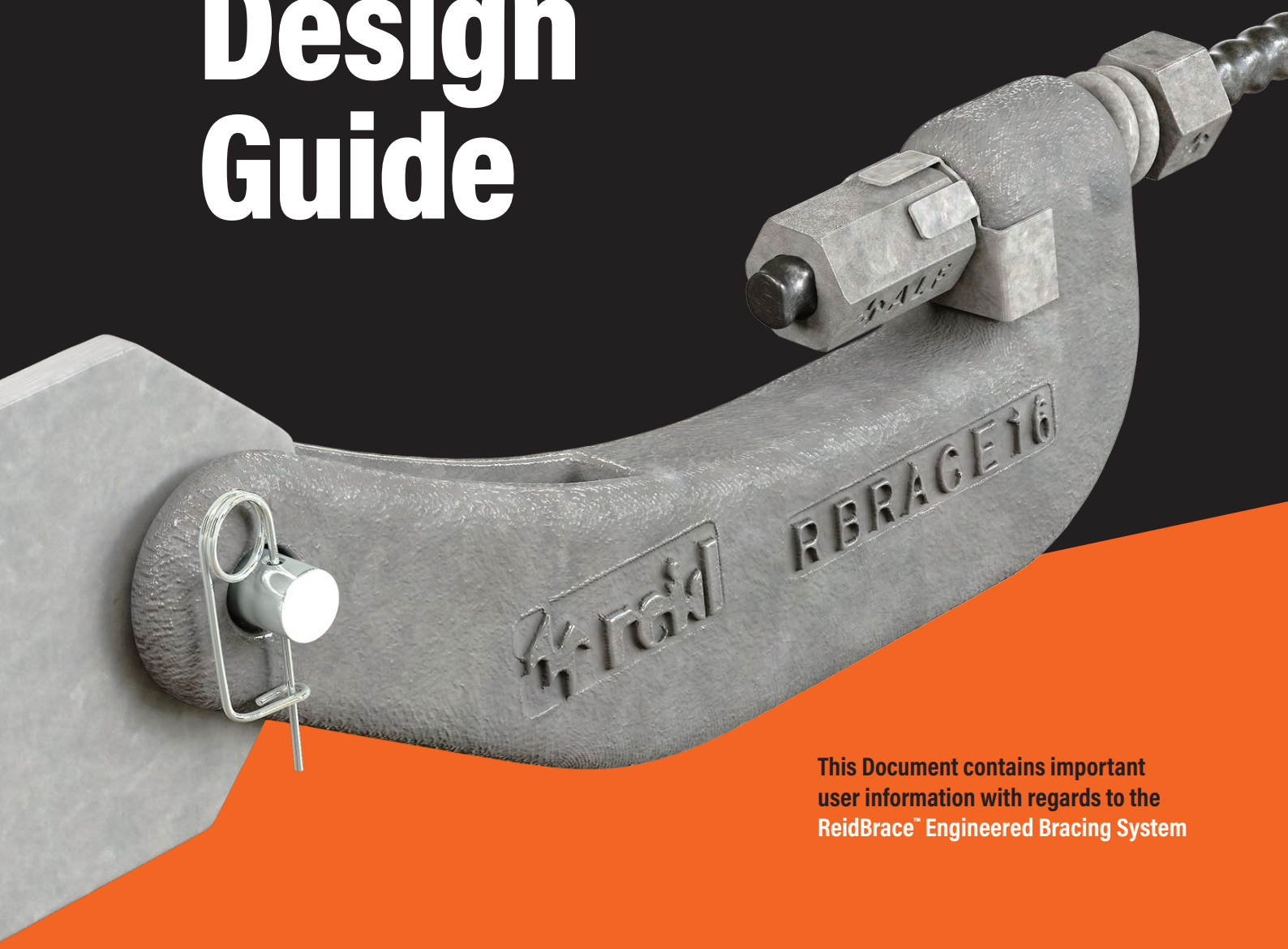
Ramset™

FEBRUARY 2025 - AU ONLY

ReidBrace™ Design Guide



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

For more information on our products call
1300 780 063
or go on www.ramset.com.au

ReidBrace™

Engineered Bracing System

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

ReidBrace™ utilises ReidBar™, a user friendly continuously threaded 500N 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.

