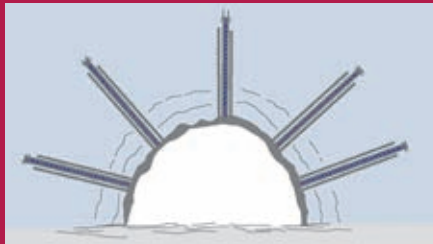


## IBI - Self-drilling Anchor



## System Components IBI - Self-drilling Anchor



### Field of application

IBI Self-drilling Anchors are successfully used for reinforcement ahead of the tunnel face in terms of spiles or spile umbrella support, additional reinforcement, and supplementary anchor works. Main applications are:

#### ■ Tunneling and Mining

- Reinforcement ahead of the face
- Reinforcement of large underground structures, widening of tunnel cross-sections
- Face anchoring
- Foot piles
- Tunnel portals, trenches, and cut and cover areas

#### ■ Special Foundations

- Rehabilitation and rapid protection of unstable slopes
- Buoyancy control of foundations – grouted piles

## System Components IBI - Self-drilling Anchor



**IBI - anchor bar**  
with left-handed thread



**IBI - coupling**  
with continuous outside-thread  
and middle stop

### IBI - drill bits

IBI - drill bits (including threaded piece) are by default available with carbide inserts. Drill bits in different designs and diameters are available on request.



**Arc-shaped drill bit**  
with 3 buttons  
R32/R38, Ø 76 mm



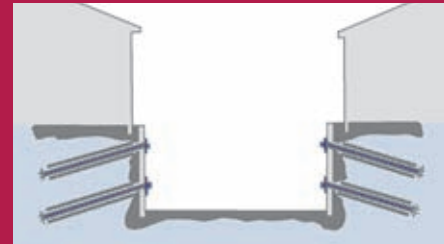
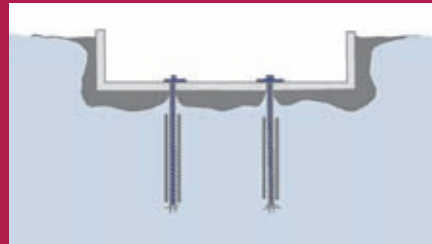
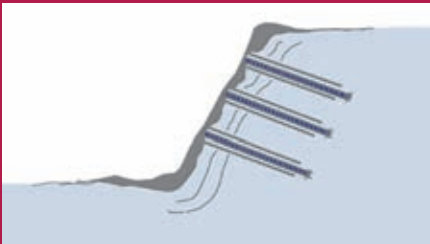
**Button bit**  
R32, Ø 51 mm



**Button bit**  
R32/R38, Ø 76 mm



**Arc-shaped drill bit**  
with 3 buttons  
R38, Ø 90 mm

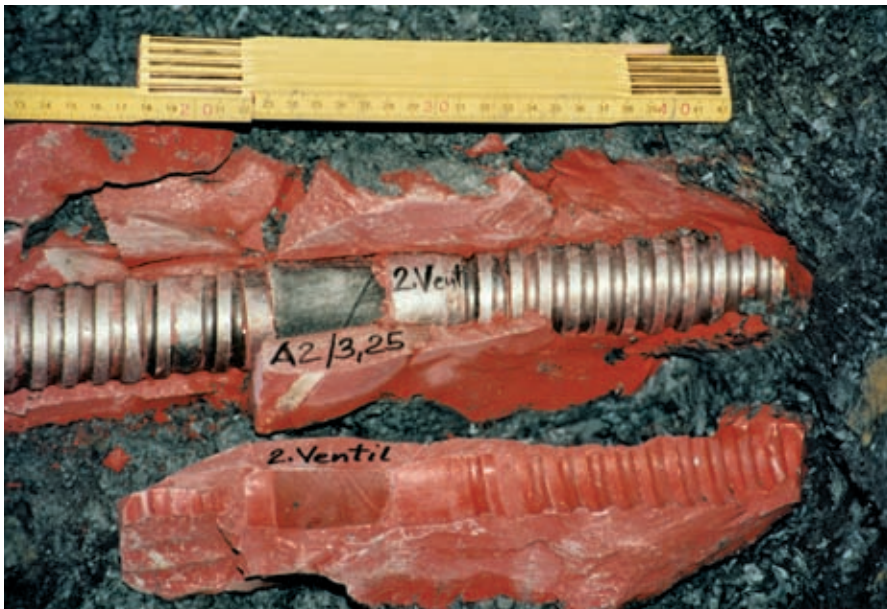


## System Description IBI - Self-drilling Anchor

- Hollow bar anchor with continuous cold-rolled thread
- Application as injection anchor without casing, especially for non-stable boreholes
- Self-drilling installation, utilization of the anchor bar as drill rod with a single-use drill bit
- Easy extension of the anchor bars by couplings
- Grouting or development of the grout body either simultaneously with drilling using a rotary injection adapter or afterwards
- Assembly of the anchor head with the anchor plate and the nut; stressing and locking of the anchor bar with a torque wrench or hydraulic jack after the grout has cured
- IBI - Self-drilling Anchor with post-injection technique: subsequent re-injections with IBI - post-grouting couplings
- Compatible flow-pressure meter available

