



GROUND SUPPORT **SOLUTIONS**

www.rocbolt.com



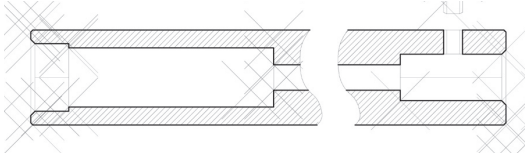
PRODUCT CATALOG

for the South African Mining Industry.

Accessories for Rock and Roof Bolts

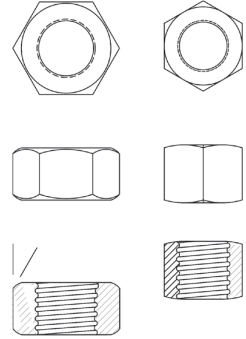
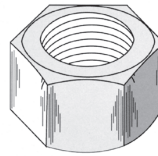
Spanners

- SA-27F/22 m or 27M/22F
- SA-32F/22 m or 32M/22F
- SA-35F/22 m or 35M/22F
- Spanners can be delivered on request.



Nuts

- 18 DIN 405 Drive Nut
- 20 DIN 405 Drive Nut
- 22 DIN 405 Drive Nut
- 25 DIN 405 Drive Nut
- Nuts can be delivered on request.

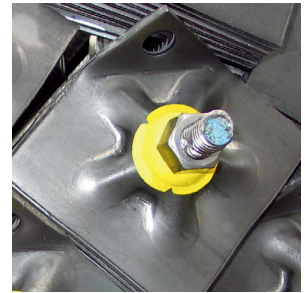


Torque Indicators

- Torque indicators can be used on 16, 18, 20 and 25mm Anchor Bolts
- Torque indicators are installed between nut and washer. The torque indicator is an indication of a correctly installed anchor bolt.

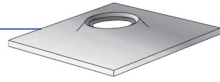


Standard Torque Indicator



Accessories for Rock and Roof Bolts

Domed Washer



Physical Properties

Technical Data		
Length, mm (in.)	125 (4.92)	125 (4.92)
Width, mm (in.)	125 (4.92)	125 (4.92)
Thickness, mm (in.)	4.5 (0.18)	5.0 (0.19)

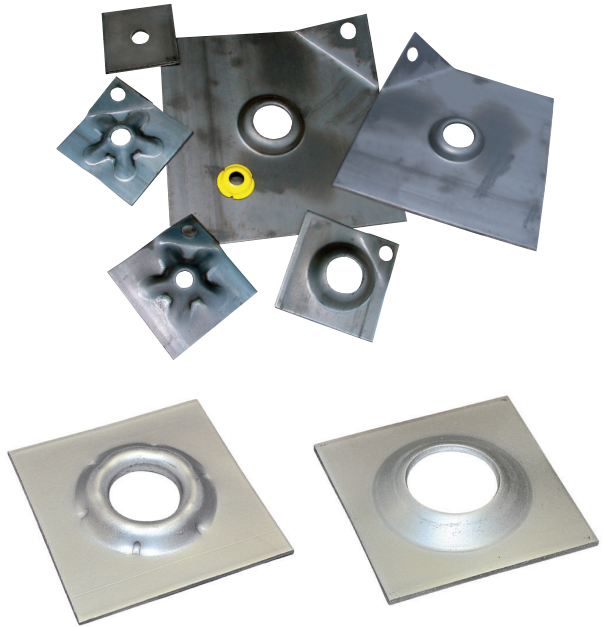
Hole size 36, 38, 42, 44, 48 mm

Features

- Domed plates are compatible with rock bolts fitted with matching dome balls
- Domed plates are complimentary to the Dome Ball and overcome the problems of surface angularity. This allows the development of a good torque tension ratio
- The Domed Plate and Dome Ball assembly provides up to 18° angle of tilt.

Packaging

- Domed plates are tied with wire clips and then palletised.

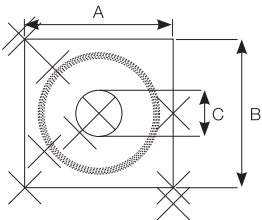


Flat Washer

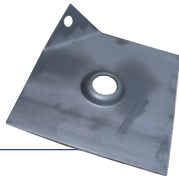
Flat Plates for general use

Technical Data		
A x B, mm (in.)	100 x 100 (3.94 x 3.94)	125 (4.92)
Thickness, mm (in.)	125 x 125 (4.92 x 4.92)	125 (4.92)
C, mm (in.)	18.5 - 19 (0.73 - 0.75)	5.0 (0.19)

Hole size 36, 38, 42, 44, 48 mm



300 x 300mm Flat Washer with central dome



- Flat dome washer with 36, 38, 44 and 48mm (1.42, 1.50, 1.73 and 1.89 in.) centre hole.

Coupler

For 25mm bar

Outer Diameter	
Outer Diameter, mm (in.)	32 (1.26)
Length, mm (in.)	70 (2.76)



Accessories for Rock and Roof Bolts

Rib Washer

Physical Properties

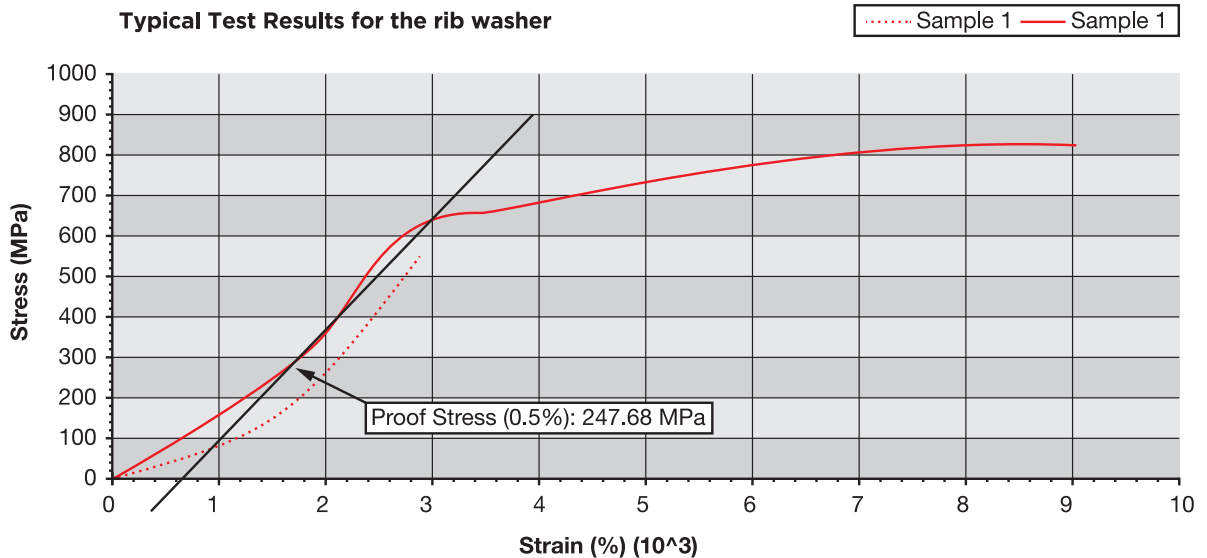
- RIB Height Minimum 0.55mm, Maximum 0.8mm
- MPA Minimum of 500 MPa
- Bar Yield Minimum of 100 kN
- Ultimate Load Minimum of 114 kN
- Thread Load 110 (+10mm - 0mm)
- NIB Area Maximum of 10mm on the thread side of bar

Features

- Rib Washer 18.5 - 19 mm and 22.5 - 27.5 mm centre holes



Extensive testing of high quality washers



Accessories for Rock and Roof Bolts

Grouting Rods

Bar Type: Rebar

Diameter, mm (in.)	Length, m (ft)
12 (0.47)	1.2 - 3.4 (3.94 - 11.15)
14 (0.55)	1.2 - 3.4 (3.94 - 11.15)
16 (0.63)	1.2 - 3.4 (3.94 - 11.15)



Forged Head Bolts

Bar Type: DD Bar

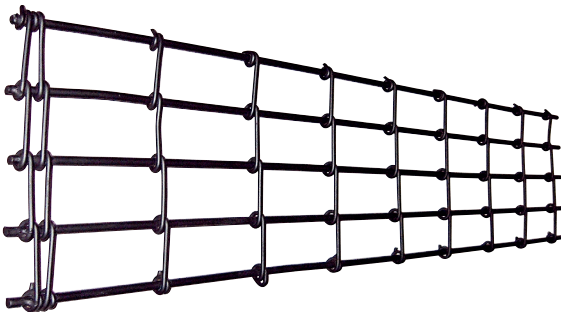
Diameter, mm (in.)	Length, m (ft)
16 (0.63)	0.6 - 2.2 (1.97 - 7.22)
18 (0.71)	0.6 - 2.2 (1.97 - 7.22)
20 (0.79)	0.6 - 2.2 (1.97 - 7.22)



Osro Straps

Bar Type: Round Steel

Diameter, mm (in.)	Length, m (ft)	Width, m (ft)
Horizontal Bars 6 - 10 (0.24 - 0.39)	1 - 6 (3.28 - 19.69)	0.25 - 1 (0.82 - 3.28)
Strapping Bars 5.5 (0.22)	1 - 6 (3.28 - 19.69)	0.25 - 1 (0.82 - 3.28)



W Straps

Bar Type: Round Steel

Steel mm (in.)	Length m (ft)	Width mm (in.)	Multi Hole
1.6 (0.06)	1.2 - 4.0 (3.94 - 13.12)	250 - 500 (9.84 - 19.69)	500mm Apart



Coupler for 20mm Bar

Outer Diameter, mm (in.)	Length, mm (in.)
28 (1.10)	61 (2.4)



Anchor Resin (Resin Component) MATERIAL SAFETY DATA SHEET**1. Manufacturer Details**

Product Name: ANCHOR RESIN
 Application: Resin based pourable anchor system
 Company: Rocbolt Technologies (Pty) Ltd
 Address: 42 Steel Rd., Spartan
 P.O. Box 15, Isando, 1600
 Telephone: (011) 970 - 1643
 Fax: (011) 970 - 3596

2. Identification of the Substance/Preparation

Name: ANCHOR RESIN (RESIN COMPONENT)
 Code: N/A
 CAS no: (Xn; Cas no. 100-42-5 < 12.5%)
 EC no. : N/A
 UN No.: EAC: 127 Hazchem: 3[Y]E
 Kemler: 33 SAPMA: 2-H-E

3. Composition/Information on Ingredients

[- R10][Xn R20][Xi R36/38]

EC Classification: - Xn R10, 20, 36/38 S02, 13, 26, 43A, 46, 51

HAZARDOUS AND/OR OTHER RELEVANT COMPONENTS

STYRENE >12.5%

[CAS #: 100-42-5] [E.C. #: 601-026-00-0]

EEC Labels: XN OEL 420mg OEL 100ppm STOEL 1050mg STOEL 250ppm CL+ S

(CL/RL = Controlled/Recommended level 'S' = Skin annotation)

4. Hazards Identification

SAPMA Health Rating: 2-MODERATE - Temporary or minor injury possible even if treatment given

Inhalation: HARMFUL. Excessive exposure to this material must be avoided.

Skin: Highly irritating. Risk of dermatitis. May be absorbed through intact skin.

Eyes: Irritating - may cause damage if not given prompt attention.

Ingestion: Harmful if swallowed. Can affect CNS. Systemic poison.

No carcinogenic, mutagenic or genetic effects established

Medium to long term environmental effects. Contain, collect & remove.

5. First Aid Measures

Inhalation: Move to fresh air. In case of discomfort seek medical attention.

Skin: Drench with water. Remove contaminated clothing. Use a skin cleaner. In severe cases refer to Doctor.

Eyes: Rinse well with water and seek medical advice if discomfort persists.

Ingestion: Wash mouth with plenty of water. Do NOT induce vomiting. Seek medical advice.

6. Fire Fighting Measures

Flammable with toxic fumes. Potential for spontaneous combustion.

Containers can burst in a fire. Can form explosive vapour/air mixture. Static discharge hazard!

Foam. CO2. Dry powder. Fog to cool and control. Do NOT use water jets.

Cool containers in case of fire.

7. Accidental Release Measures - See also Sections 5, 8, 13

Contain & Collect. Use inert, NOT sawdust. Remove waste to safe place - potential for spontaneous combustion.

8. Handling and Storage

Store separately from any reactive substances - oxidisers in particular.

No open flames. No smoking.

Keep containers cool. Avoid free fall of liquid - use earthing.

For maximum quality store at or below: 20 °C.

Anchor Resin (Resin Component) MATERIAL SAFETY DATA SHEET**9. Exposure Controls/Personal Protection**

SAPMA Rating	
2-H-E PPE:	Respirator and Eye protection
Inhalation:	In case of insufficient ventilation, use suitable respiratory protection.
Skin:	
AVOID CONTACT.	Use impervious gloves, apron and boots.
Eyes:	Avoid any form of direct contact. Do not touch eyes with dirty hands or gloves.
Ingestion:	Observe the rules of hygiene. Wash before eating, drinking or smoking.
OEL Type:	Mix- Mixture - See Section 2 Skin annotation

10. Physical and Chemical Properties

Chemical class:	RESIN SOLUTION
Description:	Viscous liquid
Smell:	Pungent
Boil. Pt (°C):	145°
Flash Point (°C):	32°C

11. Stability and Reactivity

Potential for exothermic reaction

Could generate static - USE EARTHING

Potential for spontaneous combustion

Very unstable with heat &/or water

12. Toxicological Information

No carcinogenic, mutagenic or genetic effects established

13. Ecological Information

Medium to long term environmental effects. Contain, collect & remove.

14. Disposal Information

Use reputable waste contractors - potential for spontaneous combustion. Care with used containers.

15. Transport Information

UN No.: 1866:	RESIN SOLUTION Contains STYRENE
Packing group:	III
IMO Class:	3.3
Marine Pollutant Class:	1
EAC:	127
Hazchem:	3[Y]E
Kemler:	33

16. Regulatory Information

EC no. :	N/A Contains: STYRENE MONOMER
EC Classification: -	Xn R10, 20, 36/38 S02, 13, 26, 43A, 46, 51
R10 -	Flammable
R20 -	Harmful by inhalation
R36/38 -	Irritating to eyes and skin
S2 -	Keep out of reach of children. (Retail sales items)
S13 -	Keep away from food, drink and animal feeding stuffs
S26 -	In case of contact with eyes, rinse immediately with plenty of water and seek medical advice
S43A -	In case of fire, use water fog, foam or powder - Do not use water jets!
S46 -	If swallowed seek medical advice immediately and show this container or label
S51 -	Use only in well ventilated areas

17. Other Information

TAKE PRECAUTIONARY MEASURES AGAINST STATIC DISCHARGES.
IN CASE OF ANY DISCOMFORT ALWAYS SEEK MEDICAL ADVICE.

Anchor Resin (Filler Component) MATERIAL SAFETY DATA SHEET**1. Manufacturer Details**

Product Name: ANCHOR RESIN
 Application: Resin based pourable anchor system
 Company: Rocbolt Technologies (Pty) Ltd
 Address: 42 Steel Rd., Spartan
 P.O. Box 15, Isando, 1600
 Telephone: (011) 970 - 1643
 Fax: (011) 970 - 3596

2. Identification of the Substance/Preparation

Name: ANCHOR RESIN (FILLER COMPONENT)
 Code: N/A

Chemical description

(Dibenzoyl peroxide, powder, 75% with water) - Less than 1%

Mixed with other inert fillers/limestones - more than 99%

3. Composition/Information on Ingredients

Composition / information on peroxide

Number % w/w CAS-number Chemical name

1 75.0 000094-36-0 Dibenzoyl peroxide

Annex-1 number EC-number Symbol(s)
 Risk-phrase(s)

1 617-008-00-0 202-327-6 E Xi R02 R36 R43

Other information

Balance of peroxide component: non-hazardous ingredients

Mixture is less than 1% peroxide powder with more than 99% inert filler.

4. Hazards Identification

Risk of explosion by shock, friction, fire or other sources of ignition. May cause fire.
 Irritating to eyes. May cause sensitization by skin contact.

5. First Aid Measures**Symptoms and effects**

Irritating to eyes. May cause sensitization by skin contact. Dust may be irritating to the respiratory tract and cause symptoms of bronchitis.

First aid**General**

In all cases of doubt, or when symptoms persist, seek medical attention.

Inhalation

Move to fresh air, rest, half upright position, loosen clothing.

Skin

Remove all contaminated clothing immediately. Wash off with plenty of soap and water. Seek medical advice if irritation develops. Launder clothes before reuse.

Eye

Rinse immediately and as long as possible with plenty of water. Eyelids should be held away from the eyeball to ensure thorough rinsing. Seek medical advice if irritation develops.

Ingestion

Rinse mouth with water. Do NOT induce vomiting. Call a physician immediately!

Advice to physician

Symptomatic treatment is advised.

6. Fire Fighting Measures**Extinguishing media**

Carbon dioxide, dry chemical powder, dry sand, water, foam.

Unsuitable extinguishing media

Halones.

Hazardous decomposition/combustion products

Carbon dioxide, Carbon monoxide, Benzoic acid, Benzene.

Protective equipment

Wear suitable protective clothing. Wear self-contained breathing apparatus.

Other information

Extinguish a small fire with powder or carbon dioxide then apply water to prevent re-ignition. Cool closed containers with water.

Fire and explosion hazard

CAUTION: re-ignition may occur. Decomposition under effect of heating. If involved in a fire, it will support combustion. In case of fire and/or explosion do not breathe fumes.

Anchor Resin (Filler Component) MATERIAL SAFETY DATA SHEET**7. Accidental Release Measures****Personal precautions**

Do not breathe dust. Avoid contact with skin and eyes. For personal protection see Section 8.

Environmental precautions

Do not allow to enter drains or water courses.

Methods for cleaning up

Eliminate all sources of ignition, and do not generate flames or sparks. First moisten with water. Sweep up with dustpan and brush off inert material, flushing the remainder with water. Avoid dust generation. Sweep up with dustpan and brush off inert material, flushing the remainder with water. Avoid dust generation. Keep contents moist. The waste should NOT be confined.

Other information

CAUTION: re-ignition may occur.

8. Handling and Storage**Handling**

Never weigh out in the storage room. When using do not eat, drink or smoke. Do not breathe dust. Handle in well ventilated areas. Eliminate all sources of ignition, and do not generate flames or sparks. Keep away from reducing agents (e.g. amines), acids, alkalis and heavy metal compounds (e.g. accelerators, driers, metal soaps). Keep product and emptied container away from heat and sources of ignition. Confinement must be avoided. Do not allow to dry out. Avoid shock and friction. Avoid contact with skin and eyes.

Storage requirements

Store in accordance with local/national regulations. Keep away from food, drink and animal feeding stuffs. Store in a dry well ventilated place away from sources of heat and direct sunlight. Keep only in the original container.

Storage

For maximum quality store at or below: 20 °C.

Other information

It is recommended to use electrical equipment of temperature group T3. However, auto-ignition can never be excluded. Wash hands thoroughly after handling or contact. Keep working clothing separately and do not take them home

9. Exposure Controls/Personal Protection**Engineering controls**

Ensure good ventilation and local exhaustion of the working area. Explosion proof ventilation recommended.

Personal protection**Respiratory**

Provide adequate ventilation. In case of insufficient ventilation wear suitable respiratory equipment (respirator with Filter P1).

