*ROCK BOLTS > FRICTION*

*Product Code Prefix*

# HIGH CAPACITY RING FB

**FBS**

*Ø47mm Friction Bolt*

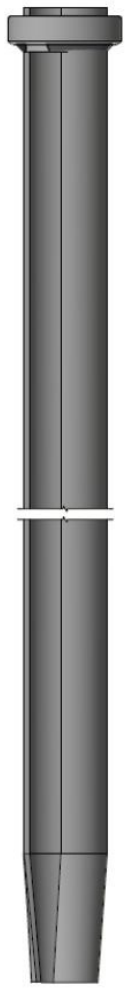
| Product Code Guide | Bolt Type | Diameter | Length | Coating | Packaging |
|---|---|---|---|---|---|
| | FBS | 47 | 150 | G | WA |

## Physical Properties

| | Minimum | | Typical | |
|---|---|---|---|---|
| Yield Strength | 400MPa | 137kN | 445MPa | 153kN |
| Tensile Strength | 460MPa | 158kN | 505MPa | 174kN |
| Mass Per Metre | 2.70kg | | | |
| Friction Bolt Diameter | Ø47mm | | | |
| Hole Diameter Range | Ø43mm min./45.5mm max. | | | |
| Cross Sectional Area | 344mm$^2$ | | | |

## Key Features

- The DSI Underground 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.
- Easy and fast installation procedure.
- Immediate load bearing capacity
- Micro alloyed steel provides elevated yield stress reducing the bending effect on insertion during installation.
- Friction bolts can be load tested by fitting a pull 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.



## Advantages of High Capacity Ring

- Ring design retains strength and integrity in squeezing ground conditions.
- Provides higher load capacity when point loaded.
- Load capacity matched with plate performance.
- Extended time before rehab is required.

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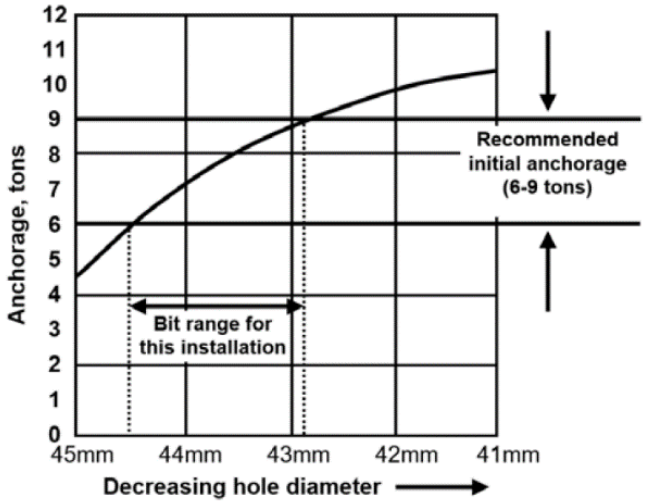


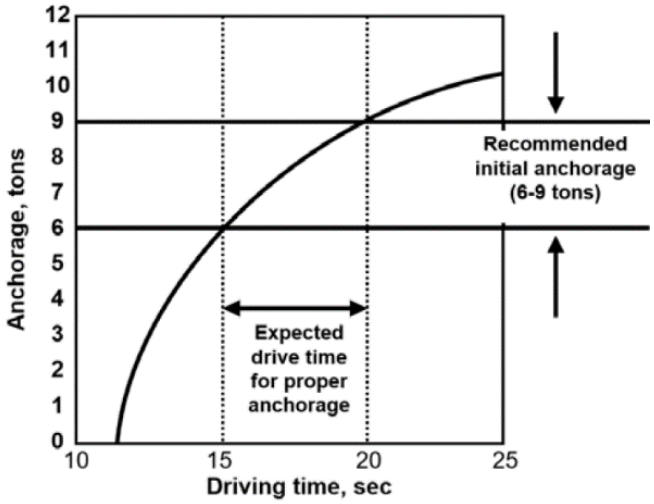


## Installation Guidelines

The following are items to be aware of when installing friction bolts:

