reid™

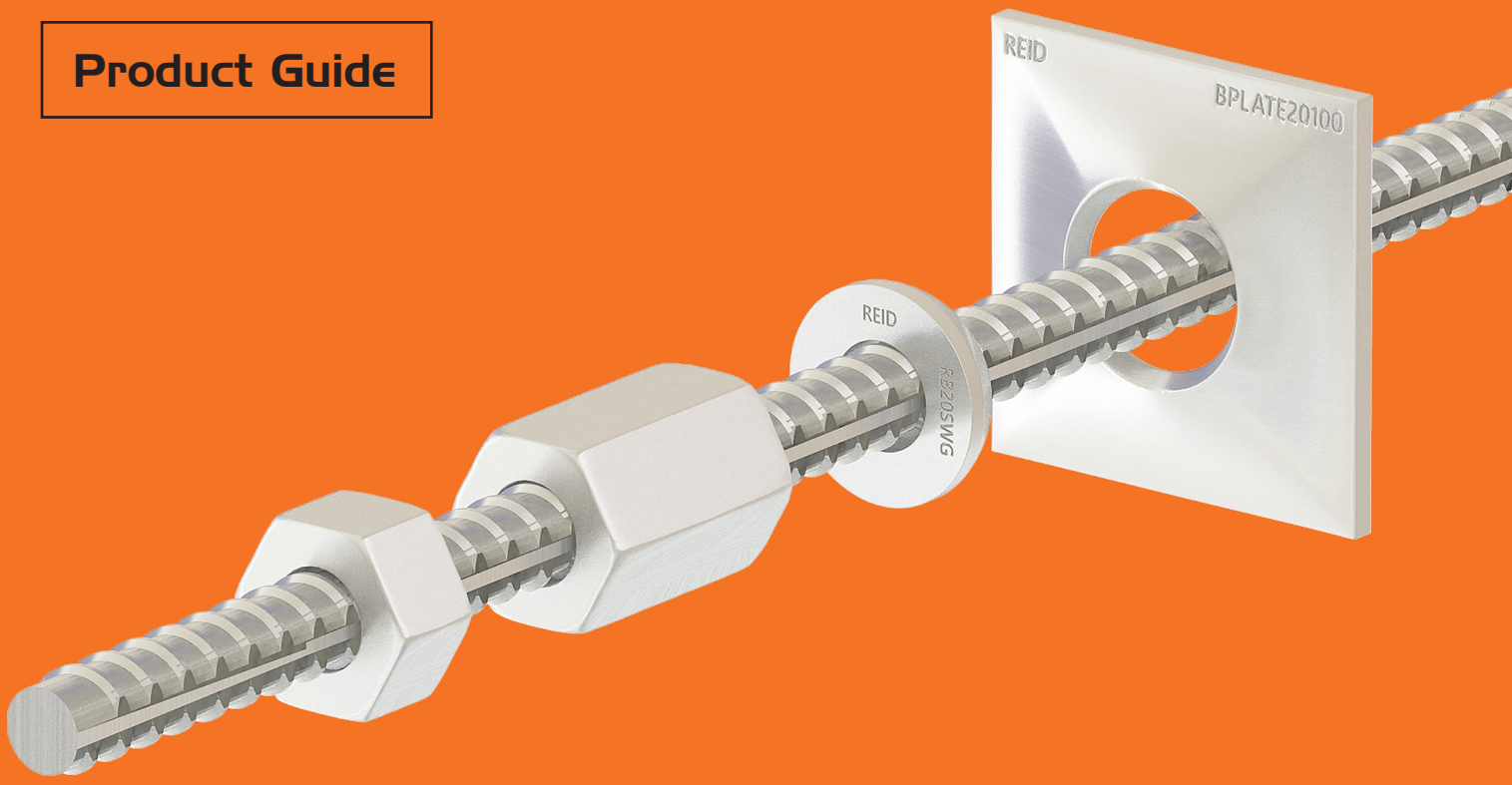
CHARTERED VERIFIED ENGINEER

March | 2026 NZ

GENUINE

ReidBar™ Soil & Rock Anchoring

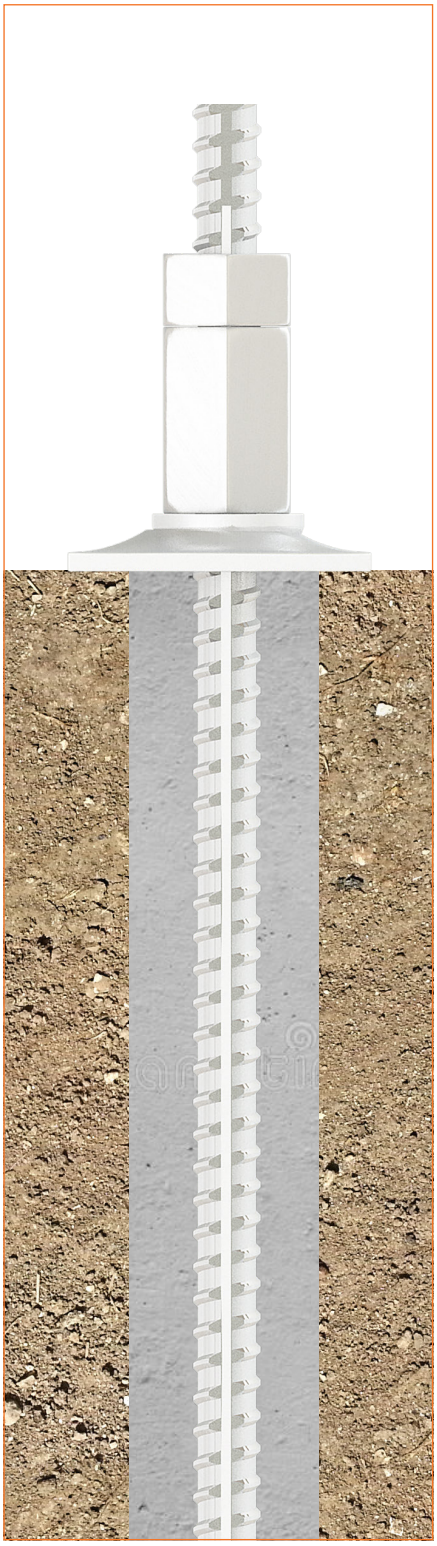
Product Guide



MADE IN NEW ZEALAND

reids.co.nz | 0800 88 22 12

Contents



System Overview

Genuine ReidBar™ Systems: The trusted Rock and Soil Anchoring Solution.

Discover unparalleled stability and reliability with ReidBar™ our Systems, meticulously crafted for rock and soil anchoring applications. Engineered to perfection, ReidBar™ sets the benchmark in anchor technology, ensuring steadfast performance over the long term.

Key Features:

Precise Mechanical Properties:

ReidBar™ boasts meticulously defined mechanical properties, guaranteeing unmatched consistency in performance. Experience peace of mind knowing that each anchor is crafted to exacting standards, delivering unwavering reliability in even the most demanding environments.