Hand

Wear suitable protective gloves of neoprene or synthetic rubber.

Eye

Wear eye/face protection. A face shield is preferred over goggles.

Skin and body

Wear suitable protective clothing.

Other information

Launder clothes before reuse.

Dibenzoyl peroxide

Time Weighted Average (TWA) 5.0 mg/m³

10. Physical and Chemical Properties**Appearance and Odour**

Powder (granules) blue

Odour: faint

Boiling point/range

Do not distil (Decomposes)

Melting point/range

Pure BPO 103 °C

Flash point

Not determined

Flammability

Not determined

Explosive properties

Yes

Oxidizing properties

Not applicable

Vapour pressure

Not determined

Density

Not determined

Bulk density

Approx. 630 kg/m³

Solubility in water

Insoluble

Solubility in other solvents

Soluble in aromatic solvents
pure phthalates

pH value

Neutral character

Partition coefficient

n-octanol/water

Not determined

Relative vapour density (air=1)

Not determined

Viscosity

Not applicable

Active oxygen content

4.83-4.96 %

Peroxide content

75 %

Auto-ignition temperature

Test method not applicable.
(See Section 8)

SADT

80 °C. See also Section 11.

Explosion limits

Not applicable

Specific conductivity

Not determined

11. Stability and Reactivity**Stability**

SADT - (Self accelerating decomposition temperature) is the lowest temperature at which self-accelerating decomposition may occur with a substance in the packaging as used in transport.

Anchor Resin (Filler Component) MATERIAL SAFETY DATA SHEET

A dangerous self-accelerating decomposition reaction and, under certain circumstances, explosion or fire can be caused by thermal decomposition at and above the following temperature: 80 °C. Contact with incompatible substances can cause decomposition at or below the SADT 80 °C.

Conditions to avoid

To maintain quality store in original closed container below: 40 °C.

Avoid shock and friction. Confinement must be avoided. Do not allow to dry out. Peroxide is explosive when dry.

Incompatibilities

Avoid contact with rust, iron and copper. Contact with incompatible materials such as acids, alkalis, and heavy metals and reducing agents will result in hazardous decomposition. Do not mix with peroxide accelerators. Use only Stainless steel 316, PVC, polyethylene or glass-lined equipment.

Decomposition

Benzoic acid, Benzene.

Other information

Emergency procedures will vary depending on conditions. The customer must have an emergency response plan in place.

12. Toxicological Information**Dibenzoyl peroxide, 78 %****Acute toxicity****Oral LD50**

Rat :> 5000 mg/kg

Inhalation LC50

Rat :> 24.3 mg/l; 4 hours exposure time max. attainable concentration

Irritation**Skin**

Non-irritating (4 hour's exposure time)

Eye

Moderately irritating

Sensitization

Sensitization possible by skin contact

Genotoxicity

Ames test: Not mutagenic

13. Ecological Information**Dibenzoyl peroxide, 78 % Eco toxicity Fish**

Acute toxicity, 96h-LC50 = 2.0 mg/l.

(Poecilia reticulata)

Daphnia

48 h-EC50: 2.91 mg/l

Bacteria

Activated sludge respiration inhibition test EC50 = 35 mg/l.

Fate Degradation Biotic

Readily biodegradable (Closed bottle test).

14. Disposal Information**Product**

Waste disposal in accordance with regulations

Contaminated packaging

According to local regulations.

15. Transport Information

Land transport (ADR/ RID) and / or DOT

Class	5.2
Classification Code	P1
RID class	5.2
Substance Identification No.	3104
TREM-Card or ERG Number	CEFIC TEC(R) - 52GPI-S
UN number	3104
Proper Shipping Name	Limestone filler containing <1% ORGANIC PEROXIDE TYPE C, SOLID; (Dibenzoyl peroxide)
Required labels	5.2 Sea transport (IMDG-code/ IMO)
Class	5.2
UN number	3104
EMS	F-J, S-R
Marine pollutant	No
Other information	Label(s); 5.2 Air transport (ICAO-TI/ IATA-DGR)
UN number	3104
Class	5.2
Proper Shipping Name	Organic peroxide type containing
Other information	Label(s); 5.2

16. Regulatory Information**Chemical description**

Limestone filler containing <1% (Dibenzoyl peroxide, powder, 75% with water)

Labelling according to EC directives EC-number

Not applicable

R(isk) phrase(s) Code Description

R02. Risk of explosion by shock, friction, fire or other sources of ignition.

Anchor Resin (Filler Component) MATERIAL SAFETY DATA SHEET

R36. Irritating to eyes.
R43. May cause sensitization by skin contact.
S(afety) phrase(s)
Code Description
S03/07. Keep container tightly closed in a cool place.
S14B. Keep away from reducing agents (e.g. amines), acids, alkalis and heavy Metal compounds (e.g. accelerators, driers, metal soaps).
S22. Do not breathe dust.
S26. In case of contact with eyes, rinse immediately with plenty of water and seek Medical advice.
S36/37/39. Wear suitable protective clothing, gloves and eye/face protection.

Other information

Substance and/or product listed in Directive 96/82/EC.

17. Other Information

R-phrases information (Dibenzoyl Peroxide)
Chemical name Dibenzoyl peroxide
R(isk) phrase(s): R02 R36 R43 Risk of explosion by shock, friction, fire or other sources of ignition
Irritating to eyes May cause sensitization by skin contact.

18: General

This Anchor Resin MSDS (Resin and filler) was derived combining the root material MSDS's and it should be noted that the Peroxide component forms a very small part (less than 1%) of the end product.

The data and advice given in this document apply when the product is used for the stated purpose or application. The product is not suitable for any other application, and use of this product for any other application may give rise to risks not covered in this document. If in doubt as to the intended application, or use in other applications is considered, the advice of Rocbolt Technologies (Pty) Ltd. should first be sought. If the product has been purchased for supply to a third party, it is the purchaser's duty to ensure that any person handling or using the product is provided with the information in this document. It is the responsibility and duty of the employer to inform employees (or others who may be affected) of the hazards described in this document and the precautions that should be taken. This document does not constitute or substitute for the users own assessment of workplace risk as required by other health and safety legislation.

Prepared By: Rocbolt Technologies (Pty) Ltd
Inception Date: 23 February 2017
Revision Number: N/A
Revision Summary: N/A

CableLok Barrel

Overview

The CableLok Barrel is designed to be used as a hydraulically pre-tensioned anchor bolt. By making use of seven strand cable the bolt is flexible and has high tensile strength. The bolt can be used for intersections or as normal mining bolt.

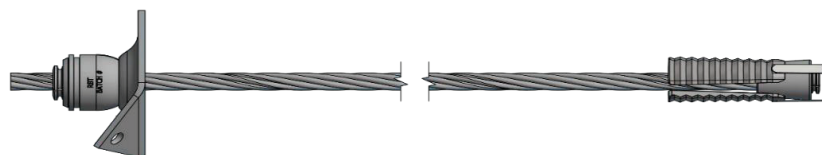
A specially fabricated barrel makes the installation and tensioning efficient. A purposefully designed ring engages the barrel and the pre-tension tonnage will be achieved accurately, the ring enables the barrel to shear at the specified load and thus locking the cable into place at the predetermined tonnage.

Two types of CableLok Barrels, spin and mechanical, makes this bolt functional in many areas. Grout and resin may be used for both types of CableLok Barrels.

The Spin anchor achieves the specified UTS by making use of bulbed sections. These bulbed sections mix the grout and resin while acting as an anchor point once the resin / grout has set.

The CableLok Barrel mechanical bolt can be easily and efficiently installed with the correct sized expansion shell. It can then be post grouted if necessary, using pumpable resin or grout. Grouting pipes and breather tubes can be supplied with the CableLok Bolt mechanical anchor.

The lengths of the CableLok Barrel ranges from 1.5m to 10m according to customer specification.



CableLok Barrel Mechanical Anchor

Technical Data				
Cable Diameter	UTS System (% of UTS Cable)	UTS Cable (kN)	Expansion unit size	Pre-tension (tons)
15.24	96%	250	32, 35, 38 & 43	5, 10, 15
18	94%	350	35, 38, 43 & 65	5, 10, 15



CableLok Barrel Spin Anchor

Technical Data				
Cable Diameter	UTS System (% of UTS Cable)	UTS Cable (kN)	Hole size (mm)	Pre-tension (tons)
15.24	96%	250	20 - 25	5, 10, 15
18	94%	350	25 - 32	5, 10, 15

CableLok Bolt

Overview

The CableLok Bolt is specifically designed to be used as a rotationally pre-tensioned anchor. By making use of seven strand cable the bolt is flexible and has high tensile strength. The bolt can be used for intersections or as normal mining bolt.

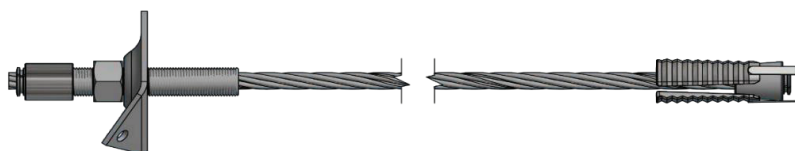
The CableLok Bolt can be tensioned, using T-spanners and mechanical bolters, to enable full contact on the bearing plate and can be retensioned when necessary.

Two types of CableLok Bolt, spin and mechanical, makes this bolt functional in many areas. Grout and resin may be used for both types of CableLok Bolts.

The Spin anchor achieves the specified UTS by making use of bulbed sections. These bulbed sections mix the grout and resin while acting as an anchor point once the resin / grout has set.

The CableLok mechanical bolt can be easily and efficiently installed with the correct sized expansion shell. It can then be post grouted if necessary, using pumpable resin or grout. Grouting pipes and breather tubes can be supplied with the CableLok Bolt mechanical anchor.

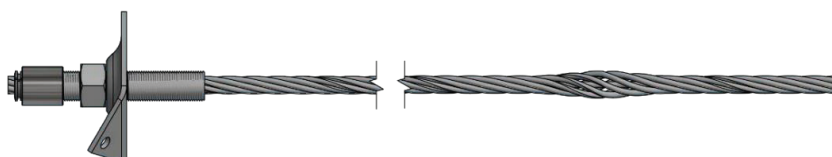
The lengths of the CableLok Bolt ranges from 1.5m to 10m, according to customer specification.



CableLok Bolt Mechanical Anchor

Technical Data			
Cable Diameter	UTS System (% of UTS Cable)	UTS Cable (kN)	Expansion unit size
12.7	94%	160	32, 35, 38 & 43
15.24	96%	250	32, 35, 38 & 43
*18	94%	350	35, 38, 43 & 65

*To be confirmed



CableLok Bolt Spin Anchor

Technical Data			
Cable Diameter	UTS System (% of UTS Cable)	UTS Cable (kN)	Hole size (mm)
12.7	94%	160	20 - 25
15.24	96%	250	25 - 32
*18	94%	350	

*To be confirmed

Double Corrosion Protection (DCP) Bolts

Double Corrosion Protection (DCP) Bolts provide stringent support in the most aggressive geological environments. This anchor type rock bolt technology is ideal for complex engineering structures and unstable ground conditions where groundwater is predominant.

The tapered DCP Bolt is enclosed by a polyethylene sheath that allows for easy installation, instant ground support and safe advancement by construction teams with a quick and stress-free patented grouting system.

Features

- DCP Bolt is an expansion shell bolt with HDPE sheathing providing corrosion protection over the bolt length
- Pre-tensioned with expansion shell
- Provides immediate roof support
- Efficient anchorage with grout bell and spherical nut combination
- Grout adaptor provides efficient post grouting
- Durable HDPE sheathing allows for inner and outer annuluses to be grouted in single pass
- Grout bell available in black steel or HDG steel for ultimate corrosion protection
- Pull tested with standard equipment
- Available in 20, 25, and 32 mm (0.79, 1.0 and 1.26 in.) diameter bars.



Applications

- Systematic permanent reinforcement of underground excavations
- Ground support for areas with limited or no access during operational lifetime
- Mining: permanent roadways and excavations.



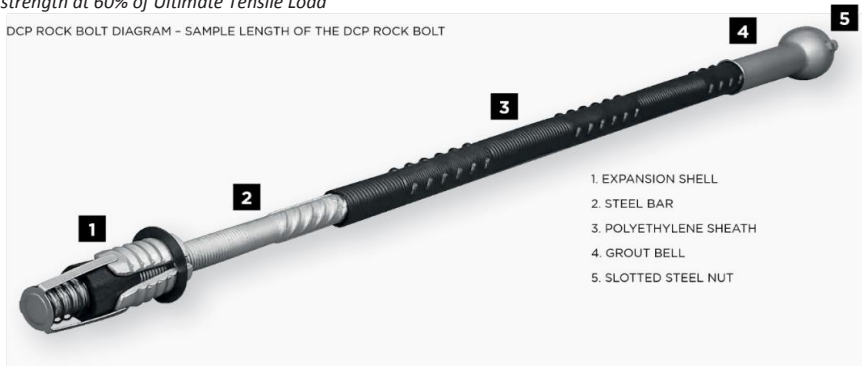
DCP ROCK BOLT SAMPLE AND CUTAWAY

Double Corrosion Protection (DCP) Bolts

Technical Data			
Bolt Size, mm (in.)	20 (0.79)	25 (1.0)	32 (1.26)
Tensile Load, kN (lbf)	219 (49.4)	343 (77.2)	498.3 (112)
Yield Strength, MPa (psi)	500 (72.51)	500 (72.51)	450 (65.26)
Elongation, %	22	22	14
Ultimate Tensile Strength, MPa (psi)	700 (101.526)	700 (101.526)	620 (Typical) (89.92)
*Calculated Shear Strength, kN (lbf)	131.88 (29.64)	206 (46.32)	299 (67.22)
Hole Size, mm (in.)	48 - 55 (1.9 - 2.2)	48 - 55 (1.9 - 2.2)	64 - 72 (2.5 - 2.8)
Density, kg/m (lb. /ft.)	2.52 (1.69)	3.86 (2.59)	6.32 (4.25)
Cross Sectional Area of Bar, mm (in.)	314 (0.4867)	490 (0.76)	804 (1.25)
Thread (Left or Right Hand)	DIN 405	DIN 405/M27	M32

Notes

- Minimum order quantities may apply to this product
- Only Rocbolt Technologies South Africa components should be used to enable the full performance of the bolt system to be attained.
- *Calculated shear strength at 60% of Ultimate Tensile Load



Fasloc® Resin Cartridges MATERIAL SAFETY DATA SHEET**1. Material identification and the manufacturer**

Product Name:	Fasloc® Resin Capsules
Application:	Resin based capsule anchor system
Compliance:	Manufactured to the requirements of SABS 1534 "Resin capsules for use with tendon based support Systems"
Company:	Rocbolt Technologies (Pty) Ltd
Address:	42 Steel Rd., Spartan P.O. Box 15, Isando, 1600
Telephone:	(011) 970 - 1643
Fax:	(011) 970 - 3596

2. Ingredients

Composition:	Polyester resin containing styrene, inert fillers, benzoyl peroxide, pigment, water.
Hazardous Ingredients:	Styrene (Xn; Cas no. 100-42-5 < 12.5%)

3. Hazard Identification

The product is flammable although the risk of ignition is very low.

4. First aid (these measures are in case of severe exposure only)

Eyes:	Irrigate with water immediately. Obtain medical assistance
Skin:	Wash immediately with soap and water (or suitable cleanser)
Inhalation:	Remove from exposure, rest, keep warm and obtain medical assistance
Ingestion:	Wash mouth with water. Obtain medical attention. Do NOT induce vomiting. Beware of aspiration should vomiting occur

5. Fire measures

Extinguishing media:	Carbon dioxide, powder, foam or water fog.
Exposure hazards:	Toxic fumes
Protective equipment:	Self-contained breathing apparatus

6. Accidental release

Personal precautions:	<ul style="list-style-type: none"> • Immediately issue "No Smoking" and "No naked flames" warnings • Wear protective clothing
Environmental:	Prevent entry to drains, sewers and water courses
Decontamination:	Soak up with inert absorbent or contain and remove

7. Handling and storage

Handling:	<ul style="list-style-type: none"> • Avoid breathing fumes • Avoid skin and eye contact • Wear respiratory equipment if necessary • Do not use near source of ignition.
Storage:	<ul style="list-style-type: none"> • Store in cool place away from sources of heat • Store as per local fire regulations • Underground storage in return airway.

8. Exposure control/Personal protection

Control measures:	Use only in well ventilated areas
Personal Protection:	<ul style="list-style-type: none"> • In case of insufficient ventilation wear suitable respiratory equipment • The use of impervious gloves and safety glasses is recommended.

9. Physical and chemical properties

Physical state:	Paste
Colour:	Black paste with off-white or coloured catalyst
Boiling point:	145 degrees Celsius
Flash point:	30 degrees Celsius
Autoflammability:	Auto ignition temperature 490 degrees Celsius
Relative density:	2.0 at 20 degrees Celsius
Water solubility:	Insoluble

Fasloc® Resin Cartridges MATERIAL SAFETY DATA SHEET**10. Stability and reactivity**

Stability:	Stable if used as directed
Avoid:	Direct sunlight and extreme temperatures
	Contact with strong oxidizing agents, strong acids, and strong alkalis
Hazardous decomposition products:	Oxides of carbon (thermal decomposition)

11. Toxicological information

Eyes:	May injure eye tissue if not removed promptly Vapour may cause irritation.
Skin:	Irritation – defats the skin
Inhalation:	Vapours may cause headaches and dizziness
Ingestion:	Irritation and symptoms similar to inhalation
Chronic:	Repeated skin contact may lead to skin disorders

12. Ecological information

Environmental assessment:	<ul style="list-style-type: none"> • May cause significant damage in aquatic systems • Must be used and disposed of in accordance with this Safety Data Sheet
Mobility:	Volatile. Insoluble in water
Persistence & degradability:	Not known. Expected to be not readily biodegradable
Bioaccumulative potential:	Not expected to be bioaccumulative
Exotoxicity:	Expected to be exotoxic to fish, daphnia and algae

13. Disposal

Disposal must be in accordance with local and national legislation. Use of a professional waste disposal company is recommended.

14. Transport

No special transport arrangements required

15. Regulatory information

Hazard label data:	Not classified as hazardous or dangerous
EC directives:	Dangerous substances directive 67/548/EEC Dangerous preparations directive 88/379/EEC Safety Data Sheets directive 91/155/EEC
Statutory Instruments:	Chemicals (Hazard information & packaging for supply) 1996 (SI 1092) Control of substances hazardous to health regulations 1994 (SI 3246)
Codes of practice:	Waste Management The Duty of Care

16. General

The data and advice given in this document apply when the product is used for the stated purpose or application. The product is not suitable for any other application, and use of this product for any other application may give rise to risks not covered in this document. If in doubt as to the intended application, or use in other applications is considered, the advice of Rocbolt Technologies (Pty) Ltd. Should first be sought.

If the product has been purchased for supply to a third party, it is the purchaser's duty to ensure that any person handling or using the product is provided with the information in this document.

It is the responsibility and duty of the employer to inform employees (or others who may be affected) of the hazards described in this document and the precautions that should be taken.

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

Prepared By: Rocbolt Technologies (Pty) Ltd

Revision Date: 6 February 2015

Revision Number: 1

Revision Summary: The company name changed.