Seismic Performance

ReidBrace™ has been tested and validated for Seismic Performance through an extensive test program at the University of Auckland's Structural Test Laboratory, Holmes Solutions Test Laboratory and at the Melbourne Testing Services NATA Accredited Laboratory. The test results have been assessed by Swinburne University providing a recommendation on the most appropriate seismic design parameters.

ReidBrace™

Boxed Set Contents

ReidBrace™ Boxed Set Contents

1. Reid™ Tension Spring
2. Reid™ Tab Washer
3. RBRACE
4. RBRACE-END
5. Full nut & Half nut*
   *full nut may be supplied in lieu of half nut, depending on product availability.
6. Pin and Clip

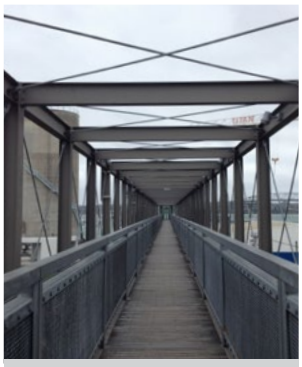
ReidBrace™ Boxed Set Kit Codes

Bar Size	Finish*	Kit Code
12mm	Galvanised	RBRACE12-SET
16mm	Galvanised	RBRACE16-SET
20mm	Galvanised	RBRACE20-SET(A)
25mm	Galvanised	RBRACE25-SET
32mm	Galvanised	RBRACE32-V2SET

Civil / Infrastructure Tie-Backs

Typical Applications

Temporary Work / Platform Bracing



Architectural Structure Bracing

Structural Steel Structure Bracing

Timber Structure Bracing

ReidBrace™

Benefits, Advantages and Features

Ease of Installation

ReidBrace™ is supplied in boxed sets, simple to install complete with a step by step installation procedure.

Performance Tested

ReidBrace™ has been performance tested as a system at the University of Auckland's Structural Test Laboratory, Holmes Solutions Testing Laboratory and Melbourne Testing Services (a NATA Accredited Laboratory).

Simple to Design

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

Quality assured products

ReidBrace™'s banana fittings, end fittings and nuts are manufactured to ASTM A536 Grade 100-70-03 / ISO 1083 Grade 600-3 SG Iron by ISO 9001 accredited manufacturer.

ReidBrace™ load bearing components are tensile tested to destruction at Ramset™ facility.

Trusted ReidBar™ Tension Rod

ReidBrace™ utilises the 500N ReidBar™ reinforcing rod. Widely recognised and readily available in the market, ReidBar™ is locally manufactured by ACRS certified Infrabuild to AS/NZS 4671.

Design Data

Tensile Capacities (ReidBrace™ System) - kN

ϕN_t = Limit State Design of System (Yield Theory) where ϕ =0.9

Size	ReidBar™		ReidBrace™ System (ReidBar™ & Components)			
				Seismic Design Parameters***		
	Min Yield Strength - f_y (kN)	Min Ultimate Strength- f_u (kN)	Design Capacity** (ϕN_t) per brace	Maximum Ductility Factor Max μ_{des}	Structural Performance Factor (S_p)	Test Report Number/Date*
12mm	56.5	61.0	47.0	1.5	0.7	MTS - 21-1064 & UoA - 25/05/18
16mm	100.6	108.5	83.0	1.5	0.7	MTS - 21-1064 & UoA - 25/05/18
20mm	157.0	169.6	130.0	1.5	0.7	MTS - 21-1064 & UoA - 25/05/18
25mm	245.5	265.1	203.0	1.5	0.7	MTS - 21-1064 & UoA - 25/05/18
32mm	402.0	434.2	332.0	1.5	0.7	MTS - 24-1235 & Holmes Solutions -21/10/24

*Note: Tested at University of Auckland (UoA), Melbourne Testing Services (MTS) and Holmes Solutions as per AS 4100:2020 clause 17.5 & ASNZS 1170.0:2002 Appendix B
**Note: The Recommended Design Capacity is derived from nominal section capacity of a tension member as per AS 4100:2020 clause 7.2
***Note: Maximum Ductility Factor and Structural Performance Factor is based on Swinburne University Recommendation dated June 2022 & January 2025

Equivalent Elastic Modulus

New method of determining Equivalent Elastic Modulus as per Holmes testing summary Table 5.