Consistent Performance:

Bid farewell to variability and welcome reliability. ReidBar™ Systems are engineered to deliver consistent performance under prolonged anchor loading. Whether enduring heavy loads or withstanding environmental pressures, ReidBar™ stands the test of time, ensuring your project remains on solid ground.

Constructional Efficiency:

Unlike traditional strand tendons, ReidBar™ anchors eliminate constructional losses, optimising efficiency and minimizing resource wastage. With ReidBar™, every installation is streamlined, maximizing productivity and reducing project timelines.

Experience the ReidBar™ Advantage:

Join the ranks of industry leaders who trust ReidBar™ for their anchoring needs. Elevate your projects with unparalleled stability, reliability, and efficiency. Choose ReidBar™ Systems and anchor your success today.

Compliance:

BS 8081:2015
Code of practice
for grouted anchors

System Components

ReidBar™ 500E Threaded Reinforcing Bar

Genuine ReidBar™ is a key component to the Soil and Rock Anchoring System, meticulously engineered to establish robust connections within soil and rock formations. Crafted to ensure utmost durability and reliability, ReidBar™ employs a 500E grade continuous threaded reinforcing bar in accordance with AS/NZS 4671:2019 standards.

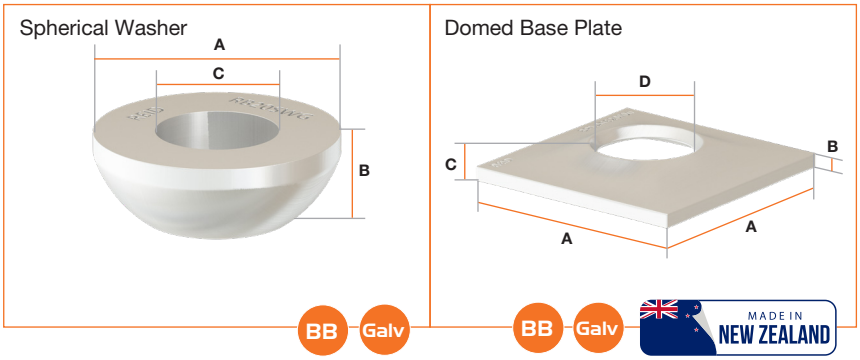
- **For Soil & Rock Anchoring Available in 16mm/20mm/25mm/32mm Bar Diameters.**
- **Reduced formwork damage.**
- **Reduced H&S risk.**
- **Increased productivity.**
- **Meets the requirements of 'Steel Reinforcing Materials, AS/NZS 4671:2019'.**

Part No.	Description	Pack Qty
RBA16	ReidBar 16mm 500E Grade Continuous Threaded Reinforcing Bar	N/A
RB20	ReidBar 20mm 500E Grade Continuous Threaded Reinforcing Bar	N/A
RB25	ReidBar 25mm 500E Grade Continuous Threaded Reinforcing Bar	N/A
RB32	ReidBar 32mm 500E Grade Continuous Threaded Reinforcing Bar	N/A

ReidBar™ HDG Spherical Washer & Domed Plate

The ReidBar™ HDG Domed Plate & Spherical Washer system is designed for ground anchoring, providing robust support for various applications. With components tailored to specific ReidBar sizes, this system ensures secure and reliable anchoring solutions.

These components offer versatility and durability, ensuring effective anchoring solutions for a variety of projects, from construction to infrastructure development.



Part No	Description	Pack Qty	A (mm)	B (mm)	C (mm)	D (mm
BPLATE20100G	ReidBar Domed Base Plate for RBA16/RB20 (Galv.)	Each	100	6.3	14 (Nom.)	40 (Nom.)
BPLATE32150G	ReidBar Domed Base Plate for RB25/RB32 (Galv.)	Each	150	10	24 (Nom.)	54 (Nom.)
RB20SWG	ReidBar Spherical Washer for RBA16/RB20 (Galv.)	100	50	18	24	N/A
RB32SWG	ReidBar Spherical Washer for RB25/RB32 (Galv.)	50	71	26	36	N/A
20FSW	M20 Washer 50mm x 50mm x 5mm to suit RBA16 (Galv.)	200	50	5	N/A	N/A

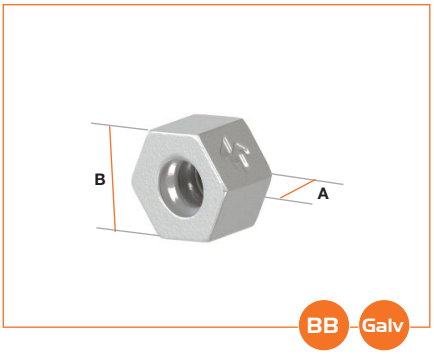
Icon Key: BB = Black Beauty Compatible. Galv. = Galvanised Finish Available

System Components (cont'd)

ReidBar™ Half Nut

The ReidBar™ Half Nut is a crucial component engineered specifically for fixing and securing ReidBar™ in soil and rock anchoring endeavors. Its design ensures tight connections, crucial for stability in challenging soil and rock formations.

When seeking optimal performance and peace of mind in soil and rock anchoring projects, the choice is clear: ReidBar™ Half Nut delivers unparalleled reliability and efficiency, making it the preferred solution for professionals across various industries.

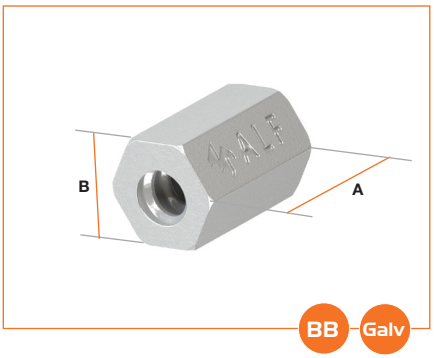


Part No	Description	Pack Qty	A (mm)	B (mm)
RBA16NHG	16mm ReidBar Half Nut (Galv.)	200	19-24	30
RB20NHG	20mm ReidBar Half Nut (Galv.)	110	22-28	36
RB25NHG	25mm ReidBar Half Nut (Galv.)	40	30-36	46
RB32NHG	32mm ReidBar Half Nut (Galv.)	30	38-44	55

ReidBar™ Full Nut

The ReidBar™ Full Nut is a crucial component engineered specifically for fixing and securing ReidBar™ in soil and rock anchoring endeavors. Its design ensures tight connections, crucial for stability in challenging soil and rock formations.

When seeking optimal performance and peace of mind in soil and rock anchoring projects, the choice is clear: ReidBar™ Full Nut delivers unparalleled reliability and efficiency, making it the preferred solution for professionals across various industries.



