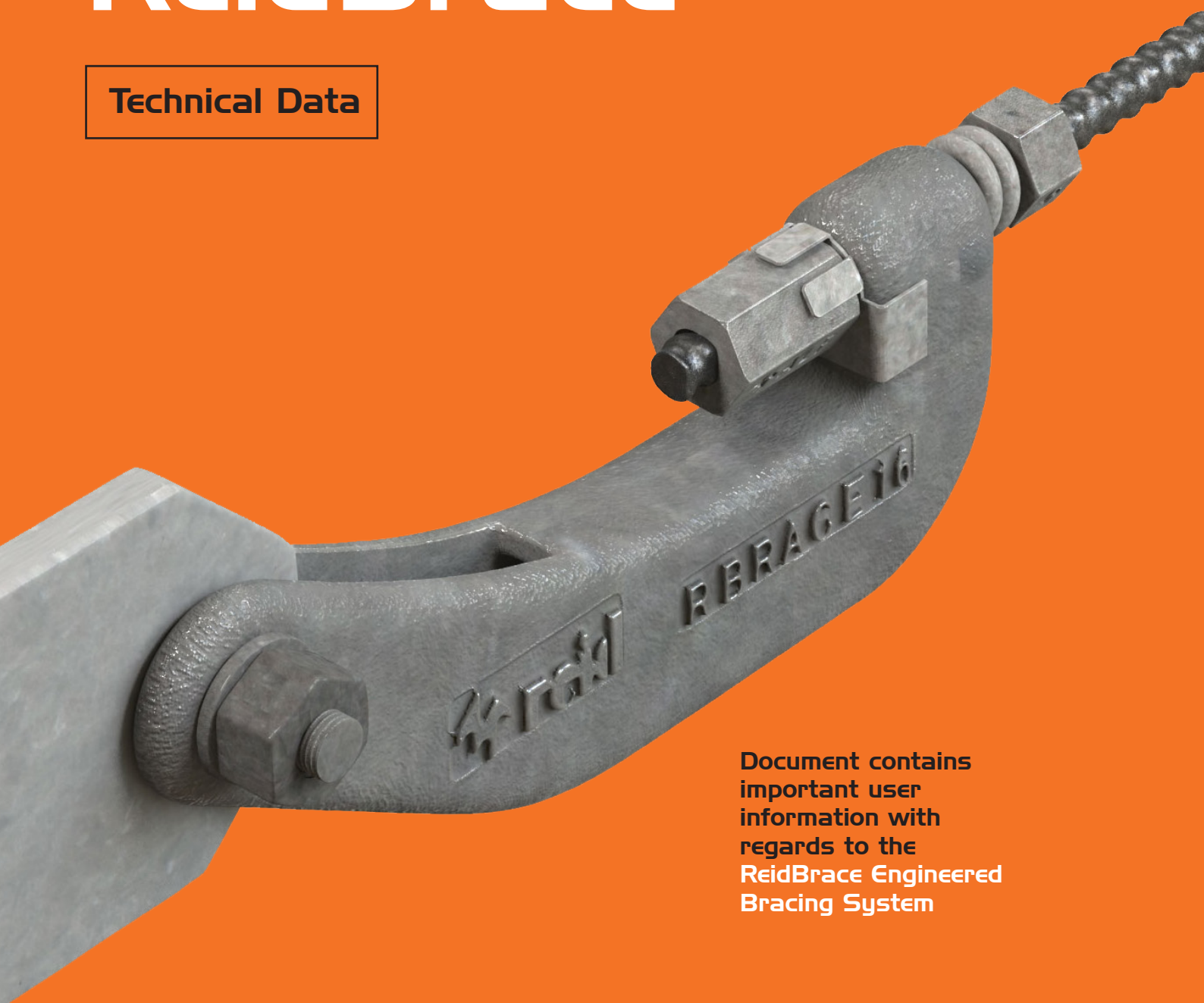


ReidBraceTM

Technical Data



Document contains
important user
information with
regards to the
ReidBrace Engineered
Bracing System

ReidBrace Engineered Bracing System

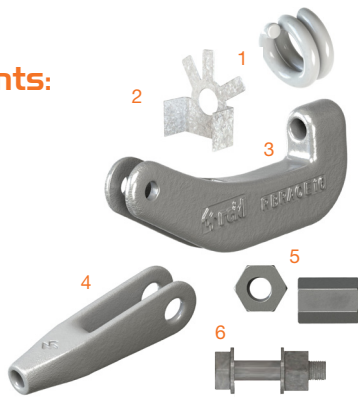


ReidBrace is an off the shelf, out of the box system that provides design engineers and constructors with an economic solution for tension bracing of structures, tie-back applications, retrofits and temporary works bracing.