Component	Elastic modulus (MPa) for braces > 4.0m	Elastic modulus (MPa) equation for braces <4m (L^{total} in mm)
ReidBrace 12	160,000	$E_{eq} = \frac{(200{,}000 \times L_{total})}{(1340 + L_{total})}$
ReidBrace 16	145,000	$E_{eq} = \frac{(200{,}000 \times L_{total})}{(2170 + L_{total})}$
ReidBrace 20	140,000	$E_{eq} = \frac{(200{,}000 \times L_{total})}{(2715 + L_{total})}$
ReidBrace 25	135,000	$E_{eq} = \frac{(200{,}000 \times L_{total})}{(2950 + L_{total})}$
ReidBrace 32 V2	155,000	$E_{eq} = \frac{(200{,}000 \times L_{total})}{(1875 + L_{total})}$

Ply in Bearing Design Recommendations

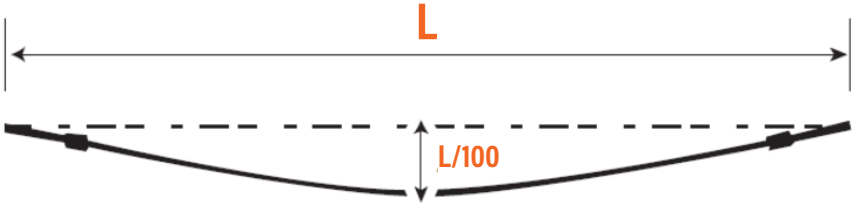
The following ply in bearing dimension recommendations have been derived using the design method outlined in AS 4100:2020 clause 9.2.2.4. The recommended cleat thickness (thickness of ply) and bolt/pin hole edge distance will be applicable for Steel Plate Grades greater or equal to 250 MPa.

To ensure the ductile capacity of the bracing system the minimum yield strength of the steel cleat plate should be 250 MPa and the minimum plate thickness and edge distance for the hole should be as follows.

Reidbar™ size (mm)	12	16	20	25	32
Cleat thickness (mm)	10	10	16	20	30
Edge distance (mm)	32	32	40	60	60

Preloading Bracing System

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

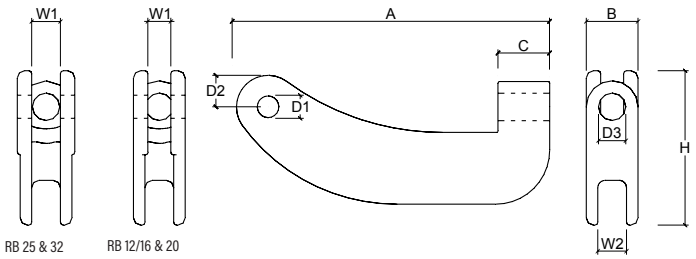


Ref:

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.

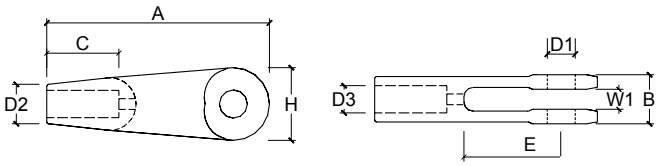
Technical Data

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	434	68	72	31	44	38	170	34	34

Product Specification - Dimensions of RBRACE-END (mm)



RBRACE-END									
Size	A	B	C	D1	Pin	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	282	70	104	31	30	114	91	34	-

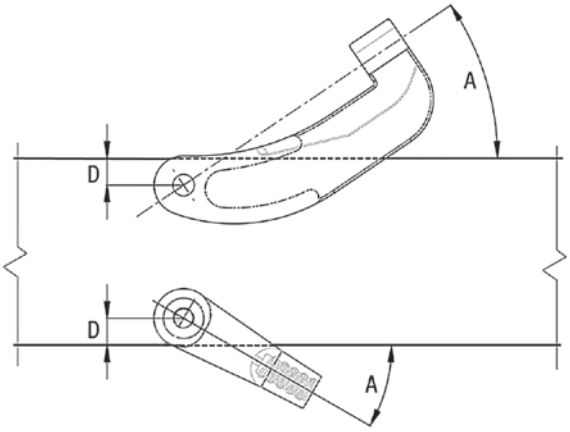
Additional notes:

