Lokset® Resin Capsule TOOSPEEDIE®

Reinforced two speed polyester resin anchor

Uses

The Lokset TOOSPEEDIE Resin Capsule is used as an anchoring medium for rockbolts and long tendons to provide primary roof and side wall support in mines and tunnels. It can be used with both Hydraulic and Pneumatic type bolters.

Advantages

Fast and slow speeds each colour coded in one capsule provides the following advantages:

- Reduced handling
- Reduced wastage
- Rapid insertion, easy and quick to use
- Helps ensure fast end of capsule inserted first
- Guarantees both fast and slow set capsules are installed
- Both speeds compatible giving reduced back pressure and easier penetration
- No plastic or cardboard joiners required
- Allows roof bolt to be pretensioned quickly
- A unique design of capsule configuration enabling extremely effective mixing of resin mastic and catalyst compartments
- Acts as a reinforcement that clamps the individual strata layers together into a single high strength beam

A specially formulated resin mastic and catalyst paste to give:

- Higher compressive strength
- Higher modulus
- Higher push and pull out strengths
- Shorter installation times
- Unaffected by vibration
- No expansion stresses, can be used in weak strata
- Protects bolt from corrosion, can be used in wet or underwater conditions.

Description

The Lokset TOOSPEEDIE Resin Capsule consists of accurately proportioned fast and slow speeds, reinforced, thixotropic polyester resin mastic in one compartment. The other compartment contains an organic peroxide catalyst separated by a physical barrier. The capsule is available in either a 40:60 or 50:50 ratio of fast:slow speeds. The rotation of the bolt during installation ruptures the capsule, shreds the skin and mixes the two components causing a chemical reaction and transforming the resin mastic into a solid anchor.

Technical support

Minova Australia, together with your local distributor offers a complete technical and field support service.

Properties

Set time

Typical insertion properties at 25°C are as follows:

Fast:Slow ratio		Approx. Spin time (secs)	Approx. Hold time (secs)
50:50	XFast/Medium	11	12-19
50:50	Super Fast/Slow	11	10-60
50:50	XFast/Slow	12	12-60
50:50	Fast/Slow	14	12-60
50:50	Medium/Slow	16	19-60
40:60	XFast/Slow	12	12-60
40:60	Fast/Slow	14	15-60
40:60	Medium/Slow	16	19-60

The hold time is the **approximate** time allowed after completion of the spin time before bolt tensioning is attempted. Total hold time should not exceed 60 seconds where Slow set resin is used as the slower component (eg TS100025FS) and 19 seconds where Medium set resin is used (eg TS88025XFM).

The times listed are an indication only, they may vary with temperature, mining conditions, equipment, hole:bolt annulus, age and storage conditions of resin capsules. Each mine site should be evaluated to determine optimum installation parameters.

For further information on capsule types, size and speed consult Minova Australia or your local distributor.

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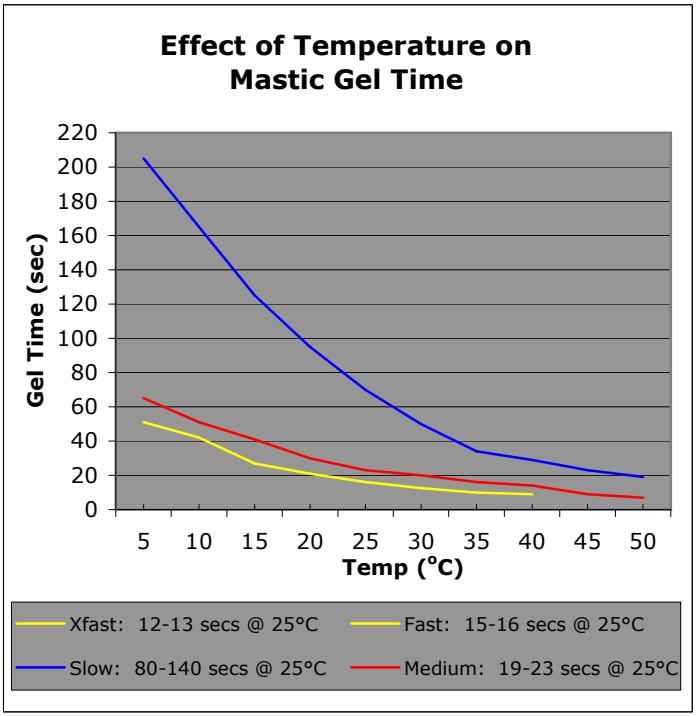


