

## RESIN (CHEMICAL) ANCHORED ROCK BOLT ASSEMBLIES

### GENERAL DESCRIPTION

Rock bolt assemblies for resin anchoring (chemical anchoring) comprise the stud, nut, bearing plate washer and a selection of accessories and modifications which can be configured to suit particular installation and rock support requirements. Rock bolt assemblies are packaged as complete, ready-to install units.

### CONFIGURATION OPTIONS

#### BAR OPTIONS

TYPE*	DIAMETER	LENGTH**	THREAD	THREAD LENGTH
Step Bar™	14.5 mm	0.5 m to 3.0 m	16 mm DIN 405	110 mm
Step Bar™	16 mm	0.5 m to 3.0 m	18 mm DIN 405	110 mm
Step Bar™	18 mm	0.5 m to 3.0 m	20 mm DIN 405	110 mm
Step Bar™	20mm	0.5 m to 3.0 m	22 mm DIN 405	110 mm
High Step Bar™	20 mm	0.5 m to 3.0 m	22 mm DIN 405	110 mm
Rebar	25 mm	0.5 m to 3.0 m	M24 metric	110 mm

\* Recommended for resin anchoring. Other bar types available on request

\*\* Non standard lengths available on request

#### BEARING PLATE (WASHER) OPTIONS

TYPE	SQUARE SIZE	THICKNESS	HOLE SIZE
Flat	100, 125, 300 mm	4.5, 5.0, 6.0 mm	As per bar diameter requirements
Domed dog ear	125, 150 mm		As per bar diameter requirements
Ribbed dog ear	125, 150 mm		As per bar diameter requirements
Flat Dog ear	125, 150 mm		As per bar diameter requirements

#### NUT OPTIONS

NUT TYPES	Plain, Flange, Crimp
ACCESSORIES / MODIFICATIONS	Shearpin, , Torque Indicator, Spherical seat, Foskote, and nibbed bar

### COMPONENTS

#### Stud (Threaded Bar)

The stud portion of the Rock Bolt Assembly comprises the steel bar with a mechanically applied thread at one end. Bars with 14.5 mm to 20 mm core diameters have cold rolled DIN 405 thread profiles. This combination of cold rolling and DIN 405 profile ensures that no strength is lost in the threaded zone, especially as the thread diameter is nominally 2 mm greater (rolled up) than the core diameter. Thus a 16 mm bar has an 18 mm thread; a 20 mm bar has a 22 mm thread. The DIN 405 standard maximises the material within the body of the thread, providing high shear strengths.

The 25 mm rebar studs are peeled and equipped with a rolled Metric 24 mm thread.

For resin anchoring STEP BAR™ and HIGH STEP BAR™ have been designed specifically to maximise adhesion and system stiffness in small and large annulus holes respectively (please refer to the "Mining Bars for Rock Tendons" Product Information Sheet).

## Bearing Plate Washer

Bearing plate washers serve to provide “areal” coverage at the point of installation. The three basic types are flat, domed and ribbed. All are square. Dimensional choice exists as to the plate thickness, hole diameter and square size. Flat washers are undifferentiated; domed washers have a hole size much greater than the bar diameter, allowing the washer to pivot for installations where the stud is not normal to the washer plate; and ribbed washers have hole sizes similar to the bar diameter for square (normal) installations. The presence of ribs or dome increases the strength of the plate.

## Nuts

Nuts may be plain or flanged, left or right thread, crimped or uncrimped. Under load the nut thread fails below the ultimate tensile load of the bar, but well above the yield load of the bar. Thus it can be expected that the nut will strip and pull off before the threaded portion of the stud fails. Crimp nuts are equipped with a deformation which resists the nut turning on the thread until a predetermined torque is achieved, thus providing similar functionality to that of the shear pin (lower torque). Copper inserts provide similar functionality.

## Spherical Seats

Also referred to as “Dome Balls”, spherical seats are used between the nut and the dome of a domed washer to allow the washer to articulate (ball and socket effect). This enables the washer to locate at the correct angle. The hole in the spherical seat approximates the diameter of the bar to prevent excessive free movement of the bar.

## Nibs

Nibs are deformities applied to the thread near the end of the stud which prevent the nut from unscrewing. These are used in reverse-spin applications where the resin is mixed by spinning in one direction and tensioning in the opposite.