Fasloc® Resin Cartridges

Fasloc® Resin Cartridges consist of a two compartment heat sealed tube of polyester film clipped at both ends. One compartment contains a dark grey or yellow resin mastic, the other an off-white or coloured catalyst.



The Fasloc® resin compound is thixotropic and fast setting. This reduces viscosity during insertion and permits relatively low force and torque. The uniquely sized graded fillers assist with shredding the film, mixing the resin and, by interlocking with each other and the sidewalls of the hole, further reduce strata movement. The results are fast installation, rapid achievement of full strength, and minimum tendency for ungelled resin to drop from the holes during installation.

Product Range

- Standard products available in sizes from 21mm to 35mm diameter, and in lengths to suit the application
- Set times from 15 seconds to 10 minutes (at 20°C)
- High strength products available for specific applications
- Dual set time cartridges
- Spin-to-stall cartridges
- Non-standard products are available on specific request (subject to pre-testing prior to supply).

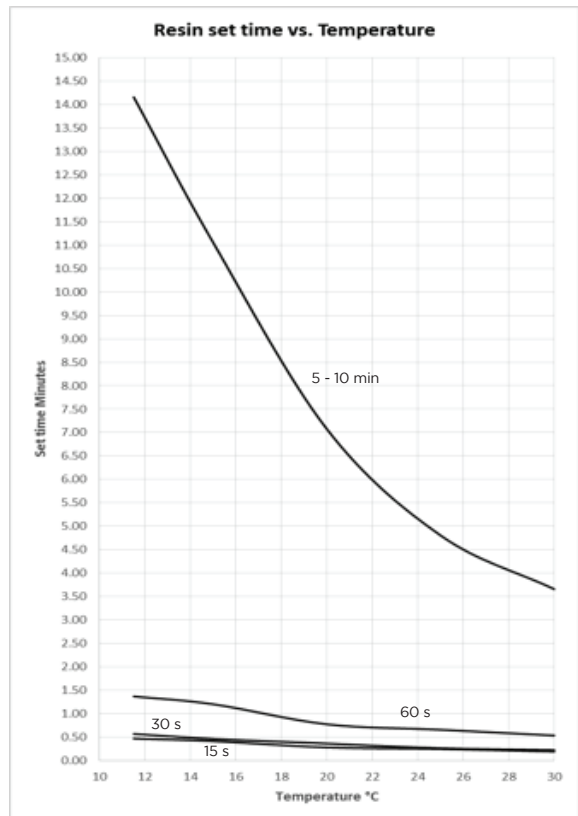
Set Times

A wide range of set times is offered for varied conditions. Cartridges are colour coded.

Colour	Set time @ 20°C	Mixing Time
Purple	15 sec	8 sec
Red	30 sec	10 sec
Green	60 sec	15 sec
Blue	120 sec	20 sec
Yellow	5 - 10 min	20 sec

Please note that mix times as indicated above are for mechanised installations. These may vary with jackhammer and other installations.

Set times will vary with the temperature of Fasloc® resin cartridges as indicated in the graph.



Fasloc® Resin Cartridges

Strengths

The performance of resin in the field depends on the design strength of the resin “mix”. Shear strength specifications are minimum 19 MPa for standard Fasloc® and 23 MPa for Fasloc®A.

Note that the effectiveness of a resin bolt system depends on many factors such as:

- Type of tendon used
- Ratio of hole diameter to tendon diameter
- Capsule diameter and length
- Length of hole and encapsulation length
- Over-drill in hole length.

Quality Control

The superior quality of the Fasloc® bolt support system is assured through a three-part quality control program.

- Ingredient testing
- In-process control tests
- Finished product acceptance tests.

Storage

- For maximum shelf life Fasloc® cartridges should be stored away from direct sunlight in a reasonably cool, well ventilated, dry area
- Storage life is six months at 20°C
- Under adverse storage conditions, shelf life is reduced
- To ensure proper storage, the product should not be subject to temperatures in excess of 30°C for prolonged periods
- Storage is recommended under cover with adequate ventilation. Conversely, while cold storage does not adversely affect the shelf life of Fasloc®, it should be warmed to a range of 10° - 15°C before using to assure set times within the specified range
- It is essential that stocks be rotated so that the oldest stock is first out. Shelf life is 4 - 6 months.



Handling Precautions

Do not open or puncture cartridge. Physical contact with liquid contained in cartridge may cause mild irritation. Safety glasses or eye shield should always be used when roof bolting is done. In case of contact with eyes, immediately flush with plenty of water for at least 15 minutes. Call a doctor.

In case of skin contact, flush skin with water. Prolonged contact with skin may cause mild irritation. Irritation should subside when material is removed.

Cartridges are filled with inert fillers, water, polyester resin and catalyst (active ingredients include low levels of styrene and modified benzoyl peroxide). Fasloc® resin cartridges are for industrial use only and are intended for use in conjunction with bolts.

Friction Bolts

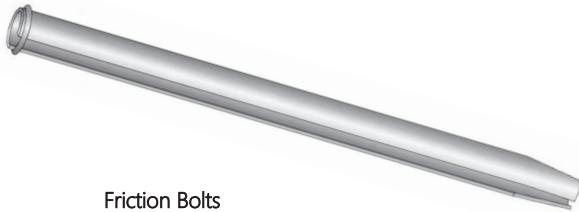
Features

- The Friction Bolt is manufactured from high strength steel tube which has a slot along its entire length. A ring, or collar, is welded on the outer end to hold a domed plate to the rock surface
- The 33mm and 39mm Friction Bolt is suitable for installation with hand held rock drills (stoppers or drifters). The 46mm Friction Bolt is NOT suitable for installation with hand held rock drills
- Friction Bolts can be load tested by fitting a special ring to the bolt prior to its installation. Pull tests can then be conducted with a hollow ram hydraulic jack
- Further corrosion protection can be provided by hot dip galvanising



Installation Guidelines

- The hole length should be longer than the bolt, nominally 150mm, to allow for any rock fretting during installation
- The friction bolt is inserted into the hole. The driving dolly is fitted into the rock drill's chuck and then the bolt (with accessories) is placed onto the dolly
- Using full percussion and thrust the bolt is fully driven into the hole until the domed plate is firmly against the rock surface. Care should be taken to ensure the rock drill's feed/thrust is in the same orientation as the hole or the bolt may be bent during installation.



Friction Bolts

TECHNICAL DATA			
Bolt Diameter, mm (in.)	33 (1.3)	39 (1.5)	46 (1.8)
Min. Yield Strength, MPa (ksi)	420 (60.9)	420 (60.9)	420 (60.9)
Min. Ultimate Material Tensile Strength, MPa (ksi)	490 (71)	490 (71)	490 (71)
Min. Ultimate Tensile Load, Tons (lb)	8 (16000)	10 (20000)	15 (30000)
Shear Strength *, KN (lbf)	56 (12.54)	70 (15.68)	105 (23.52)
Hole Diameter Range, mm (in.)	30-33 (1.18-1.29)	36-39 (1.42-1.53)	43-46 (1.69-1.81)
Density, kg/m (lb. /ft.)	1.64 (1.102)	1.84 (1.23)	2.84 (1.90)
Wall Thickness	2.3 (0.098)	2.3 (0.098)	3.2 (0.125)

*Calculated Shear Strength

All dimensions, weights, quantities and specifications are those applicable at the time of publications and may be amended from time to time.

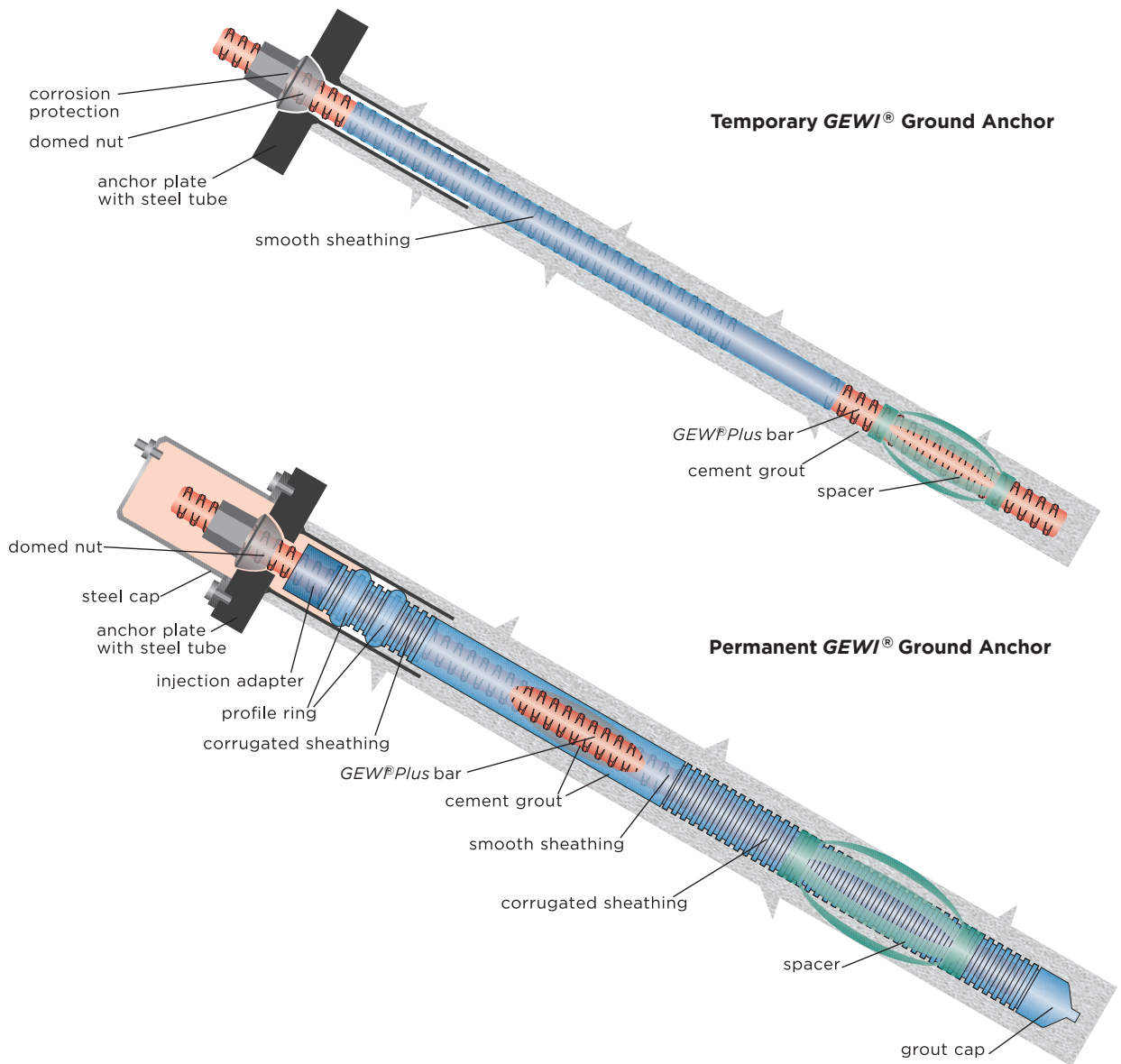
Notes

- Minimum order quantities may apply to this product
- Only Rocbolt South Africa components should be used to enable the full performance of the bolt system to be obtained.

Gewi® Ground Anchors

Advantages and Characteristics

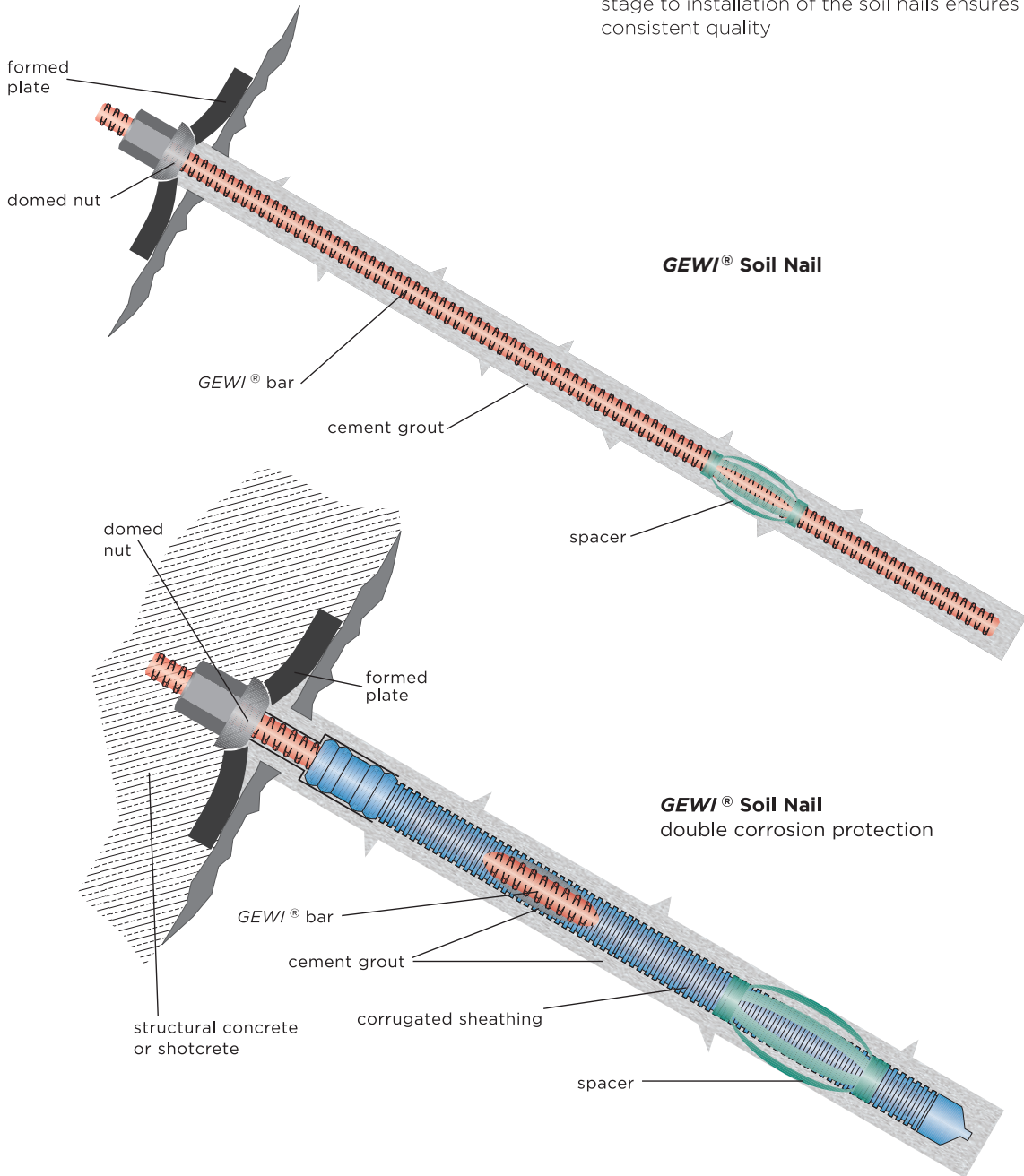
- Easy system handling
- Simple restressing and destressing through anchorage with nut
- Permanent corrosion protection possible
- Easy removal of temporary anchors through threaded sleeves
- Flexibility in transport lengths by using couplers
- High bond strength between GEWI threadbar and cement grout
- Angle compensation using wedge washers
- Quality assurance through internal and external supervision of production



Gewi® Soil Nails

Advantages and Characteristics

- High durability through double corrosion protection possible
- Low susceptibility to corrosion
- Angle compensation up to 20° through formed plate
- Flexibility in length by using couplers
- Extension bars may be attached by using couplers
- Spacers ensure proper grout cover
- High standard of quality control from production stage to installation of the soil nails ensures consistent quality

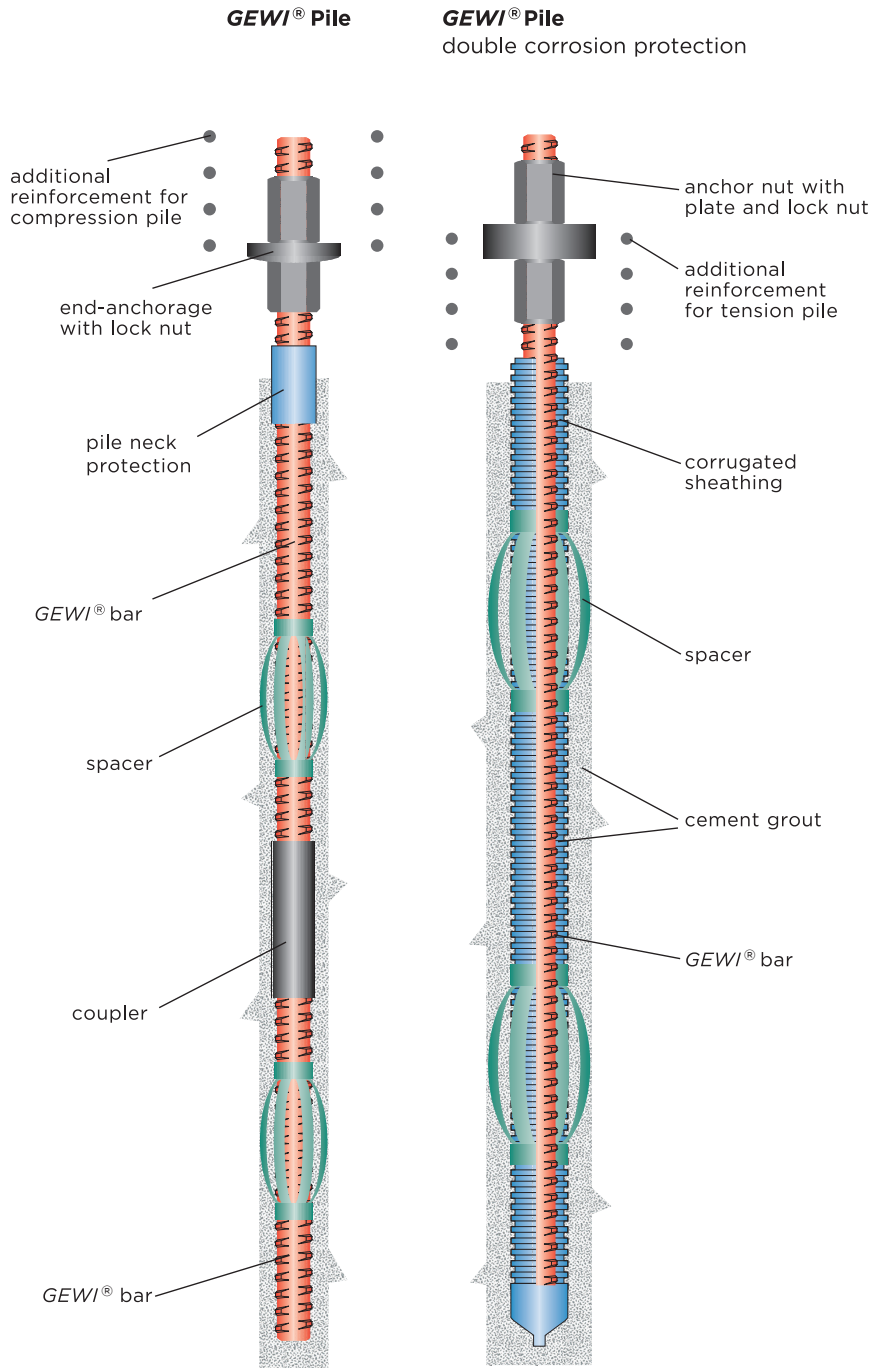


Gewi® Piles

Advantages and Characteristics

The GEWI® pile is a drilled micropile with a central steel element based on the GEWI® Threadbar with hot-rolled, continuous thread deformations on both sides. The GEWI® Threadbar is encapsulated in cement grout which acts both as corrosion protection and as load transfer into the soil or rock.