Part No	Description	Pack Qty	A (mm)	B (mm)
RBA16NG	ReidBar Nut for RBA16 (Galv.)	100	45	30
RB20NG	ReidBar Nut for RB20 (Galv.)	55	50	36
RB25NG	ReidBar Nut for RB25 (Galv.)	20	65	46
RB32NG	ReidBar Nut for RB32 (Galv.)	10	82	55

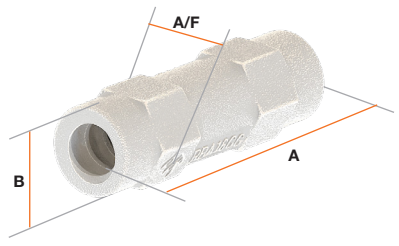
Icon Key: BB = Black Beauty Compatible. Galv. = Galvanised Finish Available

System Components

ReidBar™ Couplers

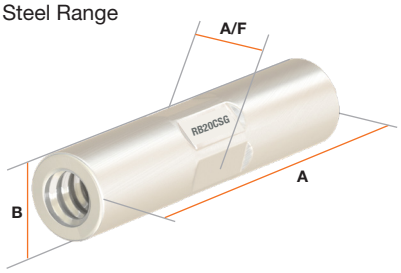
ReidBar™ Couplers can be used for Soil & Rock anchoring applications where the anchor requires an extension due to design constraints.

DCI Range



BB Galv

Steel Range



BB Galv

Ductile Cast Iron Range

Part No	Description	Pack Qty	A (mm)	B (mm)	A/F (mm)
RBA16CG	ReidBar Coupler for RBA16 (Galv.)	20	102	30	30
RB20CG	ReidBar Coupler for RB20 (Galv.)	25	119	35	37
RB25CG	ReidBar Coupler for RB25 (Galv.)	10	180	43	45
RB32CG	ReidBar Coupler for RB32 (Galv.)	5	210	55	57

Steel Range

Part No	Description	Pack Qty	A (mm)	B (mm)	A/F (mm)
RBA16CSG	Steel ReidBar Coupler for RBA16 (Galv.)	20	136	32	26
RB20CSG	Steel ReidBar Coupler for RB20 (Galv.)	25	148	35	32
RB25CSG	Steel ReidBar Coupler for RB25 (Galv.)	10	193	42	38
RB32CSG	Steel ReidBar Coupler for RB32 (Galv.)	5	242	60	52

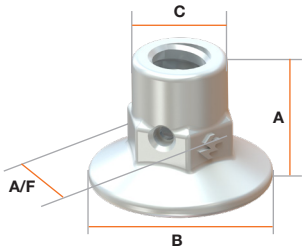
Icon Key: BB = Black Beauty Compatible. Galv. = Galvanised Finish Available

System Components (cont'd)

ReidBar™ IPort Flange Anchor

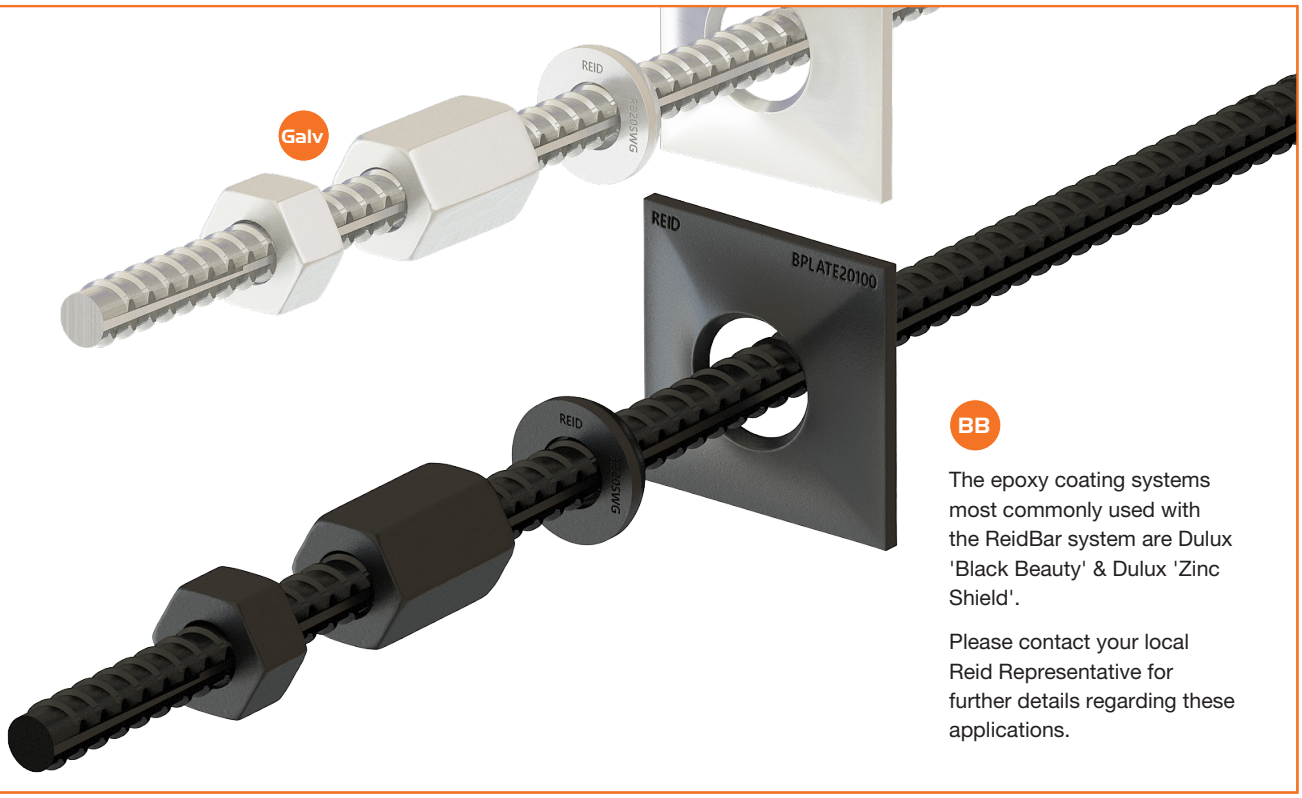
The ReidBar™ iPort Flange Anchor provides a tested and Bridge Code compliant headed anchorage solution with an improved epoxy injection system supporting increased quality control, safe handling of epoxy and simplified labour efficient installation.

Available in steel, a ReidBar™ threaded anchoring solution that is independently tested to demonstrate compliance with the performance requirements of NZS 3101 Amendment 3 and of the NZTA Bridge Manual 3rd Edition Amendment 4 is now available to the New Zealand market.



BB Galv

Part No	Description	Pack Qty	A (mm)	B (mm)	C (mm)	A/F (mm)
RBA16FAIPSG	iPort Flange Anchor to suit RBA16 (Galv.)	36	50	58	35	36
RB20FAIPSG	iPort Flange Anchor to suit RB20 (Galv.)	32	50	67	35	36
RB25FAIPSG	iPort Flange Anchor to suit RB25 (Galv.)	12	80	83	42	42
RB32FAIPSG	iPort Flange Anchor to suit RB32 (Galv.)	8	95	92	55	57



BB

The epoxy coating systems most commonly used with the ReidBar system are Dulux 'Black Beauty' & Dulux 'Zinc Shield'.

