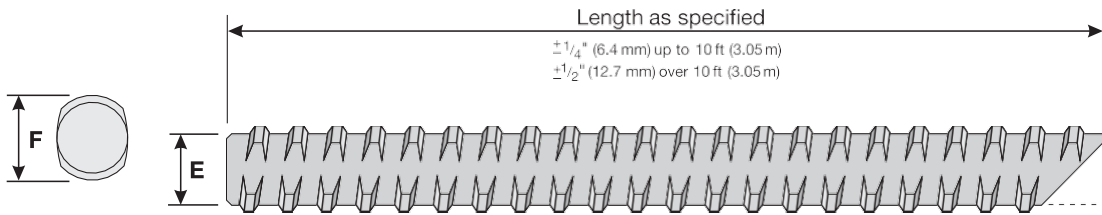


# DSI THREADBAR®

## (black & galvanized)

Category: Fully threaded bolts

### Overview



### Dimensions

	#6	#7	#8	#10	#11	#14
<b>Nominal Bar Size E</b>	3/4" (19 mm)	7/8" (22 mm)	1" (25 mm)	1-1/4" (32 mm)	1-3/8" (35 mm)	1-3/4" (44 mm)
<b>Max. Bar Diam. F</b>	0.86" (21.8 mm)	0.99" (25.1 mm)	1.12" (28.4 mm)	1.43" (36.3 mm)	1.61" (40.9 mm)	1.86" (47.3 mm)

All dimensions in accordance with ASTM F432 & CSA M430-90 specifications

### Technical data

	Nominal Size	Yield Strength (min.)	Ultimate Strength (typ.)	Nominal Weight
<b>Gr. 75 (Gr. 517/ 690)</b>	#6	33,000 lbs (147kN)	44,000 lbs (196 kN)	1.50 lbs/ft (2.24 kg/m)
	#7	45,000 lbs (200 kN)	60,000 lbs (267 kN)	2.04 lbs/ft (3.04 kg/m)
	#8	59,300 lbs (264kN)	79,000 lbs (351kN)	2.67 lbs/ft (3.98 kg/m)
	#10	95,300 lbs (424 kN)	127,000 lbs (565kN)	4.30 lbs/ft (6.41 kg/m)
	#11	117,000 lbs (520 kN)	156,000 lbs (694kN)	5.31 lbs/ft (7.91 kg/m)
	#14**	180,000lbs (801kN)	236,200lbs (1050kN)	7.65 lbs/ft (11.38 kg/m)

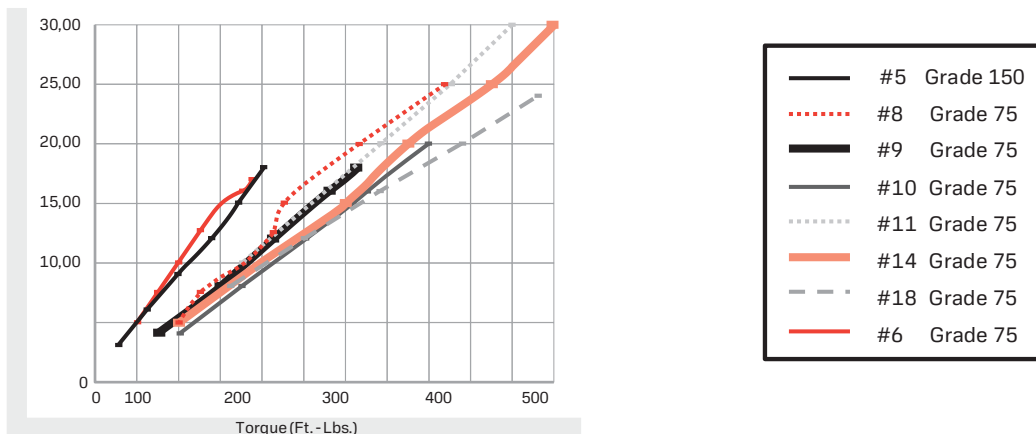
Gr.150 available (special order)

Also available hot dip galvanized to ASTM A123 and CSA G164 specifications








All mechanical and physical properties in accordance with ASTM A615-92b and CSA G30.18M-92 specifications THREADBAR® is left hand (LH) thread only unless otherwise noted

\*\* Right hand (RH) thread

### THREADBAR® Torque Tension Relationship

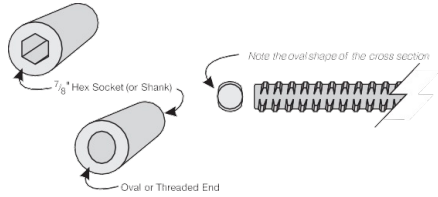
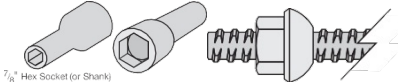


### THREADBAR® hardware (black & galvanized)

Hardware	#6	#7	#8	#10	#11	#14
 Anchornut	stock	stock	stock	stock	stock	n/a
 Hex Nut- Cast	stock	stock	stock	stock	stock	n/a
 Hex Nut - Machined	special order	special order	special order	special order	special order	special order
 Coupler - Cast	stock	stock	stock	n/a	n/a	n/a
 Coupler - Machined	special order	special order	special order	special order	special order	special order
 Bevelled Washer	special order	special order	special order	special order	special order	special order
 Eyenut - Cast	n/a	stock	stock	n/a	n/a	n/a
	n/a	n/a	n/a	special order	special order	special order

Also available hot dip galvanized to ASTM A123 and CSA G164 specifications.

