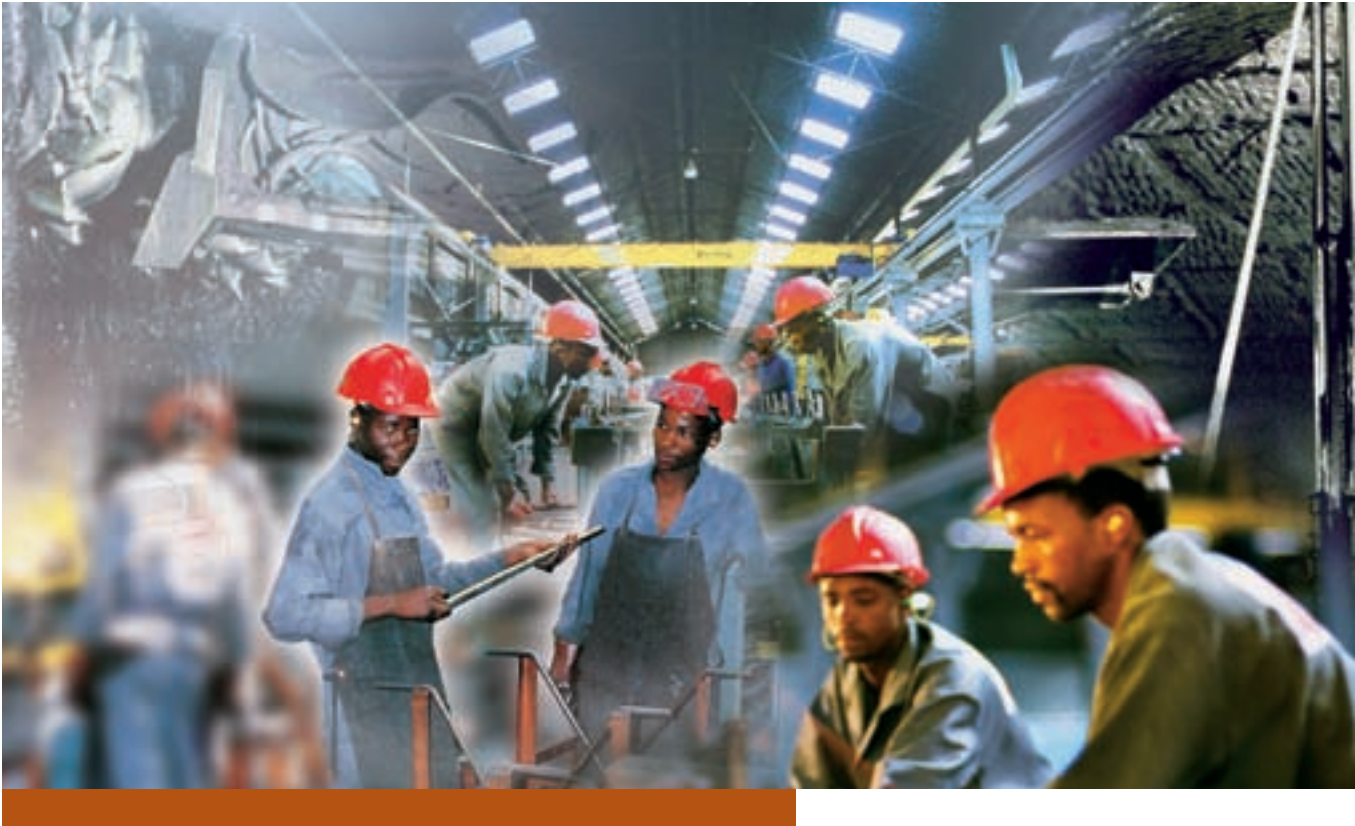


Products & Systems for Mining



DYWIDAG-Systems International Pty.Ltd. is South-Africa's leading manufacturer & supplier of mining products to the underground mining sector.

Housed in a 5,000 m² factory, DSI South-Africa is located in the center of the South African mining area. At present the company employs more than 60 people working in production and another 15 in administration. The business combines the mining expertise of DSI worldwide — especially from Australia — with the detailed local market knowledge of local partners.



Thus DSI is in the strategic position to offer best conditions to supply global mining companies on a general agreement basis. A full portfolio of strata-support products and systems is manufactured in the facility including friction anchors, resin roof bolts, deformed and flat anchor plates, fully threaded and headed rebar bolts as well as cable bolts.