Compressive strength

Tested on 40 mm cubes with slow set resin in accordance with BS 7861:Part 1:1996 (Strata reinforcement support system components used in coal mines: Part 1, Specification for rockbolting). Typical results:

Age (hours)	Uniaxial compressive strength (MPa)
24	> 60

Youngs modulus

Tested on 2:1 aspect ratio cylinder with slow set resin by BHP Engineering. Typical results:

Age (hours)	Youngs modulus (GPa)
24	> 6.5

Push out test

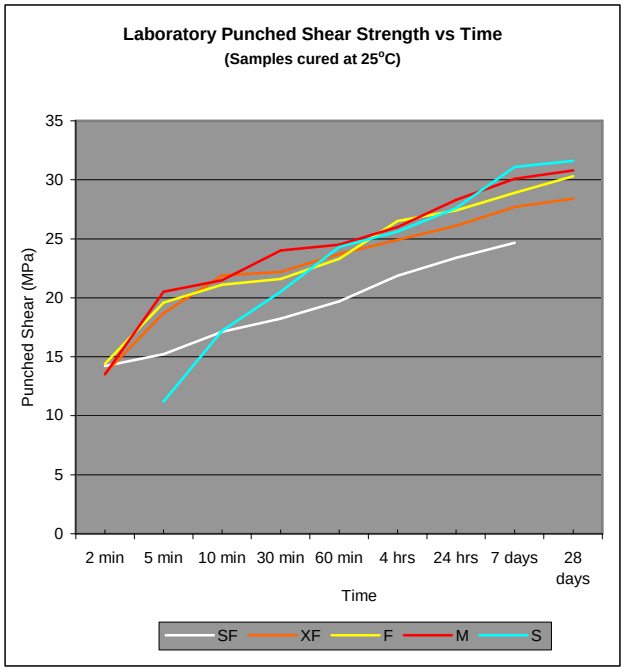
Measured on 22 mm bolt, encapsulated to 50 mm depth in 28 mm I.D. threaded cylinder, with slow set resin. Typical results:

Age (hours)	Push out force (kN)
24	> 72

Punched Shear

Measured according to BS 2782 (part 3). The appropriate quantities of resin mastic and catalyst are mixed together for six (6) seconds. The resultant mixture squashed between two uniform flat steel plates and allowed to gel. The plates are taken apart and the cured slice of resin is placed between two steel templates. The device is placed in a tensiometer and a plunger is forced into a hole in the plates at a predetermined rate thus pushing a flat circular disc out of the resin slice (ie shearing the resin). The force applied to shear the resin is recorded electronically by the tensiometer and converted to shear stress in MPa using the thickness of the disc in mm.

This test provides excellent correlation with mine pull out tests (without the variances) and is directly related to the strength of the resin. With fast setting resins the test can be performed in a very short time after the resin mixture has gelled (15 seconds).



Application instructions

It is essential that good bolting procedures are followed and the instructions on the box are observed. As a guide the following steps must be taken:

1. Drill hole to correct diameter ensuring water/air flush is used. The hole should be clean and free from dust and other loose particles. In Coal mining 27- 28 mm hole diameters are normally preferred with 22 mm core diameter roof bolts. Do not exceed the manufacturers recommended diameter.
2. Drill hole to correct length for bolt. The ideal hole length should be 100 mm shorter than the bolt. Do not deviate from the manufacturers recommended length of hole in relation to the bolt.
3. Select the correct resin capsule that has been specified for the job
4. Check that the use by date on the box label has not expired.
5. Insert one TOOSPEEDIE capsule, yellow (FAST) end first, (for SUPERFAST/SLOW, XFAST/MEDIUM, FAST/SLOW and XFAST/SLOW) or red (MEDIUM) end first (for MEDIUM/SLOW). Push it gently all the way until the capsule touches the top of the hole using the bolt (or other insertion device if available).