Please contact your local Reid Representative for further details regarding these applications.

Icon Key: BB = Black Beauty Compatible. Galv. = Galvanised Finish Available

Features, Advantages, and Benefits

Mechanical Precision:

- ReidBar™ boasts closely defined mechanical properties, ensuring consistent performance under long-term anchoring loading.
- This precision guarantees reliability in various applications, offering peace of mind to engineers and project managers alike.

Construction Efficiency:

- Unlike strand tendons, ReidBar™ anchors have no construction losses, optimising efficiency and minimising resource wastage.
- Supplied in a hot rolled condition, ReidBar™ is effectively stress-free, streamlining installation processes and reducing project timelines.

Safety, Sustainability & Durability:

- With high ductility and smooth strain hardening, ReidBar™ offers a high margin of safety against tensile/shear overload, even in cases of transverse movements in rock or soil.
- Its rugged thread resists damage, ensuring long-lasting performance in dynamic environments such as traffic wheel loads.
- ReidBar Reinforcing Bar is proudly manufactured in New Zealand, reducing carbon emissions associated with transportation and promoting sustainability in the construction industry.
- With ReidBar being produced locally, the environmental impact of long-distance transportation is minimised, contributing to a greener and more sustainable construction process.

Ease of Use:

- ReidBar™ can be tensioned, released, and re-tensioned with ease, simplifying installation and maintenance processes.
- Its simplicity in applying prestress with various tools like jacks or torque wrenches enhances operational efficiency.

UV Stability:

- ReidBar Reinforcing Bar is UV stable, ensuring long-lasting durability and strength in all weather conditions.
- ReidBar maintains its structural integrity over time, reducing maintenance costs and preserving the quality of project installations
- UV stability of ReidBar enhances its performance, making it a reliable choice for projects exposed to sunlight and harsh environmental conditions.

Versatility & Adaptability:

- Recoverable anchors simplify future excavations, offering flexibility and adaptability to evolving project needs.
- Standard stock lengths can be stored and cut to suit specific applications, reducing waste and cost.
- Offcut bars find versatile usage in standard concrete reinforcement applications on-site, enhancing resource utilisation and efficiency.

Integration & Customisation:

- ReidBar™ transmits anchor forces efficiently to the grout body without additional fittings, ensuring structural integrity and stability.
- It can be cut, spliced, or welded at any point along its length, providing flexibility in design and installation.

Application Examples

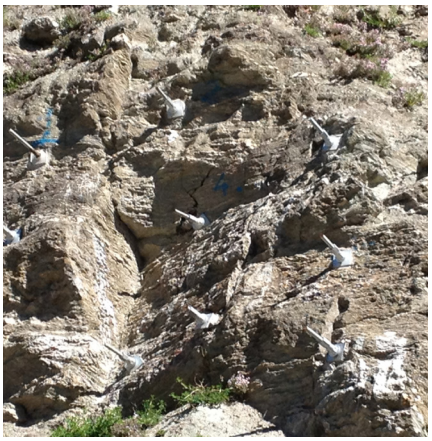
Soil & Rock Nails/Anchors

Used to provide soil and Rock stabilisation in earthwork construction.

Soil Nails/Anchors prior to grouting.

Soil Nails/Anchors post-grouting.

Ground anchoring.



Ground anchors and rockfall protection.

Retaining wall tie back.

Ground anchoring for suspended bridges.

Installation Methods

I. Typical fully grouted passive soil nail.

To position bar centrally in drilled holes a bar centraliser is used.

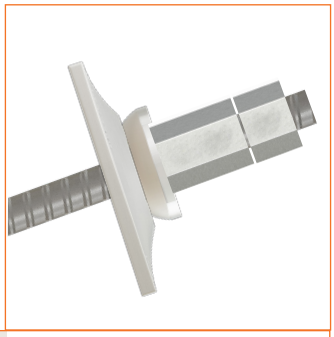
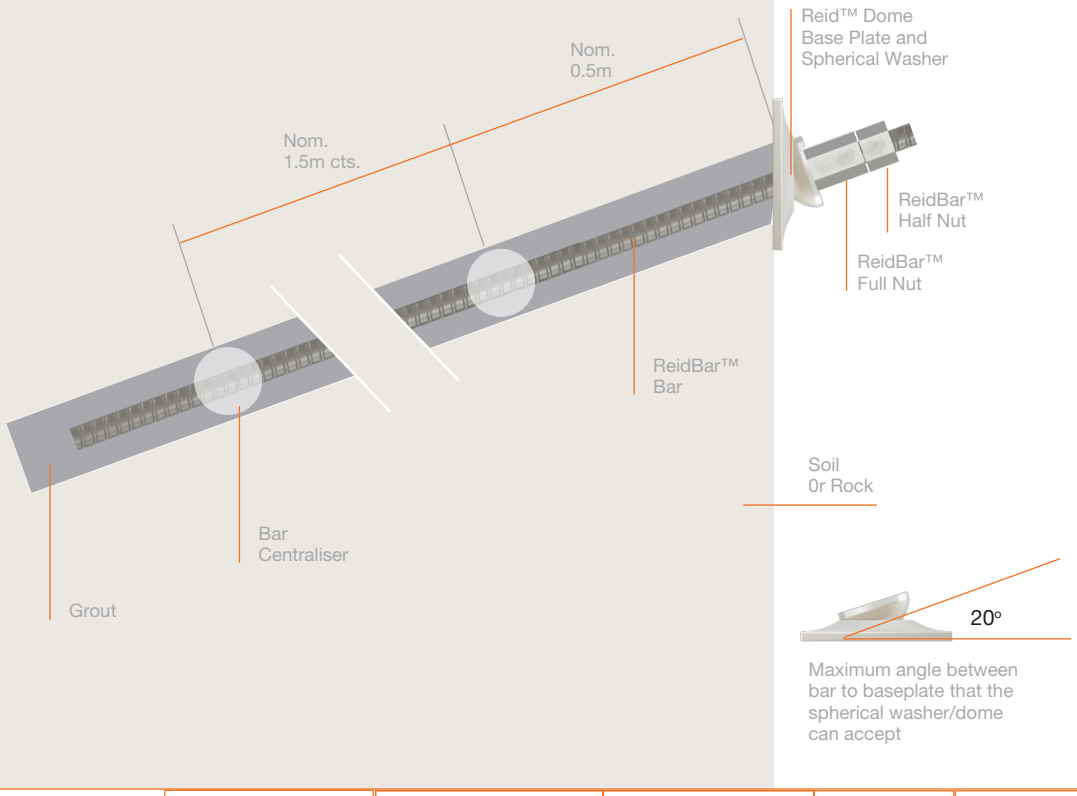
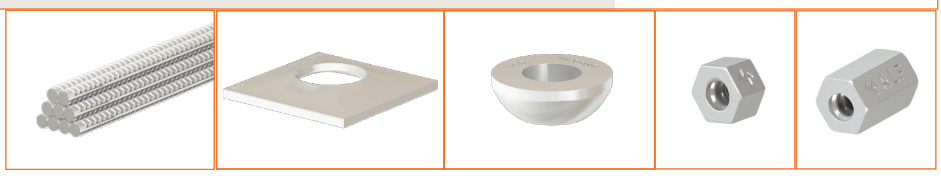