- Excellent load transfer into concrete structures by means of anchoring elements
- Tensile, compressive and alternating loads can be efficiently transferred to the structure
- The coarse GEWI® thread guarantees maximum bond between steel and cement grout
- The stress-strain curve of the GEWI® bar shows high ductility
- Settlement can be prevented by using preloaded GEWI® piles
- Load transfer into soil is optimised by post-grouting
- Double corrosion protected piles can be used for high corrosion impact as in aggressive media such as seawater or contaminated ground
- Can be cut off or coupled at any given point
- A small drill hole diameter permits economic drilling equipment
- Robust, coarse thread remains threadable even when dirty or damaged.



Gewi® Threadbar Systems

GEWI® Threadbar System Applications

- Tie rods
- Marine ties
- Mining roof support
- Heavy lifting
- Reinforcing
- Tunnelling
- Formwork and scaffolding anchors
- High strength reinforcing

Technical Specifications

GEWI® 500B THREADBAR 64mm

Technical Data								
Nominal Diameter mm (in.)	16 (0.6)	20 (0.8)	25 (1.0)	28 (1.1)	32 (1.3)	40 (1.6)	50 (2.0)	64 (2.5)
Min. Yield Strength, MPa (ksi)	500 (72.52)	500 (72.52)	500 (72.52)	500 (72.52)	500 (72.52)	500 (72.52)	500 (72.52)	555 (80.50)
Min. Tensile Strength, MPa (ksi)	550 (79.77)	550 (79.77)	550 (79.77)	550 (79.77)	550 (79.77)	550 (79.77)	550 (79.77)	700 (101.53)
Min. Yield Load, kN (kipf)	101 (22.7)	157 (35.3)	245 (55.1)	308 (69.2)	402 (90.4)	628 (141.2)	982 (220.8)	1758 (395.2)
Min. Ultimate Load, kN (kipf)	111 (25.0)	173 (38.9)	270 (60.7)	339 (76.2)	442 (99.4)	691 (155.3)	1080 (242.8)	2250 (505.8)
Calculated Shear Strength, (kN)(lbf)	66.3 (14.9)	103.6 (23.3)	162.0 (36.4)	203.0 (45.6)	265.3 (59.6)	414.5 (93.2)	647.6 (145.6)	1350.4 (303.6)
Cross Sectional Area, mm ² (in ²)	201 (0.3)	314 (0.5)	491 (0.8)	616 (1.0)	804 (1.2)	1257 (1.9)	1963 (3.0)	3215 (4.9)
Weight, kg/m (lb/ft)	1.58 (1.1)	2.47 (1.7)	3.85 (2.6)	4.83 (3.2)	6.31 (4.2)	9.86 (6.6)	15.41 (10.4)	24.86 (16.7)

GEWI® 670 THREADBAR 28mm

Technical Data										
Nominal Diameter, mm (in.)	18 (0.7)	22 (0.9)	25 (0.98)	28 (1.1)	30 (1.2)	35 (1.4)	43 (1.7)	57.5 (2.3)	63.5 (2.5)	75 (2.8)
Min. Yield Strength, MPa (ksi)	670 (97.18)	670 (97.18)	670 (97.18)	670 (97.18)	670 (97.18)	670 (97.18)	670 (97.18)	670 (97.18)	670 (97.18)	670 (97.18)
Min. Tensile Strength, MPa (ksi)	800 (116.03)	800 (116.03)	800 (116.03)	800 (116.03)	800 (116.03)	800 (116.03)	800 (116.03)	800 (116.03)	800 (116.03)	800 (116.03)
Min. Yield Load, kN (kipf)	170 (38.2)	250 (56.2)	330 (74.2)	410 (92.2)	475 (106.8)	640 (143.9)	980 (220.3)	1740 (391.2)	2120 (476.6)	2960 (665.4)
Min. Ultimate Load, kN (kipf)	200 (45.0)	300 (67.4)	390 (87.7)	490 (110.2)	565 (127.0)	770 (173.1)	1170 (263.0)	2080 (467.6)	2540 (571.0)	3535 (794.7)
Calculated Shear Strength, (kN)(lbf)	122.0 (27.4)	182.3 (40.9)	235.5 (52.4)	295.4 (66.4)	339.2 (76.3)	461.6 (103.7)	696.7 (156.6)	1245.8 (280.0)	1519.4 (341.5)	2119.5 (476.4)
Cross Sectional Area, mm ² (in ²)	250 (0.4)	375 (0.6)	491 (0.8)	616 (0.9)	707 (1.0)	962 (1.5)	1466 (2.3)	2597 (4.0)	3167 (4.9)	4418 (6.8)
Weight, kg/m (lb/ft)	1.96 (1.32)	2.94 (1.98)	3.85 (2.58)	4.83 (3.25)	5.55 (3.7)	7.55 (5.1)	11.51 (7.7)	20.38 (13.7)	24.86 (16.7)	34.68 (23.3)

Gewi® Threadbar Systems

GEWI® 950 THREADBAR

Technical Data						
Nominal Diameter, mm (in.)	18 (0.7)	26.5 (1.04)	32 (1.3)	36 (1.4)	40 (1.6)	47 (1.9)
Min. Yield Strength, MPa (ksi)	950 (137.79)	950 (137.79)	950 (137.79)	950 (137.79)	950 (137.79)	950 (137.79)
Min. Tensile Strength, MPa (ksi)	1050 (152.29)	1050 (152.29)	1050 (152.29)	1050 (152.29)	1050 (152.29)	1050 (152.29)
Min. Yield Load, kN (kipf)	230 (51.7)	525 (118.0)	760 (170.8)	960 (215.8)	1190 (267.5)	1650 (370.9)
Min. Ultimate Load, kN (kipf)	255 (57.3)	580 (130.4)	845 (190.0)	1070 (240.5)	1320 (296.7)	1820 (409.2)
Calculated Shear Strength, (kN)(lbf)	160.2 (36.0)	347.3 (78.0)	506.4 (113.8)	640.9 (144.0)	791.2 (177.8)	1092.4 (245.5)
Cross Sectional Area, mm ² (in ²)	241 (0.4)	551 (0.9)	804 (1.3)	1020 (1.6)	1257 (2.0)	1735 (2.7)
Weight, kg/m (lb/ft)	1.96 (1.3)	4.48 (3.0)	6.53 (4.4)	8.27 (5.6)	10.21 (6.9)	14.10 (9.5)

Notes

- Minimum order quantities may apply to this product
- Extended lead times may apply to certain items. Please enquire
- Only Rocbolt South Africa components should be used to enable the full performance of the bolt system to be obtained.

High Energy Absorption Mesh (HEA)

Where ground conditions are rock-burst prone and challenging, HEA mesh by Rocbolt Technologies provides improved surface containment with the addition of pre-laced wire strand. In dynamic conditions where an excavation surface deforms, the strata loading is effectively transferred to all bolts and tendons, with a strong connection between the bolts and mesh offered by the HEA mesh installation.

HEA Mesh has the ability to allow large deformations whilst maintaining a high load capacity. The ability of HEA mesh to absorb energy in dynamic and repeated loadings can complement yielding reinforcement as an element in a complete dynamic system.

Key Benefits

- Superior containment of rock mass
- Jumbo specific for rapid installation
- Reduced shotcrete requirement
- Deformation plus strength for superior performance

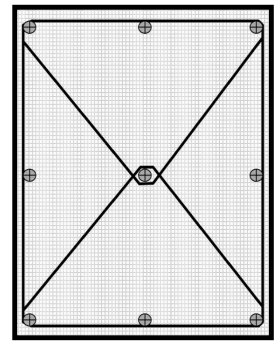
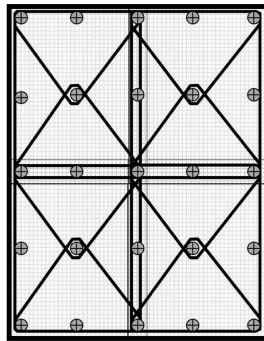
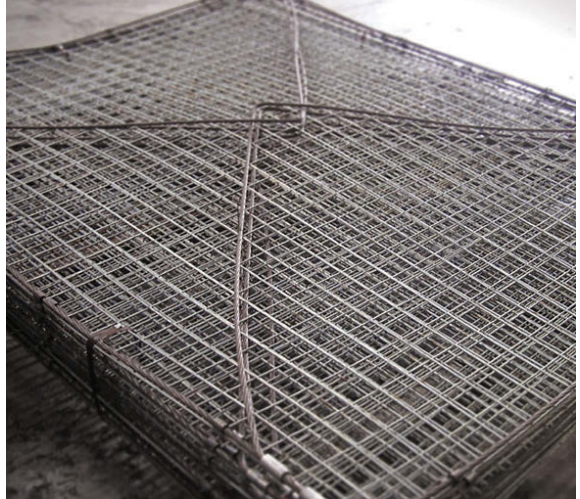
Indicative Performance*

- Deformation (typical maximum value at sheet centre): 900mm
- Point loading (typical maximum value at sheet centre): 17.5 tonnes

* Based on University of Western Australia laboratory test results - underground loading conditions may differ.

Product Properties	Typical
Sheet Size (Typical)	2400 x 3000 mm
Aperture	100 x 100 mm
HEA Mesh Wire Diameter	5.6 mm
Mass per Sheet	45.5 kg
Cable (Strand) Diameter	12.7 mm
Cable Tensile Strength	1870 kN

* Other sizes available per customer requirements

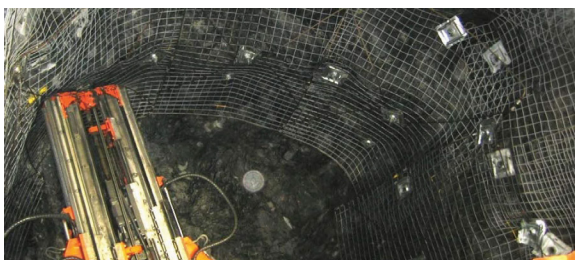


Installation Overview

The pre-laced modular concept of HEA mesh is designed to meet the development intensive requirements of Jumbo based one pass mesh and bolt installations. This is achieved by the mesh behaving as standard mesh during handling and bolting.

The bolting pattern provides interconnection of the cable lacing system between successive HEA mesh modules. Correct overlay of HEA mesh sheets and bolt placement is critical to ensure cable lacing performs as a complete system. HEA mesh effectively removes the 'weak link' of support systems.

HEA mesh provides a cost effective solution to the high energy demands of rock burst containment.



INSTaL+ Resin Bolting Solution

The INSTaL+ bolting system has been developed for resin bolting applications where normal bolting parameters are outside the limits to achieve acceptable load transfer results.

The system allows for full column resin bolting to be done with a smaller core diameter steel bolt in a hole up to 40mm diameter with acceptable performance in terms of mixing and pull-out loads.

Advantages

- Reduces effective annulus
- Reduces risk of finger-gloving
- Simple installation in large holes
- No exotic equipment required
- More possible resin bolting applications
- No special training required
- Easy to install
- Corrosion resistant
- Less mass than equivalent steel bar

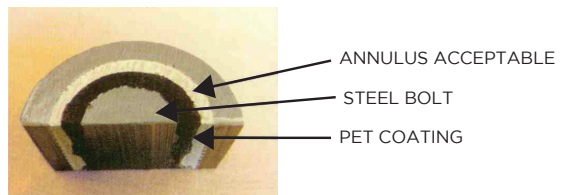
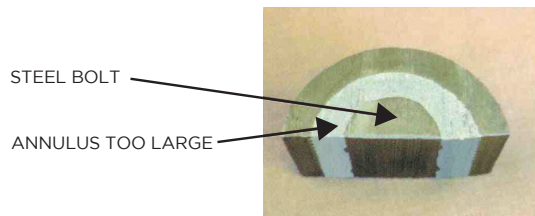
Hazard Information

- All tests done by FIRELAB
- Flammability - the material does not spread fire and does not sustain burning
- Toxicity - the material has a toxicity index of 0.875 (an index of 5 is acceptable).

TECHNICAL DATA			
Bar Diameter, mm (in)	16 (0.63)	18 (0.7)	20 (0.78)
Min. Yield Strength, MPa (ksi)	500 (72.5)	500 (72.5)	500 (72.5)
Typ. Ultimate Load, kN (lbf)	140 (31.6)	178 (40)	220 (49.4)
*Major Diameter, mm (in)	27 (1.063)	27 (1.063)	
*Effective Diameter, mm (in)	25 (0.98)	25 (0.98)	
*Major Diameter, mm (in)	29 (1.14)	29 (1.14)	29 (1.14)
*Effective Diameter, mm (in)	27 (1.063)	27 (1.063)	27 (1.063)

*after coating

- PET compound coating - injection moulding
- Nut/bearing plate/load indicator as required



MINERAL BOND LV, COMPONENT A

Safety Data Sheet according to Regulation (EC) 2015/830 amending Regulation (EC) No 1907/2006 (REACH)

Prepared on: 05.09.2016
Revision date: 05.09.2016
Version no: 1.00-EN

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifier:

Substance name: **MINERAL Bond, Component A**
Index number: Not applicable (mixture)
Synonyms: Not applicable
CAS number: Not applicable (mixture)
EC number: Not applicable (mixture)
Registration number: Excluded from registration (polymer)

1.2 Relevant identified uses of the substance or mixture and uses advised against

Relevant identified uses:

Component A of 2-component, high strength silicate resin. It is suitable for grout stabilization, for heavily cracked rock mass, gas sealing and water stopping.

Uses advised against:

Any other uses than those listed should be consulted with the Supplier.

1.3 Details of the supplier of the safety data sheet

Supplier:

DSI Schaum Chemie sp. z.o.o (limited liability company)
43-190 Mikołów, Poland
Podleska 72 Str.
Tel.: +48 32 355 90 81
Fax: +48 32 355 90 89
Email address of the person responsible for the MSDS: info@dsi-schaumchemie.pl

1.4 Details of the supplier of the safety data sheet

(Poland) Manufacturer: +48 32 355 90 81, Monday - Friday: 7:30 - 15:30

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Classification according to Regulation (EC) No 1272/2008 (CLP):

Skin Irrit. 2; H315
Eye Irrit. 2; H318

Additional information:

For full text of Hazard- and EU Hazard-statements: see SECTION 16

2.2 Label elements

Labelling according to Regulation (EC) No 1272/2008 [CLP]

Hazard pictograms:

Any other uses than those listed should be consulted with the Supplier.



Signal word:

Warning

Hazard statements:

H315 - Causes skin irritation.
H318 - Causes serious eye damage.

Precautionary statements:

P262 - Do not get in eyes, on skin, or on clothing
P280 - Wear protective gloves/protective clothing/eyes/face protection
P303+P361+P353 - IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower.
P305+P351+P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

MINERAL BOND LV, COMPONENT A

SECTION 3: Composition/information on ingredients

3.1 Substances

Not applicable

3.2 Mixtures

Name Registration Number	% [weight]	CAS No	EC No	Classification according to Regulation (EC) No 1278/2008 (CLP)
silicic acid, sodium salt 01-2119448725-31-XXXX	80 - 100	1344-09-8	215-687-4	Skin Irrit. 2; H315 Eye Irrit. 2; H318
1,2-Ethanediol 01-2119456816-28-XXXX	<4	107-21-1	203-473-3	Acute Tox. 4; H302 STOT RE 2; H373

Additional information: For full text of H-statements: see SECTION 16

SECTION 4: First aid measures

4.1 Description of first aid measures

General information:

In the event of accident or ailments appearing caused by the product it is necessary to protect the injured against continued exposure and immediately provide medical attention to him.

Poisoning by inhalation:

Move to fresh air.

Skin contamination:

Rinse with running water and soap. Apply replenishing cream. Change all contaminated clothing.

Eye contamination:

Rinse immediately with plenty of running water (for 15 minutes), seek medical attention from a specialist.

Poisoning by swallowing:

Rinse the mouth. Drink 1-2 glasses of water.

4.2 Most important symptoms and effects, both acute and delayed

Alkaline solution. Impact on the unprotected eyes can damage the eyes. Prolonged or repeated impact on the risk of unprotected skin may cause skin irritation.

4.3. Indication of any immediate medical attention and special treatment needed

Each time, if you use a doctor recommended to provide the assisting with these SDS.

SECTION 5: Firefighting measures

5.1 Extinguishing media:

Suitable extinguishing media:

Non-combustible

Unsuitable extinguishing media:

Non-combustible

5.2 Special hazards arising from the substance or mixture:

Hazardous combustion products:

Non-combustible

5.2 Advice for firefighters

Avoid direct contact with skin and eyes. Apply general purpose measures for personal protection equipment. The substance is soluble in water. Avoid getting into drains/surface water/ground water.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

In case of accidental spills contaminated site rampart, used sand or sorbent remains mechanically gather, be disposed of. Prevent from entering the municipal water system - sewage, water courses and the soil. Do not rise with water. Prevent spraying and aerosol inhalation of the substance with air. Avoid contact with skin and eyes, avoid contact with substance, and provide adequate ventilation in enclosed spaces. Apply protective clothing and rubber gloves to protect against dirt, apply a mask or respirator with dust filter A/P2; use face-protection goggles. Remove contaminated clothing and wash before reuse.

6.2 Environmental precautions:

Do not empty into drains/surface water/ground wter. Methods for cleaning and take-up: Remove mechanically. In the case of environmental contamination with plenty of substance, notify to local authority and emergency services.

MINERAL BOND LV, COMPONENT A

6.3 Methods and material for containment and cleaning up

The whole material is released into the environment to collect mechanically. Provide material collected for recycling. Do not rinse with water. Do not neutralise.

6.4 Reference to other sections

Use the control measures and personal protective equipment described in section 8 of the SDS. The released material to follow the rules described in section 13 of the SDS - Waste Disposal.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

Store in original containers. Empty containers to the end. Store in a dry place. Avoid contact with skin and eyes. Follow the general principles of occupational health and safety of chemicals, good industrial practice and the manufacturer's recommendations. If there is a need to handle the substance, use personal protective gloves, eye protection, clothing according to the principles described in Section 8 of this SDS.

7.2 Conditions for safe storage, including and incompatibilities

Store only in the original containers. Store in tightly sealed, closed containers. Do not store near acids. Do not store in containers made of or coated with zinc or aluminium.

7.3 Specific end use(s)

No information on specific end-uses. See also subsection 1.2.