   ENSURE THE CAPSULE REACHES THE TOP OF THE HOLE

   UNDER NO CIRCUMSTANCES SHOULD THE TOOSPEEDIE CAPSULE BE INSERTED UPSIDE DOWN

   The correct length, diameter and ratio of FAST:SLOW components are selected to enable full column encapsulation. Should insertion problems occur then the problem must be investigated.
6. Connect the bolt to the spinning dolly/spanner.
7. The bolt is pushed **AND** spun at maximum rpm at a constant feed rate through the entire length of the capsule, when the top of the hole is reached a further 2-4 seconds spinning will suffice to ensure complete mixing. Total spin time through the capsule and at the top of the hole should not exceed the "approximate spin time" on the box label. It is essential the bolt is pushed **AND** spun to the top of the hole before mixing is completed.

   Note: Penetration time through the capsule to the back of the hole should be greater than 8 seconds.
8. **DO NOT OVER MIX THE RESIN**. If mixing continues beyond the recommended spin time and into the gel time, the solidifying chemical may be ground up and destroyed.
9. The bolt is then held stationary and after the hold time has elapsed the bolt may be tensioned as required. The hold time is the **approximate** time allowed after completion of the spin time before bolt tensioning can be attempted. Total hold time should not exceed 60 seconds where Slow set resin is used as the slower component (eg TS100025FS) and 19 seconds where Medium set resin is used (eg TS88025XFM).
10. The following items must also be checked where hand held (air operated) equipment is utilised:

- Compressed air supply should be clean and dry
- Air supply from roof bolter to miner should not be more than 100 metres of 2" hose
- Air pressure must be between 85-100 psi (586-690 KPa) when bolter(s) are operating
- Water pressure should be between 80-90 psi (550-620 KPa) and hoses flushed out prior to connection

Consult Minova Australia or your distributor for further information.

Limitations

The annular gap between bolt and hole diameter should be at a minimum. It is recommended the annular gap be between 4-6 mm eg:

Bolt core diameter	:	22 mm
Hole diameter	:	27 mm
Annular gap	:	5 mm

Where annular gaps larger than this are encountered (eg in Hardrock mines) then the bolt must possess larger deforms or a mixing device such as Posimix wire or Paddles etc and the installation guidelines followed. Larger hole diameters/annular gaps may result in extended cure times, less efficient mixing, finger gloving of the bolt into the resin capsule, a reduction in load transfer (strength), a reduction in encapsulation length.

In all cases it is strongly recommended that short encapsulation pull tests be performed to verify that required load strengths are achieved.

Extended tensioning times may be due to:

- Low temperatures
- Broken ground
- Large hole diameters
- Insufficient spinning
- High nut break out loads
- High machine torque load levels
- Excessive thrust/feed on the installation rig

The resin appearing to be "too quick" with the bolt not reaching the top of the hole may be due to:

- High temperatures
- Smaller diameter holes
- Hole closure
- Angled holes
- Misaligned holes/rigs
- Low feed pressure
- Premature nut break out
- Old/out of date resin

All bolting parameters will vary depending on a number of factors such as:

- Strata condition/type
- Temperature
- Hole:bolt annulus
- Age of resin capsule
- Equipment
- Installation method

Consult Minova Australia or your distributor for further information

Estimating

Packaging

Lokset TOOSPEEDIE resin capsules are available in lengths from 880 to 1500 mm, diameters 25 mm "nominal" (actual 23.6 mm), 26 mm, 30 mm and 38 mm, packed in cardboard cartons labelled with colour codes and supplied on wooden pallets.