Figure I



Required ReidBar™ Components

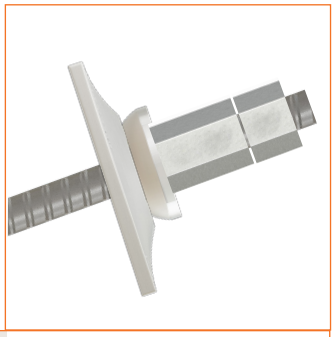
System components example
20mm ReidBar™



ReidBar Bar	Base Plate	Spherical Washer	ReidBar Half Nut	ReidBar Full Nut
RB20	BPLATE20100G	RB20SWG	RB20NHG	RB20NG

Note: ReidBar™ Couplers can be used to extend the anchor if/where required.
For 20mm ReidBar the Coupler part # would be RB20CG for Ductile Cast Iron (Galvanised). RB20CSG For Mild Steel (Galvanised).

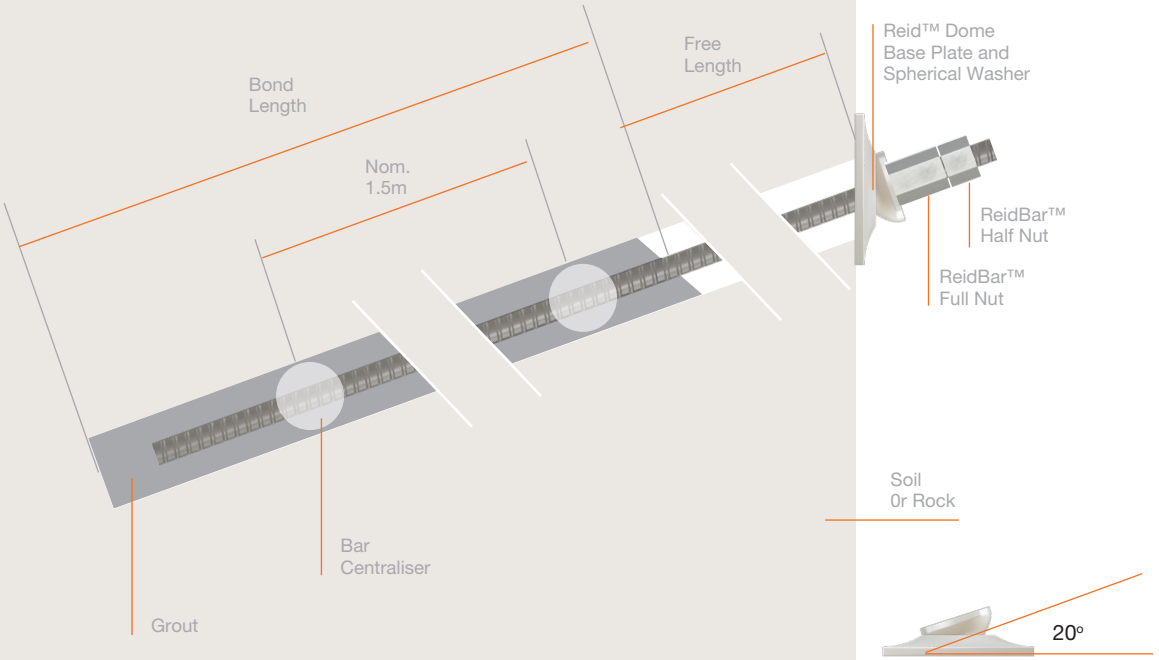
Installation Methods (cont'd)



2. Typical partly grouted active anchor.

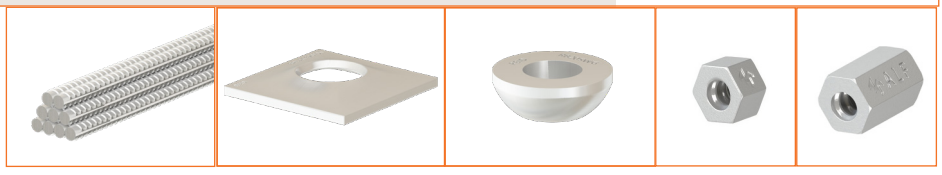
The free length is commonly grouted after the anchor has been stressed. Alternatively, the free length can be sleeved during the installation and the anchor grouted up to the surface. This effectively removes the bond over the free length allowing it to preload during the subsequent stressing operation.

Figure 1



Required ReidBar™ Components

System components example
20mm ReidBar™



ReidBar Bar	Base Plate	Spherical Washer	ReidBar Half Nut	ReidBar Full Nut
RB20	BPLATE20100G	RB20SWG	RB20NHG	RB20NG

Note: ReidBar™ Couplers can be used to extend the anchor if/where required.
For 20mm ReidBar the Coupler part # would be RB20CG for Ductile Cast Iron (Galvanised). RB20CSG For Mild Steel (Galvanised).

Installation Process

1. Drill and clean hole

- Drill a hole with diameter in accordance with Table 4. For deep holes it may be necessary to drill a larger hole initially and reduce to the correct bore diameter in the deeper region.
- Remove all debris from drilled hole.
  Flush clean with oil- free compressed air.

2. Insert ReidBar™

- Install the ReidBar™ into the hole with a grout delivery tube attached to the bar to ensure correct application of grout (refer figure 3 for example of grout deliver tube). ReidBar should also have centralisers installed & spaced as indicated in figure 1 and figure 2.

Figure 3

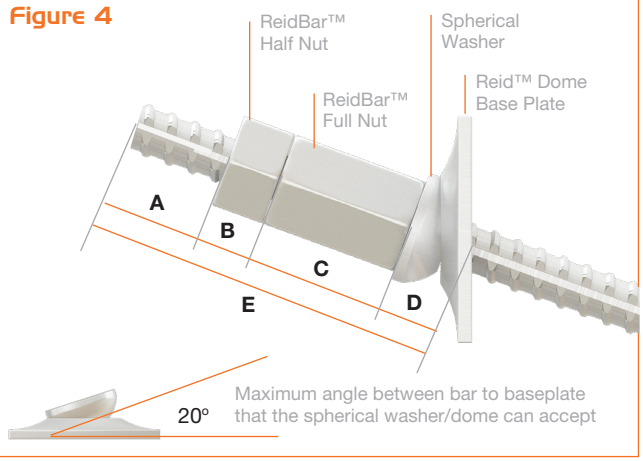
3. Apply Grout

- Apply the required volume of Grout into the hole ensuring the grout delivery tube is inserted to the bottom of the hole with the ReidBar.