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

silicic acid , sodium salt

DNEL

Application Area	Exposure routes	Health effect	Value
Workers	Inhalation	Long-term systemic effects	5.61 mg/m ³
Workers	Skin contact	Long-term systemic effects	1.59 mg/kg BW/d
Consumers	Inhalation	Long-term systemic effects	1.38 mg/m ³
Consumers	Skin contact	Long-term systemic effects	0.8 mg/kg BW/d
Consumers	Oral	Long-term systemic effects	0.8 mg/kg BW/d

PNEC

Compartment	Value
Marine water	1 mg/l
Fresh water	7,5 mg/l
Marine sediment	no PNEC available
Fresh water sediment	no PNEC available
Sewage treatment plant	348 mg/l
Aquatic intermittent release	7,5 mg/l

1,2-EthanedioI

DNEL

Application Area	Exposure routes	Health effect	Value
Workers	Inhalation	Long-term systemic effects	35 mg/m ³
Workers	Skin contact	Long-term systemic effects	106 mg/kg BW/d
Consumers	Inhalation	Long-term systemic effects	7 mg/m ³
Consumers	Skin contact	Long-term systemic effects	53 mg/kg BW/d

PNEC

Compartment	Value
Soil	1.53 mg/kg
Marine water	1 mg/l
Fresh water	10 mg/l
Marine sediment	3.7 mg/kg
Fresh water sediment	37 mg/kg
Sewage treatment plant	199.5 mg/l
Aquatic intermittent release	10 mg/l

MINERAL BOND LV, COMPONENT A

8.2 Exposure controls

Avoid contact with eyes, mucous membranes and inhalation of vapours.

It is forbidden to smoke, drink or eat while working.

Observe the typical standards of hygiene at work.

Respiratory protection:

In conditions of insufficient ventilation, while spraying the product, it is recommended to wear a mask with the filter type A2-P2 or better.

Eye protection:



Wear approved chemical safety goggles with side shields where eye exposure is reasonably probable, meet the requirements of EN 166.

Hand protection:



Use suitable protective gloves, such as: polychloroprene $\geq 0.5\text{mm}$ thick and breakthrough time ≥ 480 minutes; nitril $\geq 0.35\text{mm}$ thick and breakthrough time ≥ 480 minutes; butyl rubber $\geq 0.5\text{mm}$ thick and breakthrough time ≥ 480 minutes or fluoro-rubber $\geq 0.4\text{mm}$ thick and breakthrough time ≥ 480 minutes.

For prolonged or repeated skin contact use suitable protective gloves that meet the requirements of EN 374.

Skin protection:



According to the exposure when handling the product, wear suitable protective clothing, aprons and protective boots.

General recommendations:

See also Section 7.

Provide adequate ventilation. Remove contaminated clothing immediately. Wash hands before breaks and after work. Wash contaminated gloves before removing. At work do not eat, drink or smoke. Avoid contact with skin. Do not get in eyes. Do not breathe vapours.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Appearance	Light brown clear liquid
Odour	Characteristic
Odour threshold	Unidentified
pH	11-13
Melting point/freezing point	Not determined
Initial boiling point and boiling range	Not determined
Flash point	Not determined
Evaporation rate	Not determined
Flammability (solid, gas)	Liquid, incombustible
Upper/lower flammability or explosive limits	Not determined
Vapor pressure	Not determined
Vapor density	Not determined
Relative density	1.45 +- 0.05 g/cm ³
Solubility(ies)	Mixed in water in any ratio
Partition coefficient: n-octanol/water	Not determined
Auto-ignition temperature	Not determined
Decomposition temperature	Not determined
Viscosity	300 +- 50mPas

MINERAL BOND LV, COMPONENT A

SECTION 10: Stability and Reactivity

10.1. Reactivity

Alkalinity, water soluble substance.

10.2. Chemical stability

Stable under normal condition storage and handling.

10.3. Possibility of hazardous reactions

Reacts with acids: Heat released.

10.4. Conditions to avoid

Avoid heat sources.

10.5. Incompatible materials

Acids; aluminium, zinc, tin, lead.

10.6. Hazardous decomposition products

Under normal conditions, the substance is not degradation.

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Acute toxicity

silicic acid, sodium salt	1,2-Ethanediol
LD50 Oral - Rat = 3400 mg/kg bw LC50 Inhalation - Rat > 2.06 g/m ³ LD50 Dermal - Rat > 5000 mg/kg bw	LD50 Oral - Rat - 4.700 mg/kg LD50 Dermal - Rabbit - 10.626 mg/kg

Skin corrosion/irritation

silicic acid, sodium salt	1,2-Ethanediol
Skin Irrit. 2H315	Skin - Rabbit Result: No skin irritation

Serious eye damage/eye irritation

silicic acid, sodium salt	1,2-Ethanediol
In vitro study rabbit Result: irritating	Eyes - Rabbit Result: Mild eye irritation - 24 h

Respiratory or skin sensitisation

silicic acid, sodium salt	1,2-Ethanediol
Based on category approach, sodium silicate is not sensitising.	No data available

Germ cell mutagenicity

silicic acid, sodium salt	1,2-Ethanediol
In vitro: negative, in vivo: negative Not classified	No data available

Carcinogenicity

silicic acid, sodium salt	1,2-Ethanediol
No reliable data available. In addition, sodium silicate does not carry any structural alerts for carcinogenicity	This product is or contains a component that is probably not carcinogenic based on its IARC, ACGIH, NTP or EPA classification

Reproductive toxicity

silicic acid, sodium salt	1,2-Ethanediol
Not classified	Laboratory experiments have shown teratogenic effects. Overexposure ay cause reproductive disorder(s) based on tests with laboratory animals

MINERAL BOND LV, COMPONENT A

SECTION 10: Stability and Reactivity

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silicic acid, sodium salt	1,2-Ethanediol
Not classified	Laboratory experiments have shown teratogenic effects. Overexposure ay cause reproductive disorder(s) based on tests with laboratory animals

MINERAL BOND LV, COMPONENT A

Specific target organ toxicity - single exposure

silicic acid, sodium salt	1,2-Ethandiol
Not classified	No data available

Specific target organ toxicity - repeated exposure

silicic acid, sodium salt	1,2-Ethandiol
Not classified	Oral - May cause damage to organs through prolonged or repeated exposure - kidney

Aspiration hazard

silicic acid, sodium salt	1,2-Ethandiol
Not classified	No data available

SECTION 12: Ecological information

12.1. Toxicity

silicic acid, sodium salt

Acute toxicity to fish:

LC50 (96 h): 1108 mg/L (Brachydanio rerio)
 LC50 (96 h): 260 - 310 mg/L (Onchorhynchus mykiss)
 NOEC (96 h, Mortality): 348 mg/L (Brachydanio rerio)

Long-term toxicity for fish:

No NOEC available.

Acute toxicity for invertebrates:

EC50 (48 h): 1700 mg/L (Daphnia magna)

Long-term toxicity for algae:

EC50 (72 h, biomass): 207 mg/L (Scenedesmus subspicatus)
 EC50 (72 h, growth rate): > 345.4 mg/L (Scenedesmus subspicatus)

Exposure for aquatic environment is not sufficient to classify the substance. Because of the physical properties - extremely low vapour pressure - release to the atmosphere during use of the substance is not possible.

12.2. Persistence and degradability

As inorganic substances and in view of their chemical structure, soluble silicates are not amendable to biodegradation. In water, the substance is hydrolysed.

12.3. Bioaccumulative potential

The substance has a low potential for bioaccumulation, which was confirmed toxicokinetic on studies on vertebrates.

12.4. Mobility in soil

Due to good solubility in water, it can penetrate into the surface waters of the release site and can be detected at points located far away from this area.

12.5. Results of PBT and vPvB assessment

Not applicable.

12.6. Other adverse effects

No other effects.

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Avoid or minimize waste material production. The material must be disposed in accordance with local or national rules (Waste Act). Unrefined material is not suitable for disposal. Do not let waste material, even in small quantities, down to wastewater, sewage system or watercourses. Emptied packaging must be passed to authorised waste receiver.

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SECTION 14: Transport Information

14.1 UN Number

Not dangerous goods.

14.2 UN Proper shipping name

Not dangerous goods.

14.3 Transport hazard class(es)

Not a hazardous material under the provisions of RID and ADR.

14.4 Packing group

Not dangerous goods.

14.5. Environmental hazards

Not a hazardous material for environment.

14.6. Special precautions for user

Alkaline substance. The accidental release (spill) to collect the mechanical application of personal protection measures described in Section 8 of this SDS.

14.7. Transport bulk according to Annex II of Marpol and the IBC Code

The substance is not transported in bulk.

SECTION 15: Regulatory information

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

1. Regulation (EC) No. 1907/2006 of the European Parliament and of the Council of 18 December 2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH) and establishing a European Chemicals Agency, amending Directive 1999/45/EC and repealing Council Regulation (EEC) No. 793/93 and Commission Regulation (EC) No. 1488/94 as well as Council Directive 76/769/EEC and Commission Directives 91/155/EEC, 93/67/EEC, 93/105/EC and 2000/21/EC as amended, (REACH) (OJ EU L of 2006 No. 396, item 1).

2. Regulation (EC) No. 1272/2008 of the European Parliament and of the Council of 16 December 2008 on classification, labelling and packaging of substances and mixtures, amending and repealing Directives 67/548/EEC and 1999/45/EC, and amending Regulation (EC) No. 1907/2006 (OJ EU L of 2008 No. 35, item 1).

3. Commission Regulation (EU) No. 2015/830 of 28 May 2015 amending Regulation (EC) No. 1907/2006 of the European Parliament and of the Council of the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH) (OJ EU L of 2015 No. 132).

4. Commission Directive No. 2000/39/EC; 2006/15/EC and 2009/161/EC establishing first, second and third lists of indicative occupational exposure limit values (OJ EU L 2000, No. 142, item 47; OJ EU L 006, No. 38, item 36; OJ EU L of 2009 No. 338, item 87)

15.2 Chemical Safety Assessment

A Chemical Safety Assessment has not been carried out.

SECTION 16: Other information

The full version of the hazard classes and category codes from sections 2 and 3:

Skin Irrit. 2 - Skin corrosion/irritation; category 2.
 Eye Irrit. 2 - Serious eye damage/eye irritation; category 2.
 Acute Tox. 4 - Acute toxicity (oral); category 4.
 STOT RE 2 - Specific target organ toxicity - repeated exposure; category 2.

Full text of H-sentences (Hazard statements referred to under Sections 2 and 3):

H302 - Harmful if swallowed.
 H315 - Causes skin irritation.
 H318 - Causes serious eye damage.
 H373 - May cause damage to organs (kidney) through prolonged or repeated exposure if swallowed.

DNEL - Derived No Effect Level

PNEC - Predicted No Effect Concentration

The current edition of the safety data sheet replaces the previous edition.

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

MINERAL BOND LV, COMPONENT B

Safety Data Sheet according to Regulation (EC) 2015/830 amending Regulation (EC) No 1907/2006 (REACH)

Prepared on: 18.07.2016
Revision date: 10.11.2016
Version no: 1.00-EN

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifier:

Substance name: **MINERAL Bond LV, Component B**
Index number: Not applicable (mixture)
Synonyms: Not applicable
CAS number: Not applicable (mixture)
EC number: Not applicable (mixture)
Registration number: Excluded from registration (polymer)

1.2 Relevant identified uses of the substance or mixture and uses advised against

Relevant identified uses:

2-Component, high strength silicate resin. It is suitable for grout stabilization (for heavily cracked rock mass), gas sealing and water stopping.

Uses advised against:

Any other uses than those listed should be consulted with the Supplier.

1.3 Details of the supplier of the safety data sheet

Supplier:

DSI Schaum Chemie sp. z.o.o (limited liability company)
43-190 Mikołów, Poland
Podleska 72 Str.
Tel.: +48 32 355 90 81
Fax: +48 32 355 90 89
Email address of the person responsible for the MSDS: info@dsi-schaumchemie.pl

1.4 Details of the supplier of the safety data sheet

(Poland) Manufacturer: +48 32 355 90 81, Monday – Friday: 7:30 - 15:30

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Classification according to Regulation (EC) No 1272/2008 (CLP):

Skin Irrit. 2; H315
Eye Irrit. 2; H318
Skin Sens 1; H317
Eye Irrit. 2; H319
Acute Tox. 4; H332
Resp. Sens 1; H334
STOT SE 3; H335
Carc. 2; H351
STOT RE 2; H373

Additional information:

For full text of Hazard- and EU Hazard-statements: see SECTION 16

2.2 Label elements

Labelling according to Regulation (EC) No 1272/2008 [CLP]

Hazard pictograms:

Any other uses than those listed should be consulted with the Supplier.



Signal word:

Danger

MINERAL BOND LV, COMPONENT B**Hazard statements:**

H315 - Causes skin irritation.
 H317 - May cause an allergic skin reaction.
 H319 - Causes serious eye irritation.
 H332 - Harmful if inhaled.
 H334 - May cause allergy or asthma symptoms or breathing difficulties if inhaled.
 H335 - May cause respiratory irritation.
 H351 - Suspected of causing cancer.
 H373 - May cause damage to organs repeated exposure.

Precautionary statements:

P260 - Do not breathe dust/fume/gas/mist/vapours/spray.
 P280 - Wear protective gloves/protective clothing/eye protection/face protection.
 P284 - In case of inadequate ventilation wear respiratory protection.
 P302 + P352 - IF ON SKIN: Wash with plenty of soap and water.
 P304 + P340 - IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
 P305 + P353 + P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
 P308 + P313 - IF exposed or concerned: Get medical advice/attention/international regulation.

Supplemental hazard information:

EUH204 - Contains isocyanates. May produce an allergic reaction.

2.3 Other hazards

The substance does not meet the criteria for persistent, bioaccumulation and toxicity (PBT), or the criteria for Very Persistent and Very Bioaccumulative (vPvBO) in accordance with Annex XIII of 1907/2006/EC.

Additional information:

People with allergic ananases (e.g. asthma, chronic bronchitis) should not work with this product. Symptoms of adverse effects on the respiratory system may appear after a few hours. The main threat to the respiratory tract is dust, vapours and aerosols.

SECTION 3: Composition/information on ingredients**3.1 Substances**

Not applicable

3.2 Mixtures

Name REACH Registration Number	% [weight]	CAS No	EC No	Classification according to Regulation (EC) No 1278/2008 (CLP)
polymeric MDI excluded from registration (polymer)	80 - 100	9016-87-9	not applicable	Skin Irrit. 2; H315 Eye Irrit. 2; H318 Skin Sens 1; H317 Eye Irrit. 2; H319 Acute Tox. 4; H332 Resp. Sens 1; H334 STOT SE 3; H335 Carc. 2; H351 STOT RE 2; H373

Additional information: For full text of H-statements: see SECTION 16

SECTION 4: First aid measures**4.1 Description of first aid measures****General information:**

If any health problems occur, or in the event of any doubt or accident, seek medical attention and provide the doctor information from the Safety Data Sheet. Always ensure the affected person has peace of mind and ensure his/her warmth. If the affected person is unconscious, lay him/her down and transport him/her to a doctor in a stabilised position. If the affected person is not breathing, immediately commence artificial resuscitation. If the heart has stopped, indirect heart massage must be commenced immediately.

Poisoning by inhalation:

Move the exposed person to fresh air at once.

Skin contamination:

Wash thoroughly using copious amounts of warm water and soap or cleaning agent based on polyethylene and rinse thoroughly. Remove contaminated clothing and shoes immediately. Do not use any solvents or thinners. In all cases of doubt, or when symptoms, e.g. irritation of skin persists, seek medical attention.

MINERAL BOND LV, COMPONENT B

Eye contamination:

Rinse eyes for 15 minutes at least with plenty of water, holding eyelids wide open. Seek medical attention. Avoid strong water streams because of risk of cornea injury.

Poisoning by swallowing:

The injured conscious: Rinse mouth with water. Do not induce vomiting without medical supervision. Provide medical attention immediately.

The injured unconscious: do not orally administer anything for unconscious injured. Provide medical attention immediately.

4.2 Most important symptoms and effects, both acute and delayed

Headache, nausea, shortness of breath, sore throat, redness of the skin. Repeated or prolonged contact may cause skin sensitization. Repeated or prolonged contact may cause asthma.

4.3. Indication of any immediate medical attention and special treatment needed

Remove contaminated clothing and wash before reuse. If you feel unwell, seek medical advice immediately if possible, show the label.

Advise to doctor: Irritating to respiratory system and is a potential agent of causing allergic skin and respiratory tract. The first characteristics are irritation of respiratory tract and bronchi. Depending on the size of the exposure and the persistence of symptoms may require longer care. May cause skin and eye irritation as a result of reaction with water in th tissues. Symptoms of exposure may appear late.

SECTION 5: Firefighting measures

5.1 Extinguishing media:

Suitable extinguishing media:

Carbon Dioxide (CO₂), dry powder or foam. Fight larger fires with water spray. Water jets. Use water jets only to cool the surfaces of the containers exposed to fire to prevent them from bursting (explosion).

Unsuitable extinguishing media:

High volume water jet.

5.2 Special hazards arising from the substance or mixture:

Hazardous combustion products:

During a fire, dense smoke containing hazardous products is produced - carbon monoxide (CO), carbon dioxide (CO₂), hydrogen cyanide (HCN) in trace amounts, nitrogen oxides (NOx) and isocyanate fumes. Do not inhale fumes and gases produced in the fire. See also Section 10.

5.2 Advice for firefighters

According to the size of the fire, it may be necessary to wear protective suits against the heat, individual breathing equipment, gloves protective goggles or facemasks. Prevent fire extinguishing water and fire residues from contaminating surface water, the ground water system or into drains and sewers. See also Section 10.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

For those not belonging to the staff assisting:

Forbid unauthorized access to the site contamination.

For those providing assistance:

Avoid contact with eyes and skin. Provide adequate ventilation. Wear appropriate protective equipment - see Section 8.

6.2 Environmental precautions:

Do not empty into drains/surface water/ground wter. Methods for cleaning and take-up: Remove mechanically. In the case of environmental contamination with plenty of substance, notify to local authority and emergency services.

6.3 Methods and material for containment and cleaning up

Absorb in sawdust, dry sand or with absorbent based on hydrated calcium silicate and collect mechanically into labelled containers and deliver for disposal according to local regulations.

Damp waste left in an open container for a period of one hour to complete the reaction -- the carbon dioxide is produced. Cures residues in accordance with the recommendations set forth in Section 13.

The released product may be neutralized with one of the two decontaminants, the composition of which is given below:

- Sodium carbonate: 5-10%; washing agent: 0.2-2%, with addition of water to 100%.

- Ammonia solution: 3-8%; washing agent: 0.2-2%, with additio of water to 100%.

6.4 Reference to other sections

Protective equipment and clothing - see Section 8.

Disposal of waste - see Section 13 and 15.

MINERAL BOND LV, COMPONENT B

SECTION 7: Handling and storage

7.1 Precautions for safe handling

Ensure adequate ventilation, general and local, exhaust. Observe regular review of ventilation equipment. Avoid contact with eyes. Avoid contact with skin. Do not breathe vapours. Wear gloves and protective clothing. Do not eat, drink, smoke or store food in the working areas. Immediately remove contaminated clothing and wash before use.

7.2 Conditions for safe storage, including and incompatibilities

Store in tightly closed, original container, in a dry place. Protect from freezing. Store at temperatures from 10 to below 40°C. The product can withstand short-term heating to 50°C. See also Section 10. Suitable materials for the container: Polyethylene HDPE or steel. Do not store with food, drink and animal feed.

7.3 Specific end use(s)

No information on specific end-uses. See also subsection 1.2.