X2 TOOSPEEDIE Resin Capsules

X2 capsules are available for use with the QUICK-CHEM or other installation systems if required. E.g. TS120026MSX2 (1200 mm of Medium set connected to 1200 mm of slow set, giving a total capsule length of 2400 mm) capsule folded in half for packaging.

Contact Minova Australia or your local distributor for further information.

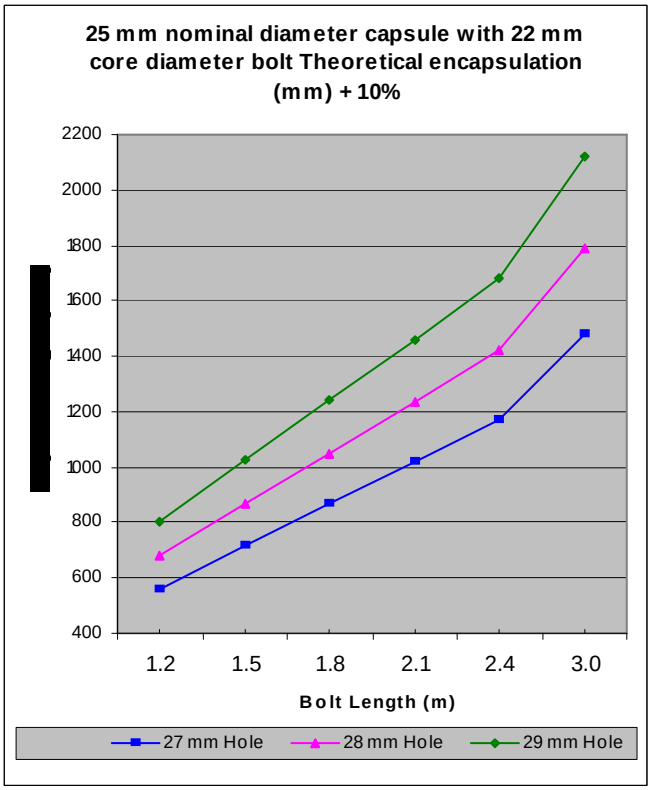
Volume

It is essential the correct length of capsule is selected to fill the volume left in the hole after allowing for the volume of the bolt.

It is good practice to use a capsule size which exceeds this volume by around 10% to allow for variations in hole diameter and length, bolt size and strata conditions.

Consult Minova Australia for further information on encapsulation, refer Minova web site for resin encapsulation sheet.

The following example is given as a guide:



27mm Hole	561	714	867	1020	1172	1478
28mm Hole	680	866	1051	1237	1422	1793
29mm Hole	804	1023	1243	1462	1681	2120

Storage

Shelf Life

The Lokset TOOSPEEDIE resin capsule suggested shelf life is 4 months when stored between 20 - 25°C. Storage at lower temperatures such as in cool rooms is highly recommended and will extend the shelf life when stored at 0 - 5°C. Stock rotation is strongly recommended. Storage at higher temperatures will severely reduce shelf life.

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 extended.

Quality

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

1. Raw Material Testing
2. In-process quality control testing
3. Finished product acceptance testing
4. Quality system management to ISO 9001

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.

Precautions

Health and safety

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

- In case of contact with skin remove contaminated clothing and immediately 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 persist.
- If ingested wash out mouth with water and obtain medical attention.

For further information see the relevant material safety data sheet, copies of which are available on our website.

Additional information

Minova Australia offer a comprehensive range of strata control products, all of which have been developed after extensive research and testing on a global scale via our international network of operations. These products include:

- Resin anchor systems
- High yield grouts and foams
- High volume output grouts
- Monolithic chock systems
- High performance cable bolt grouts
- Polyurethane resin systems
- Binder systems and accelerators for backfilling
- Pre-packaged high build spray cements
- Sprayable coatings for ventilation control
- Water stop grouts
- Ventilation Formwork Systems including: Meshblock, Gunmesh, Tecmesh and Tecplastic
- Grout Mixers and Batchers both air and hydraulically operated
- Contract Installations
- Flexible membranes for strata support and waterproofing applications

If further information is required consult Minova Australia

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