4. Assemble End Hardware (Base Plate, Spherical Washer and Nut)

- If the Reidbar™ is not perpendicular to the bearing face a special bearer plate and spherical washer is used. This arrangement will accommodate inclination up to 20°.
- See Figure 4.
- A bearer plate is not required when the Flange Nut bears directly onto concrete with a compressive strength greater than 25MPa.
- A bearer plate must be used when bearing onto low strength concrete, timber, natural soil or rock.

Figure 4



5. Apply Pre-stress Load (for active anchors only – not required for passive anchors)

- For active anchors a pre-stress or clamping load can be applied to the anchor once the grout has cured. Curing time varies according to temperature and type of grout (please refer to grout manufacture's tech data sheet for detail). .Pre-stress is applied with a hydraulic jack, torque wrench or air wrench. For frequently asked questions please refer to Appendix B.
- Tension/torque relationships for ReidBar™ Anchors are not consistent due to the wide range of variables.
- Where tensions must be preset use a calibrated jack.

Min. Extension Length of Bar Required

Product Code	1xd_b (A) mm	Half Nut (B) mm	Full Nut (C) mm	Spherical Washer + Base Plate (D) mm	TOTAL (E) mm
RBA16	16	24	45	28	113
RB20	20	28	50	28	126
RB25	25	36	65	40	166
RB32	32	44	82	40	198

Specification & Working Loads

Table I – Mechanical properties and working loads of grade 500 ReidBar™

Product Code	Grade	Char Yield Stress Mpa	Char Min Yield Strength (kN)	Char Min Ult Strength (kN)	Char Min Shear .62 min Ult (kN)	Max Tensile Working Load (kN)*
RBA16	500E	500	100.6	115.6	71.7	70
RB20	500E	500	157.0	180.6	112.0	109
RB25	500E	500	245.5	282.3	175.0	171
RB32	500E	500	402.0	462.3	286.6	281

*Nominal weight given as 60% of minimum ultimate breaking strength.

Ground Anchorage with Cement Grout

Rock Anchors

Rock anchors have traditionally been grouted with cement grouts. The ultimate strength of an anchor in sound competent rock is dependent on many factors. Among the more important of these is the unit bond stress capacity of the rock/grout interface, the unit bond stress capacity of the bar/grout interface, the length of the anchor and the consequences of failure.

The capacity of the cement grout to both bond to and protect the bar as well as the bond with the substrate is largely dependent on the water cement ratio.

“The bond and shear characteristics of a cement grout are also determined largely by the water cement ratio.

The ideal water cement ratio lies in the range 0.35 to 0.4 (Hyett et al, 1992). Cement grouts above 0.4 will cure with excessive micro porosity and grouts below 0.35 could be difficult to pump and may be susceptible to void forming and incomplete wetting of the strata.

As a practical guide a grout with a cement water ratio 0.35 is described as ‘sticks readily to and hangs from the hand when upturned’ and a ‘0.4 grout readily sticks to the hand but can be shaken free’.

Rock/Grout interface

The rock/grout interface is subject to so many vagaries that the choice of a suitable bond stress value is often difficult.

As a general guide the ultimate bond stress for competent rock can be taken as 10% of uniaxial compressive stress (where the uniaxial compressive strength is above 20Mpa and the bond stress is limited to a max of 4.2 MPa) (after Littlejohn and Bruce 1977).

Test bores will give a a guide to the initial selection but on site proof load tests are always advisable. The ability of rock to adequately confine the grout column reduces as the anchor length decreases below 1 metre (after Morris and Sharp 1973). We suggest that the bond strength of the first 600mm of the hole depth be ignored unless massive unfractured rock is at the surface.

Note that with the exception of rockbolts secured into fully competent rock, the fixed anchor length should not be less than 3 metres.

For information on corrosion protection refer to Appendix A

Specification & Working Loads (cont'd)

Table 2 – Ultimate strength of ReidBar™ in cement grouted holes (typically 20 MPa min)

Material	Ultimate Bond N/mm²	Ultimate Strength in kN per metre for nominated hole dia.				
		65 mm	75 mm	90 mm	100 mm	150 mm
Soft Shale	0.21 - 0.83	42 - 169	49 - 195	59 - 234	65 – 260	98 - 391
Sandstone	0.83 - 1.73	169 - 350	195 – 407	234 - 486	260 - 543	391 - 562
Slate & Hard Shale	0.86 - 1.38	175 - 281	202 - 325	243 - 390	270 - 433	405 - 562
Soft Limestone	1.0 - 1.52	204 - 310	235 - 358	282 - 429	314 - 477	471 - 562
Granite & Basalt	1.72 - 3.10	351 – 562	405 - 562	486 - 562	540 - 562	562 - 562
Concrete	1.38 - 2.76	281 - 562	325 - 562	390 - 562	433 - 562	562 – 562

Note 1: For working loads apply a factor of safety of at least 2.5 to these ultimate loads. The bond developed by added length of embedment may not be proportional to the additional length. The load transfer mechansism between grout and fissured rock is much less certain and it is advisable to consolidate and seal the cracked rock by pregrouting before installation of the anchor.

Note 2: Bond stresses after Littlejohn and Bruce 1977, Table B.2 BS 8081 2015 (formerly in Table 25 BS 8081 1989)

Non-shrink Grouts

For sites with limited or very restricted access, shrinkage compensated, cement-based grout is available.

Non shrink grout is available from various suppliers such as Ramset Premier Grout RPMG (supplied in 20kg bag) or SikaGrout 212 NZ (supplied in 25 kg bag) and ready for the addition of water on site. When these types of grouts are used in accordance with the instructions, they will achieve a 28 day compressive strength of 65MPa minimum.

Soil Anchors

Tables 3 and 5 give guide values for the load transfer capacity of various broad classification of non-cohesive and cohesive soils with cement grout. A test anchor should be made to reliably determine the load capacity.

The following information is provided for guidance only. A geotechnical engineer should be consulted to determine the appropriate design requirements.

When high strength non shrink grouts are used the ultimate loads will be in the upper range of the figures given in table 2 because of the superior bond strength likely to be provided whereas they will be in the lower range when using normal grout.

Specification & Working Loads (cont'd)

Table 3 – Working bond strengths between cohesive soils and cement grout

Soil Types	Condition	Bond Strength MPa
Sandy gravels	Very dense	0.38
	Dense	0.30
	Medium dense	0.20
Medium coarse sands with gravel	Very dense	0.25
	Dense	0.20
	Medium dense	0.17
Fine to medium sands	Dense	0.19
	Medium dense	0.11

Table 4 – Anchorage with non-shrink grout – hole diameters & accessories

Product Code	Max Bar OD	Recommended Min. Hole Dia*	Base Plate Part #	Dome Washer Part #	ReidBar Half Nut Part #	ReidBar Full Nut Part #
RBA16	18.4	25	**BPLATE20100G**	**RB20SWG**	**RBA16NHG**	**RBA16NG**
RB20	22.5	28	**BPLATE20100G**	**RB20SWG**	**RB20NHG**	**RB20NG**
RB25	28.6	35	**BPLATE32150G**	**RB32SWG**	**RB25NHG**	**RB25NG**
RB32	35.9	42	**BPLATE32150G**	**RB32SWG**	**RB32NHG**	**RB32NG**

* If ReidBar Couplers are required to extend the anchor length, the hole diameter will need to increase proportionally. Please contact a Reid Engineer for advice.