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

8.1.1 Occupational Exposure limit values

Substance: 4,4'-methylenediphenyl diisocyanate

CAS Number: 101-68-8

Countries	Limit value (8 hours)		Limit value	Short term
	ppm	mg/m	ppm	mg/m ³
Austria	0.005	0.05	0.01	0.1
Belgium	0.005	0.052		
Denmark	0.005	0.05	0.01	0.1
European Union				
France	0.01	0.1	0.02	0.2
Germany		0.05		0.05
Hungary		0.05		0.05
Poland		0.05		0.2
Spain	0.005	0.052		
Sweden	0.002	0.03	0.005	0.05

Source: http://limitvalue.ifa.dguv.de/Webform_gw.aspx

8.1.2 DNEL/PNEC values

Workers:

Acute/short-term exposure-systematic effects (dermal)	DNEL = 50mg/kg bw/day
Acute/short-term exposure-systematic effects (inhalation)	DNEL = 0.1mg/m ³
Acute/short-term exposure-local effects (dermal)	DNEL = 28.7mg/cm ²
Acute/short-term exposure-local effects (inhalation)	DNEL = 0.1mg/m ³
Long-term exposure-systematic effects (inhalation)	DNEL = 0.05mg/m ³
Long-term exposure-systematic effects (dermal)	Not Applicable
Long-term exposure-local effects (inhalation)	DNEL = 0.05mg/m ³
Long-term exposure-local effects (dermal)	Not Applicable

General population:

Acute/short-term exposure-systematic effects (dermal)	DNEL = 25mg/kg bw/day
Acute/short-term exposure-systematic effects (inhalation)	DNEL = 0.05mg/m ³
Acute/short-term exposure-systematic effects (oral)	DNEL = 20mg/kg bw/day
Acute/short-term exposure-local effects (dermal)	DNEL = 17.2mg/cm ²
Acute/short-term exposure-local effects (inhalation)	DNEL = 0.05mg/m ³
Long-term exposure-systematic effects (inhalation)	DNEL = 0.025mg/m ³
Long-term exposure-systematic effects (dermal)	Not Applicable
Long-term exposure-systematic effects (oral)	Not Applicable
Long-term exposure-local effects (inhalation)	DNEL = 0.025mg/m ³
Long-term exposure-local effects (dermal)	Not Applicable
Long-term exposure-local effects (oral)	Not Applicable

PNEC

PNEC aqua (fresh water)	1 mg/l
PNEC aqua (marine water)	0.1 mg/l
PNEC aqua (intermittent releases)	10 mg/l
PNEC STP	1 mg/l
PNEC soil	1 mg/kg soil dw (dry weight)

MINERAL BOND LV, COMPONENT B

8.2 Exposure controls

Avoid contact with eyes, mucous membranes and inhalation of vapours.
It is forbidden to smoke, drink or eat while working.
Observe the typical standards of hygiene at work.

Respiratory protection:

In conditions of insufficient ventilation, while spraying the product, it is recommended to wear a mask with the filter type A2-P2 or better.

Eye protection:



Wear approved chemical safety goggles with side shields where eye exposure is reasonably probable, meet the requirements of EN 166.

Hand protection:



Use suitable protective gloves, such as: polychloroprene $\geq 0.5\text{mm}$ thick and breakthrough time ≥ 480 minutes; nitril $\geq 0.35\text{mm}$ thick and breakthrough time ≥ 480 minutes; butyl rubber $\geq 0.5\text{mm}$ thick and breakthrough time ≥ 480 minutes or fluoro-rubber $\geq 0.4\text{mm}$ thick and breakthrough time ≥ 480 minutes.

For prolonged or repeated skin contact use suitable protective gloves that meet the requirements of EN 374.

Skin protection:



According to the exposure when handling the product, wear suitable protective clothing, aprons and protective boots.

General recommendations:

See also Section 7.

Provide adequate ventilation. Remove contaminated clothing immediately. Wash hands before breaks and after work. Wash contaminated gloves before removing. At work do not eat, drink or smoke. Avoid contact with skin. Do not get in eyes. Do not breathe vapours.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Melting point/freezing point	< 0°C (DIN 51556)
Initial boiling point and boiling range	> 300 °C (Read-across based on MDI mixed isomers - 26447-40-5)
Flash point	> 200 °C (open cup)
Flammability	Not flammable
Upper/lower flammability or explosive limits	Not flammable
Vapour pressure	< 10 ⁻⁵ mbar (at 20 °C)
Vapour density (air=1)	No data
Density	1.20 +/- 0.03 g/cm (at 25 °C)
Water solubility	Reacts with water
Partition coefficient n-octanol/water	Not applicable
Auto-ignition temperature	> 600 °C (1013 hPa) (EU Method A.15)
Decomposition temperature	(Read-across based on oligomeric MDI- CAS 32055-14-4)
Viscosity	No data
Explosive properties	200 +/- 80 mPa*s (at 25 °C, dynamic) (ASTM D4899)
Oxidising properties	Not explosive

This data is not always consistent with the specifications of a particular batch of product. See product sheet for more detailed information.

MINERAL BOND LV, COMPONENT B

SECTION 10: Stability and Reactivity

10.1. Reactivity

Reacts with water, acids, alcohols, amines, bases and oxidants.

10.2. Chemical stability

The main removal mechanism of MDIs in the environment is hydrolysis. MDI reacts quickly with water to form predominantly solid, insoluble polyurea. Under conditions typical of many types of environmental contact i.e. with relatively poor dispersion of the denser isocyanate, the interfacial reaction leads to the formation of a solid crust encasing partially or unreacted material. This crust restricts ingress of water and egress of amine, and hence slows and modifies hydrolysis. Polymerise above 200°C, and produces carbon dioxide.

10.3. Possibility of hazardous reactions

Reaction is slow with cold or warm water (<50°C), with hot water or steam the reaction is faster, producing carbon-dioxide causing pressure increase. Acids, alcohols, amines, bases and oxidants cause fire and explosion hazard.

10.4. Conditions to avoid

High temperature, moisture, strong light.

10.5. Incompatible materials

Water, acids, alcohols, amines, bases and oxidants.

10.6. Hazardous decomposition products

No hazardous decomposition products if stored and handled as prescribed/indicated.

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Acute toxicity:

Acute toxicity - oral: Based on available data, the classification criteria are not met.

Rats LD50 > 2000 mg/kg bw

Method: 84/449/EEC

(Read-across based on methylenediphenyl diisocyanate - CAS 26447-40-5)

Acute toxicity - aerosol inhalation:

Rats LC50 > 2.24 mg/L air (1h)

Method: OECD Guideline 403

(Read-across based on 4,4'-methylenediphenyl diisocyanate - CAS 101-68-8.)

Acute toxicity - dermal: Based on available data, the classification criteria are not met.

Rabbit LD50 > 9400 mg/kg bw (24h)

Method: OECD Guideline 402

Skin corrosion/irritation:

Rabbits Irritating. (4 h/14 days)

Method: OECD Guideline 404

(Read-across based on methylenediphenyl diisocyanat e - CAS 26447-40-5.)

Serious eye damage/irritation:

Rabbits Not irritating. (24 h/21 days)

Method: OECD Guideline 405

(Read-across based on methylenediphenyl diisocyanate - CAS 26447-40-5.)

Summarized the available animal data would not support classification of MDI as an eye irritant.

But together with human occupational case reports in which symptoms of eye irritation were reported the legal classification as eye irritant should be applied.

Respiratory or skin sensitization:

Animal data as well as studies in humans provide evidence of possible skin sensitization, and of respiratory sensitization due to MDI. Animal studies indicate that MDI is a strong allergen. Human case reports describe the occurrence of allergic contact dermatitis due to MDI exposure.

Skin sensitization:

Guinea pig: Sensitizing.

Method: Not available

(Read-across based on 4,4'-methylenediphenyl diisocyanate - CAS 101-68-8.)

Respiratory sensitization:

Mice: Sensitizing.

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Germ cell mutagenicity:

Based on available data, the classification criteria are not met.

Gene mutation, in vitro:

Salmonella typhimurium: Negative.

Method: EU Method B 13/14

(Read-across based on 4,4'-methylenediphenyl diisocyanate - CAS 101-68-8.)

Chromosome aberration, in vivo:

Rats (inhalation): Negative. (3 weeks; 1/week, 1 h/day)

Method: OECD Guideline 474

(Read-across based on 4,4'-methylenediphenyl diisocyanate - CAS 101-68-8.)

Carcinogenicity:

Rats (inhalation: aerosol) NOAEC = 0.2 mg/m³ air (toxicity) (2 years; 6 h/day, 5 days/week)

NOAEC = 1 mg/m³ air (carcinogenicity) (2 years; 6 h/day, 5 days/week) LOAEC = 6 mg/m³ air

(carcinogenicity) (2 years; 6 h/day, 5days/week)

Method: OECD Guideline 453

Reproductive toxicity:

Based on available data, the classification criteria are not met.

Effects on fertility: No fertility nor multigeneration studies are available for MDI.

Rats (inhalation) NOAEL = 4 mg/m³ air (developmental toxicity) (10 days; 1/day, 6 h)

NOAEL = 4 mg/m³ air (maternal toxicity) (10 days; 1/day, 6 h)

Method: OECD Guideline 414

STOT-single exposure:

MDIs irritant the respiratory tract.

(Read-across based on 4,4'-methylenediphenyl diisocyanate - CAS 101-68-8.)

STOT-repeated exposure:

Rats (inhalation: aerosol) LOAEC = 1.0 mg/m³ air (2 years; 6 h/day, 5 days/week)

Target organs: respiratory - lung.

Method: OECD Guideline 453

Aspiration hazard:

Not classified due to lack of data.

SECTION 12: Ecological information

12.1. Toxicity

Short-term toxicity to fish:

Freshwater fish (Brachydanio rerio) LC50 > 1000 mg/L (96 h)

Method: OECD Guideline 203

Short-term toxicity to aquatic invertebrates:

Freshwater invertebrates (Daphnia magna) EC50 > 1000 mg/L (24 h)

Method: OECD Guideline 202

Long-term toxicity to aquatic invertebrates:

Freshwater invertebrates (Daphnia magna) NOEC >= 10 mg/L (21 days)

Method: OECD Guideline 211

Toxicity to aquatic algae and cyanobacteria:

Freshwater algae (Desmodesmus subspicatus) EC50 >1640 mg/L (72 h)

Method: OECD Guideline 201

Toxicity to microorganisms:

Microorganisms (activated sludge) EC50 > 100 mg/L (3 h)

Method: OECD Guideline 209

12.2. Persistence and degradability

Photo-transformation in air:

Half-life (DT50): 1 day

Method: QSAR

(Read-across based on 4,4'-methylenediphenyl diisocyanate - CAS 101-68-8.)

Hydrolysis: MDI reacts with water to form predominantly inert polyurea.

Half-life (DT50): 20 h (at 25°C)

(Read-across based on oligomeric MDI - CAS 32055-14-4.)

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Photo-transformation in water and soil:

There are no photo-transformation data in water and soil for the test substance.

Biodegradation in water: Under test conditions no biodegradation observed. (28 days)

Method: OECD Guideline 302 C

Biodegradation in water and sediment: Data waiving. In accordance with Annex XI, simulation biodegradation tests are technically not feasible as the test substance reacts quickly with water. The corresponding PEC/PNEC ratios would be less than 1. Taking into account the scientific and exposure arguments, it appears appropriate to waive the long-term fish/plant/soil and sediment toxicity studies.

12.3. Bioaccumulative potential

Bioaccumulation - aquatic/sediment: Due to the high reactivity of the substances of the MDI category with water, bioaccumulation tests can in principle not be performed with these substances. However, one bioaccumulation test with 4,4'-MDI and a mesocosm study with PMDI with an indication of bioaccumulation potential have been performed. As no analytical measurements were done, it substances of the category approach, no new bioaccumulation study is deemed necessary.

BCF (Cyprinus carpio) 200 (28 days)

Method: OECD Guideline 305 E

(Read-across based on 4,4'-methylenediphenyl diisocyanate - CAS 101-68-8.)

12.4. Mobility in soil

There is no data available.

12.5. Results of PBT and vPvB assessment

Not applicable.

12.6. Other adverse effects

According to information provided by the manufacturer, the product has weak effects to the aquatic environment - class 1 by the German classification (classification manufacturer).

Do not allow undiluted product or large quantities of it to reach surface water, ground water or sewage system.

The product is not mixed with water. In the reaction with water produces carbon dioxide, and inert

non-biodegradable solid (polyurea).

Product is not classified as dangerous for the environment.

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Avoid or minimize waste material production. The material must be disposed in accordance with local or national rules (Waste Act). Unrefined material is not suitable for disposal. Do not let waste material, even in small quantities, down to wastewater, sewage system or watercourses. Emptied packaging must be passed to authorised waste reciever.

European Waste Catalogue code (EWC): 08 05 01*

SECTION 14: Transport Information

14.1 UN Number

Not dangerous goods.

14.2 UN Proper shipping name

Not dangerous goods.

14.3 Transport hazard class(es)

Not dangerous goods.

14.4 Packing group

Not dangerous goods.

14.5. Environmental hazards

No.

14.6. Special precautions for user

Not dangerous goods.

14.7. Transport bulk according to Annex II of Marpol and the IBC Code

No regulation.

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SECTION 15: Regulatory information

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

1. Regulation (EC) No. 1907/2006 of the European Parliament and of the Council of 18 December 2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH) and establishing a European Chemicals Agency, amending Directive 1999/45/EC and repealing Council Regulation (EEC) No. 793/93 and Commission Regulation (EC) No. 1488/94 as well as Council Directive 76/769/EEC and Commission Directives 91/155/EEC, 93/67/EEC, 93/105/EC and 2000/21/EC as amended, (REACH) (OJ EU L of 2006 No. 396, item 1).
2. Regulation (EC) No. 1272/2008 of the European Parliament and of the Council of 16 December 2008 on classification, labelling and packaging of substances and mixtures, amending and repealing Directives 67/548/EEC and 1999/45/EC, and amending Regulation (EC) No. 1907/2006 (OJ EU L of 2008 No. 35, item 1).
3. Commission Regulation (EU) No. 2015/830 of 28 May 2015 amending Regulation (EC) No. 1907/2006 of the European Parliament and of the Council of the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH) (OJ EU L of 2015 No. 132).
4. Commission Directive No. 2000/39/EC; 2006/15/EC and 2009/161/EC establishing first, second and third lists of indicative occupational exposure limit values (OJ EU L 2000, No. 142, item 47; OJ EU L 006, No. 38, item 36; OJ EU L of 2009 No. 338, item 87)

15.2 Chemical Safety Assessment

A Chemical Safety Assessment has not been carried out.

SECTION 16: Other information

The full version of the hazard classes and category codes:

- Acute Tox. 4 - Acute toxicity (oral); category 4.
- Carc. 2 - Carcinogenicity; category 2.
- Eye Irrit. 2 - Serious eye damage/eye irritation; category 2.
- Resp. Sens. 1 - Respiratory sensitisation, category 1.
- Skin Irrit. 2 - Skin corrosion/irritation, category 2.
- Skin Sens. 1B - Skin sensitisation, category 1B.
- STOT RE 2 - Specific target organ toxicity — repeated exposure; category 2.
- STOT SE 3 - Specific target organ toxicity — single exposure; category 3.

Full text of H-sentences (Hazard statements referred to under Sections 2 and 3):

- H315 - Causes skin irritation.
- H317 - May cause an allergic skin reaction.
- H319 - Causes serious eye irritation.
- H332 - Harmful if inhaled.
- H334 - May cause allergy or asthma symptoms or breathing difficulties if inhaled.
- H335 - May cause respiratory irritation.
- H351 - Suspected of causing cancer.
- H373 - May cause damage to organs repeated exposure.

According to information provided by the manufacturer, technical (polymers) MDI (pMDI) CAS 9016-87-9 (in the form of aerosol respirable fraction) is classified as category 3 carcinogens.

The current edition of the safety data sheet replaces the previous edition.

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification.

The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

Multi-strand Anchor Systems

Multi-strand Anchors are an actively tensioned ground anchor system. Tensioning minimizes or eliminates anticipated deformations of the system and deformations at the civil engineering measure. This applies both to temporary structures (e.g. pit support systems) and permanent tie backs.

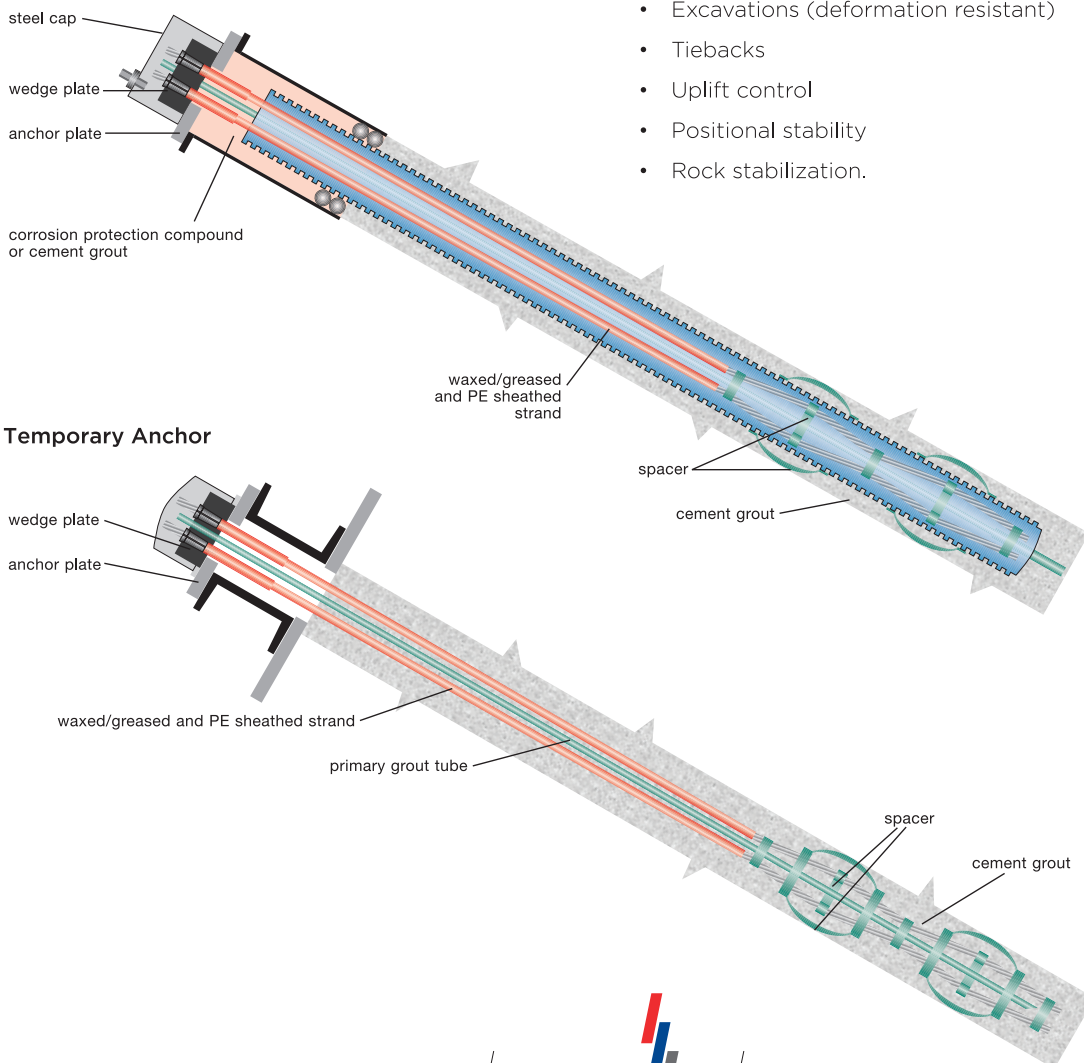
The strand anchors are produced with double corrosion protection (DCP), each individual strand is covered by corrosion protection compound and inserted into an individual duct in the factory. As long as the grout used for anchoring is load-bearing, the anchor force is unlimited because the number of strands that can be combined in the anchorage is variable at will.