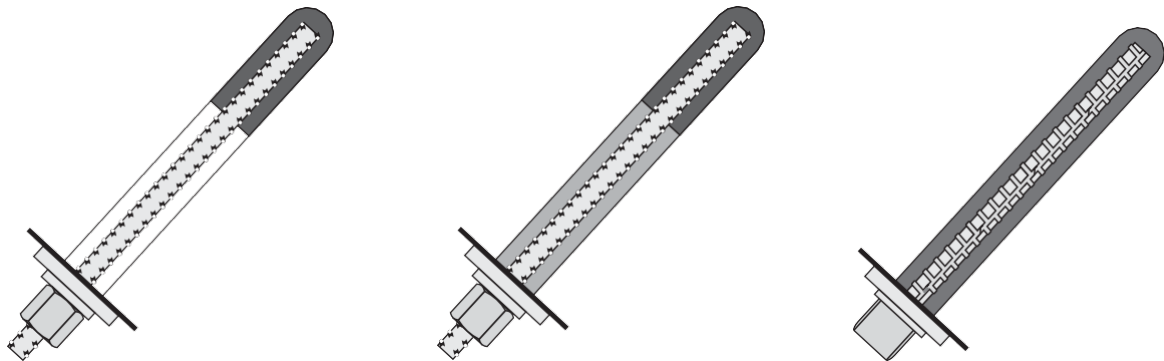
### THREADBAR® Spinners & Nutrunners

	THREADBAR® Spinners & Nutrunners	Yield Strength (min.)	Ultimate Strength (typ.)	Nominal Weight
	Oval Spinner × 7/8" Hex Socket × 7/8" Hex Shank	stock	stock	stock
	Threaded Spinner × 7/8" Hex Socket × 7/8" Hex Shank	special order	special order	special order
	Nutrunner × 7/8" Hex Socket × 7/8" Hex Shank	stock	stock	stock

Other sizes available by special order

T-thread, rope thread, 1" hex, etc. bar spinners and nutrunners available by special order

### Installation Quality Guidelines Rebar & DSI THREADBAR® Bolts



Tensioned point anchored

Tensioned fully grouted

Untensioned forget head

### Terminology

The following are items to be aware of when using/installing resin grouted rebar and rock bolts:

**Type of Ground** - The nature of the ground must be evaluated. Soft strata requires a larger plate washer bearing area and a longer anchorage length if point anchored. Soft ground results in larger hole sizes for a given bit size (due to bit rattling and reaming). This can

adversely affect the mixing of the resin.

**Scaling** - The ground should be thoroughly scaled i.e. barred down, 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 yield and ultimate strengths of the bolts as well as resin anchorage capacities.

**Condition of Rebar Threads** - Threaded rebar should be inspected before installation. Increased friction on the threads can adversely affect tensioning of the rebar. Threads are generally immune to defects and damage.

**Fillet on Forged Head Rebar** - Forged head rebar bolts should be inspected to ensure a fillet of 1/8" radius is present where the shaft connects to the forged head. Sharp transitions may weaken the bolt.

**Shelf Life of Resin** - Resin has a practical shelf life. Although the chemical ingredients do not change with time, most resin cartridges are water based and thus dry out with age. The shelf life thus refers to the workability of the resin cartridge. Aged cartridges are still effective; however, because they are drier, the ingredients are crumbly and harder to mix properly. The bolts are more difficult to insert through old resin as well. Set times may also be reduced somewhat with older resin. The resin cartridge box will have the manufacturing date written on it. Resin should be used as soon as possible. Stock should be rotated so older resin does not accumulate.

**Storage** - Resin should be stored in a cool location to maximize shelf life. Elevated temperatures dry out the resin cartridges.

**Temperature and Set Time** - Temperature greatly affects the gel (set) time of resin cartridges. A 20°F rise in temperature reduces the set time by approximately 50%. Conversely, a 20°F drop in temperature will approximately double the set time of the resin. Resin should be stored and used at room temperature whenever possible.