ReidBrace utilises ReidBar, a user friendly continuously threaded 500 grade reinforcing bar as the tension member. ReidBrace is a unique system that is as easy as screwing on a thread to install, minimising fabrication time.

ReidBrace Boxed Set contents:

1. Reid Tension Spring
2. Reid Tab Washer
3. RBRACE
4. RBRACE-END
5. Half Nut & Full Nut
6. 8.8 Grade Bolt, Nut & Washers Set (x2)



ReidBrace Boxed Set kit Codes

Bar Size	Finish*	Kit Code
12mm	Galvanised	RBRACE12-SET(B)
16mm	Galvanised	RBRACE16-SET(B)
20mm	Galvanised	RBRACE20-SET(B)
25mm	Galvanised	RBRACE25-SET(B)
32mm	Galvanised	RBRACE32-SET(B)

*Nyloc nut for the ReidBrace Bolt is mechanically zinc plated

Typical Applications



Tension Bracing



Temporary Bracing



Wall Panel Tie-back



Retrofit seismic strengthening

Features & Benefits

Performance Tested

- The ReidBrace System was tested in accordance with AS/NZS 1170.0 Appendices A and B, involving: **Monotonic Tensile Testing. Impact tensile testing from -10°C. Cyclic testing of the ReidBrace assembly.**

Simple to Design

- No welding nor custom design of bracing element. Furthermore, ramsetreid provides recommendations on steel cleat connection design.

Quality assured products

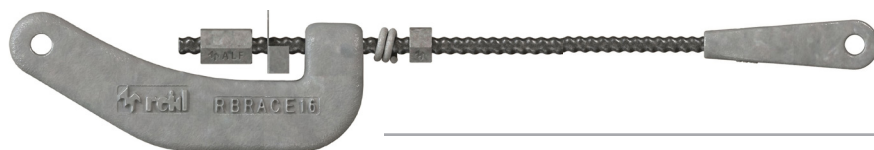
- ReidBrace's banana fittings, end fittings and nuts are manufactured to ReidBrace's banana fittings, end fittings and nuts are manufactured to ASTM A536 Grade 100-70-03 / ISO 1083 by ISO 9001 accredited manufacturer. Furthermore, for each shipment, ReidBrace load bearing components are tensile tested to destruction at ramsetreid facility.

Trusted ReidBar Tension Rod

- ReidBrace utilises the ductile 500E ReidBar reinforcing rod. Widely recognised and readily available in the market, ReidBar is locally manufactured by the ACRS certified Pacific Steel NZ to AS/NZS4671.

Ease of Installation

- ReidBrace comes off the shelf in boxed sets, complete with step by step installation procedure.



Design Data ReidBrace

Structural Displacement Ductility Factor (μ)

Structural Category (NZS 3404 12.2.3) and maximum Structural Displacement Ductility Factor for design:

Diameter	S. Cat. 4 max μ_{des}	S. Cat. 3 max μ_{des}	S. Cat. 2 max μ_{des}^*	S. Cat. 1 max μ_{des}^*
12mm	1	1.25	3	6
16mm	1	1.25	3	5
20mm	1	1.25	3	5
25mm	1	1.25	---	---

Design loads in kN – (incl Strength Reduction Factor $\phi = 0.9$)

Diameter	Design Load
12mm	63kN
16mm	112kN
20mm	180kN
25mm	255kN

*Please consider the behaviour of the overall structure when using higher ductility values.

Overstrength Factor

Overstrength loads have been determined following the principles of NZS3404, based on the experimental testing undertaken. The overstrength is to be resisted by the design capacity of secondary elements of the steel system, in a capacity designed system.