By definition, an anchor consists of the following three main components:

- **Bonded Length** – Anchor is fixed in the borehole using grout (cement grout) and can transfer the forces to the loadbearing soil via bond and skin friction.
- **Unbonded Length** – Each strand is uncoupled from the borehole using individual sleeves so that it can freely extend in the unbonded length. This way, tension can be applied to the anchor system.
- **Anchor Head** – Anchor head transfers the anchor force to the substructure and thus to the structure that needs to be anchored.

If required, anchors can be supplied retensionable.

Permanent (DCP) Anchor acc. to DIN 4125



Applications

- Excavations (deformation resistant)
- Tiebacks
- Uplift control
- Positional stability
- Rock stabilization.

Multi-strand Anchor Systems

Features

- Large degree of flexibility: force, length, transport, installation
- Practically no restrictions in terms of length: 150m (492 ft)
- Small pack size for transportation
- Minimal space required during installation
- Retensionable due to exterior thread at wedge plates
- Permanent strand anchor can be supplied in many variations (standard, EI-Iso, TWIN-Corr).

Multi-strand Anchor System

No.	Cross Sectional Area, mm ² (in ²)	Weight, kg/m (lb/ft)	Y1860 High Grade	
			Yield Load, kN (kipf)	Ultimate Load, kN (kipf)
1	140 (0.2)	1.09 (0.7)	230 (51.7)	260 (58.5)
2	280 (0.4)	2.19 (1.5)	459 (103.2)	521 (117.1)
3	420 (0.7)	3.28 (2.2)	689 (154.9)	781 (175.6)
4	560 (0.9)	4.37 (2.9)	918 (206.4)	1042 (234.3)
5	700 (1.1)	5.47 (3.7)	1148 (258.1)	1302 (292.7)
6	840 (1.3)	6.56 (4.4)	1378 (309.8)	1562 (351.2)
7	980 (1.5)	7.65 (5.1)	1607 (361.3)	1823 (409.8)
8	1120 (1.7)	8.74 (5.9)	1837 (413.0)	2083 (468.3)
9	1260 (2.0)	9.84 (6.6)	2066 (464.5)	2344 (527.0)
10	1400 (2.2)	10.93 (7.3)	2296 (516.2)	2604 (585.4)
11	1540 (2.4)	12.02 (8.1)	2526 (567.9)	2864 (643.9)
12	1680 (2.6)	13.12 (8.8)	2755 (619.3)	3125 (702.5)
13	1820 (2.8)	14.21 (9.5)	2985 (671.1)	3385 (761.0)
14	1960 (3.0)	15.30 (10.3)	3214 (722.5)	3646 (819.7)
15	2100 (3.3)	16.40 (11.0)	3444 (774.2)	3906 (878.1)
16	2240 (3.5)	17.49 (11.8)	3674 (825.9)	4166 (936.6)
17	2380 (3.7)	18.58 (12.5)	3903 (877.4)	4427 (995.2)
18	2520 (3.9)	19.67 (13.2)	4133 (929.1)	4687 (1,053.7)
19	2660 (4.1)	20.77 (14.0)	4362 (980.6)	4948 (1,112.4)
20	2800 (4.3)	21.86 (14.7)	4592 (1,032.3)	5208 (1,170.8)
21	2940 (4.6)	22.95 (15.4)	4822 (1,084.0)	5468 (1,229.3)
22	3080 (4.8)	24.05 (16.2)	5051 (1,135.5)	5729 (1,287.9)

Non-tensioned Cable Bolt (NT)



The Non-tensioned cable bolt is an adaptive anchor. The purpose of the design is to allow the anchor to contour into drilled holes. Because the cable bolt is flexible it allows for angled installations, as well as installations that will not suit conventional anchor bolts. With the use of the multi bulb system, the resin is mixed thoroughly.

The Non-tensioned Cable Bolt is generally used as a second bolting system. The application from old worked mines or sections, intersections, entries and generally anywhere a cable support is needed. The Cable Bolt is also used in conjunction with the primary roof bolts. With the use of the multi-bulb system, the bolt can be fully anchored with either resin or grouting.

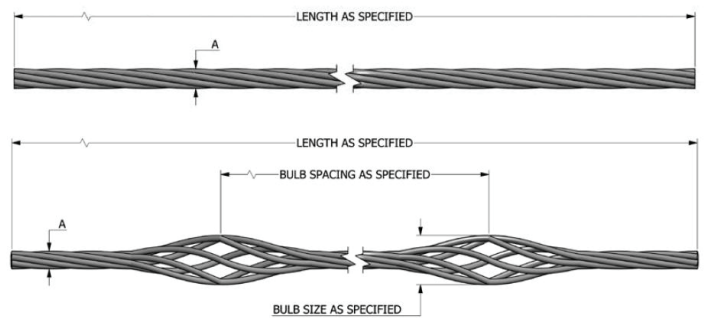
Features

- The Cable Bolt features a 15.24mm wire rope
- Stiffener tube for safe and effective installation
- Unique low seam barrel and wedge design that works in conjunction with the washer to attain the best possible installation flush to the rock face
- Hex Nut for use with standard spinning adaptors
- Length of cable specified by the customer
- Frequency of bulbs specified by the customer

Installation

The Non-tensioned Cable Bolt is designed to be as effective as possible, utilising existing technology to install. No extra equipment is needed. The bolt is installed as a roof bolt would be. Hole sizes are determined by bulb diameter.

Technical Data	
Nominal Cable Diameter, mm ² (in. ²)	15.24 (0.59)
Breaking Strength, kN (lbf)	240.2 (53.9)
Nominal Steel Area, mm ² (in. ²)	139.35 (0.216)
Nominal Mass, kg/1000m	1094
Minimum Load at 1% Extension, kN (lbf)	216.2 (48.6)
Normal Bulb Diameter, mm ² (in. ²)	22 - 23 (0.86 - 0.9)
Stiffener Tube Diameter, mm (in. ²)	21.4 (0.842)



Paddle Bolts



Features

- Paddle Bolts are manufactured from deformed bars with “paddles” pressed on the up hole end which allows a smaller diameter bolt to mix chemical anchors in standard diameter holes
- Standard thread roll formed at one end
- Designed to be used with resin capsules, but can be effectively used with cementitious grouts
- Effective in coal rib stabilisation and mesh retention on rock embankments
- Corrosion protection can be provided by hot dip galvanising or alternative coatings

Paddle Bolts

Technical Data		
Bar Diameter, mm (in.)	18 (0.71)	20 (0.79)
Min. Yield Load, kN (lbf)	152 (34.3)	157 (35.29)
Min. Yield Strength, MPa (ksi)	600 (87.02)	500 (72.52)
Min. Ultimate load, kN (lbf)	201 (45.17)	220 (40)
Min. Ultimate Tensile Strength, MPa (ksi)	790 (115)	700 (101.5)
*Calculated Shear Load, kN (lbf)	122 (27.4)	131.88 (29.64)
Standard Elongation, %	22	22
Density, kg/m (lb. /ft.)	2.14 (1.44)	2.58 (1.73)
Major Bar Diameter, mm (in.)	22.5 (0.88)	24 (0.94)
Cross Sectional Area, mm ² (in. ²)	254.34 (0.394)	314 (0.4867)

*Calculated at 60% of Ultimate Tensile Load

Notes

- Minimum order quantities may apply to this product
- Only Rocbolt Technologies South Africa components should be used to enable the full performance of the bolt system to be attained.

Pigtail Eye Bolt

The pigtail eye bolt is threaded at one end to allow the use of an expansion shell, and is hot formed into an eye on the other end. The typical applications of the pigtail eye bolt is for suspension of cabling, ventilation, electrical, water piping and tooling. The two sizes of expansion units allow for a wider range of hole sizes to be used.



Features

- 3 leaf expansion shell
- Ø32mm and Ø35mm expansion shell may be used
- Large diameter of the “Eye” for ease of use
- Easy installation
- Long thread allowing maximum tension with the expansion shell on inner hole wall
- M16 thread
- No special tools needed for installation

Technical Data	
Thread Type	M16
Bar Diameter, mm (in.)	14.5 (0.57)
Min. Ultimate Load, kN (lbf)	78.5 (17.6)
Calculated Shear Strength*, kN (lbf)	44.6 (10.0)
Eye Diameter, mm (in.)	60 (2.51)
Lengths, mm (in.)	380 450

*Shear values calculated at 60% of U.T.S

Hole size range of each expansion shell	Min Hole Size	Max Hole Size
Ø32 (Blue Sleeve)	33mm	35mm
Ø35 (Green Sleeve)	36mm	38mm

Notes

- Minimum order quantities may apply to this product
- Only Rocbolt South Africa components should be used to enable the full performance of the bolt system to be obtained

Rocbolt Anchor Resin

Rocbolt Anchor Resin is a pourable solution consisting of two components packaged in a plastic bucket. The first component, in a tin, containing resin and the second component, in a bag, being the filler/grout.



The filler is poured into the bucket provided and then the resin is decanted and mixed. The resin mixture is fast setting, 15min – 35min at 25°C

Product Performance

- Set time (Standard) • 15min – 35min at 25°C
- Working time • ±8min
- Packaged weight • 10kg
- Typical Volume (mixed) • ±4.6 liters (0.0046m³)

does not adversely affect the shelf life of Rocbolt Anchor Resin, colder temperatures may cause slower setting times.

- It is essential that stocks be rotated so that the oldest stock is first out due to the four month shelf life

Quality Control

The superior quality of Rocbolt Anchor Resin is assured through a three-part quality control program.

- Ingredient testing
- In-process control tests
- Finished product acceptance tests

Handling Precautions

Physical contact with resin contained in tins may cause mild irritation. Safety glasses or eye shield should always be used when installation is done. In case of contact with eyes, immediately flush with plenty of water for at least 15 minutes and consult a physician. Use of gloves is recommended.

Storage

- For maximum shelf life, Rocbolt Anchor Resin should be stored away from direct sunlight in a reasonably cool, well ventilated, dry area
- Storage life is four months at 20°C
- Under adverse storage conditions, above 25°C , shelf life is reduced, conversely, while cold storage

In case of skin contact, flush skin with water. Prolonged contact with skin will cause skin irritation. Irritation should subside when material is removed from skin.

Buckets are filled with inert fillers and resin (active ingredients include low levels of styrene and benzoyl peroxide).

Resin Roof Bolts

Features

- Roof and Rock Bolts are manufactured from a special hot rolled deformed bar featuring a rib pattern that actively assists with mixing the chemical anchors during installation.
- Bolt rib pattern design has modified physical characteristics to maximize load transfer from the rock to the bolt, with higher transverse ribs together with lower profile longitudinal ribs.
- Rolled thread strength nominally equals the strength of the bar.
- The Resin Roof bolt is available in either spin-to-stall (shear pin nut) or reverse spin (nibbed) configurations.
- All Anchor Bolts are designed to be used with resins.



Standard Lengths and Packaging

- Standard bolt lengths start from 600mm
- Non - standard requirements are available on request
- Bolts are packaged in bundles
- Can be supplied assembled with bearing plates

Technical Data				
Bar Diameter, mm (in.)	16 (0.63)	18 (0.7)	20 (0.78)	25 (0.984)
Min. Yield Load, kN (lbf)	100 (27)	127 (28)	157 (35.29)	245 (55.14)
Min. Yield Strength, MPa (ksi)	500 (72.5)	500 (72.5)	500 (72.5)	500 (72.5)
Min. Ultimate Load, kN (lbf)	140 (31.6)	178 (40)	220 (49.4)	343 (77.2)
Min. Ultimate Tensile Strength, MPa (ksi)	700 (101.52)	700 (101.52)	700 (101)	700 (101)
*Calculated Shear Load, kN (lbf)	98 (22)	124 (28)	132 (29.64)	205.8 (46.32)
Standard Elongation, %	22	22	22	22
Density, kg/m (lb./ft.)	1.63 (1.06)	2.059 (1.34)	2.539 (1.73)	3.75 (2.40)
Cross Sectional Area, mm ² (in ²)	201 (0.31)	254 (0.394)	314 (0.486)	490 (0.76)

*Calculated at 60% of Ultimate Tensile Load

Notes

- *Minimum order quantities may apply to this product*
- *Only Rocbolt Technologies South Africa components should be used to enable the full performance of the bolt system to be obtained.*

Self-drilling Hollow Bar Anchor System



Features

- Fast drilling and placing due to drilling, anchor installation and grouting in a single operation
- Neither separate anchor installation nor removal of casing and drill rods
- Similar installation methods for all ground conditions
- Choice of drill bits for different ground conditions
- Hollow core not only serves for flushing with air or water during drilling, but also for grouting the anchor tendon
- Flexibility in length by using couplers
- Ability to work with small drill rigs without casing in restricted headroom conditions
- Accommodation of needs for enhanced protection against corrosion upon request
- High standard of quality control from production stage to the installation of the Self-drilling Hollow Bar Anchor ensures consistent quality
- Advantageous in all applications where normally cased drilling is required
- Allows for anchoring in both cohesive and non-cohesive ground, even under limited space conditions.

Self-drilling Hollow Bar Anchor System

Technical Data							
Outer Diameter, mm (in.)	R25N (1.0)	R32S (1.3)	R38 (1.5)	R51N (2.0)	T76S (3.0)	T40/16 (1.574)	T52/26 (2.05)
Inner Diameter, mm (in.)	14 (0.6)	17.5 (0.69)	21 (0.83)	33 (1.3)	45 (1.8)	16 (0.63)	26 (1.023)
Cross Sectional area average, mm ² (in. ²)	292 (0.453)	440 (0.682)	770 (1.194)	993 (1.539)	2400 (3.720)	910 (1.41)	1250 (1.93)
Ultimate load*, kN (lbf)	200 (44.962)	360 (80.931)	500 (112.404)	800 (179.847)	1900 (427.137)	660 (148.37)	929 (208.84)
Yield load*, kN (lbf)	150 (33.721)	280 (62.947)	400 (89.924)	630 (141.630)	1500 (337.213)	525 (118)	730 (164.1)
Tensile Strength**, MPa (ksi)	690 (100.08)	818 (118.6)	650 (94.28)	750 (108.78)	760 (110.23)	725 (105.1)	743 (107.7)
Weight, kg/m (lb./ft.)	2.3 (1.5)	4.1 (2.8)	4.8 (3.2)	7.6 (5.1)	19.0 (12.8)	7.15 (4.80)	9.90 (6.65)
Calculated Shear Strength, kN (lbf)	120 (27)	216 (48.56)	300 (67.4)	480 (107.9)	1140 (256.3)	396 (89)	557.4 (125.3)
Delivery Lengths, m (ft.)	3 (9.8)						

*Ultimate and Yield Load capacity are measured values. ** Tensile and Yield Strength are calculated average values.

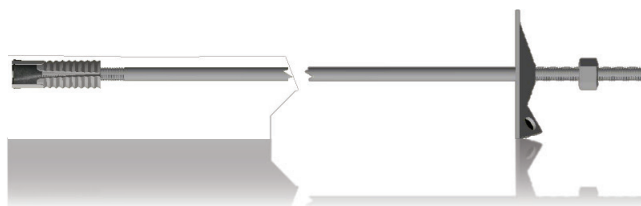
Notes

- Minimum order quantities may apply to this product
- Only Rocbolt Technologies South Africa components should be used to enable the full performance of the bolt system to be attained.

Smooth Bar Mechanical Anchor

The mechanical anchor bolt is used when there is a need for support of underground excavations. The anchor is commonly used in conjunction with wire mesh and other support sheeting which it secures into place. No grout or resin is needed for installation, but can be used for more permanent installations.

With the use of the expansion shell the mechanical anchor is easy to install. The expansion shell, once installed, locks into place assuring no movement occurs on the anchor.



Features

- Standard Hex Nuts for installation
- Washer as required
- Expansion shell for appropriate hole size
- 3 -leaf shell
- Ø32mm & Ø35mm Expansion shells available

Mechanical Anchor

Technical Data	
Bar Diameter, mm (in.)	16 (0.62)
Min Yield Strength, MPa (ksi)	450 (56.2)
Min Ultimate Tensile Strength, MPa (ksi)	590 (85.75)
Min Ultimate Tensile Load, KN (lbf)	118.56 (26.65)
Calculated Shear Strength*, kN (lbf)	71.13 (16)
Cross Sectional Area, mm ² (in ² .)	201 (0.31)
Thread	DIN405 Rd18

*Shear values calculated at 60% of U.T.S



Hole Size Range of each expansion shell	Min Hole Size	Max Hole Size
Ø32 (Blue Sleeve)	33mm	35mm
Ø35 (Green Sleeve)	36mm	38mm

Notes

- Minimum order quantities may apply to this product
- Only Rocbolt South Africa components should be used to enable the full performance of the bolt system to be obtained

Non-tensioned Cable Bolt (NT)



The Non-tensioned cable bolt is an adaptive anchor. The purpose of the design is to allow the anchor to contour into drilled holes. Because the cable bolt is flexible it allows for angled installations, as well as installations that will not suit conventional anchor bolts. With the use of the multi bulb system, the resin is mixed thoroughly.

The Non-tensioned Cable Bolt is generally used as a second bolting system. The application from old worked mines or sections, intersections, entries and generally anywhere a cable support is needed. The Cable Bolt is also used in conjunction with the primary roof bolts. With the use of the multi-bulb system, the bolt can be fully anchored with either resin or grouting.

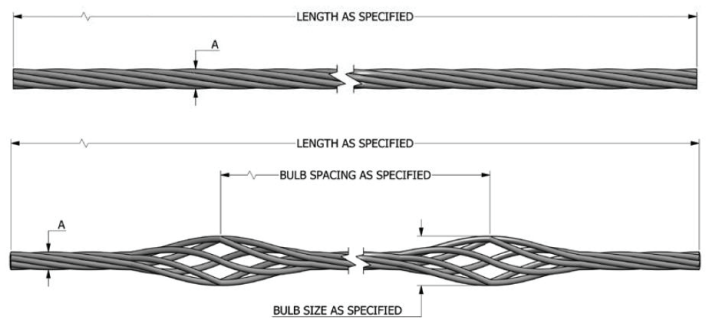
Features

- The Cable Bolt features a 15.24mm wire rope
- Stiffener tube for safe and effective installation
- Unique low seam barrel and wedge design that works in conjunction with the washer to attain the best possible installation flush to the rock face
- Hex Nut for use with standard spinning adaptors
- Length of cable specified by the customer
- Frequency of bulbs specified by the customer

Installation

The Non-tensioned Cable Bolt is designed to be as effective as possible, utilising existing technology to install. No extra equipment is needed. The bolt is installed as a roof bolt would be. Hole sizes are determined by bulb diameter.