DYWIDAG-Systems International Pty. Ltd. supplies products to coal, gold, platinum and diamond mines all over South Africa. Among its most important clients are BHP Billiton, Sasol Mining, Anglo Platinum, De Beers, Anglo Gold and New Coal.

Significant supply contracts with mining operators have already been secured. For the future, the business is destined to make a significant impact in the South African Mining Industry. The staff of DYWIDAG-Systems International Pty. Ltd. in South Africa is looking forward to offering its customers individual solutions using innovative products of high quality.



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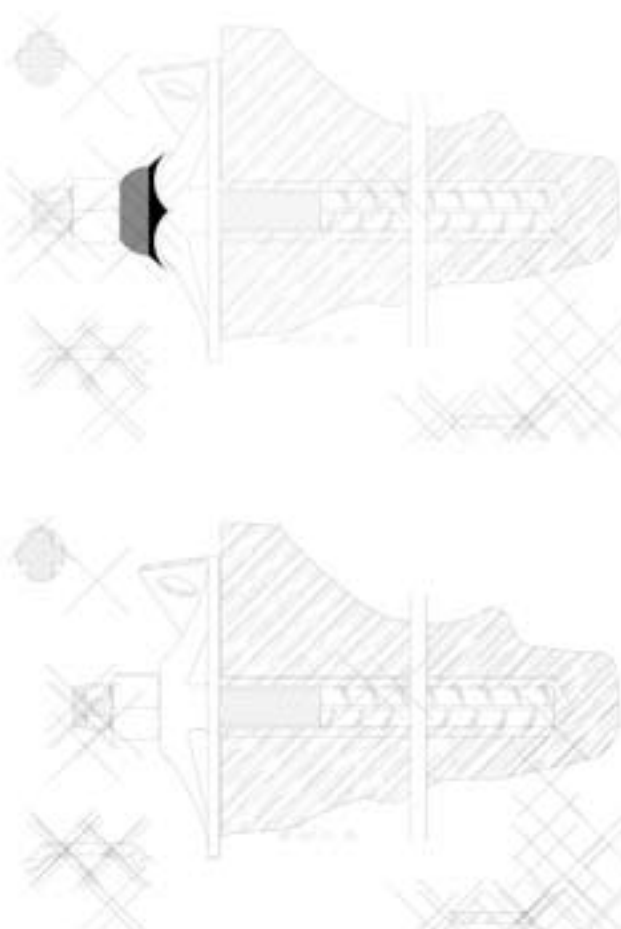


DSI South Africa Mining Products Division
is Quality Assured to ISO 9001:2000,
Registration No. QAC/R6/0315

Rock and Roof Bolts

	Yield Strength		Ultimate Tensile Strength		Calculated Shear Strength	Standard Elongation	Uniform Elongation	Mass per Metre	Bar Core Diameter	Major Bar Diameter	Cross Sectional Area
	MPa	kN	MPa	kN							
16 mm	500	110	640	130	130	16	8	1671	16	17,4	210 ¹⁾
18 mm	500	150	640	210	150	16	8	2140	18	19,8	316 ²⁾
20 mm	500	160	730	230	160	16	8	2583	20	21,8	316 ³⁾

Bar straightness to AS 1442-1991; 1) Rolled Thread DIM405-18mm; 2) Rolled Thread DIM405-20mm; 3) Rolled Thread DIM405-22mm



General Features

- Manufactured from a special hot rolled deformed bar designed by DSI South Africa known as “DDBAR”, this bolt features a rib pattern which actively assists with mixing the chemical anchors during installation.
- The bolt rib pattern design has modified physical characteristics to maximise load transfer from the rock to the bolt, with higher transverse ribs together with lower profile longitudinal ribs.
- The rolled thread strength nominally equals the column strength of the bar.
- The 16 mm, 18 mm, 20 mm anchor bolts are designed to be used with resins.

Standard Lengths & Packaging

- Standard bolt length range from 600 to
- 1600 mm (for 16 mm and 18 mm Anchor Bolt)
- 2400 mm (for 20 mm Anchor Bolt)
- Non-standard requirements are available by negotiation.