	S. Cat. 4 max μ_{des}	S. Cat. 3 max μ_{des}	S. Cat. 2 max μ_{des}	S. Cat. 1 max μ_{des}
Overstrength factor	1	1.15	1.43	1.43

Equivalent Elastic Modulus

Diameter	Equivalent elastic modulus
12mm	160,000MPa
16mm	145,000MPa
20mm	140,000MPa
25mm	135,000MPa

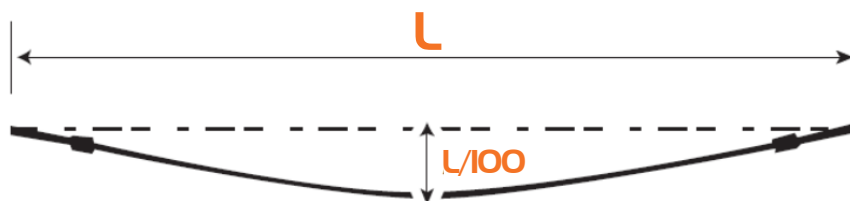
Test data has shown that the stiffness of the ReidBrace System is different from the theoretical Young's Modulus of steel; in order to obtain more realistic results from the FEM model, it is recommended to adopt the proposed Equivalent Elastic Modulus.

32mm ReidBrace

32mm was not included in the test program, due to machine capabilities in the testing facility, therefore, 32mm ReidBrace should be designed elastically ($\mu = 1$). ReidBrace 32mm components exceed the minimum yield of 32mm ReidBar.

Preloading Bracing System

Tension on structural bracing span should meet $L/100$ sag criteria.



Ref:

HERA report R4-80 section 3.3.2
Woolcock, S T and Kitipornchai, S;
Tension Members and Self-Weight; Steel
Construction, Vol. 19, No. 1, May 1985,
Australian Institute of Steel Construction.

Ply in Bearing Design Recommendations

The following are ply in bearing design capacities derived in conjunction with Associate Professor Charles Clifton based upon the University of Auckland testing programme. Numerous plate thicknesses and steel grades were considered to provide Design Engineers with options.

Refer to Charles Clifton letter summarising the testing performed at the University of Auckland.

Legend:

N_{des}	= ReidBrace Design Loads
ϕ	= Strength Reduction Factor
ϕ_{oms}	= Overstrength Factor
N_{ov}	= ReidBrace Overstrength Loads = $\frac{N_{des}}{\phi} \phi_{oms}$
	= Suitable for structural category 4 ($\mu = 1.0$)
	= Suitable for structural category 3 & 4 ($\mu \leq 1.25$)
	= Suitable for structures of every category

The following tables are based on ϕV_b Ply in Bearing being lower than N_{ov} for the respective structural categories.

12mm ReidBrace

ϕV_b Ply in Bearing (kN)			
Steel Grade	Thickness of cleat plate (mm)		
	10	12	14
G 250	115	138	161
G 300	120	144	169
G 350	126	151	176

16mm ReidBrace

ϕV_b Ply in Bearing (kN)				
Steel Grade	Thickness of cleat plate (mm)			
	10	12	14	15**
G 250	115	138	161	172
G 300	120	144	169	181
G 350	126	151	176	189

*within 5% of N_{ov} for category 1 & 2, Designer to determine acceptability

**non standard plate thicknesses will require welding additional steel plate to increase overall cleat thickness
For hole to cleat edge distances, please refer NZS3404 clauses 9.6.2 & 12.9.4.4



20mm ReidBrace

ϕV_b Ply in Bearing (kN)			
Steel Grade	Thickness of cleat plate (mm)		
	16	18	20
G 250	230	259	287
G 300	241	271	301
G 350	252	284	315

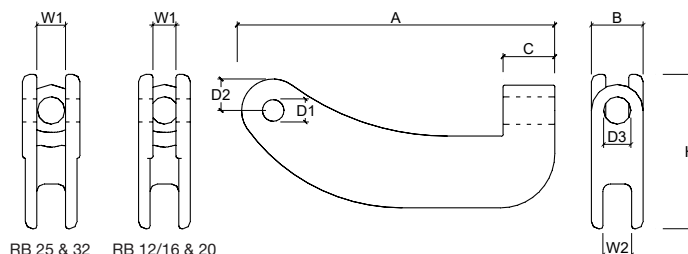
*within 5% of N_{ov} for category 1 & 2, Designer to determine acceptability

25mm ReidBrace

ϕV_b Ply in Bearing (kN)			
Steel Grade	Thickness of cleat plate (mm)		
	20	22	25
G 250	431	474	539
G 300	452	498	566
G 350	473	521	592

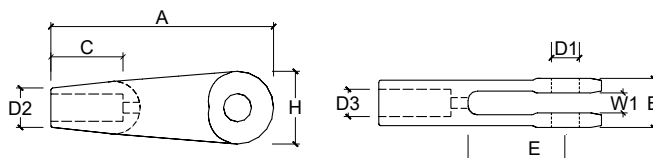
Technical Data

Product Specification - Dimensions Of RBRACE (mm)



