

Polyester Resin Anchoring System

Uses

Lokset Resin Capsules are used to anchor rock bolts and long tendons for roof support in mines and tunnels. They can be used with hydraulic and pneumatic type bolters.

Advantages

- Rapid anchoring of the bolt to the surrounding strata.
- High load transfers achieved almost immediately.
- Full column bonded bolts strongly resist the horizontal and vertical strata movements associated with convergence.
- Provides strength and rigidity to prevent sag by clamping the individual strata layers into a single high strength beam.
- Effectively seals wet, dripping holes and in most cases eliminates further deterioration of the hole and surrounding strata – unaffected by sea or fresh water, mild acids or mild alkalis.
- Resistant to anchorage failure caused by blasting or vibration.
- Easy to install.

Description

Each Lokset Resin Capsule is a two-compartment capsule that consists of a tube of polyester film clipped at both ends. One compartment contains resin, the other contains catalyst.

The Lokset Resin compound is thixotropic. This reduces viscosity during insertion of the bolt thus requiring relatively low force and torque. The uniquely size graded fillers assist with shredding of the film, mixing of the resin and, by interlocking with each other and the side walls of the hole, further increase stiffness.

Lokset Resin Capsules are for industrial use only and are intended for use in conjunction with tendons.

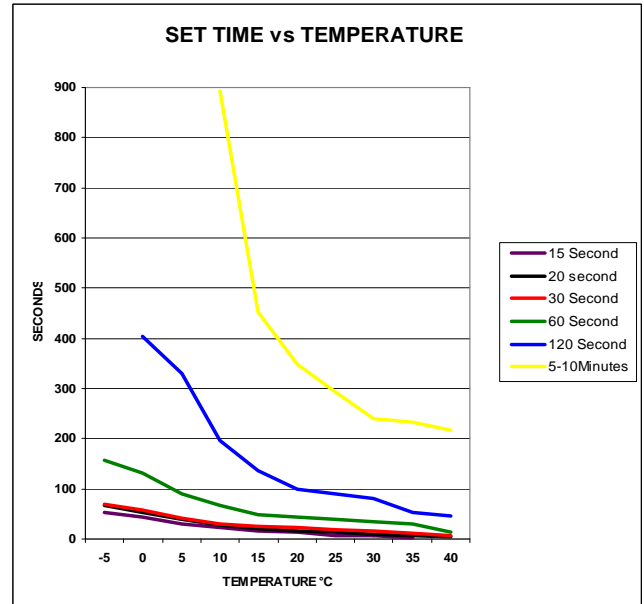
Specifications

Setting Times

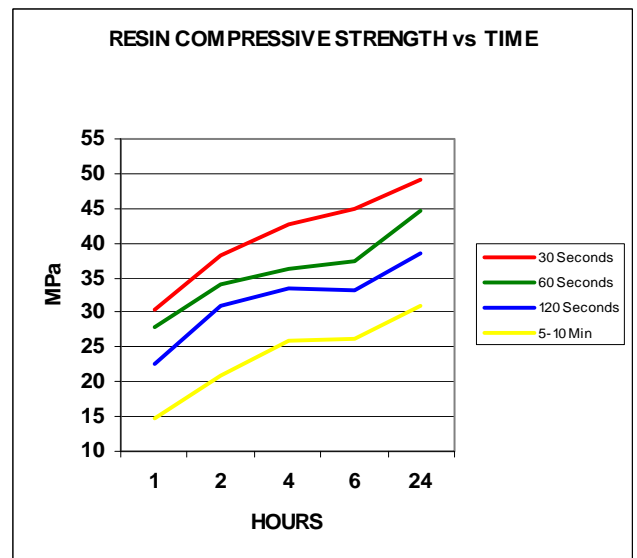
The standard set times are tabulated below. These meet most underground mine requirements. The set times are standardised at 20°C. The variation of set time with temperature is shown below. This variation should be taken into account when specifying resin for use in hot mines, or in colder areas in coal mines.

Colour Code	Set Time @ 20°C	Mixing Time 15-21°C
Purple	15 Sec	10 Sec
Red	30 Sec	10 Sec
Green	60 Sec	15 Sec
Blue	120 Sec	20 Sec
Yellow	5-10 min	20 Sec

Lokset 15 sec set-time capsules may be used as part of an approved "spin-to-stall" resin roofbolting system.



Resin Set Time vs. Temperature



Resin Strength vs. Cure Time (from start of mixing)

Capsule Dimensions

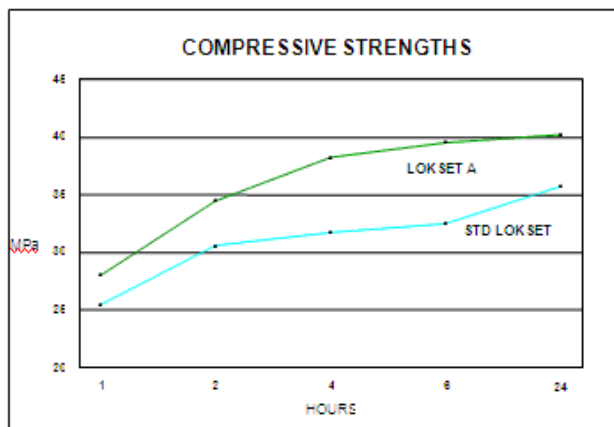
Capsule are available in standard diameters of 19mm, 21mm, 23mm, 25mm, 28mm, 32mm and 35mm. Stock capsule lengths are 380mm, 400mm, 450mm and 500mm, but other lengths can be manufactured.