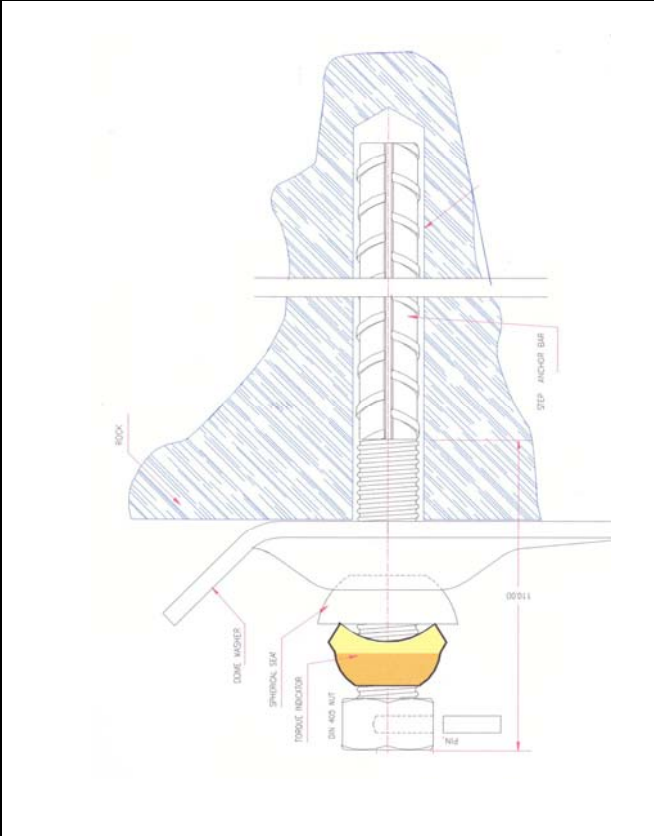
## Shear Pins

Shear pins are provided for unidirectional spinning applications, enabling resin mixing and tensioning in one continuous operation. Shear pins are inserted radially through the nut, locating within the bar at right angles to the longitudinal axis. The anchor rotates in order to mix the resin components; when resistance during gelling reaches a pre-determined torque the pin shears, freeing the nut to run up the thread and tension the installation.

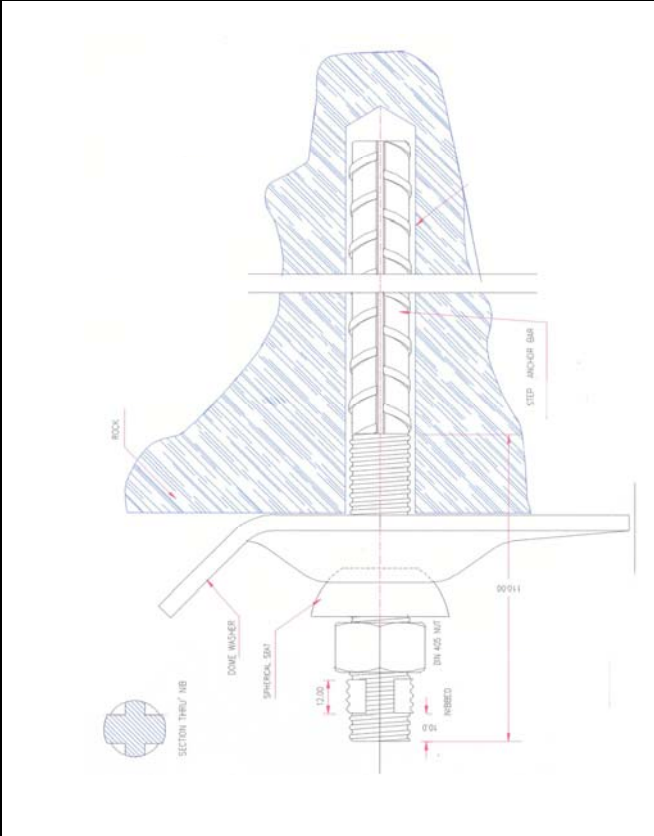
## Torque Indicator

Torque Indicators are located between the nut and bearing plate washer and serve to indicate at a glance whether a minimum load has been achieved on an installation. Comprising simple domed and profiled steel plates, they crush during tensioning, causing spreading and flattening. Failure to crush indicates a sub-standard installation.

APPEARANCE



**Schematic STEP BAR assembly showing domed washer, spherical seat, torque indicator and plain nut with shear pin**



**Schematic STEP BAR assembly showing domed washer, spherical seat, and plain nut with ribbed bar**



**20 mm STEP BAR assembly with ribbed washer and plain nut**



**25 mm REBAR assembly with domed washer and spherical seat**