Notes

- Minimal order quantities may apply to this product.
- Only DSI South Africa rock bolt components should be used to enable the full performance of the bolt system to be obtained.
- Bolts are packaged in bundles with threads.



Expansion Shells

General Features

DSI South Africa expansion shells hold in any rock strata which is sufficiently competent to provide an adequate anchorage. They are designed to anchor in soft ground or hard rock. In good strata the anchorage exceeds the ultimate strength of the steel bolt. All expansion shells require a competent strata in the anchor zone. The suitability of the anchorage and the specific expansion shell to be used is best determined by physical load testing.

DSI South Africa expansion shells feature parallel contact with the hole wall with sharp serrations on the outside leaves ensure positive holding power.

The expansion shell assembly is securely held by a strong protective sleeve, to save installation time and prevent loss of parts while handling. The sleeve must be removed prior to installation.

Packaging

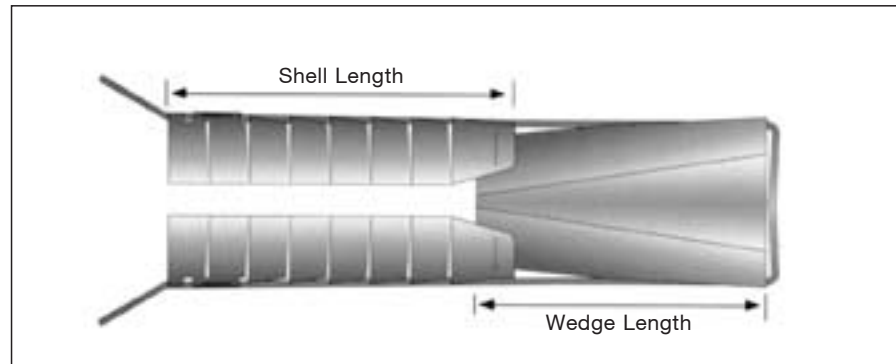
All 16 mm expansion shells are contained in cardboard boxes then packed on pallets.

Notes

Only DSI South Africa rock bolt components should be used to enable the full performance of the bolt system to be obtained.

Physical Properties

Bolt Diameter	Thread Form	Nominal Hole Diameter	Shell Length	Wedge Length	Net Weight
mm		mm	mm	mm	kg
16	DIM405-18mm	26	74.5	33.5	0.30
16	DIM405-18mm	30	74.5	33.5	0.37



Friction Bolts

General Features

- The DSI South Africa 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 33 mm & 39 mm Friction Bolt is suitable for installation with hand held rock drills (stoppers/drifters). The 46mm Friction Bolt is NOT suitable for installation with hand held rock drills (stoppers/drifters).
- 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 galvanizing.

Installation Guidelines

- The hole length should be longer than the bolt, nominally 150 mm, 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.

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

	Yield Strength		Ultimate Tensile Strength		Friction Bolt Diameter	Hole Diameter Range	Mass per Metre
	MPa	kN	MPa	kN			
33mm	410	31	520	105	33	33.75 ± 0.75	1.5
39mm	410	26	520	112	39	39.5 ± 0.75	1.75
46mm	410	136	520	152	46	46 ± 0.75	2.839