#### Resin Usage

	Hole diameters (inches)										
ASTM	1"	1 1/4"	1 3/8"	1 1/2"	1 5/8"	1 1/2"	1 5/8"	1 1/2"	1 7/8"	2"	2 1/4"
A615	Cartridge diameter (mm)										
Bar Size	23	28	32	32	32	35	35	40	40	40	40
#6(3/4")	18.5"	13"	-	-	-	-	-	-	-	-	-
#7(7/8")	-	16"	14"	-	-	12.5"	-	-	-	-	-
#8(1")	-	22.5"	17.5"	12.5"	-	15.5"	11.5"	12"	-	-	-
#10(1-1/4")	-	-	-	-	15.5"	-	18.5"	17"	13"	-	-
#11(1-3/8")	-	-	-	-	-	-	-	23"	16"	12"	-
#14(1-5/8")	-	-	-	-	-	-	-	-	-	-	11"

- Chart indicates inches of bolt encapsulation based on standard 12" length resin cartridge.
- This chart is prepared as a guide based on average drilling conditions in concrete or rock. Field trials should be conducted to determine actual resin requirements.
- Example: When a 1 1/2" hole is drilled, using a 1" diameter deformed rebar bolt, one 35 mm x 12" cartridge will grout 15.5 linear inches of the bolt.
- Inches grouted include a typical 15% loss.
- Blank spaces are non-recommended bolt/hole combinations.

**Resin Size, Bolt Size and Hole Size** - The size of the bolt relative to the cartridge and hole size is critical. The above chart gives the recommended combinations of bar, hole and cartridge sizes. The numbers in the chart refer to the yield i.e. length of encapsulation of the bolt per 12" resin cartridge. Blank spaces are non-recommended bolt and hole combinations.

**Hole Condition** - The hole should be cleaned and examined to ensure the resin cartridges and the rock bolt will insert smoothly.

**Hole Length** - If holes are drilled too short then excessive lengths of the bolt will stick out of the hole. The plate may not be effectively installed. If holes are drilled too long, then resin will be wasted at the end of the hole. This will reduce the encapsulation length for a point anchored rock bolt and can reduce the load capacity of the bolt. The bolt may not be able to be tensioned adequately.

**Oversize Holes** - If the hole size is too large relative to the bolt size, poor mixing of the resin will result. The grout yield per resin cartridge will also be reduced. This is particularly important with point anchored bolts. Oversized holes can be caused by using the

wrong bit size, leaving the drill running while flushing the hole, soft ground (faults, gouge, etc.) and bent drill steel.

**Undersized Holes** - Undersized holes will result in insufficient bonding of the bolt to the rock. Difficulties in inserting the bolt into the hole may also be experienced. Undersized holes are usually caused by worn bits and/or wrong bit sizes being used.

**Spinning of the Bolt** - refer to Resin and Cement cartridge section.

**Underspinner** - The bolt is spun into the resin cartridge to mix the two separate components (the catalyst and the resin matrix). Improper mixing will result in a poor installation. Underspinner results in inadequate mixing of the resin and insufficient gelling may occur. Operators will complain the resin will not set up.

**No Spinning** - If the bolt is simply pushed through the resin cartridge without rotation, a detrimental effect may be caused by the resin catalyst being picked up by the end of the bolt. This may cause both undercatalysed and overcatalysed areas to be created. Overcatalysed resin yields an understrength crumbly type of anchor. Undercatalysed resin stays soft virtually indefinitely because it does not have enough catalyst to speed up the gelling reaction.

**Overspinner** - Overspinner will grind up the resin as it sets. Poor anchorage will result. The bolt may not be able to be tensioned properly. Consequently, the operator will once again complain the resin is not setting up!

**Tensioning with Fast/Slow Set Resins** - As a general guideline, when bolts are to be tensioned, fast set resin should be used at the toe of the hole for 1/3" the bolt length (minimum 24"). Slow set resin is used for the remaining 2/3" length to fully encapsulate the bolt. The slow set must be sufficiently slow to allow the plate washer and nut to be installed and the bar tensioned before the resin set up. Rebar bolts can be tensioned by torquing the nut. Bolts require a greater torque to achieve adequate tension.

**Proper Grade Plates** - Thin or weak plates will deform at low bolt tension. The bolt could also rip through the plate during installation or by bolt loading. Plates should meet ASTM F432 standards.

**Perpendicular Installation** - Bolts should be installed as near perpendicular to the rock surface as possible. Bolts not perpendicular to the plate and rock surface will be marginally weaker and will not be pretensioned properly. Spherical seat washers are available to correct for angularity.

**Hardened Steel Washers** - Hardened steel washers should be used between the forged head or nut and the plate washer. The washer reduces friction and enhances tensioning in threaded rebar. Minimum grade should be ASTM F436 Type 1 or 2 and hole size in plate washer should be no more than 3/8" diameter larger than bolt size if a spherical seat washer is not used.