- Testing follows the principles of AS/NZS 1170.0
- Service temperature of the ReidBrace™ system (from NZS 3404 & AS 4100), should be limited to -5°C using the above information
- 3x 32mm HDG ReidBrace™ pin samples have been Charpy impact tested at 0°C with an average result of 140J
- For detailing of the hole in the cleat, position & tolerance, refer to AS 4100
- This document supersedes any previous publication

ReidBrace™

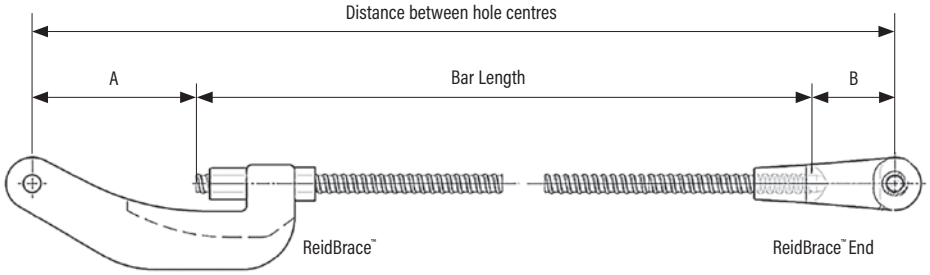
Design Data

Minimum Angle of Bracing to Fixture



Bar Size (mm)	Edge Distance D (mm)	Min angle A°	Brace	End
12	32	48	RBRACE12/16	RBRACE12-END
16	32	48	RBRACE12/16	RBRACE16-END
20	40	36	RBRACE20	RBRACE20-END(A)
25	60	46	RBRACE25	RBRACE25-END
32	60	44	RBRACE32 V2	RBRACE32-V2 END

Bar Length for Bracing Application



ReidBar™ Size	Brace	A+/-5mm	ReidBrace™ End	B+/-5mm	A+B mm
RB12	RBRACE12/16	135	RBRACE12-END	75	210
RBA16	RBRACE12/16	130	RBRACE16-END	80	210
RBA20	RBRACE20	170	RBRACE20-END(A)	105	280
RB25	RBRACE25	175	RBRACE25-END	125	300
RB32	RBRACE32 V2	200	RBRACE32-V2 END	135	335

ReidBrace™

Material Data

ReidBrace™ Pin sizes (mm)

RBRACE Set	Pin Size (Diameter x Length, mm)
RBRACE12-SET & RBRACE16-SET	16 x 50
RBRACE20-SET(A)	20 x 59
RBRACE25-SET	30 x 68
RBRACE32-V2 SET	30 x 83

HDG Pin with SS316 Clip

For applications requiring coupling system

When ReidBar™ bracing lengths need to be coupled, Reid™ couplers need to be used.

Product Code	Description	Outer Diameter (A) (mm)	Length (B) (mm)	Hex A/F (mm)
RB12C	ReidBar™ Coupler for RB12	22	90	25
RBA16C	ReidBar™ Coupler for RBA16	30	102	30
RBA20C	ReidBar™ Coupler for RBA20	33	129	36
RB25C	ReidBar™ Coupler for RB25	43	180	45
RB32C	ReidBar™ Coupler for RB32	55	210	57
RB12CG*	ReidBar™ Coupler for RB12 (Gal)	22	90	25
RBA16CG*	ReidBar™ Coupler for RBA16 (Gal)	30	102	30
RBA20CG*	ReidBar™ Coupler for RBA20 (Gal)	33	129	36
RB25CG*	ReidBar™ Coupler for RB25 (Gal)	43	180	45
RB32CG*	ReidBar™ Coupler for RB32 (Gal)	55	210	57

* lead times applies for Hot Dip Galvanised components

ReidBrace™

Installation Guidelines

Step 1: Checks

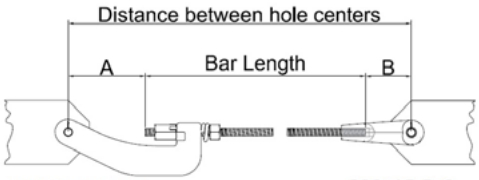
1. Check if all RBRACE components are in the box.
2. Check if the RBRACE fitting flanges will fit onto the steel cleat.