### Prime advantages of the IBI - Self-drilling Anchor

- Easy and similar operating principle for different rock mass and soil conditions
- Drilling, installation, and injection of the IBI anchor in one single operational step
- Systematic re-injections with IBI - post-grouting couplings ensure an optimum ground improvement
- No pre-drilling of a borehole by using a casing tube and extension rods with subsequent anchor installation necessary
- Minor space requirement for the accomplishment of anchoring
- Optimized machinery and manpower requirements
- Basic dimensioning of the required anchoring forces by choosing the appropriate anchor type
- Functional adjustment of the required anchor lengths using couplings
- Optimum bonding of the profiled anchor rod and the grout
- Adjustment of the IBI - drill bit design and diameter to different rock mass and ground conditions
- Controlled and documented injection or development of the grout body by the usage of the AT - Flow-Pressure Meter



## Specifications

Anchor type	Unit	R 32/42	R 38/51
Outer diameter	[mm]	42,5	51
Max. tensile load	[kN]	250	500
Yield load	[kN]	220	420
Weight	[kg/m]	4,7	7,0

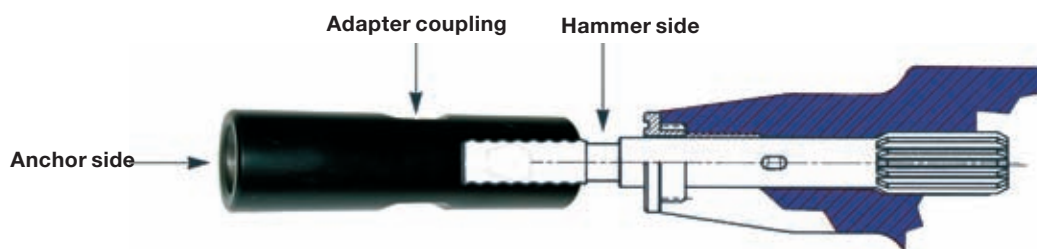
Standard lengths IBI – anchor bar	[mm]	2000	3000	4000
Dimensions IBI – anchor plate	[mm]	200 x 200 x 10	200 x 200 x 12	200 x 200 x 30

## AT - RIA Rotary-Injection-Adapter

Optimum grouting body warranted

IBI - Adapter coupling

- Simultaneous drilling and grouting



### Advantages

#### AT - RIA Rotary-Injection-Adapter

- Anchor installation and injection in one operation
- Stabilization of the borehole during anchor installation
- Complete and uniform covering of the anchor rod with grout over the whole length
- Simple switch over from flushing to injection medium at the end of anchor installation without uncoupling