Table 5 – Working adhesive strengths between cohesive soils and cement grout

	Field Test	Unconfined compressive strength (qu) (kPa)	Typical and undrained shear strength (Cu) (kPa)	Working strength adhesion short term (kPa) *	Working strength adhesion long term (kPa) **
Very soft	Excudes between fingers when squeezed in fist	10	5	1	2
Soft	Easily penetrated by thumb	18	9	2	4
Medium Strength	Difficult to penetrate with thumb	40	20	4	8
Firm	Easily indented with thumb nail	75	27	7	14
Stiff	Readily indented with thumb nail	150	75	15	30
Hard	Difficult to indent with thumb nail	300	150	30	60

* Working strength short term based on 0.5Cu/2.5 as the drilling operation causes temporary remoulding of the clay at the edge of the bore hole.
** Working strength long term based on Cu/2.5

Corrosion Protection

Corrosion Protection alternatives for ReidBar™ and their likely performance.

Hot Dip Galvanising

ReidBar™ and ReidBar™ fittings are galvanised to meet the requirements of AS/NZS 4680:2006 with the nominal coating mass on ReidBar™ being 600g/m2. This equates to a minimum average zinc coating thickness of 0.085mm (85 microns). To remove excess zinc, ReidBar™ fittings are spun in a centrifuge after galvanising and the resulting nominal coating thickness will be around 0.04~0.06mm.

Since zinc coatings protect the steel by the sacrificial erosion of itself, the protective life of a metallic zinc coating is roughly proportional to the mass of zinc per unit of surface area. This is regardless of the method of application.

The Galvanizers Association of Australia handbook gives the anticipated life of 600 g/m2 of hot dipped coating at 50 years in a mild coastal environment and 25 years in a marine environment.

Some environment limitations are noted as follows:

- Galvanising will give minimal protection for pH values less than 6.5 to 7.0. Unprotected galvanised systems should not be used with acid solutions below pH 6.0 or alkaline solutions above pH 12.5
- Additional protection is required when galvanised steel is in contact with chemically treated timber.
- Cement grouts or concrete provide an environment where the pH is typically 9.5 to 13.5 in which a passive film forms on the steel that protects it from corrosion. However the loss of this protective alkalinity around the steel, or the presence of aggressive ions, notably chloride, in the grout or concrete, can lead to corrosion.
- Hot Dip Galvanising will have no significant effect on the development length of reinforcing bars.

Surface Coatings

Surface coatings that are designed to resist corrosion simply enclose the metal component in an impervious barrier to exclude the corrosion causing elements. An effective coating needs toughness to resist abrasion and mechanical damage, proper substrate adhesion to resist corrosion migration at damage sites and be chemically inert.

An extremely effective method of providing this impervious barrier is coating the metal component with fusion bonded epoxy. In this process finely ground, fully cured epoxy powder, is applied to the hot surface of a clean grit blasted metal component. The residual heat of the component melts and fuses the epoxy powder to the component. The cured epoxy coating is flexible, abrasion resistant and almost impossible to remove.

The corrosion protection performance of fusion-bonded epoxy is further enhanced by pre coating the bar or fitting with a zinc rich fusion bonded epoxy.

ReidBar™ and ReidBar™ components can be coated with either fusion-bonded epoxy applied directly to the metal or first coated with the zinc rich fusion bonded epoxy and then over coated with fusion bonded epoxy.

The epoxy coating systems most commonly used with the ReidBar™ system are Dulux ‘Black Beauty’ & Dulux ‘Zinc Shield’. The most common methodology adopted for these products, is the application of ‘Black Beauty’ over Hot-Dip Galvanised componentry, resulting in a ‘double corrosion’ protection coating to the system. Please contact your local Reid Representative for further details regarding these applications. Both the epoxy powder and the application and testing procedures meet the requirements of ASTM A775/A775M-97.

Epoxy coatings will reduce the effective bonding of reinforcing bars in concrete. For the additional development length required, typically 1.2Ld to 1.5Ld , the designer should refer to the appropriate design literature.

Note: ReidBar™ threaded components will require a thread reaming process to be carried out following application of corrosion protection surface coating. This will ensure smooth thread compatibility between fittings.Please contact your local Reid Representative who will assist with this procedure, and arrange the necessary steps at the time of order placement.

Corrosion Protection (cont'd)

Corrosion Protection alternatives for ReidBar™ and their likely performance.

Measuring the effectiveness of a corrosion protection system

The accurate simulation of actual long term performance on site during testing is virtually impossible. However a series of accelerated corrosion tests have been undertaken to provide a comparison of the relative performance of hot dip galvanising and fusion bonded epoxy.

The tests show that in the accelerated corrosion environment fusion bonded epoxy continues to provide corrosion protection for at least 20 times longer than a hot dipped galvanised surface.

These tests were carried out in a Q-Fog Cyclic Corrosion Tester (salt spray cabinet) in accordance with the test method ASTM B 1173.

The fusion bonded epoxy top coat was applied over a zinc rich fusion bonded epoxy base coat to give a combined total coating thickness of 270 microns. This coating system provided corrosion protection for at least 10,000 hours.

The hot dipped galvanised surface showed serious distress at 350 hours and was completely destroyed at 500 hours.

The tests showed that the difference in corrosion resistance between the fusion bonded epoxy only coating and the zinc rich plus fusion bonded epoxy coating was only apparent after 5000 hours. At this time small blisters of 0.5mm diameter started showing on the bar surface but still no rusting.

Fusion bonded epoxy's are affected by ultraviolet radiation. Where part of an embedded bar is required to remain exposed some powdering may become evident.

The ultraviolet light in normal sunlight will degrade Fusion Bonded Epoxy coatings at approximately 2 microns per year.

Where Fusion Bonded Epoxy coatings are required to remain exposed to sunlight throughout a long working life then they should be overcoated with a 2 pack polyurethane paint system approximately 60 microns thick.

Due to the coating flexibility straining of up to 75% of the bar yield will not crack the epoxy coating. At these high loads there may be some damage to the coating surfaces within the nut.

References

1. Australian Tunneling Conference, Sydney Australia, August 1997

2. After Fabrication Hot Dip Galvanising, Galvanizing Association of New Zealand

3. Orica Powder Coatings lab report # 0096 of 18 March 2002

4. BS 8081:1989 British Standard Code of Practice for Ground Anchorages

5. A.S.T.M. Atmospheric Corrosion data Table 3.40

Appendix A

Frequently Asked Questions

Q - How far into the Coupler must the bar be threaded?