Diameters (mm)		Cap. Dia	Cap. length	Cap. Volume	Cap./ box
Hole	Bolt	(mm)	(mm)	(cm ³)	
22 - 24	16	19	380	108	60
22 - 24	16	19	500	142	60
23 - 26	18	21	500	173	50
25 - 28	20	23	500	208	50
27 - 32	20	25	400	196	40
28 - 32	20	25	450	221	40
29 - 32	20	25	500	245	40
30 - 36	25	28	500	308	28
34 - 40	25	32	400	321	25
37 - 42	25	35	400	384	20
37 - 45	32	35	400	384	20

When calculating the volume of resin required to give the desired length of resin bond, increase requirements by 12% to allow for overdrilling.

Strength Grades

For applications requiring higher than normal strength, Lokset A resin is available for all set times. Please consult your Minova RSA representative when considering high strength systems, as special designs are necessary.



Application Instructions

(Please refer to a Minova RSA representative to assist with determining the correct bolt, hole and resin capsule parameters).

1. Insert the necessary resin capsules into the hole.
2. Push the bolt up the hole to at least 300mm from the collar. (Rotation of the bolt during this step is optional).
3. Rotary drills: rotate the bolt rapidly (250-750rpm) for the specified mixing time, while pushing the bolt home. Percussion drills: rotate the bolt 40-60 revolutions.
4. Hold for the required time (note effect of temperature on set times).
5. Do not rotate again as damage to partially gelled resin may result. The period of strength

development following set will vary, depending on set time and product temperature. The bolt may be tensioned after the required hold time.

Resin bolts should be installed as soon as possible in a newly exposed roof.

Note: -

For optimum results it is important to ensure careful control of:

1. Hole diameter, i.e. bit size.
2. Hole length, i.e. length of drill rod.
3. Use of sufficient resin to anchor the desired length of the bolt to the surrounding strata.
4. A minimum of 500mm of resin bond is recommended to ensure long-term anchor strength of end-anchored bolts.

Mechanised Mining

Modern mechanised mining equipment is capable of installing resin-grouted bolts safely, reliably and efficiently. Please consult your Minova RSA Representative to assist when considering strata-control methods to use with mechanised mining.

Storage

Shelf Life

The Lokset resin capsule shelf life is 4 months for capsules longer than 600mm, and 6 months for capsules 600mm and shorter when stored at 20°C. Storage at lower temperatures (0-5°C) such as in cool rooms is highly recommended and will extend the shelf life. Stock rotation is essential.

Storage conditions

Store in a cool, dry place away from direct sunlight. Do not double stack pallets. When using cool room storage the resin capsules should be allowed time to attain ambient temperature before use; otherwise SPIN and HOLD TIMES will be affected.

Quality Control

The superior quality of the Lokset resin bolt support system is assured through a four-part quality control program:

1. Raw materials testing.
2. In-process control tests.
3. Finished product acceptance testing.
4. Quality System Management to ISO 9000:2008 requirements.

Testing levels and specifications for each of the above programs have been established statistically, based on actual historical data, to ensure the customer receives a uniform quality product which will perform dependably under field conditions.

Lokset Resin Capsules carry the South Africa Bureau of Standards (SABS) mark, complying with SA Standard SANS 1534 – 1991

Precautions**Health and safety**

Wear suitable protective clothing, gloves and eye/face protection.

- In case of contact with skin remove contaminated clothing and wash with soap and water, seek medical attention if skin irritation persists.
- In case of contact with eyes, flush with copious amounts of water and seek medical assistance.
- If inhaled remove from exposure and seek medical advice if effects persists.
- If ingested wash out mouth with water and obtain medical attention.

Do not use in the vicinity of open flames, electric sparks, welding, cutting or any other source of ignition. See Product Safety Data Sheet for flammability and toxicity information.

Technical Support

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

Additional Information

Minova RSA is a specialist in the supply of high performance products for the mining and tunnelling industries.

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

Lokset is a registered trademark of Minova international Limited.

Important Note

Minova RSA products are guaranteed against defective materials and manufacture and are sold subject to its standard terms and conditions of sale, copies of which may be obtained on request. Whilst Minova RSA endeavours to ensure that any advice, recommendation, specification or information it may give is accurate and correct, it cannot, because it has no direct or continuous control over where or how its products are applied, accept any liability either directly or indirectly arising from the use of its products, whether or not in accordance with any advice, specification, recommendation or information given by it.

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