Rock Bolt Accessories

RIB Washer for 16 mm Bar – Physical Properties

Bar Specifications

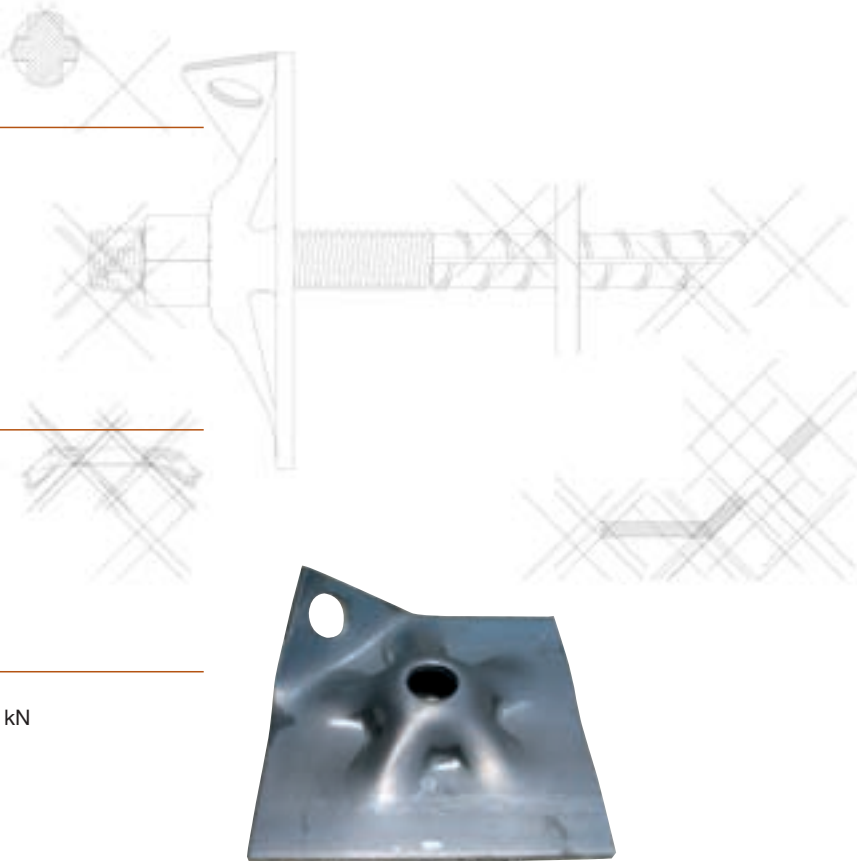
Diameter	Minimum 16 mm +- 0.03 mm Maximum
RIB Height	Minimum 0.55 mm & Maximum 0.8 mm
MPA	Minimum of 500 MPA
Bar Yield	Minimum of 100 kN
Ultimate Load	Minimum of 114 kN
Thread Load	110 (+10 mm -0 mm)
NIB Area	Maximum of 10 mm on thread side of bar

Washer Specifications

Washer Dimensions	125 mm x 125 mm
Center Hole	Minimum 18.5 mm & Maximum 19.0 mm
Dog Ear Hole	Minimum 17.5 mm & Maximum 18.0 mm
Deformation	Minimum Load of 100 kN
Dog Ear	Safe Loading Capacity of 5 kN

Nut Specifications

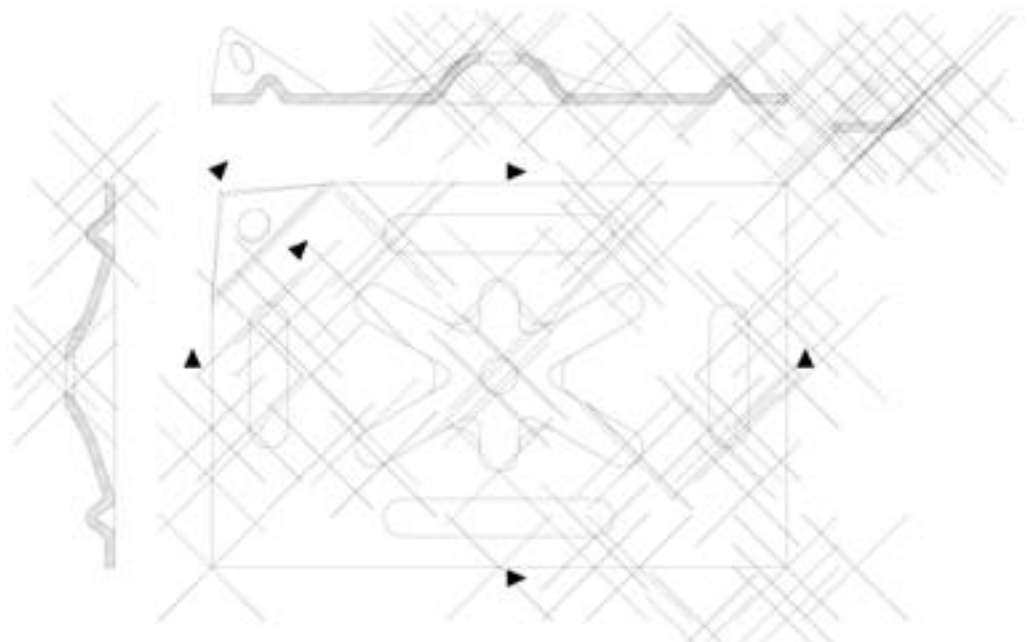
Nut	Nut must not strip at a load less than 140 kN
Dimension	27 mm across flat
Thread	M18 or DIN 405-18 mm



Rectangular Washer 200x300mm

General Features

- RIB Washer 18.5-19 mm and 22.5-23 mm centre holes.