Boxed Set Contents:

1. Reid™ Tension Spring
2. Reid™ Tab Washer
3. RBRACE
4. RBRACE-END
5. Pin and Clip
6. Full nut & Half nut*
   *full nut may be supplied in lieu of half nut, depending on product availability.

Step 2: Measure

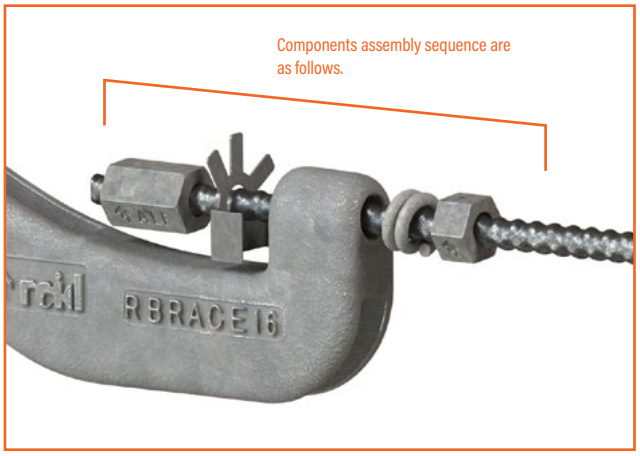
1. Measure the centre to centre distance between the holes on the steel cleat.
2. Subtract the above length by A+B as per the following table. This is the length of ReidBar™ to be cut.



ReidBar™ Size	RBRACE	A ± 5mm	RBRACE__-END	B ± 5mm	A + B (mm)
RB12	RBRACE12/16	135	RBRACE12-END	75	210
RBA16	RBRACE12/16	130	RBRACE16-END	80	210
RBA20	RBRACE20	170	RBRACE20-END(A)	105	280
RB25	RBRACE25	175	RBRACE25-END	125	300
RB32	RBRACE32 V2	200	RBRACE32-V2-END	135	335

Step 3: Assemble

1. Insert ReidBar™ into the RBRACE-END fitting and tighten.
2. Insert ReidBar™ Half Nut into the other side of the bar, followed by inserting the tension spring.
3. Slide the RBRACE Fitting onto the ReidBar™, followed by inserting the tab washer onto the ReidBar™ with the tabs facing the nut.



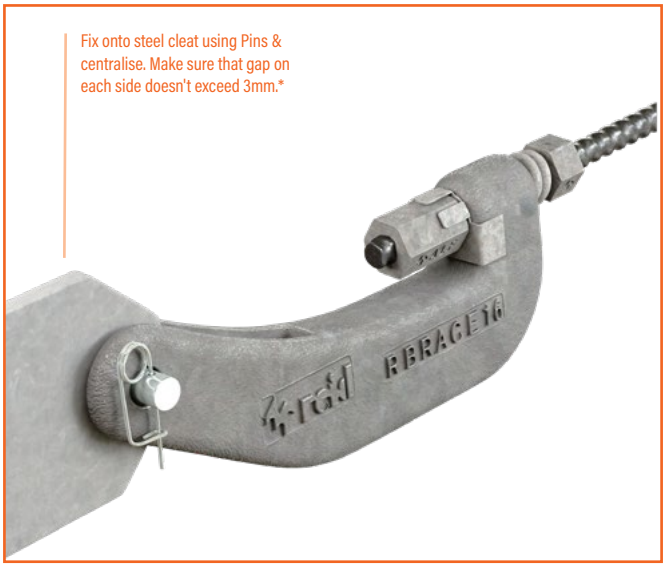
4. Wind ReidBar™ Nut onto the ReidBar™ until it is flush with the end of the ReidBar™. This will give adjustability to the RBRACE fitting upon installation.