Connection flushing /  
injection medium

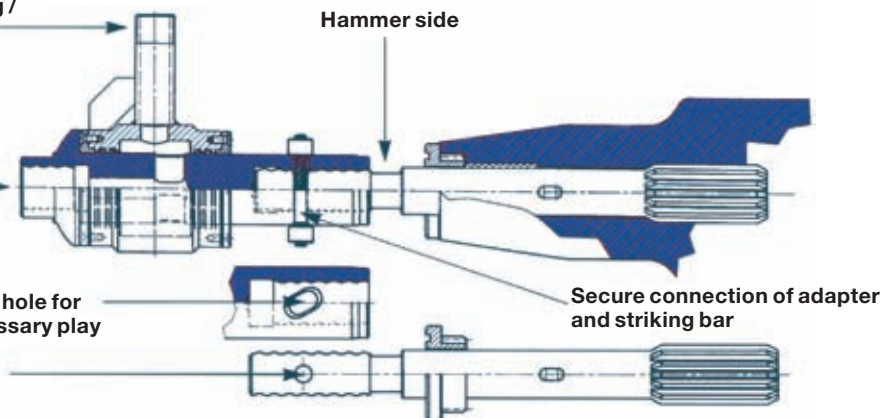
Hammer side

Anchor side

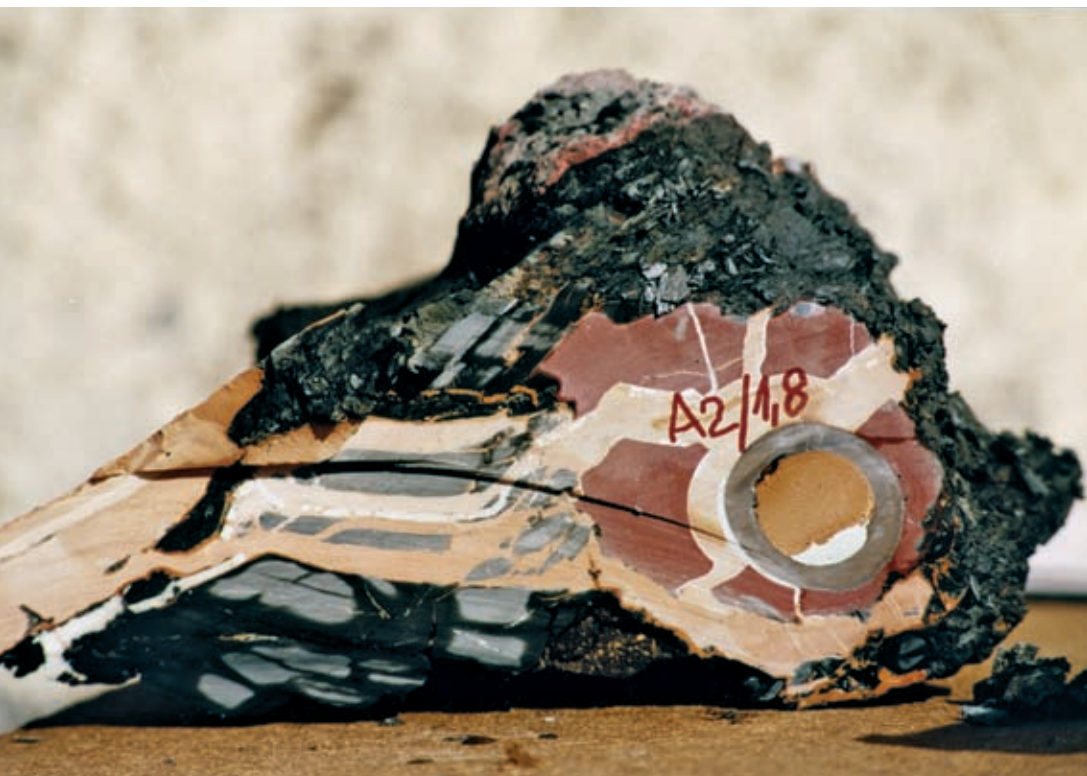
Long hole for  
necessary play

Secure connection of adapter  
and striking bar

Same hole as in  
the striking bar



## AT - RIA Rotary-Injection-Adapter



Cross-sectional view IBI - Self-drilling Anchor R32/42 with two post-grouting couplings, installed using an AT - RIA Rotary-Injection-Adapter with double re-injection. The primary injection (RED) completely encloses the anchor. This primary injection has been burst by the second and third injection (WHITE and OCHER). Thereby the grout body in the range of the post-grouting couplings was enlarged and the ground furthermore improved. The injection channel was washed out with water after the first and second injection.

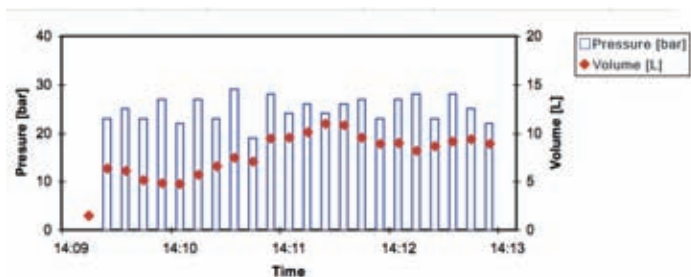
## AT - Injection Flow-Pressure Meter

### Controlled injection with the AT - Injection Flow-Pressure Meter

- Accurate and comprehensible documentation of the ground improvement
- Comprehensible control of given injection stop criteria
- Easy operation via a touch-screen
- Digital data recording of flow and pressure for every single injection hole
- Data readout over a serial interface
- Evaluation of the raw data on a PC

### Example data recording

<b>Company</b>	ALWAG
<b>Operator</b>	Supervisor
<b>Nominal pressure</b>	12,0 bar
<b>W/C ratio</b>	1,0
<b>Nominal volume</b>	550 L
<b>Total grouting volume</b>	101 L
<b>Total time</b>	237 sec
<b>Date</b>	2002-09-01
<b>Time</b>	02:09 PM
<b>Anchor station No.</b>	6
<b>Borehole No.</b>	25
<b>Borehole segment No.</b>	10
<b>Recording interval</b>	10 sec



## AT - Mortar-Mixing Pumps

For injection and infilling works, ALWAG recommends mortar-mixing pumps of the type M400 NT and M400 EASY. Accessories and other types of mortar-mixing pumps are available on request.

### Characteristics of AT - Mortar-Mixing Pumps

- Tough design and galvanized pump-casing
- Low empty weight
- Simple operation and maintenance due to modular design
- Low start-up and cleaning times
- Minor breakdown susceptibility
- Low filling and overall height
- High delivery rate at continuous pressure
- Variable discharge
- All-purpose equipment



### Specifications

Parameter	Unit	M400 NT	M400 EASY
Nominal power	[kW]	6,2	4,5
Power supply	[V / Hz]	400 / 50	400 / 50
Min. requirement power set	[kVA]	16	16
Electrical connection	[A]	3 x 12,1 (5-pole)	3 x 9,5 (5-pole)
Min. fuse protection	[A]	3 x 32	3 x 16
Flow rate <sup>1)</sup>	[l/h]	400-2000	400-2000
Max. delivery range	[m]	60	40
Max. operating pressure	[bar]	40	40
Length x width x height	[mm]	1730 x 570 x 960	1520 x 585 x 900
Total weight	[kg]	217	136

1) Depending on the W/C ratio, consistency, and grain size distribution of the material as well as the delivery range



M400 EASY



M400 NT

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