Rock Bolt Accessories

Domed Washer

Physical Properties

Length mm	Width mm	Thickness mm
125	125	4.5
125	125	5

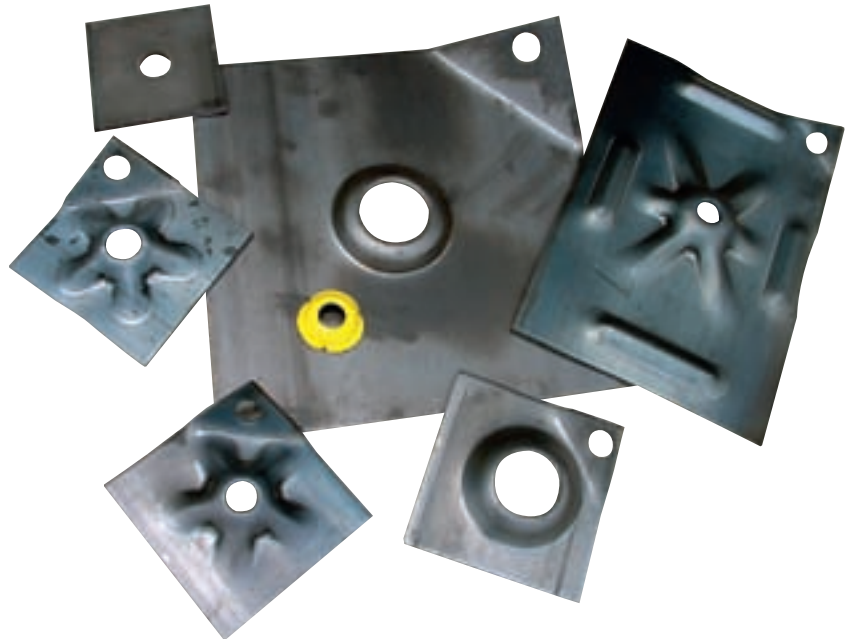
Hole size 36, 38, 44, 48mm

General Features

- Domed Plates are compatible with DSI South Africa Rock Bolts fitted with matching dome balls.
- Domed Plates are complimentary to the Dome Ball and overcome the problems of surface angularity and allows development of a good torque tension ratio to be obtained.
- 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.

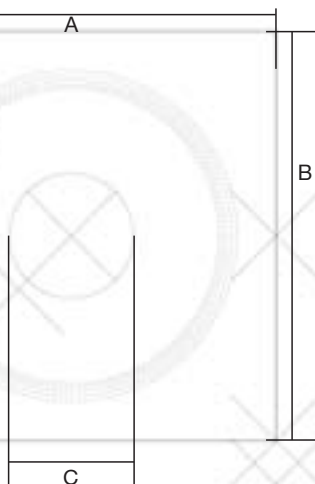


Flat Washer

FLAT PLATE – for general use

A/B: 100x100x4.5 mm
C: 18.5 to 19 mm

A/B: 125x125x4.5 mm
C: 22.5 to 23 mm



Flat Washer 300x300mm with dome

General Features

- DSI Flat Dom Washer with 36, 38, 44, 48 mm centre hole.





Grouting Rod

Grouting Rod

Bar Type	Rebar		
Diameter	12 mm Y12	14 mm	16 mm R16
Length	1,2 m – 3,4 m	1,2 m – 3,4 m	1,2 m – 3,4 m

Forged Head Bolt

Bar Type	DD Bar
Diameter	16 mm / 18 mm / 20 mm
Length	0,6 – 2,2 m

Oslo Straps

Bar Type	Round Steel
Diameter	Horizontal Bars 6-10 mm Strapping Bars 5,5 mm
Length	1-6 m
Width	.250 – 1 m

