>	:	Chemicals (Hazard Information and Packaging for Supply) (Amendment) Regs. 1996 (SI 1092). Health & Safety at Work etc. Act 1974. The Special Waste Regulations 1996 (SI 1972).
<b>Codes of Practice</b>	:	Waste Management. The Duty of Care.

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## 16. OTHER INFORMATION

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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 that 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.

**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

### FASLOC® polyester resin capsules

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

Fasloc® 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.

Fasloc® 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 Fasloc® 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

### FASLOC ® 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 Fasloc ® 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. Fasloc ® 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](mailto:info@minovarsa.co.za)

WEBSITE [www.minovainternational.com](http://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:**