ReidBrace™

Installation Guidelines

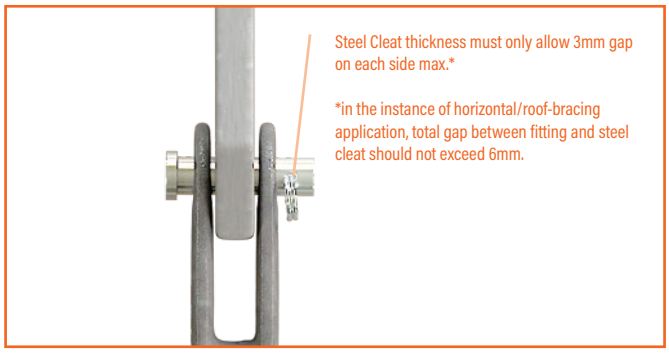
Step 4: Install

1. Lift the ReidBrace™ assembly into location.
2. Fix the RBRACE-END fitting onto the steel cleat using the pin supplied in the box set. Clip through hole in pin.

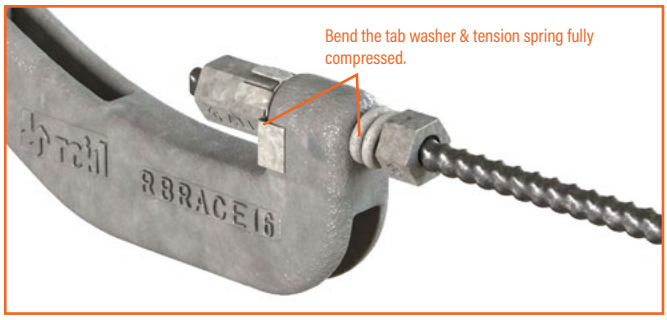


3. Place necessary means to prop the ReidBrace™ assembly so that the sag of the brace is not excessive. A sag of 1 in 100 is recommended as a maximum deflection (refer to HERA: Seismic Design of Steel Structures).
4. Fix the RBRACE fitting onto the steel cleat using the pin supplied in the box set. Fix clip through hole in pin.
5. Adjust the positions of the nuts so that the 1 in 100 maximum deflection criteria is met.
6. Tighten the Nut to fully compress the tension spring. Fold the tab washers onto the ReidBar™ Nut.

Step 5: Check



1. ReidBar™ is tightly fastened into the RBRACE-END fitting.
2. The deflection of the brace shall not exceed 1 in 100 of the brace length.



3. Tension spring is fully compressed.
4. Ensure that the sequence of the ReidBar™ Full Nut and Half Nut is as shown as the above image, and not the wrong way around.
5. Tab washer is folded onto the ReidBar™ Nut.
6. Supplied Pins and Clips are securely fixed to steel.
7. Steel cleat thickness must only allow 3mm gap each side of the ReidBrace™ fitting (or total maximum of 6mm in the case of horizontal/roof-bracing).

*Cyclic testing of ReidBrace™ has been carried out simulating horizontal/ roof-bracing application. Therefore in the instance of horizontal/roof- bracing application, it is acceptable for the ReidBrace™ Fitting to sit flush against the steel fixture, as long as the total gap doesn't exceed 6mm.

Design Tools

Ramset™ provides assistance for Engineers to choose a suitable anchoring solution which meets a project specific set of design inputs such as:

- Design tools for considering complex anchor layouts & calculating performance in grouped anchor configurations.
- Tailored outcomes to suit project specific anchoring and performance criteria.
- The latest design technology and performance calculation tools are available in hard copy or electronic format.

Specifiers Resource Book

This concise and systematically presented book contains the information most useful to Specifiers, Engineers and Architects when selecting the concrete anchoring solution that best suits their project. Selection of a concrete anchoring product is made on the basis of the basic type of fixing (bolt, stud or internally threaded), macro environment, (e.g. coastal or inland), micro environment (particular chemicals) and of course the capacity that best meets the design load case.

Scan for more information

Ramset™ iExpert™

- iExpert™ is our online anchoring design tool, which allows Engineers and design professional to work out the best product solutions for an application in line with AUS/NZ Standards.
- Featuring a simple 6 step design process, iExpert™ then provides a design report document once all the parameters have been assigned.
- Applications
- Cracked and uncracked concrete
- Seismic
- Fire

Scan for more information

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