A - Tests show that to achieve the ultimate strength of the connection the thread engagement must be at least 80% of the maximum thread depth available in the fitting. Correct bar insertion is critical to the performance of the ReidBar™ system and it is recommended that good practice requires the user to mark the bar at half coupler length back from the inserted end so that a visual check is available.

Q - Is tightening torque critical in the performance of ReidBar™ components?

A - Provided the bar is screwed tightly against the centre stop, or fully through the component, whichever is appropriate, the full breaking strength of the bar will be developed. Reid™ recommends using a wrench with a minimum length of 300mm to ensure the bar is fully engaged.

Q - How is the correct preload applied?

A - We have established that a more accurate measure is to run the nut against the coupler by hand then rotate the nut a further fixed amount. RBA16N: 100 degrees after hand tight. RB20N: 70 degrees after hand tight. RB25N: 60 degrees after hand tight. RB32N: 30 degrees after hand tight.

Q - How hard is it to apply the preload?

A - In the larger sizes the correct preload requires the use of a very large spanner up to 1.5 metres long with very stiff jaws, otherwise the corners of the nut will be turned and torque will be insufficient. A 48” crescent spanner with a length of pipe is a good tool for this application, however, you will also need a good strong vice bolted to the floor to hold the coupler. If you are applying these sorts of loads to a coupler in a precast element you need have sufficient concrete strength to resist the torque.

Q - What is the best way of cutting ReidBar™ before joining?

A - It is preferable to cut ReidBar™ with an abrasive cut-off wheel or cut-off saw as sheared or cropped ends usually present problems. Poorly maintained equipment will leave a misshaped core diameter and excessive burr on the bar end making more difficult to thread on nuts and couplers.

Q - What end treatment is required before coupling?

A - If difficulty is encountered because of burring or distortion of the end during cutting or shearing then a light dressing with an angle grinder to remove the damage is all that is required.

Q - What type of nuts should I use and when?

A - A1. For most splicing and anchoring applications the primary fittings (couplers, inserts and grout sleeves) may be used without additional nuts.

A2. Nuts are used for all designs where the nut is required to develop the full breaking strength of the bar e.g. terminations for rock bolts, ground anchors, hold down bolts, tensioning applications, etc.

Appendix A (cont'd)

Q - What testing has been done for ReidBar™?

A - During the development of ReidBar™ and like products, extensive tests were conducted by Reid™. These tests include cyclic tension load tests, pullout tests to check embedment anchorage and slip tests. The system's quality is continually monitored by Reid™, along with the steel mills and fitting manufacturers, using accredited testing laboratories in an ongoing program of quality assurance and development while specific research programs continue to be undertaken.

Contact Reid™ for copies of tests concerning specific applications for your project

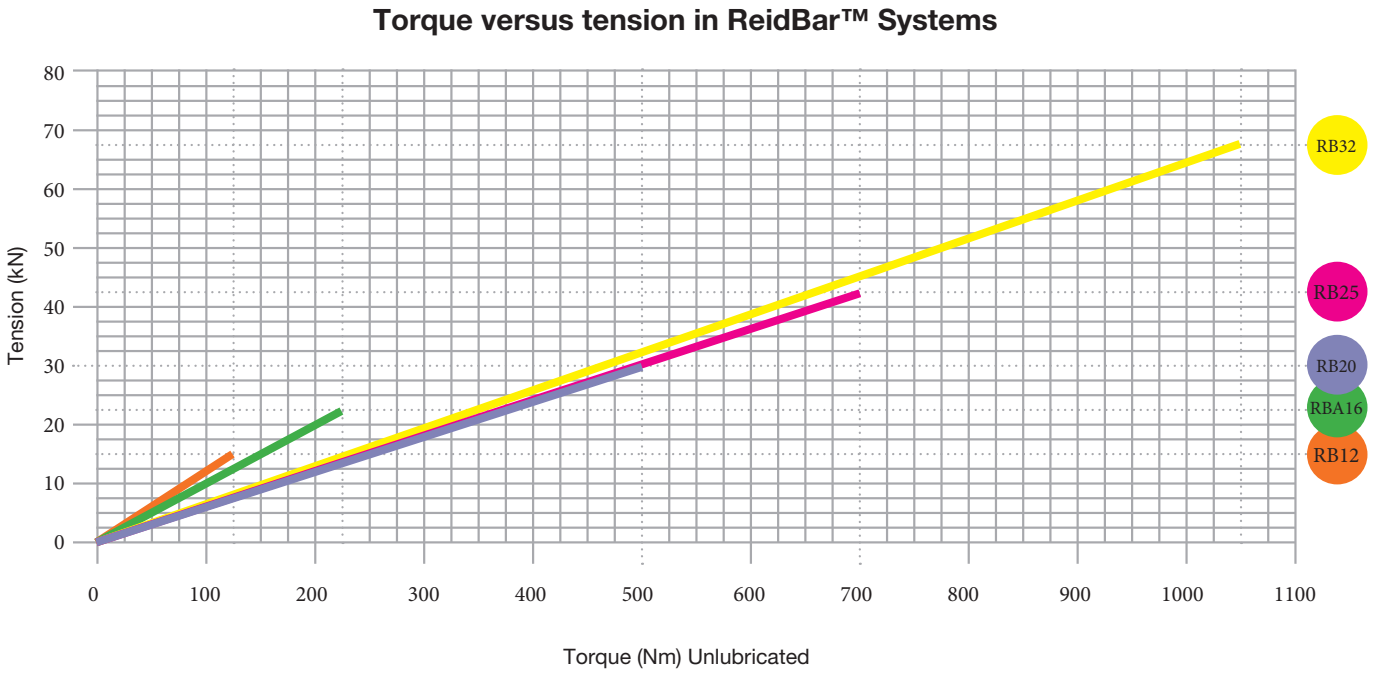
Q - Can I weld cast ReidBar™ fittings?

A - Steel ReidBar components are able to be welded to achieve a full structural connection. This process must be undertaken by a fully qualified & certified 4140 Grade Steel Welder in full accordance with AS/NZS 1554.3:2008.

Although cast SG Iron fittings can be welded using specialised techniques, it is not a recommended practice as it will degrade the strength and ductility of the fitting and it will no longer meet the performance characteristics stated in this manual. If you have further questions regarding welding, please contact Reid™ for additional clarification.

Q - what is the relationship between torque applied to the nut and tension induced in the bar?

A - The relationship of Torque versus tension in ReidBar™ systems is reasonably linear up to about 25% of the bar yield strength. Refer to the following graph.



Increased torque above these values may not relate to increased tension.

Customer Service

Reid™ Australia

Tel: 1300 780 250
Email: sales@itwcsanz.com
Web: www.reid.com.au

Reid™ New Zealand

Tel: 0800 88 22 12
Email: sales@ramsetreid.co.nz
Web: www.reids.co.nz

Reid™
AUS: 1 Ramset Drive, Chirnside Park, Victoria, Australia, 3116
NZ: 23-29 Poland Road, Glenfield, Auckland 0632