Technical Data	
Nominal Cable Diameter, mm ² (in. ²)	15.24 (0.59)
Breaking Strength, kN (lbf)	240.2 (53.9)
Nominal Steel Area, mm ² (in. ²)	139.35 (0.216)
Nominal Mass, kg/1000m	1094
Minimum Load at 1% Extension, kN (lbf)	216.2 (48.6)
Normal Bulb Diameter, mm ² (in. ²)	22 - 23 (0.86 - 0.9)
Stiffener Tube Diameter, mm (in. ²)	21.4 (0.842)



Pigtail Eye Bolt

The pigtail eye bolt is threaded at one end to allow the use of an expansion shell, and is hot formed into an eye on the other end. The typical applications of the pigtail eye bolt is for suspension of cabling, ventilation, electrical, water piping and tooling. The two sizes of expansion units allow for a wider range of hole sizes to be used.



Features

- 3 leaf expansion shell
- Ø32mm and Ø35mm expansion shell may be used
- Large diameter of the “Eye” for ease of use
- Easy installation
- Long thread allowing maximum tension with the expansion shell on inner hole wall
- M16 thread
- No special tools needed for installation

Technical Data	
Thread Type	M16
Bar Diameter, mm (in.)	14.5 (0.57)
Min. Ultimate Load, kN (lbf)	78.5 (17.6)
Calculated Shear Strength*, kN (lbf)	44.6 (10.0)
Eye Diameter, mm (in.)	60 (2.51)
Lengths, mm (in.)	380 (15.0)

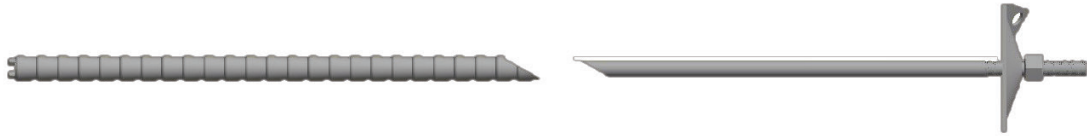
*Shear values calculated at 60% of U.T.S

Hole size range of each expansion shell	Min Hole Size	Max Hole Size
Ø32 (Blue Sleeve)	33mm	35mm
Ø35 (Green Sleeve)	36mm	38mm

Notes

- Minimum order quantities may apply to this product
- Only Rocbolt South Africa components should be used to enable the full performance of the bolt system to be obtained

YIELD-LOK Bolt



Overview

The YIELD-LOK bolt provides a two in one solution in areas with high seismic activity. It is primarily used to absorb energy through yielding at a pre-determined length. At a specific point, the bolt then provides additional support by halting the yield and holds a load until failure. The design of the YIELD-LOK bolt uses every aspect and strength of the bolt to ensure maximum performance for both loads that occur. With the unique head design on the bolt the resin capsules are mixed thoroughly providing the best results.

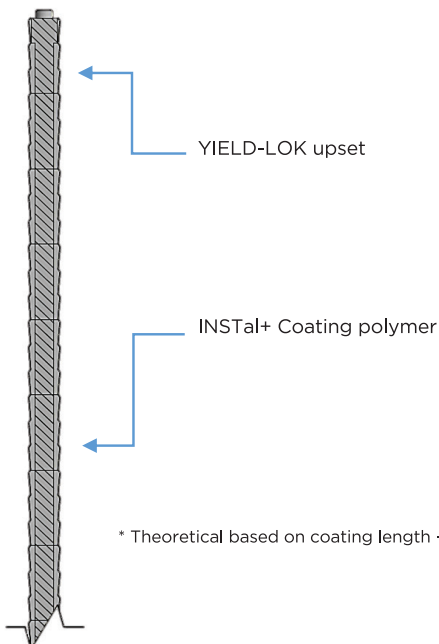
Extensive testing ensures that the performance is at its highest for the bolt. The YIELD-LOK bolt goes through vigorous quality checks before and after packaging.

Features

- The YIELD-LOK bolt is manufactured from high strength steel round bar. The round bar strength is crucial to the performance of the bolt.
- The round bar is covered with the INSTal+ Polyethylene material giving the YIELD-LOK bolt its unique performance. The Polyethylene coating allows the bolt to yield within, keeping the entire bar intact.
- The design allows for absorption of energy that is released from multiple seismic activities.
- Standard Hex Nut is fitted to the threaded end of the bar for easy installation purposes.

Advantages

- The design makes installation the same as any roof bolt.
- No special equipment needed
- High initial impact load
- Additional load point after yield
- Better resin mixing due to unique head design
- Larger Yield length across bolt
- No extra accessories are needed to install the bolt



Technical Data	
Bar Diameter, mm ² (in. ²)	18 (0.70)
Min Ultimate Tensile Load, kN (lbf)	200 (44.96)
Calculated Shear Strength***, kN (lbf)	120 (27)
Major Diameter, mm ² (in. ²)	29.4 (1.2)
Cross Sectional Area Major, mm ² (in. ²)	678.9 (1.05)
Typical Yield Point Static, kN (lbf)	140 (31.5)
Typical Yield Point Dynamic, kN (lbf)	150 (33.7)
Yield Displacement, mm* (in. ²)	650 (25.2)
Absorbed Energy Over 140mm, kJ**	19

* Theoretical based on coating length - Point loaded ** Dynamic tests Canmet Canada *** Shear values calculated at 60% of U.T.S

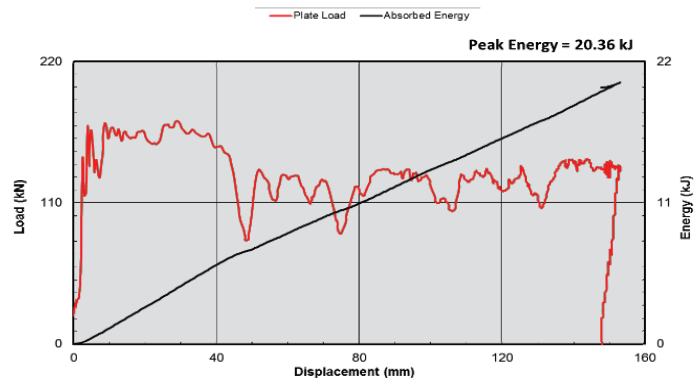
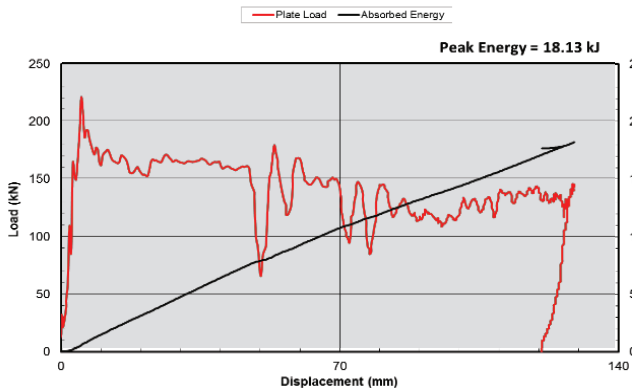
YIELD-LOK Bolt

TYPICAL TEST RESULTS

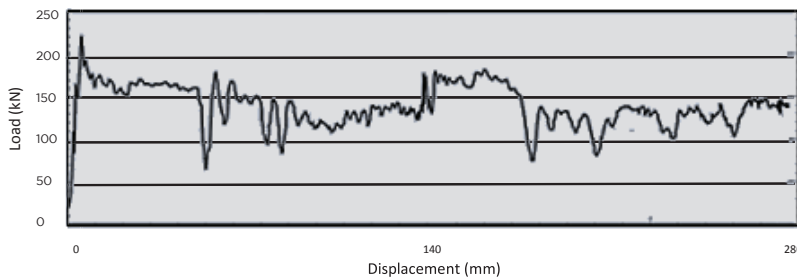
EXTERNAL DYNAMIC TEST RESULTS (CANMET)

Specimen RBT_STD Drop 1
 Mass = 1115.4kg; Height = 1.5m
 Energy = 16.4KJ; Velocity = 5.42m/s

Specimen RBT_STD Drop 2
 Mass = 1115.4kg; Height = 1.5m
 Energy = 16.4KJ; Velocity = 5.42m/s

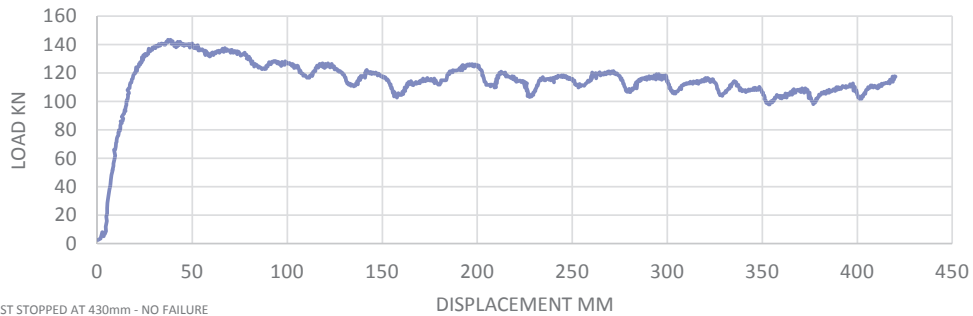


Drop 1 & Drop 2 Displacement Consolidated



IN HOUSE STATIC TEST RESULTS

Consolidated Results



Notes

- Minimum order quantities may apply to this product
- Only Rocbolt South Africa components should be used to enable the full performance of the bolt system to be obtained

Mineral Bond LV High strength silicate resin

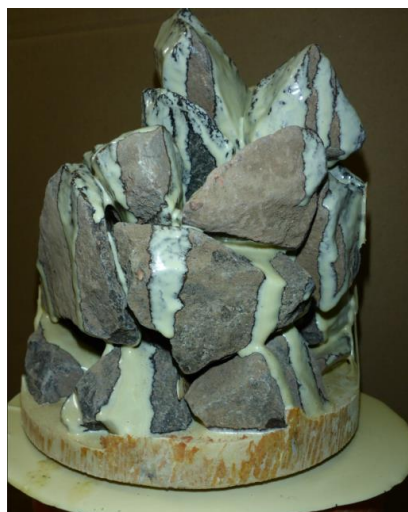
Mineral Bond LV is a 2-component, fast reacting and high strength silicate resin. It is suitable for grout stabilization (for heavily cracked rock mass), gas sealing and water stopping.

Components:

	Unit	Mineral Bond LV A	Mineral Bond LV B
Appearance	-----	Pale brown liquid	Dark brown liquid
Density at 20 °C	g/cm ³	1.45±0.05	1.21±0.05
Viscosity at 25 °C	mPas	250±90	200±90

Material properties:

	Unit	Mineral Bond LV
Foam Factor	----	1.0
Reaction Start Time	s	30-90
Reaction End Time	s	120-360
Max. Reaction Temp.	°C	< 110
Compressive Strength	MPa	> 40
Flexural Strength	MPa	> 20
Bonding Strength	MPa	3.9



The components Mineral Bond LV A and Mineral Bond LV B shall be pumped using a two component pump as commonly used in the mining and tunnelling industry with a volumetric ratio of 1:1.

It is recommend to use two static mixers of the type: M-10x360 (part no. M-10x360) or equivalent.

Components mixing ratios:

	Mineral Bond LV A	Mineral Bond LV B
by volume v/v	100	100
by weight m/m	100	87

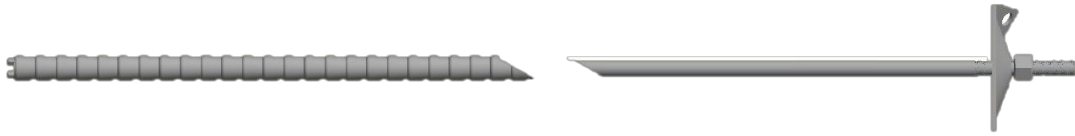
If components A and B are mixed at a different mixing ratio, the reaction time and mechanical properties may deviate from above specifications.

Both adhesive components are supplied in jerry can containers (other packaging is possible on the request). Recommended storage in dry and airy rooms at temperature range of 10 to 30 °C. The guaranteed shelf life from the date of manufacture is 12 months for Mineral Bond LV A and Mineral Bond LV B in original unopened packs (if stored according to the instructions).

Data presented in this document were obtained under laboratory conditions. Actual results under different conditions may slightly deviate from published data. A proper Material Safety Data Sheet for this product is available upon request.

Before an application, please contact with the supplier to confirm product usefulness at given application conditions.

Yield-Lok™ Bolt



Overview

The Yield-Lok Bolt provides a two in one solution in areas with high seismic activity. It is primarily used to absorb energy through yielding a pre-determined length. At a specific point, the bolt then provides additional support by halting the yield and holds a load until failure. The design of the Yield-Lok Bolt utilises every aspect and strength of the bolt to ensure for maximum performance for both loads that occur. With the unique head design and profile of the polymer coating on the bolt, the resin capsules are mixed entirely and thoroughly providing the best results.

Extensive testing ensures that the performance is at its highest for the bolt. The Yield-Lok Bolt goes through vigorous quality checks before and after packaging.

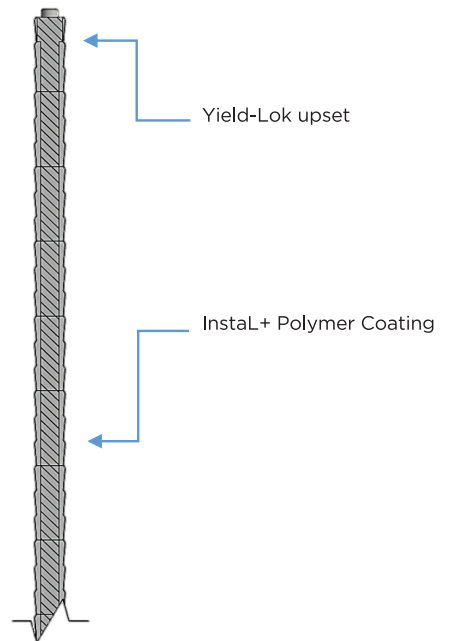
Features

- The Yield-Lok Bolt is manufactured from high strength steel round bar. The round bar strength is crucial to the performance of the bolt.
- The round bar is covered with the InstaL+ Polymer Coating material giving the Yield-Lok Bolt its unique performance. The polymer coating allows the bolt to yield within, keeping the entire bar intact.
- The design allows for absorption of energy that is released from multiple seismic activities.
- Standard Hex nut is fitted to the threaded end of the bar for easy installation purposes.

Advantages

- The design makes installation the same as any resin roof bolt
- No special equipment needed
- High initial impact load
- Additional load point after yield
- Better resin mixing due to unique head and polymer coating design
- Larger Yield length across bolt
- The polymer coating protects the bolt against the elements
- No extra accessories are needed to install the bolt

Technical Data	
Bar Diameter, mm (in.)	18 (0.70)
Min Ultimate Tensile Load, kN (lbf)	200 (44.96)
Calculated Shear Strength***, kN (lbf)	120 (27)
Major Diameter, mm (in.)	29.4 (1.2)
Cross Sectional Area Major, mm ² (in. ²)	678.9 (1.05)
Typical Yield Point Static, kN (lbf)	140 (31.5)
Typical Yield Point Dynamic, kN (lbf)	150 (33.7)
Yield Displacement, mm *(in.)	650 (25.2)
Absorbed Energy Over 140mm, kJ **	38.49



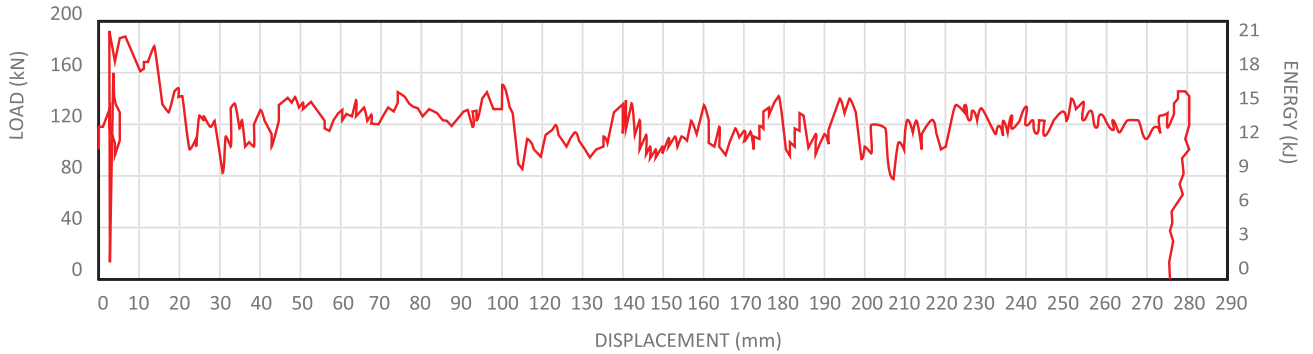
* Theoretical based on coating length - Point loaded
 ** Dynamic tests Canmet Canada
 *** Shear values calculated at 60% of U.T.S

Yield-Lok™ Bolt

TYPICAL TEST RESULTS

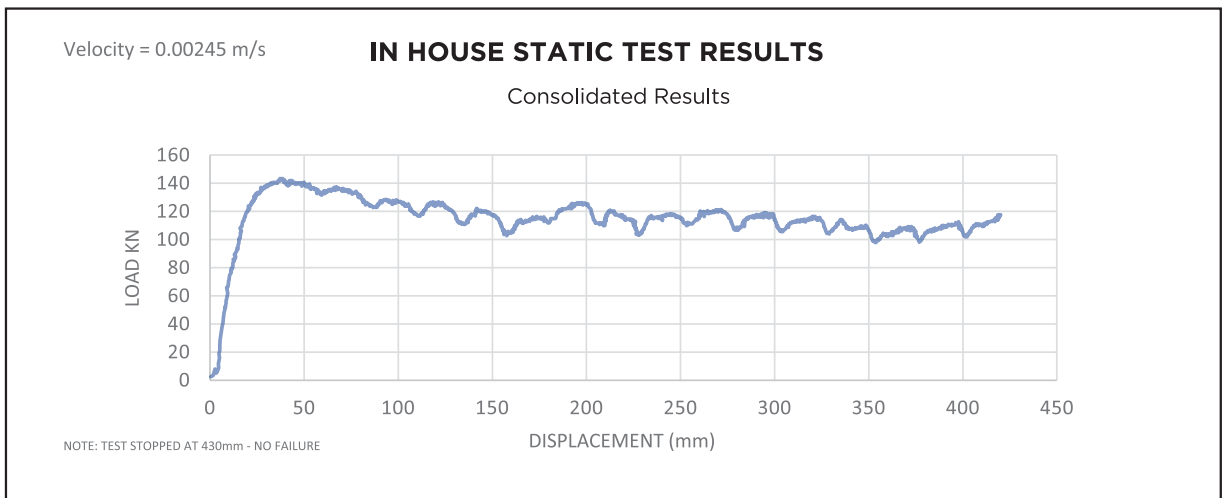
EXTERNAL DYNAMIC TEST RESULTS (CANMET)

SA Yield-Lok Bolt Performance
 Projected Energy Absorption on an Impact Load of
 ± 3.3 Tons = 47.19 kJ



Notes

Extrapolated Energy/Load vs Displacement based on Canmet tests set up as follows.
 Impact Energy = 16.4 kJ; Mass = 1115 kg Height = 1.5m; Velocity = 5.42 m/s



Notes

- Minimum order quantities may apply to this product
- Only Rocbolt South Africa components should be used to enable the full performance of the bolt system to be obtained