W Straps

Steel	1,6 mm
Length	1,2 – 4 m
Width	250 – 500 mm
Multi Hole	500 mm APART



Forged Head Bolt

Polyfelt 80 x 80 GMF Mine Grid

Physical Properties	Test Method	MARV* Values kN/m
Ultimate Tensile Strength machine direction	ISO 10319	80
Ultimate Tensile Cross machine direction	ISO 10319	80
Flame & Electrical Resistance	The material complied with the requirements as per NBC Specification 245:1985 Report No. 2005/616	
Elongation at characteristic short term tensile strength %	ISO 10319	11%
Creep limited strength (120 yrs)	ISO 13431	55
Aperture Size	Nominal	50 x 50 mm
Weight (Average)	Measured	g/m ² (estimate)

* MARV — Minimum Average Roll Values

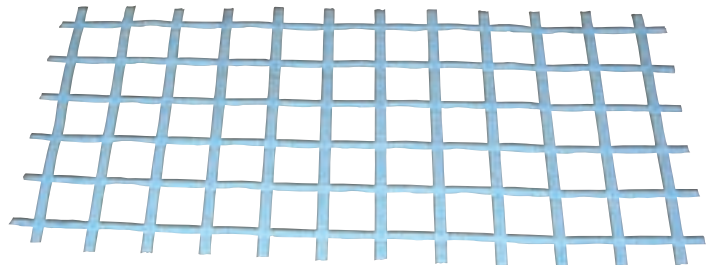
The technical values are obtained through testing at Polyfelt's Geosynthetic testing laboratory an ISO/EIC 17025 accredited testing laboratory for geosynthetics (accreditation no SAMM 207, GAILAP 45-02)



Oslo Strap



W Strap



Polyfelt

Mechanical Anchor Bolts

- The Mechanical Anchor Bolt bar is hot rolled with deformations that form a coarse left hand thread (10 mm pitch) over its entire length.
- Single pass bolt installation.
- The thread bar form provides good load transfer properties.
- Provides immediate support.
- Drive nut ensures reliable setting of the Expansion Shell and provides a bolt tail for subsequent meshing.
- Standard bolt lengths range from 600 to 1500 mm.

Mechanical Anchor Bolt, 32 mm

Physical Properties

	Ultimate Tensile Strength	Standard Elongation	Uniform Elongation	Mass Per Metre	Bar Diameter
	kN	%	%	kg	mm
32mm	80	16 to 19	12	1.671	16
35mm	80	16 to 19	12	1.671	16



Spanners

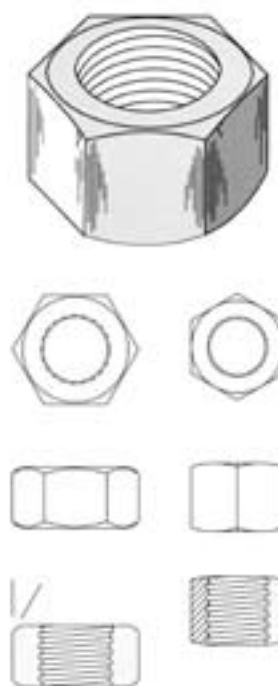
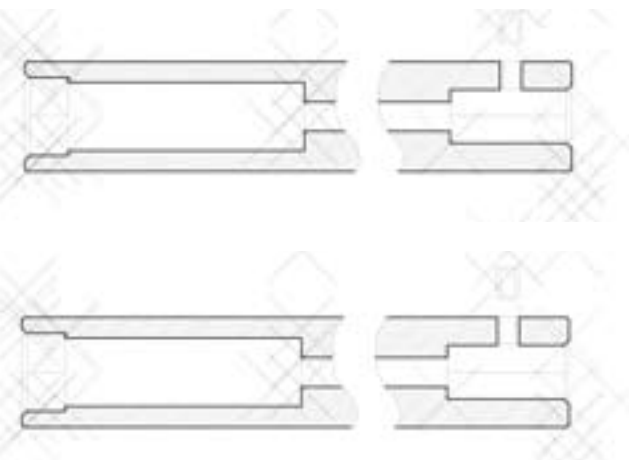
- SA-27F/22m or 27M/22F
- SA-32F/22m or 32M/22F
- Spanners can be delivered on request.

Nuts

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

Torque Indicators

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





DSI South-Africa, a division of DYWIDAG-Systems International global mining group, manufactures a full range of high quality ground support products for the underground mining industry. These products include friction bolts, cable bolts, rebar bolts, plates etc.

Our experienced staff provides superior service to all types of underground mines.



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