**Rock Bolt Dollies** - Installation dollies should only transfer rotational energy to the bolt during installation, not percussive energy when drills are used to rotate the bolt. The shank end of the dollies must be short enough to avoid contact with the drill piston in stopers and jacklegs. Typically, these rock bolt dollies have a 7/8" hex shank and are only 3¼" long. Besides being the proper size for the rock bolt head or nut, the dolly must also have sufficient socket depth to allow nuts to be run onto the threaded portion of the bolt.

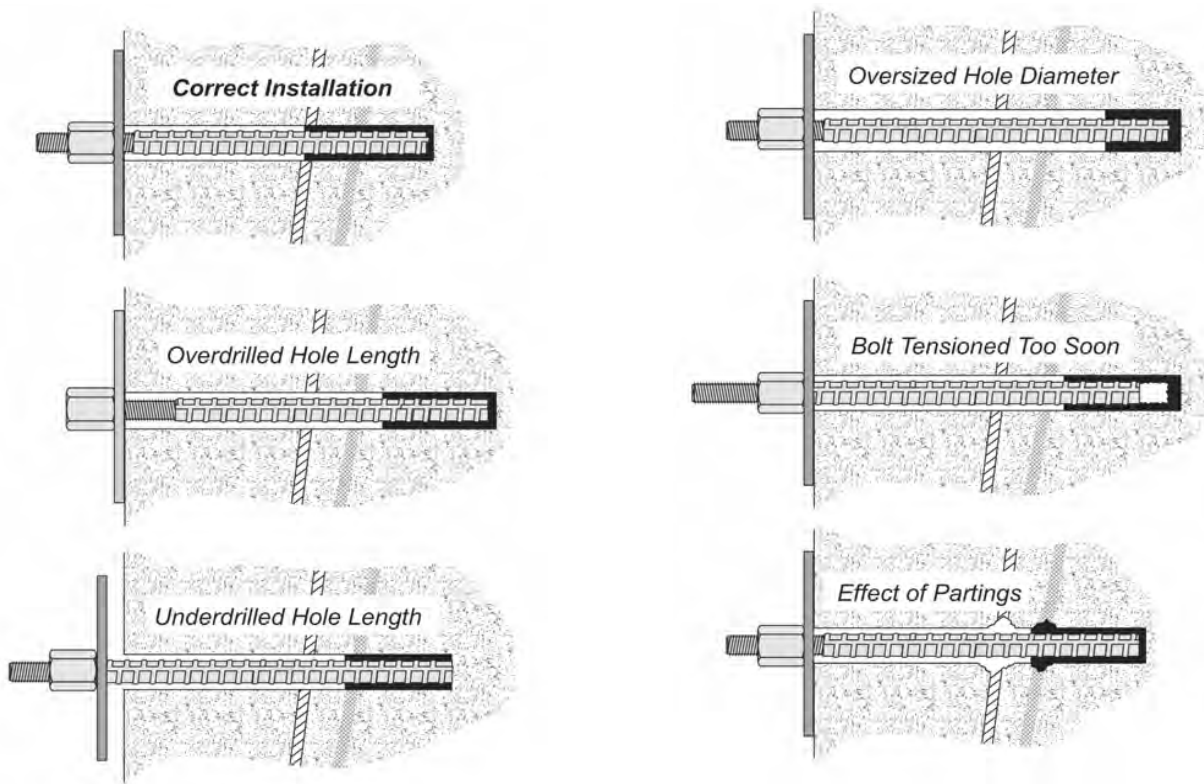
**Gloves** - Gloves and eye wear should be worn when handling resin.

**Odour** - Polystyrene monomers in the resin have a particularly noticeable smell. Properly installed bolts (i.e. properly set up resin) will have no odour. The smell of styrene underground implies broken cartridges at the work place or insufficiently mixed resin in the hole.

**Education** - Proper education of mining personnel and supervisors is mandatory. Resin anchored bolts in particular require skilled miners. As manpower turnover is relatively frequent in bolting crews, education must be continuous. Forget this and you waste money.

**Monitoring** - Installation must be monitored to ensure proper procedures and quality are maintained. Pull-test measurements should be routinely conducted on resin anchored bolts. Torque measurements can also be taken on threaded rebar bolts and monitored for changes. Torque testing is best done by a crew supervisor (or dedicated technician) while visiting work areas during his rounds.

**Packaging** - Vendors must package bolting products in an acceptable manner both for convenience of use as well as prevention of damage to the product during shipping and handling. Particular care must be paid to wrapping of the thread ends to prevent damage and corrosion. Resin cartridges must be robust so as to not rip or tear during normal handling. Good packaging costs more but is worth the added cost by reducing wastage on site.



**Legal disclaimer**

All dimensions, weights, quantities, and specifications are those applicable at the time of this publication and may be amended from time to time. Please contact your local representative for final confirmation of any key specifications.

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