RBRACE									
Size	A	B	C	D1	D2	D3	H	W1	W2
12/16	276	36	46	17	25	19	107	16	20
20	345	45	58	21	32	24	134	21	25
25	382	53	73	31	40	29	149	26	29
32	436	68	72	31	44	38	170	36	36

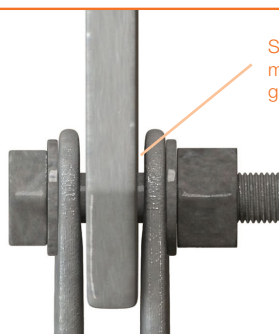
Product Specification - Dimensions Of RBRACE-END (mm)



RBRACE-END									
Size	A	B	C	D1	Bolt	E	H	W1	D3
12	145	32	50	17	16	50	40	16	Bar Diameter
16	160	36	55	17	16	67	50	16	-
20	195	45	60	21	20	88	60	21	-
25	247	50	80	31	30	108	80	26	-
32	265	62	85	31	30	120	88	32	-

Installation Special Cautions:

The ReidBrace must be centralised on the bracket to ensure central loading force.



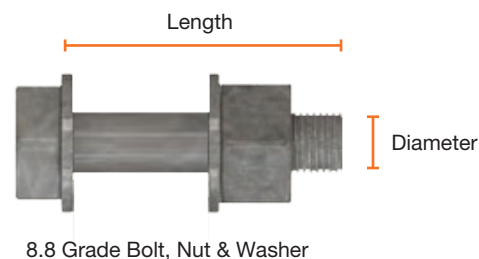
Steel Cleat thickness must only allow 3mm gap on each side max.

Additional notes:

- Service temperature of the ReidBrace system (from NZS3404 & AS4100), should be limited to -5°C using the above information
- This document supersedes any previous publication
- Testing follows the principles of ASNZS1170.0

ReidBrace Bolt sizes (mm)

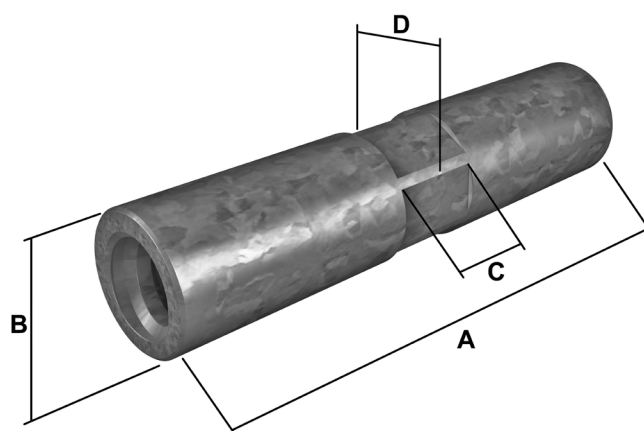
RBRACE Set	Bolt Size (Diameter x Length, mm)
RBRACE12-SET(B) & RBRACE16-SET(B)	16 x 75
RBRACE20-SET(B)	20 x 100
RBRACE25-SET(B)	30 x 120
RBRACE32-SET(B)	30 x 140



For applications requiring coupling system

When ReidBar bracing lengths need to be coupled, Reid Steel couplers need to be used. When using ReidBar Couplers for this application, Epcon C8 will be required only to install the coupler – not the ReidBrace End and the ReidBar Nut

ReidBar Steel Couplers come in sizes to suit 16mm, 20mm, 25mm and 32mm ReidBar with the following dimensions.



Product Code	ReidBar Size	A	B	C	D	Approx. Thread Depth
RB12CSG*	12mm	130mm	32mm	30mm	26mm	50mm
RBA16CSG	16mm	136mm	32mm	30mm	26mm	56mm
RB20CSG	20mm	148mm	35mm	30mm	32mm	59mm
RB25CSG	25mm	193mm	42mm	30mm	38mm	86mm
RB32CSG	32mm	242mm	60mm	30mm	52mm	110mm

*RB12CSG will be available early 2019. In the interim, for longer than usual 12mm bracing elements, upsize to 16mm ReidBrace.

Related documents:

ReidBrace Installation Guidelines

ReidBrace Charles Clifton UoA Testing Letter

Related documents can be found on the Reid website.