- Type of Ground - The nature of the ground must be evaluated. Different rock properties and ground conditions will affect the anchorage performance of friction bolts.
- Scaling - The ground should be thoroughly scaled before drilling and bolting. Periodic re-scaling may be required while drilling.
- Strength and Yield Capacity of Bolt -The mechanical properties of the bolt should be appropriate for the ground conditions, bolt length and bolting pattern. Pull tests should be performed to determine initial anchorage of the friction bolts.
- Hole Condition - The hole should be cleaned to ensure the friction bolt will insert smoothly. Variation in hole diameters and roughness (due to differing rock properties or excessively jointed ground) can yield variations in anchorage capacities.
- Hole Length - The hole should be 150mm deeper than the bolt length being used to allow for any rock fretting during installation. If holes are drilled too short, then the bolt will stick out of the hole and the plate will not make contact with the rock surface. Damage to the bolt will result if an attempt is made to drive the bolt further than the hole length will permit.
- Oversize Holes - The hole size required for the friction bolt is the most crucial aspect of the installation. The anchorage of the bolt relies on the fact that the hole is smaller than the diameter of the bolt. The larger the hole relative to the bolt diameter reduces the anchorage force.
  Oversized holes can be caused by using the incorrect bit size, leaving the drill running while flushing the hole, soft ground (faults, gouge, etc.) and bent drill steels.
- Undersize Holes - If the hole size is too small relative to the friction bolt size then it becomes extremely difficult to install the bolt. The bolt can be damaged i.e. kinked or bent when installed. Undersized holes are usually caused by worn bits and or incorrect bit sizes being used.
- Drive Times - For a typical 2.4m friction bolt, a jumbo should aim to drive the bolt into the hole in 15 to 20 seconds. This drive time corresponds to proper initial anchorages of the friction bolt. Faster drive times should serve as a warning that the hole size is too large or feed rate is too high, the initial anchorage of the bolt will be affected. (Current Jumbo outputs allow for drive times below 10 seconds, this has the potential to compromise the friction bolts performance). Longer drive times indicate smaller hole sizes possibly caused by bit wear.

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- **Bit Selection** - Button bits are commonly up to 1.5mm larger than their stated size. A Ø43mm button bit may in reality be Ø44.5mm in diameter when new. DSI Underground recommend a finished hole diameter range of Ø43 – Ø45mm
- **Perpendicular Installation** - Bolts should be installed as near perpendicular to the rock surface as possible. Friction bolts should be installed within +/- 10 degrees of the drilled hole orientation. Angles greater than this may lead to the friction bolt being bent along its length during installation reducing its anchorage capacity and affect the weld ring integrity by point loading within the plate.
- **Installation Driver Tools** - Driver tools transfer percussive energy to the bolt during installation. The driver tools must have the proper profile to fit into the friction bolt without binding and causing damage to the bolt during installation. The driver tool must be inspected for wear on the driving surface. If a groove is worn on the face the dolly should be replaced. This groove will tend to pull the steel friction bolt tube away from the ring.
- **Education** - Proper education of mining personnel and supervisors is mandatory, education must be continuous. An informed workforce will save money in the long run.
- **Monitoring** - Installations must be monitored to ensure proper procedures and quality are maintained. Pull-test measurements should be routinely conducted on friction bolts to check initial anchorage values.

## Product Accessories Examples

- DSI Underground manufactures a comprehensive range of plates specifically designed for this range of Bolts.

Typically used accessories:

| | Products | | | |
|---|---|---|---|---|
| Product Group | Dragon Fly | Dome Plates | Dome Plate | Pull Ring |
| Product Imagery |  |  |  |  |
| Product Code Prefix | DF | FRP | TDD | PRING |

## Standard Length & Packaging

- Standard bolt lengths include 2,100mm, 2,400mm, 3,000mm.
- Non-standard lengths are available on application.
- Friction Bolts are supplied in standard packs of 150 bolts.

## Notes

- Only DSI Underground rock bolt components should be used to enable the optimum performance of the bolt system to be obtained.
- DSI Underground Mining Products Division is Quality Assured to ISO 9001:2015

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## Phone APP

Want to know more; our full product range, knowledge centre, and other details are available via the App; available on iOS and Android devices by searching “DSI Underground”.

iOS

Android

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